

**Board for International Food and Agricultural Development (BIFAD)**

**Aligning Research Investments to the Global Food Security Strategy:  
A Three-Day AgExchange on Nutrition, Resilience and Agriculture-Led Economic Growth**

**Public Meeting**

**Two live-streamed webinars and a three-day moderated electronic discussion**

<https://agrilinks.org/agexchange/aligning-research-investments-global-food-security-strategy-three-day-agexchange>

**18–20 April 2017**

**Welcome and Opening Webinar**

USAID Bureau for Food Security Specialist, Julie MacCartee, started the opening webinar by welcoming the webcast audience to the 173rd BIFAD Public Meeting. The meeting was held fully on-line and started with an opening webinar. The webinar was followed by on-line moderated discussion that was focused on three main topics. Following the on-line discussion, there was a summary webinar.

Ms. MacCartee started the opening webinar by explaining the key approaches that participants could use to contribute during the webinars and on-line discussion. There were a total of 112 participants in the opening webinar. A recording of the full opening webinar is available at <https://kdad.adobeconnect.com/p2gob1a2mgl/>. The transcripts, audio recordings, Powerpoint presentation, and transcript of the question and answer session are [also available on the Internet](#).

**Comments by Brady Deaton**

Ms. MacCartee introduced Dr. Brady Deaton, BIFAD Chairman and Chancellor Emeritus of the University of Missouri, who contributed via a [recorded video message](#). Chairman Deaton welcomed the participants to the three-day stakeholder consultation. He indicated that USAID and BIFAD were excited to learn from the global research community concerning alignment of food and agricultural research investments with the US Government Global Food Security Strategy (GFSS). He indicated that participant input is very helpful to help guide the development of research strategies so that they are effectively aligned with the GFSS.

Chairman Deaton gave an introduction of BIFAD and its role for advising USAID on the ways that it can leverage the “formidable resources of the US universities” to achieve USAID’s goals in food and agricultural development, as broadly defined. These resources can be leveraged by USAID to fight world hunger and poverty. He indicated that this on-line forum is one way that BIFAD achieves its mandate under the Federal Advisory Committee Act. Chairman Deaton outlined the schedule for the webinar and then the on-line discussion. Dr. Deaton also introduced the BIFAD members who were taking an active role in moderating components of the on-line discussion.

The three focus areas for the on-line consultation were described: well-nourished population (especially among women and children), agriculture-led economic growth, a strengthened resilience. The webinar’s descriptive framing presentations were made by Drs. Saharah Moon Chapotin and Rob Bertram from USAID.

Dr. Deaton then described how BIFAD members and US Government leadership would be discussing in the second webinar the various key takeaways from the on-line discussion. Further, insights and reflections were shared. The on-line discussion forum was open for additional comments for one more day after the concluding webinar, but it was not moderated during that time.

### **Comments by Ann Bartuska**

Ms. MacCartee introduced Dr. Ann Bartuska, Acting Chief Scientist and Acting Undersecretary at the United States Department of Agriculture (USD) for Research, Education and Economics. Dr. Bartuska also provided her comments via a [recorded video message](#).

Dr. Bartuska welcomed the participants and described the long-term partnership between USDA and USAID to implement global food security programming. These efforts were strengthened in the Feed the Future efforts and with the new GFSS. She indicated that USDA contributes to global food security and nutrition through international food assistance, international capacity building and development programs, both basic and applied research programs, data/economic analysis, and promotion of science-based policy development.

The USDA has more than 90 offices at US embassies around the world. The Research, Education and Economics mission area of USDA is led by Dr. Bartuska, and it brings together the efforts of the Agricultural Research Service, Economics Research Service, the National Agricultural Statistics Service, and the National Institute of Food and Agriculture (USDA's extramural research funding arm). Dr. Bartuska indicated that these agencies conduct and promote scientific research and development efforts that support food security. She indicated that USDA is examining its experience with Feed the Future and determining how it can best support the GFSS. She further indicated that the 2011 Feed the Future research strategy must be examined to best determine how it can complement the GFSS. Dr. Bartuska described how this new strategy needs to take into account not only the US Government's work, but also work from the private sector, universities, and other stakeholders outside of government.

Dr. Bartuska described how it was important to hear diverse views from stakeholders around the world. These different perspectives can bring valuable insights into how research can best provide breakthroughs in the key areas of the GFSS. She concluded her remarks and wished the participants well.

### **The Global Food Security Strategy by Saharah Moon Chapotin**

Ms. MacCartee introduced Dr. Saharah Moon Chapotin, the Deputy Assistant to the Administrator in USAID's Bureau for Food Security, and Dr. Chapotin discussed the background of the U.S. government's global food security strategy.

After passage of the Global Food Security Act of 2016, the 11 U.S. government agencies developed an implementation strategy after a series of external consultations with key non-governmental and private-sector stakeholders. The resulting strategy took into account the experience of Feed the Future and identified an approach to sustainably reduce global hunger, malnutrition, and poverty.

Dr. Chapotin provided a graphic representation of the results framework for this strategy, and she discussed framework in detail. The three objectives of the framework are to foster inclusive and sustainable agriculture-led growth; strengthen resilience among people and systems; and to have a well-

nourished population, especially among women and children. The results framework has a number of intermediate results that contribute to the three objectives. Additionally, a series of cross-cutting intermediate results are included for progress to be realized towards the objectives.

Dr. Chapotin compared the new GFSS to the Feed the Future strategy. She indicated that nutrition had been in the Feed the Future strategy but now had even greater emphasis. Malnutrition has been elevated so that it has an emphasis similar to that in the Sustainable Development Goals and the Global Food Security Act.

Dr. Chapotin also described how resilience, a component of Feed the Future, had been elevated in the new strategy. Additionally, she indicated that emphasis on water, sanitation and hygiene (WASH), and its connection to nutrition, had also been increased in the GFSS. Capacity building (human, organizational, and system), was a cross-cutting theme in Feed the Future and has been emphasized further in both the GFSA and the GFSS as a cross-cutting intermediate result.

### **How GFSS and Research Investments Relate by Dr. Robert Bertram**

Dr. Chapotin introduced Dr. Robert Bertram, Chief Scientist of USAID's Bureau for Food Security. He reviewed the historical development of the Feed the Future Program, noting that agriculture-led growth was a key to the "way forward." He described areas of the world where poverty and child stunting are most prevalent, including hot spots in South Asia, sub-Saharan Africa, Central America, and Haiti.

Dr. Bertram indicated how the research priorities for the GFSS needed to be discussed and vetted, and that this would be a key function of the AgExchange. He provided some examples of how research results changed his thinking on ways to proceed for the GFSS. Dr. Bertram concluded by describing how research is a long-term endeavor, not something that should be started and stopped every couple of years. He used this to highlight why USAID's research investments must be highly strategic and well thought out. Dr. Bertram turned the program back to Ms. MacCartee.

### **Question and Comments from Opening Webinar Participants**

Ms. MacCartee opened the session by describing how participants could type in their questions and comments in the Chat area of the webinar software. She then gave the participants some tips about making comments in the AgExchange software (AgExchange). This aspect of the 3-day AgExchange began after the webinar concluded.

She then read several questions and Drs. Bertram or Chapotin responded with answers. Questions concerned adoption of existing technologies in development programs, how USAID determined when a research technology was ready for adoption by farmers, genetics of crops and GMOs, and the use of best practices from social sciences on technologies from cutting-edge research investments.

The opening webinar was then concluded and the three-day on-line commentary began.

## **Comments made by AgExchange participants**

The facilitated on-line discussions were held over three days. Comments could also be made on the fourth day, but were not facilitated by moderators. Over 400 individuals participated in the on-line AgExchange, and 179 made comments. The names of those who made comments are in Appendix 1 of these minutes. The names of those who registered and participated, but did not make comments in the on-line software, are in Appendix 2 of the minutes.

All comments posted in the on-line discussion software are at <https://agrilinks.org/agexchange/aligning-research-investments-global-food-security-strategy-three-day-agexchange>. Lightly edited comments organized according to session and framing question are in Appendix 3 of the minutes.

Reports provided to AgExchange participants are included in Appendix 4.

### **Research – Question 1: Criteria for Focusing Research Investments**

What alternative criteria may assist us in better aligning our investments to the goals of the Global Food Security Strategy?

### **Research – Question 2: New Opportunities in Science**

What research technologies, tools and approaches can the U.S. Government leverage to accelerate progress towards the three objectives of sustainable and inclusive agriculture-led economic growth, resilience and improved nutrition?

What investments made by science granting agencies outside of USAID should we be aware of that could be leveraged by research programs to enhance the efficiency and quality of our work?

### **Research – Question 3: Technology adoption - relevance and research questions on uptake and impact**

Improved crops for human and animal nutrition have been developed. Food animal management practices have been optimized. Region appropriate and scaled best farming and marketing practices have been designed. Yet many smallholder farmers remain locked in poverty and food insufficiency; why is that, and how can this be remedied?

## **II. NUTRITION**

### **Nutrition - Question 1: Opening the discussion on nutrition research; diet diversity; animal-source foods**

What are the most strategic research opportunities around providing and encouraging more diverse diets? What are the most promising research opportunities pertaining to consumption of animal-source foods? How could research contribute to achieving consumption gains?

### **Nutrition - Question 2: Social behavior change and nutrition education**

What research on social behavior change and nutrition education (related to production and/or consumption) could significantly advance the effectiveness of food security programming?

**Nutrition - Question 3: Nutrient-dense foods; partnerships**

What avenues for research could help make nutrient-dense foods more available, affordable, and accessible to the poor and food insecure year-round?

What nutrition outcome-oriented research could support wider decision-making and partnership among national, regional, and other partner research and policy organizations to achieve population-level impact?

**Nutrition - Question 4: Food safety, hygiene and nutrition.**

What are the research questions around smallholder production practices and food systems that could improve nutrition status while mitigating food safety risks? How should we promote more nutrient-dense foods such as meat/eggs/fish/vegetables that have inherent production and postharvest/perishability problems that can lead to high food safety risk?

**Nutrition - Question 5: Water and Nutrition**

Safe food can be easily contaminated by unsafe water in smallholder agricultural production systems. We need to do a better job linking food and water safety in these systems for improved nutrition. In an agriculture-led economic growth model, what are the research opportunities for improved water management and positive nutritional outcomes?

**Nutrition - Question 6: What's the latest and greatest in nutrition research?**

What recent research findings suggest new and potentially transformative research directions to be pursued in the area of nutrition?

**III. AGRICULTURE-LED ECONOMIC GROWTH**

**Economics - Question 1: Utilization of research outputs**

What research is needed to ensure more rapid, sustained, and broad utilization of research outputs? What research is needed to ensure more rapid and targeted utilization of research outputs by specific stakeholders, especially women?

**Economics – Question 2: Productivity and income growth on and off farm**

What research investments in the agriculture and food systems are needed to better understand opportunities for increased productivity and income growth on and off farm?

**Economics - Question 3: Integrating social and natural sciences**

What types of research approaches are available and most effective at integrating social and natural sciences to address the range of research areas discussed today?

#### **Economics – Question 4: Agriculture enabling environment**

What research on the enabling environment can foster positive transformation of the agriculture and food system? What analytic information is needed to complement research investments?

#### **Economics - Question 5: Efficiency, quality and cost-effectiveness of small-scale agricultural production**

What research areas are most critical to enhance the efficiency, quality, and cost-effectiveness of small-scale agricultural production for producers in the target geographies of the U.S. Government's Global Food Security Strategy (South Asia, sub-Saharan Africa, Central America/Haiti)?

### **IV. RESILIENCE**

#### **Resilience – Question 1: Expanding and diversifying economic opportunities**

When considering poverty dynamics (movements of people in and out of poverty), what are the research gaps in identifying livelihood strategies that allow people to escape poverty sustainably (i.e., not fall back into poverty)?

What research opportunities exist to diversify livelihood risk by expanding economic opportunities that are less sensitive to weather-related risk (including but not limited to migration and seasonal labor)?

#### **Resilience– Question 2: Behavioral development & social cognitive research**

How do behavioral development and social cognitive research improve our understanding of how these factors drive resilience? What research areas and questions should we prioritize?

#### **Resilience– Question 3: Financial services for improved resilience**

What options exist for expanding the reach of insurance?

#### **Resilience– Question 4: Shock-responsive social protection**

What research do we need to be able to appropriately prioritize investments in social protection and investments in market systems?

#### **Resilience– Question 5: Systems-level measurement for resilience**

What additional research is needed to develop robust systems-level measurement (e.g. ecosystems, market and social systems) that can inform investment decision making and program design?

A number of reports and framing papers were prepared for the participant use and review. A listing of those papers and linkages to the full paper are in Appendix 4.

### **Closing Webinar**

Ms. Julie MacCartee gave an introduction to the webinar, and she oriented participants to where they can ask questions during the session. She also made a request for participants to complete a survey for feedback to USAID. BIFAD Chairman Brady Deaton was then introduced by Ms. MacCartee. An audio recording from the closing webinar, transcripts of the audio and chat, and the Powerpoint slides used to summarize the comments are [available on the Internet](#).

Chairman Deaton introduced the session and himself as the session's moderator. He noted that the breadth and depth of discussion was outstanding. A total of over 800 comments from 35 countries and by over 400 participants had been recorded for consideration by USAID and BIFAD.

### **Summary by Dr. Robert Bertram, Chief Scientist of USAID's Bureau for Food Security**

Dr. Bertram thanked all participants for all the valuable comments. He indicated that it reminded him of 2010–2011 when BIFAD and the Association of Public and Land-grant Universities (APLU) helped BFS establish the research priorities adopted for Feed the Future. About the same large number of people (400) had participated as for this on-line stakeholder consultation.

Dr. Bertram indicated that when Congress passed and the President signed the GFSA, a big 'vote of confidence' was given to this effort. He indicated that the research strategy for GFSS will not only build on success of Feed the Future, but it will also have a new results framework that adds key parts to USAID's understanding of resilience and increases our understanding of nutrition.

He also indicated that a number of things in the field of agricultural development haven't changed. USAID and the US Government will continue to learn and partner with the private and public sectors to use evidence-based choices. The use of those kinds of strategic choices allows USAID to show that efforts have had demonstrable results.

### **Key Takeaway Messages from the Four Discussion Themes**

BIFAD Chairman Deaton introduced Dr. Nora Lapitan, Research Division Chief in USAID's Bureau for Food Security. Dr. Lapitan also thanked everyone for thoughts over the last three days.

The first theme discussed after the opening webinar emphasized the criteria for focusing research investments. Dr. Lapitan indicated that she would focus on topics with most comments, and she thanked her staff for helping with this task. She indicated that there was a robust discussion that included many comments. The first topic considered the potential for technology adoption and scalability. These were considered by participants to be very important, and impact pathways must be established and considered. The impact pathways need to reach scale, and AgExchange participants indicated that it was vital to consider the factor(s) that trigger decisions to adopt a technology. Those factors may be different for men versus women farmers, and further research is needed in this area. Dr. Lapitan indicated that both interventions and approaches should be evaluated through the "systems perspective lens" that takes into account the context within those systems.

Dr. Lapitan then described the participants' comments around the idea that risks should be considered when connecting technology adoption with social protection investments. Resilience is a key component of the new proposed GFSS research agenda, and risk is an inherent component of resilience.

The third topic that received a large number of comments was that institutional capacity building must be one of the criteria considered for research investments. Institutional capacity was observed to be critical for sustained impact.

Dr. Lapitan indicated that overall priorities for public investments must be strategic so that they can leverage private-sector investments. She concluded by describing two opportunities in science and research that could have a large impact in the future. Those opportunities are provided by "big data and information sharing platforms." Big data can be used to capture trends in technology adoption and identify emerging new needs for technologies. The use of technology to collect data was described by Dr. Lapitan, especially 'crowd sourcing approaches' to reveal knowledge gaps could be useful. Dr. Lapitan concluded by indicating that she looked forward to questions. She then introduced Dr. John Bowman, a Senior Science Advisor in USAID's Bureau for Food Security.

Dr. Bowman summarized the discussion of the nutrition session, which had six topics: dietary diversity, water and WASH (water, sanitation and hygiene), food safety, nutrient-dense foods, social behavior change, and the latest research innovations. He indicated that there were over 200 comments made on these topics, and that research innovations received the most comments. Dr. Bowman suggested that there isn't tremendous interaction between those who build agriculture and nutrition outcomes and those in the 'water and WASH community.' Dr. Bowman indicated that good nutrition outcomes typically need proper sanitation and hygiene. He reported that participants had general agreement that dietary diversity, social/behavioral change, and animal-sourced foods needed to be reinforced in consideration of a research strategy.

Three cross-cutting takeaways were identified by Dr. Bowman: using a multi-sectoral approach, uptake of recommendations, and consumption patterns. An example of a multi-sectoral approach provided by commenters was that agriculture production projects should not just be co-located with health-related efforts. Those projects should be integrated, including one-health concepts, so that full human benefits can be realized from veterinary cooperation. Dr. Bowman also indicated that participants had commented that more research is needed concerning animal genetics and zoonotic disease.

The uptake of technologies and recommendations was a potential problem concerning behavioral change according to commenters. Dr. Bowman described good success with traditional work, but the need for more work on nutrient dense foods. Research on the best age for education concerning behavior change was proposed. Commenters also suggested that implementers shift from a 'western savior' approach and treat people like customers. Participants felt more research was needed on the influence of national policy on the roll-out of technologies.

Dr. Bowman then summarized the comments made concerning our knowledge of food consumption patterns. Commenters felt that there was poor understanding of how various factors interact to change intake of good foods. Participants felt that we don't fully understand consumption patterns, and we don't know how much animal-sourced food is really needed for various ages. Better metrics are needed to evaluate for diet diversity, including food affordability.



Dr. Bertram thanked Dr. Bowman and then introduced Dr. Jerry Glover, Senior Sustainable Agriculture Advisor for USAID's Bureau for Food Security. Dr. Glover thanked Dr. Bertram, the AgExchange participants, and the USAID note takers. Dr. Glover discussed the comments made concerning agriculture-led economic growth.

There was strong support among commenters for agricultural research investments to increase agricultural productivity, according to Dr. Glover. Commenters indicated that there was also a need for research along the value chain to reduce post-harvest loss, improve marketing and transport to market, and food safety. There was also a discussion of the different types of farmers and what strategies seem to work best with those farmers. Further research may be needed in this area according to commentators. Dr. Glover also indicated that a discussion occurred calling for more research on supporting on-farm diversification to higher-value crops. A need for support of interdisciplinary research supporting food production was recognized in the comments also.

Research on technology adoption is also needed. Participants indicated that researchers should work with farmers and others to understand the needs and constraints in the development context. Dr. Glover indicated that this may be particularly important to understand for different types of beneficiaries. There was also a call for linkages with USAID development project implementation to study factors that influence adoption and impact. Research is also needed to focus on how to improve the enabling environment for agriculture-led development.

Dr. Glover introduced Dr. Greg Collins, Director for the USAID Center for Resilience and USAID Resilience Coordinator. Dr. Collins remarked that the all the AgExchange topics discussed are related to, feed into, and can be sources of resilience. He said that elevation of resilience in the new GFSS forces USAID to think beyond the traditional risk management considerations, and that the framing questions in the AgExchange have taken this expanded view.

Research needs around measurement of resilience were an important topic of the AgExchange, and Dr. Collins emphasized that resilience isn't an outcome but rather a set of capacities to respond to shocks and stresses, which in turn can mitigate or moderate impact of those shocks on such outcomes of interest as poverty, nutrition, and food security. Although most resilience measurement has focused at the household or community levels, there is a need to develop more refined ways to measure systems-level (e.g., ecological systems, market systems, social systems) resilience capacities as a complement to resilience measurement at other scales. There is a great demand by governments to move beyond a complex approach to resilience measurement toward a more practical approach that can be taken up and implemented by policymakers.

Another priority area identified in the AgExchange is research investment around social protection in market systems and thinking about risk using a multi-sectoral approach. Emergent research on shock-responsive social protection may help to improve social protection and safety net systems to expand when events occur, reducing impact on households.

There has been a tendency to view productivity improvement and resilience goals as mutually exclusive, but Dr. Collins noted that in environments of complex, compound risk, building resilience capacities is necessary to achieve productivity goals.

Another emergent area is behavioral and social cognitive research. He noted that an important sub-set of this research will be to expand the evidence base around aspiration, social capital, the ability to lean

on other households, and women's empowerment as sources of resilience and to identify how we can strengthen these factors through programming.

Financial systems and the role of insurance were another important area of discussion. Dr. Collins encouraged a broad approach to risk management that includes tools like insurance but also emergency credit, shock response, and social protection.

Livelihoods and livelihood diversification were another major theme of the discussions on resilience. There has been a call for a broader conceptualization of the heterogeneity of pathways out of poverty available to different households and communities. Improved productivity, improved market linkages, accumulating assets and income, and purchasing insurance are all strategies for buffering risk, but diversifying on farm and also outside agriculture are other approaches used by households with different asset profiles. A critical research area is to identify multiple pathways out of poverty, especially for youth.

Dr. Collins turned the webinar over to Dr. Bertram, who reintroduced BIFAD Chairman Brady Deaton. Dr. Deaton complimented the summaries and turned to Ms. MacCartee for questions submitted during the webinar. Ms. MacCartee read selected questions and the various speakers answered them.

Chairman Deaton then provided some of his own observations on the AgExchange. He indicated that comments would help BIFAD members be better informed as they have conversations globally. The first key point that Dr. Deaton made was that there were so many comments made in a variety of contexts for the need of interdisciplinary research in solving problems. He also felt that the need for multiple paths for youth was clearly brought out as a topic for future research. Chairman Deaton concluded his comments and called upon BIFAD Member Dr. Pamela K. Anderson to make some observations regarding the comments she read.

Dr. Anderson indicated that the conversations were very enjoyable and extremely rich. She started her comments by indicating that she did not hear discussion of a traditional agricultural productivity research agenda, and that she was surprised by not hearing that from the stakeholders who commented. She indicated that there was no conversation concerning protecting gains in productivity. Instead, Dr. Anderson heard in the section summarized by Dr. Glover that the emphasis on productivity gains was focused on the need for more research on efficiency of production and the impact that production research was having on the beneficiaries.

Dr. Anderson highlighted three themes that she observed that cut across many discussion topics. The first was gender, and the second theme was women's empowerment. The third theme was diversification, especially related to agricultural production. She then brought up the problem of "our collective struggle with compartmentalization." An example would be the compartmentalization of agricultural production and health, yet there is need for working across these topics. Dr. Anderson posed the question if research funding could be used enhance or "force" that convergence.

Lastly, Dr. Anderson commented that there were many comments made by the AgExchange participants that called for a more 'market driven' approach to setting the research agenda instead of focusing on just a 'supply side' approach. She thanked all the participants and USAID for hosting such an enjoyable experience.

Dr. Deaton then called on BIFAD Member, Dr. Cary Fowler to make comments. Dr. Fowler focused his comments on the sessions related to criteria for focusing research and nutrition. Dr. Fowler first indicated that he felt that there was “broad and general satisfaction” with the criteria that USAID is using to monitor progress towards Feed the Future goals. He indicated that the concerns expressed in various sessions regarding scalability of technology adoption, cost/benefit analysis, and diversification. Dr. Fowler wondered if the concern that was expressed on these issues might reflect not only the importance of the issue, but also that we may not be handling them properly in the development process.

Dr. Fowler expressed two points that were brought up by participants but that did not get emphasized. The first was a question posed was ‘what is the comparative advantage of USAID?’ Dr. Fowler wondered if this might be a good topic for USAID and/or BIFAD to consider. The second point was related to simultaneous support for both long-term and short-term research. Dr. Fowler wondered if USAID would need different monitoring criteria for long-term versus short-term research?

The comments by Dr. Laptitan concerning use of big data to capture trends in technology adoption and identify emerging needs were very important to Dr. Fowler and worth further consideration. Dr. Fowler expected a discussion of climate change by commenters, but that did not occur. Dr. Fowler thanked everyone for the excellent job in hosting the exchange.

Ms. MacCartee indicated that a webinar participant pointed out that nutrition research priorities might also have to take into account the aspects of malnutrition found with individuals that are overweight.

Dr. Deaton recognized BIFAD Member Dr. Gebisa Ejeta for comments. Dr. Ejeta indicated that he felt that comments in the resilience research needs session were particularly relevant and that he wanted to see increased emphasis on those.

Chairman Deaton then recognized Ms. Sheila Roquitte, Director of the Office of Agriculture Research and Policy for USAID’s Bureau for Food Security, and indicated that Ms. Roquitte would summarize the next steps for USAID after this AgExchange. Ms. Roquitte indicated that the AgExchange concluded the data/information gathering aspect for USAID’s considerations. The data and information will be shared with US government partners to facilitate implementation of the GFSS.

Ms. Roquitte thanked everyone for the hard work on a successful effort. She indicated that this was the most successful AgExchange that has been done. She turned the webinar back to Chairman Deaton who provided thanks and concluded the AgExchange.

Appendix 1. AgExchange participants who made comments or contributed information/files

Aaron Hawkins	Adam Ahmed	Ali Ali
Allison Floyd	AMA Innovation Lab	Archie Jarman
April Thompson	Anna Garloch	Ann Bartuska
Angela Records	Andrew Gerard	Andrew Emmott
Amrit Bart	Amer Fayad	Brenda Dawson
Brady Deaton	Bodo Raatz	Barry Pittendrigh
Barakat Mahmoud, Ph.D.	Britta Hansen	Bruce Rubin
Bruno Tran	Carla Fernandez de Castro	Carolyn La Jeunesse
Carrie Hubbell Melgarejo	Cary Fowler	Cassie Chandler
Catherine Fleming	Chandra Biradar	Charlie Turner
Chike Mba	Christine Negra	Christopher Macrae
Claire Baker	Clara K. Cohen	Clare Mukankusi
Claudia Ringler	Curt Van Tassell	Cynthia Donovan
Dan Silverstein	David Tschirley	David Tardif-Douglin
David Kraybill	David Hansen	Deepa Thiagarajan
Don Humpal	Donald Knowles	Donna Winham
Edye Kuyper	Eileen Herrera	Elaine Grings
Elaine Gray	Elizabeth Mitcham	Elizabeth Dunn
Elyssa Lewis	Elzbier Mohamed	Emily Romero
Eric Witte	Erin McGuire	Esther Ngumbi
Ethel Makila	Faith Bartz Tarr	Feed the Future Partnering for Innovation
Ganesh Bora	Gbola Adesogan	Genevieve Croft
Gitau Mbure	Global Knowledge Initiative	Guy G. Hareau
Gwyneth Cotes	Hillary Egna	Huaijun Zhou
Idupulapati Rao	J. Erin Baize	Jagger Harvey
James Thurlow	James Rhoads	Jan Low
Jane Sherman	Jawad Ullah Khan	Jean Ristaino
Jen Peterson	Jennifer Hodbod	Jennifer Cisse
Jennifer Woodward-Greene	Jerry Glover	Jessica McCarty
Jessie Vipham	John Schrock	John Bowman
Jonathan Odhong	Jordan Teague	Judy Canahuati
Julie MacCartee	Justin Temple	Justin Prudhomme
Kai-Shu Ling	Katherine Dennison	Kathryn Clifton
Kathryn Goetting	Katie Morgan	Kris Wyckhuys
Krista Jacobs	Kristin O'Planick	Kulvinder Gill
Kurt Richter	Larry Vaughan	Laura Ostenso
Lawrence Schaefer	Leah Koepfel	Lexine Hansen
Lourdes Martinez	Lusike Wasilwa	Lynn Schneider
Madeleine Smith	Manuel R Reyes	Marjatta Eilitta
Mark Erbaugh	Mark Manary	Martha S.E. Williams
Martin Fowler	Matthew Blair	Mbaziira Mahmudu
Meaghan Murphy	Meghan Anson	Michelle Jennings
Mike McGahuey	Nate Kline	Olasunkanmi Bamiro

Oscar Ortiz	Otto Gonzalez	Paige Castellanos
Patrick Webb	Patrick Smith	Paul Guenette
Paul Tanger	Paul T Gibson	Peg Willingham
Peter Thorne	Pietro Turilli	Rajul Pandya-Lorch
Rana El Hattab	Rangaswamy Muniappan	Richard Jones
Richard Choularton	Richard (Dick) Tinsley	Richard Greene
Robert Ackatia-Armah	Roberto Valdivia	Robin Shrestha
Ross Coniglio	Ruth Meizen-Dick	Robert KN Mwadime
Robert Bertram	Robert Mazur	Roberto Quiroz
Sally Abbott	Samir Ibrahim	Sang Lee
Sarah McKune	Sheila Roquitte	Sheryl Hendriks
Sonja Horne	Sophie Theis	Stephanie Mercier
Steve Yaninek	Summer Allen	Susan J. Lamont
Tara Steinmetz	Ted Carey	Tek B Gurung
Terra Kelly	Thom Jayne	Tim Porch
Tom Gill	Tyrell Kahan	Victor Pinga
William Wintermantel	William Masters	

Appendix 2. AgExchange participants who didn't make comments or contributions

Abdulsamad Isah Abdullahi	Adrian Self	Alain Souza
Alex Ruane	Alex Winter-Nelson	Alexa Potocki
Alexander Botting	Alexandra Towns	Aline DeLucia
Alwin Keil	Anna Toness	Ann Leger
Andrew Margenot	Andre Williamson	Amanda Quemore
Brenda Pearson	Bonnie Furman	Benoy Barman
Benjamin Davies	Benedicto Marinas	B. Keith Cole
Austin Humphries	Asafu Chijere	Arthur van Witzenburg
Arshiya Noorani	Bridget Aidam	Carl Birkelo
Caroline Eisel	Carolyn Hart	Carolyn Mutter
Cassie Welch	Catherine Kilelu	Charles A Davis
Clare Sullivan	Claudia Nierenberg	Corinta Guerta
Corrie Brown	Courtney Greene	Dan Northrup
Dana Cruikshank	Danielle Niedermaier	Dave Hoisington
Dave Schutz	David Ojo	David Pelletier
David Gisselquist	David Kargbo	Deanna Behring
Dena Bunnel	Devi Potluri	Diane Smith
Diane Debernardo	Donna Rosa	Dorcus Gemenet
Dovi Alipoe	Duncan Boughton	Elizabeth Poulsen
Elvis Heinrichs	Elyse Mahoro	Emily Urban
Emily Zobel	Emily Hirata	Emir Hardy
Emmanuel Tumusiime	Emmy Simmons	Eric Keys
Everisto Mapedza	Florine Essouman Mbappe	Ford Evans
Francois Stepman	Frednel Isma	Gbolahan Alagbe
Gerrit Hoogenboom	Gregory Scarborough	Gretchen Knoth
Gretchen Neisler	Gwen Varley	Hailu Tefera
Hazel Aregai	Heather Anderson	Hillary Proctor
Hope Michelson	Howard Batson	Ian MacNairn
Irvin Widders	Izabella Koziell	J. Vern Long
J.W. Camilien Saint-Cyr	Jack Westwood	Jackie Hughes
Jami Montgomery	Jamilah Cassagnol	Jan Middendorf
Jane Payumo	Janelle Larson	Jay Angle
Jennie Lane	Jérôme W Somé	Jerry Brown
Jessica Bagdonis	Jillian Emerson	Jo Anne Yeager Sallah
Joe Tohme	John Lipsey	John Russin
Jon Wakeman	Jonathan Hubchen	Jordan Dey
Jordan Lambert	Jose Cisneros	Joseph Bangnikon
Jowel Choufani	Joy Kauffman	Karin Dillon
Kateryna Schroeder	Katie Beck	Katlyn Scholl
Kelly McDonald	Kidanemaryam Wagaw	Kiersten Johnson
Kristen Cashin	Kristin Franklin	Kusum Naithani
Latha Nagarajan	Laura Cramer	Lauren Broccoli
Liana Calegare	Lilian Gatubu	Lilly Green
Lisa Wilson	Liz Guerrero	Lucio Olivero

Maingi Daniel	Mansura Kassim	Maria Rebolledo
Maria Aguirre	Maria Fernanda Alvarez	Maria Veronica Gottret
Mark Varner	Mary Laurie	Mary Beggs
Matilda Arhin	Md. Mazhar Rafique	Bappy Shahrier
Megan Nelson	Megan Blazak	Mekbib Hilegebrile Seife
Melanie Bacou	Melissa Brown	Michael Carter
Michael Olsen	Michael Victor	Michael Stoick
Michael Johnson	Mitch Boretz	Mojibar Rahman
Molly Anderson	Moraka Makhura	Mustafa Aslamy
Nafis Islam	Ndeye Ndack Diop	Neville Clarke
Newal Sherif	Nicole Mason	Nikki Schulman
Nina Schlossman	Nora Lapitan	Nupur Nagwekar
Odipo Osano	Odountan Ambaliou Olounlade	Owen Cortner
Pamela Fessenden	Patrice Armstrong	Patricia Fulton
Patricia Neenan	Patrick Tucker	Paul Muthangya
Peter Hobby	Peter King'ori	Philip Aworinde
Polly Compston	Priscila Henriquez	Rebecca Vidal
Rebecca Anzueto	Reginald Archer	Rob Rose
Rodrick McSherry	Ryan Moore	Sandra Remancus
Sarah McClung	Sarah Simons	Sarah Nuernberger
Sarah Casey	Sarahi Morales	Scott Bode
Shelley Walton	Sherman Jack	Shireen Yousef
Siaka Ouédraogo	Simon Heck	Smita Aggarwal
Sonia Kwon	Sriram Kannekanti	Stacia Nordin
Steev Lynn	Stephen Smith	Stephen Morin
Susan Bragdon	Susan Johnson	Takele Teshome
Tanya Jackson	Tara Wilfong	Tara Clerkin
Tawanda Muzhingi	Tedy Herlambang	Teresa Cavero
Terry Gipson	Thabani Maphosa	Thomas J. Herlehy
Tim Williams	Tim Krupnik	Tim Rendall
Timothy Quick	Tina Vartanian	Tom Spangler
Ty Butler	Ulrich Amoussou	Upendra Singh
Valheria Castiblanco	Vidhya Sriram	Walter E. Baethgen
Won Song	Xiomara Sinisterra-Hunter	Yibo Wood
Zachary Baquet	Zewdie Bishaw	

Appendix 3. Comments made to thematic questions during the three-day AgExchange.

## Welcome to the AgExchange! Please join the opening webinar.

APR 18, 2017 8:45 AM by [BRADY DEATON](#) Comments (6)

Welcome to the AgExchange! My name is Brady Deaton, Chancellor Emeritus of the University of Missouri and Chair of the Board for International Food and Agricultural Development (BIFAD). BIFAD and the United States Agency for International Development (USAID) are excited to host this online discussion with the food security research and development practitioner communities around the world to inform the alignment of U.S. Government research investments to the new [Global Food Security Strategy](#) (GFSS).

We're excited to kick off the AgExchange with a webinar that will set the stage for the next three days. Dr. Ann Bartuska, Acting Under Secretary for Research, Education and Economics and Acting Chief Scientist at USDA will give opening remarks, followed by Dr. Saharah Moon Chapotin, Deputy Assistant Administrator in the USAID Bureau for Food Security, and Dr. Rob Bertram, Chief Scientist of the USAID Bureau for Food Security. The recorded webinar will be posted right here for those of you who wish to review it later.

Following the webinar, we'll go into an online discussion session on criteria for focusing research investments, and then over the next three days will address the themes of nutrition, agriculture-led economic growth, and resilience, in that order. On Thursday, April 20, Day 3 of the AgExchange, BIFAD members and I will come back together with U.S. Government leadership for a live webinar (from 3:30 to 5:00 p.m. EDT) to summarize the key takeaways and to share insights and reflections. The formal moderation will end at that time, but if you didn't have time to engage and would like to post additional comments, the AgExchange will be open for an additional day, closing at 5:00 p.m. EDT on Friday, April 21.

A warm welcome to everyone, and we look forward to your active participation!

### COMMENTS

**Julie MacCartee wrote:**

Thank you to everyone who joined the opening webinar! We will post the recording of the webinar here shortly. In the meantime, you can watch the recorded opening remarks by Brady Deaton and Ann Bartuska at the links below.

[Opening remarks by Brady Deaton \(BIFAD\)](#)

[Opening remarks by Ann Bartuska \(USDA\)](#)

**Julie MacCartee wrote:**

For those who were unable to join the opening webinar, you can view the recording here: <https://kdad.adobeconnect.com/p2gob1a2mlg/>. If you are on a USAID computer and having trouble accessing the recording, try using Internet Explorer instead of Chrome.



The webinar recording runs for 1 hour and is a good starting point for context on the AgExchange, the Global Food Security Strategy (GFSS), and the need to align a US Government food security research strategy with the GFSS.

**Patrick Webb wrote:**

I liked Rob Bertram's map of 4 major agroecologies which contain the highest amount (was it proportion or absolute numbers?) of hunger and poverty. But, narrowing the focus of research investment to those geographic areas where 'today's problems reside' carries several risks: a) climate change will shift those locations over time, b) their problems may be related less to agriculture technology needs than to other challenges (infrastructure, political instability, lack of predictable markets for local output, etc.), and c) productivity gains may be limited due to local pests and diseases. We can think of many more. That doesn't mean there should be no focus. But it does speak to the potential tradeoffs in agriculture and other kinds of research (including health, nutrition, political economy) between global public goods useful to smallholders in those areas and local specific goods that have limited relevance outside of those areas. This can certainly be addressed, but let's keep broader questions that frame research prioritization to the fore, at least at the outset of this series of webinars.

**Patrick Webb wrote:**

Good point made earlier about the importance of tertiary education. But we need to understand how to encourage and support 'new' education that tends to be trans-disciplinary and problem-focused, rather than how to support agriculture studies in ag schools separate from health education in medical schools. The siloing of education within low income countries is one of the problems underpinning a lack of national capacity to do things differently.

Patrick

**Julie MacCartee wrote:**

A few tips for participating in the AgExchange online discussion:

- Add your photo to your Agrilinks profile for a more personal touch
- If you don't wish to receive emails for every discussion post, navigate to the [AgExchange landing page](#) and change your email settings under "Mail Digest Options" on the right of the page
- Don't be shy! All comments and questions are welcome. However, we ask that you stay focused on research questions, rather than details of existing project implementation
- Review the [framing papers](#) for a preview of what we'll be covering under each of the discussion themes
- See the [FAQ](#) for more tips
- Email [agrilinks@agrilinks.org](mailto:agrilinks@agrilinks.org) ([link sends e-mail](#)) if you are having technical difficulties

Thank you for your contributions over the next 3 days!

**Cary Fowler wrote:**

Patrick - just a quick response to your posts here. Great points. I, too, liked Rob's map. The point you raise about climate indicates - correct me if I am wrong - that our work on crops important to those areas should consider the likely impacts of global warming there to those crops. This might then provide us with a better sense of where the research payoffs will be and what research investment priorities we should have.

# Opening discussion: Criteria for focusing research investments

APR 18, 2017 10:00 AM by **ROBERT BERTRAM**

It's time to get the online discussion started with a focus on criteria for focusing research investments. For background on this theme, please read this [framing paper](#) and watch this [brief video introduction](#). You may also wish to review this [literature review and recorded presentation](#) on the impacts of agricultural research on poverty, malnutrition and resilience. We will be concentrating on this portion of the discussion for the next four hours, but you are welcome to add comments through the end of this week.

Given the objectives of the [Global Food Security Strategy](#) (GFSS) and additional considerations gleaned from recent literature, we invite the global community to provide feedback on the following questions:

- **For focusing investments within the U.S. Government research portfolio, what is the relative importance of the criteria used in the [2011 Feed the Future Research Strategy](#)?**
- **What alternate criteria may assist us in better aligning our investments to the goals of GFSS?**

## COMMENTS

**Richard Choularton wrote:**

Already, scalability is a criterion. As part of our prioritization of research that can lead to large-scale impacts, we should prioritize programs that help build the systems needed to move from intensive pilot implementation to more large-scale, cost-effective implementation. What do we need in terms of policy, management, technology, institutional arrangements at the local and national levels, logistics, budget, business models, etc. assess whether research that seems scalable is scalable?

**Laura Schreeg wrote:**

Hi Richard, I think you raise some great points about the need for an enabling environment that supports research products (whether they be practices or technologies), and I agree there is a lot to learn about this topic.

It's something the USAID Bureau of Food Security (BFS) has been very interested in and we recently supported Management Systems International to conduct a series of case studies to better understand the adoption of agricultural technologies. The studies considered the characteristics of innovations (e.g., ease of adoption, clear need and immediate benefit), the characteristics of the country context (e.g., supply constraints, presence of complementary services), and drivers and strategies (e.g., strength of private sector actors, supportive public policy environment, identifying early adopters). The findings are then applied to recommendations for program design, highlighting the value of a donor playing facilitative role in implementation. The [Synthesis Report of Successful Scaling of Agricultural Technologies](#) provides a summary of the five case studies. The individual studies are available on Agrilinks and the USAID Digital Experience Clearinghouse (DEC).

I think a lot more work is needed in this area. The questions you outline are key to moving research investments from research institutions to delivery pathways (public or private) that can sustainably provide access to end users (e.g., smallholder producers, processors, seed producers) and promote diffusion of adoption.

**Richard Choularton wrote:**

Thanks, Laura. I look forward to reading the report!

**Archie Jarman wrote:**

Building off of the 2011 FTF Research Strategy's goal for country-led implementation, as a maybe a foundation, I have noticed that a comprehensive knowledge/awareness of the audience of the technology or area of research is an important criterion for evaluating and prioritizing interventions, and gender should be a big part of that. For example, in terms of horticulture, is this a technology that will be widely adopted by women farmers? Or is it geared towards male smallholders? Or has it not been considered, in which case are there any barriers in adoption by women? This knowledge will also improve the probability of successful adoption, scale-up and ownership of the new technologies produced through research.

**Stephanie Mercier wrote:**

I think that USAID should commission a serious study about what techniques work in helping to disseminate new, more sustainable agricultural practices in developing countries. If we can figure out ways to help nudge the pace of that dissemination, it would make the funds we invest in developing those practices even more cost effective.

**Robert Bertram wrote:**

Stephanie--we think a lot about technology adoption communications, and in social and behavior change communication more broadly. It's interesting to think what research could tell us--I think many of our research partners do integrate into delivery partners or do consider how best to communicate about innovations...but you are right that we could probably learn what constitutes best practices. I hope some of our colleagues from the extension side will join the conversation...as they think a lot about this subject. Thanks for engaging on this!

**Summer Allen wrote:**

I agree with this comment. I think there is not enough clear information on what has worked for sharing information for agriculture and how to build on the opportunities. We tried to look into this recently but much more information is needed about why particular apps are accepted: <http://ssa.foodsecurityportal.org/regional-sub-portal-blog-entry/sub-sah...>

**Stephanie Mercier wrote:**

Rob--A good starting point might be to pull together what is known about dissemination patterns from studies on Feed the Future projects over the last several years, and then try to identify what gaps need to be addressed.

**Pietro Turilli wrote:**

Good morning all.

There has also been some thinking on the issue of dissemination/delivery in the CGIAR community (which Rob is no doubt aware of) at several past Fund Council meetings that might be dug up and contribute to this discussion.

**Stephanie Mercier wrote:**

This discussion also feeds nicely into the need to invest more in human and institutional capacity building in developing countries. Without mechanisms to distribute information to the farm level, a lot of good research work might never be implemented by actual farmers.

**Global Knowledge Initiative wrote:**

Good point, Stephanie! Appropriate dissemination pathways and mechanisms from ivory tower to farm are critical. As findings from the social and behavioral marketing sectors show, access to information may not be enough. Farmers, like most people, are complex and their choices are driven by a myriad of factors.

**Robert Bertram wrote:**

Indeed, thanks Pietro. We need to be strategic about research outputs and other innovation uptake just as we are about research strategy. In the context of Feed the Future, our Missions work hard to drive changes at the household/community and food system levels. But I think for research it's being able to envision those connections between research outputs and how they will reach scale that we need to always keep in view.

**Pietro Turilli wrote:**

Very well stated Rob - making the connections to households and ensuring dissemination of new technologies/improved varieties so that we can then achieve impact at scale. I wonder if some friends from players such as One Acre are on the call - to add their voice and experience in terms of scaling challenge.

**Robert Bertram wrote:**

Thanks Stephanie--I know that my colleagues working scaling technologies have tried to do that.... Laura Schreeg put a link in her comments above that you would be interested in. But I will put your idea on the table and perhaps we can do some sort of stocktaking across the range of research, but also mission investments. So often it's those implementing partners that are doing the "last mile" in reaching farm communities...and there's a lot of great innovation occurring in that space.

**Stephanie Mercier wrote:**

Rob--It's great that innovations on how to disseminate knowledge are occurring along that 'last mile,' which I agree is crucial. It would be even better if we can do a better job of sharing knowledge about how those innovations are working, so that the partners aren't constantly having to re-invent that wheel.

**Richard (Dick) Tinsley wrote:**

All this chat on communications has a predisposition that education is the problem and once learned farmers will follow. This is only as valid as the innovation is operational feasibility, and the farmers have the labor or other means to adopt the innovations. I would contend that this is rarely the case and farmers have already optimized most innovations to their limited operational resources. Again I refer to the link: <http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeas...> as well as links within the article. We must stop trying to badger farmers with information they are reasonably familiar with, but don't have the means to take advantage of.

**Stephanie Mercier wrote:**

I have downloaded the report that Laura provided the link for, and will look at it.

**Ruth Meinzen-Dick wrote:**

To come back to the point about access to information: this is another case where gender matters. Under the CCAFS program, we did an analysis of adoption of a range of climate-smart agricultural practices. What we found was that, broadly speaking, women were much less likely than men to have access to information about the technologies, and that when they did get information, it was often from different sources (such as women's groups or religious groups, rather than from formal extension systems). That means that you can either try to get extension systems and "conventional" approaches to reach women, or try to reach women through the sources of information that they do have and trust. To do that you need to understand what that is (a sneaky plug for the

potential value of social science

research). <https://cgspace.cgiar.org/bitstream/handle/10568/65680/Gender%20and%20Institutions%20Working%20Paper%2079.pdf>

**Robert Bertram wrote:**

Hi Archie--thanks for flagging this. Our goal is to integrate gendered thinking in every aspect of food security research--so yes, key aspects such as targeted extension using women as extension agents, friendly technologies, for example some irrigation and mechanization technologies can be used more easily and readily by women than other options, are considered both in research design and in project implementation.

**Krista Jacobs wrote:**

The Feed the Future Small-Scale Irrigation Lab is a good example of designing & testing technologies with women on their own farms (with more realistic conditions than a demo plot!) and working with researchers to assess & design for gender-equity in irrigation projects. - <http://ilssi.tamu.edu/news/all/ilssi-technical-workshops/>

**Ruth Meinzen-Dick wrote:**

Thanks for mentioning this work on gender and irrigation. As part of that project, we have also conducted qualitative research on men's and women's experiences with small-scale irrigation technology (but the principles may apply to other technologies as well). We find that group-based approaches can often increase the likelihood that women can adopt the technologies. Even after adoption, women may be using the technology, but they often don't control the benefits that are generated by the technology, especially when it is a large "lumpy" output (e.g. a grain crop) or sold through formal markets; women are more likely to be able to control the produce and income from vegetables, which have smaller harvests over time, and are less likely to be considered by the men. What this implies is that if you want technologies to benefit women as well as men (and not just add to women's workloads), then you need to consider what women want and need, and also how market systems can be set up so that they receive the income, whether this is through mobile money payments or payments via women's group accounts.

**Paige Castellanos wrote:**

Agreed. Also, we need to understand both how the intrahousehold dynamics may affect adoption of a certain technology and how the adoption may impact inequities within the household (both positively and negatively). This can be key when we are considering outcomes of hunger, malnutrition, poverty etc.

**Deepa Thiagarajan wrote:**

Social protection and nutrition are keys for resilience-building. We need to take stock of what countries are doing in nutrition-sensitive social protection--what has worked, lessons learned, challenges in design etc. Can USAID comment on how the GFSS integrates social protection elements with food intervention aspects?

**Archie Jarman wrote:**

Great point, and building on nutrition research, the impact of small-scale horticulture on household dietary diversity.

**Cary Fowler wrote:**

This is a point worthy of some exploration. We obviously have more data on the staple crops than we do on those "minor" crops produced at the household level for family consumption. Does this disparity in data cause us to undervalue these horticultural crops? Does it cause us not to recognize the research opportunities and payoffs? If there is such inbuilt bias, how can we address this? How can we fine-tune our criteria? Any suggestions???

**Archie Jarman wrote:**

Great questions! In terms of staple crops, we have seen great success in improving yields and abiotic resilience through well-funded research. To compliment that success, an increase in funding for research in horticulture would be effective, particularly due to the potential for fruits and vegetables to diversify nutrition and to be valuable source of added income.

**Robert Bertram wrote:**

This is an important discussion. We have some data from our Africa RISING program that shows that in a monomodal rainfall (one-crop cycle/year), even if a farmer does everything right (genetics, agronomy, fertilizer, crop management) on her 2 ha, she won't be able to raise her family above the poverty line just through growing a staple. To do that, she needs to be able to integrate a second crop, move to higher value crops (especially horticultural ones), integrate livestock...and after doing these means diversifying, investing in irrigation, or other means that allow a more diversified production system and livelihood. I mentioned one of these this morning in my talk...the doubled-up legumes.

Unfortunately, this is not easy for risk-adverse farming communities to do. Our work has led us to conclude that what is needed is not only a wider set of opportunities and ways of increasing productivity and incomes, but also reducing risk. Thus, investment in both staples (e.g. drought tolerant maize) and diversification options (vegetables, higher value crops/legumes/fodder, livestock and water/mechanization) are needed. Lowering risk and raising productivity of staples helps open diversification opportunities (a push!) and better, more affordable means to integrate new crops, livestock, irrigation etc. makes those things more accessible (a pull!). Policy matters for a lot of these outcomes too!

thanks to you both.

**Lawrence Schaefer wrote:**

Understanding the vulnerabilities and the needs begins the foundation for creating the program that provides all the right solutions. I've been building a model that does just that, using aquaponics. I grew up on a traditional generational family dairy farm in Iowa but now I understand how unsustainable that was and is. In this type of production, you can grow all your fruits, veggies, herbs, and fish but also grow the food needed to feed all the other animals that are needed to be raised for a complete diversified production. To provide opportunities for all ages, genders, and races and increase capacity in all aspects while at the same time mitigating the exposure to all the vulnerabilities it is essential that we seek out things we have never done. All the answers to the solutions that people are seeking are available, we just need to be open to the possibility of what it may look like.

**Robert Bertram wrote:**

Deepa, the whole area of how social protection integrates with, for example, nutrition sensitive agriculture seems ripe for exploration in pursuing a resilience agenda. Thinking about vulnerable communities--and frankly many of the communities we work with across our efforts have high risk profiles--it would be good to look at the connection between technology agendas and allied social protection investments. Thanks!

**Susan Pologruto wrote:**

Yes, social protection and safety nets is part of the GFSS under resilience. One way that it could be integrated in food interventions is by taking a systems thinking approach similar to the [Nutrition's Pathways Model](#).

The [Local Systems Framework paper](#) is helping to frame the conversation on the importance of systems thinking and understanding the interconnectedness of things. So, that is one approach.

**Gregory Collins wrote:**

There has been a growing recognition of the centrality of social protection to resilience by donors such as USAID (including in the GFSS) and DFID, but even more importantly by governments themselves. In addition to providing a predictable transfer that enables risk-averse households and communities to pursue pathways out of poverty and chronic vulnerability, the need for shock responsive social protection when events such as droughts do occur is also now widely recognized. Ethiopia's Productive Safety Net Programme and Kenya's Hunger Safety Net Programme provide rich lessons learned in the face of recent (and current) droughts on the role shock responsive social protection can play in enabling earlier (and cheaper) responses and protecting development gains (including nutritional gains) among people and places subject to recurrent crises. The question of how shock responsive social protection systems have performed in relation to nutritional outcomes is, indeed, important....and under-explored

**Richard Choularton wrote:**

Great point Greg. We will only be able to answer these questions if we get the resilience measurement systems we need in place, especially systems that measure nutrition, food security, and livelihoods outcomes over time so we can see the trends and compare the differences.

**Archie Jarman wrote:**

Regarding the indicators that align with the 2011 Feed the Future Research Strategy, one thing to consider is that the question driving the indicators should not necessarily be, will this research have impact? But rather - if we did not get an answer to this research question, what would be the ramifications on our current activities/initiatives? Also, what policy or practice will the results of this research influence? The true "impact" of research is not what happens during the project itself, or even the immediate results of that research, but what happens with those results afterwards. Does it change anything? What was it seeking to change and is it doing that? Essentially a recognition of the importance of research that does not successfully result in positive indicators, but, successfully answers questions that can then focus research in the future.

**Paige Castellanos wrote:**

This is a good point. While we need to capture and focus on the number of farmers participating in the programs, or household members that are benefiting, it is also important to emphasize the research aspect and how can we best connect the research to broader policy implementation.

**Robert Bertram wrote:**

Fair point Archie--I think what you're saying is that we need to think systematically about impact pathways, and that some may be indirect since they will lead to changes in other decisions and outcomes.... we can keep that in mind across an array of potential criteria for research. Thanks!

**Tom Gill wrote:**

A few quick thoughts/suggestions regarding the 2011 criteria (and updating or revising them) from the framing paper:

- no specific mention of "gender" was in the framing paper
- criterion: "Economic sustainability for producers/adopters" seems limiting. What about the economic sustainability of all stakeholders in various value chains?
- criterion: "Institutional sustainability/impact on capacity: engagement of national and regional partners". I would suggest that capacity development needs to also focus/mention local partners (in addition to national and

regional). Also lacking is any mention to cultural/social sustainability, though this may be implied in some of the other criteria.

**Robert Bertram wrote:**

Hi Tom--thanks for weighing in. Big oversight on our part on gender--we engage our gender advisors throughout the research programs and our partners frequently have social scientists who focus heavily on gender in terms of adoption, outcomes, etc. Also, good point...the new GFSA Results Framework encourages us to think across the agriculture and food system--productivity gains and sustainability on farm and post farm...things like reduced post-harvest losses, value addition. All of them offer sustainability and investment gains for many different stakeholders beyond producers

**Tom Gill wrote:**

Thanks, Rob. Appreciate the feedback! Yes, systems-thinking approaches need to be encouraged. The trouble is... that is hard to do and somewhat of a paradigm-shift from our traditional way of compartmentalizing/focusing on specific aspects of systems. I appreciate that USAID is increasingly recognizing the need for systems-thinking, despite the difficulties that entails!

**Cary Fowler wrote:**

Sorry for being late - I just had to resolve a little technical glitch. Hi, I'm Cary Fowler, connecting from a hotel room in New Orleans, and co-facilitating this session with Rob Bertram. Welcome.

**Lawrence Schaefer wrote:**

As a government institution, it is best to begin by looking at definitions to ensure we are all talking the same language. What is sustainable agriculture? In the definition, I believe there cannot be a usage of fossil fuels, there must be water conservation practices, there has to be a move to eliminate the usages of chemicals, there needs to be diversity of produce in the production, what is being produced needs to have nutrient density. I also believe to come up with ag plans one must consider the location of site of implementation, such as, what works in the U.S. may not be the best solution for most locations in Africa. Also, taking into consideration nutrition we need to look at what was the diet of man, originally. For example, in Africa, cassava was introduced during the colonial period but now is a mainstay for most households. How many of our grains have been manufactured or introduced into a foreign environment? Lastly, I will raise the subject of animals in the ag system. Under the same concept of definitions for sustainable ag we need to ensure we are feeding our animals only those plants we can verify that have not been engineered or enhanced with chemicals and they have been grown without chemicals. We need to ensure we are not sacrificing quality for quantity. This is proactive health care!

**Robert Bertram wrote:**

We certainly want all we do to be sustainable, but we are also trying to change systems in ways that result in real gains in productivity, incomes, diet quality and savings/household resilience. We cannot prescribe that farmers do anything--but we can try to give them a wider array of choices that meet their needs.... technologies, soil and water practices and inputs of various kinds--and then they decide what is best for them. I think our job in research is to try to ensure that the poorest and most vulnerable people in the world, many smallholders in rural underserved areas, benefit from revolutions in science, technology and communications.... but what they choose to use should be up to them. I'm sure we all agree on that. Thanks!

**Mark Manary wrote:**

This is the most excellent way to insert gender equity considerations into the process, not with a separate pillar-like program.



**Paige Castellanos wrote:**

While I agree that gender considerations need to be taken in every project and there is a need to have every program be gender sensitive, we have to be careful that as a cross-cutting theme it doesn't disappear. There is a risk that without gender focused programming a real in-depth understanding of the gender dynamics and impacts will be missed.

**Cary Fowler wrote:**

Thanks, Paige. It's an important point. We speak of enhancing food production and nutrition, for example, but may not always consider how certain crops/livestock are produced - predominantly by men? By women? As part of a household garden. An urban garden? In this context, decisions about the focus of the research can have differential impact.

**Pamela Anderson wrote:**

Paige, I think that this is precisely the lesson that we learned in the CGIAR. For about 10 years, we had a standalone system wide program on gender. That research and work was essentially ghettoized. Then, with the reform in 2008, we mainstreamed gender into each of the 15 programs, but without a complementary standalone program. What the formal assessments (several years in) told us was that gender within the programs was being deprioritized for more conventional research investments. What I took away from this was the need - as you point out - to (where relevant) mainstream gender research, but also maintain a small cross-cutting element that could harvest the program results, generate new/overarching research questions and socialize/feed lessons back into the programs to accelerate progress.

**Paige Castellanos wrote:**

Thank you for sharing this experience. It seems like some sort of balance in the approach is needed to make gender research - and essentially all the other research focus areas - effective.

**Robert Bertram wrote:**

Thanks Pamela and Paige--we have had incredible help from the BFS gender team. Krista Jacobs, Jeannie Howard and others, in really trying to make sure that the gender lens is there in the thinking that goes into the development of every research RFA...I think they can add to how we have tried to make sure we get this right--but I'm sure there's more space for on-going learning. For example, also in the work on scaling technologies and research outputs.

## New opportunities in science

APR 18, 2017 10:02 AM by [ROBERT BERTRAM](#)

In addition to developing criteria to help guide decision-making across the entire Global Food Security Strategy (GFSS) research portfolio, we recognize that there are new scientific opportunities that can drive innovation and progress toward the GFSS goals. Recognizing that several federal science granting agencies make significant contributions of relevance to the GFSS's goals, we would like to learn from the global scientific community how the research programs supported under this strategy can leverage the range of technologies, tools and approaches that have been supported by other investment.

- **What research technologies, tools, and approaches can the U.S. Government leverage to accelerate progress towards the three objectives of sustainable and inclusive agriculture-led economic growth, resilience, and improved nutrition?**
- **What investments made by science granting agencies outside of USAID should we be aware of that could be leveraged by research programs to enhance the efficiency and quality of our work?**

## COMMENTS

### **Mark Erbaugh wrote:**

One approach that needs to be pursued is strengthening the capacity of tertiary educational institutions. As recent analyses have indicated, strong institutions of higher education are fundamental to sustainable agricultural development. Short term technical assistance and technology transfer from the outside have generally proven to be short-lived and non-sustainable. We must develop the local institutional capacity to create or adapt technologies to local contexts. A fundamental dimension of tertiary institutional capacity strengthening will be enhancing the linkages between these institutions and the private sector to facilitate R&D and technology transfer.

### **Cary Fowler wrote:**

Thanks for your observation, Mark. Through my work with BIFAD (and USAID), I have noticed the development of some strong linkages between U.S. universities and counterparts in developing countries, working on specific joint research projects. The research seems productive, but I take your point that beyond that output, we should appreciate and promote the capacity building benefits as well.

### **Robert Bertram wrote:**

This has important bearings on the "how" of carrying out research, as Cary notes. I also think you have hit on a key issue--sustainability, and the ability of our country partners and their agricultural and food systems to access, develop or adapt solutions to the problems they face. Capacity building at the university level is probably seen as one of the lasting contributions of US development assistance writ large. Its strategic value isn't always quantifiable in the short term, but I have encountered it time and again around the world, as leaders draw on their experiences in university and their collaboration with American collaborators. Thanks for highlighting this Mark.

### **Elizabeth Dunn wrote:**

Several USG agencies are conducting research on hyperspectral imaging, with and without remote sensing. We could potentially use that technology to drastically reduce the cost of collecting critical MEL data on adoption rates and scaling, particularly on land area planted under new crops and technologies. Hyperspectral imaging could not only provide data on the spread of adoption, but it also has the potential to provide information on the nutrient content of crops while they are being grown (in the field).

### **Cary Fowler wrote:**

In addition, this technology might also help us get a handle on the factors behind non-adoption. Thanks for this valuable contribution.

### **Britta Hansen wrote:**

One possible area of exploration may be around wild species related to crop plants as sources of genetic disease resistance. Native plant populations, gene bank collections, landraces, and other plant genetic resources for crop improvement and genetic research to improve crop adaptation; including enhanced resistance to environmental stresses, pathogens, and pests. In Rob's presentation, this morning he mentioned drought resistance in maize- there is a lot more work to be done in this area. Additionally, cutting edge genomics approaches to discover, understand, and access novel disease resistance genes for crop improvement can be employed.

**Cary Fowler wrote:**

Valuable points, Britta. You are probably aware of the work on crop wild relatives being done by the Global Crop Diversity Trust and Kew Gardens. One area routinely overlooked in this general area concerns our collections of "minor" crops. These collections are spotty at best and typically not something upon which you would want to base a plant breeding program, particularly one for wide adaptation. And yet in a climate changing world, we might find the relative importance of some of these crops increasing. Minor crops effectively fall between the cracks in terms of collecting and conservation, not to mention breeding. There may be institutional and financial reasons for this, but I personally question whether there are any justifications from a food security standpoint. Do we have our priorities - and our priority setting criteria - right? I'm just not sure, because I so rarely see data on these crops considered in priority setting exercises. Any thoughts on this?

**Britta Hansen wrote:**

Cary- I think that crop wild relatives hold great promise for our major crop plants (not just minor ones) that feed most of the world. And as you said, they are sources of valuable genetic resistance to diseases and pests. One only needs to look at the threat posed by the African stem rust races, which were virulent on >80% of wheat cultivars and >95% of barley cultivars worldwide. We know the wild relatives of both crops are a virtual treasure trove of resistance genes against the widely virulent races.

**Max Rothschild wrote:**

Using sequencing to find natural variants and coupling that with genetic selection for improved livestock should be an area that is better funded. This could include genetics related to heat stress and disease resistance in livestock.

**Edye Kuyper wrote:**

My apologies for being late to this conversation. There is increasing awareness of the need to better understand why various interventions do and don't work, and what contributes to and constrains the opportunity to scale up promising approaches.

A stronger emphasis on implementation science, or process evaluation, is essential to being able to answer these questions, and is gaining increasing traction. This type of mixed-method approach is essential as programs become increasingly integrated, and traditional RCTs and M&E exercises are less able to account for why and how some interventions do better than others.

**Richard (Dick) Tinsley wrote:**

Discussion Summary from the Unrepentant Heretic

I would like to take advantage of the offer to accept comments through Friday to offer a few summary comments.

I have carefully followed and contributed to the discussion over the past 3 days as best I could while also preparing and shifting from Colorado to Boston. Here are some of my summary comments.

1. I really think we need to carefully distinguish between research and development as the two are different but complimentary activities. With research setting the target and physical ideal, and development being the reality check. If you really think about, it is kind of absurd to think that what was done in a small plot under the most ideal operating conditions could be easily extended across an entire farm or community, with the limited resources available to smallholder farmers. Thus, while the researcher is typically held in highest esteem, it is really the development professional who has the most challenging and rewarding job. They have a much more holistic task of sorting out the rational compromises farmers must make in applying the research ideal to their specific situation, and then figuring and facilitating what is needed to bring the farmer operational resource base more in line with what is needed to more fully utilize the research result. This should assume that extension/education is most likely the least of the problems. This all gets back to one of my comments in the discussion

2. I was pleased to see the mention of labor as being in limited supply, but it was not really factored into the research programs as the major impediment to transferring research to farmers' acceptance. In this regard, it might be good to take a closer look and the yield gap studies that go back to Randy Barker and Bob Herds work at IRRRI that was done 40 years ago. This continues to be based mostly on inputs like seed, fertilizer, crop projection, etc., but noticeably missing is labor. It is just something we have always assumed was unlimited and never really conceptualized it as limiting. I would wager if we looked at the agronomic impact of limited labor on time of planting, the compromises in plant population and quality of weeding etc., it would account for about 90% of the yield gap. This would also explain much of the difficulty farmers have in adopting many innovations. How often are the innovations mentioned in the discussion as difficult to get accepted more labor intensive than the current practices? I would also note researching labor impact this could be tricky, as it involves whole farms if not communities and not just small plots.

3. This of course all get back to my main concern that operational feasibility of innovations as written up in the article referenced in the discussion. This mentions an administrative void between the agronomist and social sciences that needs to be filled, mostly from the social scientist side. That void in not only determining the amount of operational resources needed but also the availability and rational compromises when not available. This administrative gap must be filled before there is any hope of assisting farmers out of poverty. Once this is appreciated the emphasis shifts from badgering farmers with extension information for which they have a reasonable good understanding to facilitating access to the resources need to fully utilize the knowledge. The link is: <http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeasibility.pdf>

4. On the nutrition side, the discussion remained rather conceptual with little quantification as how much animal product or other nutritional parameters were needed. More importantly, very little was said about the relationship between dietary energy and labor. I think there needs to be a statement in the final report referencing the need for at least 4000 kcal/day for those engaged in heavy manual labor. For impoverished people, someone in the family is most likely engaged in this type of work and needs this dietary energy to sustain that work requirements so they can provide the nutritional needs of dependents, like small children or pregnant and/or nursing women. Similarly, little was mentioned concerning how affordable or produce-able of the desired diet designed for the impoverished people, and what were the rational compromises they should make in quality of diet to accommodate their limited circumstances, and how that will impact future sustainability. Is their poor diet really the rational compromise of the designed diet to their limited base? I put out an exercise that would look at this. It attracted a couple positive comments. But really needs to be factored into the research effort. If not I fear the dietary research will be more academic, then practical for most of the beneficiaries.

5. On a little provocative note, when I see project promoting more labor intensive innovations and thus asking the poor, hungry, exhausted people to work in excess of their available calories, I often feel attempted to refer them to the International Criminal Court (ICC) in The Hague to investigate the individuals of the charge of advocating, promoting, and conspiring for the genocide of the smallholder farmers as a crime against humanity. Not that I really want to see people getting punished, but more to force them to take a closer look and make some serious program adjustments. I doubt if it would take more than a couple such referral to get this dietary energy balance a much closer and sincere look.

6. Finally on the capacity building side, this has to be done with a clear understanding of the very limited tax base of most developing countries, and how that restricts the services that can be done. To develop capacity in excess of financial resources to support has a high potential for getting paper compliance, and opportunity for serious corruption. You might want to review the webpages related to this:

<http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeasibility.pdf>

<http://smallholderagriculture.agsci.colostate.edu/financially-stalled-governments/>

<http://smallholderagriculture.agsci.colostate.edu/impact-of-financially-stalled-government-limited-variety-improvement-seed-certification/>

<http://smallholderagriculture.agsci.colostate.edu/informal-income-opportunities-seed-fertilizer-voucher-program-of-afghanistan/>

Thank you for allowing this heretic's summary.

Dick Tinsley

## Technology adoption - relevance and research questions on uptake and impact

APR 18, 2017 10:03 AM by ROBERT BERTRAM

This is our final set of discussion questions on criteria for focusing research investments.

- **How might the relevance of a technology (i.e., the likelihood of widespread uptake/adoption) be addressed when considering criteria for prioritization?**
- **What types of investments are needed to help maximize the uptake and impact of agricultural research investments? What questions do we need to ask to understand why, how and where technologies are being used?**

## COMMENTS

### Mark Manary wrote:

I am a believer that improved technology can make targeted impacts. I believe it is wisest to spend money around innovative technology rather than policy reform, lobbying, activism, building infrastructure or education. Good technology will be incorporated more quickly than good ideology. Choose a context (location) that is ready for the technology to impact that also impacts extreme poverty, this is difficult, so look for evidence of both. The innovative technology needs to be met with adequate infrastructure to allow it result in benefit. Can there be co-location with USAID infrastructure projects?

### Jennifer Cisse wrote:

There are many constraints to uptake of a certain technology. Certainly, if a technology is unlikely to be adopted by the targeted population (for example, the poorest and most climate-vulnerable farmers in a given region) then the research investment is ineffective (at least in terms of the GFSS) and should not be prioritized.

It is therefore vital that research investments be made in understanding farmer constraints and decision making, given their assets, resources, access to markets and finance, and risk exposure.

### Elyssa Lewis wrote:

One of the biggest constraints to adoption is risk and the lack of access to insurance. Farmers are less likely to invest in improved varieties, fertilizers, irrigation, etc. if there is a high likelihood the drought could wipe out their crop. It seems a safer bet to plant lower yielding local varieties and then intercrop with drought tolerant crops like sorghum. More research and investment should go into the creating of access to credit and insurance markets for farmers.

### Global Knowledge Initiative wrote:

Here, at the Global Knowledge Initiative, we feel there is a need to deepen and expand the collective understanding of technology adoption enablers and barriers within the agriculture space. Drawing on our work tackling post-harvest loss in Sub-Saharan Africa, we see knowledge gaps around levers that trigger behavior change, especially among smallholder farmers. We would advocate for investments that help agriculture actors gain a comprehensive understanding of levers such as the knowledge and skills that create the capacity needed to change, the resources that set up opportunities to change, and the incentives that motivate change. This calls for investments priorities that are underpinned by a systems perspective. Investments, interventions and approaches that do not account for the systems that frame the food and agricultural challenges we face will likely keep us from realizing sustained impact.

Here are a few focusing questions we attempt to consider within our work:

- How might we better understand the levers that trigger behavior change? How might we leverage our understanding of these triggers to increase uptake of relevant and appropriate technologies/ innovations?
- How might a systems perspective help us better understand the challenges we seek to address? How might a systems perspective help us prioritize the innovation opportunities we pursue? How might a systems perspective help us clarify a transformational innovation and investment agenda for agriculture?

**Robert Bertram wrote:**

Well said! Understanding specific opportunities as well as contexts needs to be a frame across our research portfolio.

**Kristin O'Planick wrote:**

I love where you're going with this. It's critical to step back to a systems lens to prioritize. A value chain focus will have blind spots in regards to the full household economic picture that determines willingness and ability to change behaviors including adopting new technologies. But even more important, instead of thinking first of technologies, we need to first identify the systemic constraints that are impeding the performance of the market systems. We aren't being efficient if we are promoting technologies for the sake of technologies and they aren't addressing a binding constraint for the market and the market actors that we're targeting.

**Robert Bertram wrote:**

You both raise really good points. We need to think about both component technologies, but also the context to which they will be adopted. Our mission value chain programs, and programs such as AGRA and many other development programs can try to span both the targeted interventions but also an understanding of the system and decision making that will affect uptake by farmers or others along the value chain. Thanks for these insights!

**Cary Fowler wrote:**

All of the participants on this thread so far have emphasized the importance of Context. While context can change, and while we can even work to change it, I take from your comments the advice that we really have to be careful in supporting research that depends, for example, on farmers changing hard-to-change practices. Too often great research that produces great results at the research station fails to make an impact at the farm level. Would it make sense to catalog our experiences in this area and see if there are commonalities? I think we can all cite examples, and I have a feeling (not backed up by any data - just a feeling) that certain types of research all too often lead to research station but not farm level breakthroughs. Is there something we could learn from this? Should research investments be reallocated accordingly?

**Global Knowledge Initiative wrote:**

Great questions here! It seems some of these can be tackled by considering how typical factors, such as who drivers research agendas and why/how research is being conduct, continue to propagate these types of knowledge gaps. For instance, crowdsourcing perspectives (as you are currently doing through this forum) is an excellent approach to moving beyond a typical lit review in clarifying a research agenda. However, I would ask what voices are absent from this forum (e.g., smallholder farmers) and how they can be integrated into these discussions. Additionally, I would consider how you hope to undertake research (such as those who will be commissioned to conduct the research, methods that will be used) and how you can draw on diverse groups and different approaches (e.g., human centered design and complexity tools) to round out this effort.

**Pamela Anderson wrote:**

One of the voices that I feel is most absent from the conversation this morning, and particularly this thread of discussion is the private sector. And, also, colleagues engaged in market research. I feel that we have learned the lesson (so well by now) that doing research and pushing it out, will not get us the dissemination - uptake - adoption that we need and desire. But, what we might not be investing in sufficiently is the market demand lens, including consumer preference (including women's preference). Investment here would not only include financial investment, but also greater investment in partnering. At least two of the foundations (Syngenta and Gates) have been working actively to better understand public-private partnerships and last mile delivery. Private sector and market research are critical voices to that discussion.

**Hillary Egna wrote:**

**How might the relevance of a technology (i.e., the likelihood of widespread uptake/adoption) be addressed when considering criteria for prioritization?**

Predicting relevance of technologies is difficult and perhaps not the best or primary metric to be used for prioritization. Unintended benefits and consequences come from even the best planning, and selecting areas that have the most relevance today may leave off discoveries for tomorrow. It is wiser to fund scientific research and subsequent technology development at various stages of uptake readiness, and to partner with private sector for tests of true scaling and relevance. If a technology is a 100% public good, then private sector uptake for testing/scaling may be low and will need to be spurred. Also, if tech relevance is a main criteria for prioritization, there may be a bias towards simple technologies, tiny fixes, and away from the riskier ventures involving basic science or more complex technologies. While technology relevance seems like it can help direct scarce funding resources, it can hamper innovation in science. Should the USAID portfolio become more technology driven, perhaps consider BFS partnering with agencies offering SBIR funding to spur technology creation from promising scientific research.

**Jennifer Woodward-Greene wrote:**

**“What types of investments are needed to help maximize the uptake and impact of agricultural research investments?”**

One strategy/investment may be to develop a support or mechanism to integrate a big data model to capture technology adoption, trends, and possibly emerging technology needs. Where possible, by integrating mobile technology features into research and applications of improved management practices, new crops or breeding strategies, as they are implemented or tested by farmers. This may provide a new window into needs, as well as what is, or is not working from research and education efforts.

(re-posted from opening discussion)

**Robert Ackatia-Armah wrote:**

It is also important that research responds to specific needs of the countries that missions provide aid and support to. While US-based university or other research institutions conduct research in many developing countries, they do not always respond to the needs of that country. It is important to look at research that responds to needs and not only academic interest all be it important

**Genevieve Croft wrote:**

Robert, this is a great point. Research investments must be responsive to the needs of the local community. In the context of this discussion thread, I see that we must do better in considering the relevance of a technology before



making the research investment. And yet, more "academic" research will take longer to translate into relevant technologies, practices, or tools. How should we prioritize research that is immediately relevant and useful vs. research that may lay the groundwork for future successes?

**Chike Mba wrote:**

The mean adoption level of improved varieties of 20 'major' crops in Africa is 35% according to the report, Diffusion and Impact of Improved Varieties in Africa (DIIVA) Project, published in 2014. It stands to reason that unless adoption rates are improved significantly, investments in research may remain futile. Perhaps, research (and development) priorities should target the removal of the constraints to the adoption of well-adapted crop varieties. The low adoption rates, unfortunately, correlate with the use of seeds and planting materials of dubious qualities.

Researchers may also be interested in understanding why obviously beneficial interventions, in this case genetic gains, are not being exploited by the farmer – even in the absence of constraints like variety protection regimes. Many of the crop varieties studied in the DIIVA project were released by National Agricultural Research Systems – that typically do not impose plant variety protection mechanisms. Are the problems solely that of a lack of information, say, because extension services are weak? Or, are the problems more systemic, such as sub-optimal government roles that have resulted in generally weak institutions? If the latter, what could be done? What can bring about the much needed culture change?

**Cary Fowler wrote:**

These are interesting points - thanks for your contribution. The Pray, Masters, et al. paper (a literature review) associated with this AgExchange contains many references to the impact of modern varieties as well as references to at least one study of the counter-factual - what would the impact be of having no modern varieties (from the CGIAR, if my memory is correct). Uptake of research can be hindered at all stages, including at the very beginning when the choice of the research question and the target constituency is made. I take your point that priority setting should be robust enough to foresee as many of these roadblocks as possible and help us either overcome them or move on to other less problematic areas.

**Ruth Meinzen-Dick wrote:**

One of the key factors affecting technology adoption is the institutional environment. Technologies that can be adopted by individual farmers with short time horizons are relatively easy compared to more "lumpy" technologies--larger scale and longer time horizon between investment and returns. For larger scale, there has to be coordination institutions--either government, collective action, or markets (e.g. if someone buys big equipment and rents it out). For investments that have a long payback period, tenure security is important. Thus complementary investments in institutions (e.g. USAID's work on land tenure security) is often important for technology uptake. Institutional change isn't a mechanistic thing, but institutions can and do change.

**Samuel Black wrote:**

As a result of a conversation with Dr. Rosemary Dolan, Nairobi, I would like to ask whether poultry production in sub-Saharan Africa, where productivity can be limited by disease, drought and nutrition, would benefit from periodic introduction of genetic diversity by new breeding stock from Europe or elsewhere leading to hybrid vigor?

**Samuel Black wrote:**

Innovation in production systems is terrific but fruitless without quality control ... Recently application of the infection and treatment Theileriid vaccine regime in East Africa was compromised by unsanctioned sale of an

ineffective vaccine and also use of "fake" ear tags designating vaccination. In addition to supporting advances in application animal/crop technology it is necessary to support appropriate implementation, should support be earmarked to prevent subversion of implementation of worthy technologies by innovative crooks.

**Huajun Zhou wrote:**

Samuel brought a great point regarding to poultry production in sub-Saharan Africa, where productivity can be limited by disease, drought and nutrition. If periodic introduction of genetic diversity by new breeding stock from Europe or elsewhere leading to hybrid vigor. A similar approach has been used in the region without much success. There are several reasons why this approach could be much successful in other regions but not in the sub-Saharan Africa. 1. Poultry house and infrastructure in the region couldn't provide environment for introduced flock to perform well or even survived; 2. limited feed resource available locally; 3. Vaccination program is very difficult to apply in rural areas due to cold chain or quality control; 4. introduced flock has hard time to adapt local harsh environment; 5. cultural acceptance only indigenous local ecotypes. As Max suggested early, advanced genetic and genomic selection focusing on local ecotypes will be one of most promising approaches in enhancing resilience to disease and heat in Africa poultry and improving livelihood and food security by selecting natural variants existing in local chicken ecotypes (more accurate and efficient selection).

**Patrick Webb wrote:**

Just a caution about the idea of criteria for prioritization. Yes, targeting and focus always matter, and for research we have to stay focused. But for programming impact, adoption is often more about choice (like so much else) among alternatives. The more we move towards multisector actions (i.e. not just one technology promoted in one sector), then a household's ability to choose what works (rather than us trying to pick the winner) can be key to not just adoption but also for retention. This suggests offering a portfolio of innovations and allowing risk-takers to adopt what they feel will be most beneficial within their large livelihood strategies. Here is one example of what I'm trying to get across from a GIZ food security program in Malawi aimed at reducing stunting: <http://www.fsnnetwork.org/sites/default/files/webb-malawi.pdf>. In other words, sharpening an arrow is the role of research, but offering for programming offering a quiver of different arrowheads may ultimately achieve greater and more sustained impact.

**Barry Pittendrigh wrote:**

I think this is an important question that is critical in the discussions between BIFAD and USAID, as they think towards ICT programs that are critical for large-scale deployment of research outputs. The U.S. university system, and their global partner academic institutions (universities, CGIAR centers, and NARs programs, to mention a few), contain considerable expertise both in terms of technical knowledge, as well as the capacity to develop and research innovative and inclusive ICT strategies. There are many ICT strategies that are not inclusive of these aforementioned groups and do not tap into this considerable expertise that exists in the U.S. university system and their global partner networks. There are some excellent NGO based farmer-to-farmer knowledge sharing strategies emerging. However, this represents one niche of knowledge sharing and we need to expand on the other important niche, which is efficient sharing of knowledge from the global expert community with those that can benefit from such knowledge. Of course, such knowledge needs to be shared in a manner that is locally appropriate, visually understandable and in local languages and dialects using locally available platforms that, in many cases, the end users may own (i.e., cell phones). My question for BIFAD and USAID is as follows. How do you see long-term ICT strategies being inclusive of U.S. university systems and their global partner academic institutions? I think this question is very critical for us to address how we can efficiently go from research innovations to sharing these outputs with end-users in an efficient manner.

# Opening the discussion on nutrition research; diet diversity; animal-source foods

APR 18, 2017 2:00 PM by [JOHN BOWMAN](#)

Hello everyone, and welcome to the AgExchange discussion on the theme of nutrition research investments. Please read the [framing paper](#) and watch this [brief video](#) for an orientation to this discussion. A team of facilitators will be monitoring the nutrition threads for the next 19 hours, and you are welcome to add your comments through 5:00 p.m. EDT this Friday.

- **Let's start the discussion with a focus on increased consumption of safe and nutritious diets. What are the most strategic research opportunities around providing and encouraging more diverse diets?**
- **What are the most promising research opportunities pertaining to consumption of animal-source foods? How could research contribute to achieving consumption gains?**

## COMMENTS

### **John Bowman wrote:**

My name is John Bowman, and I am kicking off the Ag Exchange session on nutrition research with Arie Havelaar of the University of Florida. I manage the Nutritious and Safe Foods Program Area in the Research Division of USAID's Bureau for Food Security. In this Program Area, we implement projects on operational nutrition research, commodity-based research (aquaculture, horticulture, livestock), post-harvest loss reduction research, and bio-fortification. Now, we are working against a new Results Framework (emanating from the new Global Food Security Strategy) with a high level objective of "a well nourished population" (focus on women and children) with desired intermediate results in the areas of increased consumption of nutritious and safe diets, more hygienic households and communities, and use of direct nutrition services. The point of this AgExchange is to give us (the 11 U.S. Government agencies and departments mentioned in the 2016 Global Food Security Act) your thoughts on the most salient research needs, particularly in the areas of nutritionally-diverse diet provision and safety of the food and the environment in which it is produced and served. Please peruse the six posted nutrition questions (relating to diet diversity, behavior change, partnerships, food safety, water/sanitation, transformative solutions) and help us learn more about what is being done in these areas and where the gaps are. Again, please try to focus your contributions on the content of the six posts, and focus most on research gaps and more effective ways to partner. Let the posting begin!

### **Arie Havelaar wrote:**

Hello everyone. I am Arie Havelaar, a professor of Food Safety and Zoonoses at the University of Florida. I am chairing the WHO Foodborne Disease Burden Epidemiology Reference Group, and am involved in the feed the Future Innovation lab for Livestock Systems. WHO has demonstrated a huge burden of foodborne diseases in

Africa and South East Asia particularly, and I look forward to our discussions on which research is needed to start reducing this burden.

**Jan Low wrote:**

Our knowledge of food systems is inadequate. Basic research on consumption patterns in different agro-ecologies is not sexy, but needed. Poor people have limited resources, especially labor and financial. So building on core consumption work, and understanding the production parameters in different agro-ecologies, efforts could focus on identifying foods that meet at least 2 of the following criteria: rich in needed nutrients currently missing in the diet, easy to grow or raise, easy to store.

**Mark Manary wrote:**

in 10 years I think we will have much more powerful and accurate ways to assess dietary intake with metabolomics. This is 'new science' or 'new technology' that can revolutionize the nutrition field

**Cynthia Donovan wrote:**

Knowledge of food systems: I agree with Jan. Linking consumption patterns to agricultural production and to labor use can help identify feasible opportunities, i.e. those that are within the grasp of resource poor households in their environment. It can also help expand the identification of opportunities to enhance nutrition.

**Deepa Thiagarajan wrote:**

Some research questions and scientific opportunities to consider-

Are our current food systems delivering healthy diets?

Are we too focused on food quantity and not enough on quality?

Are we offering healthy and affordable food choices consistent with desirable nutrition outcomes?

Should then, research on food, agriculture and nutrition be re-focused on achievement of healthy diets?

Do we need modern metrics for diet quality and the food system?

**Robert Ackatia-Armah wrote:**

It is critical that we have a deeper understanding of consumption patterns of vulnerable populations. Food systems and diet remain quite dynamic and if linkages with food prices and income vary, we need to understand how these interface with the choices that people make and understand whether the choices people make for their food system are based just on nutrition and income or are there more personal behavior attributes we do not know?

**John Bowman wrote:**

Robert's comment regarding "choices" resonates with the idea that we may need far more research in the area of social/behavior change.... Rather than rushing out to analyze how poor the actual diet diversity is, and then rush out with Western-based solutions on how to correct those poorly balanced diets, we may be better off initially doing lots of analysis on the behavioral aspects behind the choices - beneficiaries may be well aware of distinct dietary attributes of certain foods, but instead they make other choices based on price, availability, perishability, taboos, etc.... Thus instead of rushing out to do immediate and possibly misguided "correction", we should invest more funding on analysis of why the beneficiaries make the choices that they do... with that understanding, our "correction" efforts on dietary diversity will be delayed a bit, but they will be more effective....

**Patrick Webb wrote:**

Yes to both you, John and to Robert. We know amazingly little about what is actually eaten in the households we seek to help through investments in agriculture. This, and returns to labour in farm versus non-farm activities, is one of the main lacunae in our understanding of pathways to improved nutrition. Too much is assumed, too little effectively measured. Diet diversity is not an adequately understood proxy for actual consumption yet. But we also don't know enough about the drivers of choice. I know that Gates is funding work in this space, but there's room for much more.

**Julie MacCartee wrote:**

I would like to know how diverse diets are perceived by beneficiaries. Is diet diversity valued?

Also, on what time scale is diet diversity most important? In measuring DD, many indicators measure what was consumed in the previous day, or the previous week. A single-day measurement seems too short, as the human body can thrive on ups and downs of essential nutrients. We don't have to consume *exactly* 700 micrograms of Vitamin A (RAE) or 18mg of iron each day, or as long as we are getting adequate average intake over the course of a week...or what other time scale?

**Richard (Dick) Tinsley wrote:**

Julie, To answer your question have someone in the field work through my exercise on hard choices and see how their responses change with potential income until they can fully afford the diet you desire. the link:

<http://smallholderagriculture.agsci.colostate.edu/1028-2/>

**Max Rothschild wrote:**

A very interesting exercise. Certainly worth doing. I will try to have my students work through some examples.

**Sarah McKune wrote:**

Very interesting exercise, for both student/training as well as research.

**Elaine Grings wrote:**

This question that Julie raises about frequency of consumption is, I think, an important one. We need to understand how to put it into practical terms, if animal-source foods are to be included in diets, what is the appropriate frequency? Does it need to be one egg a day, 3 eggs per week? One cup of milk per school day for a child? Is it the needed frequency the same for lactating versus pregnant women? For children under 2 versus school age?

**Erin McGuire wrote:**

Increases in income drive dietary shifts. While this can lead to improved human nutrition, it can also lead to increased consumption of processed junk foods and/or animal products, increasing cases of obesity, diabetes and heart disease, alongside malnutrition. The availability of and demand for certain foods influences these outcomes. Therefore, understanding the linkage between increases in income and changes in consumption patterns, as well as efforts to improve demand for healthy foods, such as fruits and vegetables, will be important to promote healthy outcomes.

**Richard (Dick) Tinsley wrote:**

Interesting comment, but I think most of our beneficiaries are far from indulging in junk food, and increase in income will allow them to afford more diverse and nutritional diets. However, there has been very little commentary on the affordability of the proposed diets and rational compromises people have to make in fitting the desired diet to their income levels

**Patrick Webb wrote:**

Would that were true, Dick. But our (Nutrition Innovation Lab) repeat panel surveys of 4,500 households across rural Nepal (including in the mountains and Far West) show that among top 10 food items purchased one always finds instant potted noodles (not micronutrient fortified), sugar, and packaged snacks (mainly of the biscuit/cookie variety). Such consumption even in the remotest regions (same in the mountains of Haiti or northern Uganda), relates to relative prices among foods, opportunity costs of time for food preparation (cost of fuel included), and convenience -- the "rational compromises" that you rightly mention. So while 'junk food' in this sense is not a MacDonald's hamburger or giant sized soda, it does relate to what people globally are now choosing to consume. And its already not at all what it used to be. Bottom line: we can't assume that increased income translates into better quality diet. If fruits and vegetables or dairy and animal source foods are not available at appropriate prices then they won't be eaten by the poor. Instant noodles will be....

**Meghan Anson wrote:**

Great point, Erin. I think there's a lot of work to be done around better understanding consumption patterns and consumer behavior, especially in the context of rising incomes and increases in nutrition-related NCDs.

**David Tardif-Douglin wrote:**

Another thing to think of as incomes and the rate of urbanization increases is how to use the increased demand for "easy to prepare" foods to strengthen the link between surplus areas and deficit urban areas. Increased understanding of how processing of domestic foods for rapidly growing urban markets can provide livelihoods for young people is important and timely.

**Erin McGuire wrote:**

One other thought on the importance of diet diversity - Animal sourced foods have become widely recognized for their nutritional value, especially protein. Fruits and vegetables are also known to supply vitamins and nutrients, but their value is understated compared to animal sourced foods. Further, while caloric needs can be met through starches and other carbohydrates, critical nutrients can be missing. Research to quantify the impact of diet diversification is important to clarify the link between these food sources and health outcomes.

**Elaine Grings wrote:**

Along with this is that we currently consider a diet to be adequately diverse even if it does not include animal-sourced foods (ASF). Considering the micronutrient content of ASF and the association of those micronutrients with cognitive development, can we really have an acceptably diverse diet for children and pregnant women that does not include ASF? At what ages and physiological stages should ASF be considered critical?

**Robert Ackatia-Armah wrote:**

The literature documents well what key interventions work for nutrition. Do we have only meta-analysis of these different interventions or do we have examples of how all these known interventions have worked when implemented together in the same population or community?

**Robert Ackatia-Armah wrote:**

Dietary Diversity and Feeding frequency are important variables in determining the minimally acceptable diet for children under 2. How do government policies rather than NGO programs support in country/regional trade to ensure that food moves freely across a country and or regions to ensure that diverse food is available? Due to ecoclimatic factors, food may not be produced or be available in some parts of a country but specific government policies can ensure some uniform distribution in term of availability. In the west, there is always more than local

produce in supermarkets because where food cannot be grown it is brought in to provide availability and increase the potential or possibility for the purchase of healthy options. I think accessibility is more complex...

**Arie Havelaar wrote:**

We are nearing the end of this part of the discussion on nutritious and safe diets, and I would like to summarize the discussions so far. It was suggested we need to integrate agricultural and health research, and consider food systems rather than isolated parts. Children, from before conception, need diets that are rich in proteins, nutrient dense and diverse to support health and development. This is challenging but necessary. Likewise, promoting safe diets requires considering the whole chain, from agricultural production to final preparation. There is a need for affordable technologies, for creating awareness of hygienic risks and for behavior change.

We know little about the burden of foodborne disease, or the zoonotic disease risks associated with food production, such as exposure to animal feces leading to environmental enteric dysfunction. More data are needed on key pathogens, and key risk factors. Randomized clinical trials can help to quantify the impact of risk factors, as well as provide evidence for effective interventions.

**John Bowman wrote:**

Here are my key takeaways from the 3 posts on BCC, nutrient-dense food partnerships, and diet diversity:

- There is a high degree of interest in more N research involving analysis of social behavioral change communication; beneficiaries may be overriding or ignoring nutrition education messages put out by the development community due to aspects of income, poor availability/access of recommended foods, personal/family beliefs (taboos) that are unknown parts of the decision making equation
- There was considerable discussion on the perceived need to more effectively “imbed” and integrate ag and nutrition efforts at the project level, but with a robust acknowledgement that full integration involves very difficult aspects of willingness to co-design, co-fund, and co-attribute success of outcomes. In many cases, well done co-location or co-resident ag and N projects might actually give better results
- Everyone acknowledges the need for work on “diet diversity”, but it is a very ill-defined space. There is confusion about the best metrics for DD. There is little knowledge about how beneficiaries perceive a diverse diet. There is acknowledgment that improved income can actually lead down the slippery slope to very unbalanced and poorly diverse diets. So the space is perceived as exceedingly important for research, but there are huge issues concerning how to approach the research.

**Meghan Anson wrote:**

Hi Everyone. My name is Meghan Anson and I am a Nutrition Advisor at USAID's Bureau for Food Security. I'll be co-facilitating the nutrition discussion over the next three hours - looking forward to hearing your ideas!

**Max Rothschild wrote:**

Welcome to this next time period of the discussion. I am Max Rothschild, one of the two facilitators for the next few hours. Presently I am a faculty member in the Department of Animal Science at Iowa State University. I was a Jefferson Fellow working at the BDS at USAID in 2011-2012. My areas of interest is livestock genetics and the role animal source foods play in improved nutrition. I look forward to discussing these ideas with you.

**Max Rothschild wrote:**

Many animal have naturally occurring genotypes that allow some of them to produce milk with more iron or higher levels of certain vitamins. Should research be devoted to looking into genetic selection of animals to produce more nutritious foods? this would be non-GMO.

**Cynthia Baldwin wrote:**

Hello, all. I am Cynthia Baldwin, co-moderating this session with Katheriner Dennison. I am a professor of veterinary and animal sciences at the University of Massachusetts specializing in livestock infectious diseases and vaccines and act as a consultant for the BFS at USAID, after having served as Jefferson Science Fellow in 2009-10.

**Faith Bartz Tarr wrote:**

Hello from Addis Ababa, Ethiopia. I am Faith Bartz Tarr and I will be co-facilitator from 3 AM until 6 AM EST for the discussion on nutrition, along with my colleague Robert Mwadime. I am an American Association for the Advancement of Science, Science and Technology Policy Fellow, and Agricultural Advisor with USAID Ethiopia. I look forward to discussing opportunities for enhancing outcomes in nutrition with you all.

**Elaine Gray wrote:**

Good morning/afternoon/evening to everyone - my name is Elaine Gray and I am a Nutrition Advisor with the Bureau for Global Health at USAID in Washington, DC. I will be co-facilitating this series of discussions around nutrition research from 6:00-9:00 am EST, along with Sheila Fleischhacker. We look forward to hearing from you as we map the future of nutrition research!

**Olasunkanmi Bamiro wrote:**

Research on nutrition should be extended to safety of food away from home. In many households due to economic crunch, parents hardly have time to cook for their children, hence, both the parents and the children visit eatery facilities. However, the quality of food being sold by these outlets cannot be ascertained.

## Social behavior change and nutrition education

APR 18, 2017 2:01 PM by [JOHN BOWMAN](#)

Social and behavior change interventions seek to change behaviors by addressing factors such as knowledge, attitudes and norms. They can complement and enhance other types of nutrition and food security interventions.

- **What research on social behavior change and nutrition education (related to production and/or consumption) could significantly advance the effectiveness of food security programming?**

### COMMENTS

**Cynthia Donovan wrote:**

Cross-sectoral nutrition training and communication: We have developed a coordinated ag-nutrition approach in Guatemala that links new bean varieties and dissemination with nutritional activities and family oriented village fairs. While being a scaling up activity, we also have a bean research trial linked to this effort. This is related to Mark Manary's comment in the other stream on embedding nutrition and health research into ag research



projects. Will this be effective in joining ag research with other household needs and resources, and in helping to achieve nutrition education with a whole family approach, using ag as one of the entry points?

**Jan Low wrote:**

I think a key area for evidence to be built is at what age is social behavior change and nutrition education (knowledge about nutrition and ability to produce more nutritious foods) best done. The adolescent age period, particular among girls, is a potential entry point that gets inadequate attention. The latter years of primary school and first years of secondary school can be critical not only in introducing new habits but also building self confidence. Improving knowledge prior to first pregnancy, and potentially life skills so that girls are empowered to know how to produce and prepare better quality food should be compared to the current entry point of working with older teens or women already pregnant or with young children. Research has shown that stunting in many settings is significantly reduced when the age of 1st pregnancy is above 22-25 yrs. So this kind of intervention earlier in life could help prevent the need for remedial interventions.

Jan Low

**John Bowman wrote:**

Jan - this is a very interesting point that you raise. The target age range for nutrition messaging in the smallholder household may be very important, and I don't think much research has been done in this area. In terms of the mixed records of "home gardens" achieving measurable nutrition impact, maybe this is one of the reasons - maybe those projects which were more effectively targeted a key age range more effectively than other projects. In terms of measurable effects of VA rich sweet potato, did your work indicate that the "age factor" related to nutrition messaging could make a big difference in final nutritional status?

**Erin McGuire wrote:**

Jan - Thanks for your comments, I agree. It would be interesting to integrate schools more into our agriculture programming, along with home gardens. In the US, we do lots of farm to school programming, which encourages nutrition education as well. It would be nice to see some research that targets schools, homes, and then a combination of both for positive behavior change.

**Meghan Anson wrote:**

Hi Jan, I agree and would add that it isn't only nutrition education / behavior change that we might consider targeting at earlier entry points, but that other mutually reinforcing messaging (i.e. family planning) is important to pair with nutrition as well.

**Richard (Dick) Tinsley wrote:**

While I think we can develop and propose high quality diets, my concern is can our intended beneficiaries afford such diets. I think most of the intended beneficiaries are poor and engaged in heavy manual labor for limited wages. thus what happens when they cannot afford to purchase, or to produce the recommended diet? This would include the rational but hard choices they have to make in obtain and distributed the ration they can afford or have access to their family including children and nursing wives, How much do they have to allocate to those engaged in heavy manual labor that will optimize what they can afford tomorrow, etc.

Please review the linked exercise and internal links within it:

<http://smallholderagriculture.agsci.colostate.edu/1028-2/>

**John Bowman wrote:**

Dick, this is a huge area of concern, particularly in horticulture. It is widely known that many farmers who we have upgraded from staples into hort cannot afford the actual hort products they produce. We improve their farming skills, and their income, but many will prefer to "sell everything" and then take the income and see what they can buy locally (maybe cheap biscuits? noodles?). So part of our job in the development community is to use the best technologies, and market linkage techniques, to get food (hort) prices down. So we need to both get the market prices down and we need to improve smallholder access to markets where the hort (or meat, egg, diary, fish) prices are reasonable. Thus many are calling for less development work "on the farm" and more on post-farm linkage building coupled with nutrition education to change buying behavior.

**Richard (Dick) Tinsley wrote:**

as i have commented elsewhere the need is to reduce drudgery and caloric energy balance that virtually implies enhanced access to contract mechanization for basic land prep. Remember the operational feasibility of any agronomic program falls into an administrative void between the agronomist (myself) and other applied biologists and social scientist.

<http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeas...>

**Robert Ackatia-Armah wrote:**

Programs that have included some kind of population segmentation with targeted nutrition education seems to be successful in crossing the cultural divide in certain environments via a vis the interactions with gender. Are we focusing too much on specific groups of because they are vulnerable or does multilevel targeting and nutrition education intensity work better?

**Meghan Anson wrote:**

Hi Robert, can you elaborate on which programs you've seen to be successful re: population segmentation with targeted nutrition education? What would you envision for research around multilevel targeting related to production and/or consumption SBC and nutrition education?

**Robert Ackatia-Armah wrote:**

Hi Meghan,

I think a good example will Alive and Thrive's program that has as part of it's social mobilization approach targeted different population groups (men/adolescent girls & boys/ PLW/ local leaders/politicians/media) using the same message but communicated in different ways first to raise awareness and then create advocates out of these groups who also serve as controls to each other within their own communities. this kind of multilevel targeting all aimed at improving nutrition for women and children in the first 1000 days needs a closer look. Also if we consider the best nutrition interventions listed in the lancet series, we could explore the impact on nutritional status if all these interventions were implemented concurrently and integrated into local public health systems in a community. Hope this helps!

**Max Rothschild wrote:**

Animal source foods can be expensive and hence are not eaten. More research is needed into getting production levels to increase more milk per cow or goat or more eggs per chicken. This can reduce price and eggs and milk are small affordable units for improved nutrition.

**Meghan Anson wrote:**

Thanks, Max. I agree - figuring out how to increase production levels of ASF (and thus, increase accessibility by reducing the price) is important. There's also a need for research on SBC and nutrition education on the demand side. How do we get consumers to actually consume ASF, particularly when it is accessible and affordable, when there are cultural norms around eating items like eggs in some contexts?

**Max Rothschild wrote:**

Much of the problem is cost and availability but from an economics view point raising livestock is a clear way out of poverty and this mean more money to buy food.

**Sarah McKune wrote:**

I completely agree with your statement about more research being needed for SBC and education. I think the complexity arises in how locally specific findings will be and the problem with scaling the outcome. An earlier comment referenced the need to understand choice at the household level and I think this might be a finding of interest - how do poor household choose what to buy/sell? what are the influencing factors? It is clear that below a certain level of poverty, any increase in production will be sold to secure staple foods, which is a rational choice in that context. Is research on choice the right next step?

**Cynthia Baldwin wrote:**

There are many cultural norms around various ASF: pork of course in more than one religious group, beef in others, eggs in another. Thus that cannot be considered as an over-arching constraint to consuming ASF- they are micro constraints- and we need to consider the overall benefits of consuming ASF.

**Carolyn La Jeunesse wrote:**

Cynthia, I concur! Also, cultural sensitivity is critical in some areas. For instance, as a veterinarian and traumatologist specializing in international development and global health in crisis-affected countries/communities, I tend to work a lot with traditional or tribal cultures where bushmeat consumption, and (in some cases where conflict or crises has led to collapse in livestock production) dogs or animals source foods not typically discussed in development circles. Given the importance of global public health issues at the One Health interface (human/animal/environment) related to emerging/infectious/zoonotic diseases and food-borne illnesses alone, it is critical to be able to navigate the cultural and contextual landscape, and bring together the folks in global health and those in food/nutrition security. Simply put, given the tremendous costs in global public health, plus the enormous economic impacts from disease burden and malnutrition alone, we need to be investing far, far more into livestock R&D. Particular attention could be paid at the One Health interface where human and animal health, and environmental stewardship and natural resource management are so deeply intertwined. For instance, pasturing systems can be evaluated not only for diversification and yield improvements, but potentially targeted for infectious disease transmission abatement (which may be the case, for instance, for some tick borne diseases).

**Judy Canahuati wrote:**

I think Jan is on to something important in terms of areas of focus for research. Early on in my time at USAID, I visited one of the early Junior Farmer Field schools, a joint FAO and WFP project. Middle school and early teen HIV affected kids (orphans or children of ill parents) had the opportunity to learn horticulture skills as well as life skills. One striking thing that both children and facilitators said was that once the kids tasted the crops that they had planted, they weren't that interested in the cereal staple that was being supplied by WFP and they would not have imagined this dietary diversity. I don't think that we've paid enough research attention to this type of intervention and particularly not on what might be strategies for scale-up. I also visited, some years earlier, a

school garden program supported by UNESCO. It was pretty clear that this program had not been planned in such a thorough way as there was no integration of school subjects with the gardens (eg, the kids planting the carrots didn't know the nutritional value of carrots; the learning about budgeting going on in a "school store" project was not integrated into the classroom, even though the teacher-facilitator was also a math teacher. So it seems to me that not only the right age, but also the correct approach, curriculum and approach to scale-up (particularly) in the different countries where GFSS will focus would be a good focus for SBCC research.

**Katherine Dennison wrote:**

Completely agree with you and Jan, Judy. This is an area and age group we need to target more, since early child development and learning in social (school) environments, can reinforce the behavior to support better nutrition.

**Carolyn La Jeunesse wrote:**

Katherine, Jan and Judy. As an aside, another argument for programs deeply rooted in community is that in the most egregiously poor areas, some families cannot afford school fees, or can only do so sporadically. So, community-based youth programs play a particularly important role in filling that gap with regard to teaching about agriculture and providing real opportunities for in-home food security and early entrepreneurship. Again, there would be a need to develop assessment frameworks, and this seems a great opportunity for public-private partnerships as well. Perhaps identifying existing programs, then assessing what is working, and what local stakeholders as well as international partners believe needs some tweaking or additional key resources would be one place to start.

**Carolyn La Jeunesse wrote:**

Judy, both you and Jan make important points. I'd like to extend that a bit and look at human capacity building for job/employment opportunities. With increasing urbanization, and agriculture not being all that attractive to youth, anything we can do to double-dip on our efforts and collaborations is win. For instance, with interruption in education in crisis-affected countries, we have to find ways to provide some modicum of "classic" education that is contextually relevant and also advances important learning about nutrition, entrepreneurship, community development, the importance of agriculture, and, the "promise" of a career in agriculture.

Positive youth development programs such as 4-H and other community-based programs (especially those engaging at risk youth, conflict or disease epidemic orphans, etc.) have had some good successes, but long term funding for sustainability of these programs is difficult. It would be great to see more discussion around partnerships with NGOs, community groups, and those already involved with education to learn where collaborations can be built quickly, and outcomes assessed more easily.

Local agriculture leaders have deep wisdom about this, and are anxious to engage. They seem to best understand the best approaches for individual communities and schools, so could better inform the "correct approach, curriculum and approach to scale-up) with our collaboration. There are a number of programs in place that would benefit from the type of research to further develop, analyze and scale youth-centric programs and training. Please reach out if you need some groups in GFSS countries to work with!

**Samuel Black wrote:**

With respect to animal based protein, particularly beef and dairy, I would like to hear your views on pasture management. It is my impression that in Africa pastoralists often use common grazing land precluding effective pasture management. Resting and improving pasture is an important tool in optimizing land improvement and use.

Is this a process that could be used more effectively in areas of sub-Saharan Africa where cattle are raised for food? If so what would need to change to make this happen?

**Cynthia Baldwin wrote:**

Certainly appropriate fodder for livestock is an important issue to bring the greatest level of productivity and thus as Max commented the lowest cost of ASF. This is one considered in the crop-livestock integrated systems approach. Clearly pasture management bears on this issue.

**Samuel Black wrote:**

Thank you Cynthia. Some years ago I met a pasture expert from New Zealand, a world expert in grass fed animal protein production, who had just visited friends in West Africa. He was of the opinion that community grazing versus managed pasture use was a disaster for improving animal productivity In sub-Saharan Africa. Consistent with the focus on social behavior change and nutrition education, I ask, what changes in land use are required to improve domestic animal productivity and thus access to animal source food to improve nutrition.

**Faith Bartz Tarr wrote:**

Hello from Addis Ababa, Ethiopia. I am Faith Bartz Tarr and I will be co-facilitator from 3 AM until 6 AM EST for the discussion on nutrition, along with my colleague Robert Mwadime. I am an American Association for the Advancement of Science, Science and Technology Policy Fellow, and Agricultural Advisor with USAID Ethiopia. I look forward to discussing opportunities for enhancing outcomes in nutrition with you all.

**Robert KN Mwadime wrote:**

Hi Faith and those logged in...this is Robert Mwadime, out of Uganda. *will be co facilitating this session with Faith.* I work with USAID/SPRING project as the Chief of Party. Before joining JSI I was with FHI360. Welcome.

**Max Rothschild wrote:**

we need to look at crop-livestock systems to produce the right amounts of feed and fodder and to support land management. Social changes related to getting groups of people to work together to avoid conflict will allow great production and more animal source foods at better prices. This all requires an understanding of social structure and culture.

## Nutrient-dense foods; partnerships

APR 18, 2017 2:03 PM by [JOHN BOWMAN](#)

Here are two more discussion questions to drive our discussion on nutrition research:

- **What avenues for research could help make nutrient-dense foods more available, affordable, and accessible to the poor and food insecure year-round?**
- **What nutrition outcome-oriented research could support wider decision-making and partnership among national, regional, and other partner research and policy organizations to achieve population-level impact?**

## COMMENTS

### **Mark Manary wrote:**

**Nest nutrition and health research trials INSIDE agricultural projects.** It is through agriculture that the nutrition projects will have the most impact. So do not remove these clinical trials into a separately administered health program. The nutritionists and agriculturalist will be able to collaborate better without blindly expecting the other to deliver miracles if they must share the same real working space.

### **John Bowman wrote:**

The concept I think you are referring to can also be described as "imbedding". In order to get nutrition trials properly imbedded into ag programs, you need careful "co-design" at the RFP stage that involves equal, balanced input from both agriculturalists and nutrition/health experts. It also helps to get co-funding from both ag/economic growth and health departments to support the final "integrated" proposal. But I would also caution that the idea of nutrition imbedding into an ag project, or vice versa, sets the wrong stage and already has one sector, in a sense, at a higher priority level than the other. In my mind, the best approach may be a proposal that is wholly integrated between ag and nutrition where both sectors are balanced and both sectors strive to realize a pre-determined set of mutually agreed upon ag and nutrition outcomes. The USAID/Mali mission is implementing just such a project using deployment of best practices in horticulture to deliver both income and health outcomes, and it is co-funded.

### **John Bowman wrote:**

But I also need to caution that full integration may not be the answer. Some development specialists feel that co-located, separate ag and nutrition projects reaching the same beneficiaries, when efficiently coordinated, can actually be a more effective mechanism than integration. The feeling is that pure integration, is often just too difficult and time-consuming to pursue. And that the level of coordination at pre-proposal stage is too difficult, often due to timing issues between the ag and nutrition departments involved. Also, designing an M&E mechanism that can adequately track and attribute both ag and nutrition interventions to desired outcomes, is very difficult. We would highly appreciate the perspective of others on these issues of ag/nutrition imbedding, co-design, co-location, etc...

### **Barry Pittendrigh wrote:**

I completely agree with Mark's comments. Funding mechanisms that bring together nutritionists and agriculturalist both encourages and allows these groups to "break out of silos" and work in a synergistic manner towards common and complementary research goals.

### **Robert Ackatia-Armah wrote:**

Hi Mark,

I agree very much with your comment. I think the linkage between agriculture and nutrition and health research needs a lot of work in gathering data. However, I think that those who are served by such results also need to see the benefits of the kinds of research that we do from clinical trials rather than just reporting back to the scientific community.

### **Arie Havelaar wrote:**

Mark, this is a great comment and should lead to tightly integrated projects. The Livestock Innovation Lab aims to promote such projects and we have some success but also many steps to take to truly integrate nutrition and agricultural research.

**Jan Low wrote:**

Concerning nutrient-dense food research, access to quality seeds/planting material and increased productivity come at the top of the list. In our work in SSA, households are much more likely to have a diverse diet if they grow a more diverse range of foods. And if productivity doesn't increase, heavy reliance on cheaper staples will continue. Lower cost, easy to use processing and vacuum packaging equipment or containers that could store and guard against microbes would be most useful investments.

Nutrition-research could include more emphasis on testing different policy and regulatory approaches. For example, investing in government's ability to inform consumers about good options at a level so they could complete with private sector companies that are marketing poor choices; testing stronger regulatory procedures that regulate from the outset nutrition standards and labeling of foodstuffs and products; funding civil society advocacy groups linked to the national nutrition community. Each of these opportunities would need a 5 year or longer time commitment and significant resources to evaluate effectiveness, but large number of households could be affected.

Jan Low

**Jan Low wrote:**

In our experience with integrated ag-nutrition projects with orange-fleshed sweet potato as the key entry point, getting the two sectors to meet regularly and plan effectively did add significant cost and complexity. But it does in the longer run lead to deeper mutual understanding of the other sector and better problem solving that I doubt would be possible with separate but co-resident efforts. It is striking, however, how initially persons in each sector are reluctant to expand their horizons. But it does eventually happen and that is critical for longer-term change and hopefully further joint efforts.

**John Bowman wrote:**

Does anybody have any good ideas how donors might be incentivized to pursue more fully integrated ag/Nut projects? (which admittedly, are more of a huge "pain" to design and implement). Do we just need more continued research on the benefits of integration vs. the sum of siloed efforts? At USAID, we have a few projects pursuing operational research in this space (i.e. Tufts-led Nutrition Innovation Lab), but not many... Do we need a ton more of such projects? Any ideas on what other donors or governments might be doing?

**Max Rothschild wrote:**

Adding projects that are multidimensional is a must. USAID should require nutrition projects be involved with both more/better production of crops and animals but coupled with nutritional aspects of the products produced. BMGF certainly examines such projects.

**Don Humpal wrote:**

One avenue for research could be a market "following" strategy for fortification of nutrient dense foods that already have a processing and distribution system in place. While this has been done in urban environments for foods like yoghurt and biscuits (school children snacks), the bigger challenge is meeting the price points for commercial distribution to rural zones for foods that are already used for infants over 6 months, and -- importantly --for their families more generally. One candidate, for example, would be the extruded soy pieces that are already

broadly distributed in shelf-stable packaging at prices affordable to villages in much of Southern Africa, and have a long shelf-life. Their micronutrient profile needs reinforcement and processing options exist but their applied R&D by processing companies is slow, because these are generally SMEs with tight budgets and because of very slow development and approval of food fortification standards.

**Erin McGuire wrote:**

One of the Horticulture Innovation Lab funded projects in Kenya focuses on promoting African indigenous vegetable (AIV) production and consumption among smallholders. While AIV's have high potential to improve nutritional livelihoods, the realization of this potential depends on successfully linking production and consumption. Moving forward, resources should be dedicated to identifying and scaling-up effective approaches to increase consumption, such as nutrition education focused on incorporating AIV's into traditional meals. More work with government health agencies would benefit these linkages.

**Deepa Thiagarajan wrote:**

Complementary approaches such as food based approaches, in addition to bio fortification, food fortification are used in concert to address global challenges such as malnutrition. Food-based approaches can not only improve nutritional status, but can achieve other objectives such as increasing incomes, making it an attractive and sustainable intervention. However, research on the impact of food-based approaches is limited, as it is time consuming, complex and has not been a research priority. Given the current importance of dietary diversity, perhaps, this area needs to be adequately funded to determine if these approaches actually work.

**Max Rothschild wrote:**

Bio fortification is certainly one very good approach. With livestock, we can select animals that have genetic variants that allow them to produce meat and milk with more iron and vitamins. Sadly funding agencies do not fund enough livestock research related to improved products. We need partnerships between nutritionists and geneticists to help select healthier animals that produce more nutritious products

**Max Rothschild wrote:**

Certainly, this could be done with plants and such approaches are non GMO.

**Cynthia Baldwin wrote:**

Hello, all. I am Cynthia Baldwin, co-moderating this session with Katheriner Dennison. I am a professor of veterinary and animal sciences at the University of Massachusetts specializing in livestock infectious diseases and vaccines and act as a consultant for the BFS at USAID, after having served as Jefferson Science Fellow in 2009-10.

**Faith Bartz Tarr wrote:**

Hello from Addis Ababa, Ethiopia. I am Faith Bartz Tarr and I will be co-facilitator from 3 AM until 6 AM EST for the discussion on nutrition, along with my colleague Robert Mwadime. I am an American Association for the Advancement of Science, Science and Technology Policy Fellow, and Agricultural Advisor with USAID Ethiopia. I look forward to discussing opportunities for enhancing outcomes in nutrition with you all.

**GBOLA ADESOGAN wrote:**

Hello, I would like to follow up on Mark's comments about the importance of improving nutrition with animal-source foods. In addition to supplying high-quality protein, these food items are excellent sources of several bioavailable nutrients that are lacking in diets of poor and malnourished people including vitamins B12 and A and minerals like iodine, iron and zinc. Consequently, they are critical nutrient-dense foods for improving growth and cognitive development in infants and pregnant or lactating women. More research to demonstrate their role as



part of a diversified diet in enhancing nutrition and cognitive development is needed as well as to increase their availability, accessibility and affordability. For more information on this theme, please see some videos from our recent Global Nutrition Symposium at this website <http://livestocklab.ifas.ufl.edu/events/global-nutrition-symposium/>

**Patrick Webb wrote:**

Just a plug to remember that ASFs go beyond poultry and ruminants to include all forms of aquatic catch and increasingly (in the private sector) insect sources of dried powdered protein and micronutrient ingredients. In other words, it's not just about conventional red or white meat, dairy and eggs.

**Max Rothschild wrote:**

Great points. Fish farming and sustainable harvesting should be considered. Research to support faster growing and sustainable species should be supported.

## Food safety, hygiene and nutrition

APR 18, 2017 2:04 PM by JOHN BOWMAN

Now let's turn to some questions that consider research questions related to safe foods, and more hygienic household and community environments, with a goal of improving nutrition.

- **What are the research questions around smallholder production practices and food systems that could improve nutrition status while mitigating food safety risks?**
- **How should we promote more nutrient-dense foods such as meat/eggs/fish/vegetables that have inherent production and post-harvest/perishability problems that can lead to high food safety risk?**

## COMMENTS

**Mark Manary wrote:**

Nutrition is impacted by child feeding practices for 6-15 mo old and food safety issues. The most important food safety issue is microbial contamination of consumed foods.

**Mark Manary wrote:**

Children aged 6-12 mo need more protein and animal source foods. This means legumes and dairy foods. Dairy foods do not suit themselves to subsistence production, powdered dairy foods should be produced in larger farms and dairy additives incorporated into foods. When animal husbandry is practiced in the home, trials should be undertaken to assess sanitary practices that result in better child growth.

**Arie Havelaar wrote:**

WHO results suggest that several pathogens of either animal origin (Salmonella, Campylobacter, Taenia solium) and human origin (Salmonella Typhi, Vibrio cholerae) are key pathogens in many low-income countries. But there is little information from individual countries so this is based on a very scattered database. What can we do to get more insight in the true burden of disease and particularly the main risk factors?

**Carolyn La Jeunesse wrote:**

Arie, veterinarians are the animal disease and zoonotic/emerging/infectious disease experts. Both global health and international development spaces would benefit by engaging more veterinarians, as well as those in the One Health community whose expertise bridges global development and the interfaces of human, animal and environmental health. Thanks for pointing out the need for more of this expertise in further elucidating disease burdens and risk factors. There is much good work going on, but unfortunately the global health and international development/food security folks often don't work together.

**Meghan Anson wrote:**

Hi Carolyn, this is a great point regarding the need to engage and utilize the expertise of veterinarians in our work. Do you have any suggestions for how we might do this better?

**Carolyn La Jeunesse wrote:**

Hi, Meghan. Yes, many different ways to engage veterinarians, it just depends on the expertise you might want. I'm pretty connected, so please reach out if you'd like. I'm very happy to help! If Karen Duca is still in BFS, she probably has my contact information. If not, feel free to reach out to me through LinkedIn and I'm happy to make time to discuss.

We recently held a meeting in DC for veterinarians involved with global food security, so we have very recent outputs from that. And of course there's the whole global health, resilience and disaster response/humanitarian assistance spaces. I'm happy to make introductions to my colleagues in all of those areas and more.

**Arie Havelaar wrote:**

Promoting smallholder dairy production is a key goal of the Livestock Innovation lab, and several projects are starting up to support this. So I'm not sure if your solution of large scale dairy production is the only option. Or if families will have the income to prioritize buying such foods. There is a lot that should be done to make smallholder dairy production more efficient and sustainable.

**Deepa Thiagarajan wrote:**

Food systems oriented programs must promote availability of diverse, nutritious food through improved production, productivity and competitiveness; Must also build capacity in practices aimed at improving food safety and reduce food losses and increase food availability. Utilization of nutritious, healthy, diverse and safe food for consumption must be supported by adequate biological and social environment, with proper health care.

**Julie MacCartee wrote:**

Nutrient-dense foods like vegetables and fish may have higher food safety risk, but they also have positive nutritional components that support the immune system. And I think we can agree that the safest possible food supply would be heavily skewed towards dry processed goods and thus not very healthy. What is the relative importance of enabling diverse diets for strong immune health vs enabling safe diets free from contamination?

I've also wondered - what role can natural antimicrobial ingredients and methods play in household food safety? For example, chilies/spices, vinegar, garlic, fermentation...can promoting these things simultaneously boost

nutrition and food safety, or are most household food safety issues far beyond the powers of a few natural ingredients?

**Jan Low wrote:**

We need to making it easier for smallholder households to safely store prepared foods. In that way labor/fuel is saved and young child feeding frequency can improve cost-effectively. Research on effective drying equipment at the household level that is affordable and easy to use. Low cost thermos containers that can keep food safe for up to 12 hours. Cooling systems running off of simple, affordable solar systems.

**Elaine Gray wrote:**

This is a great point to highlight affordable technology for post-harvest/post-market storage and safety. Is more research needed on how to ensure uptake and steady supply/accessibility of these technologies, and sustainable use of these technologies (e.g. maintenance, technology being used for designed purpose in the long term)? Some challenge-type investments have convened very interesting innovations and gadgets in the realm of food storage and preservation (e.g. the LAUNCH Food cycle supported by Australian DFAT, USAID, and other partners: [launch.org/challenges/food](http://launch.org/challenges/food)); however, what is the ideal balance between introducing gadget inventions vs. promoting existing technologies, simple techniques, and household behavior change?

**Arie Havelaar wrote:**

Deepa, can you please elaborate which research is critically needed to take steps towards the goals you describe?

**Arie Havelaar wrote:**

Storage is critical to avoid food loss at the household level, and may contribute to safer food. But contamination prior to preparation (e.g. unsafe water used to irrigate plants, fecal contamination of meat) and during preparation are probably more important risk factors. We know very little about the main drivers of food safety risks. What studies can we think of? Would intervention studies be possible?

**Arie Havelaar wrote:**

Julie, I think nutrition and hygiene need to go hand in hand. Immunity is bolstered by adequate foods but unsafe foods may reduce gut barrier function through environmental enteric dysfunction. This is not only foodborne, but more generally a problem of unhygienic living environments. We cannot expect healthy children in unsanitary environments.

**Lusike Wasilwa wrote:**

In respect to smallholder production systems, how do we optimize production practices that not only contribute to diversifying the types of foods available for consumption but those that require less time and energy to process to consume or store. Also how has the shift from subsistence farming to "commercial" or farming as a business influenced the types of foods consumed - i.e. the shift to fast foods!!! How do we take the smallholders back to their pallet roots where more nutritious complex foods were consumed? Also what strategies can be put in place to promote edible landscapes?

**Richard (Dick) Tinsley wrote:**

Simple reduce the drudgery by enhancing access to contract mechanization that will condense the 8 week crop establishment period to something more reasonable, greatly enhance the returns to labor so the farmer have time and energy to diversify their cropping systems.

**Terra Kelly wrote:**

With respect to small-holder livestock and poultry producers, some important research questions include: 1) What is the burden of food-borne illness and primary risk factors for exposure to food-borne pathogens; 2) What are the most cost-effective and sustainable strategies for prevention of contamination of animal-sourced foods and what can we do to promote those best practices on the farm and in the household?

**Mark Manary wrote:**

yes, yes, yes Terra. and focus on those livestock that are among the poorest people.

**Arie Havelaar wrote:**

it is often difficult to delineate foodborne exposures from waterborne and environmental exposure, so we need to aim for all-inclusive strategies to hygienic management of livestock and their products. This is a big mountain to climb, where do we start?

**Deepa Thiagarajan wrote:**

Research is needed to understand significance of food losses and waste and the need to reduce them to improve food security and sustainability of food systems. Also need to understand how food losses and waste impact the sustainability of food systems as well as their capacity to ensure food security. Furthermore, along the food chain there can be quality decreases ie, in nutritional quality and other quality attributes of food. Food quality loss is difficult to measure as nutritional qualities are multidimensional; There is a need to harmonize and develop a reliable framework and standardized criteria to measure food loss, food quality loss and waste, across commodities and at different stages of the supply chain.

**Max Rothschild wrote:**

Welcome to this next time period of the discussion. I am Max Rothschild, one of the two facilitators for the next few hours. Presently I a faculty member in the Department of Animal Science at Iowa State University. I was a Jefferson Fellow working at the BDS at USAID in 2011-2012. My areas of interest is livestock genetics and the role animal source foods play in improved nutrition.

In that regards shouldn't research be directed at better quality animal source foods.

**Cynthia Baldwin wrote:**

Hello, all. I am Cynthia Baldwin, co-moderating this session with Katheriner Dennison. I am a professor of veterinary and animal sciences at the University of Massachusetts specializing in livestock infectious diseases and vaccines and act as a consultant for the BFS at USAID, after having served as Jefferson Science Fellow in 2009-10.

**Faith Bartz Tarr wrote:**

Hello from Addis Ababa, Ethiopia. I am Faith Bartz Tarr and I will be co-facilitator from 3 AM until 6 AM EST for the discussion on nutrition, along with my colleague Robert Mwadime. I am an American Association for the Advancement of Science, Science and Technology Policy Fellow, and Agricultural Advisor with USAID Ethiopia. I look forward to discussing opportunities for enhancing outcomes in nutrition with you all.

**philip moses wrote:**

One of the primary sources of pathogens associated with environmental enteropathy in children (linked to stunting) is animal feces, especially chicken feces. At the same time, consumption of eggs and other animal source foods by pregnant women and by children 6-23 months old is critical to prevent stunting. SPRING and other groups are working to promote household practices to reduce exposure of young children to animal feces as a means of improving nutrition. It would be helpful, I think, to find ways to promote practices that make the raising

of chickens and small ruminants more nutrition-sensitive while at the same time improving productivity. Approaches to improving productivity of the raising of chickens and small ruminants often involve in caging or penning animals. Is anyone aware of programs that have promoted the caging/penning of animals to improve productivity while at the same time reducing exposure of young children to animal feces?

**Barakat Mahmoud, Ph.D. (Food Safety) wrote:**

As we know the food systems, subsequently, the food safety concerns are very different in developed and developing countries. I am going to focus on the food system and food safety concerns, especially in rural areas, in developing countries. In the developing countries, most smallholder farmers and/or processors produce/process, only, 1-2 of the staple agricultural commodities (maize, wheat, cassava, sorghum, potatoes, cassava, soybeans, meat, milk, eggs, fish, etc.), where there is no *farm production diversity*. Among these agricultural commodities, meat, milk, eggs, soybeans are *nutrient-rich* products. Most of the above agricultural commodities are consumed after they have been cooked; there is a killing step that can eliminate biological hazards. However, the main food safety concerns come from chemical hazards including aflatoxins, pesticides, hormones, antibiotics and *histamine*. We should ask the following questions; Do producers/processors implement food safety programs such as GAPs, GHPs, GMPs, GAQPs, GDFPs, HACCP, ISO, etc.? These practices/programs prevent, eliminate or control both biological and chemical hazards. Do they use approved pesticides and antibiotics? Do they properly use these pesticides and antibiotics? Do they produce organic food products? Do they use raw manure and human waste? Do they know about aflatoxin? Do they develop/implement interventions/measures to prevent aflatoxin (during pre-post-harvest)? What they do with aflatoxin-contaminated agricultural commodities? Do they consume, feed animals, or sell aflatoxin-contaminated commodities? Do they use pasteurization (for milk)? Are dry cooling systems (during transportation, process, and storage) available? Are proper storage areas available? How they handle *histamine-forming* fish?

**Carrie Hubbell Melgarejo wrote:**

Hi Barakat, Love your questions, which highlight one of the more interesting issues in this area. Food safety is for the farmer just as it is for the consumer. Many of the same pathogens and toxins that impact consumers also impact farmers earlier in the food value chain (before they become consumers). As others have said above, meat, eggs, milk, fish, and fruits/vegetables can be high-risk products for farmers and consumers, but they are also needed. Mycotoxins, parasites, viruses, and bacteria, whether they from maize, peanuts, raw fish, uncooked milk, or feces-contaminated food and water can impact the immune system, leading to stunting, anemia, and other big nutrition challenges. The farmer can be sickened by microorganisms, while milking, slaughtering, handling animal waste, handling infected feed, caring for animals at water points that attract mosquitos, standing in water that hosts schistosomiasis, caring barefoot for crops grown in shade or soil that hold moisture, or working without access to sanitary facilities (Turner 2013; Villazanakretzer et al. 2016; Grace et al. 2015; Betz et al. 2016; Odey, Okomo, and Oyo-Ita 2015; Crosby et al. 1984; Weiss 2008; Kweka et al. 2015; Pawlowski et. al 1991; Gajadhar 2015).

Those are all resources I looked at while helping develop [SPRING's Anemia Landscape Analysis tool](#) which helps stakeholders review data and tailor different sectors' current/potential solutions to the context-specific causes of anemia. Food safety is, similarly, a complicated issue, requiring a multisectoral approach.

We have done pretty well at figuring out how to assess many of the health aspects (though we could certainly improve country-specific data about foodborne illnesses, this global report is excellent: [Foodborne Disease Burden Epidemiology Reference Group 2007-2015](#)). But we could all make progress on issues such as safety in agricultural

value chains. When a farmer is sickened by anemia or another condition caused by one of these pathogens or toxins, it impacts her productivity and so much more.

Along with your excellent questions about whether and how farmers do what they should (and whether they even know), I'd include some additional behavioral questions: How do we motivate farmers not to sell or consume (which is a risk when they can't sell) what's not safe? How do we motivate them to produce more safely, for their own health and nutrition as well as for the consumers? How do we get them access to the resources they need in order to accomplish these good practices? What would be effective ways to improve safety in informal markets?

## Water and nutrition

APR 18, 2017 2:04 PM by [JOHN BOWMAN](#)

Safe food can be easily contaminated by unsafe water in smallholder agricultural production systems. We need to do a better job linking food and water safety in these systems for improved nutrition.

- **In an agriculture-led economic growth model, what are the research opportunities for improved water management and positive nutritional outcomes?**

### COMMENTS

**Jan Low wrote:**

Water scarcity is one of the major problems faced in many parts of the world, leading to increased use of contaminated water sources. Some devices do exist for helping campers clean water to make it safe for drinking. How can we make these more affordable for poor households as a starting point? Research in to hh level, affordable water purification systems would also be desirable. Learning from the effort to place plastic bottles with water on the roof to be sterilized by UV light is an example to work from. Is it going to scale anywhere? If not, why not?

**Arie Havelaar wrote:**

So can we translate technologies for drinking water treatment to treatment of agricultural waters?

**John Bowman wrote:**

I imagine there is a fair amount of work being done to get the cost of filters and water treatment pills down... Roof solarization may work in some cases but many pathogens may require stronger treatments. There may be a great need for more "behavior change" research in this area - many smallholders may not be aware of the inherent health dangers of water used to irrigate crops vs. water that is used for human consumption. Maybe the development efforts which deploy soap/handwashing/Tippy Taps could be asked to also provide more education about the dangers of bad irrigation water to the household, particularly to women and children. And yes, good point, people are driven to filthy sources of water when the general problem of "water scarcity" is not solved. Thus we probably need more small scale irrigation projects which improve the scarcity issue, which should

be coupled with education about the dangers of contaminated irrigation water - especially, how to keep clean sources of water from becoming contaminated...

**Mark Manary wrote:**

I think an interesting area of research would try to estimate what the relative burden of water vs food borne disease. As a pediatrician working in sub-Saharan Africa 35 years, I think these are overestimated, particularly water borne disease. And food borne disease is underestimated. Microbes I believe are 'enemy #1'

**Arie Havelaar wrote:**

Estimates of the burden of waterborne disease are supported by a body of evidence from intervention trials, which are rarely done in food safety. We need more of such studies, as disentangling these complex transmission pathways through observational studies is extremely challenging.

**Max Rothschild wrote:**

what about funding more water catchment research. This could include ways to catch water and purify. The more water caught from rain water that is clean improves general nutrition.

**Cynthia Baldwin wrote:**

Hello, all. I am Cynthia Baldwin, co-moderating this session with Katherine Dennison. I am a professor of veterinary and animal sciences at the University of Massachusetts specializing in livestock infectious diseases and vaccines and act as a consultant for the BFS at USAID, after having served as Jefferson Science Fellow in 2009-10.

**Faith Bartz Tarr wrote:**

Hello from Addis Ababa, Ethiopia. I am Faith Bartz Tarr and I will be co-facilitator from 3 AM until 6 AM EST for the discussion on nutrition, along with my colleague Robert Mwadime. I am an American Association for the Advancement of Science, Science and Technology Policy Fellow, and Agricultural Advisor with USAID Ethiopia. I look forward to discussing opportunities for enhancing outcomes in nutrition with you all.

**Claudia Ringler wrote:**

I believe we need to take a much broader look at water-nutrition linkages. In a [recent IFPRI Discussion Paper](#), author Laia Domènech identifies four potential impact pathways linking irrigation to positive nutrition outcomes in Africa:

1. Irrigation as a source of more diverse foods (through increased agricultural productivity and crop diversification);
2. Irrigation as a source of income (from market sales and employment generation, particularly in the lean season);
3. Irrigation as a source of water supply, sanitation, and hygiene (through multiple water use, reducing environmental enteropathy), and
4. Irrigation as an entry point for women's empowerment (through increased asset ownership and control over resources and reduced time spent on water collection).

Of course there are also potential negative linkages, such as the risk of increased water pollution and water-related disease, that can be addressed through appropriate hazard management, but only if nutritionists and irrigators work together!

## What's the latest and greatest in nutrition research?





Biofortification of staple food crops has the potential of alleviating micronutrient deficiencies based on evidences especially in developing countries where these deficiencies are eminent. I however think that there should be a synergetic relationship between concentration/content and bioavailability of the nutrients in these staples. For instance, high Fe concentration will not possibly imply bioavailability because of inhibitory and other factors. Another factor to consider is consumer acceptability especially when culture, food habits and preferences are in play. Processing and Storage Stability especially with Carotenoids should also be taken into account. Thank you

**Katherine Dennison wrote:**

In the work that we have supported with biofortification, we have taken these into account during design. Researchers that create biofortified foods are also keenly aware of concentration and bioavailability. It's rather difficult to create biofortified foods. In addition, much programming includes social and behavior change messaging to help create the demand for this 'new' food, but it's a work in progress.

**Patrick Webb wrote:**

Thanks Peg. But may I urge that we not call some crops "healthier" just because they may be biofortified. There's so much confusion among non-nutrition partners about such terms that we have to do all we can to be more precise in our language. We should, as a community, do better at separating out health effects from nutrient content from nutritional status. Biofortified crops have higher intrinsic level of a single nutrient. That's it. Yet, people consume foods as part of diets in which all nutrients interact, and it's the interactions that underpin specific health outcomes. So, a biofortified cultivar is not in itself necessarily 'healthier' than the unbiofortified or indeed industrially fortified version. Just trying to promote discussion here!

**Deepa Thiagarajan wrote:**

Growing evidence that investment in early years (starting from before birth) is critical to help children achieve their full potential, escape poverty and boost productivity later in life.

**Mark Manary wrote:**

Good point Deepa. For nutrition, USAID is best joining the global community in choosing problems to target. I would suggest stunting in newborns and 2 yo, and wasting in 1.5 year olds. These have specific definitions and can be measured. Stunting is associated with a decrease in life expectancy of 17%, decrease in lifetime income of 22% and decrease in physical work capacity. The effects of stunting last a lifetime. Wasting puts the individual at a 5 fold increase risk of dying in childhood.

**Mark Manary wrote:**

the inflammatory state of the gut receiving the nutrition is absolutely key as to what the response of the population is to the intervention. So for some people in some places, even in some age groups, the same nutrition intervention has a different effect. The drivers of this are habitual diet (first).

**Pamela Anderson wrote:**

Sometimes transformative research is driven forward when leaders come together to define what they believe to be the next set of research priorities. In December 2016, a group of leaders in nutrition research published an article in Nature, entitled "A new global research agenda for food". They proposed 10 research priorities for the UN Decade of Nutrition: 1) identify entry points for change; 2) make more data on diets widely available; 3) agree on what constitutes a healthy diet; 4) tackle different forms of malnutrition simultaneously; 5) understand the role of value chain length; 6) analyze business incentives; 7) account for climate; 8) study supply and demand; 9) identify the economic levers for change; and 10) fix the metrics. Patrick Webb (one of the co-authors), can probably provide a link to the article. I know that other organizations are deliberating on where they can most effectively

and efficiently contribute to this proposed (transformative) agenda. As an advisor to USAID, in the spirit of John's question here, I would be very interested to hear from participants on where they think USAID would make the most effective contributions to these transformative research directions?

**Mark Manary wrote:**

I am an advocate for using the most powerful scientific methodology we have available to assess health impact, the randomized clinical trial. Avoid epidemiological surveys, opinion polls and community surveys.

**Pamela Anderson wrote:**

In the discussion thread on social behavior and nutrition education, Jan Low just made an interesting post on rethinking entry points.

**Deepa Thiagarajan wrote:**

Here's the link to the article Pamela, <http://www.nature.com/news/a-new-global-research-agenda-for-food-1.21052>

**Pamela Anderson wrote:**

Thank you, Deepa. I have it, but not in a form that I could share a link with other participants. Much appreciated.

**Sheila Fleischhacker wrote:**

#2 - Open data is critical to fostering the development and dissemination of best practices. USDA ARS has developed a variety of innovative food composition databases including their new Branded Food Databases. These investments in data - free and widely available databases, along with innovative public-private-partnerships - will be critical to understanding eating patterns and points for intervention.

**Patrick Webb wrote:**

Here's the link: <http://www.nature.com/news/a-new-global-research-agenda-for-food-1.21052>. Apologies for the delay.

**Oscar Ortiz wrote:**

Thank you very much for the interesting discussion. To me one of the main challenges for nutrition research is how to build the capacities at the national level, not only in the health/nutrition sector, but in close interaction with the agricultural sector (biofortification of crops), and educational sector (behaviour change on diets). This dialogue can be facilitated by solid research results, and policy advocacy to support cross-sectorial action. The agricultural-nutrition-health-education approach developed by the International Potato Center to promote orange sweet potato has demonstrated that the interaction across sectors is essential. These cross-sectorial approaches deal with recent approaches on innovation systems, and the critical research question is how to intervene at the system level to promote sustainable change.

**Arie Havelaar wrote:**

In our approach, we consider production of adequate and nutritious foods, sufficient family income to consume at least part of the food that is produced in the household and empowerment of women as critical factors to achieve better nutrition. Does current research take these factors sufficiently into account?

**Terra Kelly wrote:**

In regard to research on environmental enteropathy, what impact does fecal pollution by livestock/food-borne pathogens have on environmental enteropathy and stunting in children of small-holder farming communities and what are the most cost-effective and sustainable strategies for reducing their pathogen exposure?

**Mark Manary wrote:**

the impact is determined by the extent that 6-15 mo olds handle animal feces such as chickens. For 6-9 month old food that is allowed to cool for longer periods of time or fed hours after cooking plays a role

**Arie Havelaar wrote:**

Mark, you recommend RCTs, which I wholeheartedly support. Which trials would you consider to provide evidence for effective pathogen control strategies?

**Mark Manary wrote:**

I think some exposures that need control in sub-Saharan Africa are 1) water that sits in a shallow well 2) mother's hands that drop porridge into 4 mo old mouths 3) animal feces in the same room that children sleep 4) multi-purpose pieces of cloth that serve as diapers, rags and wraps. I also think a package of interventions works better than a single intervention. I think shigella and campy are key pathogens - less so e coli

**Arie Havelaar wrote:**

And Salmonella, particularly in SSA where it kills many children because of a high incidence of invasive salmonellosis with high case-fatality ratios. EPEC is also important globally, also in Africa: <http://journals.plos.org/plosmedicine/article?id=10.1371/journal.pmed.10...>

**Sheila Fleischhacker wrote:**

These comments highlight the importance of the intersections between nutrition and food safety and the need to systematically focus on establishing multi-disciplinary research priorities for ensuring safe, nutritious food and water supply that is dynamic enough to adjust for emerging food safety threats.

**Patrick Webb wrote:**

RCTs are very important to raising the bar on the use of rigorous methodologies, but let's all be realistic about the viability and indeed appropriateness of RCTs in relation to agriculture research. Simple technology experiments, fine one by one, or indeed pathogen control strategies. But "agriculture" takes place at a macro scale that is not easy to randomize. Indeed, the policy levers that often have greatest impacts on agriculture for nutrition may need to be at national scale, which itself is impossible to assess through RCTs. The Poverty Action Lab does amazing work, but they too acknowledge the limitations of RCTs. So let's talk more about appropriate rigor in research, not simply the across-the-board use of one kind of rigor.

**Max Rothschild wrote:**

we need some more discussion.

- **What recent research findings suggest new and potentially transformative research directions to be pursued in the area of nutrition?**
- **what are your ideas??**

**Katherine Dennison wrote:**

Hi, everyone,

I'm Katherine Dennison, a Nutrition Advisor in the Bureau for Food Security at USAID. I'll be co-moderating this evening (EDT) from 8pm to midnight, so hope to hear from all of you out there!

I'll review these topics and see if there is more I can contribute to the questions and discussions already posted.

Best,

Katherine

**Cynthia Baldwin wrote:**

Hello, all. I am Cynthia Baldwin, co-moderating this session with Katherine Dennison. I am a professor of veterinary and animal sciences at the University of Massachusetts specializing in livestock infectious diseases and vaccines and act as a consultant for the BFS at USAID, after having served as Jefferson Science Fellow in 2009-10.

**Aaron Hawkins wrote:**

Good morning/evening everyone from Dhaka, Bangladesh! My name is Aaron Hawkins and I will be the facilitator from 12 AM until 3 AM EST. I am the Chief of Party of the USAID SPRING project in Bangladesh.

I look forward to discussing topics of interest with you this morning/evening. I will be looking specifically at issues around nutrition.

**Faith Bartz Tarr wrote:**

Hello from Addis Ababa, Ethiopia. I am Faith Bartz Tarr and I will be co-facilitator from 3 AM until 6 AM EST for the discussion on nutrition, along with my colleague Robert Mwadime. I am an American Association for the Advancement of Science, Science and Technology Policy Fellow, and Agricultural Advisor with USAID Ethiopia. I look forward to discussing opportunities for enhancing outcomes in nutrition with you all.

**Carolyn La Jeunesse wrote:**

"Latest and greatest" could be in taking a fresh (or more in-depth look) look at integrated systems approaches. For instance, in the World Bank report, "[Do African Children Have an Equal Chance?](#)" shows that combinations of interventions and preventive measures cumulatively can have positive impacts where advances in nutrition, WASH, childhood vaccinations, and education (and perhaps other "basic services") are synergistically linked.

So, looking at existing work to find ways to more clearly define what to do, when to do it, and what "add-ons" can have greatest impacts and best leverage resources could give us great gains using existing programs in novel ways and combinations.

For instance, animal source foods are critical for nutrition...cognitive development, physical growth, immunity, etc. Along with this comes the risk of zoonotic, infectious and foodborne illnesses. What might basic hygiene interventions (decreased parasite and protozoal infections, for instance) add to increasing gut absorption of nutrients? How does education around hygiene, coupled with livestock and poultry management systems decrease risks for parasitism and diarrheal diseases (and thus improve absorption of nutrients)? How might global health folks developing vaccines for diarrheal diseases in children collaborate in the food/nutrition security space to more fully evaluate positive effects on gut immunity, digestion, and absorption?

Truly interdisciplinary and inter-sectoral approaches may save us time, money, resources, buy us faster gains, and may raise the baseline for nutrition status earlier to prevent physical and cognitive stunting and improve immunity.

**Faith Bartz Tarr wrote:**

This is a great point Carolyn. As stated in the Global Food Security Strategy: the multifactorial causes of poor nutrition highlight the need for a multi-sectoral approach to address the problem. Your suggestions offer some

practical ways this could be achieved during implementation of programs. The proposed research questions could provide an evidence base and inform best practice for layering of interventions.

**Sheila Fleischhacker wrote:**

Hello, my name is Sheila Fleischhacker and I will be helping to facilitate discussion this morning. I have enjoyed reading the thoughtful and informative comments and would appreciate folks sharing any specific examples of research projects they find captures the multidisciplinary and multisector approaches needed to accelerate progress in human nutrition research.

**Sally Abbott wrote:**

Good morning! My name is Sally Abbott and I am a nutrition advisor with the Bureau for Food Security. I am catching up on all of the interesting comments and am the third facilitator for this morning's discussion.

**Patrick Webb wrote:**

In relation to the question in the Framing Paper: "What are the most strategic research opportunities around providing and encouraging more diverse diets? The first day brought up the challenge of better understanding what 'diversity' in diets means (in an economic versus physiologically functional sense), and how to interpret the many competing metrics of diet diversity that are already out in the literature. We do need understand better how to 'map' actual consumption in field locations against what is increasingly known about the need for a balance better 'more good foods and fewer bad foods'. Current DD metrics do an astonishingly bad job of assessing what quality means in relation to various forms of diversity, including the role of transformed foods (what most people eat in urban areas, and hence what most people eat across the planet). This is a major priority area for research - to help clean up confusion and define appropriate metrics.

**Deepa Thiagarajan wrote:**

Excellent remark Dr Webb. There appears a pressing need to develop new, standardized and modern (to your point on transformed foods in urban areas) metrics and methods to characterize and assess dietary diversity and quality. Does diversity have independent effect on quality--that remains to be undetermined as well.

**Cynthia Donovan wrote:**

Diversity in diet: I agree with you, Patrick and Deepa. The work on food systems transformations also shows increasing consuming of processed foods in rural areas, so this challenge extends beyond urban borders. If we want to link this to agriculture, we need social scientists, agriculturists and nutritionists working on the issues, to understand both what diversity looks like and what it could look like for better nutritional outcomes.

**James Thurlow wrote:**

James Thurlow from IFPRI. I agree that we need to do a better job at developing dietary diversity measures that attempt to explicitly link nutrition outcomes to the economic drivers behind agricultural transformation (i.e., income growth and relative price changes). Simply counting major food groups in a person's diet is not enough - we need to add both the quality and quantity dimensions. At IFPRI we're piloting a new measure of "Satisfactory Dietary Diversity" that links food availability (production and trade) and food access (incomes and prices) to dietary change (meeting RDAs without exceeding calorie targets). We're doing this in large part because we have (finally) realized that we need to bridge the wide gap between those of us working on agricultural transformation, and our colleagues working on nutrition. I think that there is an important research agenda around agriculture-nutrition linkages. This would need to bring together not only agricultural economists and nutritionists, but also development economists. The former end up focusing on food crop production and processing, whereas the latter

generally feel that raising incomes is sufficient (irrespective of where those incomes come from, e.g., promoting nonfood export crops where the link the diets is very indirect). Crudely put, if we can speak the language of development economists, and convince them that agricultural incomes are more effective at reducing poverty and improving diets, then we might have a greater chance of convincing Ministries of Finance and Planning to continue supporting agriculture as a vehicle for improving nutrition (as well as just poverty reduction). GFSS's broader focus on agriculture and nutrition might allow it to play this facilitating role.

**Elaine Grings wrote:**

Reposting Rob Bertram's post into the nutrition discussion for capture....

Hi all,

As we finish the nutrition discussion up, i found something worth sharing--it's the program livestream of the UFI Livestock Systems Nutrition Symposium of March 30th. There are many excellent presentations on nutrition but I wanted to flag Lindsay Allen's on the need for animal source foods....at 2 hours 5 mins into the program...but there are others as well that are excellent. One take away from the day was whether it was appropriate for us to consider a diet without animal source foods as minimally acceptable....we do. But given the evidence it is reasonable to question that.

More generally with respect to our research, whether around nutrition or productivity or resilience, these kinds of contextual evidence should be considered too...so wanted to share. Thanks all and hope it's ok to be a bit wide of the new topic!

Here's the link: <https://mediasite.video.ufl.edu/Mediasite/Play/1f0355bfd2574e239ffa3500c...>

**Lee Voth-Gaeddert wrote:**

My name is Lee Voth-Gaeddert and I am a Environmental Systems Engineer completing my PhD on modeling the complex system of causal factors to child stunting in Guatemala in collaboration with USAID and Peace Corps. Some great points raised in this discussion; as an infectious disease expert I gravitate towards enteric dysfunction (enteropathy) and intestinal absorptive capacity as critical. But at large several items to think about are 1) how we can use combinations of sensors and systems analysis approaches to optimize larger food/health systems (think surveys, satellites, DNA sequencing, cell phones, etc.), 2) how do we remove the 'western savior complex' from our research and view folks as customers and how does this change our research approaches (90%+ of food moves through the private sector), and 3) how will the information economy play a role in this field, what does an "information-based product" look like for a poor mother in Guatemala?

Just a few thoughts; additionally, if you have interest in several new systems analysis methods applied to research in child stunting in Guatemala you can find my dissertation presentation here: <https://www.slideshare.net/leevg11/the-complexities-of-child-stunting-in...>

Cheers,

Lee

**GBOLA ADESOGAN wrote:**

I would like to follow up on Elaine's comment with one illustration. Vitamin B12 status in infancy was positively correlated with development and cognitive functioning in 5 year olds. Some recent surveys have shown much lower B12 status in the breast milk of women from various developing countries. In fact a recent study reported

that 89% of the Kenyan women surveyed had inadequate B12 in their breastmilk. Since animal-source foods are the only viable source of this vitamin for women and infants, more research is needed on short and long-term effects of incorporation of animal-source foods in the diet of lactating women on the development and cognitive functioning of children as the latter can have implications for their lifelong productivity. Research is also needed to reduce food safety risks associated with consumption of animal-source foods.

**Max Rothschild wrote:**

Other vitamins like Vitamin A can be increased through consumption of animal source foods. Increasing the amounts of vitamins and their precursors via genetic selection of ruminants needs to be expanded.

**Gwyneth Cotes wrote:**

While most of the focus here has been related to food and nutrients with regards to nutrition, there is a growing interest in the potential for improving nutrition among adolescents. I'm familiar with planned research to look at the potential for catch-up growth during this time-frame, either through supplementation, nutrition education, or other approaches. SPRING is also working with WHO and other researchers to explore what currently exists in terms of dietary guidance and evidence for adolescents (although the short answer right now is: not that much, particularly when it comes to evidence on interventions).

## Productivity and income growth on and off farm

APR 19, 2017 9:00 AM by JERRY GLOVER

In many regions of the world, agriculture-led economic growth is critical to raising rural incomes. Of course, off-farm income is also essential to many rural/smallholder households.

- **What research investments in the agriculture and food systems are needed to better understand opportunities for increased productivity and income growth on and off farm?**

### COMMENTS

**Jennifer Woodward-Greene wrote:**

Hello! I am Jennifer Woodward-Greene of the USDA Agricultural Research Service, Office of International Research Programs. For the next three hours, I will be co-facilitating the discussion on Ag-led economic growth. Just as a reminder, the rationale provided in the guidance document is:

"Prioritization of investment is critical to ensure resources are focused on the most important areas of research. As we examine the range of research opportunities to contribute to the goals of the Global Food Security Strategy (GFSS), we are looking into criteria to inform our investments."

[1] See U.S. Government Global Food Security Strategy (2016) <https://www.usaid.gov/sites/default/files/documents/1867/USG-Global-Food-Security-Strategy-2016.pdf>

**Julie MacCartee wrote:**

Important pieces to tackle are how to most accurately measure plot size and yield, considering that farmers may under- or over-estimate the numbers; and what scales or features of farms produce optimal yields.

Aptly, World Bank posted a [very interesting blog post](#) today about a "puzzle in development economics where, per unit of land, small farms produce more than larger farms." A number of studies show significant measurement error when farmers estimate field size or self-report their yields. Actual size of field may influence whether they over-or under-estimate these numbers.

The blog post also highlights literature that indicates that smaller farms have higher yields in part because there is a higher ratio of "edge" to the plot(s), and edges receive more attention, sunlight, and polination.

**Richard (Dick) Tinsley wrote:**

Julie, A quick estimate would be that a research crop cut, even in a farmer's field. with due diligence to get everything, will be about 10% higher than what the farmer will realize as tends to leave considerable amount behind in the straw. However, mechanical harvesting and threshing can recover most of this, and thus paying a contract thresher 10% of the yield could easily be profitable for the farmer both in terms of recovered grain and saved labor/energy.

**Andrew Gerard wrote:**

This Bank piece is interesting, and may be part of the story. A team at MSU working on coffee productivity in Rwanda and Burundi through the USAID-funded Africa Great Lakes Region Coffee Support Program has found this inverse size-productivity relationship in Rwanda and Burundi. We also, however, find higher investment in terms of labor and purchased inputs per tree on smaller farms. Yield estimates may not be exactly on, however number of trees on a farm (a relatively small, discrete number of units) is likely fairly accurate. Our interpretation has generally been that smallscale farmers invest heavily, even at a loss, because they tend not to have alternate means of gaining cash income. By comparison, larger scale farmers can choose to invest less (especially in terms of labor) per tree when prices are low. [Here is](#) a recent report on investment and productivity in Rwanda.

**Jennifer Woodward-Greene wrote:**

Imaging technologies are advancing that can estimate both plot size, and yield, for example using drones. Of course, these approaches bring their own set of challenges beyond the technology itself, in terms of privacy for example, especially in small holder situations in comparison to large farms operated by one person or entity that could grant access. Research into all the factors involved, from technology to politics to privacy may be needed to conduct a true cost benefit analysis to inform research planning, implementation, and evaluation.

**Deepa Thiagarajan wrote:**

How do we make ag led growth both poverty-reducing and nutrition-sensitive? We know that positive impacts on income, poverty etc. does not automatically translate into impact on nutritional outcomes. So 'quality' of economic growth can be a key determinant of positive nutrition implications. In order to sustain nutrition-sensitive growth, considerations such as role of social protection must be included. Also, need to prioritize investments in infrastructure, energy, water etc. in rural areas based on how these investments may enable multiplier effects on nutrition, gender equality and lead to employment opportunities on and off farm sectors.

**Jennifer Woodward-Greene wrote:**

Excellent thoughts Deepa. Social issues can often make or break the adoption and ultimate success of new methods and technologies. Enhancing traits that improve nutrient density and yield may not be enough... but are a



good start. How can we integrate a more comprehensive view of the factors that may impact the ultimate success of research, from the planning stages?

**Deepa Thiagarajan wrote:**

Also, diversification-led growth is an important consideration for small/medium scale agriculture. Potentially producers can augment their incomes with high value crops without undermining their households' food grain security. Studies show that producers in SSA, SA etc. have benefitted from modern supply chains driven by cooperatives and contract farming, in terms of higher yields, prices, lower production costs, and risk-sharing. Income and nutritional outcomes of diversification led growth can be favorable to producers in the target economies. Furthermore, research in this area must take a balanced view of rural-urban interactions, the increased food demand in rapid growing cities of SSA and SA can have positive impacts upstream on improving conditions in primary agriculture.

**Jennifer Woodward-Greene wrote:**

Great point... I remember from my days growing up on the farm, I would often hear, "diversification is the key to survival." How can research aid in diversification? We know that rotating grasses and legumes can increase production, and decrease the need for fertilizer, but how best to determine what systems fit in which regions?

**Tyrell Kahan wrote:**

Hello Jennifer, This thread leads me to ask if anyone thinks there may be a role for economist or statistical modeling to help in investigating diversification both in nutrition and agricultural production? Of course, modeling may not provide all of the answers in and of themselves, so how should it be integrated and engaged in agricultural research activities? Any newer paradigms or frameworks that anyone is aware of?

**Carolyn La Jeunesse wrote:**

Tyrell! Good to "see" you here. Feel free to send me an email. Lots of good stuff going on along those lines, and happy to share some ideas if you'd like. Hope you're well!

**Eileen Herrera wrote:**

Good afternoon, everyone (or whatever time of the day you are currently enjoying. I am Eileen Herrera with the Agricultural Research Service of the USDA. I will be co-facilitating this session from 15:00 to 18:00 Eastern DST. I believe my colleague from USAID, Raquel Gomes, will be joining at 16:00.

A reminder that this session is addressing Ag-Led economic growth.

From the whitepaper on this topic: Resources for agricultural research are limited. While research investments must consider the broader agriculture and food system and achieve wider social and environmental objectives, it is essential that investments are focused and prioritized to achieve the greatest impacts. Our colleagues at USAID have posted the 5 questions to be separate discussion areas, so please feel free to weigh in on any of these questions.

Or raise questions of your own that you think can help frame these discussions.

**Deepa Thiagarajan wrote:**

Research emphasis should be given to introduction and adaptation of high value crops to support specialization and diversification programs. Also, not to forget livestock research—better information on husbandry, improved forage varieties etc. will aid in enhancing ag productivity.

**Eileen Herrera wrote:**

Thank you, Deepa, for your comment. This is an approach that has worked well in the United States when small-scale producers are driving the introductions. I would welcome some examples of where this has worked well in developing countries and what approaches worked. For example, we have read about the successful introduction of the orange-fleshed sweet potato in sub Saharan Africa. Are there other examples that could be used, and what was done to ensure their success?

**Deepa Thiagarajan wrote:**

MSU is currently partnering with Land O Lakes (as the lead) on a USDA funded Food for Progress project in Malawi to promote diversification and boost agricultural productivity in the fruit and vegetable sector. Primary goal is to catalyze increase in value addition and income for value chain actors across Malawi. Research elements include what inputs, infrastructure and policy are needed to support on-farm production, and then provide appropriate and relevant training for farmers on improved agricultural techniques, technologies, food safety best practices and farm management.

**Jennifer Woodward-Greene wrote:**

Great! Projects such as this generate the information and data under discussion here. It highlights the importance of data sharing and analyses of that can be aggregated into larger data sets. Efforts such as Global Open Data for Agriculture & Nutrition (GODAN, <http://www.godan.info/>) are an important step to ensure that research efforts are available to synergize new questions and solutions that can work in a variety of situations.

**Richard (Dick) Tinsley wrote:**

Yesterday, I noted several comments on pasture improvement and use of communal grazing lands but no mention of the "Tragedy of the Common" that controls such use and would be difficult to overcome. Basically, the gains are to the individual while the disadvantages are shared. Thus the most rational individual response is to crowd as many animals into the land, which maximizes your return even if the animals suffer and you would be jailed in the US of treating them such.

**Kai-Shu Ling wrote:**

Increasing crop productivity would need a strong research in crop protection from abiotic factors during the growing season as well as in post-harvest and storage.

**Jennifer Woodward-Greene wrote:**

Excellent point. Who would be the right partners to gather to learn what the factors are at all phases of production, including post-harvest? Is there a vehicle to include socio-economic pressures that impact management pre and post harvest? If solutions are found that include management modifications, how will these solutions be integrated into the management processes used by farmers?

**Kai-Shu Ling wrote:**

Certainly, it needs to have a close collaboration with local research scientists and extension personnel in the developing countries. Application of modern technologies (such as next-generation sequencing) by researchers in the developed world (like in the U.S.) would help to quickly identify the causal agent(s) to the disease problem during crop production and postharvest. The sooner one can identify the actual biological cause for the disease, the sooner a proper management strategy could be developed and recommended to farmers in the developing world to manage the situation, thus to achieve a sustainable crop productivity. Of course, incorporation of social economic analysis as a team during the crop production and postharvest process would help the researchers and the management team to understand and in making the decision on disease management with the best economic sense of mind.

**Eileen Herrera wrote:**

Good point, Kai.

**Kwame Yeboah wrote:**

I completely agree with Kai. The need to collaborate with local research institutions to develop location-specific adaptation strategies is critical. Such collaborations will help build the capacity of local research scientist to address future challenges long after the project has ended. More importantly, it will ensure that strategies that will be developed benefit from local knowledge and adequately accounts for the specific local conditions, which will potentially enhance their adoption rates.

**Eileen Herrera wrote:**

Thanks, Kai. The threats to both crops and animals from pests and diseases seems never ending.

In another thread, we discussed the idea of bringing crop and animal scientists together to help foment better approaches and solutions. Is this an area where we could learn some lessons from each other? We could say that both plants and animals have vectors as a problem (although not the same species).

And let's not forget, we are seeing new approaches through gene editing and RNAi that may help us create faster solutions in time. How do we tackle what makes the best sense for developing country producers?

**Victor Pinga wrote:**

Good afternoon. My interest would be in research that investigates more the implementation side of things, specifically the effectiveness of the value chain approach within a food system to deliver quality diets. This takes off from issues arising along the value chain and market systems, as in the whitepaper, but rather than focusing on hard science research on how to increase food availability, accessibility and utilization, I'm interested more in how the value chain approach may be implemented in order to deliver diverse, quality diets for vulnerable populations. This may be more on implementation science, or the study on methods. For example, research on private sector incentives to deliver public goods, such as nutrition for the bottom of the pyramid, and the effectiveness of various methods or approaches, would offer ideas to practitioners how to pursue that holy grail.

**Eileen Herrera wrote:**

This is an interesting idea, Victor. Are there examples you can cite of similar types of studies?

I note that the food industry in the USA has changed fairly dramatically in the past 10 to 15 years or so towards "healthier" food. Sometimes it is healthier and perhaps sometimes it is more of a perception. Nevertheless, did industry change or did consumers demands change first?

Also, are private sector motivations likely to be distinct country to country or will economic benefit always be a prime motivator?

**Victor Pinga wrote:**

Thanks Eileen. Unfortunately, studies on value chains exist in business schools and grey literature, and I have come across few that specifically tackle value chains, foods systems and nutrition. IFPRI (Gelli, Ruel) and Hawkes have published, and a recent view point article came out of [Food Policy](#) by Maestre et al. These publications however are more conceptual in nature, and there may be more applied research forthcoming. There is great interest in more practical applications that may come out of the work of researchers, such as a study on methods. Since the value chain approach is predominant in USAID activities, it may be worthwhile to invest in better understanding so

that implementation approaches are evidence-based, especially in a new area such as nutrition-sensitive agriculture, or nutrition-sensitive agricultural value chains.

We know changes in the US food system have been a long process resulting from years of government policy, industry lobby, interest groups, lawsuits, protests, among many factors. For our work in developing countries, working in the business enabling environment of value chains and among value chain actor/clients, how can aid dollars leverage systemic change? Motivations and context will vary across countries and project settings-- although money is a common theme--but if we know a little better the various ways systemic change may be done for nutrition, informed by implementation research, we can be operating from a much better position.

**Lexine Hansen wrote:**

Hi Victor,

Your questions about the value-chain approach are very interesting to me. I work with a public-private partnership to reduce commodity-driven tropical deforestation (tfa2020.com) and we frequently struggle to get from consumer/buyer standards or demands to the producers. The supply chains are messy and rarely hierarchical. I would think that value chains are equally challenging. Do you think a systems approach or something similar might be useful in understanding value chains better?

**Ross Coniglio wrote:**

Hello,

Thank you for the article link. I do think there is, pardon the pun, great value in teaching a systemic approach as well. I have transitioned from teaching value chain concepts alone to value chains and value webs at the same time. Each conceptual model allows for important didactic teaching points to be made. I find that when discussing with individuals new to these fields that presenting the value web concept alongside the value chain helps to reinforce the need to think about the issues at multiple levels simultaneously and consistently think about secondary effects in the food system.

**Victor Pinga wrote:**

Hi Lexine and Ross, I believe a holistic approach is more realistic, however I'm afraid the methods for analysis and practical application may be beyond the means and scope of time-bound development activities/investments. Value webs are a very interesting concept. Can you share some resources, Ross?

**Ross Coniglio wrote:**

I had to dig through some of my stuff so these may not be the best but they illustrate some good points.

[http://www.rural21.com/nc/english/news/detail/article/the-value-web-approach-so-that-the-south-can-also-benefit-from-the-bioeconomy-00001222/?tx\\_ttnews%5BViewport%5D=3](http://www.rural21.com/nc/english/news/detail/article/the-value-web-approach-so-that-the-south-can-also-benefit-from-the-bioeconomy-00001222/?tx_ttnews%5BViewport%5D=3)

**Mbaziira Mahmudu wrote:**

Thank you Ms. Jennifer.

Prioritization of resources is so critical, focusing on the most pressing factors in fighting poverty amongst farmers more so through intensive research in post harvest handling, market research for both inputs and outputs and linking these markets with the farmers especially small holder farmers in developing countries can go a long way to improve on food security.

It's evident that most of the research has been focused on production when actually a big percentage of the produced food is lost along the value addition Chain. For instance in Uganda and many Sub-Saharan countries, most of the food produced is traded in a fresh form, when a drought hits for a short period, a huge population slides into the hunger trap.

**Jennifer Woodward-Greene wrote:**

I couldn't agree more on the importance of prioritization, and cost-benefit analyses can help with the decision process. On this, I think both production and post-harvest are important, and we miss much if we focus too much on one over the other. Providing methods to keep food safe for transport and sale, as well as for later consumption is critical especially when production is stunted...but the value of better post-harvest management is multiplied with higher yields, possibly providing more for the farmer to take to market.

**Deepa Thiagarajan wrote:**

Apologies for cross-posting. I had commented about food loss, waste in an earlier Nutrition thread yesterday-- Research is needed to understand significance of food losses and waste and the need to reduce them to improve food security and sustainability of food systems. Also need to understand how food losses and waste impact the sustainability of food systems as well as their capacity to ensure food security. Furthermore, along the food chain there can be quality decreases ie, in nutritional quality and other quality attributes of food. Food quality loss is difficult to measure as nutritional qualities are multidimensional; There is a need to harmonize and develop a reliable framework and standardized criteria to measure food loss, food quality loss and waste, across commodities and at different stages of the supply chain.

**Eileen Herrera wrote:**

This is an excellent point and may I add food safety to that list of challenges?

**Deepa Thiagarajan wrote:**

Yes ! It is critical to protect and preserve integrity of food both for nutritional/public health outcomes as well as to capture value and return some of that value back to producers.

**Kai-Shu Ling wrote:**

Hi, Eileen: The idea in possibly bringing together those vector biologists who are working in plant and animal systems to find similar RNAi and/or genome-editing solutions against similar (but not the same) pathogen types would enhance our abilities to achieve sustainable crop and animal productivities in the developed as well as in the developing countries.

**Carolyn La Jeunesse wrote:**

Hello, Kai. Your perspective is encouraging. Folks who work with, and coordinate expertise across the plant/animal/human/environment space (One Health) work consistently in these overlapping ways. I sit on the Council of Advisors for the One Health Commission and am happy to help with introductions (or even initial "imagings") if that would be of use.

**Kai-Shu Ling wrote:**

Thank you Carolyn! That is great! Please do help introduce me to those experts in other fields.

**Deepa Thiagarajan wrote:**

In relation to food safety challenges and opportunities and productive, income growth on and off farm sectors— Urban demand for high value food and food products are growing exponentially in SSA, SEA and SA. Much of this is from individual consumers but much is also through the food service industry (hotels, restaurants, hospitals,

schools, etc.). Food service represents an area where youth employment is traditionally very high (in many developing countries) and will likely continue to be a significant source of youth employment. It is also a subsector where small startup businesses can launch with very little capital. This is a sector where young people traditionally have been involved in food preparation, food delivery, “street food” services, catering, etc. MSU is actively engaged in food safety knowledge and skills training for youth in three main sectors –1. Primary production and packing of high-value food and agricultural commodities (fruits and vegetables, dairy, seafood, coffee etc.) 2. Value-added processing of high-value commodities as well as staple crops.3. The foodservice sector, including restaurants, hotels, institutional foodservice operations (e.g. hospitals, commissaries at schools and businesses, etc.) We also anticipate there will be a growing need for skilled labor in quality assurance, laboratory support, and food technology in food processing and packing operations for youth in emerging economies.

**Jennifer Woodward-Greene wrote:**

Thanks Deepa! Can you explain more how this translates to opportunities for the developing world, and how research could play a role?

**Deepa Thiagarajan wrote:**

One research area that we are focusing in our value chain development work is to objectively assess the baseline prevalence and concentrations of known food safety hazards (e.g. pathogens, hazardous chemicals, etc.) in targeted high-risk agricultural commodities and food products that are ready for consumption, and assess the impact of education, training and implementation of food safety management systems on these hazards in developing countries.

**Raquel Gomes wrote:**

Deepa,

Thanks for noting the evolving trends in food systems across Africa and Asia and MSU's work in youth training to help them take advantage of emerging market opportunities. What has MSU learned about working with market actors in providing these skills? As we increasingly look of ways of being catalytic in how we work, to what extent have market actors (such as buyers, aggregators, distributors, retailers, and service providers along the way) been willing to invest in training their workers and suppliers? Please share any research MSU may be doing on this front.

Thanks,

Raquel

**Deepa Thiagarajan wrote:**

Thanks Raquel. This is work in progress, we will be able to share lessons learned as we continue to roll out food safety related professional development and work force development programs. That said, there is serious interest backed by commitment from market actors--buyers, retailers, processors, not only from global food industry, but from domestic actors to train suppliers and appropriate personnel in the economies we are currently implementing projects.

**Lexine Hansen wrote:**

Good afternoon all. My name is Lexine Hansen, and I will be co-facilitating this discussion until 21:00 EDT (GMT - 4:00). This has been a great discussion, and I look forward to continuing it with you. So let's discuss how we can prioritize agriculture research to meet the critical needs of the development sector.

- **What research questions can help us understand how to increase productivity on-farm so as to generate income growth, both on- and off-farm?**
- **Additionally, what do we know about other positive and negative unintended outcomes of productivity-focused research and how can we address them?**

**Manuel R Reyes wrote:**

Good evening from my part of the world. From 21:00 to 24:00 Eastern Daylight Saving Time, I, Manny Reyes, Research Professor at Kansas State University, will be facilitating discussion together with Lyda Hok from the Royal University of Agriculture on **what research investments in the agriculture and food systems are needed to better understand opportunities for increased productivity and income growth on and off farm?** I hope you will share your insights on this important topic.

**Sang Lee wrote:**

Hello! My name is Sang Lee and I am an Agriculture Officer with USAID/Cambodia. I will be facilitating the next session. I look forward to your comments on what research investments in the agriculture and food systems are needed to **better understand opportunities for increased productivity and income growth on and off farm.**

A few thoughts and questions come to mind when thinking about this question. Many farmers now depend on off farm income or sell their labor on other farms to supplement their income. How can research facilitate our better understanding of how farming households have adapted and adopted their livelihood strategies and how can research help us reshape our development priorities and activities?

I look forward to your comments.

**Martin Fowler wrote:**

In response to David Kraybill's comment yesterday (see below) I wanted to let you know that in Uganda we (USAID) have been participating as a member of the "Coffee Platform" which meets each month under the chairmanship of the Government, with the private sector as the Deputy. Representation is both private and public sector, with civil society also strongly represented (and development partners and projects). Any issues can be (and are) brought to the table and is discussed with considerable openness. The private and public sectors, in coffee at least, work well together in Uganda. OK, admittedly it is only one crop (but a very important one at that). However, the Government is talking of replicating the experience, in respect of other key crops - oilseeds, maize, beans and (recently) crop seeds.

mfowler

**David Kraybill wrote:**

I am David Kraybill of Ohio State University. Based on my recent 6 year experience as COP of iAGRI in Tanzania, I agree with David Tardif-Douglin that it is difficult to get the private sector and public research organizations to work together. Trust is an issue but also lack of experience by both sides on substantive and sustained public-private interactions. The solution is to build local capacity (both individual and organizational) through innovation initiatives that bring private and public sector partners together to solve real problems using natural and social science. Can't be done overnight or by shipping in ready-made technology. Requires sustained conversation by

both sides often over a relatively long period (1-3 years) in many cases to get to a practical/ marketable solution. Mindsets begin to change when partners go through the process successfully from beginning to end. This, then, opens makes the next attempts more successful. .  
- davidkraybill

**Andrew Gerard wrote:**

Thanks for these great thoughts. On large scale commodity crops like coffee in countries with weak information and contracting systems, public-private partnerships (rather than a fully private sector-driven market) are crucial. That's especially the case with coffee (in specific specialty coffee) where cherries can go bad quickly if there is not a ready buyer. This provides huge opportunities for middlemen/buyers to push prices to farmers down. Though certainly not perfect, Rwanda (like Uganda) has regular coffee sector meetings to help coordinate government/private sector/cooperative activities. I agree that capacity needs to be built on both sides, and that long term conversation is necessary for effective public-private-partnership. In the African Great Lakes Region Coffee Support Program, we at MSU have found that sharing research results with government, private sector, and cooperatives together - and facilitating discussion on findings - can help get people with different needs and views to at least start discussions from the same factual point.

## Utilization of research outputs

APR 19, 2017 9:00 AM by [JERRY GLOVER](#) Comments

As research results emerge, they must be made available and accessible to those best able to utilize them, whether farmers, policy makers, processors, or other scientists. Research on technology and information dissemination, adoption, and scaling can help ensure other research investments have more immediate and broad impact. Novel investments in this area can also help overcome barriers to participation by specific groups, including women, youth, and other often-marginalized communities.

- **What research is needed to ensure more rapid, sustained, and broad utilization of research outputs?**
- **What research is needed to ensure more rapid and targeted utilization of research outputs by specific stakeholders, especially women?**

### COMMENTS

**Jerry Glover wrote:**

I think this is one of the more exciting areas where research efforts can really help improve the delivery of research outputs. The increased use of large data sets with improved data quality, the availability of remote sensing at high resolutions, and the much more widespread use of mobile phones and other devices capable of rapidly delivering data from farmers to scientists to policy makers, all contribute to a different research environment for adoption and scaling.

**Barry Pittendrigh wrote:**



I completely agree with Jerry's above comment. Mobile phones and other devices have significant potential to play a role in high throughput "push and pull" of information/data in a real time interactive manner. There is considerable opportunity to use these systems to understand problems in real time and deliver solutions back in real time. Within the context of research outputs, expert knowledge needs to be condensed and made available in formats that are useable by end users when and where they need it. Such information also needs to be accessible to end users of diverse literacy and language backgrounds.

**Jennifer Woodward-Greene wrote:**

Ditto Barry! I think it is important, when designing mobile apps to aid in adoption and implementation of new methods or technologies, that additional needs of the user be considered, and incorporated where practical. For example, additional basic information on animal husbandry, or crops and production related to the research use for the app. In other words, something that provides value to the user, in addition to the value of data gathering for research. Added-value apps will also encourage usage of the app. Depending on the availability and strength of the networks, will dictate the level of interactivity possible - from phone numbers, to static or interactive web pages, to return of useful reports from data collected that farmers can use for real-time management decision tools. There is also the possibility for this type of data collection to be used for regional monitoring of animal, crop, or human health or other issues by regional or country officials.

**Peter Thorne wrote:**

As joint facilitator of this session, I would like to extend my welcome from the front line of Agriculture-led Economic Growth in South Tigray, Ethiopia. For this week, at least, the town of Maichew appears to be one of the few places on the planet from which the Internet appears to be in retreat so I hope that I can maintain my presence this morning.

Looking at the five questions posed by the organizers, I am immediately drawn to the fourth; what research is needed to ensure more rapid, sustained, and broad utilization of research outputs?

The USAID-funded Africa RISING project that I have been leading in Ethiopia for the last four years has tested, adapted and validated a number of promising crop, livestock and integrated technologies for Sustainable Intensification in the Ethiopian Highlands. We have done this with a range of government and NGO partners and we know a lot about how these technologies "fit" the systems here. We have also ensured that there are strong or strengthening value chains in place for market-driven intensification. However, and this is a big however so I will start a new paragraph and, hopefully, get a little more quickly to the point

Our meeting here in Maichew is bringing together research and development stakeholders to design scaling strategies and implementation plans for Africa RISING innovations. There is a lot of practical experience and knowledge in the room but, as we move from the biophysical and socio-economic evaluations of the last four years to hard core "scaling" it seems to me that the research evidence to support us has virtually evaporated. We go from a situation in which it is difficult to uncover novel research questions and hypotheses to one in which virtually any hypothesis that pops into our heads has, at best, a patchy supporting evidence base. For example:

~ Simple innovations are more scalable than those that are compound or complex

~ More adaptable innovations are more adoptable

~ Equitable innovation is more adoptable than inequitable innovation

~ Innovation generated by R4D projects is ultimately scalable and adoptable!

I would be very happy if participants could either add to my list or dispute my contention that there is a dearth of evidence that we can use to underwrite the efforts that projects like Africa RISING are making, on the ground, to bring research outputs into widespread use.

**Lynn Schneider wrote:**

Greetings from Malawi, another front lines for food security and ag-led economic growth! I will be co-facilitating today.

This is a great comment, Peter. I am also drawn to this particular question given the major emphasis that Feed the Future has put on scaling agricultural technologies since about 2013. I would love to hear from others who are part of the Africa RISING project or others that have been working on the nexus between ag research and 'scaling'. In Malawi, we have Africa RISING and a consortium of CGIAR centers under the Malawi Improved Seed Systems and Technologies (MISST) activity working in this space. It is challenging, and I agree with you that there is a dearth of evidence on getting research outputs into widespread use.

One idea is for R4D projects to work closely with the purely development projects. In Malawi, our new Ag Diversification activity is the flagship Feed the Future value chain project. Throughout the start-up phase, Ag Div has made a concerted effort to work closely with the Soy Innovation Lab and the Peanut and Mycotoxin Innovation Lab, both of which have years of R4D work in Malawi in our focus value chains under their belts. The collaboration is a real win-win, as the Innovation Labs see some of their innovations being (hopefully) taken to scale, and the Ag Div value chain project has innovative technologies that have already been developed, tested, and proven in the Malawian context.

**James Rhoads wrote:**

Hi Lynn! I'm glad you mentioned this new value chain project in Malawi. I applaud the mission for being flexible enough with the project to allow them to really take advantage of the network that PMIL and SIL have established there. When we can integrate research within the scale-up projects and take time to consider things like a baseline counterfactual, we can really learn a lot. Since project timelines don't often overlap, the flexibility is really key.

The other aspect of this project in Malawi that we are really excited about is the integration of our private sector partners in research design and implementation. We found that they had fairly specific researchable questions and excellent capacity to manage field trials with technical supervision from PMIL co-PIs and local graduate students. The data generated from these plots will be some of the best we have generated anywhere and was very cost effective b/c the commercial farmer had the equipment, land, and experience to plant at scale. While different from smallholder on-farm trials, the data will still be very useful for the outgrower network connected to the farm and the farm staff learned a lot in the process. As Lynn said, it was a real win-win.

This same grower has also helped tremendously with variety evaluation and seed multiplication in collaboration with the national program breeder. This was another win-win b/c they have much more capacity to get new varieties to scale and they also really wanted the new varieties, which were difficult to get from the public sector program. They are also able to get clearer feedback from export and formal local markets through their formal channels on which varieties are most acceptable, something we often forget when simply chase agronomic performance. It has even energized the national breeding program b/c there is a quicker output for their varieties, which has been a bottleneck in the past.

**Pierre Rosseau wrote:**

M&E done scientifically, when properly analyzed (mixed model), can be used to develop updated (changing actual conditions, climate change, natural resource degradation, etc.) recommendations that are representative, accurate and reliable and will provide technically feasible, economically viable and socially acceptable recommendations. This could be called a form of applied research linked to extension.

It could be done locally by centers of excellence. However, they will require capacity building. To do it properly, USAID could envision to create a new M&E innovation lab at one of participant universities. I did already send a message to Rob about this.

**Richard (Dick) Tinsley wrote:**

M&E has to remember that they are the representative of the underwriting taxpayers making certain the taxpayers money is well invested and not part of the donor promotion and propaganda effort. As such they also represent the donor. Much of the M&E criteria needs to be substantially tightened so failure can be more readily identified and future projects can move on. You might want to look at this link:

<http://smallholderagriculture.agsci.colostate.edu/monitoring-evaluation-...>

Please excuse a little venting!

**Mike McGahuey wrote:**

Before research is useful, it must be known. From my experience, the development community has done a poor job of organizing and building upon the body of research conducted over the last thirty years or so. I found this out by going back over research conducted over the last few decades to look for research on questions concerning water and soil management in areas experiencing climatic shocks. I also found that researchers in the 1980's and 90's were asking many of the same questions that we ask today and had made progress in addressing them. However, there was no systematic way of getting the papers and results. The Africa Rising Project is a notable exception to the rule and their Repository of Research Results might serve as a model. But, given past Agency experiences of abandoning project data bases once a project is over, I would hope that BFS can somehow make the Africa Rising database a permanent fixture.

**Paul Tanger wrote:**

Thank you, Mike for your thoughts on this important topic. Lately there has been much effort around research data stewardship and accessibility. What groups etc are best positioned to leverage these and utilize them? How can sustainability of these systems be encouraged? Taking your example, what are some lessons from Africa Rising that can be applied broadly?

**Jennifer Woodward-Greene wrote:**

Hello! I am Jennifer Woodward-Greene of the USDA Agricultural Research Service, Office of International Research Programs. For the next three hours, I will be co-facilitating the discussion on Ag-led economic growth. Just as a reminder, the rationale provided in the guidance document is:

"Prioritization of investment is critical to ensure resources are focused on the most important areas of research. As we examine the range of research opportunities to contribute to the goals of the Global Food Security Strategy (GFSS), we are looking into criteria to inform our investments."

[1] See U.S. Government Global Food Security Strategy

(2016) <https://www.usaid.gov/sites/default/files/documents/1867/USG-Global-Food-Security-Strategy-2016.pdf>

**Eileen Herrera wrote:**

Good afternoon, everyone (or whatever time of the day you are currently enjoying. I am Eileen Herrera with the Agricultural Research Service of the USDA. I will be co-facilitating this session from 15:00 to 18:00 Eastern DST. I believe my colleague from USAID, Raquel Gomes, will be joining at 16:00.

A reminder that this session is addressing Ag-Led economic growth.

From the whitepaper on this topic: Resources for agricultural research are limited. While research investments must consider the broader agriculture and food system and achieve wider social and environmental objectives, it is essential that investments are focused and prioritized to achieve the greatest impacts. Our colleagues at USAID have posted the 5 questions to be separate discussion areas, so please feel free to weigh in on any of these questions.

Or raise questions of your own that you think can help frame these discussions.

**Donald Knowles wrote:**

Although the idea of employing teams of scientists from multiple disciplines has been discussed in the past and utilized, I suggest this concept remains underutilized for the development of research area ideas. For instance, would it make sense to bring scientists in crop production and health together with those in animal production and health?

**Eileen Herrera wrote:**

Hi, Don. Thank you for your comment.

I am a fan of integration of approaches because at the end of the day, I believe most farmers want to know how to make their farms successful. So while scientists tackle issues in depth, the farmer wants solutions for his or her animals, crops, entire farm.

So if we integrate approaches more (and why not throw in the soil, water and air and socio-economic research, too), how can we effectively organize this?

Moreover, can we envision a way to connect those working on longer-term, focused challenges with those focusing on moving the technology forward, and with those deploying the technology? Can we integrate more highly resourced research with research in developing countries in ways that help build capacity and tackle the challenges?

**Oscar Ortiz wrote:**

Hi Eileen, I am Oscar Ortiz DDG-R at the International Potato Center. I share your opinion on the importance of integration approaches, which should involve biophysical and socioeconomic/cultural aspects. However, the how to integrate the approaches and what tools we could use is still a research question to me. Some other colleagues have mentioned the increased use of "big data" and ICTs as a way of promoting interaction, but this is still an area that requires attention, some colleagues call it the science of delivery, which do require integrated approaches.

**Eileen Herrera wrote:**

Excellent point, Oscar. The single common technology that seems to have deployed rapidly is the cell phone, with the smart phone following rapidly. We can harness the technology of instant information, but how do we ensure

that the information is solidly science-based? Moreover, as technology can not only deliver information/recommendations, but also gather data, are there societal challenges we should note and address now?

**Richard (Dick) Tinsley wrote:**

This also involves recognizing the farmers are involved in multiple farm enterprises in terms of both crops and livestock, while research tends to concentrate on single commodities, thus when the research is applied to the farm, the farmer has to optimize the results over all the enterprise. This results in compromises in the quality of one enterprise to enhance another with the underlying objective to "MAXIMIZE RETURNS TO ALL FARM ENTERPRISES" rather than obtain the maximum return from any single enterprise. You might want to look at this webpage:

<http://smallholderagriculture.agsci.colostate.edu/ethiopia-diet-analysis/>

It was developed more for looking at dietary energy balance but serves this purpose as well.

**Donald Knowles wrote:**

As a follow-up, I continue to believe that vaccines that do not require a cold chain remain an important pursuit for animal health and production. However, the efficacy of these vaccines depends in part on general health and therefore nutrition. As I think everyone agrees, management interventions are inter dependent. I remember a great deal of discussion concerning the delivery of vaccines through crops. What are the challenges to having plant based vaccines a reality? I suggest that part of the challenge is getting the right folks to talk with each other.

**Barry Pittendrigh wrote:**

We need to be thinking towards research questions that address the limitations and challenges that occur between the interfaces of research, scaling, and utilization (a research to utilization chain). What can be done to lower transaction costs that allow for smoother transitions between research outputs and those pathways than can better enable utilization? Integrated teams need to be assembled that work, from the beginning, towards strategies involving groups that have technical experts, social scientists, and those that can integrate outputs into programs directly with stakeholders. Such integrated approaches may also provide outputs in terms of "lessons learned".

**James Rhoads wrote:**

This is something I've considered as well. The academic community that addresses these issues most closely is probably in business schools and the private sector figures out the answers to some of these issues much better than academics b/c the incentives and accountability is clearer. Those lessons aren't recorded in the peer reviewed journals that I try to read. Maybe we need to seek out these type of collaborations, but if publications are our commodity, I'm not sure of the incentives for academics?

**Barry Pittendrigh wrote:**

James - I completely agree with your above comments. I also think you have raised an important issue regarding publishing; the need for peer-reviewed journals that allow for articles that are highly interdisciplinary and allow for documentation of lessons learned.

**Lexine Hansen wrote:**

Thanks Barry and James:

Since peer-review is the currency of academia, what do we have to do to translate from highly-specialized peer groups to broader audiences? And secondly, where are there interdisciplinary journals which validate such approaches?

**Jennifer Woodward-Greene wrote:**

Thank you, that is an excellent comment Barry Pittendrigh, and I believe it succinctly summarizes much of the discussion here today.

**Lexine Hansen wrote:**

Good afternoon all. My name is Lexine Hansen, and I will be co-facilitating this discussion until 21:00 EDT (GMT - 4:00). This has been a great discussion, and I look forward to continuing it with you. So let's discuss how we can prioritize agriculture research to meet the critical needs of the development sector.

What research questions can help us understand how to get research outputs into the hand of those, including women, who most need them? As a policy maker, I am wondering how research can be made more accessible to people like me, who have to make programming decisions with broad expertise but perhaps little understanding of specific contexts or agricultural systems.

**Lexine Hansen wrote:**

I just spoke with a colleague today who witnessed something interesting in this line. She was involved in a project in X country in which development experts were working with ag scientists to distribute higher-nutrition crops. A second social-science research group was interviewing the beneficiaries to learn about adoption of the new crops. However, the social scientists were finding that the farmers were adopting the new crops because they were free and that if they had to pay for them, they wouldn't specifically seek them out. There were a variety of reasons for this, and the social scientists were digging into those reasons. However, the development funders stopped the social science project and continued on the planned schedule for shifting from free to market-based suppliers of the crops. To my colleague, a disinterested outsider, this seemed like a case where one side refused to listen to data they didn't want to hear, to the detriment of the outcome of the project.

My question then is: how do we shape research teams and projects so that the different actors respect the insights from other fields even if they disagree with them?

**Lynn Schneider wrote:**

Hi Lexine- This is a great question! I have seen many cases of donor-funded value chain development projects ignoring or going against research findings. In the world of agricultural development, it seems like the researchers and pure development project implementers don't talk to each other and don't always want to talk to each other. It is similar in some ways to the problem raised in other discussions on this event of the public and private sectors not talking to each other. It takes time to develop the relationship and have them see that they have shared interests.

In cases like the one you described above, is it the role of the donor to step in and ensure that the research teams and projects talk to one another and respect one another's insights? As a USAID officer, I would love to hear what researchers and implementing partners think about this.

**Manuel R Reyes wrote:**

Good evening from my part of the world. From 21:00 to 24:00 Eastern Daylight Saving Time, I, Manny Reyes, Research Professor at Kansas State University, will be facilitating discussion together with Lyda Hok from the Royal

University of Agriculture on what research is needed to ensure more rapid and targeted utilization of research outputs by specific stakeholders, especially women? I hope you will share your insights on this important topic.

**Sang Lee wrote:**

Hello! My name is Sang Lee and I am an Agriculture Officer with USAID/Cambodia. I will be facilitating the next session. This sub-session is focused on what **research is needed to ensure more rapid, sustained and broad utilization of research outputs?**

Research and development activities move at a different pace. How can we better focus research activities to have better connections to the private sector and commercialization opportunities?

**Claudia Ringler wrote:**

Dear Peter,

Your criteria for upscaling are great:

- Simple innovations are more scalable than those that are compound or complex
- More adaptable innovations are more adoptable
- Equitable innovation is more adoptable than inequitable innovation
- Innovation generated by R4D projects is ultimately scalable and adoptable!

I would, however, add some important institutional and market criteria as well:

- The technology needs to be profitable and risk-reducing If it is only profitable, but does not reduce risk, then additional measures have to be taken to address increased risk (f.ex. a new seed variety might well cost more, require application of fertilizers and or irrigation and thus dramatically increases exposure). This additional risk can only be carried if there are risk mitigating factors, such as good access to markets, stable/secure buyer, insurance that kicks in in case of drought or flood, etc.
- Market access is key to any upscaling of agricultural technologiesà areas with markets are the low-hanging fruits of ag diffusion
- Technologies that reach, benefit and empower women and men are more likely to be upscaled
- Technologies that do not cause undue increases in time burden are more likely to be upscaled.
- In some places, successful upscaling requires support of district or national officials

Regards,

Claudia

## Efficiency, quality and cost-effectiveness of small-scale agricultural production

APR 19, 2017 9:00 AM by JERRY GLOVER

Welcome to Day 2 of the AgExchange, and thanks to everyone who contributed yesterday! Our discussion today will focus on a research agenda on agriculture-led economic growth. Please read this [framing paper](#) and watch this [brief video](#) for an orientation to today's discussion.

Here's our first question for today:

- **What research areas are most critical to enhance the efficiency, quality, and cost-effectiveness of small-scale agricultural production for producers in the target geographies of the U.S. Government's Global Food Security Strategy (South Asia, Sub-Saharan Africa, Central America/Haiti)?**

## COMMENTS

### **Pamela Anderson wrote:**

Good morning - afternoon - evening, everyone. I am Pamela Anderson, BIFAD member. For the next three hours, Jerry Glover of USAID and I will be facilitating the discussion on Ag-led economic growth. Welcome....we look forward to hearing your insights and advice for how to move the ag-led growth research agenda forward.

### **David Tardif-Douglin wrote:**

Thank you Pamela. My name is David Tardif-Douglin, with DAI and Africa Lead. From my field experience, it seems to me that a number one thing we need to understand and address is the resistance to improving the enabling environment for private sector led agricultural development. My enduring experience, with a 6-year interlude in the Philippines, is in African agriculture.

### **David Tardif-Douglin wrote:**

The level of distrust between policy makers and the private sector seems to be unusually strong and runs counter to the lip service to "private sector-led" agricultural transformation, which one hears frequently in conferences and even from leaders themselves. There is a public recognition that without private sector investment, agriculture will not take off, but there is a resistance to seriously addressing the enabling environment.

### **Pamela Anderson wrote:**

Thanks David. This is such an important point. I have witnessed (and been part of) numerous failures to get private sector into our smallholder ag-led growth research and development. One of my conclusions is that both of us (public and private) have been pretty romantic. There are other groups (Syngenta Foundation) that have been tackling this work...investing in formal brokering of public-private partnerships. And the Gates Foundation has been looking at how to de-risk the entry of private sector into smallholder agricultural engagement - which is what it sounds like you are referring to. Can you share any specific ideas where you would like to see this, and how it might lead to greater productivity if we were successful?

### **David Tardif-Douglin wrote:**

Even though I have been in this business for the better part of 25 years, I admit that I have more questions than answers. But another thing I think we need to understand better is the different attitudes of different small farmers. To be too broad, but making a distinction one doesn't often hear, there are some small farmers who are farming simply because that is all they know and they may not be very good at it and actually prefer to get out of



farming. There are others that are better farmers, who are producing more for the market, more commercially-minded. Who are these different farmers and how does one address their different needs? Will improved productivity of small scale farmers growing the normal, low price commodities that everyone is growing make much of a difference in those farmers' lives and livelihoods? Or do we need to have different approaches to supporting those farmers as opposed to the farmers who identify higher value crops or agriculture endeavors for the market?

**Pamela Anderson wrote:**

Thanks David. I wonder if any of our social sciences colleagues would have thoughts on what kind of research questions or approaches this might require?

**Jerry Glover wrote:**

Thanks, David. Research programs distinguishing different farmer 'typologies' seem to be producing some rich information on targeting the different types of innovations and practices. Do you have some specific examples in mind; case studies or reports? This would also be a great conversation thread for the 'integrating social and natural sciences' question. Many thanks for the input.

**David Tardif-Douglin wrote:**

Sorry, Jerry, my thinking is driven by old research from an ag policy project in Rwanda, and by anecdotal evidence. Maybe someone else can provide more "hard" evidence.

**Ruth Meinzen-Dick wrote:**

There are a range of indicators that you can use for that. For example, in a study we did for CCAFS, we included attitudinal variables, and found them to have a significant effect on adoption of climate smart agriculture. See <https://cgspace.cgiar.org/bitstream/handle/10568/65680/Gender%20and%20Institutions%20Working%20Paper%2079.pdf>

**Laura Ostenso wrote:**

Hello- I think the question of segmenting and typing smallholder farmers to understand how to reach them as customers who are business people is important when it comes to working with private sector partners to commercialize ag solutions. The Sustainable Food Lab has some nice resources as shared by Starbucks, who I believe working with the Gates Foundation, to use marketing approaches to segment smallholders into categories for understanding adoption/uptake potential of different trainings, products, services. Those resources are [here](#), and I gleaned from it that Gates has a working survey that could be interesting to use within the research agenda more broadly for looking at this questions.

**Jerry Glover wrote:**

Hello everyone. I'm Jerry Glover, an agriculture advisor in USAID's Bureau for Food Security. I will be co-facilitating this session with Pamela Anderson. We look forward to your thoughts and questions.

**Patrick Webb wrote:**

With apologies for cross-posting, allow me to repeat what I said under the nutrition research forum. We need a lot more cost-effectiveness research on the policy and operational considerations that underpin successful scale-up/roll-out of all new agricultural technologies and also policy-level actions that affect decisions in agriculture. We know too little about the real costs of doing business (including measured impacts!) in relation to economic returns versus investments. Such knowledge is absolutely essential if we are to make effective choices among possible alternative actions in the nutrition-sensitive agriculture domain.

**Jerry Glover wrote:**

A very good point, Patrick. Are you specifically referring to the wider enabling environment such as government regulations, barriers to trade, or are you more specifically referring to the challenges on-farm to adopting new technologies or management practices?

**Patrick Webb wrote:**

Both, but more specifically to the latter. There are numerous national level policy choices that affect the decision-set open to smallholders (relating to relative prices, water access, market access, input support, etc.). My point is that while innovations in technology are of course needed, we also need much more research on cost-effectiveness among alternative actions. This is what decision makers need and call for, but too many studies are along the lines of Input A leads to Output B...without transparently noting the cost per unit of B achieved, let alone its relative cost in relation to potential Input X. Hope that's not complicating things too much!

**David Tardif-Douglin wrote:**

Patrick I agree that we need to revive cost-benefit analyses for the various kinds of research conducted on what can help drive improvements in agricultural productivity and farm incomes, especially for small holder farmers. Of course, very quickly the question of time of research impact comes into question and ripple effects, which probably makes this kind of CB work more complex than we would wish. Just the same this kind of analysis, or at least mind-set is important to support.

**Mike McGahuey wrote:**

I fully agree with Patrick that the cost of innovations, including maintenance, and the benefits that accrue to those innovations over time are critical considerations. And, I would make the argument that by assessing past investments, USAID and partners could produce valuable information about the full range of costs and benefits, including unexpected outcomes. USAID has usually been good at planning projects and programs but terrible at taking stock of their outcomes after the end of those initiatives even though the real costs and benefits can only be calculated in the out years. For example, in Mali USAID built large check dams to trap run-off in order to irrigate rice. It was found that farmers not only used the land behind the dams for rice in the rainy season, but made their real money by growing potatoes in the dry season and vegetables in the shoulder season. That project closed several years ago. Sending a team back today should provide interesting cost and benefit questions, including the unexpected outcomes, the effectiveness of the governance structures set up to manage and maintain the dam, the value chains established to increase the value of cash crops, the effects of the dam on local water tables or on mosquito populations, etc. In short, instead of asking, "What do we think that costs and benefits are of an intervention?", taking stock of past investments allows us to ask, "What were the costs and benefits of a given intervention?"

**Feed the Future Partnering for Innovation wrote:**

Hi- I'm Bob Rabatsky (Fintrac), posting from my program account. Proving the benefit of a new technology over an old one is definitely a key element to "making the sale" to skeptical farmers. Ag extension agents back in Ohio used to say, "if you can't show a 30% improvement over current practices then you won't make the sale". Sellers of new technology need to know that farmers want to be shown the advantages of a new seed, piece of equipment or other technology, and they will make the decision to use it based on their best interest. To make the sale you need to be able to state categorically that the new gizmo will (reduce labor costs by xx%, or increase yields by yy%, or improve your bottom line by \$zzz over current practices. Side-by-side demonstrations are also very helpful, and we have many examples to share (seeds, inputs, PICS bags, etc).

All this being said, research for comparing costs and benefits of a new technology to a farmer may help practitioners know how to better deploy a new technology, or for a company to make their sale of a new product. My team developed a handy cost-benefit tool for our private sector partners to help them with this analysis, which has been helpful.

**Eileen Herrera wrote:**

Good point, Bob. Is this tool readily available?

**Jennifer Woodward-Greene wrote:**

That sounds great! Where is the tool available?

**Feed the Future Partnering for Innovation wrote:**

We are testing it with a couple of partners and then will share it, most likely through the AgTechXChange: <http://agtech.partneringforinnovation.org/>. Ping us in the next month or so if you don't get it. [innovation@fintrac.com](mailto:innovation@fintrac.com)(link sends e-mail)

**Pamela Anderson wrote:**

Thanks Patrick. Cross-posting is wonderful...we ultimately want these threads (which represent the different objectives) connected to each other. This is a good example of one of those many areas that we have been attempting to tackle for years, and making slow to limited progress. To probe further, do you have a sense of what that research might look like? Could it be housed in the current FtF framework?

**Patrick Webb wrote:**

It's a fundamental cross-cutting foundation of the FTF framework, Pamela. All I'm suggesting is linking more conventional agriculture research that focuses on 'does this work in this setting' with broader cross-disciplinary research on 'what does it actually cost to make this work in this setting...and would that cost hold steady if applied to all similar settings?' The cross-disciplinarity is essential since it has to involve not just ag econ, but also political economy, process-tracing, effective assessment of the drivers of adoption behavior (or non-adoption), and taking capacity issues into account.

**Pamela Anderson wrote:**

Thanks Patrick...the reason for probing is that I am trying to think about how our USAID colleagues would take this input and operationalize your input into a new research strategy. It strikes me that this might be parallel to one of the exchanges on gender research yesterday. It is cross-cutting and needs to be mainstreamed into investments within the three objectives (ag-led growth; nutrition; and resilience) but you would also need an investment (perhaps in the policy area?) providing leadership on methodology, tracking, and socializing research to users??

**Jerry Glover wrote:**

This would be a good discussion starter for one of our other questions on the agriculture enabling environment. Perhaps you would be willing to summarize some of the discussions from the nutrition session over on the 'agriculture enabling environment' thread. Thanks.

**Robert Bertram wrote:**

Hi all,

As we finish the nutrition discussion up, i found something worth sharing--it's the program livestream of the UFI Livestock Systems Nutrition Symposium of March 30th. There are many excellent presentations on nutrition but I wanted to flag Lindsay Allen's on the need for animal source foods...at 2 hours 5 mins into the program...but there

are others as well that are excellent. One take away from the day was whether it was appropriate for us to consider a diet without animal source foods as minimally acceptable....we do. But given the evidence it is reasonable to question that.

More generally with respect to our research, whether around nutrition or productivity or resilience, these kinds of contextual evidence should be considered too...so wanted to share. Thanks all and hope it's ok to be a bit wide of the new topic!

Here's the link: <https://mediasite.video.ufl.edu/Mediasite/Play/1f0355bfd2574e239ffa3500c...>

**Pamela Anderson wrote:**

Good morning, Rob. Thank you for sharing this with everyone. The other good and subtle point that I think you are making is the bias that we seem to have towards crops when talking about agriculture. Livestock plays a critical role across productivity, nutrition and resilience.

**Carolyn La Jeunesse wrote:**

Rob, thank you for sharing this. Especially for those of us in One Health who regularly traverse policy, partnerships, and programs in the overlapping areas of international development, global/public/animal health, disaster prep/response, and "conservation," contextual evidence is critical. It's complex stuff. Even messaging within different USG entities is disjointed and conflicting, and the right hand's knowledge of what the left hand is doing sometimes quite different. Decisions on the global health end are impacting food security issues and all are impacting national security and economic security issues, and not in necessarily productive or beneficial ways. This is not intentional in most cases, just what happens when huge amounts of knowledge and increasingly specialized siloing make it impossible for folks to know everything even about their own issue areas. Every bit of knowledge we get and share is important.

It might be reasonable to consider a diet without animal source foods at some point, and the concept deserves our ongoing consideration and research. However there just is no compelling evidence now to show that it's possible to optimize nutrition, especially in the 1st 1,000 days, without animal source foods. And, regardless of whether or not that can be accomplish in some places at some time, that is certainly not likely to be the case for highly vulnerable persons where things other factors such as culture, tradition and food preferences so heavily impact uptake.

Translating the science and data into compelling narrative to inspire policymakers towards more enabling legislative frameworks for food security is so very critical. As a veterinarian working both domestically and internationally, I can tell you that it is also critical to be able to understand the context (for whatever we're discussing) and how to effectively message for various stakeholder or interest groups. That messaging must always work towards demystifying science for those who may not be scientists, and address knowledge gaps and misconceptions in ways that are welcoming and open up further avenues for building trust and shared understanding.

For instance, we can't ignore the U.S. in our nutrition discussions, for the reasons we all know. However, animal agriculture faces some particularly difficult "image" and regulatory challenges..."factory farms," animal welfare (vs."animal rights), misunderstanding about livestock ag contributions to greenhouse gas emissions, environmental impacts (water, grazing, livestock-wildlife conflicts), emerging infectious diseases (avian influenzas, BSE, foodborne illnesses, air/water quality impacts, etc.). These same issues are discussed in relation to international animal agriculture, but in much different contexts. Yet it is common for critics of, for instance, animal ag in the U.S. to

engage the same arguments against animal ag for developing countries. These groups often have strong constituencies, lots of resource and money, and the ear of influential policymakers. Our international efforts can be derailed when these messages get mixed..."contextually misapplied."

This "misapplication" is resulting in a disturbing trend coming from some environmentalists...an idea that animal ag in developing countries should not be supported. Instead, there is what I view as a very "colonial" push to "let them eat bugs" (really...that's what is being promoted) with mention of, for instance, various cricket-based products as examples of the protein that will save the world. Unfortunately, the biggest voice, regardless of its accuracy, cultural sensitivity or realistic relevance often wins, so these resources you share are all the more important in helping decision makers sort through all the noise.

One example is the developed vs. developing country discussions around animal source foods. In developed countries where calorie intake and intake of animal source foods is often too high, we have problems related non-communicable diseases and nutrition/micronutrient gaps. That story around animal ag has to be framed very differently than the one around animal ag for developing countries. And, drawing comparisons to help folks understand commonalities (all pregnant moms and kids through 1,000 to 3,000 days need a certain type of nutrition; we have problems with food access/affordability/quality/diversity/safety everywhere, not just developing countries) can go a long way to creating necessary buy in for public support of legislative efforts on both the domestic and international fronts.

Stakeholder needs and mandates across academia, private sector and public sector vary so greatly. The value of every bit of information that is shared cannot be underestimated, as it is in the nuancing of messaging that we advance support for what we're all dedicated to doing. We are careful, transparent, honest and humble in our "translation" of data and evidence to ensure that our messaging is trustworthy and understandable by those who are not so "scientifically informed" as we might be. We find ways to engage folks wherever we can for the benefit of folks everywhere. Passionate, engaged policymakers and leaders in every sector can then take this message and create their own compelling narrative in order to drive support for collective progress.

So... being "a bit wide of the new topic" seems entirely appropriate, and fundamental to the very nature of this particular consult, and, I would argue, the way that things work in the "real world."

All of our efforts here depend on policy and regulatory enabling environments. Fluency with using the knowledge we have to improve these enabling environments may be some of the most important work we all do. Sharing resources may help us get there faster.

**Marjatta Eilitta wrote:**

Dear Carolyn,

Thank you for this. You have well pointed out some of the hurdles that are there in the communication about the crucial role of animal-source foods. As a follow-up to the Global Nutrition Symposium: Fostering Development through Animal Source Foods we will make an effort to communication about the crucial role of animal-source foods, in ways that will hopefully find resonance among wider community. In the countries where we work, there is also much to do. An important research question will focus on most effective ways for behavior change, to encourage consumption among children and pregnant and lactating women - for example, are performance based messages ("your children will do better at school") more effective than health-based ones ("your children will not get sick as often")? Hurdles to increased consumption go beyond messaging; for example, in villages with low

consumption rates, animals are not regularly slaughtered and meat is therefore not available. To overcome such hurdles there is also much research that needs to be done - for example, what products can be developed that have shelf life in conditions without refrigeration. The lack of understanding of the benefits of livestock go beyond animal-source foods as there is little understanding of the crucial role that livestock has in sustaining some of the most vulnerable people in the world, and its important role in crop systems in large parts of the world. This is mainly communication effort, and therefore we need to link our studies to effective communication about this aspect also.

**Carolyn La Jeunesse wrote:**

Marjatta, I fully agree. When "sitting" with moms, kids, community leaders, tribal chiefs, etc. I love starting with sharing story and listening. The importance of gathering accurate information, building relationship and partnership through our conversations, and confirming our understanding are critical. To that end (because I'm a nerdy scientist), I use validated frameworks for outcomes-based communications, as well as decision making frameworks, particularly around sharing of scarce resources. As a veterinarian, I also can empathize with the human-animal bond aspects of livestock caregiver realities. It is rarely, rarely discussed, but attachment to these animals as a psychoemotional support and providers of a sense of security (income production, status, food security, etc.). This must be considered, but that conversation generally does not happen in a first, superficial discussion, but develops over time along with trust. If we don't understand this, we miss the opportunity to help people who often suffer from chronic, or acute on chronic stress related to poverty. The relationship with animals (unpublished qualitative data) provides a sense of connection and shared love (yes, love) when sometimes both are difficult to find, especially for poor women and children who are primary livestock caretakers.

None of my non-veterinary development friends "get" this (only because they haven't considered it). It's important to understand there is often a strong bond between animal caretakers, and that disruption of that bond, no matter how expected or necessary, and cause tremendous stress for folks already suffering from chronic stress, recurrent crises, etc. Simply being sensitive to that, normalizing it for the caretakers (many have deep shame around being so emotionally attached to their animals), showing respect for that bond, and helping folks navigate decision making with this in mind is valuable beyond what most can imagine.

Along those same lines, professional animal health workers, especially community animal health workers (CAHWs) face what appears to be considerable risk for compassion stress and burnout. As a veterinarian in the US., if I can't save your dog or cat, or your backyard chicken, that may be very difficult emotionally, but it will not be devastating with regard to your family's nutrition, household economic security, your kid's education, etc. My colleagues in especially the poorest countries experience tremendous stress and pressure to save every animal, and fully understand the consequences for a family losing it's only pig, goat, cow or chickens. Since there is not much discussion around this issue, they accumulate that stress, and over time, it can impact their clinical competency, ethical decision making, etc., so it is a significant issue to address, especially in countries where there are no or few veterinarians or veterinary paraprofessionals. These folks are precious, precious resources and we must look at the entire spectrum of challenges they face that impact their effectiveness and career longevity.

Just one example of trust building, and using validated communications frameworks in order to get at complete and accurate information in a timely fashion.

**Jennifer Woodward-Greene wrote:**

Thanks Carolyn, you make a great point. The direct connection to the ultimate beneficiaries of potential research advances are often tangential to development of research objectives and implementation of projects to meet their

needs. This is true anywhere, not only in developing countries. This is largely due to the fact that it is difficult to do, and requires a different network and expertise than typical career researchers may have. Is there a way to bring these groups together and integrate their expertise? Can extension professionals be enlisted more formally to identify specific needs that are researchable - and their 'research-ability' is informed by the extension and research communities working together in the planning, development, and evaluation of projects? Could this coordination, and the support (logistical and financial) be an integral part of USAID research strategy?

**Carolyn La Jeunesse wrote:**

Hi, Jennifer. Yes! This can be done. The folks who "do" what your suggesting are classically viewed as "stakeholder engagement specialists." For instance, this is part of what I do. So, I may be working for Department of Defense on multi-national all-hazards disaster preparedness planning initiative in country, where I "sit" with folks ranging from community leaders and youth, complex systems analysts and anthropologists, to tribal chiefs, ministers from various government agencies, and tribal chiefs, UN officials. It is my job to "sense make" and establish and shepherd those relationships. We are looking at threats to agriculture production and related value chains, climate/weather crises (rising sea levels for coastal towns, flooding for interior towns, windstorms, fires, etc.), animal or human (or shared) disease outbreaks, mass casualty events (during regional sporting events or religious pilgrimages), access to health care, mapping of assets and threats, building out human and institutional capacity with limited resources and limited communications ability, and trying to help governments navigate legislative avenues toward enabling all that is needed to address the aspects of these various things. The trick is having those stakeholder engagement specialists have requisite subject matter expertise. For me this means biomedical, social/behavioral sciences, organizational leadership and strategizing skills, research background, and deep understanding of global health, international development, the "disaster prep" space, biodiversity conservation, and psychosocial trauma (violent conflict, chronic poverty, climate change, weak health systems, etc).

Likewise, I work with policymakers (primarily global health, conservation, foreign policy and international development portfolios) to bring together stakeholders from academia, private sector, think tanks, NGOs, etc. to share learning and find ways to effectively shape more "enabling environments" for better outcomes. This might mean, for instance, revisiting how funding cycles mismatch assessment cycles. If a project has 2 to 5 year funding, but outcomes for sustainability, scaling, etc. are more accurately assessed over longer time frames, how do we create funding policy to make sure we're gathering the best outcomes data?

Because I bridge crises/global health/food security/conservation, I see these things as all very intimately intertwined, and am continually astounded (and sometimes appalled) at the incredible redundancy and likewise the gaps in coordination that would be quite easily address.

Importantly, as a communications specialist who also works with young scientists and development professionals, there are more effective ways to help them develop this broader expertise so that their good efforts in research have greater relevance, and so that they can build compelling and interesting narrative for ordinary folks (who are constituents listened to by policymakers) as well as inspiring to caring legislators.

A truly effective and accomplished stakeholder engagement specialist usually is also a gifted facilitator, able to help very talented and strongly-opinioned professionals find common ground, stay on tasks/subject, and still foster a collaborative environment that engenders enthusiasm, reveals and builds on common interests, and fosters synergism. The environment created for conversations, how those conversations are shepherded, the trust and respect that are established, and the dedication to transparency are often more critical than the actual

content. The content evolves because there is no lack of enormously knowledgeable, dedicated, determined folks working in these issue areas. Getting them to *hear* each other and *actively listen* is the single biggest benefit in getting the ball rolling.

With regard to which expertise to engage...extension and research as you mention, the answer to that is "yes" as well. And I think as we move forward rethinking funding models, new approaches to classic "corporate social responsibility" will move us closer to truly beneficial, strategic and sustainable public-private partnerships. We have vastly under-engaged businesses in developing countries (as one friend said, "there is a lot of money in African businesses, and they are looking for philanthropic things to do and ways to spend that money," but in a context and in ways that are comfortable and relevant for their realities. It's yet another example of how we can pull folks together to advance business and still advance our development efforts and ensure safeguards for the vulnerable and exploitable.

Lastly, I think this coordination and support are essential and should absolutely be a core part of USAID research strategies. I would humbly suggest the "research-ability" may be more fully informed by bringing a range of other stakeholders to the table. This would help us avoid the egregious gaps and redundancies that currently exist across related issue spaces. So much great opportunity here! It is really quite exciting!

As you can see, I love this stuff and am happy to continue the discussion here or offline!

**Jennifer Woodward-Greene wrote:**

Wonderful comments! Your work is proof positive that this is emerging and evolving, and I agree the approach needs to be incorporated into more research programs and projects. In the information age, it may seem counter-intuitive that there is not enough information to inform research needs, and develop research projects with a high potential of real impact (solutions that are put to use in the real world). However, there is so much information, that integrating it is a real challenge, and the frontier of a new field of expertise to facilitate discussions, and to include big data analysts, for the multitude of expertise you list to make sense of it all. The Feed the Future Livestock Improvement project, which I am working with, has as an outcome, the African Goat Improvement Network, ([www.ars.usda.gov/AGIN](http://www.ars.usda.gov/AGIN)), which aims to bring together a variety of fields and levels of expertise so we may address the total problems in the livestock sector, as well as promote capacity building for the future.

**Carolyn La Jeunesse wrote:**

Well, Jennifer, there are no coincidences! I am so happy to hear you're involved with the Livestock Improvement project, and have the African Goat Improvement Network as an outcome. I pray something significant comes from this. It has been agonizing to stand by and see millions of dollars wasted on, specifically, goat projects (I'm most familiar with considerable expenditures and failures in Liberia), especially when no animal health care expertise was engaged on the front side in either design of proposals, review of proposals, or in tweaking programs to integrate animal health (this seems like a "duh" to me) into programs once moved to the field for implementation. The credibility and trust we lost in Liberia and surrounding countries were enormous, and unfortunately, paints all animal/livestock involved NGOs with the same brush in the eyes of those we aim to serve. They don't necessarily understand that my NGO is not connected with your large implementer, for instance. Then, this had repercussions for PPR vaccine campaigns, for instance, with disastrous consequences during a PPR outbreak in the very areas already severely impacted (food security, nutrition security, household income, school fees, etc.) by Ebola.



I reviewed several proposals for various big money livestock (mostly small ruminants) capacity building programs and have been pretty stunned by the absence of veterinary expertise, much less animal science/husbandry expertise. As well, a disconnect between stakeholders working on exactly the same issues unable to coordinate on the simplest projects, with poor communities and livestock keepers falling through the resultant "failure gaps." It is quite tragic and frustrating given how precious are funding resources. So, I heartily hope for your wild success with this project!!

My favorite complex systems analyst is Eva Lee at Georgia tech, primarily because she can model human behavior, but also because she has exquisite cultural agility and natural gift for engaging even the most traumatized, disenfranchised and suspicious folks on the ground. Our data is only as good as the inputs. Our inputs must be precious and strategically shepherded to the best analysts (which includes how easy it is to work with them in addition to their professional talent).

With regard to goats, are you connected with the folks at the International Goat Association? A veterinary colleague and international development professional, Dr. Beth Miller, currently is President.

I would leave you with this thought: It is complex, but not complicated. There is beauty in that complexity and fabulous new insights that we gain when we come together. Of course, these communities live with the same realities we do. I don't know about you, but I don't think separately about water/sanitation/hygiene/school/shelter/clothing/electricity/connectivity/safety and security, etc. as I move through my day. But our programming approaches tend to look like we think those in developing countries live within the silos we create (out of some necessity) in our programs. My primary focus now is integrated/resilience systems approaches that always at least consider the realm of attributes, capacities and resources communities and individuals need to decrease their vulnerability and increase their resilience and self-efficacy. This is kind of a working backwards approach, first informed by those who are partners in and beneficiaries of our work "on the ground." Pretty fun stuff!

**Jennifer Woodward-Greene wrote:**

Your passion is palpable! Thank you for that, and for your ideas to integrate what can arguably be akin to 'herding cats'. Livestock has been particularly challenged for sustained success, and I believe it is due to the omission, or less than full integration of the end-user. The Feed the Future initiative championed the 'country-led' approach, which is a great inspiration to include the community level as well. Of course the challenge in making the case to the skeptic, is explaining and showing how will it 'scale'? I think a role for larger organizations could be to facilitate the logistics, and the funding for such complex collaborations - perhaps becoming the experts for this, as it sounds as you are doing. It truly is a skill, and not easy to do. You articulate well the potential benefits, and as we discuss what is important to building a new research strategy, a critical part of the discussion!

**Carolyn La Jeunesse wrote:**

Marjatta, I fully agree. When "sitting" with moms, kids, community leaders, tribal chiefs, etc. I love starting with sharing story and listening. The importance of gathering accurate information, building relationship and partnership through our conversations, and confirming our understanding are critical. To that end (because I'm a nerdy scientist), I use validated frameworks for outcomes-based communications, as well as decision making frameworks, particularly around sharing of scarce resources. As a veterinarian, I also can empathize with the human-animal bond aspects of livestock caregiver realities. It is rarely, rarely discussed, but attachment to these animals as a psychoemotional support and providers of a sense of security (income production, status, food security, etc.). This must be considered, but that conversation generally does not happen in a first, superficial

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**Jerry Glover wrote:**

For this question, we are particularly looking for ideas on critical research topics and approaches to supporting small-holder farmers boost their productivity, profitability, and resilience. We would welcome case studies of innovative research approaches or criticisms of approaches you feel have not been effective. Specific details are helpful.

**David Tardif-Douglin wrote:**

Better understanding the level and nature of risk and what might be better ways to mitigate risk without introducing large amounts of moral hazard would, I think, be a good research area to delve into. I know there is some work being done on risk mitigation (insurance) strategies. Small farmers face life and death risks that would keep anyone from trying out new varieties, new approaches even if those carried the possible promise of improved yields and incomes.

**Dan Silverstein wrote:**

In response to Jerry Glover's comment about finding critical research, you might want to contact Dr. Stephen Weise, Deputy Dir. of Research at Bioversity International in Rome.

[s.weise@cgiar.org](mailto:s.weise@cgiar.org)(link sends e-mail)

**Jerry Glover wrote:**

Thanks, Dan. Can you be more specific in terms of Dr. Weise's findings or approaches? Thanks.

**Dan Silverstein wrote:**

Bioversity has/is developing a substantial database for two of its most important initiatives; one is "Seeds for Needs" and the other is a software platform with open architecture called "ClimMob" (as in, climate sensitive mobilization of resources). Both reverse the usual flow of information from experts to beneficiaries. Farmers test a selection of three possible seed types and report back on best and worse for their locale. Then, the best is scaled up and distributed.

Here is a link to Seeds for Needs, and an excerpt: "to help farmers adapt better to climate change through the use of agricultural biodiversity." <http://www.bioversityinternational.org/news/detail/giving-farmers-choice...>

ClimMob codifies the information. "A new approach to participatory research will make it easier for farmers to contribute to new agricultural solutions. [ClimMob](#), developed by [Jacob van Etten](#) and his colleagues at Bioversity International, turns the research paradigm on its head; instead of a few researchers designing complicated trials to compare several technologies in search of the best solutions, it enables many farmers to carry out reasonably simple experiments that taken together can offer even more information."

<http://www.bioversityinternational.org/news/detail/climmob-a-software-fo...>

**Pamela Anderson wrote:**

Thank you for sharing this Dan, and elaborating on your original point. Rob (if you are still on line) - or other USAID colleagues - does our current FtF research portfolio include farmer-led research?

**Jerry Glover wrote:**

Pamela - We have quite extensive participatory on-farm research. I think it would be more appropriate to call it co-led research rather than farmer-led. Participatory action research is very interactive and involves extensive back-and-forth between farmers, scientists, and even other stakeholders such as extension agents and private sector partners.

**Jerry Glover wrote:**

Dan - This approach sounds very similar to the mother-baby trial design developed by Dr. Sieglinde Snapp and others. This approach or derivations of it are used extensively in USAID's on-farm participatory research projects. It seems quite effective in also identifying the steps to use and adoption farmers follow. It will be interesting to compare the two different (or similar) research approaches. Thanks.

**Carolyn La Jeunesse wrote:**

Dan, re: ClimMob, all I can say is, "it's about time!" And having said that, do you have any suggestions as to how to combine approaches and instruments? For instance would farmers benefit from both the ClimMob and Seeds for Need solutions as well as, say, using the [Global Yield Gap Atlas](#)? Scale may be a determining factor.

**David Kraybill wrote:**

I am David Kraybill of Ohio State University. Based on my recent 6 year experience as COP of iAGRI in Tanzania, I agree with David Tardif-Douglin that it is difficult to get the private sector and public research organizations to work together. Trust is an issue but also lack of experience by both sides on substantive and sustained public-private interactions. The solution is to build local capacity (both individual and organizational) through innovation initiatives that bring private and public sector partners together to solve real problems using natural and social science. Can't be done overnight or by shipping in ready-made technology. Requires sustained conversation by both sides often over a relatively long period (1-3 years) in many cases to get to a practical/marketable

solution. Mindsets begin to change when partners go through the process successfully from beginning to end. This, then, opens makes the next attempts more successful. .

**Jerry Glover wrote:**

Hi David - Great to see you weigh in. Do you have any experience with 'innovation platforms' (there are a range of models) and any thoughts on how well they work with integrating public and private sectors within research agendas? It often seems research programs are difficult for private sector partners to engage with due to different objectives and timelines. Innovation platforms designed to facilitate and sustain the long-term conversations have often been difficult to properly set up and maintain beyond the life of the project. Any other approaches to maintaining the sustained conversations between public sector research organizations and private sector partners? Thanks.

**David Kraybill wrote:**

Yes, we do have some experience with innovation platforms in iAGRI. At Sokoine University of Agriculture, we developed an "Innovation Portfolio" aimed at taking research from lab to market/field. In some cases, we began with the researchers and then brought in the private sector. In others, we began with the private sector and connected them with researchers. The role iAGRI played in sustaining the interaction for each particular initiative was essential and, without it, in most cases the interaction would have faded away. However, we had some definite successes and the University was so impressed that they established a Directorate of Intellectual Property and Linkages to continue this work on an ongoing basis. The hardest part is the nurturing of the interaction beyond the initial conversations on till a useful prototype is developed. Both sides tend to lose patience with the length of the process. This is why local capacity-building is essential to keep the process going during the often-lengthy and tedious incubation stage.

**Peter Thorne wrote:**

David's point about the lead in times for IPs to "feel" that they are playing a genuine role is a valid one. This can to some extent be navigated around by planning some specific tasks early on in the process. These might not be the core business of the IP but they build confidence and trust that pays dividends later on. The other big issue is empowerment. The giant leap forward taken by our Africa RISING IPs was when they realized they could actually boot out some of the more top-down / researcher driven research proposals that they did not see as meeting stakeholder's needs. IPs are not there to provide manipulated validation to inappropriate research. Don't use them if you are not going to take them seriously!

**Kris Wyckhuys wrote:**

Hello David & Gerry, this is Kris Wyckhuys from CIAT in Vietnam. An interesting case of effective integration of public & private partners is the promotion of conservation agriculture practices in cassava cropping systems within the uplands of northern Vietnam. In a handful of local communities, agro-industry (i.e., starch producers) have teamed up with city councils & provided micro-credit to farmers who wanted to establish grass filter strips in their fields. In 2015, CIAT, SDC and Agro-Insight joined forces to systematically validate & document these innovations in FtF educational video. In a 2016 pilot, private sector actors actively embraced these instructional videos and are now the ones actively distributing them amongst farmers. As a next step, the focus could be expanded beyond this specific case, establish more formal farmer x researcher x industry innovation platforms, and actively document/validate/promote a far broader set of local innovations and farmer inventions across Asia's upland farming areas.

**Marjatta Eilitta wrote:**

Dear Jerry,

I am Marjatta Eilitta, the Deputy Director for the Livestock Systems Innovation Lab. In the context of the Innovation Lab we have established national Innovation Platforms for each of the six target countries. These are multi-stakeholder meetings, at least annually, that engage public and private sectors. During the first meeting they selected the priorities for the Lab, and during the second meeting, the selected research projects were presented to them. Our hope and objective is that in the context of the Lab, these Platforms will help bring together public and private sectors (as well as USAID- and other donor-funded projects), make the research projects more relevant to the needs of producers and private sector, and also assist in the diffusion of the research results. We are still learning on how to do this most effectively and are going to study the process also. We also encourage the research projects (especially the multi-year ones) to set up local innovation platforms but up to now, no one has started such platforms.

## Agriculture enabling environment

APR 19, 2017 9:00 AM by [JERRY GLOVER](#)

Research investments are necessary for greater understanding of and impact within the broader enabling environment, which includes policies, access to finance and information, land and resource tenure, and regulations.

- **What research on the enabling environment can foster positive transformation of the agriculture and food system?**
- **What analytic information is needed to complement research investments?**

### COMMENTS

**Jerry Glover wrote:**

This question gets more into policy and markets research. Here we're looking for gaps in the information or topics that have traditionally been missed by those analyzing the impacts of policies, regulations, and markets on agriculture-led economic growth. Specific examples would be welcome.

**Nate Kline wrote:**

Hi Jerry, please see my enthusiastically long (though not-comprehensive) post below, which tries to start to respond to your question with specific research questions.

**Jennifer Woodward-Greene wrote:**

Nate, thanks so much for the generous response! Paul and I have captured it in the summary for our section (to be shared soon), and the moderators covering all three days will also be summarizing comments. You said this is the 'tip of the iceberg'; please feel free to add more to the discussion!

**Jennifer Woodward-Greene wrote:**

Hello! I am Jennifer Woodward-Greene of the USDA Agricultural Research Service, Office of International Research Programs. For the next three hours, I will be co-facilitating the discussion on Ag-led economic growth. Just as a reminder, the rationale provided in the guidance document is:

"Prioritization of investment is critical to ensure resources are focused on the most important areas of research. As we examine the range of research opportunities to contribute to the goals of the Global Food Security Strategy (GFSS), we are looking into criteria to inform our investments."

[1] See U.S. Government Global Food Security Strategy

(2016) <https://www.usaid.gov/sites/default/files/documents/1867/USG-Global-Food-Security-Strategy-2016.pdf>

**Laura Ostenso wrote:**

Hello! My name is Laura Ostenso, Knowledge Exchange Lead at Feed the Future Partnering for Innovation managed by Fintrac. We have 45 private sector partnerships working to commercialize products/service that benefit smallholder farmers/ their productivity and incomes. One enabling environment constraint I hear across them is about procuring land and licences for building up commercial infrastructure. This includes for warehouses, shops, product development, etc. Basic research on country-level regulations/ laws about processes for procuring land and construction permits would be helpful, and could also start dialogue with national country government partners about clarifying those factors that can help them make private sector development more possible.

**Jennifer Woodward-Greene wrote:**

Excellent point Laura. The complexity and variation across countries, or even within countries make this a daunting task. Is there a framework to develop a strategic approach to the research, that could lead to building alliances that would promote and facilitate this end of business development?

**Laura Ostenso wrote:**

Please see Nate's comment below- it is quite comprehensive! I think the World Bank's approach is quite strategic and looks at a ranking and comparison of individual countries composite score about an enabling business environment in each. A complementary piece of research could be about the practical application of whether or not having an enabling environment translates into smallholder impact in terms of access and use of business solutions that improve their yields and incomes. E.g. just because the enabling environment is there, does it mean a local or national company is able to take advantage of it in ways that benefit smallholders?

**Jennifer Woodward-Greene wrote:**

Thank you for calling attention to Nate's post!

**Paul Tanger wrote:**

Welcome, and thank you! This sounds like it would be a valuable set of resources. Is it a matter of compiling information or more human capacity development? What are some of the of the research questions in this space? Is it more effective to enable business development consulting or is making information transparent sufficient?

**Nate Kline wrote:**

Hello, Nate Kline here, head of the Feed the Future Enabling Environment for Food Security project. There are many research topics that are worth considering for greater investment that can have transformative impact. I will try to contain my response. But please know that this is simply the tip of the iceberg:

1. What are the proper benchmarks for a "good" enabling environment that can support agricultural transformation? The World Bank's Enabling the Business of Agriculture presents a good first attempt at benchmarking key agribusiness enabling environment practices, but much more research is required to determine whether these are indeed "good" benchmark indicators for the topics presented. Do EBA indicators present sound proxies for sector regulatory frameworks? How does EBA data correlate with critical agricultural sector performance indicators? What gaps remain? As the saying goes, "what gets measured gets done." These critical questions can help to shape the pathway and spur demand for improved enabling environment interventions; more research into these benchmarks can help to make sure that what is measured will likely lead to desired outcomes.

2. Land tenure and efficient land governance. Land is the primary factor of production for all forms of agriculture. Land is the primary source of collateral for secured finance, which helps to bring down costs of capital. Recent research in the Journal of Finance finds that a) the quality of contracts enforcement and b) the strength of property rights have a statistically significant and economically large impact on access to finance broadly within a country. What does this mean for an agricultural sector? How do we translate this (and related research) into concrete programs?

3. Agricultural finance, mobile money, and cross-border mobile payment systems: how do we begin to develop an enabling environment conducive to the proliferation of mobile money services and payment platforms in the agricultural space? Mobile payment systems can offer a critical connection point between unbanked and banked populations. Mobile payment platforms adopted by rural communities, used by nucleus farmers, outgrowers, and inputs suppliers, can help bridge the records gap for informal farms and demonstrate cashflow validated by a third-party vendor (mobile provider/bank records). How do we develop the right systems to capture this cashflow and risk profile data to help drive down the risk premium faced by the ag sector? How do we balance competing privacy interests with the immense big-data opportunities for agricultural sector development?

4. Regulation of seed, fertilizer, water, labor, and other production inputs. How can we spur greater harmonization and mutual recognition to expand market potential and increase competition among inputs companies? What does "good governance" look like? And how do we expand national, regional, and municipal dialogues to ensure that all key stakeholders have effective engagement?

I am going to stop myself here, but I have dozens of research questions/topics.

**Patrick Webb wrote:**

Building on Mark Manary's suggestion to embed rigorous health/nutrition research (RCTs) within agriculture research that would be framed and pursued along different lines, I would argue that we need more studies of how operationally meaningful agriculture platforms (service delivery mechanisms, large scale technology programs (like irrigation), input access modes, etc.) can serve simultaneously as vehicles for nutrition information and/or services and other resources. It is the integration of multisector actions that so many people look to, but the evidence on joint effectiveness, potential cost-savings, resource-leveraging and mutual sustainability of adopted practices is almost completely lacking.

**Eileen Herrera wrote:**

Good afternoon, everyone (or whatever time of the day you are currently enjoying. I am Eileen Herrera with the Agricultural Research Service of the USDA. I will be co-facilitating this session from 15:00 to 18:00 Eastern DST. I believe my colleague from USAID, Raquel Gomes, will be joining at 16:00.

A reminder that this session is addressing Ag-Led economic growth.

From the whitepaper on this topic: Resources for agricultural research are limited. While research investments must consider the broader agriculture and food system and achieve wider social and environmental objectives, it is essential that investments are focused and prioritized to achieve the greatest impacts. Our colleagues at USAID have posted the 5 questions to be separate discussion areas, so please feel free to weigh in on any of these questions.

Or raise questions of your own that you think can help frame these discussions.

**Lexine Hansen wrote:**

Good afternoon all. My name is Lexine Hansen, and I will be co-facilitating this discussion until 21:00 EDT (GMT - 4:00). This has been a great discussion, and I look forward to continuing it with you. So let's discuss how we can prioritize agriculture research to meet the critical needs of the development sector.

What research questions can help us understand how to improve the enabling environment for agriculture-led development? Are there social and political systems which get in the way of better agriculture and others which enable it? What have you seen?

**Richard (Dick) Tinsley wrote:**

In looking at the enabling environment you need to consider the overall economic environment of most host countries that I usually refer to as financially suppressed, resulting in a very limited tax base, for which the the comment no taxes no service is highly appropriate. This results in a financially stalled civil service that is more interested in informal income opportunities than good governance. Please review the following webpages:

<http://smallholderagriculture.agsci.colostate.edu/financially-suppressed...>

<http://smallholderagriculture.agsci.colostate.edu/financially-stalled-go...>

<http://smallholderagriculture.agsci.colostate.edu/impact-of-financially-...>

<http://smallholderagriculture.agsci.colostate.edu/informal-income-opport...>

**Lexine Hansen wrote:**

Thanks Dick,

These are great resources. My understanding is that until the Great Depression, the US wasn't particularly good at financing critical social services and safety nets, including good roads, schools, etc. and that the shift in the New Deal era to more taxation in return for more investment is part of what drove significant growth in following decades. I'm sure this could be argued from a variety of perspectives, but it is curious to compare different social and governmental environments and examine what has worked in success stories--and failures. Brazil was a bastion of good governance in Latin America for a while, and now is mired in a painful recession and corruption scandals. A social scientist would ask what happened there, why, and how to avoid it in the future.

**Manuel R Reyes wrote:**

Good evening on my part of the world. From 21:00 to 24:00 Eastern Daylight Saving Time, I, Manny Reyes, Research Professor at Kansas State University, will be facilitating discussion together with Lyda Hok from the Royal University of Agriculture on Agriculture Enabling Environment. I hope you will share your insights on this important topic.



**Ruth Meinzen-Dick wrote:**

I agree with Nate Klein's emphasis on land tenure as a key aspect of the enabling environment, but not necessarily because of the link to credit. A recent systematic review by IFAD found that the evidence on land titling on credit security is not that strong (see <https://www.conftool.com/landandpoverty2017/index.php/06-07-Higgins-255...>). But there are many other reasons that land tenure security--which does NOT necessarily require titling--is important, e.g. for providing a sense of security that encourages people to invest in the land, planting trees, etc.-not to mention the security and status that provides (especially for women). But figuring out what will strengthen tenure security does require understanding the institutional history, important gaps for different people, and a tailored approach.

**Nate Kline wrote:**

Agree that land tenure challenges extend beyond credit. By way of example, in Ghana, customary landholders I met 2 weeks ago indicated that they could not replace aging cacao trees well past their prime fearing this would jeopardize their customary land use rights negotiated with the chief. Dramatically reducing productivity and incomes.

**Nate Kline wrote:**

Though to clarify my previous point, I was attempting to make two distinct points that on second read were conflated:

1) Land titling reduces the cost of finance. Formal land titles introduced into urban Peru did not increase number of new loans by private banks, but did see a 9 basis point reduction in interest rates (Field and Torero 2004). Which could be explained by underlying challenges with the worthiness of the loan applications; collateral is not a silver bullet; it does not replace the need for a sound business plan that provides banks confidence of repayment on terms acceptable to both parties.

2) Strong property protection regimes and contracts enforcement systems correlate with banks offering improved access and lending terms. Based on data from 48 countries, loan approvals increased, interest rates were lower, and maturity longer in countries with stronger property protections and contracts enforcement regimes. [https://www.jstor.org/stable/20487986?seq=1#page\\_scan\\_tab\\_contents](https://www.jstor.org/stable/20487986?seq=1#page_scan_tab_contents)

**Sang Lee wrote:**

Hello! My name is Sang Lee and I am an Agriculture Officer with USAID/Cambodia. I will be facilitating the next session. What research on **enabling environment or policy can foster positive transformation of the agriculture food system?** What **analytic information is needed to complement research investments?**

Enabling environment research has largely focused on the inputs, their improvement, availability and use. Are there other research areas outside of increasing productive capacity?

I look forward to your comments!

## Integrating social and natural sciences

APR 19, 2017 9:00 AM by JERRY GLOVER

- **What types of research approaches are available and most effective at integrating social and natural sciences to address the range of research areas discussed today?**

## COMMENTS

### **Jerry Glover wrote:**

We frequently find that the decisions made within the household, how they are made, and by whom largely determine whether new innovations or management practices are successfully used. It can be difficult, though, for those working in very different disciplines to combine research efforts due to different methodologies and objectives. We welcome examples where such integrated research has successfully led to breakthroughs or where it has failed. Again, specific details are helpful. Thanks.

### **Summer Allen wrote:**

A team of researchers from McGill Business school, public health experts from University of South Carolina, and economists from IFPRI worked on a project that incorporated the private sector in an effort to show convergence of goals related to agricultural productivity, incomes, and nutrition in India. Some of the lessons are noted here: <http://www.ifpri.org/publication/innovation-evaluation-inform-policy-con...>

### **Paul Tanger wrote:**

Thank you for sharing this resource. Do you know if it is available online, or could you summarize a couple of the key lessons - it could stimulate further discussion here. Thanks again.

### **Richard (Dick) Tinsley wrote:**

You have mentioned the household which has been considered the decision making unit for about 50 years that I can record. How often is the household decision fully discretionary and how often compromised. Also should we also look at community variabilities such as access to contract mechanization and other sharing of casual labor pools, even when the casual labor is derived from fellow smallholder farmers.

### **Jennifer Woodward-Greene wrote:**

Interesting ideas! Where and how would you propose to gather this data? For the greatest impact, the data would be publicly available, perhaps GODAN (<http://www.godan.info/>) would be a good forum.

### **Jennifer Woodward-Greene wrote:**

Hello! I am Jennifer Woodward-Greene of the USDA Agricultural Research Service, Office of International Research Programs. For the next three hours, I will be co-facilitating the discussion on Ag-led economic growth. Just as a reminder, the rationale provided in the guidance document is:

"Prioritization of investment is critical to ensure resources are focused on the most important areas of research. As we examine the range of research opportunities to contribute to the goals of the Global Food Security Strategy (GFSS), we are looking into criteria to inform our investments."

[1] See U.S. Government Global Food Security Strategy

(2016) <https://www.usaid.gov/sites/default/files/documents/1867/USG-Global-Food-Security-Strategy-2016.pdf>

**Jennifer Woodward-Greene wrote:**

Participatory approaches are key to identify and incorporate the needs and objectives of producers into the research objectives. Extension education expertise can be deployed to work directly with farmers, and facilitate gathering this information. For example, USAID Feed the Future Livestock Improvement project is educating small holders in Uganda and Malawi via Community Based Breeding Programs. The work provides farmers the basic husbandry knowledge of what a formal breeding program is, and how to establish their own breeding objectives, for example weight gain or twinning. Farmer training includes record keeping so farmers can select animals based on their objectives, and track progress. This in turn provides information for geneticists to work with the farmer identified traits in developing modern tools, such as SNP chips, to eventually add these tools to farmers for use in breed pair selection. The community also allows for researchers to sample and study their livestock.

**Tara Steinmetz wrote:**

Agricultural research aimed at developing countries has typically focused on advancing the technological frontier: developing new tools, fertilizers, and hybrid seeds that increase crop yields, and, ultimately, resilience in the face of climate variability. However, the fact that average small farm yields consistently fall below what is technically possible indicates that the benefits from these new innovations are not being realized by farmers. Integrating social science into this research to better understand the barriers to adoption (even when innovations are available) may ultimately do more to close yield gaps, increase productivity, and secure more sustainable livelihoods (ultimately paving the way out of poverty).

For example, research from the Feed the Future Innovation Lab for Assets & Market Access is working to understand farmer-level constraints to the adoption of new technologies and practices, including risk & liquidity, beliefs and behaviors, and profitability. I think it's vital that research priorities reflect this integrated approach to reduce the yield gap through overcoming the barriers to improved technology adoption (bringing innovations to scale for impact).

**Cynthia Donovan wrote:**

Constraints to adoption: Tara makes key points on issues related to adoption. Social scientists can provide key elements of technology prioritization and research needs. For example, yield gaps need to be evaluated to understand what is financially and economically recoverable, not focusing simply on maximum agronomic potential. The integrated approach is critical to avoid wasting valuable resources to identify solutions that may not be feasible or that solve only the marginal problems. In the case of our Innovation Lab work in Mozambique on soil science, including researchers with extension communication is addressing the constraints to extension messaging and training on soil fertility, linked to rural sociologists identifying farmers practices and views on soil fertility diagnosis and management.

I am in complete agreement with Cynthia on this issue. I would like to add that the Innovation Lab work in Mozambique has taken an integrated approach such that once the constraints have been identified, a communications team has concurrently worked with the soil and social scientists, along with local partner groups, to develop and test messaging whereby such messaging is assessed collaboratively with the social science team to determine its effectiveness.

**Eileen Herrera wrote:**

Very interesting, Barry. Are the results of this approach likely to be published? I would love to see how your communication strategy was tested, and once deployed, how its success was measured (or will be measured).

And yes, we should not forget that communication is a huge part of successful deployment.

**Richard (Dick) Tinsley wrote:**

How much of this is the oversight that for 50 years we have not considered labor as highly limited, and limited diet even more restrictive as most smallholder can only access about 2000 kcal/day, just managing basic metabolism, to work all day they need at least 4000 kcal/day. this then limits the diligent work day to as little as 3 hours perhaps paced to 5 or so. That then extends crop establishment up to 8 weeks invalidating most of the technical promotions. Sorry but when we are expecting the farmers to expert twice the calories they have access to, i wonder how close we are coming to advocating their genocide. Strong word, but perhaps closer to the truth then we are comfortable with.

**Eileen Herrera wrote:**

I would love to get people's thoughts on the issue of labor in agriculture (or the reduction therein) as a researchable issue. My experience in remote rural areas of sub Saharan Africa is that when men work in agriculture, they tend to work with livestock whereas the women tend to work in crop production. This is not absolute, of course, but what do folks think about research to reduce labor in agriculture at the small scale?

**Richard (Dick) Tinsley wrote:**

Eileen, Thank you for reinforcing my concern.

**Jennifer Woodward-Greene wrote:**

What would be a framework to engage all of the varied expertise in solving a particular problem or set of problems? Could the engagement start with the end-users to identify their true needs and constraints, and this information then fully integrated into the development of research objectives, implementation and testing approaches, and informative metrics to evaluate the process and the research project and impacts, i.e. going "full circle"? How could these be brought together in a meaningful, and timely way?

**Tara Steinmetz wrote:**

I think its both. For example, with the constraint of risk, the AMA Innovation Lab and affiliated researchers began with identification of risk as a major constraint for smallholder farmers, then studied the underlying poverty dynamics at work that drive this reality. Then, once the poverty dynamics and the behavioral constraints were understood, researchers - in partnership with implementers (both public and private sector) and technical experts - could design and rigorously test interventions designed to overcome these constraints. I think both the testing interventions AND the fundamental research that motivate the interventions are essential parts of solution development and scaling -- and the research agenda (from our perspective) should be designed in a way that allows to come full circle, as you say.

**Jennifer Woodward-Greene wrote:**

Thanks for a great illustration of the concept!

**Richard (Dick) Tinsley wrote:**

Return to my earlier comment on limited labor and energy to fuel the labor, how can farmers be risk averse at least regarding crop establishment? If so they would have starved decades ago. Rather then risk averse they are mandatory risk takers with there survival depending on it. This really goes back to the failure to conceptualize on labor and other operational limitations. Please review this linked article: <http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeas...>

**Jerry Glover wrote:**

Thanks, Tara. Can you point us in the direction of some reports or papers on this: "Then, once the poverty dynamics and the behavioral constraints were understood, researchers - in partnership with implementers (both public and private sector) and technical experts - could design and rigorously test interventions designed to overcome these constraints." Operationally, what would it look like in a research program? Is this an iterative process? Thanks. BTW, AMA does some great work!

**Tara Steinmetz wrote:**

Thanks for that, Jerry. I'm happy to provide more, but here's an overview of one line of research, as an example:

"The economics of poverty traps and persistent poverty: An asset-based approach" (2006)

(<http://www.tandfonline.com/doi/abs/10.1080/00220380500405261>)

"Fundamental research reaching back over a decade about the nature of poverty and poverty dynamics"

(<http://www.tandfonline.com/doi/abs/10.1080/00220380500405261>) led to looking at poverty and how we

understand it in a new way – looking at livelihood-related assets rather than income. Much of this work had important conceptual elements and laid the groundwork for a new approach to chronic poverty.

This research revealed not only that poverty dynamics are best understood through the analysis of assets, but also that in some contexts there may be a critical minimum asset threshold, below which individuals become trapped in chronic poverty. This led to the development of index-based insurance, most prominently with the index-based livestock insurance (IBLI) scheme in Northern Kenya.

As index insurance began to be tested and refined, we learned a lot about how to better design the intervention for smallholder farmers. ([https://arefiles.ucdavis.edu/uploads/filer\\_public/2014/06/19/designed\\_fo...](https://arefiles.ucdavis.edu/uploads/filer_public/2014/06/19/designed_fo...))

In Kenya, we observed (through a rigorous impact evaluation) that insurance had significant impact in reducing costly coping mechanisms (meal reduction, selling remaining assets, reliance on foreign aid). This Kenya work was done in partnership with private insurance companies, research partners, and the government of Kenya. In Mali, and insured farmers invested more in productive inputs for their farms (and expanded the area cultivated) before a drought occurred. The knowledge of protection can spur investment and technology adoption. This work was again done in cooperation with insurance providers, and sold through farmers cooperatives. (A brief on these insurance impacts is available on our website: <https://basis.ucdavis.edu/publication/spotlight-evidence-impact-index-insurance-small-farm-investment-and-social-protection>).

Then, as pilots continue and we continue to learn more – even today – we're looking to next directions on how to maximize impacts of this intervention, including by combining this financial technology with cutting-edge agricultural technologies. (a new brief on the topic is available: <https://basis.ucdavis.edu/publication/policy-brief-improving-index-insur...>).

These innovations all were driven by fundamental research on the nature of poverty, which has been field tested and is now helping to leverage other investments in improved agricultural technologies, and to promote resilience and growth in the agricultural sector.

The way we've been able to try to ensure that partnerships occur and have the potential for impact and scale is by asking the researchers to work in cooperation with implementers in the field (insurance companies, seed providers, etc.) so that if research proves that the intervention is effective, the relationships have been built to take it to scale.

I hope this helps. Happy to provide more.

**Eileen Herrera wrote:**

Hi, Tara.

This is a very interesting point. When testing interventions, did any show lack of adoption or less adoption, and if so, what measures were taken? Is there a plan to follow up over time to see if adoption is sustained?

**Tara Steinmetz wrote:**

These are excellent questions. We do try to test interventions over time to see if adoption is sustained, but our ability is somewhat constrained by the funding cycles. We do - as much as possible - try to see if adoption (and impacts) are sustained.

For an intervention in Mozambique, for example, AMA Innovation Lab researchers wanted to see whether short-term subsidies designed to induce learning could increase technology adoption. To do this, they did a baseline, midline immediately after the short-term subsidies ended, and an endline two years after the end of the intervention to assess persistence of impacts. Researchers found that short-term subsidies were able to overcome constraints to technology adoption, and that these impacts persisted even after the subsidy was removed. <https://basis.ucdavis.edu/publication/policy-brief-temporary-input-subsi...>

The AMA Innovation Lab is currently also supporting research to learn more about how this kind approach can induce sustained adoption of high quality index-insurance, including improved distribution models (<https://basis.ucdavis.edu/publication/spotlight-village-insurance-saving...>), alternative contract structures (<https://basis.ucdavis.edu/publication/policy-brief-innovative-insurance-...>), use of short-term subsidies or other "learning" interventions (<https://basis.ucdavis.edu/publication/policy-brief-learning-doing-vs-lea...>), and other innovations.

We hope that these ongoing studies will provide additional behavioral insights to help ensure that technological interventions are adopted by smallholders as part of a broader strategy for growth and resilience.

**Lexine Hansen wrote:**

Thanks Tara,

This is very interesting research. Have you considered how difficult it can be politically to remove a subsidy when it is scaled and there is a significant interest group supporting it?

**Tara Steinmetz wrote:**

I think this is a significant concern that policy makers and program designers must be sensitive to. With regard to subsidies for technology adoption, I think that, based on our research, as long as the investors (government, in the Mozambique case) is clear about the limited duration and purpose of the subsidy, that can induce uptake even once the subsidy is removed. Agreed, it can be a bit sticky, but the impacts we're seeing indicate that "smart" subsidies - carefully planned and directed subsidies with an exit plan - can really have a sustained impact. (<https://basis.ucdavis.edu/publication/policy-brief-temporary-input-subsi...>)

Alternatively, considering index insurance, for example, subsidies can be used to induce "learning" or could perhaps be used to take on the most catastrophic risk. When you consider most development organizations and national governments do indeed pay the price for major disasters (drought, flood, etc.) through aid/emergency assistance, instead investing those funds through a commitment to catastrophic insurance (I would recommend some of Daniel Clarke's work on this) would maintain that assistance, but in a way that allows for careful planning, quick responsiveness (and quick payouts), that creates assistance channels BEFORE disaster strikes, and that could allow people the certainty and confidence that could induce them to invest their OWN funds productively before the disaster strikes.

Your point is well taken. Subsidies do certainly bring up a number of challenges, but - if planned and applied thoughtfully - could have significant impact well beyond the dollars spent on the subsidy.

**Lexine Hansen wrote:**

Thanks! Insurance is also a very interesting topic--there are so many risks in rural small-scale agriculture, how do we develop scale that makes the insurance worth it from a private sector perspective? Not a question for only you, just my thoughts as I learn up on a new idea!

**Tara Steinmetz wrote:**

I'd love to hear more ideas from others on this question - it's a challenging one.

Some ideas we're considering are new distribution models (<https://basis.ucdavis.edu/publication/spotlight-village-insurance-saving...>). Some other ideas are in the brief I mentioned before on "new directions" for index insurance.

Anyone else have any ideas?

**Tyrell Kahan wrote:**

Hello Tara, I am on the Technology Scaling Team here in the Bureau for Food Security at USAID. One of our concerns are creating and ensuring that there are appropriate enabling environments to support and mitigate the constraints to scaling, technology dissemination and adoption. I would love to hear your thoughts and others on what research topics would look like or what questions we should be asking as we aim to link policy to these technology dissemination efforts.

**Tara Steinmetz wrote:**

Hello Tyrell - I'd love to talk more about this - feel free to follow up with me offline if you want more detailed information.

Last November we hosted an event in DC to talk about these issues of designing interventions to address the gap between what is technologically possible and what farmers tend to achieve - we called it "Mind the Gap". This event drew from a variety of our research projects, each designed to overcome different challenges to adopt different technologies in different contexts. Many of the resources from that event are available online (<https://basis.ucdavis.edu/past-event/mind-gap-exploring-disparities-betw...>).

A short summary is that, from our perspective, effectively closing these gaps and encouraging the adoption of transformative production technologies requires research in three key areas. The first aims to develop ways to remove individual and structural constraints many poor farmers have by expanding the flexibility of their assets and their access to credit. The second will be to develop inclusive markets for farmers, especially in poorly served agro-ecological niches that miss out on many of the gains farmers see on average from productive technologies. The third area focuses on some of the behavioral factors for why farmers adopt or do not adopt productive technologies.

Again, if you want additional details, I would love to follow-up ([tlsteinmetz@ucdavis.edu](mailto:tlsteinmetz@ucdavis.edu)([link sends e-mail](#))).

**James Rhoads wrote:**

I posted a comment yesterday about limitations of adoption of "sustainable" practices in the US, even when there is clear research on the economic and environmental benefits and various incentives to support farmers to adopt. Examples include cover cropping (only 8% of US farmers use cover crops), diversifying their commodities and keeping long rotations. Many of the constraints are economic, but also physical (weather, crop timing, equipment, etc.) and difficult to balance with public levers for public goods. There may be other limitations where good social

science research can help inform innovative basic/biophysical science agenda. One example is the breeding effort for pennycress, an oilseed crop that is basically a cover crop that fits the winter planting window in the US midwest, but produces a harvestable crop as well. Yields are still low, but with molecular markers they can get to a financially viable crop fairly quickly. Are there equivalents for green manure crops or other legumes?

This type of research comes from deeply understanding farm practices (social science... and not only economists!) and getting creative with biophysical scientists. Its also fairly risky research with a relatively high chance of failure. If we are only concerned with scaling-up and commercialization, we won't get very creative with these kinds of ideas and that stifles innovation.

**Jennifer Woodward-Greene wrote:**

Excellent point. I think the difficulty may be, in spending scarce research dollars to solve problems in developing countries, the margins are already too thin to accommodate extreme high risk research and implementation of ideas... the need for impactful solutions is urgent. However, high risk usually also means high reward... eventually. Researching and testing higher risk solutions may make more sense in the developed world, with follow on research on how or if these solutions may be beneficial in developing countries and resource-limited production systems. If there is a place for higher risk research in the developing world, how could it be implemented to ensure the rewards are big enough, and soon enough to pass a cost-benefit test?

**James Rhoads wrote:**

This reminds me of relevant debate between investments in innovation vs. maintenance (one example is the article in Aeon: <https://aeon.co/essays/innovation-is-overvalued-maintenance-often-matter...>). We all get into Silicon Valley thinking, but most engineers and ag scientists for that matter work on "maintenance." We at PMIL try to have a balance of high risk/high reward blue sky thinking and some basic applied research to build foundational knowledge in each region. I've thought about this related to basic data that is often missing in developing countries (weather, crop/yield, market, soil) that would get used in all sorts of unintended ways (index insurance for example), but only if we have the basic and regularly collected (maintenance) data. If we're all being too innovative, we may not have the foundation to stand on. I'm not sure how we should balance this in our research agenda, but its an interesting way to frame the question.

**Eileen Herrera wrote:**

Hi, James.

Thank you for your insightful comment.

It is indeed a challenge to get folks to adopt management practices that provide sustainability in the medium and long-term. In my own limited experience in talking to farmers, I am frequently struck by how practical they are in the decisions they make. While it is impossible to consult all possible beneficiaries for agricultural research, I think new technologies or approaches are more likely to be adopted if the users are consulted in the development, or at least involved in some of the field testing. The challenge is how do we do this across the multiple landscapes and cultures that this strategy addresses.

Any good examples of successful introduction of management approaches? Any ideas?

**Eileen Herrera wrote:**



Good afternoon, everyone (or whatever time of the day you are currently enjoying. I am Eileen Herrera with the Agricultural Research Service of the USDA. I will be co-facilitating this session from 15:00 to 18:00 Eastern DST. I believe my colleague from USAID, Raquel Gomes, will be joining at 16:00.

A reminder that this session is addressing Ag-Led economic growth.

From the whitepaper on this topic: Resources for agricultural research are limited. While research investments must consider the broader agriculture and food system and achieve wider social and environmental objectives, it is essential that investments are focused and prioritized to achieve the greatest impacts. Our colleagues at USAID have posted the 5 questions to be separate discussion areas, so please feel free to weigh in on any of these questions.

Or raise questions of your own that you think can help frame these discussions.

**Victor Pinga wrote:**

Hi Eileen, not so much a management approach but a technology, which reminded me of what PMIL (Jamie and colleagues) are working on to develop rapid, low-cost methods for aflatoxin detection, featured in Agrilinks recently ("[What If Aflatoxin Glowed?](#)"). These simple to use technologies can have tremendous benefits to smallholder farmers, not only in terms of productivity and food safety, but also health and nutrition for smallholder families and more broadly the consumers. Developing simple, practical technologies such as these can provide significant returns to scarce research dollars. Sorry if this was off-topic, but I think it belongs in the thread of keeping it real and practical.

**James Rhoads wrote:**

Thanks for the comment on the Aflabox project. This has been an interesting example for us of a "high-risk, high-reward" project because it has a tremendous potential for application at scale. Its also been a good example for our management group of integrating disciplines for shaping the project. We did an interim evaluation with a team of experts from engineering and commercialization strategies, mycotoxins, value chain experts, and US industry experts and spent 2+ days with Dr. Yao and his team digging into his findings and thinking about different ways it could be applied. All of us got a lot out of the process and the research team adapted the technology to take into account new opportunities.

This technology is also having a great potential for adoption in the US (albeit in a different way than in Africa), which is something we often forget that we have a mandate for as well.

**Richard (Dick) Tinsley wrote:**

This looks like as good as any in the discussion to insert a concern I have about separating the role of researcher from development professional, and the concept of how to INTEGRATE technical innovations into system either dietary or agronomic. Thus following is a blog I have drafted for a LinkedIn discussion:

Integration: Separating Academic Research Ideals from Effective Development

As we review the overall development process, most innovation start as a research initiative developed under ideal conditions of unlimited operational constraints. Once this is satisfactorily completed the innovations are put forth to the intended beneficiaries with an underlying assumption that acceptance is 100% discretionary, and if not immediately accepted the problem is lack of extension/education. Generally overlooked are the limits imposed by the less than research ideal condition under which the beneficiaries are operating.

Within the overall technology development and adoption process there is often overlooked process of integration. The integration process maybe the best place to separate academic researchers from development practitioners. Both have an essential but complimentary role in the overall development effort.

The research role is fairly well defined as the inspiration for many innovations, be that agronomic or even dietary. This typically is geographically widely adaptable to the physical environment, but in less direct interactive contact with the intended beneficiaries. The development practitioners' role is less well defined and often considered primarily an extension/education of research results. However, the development practitioner is more geographically confined to project locations and thus in more direct interactive contact with the beneficiaries. Thus, before resorting to massive extension/education the development practitioner taking advantage of local interactive contacts with the beneficiaries needs to verify the feasibility of an innovation to the limited operational base of the beneficiary, as defined by the integration process of the overall technology development and dissemination process. This would also include looking at rational compromises beneficiaries might wisely make in adapting innovations to their more limited capacity and seeking supporting technologies that would enhance the beneficiaries' ability to take more complete advantage of the innovations.

<http://smallholderagriculture.agsci.colostate.edu/integration-an-under-appreciated-component-of-technology-transfer/>

Allow me a couple examples:

**Agriculture Development:** The agronomic research effort, which includes myself, does an excellent job of determining the physical potential of an area. However, it says nothing about how a smallholder farmers can achieve that. It just assumes it is not a problem. Is it really operational feasible for the farmer extend the small plot technology across an entire field, farm or community, if limited to working with a hoe and a diet of only 2000 kcal/day? And if not what are is rational compromises in terms of timing plant population etc. What kind of operational resource enhancement will improve their potential to accept innovative technology? This has actually fallen into an administrative void between the agronomists and the social scientists. Who in a development project is responsible to determine the labor, mechanization or other operational requirements needed to expand an innovation from the small research/demonstration plot to the entire field, farm or community? Even more important how available are these operational resources and what are the rational compromises farmers must make in adapting innovations to their limited labor etc.

<http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeasibility.pdf>

**Improved Nutrition:** Currently there is a major effort to as part of the Millennium Development Goals to improve nutrition across the impoverished development world. Again this appears to be coming out of academia and I will agree they are generating some good nutritional goals. The question is can an impoverished person afford the desired proposed nutrition diet. Most impoverished people are engaged in heavy manual labor for rather meager, often piece-meal, wages requiring the exertion of 4000+ kcal/day. Thus the question is what are the hard choices individuals need to make balancing their wages or energy needs between what they need to exert to survive and the academic desired diet?

<http://smallholderagriculture.agsci.colostate.edu/1028-2/>

The bottom line is that before we place a major effort on our compulsion or perhaps arrogant obsession for training beneficiaries for which the number of trainees provides an overly convenient monitoring tool, take a little

time to make certain the beneficiaries have the means to take full advantage of the training, or would a better result be in understand what can be done to facilitated their ability to use the innovations. If this integration process is not undertaken will we mostly squander substantial development funds on well-conceived innovation, but beyond the reach of most intended beneficiaries and badgering beneficiaries with training programs they are already familiar with, but do not have the means to take full advantage? Basically little more than a publicity stunt of the donor good intentions, with minimum actual impact on poverty alleviation despite the extensive number of "trained" beneficiaries.

**Raquel Gomes wrote:**

Dick,

Just jumping into the conversation here. Thanks for your insights. In trying to reframe your points in terms of a research question, would it be something around technology adoption (what is it we don't know and should about incentives for technology adoption?) or is it perhaps more of a question around organizational behavior of how we work as development partner?

Thanks,

Raquel

**Richard (Dick) Tinsley wrote:**

Raquel, Thank you for the follow up. If this is a research question it would center around the term integration of technical innovations until farming systems. I am really not certain this can be researched, but it certainly has to be addressed if we are ever going to move beyond poverty. A lot of the development work is more facilitating than research/extension and the need to fill that administrative void between the agronomist and social scientists in look at the rational compromises farmers have to make. I hope this is helpful.

**Lexine Hansen wrote:**

Good afternoon all. My name is Lexine Hansen, and I will be co-facilitating this discussion until 21:00 EDT (GMT - 4:00). This has been a great discussion, and I look forward to continuing it with you. So let's discuss how we can prioritize agriculture research to meet the critical needs of the development sector.

What research questions can help us understand how to integrate the social and natural sciences to address the human and social systems in which agriculture is practiced? I'll be upfront about my own bias here: I am an interdisciplinary social scientist and can struggle to understand the finer points of soil fertility or crop genetics.

**Richard (Dick) Tinsley wrote:**

As an interdisciplinary social scientist, could you take a look at the administrative void between the agronomist and the social scientists as outlined in the linked article on "Operational Feasibility" and advise how it might be filled as well as how important it is to fill it in the overall effort to stimulate agriculture and poverty alleviation of smallholders. the link is:

<http://webdoc.agsci.colostate.edu/smallholderagriculture/OperationalFeas...>

**Lexine Hansen wrote:**

Thanks Dick, I will read the report. I think one challenge (and thus opportunity) is the reluctance of some scientists, on both sides, to recognize the validity of the science on the other side. I am frequently reminded of my institutional and behavioral economics professor, who pointed out that people are economically minded (homo-economics from traditional economic theory) but only within the confines of their social and personal

contexts. How many of the small plot ag researchers have spent a day, or a week, with a small-holder farmer during the planting, weeding, or harvesting season? I'm a firm believer in getting folks to walk a mile in others' shoes before proposing solutions to their challenges. Do you think the scientists with whom you work would be willing to do that?

**Oscar Ortiz wrote:**

Hello, this is Oscar Ortiz (International Potato Center). This discussion is fascinating, because one of the main limitations that we have in agricultural research is still our views from particular angles (genetics, agronomy, soil, forest, markets), and there is great deal of progress in understanding the details of each constraint, but there is no sufficient attention to the question how integration of different system elements can occur and what mechanisms/tools could be used. This involves different levels or angles: micro-macro, local-regional-global, biophysical-socioeconomic-engineering, agriculture-nutrition-education-policy). Some time ago the term "convergence" (see: <http://news.mit.edu/2016/strategy-convergence-research-transform-biomedicine-0623>) was coined (see also reference to the original paper by MIT), which I found particularly interesting, and is used in other fields (i.e. biomedical research), and could be used much more in agricultural research, particularly under current trends towards big data, power computing, which will allow understanding complex systems more easily.

**Lexine Hansen wrote:**

Thanks Oscar!

Fascinating idea. In what way could convergence be applied to agriculture research? Are there agricultural scientists already looking at systems approaches? What works well?

**Tyrell Kahan wrote:**

Hello Oscar,

Thanks for sharing this interesting article! I was only able to read through the article and plan to get to the white paper soon. However, it maybe helpful to the discussion if you could elaborate a little in your own words on this idea of 'convergence'? How is different from our traditional push on interdisciplinary approaches? I see some promising ideas particularly in the articles comments on granting processes, but would love to hear more from you or any other participants!

**Tek B Gurung wrote:**

To integrate social and natural sciences I would suggest that prioritizing agri education, specially opening new universities where there are no such facilities focusing on hill and mountain agriculture system with new innovation on horticulture, livestock and fisheries might give very sustainable answers.

**Lexine Hansen wrote:**

Thank you Tek,

A lot of funding for agriculture research at universities in the U.S. is supported by agricultural companies. In Europe, my understanding, is that such research is more based on public funding. Where would developing, countries get the considerable resources needed to support new universities? I'd be interested in hearing about experiences in setting up innovative models for funding and conducting such research.

**Lexine Hansen wrote:**

Great conversations going as I hand off to the next set of facilitators.

This session, across the different threads, we discussed the importance of using social science and interdisciplinary perspectives to get information to the right people in order to act on it. We got great examples of projects which are using innovative techniques to understand adoption and how to support it. We noted the challenge of incentives in academia, such as the need for expert peer-review publications, which do not support practitioner-focused, interdisciplinary work. We also noted the need to work with the private sector, who may find ways to solve some of the technical challenges without the academic community if such research is not responsive to their needs.

I look forward to additional conversations and to building great research programs that support development, environment, and agriculture objectives!

**Manuel R Reyes wrote:**

Good evening on my part of the world. From 21:00 to 24:00 Eastern Daylight Saving Time, I, Manny Reyes, Research Professor at Kansas State University, will be facilitating discussion together with Lyda Hok from the Royal University of Agriculture on integrating social and natural sciences to address the range of research areas discussed today. I hope you will share your insights on this important topic.

**Claudia Ringler wrote:**

If we want to meet the global challenges of sustainable agriculture, nutrition and health, we need to not only link social and natural sciences, something we have gotten a lot better at over the last 10-15 years (even though there still seem to be more contested than friendly exchanges between social and natural scientists as working with the 'other science' still seems to be associated, at least in the minds of some, with giving up some power or turf or not getting one's own research design in the lead..); more importantly we need to take a much broader stance and bring health experts in to help us identify sustainable agricultural solutions and we need to bring in agricultural experts and hydrologists to address health challenges, such as malaria. On the latter, there are clear indications that agricultural interventions can directly and sustainably affect malaria outcomes, f.ex. <http://ebrary.ifpri.org/utils/getfile/collection/p15738coll2/id/127695/filename/127906.pdf> --despite this it is close to impossible to attract funding for malaria eradication through agricultural interventions.

Similarly, hydrologists are called to work more closely with health experts on malaria given the significant role of dams and other water infrastructure on malaria outcomes <https://malariajournal.biomedcentral.com/articles/10.1186/s12936-015-0873-2>

CGIAR WLE has been <https://wle.cgiar.org/> has been developing proofs of concept for such much broader cross-sectoral and interdisciplinary thinking--some of which are also tested in the Feed the Future Innovation Lab for Small Scale Irrigation <http://ilssi.tamu.edu/> - where linkages between irrigation and health outcomes are examined.

The Bridge Collaborative - <https://www.nature.org/science-in-action/bridge-collaborative-fact-sheet-final.pdf> has been developing guidance and principles that can be used by experts in the health, agriculture & development and environmental sectors to work more closely together to jointly address key sustainability, nutrition and health challenges. They will be published later this year.

## Opening the discussion on resilience research

Welcome to our final discussion theme of the AgExchange - research on resilience. Please read the [framing paper](#) and watch this [brief video](#) for an orientation to today's discussion.

First, we'd like to discuss how expanding and diversifying economic opportunities on and off farm, in and outside agriculture, is critical for strengthening the resilience of chronically poor and vulnerable households and communities, including landless and asset-poor households.

- **When considering poverty dynamics (movements of people in and out of poverty), what are the research gaps in identifying livelihood strategies that allow people to escape poverty sustainably (ie not fall back into poverty)?**
- **What research opportunities exist to diversify livelihood risk by expanding economic opportunities that are less sensitive to weather-related risk (including but not limited to migration and seasonal labor)?**

## COMMENTS

**Patrick Smith wrote:**

Good morning everyone. I am Patrick Smith, Agriculture Officer in the USAID/ Sahel Regional Office and co-facilitator of this session. I am very much looking forward to our discussion this morning on resilience.

**Justin Prudhomme wrote:**

Good morning everyone! I'm Justin Prudhomme, Strategic Communications Adviser at the USAID Center for Resilience, and I'm facilitating this online discussion along with colleagues Camilien Saint-Cyr and Patrick Smith. We look forward to hearing your thoughts on the questions above -

**Mike McGahuey wrote:**

Good morning, In responding to the two excellent questions, I would like to ask a further question for the first and note some progress on the second. We know, at least anectodally, that one of the risks of climatic or market shocks for marginal, dryland smallholders is to be put into a position of having to sell productive assets in order to purchase food for their family's survival. These assets would include livestock, tools, and land, the sale of which would put them further in the hole to recover and prosper post-shock. My question is whether anyone knows of any reliable case studies that have quantified such instances and if those studies include strategies and tactics used by farmers and/or projects?

For the second question, I fully agree that strengthening resilience requires more diversification of household economies. And, I would emphasize the idea that such diversification include revenue-generating activities that are less-dependent than annual staples upon reliable rainfall. As an example of such diversification, a small study (13 villages) was conducted by Nigerien researchers comparing strategies of Nigerien communities following the food crisis in 2004/5. Farmers in ten villages practiced on-farm forestry while those in three villages did not. Farmers in both villages suffered very low grain yields due to the drought, but farmers who practiced on-farm forestry were able to generate revenue from the sale of fuelwood, poles and browse and were able to purchase

food. Farmers who did not practice on-farm forestry had to sell assets and/or depend more on food aid. While I think that the above represented what happens in many cases, the empirical evidence is thin. Does anyone have any other case studies of such strategies that support or do not support such the above outcomes?

Finally, even the above case is only buying time for many marginal smallholders in regions where population pressure is high and farm sizes are diminishing to the point where even the best farmers are having a difficult time in feeding their families. In these cases, I would suggest than an effective Resilience Strategy requires options for helping farmers move off the land and into other forms of livelihoods.

**Mike McGahuey wrote:**

I forgot to identify some of the revenue-generating activities that are less vulnerable to climatic and market shocks than annual staple crops. These would include tree products (fuelwood, poles, browse, foods), livestock, and aquaculture.

**J.W. Camilien Saint-Cyr wrote:**

Thanks Mike, These are great questions. In the Sahel, seasonal migration has been considered as one of these non-Ag alternatives livelihood options during the lean season. Does anyone have anything to add along these lines?

**Patrick Smith wrote:**

Mike,

Thank you for sharing those excellent ideas and reinforcing that off-farm livelihoods opportunities must be increased if we are to respond to growing population pressures on the land. As mentioned earlier, the need to provide attractive opportunities for youth is also critical and many of them will be more interested in urban or peri-urban opportunities, including migration. Does anyone know about existing research on migration patterns in the Sahel and the economic potential of migration to engage growing populations of youth? Do we know the extent to which migration drives economic growth and expansion, creating inclusive opportunities? Have the impacts on migration of increasing insecurity/extremism been documented? Or are these research gaps?

**Mike McGahuey wrote:**

On youth, the USAID Mission in Mali conducted a long-term project in the cotton zone just south of Bamako (the OHVN--The Upper Niger Valley Development Project) that focused on strengthening the capacity of Producer Associations to operate as a business. One of the key features of the OHVN was to catalyze the development of small agriculture-based businesses managed by members of the Associations. Another feature was targeting the villages' youth for business management training (how to keep accounts, develop bankable loan applications, conduct cost-benefit studies, etc.) In our assessments we found that (a) a number of the enterprises were successful and (b) that more capable youth were staying in the village to help the elders manage these enterprises. The OHVN was not unique. It might be a good time to see if the effects of such training and intermediary services have had enduring effects and if there are lessons going forth that would increase opportunities for youth.

**Justin Prudhomme wrote:**

Thanks for your comments Mike, and thanks for pointing us towards the OHVN located project as an example. In many developing regions it seems that youth are primarily involved in activities ancillary to farming, but not farming. It would be interesting to see if this is due to perceptions about farming, the potential return on farming, or just access to land in population stressed areas. Or maybe a combination.

**Michelle Jennings wrote:**

Thanks for this concrete example but I think we have hundreds of these 'success stories' no? When will we dig into our DEC and development databases and do retrospective studies and metanalysis on similar experiences to get at high level analysis of successful approaches? We may not need to do new research but look across similar project successes and failures to identify these in a more systematic way...I feel we don't use our own data enough...do we have the computational capacity to do this analysis and synthesis?

**Richard Choularton wrote:**

The conversation on diversification is a really important one and one where we need lots more research. Does diversification mean you are more resilient? and how does that differ depending on where you live?

In a study I participated in on Mali on climate risk and food security in Mali, we say the most diversified people were pastoralists in the north - yet they were the most food insecure and poorest people. In contrast in the south where the climate is much more reliable, the wealthiest people were the least diversified. In the middle, the poorest were wholly dependent on climate sensitive sources of food and income, and the better off had at least 2 non-climate sensitive sources of food and income. In this middle area, people had faced the biggest impact of the 1970's climate shift in the Sahel and we proposed that the poorest people were too poor to adapt.

**Taking a step back and looking at resilience research in different areas, there is a tensions between optimal but fragile production systems vs. sub-optimal but resilient systems.** Often optimal production systems are fragile when faced with infrequent or oblique shocks and stressors. In contrast, resilient systems are often sub-optimal economically, but able to withstand pressure from multiple risks. For example, it may be more profitable in normal years to plant a high-yielding seed, but in a drought year, the losses will be higher than a lower yield drought-tolerant seed. This leads to a number of important research questions: How do we help farmers and others develop the right balance so that they can minimize risk, invest in their livelihoods, and escape poverty and vulnerability? There is lots of knowledge on the low thresholds for taking risks that poor farmers have because of their high exposure to multiple risk factors. A more dynamic look at how to help these farmers to manage and to take risk will provide valuable lessons for resilience programming.

**Mike McGahuey wrote:**

I fully agree with Michelle that there is a large body of experiential knowledge that is largely untapped. I would venture to say that there are few development questions that have not been addressed to one degree or another, albeit that all questions can be refined. One way to tap into experiential knowledge is to conduct impact assessments of projects in the years after projects--as that would be the time when when many impacts and lessons are manifest. However, for one reason or another, few Agencies invest in such assessments. There are exceptions and we can point to such assessments having been conducted on a Sahel-wide basis, Senegal, Mali and Botswana. I can attest to having been informed by these assessments when I was with USAID. Perhaps a first step would be to compile a list matching past projects with questions critical for this Strategy.

**Sarah McKune wrote:**

Sarah McKune here from University of Florida. As part of the Sahel Research Group here at UF, a colleague of mine, Abdoulaye Kane, researches migration in the Sahel. More information on him is available here: <http://sahelresearch.africa.ufl.edu/research/religion-and-migration/>

I have seen him present recently on migration data for the region, though much of his published work to date looks at the western Sahel countries (Senegal and Mali). At least some forthcoming work is more regional.

**Patrick Smith wrote:**



Sarah,

thanks for the link! It will be very interesting to have a look at his relevant work. Perhaps you could encourage him to share his observations in this forum?

**Anna Garloch wrote:**

Building on this topic of migration - I'm always struck by the findings from this longitudinal study in TZ on the links between mobility (i.e. migration of some sort) and consumption expenditures (an indicator of a HH's well-being). People who moved were better off - no matter what their starting point was (in ag, out of ag, etc). See Box 12, page 32 of this extensive lit review conducted by our LEO contract on the evidence base relating wage labor in agrarian economies with pathways out of poverty. Of course this is but one study - and they all have their design flaws - and we should be careful not to generalize. But it is a powerful one nevertheless. We need more like it. (And apologies in advance for what might be a bunch of links to LEO publications from me today!....) ;) As a learning-focused contract from USAID, many of the topics on this thread were touched on in some way.

**Jennifer Cisse wrote:**

One thing that I think deserves more research focus is how different communities benefit (or don't) from livelihood diversification. Some research shows that relatively wealthy households are able to invest in more productive secondary or tertiary strategies, while also increasing the productivity of their farms through, for example, improved input use. These productive strategies are often not available to poorer households or in poorer areas. Often alternatives available to the poor share a similar risk profile as their primary livelihood (weather risk) and so diversification into secondary (lower return) livelihoods may not increase resilience.

I think there's a lot of room (and need) for research in this space.

**Sheila Roquitte wrote:**

Jen, thanks for your comment. Migration is one of the adaptive strategies commonly used that can diversify the livelihood risk profile, although it comes with its own risks. There have been a few comments on the various threads about migration.

**Ganesh Bora wrote:**

Research can help small as well as large farmer. The concept of precision farming for small holders is necessary. It can be done by available technology at home but the concept of yield monitoring by indigenous methods and then apply fertilizer and chemicals in places where needed!

**Justin Prudhomme wrote:**

Please also check out the other online discussion pages with research questions around resilience in this AgExchange!

**Patrick Smith wrote:**

An interesting aspect of livelihoods diversification that we increasingly face is the impact of emerging conflicts in the Sahel on livelihoods options. For example, conflicts in Nigeria are affecting migration opportunities for Nigerien men who have traditionally engaged in wage labor in Niger. Their remittances have been an important source of household resilience in Niger. What do we know about this phenomenon already and what are some key research questions that would help us better take advantage of migration as a livelihood option, while adjusting to regional insecurity?

**Patrick Smith wrote:**

Just to clarify a typo - they migrate from Niger to Nigeria for jobs.

**J.W. Camilien Saint-Cyr wrote:**

Hello, I am J.W. Camilien (Cam) Saint-Cyr, Technica Director of the USAID/Senegal/Sahel Regional Office and co-facilitator of this session on resilience. I look forward to our discussion this morning. Cheers.Cam

**Archie Jarman wrote:**

Good morning! I mentioned this in the open discussion on focusing research, so please forgive me for repeating myself somewhat. Research dedicated to increasing staple crop yields has been effective in terms of addressing caloric needs of the chronically poor. Building on this achievement, expanding research in horticulture - as an increase on the current level of investment - and further validating its ability to increase economic opportunities across the entire horticulture value chain is a prime opportunity. Furthermore, beyond generating diverse economic opportunities, horticulture can diversify diets (improving nutrition) and diversify crop production (limiting the impact of a crop-specific disease or infestation or a specific period of drought) – cumulatively, increasing resilience.

In terms of biological resilience - Diversity in agriculture, as in ecology, improves resilience in developing countries. Monocropping exposes farmers to increase risk of comprehensive loss from pest/insect infestations and requires intensive IPM. I think horticulture offers an alternative to monoculture staple crops, increasing the sustainability of the whole via diversity.

In terms of nutrition research and horticulture, although horticulture is a sustainable way to fight micronutrient malnutrition in both developed and developing countries and, there is considerable, targeted research into in the use of food-based approaches to micronutrient deficiencies, such as integrated small-scale horticulture, these approaches have been, relatively to other areas, inadequately evaluated, funded and scaled-up globally.

**Mike McGahuey wrote:**

I fully agree that horticulture provides a source of revenue that is less vulnerable to climatic and market shocks than annual crops. I may be merging the fields of horticulture and forestry when I suggest that more research be conducted on the management of naturally-occurring field trees that produce consumable products (e.g., baobab, tamarind), high-quality browse (many species), medicines, and even fuel and construction materials. As I noted in a previous comment, such revenue-generating products are available even in years of crop failure due to drought thereby providing farm families with the means to purchase food and other necessities and reducing pressure on selling productive assets in order to survive. In the better years, such trees provide farmers with a means to climb up the economic ladder.

**Pamela Anderson wrote:**

Good morning, Archie. I have been following the AgExchange across the discussion topics of nutrition, ag-led growth and resilience. One of the things that I have been watching for is common threads. Diversification has now come up in all three discussions - for improving nutrition outcomes, improving income, and now as a resilience factor. In terms of resilience, what I would share is experience from several decades of living and working in Central America. I often saw diversification backfire, and drive smallholder farmers into deeper poverty. I saw it most specifically in cases of diversification into tomatoes and papaya. Horticultural crops can be capital intensive, and they very often have a pest and disease load that is much more complicated to manage - often these horticultural pests and diseases (literally in terms of identification) are unknown and/or understudied, and we do

not have effective, or cost-effective. management practices for them. And, even if we do understand how to manage these problems, with a lack of extension infrastructure in low and middle income countries, small farmers have little or no access to technical assistance. I watched entire valleys (across tropical America) that had been diversified into tomatoes and other horticultural opportunities get wiped out due to whitefly-transmitted viruses. Farmers lost all of the capital they invested. Several times, I saw the same thing (more locally) with papaya - due to papaya diseases. I would argue, for diversification into horticulture, beyond critical development components (e.g. adequate technical assistance), there must be a strong and active research investment in smallholder-appropriate integrated pest management in the horticultural crops of interest.

**Sheila Roquitte wrote:**

Pamela, Thanks for your insightful comments. It's really important to have that on-the-ground reality check. Do you have further suggestions on research areas we should consider to help mitigate or transfer risk for small holder farmers who choose a diversification strategy?

**Robert Bertram wrote:**

Thanks Pamela for spotting that important thread around diversification across topic areas. And also for flagging the risks that can be involved. It would be interesting to look closely at decision making associated with, say, the adoption of doubled up legume rotations that can deliver higher maize yields as part of an integration of legumes in rotation. This might provide opportunity for continuing to grow maize on some land but also doing some diversification elsewhere...so perhaps lowering risks? Govt of Malawi has decided to promote the doubled up legumes rotation worked on by Sieg Snapp and African collaborators...maybe we'll have a laboratory for increasing our understanding of smallholder risk mgmt with respect to diversification.

One additional possibility is integration of livestock and poultry in a mixed system...another thing to look for--utilizing higher maize yields and biomass from legumes.

Not sure how much one other topic intimately linked to both risk and diversification has been discussed--that's water mgmt and small scale irrigation. Seems appropriate to also raise it under resilience. Water is pivotal in so many respects--and both the expanded role of WASH and nutrition, along with the emphasis on resilience in the GFSS both raise the profile of water going forward. And for all of us..how can research advance expanded sustainable use of water resources that drive resilience (including via diversification)...many different research partnerships deal with water one way or another.

**Pamela Anderson wrote:**

Rob, I think that I was coming to a similar conclusion. Given what people seem to be pointing to (i.e. that we could harvest impact across the three FtF objectives), but that so many of the details would be local (the point you and others made yesterday about contextualization)...what would be the global public goods research dimension of diversification? It could be very interesting to look at the state of research, and research needs, related to smallholder risk management with respect to systems change/diversification.

**Pamela Anderson wrote:**

One thing I would add, Sheila, is market research (and linking the seed systems to that market research). Often, the horticultural varieties that the smallholder would (or could grow due to what seeds were available, or which varieties did have some resistance) were not what the market was asking for, or what the market was paying for - so even if they did sell, they were not getting the economic return they needed to justify their investments.

**Anna Garloch wrote:**

This example is a great illustration of the importance of diversifying risk *factors*, not just diversifying within ag - which leaves people vulnerable to a similar set of risk factors (weather, crop diseases, trade flow disruptions, etc). Mercy Corps did an oft-cited study on this in Somalia a few years ago (which was profiled in a LEO paper looking at factors of resilience within market systems themselves - <https://www.microlinks.org/library/market-systems-resilience>). This is why I am so encouraged by the greater dialogue (and even a few projects coming out of USAID - like the recent Guatemala Creating Economic Opportunities contract) that invest heavily not just in off-farm but also non-farm. I'd like to see more discussion on this thread about supporting the emergence and development of non-farm sectors, especially within Sub-Saharan Africa, where that nut is a bit harder to crack. This, to me, is the future of development.

**Mike McGahuey wrote:**

Anna makes an important distinction in targeting risk factors instead of focusing only on crop diversity. As others have pointed out, crop diversity, by itself, may not reduce climatic risks. Taking the risk-prone Sahel as an example, farmers can expect a climate-induced grain crop failure every few years. If they were to diversify only within their annual-crop portfolio, they would only marginally reduce their vulnerability to droughts. Instead, a growing number have expanded their farming system to include naturally-regenerated, on-farm forestry where they manage native trees and shrubs as an intercrop as a way to manage risks as well as to increase productivity. When properly managed, the trees increase the annual crop productivity by recycling nutrients and increasing the capacity of the soil to retain nutrients and moisture. In years of poor harvests due to drought, farmers generate revenues from the sale of fuelwood, high-quality browse, fruits, poles, etc. with which to purchase foods, thereby reducing their need to sell productive assets or migrate in order to survive. To return to Anna's point of considering risk factors, not only are such systems much less vulnerable to climatic shocks, but, since they include naturally-regenerated native trees and shrubs (i.e, there are no expensive nurseries or planting operations), they are low-cost and do not introduce new risks into the equation.

**Robert Bertram wrote:**

Anna's comment connects to considerations that went into the GFSS. Our new results framework propels us towards a system view that spans on-farm to off-farm, especially via input and output markets and value chains that generate diversified employment opportunities. A key factor to consider is how those approaches still drive productivity gains overall...market efficiency gains offer improved opportunities that both producers and consumers can benefit from. And those gains can spur diversified uses of more affordable/reliable products.

This was the central message from the Masters-Pray review that was done as background for this AgExchange--- that on-farm productivity gains are a critical driver for economic transformation and even of gains in nutrition. This doesn't take away from the importance of other kinds of investments (infrastructure, education for example), but it does highlight that for food security focused research, sustaining *and increasing* productivity gains both on- and off-farm will be critical in how effectively this whole endeavor area contributes to transformation-- improving incomes, nutrition and economic opportunity, especially for low-income people. This is captured on page 2 in their paper in figure from Jim Oehmke (2010).

Keith Wiebe's paper from IFPRI, provides an addition, helpful macroeconomic analysis on agricultural productivity gains drive pro-poor economic transformation...here's the link: <http://www.ifpri.org/publication/foresight-modeling-agricultural-research>

So it seems like there is still a compelling body of evidence that points to the centrality of agricultural growth as a critical driver of development. Again, not the only one, but the one for which the evidence is very strong. Regarding Africa, which you note has presented challenges, the emerging consensus from our Food Policy Innovation Lab at MSU is that the huge opportunity--even imperative--is for African farmers and rural regions to link to and respond to the demands for food from growing populations and wealth in cities and towns. Meeting that challenge will be one of the most critical determinants of economic transformation on the continent. The last few days have shown us there are lots of reasons for optimism about how research can contribute. .

**Patrick Webb wrote:**

In other words, Rob, focus the goal of research on future consumer demand rather than only on past patterns of productivity. While protecting past productivity gains is a critical component of ongoing and future research (something that has not been highlighted enough so far, I feel - we need to address growing threats not just from climate but from antibiotic use, chemical compounds, disease and pest adaptation, etc.), we have to get out of commodity-framed research agendas and figure out how to respond to consumer demand (urban and rural). And that means researching and producing the elements of a healthy diet for all, not just more calories for most. Adopting this different lens would actually be revolutionary in terms of how we need to consider prioritization of individual foods, research investments and capacity-building among NARS and other partners.

**Michelle Jennings wrote:**

Patrick, I like your thought process and brings me to the demand versus supply rationale that Clare Kremen talks about at UC Berkley...about being more efficient...it's kinda way out there for the development context but a disruptive idea that merits discussion.

(<https://thebreakthrough.org/index.php/issues/the-future-of-food/response...>)

**Robert Bertram wrote:**

Yes and interestingly, many of the foods demanded as people raise their incomes are the non-staples (vegetables, animal source foods, legumes, etc.). Those represent excellent income opportunities for producers--and productivity gains in their production, processing, transport and marketing are going to help make them more affordable to lower income people who need them most. Regarding staples, productivity gains there will help drive diversification (so that less land may be used for example, freeing up resources for a higher value, higher nutrition option perhaps), but also because staple affordability directly impacts the ability of the poor to purchase a higher-quality, more diverse diet. So I tend to see both diversification and consumer led demand complemented by and sometimes synergistic with, staple productivity gains. The key, as you point out, is to design a research strategy and portfolio that takes this all into account.

**J.W. Camilien Saint-Cyr wrote:**

Re: livelihood diversification: From a Sahel perspective, Youth is one of the most vulnerable groups in the Sahel. Our current resilience programs do target youth, but not as much as it should. The challenge now is how to identify specific areas and livelihood opportunities that would meet youth aspirations and motivations.

The one other point is the nexus between the lack of livelihood opportunities and youth attractions to extremist organization ideology. Hence the connections between livelihood, resilience and violent extremism.

**Sarah McKune wrote:**

Agreed. Which then mandates that future research take an interdisciplinary approach - including not only the natural and social scientists we typically engage in coupled human-ecological work, but also political scientists of religion, social movements, history, etc. We are trying to do that here at UF through the Sahel Research Group.

**Martin Fowler wrote:**

In response to Archie Jarman's comment on the need for more a change in focus away from staple grains/starches to horticulture: OK, but let's be careful about the research and make sure it is thorough. Horticultural crops on the whole, need far higher inputs of labor than do staple starches. So let's make sure that the researchers have this fact 'up front' in their designs and field work, so as to make sure they come up with technologies and farming practices that make sense to the smallholder producers that, I hope, are the focus of their research. I have written extensively on the irrelevance to smallholder of much research in Uganda, going back well before Independence...and its sad to see the enormous waste of financial and human resources that were involved in this "cutting edge" research.

mfowler

**Archie Jarman wrote:**

That makes sense, Martin. Ensuring that the technology is scalable for the smallholder producer by fully incorporating stakeholder input on design and its parameters is needed for adoption and ownership and to minimize interventions that are not feasible. In terms of youth, urban and peri-urban, there may be opportunities in the value chain for youth to play a roll in marketing, developing unique products, storage, distribution, etc...

**Cary Fowler wrote:**

I only want to point out that diversification need not be into additional cash crops that displace or disrupt production of existing crops. Diversification on a smaller scale could simply entail better production of highly nutritious foods for direct household consumption, with the possibility of selling a surplus if any. Could research applied to such under- or non-researched crops result in breakthroughs that would make their use much more beneficial across many households, including in urban settings?

**Archie Jarman wrote:**

Thanks for making that clarification, Cary. I don't mean to downplay the importance of existing production that is not intended as a cash crop, especially if it is source of highly nutritious foods.

**Michelle Jennings wrote:**

I think it is important to note the comment posted yesterday by TARA from the AMA Innovation Lab where the focus is on social science research on poverty and asset depletion. I am mystified why we this research that highlights a focus on poverty through looking at assets versus livelihoods income has not become a highly debated topic within USAID...why is that I wonder? Tara posted some links to the research and website where this research is posted. So, another research questions...how long until we apply research findings into our approaches? Are social science research findings less likely to be uptaken and incorporated into policy to improve resilience building approaches? Why?

**Ruth Meinzen-Dick wrote:**

Michelle--I think you raise a very important point about assets being critical. Income is transitory, but assets enable livelihoods, as well as provide a basis for resilience. And it's not only household assets that matter, but how use, control and ownership over those assets are controlled by different members of the household that determines whether people can participate in different types of livelihoods. We looked at this both conceptually

and empirically in the Gender, Agriculture and Assets Project--the conceptual framework and summary of findings are available in this article: <http://www.sciencedirect.com/science/article/pii/S0305750X16000073>

So if you want poor people (women and men of different ages) to be able to participate in different livelihood strategies, you either need to build up their assets or lower the asset thresholds for the different strategies.

I think USAID has taken this on board in incorporating women's control over assets as a key domain of the Women's Empowerment in Agriculture Index ( see <http://www.ifpri.org/topic/weai-resource-center> ) but I do think that asset-based thinking is key to resilience, especially if assets are considered broadly, to include human and social capital (for the latter, see <http://www.ifpri.org/sites/default/files/publications/pr29.pdf> <http://dx.doi.org/10.2499/9780896295674> )

<http://www.sciencedirect.com/science/article/pii/S0305750X16000073>

**Roberto Quiroz wrote:**

Good Morning, I'm Roberto Quiroz from the International Potato Center, based in Lima. I would suggest we need to analyze, document, and learn from the coping and adaptation strategies of regions of the world where farming communities have been facing extreme events frequently. It is important to understand their strategies as entry points for enhancing resilience. For instance, in the dry High Andes (Above 3800 m above sea level- warming trend since the 50's 3X global average) farmers face constant droughts, frosts, hailstorms as eventually floods. There are several strategies/tactics that have been implemented over hundreds of years. Let me summarize a few: 1. weather forecasting using bio-indicators- a practice dominated by elder men but they indicate that with the increment in the frequency and magnitude of extreme events the "signs" as they call them are changing; 2. Diversified agriculture- different crops and livestock, many varieties within a crop (e.g. it is common to find up to 100 potato varieties in small fields) 3. wise use of landscape due to differences of up to 2 oC in minimum temp over a few meters- e.g. frost tolerant crops and varieties at the bottom of the property and more susceptible at the top, 4. Stagger planting to escape extreme events 5. Building assets (animals and natural freeze-drying (pre-incan technique) of bitter potato that last more than 20 years, and 5. Migration for remittances- primarily male migration that have other consequences such as the lost of important knowledge such as weather forecasting that is transferred through farming

If collectively we can learn from cases like this around the world and modeling their suitability, based on past experience we can generate, I believe better hypotheses, strategies and tactics for resilience at different scales

**Sheila Roquitte wrote:**

Thanks Roberto for summarizing some of the adaptive and coping strategies used in the High Andes. Do you have a link to a document so we can dig into this more deeply?

**Roberto Quiroz wrote:**

This is precisely what I meant, to analyze what we collectively have and draw lessons from them

**Sarah McKune wrote:**

I don't think we can engage in discussions of resilience in the Sahel without thinking about livestock holders across an agropastoral continuum. Pastoralism can shed much light on resilience and adaptive capacity in a specific

landscape, including investigation and understanding of how it has been degraded. So much of the agricultural GDP in the Sahel comes from livestock (some countries more than others), and much of the livestock comes from the pastoral sector, yet what models have been developed to look at the future of pastoral systems? With climate change? With political unrest? What adaptations work for households, clans, livelihoods, sectors?

**J.W. Camilien Saint-Cyr wrote:**

Sarah, you just touched on a fundamental issue here: Pastoralists along the corridors. As you said and I agree-- livestock represents the engine of the economies in the Sahel, especially Burkina Faso and Niger, yet due to their mobility, development colleagues and searchers have not yet come to grasp on the anthropological aspect of pastoralism in the Sahel. As long as we don't understand this aspect, it will be hard to fully understand how these folks are contributing to resilience building and how can our programs benefit them directly as a special vulnerable group. Great point Sarah!

## Behavioral development and social cognitive research

APR 20, 2017 6:57 AM by [GREGORY COLLINS](#)

The growing body of evidence on resilience makes clear that factors such as social capital (the ability to lean on others), women's empowerment, and aspiration (or hope), are critical sources of resilience across a wide variety of contexts.

- **How do behavioral development and social cognitive research improve our understanding of how these factors drive resilience? What research areas and questions should we prioritize?**

### COMMENTS

**Justin Prudhomme wrote:**

Good morning everyone! I'm Justin Prudhomme, Strategic Communications Adviser at the USAID Center for Resilience, and I'm facilitating this online discussion along with colleagues Camilien Saint-Cyr and Patrick Smith. We look forward to hearing your thoughts on the research questions posed or other related questions.

**Andrew Gerard wrote:**

Although we are seeing behavioral economics and other behavioral social sciences brought into agricultural/agricultural resilience research, I would like to see behavioral economics concepts such as loss aversion, the sunk cost fallacy, anchoring, and others better integrated (I realize that these aren't totally connected to social capital, women's empowerment, and aspiration - but I thought I'd bring them up anyway). Although Dean Karlan et al at Innovations for Poverty Action and some others have integrated behavioral concepts into their research, often the assumptions underlying applied economic research do not take these ideas into account. For example, understanding investment (including diversification) by small scale farmers benefits from behavioral concepts around loss aversion. So, in general, I would hope to see a continued, expanded use of behavioral



economics informing research, as well as inputs from other social and natural sciences (sociology, psychology, sustainability studies, ecology, etc.).

**Jenna Borberg wrote:**

Good morning. Jenna Borberg here from the AquaFish Innovation Lab at Oregon State University. Thank you for including this important and interesting topic. Being the first to join this topic, I'm going to keep my comments pretty broad – hoping more will join in on this discussion.

There is of course a large body of behavioral and social cognitive research on the power of hope (largely in the medical field), some showing that that people who are more hopeful are more resilient. Which is a natural connection when hope is defined as being open to positive outcomes and also accepting inherent risks of a given situation. It also follows logically that empowering marginalized groups and improving social capital are going to improve hope. An important question to review in existing literature, and follow up with research where there are gaps, is what are the most successful strategies for fostering hope? And to target strategies to a given community, country, or region, it is important to understand how these are influenced by social and cultural norms.

Understanding attitudes and norms is the “easy” part – effecting change and improving hope is the bigger challenge. No doubt this international development forum is well aware of this challenge.

**Sheila Roquitte wrote:**

Jenna, Thanks for helping to ignite more interest in this question. I hope others will join in with their insights. I've seen the importance of hope throughout my career as a development professional; however, few people have been able to integrate it into programming in a meaningful way. While this is only somewhat related, I would recommend a book that was recently released and on the NYT bestseller list-- The Book of Joy: Lasting Happiness in a Changing World (about the Dalai Lama and Desmond Tutu). I found it particularly interesting as I worked with Archbishop Tutu on the Truth Commission and then ran a small NGO (in South Africa), established in memory of an American woman whose killers received amnesty. Many of the things in the book are applicable in the development contexts in which we work.

**Patrick Webb wrote:**

Interesting avenue to pursue. I'd point out that 'cognitive development' writ broadly is a cutting edge field in health and nutrition research, which other development practitioners may want to consult. It has so far focused mainly on 3 key areas of research: a) to what extent is malnutrition (mainly stunting or wasting) linked to cognitive impairment (manifest usually through lowered educational attainment and labor productivity later in life), b) are there specific ways to measure cognitive outcomes earlier in life such that metrics can be used in line with the 1,000 Days agenda (<2y)?, c) are there aspects of the diet that contribute to being not just well-nourished but well-developed in a cognitive sense (brain development as well as behavioral aspects)? The last one has focused on the role of omega 3-6 and iodine as key nutrients, but of course it has been shown that animal source protein (or certain of the amino acids) are also closely linked to educational outcomes (not just linear growth). So this is a domain where social and natural scientists ought to be collaborating more.

Oh, and the other dimension to consider is that there are studies from psychology in low income settings focused on the opposite of 'hope', such as pain or traumas associate with famine, forced displacement, conflict or HIV/AIDS. The work on this opposite end of the scale is rather linked to the postive end that you're both talking about.

**Michelle Jennings wrote:**

Patrick, fascinating information and areas that we need to delve into. Are there examples that we have incorporated into the extension of ag knowledge and poverty reduction research that you think are worthy to explore further on behavioral economics? Seems we have good material to study from health experiences. And I do know that the UC Davis AMA I Lab did some work on this topic as well. <https://basis.ucdavis.edu/papers-presentations>

**Jenna Borberg wrote:**

Patrick - Agreed that nutrition and health (physical and mental) fall at the nexus of natural and social sciences. A fascinating area, and the many unanswered questions \*almost\* make we want to go back to school to get my PhD :)

**Jenna Borberg wrote:**

Thank you for the book recommendation, Sheila - I will definitely add it to the top of my reading list. "A Path Appears" by Kritsof and WuDunn has a chapter on the power of hope in the international development context. It was a well-researched and inspirational book that I would recommend.

**Michelle Jennings wrote:**

Hello everyone, my name is Michelle Jennings from the Office of Global Climate Change at USAID. I'll be co-facilitating the Resilience session with Otto Gonzalez from USDA. 12 – 3pm. The morning discussion has been really interesting with a lot of themes being chatted robustly. I look forward to your insights further as we unpack this theme that based on activity, does require more focused attention.

I've been intrigued by the human centered design concepts and participatory action research as applied to small holders...has that approach gotten any traction in ag/food sectors as it has in health and nutrition sectors? What research gaps remain and what is out there already that we might be able to crib from?

**Barry Pittendrigh wrote:**

Resilience also involves having a "diverse knowledge set" that allows one to use innovations at a time and place that is appropriate. We need to think towards delivery of knowledge sets that allows people to use knowledge in a time and place that is most useful for them.

## Financial services for improved resilience

APR 20, 2017 6:58 AM by [GREGORY COLLINS](#)

Insurance and other financial services (savings, credit and remittances) are critical for resilience. However, significant debate remains on the viability of insurance tools (weather-indexed and other forms of insurance) for poorer households.

- **What options exist for expanding the reach of insurance (or is it inherently a niche product)?**

### COMMENTS

**Sheila Roquitte wrote:**

Hello everyone, my name is Sheila Roquitte from USAID, and I'll be co-facilitating the Resilience session with Dr. Gebisa Ejeta (9-12pm). I look forward to your insights. Please remember to check out all of our questions concerning resilience.

**Jennifer Cisse wrote:**

I think we are making a lot of progress in this space, but there is still a lot to learn. The USAID-funded AMA IL Index Insurance Innovation Initiative at UC Davis is allowing us to learn a lot about index insurance in various contexts, but there is a lot more to learn.

Not all places are equally well-suited to index insurance. Tools to determine suitability and then to improve the development of indices (to reduce basis risk while minimizing moral hazard) are needed.

Insurance is not a silver bullet, either. Research on which suites of products most improve resilience when combined with insurance, such as those used in the R4 project, is also needed to make sure that insurance is taken up and programming is effective in improving resilience.

**Richard Choularton wrote:**

Reposting some comments on the background paper on this question:

**Insurance or risk transfer?** Research on insurance has typically focused on insurance as a financial instrument. Our research should take a step back and look at tools to transfer risk, and the role that insurance can play in helping people, private enterprises, and governments manage risk within a broader risk management framework. Insurance and other risk transfer tools cannot be effective on their own. We need more specific research into what combinations of tools, including insurance, are most effective at achieving resilience, food security, and development outcomes. Lastly, we need to understand better the opportunities to take risks that insurance can catalyze. A key part of this needs to be understanding where insurance can be used as a stop gap to manage risk while other risk reduction and management systems are being built.

How do you actually implement shock responsive social protection? We have been working on shock responsive and adaptive social protection for some time. There have been some research programs to pilot different ideas. Many have shown very promising results. But, when we try to scale up these results we realize that the systems needed for large scale implementation are lacking or weak. Can we prioritize research into how to build systems that can scale up without losing quality?

**Sheila Roquitte wrote:**

Richard, Thanks for these important contributions. Could you expand a bit more on what you mean when you say "the systems needed for large scale implementation are lacking or weak"? Do you mean the policy and enabling environment? I'd love to understand a bit better what impediments you have encountered. Thanks.

**Richard Choularton wrote:**

Hi Sheila, I mean both the policy and enabling environment, but also the operational capacities. For example, availability of agricultural and weather data or the ability to design, monitor and operationalize weather indexes or

operate loss adjustment systems or mobile communications and money infrastructure. At present much of this work is done by expatriate consultant expertise, with limited private and public sector capacity development.

**Christine Negra wrote:**

To Richard's important point about appropriate combinations of tools, I would recommend reviewing the CTA publication on "[Value Chain Finance for Agricultural Climate Change Resilience](#)," which presents a range of case studies (e.g. short-term debt financing; risk-mitigation instruments) that highlight the diverse entry points to resilience enhancement (e.g. input suppliers, farmers, traders, processors, marketing and storage companies, exporters, wholesalers and retailers, FIs, government, NGOs).

**Sheila Roquitte wrote:**

Thanks Christine for sharing that publication!

## Shock-responsive social protection

APR 20, 2017 6:58 AM by [GREGORY COLLINS](#)

Shock-responsive social protection is increasingly seen as both a foundation for strengthening resilience and a platform for disaster risk management.

- **How do we prioritize investments in social protection and investments in market systems? What additional research is needed in this area?**

### COMMENTS

**Sheila Roquitte wrote:**

Hello everyone, my name is Sheila Roquitte from USAID, and I'll be co-facilitating the Resilience session with Dr. Gebisa Ejeta (9-12pm). I look forward to your insights. Please remember checkout all of our questions concerning resilience.

**J.W. Camilien Saint-Cyr wrote:**

Hi, this is J.W. Camilien (cam) Saint-Cyr, Director of the Sahel Regional Technical Office at USAID/Senegal. The topic of Shock-Responsive is an important topic that I look forward to hearing people's perspectives on as we just developed a Shock-Responsive RISE Programming strategy to help support livelihood, save lives, while preserving our development gains in areas subjected to recurring crises in the Sahel. Of course, social protection/humanitarian will be part of the equation, but needs to be well planned and coordinated so that the right hand does not destroy gains that the left hand achieved so hardly. Nice topic and very timely. I look forward to the discussions. Thanks Sheila for facilitating the discussion.

**Deepa Thiagarajan wrote:**

An important consideration for prioritization of investments towards social protection and resilience, is how do we address specific needs, vulnerabilities and in certain contexts—crisis and post-conflict situations. Impacts of

specific shocks on vulnerable groups often result in chronic food insecurity and malnutrition. For those populations that live in conflict, insecurity, below the poverty line, and in areas prone to environmental shocks, special considerations need to be given. It is critical to address the specific needs and vulnerabilities of children during the first 1000 days but the elderly are also vulnerable, especially in conflict or crisis environments.

**Sheila Roquitte wrote:**

Deepa, Thanks for your comments noting the special needs of particular groups such as the very young and elderly. What are the key questions that need to be researched so that we might be able to better address these needs? What research questions would help inform strategies to build absorptive, adaptive, and transformative capacities of targeted populations at various scales?

**Deepa Thiagarajan wrote:**

Some general thoughts (look forward to hearing from subject matter experts here in this thread)--One would start with using appropriate resilience system analysis, and consider the scope of the underlying risks within specific contexts and populations and how to boost the resilience of individuals, households, communities to the risks and where should we invest time, skills and funds to empower at-risk people, helping them to better absorb, adapt to shocks. The analysis to guide research questions would require multi-sectoral expertise --researchers who are knowledgeable about risks, food systems and also key decision makers and how to inform policies and programming to mitigate the risks at various scales.

**Michelle Jennings wrote:**

Deepa, I agree with your comment full heartedly but who has the comparative advantage and computational expertise to research and analyze what is an "appropriate resilience system" and how can we get competing sectors to objectively assess "the scope of the underlying risks within specific contexts." If we did do this then perhaps our development investments would be focused on governance, local capacity, policy, and education exclusively. I find your comment right on the money but really hard to execute for some reason that I still don't understand completely.

**Tara Steinmetz wrote:**

I think there's been a lot of interesting work around poverty dynamics that has helped us understand how poverty functions in many contexts. I wonder if additional research could investigate how optimal risk coverage & resilience programming might change over time or across sub-populations. For example, a relatively poorer farmer might begin to accumulate the resources that would make her less reliant on insurance and more on savings mechanisms, contingent credit, etc. In addition, I think there could be more research around how risk management mechanisms could be combined with other value-added tools (stress-tolerant seeds, for example) to more effectively manage the risk portfolio faced by farmers and promote resilience. Finally, I think that while many countries now offer farmers a variety of social protection schemes, there is still much to learn about how to optimally design these schemes in a way to offer beneficiaries the strongest incentives for investment and growth.

**Sheila Roquitte wrote:**

Thanks Tara. Great suggestions and good to see you again :-). One of the things our field missions have asked for is a better understanding of decision-making at the household level, including traits of early adopters of interventions (from improved agronomy practices to taking advantage of social protection schemes). Are you aware of any good studies that could help us with this?

**Richard Choularton wrote:**

Certainly one way to prioritize social protection investments is better resilience measurement over time that will help show who and where social protection is needed the most. Linked to this we need to know what combinations of social protection, agriculture, risk reduction, and other tools yields the best results.

**Sheila Roquitte wrote:**

Thanks Richard. TANGO and others have done some interesting work on measuring resilience capacities at the household level using recurrent monitoring. I'm checking with my colleagues to dig up some links. One of the things they have found is that social capital is one of the most important determinants of resilience. With this in mind are there some key research questions around social capital that we should consider?

**Deepa Thiagarajan wrote:**

Hi Shiela, you may have already seen this recent IFPRI Conference paper on Resilience and Social Capital, link below-<http://reliefweb.int/sites/reliefweb.int/files/resources/2020resilienc...>

This review paper "looks at the role of social capital in encouraging and promoting resilience, in particular examining the role of networks and local-level organizations"

**Sheila Roquitte wrote:**

Here's also a link to one of the TANGO papers. <https://www.climatelinks.org/sites/default/files/asset/document/prime%20ethiopia.pdf>

**Richard Choularton wrote:**

Thanks, Sheila, WFP has also done some really interesting analysis of their Food Security monitoring Systems data looking at changes in Coping Strategies Indexes, Food Consumptions Scores, and Dietary Diversity. With mobile data collection exploding, we should have much more fo this data to learn from.

**Michelle Jennings wrote:**

Hello everyone, my name is Michelle Jennings from the Office of Global Climate Change at USAID. I'll be co-facilitating the Resilience session with Otto Gonzalez from USDA. 12 – 3pm. The morning discussion has been really interesting with a lot of themes being chatted robustly. I look forward to your insights further as we unpack this theme.

## Systems-level measurement for resilience

APR 20, 2017 6:59 AM by [GREGORY COLLINS](#)

There is widespread recognition that resilience exists (and can be strengthened) at multiple scales, including individual, household, community, systems, and countries. Significant progress has been made in measuring resilience at the household and community scales in ways that directly inform investment decision-making. Much less progress has been made in measuring systems-scale resilience, including market systems, ecological systems and social systems.

- **What additional research is needed to develop robust systems-level measurement that can inform investment decision making and program design?**

## COMMENTS

### Sheila Roquitte wrote:

Hello everyone, my name is Sheila Roquitte from USAID, and I'll be co-facilitating the Resilience session with Dr. Gebisa Ejeta (9-12pm). I look forward to your insights on key research questions concerning resilience. Please remember to look at the other questions as well. People tend to "hangout" in one discussion thread, but we have several other interesting resilience questions for which we would like your input! Look forward to your comments.

### Gebisa Ejeta wrote:

- **What would be the role of 'spatially smart' digital technologies for soil mapping for example contribute in a watershed by efficiently mapping out key resources and monitoring those over time?**

### Claudia Ringler wrote:

The Small-Scale Irrigation Innovation lab (ILSSI) has used a variety of integrated biophysical and socioeconomic tools to assess the potential of expanding small-scale irrigation in various SSA countries. An example is here <http://ilssi.tamu.edu/media/1305/assessing-potential-land-suitability-for-surface-irrigation-using-groundwater-in-ethiopia.pdf> The tools are available, but they are not often enough used by policymakers in the design of irrigation projects--maybe some communication barriers need to be overcome--and of course a lot of these sustainability assessments will show that many planned investments are NOT sustainable, further reducing incentives to use the tools!

### Michelle Jennings wrote:

Hello everyone, my name is Michelle Jennings from the Office of Global Climate Change at USAID. I'll be co-facilitating the Resilience session with Otto Gonzalez from USDA. 12 – 3pm. The morning discussion has been really interesting with a lot of themes being chatted robustly. I look forward to your insights further as we unpack this theme.

I'd be interested in people's thoughts around research that addresses risk systematically, especially climate, weather, and water risk factors—are these already factored into most of our research and do we have the information we need to balance priorities and trade-offs as mentioned by Richard --the efficiency goals versus resilience goals?

### Michelle Jennings wrote:

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I'd be interested in people's thoughts around research that addresses risk systematically, especially climate, weather, and water risk factors—are these already factored into most of our research and do we have the information we need to balance priorities and trade-offs as mentioned by Richard --the efficiency goals versus resilience goals?

**Amrit Bart wrote:**

Additional resiliency research needs to take stock of what has been learned from recent past experiences. A great deal of investment was made following 2004 post- Indian Ocean Tsunami and a number of hypotheses concerning what makes a HH, community and a nation resilient. Literally hundreds of governmental and non-governmental Organizations implemented community resilient interventions particularly directed towards poor coastal communities. It would be worth our while to revisit these hypotheses (i.e., coastal fishers accept agriculture livelihood post disaster, diversified income source leads to resilient communities/HH, risk management allows communities to bounce back quicker post event...) after 10 years and see what we can learn from those and other events before being able to develop and inform new program design.

**Michelle Jennings wrote:**

Thanks for your contribution to this thread...I think we are wrapping up and moving on to the summary at 3:30pm. Thanks again to all who contributed.

## Join our closing webinar for key takeaways and BIFAD deliberation

APR 20, 2017 3:00 PM by [BRADY DEATON](#)

Thank you all sincerely for your participation in the AgExchange discussion over the past three days! Your input will be invaluable in helping the U.S. Government shape its global food security research investments in alignment with the USG Global Food Security Strategy.

In just a few minutes--at 3:30 p.m. EDT (GMT-04:00)--we will be holding a live closing webinar to share key takeaways, reflection, and next steps. The recording of this closing webinar will also be posted right here.

### COMMENTS

**Brady Deaton wrote:**

Thanks to everyone who joined our closing webinar yesterday. [The recording is now available here](#). If you weren't able to join live, I highly recommend watching the recording - four BIFAD members and six representatives from the USAID Bureau for Food Security provided interesting and useful reflections on our three-day discussion.

Before signing off, I'd like to express gratitude to those who made this AgExchange possible:



I'd like to thank BIFAD members for their insights and for their role in facilitating several sessions: Pamela Anderson, Cary Fowler, and Gebisa Ejeta.

I also give special thanks to Ann Bartuska, Acting Chief Scientist and Under Secretary, Research, Education, and Economics Mission Area for USDA, Saharah Moon Chapotin, Deputy Assistant Administrator in USAID's Bureau for Food Security, and Rob Bertram, Chief Scientist in USAID's Bureau for Food Security, for their remarks.

Any major undertaking such as this requires a substantial number of individuals with a wide-reaching set of skills and expertise. I'd like to acknowledge this amazing team, which included key U.S. Government partners and the wider global food security community: USDA, USAID headquarters and field Mission staff, research implementing partners, civil society, and U.S. universities.

Thank you for your dedication in leading and planning the event, drafting papers, delivering presentations, and keeping us focused on the task at hand: how research investments can best support the U.S. Government's Global Food Security Strategy (GFSS).

We are very grateful to the following for their support to the AgExchange: Sally Abbott, Adam Ahmed, Meghan Anson, Sabrina Ayoub, Jessica Bagdonis, Cynthia Baldwin, Zachary Baquet, Lily Bork, John Bowman, Carla Castro, Clara Cohen, Greg Collins, Kelley Cormier, Genevieve Croft, Jen Cupp, Katherine Dennison, Cara Eisel, Sheila Fleischhacker, Kristin Franklin, Jerry Glover, Raquel Gomes, Otto Gonzalez, Elaine Gray, Elaine Grings, Lexine Hansen, Arie Havelaar, Aaron Hawkins, Eileen Herrera, Lyda Hok, Michelle Jennings, Ahmed Kablan, Tyrell Kahan, Nora Lapitan, Carell Laurent, Sang Lee, Sarah Leonard, Carole Levin, Vern Long, Julie MacCartee, Will Masters, Jami Montgomery, Katie Morgan, Robert Mwadime, Tracy Powell, Carl Pray, Justin Prud'homme, Angela Records, Manny Reyes, Sheila Roquitte, Max Rothschild, Camilien Saint Cyr, Lynn Schneider, Adam Schrecengost, Patrick Smith, Paul Tanger, Faith Bartz Tarr, Vuthy Theng, April Thompson, Peter Thorne, Charlie Turner, Eric Witte, Jennifer Woodward-Greene, and everyone else who contributed to the event's success!

**Brady Deaton wrote:**

Dorcus Gemenet raises critical issues of funding. Greater collaboration is needed between CGIAR and University researchers, when the funding is very tight. Effective collaboration requires close interaction that is resource intensive. I see so much good research in universities that is not being undertaken with knowledge of CGIAR partners or USAID. It is largely outside the Innovation Labs as well, even though all the above should be standard fare. But being standard fare takes time and effort that we have so little of with such restricted funding. This places an even greater burden on everyone to go the extra mile, and to be strategic, but that takes time and resources. It is no one's fault. Funding is so limiting these days, with budget restrictions continuing to hamper collaboration! New thinking is needed to be more strategic and efficient, but let us not kid ourselves that we have the resources to keep doing what we are doing. Fortunately, there is still much important basic research, and even applied work in the genomic area, on climate issues especially, that needs to be enhanced and shared. We can probably say that about so many important areas. USAID faces an enormous challenge that will take a real sense of mission and whole of government commitment to be strategic. Some unselfish, public spirited leadership will go a long way to help out. We may need to explore new ways of collaborating-a multiple pathway effort. Partnerships always require a two way process. It does not help to simply require fund transfers for one partner to another. That is simply reallocation. The outcomes are markedly different. Effective peer collaboration and joint reviews of research methods, data quality and reliability, and publications of results, are all steps that can help. The linkage

into the program implementation process in target countries also needs attention and will require management resources, as has been pointed out several times over the past three days.

Thanks again to all participants.

Appendix 4. List of reports provided to AgExchange participants.

- [Feed The Future: Global Food Security Research Strategy, May 2011](#)
- [U.S. Government Global Food Security Strategy FY 2017-2021](#)
- [Impacts of Agricultural Research on Poverty, Malnutrition and Resilience](#)
- [Resilience at USAID 2016 Progress Report](#)
- [U.S. Government Global Nutrition Coordination Plan 2016-2021](#)
- [USAID Multi-Sectoral Nutrition Strategy 2014-2025](#)
- [Framing Paper: Research Agenda on Resilience](#)
- [Framing Paper: Research on Inclusive and Sustainable Agriculture-led Economic Growth](#)
- [Framing Paper: Research on Nutrition](#)
- [Framing Paper: Criteria for Focusing Research Investments](#)