Interim Report
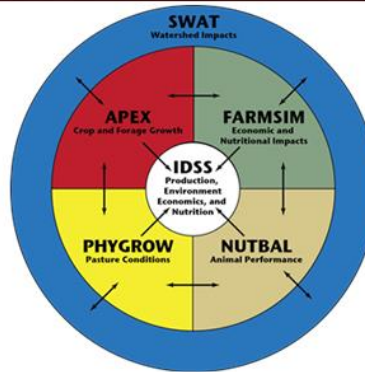**Pilot Study of the Global Decision Support System - Phase II**
Results of Presentations and Consultations
Integrated Decision Support System
Addis Ababa, Ethiopia
April 12-20, 2013

Summary of Results for Gates Foundation Pilot Study

A pilot study was conducted for an area in the highlands of Ethiopia to evaluate and demonstrate the utility of Integrative Decision Support System (IDSS) for the Gates Foundation and its developing country partners, in which the multiple impacts of several levels of faming system intensification were evaluated at the peasant association (kebele) and watershed levels. The studies were done for the Weg-Arba Amba and Shena kebeles and the Gumera and Rib River basins near the eastern shore of Lake Tana. Quantitative estimates of the increase in yields, cost of production, environmental consequences and five year probability of a range of economic results were provided for each of the scenarios. The impact of adoption rate on outcomes was also estimated. The results demonstrate the utility of the IDSS in quantitatively forecasting the differences in yields, economic and nutritional impacts, and environmental consequences of more intensive alternative farming technologies. The early results identify the further analysis that would be needed to take this study past the demonstration phase to an actual evaluation of outcomes.   The ability to model increased use of inputs and manage trade-offs to optimize these outcomes was also evident.

Scenarios Modeled

- **Current farming practices in two kebele in the Lake Tana Basin**

- **Enhanced by optimum fertilization and water**

- **Further enhanced by improved germplasm and cropping systems**

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The importance of variables such as policy, availability of capital, access to markets, and changes in social mores was clearly revealed and forms the basis for future studies building on this demonstration. The broader application of the IDSS in other countries is evident.

Results of Mission to Ethiopia

The Texas A&M mission to Ethiopia was undertaken to seek engagement and advice from national and international stakeholders relative to the validity, utility, and sustainability of the Integrated Decision Support System, the results of which were presented to the Gates Foundation leadership and staff in January 2013. Key issues included determining if there is a useful role for the IDSS in the development agendas of government agencies; exploring how the requisite input data for the IDSS might be obtained in Ethiopia and other developing countries, and to explore how the IDSS might be woven into the fabric of the agendas for planning and implementation of technology and policy to achieve the goals of Ethiopia's Agricultural Growth Plan and thereby help ensure its longer term sustainability.

Senior administrators and experts from the Ethiopian Ministry of Agriculture (MOA) and the Ethiopian Agricultural Transformation Agency met with the IDSS team where seminars on the IDSS were followed by active discussion aimed at evaluating the system and pursuing how it might be used in various agencies. There was broad interest in the IDSS with multiple specific opportunities identified for its incorporation into new and planned development in both the MOA and ATA. Leadership in both agencies will communicate their interest in using the system if a Gates Foundation grant to further develop and demonstrate its use is provided. At the level of the State Minister of Agriculture, there is active interest in the early application of the IDSS to the Planning Directorate and strategic assessment of options for development and training. In the Advanced Development Agency, initial interest is in applying the IDSS to their ongoing development activities at the Woreda Cluster level, taking the application of the system to the enterprise level. Training will be a critical component of the early efforts for both the Ministry and the ADA. Teams of analysts would be trained to use the suite of models and to train other to use them. Texas A&M, if successful in gaining grant support from the Gates Foundation, would work with national partners to develop, evaluate, train, and backstop national experts in the use of the IDSS.

The CGIAR centers with presence at the Addis Campus of ILRI were also engaged and all found that the IDSS could be a useful analytic capacity in both Cooperative Research Programs and System Initiatives of the CGIAR. Initial discussions of how to develop a structure and platform for multi-center engagement of the IDSS provided an initial pathway towards cooperation and collaboration. With further demonstration and site specific application, the IARC leadership and faculty believe the IDSS can be a useful analytic tool added to their existing methods to more effectively and comprehensively conduct ex ante and ex poste assessment of the integrated impact of options for introduction of technology or policy in developing country scenarios. Leaders of the several centers are also willing to communicate with the Gates Foundation in support of funding for the further development and integration of the IDSS into the analytic framework of the centers.

Feedback from key stakeholders in the Government of Ethiopia to the Gates Foundation is needed to support their decision to call for a proposal to support a substantial multi-year grant to Texas A&M and International Center and GOE partners to establish the IDSS in Ethiopia as a pilot country for Sub-Saharan Africa and to institutionalize its use by experts and analysts in the country.

General Strategy for the IDSS

- **Summary:**

A Texas A&M mission to Ethiopia was undertaken to seek engagement and advice from national and international stakeholders relative to the validity, utility, and sustainability of the Integrated Decision Support System, the results of which were presented to the Gates Foundation leadership and staff in January 2013. Key issues included determining if there is a useful role for the IDSS in the development agendas of government agencies; exploring how the requisite input data for the IDSS might be obtained in Ethiopia and other developing countries, and to explore how the IDSS might be woven into the fabric of the agendas for planning and implementation of technology and policy to achieve the goals of Ethiopia's Agricultural Growth Plan and thereby help ensure its longer term sustainability.

Concurrently, the IDSS is evolving this system towards a web-based structure that provides broad databases and analytic tools that can support more specific analysis by planners and operators at varying levels of scale in both government and non-government institutions. The application of such a system for US based governmental and private sector operations has growing support. There is need to further develop and demonstrate the utility of the system for application in developing countries to enhance food security and to improve livelihoods of subsistence and pre-market driven farm families.

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several centers are also willing to communicate with the Gates Foundation in support of funding for the further development and integration of the IDSS into the analytic framework of the centers.

A conceptual framework emerged from both government and CGIAR center engagements in which the IDSS – as an international web-based system – would support the site specific efforts of the government and the IARCs, initially in Ethiopia. Local users would define the specifics of the needs and analytic outcomes needed and the IDSS would provide initial collaboration and ongoing backstopping of these efforts. Presence of these institutions in Ethiopia would provide site specific resources to acquire the data needed to run the IDSS and interpret results. Government officials and IARC related training and technology capacities would be used to provide communication to farmers and other stakeholders at village and household levels. The initial collaboration to instill and install the IDSS in Ethiopia would require support by the Gates Foundation in the form of a multi-year grant to Texas A&M who would in turn engage the centers in the further development of the system for Ethiopia and other SSA countries. Following the initial development, the web-based system would support ongoing users and collaborators, serving as sub-contractors to efforts led by principle users of the system.

Specific Components of the Strategy

- Proponents of the SWAT component of the IDSS are finding broad interest in the U.S. and other countries in the broader use of model. USDA, EPA, and the World Bank are all positive about a vision for a system that is web-based, acquires and maintains currency of data and model evolution. It is envisioned that the system would incorporate other models and data into a growing and evolving system that uses open-source materials to provide support for individual users of this and related systems at both U.S. and international levels.

- The basic approach is well suited to the Integrated Decision Support System (IDSS) which could become a broader platform to support agriculture and natural resources analyses on a world-wide basis. The concept of an integrated system that deals with production, environmental, and economic consequences of policy and investment options and that can be applied at varying levels of scale is increasingly recognized as a high value capacity.

- Much of the data needed to operate the various elements of the IDSS are available but not well consolidated. It is a stated goal of the Gates Foundation to facilitate the aggregation of such data and the models that use them. This applies to national and international data on water, soil, weather, *inter alia*. Bringing this information into a web-based structure that is accessible to all would be part of the larger contribution of the IDSS.

- The current suite of models in the IDSS could form a core platform for analysis and be part of the web-based system. The system will be organized so that it can readily accommodate other models and other data. The concept is for a core capacity under the IDSS that is effectively networked to other capacities. Texas A&M has offered to be a convener in a Gates Foundation sponsored undertaking to explore interest and commitment in developing a linked network of such capacities in modeling for food and agriculture. The implications for human health of such a system are also implicit.

- The IDSS would provide the generic platform and organization of data and analysis that could be made issue and site specific by the users of the system. Building and maintaining the system for general use would substantially reduce the startup time and cost for new and continuing users. A potential user of the system in the World Bank estimated that it would reduce startup time for new projects by as much as 70%.

- The IDSS would serve as the focal point for multiple users and be organized to
    o Provide training for new and continuing users
    o Maintain ongoing colloquia among users of the IDSS and its networked system to plan and improve its use
    o Work jointly with new users to develop their skills in specific applications
    o Serve as a convener to establish networks with other analytic capacities
    o Provide consultation and trouble-shooting for users of the system
    o Participate in conceptualizing new uses of the IDSS by its constituents

- Users of the IDSS capacity (not IDSS team) would undertake the site and subject specific applications of the system
    o Problem or issue definition
    o Design for application of the IDSS to their needs
    o Acquire the web-based generic data and IDSS models (one or more)
    o Acquire the site and situation specific data needed to exercise the IDSS
    o Share their data and derivative model development as part of the evolving IDSS when/as possible.

- The centralized IDSS capacity would
    o Provide a focus of integrated expertise and know-how, intellectual leadership and education/training capacity to support other users of the IDSS in addition to conducting its own research
    o Maintain the evolving integrated model set and its networked constituent parts
    o Maintain the currency and content of databases and specific applications shared by its constituent users.
    o Serve as a participant (subcontractor) to specific projects undertaken by users of the system at both national and international levels

- In some cases, the IDSS team would be a collaborator with users of the system, especially in the initial phases of new projects. As user experience grows, the IDSS team would take a secondary role of backstopping the ongoing work
- When the IDSS has been in place and successfully used over time, the function would be sustained in part by being sub-contractors to other users of the system.

- The centralized IDSS capacity (need a name and institutional home) would not have its primary focus on individually run projects
  - It would not usually be engaged separately in specific research, development, or analysis in developing countries – or even in the U.S.
  - National and local users would define the goals and design the studies needed to achieve those goals using the IDSS, perhaps with backstopping by the IDSS capacity.
  - National and local users of the IDSS would acquire the site specific data needed to apply the general IDSS methodology
  - The IDSS capacity would be unlikely to have the human resources to undertake specific developing country projects and acquire the highly specific data needed to conduct analyses at these levels of scale
  - As participants in such project, led by others, the IDSS would continuously acquire, organize and make available data and know-how on the use of the system that emerges with experience.

- Current and future engagements with multiple users have generated a set of long term collaborators and users of the component parts of the IDSS that sets the stage and offers high likelihood that the development of the integrated system at the national level in the U.S. and to some extent in the international scene will occur. The opportunity is there to capture the momentum for this evolution and make it available for the developing world.

- While it may be more challenging to establish and maintain the capacities to effectively use the IDSS in developing countries, the recent experiences from the consultations done by the IDSS team in Ethiopia clearly show the perception of need by stakeholders in that country and the interest in using the IDSS for their applications at both national and local levels.
  - The Agriculture Growth Program (AGP) sets an ambitious agenda for Ethiopia which both the Ministry of Agriculture (MOA) and the Agricultural Transformation Agency (ATA) are actively addressing. The goals of the AGP and implementing agencies will find immediate and ongoing use of the IDSS in a planning and assessment capacity.
  - The ATA, if it is supported over time, provides a more stable capacity for planning and facilitating development at national and local levels. The presumed

stability of that organization makes it an especially attractive user of the emerging IDSS capacities. There is very strong interest in such uses by the Agency's leadership and experts.

- o The Ministry of Agriculture has the ultimate responsibility for federal activities to support and advance food and agriculture. Working with their regional partners, they have the mandate for taking new initiatives to the local level. The ATA uses responds to the MOA from which it is derived and serves to plan, support, and evaluate development undertaken by the resources of the MOA and its regional counterparts.

- o In this role, the MOA has expressed active interest in using the IDSS – initially in the Planning sub-ministry, where they see the use of the system as a means of communicating among the directorates in the MOA and developing integrated approaches to advance the goals of the AGP.

- o Users of the IDSS in the Government of Ethiopia (GOE) will develop the specific plans for its application and use and will use their resources to acquire the data needed to run the IDSS. The IDSS team will initially collaborate with these programs and define the needs for data to run the system, but will not be responsible for on-the-ground engagement at local or regional levels. The IDSS team will provide initial training for national users and participate in running the IDSS and interpreting results – but in a supportive role.

- The CGIAR Centers represent an international resource that is well understood and that has sustainably evolved over time to provide a set of interactive capacities to advance food, agriculture, natural resource, and economic goals in developing countries. The IDSS mission to Ethiopia involved active engagement with several of these centers. In all cases, center leaders and researchers have active interest in engaging and using the IDSS.

- o The ILRI campus at Addis Ababa houses the centers with greatest capacities to benefit from and apply the IDSS to ongoing and planned studies. The IDSS team has existing relationships with a number of the centers and is engaged in both planning and active/previous collaboration. The IDSS mission to Ethiopia engaged IWMI, ILRI, CIMMYT, and ICARDA and recently met with IFPRI in Washington (see below).

- o The CGIAR's Cooperative Research Projects and Systemwide Initiatives involve a matrix of participating centers actively engaged in multidisciplinary approaches that are well suited to use the IDSS.

- o The centers have existing analytic capacities in their areas of expertise and often collaborators which would add value to the overall network of models and data envisioned for the IDSS

- o The international experience of scientists in the centers assures practical and precise use of the IDSS in the broader context of their programs

- The centers have established networks and credibility with national and other international programs that are vital to the successful broader application of the IDSS internationally. The IDSS will use and extend these existing relationship in a mutually advantageous engagement.
- The centers have established relationships at multiple levels of scale with operators in developing countries. They represent the mechanism for putting the IDSS to practice at these levels. The IDSS will enhance their ability to work with their partners – making it a win-win situation.
- The centers in Addis are actively interested in working together with the IDSS and with each other in the use of the IDSS. An intercenter framework for the use of the IDSS and a coordinating and planning function were discussed and more than one of the centers has offered to be the convener.
- The presence of these key centers in Ethiopia is highly congruent with the goal we have with the Gates Foundation for using Ethiopia as a pilot country to further develop and demonstrate the use of the IDSS for multiple purposes and scales.