This report is made possible by the generous support of the American people through the United States Agency for International Development (USAID). The contents are the responsibility of the Feed the Future Innovation Lab for Horticulture and do not necessarily reflect the views of USAID or the United States Government.

COVER PHOTO
Vertical growing system, at Zamorano University Regional Hub, Honduras
Horticulture Innovation Lab photo by Archie Jarman
The Feed the Future Innovation Lab for Horticulture at the University of California, Davis (UC Davis) will work with and promote local leadership in communities across the globe to advance horticultural and social innovations for nutritional and financial security. Initiated in October, 2021 with a base $15 million investment from U.S. Agency for International Development (USAID) the Horticulture Innovation Lab is a five-year program and is the second competitive Feed the Future Innovation Lab awarded to UC Davis. The competitive award for the Horticulture Innovation Lab was first received in 2009 when USAID selected UC Davis to lead a $14.6 million, five-year program (then called the Horticulture Collaborative Research Support Program, or Horticulture CRSP). The university was awarded a subsequent five-year phase for the Horticulture Innovation Lab ending in 2019 for $18.75 million.

The program team and its projects will 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 will be guided by ensuring gender equity, youth empowerment, improved nutritional outcomes, improving information access, targeting innovative technologies and increasing research capacity.

Horticulture Innovation Lab projects will span the value chain of fruit and vegetable production, from seed systems to postharvest processing. Through partnerships and collaborative research, the program also aims to build the capacity of researchers, institutions and farmers to advance horticultural science.

**MANAGEMENT ENTITY**

The Horticulture Innovation Lab Consortium is managed by a team in the UC Davis College of Agricultural and Environmental Sciences, under the Department of Plant Sciences and the International Programs Office.

Members of the management entity:

- Elizabeth Mitcham, Director
- Erin McGuire, Associate Director
- Archie Jarman, Operations Manager
- Heather Kawakami, Financial Analyst
- Maritza Filson, Undergrad Assistant

As part of this Management Entity Team, Consortium Specialists consistently engage with the Management Entity. Specialists include:

- Christine Stewart, Nutrition Specialist
- Hilary Proctor, Youth Specialist
- Janelle Larson, Gender Specialist

**CONSORTIUM PARTNERS**

Along with Consortium Specialists, the Consortium consists of Partners that are recognized as global experts in horticulture research and related fields. Partners include:

- Florida Agricultural and Mechanical University
- Michigan State University
- Texas A&M University
- World Vegetable Center
Along with Partners and Specialists, the Consortium also includes Scaling Partners that have experience with broad dissemination of innovations. Scaling Partners include:

- Cultivated New Frontiers in Agriculture
- International Fertilizer Development Center

**TECHNICAL AND/OR ADVISORY COMMITTEE INFORMATION**

The Horticulture Innovation Lab's International Advisory Board will be the program's senior advisory council. The International Advisory Board will ensure that Horticulture Innovation Lab priorities are met and integrated for maximum effectiveness. The International Advisory Board is still being formalized, with a preliminary list of qualified individuals having been compiled for consideration. Terms of Reference for the International Advisory Board have been developed. The International Advisory Board is targeted to consist of ten to thirteen members from:

- The major geographical priority regions
  - East sub-Saharan Africa
  - West sub Saharan Africa
  - South/Southeast Asia
  - Central America
- Private horticulture-related industry
- Scaling partners: Cultivating New Frontiers in Agriculture and the International Fertilizer Development Center
- National Agricultural Research Organizations (NAROs), Agricultural Ministries, Horticulture Research Organizations
- A Feed the Future Innovation Lab
- Horticulture Innovation Lab Director (ex officio)
- Horticulture Innovation Lab Associate Director (ex officio)
- U.S. Agency for International Development - AOR (ex officio)

**LOCATIONS OF 2021 – 2022 PROJECT ACTIVITIES**

Although research projects will not be developed until after local challenges and opportunities are assessed, the Horticulture Innovation Lab plans to focus research activities in Feed the Future countries, with Regional Hub countries in Ghana (serving West Africa – Mali, Niger, Nigeria, and Senegal), Kenya (serving East Africa – Uganda, Ethiopia), Honduras (serving Central America - Guatemala), and Nepal (serving South/Southeast Asia - Bangladesh).
Countries where the Horticulture Innovation Lab is planning a Regional Hub are indicated with solid red and in blue are locations where we anticipate having research activities.

PROGRAM PARTNERS

United States – Cultivating New Frontiers in Agriculture; Florida Agricultural and Mechanical University; Institute for Global Nutrition, University of California, Davis; International Fertilizer Development Center; Making Cents International; Michigan State University; Pennsylvania State University; Texas A&M University

Ghana – University of Ghana; Afori Agrochemical Services (DryCard Entrepreneur)

Guatemala – EarthEmpower (DryCard Entrepreneur)

Haiti - Fondation Haïtienne de Développement Agricole Durable (DryCard Entrepreneur)

Honduras - Pan-American Agricultural School, Zamorano

India - Vivia Foundation (DryCard Entrepreneur)

Kenya – International Center for Evaluation and Development; Jomo Kenyatta University of Agriculture and Technology; GROOTS Kenya, BetterCrops Ltd. (DryCard Entrepreneur)

Mexico – EarthEmpower (DryCard Entrepreneur)

Nepal –University of Agriculture and Forestry University; Forum for Rural Welfare and Agricultural Reform for Development; R&D Innovative Solutions (DryCard Entrepreneur)

Nigeria – Willow Foundation (DryCard Entrepreneur)

Rwanda – Development Solutions Consulting (DryCard Entrepreneur)

Taiwan – World Vegetable Center

Tanzania –Market Infrastructure, Value Addition and Rural Financial Services (DryCard Entrepreneur)

Thailand –Go Organics (DryCard Entrepreneur)

Uganda –Mwino Group (DryCard Entrepreneur)
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I. EXECUTIVE SUMMARY

The Feed the Future Innovation Lab for Horticulture at the University of California, Davis (UC Davis) began its program in October 2021 and has been working to set up administrative systems and initiate program activities. The program goal is to work with and promote local leadership in communities in Feed the Future countries to advance horticultural and social innovations for nutritional and financial security. The program team and its projects will assist 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. Our work will be guided by ensuring gender equity, youth empowerment, improved nutritional outcomes, improving information access, targeting innovative technologies and increasing research capacity.

UC Davis and its Consortium Partner institutions, (Florida Agricultural and Mechanical University; Michigan State University; Texas A&M University, and the World Vegetable Center), its Consortium Specialists (Pennsylvania State as gender specialist; Institute for Global Nutrition at UC Davis as nutrition specialist; and Making Cents International as youth specialist), and its Consortium Scaling Partners (Cultivating New Frontiers in Agriculture and International Fertilizer Development Center) provide a broad range of horticulture for development expertise to support locally-led research.

The Horticulture Innovation Lab plans to focus research activities in Feed the Future countries, with Regional Hub countries in Ghana (serving West Africa – Mali, Niger, Nigeria, and Senegal), Kenya (serving East Africa – Uganda, Ethiopia), Honduras (serving Central America - Guatemala), and Nepal (serving South/Southeast Asia - Bangladesh). In Ghana, Kenya, Nepal, and Honduras, four institutions will be selected to be Regional Hubs, and in each of these hubs there will be a Regional Hub Manager charged with assisting in the coordination of research projects, trainings, introduction and scaling of new innovations, as well as cultivating in-country networks and USAID mission relationships. The Hub institutions will be selected and Hub managers hired after upcoming regional engagement; near the end of FY2022.

The Horticulture Innovation Lab recognizes that there are many challenges that limit further development of the horticulture sector. Our strategic approach to research is to ground-truth these challenges and learn about opportunities within each focus region. Following the Horticulture Innovation Lab’s locally-led approach, the Innovation Lab is funding the development of Regional Workshops and horticulture assessments to be led by local organizations in each Hub country. These workshops will be attended by regional leaders in academia, private sector, NGOs and government to identify opportunities and challenges in the horticulture sector which could be addressed through research or capacity building activities. Contracting is underway and the workshops will take place 25-27 May (Kenya), 31 May to 1 June (Ghana), 15-17 June (Honduras) and 18-22 July (Nepal). The final product of these workshops will be a comprehensive report which prioritizes research needs to address constraints or capitalize on opportunities. The Horticulture Innovation Lab will use those priorities to generate calls for proposals for Market-Oriented Research for Empowerment projects that will be locally led, and globally supported by the Innovation Lab’s Consortium. Project awards will be determined prior to the close of FY2022.
Critical Engagement Projects are smaller-scale, targeted research projects addressing the Innovation Lab’s internal cross-cutting themes, and have research deliverables that will inform the activities of the broader, Market-Oriented Research for Empowerment projects. Design and development of two Critical Engagement Projects was initiated in the first half of FY2022 with proposals under development through a co-collaboration process. Both projects will use observational, comparative methods that will produce findings with broad applicability and are intended to start in the second half of FY2022. The first will investigate incentives for motivating informal mid-stream actors in horticulture value chains in Nigeria so they become actively engaged in value chain improvements, and the second looks at the nutrition, economic, and social tradeoffs of long and short value chains and ICT in Kenya to determine which value chains are most resilient.

Social Innovation Network mapping will be used to measure the effectiveness of the Horticulture Innovation Lab’s capacity to grow innovation networks and facilitate knowledge exchange within them. The Innovation Lab will use the Regional Workshops as an opportunity to establish a baseline Social Innovation Network Map. Additionally, previous data will be analyzed to understand innovation development and scaling progress of specific types of technology, within certain regions, and over time. Through data collection and analysis that will be updated annually, we will visually represent this data, indicating our program’s effectiveness in innovation development and scaling. The initial assessment will be completed in the second half of FY2022, and serve as a baseline for measuring the impact of the overall Horticulture Innovation Lab program over the next four years.

Our planning for the Trellis Fund Fellowship program will begin in the second half of FY2022. This program will connect graduate level researchers from Minority Serving Institutes in the United States with in-country organizations to complete year-long, small-scale research projects in the horticulture sector. The planning for the Trellis Fund fellowship will be in close collaboration with Consortium Partner, Florida Agriculture and Mechanical University.

Through our first six months of activity, we have been encouraged by the enthusiasm and capacity of the local organizations we have engaged with, and expect that our overall focus on local researchers addressing local challenges and opportunities while promoting inclusion will generate sustained impacts beyond the life of the Feed the Future Innovation Lab for Horticulture award, increasing resilience, access to nutritional fruits and vegetables, and improved livelihoods for stakeholders in the horticulture value chain.

II. TARGET COUNTRY KEY ACCOMPLISHMENTS

REGIONAL WORKSHOPS
Following the Horticulture Innovation Lab’s locally-led approach, the Innovation Lab will fund four Regional Workshops attended by regional leaders in academia, private sector, NGOs and government to identify opportunities and challenges in the horticulture sector which could be addressed through research
or capacity building activities. These challenges or opportunities could be bio-physical, for example supporting regenerative agriculture practices, or better understanding post-harvest loss in certain crops. They could also be social and behavioral, for instance how to engage youth in entrepreneurial horticulture activities, or increase consumption of fruits and vegetables. In any case, the chosen activities will be driven by local researchers, experts, and organizations. The final product of these workshops will be a comprehensive report which prioritizes areas of research, and the Horticulture Innovation Lab will then take those priorities to generate a call for proposals to implement market-oriented research projects that will be locally led, and globally supported by the Innovation Lab’s Consortium.

In-country partners will lead the design and implementation of the Regional Workshop and will develop the final report with support from the Horticulture Innovation Lab Management Entity. Partners have been selected in Honduras, Kenya, and Ghana. The partners are: Zamorano University in Honduras for the Central America workshop; University of Ghana in Ghana for the West Africa workshop; the International Center for Evaluation and Development in Kenya for the East Africa workshop; and, Forum for Rural Welfare and Agricultural Reform for Development (FORWARD) and Agriculture and Forestry University in Nepal. Contracting and necessary approval processes have been initiated with all of these partners with the exception of FORWARD and AFU as the scope of work is still being refined. Currently scheduled dates for the Regional Workshops are:

- East Africa (Kenya): May 25th to 27th
- West Africa (Ghana): May 31rst to June 1rst
- Central America (Honduras): June 15th to the 17th
- South/Southeast Asia (Nepal): July 18th to the 22nd

The Workshops will incorporate a literature review of regional horticulture assessments and research activities prior to implementation, focus groups, and finally a hybrid (remote and in-person) workshop. The hybrid approach to the workshop will allow for greater participation from stakeholders who may not have the capacity to travel and for engagement from the Horticulture Innovation Lab’s Consortium.

Locally led, globally supported is a central tenet of the Horticulture Innovation Lab. Part of this tenet is the understanding that local capacity can exist and also can be expanded to address challenges in horticulture and meet opportunities. It is vital to have a robust exchange of expertise and innovation among a network of global and local stakeholders throughout the program of the Horticulture Innovation Lab to build capacity and scale research innovations. To measure the effectiveness of the Horticulture Innovation Lab’s capacity to grow these innovation networks and facilitate knowledge exchange within them, the Innovation Lab will use the Regional Workshops as an opportunity to establish a baseline Social Innovation Network map that will be updated annually to visually represent data indicating effectiveness in innovation development and scaling. Additionally, previous data will be analyzed to understand innovation development and scaling progress of specific types of technology, within certain regions, and over time.

**CRITICAL ENGAGEMENT PROJECTS**

Design and development of two critical engagement projects was initiated in the first half of FY2022 with proposals in drafting phase. Both projects will use observational, comparative methods that will produce findings with broad applicability and are intended to start in the second half of FY2022. The first focuses on internal innovation drivers in information markets, and the second looks at the nutrition, economic, and social tradeoffs of long and short value chains in Kenya.
In Nigeria, Wageningen University and Research in partnership with the Horticulture Innovation Lab will investigate incentives for motivating informal mid-stream actors in horticulture value chains so they become actively engaged in value chain improvements. Using a pilot project which introduced plastic crates in horticulture value chains in Nigeria implemented by Wageningen, this proposed research project will diagnose and analyze these cases to determine incentives related to motivation, social capital, financial capital, organization, and governance issues. The findings will inform researchers’ understanding of organization and governance, as well as private sector led innovation, to enhance the scalability of successful interventions in informal horticulture value chains, a predominant type of horticulture value chain in target countries.

In Kenya, in collaboration with Jomo Kenyatta University of Agriculture and Technology, GROOTS Kenya, the World Vegetable Center, Dr. Janelle Larson (Horticulture Innovation Lab Gender Specialist), and Dr. Christine Larson (Horticulture Innovation Lab Nutrition Specialist), the second Critical Engagement Project will investigate the trade-offs in terms of impacts on gender equity, nutrition, economics, and youth engagement in short or local horticulture value chains in comparison to long value chains and the impact of digital apps that have been incorporated into some of those value chains. The findings from this proposed research program will advance knowledge on key benefits and necessary mitigating activities of these value chains and digital technologies that can be advanced and/or replicated in other regions to increase gender equity, youth engagement, and incomes, and improve household nutrition.

III. RESEARCH PROGRAM OVERVIEW AND STRUCTURE

RATIONALE FOR HORTICULTURE RESEARCH
Investment in horticulture is important because of the close link between poverty, hunger and malnutrition. Horticulture development offers the opportunity to improve nutrition and health in the developing world, while providing prospects for income diversification and economic advancement of the rural poor. In addition, women are, in many regions, the main producers and marketers of horticulture crops, so increased horticultural production often leads to an improved income streams for women and youth. Horticulture research is crucial to enabling small-scale producers to overcome agronomic market barriers and realize the benefits offered by horticultural development.

TECHNICAL LEADERSHIP
UC Davis and its Consortium Partner institutions, (Florida Agricultural and Mechanical University; Michigan State University; Texas A&M University, and the World Vegetable Center), its Consortium Specialists (Pennsylvania State as gender specialist; Institute for Global Nutrition at UC Davis as nutrition specialist; and Making Cents International as youth specialist), and its Consortium Scaling Partners (Cultivating New Frontiers in Agriculture and International Fertilizer Development Center) provide a broad range of horticulture for development expertise to support locally-led research. The
Management Entity regularly meets with the Consortium entities for guidance and to build connections with in-country researchers seeking solutions to challenges in the horticulture sector.

INTERNAL CROSS-CUTTING THEMES:

_capacity development at all levels_: Human and Institutional Capacity Development is both a management strategy and a cross-cutting theme for the UC Davis-led Consortium. Capacity development is essential for addressing current challenges and building opportunities, and for long-term sustainability of horticulture value chains.

_Climate Change Adaptation and Mitigation_: As one of the more pressing global challenges, tenets of climate-smart and agro-ecological principles will be critical to each of our projects. Further the Horticulture Innovation Lab will aim to not just mitigate climate change, but also increase ecosystem services through horticulture crops.

_Gender and Equity_: The Innovation Lab’s research and interventions will be built to empower vulnerable people. The questions the Lab will ask will be informed by leaders within the most marginalized communities, and the Horticulture Innovation Lab will design innovations and interventions that specifically provide opportunities to these groups. The Innovation Lab will also integrate inclusivity into the project teams through training and accountability mechanisms for equity, equality, inclusion, and responsive project planning.

_Youth_: Providing a path to meaningful economic engagement through horticulture is an important goal of the UC Davis-led Consortium. The Horticulture Innovation Lab will engage with youth to determine their wants and needs to create youth-centered, age appropriate opportunities, and help catapult youth into leadership positions in the horticulture sector.

_Nutrition and behavior change_: The Horticulture Innovation Lab 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. Development of food safety practices are essential in addressing health in the communities the Lab’s networks serve. Research projects will be nutrition sensitive and incorporate appropriate nutrition objectives and benchmarks throughout the project term.

_Resilience_: Horticulture crops offer unique pathways to financial diversification, quick access to food and cash, and are often farmed by women, youth, and other marginalized communities. The Horticulture Innovation Lab will capitalize on this by designing research projects to capture these lessons and leverage them for larger populations.

RESEARCH APPROACH

The Horticulture Innovation Lab recognizes there are many challenges that limit further development of the horticulture sector. The Horticulture Innovation Lab’s strategic approach to research is to ground-truth these challenges and also learn about opportunities within the four selected regions, highlighting local stressors that impact the horticulture sector, and brainstorm solutions during our Regional Workshops. The Horticulture Innovation Lab, in collaboration with local stakeholders, will prioritize those areas of greatest need and potential impact and empower local experts - that will be globally supported by experts within the Horticulture Innovation Lab Consortium - to conduct research to improve the horticulture sector and to develop appropriate, affordable, and scalable technological solutions. Additionally, there are important research topics in the social science area, such as understanding the drivers of fruit and
vegetable consumption, testing models and understanding the constraints for youth/women/disadvantaged group engagement in horticulture, that will be integral within the Horticulture Innovation Lab research strategy.

There will be two types of research projects that will be locally led, globally supported. Market-Oriented Research for Empowerment projects will research regional market solutions in the horticulture sector that also have gender equity, youth engagement, and nutritional benefits. Critical Engagement Projects will be smaller-scale, targeted research projects addressing the Innovation Lab’s internal cross-cutting themes, and have research deliverables that will inform in part inform the activities of the broader, Market-Oriented Research for Empowerment projects.

REGIONAL HUBS
In Ghana, Kenya, Nepal, and Honduras, four institutions will be selected to be Regional Hubs. In each of these hubs there will be a Regional Hub Manager charged with assisting in the coordination of research projects, trainings, introduction and scaling of new innovations, as well as cultivating in-country networks, USAID mission relationships, and supporting the pursuit of buy-ins and associate awards. This on-the-ground presence will be key in ensuring research objectives are met, opportunities for new areas of research are captured and shared, and that the Horticulture Innovation Lab is meeting the needs of local stakeholders and the respective USAID Missions.

IV. THEORY OF CHANGE AND IMPACT PATHWAY

The Horticulture Innovation Lab is a global research network that works with and promotes local leadership to advance horticulture and social innovations to empower smallholder fruit and vegetable farmers to earn more income while better nourishing their communities. To support this goal, the Horticulture Innovation Lab has locally led, globally supported activities that include Market-Oriented Research for Empowerment Projects and Critical Engagement projects. Along with other activities, this approach will lead to outcomes such as increased financial capacity and entrepreneurship, long-term degree attainment, empowered regional leadership, well-connected market systems, and institutional development. Ultimately, the outcomes of these activities will contribute to developing capacity of local networks and building resilient horticulture management systems, improved community nutrition, inclusive and profitable market systems, and gender equity, youth engagement and social inclusion. The overall focus on local researchers addressing local challenges and opportunities while promoting inclusion generates sustained impacts beyond the life of the Feed the Future Innovation Lab for Horticulture award, increasing resilience, access to nutritional fruits and vegetables, and improved livelihoods for stakeholders in the horticulture value chain.
V. RESEARCH PROJECT

SUMMARY

Horticulture is a critical component in empowering women and the most vulnerable, increasing incomes for smallholder farmers, and improving nutrition for farming communities. Thus, the Horticulture Innovation Lab is committed to the Feed the Future objectives of inclusive and sustainable agriculture growth, increased resiliency, and better nutrition (particularly for women and children).

Development, contracting, notification and approval processes have been initiated for the projects below. Each of these projects (or workshops) will be initiated in the second half of FY2022.

Regional Workshops

- **West Africa Regional Workshop in Ghana**
  - Hosted by the University of Ghana.
  - Estimated budget cost: USD$71,626.00
  - When: May 31 to June 1

- **East Africa Regional Workshop in Kenya**
  - Hosted by the International Center for Evaluation and Development.
  - Estimated budget: USD$89,930
  - When: May 25th to 27th

- **Central America Regional Workshop in Honduras**
  - Hosted by Zamorano University
  - Estimated budget cost: USD$68,356
  - When: June 15th to the 17th

- **South/Southeast Asia Regional Workshop in Nepal**
  - Hosted by Forum for Rural Welfare and Agricultural Reform for Development with collaboration from Agriculture and Forestry University.
  - Estimated budget cost: TBD, but within the range of other Regional Workshops’ budgets.
  - When: July 18th to the 22nd

Critical Engagement Projects (both under development, proposals to be submitted to USAID soon)

- **Engaging and understanding informal mid-stream actors in the horticulture sector**
  - Implementing Entities: Wageningen University and Research
  - Project duration: 1.5 years
  - Location: Nigeria
  - Estimated award amount: USD$65,000
  - Project goal: To enhance food system outcomes, such as accessible and affordable healthy diets, improvements in the mid-stream of horticulture value chains are needed. Therefore, research is needed to determine how informal mid-stream actors can be involved in addressing value chain challenges that impact the affordability and availability of healthy and safe foods for urban consumers.

- **Trade-offs – Local/short horticulture value chains versus long horticulture value chains and the impact of digital apps in those value chains.**
VI. HUMAN AND INSTITUTIONAL CAPACITY DEVELOPMENT

During the first half of FY2022, no formalized human or institutional capacity building occurred.

VII. INNOVATION TRANSFER AND SCALING PARTNERSHIPS

The Horticulture Innovation Lab supports the development of disruptive innovations and technologies to stimulate and facilitate horticultural development worldwide. Technologies and innovations have the ability to solve problems and to reduce barriers within the horticulture sector. With proper needs assessment, research, input and support, these technologies have the potential to change the lives of the world’s smallholder farmers for the better. The Horticulture Innovation Lab will focus on technologies that reduce on-farm costs, reduce postharvest losses, use labor more efficiently, empower women and youth, take advantage of information communications technologies 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.

Recognizing the importance of scaling innovations, the Horticulture Innovation Lab has two Scaling Partners within the Consortium – Cultivating New Frontiers in Agriculture and the International Fertilizer Development Center. Two individuals from these large-scale development entities were selected in the first half of FY2022 to serve on the Innovation Lab’s International Advisory Board.

In the first half of FY2022, the Horticulture Innovation Lab worked closely with the USAID Scaling Team, Dr. Richard Kohl, and Innovation, Research, Extension and Advisory Hub (iREACH). With the USAID Scaling Team, the Horticulture Innovation Lab has followed up on presentations made at the Africa Green Revolution Forum (AGRF) covering several postharvest technologies that were developed during the previous iteration of the Lab. This continued follow-up with AGRF attendees resulted in the establishment of a new DryCard entrepreneur in Nigeria who had attended AGRF. Additionally, the Horticulture Innovation Lab is supporting a technology showcase at the USAID Mission in Senegal organized by the USAID Scaling Team. In coordination with Richard Kohl, the Innovation Lab evaluated Phase 4 technologies developed during the previous iteration of our program to help with the prioritization of a sub-selection of those Horticulture Innovation Lab technologies that offer particularly high commercial viability. Finally, with iREACH, the Horticulture Innovation Lab’s Dry Chain technologies have been selected to be displayed, at a minimum, at the iREACH technology park in Ghana, and likely other locations. Technologies from the previous iteration of the Horticulture Innovation Lab that are within the Dry Chain include the DryCard (low-cost dryness indicator), the Chimney and Pallet Dryers (low-cost dryers), and the Drying Beads (desiccants that can be reused).

THE DRYCARD

Efforts to carry forward the scaling of the DryCard from the previous iteration of the Horticulture Innovation Lab continue. During the first half of FY2022, the Willow Foundation in Nigeria and BetterCrops Ltd. in Kenya were established as DryCard entrepreneurs and began manufacturing the DryCard. Although COVID-19 profoundly impacted most of the operations of existing entrepreneurs (there are now eleven) over the past two years, entrepreneurs were still able to distribute close to 13,000 DryCards in FY2020 and FY2021 and 1200 DryCards were distributed in the first half of FY2022.

VIII. ENVIRONMENTAL MANAGEMENT AND MITIGATION PLAN

The Horticulture Innovation Lab submitted an Environmental Management and Mitigation Plan (EMMP) template to our Agreement Officer’s Representative (AOR) for review. As no projects have been formally
funded or initiated, no EMMPs have been completed. At the initiation of projects, research activities will be categorized in an EMMP, and the Innovation Lab will seek guidance from AOR and Bureau Environmental Officer (BEO) for any activities that do not meet the predetermined types of activities listed in the to-be-approved EMMP, or, do not qualify for categorical exclusion. No PERSUAPs are currently anticipated, but if needed, these will be sent for review and approval by the AOR and BEO prior to any research activities. The Management Entity will gladly provide completed EMMPs as they are submitted and project compliance with EMMPs will be tracked through the Piestar Database.

IX. OPEN DATA MANAGEMENT PLAN

The Open Data Management Plan (plan) is tracked in our Piestar database in a format that aligns with approved Data Management Plan template. Data ready for submission will be either uploaded directly into the Development Data Library (DDL) or submitted to the DDL through a link to a publicly available data repository such as Harvard Dataverse. Updated Data Management Plans can be exported from Piestar and provided upon request.

X. GOVERNANCE AND MANAGEMENT ENTITY ACTIVITY

The extensive horticulture experience UC Davis and the Consortium bring to the management of the Horticulture Innovation Lab gives tremendous value to this program and to USAID. The Management Entity at UC Davis uses this expertise and previous experience to develop strategic plans for promoting the benefits of horticultural crop production and marketing to improve livelihoods in developing countries. Our locally led approach, with support from this global expertise, positions the Innovation Lab to determine research priorities and develop requests for proposals that will meet the local needs, increase local capacity, and promote the sustainability and scalability of the program deliverables.

The Management Entity of the Horticulture Innovation Lab is structured to minimize administrative overhead, ensure flexibility and transparency, and foster collaboration between institutions in the United States (including within the Consortium) and the developing world in building capacity for horticultural
research, outreach and implementation. A unique feature of the current iteration of the Horticulture Innovation Lab is the structure of the Consortium which consists of Partners (with broad expertise in biophysical, social, and economic sciences), Specialists (expertise in high priority areas of gender equity, youth engagement and nutrition), and Scaling Partners (expertise in wide dissemination of hard and soft technologies). The Management Entity coordinates the Consortium’s global expertise to collaborate with in-country experts to solve challenges and pursue opportunities in the horticulture sector.

The International Advisory Board will play a key role in ensuring the Horticulture Innovation Lab is positioned to achieve its programmatic research objectives set internally and guided by Feed the Future. The Advisory Board will consist of both global and regional experts in horticulture, economics, policy, nutrition, gender-equity, and youth engagement. During the first half of FY2022, potential board members have been defined and Terms of Reference finalized. In the second half of FY2022, individuals will be selected to serve on the Board, and a first Board meeting will be held.

XI. OTHER TOPICS

Key infrastructure for the Horticulture Innovation Lab was put in place during the first half of FY2022. The Piestar Database, a data and reporting collection system that aligns with the various USAID reporting requirements (Semi-Annual and Annual Reports and project reports, EMMP) and databases (DIS, Research Rack Up, DDL, DEC, TEAMS) have been established and customized, and Management Entity staff trained. The Horticulture Innovation Lab has also updated their existing website to match the structure of the new program, including our Consortium and new mission statement, and the site is prepped for the development of webpages dedicated to new projects, partnerships, and collaborators. A Horticulture Research Demonstration Center on the UC Davis campus has been maintained and prepared for visits from researchers, community members, and international stakeholders. Additionally, the Horticulture Innovation Lab will develop the first draft of a Locally-Led Toolkit for Innovation Lab’s which will be submitted to Innovation Lab Affinity Group focused on increasing locally-led research initiatives. Finally, the Horticulture Innovation Lab significantly progressed in finalization and approval of key programmatic documents.

XII. ISSUES

No significant issues. As anticipated, with a newly started Innovation Lab, the Horticulture Innovation Lab needed to go through several administrative approval steps to initiate on-the-ground activities, on-board Consortium Specialists, and hire staff.

There has been some delay in awarding projects Horticulture Innovation Lab using a locally-led globally supported approach. The Innovation Lab aims to being responsive to regional priorities and thus need to wait for the local organizations to hold the regional workshops and receive the resulting reports before research projects are developed and Requests for Proposals released. However, the Horticulture
Innovation Lab believes that these research projects will ultimately be more effective and resulting innovations will scale more quickly in these communities. Regardless, the Innovation Lab has had to navigate specific issues related to working with local entities, including vetting multiple local partners instead of going with well-known U.S.-based institutions, and mitigating risk for UC Davis by working through financial intermediaries. The Horticulture Innovation Lab will to capture these lessons and provide guidance for other Labs through the creation of the first draft of the Locally-Led Toolkit for Innovation Labs. Additionally, due to the pandemic, UC Davis is experiencing staffing shortages and taking significantly longer than usual to process contracts.

XIII. FUTURE WORK

In the second half of FY2022, the Horticulture Innovation Lab’s four Regional Workshops will be held in Ghana, Kenya, Nepal and Honduras. Based on the data and perspectives collected during the workshop and produced into four regionally-specific reports, the Horticulture Innovation Lab Management Entity and Consortium will develop and release requests for proposals for Market-Oriented Research for Empowerment projects and select awardees prior to the close of FY2022. Additionally, innovation network mapping through data collection and analysis will be completed in the second half of FY2022, and serve as a baseline for measuring the impact of the overall Horticulture Innovation Lab program.

Research activities for the two Critical Engagement Projects described earlier in this report will start in the second half of FY2022 in Kenya and Nigeria.

In terms of governance and structure, the Horticulture Innovation Lab will complete the creation of the International Advisory Board and hire additional staff (communications, graduate student assistants) by the end of FY2022. An initial meeting of the Advisory Board will be held in the second half of FY2022, as well.

Trellis Fund Fellowship program planning will begin in the second half of FY2022. This program will connect graduate level researchers from Minority Serving Institutes in the United States with in-country organizations to complete year-long, small-scale research projects in the horticulture sector. The planning for the Trellis Fund fellowship will be in close collaboration with Consortium Partner, Florida Agriculture and Mechanical University.
APPENDICES

APPENDIX A. LIST OF AWARDS GIVEN TO PARTNERS
In the first half of FY2022, with the exception of establishing agreements with Horticulture Innovation Lab Specialists (Hillary Proctor from Making Cents International, Christine Stewart from the Institute for Global Nutrition and Janelle Larson from Penn State) for their expertise and engagement in the program, no awards were given to partners.

Within the next month or two, awards will be given to Zamorano University, University of Ghana, and the International Center for Evaluation and Development for the Regional Workshops, and to Jomo Kenyatta University of Agriculture and Technology, GROOTS Kenya, and Wageningen University for the two Critical Engagement Projects.

APPENDIX B. RESEARCH PROJECT REPORTS
No individual project reports at this time.

APPENDIX C. ASSOCIATE AWARD RESEARCH PROJECT REPORTS
No Associate Awards to report at this time.

APPENDIX D. SUCCESS STORIES
To be reported in Annual Report.

APPENDIX E. PUBLICATIONS
No publications to report at this time.