

**Knowledge Systems for Sustainable Landscape Management:  
Leveraging data assets, information technology and cyberinfrastructure in broad  
partnerships toward improved outcomes in human and environmental dimensions  
in the developing world**

12-13 June 2012

at

Suite 801 (Nile and Congo rooms)

U.S. Agency for International Development 1717 H St. NW, Washington, DC 20006

hosted by the International Food Policy Research Institute, the U.S. Agency for International Development, U.S. Department of Energy's Oak Ridge National Laboratory and the University of Wisconsin-Madison

*Meeting deliverables:* This meeting will review several large integrated "cases" that focus on the links between agriculture, natural resources and outcomes in human dimensions such as agricultural productivity, food and nutritional security, poverty and livelihoods. A key challenge shared by each of the selected cases focuses on the ability to access and link data, information and knowledge assets with appropriate analytical approaches that are geospatially and temporally explicit.

We will review the ongoing activities in these cases that tackle this challenge to determine the opportunity to bring together new partnerships and capabilities to advance our ability to share and analyze information about agriculture, food, natural resources, climate, infrastructure, health and socioeconomic status. We will test the concept that these cases can usefully be placed into a framework that will allow us to abstract more general insights from each specific set of activities. In the second day's breakout sessions, we will focus on the specific tasks needed for our partners to facilitate each case's commitments. Drawing on materials provided by each case ahead of the meeting and discussion at this meeting, we expect to establish specific commitments among partners and specific next steps in framework development.

The goal of the meeting is to promote the ability of several major projects to realize their specific goals with respect to mobilizing new categories of information assets and implementing more integrated ways of tracking outcomes and outputs and managing project-related data of a variety of types.

Special thanks to Dr. David LeZaks, Fatima Zaidi, Maria Theresa Tenorio and Kayla Williams for their help in organizing this meeting and IFPRI and ORNL for financial support.

June 12, 2012

Time	Activity	Lead
0830-0900	Continental breakfast	Hosted by IFPRI
0900-0930	<p><b>Welcome from our host</b></p> <p><b>Overview: history of the KSS initiative, meeting structure, and proposed goals</b></p> <p><b>Review of agenda, deliverables, and objectives</b>            (1) review specific cases in the KSS framework;            (2) determine what can be done to tackle data/information/knowledge/analysis/decision-making challenges through partnerships;            (3) define specific tasks/commitments for partnerships.            (4) determine how to clarify the connections of each case to the framework and goals of the KSS</p>	<p>Jerry Glover</p> <p>Molly Jahn &amp; Stan Wood</p> <p>Christine Negra</p>
0930-1000	<b>Introductions of meeting attendees and organizations</b> (Name, affiliation and organizational objective for the meeting (e.g., learn about projects, communicate potential contribution, gain partners)	All
1000-1015	<p><b>Introduction to the proposed conceptual and operational framework for this meeting: An integrated knowledge system for sustainability</b></p> <p>Introduction of KSS leads: Chris Duffy (<a href="#">PSU</a>) (data &amp; information), Tony Janetos (<a href="#">DOE PNNL</a>) (modeling), Deb Niemeier (<a href="#">UC Davis</a>) (decision sciences and case structure), ‘Pic’ Bob Piccerillo (<a href="#">ODNI MACE</a>) user-defined operations &amp; learning knowledge systems</p>	Molly Jahn & Tom Richard
1015-1045	<p><b>Introduction to DOE Oak Ridge National Lab’s role in KSS; <a href="#">DOE ORNL</a>, PNNL and the Environment by Design Initiative;</b>            allied US Government capacities—  <b>NSF and Relevant Cyberinfrastructure for Sustainability</b>  <b>NASA and <a href="#">GEO GLAM</a></b>  <b>Smithsonian Institution and <a href="#">US GEO</a></b></p>	<p>Gary Jacobs &amp; USG colleagues</p> <p>C. Maitland</p> <p>Brad Doorn</p> <p>Len Hirsch</p>
1045-1100	Break	
1100-1115	<b>Adaptive approaches to monitoring and evaluation (M&amp;E) in large projects; Overview of the <a href="#">CGIAR’s</a> interest in rationalizing and modernizing its relationship to project data and geospatially explicit data resources for environmental, agricultural, economic and human dimensions</b>	Stanley Wood
1115-1130	<p><b>The role of "Cases" i.e., geographically explicit tests of this approach</b></p> <p><b>Review of a proposed “Case Framework” Document</b></p>	Deb Niemeier

Time	Activity	Lead
1130 - 1145	<p><b>Overview of 4 key cases for this meeting and introduction of teams</b></p> <ul style="list-style-type: none"> <li>• U.S. State Department’s studies on Bangladesh &amp; Afghanistan</li> <li>• <a href="#">Cereal Systems Initiative for South Asia (CIMMYT, IFPRI, IRRI, ILRI)</a></li> <li>• <a href="#">McGill World Platform for Health and Economic Convergence</a>; World Bank/Booz Allen Hamilton/IFPRI nutrition/agriculture</li> <li>• <a href="#">Africa Rising</a>/USAID</li> </ul>	Molly Jahn
1145-1245	<p><b>Discussion of Cases</b></p> <p><b>Case 1: US State Department: Rise of extremism in Bangladesh and Afghanistan</b></p> <p>Working in a geospatially explicit framework, this team highlights linkages between social, biophysical and economic dimensions and illustrates sophisticated approaches to social media, sharing information assets among trusted partners and generic analytics.</p>	Emily Goldman, Bob ‘Pic’ Piccerillo, Amy Dalton & Jim Wickman
1245-1330	<p>Lunch hosted by IFPRI</p> <p><b>Briefing: <a href="#">U.K. Natural Environment Research Council</a> &amp; The <a href="#">UK’s Environmental Virtual Observatory</a></b></p> <p>Australia’s <a href="#">CSIRO flagships</a> and <a href="#">The National Plan for Environmental Information</a></p>	Andrew Impey  Bronwyn Harch
1330-1430	<p><b>Case 2: <a href="#">The Cereal Systems Initiative for South Asia (CSISA): Challenges in data &amp; information management, metrics and analytics</a></b></p> <p>CSISA was established in 2009 as a platform to support regional and national efforts on improving cereal production growth in South Asia’s most important grain baskets, and is beginning a Phase 2 with a commitment to emphasis on data management and integrated impacts at scale. Operating in rural hubs in Bangladesh, India, Nepal, and Pakistan, CSISA involves 4 CG centers and &gt;300 public, civil society, and private sector partners in the development and dissemination of: improved cropping systems; resource-conserving management technologies; new rice, wheat and maize varieties; livestock feed supply chains; aquaculture systems; improved policies; and public-private delivery systems.</p>	David Spielman, Andy McDonald & Kevin Pixley

Time	Activity	Lead
1430-1530	<p><b>Case 3: <a href="#">The Whole-of-Society Knowledge Architecture and Modeling Platform for Real-Time Monitoring of Food, Nutrition, and Health Across the Development Continuum</a> (McGill U &amp; partners)</b></p> <p>This initiative examines the full development spectrum, ranging from subsistence agriculture communities still struggling against hunger and nutritional deficiency as the rate of obesity and diabetes starts to rise (India, Palwal State), to industrialized societies that are making major investment in whole-of-society transformation to prevent and control overnutrition and its obesity and non communicable diseases (NCDs) consequences (Canada, Quebec; Australia; South-East Region). The overarching goal is to characterize the many shades of biological, environmental and behavioral risk, vulnerability and resilience to hunger, undernutrition, overnutrition, obesity/NCDs and the responsiveness to whole-of-society transformation occurring at both ends of the development continuum, in order to point to paths of convergence for more effective transition. The aim is to work in near real time, on multiple scales with high geographic resolution, combining statistical, mathematical and computational models in order to accelerate effective and integrated knowledge co-creation and translation into policy, innovation and decision making by all actors in society. Links are made with related efforts deployed by World Bank in Bangladesh and India.</p>	Laurette Dube, David Buckridge, Jeroen Strueben. and Paul Thomassin; John Newman
1530-1545	<b>Break</b>	
1545-1645	<p><b>Case 4: <a href="#">Africa Rising</a></b></p> <p>Africa RISING is a CGIAR-managed research program focused on sustainable intensification of farming systems in the Guinea Savannah zone of West Africa, the Ethiopian Highlands, and the maize-mixed production region of Tanzania, Malawi, and Zambia. The program focuses on demand-driven research at the household scale and assesses intervention impacts at the field, farm, community, and landscape scales. Designed to address country-identified priorities, the program's purpose is to provide pathways out of poverty and hunger for smallholder farmers through increased crop &amp; livestock productivity and improved natural resource management.</p>	Stanley Wood and Jerry Glover
1645-1715	<b>Discussion, Reactions, Synthesis</b>	C Negra
1715-1730	<b>Review of a proposed operational framework to standardize tracking of cases and Discussion</b>	Henry Neufeldt
1730-1930	Reception hosted by IFPRI	

Wednesday, June 13, 2012

Time	Activity	Lead
0800-0830	Breakfast - Hosted by IFPRI	
0830-0845	<b>Check in</b> <b>Charges for the day in light of meeting objectives</b>	Christine Negra
0845-0930	<p><b>Evaluation of the “case” concept within a knowledge system framework.</b></p> <p><b>What are the obvious global data holdings relevant to these cases? How can we make specific linkages to mobilize data assets into the cases in a standardized way?</b></p> <ul style="list-style-type: none"> <li>- <a href="#">DOE ORNL (NASA, NOAA)</a> + <a href="#">DOE PNNL</a></li> <li>- <a href="#">NASA</a> + international partners + <a href="#">GEO GLAM</a></li> <li>- Can we generalize from Australia’s example e.g., water?</li> <li>- <a href="#">Geoshare</a> and <a href="#">HubZero</a></li> <li>- <a href="#">IFPRI</a>, <a href="#">CIMMYT</a>, <a href="#">CRP2</a> &amp; <a href="#">CCAFS</a> &amp; the <a href="#">CGIAR Consortium</a></li> </ul> <p><b>How can these cases allow us to advance the concept of a community of trusted partners focused on information sharing for improved human and environmental outcomes through agricultural interventions?</b></p>	Christine Negra  G Jacobs B Doorn B Harch N Villoria S Wood
0930-0945	<b>Break:</b> Move to breakout groups to focus on building an action plan and committed partners for each of the selected cases	
0945-1100	<p>Break out groups for projects selected to advance: <b>Compile action lists and specific commitments either in hand or necessary to move forward;</b> <b>Identification of project leads and KSS liaisons</b></p> <p><b>BREAK OUT GROUPS</b></p> <ol style="list-style-type: none"> <li>1. Cereal Systems Initiative for South Asia</li> <li>2. McGill World Platform for Convergence of Health and Economics</li> <li>3. Africa Rising</li> <li>4. Borlaug Institute for South Asia (a proposed research institute that could be designed to reflect concepts under discussion in this meeting hosted by CIMMYT in India)</li> </ol>	Christine Negra  Spielman & McDonald Dube et al. Glover & Wood Pixley et al.
1100-1200	<b>Report from Breakout Groups</b> <b>Conclusions from Breakout Groups-Moving forward on specific cases within a unified framework; relationship of the CG and ORNL to that framework</b>	Christine Negra, Stan Wood, and Molly Jahn

1200-1300	Lunch (Hosted by IFPRI): Review of meeting progress & action items	
1300-1330	<p><b>Meeting conclusions:</b> Finalize commitments within each partnership</p> <p>Solidify roles of anchoring partners with capacities of general significance</p> <p>Define next steps for development of the KSS case framework</p> <p>Next meetings within partnerships</p> <p>Next meetings across these cases; the role of the CGIAR going forward</p>	Christine Negra
1330	<b>Meeting Adjourns</b> with thanks to our sponsors!	
1400-1600	Optional meeting focused on “Roadmap 4” focused on knowledge systems for McGill Group’s <a href="#">New Delhi Workshop June 22-24, 2012</a>	

*Background:* Natural resources and food security are priorities of paramount importance in the 21<sup>st</sup> century. In every region on Earth, we face obvious, urgent and inter-connected challenges of meeting both immediate and longer term human demands for food, water and energy in the face of resource limitation, environmental degradation, and extreme weather. In this era where human activities dominate the condition of our planet and its natural resources, many of our fundamental activities such as agriculture are still managed in fundamentally extractive modes. In the face of mounting evidence that these practices can lead to resource, economic and political instability, insufficiency and detrimental impacts on human health and wellbeing, the imperative to shift our decisions to reflect more holistic perspectives that allow us to meet human demands within long term balance with the natural resource base is now inescapably clear. The risks of failure to manage our planet’s finite and dwindling resources, whether apparent as conflict, famine, poverty, and/or the rise of extremism are also now increasingly clear to governments and business, yet systematic approaches to bringing our trajectories into alignment with long term “safe operating space” are not generally recognized.

This high-level working meeting will draw together in a structured 2 day meeting with specified deliverables selected key leaders from

- the international agricultural research and development community
- the global science and engineering communities focused on the nexus of food, water and energy, and
- information sciences.

Recognizing the need to improve our ability to better manage linkages amongst human welfare, the state of natural resources, political and economic stability, and long-term economic prosperity, the meeting will explore the potential to leverage massive investments being made across these disparate domains in the form of 4 key cases toward achieving large-scale and accelerated positive outcomes in the human condition, particularly for the world’s most vulnerable people.

Cereal Systems Initiative for South Asia  
The Borlaug Institute for South Asia (proposed)  
The McGill World Platform for Health and Economic Convergence  
U.S. State Department’s study on extremism and food security in Bangladesh and Afghanistan  
Africa Rising/USAID

One specific goal for this meeting is to explore the possibility to identify a team of partners who might come together with the CGIAR Consortium, its Centers and Research Programs to grapple with questions of limited access to, as well as limited capacity to manage and render interoperable, a sufficient spectrum and frequency of critical and sensitive data elements needed to achieve its research goals of addressing global food security and poverty reduction.

This meeting builds on a partnership that has developed a proposed framework for a modern knowledge system (Knowledge Systems for Sustainable Landscape Management, KSS) that would better mobilize existing investments in data, information and knowledge, modeling and meta-modeling infrastructure and decision sciences. In this framework, we resolve 4 dimensions of a modern knowledge system necessary but not sufficient for more sustainable management of agriculture and food systems for improved human outcomes: User-defined interfaces, Decision Sciences, Modeling and meta-modeling infrastructure and capacities to curate, annotate, align and parametrize models and model ensembles and data, information and knowledge assets. A further goal of this meeting is to set into action within a clearly specified framework a series of projects that collectively can deliver proof of concept that include the cases we will consider in detail above, leading to recommendations for the organizations in attendance and others at local, national, regional and global levels.

In summary, there is broad interest in exploring the feasibility of specific approaches that would facilitate the mobilization of descriptive data regarding the Earth system, data regarding the use of ecosystems to meet human demands, and data regarding the human condition via data standardization approaches that facilitate data sharing and aggregation and that allow checks of data quality, as well as analytical approaches that generate testable predictions or scenarios. Toward this end, we will highlight throughout the meeting specific technical strategies used to integrate data relevant to these questions, and layer data, information and knowledge assets into existing frameworks to leverage analytics and allow better elucidation of interactions across dimensions that are not obvious *a priori*. The critical gaps in existing data and data management infrastructure will also be enumerated and prioritized by meeting attendees as the basis for a global call to action.

### **Supporting documents to be provided:**

List of invitees with contact information

Bios of meeting attendees

Briefings for each of the 4 anchor cases to be considered

Case Framework that will allow us to align cases as mutually informative elements in a portfolio

Lexicon of acronyms

Partnership Principles of the KSS

## Lexicon of Acronyms

Acronym	Name	Website
AgMIP	The Agricultural Model Intercomparison and Improvement Project	<a href="http://www.agmip.org/">http://www.agmip.org/</a>
Agree	-	<a href="http://www.foodandagpolicy.org/">http://www.foodandagpolicy.org/</a>
BFS	USAID Bureau for Food Security	-
BISA	The Borlaug Institute for South Asia	<a href="http://tinyurl.com/cx6xdmy">http://tinyurl.com/cx6xdmy</a>
CBW	The Chesapeake Bay Watershed	
CCAFS	Climate Change, Agriculture and Food Security (CGIAR research program)	<a href="http://ccafs.cgiar.org/">http://ccafs.cgiar.org/</a>
CGIAR / CG	originally the Consultative Group on International Agricultural Research, now the Consortium of International Agricultural Research Centers	<a href="http://www.cgiar.org/">http://www.cgiar.org/</a>
CIMMYT	International Maize and Wheat Improvement Center	<a href="http://www.cimmyt.org/">http://www.cimmyt.org/</a>
CIMMYT	Centro Internacional de Mejoramiento de Maíz y Trigo (CGIAR center)	<a href="http://www.cimmyt.org/">http://www.cimmyt.org/</a>
CRP	CGIAR Research Programs	<a href="http://www.cgiarfund.org/cgiarfund/research_portfolio">http://www.cgiarfund.org/cgiarfund/research_portfolio</a>
CSIRO	Commonwealth Scientific and Industrial Research Organisation (Australia)	<a href="http://www.csiro.au/">http://www.csiro.au/</a>
CSISA	Cereal System Initiative South Asia	<a href="https://sites.google.com/site/csisaportal/">https://sites.google.com/site/csisaportal/</a>
DoD	United States Department of Defense	<a href="http://www.defense.gov/">http://www.defense.gov/</a>
DOE	United States Department of Energy	<a href="http://energy.gov/">http://energy.gov/</a>
DOI	United States Department of the Interior	<a href="http://www.doi.gov">http://www.doi.gov</a>
EarthCube	-	<a href="http://earthcube.ning.com/">http://earthcube.ning.com/</a>
EVO	Environmental Virtual Observatory	<a href="http://www.evo-uk.org/">http://www.evo-uk.org/</a>
GEO	Group on Earth Observations	<a href="http://www.earthobservations.org/index.shtml">http://www.earthobservations.org/index.shtml</a>
GEO-GLAM	GEO Global Agriculture Monitoring initiative	-
Geoshare	-	<a href="http://www.geoshareproject.org/">http://www.geoshareproject.org/</a>
GEOSS	The Global Earth Observation System of Systems	<a href="http://www.earthobservations.org/geoss.shtml">http://www.earthobservations.org/geoss.shtml</a>
HubZero	-	<a href="http://hubzero.org/">http://hubzero.org/</a>
IC	Intelligence community	-
ICRAF	World Agroforestry Centre (CGIAR center)	<a href="http://www.worldagroforestrycentre.org/">http://www.worldagroforestrycentre.org/</a>
IFPRI	International Food Policy Research Institute	<a href="http://www.ifpri.org/">http://www.ifpri.org/</a>
ILRI	International Livestock Research Institute (CGIAR center)	<a href="http://www.ilri.org/">http://www.ilri.org/</a>
IRRI	International Rice Research Institute (CGIAR center)	<a href="http://irri.org/">http://irri.org/</a>
KAUST	King Abdullah University of Science and Technology	<a href="http://www.kaust.edu.sa/">http://www.kaust.edu.sa/</a>
M&E	Monitoring and evaluation	-
MACE	Multi Agency Collaboration Environment	<a href="http://www.macefusion.com/">http://www.macefusion.com/</a>
NASA	National Aeronautics and Space Administration (US)	<a href="http://www.nasa.gov/">http://www.nasa.gov/</a>
NCD	Non-communicable disease	-
NERC	Natural Environment Research Council (UK)	<a href="http://www.nerc.ac.uk">http://www.nerc.ac.uk</a>
NOAA	National Oceanic and Atmospheric Administration	<a href="http://www.noaa.gov/">http://www.noaa.gov/</a>



ODNI	Office of the Director of National Intelligence	<a href="http://www.dni.gov/">http://www.dni.gov/</a>
ORNL	Oak Ridge National Laboratory	<a href="http://www.ornl.gov/">http://www.ornl.gov/</a>
PNNL	Pacific Northwest National Laboratory	<a href="http://www.pnl.gov/">http://www.pnl.gov/</a>
PSU	The Pennsylvania State University	<a href="http://www.psu.edu/">http://www.psu.edu/</a>
USAID	United States Agency for International Development	<a href="http://www.usaid.gov/">http://www.usaid.gov/</a>
USDA	United States Department of Agriculture	<a href="http://www.usda.gov">http://www.usda.gov</a>
USGS	United States Geological Survey	<a href="http://www.usgs.gov/">http://www.usgs.gov/</a>
WB	The World Bank	<a href="http://www.worldbank.org/">http://www.worldbank.org/</a>
PM-ISE	Program Manager - Information Sharing Environment	<a href="http://ise.gov/">http://ise.gov/</a>

<b>CGIAR Research Centers</b>	
Africa Rice Center	
Bioversity International	
CIAT	Centro Internacional de Agricultura Tropical
CIFOR	Center for International Forestry Research
CIMMYT	Centro Internacional de Mejoramiento de Maiz y Trigo
CIP	Centro Internacional de la Papa
ICARDA	International Center for Agricultural Research in the Dry Areas
ICRISAT	International Crops Research Institute for the Semi Arid Tropics
IFPRI	International Food Policy Research Institute
IITA	International Institute of Tropical Agriculture
ILRI	International Livestock Research Institute
IRRI	International Rice Research Institute
IWMI	International Water Management Institute
ICRAF	World Agroforestry Centre
WorldFish Center	
<b>CGIAR Research Programs (CRPs)</b>	<a href="http://consortium.cgiar.org/our-strategic-research-framework/cgiar-research-programs-crps/">http://consortium.cgiar.org/our-strategic-research-framework/cgiar-research-programs-crps/</a>
<b>CRP1.1</b>	Dryland Systems
<b>CRP1.2</b>	Humid Tropics Systems
<b>CRP1.3</b>	Aquatic Agricultural Systems
<b>CRP2</b>	Policies, Institutions and Markets
<b>CRP3.1</b>	Wheat
<b>CRP3.2</b>	Maize
<b>CRP3.3</b>	Rice
<b>CRP3.4</b>	Roots, Tubers and Bananas
<b>CRP3.5</b>	Grain Legumes
<b>CRP3.6</b>	Dryland Cereals
<b>CRP3.7</b>	Livestock and Fish
<b>CRP4</b>	Nutrition and Health
<b>CRP5</b>	Water, Land and Ecosystems
<b>CRP6</b>	Forests, Trees and Agroforestry
<b>CRP7</b>	Climate Change, Agriculture and Food Security