Feed the Future Innovation Lab for Livestock Systems
Institute of Food and Agricultural Sciences, University of Florida

Request for Applications (RFA) for Research and Capacity Building in Burkina Faso, Ethiopia, Nepal, Niger, and Rwanda
RFA No. AID-OAA-L-15-00003-LSIL-05

Important dates[1]

Release date	June 1, 2021
Deadline for submission of written questions[1]	June 15, 2021
Posting of responses to written questions on Piestar RFx	June 17, 2021
Deadline for submission of Concept Notes for Reach[2] and Focus[3] projects	July 6, 2021
Notification about acceptance of Concept Notes and invitation to submit full proposal	*approximately 2 weeks after Concept Note submission*
Deadline for submission of full proposals	*6 weeks after invitation*

Notes:

All Concept Notes must be submitted before 11:59:59 PM Eastern Daylight Time (Florida time) on the date indicated above. Please submit your Concept Note well before the deadline to avoid last minute problems or technical issues with the submission. The Livestock Systems Innovation Lab will not accept Concept Notes submitted after the deadline regardless of any technical or other problems. Invitations to submit full proposals are scheduled to be sent to the shortlisted applicants approximately two weeks after the deadline for submission of Concept Notes. Full proposals must be submitted by the deadline indicated in the invitation.

Organizations can submit more than one Reach or Focus project proposal. Proposals must be from institutions, not individuals. Individuals can be involved in more than one proposal. See page 17 for more details.

[1] In order to maintain the integrity of the competitive process, the Management Entity (ME) of the Livestock Systems Innovation Lab will only provide written answers to written inquiries about the RFA that are submitted to livestock-lab@ufl.edu by the deadline indicated above. Please note that USAID staff, including Mission staff, will be unable to advise or provide information to potential applicants that will be used in preparing a proposal. Therefore, applicants are advised not to contact University of Florida faculty or staff, USAID Missions staff or any other USAID staff members regarding this RFA, except to submit written questions to the Livestock Systems Innovation Lab by the stated deadline.

[2] Reach grants are longer term large subawards for projects lasting up to three years with budgets of up to $750,000. See page 8 for more details.

[3] Focus grants are smaller subawards for projects lasting up to one and a half years with budgets of up to $125,000. See page 8 for more details.

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ACRONYMS

AOI	Area of Inquiry
ASF	Animal-source foods
CAGED	Campylobacter genomics and environmental enteric dysfunction project
CCT	Cross-cutting Theme
CFR	Code of Federal Regulations
CGIAR	Consultative Group for International Agricultural Research
DUNS	Data Universal Numbering System
EED	Environmental Enteric Dysfunction
FAO	Food and Agriculture Organization of the United Nations
FTE	Full time equivalents
FY	U.S. Federal Fiscal Year
GBAD	Global Burden of Animal Diseases
GDP	Gross Domestic Product
IFAS	Institute of Food and Agricultural Sciences
ILRI	International Livestock Research Institute
LCD	Local Capacity Development
ICRISAT	International Crops Research Institute for the Semi-Arid Tropics
IITA	International Institute of Tropical Agriculture
INERA	*Institut de l'Environnement et de Recherche Agricole* / Environmental Institute for Agricultural Research
LMIC	Low – Middle Income Countries
LSIL	Feed the Future Innovation Lab for Livestock Systems, aka Livestock Systems Innovation Lab
ME	Management Entity
M&E	Monitoring and Evaluation
NGO	Non-governmental Organization
PI	Principal Investigator
R4D	Research for Development
RFA	Request for Applications
SAM	System for Award Management
SDN	Specially Designated Nationals
UF	University of Florida
UNICEF	United Nations Children's Fund
USAID	United States Agency for International Development
WaSH	Water Sanitation and Hygiene
WHO	World Health Organization

INTRODUCTION

The estimated impact on the global economy of malnutrition in all its forms could be as high as US$3.5 trillion per year, or US$500 per individual (UNICEF/WHO/World Bank, 2021). Micronutrient deficiencies and undernutrition are estimated to cost US$1.4–2.1 trillion per year, equivalent to 2 to 3% of global Gross Domestic Product (GDP) (FAO, 2013). Stunting, a summary measure for chronic malnutrition, affected an estimated 22% or 149 million children under 5 globally in 2020 (UNICEF/WHO/World Bank, 2021). Poor nutrition in-utero and early childhood can result in stunted growth, with devastating and irreversible physical and cognitive damage, as the brains of the children may never develop to their full potential. Consequently, academic performance, productivity, and earning potential are severely impacted.

While the number of countries with very high prevalence of stunting has declined from 67 to 33 since 2000, stunting continues to be prevalent in South Asia and Sub-Saharan Africa, with many countries still having rates exceeding 30%. World Bank researchers (2018) estimate that the GDP of African and Asian countries is reduced by 10% on average due to the lifetime effects of stunting. Furthermore, the 2020 State of Food Security and Nutrition in the World estimates that between 83 and 132 million additional people will experience food insecurity as a direct result of the COVID-19 pandemic (FAO et al., 2020).

Animal-source foods (ASF) are the best, high quality nutrient-rich foods for 6–23-month-old children (WHO, 2014). Young children have limited gastric capacity, so dense and nutrient bioavailable foods are best suited to meet their high nutrient needs. In addition to being a good source of the highest quality protein, ASF provide omega-3 fatty acids, iron, iodine, zinc, folic acid, and vitamins A, D3, and B12 in bioavailable forms. Yet, 59% of children worldwide are not fed much-needed nutrients from ASF (UNICEF, 2019).

Enrichment and diversification of diets of vulnerable populations, particularly infants, children, and pregnant and lactating women in Low – Middle Income Countries (LMIC) with ASF can prevent or reduce the devastating impacts of stunting and malnutrition. Growing evidence underpins the importance of ASF consumption. A meta-analysis by Pimpin et al. (2019) documented a positive relationship between increased ASF consumption, higher birth and child weights, and reduction in stunting. A strong association between ASF consumption and reduction in stunting was documented by Headey et al. (2018). Studies by the Feed the Future Innovation Lab for Nutrition (Zaharia, 2021) that included 7079 infants across Uganda, Nepal, and Bangladesh found that increased ASF consumption was associated with greater linear growth and lower stunting. Iannotti et al. (2017) showed that consumption of one egg a day by infants in Ecuador reduced stunting by 47%, but partly due to subsequent lack of egg consumption, no effects were evident two years later (Iannotti et al., 2020). A similar study in Malawi (Stewart et al., 2019) showed that ASF consumption did not reduce infant stunting, partly due to high fish consumption in the basal diet, but it did increase linear growth and head circumference, a measure of cognition. A randomized controlled study by McKune et al. (2020) in Burkina Faso showed reduction in wasting and underweight due to increased consumption of eggs by infants under two years of age.

Livestock farmers are more likely than their counterparts to consume ASF (FAO, 2009, Hoddinott et al., 2015; Choudhury and Headey, 2018). Raising livestock can diversify income sources for smallholders facing climate change (Jones and Thornton, 2009), yet a 2007 World Bank study shows that households that rely on agriculture, including livestock production for their livelihoods, are among those that are significantly food and nutrition insecure. This is partly due to use of the income from livestock for purposes other than improving diet diversity and quality, and partly due to inadequate knowledge about their importance.

More research, capacity building, and awareness creation is needed to demonstrate the vital importance of ASF in the diet of the vulnerable and to ensure that sufficient safe and nutritious ASF are affordable, accessible, and available to enhance diets and livelihoods of the vulnerable and to increase their resilience. A multi-pronged approach is needed to reduce livestock production and productivity impediments and costs, barriers to market access, and other cultural and socioeconomic factors restricting consumption of ASF. Continuation of such trends will threaten the livelihoods, welfare, and existence of vulnerable populations.

This Request for Applications (RFA) focuses on Burkina Faso, Ethiopia, Nepal, Niger, and Rwanda. The research for development priorities for all target countries were developed based on Phase I research findings and stakeholder consultations between September 2020 and March 2021.

All subaward projects funded in response to this RFA should be designed to directly or indirectly improve the nutritional status and health of vulnerable households and livestock producers, especially pregnant and lactating women and children with climate-smart approaches or technologies.

LIVESTOCK SYSTEMS INNOVATION LAB

The U.S. Agency for International Development (USAID) awarded the University of Florida (UF) Institute of Food and Agricultural Sciences (IFAS) funds to establish the Feed the Future Innovation Lab for Livestock Systems (LSIL) and to act as its Management Entity (ME). This ten-year initiative (Phase I 2015-2020, Phase II 2020-2025) supports USAID's agricultural research and capacity building work under Feed the Future, the U.S. Government's global hunger and food security initiative. The International Livestock Research Institute (ILRI) continues as the main partner of LSIL.

The ME funds and manages a global research for development program with over 40 country-focused and demand-led research and capacity building projects, which are mostly implemented through competitive research subawards.

Vision and Objectives

The vision of LSIL is to sustainably intensify smallholder livestock systems to improve the nutrition, health, livelihoods, and incomes of vulnerable people. This vision is achieved through research, technology application, capacity building, and knowledge generation.

The objectives of LSIL are to:

- sustainably improve livestock productivity and marketing and ASF consumption using appropriate improved technologies, capacity development, and policy advocacy;
- increase the resilience of vulnerable populations;
- reduce the environmental impact of livestock systems; and
- advance the understanding of evolving livestock systems and their roles in food security, nutrition, and health.

In Phase I, LSIL research led to innovative strategies to: 1) improve livestock feeds and feeding; 2) increase ASF consumption; 3) improve livestock disease surveillance and mitigation; 4) strengthen markets; 5) improve food safety; 6) foster a conducive livestock policy environment; and 7) model effects of externalities on livestock systems in the future.

In Phase II, LSIL will continue working in these areas, with a stronger emphasis on improving resilience of vulnerable people, increasing dietary diversity and adequacy with ASF by reducing ASF production costs, increasing ASF safety, improving ASF markets, and reducing barriers to ASF consumption.

Approach

Building on Phase I research findings, the LSIL will achieve its vision and objectives through an integrated approach that accomplishes the following: 1) identifies and prioritizes critical ASF production and marketing constraints and opportunities in an integrated, participatory, and inclusive manner; 2) employs multidisciplinary, integrated research for development to provide location-appropriate innovations (technologies and practices) that will increase production, consumption, and sales of ASF in a climate-smart and environmentally sustainable manner; 3) adopts a One-Health approach that minimizes the risk of spreading zoonotic diseases and causing environmental enteropathy; 4) increases adaptation of livestock systems to climate change; 5) increases income generation by and nutritional status of vulnerable people, particularly women and youth; 6) integrates human nutrition and behavior change into ASF production and marketing efforts; and 7) builds on current and previous pertinent USAID, Bill & Melinda Gates Foundation, and other funded projects and activities and leverages their data and findings. The projects that will be selected in response to this RFA will form an integral component of the LSIL's strategy for achieving its vision.

Contributing to post-pandemic recovery

The societal impacts of the COVID-19 pandemic have been and continue to be significant across the world. In addition to the immense human loss, the pandemic also resulted in drastic changes in agricultural supply and demand. Like other farmers, livestock keepers have faced severe challenges from COVID-19 related restrictions on movement of people and products, including market closures (Jaquez et al., 2020 Arasio et al., 2020; FAO, 2020). Tesfaye et al. (2020) reported a temporary drop in fresh milk consumption in Ethiopia (Tesfaye et al., 2020), and chicken consumption decreased in India (Mahendra Dev, 2020) due to the misconceptions that the virus could be spread through livestock products as well as constraints on ASF distribution imposed by the COVID-19 restrictions. Changes in livestock ownership were also caused by the pandemic (Amankwah and Gourlay, 2021) across five illustrative African countries (Burkina Faso, Ethiopia, Malawi, Nigeria, and Uganda). In Nigeria, about 19% of households that did not own/raise livestock pre-pandemic are doing so now whereas about 15% that owned/raised livestock before the pandemic are no longer doing so. A similar increase was reported for Malawi. In Uganda, however, there have been more households exiting livestock production (17%) than those starting (10%). Across countries, the percentage of households going into livestock production due to the pandemic appears higher than those transitioning into crop farming, perhaps due to the seasonal nature of crop production compared to livestock farming (Amankwah and Gourlay, 2021).

The Phase II research should contribute to post pandemic recovery through, for example:

- Innovative trading practices involving mobile communication and fund transfers
- Resilient livestock and livestock product trade and distribution channels that can withstand external shocks with minimal disruptions
- Prevention and control measures against (zoonotic) livestock diseases
- Strategies to improve the processing of ASF to increase shelf life and attain/maintain high food safety standards
- Approaches to overcome barriers to ASF consumption, particularly among smallholders in rural areas.

Contributing to climate change mitigation and adaptation

Livestock systems are impacted by climate change mainly through increasing temperatures, precipitation variation, as well as atmospheric carbon dioxide (CO_2) concentration and a combination of these factors (IPCC, 2019). Temperature affects most of the critical factors determining livestock productivity, such as water and feed availability and intake, animal production and reproduction, and animal health—mostly through heat stress. The prevalence of livestock diseases is often increased by increases in temperature and precipitation variation (Rojas-Downing et al., 2017). Pastoral systems are more vulnerable to climate change than others and this is further exacerbated by various non-climate factors (land tenure, sedentarization, changes in traditional institutions, invasive species, lack of markets, and conflicts, among others). Adaptation to climate change research could focus on validating the improved productivity and nutritive value of forage hybrids and fostering adoption of those that are more tolerant of drought, disease, and/or heat stress. Livestock research could also focus on mitigating heat stress and diseases using improved management strategies and technologies.

With its global emissions estimated at 7.1 gigatons CO_2 -eq per annum, representing 14.5% of human-induced greenhouse gas emissions, the livestock sector plays an important role in climate change (Gerber et al., 2013). Within agriculture direct emissions from livestock production accounted for an estimated 65, 57, and 31% of emissions in South, East, and Southeast Asia, respectively. In Western, Eastern, Central, and Southern Africa in 2010, respective values were 76, 75, 36, and 62%. Although livestock contribute higher shares to agricultural greenhouse gas emissions in Sub-Saharan Africa, in 2010, total greenhouse gas emissions from livestock there amounted to less than 40% of those in Asia (Otte et al., 2019). Additional livestock sector-related emissions come from land use change for animal feed production, as well as product storage, processing, and transport.

Research proposals should outline strategies that may contribute towards making livestock systems carbon neutral or positive. Important options to limit sector emissions include increasing productivity per unit through feed, health, and manure management; breeding and prompt culling strategies; limiting and even sequestering carbon emissions from grazing lands and silvopastoral systems; and shifting demand away from higher emitting livestock species (e.g., cattle) toward lower emitting species (e.g., poultry) (Gerber et al., 2013; Havlik et al., 2014). Note that mitigation policies targeting land use change are five to ten times more efficient that policies that solely target livestock.

Food loss and waste is a global problem that reduces the profitability of farming, including livestock production, wastes limited resources, and contributes substantially to global food insecurity. In addition, food loss and waste contribute to global warming directly through emissions from the wasted food as well as those from inefficiencies that lead to the waste. Research should develop sustainable, climate smart approaches to reducing food loss and waste that benefit people, animals and the environment. Such research should contribute towards making livestock-based food systems more circular, or better still more spherical, by integrating One-Health principles.

Proposals should meaningfully contribute to adaptation to and/or mitigation of climate change by validating and/or fostering adoption of strategies to reduce emissions or facilitate adaptation to climate change. Only climate-smart technologies or approaches that will help to sustainably intensify livestock systems in the target countries will be funded. It should be noted that viable pathways to sustainable agricultural intensification vary by location and scale and are based on the agro-ecological zone, farming system, cultural preferences of farmers, and influence of institutions and policies, among other factors.

Types of Projects

The following types of projects will be funded:

(1) **LSIL Reach projects:** These are longer term, large grants issued as subawards to the lead organization for projects lasting up to three years with budgets of up to $750,000. Reach projects will commonly involve multiple partners and employ an integrated, interdisciplinary approach involving both research and capacity development components; however, the primary focus should be on research. The minimum requirements for all Cross-cutting Themes (CCTs) described below must be addressed, and one should be addressed meaningfully. Reach projects must employ an interdisciplinary research approach by integrating one primary and at least one secondary Area of Inquiry (AOIs, described below).

(2) **LSIL Focus projects:** These are shorter term, smaller grants issued as subawards to the lead organization for projects lasting up to a year and a half with budgets up to $125,000. Focus projects should address a proof of concept or conduct research for development bridging studies that will yield near-term beneficial impacts. Focus projects should focus on at least one AOI and one or more CCTs. Where applicable, PIs can describe possible follow-on research projects that could be implemented after the initial Focus project ends. These follow-on proposals may be considered for additional funding at a later stage.

Both Reach and Focus grants will be awarded through a **two-step process** involving the submission of a Concept Note (see Guidelines below), followed by a full proposal if the applicant team is invited to do so.

The LSIL ME reserves the right to ask applicants to make changes to the budgets, scope, timing, and locations of proposed activities or to combine proposals. Each applicant's responses to such requests will be considered during the selection process.

Geographical Focus

This RFA focuses on Burkina Faso, Ethiopia, Nepal, Niger, and Rwanda. Research should take place in the Zones of Influence (ZOI) in the respective countries (Table 1). A ZOI is a group of targeted sub-national regions/districts where USAID and the United States Government intends to achieve the greatest household- and individual-level impacts on poverty, hunger, and malnutrition. Proposals will need to justify the choice of the target country and ZOIs with appropriate references and supporting statistics. However, we understand that certain research topics, such as policy research or modeling, may require a nationwide approach or may include areas outside the ZOI.

Table 1. Overview of Zones of Influence in target countries

Country	Zone(s) of Influence
Burkina Faso	Est, Sahel, and Centre-Nord regions
Ethiopia*	Afar Region: Zones 1 and 3; Amhara Region: Zones Awi, Debub Gonder, Maekelawi Gonder, Mirab Gojjam, Semen Wello, Waghimra; Dire Dawa Astedad: Zone Dire Dawa; Oromiya Region: Zones Arsi, Balem Borena, Guji, Jimma, Mirab Arsi, Mirab, Hararghe, Mirab Shewa, Misrak Hararge, Misrak Shewa, Misrak Wollega; Southern Nations, Nationalities, and Peoples (SNNP) Region: Zones Bench Maji, Gedeo, Gurage, Hadiya, Kefa, Sidama, Silite; Somali Region: Zones Dawa, Fafan, Jerer, Liben, Siti; Tigray Region: Debub Misrak, Debubawi, Mehakelawi, Misrakawi, Semen Mirab
Nepal	Far-western region (6 districts): Achham, Baitadi, Dadeldhura, Doti, Kailali, Kanchanpur; Mid-western region (10 districts): Banke, Bardiya, Dailekh, Dang, Jajarkot, Pyuthan, Rolpa, Rukum, Salyan, Surkhet; Western region (4 districts): Arghakhanchi, Gulmi, Kapilvastu, Palpa
Niger	Dosso, Tillabéri, Maradi, and Zinder regions
Rwanda	The ZOI excludes only the 3 districts that comprise Kigali City (Gasabo, Kicukiro, and Nyarugenge districts). All other 27 districts apply across 4 provinces – Northern, Southern, Eastern, and Western.

* For details on the target woredas in each of the zones in Ethiopia, please refer to the Ethiopia overview document available from the LSIL webpage https://livestocklab.ifas.ufl.edu/countries/ethiopia.

Areas of Inquiry

Each proposed research for development project should integrate one primary and at least one secondary AOI. Each project is also required to develop policy recommendations for the target country government based on the research findings.

(1) Livestock Production & Disease Management

According to Enahoro et al. (2019), between 13% and 42% of the rural population in the target countries are estimated to be poor livestock keepers (those that live below nationally defined poverty lines and keep livestock). Livestock productivity in these countries is typically suboptimal, partly due to issues such as challenging climatic conditions that cause periodic feed scarcity, lack of a market orientation among producers, limited knowledge about improved practices, and lack of resources required to improve productivity. Therefore, innovative approaches and technologies coupled with strategic collaborations among animal production and health professionals in academia, government, and the private sector[1] are

[1] USAID Private Sector Engagement Policy defines the "private sector" as encompassing the following: "for-profit, commercial entities and their affiliated foundations; financial institutions, investors and intermediaries; business associations and cooperatives; micro, small, medium and large enterprises that operate in the formal and informal sectors; American, local, regional, and multi-national businesses; and for-profit approaches that generate sustainable income (e.g., a venture fund run by a non-governmental organization (NGO) or a social enterprise)." (page 6)

needed to tackle the diverse challenges associated with livestock production systems in the target countries.

Livestock production

In addition to the above challenges, livestock productivity, processing, and marketing are also hampered by inaccessibility or unaffordability of inputs and lack of important information such as market prices for ASF. Furthermore, along the various ASF product value chains, inefficiencies exist because of poor infrastructure, limited transport or inadequate refrigeration. These often result in increased costs, which make ASF products less accessible or affordable, especially to vulnerable groups. Research should address one or more of these areas:

- **Resilient livestock systems:** Research the feed and forage supply chains for peri-urban and pastoralist production systems in order to align production with demand, increase resilience, and provide opportunities to transition from pastoral to agropastoral systems.
- **Feed price-quality relationship:** Devise strategies to establish quality-based pricing systems for forage such as by demonstrating potential livestock production and economic gains that would result from using higher quality forages to smallholders and introducing forage quality indices.
- **Milk preservation:** Examine sustainable alternative cooling strategies that improve milk quality and safety, and assess strategies to maintain milk quality during transport, handling, and processing at collection centers to ensure better quality safe milk is provided to consumers.
- **Reducing production costs to reduce prices of animal-source foods:** Study the main factors contributing to high cost of ASF and determine the efficacy of using promising approaches to reduce production costs, increase farm profits, and reduce ASF prices. An example is by validating the potential to replace expensive concentrate ingredients in livestock rations with cheaper, underexploited, locally available agroindustrial byproducts or co-products.

Disease management

A high burden of infectious and/or metabolic diseases can have a detrimental effect on food security, access to ASF, human nutrition, as well as income from livestock sales. Livestock diseases can have direct, severe, and widespread repercussions on the productivity, profitability and existence of livestock systems. Public health services in the target countries sometimes struggle to control, let alone prevent, the spread of diseases. The urgency of this area of research is evident from the pandemic as well as from the growing livestock numbers and spread of infectious and zoonotic diseases among livestock and humans. The research scope includes:

- **Improved disease management:** Research to pilot improved disease management practices and innovative delivery methods. The research should use a One-Health approach to contribute to healthier human populations and environments at the household, village, regional, and national levels.
- **Epidemiology and economics:** Research to estimate economic impacts of diseases and mortality on livestock production and revenue at the household, village, regional, and national levels. For research results to contribute to the Global Burden of Animal Diseases (GBAD) initiative, data should be collected on animal populations (by age, sex and breed; a description of the production system), production parameters (e.g. mortality, growth curves, egg production), prices (e.g. live animals, animal source proteins, livestock fibers, draught power, manure, skins and byproducts), resource use (e.g. infrastructure, veterinary services and medicines, labor) and disease (levels and impacts on production parameters and market access). A full description of the analytical

structures and data needs can be found here: www.animalhealthmetrics.org/coreanalytics. In addition, research on the return on investment from a range of existing or new animal-health interventions could be conducted to inform policy.

- **Public-Private Partnerships:** Research to assess the need to formulate, implement, and evaluate PPPs for delivery of animal-health services in target countries, in consultation with the local public and private stakeholders. This could address: 1) research/extension partnerships for delivery of animal health services; 2) operation of accredited private laboratories; and 3) other initiatives of interest to target country stakeholders.

(2) Human Health, Food Safety & Diets and Nutrition

Human growth and development are complex, multifactorial processes, and no single intervention can adequately address all underlying causes of impairment. This AOI encompasses two realms of research:

Safe livestock production and food safety

Impaired childhood growth and development can be due to increased exposure to diarrhea-causing pathogens that originate from livestock reservoirs, which are increasingly recognized as causative agents of environmental enteric dysfunction (EED). Research should seek to improve the safety of ASF from production to consumption. This realm emphasizes a One-Health approach to Water Sanitation and Hygiene (WaSH) that includes reducing exposure to livestock-borne pathogens. Research should address one or more of these areas:

- **Human-livestock interactions:** Research to better understand and mitigate the risks of human-livestock cohabitation in smallholder households. This could include: 1) source attribution studies to better understand and quantify the contribution of different livestock species to exposure of children to enteric pathogens; 2) comparative exposure and risk assessment studies; 3) intervention trials of cost-effective and sustainable methods of separating children from livestock and their excreta, and 4) studies on how collection and use of livestock manure as a resource in smallholder settings contributes to reducing exposure of children to pathogens.
- **Food safety:** Research to assess the risks and to test culturally appropriate interventions to improve the microbial safety of ASF that are consumed raw or with inadequate processing for safety, as well as ready-to-eat ASF. Pathogens of concern are primarily bacteria and protozoa with putative animal reservoirs, but research could also examine pathogens with exclusively human reservoirs, because ASF contamination can occur during intensive handling throughout the value chain.
- **Risk-benefit assessment of aflatoxin:** Research should integrate existing data into risk assessments that may support deriving appropriate standards for safe levels of aflatoxins in animal feeds, milk, and other dairy products. Application of US or European standards may be inappropriate for target countries, yet these are used given the absence of country-specific standards. Proposals should outline research that will allow countries to develop more relevant and feasible standards while balancing the risks for animal and human health with the nutritional benefits of ASF, particularly for vulnerable groups.

Consumption, dietary diversity and adequacy

Diverse and healthy diets, which include nutrient-dense foods, particularly ASF, are often rare in vulnerable populations. Low consumption of ASF/nutrient-dense foods can lead to sub-optimal nutrition and health outcomes. Increasing consumption of ASF is more complicated than increasing production of ASF, as it may be additionally constrained by cost, value of ASF, markets, and cultural norms and behavior. Research under this theme should focus on one or more of the following:

- **ASF production impact:** Research to understand the impact of increased livestock production or productivity on human nutritional outcomes. This research will build on existing evidence and address knowledge gaps identified in existing studies to better translate livestock production and productivity gains to ASF consumption and improved, diverse diets.
- **Overcoming barriers to ASF consumption:** Research to identify and overcome cultural, economic, and structural barriers to ASF consumption by vulnerable populations. These may include household-level interventions, community based social marketing, market-based research, or policy-level intervention and/or analysis. Studies that examine strategies to increase ASF affordability, availability, and accessibility and their effects on ASF consumption are encouraged. Consider assessing approaches to overcoming barriers that provide evidence from multiple countries and have strong potential to scale. Due to the challenges and cost of designing studies with sufficient statistical power to detect ASF consumption effects on stunting and child development outcomes, studies can be powered for nutritional and child development indicators like minimum acceptable diet, minimum dietary diversity, minimum meal frequency, head circumference, etc.
- **Behavioral change for ASF consumption:** Research to increase the current knowledge base on specific behavior change strategies to increase ASF consumption. This will include improved understanding of the relationship between nutritional and livestock-related knowledge, attitudes, practices, and ASF consumption. Research should seek to understand the contexts in which behavior change strategies increase ASF consumption (e.g., proximity to markets, conducive current cultural practices and norms; income/poverty thresholds, etc.).

(3) Markets & Innovation Translation

The rationale for this new AOI is to address challenges beyond the farmgate, namely, market access and performance and pricing of ASF and livestock. Research addressing the "Markets" component of this AOI can address demand-side issues (e.g., the effect of nutritional knowledge on ASF consumption), supply-side issues (e.g., farm productivity), as well as issues at the intersection of supply and demand (e.g., how the previously mentioned mechanisms affect prices), but not necessarily all three of these dimensions. Research should take into consideration monetary (e.g., income or profits) and non-monetary (e.g., nutrition) dimensions of welfare when evaluating effectiveness of interventions, and the linkages between these different dimensions. Research should focus on value chains prioritized by target country governments and USAID and should be based on experimental designs that yield credible answers to the issues described below. This AOI will also address research on scaling pathways to ensure that generated innovations reach and are adopted by the target users. Research areas include:

- **ASF marketing:** Research into the potential of new market opportunities supported by supply and demand-side data (e.g., adoption rates for the former and willingness-to-pay studies for the latter). The research into market innovations will target the entire value chain, from livestock production to processing and distribution (and even to ASF consumption where appropriate). Research could examine improvements in market performance with demonstrable benefits to women and youth (monetary or otherwise), particularly through increased entrepreneurial opportunities.
- **ASF pricing:** Research that monitors and improves understanding of availability and prices of ASF in markets across seasons and geographies. Information from such studies is critical for examining the links between increased access and affordability of ASF, ASF consumption, and household/community level resilience.

- **Market performance:** Research on market diagnostics that considers market functionality at the micro and aggregate levels while viewing market performance through the lens of resilience. Research could examine improving market access for smallholders and pastoralists; how the resilience of livestock trade, markets and market actors (particularly women, youth, and marginalized groups) are affected by stressors like conflict, climate, and disease e.g. the COVID-19 pandemic in particular) and market actors (particularly women, youth, and marginalized groups) are affected by stressors; how existing policies affect the stressors; and how the private sector can be engaged to alleviate the stressors. Proposals could also assess if and how certain policies, strategies, or actors helped to alleviate the impact of COVID-19 on livestock systems, markets, and actors.
- **Market-based solutions:** Research on a market-based approach to challenges associated with other AOIs and CCTs. Examples include creating incentives for improved delivery of extension and animal health services, increasing affordability of ASF for better nutrition, increasing participation by women and youth in commercial livestock value chains, as well as testing interventions that support enabling environments for thriving livestock markets.
- **Scaling of innovations:** Research that goes beyond catalyzing scaling to compare alternative scaling pathways or design scaling strategies in ways that allow robust analysis of adoption. Project teams should also consider conducting market research studies for anticipated innovations. Engaging diverse private-sector actors along ASF value chains will be crucial for scale up. Proposals emphasizing innovation translation should outline strategies to ensure inclusive and sustainable private-sector solutions that include recruiting and training of youth and women entrepreneurs and encourage developing business plans and sourcing complementary/alternative financing.

Scaling Emphasis

Apart from proposals focused on analyzing innovation scaling, all other proposals must describe potential applicability, relevance, feasibility, and likelihood of scaling of the anticipated results of the work they propose to undertake and how demand was assessed for the prospective findings and innovation(s) arising from the work (see "Requirement' section below). The product life cycle framework (Mercer D., 2005) should be used to verify that proposed innovations will meet the needs of end users. It should reflect partnerships and strategies to achieve scale as the proposed innovation moves from market research, through discovery and proof of concept, to validation and commercialization, and delivery.

Proposals must demonstrate that the research design will create a foundation for scaling of successful interventions beyond the lifetime of the grant. Key aspects of a strong scaling foundation include documenting support from potential users of innovations in the proposal submitted, as well as creating a plan for collecting data that will credibly demonstrate interest in successful innovations among relevant consumers and producers. Researchers are encouraged but not required to build qualitative or quantitative assessments of different scaling pathways directly into their research designs.

Cross-cutting Themes

The CCTs described below are fundamental to the work of LSIL and are complementary to the AOIs. Consequently, Reach project proposals must address the minimum requirements for all CCTs and should address one CCT meaningfully and deeply. For Focus project proposals, at least one CCT must be integrated.

(A) Local Capacity Development
In Phase II**,** the LSIL will follow USAID's forthcoming approach to local capacity development (LCD). The LCD efforts should focus on improvements in management, governance, strategic planning, monitoring, evaluation and learning, plus collaboration and creating social value through organizational and institutional strengthening. In particular, proposals should focus on improving capabilities of livestock research organizations (collective ability) and competencies (of individuals within the broader research organization system) and apply LCD systems-wide approaches to engage policy and key decision makers to support and sustain changes in the system.

Focus and Reach proposals must address local capacity development needs as they relate to the proposed research and to the partners' expressed concerns and needs. Proposals should develop an LCD plan that is integrated with the research hypothesis, objectives, and activities, and that strengthens capacities at the local partner level. The capacity development efforts should also consider other CCTs. Applicants are encouraged to opt for professional development activities instead of short-term training to create a pipeline of diverse skills for livestock research systems. At a minimum, proposals should include:

- the anticipated beneficiaries, how beneficiaries are to be selected, and proposed LCD approach
- a professional development plan for any graduate degree training
- a sustainability or viability plan for any short-term training, e.g., training of trainers, training manuals, organizational commitment, etc. to ensure that capacity development is carried forward

Examples of potential beneficiaries include universities (faculty, students, staff, and administrators), national agricultural research organizations (researchers and administrators), government agencies, smallholders, private sector actors, and non-governmental organizations (NGOs). Applicants are encouraged to involve students (undergraduate and/or graduate), post-docs and junior faculty. Illustrative examples of LCD activities include, but are not limited to:

- Collaborating with extension services to test improved management practices or facilitate technology adoption by smallholders
- Offering mentorship or fellowship opportunities to junior researchers, faculty, post-docs, and students to provide personalized guidance and build professional networks
- Offering a continuing professional development program for laboratory personnel
- Combining laboratory support with improvements in laboratory management practices to ensure laboratories are safe, well maintained, and run properly and efficiently
- Leadership training in research administration and proper and compliant conduct of research;
- Promoting inter-college or -departmental collaborations within organizations for cross-learning.

The PIs of shortlisted Concept Note proposals must complete a short online module on "Integrating Local Capacity Development in Research Design and Implementation" and submit the certificate of completion with the full proposal via the online Piestar portal.

(B) Gender and Youth
Access and control over productive livestock resources as well as the benefits from livestock production, processing, and marketing are not equitable. Although women play essential roles from the production to consumption of nutritious foods like ASF, they are often disadvantaged in terms of access to information, services, or markets that could improve their livelihoods. Rigid gender roles are a key barrier but not the only one. This CCT pursues an intersectional approach that considers gender and age and, to the extent

possible, other factors that limit opportunities for individuals in the livestock sector, such as caste, race, religion, education, employment, and socio-economic status. Aspects that can be explored include:

- **Women and youth engagement:** Research on how women's and youth engagement in livestock systems contribute to achieving the U.S. Government's Global Food Security Strategy objectives.
- **Women and youth empowerment:** Research on livestock-related strategies to empower women and improve dietary outcomes for children, or how to overcome constraints to technology adoption by women and youth in the livestock sector.
- **Entrepreneurship and private sector engagement:** Research to determine entry points and strategies to overcome barriers to women's and youth involvement in livestock systems, including researching opportunities for entrepreneurship to generate sustainable livelihoods.
- **Gender and nutrition:** Research on the role of boys and men in improving household nutrition.

At a minimum, proposals should include:

- how project beneficiaries will be selected, and an outline of what will be done to target women, other disadvantaged groups, and youth
- how women, other disadvantaged groups, and youth will benefit from the project activities.

Helpful tools for doing so include the Feed the Future Project Design Guide for Youth-Inclusive Agriculture and Food Systems, and resources generated during Phase I. Where appropriate, plan to use the Women's Empowerment in Livestock Index tool to measure women's empowerment.

The PIs of shortlisted Concept Note proposals must complete a short online module on "Integrating Gender and Youth into Livestock Research Projects" and attach the certificate of completion with the full proposal via the online Piestar portal.

(C) Future Livestock Systems & Resilience

The Future Livestock Systems AOI from Phase I was converted into a CCT to ensure that forecasting and resilience are better integrated into research projects. USAID (2021) defines resilience as "the ability of people, households, communities, countries, and systems to mitigate, adapt to, and recover from shocks and stresses in a manner that reduces chronic vulnerability and facilitates inclusive growth." One way to promote resilience is through research that anticipates future shocks and stresses. The minimum requirement for both Focus and Reach projects is to describe how the proposed research and activities will contribute to strengthening resilience. This CCT should be prioritized in research projects targeting Burkina Faso and Ethiopia because these are Feed the Future Resilience countries. Aspects that can be explored include:

- **Future of pastoralism**: Identify elements of pastoralism that make pastoralist groups more resilient and will allow them to prosper in the future despite climate issues, conflict, and socio-economic challenges.
- **Resilient forage systems**: Research can expand Phase I work to generate forage production maps that link water availability with ideal, resilient, and high-yielding forage types. Country-scale and sub-national scale analyses could aid policymakers in identifying and supporting areas of resilient and sustainable forage systems. Modeling research can examine which socio-economic drivers and networks should be targeted to increase domestic feed production.
- **Resilient value chains and networks**: Research can build on Phase I work to expand understanding of the Sahelian livestock trade network. These studies can include how market

networks and value chains are affected by shocks, including conflicts and insecurity, disease transmission, increasing urban populations, corruption, and economic growth. Additional research can examine how livestock markets and trade dynamics can be organized to increase the resilience of poor livestock keepers and food consumers and how national borders and trade policies may affect access to food.

(D) Enabling Environment

The aim of this CCT is to assess and enhance the national context for supporting livestock policies and institutions. The minimum requirement for both Focus and Reach projects is to describe how knowledge generated through the work will be shared with leaders of organizations and the government and how stakeholders will be engaged throughout the life of the project. In each target country, project efforts should complement the LSIL annual multi-stakeholder innovation platform meetings. At a minimum, projects should promote, and document activities, aimed at creating and strengthening sustainable networks between livestock sector stakeholders. Other aspects to explore may include:

- **Political economy analyses**: Consider analyses or other expert reviews of the impact of existing or potential policies on ASF production, food safety, and consumption.
- **Partnership models**: Develop a partnership model directed at scaling or sustaining research findings, with particular attention to private sector engagement.

Theory of Change

The LSIL supports applied research on ways to overcome challenges and take advantage of opportunities within the livestock sector in developing countries, particularly in Sub-Saharan Africa and East Asia. This is accomplished through developing technologies, improving livestock-related practices, and facilitating stakeholder environments to support the research-to-practice pipeline. Through a multi-pronged approach, LSIL engages in four major activities across local, national, and regional levels of the livestock-value chain: 1) supports and conducts research; 2) acquires, integrates and shares knowledge; 3) develops human and institutional capacity across different levels of the livestock-value chain; and 4) develops and engages in strategic partnerships, networks, and communications with stakeholders. (See appendix 1)

Through these four activities, LSIL creates the conditions for four types of change/outcomes:

- **Improved behaviors and practices** of individuals, organizations, and institutions, which contribute to healthy and productive livestock, healthy and empowered people, and healthy and safe environments where ASF is produced and consumed. This is accomplished through developing innovations and training on improved practices.
- **Improved dietary outcomes** by providing knowledge and resources for more balanced diets for the target population, especially for young children and pregnant and lactating women. This is accomplished through nutrition-focused educational programs and through research and practices designed to increase the consumption, availability, accessibility, affordability, and safety of ASF and the health of the environment in which it is produced, thereby contributing to increased household incomes and women's empowerment.
- **Capacitated researchers and research systems** through strengthening the next generation of scientists, collaboratively producing scientific knowledge, partnering with research institutions, and building institutional capacity. This is accomplished through university student training, funding a diverse research portfolio, and providing targeted support for research institutions to advocate for research-based policy change.

- **Enhanced research-to-practice pipeline** through strengthening and empowering stakeholder networks and increasing the knowledge needed to make science-informed policy decisions in the livestock sector. This is accomplished through continuous stakeholder engagement, participatory platforms for stakeholder communication, and knowledge sharing to support decision-making.

Eligibility

This competition is open to any qualified research, educational, governmental, private sector, or non-profit organization that either has or that collaborates with an organization that has a Data Universal Numbering System (DUNS number) and is registered in the System for Award Management (SAM). The status of eligible organizations must be verifiable against both the U.S. Department of Treasury Office of Foreign Assets Control List of Specially Designated Nationals (SDNs) and Blocked Persons, and the United Nations Security Designation List, in accordance with 2 Code of Federal Regulations (CFR) 25.110 (https://www.gpo.gov/fdsys/granule/CFR-2013-title2-vol1/CFR-2013-title2-vol1-sec25-110).

We strongly encourage proposals from and collaboration with U.S. Minority-Serving Institutions. These include, but are not limited to, Historically Black Colleges and Universities, Predominantly Black Institutions, Hispanic Serving Institutions, Tribal Colleges and Universities, and Asian American, Native Alaskan, and Pacific Islander Serving Institutions.

Lead Organization and Collaborator Roles

For proposals selected for funding, UF will establish a subaward with the lead organization in the applying consortium, which will coordinate all activities in the target country, including execution of appropriate agreements with all collaborating partner(s). We encourage, but do not require, target country organizations to be the lead organization. If requested, UF can issue a separate subaward directly to a US or international sub-partner organization when a target country organization is the prime or lead member of the applying consortium. However, the limit of direct subaward contracts per project from UF is two.

The lead organization is responsible for implementing the project, monitoring progress, ensuring compliance with UF and USAID rules and guidelines, managing funds appropriately, collating and presenting results, and submitting progress and final reports. The lead organization will be responsible for fulfilling all USAID requirements and submitting data and reports to the ME. This includes responsibilities related to Monitoring and Evaluation, Open Data Management, Knowledge Sharing, and Environmental Management and Mitigation measures. The lead organization will also need to ensure compliance with the Branding Strategy and Marking Plan of the LSIL. The ME will provide oversight to the lead organization, and through it to its subawardees, on matters that are technical (e.g., by giving feedback on work plans and progress reports, and by monitoring ongoing field and other activities), administrative (e.g., verifying quality of reporting), and financial (e.g., reviewing financial reports, and giving approvals for procurement and travel).

Consortia

A key requirement of all proposals is collaboration between a research agency or university in the target country and a research organization or university in the US or a Western country and a private sector or government scaling partner.

If the Principal Investigator (PI) is from a Western country, at least one research partner in the applying consortium must be from the target country and must be a Co-PI (i.e., not just a collaborator). If the PI is from a target country, at least one partner from a Western country must be a Co-PI (i.e., not just a

collaborator). Examples of foreign country partners include U.S. or European universities, regional research organizations, international agricultural research centers (e.g., Centers of the Consultative Group for International Agricultural Research, CGIAR), other Feed the Future Innovation Labs,or a Western private sector actor or international non-governmental organizations. Partnerships with scaling partners are required for all proposals. Reach projects are strongly encouraged to include a private sector actor in the project team. Collaborations with public or private extension and advisory service providers are strongly encouraged.

The host country governments, in particular the ministries of agriculture and/or livestock as well as the ministries of health and related agencies, are critically important stakeholders in each target country. Consider how best to involve them in the proposed activities.

The consortia requirements aim to ensure mutually beneficial partnerships, to strengthen the capacity of target country partners, to ensure they can access the latest scientific information, and to facilitate development of local or context-appropriate, scientifically, and statistically robust research for development proposals. In addition, collaboration with a scaling partner is required for all projects from the outset to ensure carefully formulated plans for scaling and adoption of validated best-bet technologies/innovations, practices and services in ways that are sustained well after the life of the subaward.

International organizations with an office or branch in the target country are not considered target country partners.

Full proposals should clearly identify the respective roles, responsibilities and activities of the consortium members in the Management Plan section, and by including a more detailed description of each of the key personnel using the form in Appendix 5. The respective budget allocations and budget justification narrative for each collaborating partner should also be described using the template in Appendix 4. All subaward projects must comply with USAID, UF, and their own organizational rules governing the use of human subjects and animals for research purposes.

Requirements

All subaward projects need to implement specific activities that:

(1) **Support USAID Mission objectives and activities:** All activities should be supportive of USAID Mission and U.S.-government funded Feed the Future activities, among others. Projects should contribute to development, food security, and poverty alleviation in the Feed the Future Zones of Influence (ZOIs) and should take place within them. This is important to ensure synergy, avoid unnecessary duplication of efforts, and leverage and increase the scope and impacts of the existing USAID Mission and U.S. government-funded projects. For information on the Feed the Future zones, see Table 1 or visit https://www.feedthefuture.gov.

(2) **Are aligned with country strategies:** All activities should also be aligned with the target country government's existing livestock policies and, when appropriate, support additional enabling policies for ASF production and consumption. Proposed activities should complement, involve collaboration with, and/or and leverage the work of other relevant projects to avoid unnecessary duplication. The target country overview documents on the LSIL website provide a snapshot of recently finished and ongoing research and development projects. Note that these are not exhaustive.

(3) **Involve true collaborative partnerships:** True, meaningful partnerships with shared visions, responsibilities, and decision-making are central to the LSIL approach (see section on Consortia above). The project teams must involve partnerships between relevant and appropriate target and foreign country research organizations or universities as well as private sector partners as outlined earlier. Projects should plan to closely engage with cooperatives, private extension service providers, input suppliers, and processors through testing of pertinent innovations, knowledge sharing, capacity development, and business planning.

(4) **Have an explicit, rigorous research design and approach:** This includes clearly stated hypotheses, objectives, experimental designs, and analytical methods (including describing or providing references for proposed methods). In addition, explicit descriptions and convincing justifications are required for the sampling approach, number of experimental units or replicates (a power analysis should be used for this purpose), and the statistical analysis approach.

(5) **Integrate efforts across several AOIs, when appropriate:** This is required for Reach projects and recommended for Focus projects.

(6) **Address CCTs:** Reach project proposals must address the minimum requirements for all CCTs and should address one CCT meaningfully and deeply. For Focus project proposals, at least one CCT must be integrated.

(7) **Clearly complement pertinent, past, and ongoing efforts:** Proposals need to consider past and ongoing research efforts, including those by the LSIL Phase I, and show how they will add value to the existing body of knowledge and ensure their research plans result in developmental impacts.

(8) **Are likely to scale.** All proposals should describe potential applicability, relevance, feasibility, and likelihood of scaling of the anticipated results of the work they propose to undertake and how demand for the prospective findings and innovation(s) arising from the work was assessed.

Scaling out research-based solutions may also imply working with policymakers and regulatory institutions, which is an integral part of the Enabling Environment CCT. Scaling potential will be assessed during Concept Note and full proposal reviews, and the LSIL ME will work with the subaward teams to develop this further. Where applicable, the product life cycle framework should be applied.

A summary of Reach and Focus project requirements and recommended practices are stated in Tables 2 and 3, respectively.

Table 2. Reach project requirements and recommendations

Area	Requirement	Recommendations
Partnerships	Involve collaborative research and capacity development endeavors between host country organizations and U.S.-based or other appropriate Western organizations or universities and a scaling partner, preferably from the private sector. Include letters of support from partners in the proposal.	Involve all livestock sector stakeholders as partners, especially the private sector. Consider which livestock sector stakeholders should be potential partners and include letters of support from partners in the proposal.
	Develop true partnerships based on shared vision, resources, and efforts.	Integrate a holistic approach from research to extension, including field practice. Partner or collaborate with appropriate target country scaling partner(s). Forge partnerships to achieve scale through a product life cycle lens.
	Support Feed the Future objectives and activities in the Feed the Future Zones of Influence.	Partner with Feed the Future initiatives or other U.S. government activities.
Research approach	Focus research on one or more of the three pathways to improve human nutrition[1] as well as human health and incomes by increasing the quantity and quality of human-consumable animal products.	Focus on one of the three pathways to improve human nutrition as well as issues related to consumer behavior.
	Proposals focusing on AOI #1: Livestock Production and Disease Management, and AOI#2: Human Health, Food Safety, Diets and Nutrition, should use a One-Health approach to address the interactions between human, environmental, and animal health and to ensure nutritional benefits for vulnerable people.	
	Employ an interdisciplinary research approach by integrating one primary and at least one secondary AOI.	
	Integrate the minimum requirements of the four CCTs and one CCT in depth.	
	Use appropriate statistical designs and include a power analysis to justify the number of replicates or experimental units in experiments.	
	Develop policy documents based on research findings for the pertinent organization's leaders and the government.	
	Examine sustainable climate-smart, livestock, or ASF improvement technologies/approaches that promote resilience to climate change and/or reduce greenhouse gas emissions.	

Area	Requirement	Recommendations
Likelihood to scale	Describe the potential applicability, relevance, feasibility, and scalability of the proposed research.	Apply a product life cycle lens with a clear target product profile developed based on market research and segmentation.
	Demonstrate that there is demand for the prospective findings and innovation(s) arising from the proposed research.	In the proposal, summarize evidence for demand using available data as well as the relevant academic literature, grey literature, and administrative sources. During the lifetime of the funded research, plan to measure demand for research innovations using appropriate data (e.g., adoption rates or willingness-to-pay metrics estimated using credible methods).
	Identify the end user of innovation(s) arising from the proposed research as well as the likely adoption pathway: Public, Public-Private Partnerships, or Private?	When possible, document through support letters interest in proposed research by potential downstream users, e.g., businesses, farmer groups, as well as government and NGO entities.
	Include a plan for determining the farm or business level costs and benefits of adopting the innovation(s) arising from the research.	
Implementation modalities	Participate in and present research findings at multi-stakeholder Innovation Platforms in the target country.	Participate in wider networks beyond the Innovation Platforms in the target country for knowledge and data sharing and development impact.

[1] The pathways are food production, income generation, and women's empowerment (Herforth and Harris, 2014).

Table 3. Focus project requirements and recommendations

Area	Requirement	Recommendations
Partnerships	Involve collaborative research and capacity development endeavors between host country organizations and U.S.-based or other appropriate international organizations or universities and a scaling partner.	
	Develop true partnerships based on shared vision, resources, and efforts.	Integrate a holistic approach from research to extension including field practice Partner or collaborate with appropriate target country scaling partners. Forge partnerships to achieve scale through a product life cycle lens.
	Support Feed the Future objectives and activities in the Feed the Future Zones of Influence.	Partner with Feed the Future initiatives or other U.S. government activities.
	Address one AOI.	

Area	Requirement	Recommendations
Research approach	At least one CCT must be integrated.	
	Proposals focusing on AOI #1: Livestock Production and Disease Management, and AOI#2: Human Health, Food Safety, Diets and Nutrition, should use a One-Health approach to address the interactions between human, environmental, and animal health and to ensure nutritional benefits for vulnerable people.	
	Use appropriate statistical designs and include a power analysis to justify the number of replicates or experimental units in experiments.	
	Develop policy documents based on research findings for the pertinent organization's leaders and the government.	
	Examine sustainable climate-smart, livestock, or ASF improvement technologies/approaches that promote resilience to climate change and/or reduce greenhouse gas emissions.	
Likelihood to scale	Describe the potential applicability, relevance, feasibility, and scalability of the proposed research.	Apply a product life cycle lens with a clear target product profile developed based on market research and segmentation.
	Demonstrate that there is demand for the prospective findings and innovation(s) arising from the proposed research.	In the proposal, summarize evidence for demand using available data as well as the relevant academic literature, grey literature, and administrative sources. During the lifetime of the funded research, plan to measure demand for research innovations using appropriate data (e.g., adoption rates or willingness-to-pay metrics estimated using credible methods).
	Identify the end user of innovation(s) arising from the proposed research as well as the likely adoption pathway: Public, Public-Private Partnerships, or Private?	When possible, document through support letters interest in proposed research by potential downstream users, e.g., businesses, farmer groups, as well as government and NGO entities.
	Include a plan for determining the farm or business level costs and benefits of adopting the innovation(s) arising from the research.	
Implementation modalities	Participate in and present research findings at multi-stakeholder Innovation Platforms in the target country.	Participate in wider networks beyond the Innovation Platforms in the target country for knowledge and data sharing and development impact.

RESEARCH PRIORITIES BY COUNTRY

Burkina Faso

For Burkina Faso, the priority livestock species are:

1. Small ruminants (sheep and goats)
2. Poultry (chickens and guinea fowl)

Livestock Production & Disease Management

The livestock production research should enhance the feed and forage value chains, building on Phase I research and including the learnings from the EQUIP Feed project, funded by the Bill & Melinda Gates Foundation. Priority research topics include:

- Assessing innovative approaches to overcome regional feed shortages: Research by the EQUIP Feed project showed that feed shortages do not happen uniformly across Burkina Faso: Cascades, Centre, Hauts-Bassins, and Sahel regions had notable feed shortages in 2019, yet a 6 million metric tons of feed (excluding agro-industrial byproducts and concentrates) surplus was reported for the country, partly due to surplus feed production from Boucle du Mouhoun and Centre Est Regions. Research could assess 1) which innovative or existing sustainable and highly effective crop residue improvement and conservation techniques are most likely to scale; 2) best-bet approaches to increase adoption of improved forage varieties; 3) higher nutritive value and yielding drought-tolerant hybrids adapted to the Sahel Zone, taking care to avoid duplicating previous studies in this area, for example by LSIL, the Environmental Institute for Agricultural Research (INERA), the Sorghum and Millet Innovation Lab, the International Crops Research Institute for the Semi-Arid Tropics (ICRISAT), the International Institute of Tropical Agriculture (IITA), International Livestock Research Institute (ILRI), etc. Research could also explore 4) innovative models to link livestock producers with feed markets in order to facilitate transport of feed from production areas to areas of great need.
- Strengthening fodder markets and seed systems: Expansion and/or strengthening of the existing feed and fodder value chains, particularly markets, is critical for the sustainable growth of the livestock sector. Research could focus on strategies to increase quality forage availability, particularly during the dry season, and approaches to ensure sustained supply of competitively priced, quality-improved forage seeds.
- Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale: To reduce ASF prices and increase their affordability, input prices, particularly for feed, need to decrease. Research can focus on strategies to sustainably reduce production costs while sustainably intensifying the system. An example is studying climate smart decision-support tools, technologies, or management strategies for more efficient use of locally available resources.

Additional topics include:

- Processing of ASF to increase shelf life and maintain food safety: Research into reducing perishability of ASF whilst preserving its nutritional content and safety may increase consumption of ASF and contribute to reduced wasting and stunting rates in infants. Research could focus on processing strategies that are likely to scale and that increase shelf life, value, and safety.

Livestock disease management research priorities include:

- Assessing innovative disease management practices, including public-private models that will improve access to animal health services by livestock producers.
- Assessing the economic impact of disease and mortality due to priority diseases identified by the Government of Burkina Faso (See country resource page for more details): Studies should follow guidance provided by the GBAD program as outlined on page 10.

Human Health, Food Safety & Diets and Nutrition

In the area of safe livestock production and food safety, research priorities include:

- Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households: The knowledge generated will contribute to the body of evidence on the role of livestock pathogens in environmental enteric dysfunction (EED) in infants, which contributes to malnutrition.
- Assessing best-bet interventions to improve the microbial safety of ASF that are consumed raw or with inadequate processing for safety, as well as ready-to-eat ASF.
- Integrating existing data into risk assessments that may support deriving appropriate standards for safe levels of aflatoxins in animal feeds, milk, and other dairy products. Research should complement LSIL Phase I research in Burkina Faso and from Saha Turna and Wu (2021).

Research priorities around ASF consumption, dietary diversity and adequacy include:

- Increasing ASF consumption, particularly the impact of increased livestock production or productivity on nutritional outcomes: Such research should build on existing evidence from Burkina Faso by McKune et al. (2020) and elsewhere (see Introduction section) and address knowledge gaps identified.
- Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them: These may include household-level interventions, community based social-marketing, market-based research, or policy-level intervention and/or analysis. Rather than funding research that explicitly tests the effect of ASF consumption on determinants of stunting and child development outcomes, we encourage inclusion of nutritional and child development indicators such as minimum acceptable diet, minimum dietary diversity, minimum meal frequency, and head circumference, and other indicators in studies that seek to improve ASF consumption and quality of diets.

Markets & Innovation Translation

Research priorities in this area of inquiry include:

- Researching new market opportunities for livestock and ASF supported by supply and demand-side data: Examples are adoption rates for supply data and willingness-to-pay studies for demand data. Proposals should examine strategies to improve market performance with demonstrable benefits to women and youth, particularly through increased entrepreneurial opportunities.
- Monitoring and improving the understanding trends in ASF availability and prices in markets across seasons and geographies: Information from these studies is critical for examining the links between increased access and affordability of ASF, ASF consumption, and household/community level resilience.
- Research on a market-based food-systems approach to challenges associated with other AOIs while viewing market performance through the lens of resilience.
- Comparing alternative scaling pathways or designing scale-up interventions so that credible analysis of innovation impacts can be conducted at scale. Proposals emphasizing innovation translation will need to outline how to create incentives for inclusive and sustainable private-sector solutions that

encourage recruiting and training of youth entrepreneurs, developing business plans, and sourcing complementary/alternative financing.

Ethiopia

For Ethiopia, the priority livestock species are:

1. Dairy cattle
2. Poultry (chickens)

Livestock Production & Disease Management

The livestock production research should enhance the feed and forage value chains, building on Phase I research and including the learnings from the EQUIP Feed project, funded by the Bill & Melinda Gates Foundation, as well as research from the Sorghum and Millet Innovation Lab. Priority research topics include:

- Assessing innovative or existing best-bet sustainable and effective crop and residue improvement and conservation techniques that are most likely to scale: In addition to assessing technologies, the research should address aspects of technology adoption, understanding barriers to adoption, and developing interventions that will help overcome them.
- Researching approaches to increase adoption of improved forage varieties: The research should not focus on variety testing, as many research initiatives have already conducted and published on this aspect. Rather, the research should focus on technology adoption, namely, understanding barriers to adoption and developing interventions that will overcome them and increase their use in small scale beef and small ruminant fattening.
- Strengthening fodder markets and seed systems: Expansion and strengthening of the existing feed value chains is critical for the sustainable growth of the livestock sector. Higher producing animals need better inputs, such as high nutritional quality improved fodder and concentrates. To expand the forage availability, there is a need to increase the availability of competitively priced quality seeds produced in Ethiopia.
- Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale: To reduce ASF prices and increase their affordability, input prices, particularly for feed, need to decrease. Research can focus on strategies to sustainably reduce production costs while sustainably intensifying the system. An example is studying climate smart decision-support tools, technologies, or management strategies for more efficient use of locally available resources.

Other topics:

- Processing of ASF to increase shelf life and maintain food safety: Research into reducing perishability of ASF whilst preserving its nutritional content and safety may increase consumption of ASF and contribute to reduced wasting and stunting rates in infants. Research could focus on processing strategies that are likely to scale and that increase shelf life, value, and safety.
- Researching strategies to maintain milk quality and safety during transport, handling, and processing.

Livestock disease management research priorities include:

- Testing different strategies to scale youngstock mortality prevention and mitigation interventions, particularly those validated in Phase I.

- Assessing innovative disease management practices including public-private models that will improve access to animal health services by livestock producers. The proposed interventions should also consider aspects listed under the Markets & Innovation Translation AOI.
- Assessing the economic impact of disease and mortality due to priority diseases identified by the Government of Ethiopia (See country resource page for more details): Studies should follow guidance provided by the GBAD program as outlined on page 10.

Human Health, Food Safety & Diets and Nutrition

In the area of safe livestock production and food safety, research priorities include:

- Improving the understanding and developing risk mitigating measures on the risks of human-livestock cohabitation in smallholder households: The proposed research should complement the ongoing research as part of the EQUIP *Campylobacter* genomics and environmental enteric dysfunction (CAGED) project.
- Integrating existing data into risk assessments that may support deriving appropriate standards for safe levels of aflatoxins in animal feeds, milk, and other dairy products. Research should complement LSIL Phase I research by Saha Turna and Wu (2021).
- Evaluating the risks relative to benefits of consuming milk containing aflatoxin M1, particularly to children and pregnant and lactating women.

Research priorities around ASF consumption, and dietary diversity and adequacy include:

- Increasing ASF consumption, particularly the impact of increased livestock production or productivity on nutritional outcomes: Such research should build on existing evidence from Burkina Faso by McKune et al. (2020) and elsewhere (see Introduction section) and address knowledge gaps identified.
- Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them: These may include household-level interventions, community based social-marketing, market-based research, or policy-level intervention and/or analysis. Rather than funding research that explicitly tests the effect of ASF consumption on determinants of stunting and child development outcomes, we encourage inclusion of nutritional and child development indicators like minimum acceptable diet, minimum dietary diversity, minimum meal frequency, head circumference, and other indicators in studies that seek to improve ASF consumption and quality of diets.
- Developing and testing social behavior change communication to increase ASF consumption in young children: Research should contribute to improved understanding of the relationship between nutritional and livestock-related knowledge, attitudes, and practices, and ASF consumption. Research should also consider how contexts (e.g., proximity to markets, conducive current cultural practices and norms; income/poverty thresholds) increase ASF consumption.

Markets & Innovation Translation

Research priorities in this AOI include:

- Researching new market opportunities for livestock and ASF supported by supply and demand-side data: Examples are adoption rates for supply data and willingness-to-pay studies for demand data. Proposals should examine strategies to improve market performance with demonstrable benefits to women and youth, particularly through increased entrepreneurial opportunities.
- Researching market performance: Research could examine improving market access for smallholders and pastoralists; how the resiliency of livestock markets (faced with external stressors like conflict, climate, and disease) and market actors (particularly women, youth, and marginalized groups) are affected by stressors; how existing policies affect the stressors, and how the private sector can be

engaged to alleviate the stressors. Proposed research should complement LSIL Phase I research on market performance.

- Comparing alternative scaling pathways or design scale-up interventions so that credible analysis of innovation impacts can be conducted at scale. Proposals emphasizing innovation translation will need to outline how to create incentives for inclusive and sustainable private-sector solutions that encourage recruiting and training of youth entrepreneurs, developing business plans, and sourcing complementary/alternative financing.

Nepal

For Nepal, the priority livestock species are:

1. Goats
2. Dairy cattle and buffaloes

Livestock Production & Disease Management

The livestock production research priorities focus on improving feeds and forage availability for livestock through:

- Assessing the increase in feed and forage production capacity needed to meet the feed demands of the growing goat and poultry population and reduce production costs.
- Developing innovative business models for off-farm feed and forage production that will contribute to reducing the importation of feed inputs such as soybean and maize.
- Increasing adoption of improved forage species and decision support tools to expand availability of balanced rations. Proposed research should build on LSIL Phase I research in Nepal.
- Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale: To reduce ASF prices and increase their affordability, input prices, particularly for feed, need to decrease. Research can focus on strategies to sustainably reduce production costs while sustainably intensifying the system. An example is studying climate smart decision-support tools, technologies, or management strategies for more efficient use of locally available resources.

Livestock disease management research priorities include:

- Assessing innovative disease management practices including public-private models that will improve access to animal health services by livestock producers. The proposed interventions should also consider aspects listed under the Markets & Innovation Translation AOI.
- Assessing the economic impact of disease and mortality due to priority diseases as identified by the Government of Nepal (See country resource page for more details): Studies should follow guidance provided by the GBAD program as outlined on page 10.

Human Health, Food Safety & Diets and Nutrition

In the area of safe livestock production and food safety, research priorities include:

- Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households: The knowledge generated will contribute to the body of evidence on the role of livestock pathogens in environmental enteric dysfunction (EED) in infants, which contributes to malnutrition.
- Assessing best-bet interventions to improve the microbial safety of ASF that are consumed raw or with inadequate processing for safety, as well as ready-to-eat ASF.

- Evaluating the risks relative to benefits of consuming milk containing aflatoxin M1, particularly to children and pregnant and lactating women.

Research priorities around ASF consumption, dietary diversity and adequacy include:

- Increasing ASF consumption, particularly the impact of increased livestock production or productivity on nutritional outcomes: Such research should build on existing evidence and address knowledge gaps identified in existing studies to better translate livestock production and productivity gains to ASF consumption and improved diets.
- Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them: These may include household-level interventions, community based social-marketing, market-based research, or policy-level intervention and/or analysis. Rather than funding research that explicitly tests the effect of ASF consumption on determinants of stunting and child development outcomes, we encourage inclusion of nutritional and child development indicators like minimum acceptable diet, minimum dietary diversity, minimum meal frequency, head circumference, and other indicators in studies that seek to improve ASF consumption and quality of diets.

The proposed research on ASF consumption, dietary diversity and adequacy should build on LSIL Phase I research as well as research in Nepal from the Nutrition Innovation Lab.

Markets & Innovation Translation

Research priorities in this AOI include:

- Researching new market opportunities for livestock and ASF supported by supply and demand-side data: For example, adoption rates for the former and willingness-to-pay studies for the latter. Proposals should examine strategies to improve market performance with demonstrable benefits to women and youth, particularly through increased entrepreneurial opportunities.
- Monitoring and improving the understanding trends in ASF availability and prices in markets across seasons and geographies: Information from these studies is critical for examining the links between increased access and affordability of ASF, ASF consumption, and household/community level resilience.
- Researching market performance: Research could examine improving market access for smallholders; how the resiliency of livestock markets (faced with external stressors like conflict, climate, and disease e.g. the COVID-19 pandemic in particular) and market actors (particularly women, youth, and marginalized groups) are affected by stressors; how existing policies affect the stressors; and how the private sector can be engaged to alleviate the stressors. Proposals could also assess if and how certain policies, strategies, or actors helped to alleviate the impact of COVID-19 on livestock systems, markets, and actors. Proposed research should complement LSIL Phase I research on market performance.
- Comparing alternative scaling pathways or design scale-up interventions so that credible analysis of innovation impacts can be conducted at scale. Proposals emphasizing innovation translation will need to outline how to create incentives for inclusive and sustainable private-sector solutions that encourage recruiting and training of youth entrepreneurs, developing business plans, and sourcing complementary/alternative financing.

Niger

For Niger, the priority livestock species are:

1. Small ruminants (sheep and goats)
2. Poultry (chickens and guinea fowl)

Livestock Production & Disease Management

The livestock production research should enhance the feed and forage value chains building on Phase I research as well as research from the Sorghum and Millet Innovation Lab. Priority research topics include:

- Assess innovative or existing best-bet crop residue improvement and conservation techniques that are most likely to scale: Apart from possibly assessing new technologies, the research should address aspects of technology adoption, understanding barriers to adoption, and developing interventions that will help overcome them.
- Researching various approaches to increase adoption of improved forage varieties: The research should not focus on variety testing as many research initiatives have already conducted and published on this aspect. Rather, the research should focus on technology adoption, namely, understanding barriers to adoption and developing interventions that will help overcome them.
- Strengthening fodder markets and seed systems: Expansion and/or strengthening of the existing feed and fodder value chains, particularly markets, is critical for the sustainable growth of the livestock sector. Research could focus on strategies to increase quality forage availability, particularly during the dry season, and approaches to ensure sustained supply of competitively priced quality improved forage seeds.
- Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale: To reduce ASF prices and increase their affordability, input prices, particularly for feed, need to decrease. Research can focus on strategies to sustainably reduce production costs while sustainably intensifying the system. An example is studying climate smart decision-support tools, technologies, or management strategies for more efficient use of locally available resources.

Livestock disease management research priorities include:

- Assessing young stock mortality and developing suitable prevention and mitigation strategies building on LSIL Phase I research.
- Assessing the economic impact of disease and mortality due to priority diseases as identified by the Government of Niger (See country resource page for more details): Studies should follow guidance provided by the GBAD program as outlined on page 10.
- Assessing innovative disease management practices including public-private models that will improve access to animal health services by livestock producers. The proposed interventions should also consider aspects listed under the Markets & Innovation Translation AOI.

Human Health, Food Safety & Diets and Nutrition

In the area of safe livestock production and food safety, research priorities include:

- Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households: The knowledge generated will contribute to the body of evidence on the role of livestock pathogens in environmental enteric dysfunction (EED) in infants, which contributes to malnutrition.
- Assessing best-bet interventions to improve the microbial safety of ASF that are consumed raw or with inadequate processing for safety, as well as ready-to-eat ASF.

Research priorities around ASF consumption, dietary diversity and adequacy include:

- Investigating barriers to ASF consumption, particularly in infants, and testing interventions to overcome them: These may include household-level interventions, community based social-marketing, market-based research, or policy-level intervention and/or analysis. Rather than funding research that explicitly tests the effect of ASF consumption on determinants of stunting and child development outcomes, we encourage inclusion of nutritional and child development indicators like minimum acceptable diet, minimum dietary diversity, minimum meal frequency, head circumference, and other indicators in studies that seek to improve ASF consumption and quality of diets.
- Developing and testing social behavior change communication to increase ASF consumption in young children: Research should contribute to improved understanding of the relationship between nutritional and livestock-related knowledge, attitudes, and practices, and ASF consumption. Research should also consider how contexts (e.g., proximity to markets, conducive current cultural practices and norms, and income/poverty thresholds) increase ASF consumption. The proposed interventions should also consider aspects listed under the Markets & Innovation Translation AOI.

Markets & Innovation Translation

Research priorities in this area of inquiry include:

- Researching new market opportunities for livestock and ASF supported by supply and demand-side data: For example, adoption rates for the former and willingness-to-pay studies for the latter. Proposals should examine strategies to improve market performance with demonstrable benefits to women and youth, particularly through increased entrepreneurial opportunities.
- Researching market performance: Research could examine improving market access for smallholders and pastoralists; how the resiliency of livestock markets (faced with external stressors like conflict, climate, and disease) and market actors (particularly women, youth, and marginalized groups) are affected by stressors; how existing policies affect the stressors; and how the private sector can be engaged to alleviate the stressors.
- Comparing alternative scaling pathways or design scale-up interventions so that credible analysis of innovation impacts can be conducted at scale. Proposals emphasizing innovation translation will need to outline how to create incentives for inclusive and sustainable private-sector solutions that encourage recruiting and training of youth entrepreneurs, developing business plans, and sourcing complementary/alternative financing.

Rwanda

For Rwanda, the priority livestock species are:

1. Dairy cattle
2. Poultry (chickens)
3. Pigs

Livestock Production & Disease Management

The livestock production research should enhance the feed and forage value chains through:

- Assessing the increase in feed and forage production capacity needed to meet the projected feed demands as per the Rwanda Livestock Master Plan.
- Improving feed analysis and diet formulation for priority species
- Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale: To reduce ASF prices and increase their affordability, input prices, particularly for feed, need to decrease. Research can focus on strategies to sustainably reduce

production costs while sustainably intensifying the system. An example is studying climate smart decision-support tools, technologies, or management strategies for more efficient use of locally available resources.

Regarding milk preservation, priorities include research on strategies to maintain milk quality and safety during transport, and handling and processing.

Livestock disease management research priorities include:

- Assessing young stock mortality and developing suitable prevention and mitigation strategies building on LSIL Phase I research.
- Assessing the economic impact of disease and mortality due to priority diseases as identified by the Government of Rwanda (See country resource page for more details): Studies should follow guidance provided by the GBAD program as outlined on page 10.
- Assessing innovative disease management practices including public-private models that will improve access to animal health services by livestock producers.

Human Health, Food Safety & Diets and Nutrition

In the area of safe livestock production and food safety, research priorities include:

- Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households: The knowledge generated will contribute to the body of evidence on the role of livestock pathogens in environmental enteric dysfunction (EED) in infants, which contributes to malnutrition.
- Integrating existing data into risk assessments that may support deriving appropriate standards for safe levels of aflatoxins in animal feeds, milk, and other dairy products. Research should complement LSIL Phase I research in Rwanda by Nishimwe et al. (2019) and Saha Turna and Wu (2021).
- Evaluating the risks relative to benefits of consuming milk containing aflatoxin M1, particularly to children and pregnant and lactating women.

Research priorities around ASF consumption, dietary diversity and adequacy include:

- Increasing ASF consumption, particularly the impact of increased livestock production or productivity on nutritional outcomes: Such research should build on existing evidence from Burkina Faso by McKune et al. (2020) and elsewhere (see Introduction section) and address knowledge gaps identified.
- Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them: These may include household-level interventions, community based social-marketing, market-based research, or policy-level intervention and/or analysis. Rather than funding research that explicitly tests the effect of ASF consumption on determinants of stunting and child development outcomes, we encourage inclusion of nutritional and child development indicators like minimum acceptable diet, minimum dietary diversity, minimum meal frequency, head circumference, and other indicators in studies that seek to improve ASF consumption and quality of diets. Such research should build on existing evidence from Rwanda.

Markets & Innovation Translation

Research priorities in this area of inquiry include:

- Researching new market opportunities for livestock and ASF supported by supply and demand-side data: For example, adoption rates for the former and willingness-to-pay studies for the latter. Proposals should examine strategies to improve market performance with demonstrable benefits to women and youth, particularly through increased entrepreneurial opportunities.

- Monitoring and improving the understanding trends in ASF availability and prices in markets across seasons and geographies: Information from these studies is critical for examining the links between increased access and affordability of ASF, ASF consumption, and household/community level resilience.
- Researching market performance: Research could examine improving market access for smallholders; how the resiliency of livestock markets (faced with external stressors like conflict, climate, and disease) and market actors (particularly women, youth, and marginalized groups) are affected by stressors; how existing policies affect the stressors; and how the private sector can be engaged to alleviate the stressors.
- Comparing alternative scaling pathways or design scale-up interventions so that credible analysis of innovation impacts can be conducted at scale. Proposals emphasizing innovation translation will need to outline how to create incentives for inclusive and sustainable private-sector solutions that encourage recruiting and training of youth entrepreneurs, developing business plans, and sourcing complementary/alternative financing.

GUIDELINES

Concept Notes

Applicants shall submit initial Concept Notes introducing the proposed research.

- Concept Notes are required for both Reach and Focus grants.
- All Concept Notes must be in English.
- All Concept Notes must be five pages or less, excluding the title page, references, and qualifications.

Furthermore, the applicant shall:

- Use the Letter Format 8 ½" x 11" with 1" margins.
- Use Times New Roman font size 11, single space except for 1) budgets may be in a slightly smaller font (10 point) with smaller margins, and 2) tables may use smaller fonts and margins, however, must be easily readable and no smaller than font of 9 point.
- Include the name of the lead institution and page numbers in the header on each page.
- Submit the Concept Note (as a single document) in PDF format through the Piestar RFx platform.

Table 4 shows the required outline for Concept Notes. Please note that Concept Notes that do not follow the format given in the table may be rejected.

Table 4. Outline of Concept Notes

Section	Description
Title page	● Type of project: Focus or Reach ● Project title ● Country and geographic focus (Zone(s) of Influence within the country) ● PI, Co-PI(s), and collaborator(s) names, titles, departments, organization, addresses, email addresses, and phone number. ● Duration of the project ● Total budget requested ● Contact information for authorized official from the lead organization

Section	Description
Technical narrative	● Clear overarching project goals, rationale, hypothesis, and research objectives. ● Brief overview of technical approach (including the experimental design plans, and methods, justification of the number of experimental units and the statistical analysis approach), rationale for the approach, anticipated results and impacts, and incorporation of Cross-cutting Themes. ● Indication of which Area(s) of Inquiry the proposal addresses.
Timeline	● Schedule or timeline of activities over the life of the project delineated by the project's objectives. No required format at Concept Note stage.
References	Use the Journal of Animal Science style to format references: https://academic.oup.com/jas/pages/General_Instructions
Qualifications *(maximum 2 pages per biographical sketch; total 4 pages maximum)*	Required: Biographical sketch of PI (Appendix 3) Optional: Biographical sketch of one or two Co-PIs/collaborators (within page limit)

Full Proposals

Only applicants whose Concept Notes are approved will be invited to submit full proposals.

- The maximum length for **Focus** project proposals is **15 pages** excluding the title page, table of contents, acronyms, executive summary, references, and appendices.
- The maximum length for **Reach** project proposals is **20 pages** excluding the title page, table of contents, acronyms, executive summary, references, and appendices.
- Formatting requirements for full proposals are identical to those for the Concept Notes.
- Two documents must be prepared in Microsoft Excel: 1) a project budget; and 2) a combined workplan and results framework. Templates for each can be found in Appendix 4 and 8. Please note that Appendix 8 contains two worksheet tabs, both of which must be completed.

Full proposal sections for Reach and Focus projects are described in the table below. Please note that proposals that do not follow the format given in the table may be rejected.

Table 5. Outline of full proposals

Section*	Description
Title page	● Type of project (Reach/Focus) ● Project title ● PI, Co-PI(s), and collaborator(s) names, titles, departments, organizations, addresses, email addresses, and phone number. ● Duration of the project ● Total budget requested (USD) ● Contact information for authorized official from the lead organization

Section*	Description
Table of contents	
Acronyms	
Executive summary	● One page
Technical approach	● Provide background and context (describe previous research on the topic and the rationale for the proposed work). ● Write a justification for geographic focus area(s) within the indicated target country. ● Describe the research rationale, hypothesis and objectives. ● Describe research design, plans, and methods (including experimental design, layout, and plans, justification of experimental units, and statistical analysis approach) in relation to the selected AOI(s). ● Describe how the CCTs will be integrated across the technical approach. ● Indicate how to leverage existing USAID, U.S. government, and other efforts and plans for acquiring additional investments.
Scaling potential and plans	● Describe the potential applicability, relevance, and feasibility of the work you propose to undertake, and how likely to scale it is. Indicate how you have assessed demand for the prospective findings and innovation(s) arising from your work. Explain how you will determine the farm or business level costs and benefits of adopting the innovation(s) and/or indicate how you are planning to assess the country/economy-wide benefits of implementing recommendations or innovations at a larger scale. ● Name the partners and key stakeholders you plan to engage with throughout the research project that will facilitate adoption and scale out of the innovation(s) arising from the work.
Management plan	● Describe the qualifications, roles, and responsibilities of the lead and each member organization of the consortium, including a staffing plan (for key personnel and other project staff). ● Mention anticipated problems and how they will be addressed. Explain how you will address possible COVID-19 related restrictions that may impact the research.
Monitoring and evaluation plan	● Describe a Theory of Change that fits within the LSIL's Theory of Change. This should include a narrative with a graphic. ● Describe the proposed data collection approach for baselines, endlines, and performance monitoring evaluation. Describe how the project and its activities will be evaluated for impact.
Knowledge sharing plan	For Reach projects: ● Indicate how you plan to share generated knowledge within the host country and outside. Include the expected number of peer reviewed publications as well as number of other knowledge products resulting from the research. For Focus projects: ● A Knowledge Sharing Plan need not be submitted with the Focus project proposals. Instead, the plans will be requested after the Focus grants awards have been made.

Section*	Description
Budget narrative	● Provide a detailed budget narrative that is clear and thorough so that costs included in the spreadsheet can be easily verified.
Budget	● *Use the "Budget template" in Excel and upload to Piestar RFx as a separate document.* Further instructions are provided below. (Appendix 4)
Work plan	● Outline objectives, intermediate results, and activities for the life of the proposed project. *Use the first tab of the combined "Workplan and results framework template" in Excel and upload to Piestar RFx as a separate document.* (Appendix 8)
Results framework	● Submit a results framework specifying which Feed the Future and LSIL indicators are relevant to your project. Specify how indicators are related to your project's objectives, intermediate results, and activities (in some cases one indicator may be related to more than one objective, intermediate result, and/or activity). Also provide numerical targets for each indicator chosen. *Use the second tab of the combined "Workplan & Results Framework template" in Excel and upload to Piestar RFx as a separate document.* (Appendix 8)
References	● Use the Journal of Animal Science style to format references (https://academic.oup.com/jas/pages/General_Instructions).
Principal Investigator qualifications	● Provide the biographical sketch for the PI (maximum of 2 pages). *Use the version that was included in the Concept Note.*
Collaborator qualifications	● Provide biographical sketches for all key personnel, including Co-PIs. Maximum of 2 pages each. (Appendix 3)
Letters of support	● Provide a letter of support for all proposed collaborating organizations (maximum 1 page each) as non-binding documentation of collaborators' intent, willingness, and ability to commit to conducting activities together if the proposal is selected for funding. ● The letters should indicate relevant projects by the implementing team, and including a minimum of two projects conducted by the lead organization that illustrate the capability of the team.
Conflict of interest	● Complete the Conflict of Interest form for key personnel. (Appendix 6)
Current and pending support	● Complete the Current and Pending Support form for key personnel. (Appendix 7)
Certificates of completion	● *Upload the certificates of completion for the Gender & Youth module and for the Local Capacity Development module to Piestar RFx as separate documents.*
EMMP	● Complete the Environmental mitigation and monitoring activity checklist. (Appendix 9)

* Sections marked in bold count towards the page limit.

Other Provisions

Collaborating partners may be contractors or subrecipients and should be aware of the distinction between procurement contracts (acquisition) and subawards (assistance). Contracts are subject to 2 CFR 200.318-326 (http://www.ecfr.gov/cgi-bin/text-idx?node=2:1.1.2.2.1.4.31&rgn=div7) and the USAID standard

provision entitled "USAID Eligibility Rules for Goods and Services" (http://www.ecfr.gov/cgi-bin/text-idx?c=ecfr&SID=260c5b7cc4cf7639856f204d96e3515f&rgn=div5&view=text&node=22%3A1.0.2.22.25&idno=22) in 22 CFR 228 in the procurement and long-term lease (as defined in 22 CFR 228.01 of goods and services with USAID funds). Subawards are subject to 2 CFR 200 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title02/2cfr200_main_02.tpl), 2 CFR 700 and the USAID standard provision entitled "Applicability of 2 CFR 200 and 2 CFR 700" (https://www.usaid.gov/sites/default/files/documents/1868/303maa.pdf).

The lead and partner subaward recipient's contractors and subcontractors at all tiers must meet USAID's supplier nationality requirements. In procurement and long-term lease of goods and services, the lead and partner subaward recipients have to comply with USAID's Rules for Procurement of Commodities and Services Financed by USAID in 22 CFR 228 (http://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=22:1.0.2.22.25) in the procurement and long-term lease (as defined in 22 CFR 228.01; https://www.gpo.gov/fdsys/granule/CFR-2003-title22-vol1/CFR-2003-title22-vol1-sec228-01/content-detail.html) of goods and services with USAID funds. These rules govern the source of USAID-financed commodities and the nationality of suppliers of USAID-financed commodities and services, which must be in a country that is included in the authorized geographic code for this project. These rules do not apply to procurement or long-term lease of goods and services with cost-sharing or program income funds.

It is USAID policy that no profit (i.e., any amount in excess of allowable direct and indirect costs) is payable under the prime award or under any subaward (i.e., sub-grants and sub-cooperative agreements, but excluding procurement contracts). However, profit is payable by the prime recipient or a sub-recipient to a contractor/vendor if the recipient or sub-recipient is procuring goods or services in furtherance of the program being supported by the award or subaward. The following website contains additional information: (http://www.usaid.gov/ads/policy/300/303sai).

For the subaward(s) resulting from this solicitation, the authorized Geographic Code is 937. This includes all but "restricted commodities" and other special cases. Geographic Codes are described in 22 CFR 228.03 (http://www.ecfr.gov/cgi-bin/text-idx?rgn=div5&node=22:1.0.2.22.25) and the Internal Mandatory References to Chapter 310 of USAID's Automated Directives System (ADS 310; https://www.usaid.gov/ads/policy/300/310) entitled "List of Developing Countries", "List of Advanced Developing Countries", and "List of Prohibited Source Countries". Special rules apply to restricted commodities, and are described in ADS 312.3.3 (https://www.usaid.gov/sites/default/files/documents/1876/312.pdf).

Exchange students and visitors funded through subawards need to adhere to USAID policies concerning visa compliance for exchange visitors (ADS 252) and participant training and exchanges for capacity development (ADS 253).

Budget

At the full proposal stage, a detailed budget must be submitted as a separate file using the MS Excel template provided (Appendix 4). The budget narrative must be submitted as part of the full proposal (see Table 5). At least 50% of the total budget amount (including direct and indirect costs) must be spent in the target country. Examples of in-country spending include: subawards given to in-country organizations; costs budgeted for in-country activities such as trainings, seminars, workshops or stakeholder meetings; other consultants or service contracts made with in-country suppliers; equipment and supplies purchased in the target country.

The budget and budget narrative must include the following:

- Direct salaries and wages: Include names and positions of individuals for each position proposed (if known). Please consider directly budgeting fiscal/clerical support to adequately support project administration. Directly budgeted administrative position(s) may not be recovered through indirect costs. Salaries should be budgeted in the units in which they are paid. For example, if an organization pays its employees in monthly rates, then the unit of measure in the budget should be the month and the applicant must use the rate per month for each employee. Salary increases can be adjusted to allow for inflation.
- Fringe: Include any employment benefits that staff paid from this project will receive. These may include health insurance, unemployment benefits, education benefits, etc. Benefits should be calculated based on the standard employment benefits offered by the organization and should meet the minimum requirements mandated by law.
- Travel, transportation, and per diem: Follow the USAID standard provisions "Travel and International Air Transportation". Describe the itinerary including dates, estimated airfare, class of travel, and any transportation-related expenses. Include lodging and subsistence costs in accordance with your institution's established policies and practice (U.S. Government per diem rates can be used) for each trip, location, number of days, and the daily rate. Also include miscellaneous travel expenses such as ground transportation, shuttle/transfers, etc. Distinguish between domestic (U.S.) and international travel.
    - For Reach grants, include the cost of travel for the PI to the LSIL annual general meetings in Gainesville, FL (2 trips, FY23 and FY25) and to Innovation Platform meetings (held in project target country every year).
    - For Focus grants, include one trip to the LSIL annual general meeting in Gainesville, FL, and one trip to the Innovation Platform meeting in your project target country.
- Equipment: Provide a detailed budget breakdown for purchases of durable equipment, including type, quantity, unit price and total cost. Durable equipment is defined as any item valued US $5,000 or more with an expected life of more than one year. All costs for durable equipment must be determined through formal price quotes and the applicant must be ready to provide these quotes to UF upon request.
- Consultants: Include names and titles of proposed individuals (if known), number of units (days, months, or FTEs) for each person, proposed unit rate, and total consultant costs.
- Overseas allowances: Follow your institution's established policies and practices for overseas allowances (excluding per diem and shipping/storage allowances, which should be listed under "Travel, Transportation, and Per Diem").
- Other direct costs: Include costs for branding and marking, mitigation of environmental impacts, M&E data collection and management, communications, postage, passport/visas, medical exams/immunization (for international travel), medical evacuation insurance, expendable supplies and materials, lab tests, field inputs, publication costs, etc. Provide the basis for each estimate, including type, quantity, unit price, etc. as applicable. Costs for mitigation of environmental impacts and M&E data collection and management are the responsibility of the subawardee and associated costs should be included in the project budget. In this section, also include:
    - Trainings, seminars, workshops or stakeholder meeting costs: These refer to all the costs incurred for organizing and conducting training events, workshops, seminars, or stakeholder meetings, including travel.
    - Participant Support Costs: All Participant Support Costs must be preapproved by USAID and should thus be identified separately in the proposal budget. Participant Support Costs could include stipends, travel reimbursements or other fees paid on behalf of a participant in connection with a training, workshop, or activity. A 'participant' is defined as a non-

employee who is the recipient, not the provider, of a conference, workshop, seminar, training, or other short-term informational activity. Participants do not provide deliverables, perform work, or provide training.
    - Tuition: Tuition fees are allowed as outlined and described in 2 CFR 200 (http://www.ecfr.gov/cgi-bin/text-idx?tpl=/ecfrbrowse/Title02/2cfr200_main_02.tpl).
- Subaward: If the proposed work includes subrecipients, a detailed line item budget breakdown for each of such subrecipients should be included in addition to including the lump sum in the prime budget. Applicants are encouraged to use the detailed line item budget template (Appendix 4) to calculate subrecipients' expenses. Each subrecipient's budget must be accompanied with a detailed budget narrative.
- Contracts: If your proposed work includes vendor services, include them separately in the budget.
- Indirect cost (overhead or general and administrative costs): U.S. institutions may recover their full federally negotiated indirect cost rate (a copy of the current rate agreement should be attached). U.S. institutions and foreign entities with no federally-negotiated rate may claim 10% de minimis indirect cost rate as defined in 2 CFR 200.414(f) (http://www.ecfr.gov/cgi-bin/text-idx?node=se2.1.200_1414&rgn=div8). Describe the type of indirect rate applied.

All proposed grant activity costs must be allowable within the normal operating practices of the applicant and should be in accordance with their written policies and procedures. All line items must be clearly explained in the budget narrative with enough detail to allow UF to determine if the cost is allowable. Budgeted amounts must also be supported by justification and the applicant must be able to provide supporting documents if requested.

Important: No funding should be requested for acquisition, construction, alteration, refurbishment or repairs (including dredging and excavation) of buildings or other vertical structures.

Submission

All Concept Notes and Full Proposals must be submitted via the Piestar RFx proposal platform. To submit, the PI will need to create a free account at https://livestock.piestar-rfx.com/opportunities and follow the detailed submission instructions. If you have technical difficulties with your submission, click on "Help" within Piestar RFx. Proposals and/or supporting documents (e.g., budgets, supporting letters) that are submitted via e-mail will not be accepted.

Questions

Questions or concerns about the technical content or budget should be written and emailed to livestock-lab@ufl.edu by 11:59:59 pm U.S. Eastern Daylight Time (Florida time) before June 15, 2021, using the subject line "LSIL RFA related question" Answers to the inquiries will be posted June 17, 2021 on the website from which this RFA was accessed. To maintain fairness and competitiveness, the LSIL will be unable to answer questions received after the above deadline.

CONCEPT NOTE AND FULL PROPOSAL EVALUATION AND APPROVALS

Concept notes

The LSIL ME will review the Concept Notes for completeness and alignment with the guidelines outlined in this RFA. Concept Note exclusion criteria are:

- The proposed project team does not meet the required composition requirements (i.e., Western + target country partners +private sector/government/NGO scaling partner.
- Project team lacks the proper subject matter expertise for the main research areas proposed.

- Concept note does not have the required format/information.
- Concept note is so very poorly written that it cannot be fully understood.
- Concept note does not focus on the target countries and their priorities outlined in this RFA.
- Concept note does not focus on the Areas of Inquiry (AOIs), Cross-cutting Themes (CCTs), priorities identified.
- The proposed research unnecessarily duplicates previous research in the target country.
- The proposed research approach is not suitable.

Successful applicants will be invited to submit a full proposal. Unsuccessful applicants will also be informed.

Full proposals
Only applicants invited by the LSIL ME to submit a full proposal will be eligible to do so. All full proposals will be:

- Assessed by the LSIL ME to ensure completeness of the application, the Management Approach, and the Budget;
- Evaluated by the Technical Evaluation Panel as well as the relevant AOI and CCT leaders for the Technical Approach;
- Assessed by the LSIL External Advisory Board, for programmatic alignment. The Board will jointly select projects to be funded in consultation with the Agreement Officer Representative within the Bureau of Resilience and Food Security at USAID in Washington, D.C.;
- Shortlisted projects will be assessed by the country governments for alignment with country priorities and assessed for alignment with the Global Food Security Strategy or specific country plan, by USAID Washington D.C., and by USAID target country Missions.

Table 6: Evaluation criteria for full proposals.

	Points
Technical Approach	**77.5**
Alignment with stated priorities for that country and complementarity with existing USAID and non-USAID funded projects and activities	5.0
Justification for the geographical focus	2.5
Innovation, scientific quality, experimental design, and soundness of the approach	35.0
Integration of Cross-cutting Theme(s)	5.0
Feasibility of achieving results within the proposed budget and timeline	10.0
Feasibility and likelihood of scaling, widespread adoption, and sustainability to ensure lasting development impact	20.0
Management Approach	**12.5**
Team member qualifications and past performance in research for development projects	10.0
Monitoring, evaluation, and impact plan	2.5
Budget	**10.0**
Proposed costs will be evaluated for reasonableness, effectiveness, realism, fairness, necessity, allowability, and allocability	10.0

ADDITIONAL MATERIALS FOR CONCEPT NOTE AND PROPOSAL DEVELOPMENT

Feed the Future and USAID Materials

- Bureau for Resilience and Food Security, https://www.usaid.gov/who-we-are/organization/bureaus/bureau-resilience-and-food-security
- About Resilience, https://www.usaid.gov/east-africa-regional/resilience
- Environmental Procedures Hub, https://www.usaid.gov/environmental-procedures
- Feed the Future Handbook of Indicators, https://www.feedthefuture.gov/resource/feed-the-future-handbook-of-indicator-definitions
- Feed the Future Results Framework, https://www.feedthefuture.gov/resource/feed-the-future-results-framework-2

Country Level Resources

Resources related to each country are available on our website, and they include "Selected Publications & Research Findings", "Useful Resources" (from both internal and external sources), a list of "Projects", and a list of "Partners".

- Burkina Faso, https://livestocklab.ifas.ufl.edu/countries/burkinafaso
- Niger, https://livestocklab.ifas.ufl.edu/countries/niger
- Ethiopia, https://livestocklab.ifas.ufl.edu/countries/ethiopia
- Rwanda, https://livestocklab.ifas.ufl.edu/countries/rwanda
- Nepal, https://livestocklab.ifas.ufl.edu/countries/nepal

Areas of Inquiry and Cross-Cutting Themes

Our portfolio of research includes three Areas of Inquiry and four Cross-Cutting Themes. Each webpage has a set of unique resources compiled by the Feed the Future Innovation Lab for Livestock Systems.

Areas of Inquiry:

- Markets & Innovation Translation, https://livestocklab.ifas.ufl.edu/themes/aoimit
- Production & Disease Management, https://livestocklab.ifas.ufl.edu/themes/aoilpdm
- Human Health, Food Safety & Diets and Nutrition, https://livestocklab.ifas.ufl.edu/themes/aoihhfsdn

Cross-Cutting Themes:

- Gender & Youth, https://livestocklab.ifas.ufl.edu/themes/cctgy
- Local Capacity Development, https://livestocklab.ifas.ufl.edu/themes/cctlcd
- Future Livestock Systems & Resilience, https://livestocklab.ifas.ufl.edu/themes/cctflsr
- Enabling Environment, https://livestocklab.ifas.ufl.edu/themes/cctee

REFERENCES

Amankwah, A. and Gourlay, S. 2021. Impact of COVID-19 Crisis on Agriculture: Evidence from Five Sub-Saharan African Countries (English). LSMS Integrated Surveys on Agriculture. Washington, D.C. World Bank Group. http://documents.worldbank.org/curated/en/304561611294945287/Impact-of-COVID-19-Crisis-on-Agriculture-Evidence-from-Five-Sub-Saharan-African-Countries

Arasio, R. L., Catley, A. and Ayele, M. 2020. Rapid Assessment of COVID-19 Impacts in Karamoja, Uganda. Karamoja Resilience Support Unit (KRSU), USAID/Uganda, Kampala.

Choudhury, S. and Headey, D.D. 2018. Household dairy production and child growth: Evidence from Bangladesh. Economics and Human Biology 30 (September 2018):150-161. https://doi.org/10.1016/j.ehb.2018.07.001

Enahoro, D., Njuri, N., Thornton, P. and Staal, S.J. 2019. A review of projections of demand and supply of livestock-derived foods and the implications for livestock sector management in LSIL focus countries. Mid-Project Research Report of the Feed the Future Innovation Lab for Livestock Systems (LSIL) Futures Foresight Component, Module I (Quantitative Scenario Modelling). CCAFS Working Paper no. 262 Wageningen, the Netherlands: CGIAR Research Program on Climate Change, Agriculture and Food Security (CCAFS). Available online at: www.ccafs.cgiar.org

FAO. 2009. The State of Food and Agriculture: Livestock in the balance. Rome, Italy: Food and Agriculture Organization of the United Nations. http://www.fao.org/3/a-i0680e.pdf

FAO. 2013. The State of Food and Agriculture 2013: Food systems for better nutrition. Rome, Italy: Food and Agriculture Organization of the United Nations. http://www.fao.org/publications/sofa/2013/en

FAO. 2020. Mitigating the impacts of COVID-19 on the livestock sector. Rome, Italy: Food and Agriculture Organization of the United Nations. http://www.fao.org/documents/card/en/c/ca8799en

FAO, IFAD, UNICEF, WFP and WHO. 2020. The State of Food Security and Nutrition in the World 2020. Transforming food systems for affordable healthy diets. Rome, Italy: Food and Agriculture Organization of the United Nations. https://doi.org/10.4060/ca9692en

Gerber, P.J., Steinfeld, H., Henderson, B., Mottet, A., Opio, C., Dijkman, J., Falcucci, A. and Tempio, G. 2013. Tackling climate change through livestock – A global assessment of emissions and mitigation opportunities. Rome, Italy: Food and Agriculture Organization of the United Nations. https://www.fao.org/3/i3437e/i3437e.pdf

Global Panel. 2016. The cost of malnutrition. Why policy action is urgent. London, UK: Global Panel on Agriculture and Food Systems for Nutrition. http://glopan.org/sites/default/files/pictures/CostOfMalnutrition.pdf

Headey, D., Hirvonen, K. and Hoddinott, J. 2018. Animal sourced foods and child stunting. American Journal of Agricultural Economics, 100(5), 1302-1319. https://doi.org/10.1093/ajae/aay053

Herforth, A. and Harris, J. 2014. Understanding and Applying Primary Pathways and Principles. Brief #1. Improving Nutrition through Agriculture Technical Brief Series. Arlington, VA: USAID/Strengthening Partnerships, Results, and Innovations in Nutrition Globally (SPRING) Project.

Hoddinott, J., Headey, D. and Dereje, M. 2015. Cows, missing milk markets, and nutrition in rural Ethiopia. The Journal of Development Studies, 51(8), 958-975. https://doi.org/10.1080/00220388.2015.1018903

Iannotti, L.L., Lutter, C.K., Stewart, C.P., Gallegos-Riofrío, C.A., Malo, C., Reinhart, G., Palacios, A., Karp, C., Chapnick, M., Cox, K., and Waters, W.F., 2017. Eggs in early complementary feeding and child growth: a randomized controlled trial. Pediatrics, 140(1). https://doi.org/10.1542/peds.2016-3459

Iannotti, L.L., Chapnick, M., Nicholas, J., Gallegos-Riofrío, C.A., Moreno, P., Douglas, K., Habif, D., Cui, Y., Stewart, C., Lutter, C.K. 2020. Egg intervention effect on linear growth no longer present after two years. Maternal & Child Nutrition, Volume 16:e12925. https://doi.org/10.1111/mcn.12925

IPCC. 2019. Climate Change and Land: an IPCC special report on climate change, desertification, land degradation, sustainable land management, food security, and greenhouse gas fluxes in terrestrial ecosystems [Shukla, P.R., Skea, J., Calvo Buendia, E., Masson-Delmotte, V., Pörtner, H.-O., Roberts, D.C., Zhai, P., Slade, R., Connors, S., van Diemen, R., Ferrat, M., Haughey, E., Luz, S., Neogi, S., Pathak, M., Petzold, J., Portugal Pereira, J., Vyas, P., Huntley, E., Kissick, K., Belkacemi, M. and Malley, J. (eds.)]. In press.

Jaquez, C., Granville-Ross, S. and Chetail-Armour, S. 2020. COVID-19 and Livestock Market Systems: The impact of C-19 on livestock-based economies in the Horn of Africa. Portland, Oregon: Mercy Corps. https://www.mercycorps.org/sites/default/files/2020-08/MC-HoA-COVID-Impact-Livestock-Mrkts-Aug-2020.pdf

Jones, P.G. and Thornton, P.K. 2009. Croppers to livestock keepers: livelihood transitions to 2050 in Africa due to climate change. Environmental Science & Policy, 12(4), 427-437. https://doi.org/10.1016/j.envsci.2008.08.006

Mahendra Dev, S. 2020. Addressing COVID-19 impacts on agriculture, food security, and livelihoods in India. Guest Blog. Washington D.C.: International Food Policy Research Institute. https://www.ifpri.org/blog/addressing-covid-19-impacts-agriculture-food-security-and-livelihoods-india

McKune, S.L., Stark, H., Sapp, A.C., Yang, Y., Slanzi, C.M., Moore, E.V., Omer, A. and N'Diaye, A.W. 2020. Behavior change, egg consumption, and child nutrition: A cluster randomized controlled trial. Pediatrics, December 2020. 146 (6) e2020007930. https://doi.org/10.1542/peds.2020-007930

Mercer, D. 2005. A Two-Decade Test of Product Life Cycle Theory. British Journal of Management. 4. 269 - 274. https://doi.org/10.1111/j.1467-8551.1993.tb00063.x

Nishimwe, K., Bowers, E., Ayabagabo, J.D., Habimana, R., Mutiga, S. and Maier, D. 2019. Assessment of Aflatoxin and Fumonisin Contamination and Associated Risk Factors in Feed and Feed Ingredients in Rwanda. Toxins 2019, 11, 270. https://doi.org/10.3390/toxins11050270

Otte, J., Pica-Ciamarra, U. and Morzaria, S. 2019. A Comparative Overview of the Livestock-Environment Interactions in Asia and Sub-saharan Africa. Frontiers in Veterinary Science, 6, 37. https://doi.org/10.3389/fvets.2019.00037

Pimpin, L., Kranz, S., Liu, E., Shulkin, M., Karageorgou, D., Miller, V., Fawzi, W., Duggan, C., Webb, P. and Mozaffarian, D. 2019. Effects of animal protein supplementation of mothers, preterm infants, and term infants on growth outcomes in childhood: a systematic review and meta-analysis of randomized trials. Am. J. Clin. Nutr., 110 (2) (2019), pp. 410-429. https://doi.org/10.1016/j.gfs.2017.01.001

Rojas-Downing, M.M., Nejadhashemi, A.P., Harrigan, T. and Woznicki, S.A. 2017. Climate change and livestock: Impacts, adaptation, and mitigation. Clim. Risk Manag., 16, 145–163. https://doi.org/10.1016/j.crm.2017.02.001

Saha Turna, N. And Wu. 2021. Aflatoxin M1 in milk: A global occurrence, intake, & exposure assessment. Trends in Food Science & Technology. https://doi.org/10.1016/j.tifs.2021.01.093

Stewart, C.P., Caswell, B., Iannotti, L., Lutter, C., Arnold, C.D., Chipatala, R., Prado, E.L. and Maleta, K. 2019. The effect of eggs on early child growth in rural Malawi: the Mazira Project randomized controlled trial. The American Journal of Clinical Nutrition, 110(4), pp.1026-1033. https://doi.org/10.1093/ajcn/nqz163

Tesfaye, A., Habte, Y. and Minten, B.. 2020. COVID-19 is shifting consumption and disrupting dairy value chains in Ethiopia. In: COVID-19 and global food security, eds. J. Swinnen and J. McDermott. Part Two: Diets and nutrition, Chapter 9, Pp. 42-45. Washington D.C.: International Food Policy Research Institute. https://doi.org/10.2499/p15738coll2.133762

UNICEF. 2019. The State of the World's Children 2019. Children, Food and Nutrition: Growing well in a changing world. UNICEF, New York. https://www.unicef.org/media/63016/file/SOWC-2019.pdf

UNICEF/WHO/The World Bank. 2021. Levels and trends in child malnutrition. Joint child malnutrition estimates 2021 edition - UNICEF DATA. https://data.unicef.org/resources/jme-report-2021

USAID. 2021. USAID Private Sector Engagement Policy. Washington D.C.: United States Agency for International Development. https://www.usaid.gov/sites/default/files/documents/1865/usaid_psepolicy_final.pdf

USAID. 2021. Resilience. East Africa Regional Office. Washington D.C.: United States Agency for International Development. https://www.usaid.gov/east-africa-regional/resilience

World Bank. 2007. The World Development Report 2008: Agriculture for Development. Washington D.C.: The World Bank. https://openknowledge.worldbank.org/bitstream/handle/10986/5990/WDR%202008%20-%20English.pdf

World Bank. 2018. The Aggregate Income Losses from Childhood Stunting and the Returns to a Nutrition Intervention Aimed at Reducing Stunting. Prepared by E. Galassoa and A. Wagstaffa, Development Research Group, Policy Research Working Paper 8536. Washington D.C.: The World Bank. http://documents1.worldbank.org/curated/en/528901533144584145/pdf/WPS8536.pdf

Zaharia, S., Ghosh, S., Shrestha, R. Manohar, S., Thorne-Lyman, A.L., Bashaasha, B., Kabunga, N., Gurung, S., Namirembe, G., Appel, K.H., Liang, L and Webb, P. 2021. Sustained intake of animal-sourced foods is associated with less stunting in young children. Nature Food 2, 246–254 (2021). https://doi.org/10.1038/s43016-021-00259-z

LIST OF APPENDICES

Informational

Appendix 1. Theory of change

Appendix 2. Summary of the research priorities for each target country

Forms and templates to complete

Concept note and full proposal:

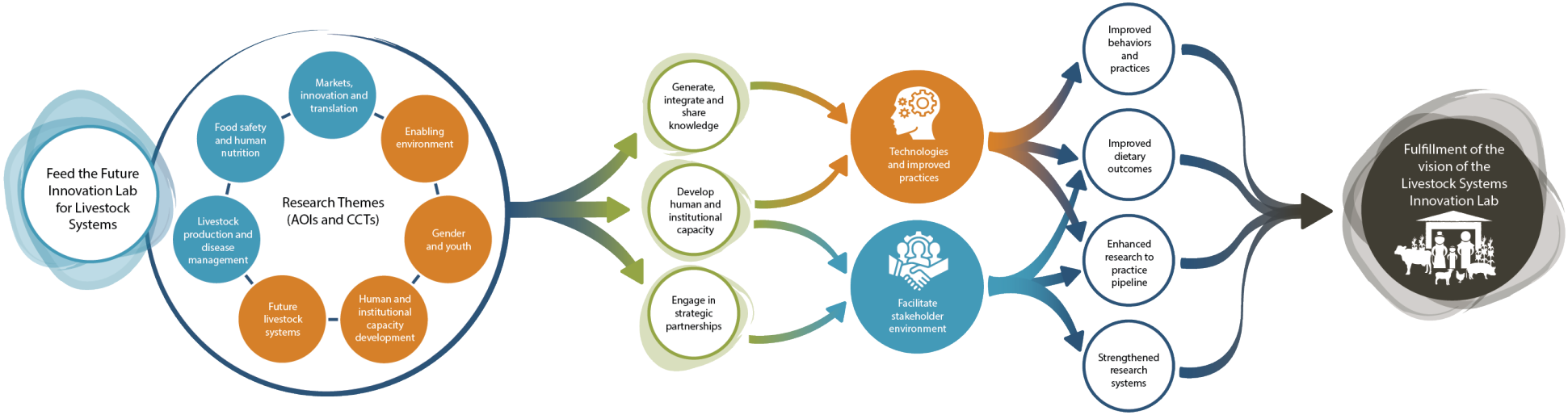
Appendix 3. Biographical sketch template

Full proposal only:

These appendices will be shared at the time that applicants are invited to submit a full proposal:

Appendix 4. Budget template
Appendix 5. Key personnel
Appendix 6. Conflict of interest form
Appendix 7. Current and pending support form
Appendix 8. Workplan and results framework template
Appendix 9. Environmental mitigation and monitoring checklist

APPENDIX 1: THEORY OF CHANGE



APPENDIX 2: SUMMARY OF THE RESEARCH PRIORITIES FOR EACH TARGET COUNTRY

Country	Livestock Production & Disease Management	Human Health, Food Safety & Diets and Nutrition	Markets & Innovation Translation
Burkina Faso Priority livestock species: Small ruminants Poultry (chickens & guinea fowl)	**Livestock production** Feed/forage value chain enhancement: • Assessing innovative approaches to overcome regional feed shortages. • Strengthening fodder markets and seed systems. • Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale. Other topics: • Processing of ASF to increase shelf life and maintain food safety. **Livestock disease management** • Assess innovative disease management practices including private-public models. • Estimate the economic impacts of disease and mortality due to priority diseases identified by the Government of Burkina Faso.	**Safe livestock production and food safety** • Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households (link to EED). • Assessing best-bet interventions to improve the microbial safety of ASF. • Integrating existing data into risk assessments that may support deriving appropriate standards. **ASF consumption, dietary diversity and adequacy** • Increasing ASF consumption particularly the impact of increased livestock production or productivity on nutritional outcomes. • Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them.	• Researching new market opportunities for livestock and ASF supported by supply and demand-side data. • Monitoring and improving the understanding trends in ASF. availability and prices in markets across seasons and geographies. • Research on a market-based food-systems approach to challenges associated with other AOIs while viewing market performance through the lens of resilience. • Comparing alternative scaling pathways or design scale-up interventions.
Ethiopia Priority livestock species: Dairy cattle	**Livestock production** Feed/forage value chain enhancement: • Assessing innovative or existing best-bet sustainable and effective crop and residue improvement and conservation techniques that are most likely to scale. • Researching approaches to increase adoption of improved forage varieties.	**Safe livestock production and food safety** • Improving the understanding and develop risk mitigating measures on the risks of human-livestock cohabitation in smallholder households (link to EED) • Integrating existing data into risk assessments.	• Researching new market opportunities for livestock and ASF supported by supply and demand-side data. • Researching market performance. • Research on a market-based food-systems approach to challenges associated with other AOIs while viewing market performance through the lens of resilience.

Country	Livestock Production & Disease Management	Human Health, Food Safety & Diets and Nutrition	Markets & Innovation Translation
Poultry (chickens)	• Strengthening fodder markets and seed systems. • Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale. Other topics: • Processing of ASF to increase shelf life and maintain food safety. • Researching strategies to maintain milk quality and safety during transport, handling and processing. **Livestock disease management** • Testing different strategies to scale youngstock mortality prevention and mitigation interventions. • Assessing the economic impact of disease and mortality due to priority diseases identified by the Government of Ethiopia. • Assessing innovative disease management practices.	• Evaluating the risks relative to benefits of consuming milk containing aflatoxin M1. **ASF consumption, dietary diversity and adequacy** • Increasing ASF consumption particularly the impact of increased livestock production or productivity on nutritional outcomes. • Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them. • Developing and testing social behavior change communication to increase ASF consumption in young children.	• Comparing alternative scaling pathways or design scale-up interventions.
Nepal Priority livestock species: Goats	**Livestock production** Improving feeds and feeding for livestock: • Assessing the increase in feed and forage production capacity needed. • Developing innovative business models for off-farm feed and forage production. • Increasing adoption of improved forage species and decision support tools.	**Safe livestock production and food safety** • Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households (link to EED). • Assessing best-bet interventions to improve the microbial safety of ASF.	• Researching new market opportunities for livestock and ASF supported by supply and demand-side data. • Monitoring and improving the understanding trends in ASF availability and prices in markets across seasons and geographies. • Researching market performance

Country	Livestock Production & Disease Management	Human Health, Food Safety & Diets and Nutrition	Markets & Innovation Translation
Dairy (Cattle & buffaloes)	• Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale. **Livestock disease management** • Assessing innovative disease management practices. • Assessing the economic impact of disease and mortality due to priority diseases as identified by the Government of Nepal.	• Evaluating the risks relative to benefits of consuming milk containing aflatoxin M1. **ASF consumption, dietary diversity and adequacy** • Increasing ASF consumption particularly the impact of increased livestock production or productivity on nutritional outcomes. • Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them.	• Comparing alternative scaling pathways or design scale-up interventions.
Niger Priority livestock species: Small ruminants Poultry (chickens & guinea fowl)	**Livestock production** Feed/forage value chain enhancement: • Assess innovative or existing best bet crop residue improvement and conservation techniques that are most likely to scale. • Researching various approaches to increase adoption of improved forage varieties. • Strengthening fodder markets and seed systems. • Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale. **Livestock disease management** • Assessing young stock mortality and developing suitable prevention and mitigation strategies. • Assessing the economic impact of disease and mortality due to priority	**Safe livestock production and food safety** • Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households (link to EED) • Assessing best-bet interventions to improve the microbial safety of ASF **ASF consumption, dietary diversity and adequacy** • Investigating barriers to ASF consumption, particularly in infants and test interventions to overcome them. • Developing and testing social behavior change communication to increase ASF consumption in young children.	• Researching new market opportunities for livestock and ASF supported by supply and demand-side data. • Researching market performance. • Comparing alternative scaling pathways or design scale-up interventions.

Country	Livestock Production & Disease Management	Human Health, Food Safety & Diets and Nutrition	Markets & Innovation Translation
	diseases as identified by the Government of Niger. • Assessing innovative disease management practices.		
Rwanda Priority livestock species: Dairy cattle Poultry (chickens) Pigs	**Livestock production** Feed/forage value chain enhancement: • Assessing the increase in feed and forage production capacity to meet increase feed demands as per the Livestock Master Plan. • Improving feed analysis and diet formulation for priority species. • Reducing the ASF production costs through climate-smart agricultural practices and decision-support tools that are likely to scale. Other topics: • Researching strategies to maintain milk quality and safety during transport, handling and processing. **Livestock disease management** • Assessing young stock mortality. • Assessing the economic impact of disease and mortality due to priority diseases as identified by the Government of Rwanda. • Assessing innovative disease management practices.	**Safe livestock production and food safety** • Improving the understanding and developing mitigation measures to address the risks of human-livestock cohabitation in smallholder households. • Integrating existing data into risk assessments that may support deriving appropriate standards. • Evaluating the risks relative to benefits of consuming milk containing aflatoxin M1. **ASF consumption, dietary diversity and adequacy** • Increasing ASF consumption particularly the impact of increased livestock production or productivity on nutritional outcomes. • Investigating barriers to ASF consumption, particularly in infants and testing interventions to overcome them.	• Researching new market opportunities for livestock and ASF supported by supply and demand-side data • Monitoring and improving the understanding trends in ASF availability and prices in markets across seasons and geographies. • Research on market diagnostics that considers market functionality at the micro and aggregate levels • Researching market performance. • Comparing alternative scaling pathways or design scale-up interventions so that credible analysis of innovation impacts can be conducted at scale.

APPENDIX 3: BIOGRAPHICAL SKETCH

Name …

[The biographical sketch should include an overview of academic and research credentials, as applicable; e.g., earned degrees, teaching experience, employment history, professional activities, honors and awards, and grants received. The biographical sketch is limited to 2 pages, including publications.]

Education and Training *[List in chronological order]*

Year Awarded	Degree	Organization	Area

Research and Professional Experience *[List in reverse chronological order beginning with your current position]*

Years	Position title and organization/unit

Synergistic Activities

[…]

1. …
2. …

Publications

*[Include a chronological list of your publications in refereed journals, including those in press, or non-refereed technical publications from that past four years that have relevance to the proposed project. All authors should be listed in the same order as they appear on each paper cited, along with the title and complete reference as these usually appear in journals. Publications **are included** in the 2-page limit]*