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INNOVATION LAB**

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Feed the Future Innovation Lab for Collaborative Research on Horticulture

Request for Proposals

Research on Appropriate Postharvest Handling, Processing, and Marketing of Dried Apricots in Tajikistan

Horticulture Innovation Lab

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Timeline:

- Request for proposals: July 11, 2016
- Proposals due to the Horticulture Innovation Lab via email (horticulture@ucdavis.edu): September 12, 2016
- Review of proposals: September 13-27, 2016
- Notification of funding: October 14, 2016
- Projects begin: January 1, 2017

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Abstract of Request

In collaboration with USAID/Tajikistan, the Horticulture Innovation Lab is seeking research proposals on appropriate postharvest handling, processing, and marketing of dried apricots. Research findings should be applicable to, and easily implemented by, smallholder farmers and the USAID-funded projects that support them in southern Tajikistan. The selected research project will be funded for up to \$150,000 a year for up to 2 years, for a maximum total of \$300,000.

The production of apricots and other stone fruits for both the fresh market and for processing is an important component of agriculture in Tajikistan. The majority of apricot production occurs in the northern province of Sughd, where agricultural systems are, in general, more advanced. In 2015, a severe frost in the north caused processors in that region to develop new partnerships with apricot producers in southern Tajikistan, including Khatlon Province, where the Feed the Future Tajikistan Zone of Influence (ZOI) is located. These new partnerships demonstrated the potential for production in the south to make the Tajik apricot industry more resilient and to further supply a growing demand for dried apricots abroad.

Russia is the world's largest importer of dried fruit, and currently, over 80% of dried apricots produced in Tajikistan are exported to Russia. The Russian market continues to demand products of higher quality which places increasing pressure on Tajik producers to meet these demands or risk losing their share of the export market. If quality standards can be met, there is potential that producers could expand their export markets within Russia and eventually into Europe. A market analysis, with an emphasis on opportunities for southern producers, will be essential in helping to achieve this.

Khatlon has seen a significant increase in the number of orchards in recent years. Because of its potential to increase incomes and improve nutrition, USAID chose orchard crops (with a focus on apricots) as one of Feed the Future Tajikistan's target value chains. As the number of orchards increases, southern producers are beginning to apply existing technologies used in northern Tajikistan and in other countries. Often, such technologies are applied without proper testing and are thus not well adapted to local conditions. As a consequence, farmers do not achieve maximum harvest potential and often do not produce varieties with the desired characteristics for marketing further down the value chain – particularly in fruit drying. Quality research is needed to determine the most appropriate technologies and practices for these new apricot farmers.

Currently, there are several ongoing Feed the Future activities working in this sector. The Feed the Future Tajikistan Agriculture and Water Activity is working with apricot farmers and private sector entities in the ZOI on a variety of interventions including modern pruning techniques; soil testing to assess fertilizer needs; post-harvest handling, processing and storage; and the development of demonstration plots and nurseries. Across these interventions, Feed the Future Tajikistan Agriculture and Water Activity utilizes international experts through the John Ogonowski and Doug Bereuter Farmer-to-Farmer Program. The Feed the Future Tajikistan Agriculture and Water Activity will also work with local universities and private sector entities to further develop agricultural extension and advisory services for apricot farmers in Tajikistan. Finally, as a crop rich in vitamin A and other nutrients, the Feed the Future Health and Nutrition Activity is promoting household consumption of apricots and apricot products.

Through our existing programs, Feed the Future Tajikistan has put in place a strong team to assist the growing number of orchard farmers in the ZOI. However, the current team lacks a research component to provide evidence-based recommendations for our growers and processors. The Horticulture Innovation Lab is looking for research project proposals from a U.S.-Tajik research team to help fill this space. The research team will work closely with existing USAID Tajikistan Feed the Future activities to determine the most appropriate technologies and practices for our stakeholders by addressing the following research objectives:

1. The research team will conduct a market analysis that identifies potential markets for Southern produced apricots and barriers that currently keep farmers in the ZOI out of those markets.
2. The research team will conduct an assessment of food safety challenges for export and test appropriate solutions with Tajik farmers. Based on the research, the team will make recommendations, which could include the development of a good postharvest and food safety practices handbook tailored specifically for the Tajik context.
3. The research team will conduct applied postharvest and processing research that improves the quality and packaging of dried apricots and deliver those research results in an appropriate way for Tajikistan farmers in the ZOI.
4. The research team will work closely with the Feed the Future Tajikistan Agriculture and Water Activity project to support their development and training work with applied research in marketing and postharvest handling.

All applied research should consider technologies and practices used in the more agriculturally advanced regions of Northern Tajikistan that are readily transferable and/or adaptable to conditions in the ZOI.

As stated above, the U.S.-Tajik research team will be expected to work closely with the Feed the Future Tajikistan Agriculture and Water Activity. Proposals from new and existing U.S.-Tajik research teams are welcome. U.S. researchers who need to identify a Tajik research partner are encouraged to contact Tajikistan Technological University or Tajikistan Agrarian University. Contact information for each institution can be found below:

- Feed the Future Tajikistan Agriculture and Water Activity
Implemented by Chemonics International Inc.
Mr. Kirk Ramer, Chief of Party
Email: kramer@tawa.tj
Phone: +992 93 905 04 94
- Tajikistan Technological University (<http://tut.tj/en/>)
Dr. Qurbonov Faizali Boboevich, Dean of Mechanization and Technology
Tajikistan Technological University
Email: faizali_58@mail.ru
Phone: +992 98 529 56 13

- Tajikistan Agrarian University (<http://www.tajagroun.tj/en/>)
 Dr. Rustam Bobohonov, Department Head
 Post-harvest Handling and Storage
 Tajikistan Agrarian University
 Email: r.bobokhonov@mail.ru
 Phone: +992 919 05 11 50

Successful proposals will:

1. Be comprised of an interdisciplinary research team, including Tajik researcher(s). Proposals submitted by a lead PI from a public U.S. university will be given preference, but proposals led by other U.S. organizations, including nonprofit and for profit groups, will be considered.
2. Conduct research that aligns with and contributes to Horticulture Innovation Lab principles. The Horticulture Innovation Lab has a commitment to innovation and scaling, capacity building, nutrition sensitive horticulture, empowering vulnerable populations, information dissemination, and value-chain research. Successful proposals will consider these principles in program development.
3. Lay out a monitoring and evaluation plan that also indicates the stages of the project where reflexive action will be taken.
4. Address how it plans to collaborate with the Feed the Future Tajikistan Agriculture and Water Activity and local universities, as well as any other relevant USAID projects in the Tajikistan Zone of Influence.
5. Include rationale of how this research will impact development practices. Horticulture Innovation Lab research should benefit people working in development, including USAID employees, contractors, and in-country project managers.

Mission Service Project with USAID/Tajikistan. In an effort to create greater synergies between the horticulture portfolios of country-based USAID Missions and the applied research sponsored by the Horticulture Innovation Lab, the Horticulture Innovation Lab solicited research needs from a number of USAID Missions to address a persistent challenge related to horticulture facing their development projects. These horticultural challenges could be anywhere along the value chain from seeds to markets, including questions related to policy, production, nutrition, gender, markets and/or postharvest handling. All submissions were reviewed by the management entity on the basis of projected impact and feasibility of success within a 2-year timeframe. As part of this process, USAID/Tajikistan collaborated with our office to create and draft this RFP. While the Horticulture Innovation Lab will manage this research project as part of its portfolio, the research team is also expected to work closely with the USAID/Tajikistan Mission and the appropriate USAID-funded projects to ensure that research remains relevant and findings are easily incorporated into local program designs and activities.

About the Horticulture Innovation Lab

Feed the Future Innovation Labs. The Horticulture Innovation Lab is one of 24 Innovation Labs led by U.S. universities with funding from the United States Agency for International Development (USAID), as part of the U.S. government's global hunger and food security initiative called Feed the Future. Of the 24 Feed the Future Innovation Labs, the Horticulture Innovation Lab is one of 10 programs that specifically focus on collaborative research (previously called CRSPs) and share the following goals and characteristics:

- Coordinated, multi-disciplinary research programs that are collaboratively developed and cooperatively implemented, with shared responsibilities between U.S. and host country institutions and scientists. Our goals are to support economic growth and to reduce poverty through the generation of knowledge and technologies important to the development of agriculture and natural resources of developing and transition countries, while also contributing to the improvement of agriculture in the United States.
- Long-term activities carried out largely in developing countries. Research proposals are selected competitively and are subject to review by USAID.
- Development of the human and institutional capabilities of research organizations in the countries where our activities are located. Research projects are a vehicle for this capacity development, as are graduate degree programs, research assistantships, and workshops. The institutional relationships established between our programs and host country institutions are intended to be enduring and to transcend the life of the program.

Horticulture Innovation Lab. The Horticulture Innovation Lab builds international partnerships for fruit and vegetable research to improve livelihoods in developing countries. The program began in 2009 when USAID selected the University of California, Davis, to lead a 5-year program (then called the Horticulture Collaborative Research Support Program, or Horticulture CRSP). The program team and its projects help the world's poorest people break out of a persistent cycle of poverty by improving smallholder farmers' abilities to grow and sell high-value crops. Improving livelihoods—through higher profits and diversified, nutrient-rich diets—is a primary goal for the Horticulture Innovation Lab's research efforts around the world. The program's work is focused on ensuring gender equity, improving information access, targeting innovative technologies and increasing research capacity.

The Horticulture Innovation Lab projects span the value chain of fruit and vegetable production, from seed systems to postharvest processing. Individual projects are generally led by U.S. university researchers, with collaborating partners in developing countries. In its first five years, the Horticulture Innovation Lab funded 61 projects in more than 30 countries. These projects ranged from six-month Trellis projects, which paired graduate students with developing country organizations, to 3-year, multi-country comprehensive projects, which addressed bottlenecks throughout an entire value chain. Projects involved 18 U.S. public universities, more than 200 universities and organizations in the developing world, and 366 undergraduate and graduate students. These projects have field-tested 583 new technologies, 514 of which are currently ready for transfer.

As a result of the Horticulture Innovation Lab's activities, 39,027 individuals (56% women) received short-term training, and 14,492 farmers (65% women) applied new technologies or management practices on their farms between 2009 and 2015. Between Africa, Asia, and Latin

America, 11,864 hectares are now under improved management practices or managed with improved technologies, as a result of our work. These trainings and technologies also benefited 8,489 rural households – 2,441 of them considered vulnerable.

Horticulture Innovation Lab objectives and pillars

The Horticulture Innovation Lab is committed to:

- Increasing capacity of scientists, development professionals, farmers, students, intermediaries, and institutions to address horticultural challenges.
- Improving access to reliable horticultural information.
- Increasing empowerment of women and disadvantaged groups working in horticulture.
- Improving horticultural systems, from seed to consumption, as a result of collaborative research.
- Improving opportunities for smallholders and entrepreneurs in horticultural markets.
- Improving the nutritional status of people as a result of including horticultural crops in diets.

Our work focuses on these six pillars:

Commitment to horticultural value chain research. We support research that tackles knowledge gaps along the entire value chain for important horticultural products. Our research provides much needed baseline information, and information about barriers to adopting new technologies or crops. We support adaptive research and research that enables farmers to have greater access to markets through innovative technology

Commitment to innovation and scaling. We support the development and dissemination of technologies that provide advanced tools to stimulate and facilitate horticultural development worldwide. The work of an innovation in horticulture is to make something better, more efficient, healthier, or more productive and profitable. The Horticulture Innovation Lab believes that specific technologies and innovations have the ability to solve problems and challenges and to reduce barriers within the horticulture sector. The Horticulture Innovation Lab focuses on technologies that reduce on farm costs, reduce postharvest losses, use labor more efficiently, empower women, take advantage of ICT opportunities, and use limited natural resources more sustainably.

Technologies and innovations come in a variety of forms. “Hard” technologies are devices, prototypes and designs that improve our lives and in some way change the current system. “Soft” technologies encompass innovation in systems, behaviors, and methods within the horticulture sector. Assemblies of ideas and thought processes make up a soft technology. For example, a new device for cooling produce is a hard technology while a new system developed to train farmers in postharvest cooling could be considered a soft technology.

Advances in technologies, when combined with innovative delivery methods, can turn unproductive and unprofitable systems into more productive and profitable ones. We support projects that address the constraints to horticultural production through modern research practices. We work closely with USAID in-country missions, our Regional Centers and local and regional partners to scale technologies or techniques developed by our collaborators.

Commitment to capacity building. Our projects build the capacity of our partners and their institutions worldwide to improve horticultural research and production. Together, we build the

capacity of students and their faculty mentors in the developing world, and the capacity of various actors involved in the horticulture sector, including extension workers, farmers, traders, processors and marketers through targeted trainings and information dissemination. One of the strengths of the Innovation Labs for Collaborative Research is their role in building the capacity of students, faculty, institutions and participants in the horticultural value chain. Projects build capacity through training, information dissemination, and through the participation of students, local community members, and other value chain actors in project activities. For students, capacity building is embedded within the collaborative research program between U.S. universities and developing country institutions. The nature of these embedded programs ensures that the research students are engaged in is relevant to their home countries. In general, Horticulture Innovation Lab project research takes place in the focus country, which means that involved students are much more likely to find employment in their country and in their field of interest as a result their Horticulture Innovation Lab research experience.

Long-term training. The Horticulture Innovation Lab projects provide long-term training through a mixture of models, including supporting graduate degrees in the U.S., at home institutions, and at third party institutions in the developing world.

Short-term training. The Horticulture Innovation Lab projects will offer extensive short-term training opportunities. These will be embedded in the research projects, offered through our regional centers, and incorporated in the activities of the information management and dissemination activities of the Management Entity. Short-term training will be geared towards a variety of stakeholders engaged in horticultural crop production, handling and marketing, including seed producers, farmers of small and medium-sized plots, traders, and marketers, as well as researchers and extension educators.

Commitment to nutrition sensitive horticulture. We support research that improves understanding of nutritious crops from production to consumption and enhances their availability. Nutrition is uniquely important in poverty reduction. All of our research projects will be nutrition sensitive, and will seek to understand the roles of nutrition within their projects. All projects will identify the possible nutrition-related impacts of their research or interventions, and will outline how their project will contribute positively to human nutrition at the household, community, local and/or regional levels. The management team at UC Davis will work with projects throughout their lifecycle to ensure that they are nutrition sensitive.

Commitment to empowering women and the most vulnerable. Our research and interventions will be designed to empower women and vulnerable people. Women and other vulnerable people (the elderly, people with diseases, indigenous peoples, people living in conflict) often work in horticulture value chains, and much of this work is unpaid labor. The Horticulture Innovation Lab seeks to understand how women and members of vulnerable groups can benefit from the production of fruits and vegetables, either as income generating crops or as crops that complement a healthy and diverse diet. Unfortunately, little is known about how horticultural crops could better benefit these at risk populations.

Our research and interventions are aimed at empowering women and vulnerable people. We conduct baseline studies within all of our projects that increase knowledge about women and vulnerable groups. We design technologies and interventions that specifically target these groups. Trainings and research projects are equitable. Our project teams are trained on empowerment

and responsive project planning, and all projects are assessed on their impact on the empowerment of women and the most vulnerable. In addition, the management team at UC Davis will work with funded projects to ensure that projects are gender sensitive, women's participation is encouraged, and women and vulnerable people benefit from the research.

Commitment to sharing information. We make our research and global horticulture knowledge available in readily accessible and easily understandable formats. We work to understand, package and share both technical information and information about the best practices for information dissemination. We work with other horticulture partners like the Global Horticulture Initiative and the International Society for Horticultural Science to be the leaders of horticultural information dissemination. We seek to better understand how and where farmers get their information. We explore how intermediaries and their associated information channels best develop and provide credible, relevant information in order to better help horticulture farmers around the world. This effort includes creating fact sheets, summarizing research findings from projects into usable data sheets, and developing and circulating simple, concise methodologies for enhanced information dissemination. We support trainings and conduct research that improves intermediaries' ability to connect farmers with up-to-date horticultural research. This effort includes the continuation of our efforts looking at the appropriate use of Information and Communications Technologies (ICT) and how such tools can both expand information access and use and help us better understand target audiences and their evolving needs. Across all projects, the management team at UC Davis works with our collaborators to enable them to better package and deliver the information from their project research. This expands the impact of all of our projects and enables more people to benefit.

Regional Centers

Projects are encouraged to interact with our Regional Centers to learn about technologies promoted by the Horticulture Innovation Lab that might benefit their work, and to engage with the Centers if appropriate. The Centers have six strategic objectives:

1. Increase farmer knowledge of improved horticultural practices.
2. Increase the number of regionally specific horticultural technologies.
3. Increase local adoption of horticultural technologies by smallholder farmers.
4. Improve the research and management capacity of the host institutions.
5. Increase investments in and the number of entrepreneurs working with horticultural technologies.
6. Contribute to the Global Horticulture Knowledge Bank, and build networks between Centers.

The Centers meet these objectives by integrating with new and existing Horticulture Innovation Lab research projects, synchronizing with new and existing USAID/BFS funded value-chain projects and Mission-led horticulture projects, building strategic relationships with partners, conducting research, and building local management, research, and horticulture capacity. Each Center focuses on innovation and technology; working in parallel with each Horticulture Innovation Lab funded research project to test and modify new technologies, host workshops and activities and serve as a regional resource for project PIs. To learn more, visit: <http://horticulture.ucdavis.edu/main/centers.html>.

Horticulture Innovation Lab and Feed the Future

The Horticulture Innovation Lab's goals associated with battling malnutrition, improving gender equity, 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 four key Feed the Future objectives, specifically:

1. Improved agricultural productivity
2. Increased employment opportunities in targeted value chains
3. Increased resilience of vulnerable communities and households, and
4. Improved access to diverse and quality foods.

The Horticulture Innovation Lab focuses on bottlenecks in production-to-consumption of horticultural value chains. The program emphasizes research where horticulture can complement and diversify staple crops, extend cropping and marketing seasons, impact the entire horticulture value chain, and increase the production and consumption of nutritious horticultural products. Thus far the Horticulture Innovation Lab has supported research projects on seed systems, sustainable production of horticultural crops, postharvest practices, food safety, market access and linkages, nutrition, gender, and enabling environments. Find a list of Horticulture Innovation Lab projects at <http://horticulture.ucdavis.edu/main/projects.htm>. These projects align well with Feed the Future's research priorities on food safety, nutrition and creating an enabling environment.

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 and promoting our values, 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>.

Proposal Preparation and Submission Instructions

Who may submit proposals

Proposals from U.S. university researchers with PI status will be given priority for funding, but proposals led by other U.S. organizations, including nonprofit and for profit groups, will also be considered.

Funding restrictions and cost share

Proposals are not to exceed \$150,000/year for two years. Each applicant will be required to identify 25% of the total federal dollars per year in matching funds from non-federal sources. An exception has been granted to Horticulture Innovation Lab partner institutions, which include University of Florida, University of Hawaii at Manoa, and North Carolina State University, who

are required to identify 15% cost share.

1. *Indirect Costs*. Institutions may claim indirect costs at their federally-negotiated rate. If no approved rate applies, the institution may take up to 10% of modified total direct costs for their indirect costs. An approved indirect cost rate agreement (if applicable) must be provided at the time of proposal submission.

2. *Cost Sharing*. Cost sharing is required at 25% of the total federal funds requested from the Horticulture Innovation Lab. PIs from Horticulture Innovation Lab partner institutions (University of Florida, University of Hawaii at Manoa, and North Carolina State University) are required to cost share 15% of the total federal funds requested. The cost share must consist of non-federally funded contributions that meet the criteria detailed in 22 CFR 226.23. 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 proposal 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 from the main institution and subaward(s) as appropriate. Provide a detailed cost-sharing narrative listing institution(s), dollar amounts, and descriptions.

Proposal format and submission

Proposals should be submitted via email to horticulture@ucdavis.edu.

Two files must be submitted:

1. Complete proposal in PDF format (one file).
2. Complete budget in Excel format using the Horticulture Innovation Lab budget form: <http://horticulture.ucdavis.edu/main/rfp/2016-budget.xlsx>. Budget instructions are included as the first sheet of the spreadsheet.

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

Sections of the proposal

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 and FAX numbers of Principal Investigators and Collaborators
- Signature and contact information for authorized official from the Lead Institution. If the institution is the University of California, Davis, the authorized official is the department chair.
- Contact information for person to contact for proposal questions
- Contact information for person responsible for negotiating final contract

II. Project Summary Page

The Project Summary Page is limited to one page and should include only the following:

- 200- to 250- word abstract (to be used when describing the project to USAID, reviewers, media, and other interested persons)
- Up to 5 keywords
- List of countries and the Feed the Future regions in each country where project will take place
- Total amount of money requested.
- Percentage of requested funds (\$) that will be sent to Focus Country Institution(s)

III. Technical Narrative

20 pages maximum for items (a) through (l) (suggested page number limits are included in each section; literature cited does not count towards 20 page limit)

a) Introduction

Introduction should include, but is not limited to, a statement of the problem, project justification, approach, and expected impacts. (~2 pages recommended)

b) Overall objectives addressed

Include a description of how project fits with the objectives of Horticulture Innovation Lab, Feed the Future, and the specific USAID Mission and USAID-funded project plans within the target country. (~1 page recommended)

c) Specific project objectives

Include a list and description of project objectives. (~1 page recommended)

d) Activities and methodology

Outline the activities and methodologies required to accomplish each objective. Successful proposals 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 played in project development. (~1 page recommended)

f) Timeline of activities

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

g) Outreach and capacity building

Outreach, extension, and capacity building are central to any Horticulture Innovation Lab Project. This section should include explicit details of how project outputs will be disseminated to local farmers as well as how the project builds local capacity. Describe involvement of graduate and undergraduate students from U.S. and focus country(s). 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 outreach activities and deliverables. (~2 pages recommended)

h) Sustainability

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

i) Gender and social equity

Gender and social equity is central to achieving Horticulture Innovation Lab goals. This section should include a plan on how gender and other issues were taken into

consideration in this proposal, how constraints that limit women and vulnerable groups' participation in agricultural development are addressed, and how community level gender issues will be approached to achieve gender parity. Successful proposals will give meaningful consideration to gender issues in the design of their program. Guidelines to the Horticulture Innovation Lab's gender principles can be found in Appendix I.

(~1 page recommended)

j) Nutrition

Improving nutrition is one of the key pillars 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 proposals will identify which of the 7 pathways between agriculture and nutrition will be addressed, how they will be targeted and what is the logic behind them (see <http://agrilinks.org/working-group/agriculture-amp-nutrition-global-learning-and-evidence-exchange-agn-gee/group-3> and Appendix II). Successful proposals 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)

k) Innovative technologies

Describe any "disruptive" or innovative technologies or processes included in the proposed project and their potential for impact. Please outline any plans for scaling these technologies. (~1 page recommended)

l) Regional Centers

If applicable, discuss how this project could work with and/or complement the work of the Regional Centers. Projects are encouraged to explore the technologies and resources promoted by the Regional Centers for things that might be of use. For more information on the Regional Centers, see Appendix III. (~1/2 page recommended, not required)

m) Literature cited (length as needed)

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 proposals must include a monitoring and evaluation (M&E) plan. Projects will address Objectives through defined Activities that will have specific Outcomes (deliverables/outputs) and Measures of Success.

Monitoring and evaluation plans will be refined during the initial phases of the project and used to assess progress toward objectives. Proposals must include baseline assessment of situation in terms of the topic area and region. Within this framework, we define the following terms and provide a sample table below:

- a. *Objectives*. A statement of intention. Objectives should be specific, measurable, achievable, realistic and time-bound (e.g. reducing postharvest losses of leafy vegetables in East Africa in year 1).
- b. *Activities*. Research or training/outreach programs intended to achieve the objectives (e.g. determine the benefits of perforated plastic bags for reducing water loss, evaluate the use of evaporative coolers for short term storage and transport, & conduct a 3-day workshop and demonstration for women's farmer groups)

- c. *Outcomes (Deliverables/Outputs)*. Expected results of the activities (e.g. documented effects of plastic bags and evaporative coolers on weight loss, 50 women farmers trained in postharvest technology).
- d. *Measure of Success*. How will you decide if your activity was successful? (e.g. perforated plastic bags and evaporative cooling led to an X% reduction in water loss of leafy greens, X trainees implement improved postharvest practices).
- e. *Documentation of Success*. How will you objectively document the success of your activities? (e.g. extension bulletin in local language(s) on benefits of perforated bags and evaporative cooler, results of pre- and post-training quizzes to document knowledge gained)
- f. *Impact*. What is the long-term result of the activities and outcomes? (e.g. reduced losses of leafy greens after harvest)

Objective 1:				
Activities	Outcomes	Measure of Success	Documentation of Success	Impact
Insert more rows as needed.				

IV. Statement of institutional experience

Include a description of the international development experience 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)

V. Curriculum vitae (CV)

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

VI. Budget

Budget must be submitted using the Horticulture Innovation Lab budget in Excel. The link to the budget is at: <http://horticulture.ucdavis.edu/main/rfp/2016-budget.xlsx>. Please follow the directions in the workbook when entering your budget numbers.

VII. 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, no page limit). *Label the top of each budget justification with the name of the institution and the total dollar amount per year.*

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
- pharmaceuticals
- pesticides
- US Government-owned excess property
- 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.

d. **Travel**

Domestic

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

Foreign

Provide a full explanation for each anticipated international trip by the budget sheet identifier (A1, B12, etc.)—this explanation needs to include the following information (per trip):

- names and/or number of travelers
- destination country

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 U.S. P.I. plus at least one host country collaborator to attend the annual Horticulture Innovation Lab Annual Meeting(s).

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.

f. **Subawards**

Briefly list each subaward here and include yearly and cumulative 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 Development. <http://www.usaid.gov/policy/ads/200/253.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 by the budget sheet identifier (A1, B12, etc.). 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 and U.S.-based short-term training (fewer than six months), program allowance rates (such as standard per diem rates) are based on the General Services Administration (GSA)'s Standardized U.S. Government Federal Travel Regulations, as established by the General Services Administration (GSA). These rates are found at **41 CFR 301-7** and **301-8**.
 - For third-country long-term training (greater than 6 months), 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), please refer to the monthly maintenance rates (by state or region) available here: [http://trainethelp.usaid.gov/Documents/rawmedia_repository/Monthly Maintenance Rates.pdf](http://trainethelp.usaid.gov/Documents/rawmedia_repository/Monthly_Maintenance_Rates.pdf) Annual tuition/enrollment fees caps for international students are currently at \$26,063 for undergraduate students and \$31,926 for graduate students (a five percent inflation factor may be added for each successive year).

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). U.S. Institutions and foreign entities with no federally-negotiated rate may claim 10% of modified total direct costs for their indirect costs.

Detail the rate calculation accordingly.

j. **Cost Sharing**

Cost sharing is required at 25% of the total federal funds requested from the Horticulture Innovation Lab. Horticulture Innovation Lab partners are required to cost share 15% of the total federal funds requested. The cost share must consist of non-federally funded contributions that meet the criteria detailed in 22 CFR 226.23. 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 proposal 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.

VIII. Supporting Budget Letters

The following supporting budget letters must be attached.

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

IX. Additional Letters of Support (if any)

Please provide general letters of support. Letters of support can include letters that indicate other sources of funding. Please indicate the objectives addressed by the additional funding in comparison with the current funding request and the respective costs. Letters of support can also be solicited from USAID Missions or their partners.

Proposal Evaluation Process

Proposals will be reviewed by at least three reviewers external to Horticulture Innovation Lab. Reviewers are solicited worldwide and have relevant experience to the topic areas. External reviewer ratings and comments will be combined with those of the Horticulture Innovation Lab Management Entity and USAID/Tajikistan. Final approval of all Horticulture Innovation Lab projects is made by the Horticulture Innovation Lab Management Entity in consultation with the USAID AOR.

Proposals will be rated by the following criteria:

- **Project impact**: How well does the proposed project meet the research needs outlined by the Mission in this RFP? How well does the proposed project contribute to attainment of the Horticulture Innovation Lab and Feed the Future goals, objectives and themes? What is the potential for success? (20%)

- Capacity building: How well do the degree, faculty exchange, certificate and/or short-term training programs build capacity for sustaining future horticulture development in the focus country? Are university faculty, graduate and/or undergraduate students from the focus country engaged in the project? If so, in what ways and how well are they engaged? Is a significant (and appropriate) amount of funding being provided to the focus-country organizations? (15%)
- Scientific merit: How appropriate are the proposed activities to advancing knowledge and understanding in the focus topic and region? To what extent are the activities focused on addressing bottlenecks in the system? To what extent do the proposed activities utilize “leap frog” or “disruptive” technologies and explore creative and original concepts? Are the proposed research and outreach methods appropriate? Can the proposed research be technically implemented within the proposed time frame and budget and given the available resources? Are proposed research and extension activities effectively targeted towards project objectives? (20%)
- Participatory partnerships: How well qualified is the research team to conduct the project? Is the proposed team sufficiently diverse institutionally (universities, IARCs, NGOs, Private Sector, etc.), disciplinarily (social, biological and physical scientists), and by gender for the intended research? Is a socio-economist included in the project? Were developing country stakeholders and USAID Mission sufficiently involved in the conception and design of the research application? How well does the research proposed integrate local partners and other stakeholders into the research program? Have collaborations been forged with other groups involved in similar work? Effectiveness of identified groups of local stakeholders? (15%)
- Gender and enabling environment: How well is the gender of stakeholders (end-users, trainees, and other participants) taken into account? To what extent has gender sensitivity been integrated into activities? How well does the proposed activity broaden the participation of women? Has significant consideration been given to gender issues in project development? Does the project contribute to policies and/or market access that will ultimately alleviate poverty, enhance quality of life, and improve economic livelihoods of woman and their families? (15%)
- Monitoring, evaluation and impact plan: How well is the Monitoring and Evaluation (M&E) plan developed and designed specifically for the proposed project? Are benchmarks established so progress toward achieving objectives can be measured? Are the measures of success measurable and the documentation of success legitimate? Does the M&E plan indicate the stages of the project where reflective action will be taken and what mechanisms will be in place to take action on the outcomes of these reflections? (15%)

Appendix I - Gender Assessment

Principles

1. Gender refers to social characteristics of men and women, such as their different roles within the family or in farming and the types of behavior expected of them (for instance, women are gentle and faithful, men are strong and free). These issues speak to the ability of women and men in specific communities to carry out certain farming activities, to be able to travel outside their immediate area for training and meetings, to be sufficiently educated to participate in training, and so on.
2. Gender stereotypes will vary among cultural groups. It is necessary to be aware of how they function in your particular cultural group because they will affect constraints for both sexes. For instance, if you want to add more weeding on a man's crop and weeding is a woman's task in that culture, you may not get your technology adopted. Include in your proposal an assessment of how you will deal with this.
3. Gender issues also speak to who farms which crops and/or which practices do they do in farming. What are the differential usages of men and women regarding natural resources (water, firewood, etc.)? For instance, women's inability to participate in formal employment or their restraints in mobility may result in their using natural resources in order to get cash. For instance, in Africa women may cut down trees to sell the wood because they have no other income source.
4. Gender issues also exist in regard to scientists, extension agents, and students. This includes both numbers and in men's and women's perspectives.
5. 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.

The Horticulture Innovation Lab Management Entity can provide further help in formulating gender-sensitive criteria 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.

Assessment Criteria (Use those that apply to the work you are doing.)

General:

- 1) Review your stakeholder/participant list and consider the gender issues with each group.
- 2) In writing your proposal, make the sex of your participants explicit – e.g., Men and women farmers/students.
- 3) Go beyond numbers to consider gender stereotypes that might hamper participation of one group or other.
- 4) Add relevant gender training to all training programs, long and short term.

Farm/Enterprise level:

- 1) Specify the gender division of labor for Horticulture Innovation Lab activities in your target area. Make it clear in your proposal what these are and the implications for your proposal.
- 2) Identify constraints on women - mobility, resources, etc. - so you can include ways of

- dealing with this in your proposal.
- 3) Clarify whether you 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. Show us that farmers and other stakeholders have been consulted on the various phases. And thus that what you are proposing corresponds to their needs.

Extension level:

- 1) Aim at working with a minimum of 50% women. If necessary figure out how to find relevant women in or near the communities who might be able to work as assistant extension agents. For instance, you will be working with extension services. You want to provide extension workers with bicycles but women in that area have traditionally not ridden bicycles. How will you handle this? Discuss the constraints in your research area in your proposal as also any relevant constraints on women/men farmers.
- 2) At the community level take into account how men and women are organized into associations, how group activities are structured, and what tasks provide for group communication such as doing laundry by the stream, or drinking tea under the shade tree.
- 3) Please provide gender assessment of the information knowledge transmission systems associated with your 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 proposal 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 your project will do to ameliorate the situation.

Scientists:

- 1) Include women scientists in both the US and host countries. If you cannot do this, explain the constraints that have prevented this.

Appendix II – Nutrition and horticulture

Improving nutrition is one of the key pillars 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 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 don't 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:

- 1) Own production -> food consumption
- 2) Income -> food purchase
- 3) Income->healthcare purchase
- 4) Food prices ->food purchase
- 5) Women's time use ->care capacity
- 6) Women's workload -> maternal energy use
- 7) Women's control of income -> resource allocation

Horticulture
Innovation Lab
projects have
focused on these
pathways to
improve nutrition.

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.

- 1) Extension- behavior change communication, nutrition counseling;
- 2) Inputs- diverse and quality seeds, water and sanitation, proper use of chemical inputs;
- 3) Production- nutritious crops, on farm diversification, nutritional value at harvest, women's time and labor;
- 4) Storage- food safety considerations, postharvest practices that can maintain nutritional quality of crops, reducing overall losses;
- 5) Processing- maintaining nutritional quality of final product, food safety, reducing overall losses, packaging;
- 6) Distribution- food safety, proper cold storage and handling;
- 7) Marketing- increasing demand of nutritious crops and products, creative marketing campaigns;
- 8) Consumption- promotion of nutrition messages, behavior change, cooking classes, home gardens for consumption.

Assessment Criteria (use those that apply to your proposed project)

Does the proposed project:

- 1) Incorporate explicit nutrition objectives and indicators into its design?
- 2) Identify, track and mitigate potential harms? Including mitigating the health risks posed by agriculture along the value chain.
- 3) Facilitate production diversification, and increase production of nutritious foods that vulnerable households can access and utilize?
- 4) Incorporate nutrition education and employ behavior change communication to ensure that nutritious crops are consumed by the household?
- 5) Assess the context of the intervention (social, economic, logistical, etc.) and identify how it will succeed?
- 6) Monitor food prices and assess the interventions effect on local and regional food prices?
- 7) Target vulnerable groups and work to improve equity?
- 8) Empower women, reduce women's work load, increase women's share (and control) of household income?
- 9) Improve food safety, processing, and storage of fruits and vegetables? Encourage small-scale processing that creates business and employment opportunities, or technologies that reduce labor.
- 10) Expand markets and market access for vulnerable groups, particularly for marketing nutrient-rich foods?

11) Collaborate and coordinate across sectors, especially between nutritional science, medicine, public health, horticulture and agriculture. Have collaborators and team members been selected from diverse academic and practice backgrounds?

The Horticulture Innovation Lab's nutrition specialist will be available to help proposed projects best meet the above criteria.

Appendix III – Regional Centers

In collaboration with host institutions, the Horticulture Innovation Lab Regional Centers at present serve the regions of Central America and Southeast Asia to showcase technologies and innovations that can improve horticulture in their respective regions. The Central America center is located at The Panamerican Agricultural School, Zamorano, Honduras and the Southeast Asia center is at Kasetsart University in Bangkok, Thailand. And currently, a center is being developed in Zambia to serve the Southern African region.

The centers connect horticultural researchers, extension workers, farmers, non-governmental organizations (NGOs) and relevant private sector partners within their respective regions. The centers each serve as a regional repository for horticultural technologies and knowledge, provide training programs, facilitate the evaluation and adaptation of horticultural technologies, and develop mechanisms for sharing ideas within and across borders. The centers work with national agriculture research and extension systems, agricultural universities, NGOs and the private sector to provide ongoing training for the local horticultural industry and for trainers both at the centers and across the regions. The centers draw on local experts who have received technical training through advanced degree programs or train-the-trainer courses. The centers provide testing grounds for horticultural technologies and physical facilities for workshops and training sessions.

The objectives of the Regional Centers are to (1) Increase farmer knowledge of improved horticultural practices, (2) Increase the number of regionally specific horticultural technologies, (3) Increase local adoption of horticultural technologies by smallholder farmers, (4) Improve the research and management capacity of the host institutions, (5) Increase investments and number of entrepreneurs working with horticultural technologies, and (6) Contribute to the Global Horticulture Knowledge Bank, and build networks between centers

One of the Centers' major roles is to test horticultural technologies, adapt them to local conditions, and scale up their use regionally. This research builds capacity at the Centers and for the students and farmers who participate in the testing and adaptation. Currently, the Centers are testing pest exclusion nets, seed drying beads, Coolbots for cold storage, innovative insulation panels, solar dryers, solar irrigation pumps, macro tunnels, mesh houses, and facilitated solarization. For more information about the Regional Centers, visit <http://horticulture.ucdavis.edu/main/centers.html>

Projects are encouraged to interact with our Regional Centers to learn about technologies promoted by the Horticulture Innovation Lab that might benefit their work, and to engage with the Centers if appropriate.

Examples of past activities:

The Centers have hosted a number of workshops for various Horticulture Innovation Lab projects, as well as collaborated on research and dissemination activities. For example, the Regional Center in Thailand has collaborated with the “Implementing drying beads for seeds” project led by UC Davis by hosting a workshop and other training activities. This Center has also trained farmers on various technologies through the “Empowering women vegetable growers with drip irrigation” project led by North Carolina A & T State University. Similarly, the Regional Center at Zamorano (Honduras) hosted a *Phytophthora* diagnostics training course with

Horticulture Innovation Lab PI Jean Ristaino, with 22 participants from Central America attending.

The Horticulture Innovation Lab's Program Officer for the Regional Centers, Britta Hansen, will be available to help proposed projects align with each Center as needed. She can be contacted at bhansen@ucdavis.edu.