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Round-Table on Opportunities for New Public-Private Collaborations on the Modeling of Sustainable Nutrition Security

Hosted by International Life Sciences Institute Research Foundation (ILSI-RF)
Center for Integrated Modeling of Sustainable Agriculture and Nutrition Security (CIMSANS)

Dublin, Ireland
10 April 2013

Meeting Summary

The round-table had been planned over a series of several months by a small committee: Dave Gustafson (Director, CIMSANS), Jerry Nelson (International Food Policy Research Institute, IFPRI), Jim Jones (University of Florida), Adam Drewnowski (University of Washington), and Jerry Hatfield (USDA/ARS). The meeting format began with a series of presentations by public and private sector scientists, each sharing their perspectives on the definition of "sustainable nutrition security" and how climate change, resource scarcity (especially water), and other sustainability concerns will present an increasing challenge for overall crop productivity and genetic gain to meet global nutrition demand, including such factors as micro-nutrients. After these presentations, the group entered into a round-table brain-storming format to identify new public-private collaboration opportunities, broadly targeted to fall into the following theme areas, all previously identified by CIMSANS as areas of focus.

> Data: The private sector has large data sets that are highly relevant, and which could be made available to the public, with appropriate processing to remove business-confidential aspects.
>
> Models: Individual component models require improvement (cf. new collaborative efforts underway at "AgMIP" – the "Agricultural Model Intercomparison & Improvement Project").
>
> Sustainable Nutrition Security Assessments: The key assumptions and scenarios used in integrated modeling assessments of sustainable nutrition security would benefit from review by a multi-disciplinary suite of public and private sector scientists.
>
> Collaborative Adaptation Responses: The imperatives suggested by these assessments (such as shortfalls in certain macro- or micro-nutrients) will likely require major new collaborative adaptation responses: such as reformulation of foods, planting of alternate crops, investments in new irrigation infrastructure, etc.

This document is not intended to summarize the presentations in detail or to provide a complete re-cap of the entire round-table discussion. Instead, it provides a brief synopsis of the presentations and then identifies the particular areas of new collaborative work that seemed to receive the most support during the discussions. The document concludes with proposed next steps.

The agenda for the day is included as Appendix 1 and the list of attendees (about 40) is included as Appendix 2. All of the presenters' slide presentations have been posted (as PDF's) to the CIMSANS portion of the ILSI Research Foundation web-site. An additional set of slides is posted there, which were given as reviewer comments by Dave Gustafson at the Food Security Futures Conference on April 12.

Issued May 5, 2013

Synopsis of Presentations

Introductory comments were provided by Jerry Hjelle (President, ILSI) and Mark Rosegrant (IFPRI). Mark serves as Chair for the CIMSANS Science Advisory Council.

Dave Gustafson, Jim Jones, Jerry Nelson: Dave gave an introduction to the ILSI Research Foundation and the vision for CIMSANS; Jim provided a summary of AgMIP (the Agricultural Model Intercomparison and Improvement Project); and Jerry described the work of the AgMIP global economic model comparison team, which just completed Phase 1 of its work.

Adam Drewnowski (U Washington): Adam paraphrased the FAO definition of "sustainable diets" as follows: nutritionally adequate, economically affordable, culturally acceptable, accessible, healthy and safe. He then asked a series of provocative questions: Are healthy diets too expensive? Are healthy diets environmentally friendly? Are healthy diets sustainable? In most cases there are major trade-offs between nutrition, cost, and environmental impacts. Adam also briefly introduced a number of European initiatives in these areas.

Terri Raney (FAO): Terri surveyed a number of her FAO colleagues with the following open-ended question: What are the most important policy questions facing FAO at the nexus between environmental/social/economic sustainability and food security/nutrition? She received a number of interesting responses, which again highlighted the tradeoffs between environmental sustainability and nutrition. As for the rationale for more public-private collaboration in this area, she noted that the private sector should have capacity/data on the food system/trade and the public sector on production systems.

John McDermott (CGIAR): John highlighted childhood malnutrition as the most important challenge to sustainable nutrition security, with multiple harmful impacts: chronic illness, cognitive losses, obesity, and early mortality. He noted that improvements in agricultural production systems are necessary, but not alone sufficient to address these challenges – the entire nutrition delivery system must be addressed. He identified a number of nutrition research gaps that lie primarily in the social sciences, especially economics.

Gabriel Masset (Aix-Marseille Université): Gabriel gave a data-laden talk looking at the various relationships between diet, nutrition, health status, and various environmental metrics of diet sustainability (GHG's, water footprint, etc.). Linear programming is being used to look at ways to optimize diets for both nutrition and sustainability.

Food Companies – Tara Acharya (Pepsi Co), Mike Knowles (Coca Cola), Anne Roulin (Nestlé), & Drew Lein (General Mills): The food company scientists unanimously acknowledged the serious challenges to meeting consumer demand for more sustainable and more nutritious foods. Each gave specific examples of initiatives they already have undertaken in the area of sustainable nutrition security. Some common themes that emerged were the need to look at soil health, the use of water, more healthful foods, reduction of waste, and the overall environmental impacts of alternative supply chains. A number of collaborative efforts have already been launched by the private sector on agricultural sustainability topics, including: Field to Market, RISE, SAI, and the World Food LCA Database.

Cathy Lasser (IBM): Cathy described IBM capabilities on data and modeling that could be applied to the topic of quantifying the impacts of climate change and resource scarcity on sustainable nutrition

security. She highlighted specific examples of work that are particularly relevant to this topic: precision agriculture, mobile apps for farmers, genomics, etc. She emphasized the need to collect large quantities of data and then allow the data to "speak for itself" in order to help better inform the efforts to respond to the sustainable nutrition security challenge.

Frank Ewert (U Bonn): Frank is a lead researcher on MACSUR, an EC project with goals that significantly overlap with those of both AgMIP and CIMSANS. Along with the other environmental challenges previously mentioned, Frank highlighted ozone as a significant threat to important staple crops, especially wheat and soybeans. He indicated that current integrated modeling approaches haven't really addressed nutrition security, *per se*, with the need for more data and new models to directly address such factors as micro-nutrients, for instance.

Jason Jorgenson (U Reading): Jason is also involved with MACSUR, primarily on the IT side of things. He gave good insight on the challenges associated with the wide range of data that are needed to run the various integrated modeling tools, and on the solutions they have chosen (for example, the use of cloud-based data storage).

Potential Areas of New Private-Public Collaboration

As the group entered into its discussion of specific potential new areas of collaboration, Jerry Hjelle challenged all to answer the following closely-related questions:

> *Why don't we have the resources we need? Why can't we communicate the true significance of the problem? Why is the magnitude of the effort we see as being needed being missed by so many people?*

A number of answers and responses were prompted by Jerry's questions:

- Malnutrition problem globally – under-nutrition and micro-nutrient deficiency, but we don't really know how big it is, costs to society, real progress being made, but hard to quantify due to lack of data
- Extremely complex issues, and what we think we know is based on very thin evidence
- What should we do? Map out diet quality deficits, globally help understand what co-investments are needed, target low-input agrarian countries, vs. south Asia, socio-economic issues, food is necessary but not sufficient
- Clear communication, "improve diet quality"
- Issue of sustainability is not well-understood, lack of general understanding that there really is a problem – "the store shelves are full, so what's the problem" then you add "nutrition security" then it gets to be tremendously too complex
- There has been quite a response to climate change, but not so much to date on food security – can "we" learn something from the climate change community on communications
- Nobody questions that we have a problem feeding the world, especially the developing world – sustainability to the developing world seems almost irrelevant – in the developed world the word "sustainability" is misused.
- Improper balance of resources developing vs. developed world?

Following this brief response to Jerry's questions, the group then brain-stormed a number of ideas for potential collaboration. These idea/topics have been grouped below into the four areas of focus for CIMSANS (not prioritized yet – that is among the proposed next steps):

Data:

- Broaden participation in the World Food LCA Database
- Need data on the relationship between consumer behavior and nutrition
- Crowd-sourcing consumer behavior through QR codes or other new tools
- Need data on waste in the value chain
- Multiple databases and no shared terminology (ontology issue)
- Open Data policy should be enforced broadly in this area of work
- Data Sharing: Collection, curation, sharing of data (e.g. soils data)
- Data on farm-level yields and costs of production globally, infrastructure to analyze farmer behavior, invest in data-generation
- Micro-nutrient deficiency data quality is poor, but life expectancy is growing rapidly in the developing world – conundrum, what can we do to improve the quality of the data, which data, how do we prioritize, data are public goods
- Not investing enough on data curation, access – same is true on the knowledge side, e.g. where crops could be grown
- Micro-nutrients: Fortification? How do we tweak the ag and food world to meet demand?
- Back-end infrastructure investments needed to support a community where all information is available and reliable
- Reliable systems for collecting data need to be restored, USAID has renewed investment, but important for other voices to be pressing for national-level data collection
- Genetic mapping of additional "orphan" crops
- Data on Dietary Intakes: Only half of the EU countries have good data – lack of reliable comparable data on dietary consumption in many countries of the world, even in much of Europe, some MS have some data going way back (at the national scale)
- Data inventory, where are the gaps?
- Need databases, minimum standards for data collection, need data collection systems – not just data
- Development, curation, and delivery of real-time data & expertise

Models:

- Model ownership issues – spectrum from single-user models to ubiquitous (Microsoft Excel)
- Identify specific questions we have for which models can help provide solutions
- Models for "under-served" crops, livestock, and other foods: cassava, chickpea, millet, fruits-veggies, fish, goats, etc.
- Better models for how market forces influence consumer choices, land-use change, etc. – rather than only natural resource type models
- Knowledge exchange on data/models/information
- Need to add "real" nutrition modelers and look at "real" diets, not just the key staple crops
- Extreme events – Correlated globally? Will climate change affect this?
- Evaluate back-casting skill of integrated models over the past 20 years
- Improved models for how climate will impact food pests and disease

Sustainable Nutrition Security Assessments:

- Integrated modeling requires cross-sectoral inter-personal interactions, in addition to all of the data and modeling needs (issues of trust and sharing must be addressed)
- Scenarios: Design plausible scenarios for technology, demand, etc. to be used in assessments
- Need a method for quantifying "sustainable nutrition security"
- Missing link? – foods vs. commodities, important for linking to nutrition
- Comprehensive Life Cycle Analysis of overall nutrition delivery systems

Collaborative Adaptation Responses:

- Product reformulation (retain "pleasure" while boosting nutrition and sustainability)
- Identify new crop varieties or cropping areas based on the impact of climate change and/or other sustainability concerns
- Increase consumer demand for more nutritious foods
- Regulation: "Smart" regulation of GHG's, water, etc. in the agricultural sector
- How do we establish a diet that is both nutritionally and environmentally diet – how do we get people to buy it? Is it advertising? Or does it just have to taste good? How do you get farmers to grow the right thing?
- Producing 40% more food than we consume, need to address food waste – different for different countries
- Water quality, gender issues, nutrition security is more than just key staple foods
- Human dimension: India, most stunted youth, emerging obesity, Why? Add cost of disease burden to total costs of food?
- True cost of food, health outcome costs, environmental costs, "externalities" should be included
- Physical activity and life-style – wealth brings cars, which can counteract benefits of improved food availability
- Soil health – key to building climate resilience and more nutritious crops
- Water management – infrastructure & stop unsustainable "mining" of water
- Protected food production – extreme adaptation imperative for some

Near the end of the discussion, Dave G put up a summary slide (the text of which is shown below), He had prepared this slide as part of his prepared comments as a report reviewer to the Food Security Futures conference (delivered to the conference on April 12). The slide also provides a vision for the overall strategy of how CIMSANS will address the sustainable nutrition security issue:

Overall Strategy

- Assemble data and modeling skill sufficient to develop credible sustainable nutrition security assessments for key staple foods
- Develop plausible future scenarios identifying the countries and vulnerable sub-populations whose sustainable nutrition security is most at risk due to climate change, resource scarcity, etc.
- Design and implement prioritized adaptation strategies to help those countries predicted to have the greatest challenges in fulfilling their nutrition security needs in a sustainable manner
- Deploy rigorous monitoring & evaluation processes to check forecast accuracies, and to detect sustainability concerns & nutrition security threats in real-time
- All data and knowledge generated under this strategy should be curated and delivered to all relevant stakeholders – and used to continuously refine the assessments and actions

Proposed Immediate Next Steps

- CIMSANS to prepare a White Paper describing a shared vision for what would constitute a "comprehensive and credible global sustainable nutrition security assessment," highlighting the current gaps in preventing the assembling of such an assessment
- CIMSANS to launch and conduct interim Pilot Studies (limited by geography, time-scale, number of crops, etc.) to develop a better understanding of the total time and resources that will be required in order to complete the first comprehensive global assessment
- CIMSANS to continue to solicit the involvement of additional volunteers from among round-table meeting participants and the broader integrated modeling community to join in the execution of the above next steps
- CIMSANS Data Committee, already launched, will continue to meet monthly, generally by phone (see reference to in-person May 14 meeting below)
- CIMSANS representatives meet in Washington DC during the week of October 7 to review status of the White Paper and the Pilot Studies

Upcoming Meetings

- G-8 Conference on "Open Data for Agriculture" (Washington DC, April 29-30, 2013)
- Data Committee meeting to review GEOSHARE proposal (Washington DC, May 14, 2013)
- UNGC GEOGLAM Symposium (Tällberg, Sweden, June 11-13, 2013), co-sponsored by CIMSANS and the World Bank
- CIMSANS collaboration with ILSI-Korea on a "Climate Change & Food Security" Mini-Symposium (Kintex, Korea, September 11-13, 2013)
- First International Conference on Global Food Security (Noordwijkerhout, The Netherlands, September 30 – October 2, 2013)
- CIMSANS Science Advisory Council (Washington DC, October 7-8, 2013)
  ILSI Research Foundation Science Conference (Washington DC, October 9-10, 2013)
  Review status of White Paper and Pilot Studies that same week
- CIMSANS collaboration with ILSI-India on "Climate Change & Food Security" Symposium, tentatively scheduled for November 2013

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Appendix 1.

AGENDA: CIMSANS Round Table on Opportunities for New Public-Private Collaborations on Modeling of Sustainable Nutrition Security

Wednesday, 10 April 2013
Location: Elm & Oak Suite, Ballsbridge Hotel (Dublin)
The Center for Integrated Modeling of Sustainable Agriculture and Nutrition Security (CIMSANS) was recently established by the ILSI Research Foundation[1] to foster broad public/private collaboration in the development and application of sound science to the integrated modeling, as applied to the critical problem of meeting global nutrition needs in a sustainable manner, given the constraints of climate change, dwindling natural resources, and increasing food demand. The purpose of this round-table is to identify new collaboration opportunities specific to the **modeling of sustainable nutrition security**. CIMSANS intentionally focuses upon "nutrition security" – not just food security – this is meant to include consideration of caloric and micro-nutrient imbalances, and not only macro-nutrient availability.

Time	Title	Presenters
0900	**Welcome and Charge to the Group**	*Jerry Hjelle (President, ILSI)* *Mark Rosegrant (IFPRI & Chair of the CIMSANS Science Advisory Council)*
0910	**Introductions:** CIMSANS overview, challenges of modeling overall crop productivity and genetic gain in the face of climate change and water availability	*Dave Gustafson (ILSI-RF CIMSANS)* *Jerry Nelson (IFPRI)* *Jim Jones (U Florida)*
0930	**Sustainable Nutrition Security:** **Public Sector Perspectives** Moderator: Adam Drewnowski (*U Washington*)	*Terri Raney (FAO)* *John McDermott (CGIAR)* *Gabriel Masset (Aix-Marseille Université)*
1100	Break	
1115	**Sustainable Nutrition Security:** **Private Sector Perspectives** Moderator: Dave Gustafson (*ILSI-RF CIMSANS*)	*Tara Acharya (Pepsi Co)* *Mike Knowles (Coca Cola)* *Anne Roulin (Nestlé)* *Drew Lein (General Mills)*
1245	Lunch	
1330	**New Data and Modeling Needs for Quantitative Assessment of Sustainable Nutrition Security** Co-moderators: Jim Jones (*U Florida*) & Jerry Nelson (IFPRI)	*Cathy Lasser (IBM)* *Frank Ewert (MACSUR)* *Jason Jorgenson (MACSUR)*
1500	Break	
1515	**Brainstorming** on New Public-Private Collaborations	*All*
1645	**Summation and next steps**	*Dave Gustafson* *Mark Rosegrant*
1700	Adjourn	

[1] http://www.ilsi.org/ResearchFoundation/Pages/CIMSANS.aspx

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Appendix 2. List of Attendees

Tara Acharya (PespiCo)
Martin Banse (MACSUR)
Jacques Delince (JRC)
Patrick Denzel (Nestlé)
Nancy DeVore (Bunge)
Adam Drewnowski (U Washington)
Frank Ewert (U Bonn)
Mbene Faye (CORAF)
Tracy Gerstle (CLI)
Dave Gustafson (ILSI-RF)
Klauss Hammel (Bayer)
Paul Hendley (Phasera)
Jerry Hjelle (Monsanto)
Julie Howard (USAID)
John Ingram (Oxford U)
Sander Janssen (WUR)
Jim Jones (U Florida)
Jason Jorgenson (U Reading)
Michael Knowles (Coca Cola)
Cathy Lasser (IBM)
Ronit LeCoutre (Nestlé)
Drew Lein (General Mills)
Hermann Lotze-Campen (U Potsdam)
Gabriel Masset (Aix-Marseille Université)
John McDermott (CGIAR)
Carolyn Mutter (Columbia U)
Jerry Nelson (IFPRI)
Cathal O'Donoghue (Teagasc)
Fina Opio (ASARECA)
Terri Raney (FAO)
Mark Rosegrant (IFPRI)
Anne Roulin (Nestlé)
John Ruff (IFT)
Jorg Spieldenner (Nestlé)
Jetse Stoorvogel (WUR)
Philip Thornton (ILRI)
Dominique van der Mensbrugghe (FAO)
Ghislaine Weder (Nestlé)
Stanley Wood (BMGF)
Yelto Zimmer (Agri Benchmark)