



187th BIFAD Public Meeting (Virtual)

Transformative Pathways Toward a Climate-Resilient Agricultural, Nutrition, and Food System: A Public Consultation Ahead of the 27th Conference of Parties

Meeting Minutes

October 26, 2022, 10:00 AM–12:00 PM EDT

Board for International Food and Agricultural Development (BIFAD) Members:

Laurence B. Alexander, BIFAD Chair and Chancellor of the University of Arkansas at Pine Bluff
Pamela K. Anderson, Director General Emerita, International Potato Center
Marie Boyd, Associate Professor, University of South Carolina School of Law
Rattan Lal, Distinguished Professor of Soil Science, The Ohio State University (absent)
Saweda Liverpool-Tasie, MSU Foundation Professor, Department of Agricultural, Food, and Resource Economics, Michigan State University (absent)
Henri G. Moore, Vice President/Head of Responsible Business, Haleon
Kathy Spahn, President and CEO of Helen Keller International

BIFAD Subcommittee on Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems Members:

Eva (Lini) Wollenberg, BIFAD Subcommittee Co-Chair, Research Professor, University of Vermont
Erin Coughlan de Perez, BIFAD Subcommittee Co-Chair, Research Director, Dignitas Professor, Tufts University
Mauricio Benitez, Nature-Based Solutions and Food Systems Lead, responsAbility Investments AG
Daniela Chiriac, Senior Consultant, Climate Policy Initiative (absent)
Chinenye Juliet Ejezie, Country Coordinator, Climate Smart Agriculture Youth Network
Jessica Fanzo, Bloomberg Distinguished Professor, Johns Hopkins University
Mario Herrero, Professor, Cornell Atkinson Scholar, Cornell University
Sophia Huyer, Gender and Social Inclusion Lead, International Livestock Research Institute (ILRI)
Andrew Muhammad, Professor and Blasingame Chair of Excellence, University of Tennessee
Carlijn Nouwen, Co-founder, Climate Action Platform for Africa (CAP-A) (absent)
Ishmael Sunga, Chief Executive Officer, Southern African Confederation of Agricultural Unions (SACAU)
Angelino Viceisza, Associate Professor of Economics, Spelman College
Peter Wright, Senior Technical Advisor, Climate Resilient Agriculture, CARE, USA

Speakers:

Rahel Diro, Disaster Risk Finance Associate, Tetra Tech
Edward Carr, Director of International Development, Community, and Environment, Clark University
Carmen Benson, Senior Counselor, BIFAD Support Team, Tetra Tech
Dan Zook, Executive Director, ISF Advisors
Ann Vaughan, Senior Advisor for Climate Change, Bureau for Resilience and Food Security (RFS), USAID
Songbae Lee, Agricultural Finance Team Lead, RFS, USAID

Welcome and Introductions

Laurence Alexander, BIFAD Chair, University of Arkansas-Pine Bluff

The Board for International Food and Agricultural Development (BIFAD) Chair, Dr. Laurence Alexander, welcomed participants to the public meeting, *Transformative Pathways Toward a Climate-Resilient Agricultural, Nutrition, and Food System: A Public Consultation Ahead of the 27th Conference of Parties*. Dr. Alexander noted that participation in public meetings is central to BIFAD's role in providing evidence-based recommendations to the United States Agency for International Development (USAID). BIFAD is a seven-member, presidentially appointed advisory board to USAID and was established to ensure that USAID brings the assets of U.S. universities to bear on development challenges in agriculture, nutrition, and food security. Dr. Alexander introduced himself and named the other BIFAD members: Kathy Spahn, Henri Moore, Saweda Liverpool-Tasie (absent), Rattan Lal (absent), Marie Boyd, and Pamela Anderson. He asked participating BIFAD members to introduce themselves in the Zoom chat.

Dr. Alexander noted that the meeting presentations and discussion were a lead-up to the 2022 United Nations Framework Convention on Climate Change 27th Conference of Parties. Dr. Alexander explained that the purpose of this public meeting was for the authors of the BIFAD-commissioned study, *Working Paper: Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems*¹, to present and discuss their preliminary findings and seek public input to guide the next phases of study implementation. The authors would discuss climate-resilient pathways for inclusive, transformative, systemic change in agricultural, nutrition, and food systems; key systems for inclusive transformation in food, agriculture, and nutrition; barriers to inclusive transformation in agricultural, nutrition, and food systems; high-potential leverage points for transformative systemic change; and climate finance solutions to catalyze inclusive adaptation and mitigation actions in the agricultural, food, and nutrition sectors. This study is guided by members of the BIFAD Subcommittee on Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems (subcommittee).

Dr. Alexander highlighted that the subcommittee was formed by BIFAD and USAID as a direct response to USAID Administrator Samantha Power's request that BIFAD provide bold recommendations for systemic solutions to climate change, supporting the Administrator's vision of a USAID agency-wide approach to tackle climate change and informing the implementation of the USAID Climate Change Strategy, 2022–2030.²

The public meeting was intended to share the author team's and subcommittee's work publicly—as the study is about mid-way through implementation—and to facilitate discussion among BIFAD members, subcommittee members, the author team, and the public. Dr. Alexander said that public engagement and deliberation were central to BIFAD's role in providing evidence-based recommendations to USAID. Dr. Alexander invited all participants to actively engage by sharing comments and resources in the chat box and sending questions for the public comment period. Dr. Alexander reminded participants that written and oral comments would be recorded for the public record, and official proceeding minutes would be posted on USAID's BIFAD website following the event (www.usaid.gov/bifad).

Dr. Alexander then introduced Dr. Lini Wollenberg, Subcommittee Co-Chair, Fellow in the Gund Institute at the University of Vermont, and Associate Scientist of the Alliance of Bioversity International and the International Center for Tropical Agriculture; and Dr. Erin Coughlan de Perez, Subcommittee Co-Chair and Research Director and Dignitas Professor at the Friedman School of Nutrition, Tufts University. Dr.

¹ <https://www.usaid.gov/bifad/climatechangeworkingpaper>

² <https://www.usaid.gov/policy/climate-strategy>

Alexander explained that Drs. Wollenberg and Coughlan de Perez would guide participants through the meeting and expressed appreciation for their leadership and vision. Dr. Alexander expressed gratitude to the subcommittee for their guidance of the commissioned report.

Introducing the BIFAD Subcommittee on Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems, Including Members, Progress Toward Subcommittee Objectives, and the Status of the BIFAD-Commissioned Study

Lini Wollenberg, Subcommittee Co-Chair, University of Vermont

Dr. Wollenberg welcomed all participants and explained that the mandate of the 13-member subcommittee established in June 2022 is to provide BIFAD with independent and evidence-based recommendations on priorities in agriculture, food security, and nutrition sectors in two areas: 1) systemic solutions for climate change adaptation and mitigation; and 2) innovations in climate finance. She showed a slide with the subcommittee members' names and affiliations and invited the members to introduce themselves in the chat box on the Zoom platform.

Dr. Wollenberg described the primary effort of the subcommittee, which is to guide a commissioned study to inform BIFAD's recommendations to USAID for systemic solutions for climate change adaptation and mitigation in agriculture, nutrition, and food systems. This report would be completed in the spring of 2023. Dr. Wollenberg emphasized that the objective of today's public meeting was to share with the public the study team's preliminary findings—produced as a working paper, or mid-term product—and to collect input and feedback to inform the study's final recommendations. To guide feedback, Dr. Wollenberg encouraged participants to reflect upon the following questions:

- How can this study support not just technical changes but also behavioral changes?
- How can we challenge business as usual within existing systems?
- What USAID interventions that the study team should consider in the report relative to the leverage points to be presented today?

Dr. Wollenberg invited participants to share comments in the chat and questions using the question and answer (Q/A) function of the Zoom platform. Dr. Wollenberg outlined the meeting agenda: brief presentations from each of the four study team authors, a panel of two members of the BIFAD subcommittee and two USAID officials to share feedback, questions from BIFAD and the subcommittee members, a public comment period, and closing remarks from Dr. Wollenberg and Dr. Alexander.

Dr. Wollenberg then introduced the BIFAD-commissioned study Coordinating Authors, Ms. Rahel Diro and Dr. Ed Carr, as well as study authors Ms. Carmen Benson and Mr. Dan Zook. Ms. Diro is a Disaster Risk Finance Associate at Tetra Tech, advisor to the subcommittee, and Coordinating Author of the commissioned study. Dr. Carr is a professor of geography in the International Development Community and Environment Department and the Director of the Humanitarian Response and Development Lab at Clark University. Dr. Carr was also an American Association for the Advancement of Science (AAAS) fellow in the Office of Global Climate Change at USAID. Ms. Benson is the Senior Counselor to BIFAD with the BIFAD Support Contract at Tetra Tech. Mr. Zook is the Executive Director of ISF Advisors.

Presentation of Progress and Preliminary Results of the BIFAD-Commissioned Study

Rahel Diro, Coordinating Author, Tetra Tech

Carmen Benson, Senior Counselor, BIFAD Support Contract, Tetra Tech

Ed Carr, Coordinating Author, Clark University

Dan Zook, Study Author, ISF Advisors

Ms. Diro thanked Dr. Wollenberg and introduced the team of 12 contributing authors: Dr. Ed Carr, Coordinating Author; Ms. Lydia Mbevi, Gender, Youth and Social Inclusion Expert; Mr. Dan Zook, Executive Director of ISF Advisors, leading the climate finance focus of the study; and Dr. Tyrone Hall, Behavioral Change and Communications Expert. The study team is also supported by Research Assistants Ms. Katie Liming, Mr. Hayden Aldredge, Ms. Lauren Allognon and Mr. Tommy Crocker. Contributing authors Ms. Mary Beggs and Ms. Carmen Benson from Tetra Tech will ensure the integration of the report. Ms. Diro acknowledged the opportunity to share the study preliminary findings.

The goal of the study is to provide recommendations on systemic solutions for climate change adaptation and mitigation in the agriculture, food, and nutrition systems. The study has three specific objectives:

1. Estimate realistic 2030 targets and intermediate results for the agriculture, food, and nutrition sector to guide USAID program design;
2. Identify priority leverage points leading to transformative systems change, including scaling climate finance; and
3. Prioritize areas for USAID actions and recommend interventions.

The focus of the interim product to be presented at the public meeting is the second objective. Ms. Diro explained that the author team began working on the report in August 2022, starting with the study design and conceptual framework, which the study team shared at the 185th BIFAD Public Meeting, *A Consultative Workshop on Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems*³, on August 31, 2022. Today, the author team would present preliminary results on entry points and opportunities identified. She said the author team would draft the final report in January 2023 and complete it in the spring of 2023.

Ms. Diro emphasized that the working paper presented at the meeting was not a final product and should be treated as a work in progress. The preliminary report was informed by a literature review of existing evidence and expert interviews. She presented the study analytical framework, which identifies relevant systems within the agriculture, food, and nutrition sectors that have the scale and depth necessary to facilitate transformation; barriers and opportunities for system transformation; leverage points in these systems that could lead to transformation toward climate-resilient development pathways; and prioritized actions and investments to set transformation in motion. At this stage of the study, the preliminary report identifies key systems and leverage points. The next step will be to prioritize them, using criteria based on: (1) the scale of impact in achieving adaptation and mitigation objectives; (2) the depth of evidence for potential economic, social, and behavioral transformation; and (3) alignment with USAID policies and international agreements (e.g., the Paris Agreement). The study adopts a climate-resilient development pathway framework. Because discussions with key informants indicated that adaptation and mitigation activities are separated into silos at USAID, making implementation difficult, a climate-resilient development pathway approach allows more integrated consideration of mitigation opportunities and tradeoffs in adaptation planning and adaptation opportunities in mitigation planning. A climate-resilient development pathways framework also helps to build multi-stakeholder systems, locally driven climate and development actions, and systemic gender and social inclusion integration. Climate-resilient development pathways are a dynamic process with constant adaptation and reorientation of actions to account for a changing world and environment. The

³ https://www.usaid.gov/sites/default/files/2022-11/185th_BIFAD_Public_Meeting_Minutes.pdf

climate-resilient development pathways framework, therefore, is proposed for USAID to successfully integrate mitigation, adaptation, and sustainable development objectives.

Ms. Diro invited Ms. Benson to discuss inclusive transformation in the study. Ms. Benson presented on behalf of Ms. Lydia Mbevi, gender, youth, and social inclusion author, who was unable to join the meeting. Nancy Mukupa served as a research assistant on gender, youth, and social inclusion. Looking at the big picture, the preliminary report assumes that there are no gender-neutral, age-neutral, and socioeconomic-neutral systems, leverage points, or interventions within the agriculture, food, and nutrition systems. The author team was guided by BIFAD's and the subcommittee's vision to elevate the commitment to inclusive, transformative change across the report. When studying each high-impact leverage point, the author team considered potential impacts on women, youth, and other marginalized groups; the potential for these groups to be agents of transformational change; and the enabling environment necessary to facilitate this change.

Within the food waste and post-harvest loss priority leverage point, for example, in West Africa, more than 70 percent of actors engaged in the post-harvest handling and processing nodes of the system are women, and women also generally work with crops that are more perishable. The same factors that affect women's participation in agricultural production—such as limited access to extension and advisory services, lack of transportation, and limited access to or agency over farm resources and decision-making—also constrain women's participation in post-harvest loss. This is one of many examples in the report demonstrating that empowerment of women and other marginalized groups is a precondition to realizing the potential full impact of interventions in this leverage point.

Drawing on contributions from the subcommittee members, especially those of Dr. Sophia Huyer, the preliminary report proposes that empowerment is *per se* a leverage point. This leverage point focuses on agency and decision-making at local, national, and global levels, as well as the collective action of these groups. The report proposes evidence that increasing the ability of a greater set of actors in global food systems to take climate change adaptation and mitigation actions is more effective when women, youth, Indigenous communities, and other marginalized groups have equal access to and agency over resources (e.g., finance, land and natural resources, technology, and information) and when they participate equally in decision making and leadership.

Part of the prioritization process going forward will include considering those leverage points and interventions with the greatest potential for transformational impacts in mitigation and adaptation, while also meeting USAID policies and goals around gender equality, locally led development, and inclusive development. This process will be informed by a rigorous literature review and additional key informant interviews with stakeholders from marginalized populations and experts in the field. Ms. Benson underscored that in the next phase of the study, the author team will focus on youth inclusion and understanding how indigenous environmental management strategies can inform achievement of mitigation goals.

Ms. Benson invited Dr. Carr to present key definitions, priority systems, and high-potential leverage points. Dr. Carr thanked Ms. Benson for the introduction and shared three key definitions:

- **Transformative systemic change:** This includes changes to the fundamental attributes of systems in response to actual or expected climate change and its effects on people, often at a scale and ambition greater than incremental activities. It includes systems changes toward a climate-resilient development pathway that addresses climate change over timescales.

Dr. Carr highlighted that not every action taken under the broad rubric of transformative change has to be transformative *per se*, but actions should take steps that move toward transformation in systems.

- **Leverage points:** Processes, interactions, or elements of a system or systems where targeted actions could lead to transformational change.

Similarly, leverage points don't have to bring about instant transformational change but should help get on a pathway to systems transformation.

- **Intervention:** Any activity or a set of activities organized in a project or program designed to influence positive economic, social, and behavioral change.

Dr. Carr explained that the preliminary report identifies several key systems where transformation could yield large climate and development benefits but has not yet prioritized among these systems because that would require analysis of potential climate impacts and taking into account the geographies where impact can be realized. Dr. Carr listed four potential high-priority systems:

- Production systems;
- Demand and consumption systems;
- Processing and post-processing systems; and
- Land tenure and land-use systems.

Within production systems, for example, the study team looked at transforming livestock systems to reduce emissions via enteric fermentation by changing livestock feed, improving management of manure, or reducing the number of ruminants. The largest benefit is in the global north, where USAID does not have a presence. However, in the geographic regions where USAID does have a presence, Asia has the largest share of emissions from livestock systems, with the share of greenhouse gas emissions from livestock systems in sub-Saharan Africa rising rapidly. Both regions might offer opportunities for low-emissions development.

In another example of transforming smallholder systems, there are at least 608 million smallholder farms globally, with the majority in countries where USAID has a presence. Dr. Carr explained that transforming smallholder systems toward enhancing productivity and increasing market access could yield significant adaptation benefits, although the metrics for adaptation benefits remain somewhat challenging today. Smallholder systems transformation can also result in significant mitigation benefits. What is grown and how it is grown can change and enhance soil carbon stocks and provide a mitigation benefit. But, on the other hand, long supply chains for agricultural commodities can create an offset in cost and reduce the mitigation benefit. Assessing these tradeoffs is important and locally specific. Prioritizing among identified systems is not straightforward. Measuring the tradeoffs between adaptation and mitigation is difficult and somewhat like apples and oranges. Dr. Carr explained that the author team would conduct an expert elicitation to help organize and prioritize these systems. This is a moment in which USAID could mobilize its research agenda to deepen metrics and understanding, and to allow for the weighting and prioritization of systems and impacts across adaptation, mitigation, and sustainable development.

Leverage points are one emerging entry point of the working paper, Dr. Carr said. They are linked to unique attributes of systems and need to be co-identified with local actors and communities. Another emerging entry point is that forming coalitions across governments, donors, and private sector actors will be a key success factor for climate action. Dr. Carr presented a slide showing ten leverage points identified in the report with high potential for transformative change:

- De-risking agriculture and food systems;
- Integrated soil management and health;
- Empowerment of women and other marginalized groups;
- Carbon markets;
- Food waste and post-harvest loss;
- Research and development for climate action;
- Net-zero and environmental, social, and governance commitments of multinational corporations;
- Low-emissions livestock development;
- Agriculture and forest cover synergies; and
- Climate services.

Dr. Carr emphasized that not all leverage points will work on all systems and that the list of leverage points was not prioritized in the preliminary report. The prioritization of leverage points would be informed by the prioritization of systems in the final report.

That said, the study authors have started to identify leverage points that might have an impact on a number of systems to prepare for that prioritization.

For example, soil health can be a critical leverage point in a number of systems. Enhancing soil carbon management has been projected to have significant technical potential to reduce emissions. Soil health is also foundational for the use of inputs in farming techniques, including climate-smart agriculture approaches that can build the adaptive capacity of smallholder farmers. Dr. Carr highlighted that empowering women and other marginalized groups to make climate change adaptation and mitigation decisions could be another critical leverage point in almost every system. Additionally, evidence shows that production in these systems is not pareto optimal, in which the distribution of resources is not such that e production, access, and availability are maximized Therefore, women’s empowerment is likely to increase total productivity overall, leading to an adaptation benefit. Dr. Carr summarized that the author team had identified system and leverage points but had not yet prioritized them. The author team is looking forward to receiving feedback on the preliminary report.

Dr. Carr invited Mr. Dan Zook to present the climate finance piece of the preliminary report. Mr. Zook thanked Dr. Carr for the introduction and provided an overview of key statistics. Approximately three percent of global climate finance is directed to agriculture, forestry, and the land-use sector. Only about half of this, or \$10 billion, focuses on small-scale production and is predominantly financed from public-sector sources. Mr. Zook highlighted that there is an enormous need to mobilize capital, especially private-investment capital, for adaptation and mitigation in the global food system. In doing so, it is important to incorporate a lens of inclusivity for marginalized communities.

Mr. Zook explained that the author team identified multiple levers to mobilize and shape capital. These levers fall into three broad categories:

1. **Market enabling:** interventions that target broad-based systemic and macro/meso results that enable market actors—primarily in the private sector—to achieve success;
2. **Pipeline development:** interventions that focus on catalyzing sustainable finance into the sector by expanding the depth and breadth of investable opportunities;
3. **Direct capital participation:** interventions that leverage USAID capital into key high-impact areas of the market to serve as a catalyzing and targeting force, ensuring impact is focused on key inclusive goals.

Mr. Zook explained that the goal of market-enabling levers is to enable the standards, methodologies, and oversight bodies that allow financial markets to capture value from adaptation and mitigation practices. Here, the most obvious example is carbon markets, where there is an “alphabet soup” of emerging and varied frameworks and standards to shape what we mean by capital for impact. Mr. Zook highlighted that, as the standards emerge, implementation becomes the challenge. There is an opportunity for USAID to bridge between existing and emerging global associations and standards and to connect them with local governments that are working to establish their own standards in the country context. Key informants interviewed by the team highlighted the need to unpack and characterize the range of financial solutions that can efficiently support adaptation, mitigation, and natural capital preservation, and to understand the business economics of each. This is especially true for adaptation because small-scale farming is not a large source of greenhouse gas emissions but is the most in need of adaptation interventions. It is difficult for investors to understand the range of options related to smallholder-anchored production systems and therefore to direct capital.

The second category of intervention that USAID can use in climate finance is pipeline development. Mr. Zook explained that pipeline development refers to supporting processes that allow financial markets to work and to allocate capital efficiently within the system. Here, the key barriers are limited technical expertise within financial institutions, high transaction costs, and insufficient track record of proven models. USAID has an opportunity to assist financial institutions in developing products and assessing climate risk in agriculture. This could include support for developing internal policies and processes or incorporating environmental risk data into decision-making. In terms of product development, there is a need for longer-term investment products because the timeframe for climate finance and land use and agriculture is not always aligned with investors’ preference for short-term credit. Part of the solution is developing the business case for longer-term investment horizons, which has been relatively successful within the renewable energy sector. Mr. Zook highlighted other financial products and instruments to support climate finance for agriculture, including carbon financing, results-based financing like impact-linked funding, risk mitigation instruments like guarantees, blended finance, and other insurance products that range from products for individual farmers to portfolios to regional catastrophic insurance.

A third category of intervention that USAID can use as an entry point is direct capital participation. Direct capital participation refers to the process of USAID using agency capital as an active player to catalyze follow-on activity in financial markets. This could include, as an example, using grant money to facilitate transactions and cultivate financial pipelines, like the Green Invest Asia Program or the trade hubs. As another example, USAID could provide grant capital to fund project preparation facilities, investment structuring, or technical assistance facilities. Mr. Zook explained that there is a suite of financial instruments offered by the U.S. Government’s Development Finance Corporation (DFC), which can invest in emerging climate- and agriculture-focused funds and opportunities in the market. Additionally, there are opportunities for USAID to work with multinational companies or national champions on achieving net-zero commitments within their supply chain.

Mr. Zook highlighted that there are abundant opportunities for USAID to leverage climate finance for climate change adaptation and mitigation in food, agricultural, and nutrition systems. The three primary entry points of focus in the preliminary report are: 1) supporting local governments, 2) participating as an active player in the financial markets, and 3) supporting the development of investable pipelines. Ultimately, context matters, and it’s important to position investment support alongside the activities of peer donor agencies and national government strategies, leveraging relevant strengths and capabilities of each. Mr. Zook concluded the presentation and invited Ms. Diro to discuss the next steps of the preliminary report.

Ms. Diro thanked Mr. Zook and explained that the author team was halfway through the complete BIFAD-commissioned report. The next stage of the report would include outlining targets for the food, agriculture, and nutrition sectors. The author team would prioritize key leverage points that have been identified in the preliminary report and consider new leverage points based on feedback received. The author team would also identify and prioritize potential interventions and provide actionable recommendations for USAID policies, programs, and actions. Ms. Diro emphasized that, throughout this process, the author team would conduct an in-depth analysis of the social aspects of transformation toward climate-resilient development. Although the author team focused more in the preliminary report on the technical aspects of climate-resilient development, they would take a closer look at social transformation. Lastly, the author team would develop a plan for disseminating the findings of the final report. Ms. Diro invited Dr. Wollenberg to moderate the panel discussion.

Panelist Discussion: Next Steps and Future Direction of the Study
Moderated by Lini Wollenberg, Subcommittee Co-Chair, University of Vermont

Dr. Wollenberg thanked the author team for the overview of the study and said that the next part of the meeting will be dedicated to receiving input on the next steps and future directions of the study. Dr. Wollenberg introduced the four panelists: Dr. Erin Coughlan de Perez, Subcommittee Co-Chair and Research Director and Dignitas Professor at the Friedman School of Nutrition at Tufts University; Mr. Ishmael Sunga, Subcommittee member and Chief Executive Officer of the Southern African Confederation of Agricultural Unions in South Africa (SACAU); Ms. Ann Vaughan, Senior Advisor for Climate Change in USAID's Bureau for Resilience and Food Security; and Mr. Songbae Lee, Agricultural Finance Team Lead in USAID's Bureau for Resilience and Food Security. Dr. Wollenberg explained that panel remarks would be followed by a discussion with BIFAD members and a question-and-answer session with participants and panelists.

Dr. Wollenberg invited Dr. Coughlan de Perez to begin the panel presentations.

Panelist Presentation: Future Direction of the Study and Subcommittee's work, Reflection and Summary of Feedback from the Internal Review Process
Erin Coughlan de Perez, Subcommittee Co-Chair, Tufts University

Dr. Coughlan de Perez thanked Dr. Wollenberg for the introduction and highlighted that it had been a delight to follow the work of the author team on this report. Dr. Coughlan de Perez offered three main comments representing feedback expressed by the subcommittee.

Dr. Coughlan de Perez' first point was "what is transformation, and how do we cause it?" Dr. Coughlan de Perez remarked that we know what transformation is when we see it and hope that transformation takes place in systems where transformation is necessary for climate resilience, but how do we make this happen? Dr. Coughlan de Perez said that this question is difficult to answer but doing so would make the report pathbreaking.

Dr. Coughlan de Perez posed the question, "how does one effect transformation?" When Dr. Coughlan de Perez worked on the Intergovernmental Panel on Climate Change (IPCC) report last year, it was easy to catalog adaptation approaches as transformative or not. For example, farmers continued farming in a floodplain because they felt protected by a flood early warning system. In hindsight, this early warning system was not very transformative. Transformation or lack thereof might be easy to distinguish in hindsight but is often difficult to plan for with foresight, especially to plan for incorporating dynamic pathways and the ways in which people want to transform their own lives. Dr. Coughlan de Perez expressed her excitement about the next steps of the preliminary report, particularly on the inclusion of the social and behavioral aspects of change and behavior change.

Dr. Coughlan de Perez asked if recommendations for USAID about transformation could consider the timing of interventions. The technical aspects of an intervention are important, but it is also important to pay attention to the timing of those interventions. For example, in post-disaster scenarios, everyone is ready to rebuild, but it is an opportune time to rebuild differently. Another opportunity is to work with youth, who are already open to thinking about transformation and changing their livelihoods compared to those of their parents. Considerations of timing are particularly important for gender as a leverage point.

Another concrete suggestion in the context of transformation could be helping readers visualize how leverage points, opportune moments for transformation, and behavior change fit together in a theory of change, potentially in terms of input and outcomes. Dr. Coughlan de Perez highlighted the depth of information presented in the preliminary report and praised the author team for their efforts to date. Why are specific interventions a great choice for causing transformation at an opportune moment?

Dr. Coughlan de Perez said a second recommendation for the author team concerns geographic priorities, noting the importance of context specificity highlighted by Dr. Carr. For example, it is difficult to make generic recommendations about soil health because the world's soils are infinitely diverse. It will be important to think through geographic priorities for different regions and the process by which one determines such geographic priorities.

Dr. Coughlan de Perez shared a third set of considerations reflecting subcommittee feedback. She remarked that the final report should further investigate the pathways on nutrition, not solely food production. It will be important to understand what people are eating, how they use this food, and the implications for human nutrition. The subcommittee also had questions about water, including green water and blue water, and questions on changes to demand and consumption.

Dr. Coughlan de Perez invited Mr. Sunga to provide comments.

Panelist Presentation: Future Direction of the Study and Subcommittee's work in Order to Ensure the Study Puts Forward Recommendations for Localized, Equitable, and Inclusive Transformation
Ishmael Sunga, CEO, Southern African Confederation of Agricultural Unions (SACAU)

Mr. Sunga thanked Dr. Coughlan de Perez for the introduction and said that the topic of his presentation would be implementation, particularly for marginalized communities, which are a central part of inclusivity. Mr. Sunga highlighted that the report is off to a good start, covering many angles of inclusivity, including smallholder farmers, women, and youth, and rightly identifying this segment of society, or group of people, as a leverage point. The question then is "how should we concretize it?" Mr. Sunga noted the expectation that the report should provide more guidance on how transformation will be expressed in practical terms at the ground level. Mr. Sunga offered a few insights for consideration in the final report and ideally for incorporation into USAID agency frameworks, following the advice that could emanate from this research and from the subcommittee's work.

Mr. Sunga highlighted that the first point of consideration is for the final report to be very explicit and deliberate about targeting. As a matter of policy, that should be a fundamental pillar of USAID's approach. Working with institutions that represent marginalized and underprivileged groups should also be a specifically targeted area because it is difficult to work with all farmers, herders, fisherfolk, etc. individually. Thus, the final report should emphasize the importance of working with meso-level organizations that represent these communities.

It is important to ensure that the meso-level organizations have sufficient capacity to provide the required services to people on the ground. Mr. Sunga explained that meso-level organizations often lack

capacities and means through which they can carry out outreach functions. Providing technical and financial support to meso-level organizations is fundamental and critical to ensure that interventions are scaled up and reach everyone. Such support must be deliberate, especially when considering youth.

Not only as a leverage point, but cutting across all other leverage points, performance measurement and management systems are needed to provide ambitious, quantitative targets, key performance indicators, and outcomes and to ensure that implementation takes results into account. It is important to have sufficient consultation with the representative structures to ensure that the views of those impacted by the implementation of initiatives are taken into account.

Mr. Sunga highlighted that available facilities are often not well marketed to those for whom they are intended. Communication and visibility are necessary to improve access to opportunities that come with the USAID facilities. This communication seems basic but is fundamental for improving access to information, and insufficient communication has the potential to exclude those who do not have access to information. Specific ring-fence financing facilities could be developed to specifically target marginalized groups, for example, a special-purpose youth green entrepreneurship fund or a woman fund. This would enhance visibility and traction at the ground level.

Mr. Sunga remarked that it is difficult for one organization, USAID, to operate at a scale that is ambitious enough. USAID could use its facility—through blended finance arrangements or grant financing—to crowd in other players, taking the lead to mobilize other development and private-sector partners to support meso-level organizations and the communities they represent. These are some practical ways to demonstrate the spirit and intent of inclusiveness. Mr. Sunga invited Ms. Ann Vaughan to offer comments and recommendations.

Panelist Presentation: Reflections on the Review of the Working Paper with Advice to the Subcommittee and Author Team on Ensuring Recommendations are Actionable to Inform USAID Policies and Programs

Ann Vaughan, Senior Advisor for Climate Change, Bureau for Resilience and Food Security (RFS), USAID

Ms. Vaughan thanked Mr. Sunga and Dr. Coughlan de Perez for their helpful comments and the subcommittee and author team for their tremendous work pulling together a wide and comprehensive series of points and recommendations in a short period of time. Ms. Vaughan highlighted that it was helpful to have the report ahead of the Conference of Parties (COP) 27, which was less than two weeks away. Ms. Vaughan explained that USAID could incorporate the recommendations from the preliminary report and the audience to advance these important objectives. Ms. Vaughan explained that her presentation would cover various USAID perspectives, while Mr. Lee would speak specifically on the finance section of the preliminary report. Ms. Vaughan would discuss topics on systems change and how we achieve it; integration and siloing around adaptation and mitigation; gender; geographies and private-sector engagement.

Ms. Vaughan explained that USAID has exciting, ambitious, and necessary systems-level change targets outlined in the USAID Climate Change Strategy 2022–2023. USAID understands that achieving systems-level change is challenging, so the agency appreciates the thinking that has gone into the report’s framework and leverage points. Ms. Vaughan said it would be helpful for USAID and its missions globally if the final report could identify concrete examples of what systems change looks like. This would help USAID missions operationalize the USAID Climate Strategy and think about the tradeoffs that have been highlighted in the report in a more concrete way.

Ms. Vaughan shared a second key point on the issue of integration versus mainstreaming. Ms. Vaughan said that the discussion on mainstreaming climate action—and how that differs from integrating climate—could lead USAID back to a previous debate between climate and development silos. Ms. Vaughan explained that USAID does not want this and had moved past that division as an agency. USAID is trying to support systemic change with a climate lens, recognizing the different interconnected risks that food systems face. USAID wants to ensure integration is achieved correctly. However, the final report must also recognize that USAID, as a donor, operates within existing systems that are legislated or are challenging to change. It would be helpful for the final report to identify ways to use existing tools, such as the climate risk management tool, which is used to screen projects to understand climate risks. Should USAID be using that tool to think differently about systems-level change? What other day-to-day work are USAID missions already doing or need to do to better mainstream or integrate climate? How can USAID elevate those to achieve systems change? How does USAID make it as easy as possible for busy mission staff to support this type of work going forward?

Ms. Vaughan's third point was on gender. Ms. Vaughan appreciated the attention and elevation of gender in the report and the specific text in the report that outlines the difficult challenges that women face. It is important that authors continue to identify the specific challenges of women in food systems and women with climate-smart agriculture. Ms. Vaughan highlighted that USAID has a \$2.6 billion target of funding on gender programming across the agency, some of which will be directed to food systems and will overlap with our food systems and climate work. This is a great opportunity to think about—especially in countries where the percentage of funding overlap of different “colors of money” is high—how USAID can go beyond usual activities and push hard to ensure that programming is transformational. USAID needs help to highlight good examples of gender transformation in food systems with a strong climate lens.

Ms. Vaughan reiterated Dr. Coughlan de Perez's remark to have very specific recommendations around geographies.

Ms. Vaughan highlighted that USAID Administrator Samantha Power has called on USAID to elevate its work with the private sector. Ms. Vaughan appreciated the report's comments on environmental, social, and governance commitments of corporations. In addition to mitigation, USAID is working in the adaptation space with private sector companies and needs to think more holistically about further incorporating adaptation into its work with the private sector. Ms. Vaughan said USAID was looking to do this more at COP 27 and welcomed suggestions on how USAID could move more of its work in concert with that and take greater advantage of the environmental, social, and governance efforts by the private sector. Ms. Vaughan invited Mr. Lee to comment on the climate finance portion of the preliminary report.

Panelist Presentation: Reflections on the Climate Finance for Agriculture Deep Dive in the Working Paper with Advice to the Subcommittee and Author Team on Ensuring Recommendations Put Forward are Actionable to Inform USAID Policies and Programs

Songbae Lee, Agricultural Finance Team Lead, Bureau for Resilience and Food Security (RFS), USAID

Mr. Lee explained that his background was not in agriculture but rather in general finance, and he was learning a lot by participating in this process. Mr. Lee thanked the author team for their work and explained that he had not extensively reviewed the revised preliminary report, so he apologized in advance if some of the comments he made previously had been already addressed since the latest revision. Mr. Lee explained that he would make three broad comments. The first is high-level theoretical, the second is more practical, and the third is more specific.

Starting with the theoretical comments, Mr. Lee said it was important to think about the general role of finance. Mr. Lee did not believe that capital markets by themselves would change or solve the situation independently. Mr. Lee said that, while this may sound obvious, similar reports often argue that if enough capital is raised to meet the current finance gap, climate change will be solved. It should be clear that raising capital at scale is an important piece that we need to keep doing at scale, but it will not be sufficient in solving the problem alone.

Mr. Lee turned to the issue of inclusive finance and said that the statement in the report, “inclusive finance for the most vulnerable communities” was contradictory. Mr. Lee said that finance is used when a model that generates revenue exists and is sufficient to cover costs and repay investors. Sometimes interventions do not generate revenue but are still justified to invest in because of their associated impacts. It is important to recognize the tension between situations that can use finance and the impact of the intervention. A potential for great impact does mean that an intervention can take a financial solution. Mr. Lee explained that there are two ways of approaching this tension when thinking about inclusive finance, impact investing, and blended finance. On one end of the spectrum, traditional grantmaking, coming from the philanthropy side, aims to leverage limited grant dollars. On the other end of the spectrum, capital markets, like ESG (environmental, social, and governance), are an attempt to change the way money is invested. These are two very different approaches with different goals in different situations. These differences must be acknowledged because confusing these two approaches results in unclear and unsuccessful solutions.

In a second point about roles, Mr. Lee said the report needs to explicitly identify its target audience. The target audience could be a donor agency like USAID, a foundation like the Bill and Melinda Gates Foundation, or a development financial institution like the U.S. International Development Finance Corporation (DFC). Mr. Lee argued that the preliminary report seems like a report that was designed to discuss climate change in general. This is not bad, but it is important to remember that the target audience of the report is USAID, a donor organization, and should be written for that specific audience. Even within donor organizations, would this report be different for USAID as opposed to the Foreign Commonwealth and Development Office (FCDO)? (Yes, it should). Mr. Lee explained that these points parallel Ms. Vaughan’s suggestion that the final report should be very specific. Mr. Lee highlighted that as a government agency, USAID reports to Congress, whereas the Bill and Melinda Gates Foundation does not. USAID does not expect a financial return on investment, whereas the DFC requires its money back, plus a small return on the investment. The report should be specific so that readers understand it is directed to USAID and its specific circumstances.

Third, Mr. Lee highlighted that the report should have more specific examples with more details. There are examples in the report, but it would be helpful to dive more deeply. The Climate Smart Agriculture Food Security Fund (CSAFSF) is mentioned in the report, managed by responsAbility, in which the DFC is investing. Some of the more interesting details that could come out more prominently in the report are, first, that it is an innovative product—a guarantee at the mezzanine level—not something often seen and could be highlighted. Second, USAID supported the fund, so it is a great example of a USAID-sponsored DFC transaction through the USAID transaction window at DFC, the Mission Transaction Unit. The fund illustrates a way USAID can support climate finance and could be further teased out in the report. Mr. Lee highlighted other examples not mentioned but that could be included in the report, including MCE Empowering Sustainable Agriculture Fund LCC (MESA), an agriculture-focused SME fund with a strong emphasis on climate change in Africa that is being launched with USAID’s support. Another example is Aceli Africa, a program supported by USAID that mobilizes capital for climate-smart agriculture for SMEs in Africa and also has a climate focus. Two other examples are Cinch, an activity in Africa that is aggregating land and providing smallholder farmers with an option to exit farming,

supported by the Development Innovation Ventures (DIV), and Climate Shot, an example of an existing network. Mr. Lee highlighted that the final report should provide recommendations to USAID to support coordination and reduce duplication. Mr. Lee said that, even within USAID, it is difficult to keep track of all climate reports written by different parts of the agency.

Mr. Lee said that the report should consider the benefits of going through a fund as opposed to directly to an organization. Mr. Lee argued that there is a bias in USAID to work directly with SMEs ; however, from a financial perspective, it is a much more efficient and risk-adjusted approach to work through a fund. For personal investors, it is more fun to pick individual companies, but there is a reason you cannot pick companies in a 401(k) because it is too risky.

The report should also further consider the differences between equity and debt. There are examples in the report, including the Acumen Fund, which is an equity fund primarily, and the Responsibility Fund, which is a debt fund. Mr. Lee said it is important to ask why these funds are different and what different outcomes each expects to achieve? These very different products require a very different investment approach.

Mr. Lee remarked that the report needs to strengthen its discussion of the transaction size of climate finance. The Smallholder Resilience Fund (SRF), designed by One Acre Fund and CSAFSF, will have very different transaction sizes likely ranging from the thousands to the millions. Mr. Lee said that the proxy of transaction size can provide important information on what can and cannot be done with finance.

Mr. Lee also urged the author team to acknowledge the roles of developing countries vs. developed countries in the report. In the report, Mr. Lee said, smallholder farmers or SMEs in developing countries are asked to change their behavior, but how much, he asked, are developed countries asked to change their behavior? It is important to consider how much responsibility the United States has as a developed and wealthy country that has contributed to climate change. Mr. Lee said that when he reads these kinds of reports, he feels that developing countries are being asked to solve the problems that developed countries created. Mr. Lee concluded the presentation and invited Dr. Wollenberg to provide a few summary remarks.

Dr. Wollenberg thanked Mr. Lee and invited Ms. Diro to offer a quick reaction on behalf of the author team.

Ms. Diro thanked the four panelists for their suggestions and highlighted that the author team had noted all the excellent comments and recommendations. Ms. Diro remarked that this panel presentation fulfilled the author team's hopes for the session. Dr. Wollenberg stated that the theme of how to increase specificity for USAID was common to all the presentations.

BIFAD Comment Period

Moderated by Lini Wollenberg, Subcommittee Co-Chair, University of Vermont

Dr. Wollenberg invited members of the BIFAD committee to comment on the directions of the report, including the study methodology, the panelists' presentations, and any other points that arose during the meeting.

BIFAD Member Dr. Pamela Anderson thanked the subcommittee and author teams for the effort that went into producing the preliminary report. Dr. Anderson said that one of the critical messages of the preliminary report is the need to pivot and take on a "both" "and" approach, holding mitigation and adaptation together. Conceptually, this will be an important product within this body of work. This is evident through the potential high-impact leverage points that were identified in the preliminary report.

Dr. Anderson said the report is very thin on the methodology, which was alluded to earlier. Given the weight of those leverage points as a major output of the report, it is important to be explicit and transparent on the methodology that was used to develop them.

Referring to Dr. Carr's plan to prioritize production systems first and to use that prioritization to prioritize the leverage points, Dr. Anderson highlighted that the preliminary report would be strengthened if key concepts were defined and clarified in the beginning, where production systems are addressed. Currently, the preliminary report defines "system" but does not offer an operational definition of "production systems". Dr. Anderson said that the production systems described in the report are a mixture of what is produced (e.g., fish or cattle, and Dr. Anderson noted a gap in forestry), how things are produced (e.g., with or without irrigation or agroecological methods), and who is producing (e.g., smallholder farmers). Dr. Anderson said this is likely the result of how the literature presents production systems and emphasized that it would be helpful to clarify exactly what is meant by a production system, particularly in aligning the systems that we want to prioritize with the directions we want to go in. Picking up Dr. Coughlan de Perez' earlier point, Dr. Anderson noted that we want to drive fruit and vegetable systems, we want to drive legumes systems, and we want to think about crop systems that are more water efficient and climate resilient.

Dr. Anderson summarized that the information presented in the preliminary report was exciting but could be further strengthened with more explicit methodology and additional concept clarification. Dr. Anderson thanked the author team for their work and concluded her reflection and comments.

Dr. Wollenberg invited BIFAD Member Ms. Kathy Spahn to share additional comments and reflections. Ms. Spahn echoed Dr. Anderson's appreciation to the subcommittee and author team for the work that went into developing the preliminary report. Ms. Spahn highlighted the general consensus that the world is at a turning point right now and that the nexus of climate, agriculture, and nutrition has never been more paramount for development success. In fact, COP 27 has several events focused on nutrition, including the launch of a new initiative—the Initiative on Climate, Action, and Nutrition (ICAN). Ms. Spahn explained that this focus is critical given the skyrocketing and frightening rates of global hunger and nutrition. Recognizing that the preliminary report is not the final product, Ms. Spahn emphasized that there is currently little focus on nutrition and its solutions. Ms. Spahn argued that the world cannot afford climate-smart food systems to focus entirely on agricultural yields and productivity because without good nutrition, we undermine all development efforts that we are all committed to. Ms. Spahn asked what the subcommittee's plan is, if any, to incorporate and prioritize nutrition among the recommended actions. Dr. Wollenberg invited Ms. Diro and Dr. Carr to respond to the questions and comments posed by Dr. Anderson and Ms. Spahn.

Ms. Diro responded to Dr. Anderson's comment and said that the author team recognizes that the methodology can be further elaborated on and explained this will be addressed in the next draft of the report. In terms of the prioritization criteria in the analytical framework, the author team will focus on the scale of impact that the specific system or leverage point will have in terms of enabling the achievement of adaptation and mitigation objectives. Ms. Diro said that the author team would also explore the existing evidence to understand if these leverage points and interventions are practically applicable for systems transformation. For new areas or innovative ideas that have not been tested and where the evidence does not yet exist, the author team will consult with experts in key informant interviews, while considering sources and policy alignment within USAID. Ms. Diro emphasized that the author team would consider USAID context and policy, especially as interventions are identified, to make specific and actionable recommendations. Ms. Diro concluded by thanking Dr. Anderson and Ms. Spahn for the comments and invited Dr. Carr to provide additional points.

Dr. Carr thanked Dr. Anderson for the comments and questions. Dr. Carr explained that a key emerging finding from the author team's work is the opportunity related to USAID's research agenda. Much of the work USAID has done for years in stovepipes around adaptation or mitigation has allowed the author team to think about measurement within those stovepipes. However, there is not much information about how to measure this work across these stovepipes in a way that allows for prioritization. This has made prioritization challenging. Dr. Carr re-emphasized Ms. Diro's point that the author team will expand on the report's methodology and flagged that this is an opportunity to foster more work to think about bringing adaptation and mitigation together in context of climate-resilient development.

Dr. Wollenberg thanked Dr. Carr and invited subcommittee member Dr. Jessica Fanzo to comment on and address Ms. Spahn's question on nutrition.

Dr. Fanzo thanked Ms. Spahn for championing nutrition. Dr. Fanzo agreed that nutrition and diets were not adequately addressed in the preliminary report and noted that the subcommittee had previously alerted this to the author team. Dr. Fanzo explained that the next draft of the report would incorporate more on nutrition and diets and indicated that she would help the author team approach these points. Dr. Fanzo said one area that needs greater attention is diet, as there is abundant evidence on the impacts of climate on diets and diets on climate and that access to healthful diets is insufficient as a pathway to better nutrition. Focusing on proposed recommendations of the report, Dr. Fanzo noted that the author team would need to ensure that access to healthful diets is central in the climate agenda through food system action. Dr. Fanzo also noted that it would be helpful to discuss with Ms. Spahn to determine if this plan is sufficient or if the report will need to go further to incorporate more nutrition outcomes (e.g., growth). Dr. Fanzo highlighted that a focus on quality and diversity of diets as potential levers of action toward better nutrition could be a way forward for the report. Dr. Fanzo concluded her comments and suggestions.

Dr. Carr noted that the author team had discussed these points with Dr. Fanzo and was looking forward to working with her to enhance the report's focus on nutrition.

Dr. Wollenberg explained that BIFAD member Marie Boyd was unable to attend the public meeting but requested that Dr. Wollenberg share a question on her behalf. Dr. Wollenberg read the question: "The author team also noted the need in the report for further focus on the role of youth. Perhaps subcommittee member, Ms. Chinenye Ejezie, given your leadership role in the Climate Smart Agriculture Youth Network (CSAYN), what advice would you share with the author team to elevate youth in the research and recommendations?"

Ms. Ejezie thanked Professor Boyd for the question and said she was happy to lend a voice for youth. Ms. Ejezie explained that youth are at the front line of climate change and are expected to come up with ways to adapt to climate change in food security, especially in the future if the intensity of the effects continues to increase. This alone justifies the reason why youth should be involved with decision-making, strategizing, and drafting implementation processes surrounding climate change mitigation and adaptation in agriculture. There is a great need to include and involve the youth, understanding that their future is at stake. To do this, Ms. Ejezie suggested that we must understand the barriers and limitations to youth participation in climate change adaptation and mitigation, agriculture, and nutrition. These limiting factors can have to do with capacity development (e.g., not having access to adequate funding and financial services). Another barrier for youth is lack of access to adequate information and extension services that can support their work in the field. Ms. Ejezie emphasized that identifying and addressing these limiting factors will help facilitate youth-led solutions in climate adaptation and mitigation processes. Furthermore, it is not enough to simply offer youth seats in platforms where policy and decisions are made, but it is important to have youth included in implementation processes. This

will help youth become aware of the contributions they can make to the climate crisis affecting the food sector. Ms. Ejezie highlighted that youth should have greater access to green technologies, good digital skills, and entrepreneurial skills. Youth need to be involved because they cannot solve the problem if they are unaware of the problem at hand. To be involved in providing solutions, youth need to be actively engaged in some of these processes.

Ms. Ejezie highlighted that, although CSAYN is not a funding organization, it has been working on building capacity and advocacy. CSAYN has a program tied to children and youth in agriculture specifically designed to target the grassroot levels. Ms. Ejezie explained that this is done by collaborating with primary, secondary, and tertiary institutions to establish climate-smart agriculture clubs in schools. CSAYN works to ensure that young people at every level are aware of how they can contribute to the wellbeing of the food system. Considering youth in decision making can help to facilitate youth-led solutions. Ms. Ejezie highlighted that many youth are already involved in agriculture, and as a youth, she was personally involved in pork production and processing. Youth participation should be encouraged in agriculture. Unless the limiting factors or obstacles to participation are addressed, the full potential of youth participation in agriculture cannot be realized. Ms. Ejezie suggested more support for youth-led solutions and paths in food systems. Ms. Ejezie concluded her comments and suggestions.

Dr. Wollenberg thanked Ms. Ejezie for her comments and suggestions. Dr. Wollenberg read a comment in the chat highlighting the importance of youth involvement beyond the farm level and considering the role of youth across the supply chain. Dr. Wollenberg invited Mr. Sunga to address this comment.

Mr. Sunga said it is important to look at what really excites youth. He highlighted that, in SACAU's experience, youth are often very interested in learning about and building skills in entrepreneurship. It is important to identify existing or potential entrepreneurship opportunities in the areas of adaptation and mitigation without necessarily selling the idea of climate change but rather imagined opportunities. Youth perceive that few business opportunities exist in climate change or climate-smart agriculture. Mr. Sunga explained that in Southern Africa, some youth are using mangoes as chicken feed but not in the name of climate change. Mr. Sunga also highlighted the need for data and investment profiles that target and excite youth to engage in entrepreneurship while simultaneously fulfilling an important climate-mitigation function. This could even be an investment area supported by USAID.

Dr. Wollenberg thanked Mr. Sunga for reinforcing the role of youth in addition to their roles on the farm and noted that time remained for another question or two. Dr. Wollenberg invited BIFAD member Ms. Henri Moore to share a question for the author team.

Ms. Moore highlighted that the study presents carbon markets as a potential leverage point. She asked how to ensure that carbon markets benefit smallholders without shifting the burden of responsibility of lowering emissions on smallholder farmers and how to ensure carbon markets are not an obstacle to achieving real and lasting emissions. Ms. Moore invited Mr. Zook to respond.

Mr. Zook said that answering this question would also provide an opportunity to address comments and questions shared in the chat. One thing to keep in mind is that smallholder farmers are not the source of greenhouse gas emissions, at least outside of livestock, rice, and a couple of other commodities. Generally, smallholder farmers, especially in Africa, are not the ones emitting greenhouse gases. This point is important to acknowledge. One cannot expect smallholder farmers to bear the burden of reducing greenhouse gas emissions because there is minimal emission in the first place. However, there are still needed solutions that exist and can be utilized, especially from an adaptation point of view. Mr. Zook re-emphasized Mr. Lee's point that, for many of these solutions, the benefits or revenues must outweigh the costs, plus interest and cost of equity, for them to be investable. Some solutions are

profitable while others are not. He had not seen a very good inventory of solutions from the point of view of which ones are investable and which are not. Even those not currently investable could be with greater support through de-risking or grant mechanisms.

This is where carbon credits come into play. The author team spoke to entrepreneurs who are providing products like drip irrigation or biodigesters to farmers, and in some cases, they are using carbon credits to partially cover the cost. Many of these entrepreneurs started doing this before the crash of the markets and switched to selling those products based on the economic fundamentals alone. Now, carbon markets are coming back, and these entrepreneurs can incorporate carbon credits. There is an opportunity to reduce the costs of products and services for farmers. Mr. Zook also explained that the author team also heard about the danger of less-scrupulous actors signing contracts with farmers who are unaware of what they are getting into and end up signing away their carbon credits. In these cases, farmers may get little or nothing and are unaware of the long-term effects of these transactions. Thus, there is a need for greater transparency, and USAID could support the local context by providing transparency around existing carbon transactions. One key informant argued that transparency should exist for carbon credit transactions just as it does for natural resource extractions, yet carbon credits go out of the country without people knowing. Dr. Wollenberg thanked the BIFAD members for their questions and comments, as well as the subcommittee and author team members for their remarks. Dr. Wollenberg invited Dr. Coughlan de Perez to transition to the public comment and questions section of the meeting.

Public Comment and Questions

Moderated by Erin Coughlan de Perez, Subcommittee Co-Chair, Tufts University

Dr. Coughlan de Perez explained that this portion of the session would be an opportunity for the panelists, subcommittee members, and author team to respond to questions from the audience. Dr. Coughlan de Perez noted that the author team would receive and work through each of the questions sent in the chat, whether or not they were answered during the session. Dr. Coughlan read a question from participant Laura Schmitt Olabisi: “Have you considered cross linkages with other systems impacted by USAID programs?”

Dr. Carr responded that the author team is considering this and noted that this point arose earlier in the discussion of mainstreaming versus integrating climate. The author team is trying to think of ways to bring climate change considerations to programming from within a food system, food security, and nutrition perspective. This point also touches on biodiversity and forestry, given the expansion of agricultural land to meet population needs. This also brings up education, which is about the social change component. Dr. Carr explained that, while the author team is paying attention to this point, they will likely not give it explicit focus all the way through the report because it would require expansion beyond the scope.

Ms. Diro added that the author team plans to build a theory of change, and in doing so will place greater emphasis on the enabling environment necessary for transformation to occur. This point would be considered as the author team builds the theory of change.

Dr. Coughlan de Perez read questions from participant Diane Russell: “Does your report assume that people need to remain in farming? If they are smallholder farmers right now, must they stay smallholder farmers? Is that our goal for them?” Dr. Coughlan de Perez noted that these questions were asked in relation to women’s empowerment.

Ms. Diro responded that the author team does not assume that smallholder farmers should remain in or leave farming. The goal of the report is to develop climate-resilient development pathways to facilitate

choice and agency over these decisions so that people have options if they want to stay in or leave farming. Dr. Coughlan de Perez read a question from participant Cary Fowler, Special Envoy for Global Food Security at the Department of State, directed to Mr. Sunga: “We see a lot of plant breeding work happening for very specific crops, and in fact, for most global crops, there is very little investment in plant breeding. How can we reconcile that with some of the solutions that are being promoted here?”

Mr. Sunga responded that, in terms of transformation, we are going to rely on different inputs and systems all interplaying with each other. There will be technical solutions that will be important to advance, and there will be social engineering aspects to consider. There is space for everything as long as the vision is toward transformation. Mr. Sunga argued that we should not look at where the technical research and development should be directed, but we should rather understand that everything must come together to facilitate transformative change. Transformation will not be dependent on one lever alone; it will require all leverage points acting in unison toward the vision for the future.

Dr. Coughlan de Perez said that we shouldn’t be limited to existing R&D but should be open to new R&D. She read a question from participant Halid Abu-Hiban for BIFAD Subcommittee member Dr. Sophia Huyer: “In some countries where there is not necessarily a policy context that is conducive to empowering women there would be substantial pushback. How can we talk about that in the context of empowering women as a leverage point?”

Dr. Huyer agreed with the comment on policy. Much positive policy already exists, and the women’s empowerment movement has been successful in many ways in getting more gender and development issues into national policies in different sectors. However, we are not necessarily seeing the change on the ground level. Especially in agriculture, we need to focus action at the local level and work with women, youth, and other marginalized groups who are not empowered, advantaged, nor represented, empowering them to take action in their lives with regard to agriculture and other aspects of their lives. Dr. Huyer emphasized that, when discussing climate change, we must consider resilience and adaptive capacity, and helping farmers have the capacity and ability to recover well from climate impacts, such as droughts, floods, and landslides. Dr. Huyer asked “How can we help farmers recover in a way that can be positive for themselves, for their households, and for their communities?” Dr. Huyer said that some solutions to these questions, including access to credit and finance, have arisen from her work with the Consultative Group on International Agriculture Research (CGIAR). There is consensus that climate finance is not reaching local populations in great numbers. Dr. Huyer asked how we can overcome that constraint and work with groups at the local level. Dr. Huyer posed the question, “How do we provide climate information services for smallholder farmers, including women and youth, that will enable them to take action on their lives, on their farms, and in their communities?” Dr. Huyer mentioned that the use of collective action or the development of organizations at the local level has been a successful platform in facilitating and disseminating these solutions. This can include village savings and loans associations, farmers associations, producer associations, women’s associations and organizations, youth organizations, and other community-based organizations for environmental management. These organizations have been successful in enhancing access to resources and capacities that these groups need for resilience.

Dr. Coughlan de Perez read a question from participant Carl Wahl: “Is it possible to think about direct payment mechanisms to small-scale farmers to enable them to make this transition, to change what they are doing to something that might be more adaptive or resilient?” and a question from participant Thon Huijser for Mr. Zook: “If the optimum growing area for a crop is moving, and small-scale farmers are unable to physically move their own farm, what kind of financial solutions could support their relocation and enable them to take advantage of their expertise in a specific crop?”

Mr. Zook responded that yes, there is a need for some sort of direct payment or subsidy. Agriculture is subsidized everywhere, especially in the United States and in Europe. However, Mr. Zook argued that USAID should not directly subsidize farmers in other countries because it is not necessarily sustainable, especially given the five-year cycle of USAID programming. There are other ways that USAID can de-risk and influence that process. For example, in many countries, subsidies for farmers already exist, and many of these are directed at fertilizer access. Mr. Zook highlighted that fertilizer prices have significantly increased because of the Ukraine crisis and suggested rethinking how those subsidies are used for transformation toward regenerative practices. There are opportunities to work with local governments to identify productive regions of the country, and if these regions are shifting, to identify what commodities or employment opportunities farmers should be shifting toward. Recalling the Cinch program that Mr. Lee mentioned, Mr. Zook explained aggregating land and finding other employment opportunities for farmers is an interesting approach. Mr. Zook said these types of activities are positive because they work behind the scenes to catalyze programs and enterprises that can indirectly subsidize farmers or work with local governments to subsidize farmers.

Dr. Coughlan de Perez read a question about ruminants from participant Noel Gurwick, of USAID, which gets to the crux of the adaptation–mitigation question: “We know that ruminants are one of the major emitters of greenhouse gases in the agriculture and food system, and we also hear from nutritionists that animal-based products are an important aspect of nutrition, especially for children. Has the author team found information on how much ruminant agriculture in low- and middle-income countries where USAID works would need to grow to meet nutrition needs adequately?” Dr. Coughlan de Perez directed the question to the author team and Dr. Fanzo, around the nutrition aspects and asked if there was space for ruminant agriculture to grow, what would be the expectations, and how adaptation and mitigation balance on this topic.

Dr. Carr responded that this question points to one of the big challenges the author team has for the prioritization of leverage points and interventions. On one hand, the author team can look to outstanding published literature that discusses the technical and feasible potential for mitigation by addressing the number of ruminants in the world, how we feed ruminants, and how we manage the manure of ruminants. However, these discussions are often detached from the nutrition question that was asked. These are the points that need to be considered as the other team approaches prioritization. A knowledge gap may exist that prevents this exercise, but this is not known yet and is a future focus of the author team.

Subcommittee member Dr. Mario Herrero also noted that this question is important and responded in three parts. Livestock products are essentially nutrient dense and are often referred to as nutrient bombs. They are very effective at providing animal proteins and micronutrients to poor people. Dr. Herrero emphasized that this is not just the case with ruminants, but also poultry in all its forms, including eggs. In terms of ruminants, it is important to promote sustainable intensification, which will increase milk yields and reduce emission intensities. At the same time, it is important that we strive to reduce animal numbers. Dr. Herrero explained that each animal will consume too many resources, so having fewer but more-productive cows can become a way of achieving mitigation and adaptation and increasing production to satisfy people’s nutritional needs. Dr. Herrero explained that this approach has a fundamental effect of reducing land use, which is important and can reduce the pressure on both feed resources and trade-offs between food and feed, which are often faced by smallholder farmers in tropical regions. Should farmers plant forages to feed livestock or plant maize and beans? Recognizing that there is limited land for agricultural expansion, it is necessary to have integrated strategies in place. Can we increase animal-source food production? Dr. Herrero argued that it is possible—not to the level of consumption of animal-source foods among the Organization for Economic Cooperation and

Development (OECD) countries, but certainly to lower levels aimed at achieving more healthful diets from sustainable food systems.

Dr. Coughlan de Perez read a question from participant Ruba Hindi to Dr. Wollenberg: “How can we measure the impact of climate-smart agriculture on climate-mitigation indicators, such as greenhouse gas emissions reduced, sequestered, or avoided in the short term?”

Dr. Wollenberg responded that it is not practical for most development projects to measure their impacts on greenhouse gas emissions specifically. Many activity indicators of climate-smart agriculture can be used and are likely more appropriate for development organizations. Then we could relate those to studies on how such activities relate to greenhouse gas emissions through chamber studies, for example, or measurements on the field or of the animals in chambers.

Dr. Herrero added his support to what Dr. Wollenberg said. Also, he has been working with the Bill and Melinda Gates Foundation developing tools so that they can conduct *ex ante* environmental impact assessments of their proposed projects. This is important because the Bill and Melinda Gates Foundation wants to ensure that their funded projects fall in line with mitigation guidelines that countries want to achieve. These kinds of assessment tools will be made available to other development organizations to look at environmental impact in an *ex ante* way before the project starts. If necessary, projects can be adjusted to ensure that they do no harm.

Dr. Coughlan explained that this answered an additional comment from participant Noel Gurwick: “It’s good to hear discussion about tackling adaptation and mitigation at the same time. However, oftentimes if you were looking to prioritize major investments in adaptation, you might pick a different geography than you might prioritize for a major investment in mitigation.” Dr. Coughlan de Perez invited Dr. Carr or Ms. Diro to address this comment and discuss the approach to prioritization for system transformation and how to juggle the big wins with the big picture.

Reflecting on an earlier question posed by Dr. Coughlan de Perez, Dr. Carr explained that the author team has not yet developed theories of change that link priority systems to priority leverage points and to interventions that would work on those leverage points to expected outcomes. Developing these theories of change is a priority next step and doing so would answer Mr. Gurwick’s question for a variety of systems and leverage points. Mr. Gurwick’s point on geographies is correct. Dr. Carr noted that the author team would not recommend splitting mitigation and adaptation evenly for every intervention in every place. Identifying the right balance between mitigation and adaptation is important. Sometimes there will be a heavy focus on adaptation with attention to the impact of those actions on mitigation outcomes, as opposed to necessarily acting on both. Dr. Carr emphasized that climate-resilient development doesn’t mean undertaking mitigation and adaptation in equal measure everywhere, but rather considering both in the context of development goals, in this case, in the context of goals for food security and food systems.

Dr. Coughlan de Perez read a combined question from Noor Seddiq and Olawunmi Ilesanmi: “What are some roles for academic and research work that U.S. universities could work on in partnership with local universities, for example, in countries around the world, or specific research areas that we should focus on to generate the evidence that is needed to enable these transformations?” She invited Dr. Muhammad, Dr. Hall, and Dr. Viceisza to respond.

Subcommittee member Dr. Andrew Muhammad responded that, when thinking about profit in the context of environmentally friendly practices and transformation as they relate to agriculture, it is important to think about the role of government and organizations to incentivize certain behaviors that may not necessarily maximize profit to the producer directly but maximize benefit for broader society.

There is always that role of government. When discussing climate-smart activities, we are trying to address what would be considered a market failure, or the negative externalities of being purely profit driven. Governments need to intervene to address the market imperfections. Dr. Muhammad also noted the important role of agricultural cooperatives and producers coming together. Through cooperation, one can encourage good production practices that could lead to the collective profit of the group and not just individual profit for each producer. There are ways to incentivize this, both through government and cooperation.

Dr. Coughlan de Perez acknowledged that Dr. Muhammad's response also answered a question that was posed in the meeting chat about the economic viability of these solutions and appreciated that people are thinking in the same way and invited Dr. Tyrone Hall, Behavioral Change and Communication Author, to comment on the roles for research work and collaboration of the report.

Dr. Hall responded that many specific research entry points emerged from the study. One that stands out is gathering and clarifying indigenous knowledge and ways to best apply these knowledge systems. An emerging trend from key informant interviews is that many Indigenous and traditional communities have a sense of the natural pathways that they need to follow, but there has been some attrition in the resilience of those methods over time. How do we best collate what exists and triangulate this knowledge with the standard USAID interventions and points of view? This is not a case where we are entering spaces where there is a blank slate, but rather drawing points of connection. There is a need and opportunity to conduct rapid research and alignment. A second point is that USAID has an opportunity to tease out a key message that emerges from the study, which is that de-risking is an opportunity for innovation and for linking smallholders with market mechanisms. Detailing specifically how that would happen is a key next step. This example is relevant because "how" the study is teasing up the de-risking process is not a singular, but rather a multilayered process of engaging and putting into dialogue market segments, donor coordination, and policy alignment. Research could help identify the best-case scenarios or recommended practices for linking those three elements to enable efficient de-risking in food and agricultural systems.

Subcommittee member Dr. Angelino Viceisza responded that Dr. Muhammad and Dr. Hall had already started to pinpoint key areas for future research. On the question of collaborations across universities internationally, Dr. Viceisza said that the subcommittee had actively discussed engaging with and facilitating behavior change in the short and long run as a research area ripe for collaboration. The report will be delivered in the short term, but, engaging with and facilitating behavior change is very important in the long run, acknowledging that this process is not just about scientific changes that need to occur but also on people adopting and going along with changes. This is an area where there is room for U.S. and global universities to collaborate. Dr. Viceisza agreed with Dr. Hall's point that indigenous knowledge and what communities know are another area where there is room for better understanding of people's perceptions and how we can best engage with those in terms of behavior change.

Dr. Coughlan de Perez acknowledged that participant Kristin O'Planick asked a similar question in the chat about behavior change and that the author team will have an opportunity to respond to this after a response from subcommittee member Mr. Peter Wright.

Responding to the points about traditional knowledge, Mr. Wright added that there are established surveys that can be implemented to identify local experts and resources. When these are identified, they can offer a grassroots layer of social capital that one can start building around. Some are old skills and others are new skills learned more recently. When these surveys are aggregated, this provides a solid basis to start working on an inter-community plan. It feeds into the idea that we need to approach problems with greater focus on the sociological, not technical, aspects. Mr. Wright noted that traditional

communities exhibit a breadth of technical skills and, when brought together, create a platform for further learning among both traditional communities and others outside of the community. This is a solid basis to begin action at the community level.

Dr. Coughlan de Perez read a question from participant Julie Howard: “Countries are already on pathways. People have written lots of documents about their plans and their own pathways, and they have done a lot of analysis and consultation to say, here is where we are going and here are our priorities for our food systems. How can you incorporate those pre-existing plans and momentum into your report, your findings, and your suggestions to USAID in terms of leverage points?” Dr. Coughlan de Perez also read a question from participant Kristin O’Planick: “How can we work in terms of transforming roles, incentives, relationships, norms, and power dynamics?”

Ms. Diro appreciated the question and responded that this is something that the author team had been thinking about. Throughout the day’s discussion, many comments addressed the importance of being specific and the need for greater specificity. This specificity is exactly the next step that the author team will focus on moving forward. As interventions are identified and geographies are explored, the author team will consider policy alignment to make those interventions happen, including USAID policies but also country policies (National Adaptation Plans [NAPs] and National Determined Contributions [NDCs] in different geographies). Ms. Diro concluded that examining these further is a priority for the author team as it gets to very specific recommendations. She invited Dr. Carr to make additional points on the social aspects of transformation.

Dr. Carr explained that social aspects of transformation are the most challenging part of transformation in many ways. Technology, science, and policy are important, but in the end, getting down to the social level is where change will take place. The author team looked at this with the help of Dr. Huyer on the subcommittee. Dr. Carr highlighted that there is emerging evidence in the literature—in Paraguay, for example—that de-risking is a leverage point. When we reduce risk and vulnerability within systems, nascent innovations come out of these systems. In other words, people are taking up different roles and responsibilities, not because these roles are being imposed, but because the space has opened for them to do so. Dr. Carr noted that the author team will look at that kind of evidence and will think about how to align it with the interventions to build out to leverage points and systemic change in the report

Dr. Coughlan de Perez thanked the audience for these questions and the subcommittee members and author team for the responses.

Dr. Coughlan de Perez invited Dr. Wollenberg to provide an overview of key points that emerged from the meeting and next steps for the report.

Key Points and Next Steps

Lini Wollenberg, Subcommittee Co-Chair, University of Vermont

Dr. Wollenberg thanked Dr. Coughlan de Perez, the author team, the audience, the BIFAD committee, and the panelists for the input shared during the meeting. Dr. Wollenberg highlighted that this meeting had a full agenda and was context rich. Dr. Wollenberg provided an overview of three themes that emerged during the meeting. First, it is important that the report is specific, not just in terms of interventions, but also specific to USAID programming and policy. Second, it is important to acknowledge that finance is not a panacea. There is a need to think about the economic viability of interventions and how to direct finance in the most targeted way. Third, to be transformational, the report must think out of the box, not just in terms of agriculture, but in terms of nutrition, women’s exit from farming, value chains, and youth’s role. She thanked the participants for the targeted feedback.

Dr. Wollenberg explained that the subcommittee will use comments from today’s meeting to guide the author team’s efforts and final recommendations for the report. The final report will be completed in spring of 2023, at which another public consultation will take place. Dr. Wollenberg highlighted that subcommittee members and Dr. Tyrone Hall of the author team would host a listening session at the inaugural Food Systems Pavilion of Clim-Eat and partners at COP 27 in Sharm El Sheikh, Egypt, on the evening of November 14, 2022. This listening session would be another opportunity for public input. Members of the subcommittee and author team will present preliminary findings to address three points:

- Improving recommendations for ambitious implementation of USAID’s Climate Strategy;
- Identifying points of consensus and key gaps based on feedback from the wider agriculture, nutrition, food systems, and climate change communities; and
- Strengthening the utility of the study based on community recommendations.

Dr. Wollenberg concluded the session and invited BIFAD Chair Dr. Alexander to provide closing remarks.

Closing Remarks and Notes of Appreciation

Laurence Alexander, BIFAD Chair, University of Arkansas-Pine Bluff

Dr. Alexander thanked Dr. Wollenberg for the robust discussion today, which gave BIFAD much to consider as the subcommittee and author team’s work continues. On behalf of BIFAD, Dr. Alexander thanked co-chairs Dr. Wollenberg and Dr. Coughlan de Perez, all the subcommittee members, the USAID and subcommittee panelists, the study authors, the BIFAD contract support team, and USAID colleagues for their support of today’s event. Dr. Alexander thanked meeting participants and emphasized that the advice, questions, and resources were very important to BIFAD and will inform the subcommittee and author team’s next steps. Dr. Alexander invited all participants to join the listening session at COP 27 from 6:25pm–7:10pm EET, titled *Achieving Ambitious Food System Transformation in the Context of USAID’s New Climate Strategy: A Listening Session*. Dr. Alexander asked participants to visit the BIFAD website and their email inboxes for more details to come. The meeting concluded with a final message of thanks from Dr. Alexander.

Certification of Minutes

We hereby certify that the foregoing minutes are an accurate and complete summary of the matters discussed and conclusions reached at the meeting held on October 26, 2022.

Laurence Alexander, BIFAD Chair and Chancellor, University of Arkansas at Pine Bluff

Clara K. Cohen, Executive Director, Board for International Food and Agricultural Development, Bureau for Resilience and Food Security, USAID

January 24, 2023

ANNEX 1: ZOOM QUESTIONS AND ANSWERS

1. **Laura Schmitt Olabili:** Have you also considered cross-linkages with other systems impacted by USAID programs (e.g. biodiversity, education, etc.) to scan for synergies and/or actions that could operate at cross-purposes?
 - a. **Answer:** Live answered.
2. **Naziyo Yeeko:** How can the African continent, for example Uganda, address the challenges brought about by climate change in relation to the farming activities they practice on it?
 - a. **Answer:** No response.
3. **Ram Das:** Does this study look for both community and public system resilient components out of climate change impact??
 - a. **Answer:** No response.
4. **Halid Abu-Hiban:** When we are talking about empowering women in the agricultural sector, prevention of post-harvest loss, etc. how do we make this happen when let's say policy leaders in a country especially my country are not ready to make such positive changes impactful?
 - a. **Answer:** Live answered.
5. **Mike Nsuka:** How does climate affect food security?
 - a. **Answer:** No response.
6. **Mike Nsuka:** What is the best policy, in your opinion, to make sure people are fed in the future?
 - a. **Answer:** No response.
7. **Carl Wahl:** Using an example ... the Conservation Reserve Program in the USA is funded through direct payments to farmers in the form of land rental (the Conservation Reserve Program <https://www.fsa.usda.gov/programs-and-services/conservation-programs/conservation-reserve-program/>), which in a sense, pays individual farmers to protect land that they would otherwise utilize for cropping. Is there space in the "de-risking" aspect of USAID funding to consider direct payment mechanisms to small-scale farmers, particularly the poorest, to enable them to progressively manage the transitioning of their farmland to more adaptive / resilient forms?
 - a. **Answer:** Live answered.
8. **Harsha Vishnumolakala:** How is women's empowerment defined within the agricultural context? Are existing indices such as the Women's Empowerment in Agriculture Index taken into consideration?
 - a. **Answer:** Live answered.
9. **Ekaneth Khatiwada:** In terms of the trade-off and incentives on the leverage points, In the report, we are still missing the need for Water, Energy, and Food nexus-related technologies and the required financial need for scale-up and ensuring affordability by the smallholders in the agriculture systems. On the other hand, national cross-sectoral policies/ incentives around water, Energy, food, and environment issues are not well aligned or synchronized with each other. How are we addressing these issues in the suggested framework?
 - a. **Answer:** No response.
10. **Mike Nsuka:** Effective interventions to reduce food insecurity thus need to address the intersection of these water, food, and health constraints as well as the fundamental economic conditions that cause families to live in persistent poverty.
 - a. **Answer:** No response.
11. **Marco Galvez:** Have you considered Cover Crops/Green Manure as an option for soil fertility improvement? There is a lot of research in the tropical area of the world that suggests green manure as a good option.

- a. Answer:* That is a great suggestion for the intervention section we are going to work up next - so it is certainly on the table!
- 12. Cary Fowler:** As you well know, the world will need to produce at least 50% more food by 2050. I don't know of anyone who thinks that agricultural crops will welcome climate change and reward us by increasing their yield 50% more automatically. Here in the Office of Global Food Security at the U.S. Department of State, we are beginning an initiative to promote crop adaptation to climate change. Of course, the challenge is greatest for crops for which there is little or no current investment in plant breeding - that would be most crops. Off-line (as I must leave the meeting soon), I would be happy to talk with any of the committee members interested in this topic. Thanks. Cary Fowler, U.S. Special Envoy for Global Food Security. Department of State, Washington.
- a. Answer:* Live answered.
- 13. Mohammad Shibly:** Do you have any study report on which crops release how much carbon?
- a. Answer:* You'll find some data via <https://www.fao.org/3/cb3808en/cb3808en.pdf>
- 14. Thon Huijser:** Climate Change causes the crop-optimum growing area to 'move', inducing an eventual need for relocation. For tree-crops like cocoa, coffee, cashew, palm oil, mango, citrus etc. the smallholder cannot relocate the land along thus resulting in a negative spiral lower yields, lower income etc. affecting the family's income. By the time relocation of the farm is inevitable, the smallholder family has run out of funds. Leaving them with their valuable asset: Know-how to grow the crop. How would a (financial) solution look like that enables a smallholders' family to relocate towards the new crop-optimum growing area to allow them the leverage on their crop know-how?
- a. Answer:* Live answered.
- 15. Noel Gurwick:** It's interesting to hear the comments about better integrating Adaptation and Mitigation. On the surface that makes sense - and at the same time analysis by CCAFS has underscored that the highest priority geographies for mitigation from agriculture and adaptation in agriculture in developing countries do not overlap very much at all. So if we are looking for this report to help USAID set priorities for systems transformation, then in terms of allocating resources among countries, would it make sense to treat adaptation and mitigation separately?
- a. Answer:* Live answered.
- 16. Ruba Hindi:** How can we measure the impact of CSA on "climate mitigation indicators, such as GHG emissions reduced, sequestered, or avoided" considering the project is within a 2 years framework! or any other CSA indicator that we need to measure!
- a. Answer:* Live answered.
- 17. Mohammad Shibly:** Do you have a list of climate-smart agricultural technologies across the world?
- a. Answer:* I've seen documents published by FAO that present many, but perhaps not all.
- 18. Kate Fehlenberg:** Any solution must be economically viable to be sustainably taken up. Is there an economic viability lens to adoption strategies? Meaning, are we ensuring climate-smart ag practices are also profitable for farmers and value chain actors (suppliers, dealers, etc)-?
- a. Answer:* Live answered.
- 19. Noel Gurwick:** We know that ruminants are one of the major emitters of GHGs in the ag and food system, and we also hear from nutritionists that animal-based products are an important aspect of nutrition especially for children. Has the author team found information on how much ruminant agriculture in low and middle income countries where USAID works would need to grow to meet nutrition needs adequately?
- a. Answer:* Live answered.

- 20. Kristin O'Planick:** I really appreciate the recognition of the technical intervention vs sociocultural dimension discussion in the draft. As the authors note: The social dimensions of transformation are central to the goals of this report, but difficult to identify, articulate, and address at the scale of the system. We've known the necessary technical interventions for a long time. But programming that focuses on technical intervention has not shown much promise to achieve systems transformation. I'd love to hear more about how this report might deepen the focus on the sociocultural - the hardest, but most essential dimensions around these leverage points if we're going to get serious about transformation. Roles, incentives, relationships, norms, power dynamics...
- a. Answer:** Thank you for this question - we will be diving into the sociocultural dimensions of change once we have prioritized systems and leverage points, as that will give us the specificity we need to really dig in on these topics. We categorically agree that solutions will not be technical - technology without alignment to the sociocultural context will not work!
- 21. Noor Seddiq:** Transformative Pathways Toward a Climate-Resilient Agricultural Food and Nutrition System is a very complex set of activities that requires academic and research work and financial support. With that said, is there any chance that US universities specifically land-grants universities to get involved and play a major role by pairing and working with higher education institutions (HEI) in LMICs. The involvement of HEI from developed countries with developing countries can ensure to produce enough qualified local professionals in the agriculture, nutrition and food security sector who will enable local partners with sound implementations of the Climate-Resilient Agricultural Food and Nutrition System programs. Thank you.
- a. Answer:** Live answered.
- 22. Carl Wahl:** With regards to creating large critical masses of farmers who practice what you're suggesting (particularly around regenerative agriculture or agroforestry) that require large investments in labour and land management over multi-year timeframes, what do you suggest are pathways for implementation that would create these critical large (and contiguous) masses of practicing farmers? And how will that consider historical, economic, social configurations that enable existing systems?
- a. Answer:** Live answered.
- 23. Anonymous Attendee:** How can farmers, especially uneducated farmers in rural areas deal with climate change integration with their related farming activities?
- a. Answer:** No response.
- 24. Julie Howard:** Following the UN Food Systems Summit in 2021, many countries have been working on "pathways" documents intended to reflect analysis and consultation to guide country-driven priorities for food systems transformation. Will the report take these plans on board in considering opportunities for USAID?
- a. Answer:** Live answered.
- 25. Olawunmi Ilesanmi:** Great engagement today. Can you also identify research areas you would want scholars to amplify for evidence based data to inform climate smart adaptation and mitigation strategies?
- a. Answer:** No response.
- 26. Fred C. Johnson:** We are empowering women and Youth in Liberia in Agriculture over 150 persons can we be included in the next circle of your program?
- a. Answer:** No response.
- 27. Nicholas Panasik:** At Claflin University (a top HBCU) we are about to offer an Online Master's Degree Program in Biotechnology specifically addressing Climate Change. In their capstone

project students propose biotech solutions to climate problems local to them. We also focus on food security and emerging diseases. We are looking for ways to raise the profile of the program, connect with students, biotech companies, and NGOs working in the field.

- a. Answer:* No response.
- 28. Fred C. Johnson:** Liberian United Youth for Community Safety and Development LUYCSD is located in the republic of Liberia specifically Nimba County. web: <https://www.luycsd.org>
- a. Answer:* No response.
- 29. Olawunmi Ilesanmi:** It is also important to delineate what areas are needing these specific adaptation and mitigation strategies since we know the intensity of emissions are not universal.
- a. Answer:* No response.
- 30. Shane Mulligan:** The working paper reiterates the importance of USAID investing in "new and existing climate finance funds". USAID tends toward sitting at the table at the start of a fund or joining a fund led by a large, well-known fund manager. However, local in-country fund managers often have difficulty raising capital compared to large US fund managers. In line with the localization policy, can the report propose or consider USAID opportunities to invest directly into sustainable climate finance funds managed by private equity or venture capital firms in the target country? -Shane Mulligan, Palladium
- a. Answer:* Thanks Shane. We agree with that. Local solutions are always preferable. Risk tolerant funding to support local and first-time fund managers would be a good use of USAID funding.
- 31. Pierre-Andre Jacinthe:** Hearing Mario Herreo's comments (sorry for misspelling), I think there's another element to consider in our analysis of connections between nutrition and climate adaptation. It makes sense to reduce emission intensity in the animal production sector as a mitigation strategy (fewer animals) but that strategy may fail considering consumption behavior. There is ample evidence that consumption of meat products/proteins tend to increase as income increases (people become wealthy). Yet, we would like to fight poverty and promote an increased standard of living everywhere. How do you reconcile these seemingly incompatible goals?
- a. Answer:* No response.
- 32. Sara Diamond:** How do you balance more efficient milk production per cow vs. less productive buffalo milk production in places such as India and Nepal, where buffalo are frequently slaughtered for meat once no longer productive, but cows live out their natural lives long after milk production falls off?
- a. Answer:* No response.
- 33. David Brown:** Whom would you like to read this report? Through whose eyes will you be looking? Over what time frame? I'd think that would affect how you shape and present it.
- a. Answer:* Thanks for the question, David. The report will be of interest for the broader stakeholder community, but BIFAD's role is to advise USAID, and when the final report is delivered in the spring of 2023, they will transmit findings, conclusions, and recommendations from the report directly to the USAID Administrator.

ANNEX 2: CHAT TRANSCRIPT

Comments were slightly edited to redact any contract information or exclude logistics-related comments

From Mohammad Shibly:

Good Morning all, This is Mohammad Shibly, USAID/ Bangladesh

From Molly Hellmuth:

Good morning, Molly Hellmuth, Winrock International

From Olivia Shoemaker:

Hello all - Olivia Shoemaker, Foundation for Food & Ag Research (FFAR) in Washington DC

From Tommy Crocker:

Welcome everyone! The event will start shortly. Please feel free to introduce yourself in the chat.

From Oumarou Samna:

Good Morning, Oumarou SAMNA from Niger

From Muktar Arbe:

Good morning, this is Muktar Arbe from GIZ/BMZ Ethiopia.

From Charlotte Block:

Good morning - joining from NCBA CLUSA in Washington, DC.

From Thon Huijser:

Good morning Thon Huijser, Global Head Agribusiness of Oikocredit International from the Netherlands

From Harsha Vishnumolakala:

Hello all - Harsha Vishnumolakala, Climate Policy Initiative

From Camilo Sanchez:

Good morning. Camilo Sanchez form Olam Food Ingredients (ofi)

From Laura Schmitt Olabisi:

Hello everyone, Laura Schmitt Olabisi, Michigan State University, USA

From Leonard Akwany:

Leonard Akwany from Conservation International. Zooming in from Kenya.

From Robert Beach:

Hello everyone, Robert Beach, RTI International from North Carolina, USA

From Andrea Bohn:

Andrea Bohn, University of Florida

From Clara Cohen:

Good day everyone! Clara Cohen from USAID's Bureau for Resilience and Food Security.

From Alex Russell:

Good morning everyone. I'm Alex Russell with the Feed the Future Innovation Lab for Markets, Risk & Resilience.

From Jean Claude Dusabumuremyi:

Good morning. Jean Claude Dusabumuremyi from Rwanda

From Mefor Cynthia:

hello everyone this Cynthia from cameroon

From Sarah Brenholt:

Good Day- Sarah Brenholt with Cargill

From Kelly Sheridan:

Kelly Sheridan - U.S. Dairy Export Council

From Kathleen Nay:

Good morning - Kathleen Nay from Perfect Day

From Joseph Orenuga:

Hello, Everyone. Joseph Orenuga; Praiseland schools, Nigeria.

From Matthew Blair:

good morning .. Matthew Blair from Tennessee State U

From Misheck Musokwa:

Hello everyone from South Africa @ Southern African Confederation of Agricultural Unions (SACAU)

From Pamela Bowen:

Good day everyone. Pamela Bowen Chief of Party USAID Private Sector Engagement (PSE) Support. Washington DC

From William Akiwumi:

Hello, this is William Akiwumi, USAID Africa Bureau, Washington

From Benjamin Kohl:

Hi everyone!
Ben Kohl

Program Administrator
Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet (SMIL)
Kansas State University
Manhattan, Kansas USA
[Contact information removed]

Website: <https://smil.k-state.edu>

LinkedIn: <https://www.linkedin.com/company/sorghummillet>

Twitter: https://twitter.com/sorg_millet_lab

From Hans Goertz:

Greetings! Hans Goertz, University of Tennessee, Smith International Center

From Tommy Crocker:

Welcome everyone! Please note that closed captioning is available in ZOOM.

From Ekanath Khatiwada:

Good morning, Ekanath Khatiwada from WE4F Asia regional hub, joining from Nepal

From Kathy Spahn:

Greetings. Kathy Spahn from BIFAD and Helen Keller Intl. In New York.

From Denise Mainville:

Hello all, Denise Mainville, consultant in market systems development, gender, and payment-for-results, among other areas.

From Rebecca Chamberlin:

Hello all! Rebecca Chamberlin from Land O'Lakes Venture37. Joining from Washington, DC.

From Jonathan Cook:

Hi, Jonathan Cook from USAID's Center for Resilience and climate adaptation team

From Becatien Yao:

Hi! Becatien Yao from USAID/DDI/EMD Washington DC

From Gilbert Phiri:

Greetings, Gilbert Phiri from South Africa - International Federation of the Red Cross and red Crescent - Africa Regional Coordinator for the Pan African Zero Hunger Initiative

From Carolyn La Jeunesse:

Hello, All. Carrie La Jeunesse, La Jeune Consulting, Washington State, U.S.

From Emma Bratton:

Morning! Emma Bratton from USAID/RFS/CA Washington DC

From Ekanath Khatiwada:

Good morning/Afternoon Everyone , Ekanath Khatiwada from WE4F Asia Regional hub, joining from Nepal

From Grace Folts:

Good day everyone! Grace Folts from MEDA joining from Canada.

From Tommy Crocker:

Learn more about the subcommittee here: www.usaid.gov/bifad/climatechange

From Carl Wahl:

Carl Wahl, USAID/BHA/TPQ, Sr. Agri. Advisor - DC

From Olunuga Olawale:

Hello everyone, Olunuga Olawale Joshua Msc. Agricultural extension and Rural Development Federal University of Agriculture Abeokuta Ogun State Nigeria

From Lexine Hansen:

Hello! I'm Lexine Hansen, and I'm with Environmental Incentives and Measuring Impact II.

From Oliver Haugland:

Good morning everyone! Oliver Haugland from USAID Center for Nutrition

From Tommy Crocker:

View or download the Working Paper here: www.usaid.gov/bifad/climatechangeworkingpaper

From Tommy Crocker:

Today's agenda and speaker bios are available here: www.usaid.gov/bifad/187th-public-meeting-agenda

From Rachel Golden Kroner:

good morning! Rachel Golden Kroner, Research division (DDI/ITR/R), USAID

From Whitney Lopez:

Hi all. Whitney Lopez from USAID/Washington, FACA Management Backstop

From Cindy Cox:

Hello, Cindy Cox from Washington DC @ USAID/BHA/TPG Agriculture Team!

From Noor Seddiq:

Hello, Noor Seddiq, Howard University, Washington, DC

From Walid Nasr:

Hello everyone, This is Walid Nasr - founder of Zr3i.com : an innovative digital agriculture platform as a service offering precision farming solutions mainly crop monitoring, management

and crop insurance services operating from Egypt and expanding to the Middle East and Africa region

From Ruba Hindi:

Hi, Ruba from DC @NCBA-CLUSA

From Tommy Crocker:

We hope you will join the discussion by sharing your ideas and resources in the chat and send questions to panelists using the Q/A function.

From Bamidele Afanwoubo:

Hi, James from Nigeria

From Tommy Crocker:

Learn more about the subcommittee here: www.usaid.gov/bifad/climatechange

From Erin Coughlan de Perez:

Hi! Erin Coughlan de Perez, Friedman School for Nutrition Science and From Policy, Tufts University

From Hayden Aldredge:

Greetings everyone! Hayden Aldredge from ISF Advisors

From Angelino Viceisza:

Hello. Angelino Viceisza, Associate Professor of Economics, Spelman College, Subcommittee Member

From Arouna SADJI BOUKARI:

Hello SADJI BOUKARI Arouna from Benin, Chief of Gender and Environnement Unit Ministry of Developpement

From Zainab Musa Sa'eed:

Hello all. Zainab Musa Sa'eed, Planning and Budget Commission, Kaduna State - Nigeria

From Sabinus Anaele:

Sabinus Anaele, Sr. Ag. Advisor, BHA/FSL/TPQ, Washington, DC.

From Peter Wright:

Peter Wright, CARE Technical Advisor based in Niger; Sub-committee member

From Tom KAYITARE:

Hi! Tom from Rwanda legal representative of Rwanda conservation initiative

From Sarah Devermann:

Hello! Sarah Devermann from ISF Advisors

From Hart Jansson:

Hart Jansson, from the trenches of rural women micro-enterprise and improved nutrition –
[Contact information removed] www.malnutrition.org

From Mary Beggs:

Good day everyone! Mary Beggs, Sector Director of Ag and Economic Growth at Tetra Tech, and
BIFAD Support Team Project Manager

From Adams Idoko:

Hi everyone! Adams IDOKO from HELEN KELLER INTERNATIONAL NIGERIA.

From Chinenye Ejezie:

Hi everyone, I am Chinenye Juliet Ejezie from Climate Smart Agriculture Youth Network (CSAYN)
Nigeria. Subcommittee member of BIFAD.

From Lauren Allognon:

Hello everyone! Lauren Allognon from Tetra Tech's Agriculture and Economic Growth team and
BIFAD Study Team Research Assistant.

From Waliou Yessoufou:

Hi everyone! Waliou Yessoufou from National University of Agriculture, Benin

From Tommy Crocker:

Today's agenda and speaker bios are available here: <https://www.usaid.gov/bifad/187th-public-meeting-agenda>

From Ricardo Makuil:

Hello everyone! Ricardo Makuil from Africa specially South Sudan

From Loretta Michaels:

Will the slides be made available?

From Tommy Crocker:

View or download the Working Paper here:
<https://www.usaid.gov/bifad/climatechangeworkingpaper>

From Tommy Crocker:

Learn more about the subcommittee here: <https://www.usaid.gov/bifad/climatechange>

From Tommy Crocker:

Hi everyone! We hope you will join the discussion by sharing your ideas and resources in the
chat and send questions to panelists using the Q/A function.

From Mike Nsuka:

Hello everyone, I am happy to be here.

From Vincent:

Hello everyone, glad to meet again

From Nkole Mwamba:

Thanks for this important meeting. Ambassador Nkole Mwamba, Executive Director Savannah Zambia. [Contact information removed]

From Byamungu Zabuloni:

hello everyone. It's Byamungu from University of KwaZulu-Natal, South Africa.

From Tommy Crocker:

Hi everyone, please direct your comments, ideas, and resources to "Everyone" in the chat function.

From Jennifer McCallum:

Hi everyone! [SEP]Jen McCallum for SRI-2030. [SEP]Glad to connect:[Contact information removed]
And see our work here: <https://www.sri-2030.org>

From Mike Nsuka:

How does climate change affect food security?

From Kristin O'Planick:

Alongside timing, I'd add sequencing. Implications of sequencing is pretty critical in systems change facilitation.

From Leonard Akwany:

Indigenous seeds and onslaught from GMOs. Like local vegetables and climate change resilience as opposed to GMOs? What are the leverage points? Lastly financing Farmer Led Irrigation will be transformative.

From Marco Galvez:

Have you considered cover crops/green manure as a option for soil fertility improvement, in Honduras we use to have a center which collected a lot information about green manure.

From Harsha Vishnumolakala:

How is women's empowerment defined within the agricultural context? Are existing indices such as the Women's Empowerment in Agriculture Index taken into consideration?

From Vincent:

Great presentation Ishmael

From Julie Howard:

Excellent points from @Ishmael Sunga - thank you. Esp points on which on the ground organizations will be critical and how their capacities will be strengthened; and the very important point that for such an ambitious agenda USAID *must* mobilize other partners and work in coordination.

From Tommy Crocker:

Thank you to those who have submitted a question in the Q/A function. Panelists will try to respond to as many questions as possible during the Public Q/A Session. We encourage more insightful questions!

From Nicholas Panasik:

At Claflin University (a top HBCU) we are about to offer an Online Masters Degree Program in Biotechnology specifically addressing Climate Change. In their capstone project students propose biotech solutions to climate problems local to them. We also focus on food security and emerging diseases. We are looking for ways to raise the profile of the program, connect with students, biotech companies, and NGOs working in the field. We want to supply the scientists needed to address these problems. If you think you could partner please DM

From Clara Cohen:

Thanks, everyone, for your active participation today and the great comments and questions. Following today's meeting, additional feedback on the working paper to be included in the public record (including suggestions of literature, case studies, or other resources), may be sent via email to Clara Cohen, BIFAD Executive Director, at ccohen@usaid.gov. We will accept comments up to two weeks after the meeting. They will be included in the official minutes for today's meeting.

From Vincent:

Thanks for your presentation Ann

From Matthew Blair:

Hi Nicholas (at Claflin) .. we are interested in your online program and capstone projects. [Contact information removed] thanks, Matthew

From Abdifatah Ahmed Mohamed:

Thanks again for your Presentation. Am Abdifatah From Somalia. One of the most needed Country for this Topic.

From Alex Russell:

We appreciate the detailed focus on de-risking agriculture and climate finance in the draft report. The Feed the Future Innovation Lab for Markets, Risk & Resilience has been investigating challenges with the broad adoption of climate-resilient technologies like microinsurance or stress-tolerant seeds that have shown to empower small-scale farmers and pastoralist households who face significant risk. Two of the major barriers to these technologies is that (1) most of them come at a non-trivial cost for households who have very little to spare and (2) these technologies deliver their greatest benefits in the event of a shock, but in normal years may provide no benefits at all. In a recent brief, we outlined evidence on what may be required

to spark permanent adoption of climate resilient technologies and would be happy to share more evidence: <https://basis.ucdavis.edu/publication/evidence-insight-sparking-permanent-adoption-resilience-building-agricultural>

From Joseph Orenuga:

While the interventions to manage climate change outcomes should be pluralistic in certain respects, they should still be sensitive enough to make allowances for current challenges faced by the most marginalised populations who are already under immense pressure. Otherwise, there is a real risk of deepening these disparities, especially in the LMICs.

From Laura Schmitt Olabisi:

I'm curious if you all have delved into the research and resources provided through the Resilience Alliance. They serve as a hub for socio-ecological systems transformation research and practice. They maintain a database of transformational SES change examples (good and bad) and guides for identifying the factors that lead to systems change: <https://www.resalliance.org/>

From Pamela Bowen:

Thanks all excellent points

From Benjamin Kohl:

Great and well thought out comments from panel!

From Tommy Crocker:

Thank you for the valuable comments. As a reminder, all questions and comments will be posted in the public record and available to inform BIFAD's work.

From Joseph Orenuga:

Recent reports from relevant multilateral agencies relating to global food loss and food waste, particularly in light of the grim numbers seen in the State of food security and nutrition report should also be integrated into developing future action plans.

From Magda Aparecida Lima:

It is good to know about the Resilience Alliance. I would like to have more info.

From Vincent:

Many thanks indeed Pamela

From Umesh Babu M S:

Some insights on crop specific adaptation and mitigation strategies would help understand the climate change impacts on agriculture

From Joseph Orenuga:

Wrote a bit about the SOFI report and possible action plans a while back. Anyone interested in reading can find it here <https://medium.com/@joenuga/longer-numbers-stronger-hunger-8a0e1d934490>

From Joseph Orenuga:

Great job all around by all the presenters. [thumbs up emoji]

From Kate Fehlenberg:

I just moderated a session at the GYLC on Youth Modernizing Ag. What came out was Youth will apply their innovation and energy to Ag is it's made exciting and profitable-- there are LOTS of opps across value chain --not just the farm-- in ICT, research/ science, Business ownership, regulation, etc. Supporting youth to get into these fields would be a win. Education, training, enterprise support, etc.

From Pierre-Andre Jacinthe:

Professor Ishmael Sunga made important points regarding how recommendations for transformative changes will be translated on the ground. Specifically, I'm glad he made the point that quite often programs are not adequately advertised to communities that are most in need (because these communities don't have access to information). This is an important observation, and I hope the committee will take it into consideration.

From Pamela Bowen:

Excellent point Chinenye. Participating in planning and implementation at the local level helps support ownership and long-term sustainability.

From Kate Fehlenberg:

Youth gave examples of working on front lines of climate change as First Responders after storms to rural farm recovery; Youth are great at Community Mobilization/ Awareness, DRR, etc-- using social media, public events. etc.

From Kate Fehlenberg:

Prof Sunga- exactly: Youth and Entrepreneurship is an area ripe for expansion-- needs resources and support, but there are models for Ideation, Enterprise support, etc. - like the CGIAR Big Data competitions, etc.

From Kate Fehlenberg:

USAID Ghana has a good example of revenue sharing from carbon market income among smallholder farmers sequestering carbon in aggregate

From Jonathan Cook:

So does USAID Colombia and possibly others.

From Laura Schmitt Olabisi:

Great point Henri, there has been increasing concern/critiques about carbon markets recently. One such is that beneficiaries can get credit for prevented emissions, which can encourage people to 'threaten' carbon intensive projects like deforestation, in hopes of getting paid not to do it. A kind of perverse incentive.

From Tommy Crocker:

All questions and comments will be posted in the public record and available to inform BIFAD's work.

From Camilo Sanchez:

Do you have examples of farmers getting paid for carbon? Where? how much of their income is from Carbon related activities?

From Tommy Crocker:

Panelists will try to respond to as many questions as possible today. Written public comments to inform BIFAD's recommendations to USAID are also welcome after the meeting. To submit comment, please email in the next two weeks to BIFAD Executive Director, Dr. Clara Cohen at: ccohen@usaid.gov with subject "Public Comment for 187th Public Meeting"

From Kate Fehlenberg:

Smallholder farmers can have econ value in carbon sequestration in aggregate if Ha/ etc can be measured consistently under 1 program, govt or donor--then quantified and sold, then revenues shared. but of course takes capacity building in practices and measurements, accreditation, then transparency in sales and rev dist

From Kate Fehlenberg:

Any solution must be economically viable to be sustainably taken up. Is there an economic viability lens to adoption strategies? Meaning, are we ensuring climate-smart ag practices are also profitable for farmers and value chain actors (suppliers, dealers, etc)-?

From Nicholas Panasik:

How would a university like Claflin, that has an Online Masters Program in Biotechnology for climate change, find ways to interface with these programs to collaborate on projects and supply potential scientists?

From Hart Jansson:

For an example of carbon-saving action that provides income to women and improves nutrition, check out <https://www.dropbox.com/s/ct6bvswxg3ox8wg/Climate%20smart%20approach%20-%20affordable%20nutrient-dense%20foods%20v3.docx?dl=0>

From Adams Idoko:

HOW CAN SMALL HOLDER FARMERS ENFORCE SOIL HEALTH WHEN FARMERS ARE USED TO USING AGROCHEMICALS FOR IT'S QUICK EFFECTS WITHOUT MINDING THE NEGATIVE EFFECTS IT POSE TO CROP NUTRITION OR THE IMPACT ON THE SOIL.

From Alex Russell:

Payments for Ecosystem Services (PES) could be a powerful avenue to fund incentives for small-scale farmers to adopt climate-smart agricultural practices that reduce emissions and improve soil health. In Malawi, for example, hydropower plants must pay to clear silt from turbines that are washed down from farms along the Shire River. That cost could be dedicated to subsidizing farmers for adopting practices that reduce runoff and improve their farms' long-term

sustainability: <https://basis.ucdavis.edu/publication/policy-brief-incentives-could-create-tipping-point-conservation-agriculture-adoption>

From Norman Uphoff:

I appreciate Pamela Bowen's comment, having been working with USAID on the analysis and promotion of participating since the 1970s. But I would take the comment a bit further. What has struck me about this very high-level discussion is the mindset we have expressed which seems at variance with the objective of 'transformative' change. The discourse has proceeded with a premise of 'we' vis-a-vis. 'them,' even when advocating larger roles for women and marginalized communities. There has been little implication of 'us.' References to 'small farmers' sound rather abstract and homogenized, rather than stressing the diversity and variety of 'them' (probably even greater than what we know exists as among us). I would like us to have more identification with the members of rural and urban communities and appreciate how they can be regarded more as assets, not just as objects whom we want to 'change.' Most people resist being changed by those whom they do not know have their best interests at heart.

From Kristin O'Planick:

+1 @Norman

From Emma Bratton:

+1 @Norman

From Fred C, Johnson:

My name is Fred C Johnson. I'm the executive director for Liberia United Youth for Community Safety and Development LUYCSD. can I ask a question or make a comment?

From Songbae Lee (USAID):

Some info on Cinch here (see page 7) https://pdf.usaid.gov/pdf_docs/PA00Z5KW.pdf

From Hart Jansson:

One good partial solution to ruminants and methane emissions is to implement policies that encourage plant-based substitutes for animal protein (eg Soy foods as endorsed by the WHO, USDA, FDA etc). A soyfoods micro-enterprise project in Malawi is substituting 3M eggs per month with 600,000 liters of soymilk per month for 300,000 consumers - saving 100 tons of carbon emissions per month see www.malnutrition.org

From Carl Wahl:

+1 Norman

From Sara Diamond:

How do you balance more efficient milk production per cow vs less productive buffalo milk production in places such as India and Nepal, where buffalo are frequently butchered for meat once no longer productive, but cows live out their natural lives long after milk production falls off?

From Alex Russell:

These are great points from Mario Herrero. Risk may actually increase livestock herd size. Our colleagues found that in northern Kenya, where drought is a constant risk, Index-based Livestock Insurance for pastoralist households reduced herd size and increased investments in the animals they had.

https://scholarworks.montana.edu/xmlui/bitstream/handle/1/12815/Janzen_RSTechnique_OIE_2016.pdf?sequence=1

From Clara Cohen:

Thanks, everyone, for the great comments and questions. For those still reading the report, additional feedback on the working paper can be sent following this meeting. Please email Clara Cohen, BIFAD Executive Director, at ccohen@usaid.gov. We will accept comments up to two weeks after the meeting for inclusion in the public record. These and all the comments and questions from today will be included in the official minutes from today's meeting.

From David Brown:

Whom would you like to read this report and its spinoffs? Through whose eyes will you be looking? I'd think that would affect how you frame and present it.

From Mike Nsuka:

Thank you so much!

From Kristin O'Planick:

Very exciting. Thanks, Ed.

From Pamela Bowen:

Great session. Thanks to the research team and panelists.

From Jean Claude Dusabumuremyi:

Thank you so much for great work

From Olawunmi Ilesanmi:

Very insightful! Thank you all. Olawunmi Ilesanmi from Borlaug Institute for International Agriculture, Texas A&M University

From Mohammad Shibly:

Nice discussion, very informative.

From Tommy Crocker:

For more information about the November 14th Listening Session at COP, hosted by the Subcommittee and USAID, please visit: <https://foodsystemspavilion.com/embrace/pavilion-session-3/>

From Mike Nsuka:

Great!

From Mary Condon:

Thanks everyone!

From Benjamin Kohl:

Thanks to all. Great discussion, questions, answers, and comments!

From Noor Seddiq:

Thank you all participants - Very informative

From Tommy Crocker:

Thanks to everyone for enhancing this engaging dialogue. Watch for more information about upcoming BIFAD public meetings: <https://www.usaid.gov/bifad>

From Emma Bratton:

Thanks everyone!

From Tommy Crocker:

Thank you for participating in today's meeting. The meeting recording and minutes will be posted publicly and shared with participants by email after the meeting.

From Mary Beggs:

Thanks everyone!

From Mike Nsuka:

Many thanks

From Marco Galvez:

Thank you, I did not hear about my Q on Green Manure.

From Clara Cohen:

Many thanks to BIFAD, subcommittee members, speakers, panelists, and participants! From Joseph Orenuga:

[wave emoji]

From Ed Carr:

Thanks to everyone!

From Tommy Crocker:

Written public comments to inform BIFAD's recommendations to USAID are also welcome after the meeting. To submit comment, please email in the next two weeks to BIFAD Executive Director, Dr. Clara Cohen at: ccohen@usaid.gov with subject "Public Comment for 187th Public Meeting"

From Gilbert Phiri:

[clapping emoji]

From Mike Nsuka:

cd [heart eyes emoji; thumbs up emoji]

From Abdifatah Ahmed Mohamed:

Thank you

ANNEX 2: MEETING PARTICIPANTS

Number of Participants: 273

c	First Name	Last Name	Organization
BIFAD Members			
1	Laurence	Alexander	BIFAD; University of Arkansas Pine Bluff
2	Pamela	Anderson	BIFAD; International Potato Center
3	Marie	Boyd	BIFAD; University of South Carolina School of Law
4	Henri	Moore	BIFAD; Haleon
5	Kathy	Spahn	BIFAD; Helen Keller International
BIFAD Subcommittee Members			
6	Mauricio	Benitez	Subcommittee; responsAbility Investments AG
7	Erin	Coughlan de Perez	Subcommittee; Tufts University
8	Chinenye	Ejezie	Subcommittee; CSAYN
9	Jessica	Fanzo	Subcommittee; Johns Hopkins University
10	Mario	Herrero	Subcommittee; Cornell University
11	Sophia	Huyer	Subcommittee; AICCRA
12	Andrew	Muhammad	Subcommittee; University of Tennessee
13	Ishmael	Sunga	Subcommittee; SCAU
14	Angelino	Viceisza	Subcommittee; Spelman College
15	Lini	Wollenberg	Subcommittee; University of Vermont
16	Peter	Wright	Subcommittee; CARE
Speakers			
17	Carmen	Benson	Tetra Tech, BIFAD Support Team
18	Ed	Carr	Clark University
19	Rahel	Diro	Tetra Tech
20	Songbae	Lee	USAID
21	Ann	Vaughan	USAID
22	Dan	Zook	ISF Advisors
Participants			
23	Halid	Abu-Hiban	No Response
24	Anfal	Adam	USAID
25	Adewole	Aderemi	FCT Agricultural Development Project
26	Emmanuel	Adesoji	University of Ibadan
27	Bamidele	Afanwoubo	Ladoke Akintola University of Technology, Ogbomoso, Nigeria
28	William	Akiwumi	USAID
29	Leonard	Akwany	Conservation International
30	Hayden	Aldredge	ISF Advisors
31	Gabrielle	Allmendinger	Massachusetts AGO
32	Lauren	Allognon	Clark University

c	First Name	Last Name	Organization
33	Sabinus	Anaele	USAID
34	Johanna	Andrews	USAID
35	Lindsey	Anna	USAID
36	Alex	Apotsos	USAID
37	Muktar	Arbe	GIZ
38	George	Asare	IGNITIA
39	Laurie	Ashley	USAID
40	Rainer	Asse	USAID
41	Ayub	Ayubi	DRC
42	Sarah	Barnhart	USAID
43	Cheryl	Bax	Retired from ERS
44	Robert	Beach	RTI International
45	Elena	Beisel	USAID
46	Barituka	Bekee	University of Missouri
47	Andrew	Bisson	USAID
48	Matthew	Blair	Tennessee State University
49	Charlotte	Block	NCBA CLUSA
50	Andrea	Bohn	University of Florida
51	Edward	Boor	Better Together
52	Pamela	Bowen	No Response
53	Emma	Bratton	No Response
54	Sarah	Brenholt	CARGILL INC
55	David	Brown	Retired int'l ag econ prof, program leader & policy advisor
56	Sarah	Brunnig	University of Florida
57	Bathsheba	Bryant-Tarpeh	USAID
58	Hannah	Butler	No Response
59	Rodolfo	Camacho	The Palladium Group
60	Lianne	Canarick	No Response
61	Lila	Cardell	No Response
62	Sara	Carlson	USAID
63	Jake	Carter	We and Goliath
64	Rebecca	Chamberlin	Land O'Lakes Venture37
65	Moushumi	Chaudhury	No Response
66	Tinashe	Chavhunduka	SACAU
67	Ziqi	Chen	Zhejiang University
68	Stephen	Church	USAID
69	Michael	Colby	USAID/AFR
70	Mary	Condon	Johns Hopkins
71	Jonathan	Cook	USAID
72	Kristy	Cook	USAID
73	Amalia	Corby	American Society for Microbiology

c	First Name	Last Name	Organization
74	Kelley	Cormier	USAID
75	Caitlin	Corner-Dolloff	USAID
76	Cindy	Cox	USAID / BHA
77	Allison	Crittenden	JBS
78	Mefor	Cynthia	No organization
79	Amira	Dardir	No Response
80	Ram	Das	CARE
81	Sarah	Devermann	ISF Advisors
82	David	DeYoung	Michigan State University
83	Sara	Diamond	No Response
84	Taye	Doherty	NAPAC Foundation
85	Jean Claude	Dusabumuremyi	INES-Ruhengeri Institute of Applied Sciences
86	Carly	Edwards	No Response
87	Jeremiah	Erasquin	We & Goliath
88	Paul	Eteudo	University of ibadan
89	Teia	Evans	NCBA CLUSA
90	Alison	Evans	Palladium
91	Matias	Fabião	No Response
92	Kate	Fehlenberg	FHI 360
93	David	Fernandez	UAPB
94	Grace	Folts	No Response
95	Martin	Fowler	USAID
96	Cary	Fowler	U.S. Department of State
97	Glen	Fujii	We and Goliath
98	Pete	G	No Response
99	Marco	Galvez	No Response
100	Nicholas	Gardner	USDEC
101	Valerie	Gatchell	No Response
102	Caroline	Gatobu	Kaimosi Friends University
103	Tom	Gill	University of Tennessee
104	Jerry	Glover	USAID
105	Hans	Goertz	University of Tennessee
106	Rachel	Golden Kroner	USAID
107	Stephanie	Goodwin	Danone
108	Quintin	Gray	1890 Universities Foundation
109	Noel	Gurwick	USAID
110	Lailah	Hall	Tetra Tech
111	William	Hall	USAID
112	Tyrone	Hall	Tetra Tech
113	Petra	Hamers	Oxfam Novib
114	Qwamel	Hanks	USAID

c	First Name	Last Name	Organization
115	Lexine	Hansen	Environmental Incentives
116	Britta	Hansen	Land O'Lakes Venture37
117	James	Hansen	International Research Institute for Climate and Society (IRI), Columbia Climate School
118	Laura	Harwig	Tetra Tech
119	Kedir	Hassen	Haramaya University
120	Oliver	Haugland	USAID
121	Henry	Heilbroner	USAID
122	Hallie	Heinzen	No Response
123	Molly	Hellmuth	Winrock
124	Carter	Hemphill	USAID
125	Ruba	Hindi	NCBA CLUSA
126	Shawnee	Hoover	USAID/BHA
127	Stew	Houston	Sensible
128	Julie	Howard	CSIS
129	Thon	Huijser	Oikocredit International
130	Don	Humpal	DAI
131	Joseph	Hunt	Harvard summer school
132	Eric	Hyman	USAID
133	Adams	Idoko	HELEN KELLER INTERNATIONAL NIGERIA
134	Olawunmi	Ilesanmi	Texas A&M University
135	Beau	Ingle	The Ohio State University
136	Simin	Irani	UNICEF
137	Pierre-Andre	Jacinthe	USAID
138	Amzi	Jackson	We and Goliath
139	Hart	Jansson	Malnutrition Matters
140	Carol	Jenkins	USAID
141	Aliyu Tijani	Jibril	No Response
142	Fred C	Johnson	Liberia United Youth for Community Safety and Development LUYCSD. INC.
143	Ahmed	Kablan	USAID
144	Peter	Kathuli	Kenya agriculture and livestock research organization
145	Tom	Kayitare	rwanda conservation Initiative for sustainable development
146	Gloria	Kessler	USAID
147	Ekanath	Khatiwada	WE4F S/SE Asia regional Hub
148	Brian	Kiger	DAI
149	David	Kinyua	USAID
150	Nate	Kline	USAID

c	First Name	Last Name	Organization
151	Benjamin	Kohl	Feed the Future Innovation Lab for Collaborative Research on Sorghum and Millet (SMIL)
152	Yaya	Koloma	AfDB
153	Elmedina	Krilasevic	Palladium
154	Michael	Kunz	USAID/RFS/Center for Resilience
155	Daniela	Kwon	Michigan State University
156	Carolyn	La Jeunesse	La Jeune Consulting
157	Sophia	Lajaunie	USAID
158	Nika	Larian	USAID
159	Aaron	Larsen	USAID/BHA
160	Ellen	Levinson	Levinson & Associates
161	Jessica	Li	Palladium
162	Magda Aparecida	Lima	Embrapa - Brazilian Agricultural Research Corporation
163	Rebecca Lochmann	Lochmann	UAPB
164	Whitney	Lopez	USAID
165	Umesh Babu	M S	Institute for Social and Economic Change
166	Kefyalew	M.Kassa	Max Foundation
167	Abdelkader	Mahamane Soule	Institut National de la Recherche Agronomique du Niger (INRAN)
168	Denise	Mainville	Denise Mainville Consulting, LLC
169	Ricardo	Makuil	Independent consultant
170	Julie	March	USAID
171	Ellery	Marks	No Response
172	James	Mawanda	African Forum for International Relations in Research & Development
173	Jennifer	McCallum	SRI-2030
174	Maxwell	McGrath-Horn	Chemonics International
175	Erin	McGuire	UC Davis
176	Evey	Mengelkohc	National Council for Workforce Education
177	Loretta	Michaels	No Response
178	Hichem	Mihoub	KickStart International
179	Howard	Miller	Center for Financial Inclusion
180	Elizabeth	Mitcham	Horticulture Innovation Lab
181	Penjani	Mk	No Response
182	Lina	Mohammadi	Tetra Tech
183	Omesa	Mokaya	Clark University
184	Steve	Morin	USAID Center for Agriculture
185	Glenn	Morris	University of Florida
186	Daniel	Moss	We and Goliath
187	Nancy	Mukupu	No Response

c	First Name	Last Name	Organization
188	Shane	Mulligan	Palladium
189	Zainab	Musa Sa'eed	Planning and Budget Commission, Kaduna State - Nigeria
190	Misheck	Musokwa	Southern African Confederation Unions (SACAU)
191	Hans	Muzoora	USAID
192	Nkole	Mwamba	Savannah Zambia
193	Maria	Naldo-Fontelo	USAID
194	Walid	Nasr	Zr3i
195	Kathleen	Nay	No Response
196	Kenneth	Njagi	University of Nairobi
197	Mike	Nsuka	Wizwin Center
198	Ngozi	Ogah	Burundi missions
199	Maurice	Ogotu	USAID/Uganda
200	Ibifubara	Okoseimiema Joshua	No Response
201	Mary	Okpala	Federal Polytechnic Oko, Anambra State Nigeria
202	Olunuga	Olawale	Federal University of Agriculture Abeokuta
203	Isaiah	Oliver	Chemonics International
204	J	Olson	No Response
205	Farhana	Omara	Ministry of public health
206	Simeon	Onya	Michael Okpara University of Agriculture
207	Kristin	O'Planick	USAID
208	Joseph	Orenuga	Praiseland schools
209	Saadatou	Oumarou	USAID
210	Rachel	Owen	Agronomy, Crops, and Soil Science Societies of America
211	Femi	Oyebode	Rural And Urban Aid For Youth Development Initiatives
212	Katie	Paguaga	Palladium
213	Nicholas	Panasik	Clafin University
214	Jen	Peterson	Tetra tech
215	Gilbert	Phiri	International Federation of Red Cross Red Crescent
216	Kara	Reeve	USAID
217	Alicia	Robinson-Farmer	University of Arkansas at Pine Bluff
218	Deborah	Rubin	Cultural Practice, LLC
219	Samantha	Rubin-Pope	Palladium
220	Chris	Rue	No Response
221	Alfredo	Rueda	UMH
222	Diane	Russell	USAID

c	First Name	Last Name	Organization
223	Alex	Russell	Feed the Future Innovation Lab for Markets, Risk & Resilience
224	Arouna	Sadji Boukari	Ministère du Développement et de la Coordination de l'action gouvernementale
225	Stella	Salvo	Bayer Crop Science
226	Oumarou	Samna	University
227	Camilo	Sanchez	ofi
228	Arie	Sanders	EAP Zamorano
229	Faridah	Sanni	No Response
230	Hector	Santos	USAID
231	Laura	Schmitt Olabisi	Michigan State University
232	Sophie	Schrader	Training Resources Group, Inc.
233	Erica	Scott	USAID
234	Noor	Seddiq	Howard University
235	Kelly	Sheridan	U.S. Dairy Export Council
236	Mohammad	Shibly	USAID/Bangladesh
237	Olivia	Shoemaker	FFAR
238	Aalaa Ullaah	Sida	Ain shams University
239	Jules	Siedenburg	University of East Anglia
240	R. Darrell	Smith	USAID
241	Amit	Smotrich	USAID
242	Nik	Steinberg	Chemonics International
243	Costanza	Strinati	No Response
244	Ghazala	Syed	USAID
245	Faith	Tarr	USAID
246	Bill	Thomas	USAID/RFS
247	Kelsey	Torres	USAID Advancing Nutrition
248	Kazuto	Tsuji	saitama university
249	Craig	Updyke	ASTM International
250	Norman	Uphoff	Cornell University
251	Surajo	Usaini Rimi	No Response
252	Collin	VanBuren	USAID
253	Tim	Vandervoet	USAID
254	Jean Michel	Voisard	Chemonics International
255	August	Wagner	NCBA CLUSA
256	Carl	Wahl	BHA
257	Amtul	Waris	Indian institute of rice research
258	Laura	Wilkinson	USAID
259	Carol	Wilson	USAID/RFS
260	Huawei	Y6II	FTRI
261	Becatien	Yao	USAID

c	First Name	Last Name	Organization
262	Naziyo	Yeeko	Agric farm organization
263	Comfort	Yelipoie	Ministry of Food and Agriculture
264	Waliou	Yessoufou	No Response
265	Byamungu	Zabuloni	University of KwaZulu-Natal
266	Ayah Talal	Zaidalkilani	University of Petra
267	Steven	Zuiss	Koch
268	9842861b		Botswana Farmers Association (BOFA)
269	Vincent		No Response
Secretariat and Support Team			
270	Mary	Beggs	Tetra Tech, BIFAD Support Team
271	Clara	Cohen	USAID, Bureau of Resilience and Food Security
272	Carol	Chan	Tetra Tech, BIFAD Support Team
273	Tommy	Crocker	Tetra Tech, BIFAD Support Team

ANNEX 3: PUBLIC COMMENT AND MATERIALS PROVIDED TO THE BOARD

No.	First Name	Last Name	Organization	Date
1	Jean	Public	N/A	10/4/22
Submitted Email:				
<p>“Get the united nations out of usa affairs. It will not be good for America to take directions from the directions from the criminally corrupt un. This comment is for the public record.”</p>				
2	Martin	Fisher	KickStart-International	10/10/22
Submitted Email:				
<p>“As advised during the last 187th Public Meeting hosted by the Board for International Food and Agricultural Development (BIFAD), I would like to comment on your report's preliminary findings and recommendations compiled under the working Paper: Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems.</p> <p>I would like to submit additional evidence to inform this work, particularly around the topic of small-scale irrigation. I, and many others, firmly believe that small-scale, smallholder 'farmer-led' irrigation should be a central piece of USAID's program design and targets for climate change adaptation if we want to achieve transformative, systemic long-lasting change for the agriculture, food, and nutrition sectors in Sub-Sahara Africa.</p> <p>To that end, I prepared 2 documents that you can find attached:</p> <ul style="list-style-type: none"> • The first is a list of, and links to, multiple publications and reports from academic researchers and others describing RCTs and other studies on the links between the introduction of small-scale irrigation and climate change adaptation by smallholders in sub-Saharan Africa—with a focus on the impacts on food security, nutrition, health, stunting, farm incomes, resilience and the empowerment of women, and on the potential for large-scale adoption. • The second is a summary of results from external and internal impact studies on the impacts of low-cost, small-scale, "MoneyMaker" branded, irrigation pumps designed and widely promoted across sub-Saharan Africa (over 380,000 pumps used to date) by KickStart-International www.kickstart.org —an organization I co-founded back in 2020. <p>I'd be happy to get on a call and talk about these issues—just let me know—and I'm hoping that you'll give your earnest consideration to this matter.”</p> <p>Attached Information:</p> <p>Jean Kamwamba-Mtethiwa, Keith Weatherhead and Jerry Knox. Assessing performance of small-scale pumped irrigation systems in Sub-Saharan Africa: evidence from a systematic review. Volume 65, Issue 3, July 2016, pp308–318 https://dspace.lib.cranfield.ac.uk/handle/1826/11570</p>				

No.	First Name	Last Name	Organization	Date
<ul style="list-style-type: none"> <li data-bbox="228 275 1373 411">· The case for distributed irrigation as a development priority in sub-Saharan Africa, Jennifer A. Burney, Rosamond L. Naylor, and Sandra L. Postel. Edited by Pedro A. Sanchez, Columbia University, Palisades, NY, and approved June 3, 2013 (received for review July 6, 2012), https://doi.org/10.1073/pnas.120359711 <li data-bbox="282 459 1365 558">· Dyer, Julian and Shapiro, Jeremy, Pumps, Prosperity and Household Power: Experimental Evidence on Irrigation Pumps and Smallholder Farmers in Kenya, 2022. Available at SSRN: https://ssrn.com/abstract=4049473 or http://dx.doi.org/10.2139/ssrn.4049473. <li data-bbox="272 611 1325 674" style="padding-left: 40px;"> PowerPoint Presentation about the Publication: http://individual.utoronto.ca/julian_dyer/DyerShapiro_KS_RCT_Slides.pdf · FAO, Zambia <li data-bbox="363 716 1230 747" style="padding-left: 80px;"> Irrigation Market Brief, 2014, https://www.fao.org/3/i4157e/i4157e.pdf <li data-bbox="228 800 1373 999">· Hambulo Ngoma, Byman Hamududu, Peter Hangoma, Paul Samboko, Munguzwe Hichaambwa, Chance Kabaghe, 2019. Irrigation Development for Climate Resilience in Zambia: The Known Knowns and Known Unknowns. Feed the Future Innovation Lab for Food Security Policy Research Paper 144. East Lansing: Michigan State University. https://www.canr.msu.edu/resources/irrigation-development-for-climate-resilience-in-zambia-the-known-knowns-and-known-unknowns <li data-bbox="282 1052 1349 1115" style="padding-left: 40px;">· Bryan, Elizabeth; Chase, Claire; and Schulte, Mik. 2019. Nutrition-sensitive irrigation and water management. Washington, DC: World Bank. http://hdl.handle.net/10986/32309 <li data-bbox="228 1167 1333 1262">· Chafuwa, Chiyembekezo. 2017. Priorities for irrigation investment in Malawi. MaSSP Policy Note 28. Washington, D.C: International Food Policy Research Institute (IFPRI). http://ebrary.ifpri.org/cdm/ref/collection/p15738coll2/id/131376 <li data-bbox="228 1314 1300 1451">· Julius H. Mangisoni (2008), Impact of treadle pump irrigation technology on smallholder poverty and food security in Malawi: a case study of Blantyre and Mchinji districts, International Journal of Agricultural Sustainability, 6:4, 248-266, DOI: 10.3763/ijas.2008.0306 <li data-bbox="228 1461 1390 1556">· Regional analysis of treadle pumps: Potential for expansion in Sub-Saharan Africa, AGWATER SOLUTIONS, 2012 https://www.ifpri.org/publication/regional-analysis-treadle-pumps-potential-expansion-sub-saharan-africa <li data-bbox="228 1608 1390 1808">· Water for wealth and food security: supporting farmer-driven investments in agricultural water management, 2012, by Meredith Giordano ; Charlotte de Fraiture ; Elizabeth Weight ; Julie van der Bliet ; Food and Agriculture Organization (Rome, Italia) ; International Food Policy Research Institute ; International Water Management Institute ; Stockholm Environment Institute http://www.iwmi.cgiar.org/Publications/Other/Reports/PDF/Water_for_wealth_and_food_security.pdf 				

No.	First Name	Last Name	Organization	Date
				<ul style="list-style-type: none"> · Xie, Hua; You, Liangzhi; Wielgosz, Benjamin; and Ringler, Claudia. 2014. Estimating the potential for expanding smallholder irrigation in Sub-Saharan Africa. <i>Agricultural Water Management</i> 131(1): 183-193. http://dx.doi.org/10.1016/j.agwat.2013.08.011 · Lisa M Butler, Shiva Bhandari, Phelgona Otieno, Sheri D Weiser, Craig R Cohen, Edward A Frongillo, Agricultural and Finance Intervention Increased Dietary Intake and Weight of Children Living in HIV-Affected Households in Western Kenya, <i>Current Developments in Nutrition</i>, Volume 4, Issue 2, February 2020, nzaa003, https://doi.org/10.1093/cdn/nzaa003 · McDonough A, Weiser SD, Daniel A, Weke E, Wekesa P, Burger R, Sheira L, Bukusi EA, Cohen CR. "When I Eat Well, I Will Be Healthy, and the Child Will Also Be Healthy": Maternal Nutrition among HIV-Infected Women Enrolled in a Livelihood Intervention in Western Kenya. <i>Curr Dev Nutr.</i> 2020 Mar 13;4(4):nzaa032. doi: https://academic.oup.com/cdn/article/4/4/nzaa032/5804722 · Weiser SD, Bukusi EA, Steinfeld RL, Frongillo EA, Weke E, Dworkin SL, Pusateri K, Shiboski S, Scow K, Butler LM, Cohen CR. Shamba Maisha: randomized controlled trial of an agricultural and finance intervention to improve HIV health outcomes. <i>AIDS.</i> 2015, https://www.ncbi.nlm.nih.gov/pmc/articles/PMC4573846/ · Domenech, Laia. (2015). Improving irrigation access to combat food insecurity and undernutrition: A review. <i>Global Food Security.</i> 6. 24-33. 10.1016/j.gfs.2015.09.001. https://www.researchgate.net/publication/282400419_Improving_irrigation_access_to_combat_food_insecurity_and_undernutrition_A_review · Fighting malnutrition with irrigation, Feed the Future, Innovation Lab For Small Scale Irrigation, 2019 https://ilssi.tamu.edu/2019/12/09/fighting-malnutrition-with-irrigation/ · Dennis Wichelns, Investing in small, private irrigation to increase production and enhance livelihoods, <i>Agricultural Water Management</i>, Volume 131, 2014, Pages 163- 166, https://doi.org/10.1016/j.agwat.2013.09.003 · Yihun Dile, Texas A&M University, Feed the Future, Innovation Lab For Small Scale Irrigation, Stakeholder Consultation - International Livestock Research Institute, Addis Ababa - 24th May 2018, Potential for upscaling small scale irrigation, https://ilssi.tamu.edu/files/2019/10/presentations-for-potentials-for-upscaling-gaps-constraints-ethiopia.pdf <p>Shamba Maisha – A large scale RCT led by UCSF Medical School – to measure the impacts of small-scale irrigation on farmers living with HIV in Western Kenya. Human powered 'MoneyMaker' irrigation pumps, inputs and 'agropreneurship' training were provided to HIV positive families (2016-21).</p> <p>Publications of Shamba Maisha, multisectoral studies which aims to improve the lives of farmers living in HIV-affected communities, University of California San</p>

No.	First Name	Last Name	Organization	Date
Francisco, https://shambamaisha.ucsf.edu/resources/publications				
<u>New Paper Submitted for Publication in October '22 – expected publication in Dec. '22:</u>				
Effect of a Multisectoral Agricultural Intervention to Improve HIV Health Outcomes in Kenya: The <i>Shamba Maisha</i> Cluster Randomized Controlled Trial , Shamba Maisha, University of California San Francisco				
<ul style="list-style-type: none"> · Authors: Craig R. Cohen MD¹, Elly Weke MS², Edward A. Frongillo PhD³, Lila A. Sheira MPH⁴, Rachel Burger MPH¹, Adrienne Rain Mocello MPH¹, Pauline Wekesa², Martin Fisher PhD⁵, Kate Scow PhD⁶, Harsha Thirumurthy PhD⁷, Shari L. Dworkin PhD⁸, Starley B. Shade PhD⁹, Lisa M. Butler PhD¹⁰, Elizabeth A. Bukusi PhD^{1,2}, Sheri D. Weiser MD⁴ 				
Intervention:				
<i>The intervention consisted of a loan to purchase a human-powered irrigation pump, fertilizer, seeds and pesticides, combined with the provision of training in sustainable agriculture and financial literacy.</i>				
Results:				
<i>We enrolled 366 and 354 participants in the intervention and control arms, respectively. Retention was 94.0% at the 24-month visit. HIV viral suppression improved in both arms from baseline to endline: intervention 87.9% to 96.2% and control 82.4% to 94.3% (p=0.86). Food insecurity decreased more in the intervention than the control arm (difference in linear trend = -3.54, 95% confidence interval (CI): -4.16 to -2.92). Proportions of those with depression over the 24-month follow-up period declined more in the intervention arm (46.3% to 10.5%) than control arm (29.9% to 12.3%); (difference in trend = -0.83, 95% CI: -1.45 to -0.20). Self-confidence improved more in the intervention than control arm (difference in trend = -0.37; 95% CI: -0.59 to -0.15; p=0.001) as did social support (difference in trend = -3.63; 95% CI: -4.30 to -2.95; p<0.001).</i>				
Additional Preliminary Results: Yet to be published, data and analysis from the same Shamba Maisha Large Scale RCT:				
<ul style="list-style-type: none"> · Dr Lisa Butler, Institute for Collaboration on Health, Intervention and Policy (InCHIP), University of Connecticut, examined the impacts of the intervention on the growth of children in the households using the irrigation pumps <ul style="list-style-type: none"> o Children in the households of between 6 & 24 months in Treatment & Control Groups were followed for 2 years o Children in households with irrigation pumps grew by on average 1.18cm more in height/length than similar aged children in families w/out pumps (p= 0.004) 				

No.	First Name	Last Name	Organization	Date																																
<p>Table X: Somatic growth differences between intervention and control groups across 24 months of follow-up on anthropometric outcomes for children ages 6 to <24 months</p> <p>Outcome Intervention</p> <table border="1"> <thead> <tr> <th></th> <th>trend (P value)</th> <th>Control trend (P value)</th> <th>Difference trend (P-value)</th> </tr> </thead> <tbody> <tr> <td>Height (in cm)</td> <td>5.28 (<.0001)</td> <td>4.10 (<.0001)</td> <td>1.18 (0.004)</td> </tr> <tr> <td>Height-for-age z-score</td> <td>-0.055 (0.61)</td> <td>-0.45 (<0.001)</td> <td>0.390 (0.007)</td> </tr> <tr> <td>Weight (in Kg)</td> <td>1.05 (0.002)</td> <td>1.17 (0.0004)</td> <td>-0.130 (0.299)</td> </tr> <tr> <td>Weight-for-age z-score</td> <td></td> <td>-0.216 (0.002) - 0.117 (0.052)</td> <td>-0.099 (0.279)</td> </tr> <tr> <td>Weight-for-length/ height z-score</td> <td>-0.172 (0.105)</td> <td>0.245 (0.009)</td> <td>-0.418 (0.003)</td> </tr> <tr> <td>BMI</td> <td>-0.508 (0.198)</td> <td>0.195 (0.614)</td> <td>-0.703 (0.001)</td> </tr> <tr> <td>BMI-for-age z-score</td> <td>-0.192 (0.107)</td> <td>0.271 (0.010)</td> <td>-0.463 (0.004)</td> </tr> </tbody> </table>						trend (P value)	Control trend (P value)	Difference trend (P-value)	Height (in cm)	5.28 (<.0001)	4.10 (<.0001)	1.18 (0.004)	Height-for-age z-score	-0.055 (0.61)	-0.45 (<0.001)	0.390 (0.007)	Weight (in Kg)	1.05 (0.002)	1.17 (0.0004)	-0.130 (0.299)	Weight-for-age z-score		-0.216 (0.002) - 0.117 (0.052)	-0.099 (0.279)	Weight-for-length/ height z-score	-0.172 (0.105)	0.245 (0.009)	-0.418 (0.003)	BMI	-0.508 (0.198)	0.195 (0.614)	-0.703 (0.001)	BMI-for-age z-score	-0.192 (0.107)	0.271 (0.010)	-0.463 (0.004)
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3	Rattan	Lal	BIFAD; The Ohio State University	10/19/22																																
<p>Submitted Email:</p> <p>“I thank you for sharing the working paper, <i>Systemic Solutions for Climate Change Adaptation and Mitigation in Agriculture, Nutrition, and Food Systems</i>.</p> <p>I regret the delay in my response.</p> <p>First of all, I thank you all for appointing a subcommittee, which comprises high class professionals from diverse backgrounds. They all have worked very hard.</p> <p>The report is very comprehensive and thorough. It will be widely used. It contains all the good things that you expect from such a report.</p>																																				

No.	First Name	Last Name	Organization	Date
<p>Yet, I must admit that I wanted something more, unusual, different, pathbreaking, out of the box, than the normal reports are. But it is a normal report. There is nothing wrong with it, but it is not a Wow Report.</p>				
<p>I provide you some points why I reached this conclusion:</p>				
<ol style="list-style-type: none"> 1. Title and contents of the report do not match: pages 18-36 are focused on “Adaptation and Mitigation”. If that is the focus of the report why not put that in the title. 2. The Financial section is focused on Markets. If that is the focus why not put that also in the title. 				
<p>The title should tell the reader what to expect. From the title, I did not get what I expected.</p>				
<ol style="list-style-type: none"> 3. I am surprised that “payments for ecosystem services” as an alternate approach to marked is not given any emphasis. I say that because let us go back to the “false start of the financial market” approach of “CCX” started in 1999-2000 and it collapsed in 2005-2006 at the peak price of \$4 pre credit. There was a lot of supply (from forest, agricultural land, etc.) but no demand because there was no cap on burning fossil fuel. Thus, the Financial Market collapsed. 				
<p>Unfortunately nothing has changed since then, and nothing will change in the near future. Thus, alternatives to financial market (n payments for ecosystem services) must be discussed, without confusing it with subsidies.</p>				
<ol style="list-style-type: none"> 4. COP27 is the focus of the report. However, what key statements must go into COP27 to ensure that “Agriculture and Forestry are Solutions” does not come out specifically in the report. There should be a section on COP27. 				
<ol style="list-style-type: none"> 5. Figure C on page 12 is the key figure. It should form the basis of discussion as follows: 				
<ol style="list-style-type: none"> a. In the Figure Legend add the total global emissions as Pg CO2 equivalent. The data on percentages for different sectors are not good enough to stand alone. 				
<ol style="list-style-type: none"> b. There should be a corresponding table in the Discussion which should outline options to reduce emission (and sequester carbon) where possible for each sector given in this pie chart along with supporting reference. 				
<p>This section should be expanded and should form the key focus of what should and should not be done.</p>				
<ol style="list-style-type: none"> 6. Page 18: Bullets on page 18 leaves out very important issues. 				
<ol style="list-style-type: none"> a. For example, key sources of energy use (and emission in agriculture are: water use in agriculture (which is 70% of all water withdraw by humanity). Thus, saving water is the key strategy along with water harvesting, soil storage and conservation. 				
<ol style="list-style-type: none"> b. Pesticides have a large carbon footprint. IPM should focus so that use of pesticides can be minimized. 				
<ol style="list-style-type: none"> c. Fertilizer use: Nitrogen use has a very high carbon footprint and low efficiency. Thus, INM and biofertilizers should be focused 				
<ol style="list-style-type: none"> d. Soil Health: This section should be enlarged and made a central point of the report. 				

No.	First Name	Last Name	Organization	Date
<p>e. Erosion of soil from agroecosystems is a major problem and it affects global warming and vice versa. This subject cannot be treated lightly.</p> <p>f. Global drylands are increasing from 41-42% of the world land to 50% by 2100. Managing global drylands is a key to sequestration of inorganic carbon in soil.</p> <p>I would prefer to have a discussion with the leaders of the Subcommittee.”</p>				
<p>Submitted References:</p> <ul style="list-style-type: none"> ● Lal R. <i>Soil carbon sequestration impacts on global climate change and food security</i>. Science. 2004 Jun 11;304(5677):1623-7. doi: 10.1126/science.1097396. PMID: 15192216. ● Lal R. <i>Feeding the world and returning half of the agricultural land back to nature</i>. Journal of Soil and Water Conservation July 2021, 76 (4) 75A-78A; DOI: https://doi.org/10.2489/jswc.2021.0607A ● Lal et al. <i>The carbon sequestration potential of terrestrial ecosystems</i>. Journal of Soil and Water Conservation. 73(6):145-152. DOI: 10.2489/jswc.73.6.145A ● Lal R. <i>Digging deeper: A holistic perspective of factors affecting soil organic carbon sequestration in agroecosystems</i>. Glob Chang Biol. 2018 Aug;24(8):3285-3301. doi: 10.1111/gcb.14054. Epub 2018 Mar 25. PMID: 29341449. ● Lal R. <i>Societal value of soil carbon</i>. Journal of Soil and Water Conservation November 2014, 69 (6) 186A-192A; DOI: https://doi.org/10.2489/jswc.69.6.186A 				
4	Hart	Jannsson	Malnutrition Matters	10/25/22
<p>Submitted Email:</p> <p>“Some input to consider for your paper:</p> <p>One of the key objectives is to empower women to make decisions; this empowerment will require more than access to VSLAs – it often requires access to livelihoods and/or the means to generate livelihoods. A key problem is the methane emission from livestock. I understand that livestock can be made to lower emission somewhat, but I would suggest the more effective strategy (and tactics) would be to encourage and make available more nutrient-dense plant-based foods, such as locally made soymilk. This approach would have significant positive climate impacts, would benefit poor consumers because they could afford more protein and would benefit women economically because they could profitably sell the soymilk in their neighbourhoods.</p> <p>I have attached a SoyaKit Concept Note (describing a project requiring only \$68,000 in funding) as an example, and a paper on a climate-smart approach to nutrition which details one concrete manner to both empower women, improve nutrition and benefit the climate. This approach is currently saving over 100 tons of carbon emissions <u>per month</u> in Malawi, with 5,000 women entrepreneurs there, making 600,000 liters of soymilk per month, the equivalent protein of 3M eggs per month. It is also providing twice as much whole protein to poor consumers as animal-based protein for the same price.</p>				

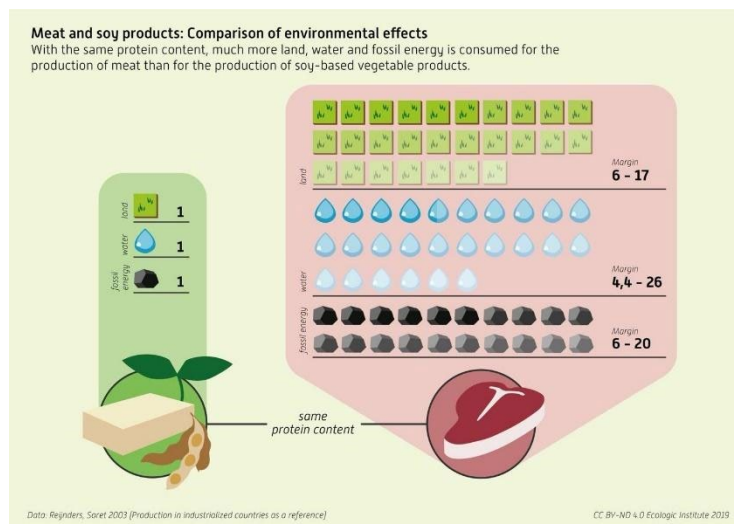
No.	First Name	Last Name	Organization	Date
<p>I think these policy initiatives sometimes get lost in the clouds – please consider how your paper could help scale such initiatives as described above, which is achieving a number of the policy goals you have spelled out, without any explicit change in policies!”</p> <p>Attached Paper:</p> <p>“Climate-smart approach to affordable, nutrient-dense foods: the SoyaKit and SoyCow</p> <p>Malnutrition Matters has been deploying woman-empowering and rural-appropriate food technology solutions since 2000. These micro-enterprise-based approaches enable hyper-local processing of soy foods with a financially self-sufficient approach; the result is affordable and sustainable protein-rich foods accessible to communities with higher rates of malnutrition.</p> <p>The SoyaKit (Malnutrition Matters copyrighted term for the appropriate technology that it has designed and distributes) has been documented in the journal <i>Food and Nutrition</i> as an appropriate technology for rural settings that enables women entrepreneurs to earn a reasonable profit, such that they can repay the cost of the equipment and operate a long-term sustainable businessⁱ. Overview information here for the SoyaKit and the SoyCow, and a SoyaKit Concept Note and a SoyaKit Video. Retail prices of the soy foods produced, on a per-gram-of-protein basis, are typically 50% less than those of dairy foods, eggs or other animal-based proteins. Cultivation of soy produces twice as much protein per acre than any other major vegetable or grain crop, and 5 to 15 times more protein per acre than land set aside for dairy or meat productionⁱⁱ. The World Health Organization states that soy protein is the only plant-based protein that has an amino-acid profile equivalent to that of dairy, meat and eggsⁱⁱⁱ; the US FDA endorses the quality of soy protein^{iv}.</p> <p>The hyper-local soya processing approaches are also climate-smart in that they use 5% to 7% of the fossil fuel energy compared to dairy milk production for example^v, and 12% of the water required for meat production^{vi}, before even accounting for the methane emissions of dairy cows or beef cattle. This means that dairy milk or meat production can result in 15 or more times the GHG emissions required for production of soyfoods, before accounting for ruminants’ methane production. The studies quoted compare production in industrialized countries – they do not account for additional GHG reductions associated with the SoyaKit. The SoyaKit uses a heat-retention cooking bag, reducing fuel required for cooking by 50%, further reducing GHG emissions from these comparatively low levels^{vii}. Similarly, when compared to eggs, soymilk production results in only 25% of GHG emissions^{viii}.</p> <p>Production of soyfoods, compared to production of animal-based proteins including dairy products, eggs and meat, results in these significant savings, which directly and indirectly mitigate climate change:</p> <p>Energy savings, directly reducing GHG emissions</p> <ul style="list-style-type: none"> ● Water saving ● Land saving 				

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- Zero waste
- Saving of methane emissions from ruminants, pigs and poultry
- Reduced use of fertilizer due to nitrogen-fixing property of soybean cultivation.

The figure on the next page illustrates the substantial difference in resources required for soyfood production vs animal protein^{ix}.

Cultivation of soybeans, as part of a crop rotation, also facilitates regenerative agriculture by naturally improving soil health, enabling production of high quality, nutrient dense food, and ultimately leading to productive farms and healthy communities and economies. By saving land otherwise used in the inefficient production of animal-based proteins, the further deforestation required to support animal protein production can be prevented. When used as a rotation crop, soybean can lower the fertilizer requirement for a complementary crop such as maize. Soybean, as is true for other legumes, fixes nitrogen in the soil, which is available to be absorbed by a rotation crop in the next season.



Production of soyfoods using the SoyaKit or SoyCow results in output of various foods (soymilk, yoghurt, tofu, sour milk, puddings, ice cream etc) and a fibrous by-product, okara. The okara is cooked, and contains some protein and is usable for human consumption or for animal feed. It can be used in soups, bread, deep-fried snacks or biscuits. It can also be sold directly for animal feed for cows, goats, chickens or pigs. Therefore, the entire soybean is consumed – no waste remains, as opposed to meat production where up to 1/3 of the animal weight is not consumable.

The energy savings associated with soybean cultivation and direct human consumption of soyfoods is quite substantial; these energy savings are directly associated with a reduction in GHG emissions. When measured on a ‘global biomass’ basis, direct human consumption of soyfoods is 30x more energy efficient than animal protein production^x.

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One of the main reasons for the vastly greater amounts of GHG emissions in animal-based protein production is the Feed Conversion Ratio^{xi}. This measures the ratio of calories and protein fed to animals to the live weight or edible weight produced. The ratio of protein production for various edible weights is shown here:

Feed Conversion Inefficiencies			
	Chicken	Pork	Beef
Feed conversion (feed/live weight)	2.5	5	10
Feed conversion (feed/edible weight)	4.5	9.4	25
Protein content (% of edible weight)	20	14	15
Protein conversion efficiency (5%)	20	10	4

Source: Vaclav Smil, 2008. *Eating meat: Evolution, Patterns and Consequences*

This shows us that the protein conversion ratio for chickens per unit of feed is 20 (i.e., 100 units of feed produces 20 units of edible protein), and is worse for pork (ratio of 10) and even worse for beef (ratio of 4).

Currently 62% of land under cultivation is used to support animal protein production^{xii}; using a feed conversion ratio of about 12 (between 4 and 20), these lands produce only 5% of calories and 10% of protein than the same amount of land used for plant-based food.

The USAID-funded AgDiv project in Malawi, with assistance from Malnutrition Matters, currently has over 5,000 women entrepreneurs locally producing and selling soymilk and yoghurt in their neighbourhoods. Current production is over 600,000 liters per month, or about 3.5M servings (protein equivalent to one egg). **Estimated GHG savings using figures in the above references are 110 metric tons of CO₂ equivalent per month.** This estimate assumes:

- Average family income in rural communities in Malawi is \$35 /month; estimated money available for protein-rich food is \$0.15 per day (3 servings of soy milk or 1.5 eggs)

No.	First Name	Last Name	Organization	Date
<ul style="list-style-type: none"> • Most affordable local protein is eggs, as dairy is rarely available/accessible • Twice as much soymilk would be consumed as eggs would have been given the deficiency of protein in most diets (and therefore losing half of the potential GHG savings) • GHG emissions of 150g per egg vs 37g per serving of soymilk, means 37g of GHGs saved per serving of soymilk (about 30 servings per kg of GHGs saved) • Savings may be higher as the 50% fuel savings realized by the use of the heat-retention cooking bag are not included. 				
References:				
<p>i) Chungmann Kim, BS, Peter Goldsmith, PhD, The Economics of the Soy Kit as an Appropriate Household Technology for Food Entrepreneurs, Food and Nutrition, April 21, 2021</p>				
<p>Article link with preface from Malnutrition Matters: https://www.dropbox.com/s/m7s3bgveb07er/SoyaKit%20Journal%20Article.pdf?dl=0</p>				
<p>ii) National Soy Research Laboratory, U. of Illinois, <i>All About Soy</i>, Nov 20, 2015</p>				
<p>https://web.archive.org/web/20151120072618/http://nsrl.illinois.edu/content/benefits-soy</p> <p>Soybeans can produce at least twice as much protein per acre than any other major vegetable or grain crop, 5 to 10 times more protein per acre than land set aside for grazing animals to make milk, and up to 15 times more protein per acre than land set aside for meat production.</p>				
<p>iii) Protein Quality Evaluation: Report of the Joint FAO/WHO Expert Consultation, Bethesda, Md., USA 4-8 December 1989</p>				
<p>https://books.google.com/books?hl=en&lr=&id=ieEEPqffcxEC&oi=fnd&pg=PA1&ots=lvCFOavYEh&sig=T7dQSQ3ouvfkSQtIJDiuuRRQPEM#v=onepage&q&f=false</p>				
<p>iv) Henkel J. , Soy health claims for soy protein, questions about other components. <i>FDA Consum.</i> 2000;34(3):13-15.</p>				
<p>v) Friedlander, J., Soy versus dairy: what’s the footprint of milk? <i>The Conversation</i>, August 27, 2012</p> <p>https://theconversation.com/soy-versus-dairy-whats-the-footprint-of-milk-8498</p>				

No.	First Name	Last Name	Organization	Date
			Cornell University scientist, David Pimentel, <u>has found</u> it takes about 14 kilo-calories (kcal) of fossil-fuel energy to produce 1kcal of milk protein using conventional milk production. Organically produced milk might require a little less than 10kcal of fossil-fuel energy per kcal. In comparison, Pimentel’s data suggests that in a conventional soybean production system, one kcal of fossil energy invested produces about 3.2kcal of soybean. For 1kcal of fossil energy invested in <i>organic</i> soybean production, you get an average of 3.8kcal of soybeans. This means it takes between .26 and .31kcal of fossil fuel to make 1kcal of soybeans (contrasted with 10-14kcal to make 1kcal of dairy milk protein). Pimentel states that soy protein accounts for about 35% of those kilocalories, so making soy protein is 15x more energy-efficient than dairy protein.	
vi)			The Food Transformation, Harnessing consumer power to create a fair food future, OXFAM International, July 2012 https://oi-files-d8-prod.s3.eu-west-2.amazonaws.com/s3fs-public/file_attachments/food-transformation-grow-report-july2012_4.pdf pages 22, 39 for references regarding water use of soy vs meat Cultivation / harvesting of 500g soybeans uses 818 liters of water Production of 500g beef uses 6800 liters of water P 40 shows how much methane a cow produces	
vii)			SoyaKit© : Home Business in a Box, Malnutrition Matters, May 2017 https://www.dropbox.com/s/9ehx1t5fb0ugsxu/Soya%20Kit%20overview%2001-21.pdf?dl=0	
viii)			Carlsson-Kanyama, A., González, A. D., Potential contributions of food consumption patterns to climate change, <i>The American Journal of Clinical Nutrition</i> , Volume 89, Issue 5, May 2009, Pages 1704S–1709S, https://doi.org/10.3945/ajcn.2009.26736AA Published:01 April 2009 TABLE 3 Carbon dioxide, methane, and nitrous oxide emissions from farm to table for 22 items commonly consumed in Sweden This table showed .92kg of Co2 emissions per kg of cooked soybean vs 2.5 for eggs, 4.3 for chicken, 9.3 for pork and 30 for beef. However, the soybeans were shipped from Nebraska	

No.	First Name	Last Name	Organization	Date
<p>and the meat products were all local. The shipping contributed .32kg of CO2 (1/3 of total). When we subtract that we see that the factor for increased GHGs is:</p>				
<p>4x for eggs 7x for chicken 15x for pork 50x for beef</p>				
<p>ix) Reijnders, Soret, 2003; copied by Ecologic Institute 2019</p> <p>https://www.ecologic.eu/16618</p>				
<p>x) Changing global diets is vital to reducing climate change, <u>University of Cambridge</u>, Aug 31, 2014</p> <p>https://phys.org/news/2014-08-global-diets-vital-climate.html</p> <p>“The average efficiency of livestock converting plant feed to meat is less than 3%, and as we eat more meat, more arable cultivation is turned over to producing feedstock for animals that provide meat for humans. The losses at each stage are large, and as humans globally eat more and more meat, conversion from plants to food becomes less and less efficient, driving agricultural expansion and land cover conversion, and releasing more greenhouse gases. “</p>				
<p>xi) Feed-to-Meat Conversion Inefficiency Ratios, A Well-Fed World Foundation, 2022</p> <p>https://awellfedworld.org/feed-ratios/</p>				
<p>FCR Mainstream Examples</p> <p>Live Weight</p> <ul style="list-style-type: none"> ● 6:1 – beef cows – Beef Magazine (industry) ● 6:1 – beef cows, 3.4:1 – pigs, 2:1 – poultry – Noble Foundation (industry) ● 7:1 – beef cows, 4:1 – pigs, 2-1 – chickens – Brown (advocate) ● 8-12:1 – beef cows, 5-6.5:1 – pigs, 2-2.5:1 – chickens – Smil (p.157) via Cassidy (p.6) <p>Edible Weight (more accurate)</p> <ul style="list-style-type: none"> ● 16:1 – beef cows – Lappe (Diet for a Small Planet, 1991, p.69) – (frequently-cited advocate) ● 25:1 – beef cows, ● 9.4:1 – pigs, ● 4.5:1 – chickens ● – Smil (EM/2008 via UKY) (researcher) 				

No.	First Name	Last Name	Organization	Date
<p data-bbox="302 296 620 323">More Comprehensive FCRs</p> <p data-bbox="302 338 941 365">Percent/Units of Edible Output per 100 Units of Feed</p> <ul data-bbox="350 396 889 495" style="list-style-type: none"> ● Poultry – Calories – 11% – Protein 20% ● Pigs – Calories – 10% – Protein 15% ● Cows/Beef – Calories – 1% – Protein – 4% <p data-bbox="302 512 1419 611"><i>Source: World Resources Institute (w/UN & WB): Creating a Sustainable Food Future, p.37</i> New, more comprehensive methods show that even the high-end of commonly cited FCRs are highly conservative.</p> <p data-bbox="204 659 1398 758">xii) Uwe R. Fritsche, Ulrike Eppler, Leire Iriarte, Sabine Laaks (International Institute for Sustainability Analysis and Strategy (IINAS)), Resource-Efficient Land Use – Towards a Global Land Use Standard (Globalands), <i>Umweltbundesamt</i> (Germany), October, 2015</p> <p data-bbox="302 827 1406 890">https://www.umweltbundesamt.de/sites/default/files/medien/378/publikationen/texte_82_2015_resource_efficient_land_use.pdf</p> <p data-bbox="302 957 1419 1094">Page 19 shows that (footnotes 7 and 8) many more times of water and energy are required for animal-based foods. 62% of land use is for animals... using a feed conversion ratio of about 12 (between 5 and 20), this 62% of land produces about 5% of calories and 10% of protein than the same amount of land used for plant-based food.”</p> <p data-bbox="204 1152 492 1180">Attached Concept Note:</p> <p data-bbox="506 1201 1068 1228" style="text-align: center;">“Concept Note – Rural Women Selling Soymilk</p> <p data-bbox="597 1260 1036 1323" style="text-align: center;">Reducing Malnutrition through Economic Empowerment of Women</p> <p data-bbox="204 1346 367 1373">Introduction:</p> <p data-bbox="204 1381 1419 1801">This Concept Note describes a project where the Rotary Club of Tamale, in conjunction with Malnutrition Matters and with Urbanet, an experienced NGO registered in Ghana, would provide affordable nutritious food, on an indefinite, sustainable basis to 8,000 beneficiaries on a daily basis, and provide well-paying self-employment opportunities (\$3 per day or more) to at least 100 women. This hyper-local availability of affordable nutrient-dense food is critical in solving chronic malnutrition. Implementation would be relatively rapid, where more than half of the beneficiaries / entrepreneurs would be impacted within 6 months of project start. The project is designed in the context of previous successful implementations in Kenya, Ghana, DR Congo and Malawi (the latter with an initial deployment of 230 SoyaKits, now over 5,000 and the topic of the Malawi SoyaKit Case Study). A <i>COVID-19 Hygiene Practices Guide</i> describing best practices for food-based retail entrepreneurs to minimize transmission risk, is available. A video, with commentary from the women entrepreneurs and various experts is available here: https://www.youtube.com/watch?v=NnOtIJ-U6KQ .</p> <p data-bbox="204 1866 367 1894">The Concept:</p>				

No.	First Name	Last Name	Organization	Date
<p>The proposed project will support 100 women in establishing a home-based soy-processing business with the aim of enhancing access to nutrient-dense foods in populations characterized by very high rates of nutritional deficiency. Through a complete package of support, including business skill development and marketing, the project will enable locally produced soybeans to be converted into affordable products that are rich in protein and micronutrients. One entrepreneur can produce 7 liters of soymilk or soy yoghurt per hour, with minimal need for fuel and labour. This level of production, for two hours, can readily serve 100 beneficiaries per day (14L x 7 servings / L), with retail prices of about 1 cent per gram of protein – e.g., a 140 ml serving with 4.3g of protein and 100 calories for 5 cents.</p>				
<p>At this level of production, the cumulative total of 50 kg of protein provided to consumers daily, is the equivalent of 10,000 eggs per day, 200,000 eggs per month, or 2.5 million eggs per year – but at half the cost of eggs which typically cost about 10 cents (2 cents per gram of protein). The income produced for each entrepreneur would be \$2.50 per day or more (typically more and much more if they are selling soy yoghurt) or \$50 / month or \$600 / year). The aggregate income would be \$60,000 or more per year which would create a substantial economic benefit in the local communities as there is no profit leakage and the entrepreneurs would tend to spend most or all of this income locally. So, for a net investment of \$680 per SoyaKit, the entrepreneurs earn the same amount, just in the first 15 months of what is expected to be 5 years or more of production, in addition to the substantial nutritional benefit and the cash saving to the consumer in lower prices for protein; in larger projects, the net investment per SoyaKit is lower. The entrepreneurs can use the equipment to reduce labour and fuel required for other home food preparation and cooking tasks. Also, the entrepreneurs learn skills that can be transferred to other business opportunities, and gain greater agency in their communities.</p>				
<p>With local rural and peri-urban populations as the target market, the project will bring nutritional improvement to 8,000 to 10,000 households in the region. A particular target for the project is children from six to 24 months of age and women of child-bearing age. At the same time, the project will empower women in the target areas through the establishment of a viable food processing business. The intervention aims to reduce malnutrition through the economic empowerment of women.</p>				
<p>Why Soy Foods?</p>				
<p>In many of the poorest regions of Africa and Asia, food insecurity is endemic to a high proportion of the population - up to 40% of children under the age of five can be stunted, whilst rates of maternal and childhood anaemia and Vitamin A deficiency can exceed 50% and 70% respectively. The consistent access by the poor to nutrient-rich foods is a significant problem; diet is often heavily dependent on consumption of starchy staples even though there is often significant cultivation of protein-rich soybeans nearby.</p>				
<p>Most regions have been impacted significantly by restrictions due to government regulations to control COVID-19. Thus, food supply chains have been disrupted, enhancing food insecurity in an already precarious region of the country. Women’s livelihoods have been especially affected. It is expected that the nutritional quality of local diets has declined appreciably as a result. Thus, the COVID-19 pandemic has highlighted the need for more robust and locally based supply chains for food, and especially foods that are nutrient-rich.</p>				

No.	First Name	Last Name	Organization	Date
<p>The intervention</p> <p>The proposed project would support the adoption of the SoyaKit, a small-scale soybean processing system, that has been developed by the Canadian NGO malnutrition Matters (MM). The SoyaKit enables micro and small enterprises to process locally grown soybeans into a range of soy-based food products, that can be enriched with micronutrients. This technology does not require electricity and uses heat-retention cooking to reduce fuel costs and smoke production. It has been developed in a way that minimizes the upfront capital investment, making it suitable for adoption by women who operate microenterprises.</p> <p>To date, SoyaKits have been introduced in four countries in sub-Saharan Africa, namely Ghana, Kenya, DRC and Malawi, with over 5,000 women entrepreneurs earning income. These interventions have demonstrated the commercial viability of soy-processing businesses run by women, that can generate a daily profit of between US\$2 and US\$8. Amongst poor women this can increase household income by between 50% and 200% and act to empower women both within their household and their community. A recent quantitative study of the implementation of the SoyaKit in Malawi has served to provide a proof of concept of this technology.</p> <p>The Project:</p> <p>This project will support the establishment of 100 women-run soy processing businesses. This will be achieved through a complete package of support that will include:</p> <ul style="list-style-type: none"> ● Recruitment of female entrepreneurs through an encouragement-based process, ● Provision of basic business training, ● Procurement and implementation of SoyaKits, ● Establishment of linkages with input suppliers and finance providers, etc, ● Awareness raising and product promotion within communities, and ● On-going market support. <p>Importantly, the project will involve a staged approach through which potential women entrepreneurs will be recruited and provided with the package of support, which will be gradually withdrawn over time. In so doing, the aim is to promote the establishment of sustainable women-led businesses that bring about significant and sustained improvements in the nutrition of infants and women of child-bearing age in their communities.</p> <p>The project would be implemented over 18 months.</p> <p>Roll-out of SoyaKits will be done in 3 phases, 4 months each, with 33 SoyaKits in each phase ; these will be preceded by a 2-month planning and preparation phase where detailed project planning takes place and the SoyaKits are shipped to Ghana.</p> <p>Data Collection:</p>				

No.	First Name	Last Name	Organization	Date
<p>The project aims to provide rigorous and quantitative evidence of both revenue generation and consumption of protein-rich food. Thus, the project will include a robust data collection component that will collect baseline and follow-up data from impacted communities. As appropriate, additional evaluation data could be collected, with help from MM’s partner the University of Guelph, in either survey design and/or assistance from local universities; this would require substantially increased funding.</p>				
<p>The Project Team:</p>				
<p>The implementation structure of the project involves Rotary Tamale providing local oversight, Malnutrition Matters, providing 100 SoyaKits, training services and project coaching assistance and capacity building support to Rotary Tamale and Urbanet. Malnutrition Matters will work with a local partner, Urbanet, based in Tamale. Urbanet’s expenses would be partially defrayed by collecting a \$70 to \$100 payment for the SoyaKits from the entrepreneurs, paid out of ongoing profits. Malnutrition Matters insists on some charge for the SoyaKits as the entrepreneur should recognize the equipment and the opportunity as valuable.</p>				
<p>Urbanet, a Ghanaian NGO based in Tamale, has experience in projects involving value-added processing and also in soybean cultivation. Projects include WISE, which was overseen by Plan International Canada and funded by Global Affairs Canada. See www.urbanetgh.org .</p>				
<p>Planning Phase:</p>				
<p>The SoyaKits will be ordered on project launch, delivery within 2 months of order. A local manager will perform detailed planning of the project including:</p>				
<ul style="list-style-type: none"> ● geography to be covered (already decided: Tamale and Sevagulu districts), ● possible local procurement of heat-retention cooking bags, as feasible, ● entrepreneur recruitment and selection tactics ● data collection procedure ● market development strategy and tactics ● monitoring and evaluation (M&E) process details 				
<p>Data collection and synthesis, and project reporting is part of the direct support effort described above. Best practice where possible is text msg data reporting, to minimize effort for collection and data entry. Weekly reporting, including daily input costs, product types, revenue.</p>				
<p>Implementation variables:</p>				
<p>Implementation partners will sell the SoyaKit to the entrepreneurs as a means of covering some implementation costs (examples below). However, the success of the program is paramount, as defined here:</p>				
<ul style="list-style-type: none"> - deployment of all the SoyaKits within 10 months of equipment delivery, 				

No.	First Name	Last Name	Organization	Date
<ul style="list-style-type: none"> - success of the entrepreneurs (ie, multiple months of profit of > \$40 / month), as corroborated by weekly data collection for at least 3 months - performance improvement of entrepreneurs who are struggling, through support from Urbanet Field Officers, mentoring and peer networking - reclamation of SoyaKits where performance does not improve, and training of replacement entrepreneurs <p>Example 1: sell the SoyaKit to the entrepreneur for \$60, \$10 upfront, with \$50 pay-as-you-go based on 50% of profits earned; revenue of \$6,000</p> <p>Example 2: sell the SoyaKit to the entrepreneur for \$70, \$10 upfront, with \$60 pay-as-you-go based on 50% of profits earned; revenue of \$7,000</p> <p>Example 3: sell the SoyaKit to the entrepreneur for \$100, \$20 upfront, with \$80 pay-as-you-go based on 50% of profits earned or where the purchase is financed by a 3rd-party MFI; revenue of \$10,000</p> <p>MFIs may be involved to provide financing to the entrepreneurs, but pay-as-you-go plans or no-interest or low-interest (< 5% / month) financing is preferred.</p> <p>M&E activities:</p> <p>We may choose to employ different recruitment techniques and/or market development tactics with different entrepreneur groups to evaluate relative success. We will likely implement a weekly data collection regime via cellphone, where the entrepreneur provides weekly data via text. The M&E officer would enter this data into a spreadsheet and these figures would be used to track overall data, as well as a means to identify high-achievers and to identify those entrepreneurs who are struggling and would receive immediate support.”</p>				
5	Jesse	Poland	KAUST University	10/27/22
<p>Submitted Email:</p> <p>“Thank you for the nice note. It has been a great program, with some fun and exciting work with all of my colleagues. We really appreciate the sustained support from USAID for these wheat programs.</p> <p>This is a very extensive working paper and a real tour de force. I have only started reading it now and will try to spend more time and get comments back to you. From a plant breeding and crop improvement perspective, my first impression is that the study is missing key points on the urgent need and value of developing improved crop varieties, particularly this interaction with changing climates, as the plant breeding process is long-term, and also with the interaction between improved varieties and improved agronomic practices, as this is a very synergist enterprise (e.g. the development of improved cultivation techniques and be amplified by selection of optimal varieties for these production practices, and visa versa).</p> <p>I see some of this is highlighted under the Leverage Point for R&D For Climate action, but I can tell from the writing that it is really missing a plant breeding perspective.</p>				

No.	First Name	Last Name	Organization	Date
<p><i>Robust and agile research must be accelerated in order to develop diversified and nutrition-rich seeds, heat-tolerant seeds and livestock breeds, improved feed and feed additives, improved inputs, and other products that are linked to robust local market systems, as well as soil and water management technologies that are compatible with changing local ecosystems (Niles et al., 2020; Sala et al., 2019). There are innovative climate adaptation and mitigation technologies that require additional R&D to bring the cost to scale (Herrero et al., 2016)."</i></p>				
6	Jonathon	Cook	USAID	11/14/22
<p>Submitted Email:</p> <p><i>"Systemic and transformative are critical touchpoints for the study and still need to be more effectively defined, unpacked, and articulated. For instance, 1.3 combines them into a single concept ("transformative systemic change") while elsewhere they are brought up separately. 2.1 offers some useful examples but the paper could use more examples that clarify in a USAID context what 'transformative' change looks like and how it's different from existing approaches.</i></p> <p>2.1: While the CRD framework is a compelling way to present climate/development relationships, this paper is directed at an audience whose primary objective is defined in terms of food security and the paper does not always engage directly enough with that objective</p> <p>2.3 needs work – it is muddled. Bottom line: How can USAID's agriculture/food programs integrate meaningful A&M results and transformative approaches that take account of a changing climate while still delivering on their fundamental goals?</p> <p>3.2 provides some thoughts on what 'transformative' looks like but again it is muddled. Be very clear, perhaps through a typology or table, about potential categories of transformative action that may be required and how that differs from incremental adaptation and mitigation.</p> <p>The section on Barriers to transformation is largely focused on adaptation/mitigation tradeoffs. What about many other types of barriers? Institutions/governance and social are big categories that will be treated in the next draft, but how to capture, for instance, the continued bias towards productivity rather than production systems? Water availability and infrastructure limitations? Access to finance and risk management strategies?</p> <p>The leverage points are a grab bag, and it is not always clear how they map back onto the 'problem' that have been identified in previous sections.</p> <p>R&D – What else can the USAID-funded Innovation Labs do to identify innovative and transformative approaches?</p> <p>Finance section:</p> <p>Enough focus on mainstreaming climate into existing agr-related finance? Much as with the rest of the paper"</p>				