Supporting Program Design Through Research on Agriculture-to-Nutrition Linkages
Feed the Future Innovation Lab for Nutrition

Synthesis Report of Annual Partners Meeting
August 6-7, 2019
Boston, USA
Executive Summary

Since 2010, the Feed the Future Innovation Lab for Nutrition has pursued rigorous research that supports the goals of the U.S. Government’s Feed the Future initiative, while also building complementary human and institutional capacity for analysis and policy formulation in developing countries. The Nutrition Innovation Lab’s research focuses on three major overarching research questions: 1) understanding agriculture-to-nutrition linkages, 2) program and policy processes supporting nutrition goals, and 3) neglected biological mechanisms in the agriculture-to-nutrition continuum. These themes form a framework for a host of nested studies that generate concrete evidence that responds to priority concerns of low-income countries. All research was pursued in ways to enhance policymaker’s understanding of how to overcome constraints in policy, program designs, and implementation, and to generate global public goods in the form of new scientific knowledge relevant to diverse country settings.

This report is a synthesis of the 2019 Annual Partners Meeting organized by the Nutrition Innovation Lab under the rubric of “Supporting Program Design through Research on Agriculture-to-Nutrition Linkages”. Held at the Friedman School of Nutrition Science and Policy at Tufts University in Boston on August 6-7, 2019, the meeting brought together 65 participants from five countries (Bangladesh, Malawi, Mozambique, Nepal, Uganda), nine US-based universities (Harvard, Johns Hopkins, Kansas State University, Purdue, Tufts, Tuskegee, UC Davis, University of Georgia, Cornell University), and representatives from the United States Agency for International Development (USAID).

The objective was to bring together all the partners and collaborators of the Nutrition Innovation Lab to: a) learn from and synthesize findings across different focus countries, taking stock of both completed and ongoing research, b) discuss how findings inform policy and programming within the context of USAID, as well as, globally, and c) identify research gaps for future consideration.

The two-day partners meeting facilitated dialogue and knowledge-sharing among all partners through plenary sessions, oral and poster presentations, and breakout discussion. The meeting considered all the achievements of the past 9 years of Nutrition Innovation Lab activity. The presentations were videotaped and are available on the Nutrition Innovation Lab website.

Day 1 of the meeting started with an overview of the research consortium’s flagship research studies, focusing on 1) interventions that can improve suboptimal diets and/or maternal and child nutritional status, and 2) how to understand and better measure resilience in relation to household diets and food security. Eleven presenters from Nepal, Bangladesh, Uganda, Malawi, Mozambique and the US shared findings from their work. Participants were then divided for breakout sessions to discuss research/programming gaps and challenges and opportunities to further leverage nutrition impacts. The topics discussed in small groups were, 1) agriculture, sustainable food systems, and diet, 2) markets and infrastructure, 3) nutrition resilience, and 4) public private partnerships engagement. The evening of Day 1 featured an interactive poster presentation session held in the auditorium at the Hotel Courtyard Marriott. Twenty-seven posters from different partners of the Nutrition Innovation Lab were exhibited highlighting publications and presentations on agriculture-to-nutrition linkages.

Day 2 featured 16 presenters who talked on issues clustered around four themes, 1) building research capacity to bridge gaps in agriculture-to-nutrition linkages, 2) analytical methods and assessment metrics relating to agriculture, nutrition and health, 3) infant and young child growth, and 4) child nutrition and cognitive development. As in Day 1, participants were then divided into groups and asked to discuss research/programming gaps, challenges, and opportunities. The topics for Day 2 were: 1) nutrition governance, 2) mycotoxins and health, 3) linking agriculture (crops and livestock), WASH and nutrition through food safety lens, and 4) the triple burden of malnutrition. The groups worked together and identified key challenges and opportunities.
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About the Meeting

The two-day Annual Partners Meeting, organized by the Feed the Future Innovation Lab for Nutrition at Tufts University, was held at the Jean Mayer USDA Human Nutrition Research Center for Aging, Tufts University, Boston, USA from August 6-7, 2019. The meeting was attended by more than 65 partners from five partner countries (Bangladesh, Malawi, Mozambique, Nepal, Uganda), nine US-based universities (Harvard University, Johns Hopkins, Kansas State University, Purdue, Tufts, Tuskegee, UC Davis, University of Georgia, Cornell University), along with active participation of representatives from the United States Agency for International Development (USAID) from Washington D.C. and Nepal.

Context

Since 2010, the Feed the Future Innovation Lab for Nutrition (hereafter the Nutrition Innovation Lab) has pursued rigorous research that supports the goals of the U.S. Government’s Feed the Future initiative, while also building human and institutional capacity for analysis and policy formulation in developing countries.

Tufts University Friedman School of Nutrition Science and Policy has served as the Management Entity for the Nutrition Innovation Lab since October 2010. Tufts University manages the activities in close partnerships with several US-based university partners – Tuskegee University, Purdue University, Johns Hopkins University, and Harvard University. Additional partnerships have been formed around the research and capacity-building agenda in the United States and focus countries including Nepal, Uganda, Malawi, Mozambique and Bangladesh. Collaborators include government bodies (such as Nepal’s National Planning Commission and Uganda’s National Planning Authority), non-governmental actors (such as Helen Keller International, USAID SPRING and International Food Policy Research Institute), academic partners (Makerere University in Uganda, LUANAR and the College of Medicine in Malawi, Bangladesh Agricultural University in Bangladesh, Institute of Medicine, Tribhuvan University and Patan Academy of Health Sciences in Nepal, University Lúrio in Nampula, Mozambique, Cornell University, University of Georgia, Bergen University in Norway, and the London School of Hygiene and Tropical Medicine in the United Kingdom), United Nations agencies (UNICEF and FAO), and operational programs in the field (USAID Suahara in Nepal and Uganda Community Connector in Uganda). The Nutrition Innovation Lab also works in close collaboration with the Feed the Future Innovation Lab for Horticulture, the Innovation Lab for the Reduction of Post-Harvest Loss, the Innovation Lab for Collaborative Research on Aquaculture & Fisheries, and the Innovation Lab for Peanut research.

The Nutrition Innovation Lab’s global research framework focuses on three over-arching research questions:

1. **Understanding the Agriculture-to-Nutrition Linkages**: In what ways do investments in agriculture achieve significant measurable impacts in nutrition? What are the types of metrics that will be critical to assess resilience within the agriculture-to-nutrition continuum? As a corollary, can pathways to impact be empirically demonstrated? How can large-scale programs best incorporate such knowledge into cost-effective, multi-sectoral interventions aimed at improving nutrition?

2. **Program and Policy Processes**: How can policy and program implementation processes be enhanced to support both nutrition-specific and nutrition-sensitive actions?

3. **Neglected Biological Mechanisms in the Agriculture-to-Nutrition Continuum**: What are the major contributors/risk factors linked to pregnancy and early life, to infant and young nutrition outcomes, focusing on issues related to WASH, water quality, aflatoxins, gut microbiota and environmental enteropathy, and animal source protein availability?
These overarching questions form the framework for a host of nested studies that are generating concrete evidence that responds to priority developing country concerns while supporting the goals of U.S. Government’s Feed the Future initiatives. The research was pursued in ways to enhance a policymaker’s understanding of how to overcome constraints in policy and program design and implementation and produce global public goods in the form of new scientific knowledge of relevant and diverse settings.

Meeting Agenda

Tufts University developed the Partners Meeting agenda that prioritized learning objectives for the two-day meeting. The agenda is attached in Appendix 1. The goal of the annual Partners Meeting was to bring together all the partners and collaborators to:

- Learn and synthesize findings across different focus countries, thus taking stock of the completed and ongoing research.
- Understand how these contribute to our shared research agenda and how these inform policy and programming within the context of USAID, as well as, globally at large.
- Understand how our findings support practice and what needs to be done to better link research to practice, as well as, identify research gaps for future consideration.

This report is organized chronologically according to the meeting agenda, highlighting exposition by the partners on a shared research agenda, future consideration and its contribution to USAID Feed the Future’s global initiatives.

Proceedings: Day 1

Session I: Setting the Stage

The meeting commenced with welcome remarks from three prominent speakers.

Dr. Dariush Mozaffarian, Dean of the Friedman School of Nutrition Science and Policy at Tufts University welcomed the participants to the Friedman School as the host of the meeting and congratulated USAID and the Nutrition Innovation Lab partners on their contribution to international research on nutrition.

Dr. Robert Bertram, Chief Scientist at the United States Agency for International Development (USAID) urged partners of the Nutrition Innovation Lab to think prospectively as nutrition is more important than ever before. In his keynote, Dr. Bertram commemorated the roots of the Feed the Future program that started as an emergency supplemental initiative during the tenure of President Bush, evolved from being a presidential initiative to the law of land during the President Obama administration, and was then reenacted for five years instead of two under President Trump. Dr. Bertram also highlighted that the focus of USAID is now expanding with the advent of resilience and addition of water, sanitation, and hygiene (WASH). Agriculture in the fourth bureau will be renamed as Resilience and Food Security. Dr. Bertram encouraged the participants to remain evidence-focused and do purpose-driven research, while being very focused on impact. In addition, he shared some of his observations around increased prevalence of malnutrition driven by over and underconsumption and though we continue to make progress on reducing undernutrition, and whether the drivers and issues for all types of malnutrition can be addressed without losing focus on undernutrition. He also emphasized that there needs to be a clear understanding of the theory-of-change to address hunger and stunting. He highlighted the growing need of evidence around
animal sourced foods and their impact on nutrition outcomes, gender and women empowerment, affordability and relative prices between quality foods, starchy staples, diversified farming and food systems to uplift livelihoods of people engaged in agriculture, and eventually making quality diets affordable to address micronutrient deficiencies and intergenerational issues of nutrition and birth outcomes. He emphasized that in countries like Bangladesh, which has been reducing rates of stunting and has had sustained income growth, wasting is still high. He strongly suggested the need to figure out the drivers of these outcomes and the need to see nutrition as an economic problem in the global economy. He advocated for the development of a theory-of-change on food systems and metrics for that theory-of-change because what gets measured gets done. Dr. Bertram congratulated the Nutrition Innovation Lab for its achievements and concluded his presentation with a takeaway question - *How can we marry rural income growth driven by agricultural growth with gains in terms of undernutrition and that is also net positive, pushing back on the negative dietary transition driven by cheap oils, sugar, etc.?*

**Dr. Patrick Webb**, Director of the Nutrition Innovation Lab, welcomed participants and provided background on what started as a Nutrition Collaborative Research Support Program in March 2010, highlighting achievements over the past nine years. Responding to calls for more rigorous and holistic studies on multi-sectoral integrated programs for nutrition, the Nutrition Innovation Lab launched its primary studies in Uganda and Nepal looking at population exposure to a variety of projects while the Lab was also involved in primary and secondary data collection in a range of other countries. Dr. Webb emphasized that attribution is challenging where there were multiple large integrated programs like in Nepal and Bangladesh. He suggested that there is a need to calibrate expectations from a program and be very clear about what is feasible in terms of change in diet and nutrition outcomes, hence what can be measured. Dr. Webb also reminded the participants that the strength of evidence on impacts of agriculture on nutrition was previously considered weak because of lack of rigor in study designs, but that the evidence is now getting stronger, albeit with a lot of caveats. The Nutrition Innovation Lab is trying to understand these caveats and contextual factors. Dr. Webb also noted that participation in a program does not inherently mean adoption of desired practices or outcomes and that some of the anthropometric impacts might materialize only after the lifecycle of the project; therefore, impacts should not only be measured at the end of the project cycle but should also be considered beyond the project period. He also shared a few examples of the exceptional work on agricultural production and diet diversity, the relationship between wasting and/or stunting with environmental enteric dysfunction (EED), and the relationship between aflatoxin exposure and birth outcomes and linear growth in infants and children.

**Session 2: Flagship Research Studies of the Nutrition Innovation Lab**

This session was moderated by Dr. Eileen Kennedy, professor at the Friedman School and a member of the High-Level Panel of Experts on Food Security and Nutrition of the U.N. Committee on World Food Security. The following individuals presented on the flagship research studies that have been conducted by the Nutrition Innovation Lab over the previous nine years:

**Dr. Keith West Jr.** (Johns Hopkins University, Baltimore, Maryland)

*PoSHAN Community Studies: Rationale, Design, Achievements, and Lessons*

Dr. West provided an overview of the nationally representative Policy and Science for Health, Agriculture and Nutrition (PoSHAN) study in Nepal, which assessed variations in agricultural practices, household food security, dietary patterns, and nutritional status between the three agro-ecological zones of Nepal. Dr. West also emphasized the importance of Nutrition Innovation Lab ability and interest in conducting research in the field of agriculture, public health, and food security and nutrition by groups within Nepal through in-country capacity building activities.
Dr. Bernard Bashaasha (Makerere University, Uganda)

Effectiveness of Integrated Agriculture, Health, and Nutrition Interventions to Improve Maternal and Child Nutrition and Health in Rural Uganda

Dr. Bashaasha presented an overview of both the Uganda Birth Cohort Study and the Uganda Panel Study. The overall objective of both studies was to understand the effect of integrated interventions in nutrition, agriculture, and health on maternal and child health in rural Uganda.

Dr. Patrick Webb (Tufts University, Boston, Massachusetts)

Bangladesh Aquaculture and Horticulture for Nutrition Study: Rationale, Design, Accomplishments and Challenges

Dr. Webb provided an overview of the longitudinal panel survey in 3,060 households located across 102 unions in Bangladesh. Dr. Webb explored the integration of work from multiple Innovation Labs in horticulture, aquaculture, nutrition, and agricultural interventions and practices.

Dr. Shibani Ghosh (Tufts University, Boston, Massachusetts)

Assessing Mycotoxin Exposure in Nepal and Mozambique: Rationale, Design, Accomplishments, Challenges

Dr. Ghosh explained that to contribute to a better understanding of the mycotoxin-stunting relationship, the Nutrition Innovation Lab implemented several studies to broaden the global understanding and research on mycotoxins, with a focus on early life nutrition. Dr. Ghosh provided an overview of research studies in Nepal and Mozambique that focused on assessing the relationship between aflatoxin exposure and birth and linear growth outcomes.

The objectives of the presentations were to discuss the rationale, design, accomplishments, and challenges, operational and methodological, in Nepal, Uganda, Bangladesh, and Mozambique. During the discussion and Q&A that followed these presentations, partners in the audience made the following suggestions and recommendations:

- Although not all data are integrable due to differences in study designs, sampling methods, and geographic locations, efforts should be made to generate robust evidence by integrating datasets from panel surveys, for example, in Nepal and Uganda. Recommendations for cross-country analyses were made, where there are opportunities.
- Ongoing efforts are being made to integrate aflatoxin datasets from Nepal, Uganda, and Mozambique to assess thresholds of serum aflatoxin levels that can be linked to anthropometric outcomes such as birth weight and infant and child length/height.
- Partners inquired if investments in building in-country capacity to analyze biological samples for ongoing and future studies. In response, the speakers shared their experiences that although building in-country capacity was the desirable approach, not all countries have the human and institutional capability to do so. In doing so, the speakers shared their experiences from Nepal and Egypt to analyze breast milk samples and shipment of DNA samples from the two countries, respectively.
Session 3: Factors that Modify Poor Diets and/or Nutritional Status

The session was moderated by Dr. Agnes Mwangela, Associate Professor of Food Science and Dean of Faculty of Food and Human Sciences at the Lilongwe University of Agriculture & Natural Resources (LUANAR), Malawi, who highlighted that the session would focus on evidence generated by the Nutrition Innovation Lab around factors that affect diets, diet quality, and nutritional status. The sessions consisted of the following three presentations:

Dr. Gerald Shively (Purdue University, West Lafayette, Indiana)

*Drivers of Diet Complexity in Nepal*

In Nepal, there is a positive association between dietary diversity and linear growth. Dr. Shively looked at which factors help to explain patterns of household diet complexity.

Dr. Will Masters (Tufts University, Boston, Massachusetts)

*Affordability of Nutritious Diets: Malawi, Tanzania, Ethiopia and Worldwide*

Why measure the cost of nutritious diets? Dr. Masters discussed several approaches and measures for defining and calculating affordability of nutritious diets using country-specific and global data.

Mr. Nassul Kabunga (Nutrition Innovation Lab, Uganda)

*Evaluation of the USAID Community Connector Program*

The Community Connector (CC) Program was implemented in 15 Ugandan districts between 2012-2016. Kabunga covered an impact evaluation of CC, specifically on intermediary/pathway outcomes and maternal and child nutrition and health outcomes.

During Q&A and discussions that followed these presentations, participants gave the following clarifications and recommendations:

- A question was posed to Dr. Shively asking to explain why female-headed households and households receiving remittances were positively correlated with more complex diets. Dr. Shively’s response was that those households may have been receiving remittances from males working abroad and that the females from those households were better educated and empowered.
- Dr. Will Masters was asked whether new policy suggestions are emerging to address systemic differences on food and nutrients. Dr. Masters responded that there are no silver bullets and that we need progress on all fronts, but we should also examine market spaces in terms of infrastructure, competition, and government assistance in order to provide useful insights to guide policies and programs. He also emphasized that there are other factors that can promote or inhibit nutrition as foods come together and these factors need to be added into the calculation for the cost of nutritious diets. We need to expand on this work and look at anti-nutrients, EED, and aflatoxins in the diet, though these factors complicate the math of affordability of nutritious diets.
- In response to questions about least cost diet analysis and whether the recommended food baskets could be taken and applied in the communities, Dr. Masters clarified that the study was not meant to do that, rather it was done to analyze markets and infrastructure and diagnose the food systems. If intended to apply to communities, issues such as cultural preferences, taboos, and palatability would need to be factored in.
Session 4: Nutrition Resilience, Food Security and Metrics

The session was moderated by Dr. Steve Vosti, Adjunct Professor at the Agricultural and Resource Economics at the University of California, Davis. Dr. Vosti highlighted that the objective of the session was to understand the current research findings from the Nutrition Innovation Lab’s activities on resilience. The session consisted of the following three presentations:

**Dr. Sonia Zaharia** (Tufts University, Boston, Massachusetts)
*A Novel Method to Measure Resilience in Nutrition: Application to Diets of Rural Women and Children in Nepal and Bangladesh*

Dr. Zaharia advocated that measures of resilience are needed for the design and evaluation of policy interventions. Dr. Zaharia presented on a novel method to measure resilience using panel data and its application in survey data on maternal and child diets in Nepal and Bangladesh.

**Dr. Andrew Thorne-Lyman** (Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland)
*Nutritional Resilience in Nepal after the 2015 Earthquake*

Using data from the PoSHAN study, Dr. Thorne-Lyman analyzed the nutritional resilience of seven earthquake-affected districts. The outcomes from the study were surprising and Dr. Thorne-Lyman discussed some of the factors that may have led to these findings.

**Dr. Janet Jeeyon Kim** (Mercy Corps, Washington D.C.)
*The Effects of Migration-Related Remittance on Household Food Security Status in Nepal*

Dr. Kim revealed some soon-to-be published research on the effects of remittances from Nepalis living outside the country on household food security status in Nepal.

During Q&A and discussions that followed these presentations, participants gave the following clarifications and recommendations:

- In response to a query on whether a migration decision is connected to food security and what factors were driving migration in the first place, Dr. Kim explained that endogeneity is an issue since migrants self-select to migrate, but also that they are not inferring causality. Household characteristics can be linked to migration but not connected to wealth index. Participants also suggested this may be an opportunity to consider the contribution of epigenetics to resilience since seasonal starvation could affect epigenetics. Suggestions were also made to examine effects of regional versus international migration.
During this session, participants were assigned to different topic groups and were asked to discuss in their own groups research/programming gaps, challenges, and opportunities to further leverage nutrition impacts. The participants were asked to report back on the three questions: 1) What do we know about key scientific knowledge gaps today? 2) Where does this point to with respect to next steps/approach/focus? 3) What scientific questions should be prioritized for future funding?

Each topic group was guided by two discussants and a rapporteur. The discussions were facilitated by Dr. Patrick Webb, Dr. Shibani Ghosh, Dr. Robin Shrestha, Ms. Katherine Heneveld, and Ms. Hannah Koehn. A bulleted summary of the discussion report on the topics is below:

1) **Agriculture, sustainable food systems and healthy diets**
   - Need a consensus on the definition of sustainable food systems
   - Need to consider gender and how it might intersect with food systems, identify research priorities. Gender policies are there. So what? Why aren’t we getting it done?
   - Need better measures of diet quality, need better ways to conduct diet recalls using digital tools
   - Huge gap in consistently measuring women’s empowerment
   - Need to prioritize research around drivers of the food environment. What research can feasibly be done and should be prioritized on healthy food markets, standards and guidelines, food safety and capacity building around food safety, engagement of private sector, incentives to make nutritious foods profitable and desirable?
   - The thinking around agriculture, sustainable food systems and healthy diets should incorporate our learnings and mistakes made in the past, where we think too narrowly and don’t realistically think of the intermediate outcomes

2) **Markets and infrastructure**
   - Markets are where nutrition and agriculture come together
   - Not everyone participates in markets, but we don’t have a good understanding of why
   - The cost of a healthy diet is often more expensive in low- and middle-income countries (LMICs) as compared to high-income countries (HICs)
   - Access to markets can act as a buffer in case of shocks
   - Farmers don’t always participate in markets because they have a surplus, instead, it is the only way for them to access money
   - Nutrition is often not at the top of households’ list of priorities
   - Often the recommended foods from a nutrition standpoint are not available in markets and when they are available, the cost is often high
   - Some of the most nutritious foods are also most vulnerable to food safety issues
   - Some of the knowledge gaps discussed include the following:
     - Should markets be considered “public goods” and should we be making public investments in them?
     - What aspects of a market make them “good” as well as good for nutrition?
How would prioritizing nutrition outcomes impact the way governments invest in markets and infrastructure?
What metrics are there for measuring market access and for comparing different markets?
Future research should be able to generate data on who is participating in markets and why?

3) Nutrition resilience
• Discussions started with definitions of resilience from the perspective of individual households. The group agreed on the following definitions:
  o Household no longer vulnerable to seasonal or environmental changes (food storage and safety throughout year, avoiding losses, etc.)
  o A positive outcome to the same stressors/shocks that was not expected (e.g. households experiencing same conditions but different outcomes (positive deviance perspective)
  o Ability to overcome unexpected situations
  o Ability to respond to treatment (vs. non-response or failure); for example, resilience is about the ability to improve or progress (in addition to not sliding back)
  o Discussions were held on definition of resilience from food systems perspective (for e.g. climate change resilience) and that resilience is a more complicated pathway that includes non-economic indicators, not just about wealth and poverty. When strategizing programs for resilience, flexibility (movement of people and goods) and diversity (diversity of crops, livelihoods, etc.) should also be accounted for. For example, strengthening vulnerable places from potential shocks (to the point where intervention is no longer needed) vs. responding to crisis situations

• Knowledge gaps, remaining questions, next steps
  o There is not enough literature in terms of recovery from shocks from the food systems lens, and we need to figure out metrics of resilience that include non-economic indicators (e.g. accumulation of social capital as well as financial capital).
  o There is a need to identify safety nets that make households more resilient
  o There is a longitudinal data gap that can help better understand how and when to intervene, there is a need to think carefully about timing of when to intervene, in order to not disrupt a natural process of resilience to avoid unintentionally making households less resilient
  o There is a need to identify a threshold and/or a point of no return and how we can assess resilience in such dynamic settings
  o The group also emphasized the need to distinguish between degrees of resilience and think about the differential impacts throughout the whole development spectrum (e.g. if one household owns multiple cows and another owns one cow and both lose one of them, the households will be affected differently

4) Public private partnerships (PPP) and engagement in the multi-sector approach
• The group started with different examples where PPP exists (e.g. food fortification, agri-business, etc.), although these partnerships don’t always reach the most vulnerable. Knowledge gaps on best practices for engagement were discussed and the need to consider the role of private sectors (buyer vs. seller). Is there a clear business case for the private sector and what and who holds risks and who aims for profits?
• There are significant knowledge gaps in how we can make these engagements available in a value chain (small and large scale). There are opportunities for clear market engagement, but generally it is more complex. We need to find ways to engage commercially but with social responsibilities
• Trust and branding are extremely important for buyers. Breastmilk substitutes are a great example of a market that has been created and people will pay for it because they trust the quality
• We need good data on how the public sector can benefit from this partnership and how to build an enabling environment for the private sector to engage in
• There is a need for frameworks to diagnose the complexity of the issue and find and prioritize gaps and identify opportunities for private sector engagement

**Poster Exhibition**

The final session of Day 1 featured an interactive poster session held in the auditorium at the Courtyard Marriott Hotel. Twenty-seven posters from different partners were exhibited, highlighting publications/presentations of the on the agriculture-to-nutrition linkages. The posters are listed in Appendix 3 of this report.

**Proceedings: Day 2**

**Session 6: Building Research Capacity to Bridge Gaps in Agriculture-to-Nutrition Linkages**

The first session of Day 2 was moderated by Dr. Patrick Webb, McFarlane Professor at the Friedman School of Nutrition Science and Policy at Tufts University and Dr. Kedar Prasad Baral, Professor at the Department of Public Health, Patan Academy of Health Sciences, Nepal. The session consisted of speakers and partners working in Nepal, Malawi, Ethiopia, and Uganda who shared their experiences on capacity building activities in Nepal. The topics and speakers were as follows:

**Dr. Swetha Manohar** (Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland)

*Building Capacity in Nepal – The National Nutrition Symposium and Annual Research Methods Course*

Dr. Manohar detailed experiences in conducting the annual Nepal National Nutrition Symposium beginning in 2012. The symposia have focused on agriculture-to-nutrition linkages and pathways and they have the investment of multiple national government and non-governmental stakeholders. These symposia have been unique in the audience they attract (policymakers, academics, program implementers, and students) and in their combination of presentations with workshops and networking sessions.

**Mr. Ram Shrestha** (CAFODAT, Nepal)

*Background of Nutrition Research Landscape in Nepal*

According to Mr. Shrestha, nutrition has not traditionally been a priority area in Nepal, but in 1975 a nutrition support program helped to sensitize the government on this gap spurring the creation of the Nepal Technical Assistance Group (NTAG) and a multi-sectoral nutrition program. Since then, investments in nutrition have continued and support from universities like Tufts and Johns Hopkins have been building capacity to meet those objectives.

**Mr. Edgar Agaba** (Nutrition Innovation Lab, Uganda)

*Building Capacity in Uganda – Supporting Ugandan Students and Professionals in Nutrition-Agriculture Research for Development*

Tufts and its partners have been supporting capacity building at three levels in Uganda, 1) academic training; 2) symposia; 3) non-academic/short-term training/local government support. From 2010-2017 1,743 individuals have received short-term training and 75 individuals have received long-term training. Nutrition-related capacity gaps still exist at the national and local levels and Mr. Agaba explained that next steps in
capacity building efforts include a research writing workshop at dissemination and symposia activities, providing short trainings at the national and local government levels, and providing advanced training at the graduate level.

**Dr. Agnes Mwangela** (LUANAR, Malawi)

**Dr. Averalda van Graan** (South Africa Medical Research Council)

*Nutrition Capacity Development in Malawi: Update on Activities*

Dr. Mwangela and Dr. van Graan explained that the cooperative agreement for nutrition capacity development to meet national priorities activities in Malawi included, 1) development and implementation of the nation’s first dietetics program; 2) development of the first national food composition table; 3) integration of nutrition into the medical school curriculum. Dr. Mwangela explained that the government of Malawi has institutionalized the national dietetics program and has created government positions for graduates. Malawi is also in the process of establishing a dietician’s association. Dr. van Graan elaborated on the process of establishing the first Malawian food composition database from scoping to publication. The publication of the food composition table will be available in 2020 with open access (links through DHNA and Tufts).

**Dr. Eileen Kennedy** (Tufts University, Boston, Massachusetts)

**Dr. Robin Shrestha** (Tufts University, Boston, Massachusetts)

**Dr. Kedar Baral** (Patan Academy of Health Sciences, Nepal)

*Building Capacity on Nutrition Governance Research: Experiences from Nepal and Ethiopia*

**Ethiopia:** In 2013 focus group interviews with key informants were conducted at the national, regional, and woreda (local) levels to identify barriers and facilitators for implementation of the Multisectoral Nutrition plan (MSNP). This same process was repeated in 2018. Key constraints that were identified by implementers at the local level including collaboration, decentralization, and commitment. Multiple forms of capacity building including degree programs and module development are currently being planned.

**Nepal:** The capacity to support nutrition governance in Nepal has included several strategies:

1. Stimulate demand around nutrition research capacity through short- and long-term capacity building activities via the development of a national nutrition curriculum in collaboration with Institute of Medicine (IOM).
2. Provide a good supply of evidence through research activities – mostly targeted towards policy makers, implementers, researchers, academicians, students and others.
3. Facilitate demand through continued engagement with the government of Nepal and to ensure a good balance between supply and demand. For example, the annual scientific symposium has been used to feed research findings to potential users, conducted policy concentration workshops such as the mycotoxin workshop, and supported project meetings with program implementers, government stakeholders, as well as with colleagues at the Mission.
During Q&A and discussions that followed these presentations, participants gave the following clarifications and recommendations:

- In response to a query on the training of doctoral and postgraduate students and how these skills are being utilized in-country, speakers responded by giving examples of how the professionals that received trainings through the Innovation Lab were being integrated institutionally to further train other graduate students in Malawi, Nepal, and Uganda. A strong community of nutrition practitioners is now being assembled in Malawi. The creation of paid positions in the Malawian government was a huge and successful undertaking.

- Donors like USAID and other major donors are active in-country in building human and institutional capacity, but we need to know if the countries are well-positioned to integrate resources (funding) from all such donors.

Session 7: Agriculture, Nutrition and Human Health: Methods and Assessment

The session was moderated by Dr. Lynne Ausman, Program Director, MSNP Program at Tufts University, who highlighted achievements in developing and formulating innovative and cost-effective assessment methods around agriculture, nutrition, and human health. The session consisted of the following four presentations:

Dr. Jia-Sheng Wang (Department of Environmental Health and Science, College of Public Health, University of Georgia, Athens, Georgia)

*Development and Validation of Method for Detection of Aflatoxin-Lysine Adduct in Dried Blood Spot Samples of Animals and Humans*

In 2007, USAID funded the five-year project “Global AF Exposure Work” in 20 countries. Its original goal was to establish and validate methods for measuring major aflatoxin biomarkers in dried blood spot (DBS) samples to support the need of NIL projects. The working group’s hypothesis was that the levels of serum aflatoxin are correlated to dietary aflatoxin exposure in high risk human populations. Dr. Wang's lab was able to use blood samples from Nepal. Results from DBS analysis show nearly 100% exposure in the study sample. The use of DBS is highly innovative and significant and may be used to meet urgent needs and fill research gaps for understanding the relationship between biological response and aflatoxin exposure.

Dr. Saurabh Mehta (Cornell University, Ithaca, New York)

*SAFEPhone - Smartphone-Based Aflatoxin Evaluation at the Point-of-Need*

The SAFEPhone was developed as a point-of-need method for assessing aflatoxin exposure in food, urine, and blood. The SAFEPhone can be used in the field with any smartphone device and provides results within twenty minutes. Validation results have been positive in peanut and urine samples and are ongoing in blood samples.

Dr. Johanna Andrews-Trevino (Tufts University, Boston, Massachusetts)

*Chronic Aflatoxin Exposure and Risk of Growth Impairment During the First 1000 Days: A Birth Cohort Study in Banke, Nepal*

The main objective of Dr. Andrews-Trevino’s study in Banke, Nepal was to understand the relationship of in utero and early life exposure to aflatoxin and linear growth in the first 24 months of life, controlling for other explanatory factors. Breast milk and blood were collected from mothers and blood and urine was collected from infants. Results show widespread exposure to aflatoxin in both pregnant women and young
children and that undernutrition is persistent. As Nepal is faced with relatively high levels of malnutrition and food contamination, additional considerations should be given to regulatory reforms that concentrate on food safety rules.

**Dr. Jacqueline Lauer** (Boston Children’s Hospital, Harvard University, Boston, Massachusetts)

*Assessing Maternal Environmental Enteric Dysfunction and its Association with Adverse Birth Outcomes in Uganda*

The objective of Dr. Lauer’s prospective cohort study in Mukono district, Uganda was to examine the association between environmental enteric disorder (EED) biomarkers (L:M ratios and anti-flagellin/anti-LPS IgGs) in pregnant women aged 18-45 years and subsequent adverse birth outcomes (shorter gestational age, lower birth weight and length, and smaller head circumference). Results showed that higher ln concentrations of anti-flagellin IgG and anti-LPS IgG were significantly associated with shorter length of infant gestational age at birth, lower length at birth, and lower LAZ at birth.

During Q&A and discussions that followed these presentations, participants gave the following clarifications and recommendations:

- Participants congratulated the speakers on the tremendous work being done on the innovative methods for analyzing biomarkers. Further suggestions were made to advance the focus to xenobiotics load and epigenetic changes.
- Suggestions were also made on leveraging the policy instruments that can be used at the government level.
- Suggestions were also put forth for the possibility of using technologies like NUTRIPhone and SAFEPhone in epidemiological studies.

**Session 8: Infant and Young Child Growth**

The session was moderated by Dr. John Phuka, Dean of the School of Public Health and Family Medicine at the College of Medicine, Malawi and consisted of the following three presentations:

**Dr. Swetha Manohar** (Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland)

*Growth Faltering and Associated Risk Factors Among Infant and Young Children from Nepal*

Dr. Manohar’s presentation covered her soon-to-be published research on growth faltering. This innovative research assessed risk factors associated with growth faltering by age, and results were significant. Once published, Dr. Manohar’s research may be used for future methods of analyzing child growth patterns.

**Mr. Tim Smith** (Purdue University, West Lafayette, Indiana)

*Altitude and Child Linear Growth in Nepal*

The motivation of Tim Smith’s research in Nepal was to answer why children at high altitudes exhibit restricted linear growth compared with children at lower altitudes. Results showed that children at high altitude are at particular risk for malnutrition, but this is at least partially due to a lack of resources and infrastructure. Mr. Smith discussed several issues around household food access, micronutrient deficiencies, and potential boron toxicity that may have also contributed to his results but were not analyzed in his research.
Dr. Isabel Madzorera (Harvard University, Boston, Massachusetts)

**Dietary Diversity during Pregnancy and Infant Growth Outcomes in Uganda**

Dr. Madzorera’s research in Uganda aimed to examine associations between prenatal maternal diet diversity with incidence of stunting, wasting, and underweight in infants 3 to 12 months of age. She found that infants whose mothers were in the higher dietary diversity group had 30-35% lower risk of being underweight through age 12 months. During her presentation she suggested that further research is required on the role of maternal diets during pregnancy on other infant growth outcomes in diverse locations.

During Q&A and discussions that followed these presentations, participants gave the following clarifications and recommendations:

- In response to the query on the use of Minimum Dietary Diversity for Women (MDD-W) as an indicator, the speaker’s responded that the indicator has limitations as it did not account for fat, salt, etc. but could be combined with other indices. On its own, it might be too basic to use as an indicator.

**Session 9: Infant and Young Child Nutrition and Cognitive Development**

The final plenary session of Day 2 was moderated by Dr. Shibani Ghosh, Associate Director. The session consisted of the following three presentations:

**Dr. Laurie Cass Miller** (Tufts University, Boston, Massachusetts)

*Cognition, Diet, and Child Well-Being in Rural Nepal*

Dr. Miller’s study results on cognition, diet, and child well-being in rural Nepal have been published in *Nutrients*. Her research covers the process of measuring child developmental performance over time and associated factors.

**Dr. Andrew Thorne-Lyman** (Johns Hopkins Bloomberg School of Public Health, Baltimore, Maryland)

*Vitamin B-12 Status in Infancy is Positively Associated with Development and Cognitive Functioning 5 Years Later in Nepalese Children*

Dr. Thorne-Lyman’s research is published in the *American Journal of Clinical Nutrition*. This study enrolled mother-infant pairs for a cross-sectional survey of nutritional status/intake in Bhaktapur, Nepal. Dr. Thorne-Lyman’s research group hypothesized that early vitamin B-12 status and maternal intake would be associated with gross, fine, sensorimotor and visuospatial functioning. Contrary to hypothesis, no associations were found between executive function, attention or sensorimotor domains. Adjusting for socioeconomic status, iron status, growth, breastfeeding, maternal energy intake, folate supplementation did not change estimates. Dr. Thorne-Lyman concluded that Vitamin B-12 deficiency is a potential cause of adverse developmental outcomes in this population and that longer-term effects need more study.
Ms. Dale Davis (Helen Keller International, Nepal)

**Nutrition Sensitive Programming: HKI Experience from the Field - SBC, IYCF and Child Development**

Ms. Dale Davis presented on the extensive work of Suahara in Nepal. Suahara is a USAID-funded nutrition program whose purpose is to reduce stunting through a multisector approach to reach all pregnant and lactating women and children under two in food insecure and vulnerable districts of Nepal, with a focus on the most disadvantaged groups and families. Suahara has many arms including, but not limited to, WASH programming, public private partnerships, promotion of animal-sourced food consumption, and capacity building of health workers. Evidence in target populations shows that exposure to interventions continues to increase, the program is reaching new target audiences, egg consumption is improving, and the economic gap is closing. The government is now replicating and expanding some key Suahara activities.

During Q&A and discussions that followed these presentations, participants gave the following clarifications and recommendations:

- The participants suggested that there is a need to continue to refer to diet quality in terms of its effect on the physical and cognitive development of a child. Certain food groups like animal-sourced foods certainly have prime importance but the thinking should be about improving overall diet and diet quality. Emphasis was placed on needing a well-being index that includes cognitive well-being as one of the important developmental outcomes. Suggestions were made to have a functional outcome instead of impact outcomes that we currently use, such as stunting.

**Session 10: Breakout sessions - Priority Knowledge Gaps and Next Steps**

Day 2 breakout sessions included four topic groups that were guided by two discussants and a rapporteur. The discussions were facilitated by Dr. Patrick Webb, Dr. Shibani Ghosh, Dr. Robin Shrestha, Ms. Katherine Heneveld, and Ms. Hannah Koehn.

A summary of discussion report on the topics are below:

1) **Nutrition Governance**

- The group shared their understanding of nutrition governance and there was no consensus on a single definition of nutrition governance.

- Nutrition-centered activities have always operated in conjunction with other parallel health activities and departments until recently. Governments are beginning to realize that nutrition is a single complex entity that needs a multi-sectoral approach and they have started allocating budget accordingly.

- For example, in Malawi, Nepal and Uganda, nutrition is now being recognized as a national development priority. Participants provided examples from Uganda where nutrition programs are being implemented through a vertical approach in which coordination from the lower levels (district, sub-counties, parishes) and the central levels (Minister’s offices) are ongoing. The outputs or yardsticks that officials go by in order to assess performance and identify gaps in nutrition-related management are still unclear in Uganda.
2) Mycotoxin and Human Health

- The participants in the group agreed on the harmful impacts of mycotoxins in human and animal health. Common mycotoxins identified were aflatoxin (M1 and B1), Fumonisins, OTA, DON, Zearalenone. The group discussed the carcinogenic and some teratogenic effects of these mycotoxins and their sources (food, air, water). The group also discussed the effects of aflatoxin in the human body and how it binds to protein (albumin) and the half-life of aflatoxin, which is about 2-3 months. The group was also aware of the fact that if cattle are fed with contaminated crops, they will contaminate humans if their meat or milk is consumed. There is evidence for each of the above. The group also agreed that the detecting mycotoxin exposure in food is difficult because the matrix is too big, and the contamination could be present on one side of the food/crop and/or in areas that were not sampled.

- The group was able to discuss the knowledge gaps around the adoption of preventive pre- and post-harvest techniques and technologies. They also discussed how to make consumers aware of the public health consequences of mycotoxins, how to make the technologies cheaper for the farmers to make them adopt them, what happens if there is acute aflatoxicosis, and the lack of a threshold or a cut-off aflatoxin level in the human body, although a cut-off for food and agriculture commodities is currently available.

- The group made recommendations to make consumers aware of the public health consequences of mycotoxins and that it might be a motivation for the farmers to think about crop safety and good agricultural practices and discard contaminated maize, groundnuts, chilies.

- The group agreed that there is a need to establish a threshold of exposure to mycotoxins that is harmful in the human body. Participants suggested that the threshold should be proposed by the Innovation Lab from this activity and that more years of research can further refine it.

3) Linking Agriculture WASH and Nutrition through Food Safety Lens

- The group discussed the universal and complex issue of food safety and how even most nutritious foods that people wish to consume are prone to food safety issues. They also discussed the safety issues along the value chain, during transport, packaging, etc., that can increase the chances of contaminants, which eventually lead to a loss of food quality and food waste/loss. The group discussed the importance of animal source foods, and the need to consider sanitation regarding livestock (slaughterhouses, etc.).

- The unintended consequences of livestock, such as environmental/health impact, increase zoonotic diseases, issues with water quality, and overall adverse impact in child health outcomes, were discussed.

- The group also discussed the food safety and access trade-off since safe food can get expensive and whether consumers have the willingness to pay for safe food. Issues of food processing and the use of increased amounts of salt and sugar were discussed. Food safety issues because of pesticides were discussed, as well.

- The group discussed market incentives for safe food and that food safety should be part of the agriculture extension system. There need to be policy interventions or a policy-enabling environment for policies to establish good agriculture systems that also counter agricultural adulteration.

- The group made recommendations to strengthen the food system by empowering the consumers with knowledge and behavior change by understanding the drivers of the change and linking agriculture extension with health education and awareness.

4) Triple Burden of Malnutrition

- The group discussed the use of the term “triple burden of malnutrition” and made suggestions that the second burden be not healthy diets but obesity. The group discussed how the poorest of the population in
low- and middle-income countries suffer from undernutrition in early stages of life, which increases the vulnerability of their immune systems for life and leaves them vulnerable for other non-communicable diseases and chronic diseases.

- They discussed fortified foods used for delivery of micronutrients such as sugar, salt, and/or oil. The group pointed out the lack of understanding about the upper limit for micronutrients, both in developed and developing countries. For example, some children are well over the zinc limit and the group discussed how this should be adequately addressed.

- Issues around food labeling and testing were discussed and how actual nutrient content is not often what is labelled, for example, fortified iron is much lower than what is labelled. Consumers may not have a good understanding of what a healthy diet means and that there is a gap of nutrition knowledge. Then, even if they are aware, there are issues of affordability.

- The group emphasized the role of physical activity. In terms of indicators for diet quality, suggestions were made to explore for the next Minimum Dietary Diversity for Women (MDD-W) given the current MDD-W’s limitations. The indicator should be a multi-dimensional score that reflects different aspects related to health risks that also covers portion sizes and the processed and packaged food groups.

- The group had a detailed discussion about how to influence the food environment by also recognizing the presence of packaged foods. The role of packaged and processed foods as part of the problem needs to be recognized since that is part of the solution. Healthy foods cannot be promoted by disregarding packaged foods. This gap needs to be reduced.

- The group talked about the safety net ensuring affordability along with food production and marketing and that the safety net needs to be associated with nutritious food, simplified labeling, strictly enforced label regulation, and contents regulation.

**Closing Remarks**

Dr. Ahmed Kablan, Senior Nutrition Research Adviser at the Bureau of Food Security, USAID and Dr. Patrick Webb congratulated and thanked all the partners and participants for the engaging presentations and discussions during the meeting. They further accredited all the partners and researchers’ contributions in generating evidence, focused on informing the Feed the Future global initiatives during the nine years of the project period. They then concluded this year’s partners meetings with an invitation to the next Partners Meeting in Washington D.C in 2020.
Acknowledgement

This report was funded by the USAID Feed the Future Innovation Lab for Nutrition. This activity is funded under grant contract AID-OAA-L-10-00006 from the United States Agency for International Development (USAID). The views expressed herein does not reflect the official opinion of the USAID.

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Appendices

Appendix 1: Partners Meeting Agenda

Program Schedule
August 6, 2019 (Tuesday)

Breakfast and Registration: 7:30 am – 8:00 am

Welcome remarks: 8:00 am – 8:10 am
Dariush Mozaffarian, Dean
Friedman School of Nutrition Science and Policy
Tufts University

Session 1: 8:15 am – 9:10 am
Setting the Stage
Nutrition within the context of USAID’s Global Food Security Initiative Research Agenda
Robert Bertram,
Chief Scientist, Bureau for Food Security, USAID

Leveraging agriculture for nutrition impacts
Patrick Webb, Director
Feed the Future Innovation Lab for Nutrition

Discussion

Session 2: 9:15 am -10:30 am
Flagship Research Studies of the Nutrition Innovation Lab
Moderator: Eileen Kennedy
1. PoSHAN Community Studies: Rationale, design, accomplishments and challenges (Keith West, Johns Hopkins University)
2. Uganda birth cohort studies: Rationale, design, accomplishments and challenges (Bernard Bashaasha, Makerere University)
3. Bangladesh aquaculture and horticulture for nutrition study: Rationale, design, accomplishments and challenges (Patrick Webb, Tufts University)
4. Assessing mycotoxin exposure in Nepal and Mozambique: Rationale, design, accomplishments, challenges (Shibani Ghosh, Tufts University)

Discussion

Coffee and Tea Break: 10:30 am – 11:00 am
Session 3: 11:00 am – 12:00
Factors that modify poor diets and/or nutritional status
Moderator: Agnes Mwangela
1. Diets and dietary diversity in Nepal (Gerald Shively, Purdue University, co-author: Evans)
2. Affordability of nutritious diets: Malawi and other FTF focus countries (Will Masters, Tufts University)
3. Evaluation of the USAID Community Connector program (Nassul Kabunga, Tufts University)

Discussion

Lunch: 12:00 pm – 1:00 pm

Session 4: 1:00 pm – 2:00 pm
Nutrition Resilience, Food Security and Metrics
Moderator: Stephen Vosti
1. A novel method to measure resilience in nutrition: Application to diets of rural women and children in Nepal and Bangladesh (Sonia Zaharia, Tufts University)
2. Nutritional resilience in Nepal after the 2015 earthquake (Andrew Thorne-Lyman, Johns Hopkins)
3. Effects of migration on household food security in Nepal (Janet Jeeyon Kim, Mercy Corps)

Discussion

Coffee and Tea Break: 2:00-2:30 pm

Session 5: 2:30 pm – 5:30 pm
Breakout Session
Facilitators: Robin Shrestha, Patrick Webb and Katherine Heneveld

Objectives:
1. Within the context of the group, what do we know?
2. Where does this point to with respect to next steps/approach/focus?
3. What scientific questions should be prioritized for funding in the future?

Participants will be asked to choose a topic of their interest (and discuss in their own groups research/programming gaps, challenges and opportunities to further leverage nutrition impacts. The group will present their discussion summary to the larger group at the end of the breakout. Two discussants will guide the discussion in each session.

Topics for discussion (proposed discussants in parentheses)
- Agriculture, sustainable food systems and healthy diets (Ilana Cliffer and Ingrid Weiss)
- Markets and infrastructure (Jerry Shively and Janet Kim)
- Nutrition resilience (Sonia Zaharia and Will Masters)
- Private sector engagement in the multi-sector approach (Rebecca Egan and Corey O’Hara)

Breakout: 2:45-4:00 pm
Discussion: 4:00 – 5:00 pm

5:30 pm – 7:00 pm
Reception and Poster Exhibition highlighting publications/presentations on Agriculture-to-Nutrition Linkages
Location: Courtyard Marriott, Boston.
August 7, 2019 (Wednesday)

Breakfast: 8:00- 8:30 am

Session 6: 8:30 am – 10:00 am
Building research capacity to bridge gaps in agriculture-to-nutrition linkages
Moderator: Kedar Baral and Patrick Webb
1. Building capacity in Nepal- the national nutrition symposium and annual research methods course (Swetha Manohar, Johns Hopkins University and Ram Shrestha)
2. Building capacity in Uganda – Supporting Ugandan students and professionals in Nutrition-Agriculture research for development (Bernard Bashaasha, Makerere and Edgar Agaba, Tufts University)
3. Building capacity in Malawi: the first Dietetics program and a national food composition table (Agnes Mwangela, LUANAR, John Phuka, College of Medicine, Malawi, Averalda van Graan, South Africa Medical Research Council)
4. Building capacity on nutrition governance research: experiences from Nepal and Ethiopia (Kedar Baral, PAHS, Eileen Kennedy, Tufts and Robin Shrestha, Tufts)

Discussion

Coffee and Tea Break: 10:00 am – 10:30 am

Session 7: 10:30-12:00 pm
Agriculture, Nutrition and Human Health: Methods and Assessment
Moderator: Lynne Ausman
1. Development and Validation of Method for Detection of Aflatoxin-Lysine Adduct in Dried Blood Spot Samples of Animals and Humans (Jia Sheng Wang, University of Georgia)
2. SAFEPhone - Smartphone-based Aflatoxin Evaluation at the Point-of-Need (Saurabh Mehta, Cornell University)
3. Chronic aflatoxin exposure and risk of growth impairment during the first 1000 days: A birth cohort study in Banke, Nepal (Johanna Andrews Trevino, Tufts University)
4. Assessing maternal environmental enteric dysfunction and its association with adverse birth outcomes in Uganda (Jacqueline M. Lauer, Harvard University)

Discussion

Lunch: 12:00 pm – 1:00 pm

Session 8: 1:00 pm- 2:00 pm
Infant and young child growth
Moderator: John Phuka
1. Linear growth faltering and associated risk factors in Nepal (Swetha Manohar, Johns Hopkins University)
2. Altitude and child linear growth in Nepal (Tim Smith, Purdue University, Co-authors: Shively and Paskey)
3. Dietary diversity in pregnancy and child growth outcomes (Isabel Madzorera, Harvard University)

Discussion
Session 9: 2:00 pm - 3:00 pm
Infant and young child nutrition and cognitive development
Moderator: Shibani Ghosh

1. Vitamin B12 deficiency in infancy and cognitive development (Andrew Thorne-Lyman, Johns Hopkins University)
2. Cognition, diet, and child well-being in rural Nepal (Laurie Miller, Tufts University)
3. Nutrition sensitive programming, behavior change, IYCF and child development- HKI experiences from the field (Dale Davis, Helen Keller International)

Discussion

Session 10: 3:00 pm – 5:00 pm (coffee and tea available through session)
Break out Session
Facilitators: Robin Shrestha, Shibani Ghosh, Hannah Koehn

Objectives:

1. Within the context of the group, what do we know?
2. Where does this point to with respect to next steps/approach/focus?
3. What are the priority knowledge gaps still to be filled?

Participants will be asked to choose a topic of their interest (and discuss in their own groups research/programming gaps, challenges and opportunities to further leverage nutrition impacts. The group will present their discussion summary to the larger group at the end of the breakout. Two discussants will guide the discussion in each session.

Topics for discussion (proposed discussants):

- Nutrition governance (Eileen Kennedy)
- Mycotoxins and human health (Johanna Andrews Trevino and Kathy Xue)
- Linking agriculture (crops and livestock), WASH and nutrition through food safety lens (Ahmed Kablan and Jackie Lauer)
- Triple Burden of Malnutrition (Dale Davis and Andrew Thorne Lyman)

Breakout: 3:00-4:00 pm
Discussion: 4:00 – 5:00 pm

Concluding remarks - 5:00 pm – 5:30 pm
Ahmed Kablan, CSI Division USAID, Patrick Webb, Tufts University
Appendix 2: Speaker Biographies

Dariush Mozaffarian is a cardiologist, Dean and Jean Mayer Professor at the Tufts Friedman School of Nutrition Science and Policy, and Professor of Medicine at Tufts Medical School. Dr. Mozaffarian has authored nearly 400 scientific publications on dietary priorities for obesity, diabetes, and cardiovascular diseases, and on evidence-based policy approaches to reduce these burdens in the US and globally. He has served in numerous advisory roles including for the US and Canadian governments, American Heart Association, World Health Organization, and United Nations. His work has been featured in a wide array of media outlets including the New York Times, Washington Post, Wall Street Journal, National Public Radio, and Time Magazine.

Rob Bertram is the Chief Scientist in USAID’s Bureau for Food Security, where he serves as a key adviser on a range of technical and program issues to advance global food security and nutrition. In this role, he leads USAID’s evidence-based efforts to advance research, technology and implementation in support of the U.S. Government’s global hunger and food security initiative, Feed the Future.

He previously served as Director of the Office of Agricultural Research and Policy in the Bureau for Food Security, which leads implementation of the Feed the Future research strategy and related efforts to scale innovations in global food security efforts, working with a range of partners. Prior to that, he guided USAID investments in agriculture and natural resources research for many years.

Dr. Bertram’s academic background in plant breeding and genetics includes degrees from University of California, Davis, the University of Minnesota and the University of Maryland. He also studied international affairs at Georgetown University and was a visiting scientist at Washington University in St. Louis. He has been especially active in plant genetic resources policy as it relates to research for development, including applications of biotechnology in food security-related research.

Before coming to USAID, he served with USDA’s international programs as well as overseas with the Consultative Group on International Agricultural Research (CGIAR) system.

Keith West is a George G. Graham Professor at Johns Hopkins Bloomberg School of Public Health with over 38 years of experience in international health. His research has mainly focused on improving health and survival of vulnerable populations through nutritional means.

Bernard Bashaasha is a Professor in the College of Agricultural and Environmental Sciences, Makerere University, Uganda. He holds a Ph.D. in Agricultural and Development Economics from Ohio State University and a MSc in Agricultural Economics from Seoul National University.

Patrick Webb is the Director of USAID’s Feed the Future Innovation Lab for Nutrition and leads the US government’s Food Aid Quality Review. He is an Honorary Professor at Hohenheim University and has a faculty position by courtesy at the Fletcher School of Law and Diplomacy (Tufts University).

Shibani Ghosh is the Associate Director for the Feed the Future Innovation Lab for Nutrition at Tufts University. She is also a Research Associate Professor at the Friedman School of Nutrition Science and Policy.
Gerald Shively is an Economist and Professor in the Department of Agricultural Economics at Purdue University. He conducts nationally and internationally recognized research on agricultural development and the environment.

William Masters is a Professor at Tufts University, in the Friedman School of Nutrition Science and Policy with a secondary appointment in the Department of Economics. His research uses economic methods to inform and improve the food system, especially in developing countries.

Nassul Kabunga is a Research Fellow at the International Food Policy Research Institute (IFPRI), in Kampala, Uganda. He earned a PhD in Agricultural Economics and Rural Development from the University of Gottingen, Germany.

Sonia Zaharia is a postdoctoral fellow at the Friedman School of Nutrition Science and Policy at Tufts University. Her research is focused on finding sustainable solutions to global food security through economics, agriculture, and nutrition.

Andrew Thorne-Lyman is an Associate Scientist at Johns Hopkins Bloomberg School of Public Health. Andrew has collaborated for a decade with the U.N. World Food Programme before earning his Doctor of Science degree from Harvard T.H. Chan School of Public Health. Andrew’s research as part of the Innovation Lab for Nutrition is focused on improving the understanding of the links between agriculture and nutritional outcomes.

Janet Kim is the Senior Researcher for Resilience at Mercy Corps, where she leads research focused on migration and linkages between resilience and women’s empowerment, social connectedness, and food security.

Swetha Manohar is a Project Scientist at the Johns Hopkins Bloomberg School of Public Health. She is a MS in Public Health and a Registered Dietitian.

Ram Shrestha is the Senior Improvement Advisor for Community Health and Nutrition for the USAID ASSIST Project. He is an innovator within the field of community health, and he has adapted his community health system model to improve health outcomes at the community level. His model is being used in Mozambique, Burundi, Tanzania, and Uganda. In 2005 Ram was named to Time magazine’s list of Global Health Heroes and in 2006 he was honored with the Friedman School Alumni Association’s Frontline Award for his innovative work in nutrition.

Bernard Bashaasha is a Professor and Principal of the College of Agricultural and Environmental Sciences, Makerere University, Uganda. He holds a Ph.D. in Agricultural and Development Economics and from Ohio State University and a MSc in Agricultural Economics from Seoul National University.

Edgar Agaba is a program developer at the Innovation Lab for Nutrition. Edgar has more than a decade of experience in designing and managing programs, coordinating & building partnerships for agriculture and health interventions. He has a MS degree from Makerere University and a MPH from Tufts.

Agnes Mwangwela is a Food Scientist with vast experience in food science, food product development and food analysis. She is an Associate Professor of Food Science and Dean of Faculty of Food and Human Sciences at the Lilongwe University of Agriculture & Natural Resources (LUANAR), Malawi.
John Phuka is the Dean of the School of Public Health and Family Medicine at the college of Medicine, Malawi. John plays a key role by participating on technical working groups and nutrition policy advisory boards such as Health Sector Strategic Plan, Malawi Growth Development Strategy, and Sustainable Development Goals.

Averalda van Graan is the Manager of the South African Food Data System (SAFOODS) which is the national food composition database developed and maintained by the South African Medical Research Council. Dr van Graan is also a Senior Lecturer in the Centre of Excellence for Nutrition in North-West University Potchefstroom.

Kedar Baral is a Professor of Public Health and the MPH Program Director at the Patan Academy of Health Sciences in Lalitpur, Nepal. Kedar specializes in research in Hematology, Pediatrics and Obstetrics.

Eileen Kennedy is a former Dean of the Friedman School at Tufts University and also was the first Director of USDA's Center for Nutrition Policy and Promotion. She is currently a professor at the Friedman school and a member of the High-Level Panel of Experts on Food Security and Nutrition of the UN Committee on World Food Security. Among Kennedy's research interests there is the assessment of health, nutrition, diet and food security impacts of policies and programs; nutrient density and diet diversity; and agriculture nutrition linkages.

Robin Shrestha is a Medical doctor and has a degree on Human Nutrition with specialization on Food Policy and Applied Nutrition and Humanitarian Assistance from Friedman School of Nutrition Science and Policy. He has been since involved with multiple research projects at the USDA Human Nutrition Research Center for Aging and Feed the Future Innovation Lab for Nutrition.

Jia Sheng Wang is a Professor and the Head of the Department of Environmental Health Science, on the College of Public Health at the University of Georgia. Dr. Wang has researched and taught toxicology for more than 36 years, including molecular epidemiology, cancer chemoprevention and chemical carcinogenesis.

Saurabh Mehta is an Associate Professor of Nutritional Science in Cornell's College of Human Ecology and a faculty fellow at Cornell's Atkinson Center for a Sustainable Future. Dr. Mehta has a vast experience in working in resource-limited settings in the areas of infectious diseases; epidemiology; and nutrition.

Johanna Andrews Trevino is a Postdoctoral Research Fellow at the Friedman School of Nutrition Science and Policy at Tufts University. Her research focuses on examining linkages between Agriculture, Food safety and Nutrition.

Jacqueline Lauer is a Postdoctoral Research Fellow at Boston Children's Hospital. Her research focuses on international nutrition and public health policies and programs. She earned her PhD degree in Food Policy and Applied Nutrition at Tufts University.

Timothy Smith is a Postdoctoral Research Associate at Purdue University. He earned his M.S. and recently a Ph.D. in Agricultural Economics at Purdue. His research focus includes the influence of geographic factors on inequality and opportunity.

Isabel Madzorera recently earned her Doctor of Science degree at Harvard School of Public Health. She has extensive field experience leading the implementation and evaluation of nutrition-sensitive agriculture, maternal and
child nutrition interventions in the Africa region. She currently works as a consultant at UNICEF, focusing on child diets and complementary feeding.

**Andrew Thorne-Lyman** is an Associate Scientist at Johns Hopkins Bloomberg School of Public Health. Andrew has collaborated for a decade with the U.N. World Food Programme before earning his Doctor of Science degree from Harvard T.H. Chan School of Public Health. Andrew’s research as part of the Innovation Lab for Nutrition is focused on improving the understanding of the links between agriculture and nutritional outcomes.

**Laurie Miller** is a Professor of Pediatrics and an Adjunct Professor of Nutrition and Child Development at Tufts University. Her latest research focuses on rural children in Nepal and Uganda and interventions to improve nutritional outcomes.

**Dale Davis** is the country director of Helen Keller International in Nepal. She has contributed to a wide range of public health and nutrition programming over the past thirty years including micronutrient supplementation for children and women, emergency obstetric care, family planning, gender and social inclusion, programming for people living with HIV and multisector nutrition and infant and young child feeding.
## Appendix 3: Poster Presentations

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<th>Presenter Name</th>
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<tr>
<td>Andrew Thorne-Lyman</td>
<td>Livestock ownership and children’s intakes of animal source foods in Nepal</td>
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<td>Andrew Thorne-Lyman</td>
<td>Dietary Patterns of Women in Relation to Risk of Over- and Underweight in Nepal</td>
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<td>Angela KC</td>
<td>Preschool nutritional status in Nepal in 2016 and comparative trends</td>
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<td>Averalda Van Graan</td>
<td>Reporting on a collaborative scoping mission to establish a Food Composition Database in an East African Country</td>
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