

U2U Process Evaluation

August 15, 2012 Check-in

UNIVERSITY OF MINNESOTA

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Methods

Information on the progress of the U2U grant was primarily collected through phone interviews that were conducted between the end of August and the middle of September 2012. It was anticipated at the last check-in that progress would have been made by August 15th on a number of different parts of Objective 1 and Objective 2. (Efforts on Objective 3 were officially in a meeting in October after the interviews were conducted.) PIs as well as some students and staff who were expected to contribute a significant amount of work to these parts by August 15th were interviewed. Those interviewed were asked to share about the progress they had made on specific tasks, about who they worked with on those tasks, and about how they felt the work on the U2U Grant was going overall. Almost everyone initially contacted to be interviewed agreed to be interviewed, and 12 different individuals were interviewed in total. These interviews took between 15-25 minutes. They informed the updates noted on the majority of tasks, and they informed the notes on the working groups and the overall process.

Objective 1 Update

Objective 1 aims to use existing data and model simulation data to develop a knowledge base of the potential biophysical and economic impacts of climate change and the relative risks of these changes. In year 2, Objective 1 primarily focuses on preparing data for crop models, developing the crop models, and using the crop models to conduct case studies and write articles.

The following overviews the progress made on different parts of Objective 1 that were either not completed as scheduled in year 1 or planned to be started in year 2. Each part is broken into individual tasks. *(A summary of these updates are also included in the table at the end of this document.)*

Crop Model Development

- Site-specific validation/calibration of all models: This task is on track to be completed by the ASA meeting in October. The crop models require very specific variables, and they need to be validated at two levels, individual sites and counties. Two detailed datasets

from Nebraska and Illinois have been used to produce a comprehensive representation of a model. While the model was validated in the Central Corn Belt, it did not do very well in other areas. Specifically, it did not do well in the Northwestern region, and work is currently being done to fix this. *Next milestone: October ASA meeting.*

- Run crop models on grid: Work has already begun on this task, and it should be completed by the spring of 2013. Crop model simulation requires a huge amount of input and intensive time to set-up, and it has taken longer than expected to get input areas for all the grids in the region. NARR data from 1979-2012 will, nonetheless, be used. In the next 1-2 months, a working prototype of the modeling framework should be completed. *Next milestone: April 15th (or sooner).*
- Integrate future climate scenarios into site-specific and gridded model runs: While it is unclear how long this will take, a discussion on how to do this has started, and progress should be made at the October ASA meeting. There are many questions about what parameters need to be described. Cornell is working on a grant that similarly looks at future climate scenarios, and hopefully they will be willing to work with U2U in deciding the parameters so that there are some consistencies between the two projects. Once decisions are made, actually running the models will not take very long. *Next milestone: End of year 2.*
- Development and implementation of framework for managing crop model inputs/outputs on the HUB: This task is not quite on track. This is because it cannot be completed without specific data, and the HRDLAS output data is not ready and the gridded data has not yet been started. *Next milestone: ASA October meeting/depends on data availability.*

HRLDAS Data (Soil moisture, temperature, ET mapping)

- Output gridded hydroclimate variables: This task is a bit behind schedule because it is a huge task and because there were a few problems that needed to be fixed, which consumed several months longer than anticipated. Students are currently working with the data. Output data is now being processed and sample runs have been done. The next

step is to figure out how to automate the targeted variable in the data. Once that is done, information will be available for the modelers. *Next milestone: October ASA meeting?*

Identify yield linkages with ENSO

- Finish analysis of region: This task is nearly completed and it should be done by October. There is still some uncertainty about the targeted regions and dates. Initially data from 1970-2000 from Indiana was analyzed. Now a baseline analysis might be done using data from 1980-2010. Once this is completed, it can be used in the crop models. A graduate student is now working on it full time. *Next milestone: October ASA meeting.*

Nitrogen Related Work

- Establish a U2U-Cornell Partnership: This relationship is still in the early stages, but both sides have expressed interest in collaborating. There is a great possibility that such collaboration would allow for the investigation of issues that could otherwise not be addressed. A short white paper is being written that overviews the mutual interests of both sides, and it will be presented to the Cornell group in an effort to formally establish a collaborative effort. *Next milestone: December 2012.*

Economic Case Studies

- Build optimization framework: Everything has fallen into place with the other modeling work. It has become clear what the inputs should be, and it will probably be started after the field days article work is completed. *Next milestone: Start in October 2012?*
- Test trials: This is on track to be completed before spring. *Next milestone: Winter 2012/2013.*
- “Historic” results for some site: This is on track to be completed by next spring. *Next milestone: late spring 2013.*

Publications

- Decision Calendar: This will be submitted next week, and it was a pleasant, unplanned publication. *Next milestone: End of September.*
- Fieldwork Days article: While this progressed slower than anticipated, a lot of progress has been made on it, and it will be done in October. *Next milestone: October 2012.*
- Site-specific modeling results: These publications are part of an ongoing process. Findings will be presented at ASA in October, and a book chapter will be near completion by the start of October. *Next milestone: October 2012.*

Objective 2 Update

Objective 2 aims to understand how producers make decisions under uncertain climate projections, what type of information they need to make better decisions, and what are effective methods for disseminating usable knowledge to them and to larger agricultural networks. In year 2, the primary focus of Objective 2 involves analyzing data from the producer and advisor surveys, publishing articles based on these surveys, completing a network analysis of producers and advisors, and conducting focus groups with advisors.

The following overviews the progress made on different parts of Objective 2 that were either not completed as scheduled in year 1 or planned to be started in year 2. Each part is broken into individual tasks. (*A summary of these updates are also included in the table at the end of this document.*)

Producer Survey

- Analyze results: The survey is in the data cleaning and analysis stage. *Next milestone: End of 2012.*
- Publications: The first paper has been sent out. The next publication will be a journal article with general findings, which CAP is leading. A graduate student must also write three journal articles by next year in order to finish her degree on schedule. *Next milestone: Unclear.*

Advisor Survey

- Analyze results: The data is being analyzed. Some preliminary analysis was completed in July, and more intensive analysis should be completed by the Objective 3 meeting in October. *Next milestone: Objective 3 meeting.*
- Publications: The first paper is out for review. Two more papers are being worked on. *Next milestone: January 2013.*

Network Analysis

- Finalize methods for pilot: Questions and methods for the network analysis have been finalized. The current plan is to start the pilot with a random sample of producers in each watershed. Depending on costs and time restrictions, those identified as by producers from initial sample may be interviewed. *Next milestone: December 2012*
- Conduct pilot: The first round of producers should be surveyed by December, and the initial network will be analyzed then. *Next milestone: December 2012.*
- Conduct network analysis: This is on track. *Next milestone: Spring 2013.*

Climatologist interviews

- Analyze interviews: A total of 22 interviews were conducted. A preliminary analysis of the interviews has been completed, and the results were presented at a conference. A more rigorous analysis is currently being worked on and should be done by the end of fall. *Next milestone: End of fall 2012.*
- Publish papers: A graduate student will need to write 2-3 articles on the interviews in order to complete his master's this spring. *Next milestone: Spring 2013.*

Focus Groups

- Pilot focus group: The pilot went really well. Corn producers were invited to participate, and attendance was good. Participants also gave good feedback. *Next milestone: This task is complete.*
- Conduct focus groups in selected states: Focus groups will be held in Nebraska and Indiana. IRBs still need to be approved. *Next milestone: January 2013.*

Working Groups

PIs continue to work closely with the others on their same objective, especially those who work on related tasks. One PI, however, noted that everyone tends to work in silos, a sentiment that was echoed by a couple others. Many PIs mentioned that the regular conference calls play an essential role in the group's communication. Moreover, as many PIs only communicate at the group conference calls, a few thought there might be benefit to increasing communication between the calls. Melissa was also named key to keeping the group informed about developments.

The group also has continued to involve outside stakeholders. The relationship of Objective 2 with the CAP group is still strong, and the two will be collaborating on papers stemming from the producer survey. There are also plans for some PIs on Objective 1 to collaborate with Cornell, where similar work is being done on another grant. The hope is that U2U and Cornell can agree on some common parameters so that is some consistency between the grants. Finally, efforts to engage the Advisory Group have been made, and many members were present at the annual meeting in May.

Group Process

Every PI felt positive about other PIs and about the progress the group is making as a whole. The group overwhelmingly expressed how much they respected the people they were working with and that everyone worked well together. Many were impressed by the group dynamics, as the group is so large. Both Melissa and Linda were cited as playing a big part in keeping the group working well together and on track. The majority of PIs were very excited about the findings so far, and they were confident that the group was on track to meet their goals.

However, PIs did express some concerns. First of all, as noted above, some PIs see a need for more communication than just the conference calls. Some also mentioned that their work was dependent on the work of others, and they were delayed as a result. In fact, a few PIs specifically noted that the slower than anticipated progress of students delayed their own work.

One PI actually felt this was an issue that needed to be addressed, and that PI suggested that more effort be made to include students and keep them well informed on all the different parts of the grant. Another issue that surfaced was that, even though almost everyone was following the publication guidelines, not 100% of PIs have adhered to the inclusion rule. Finally, most PIs recognized that Objective 3 would be a real test. A growing sense of urgency has emerged with Objective 3 on the horizon, and many noted that it will take a great deal of collaboration to use the findings from Objective 1 and Objective 2 to develop tools. While PIs were excited about getting started on Objective 3, they also expressed some anxiety around the challenges it is likely to present.

Objective 1

| TASKS | YEAR 1 PROGRESS | LEAD | ANTICIPATED DATE OF COMPLETION | ACTUAL PROGRESS |
|---|--|-----------------------|---------------------------------------|---|
| Crop Model Development | | | | |
| Site-specific validation/calibration (all models) | Initial runs nearly complete. Need to runs models with predefined experimental treatments. | Jeff, Dev, Atul | ASA meeting – October 2012 | 9-21: Most of it is completed. Need to revise model for NW region. Will be ready for October meeting. |
| Run crop models on grid (all models) | Domain and common datasets identified. Soil characteristics data compiled. | Jeff, Dev, Atul | Spring 2013 | 9-21: Calibrated and tested site-specific data, calculated results for gridded data. In the next 1-2 months, working prototype should be developed. |
| Integrate future climate scenarios into site-specific and gridded model runs | | Gene, Jeff, Dev, Atul | End of year 2 | 9-21: A discussion has started. Need to decide on parameters, and hoping for Cornell's cooperation on it. |
| Develop and implement framework for managing crop model inputs/outputs on the HUB | Conceptual framework developed and implementation is underway. | Carol, Larry | End of 2012 Spring 2013 | 9-21: Behind schedule because data not completely ready. Good progress on site specific, but still need to do gridded models. |
| HRLDAS Data (Soil moisture, temperature, ET mapping) | | | | |
| Output gridded hydroclimate variables | Domain and input variables identified. Working on model setup. | Dev, Larry | ASA meeting – October 2012 | 9-21: Took longer than expected because ran into problems. Output data is being processed. Need to figure out how to automate modelers. |
| Identify yield linkages with ENSO | | | | |

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|-----------------------------------|---|------|---|--|
| Finish Analysis for region. | Analysis completed for Indiana, but waiting on National Climatic Data Center to release updated climate 11ormal before finishing analysis for the region. | Dev | ASA meeting – October 2012 | 9-21: Data from IN from 1970-2000 has been analyzed. A baseline from IN from 1980-2010 needs to be done. |
| Nitrogen Components | | | | |
| Establish U2U-Cornell Partnership | | Jeff | Dec 2012 | 9-21: The relationship is in early stages. Will present white paper to Cornell in effort to formally establish relationship. |
| Economic Case Studies | | | | |
| Build optimization framework | | Ben | Completed by end of summer 2013 | **Note: These studies cannot be finished until DSSAT model output has integrated future climate scenarios |
| Test trials | | Ben | Start in Fall 2012 Start in Oct 2012 | 9-21: Started this fall. Everything falling into place with modeling. |
| “Historic” results for some sites | | Ben | As early as late spring 2013 | 9-21: Getting clearer on inputs. |
| Publications | | | | |
| Decision Calendar | During Year 1 it was submitted to BAMS and they suggested a different audience. A revised publication is in the works. | Gene | End of summer 2012 End of Sept 2012 | 9-21: This will be submitted next week. |
| Fieldwork days article | The final analysis still needs to be completed. | Ben | End of Summer 2012 End of Oct 2012 | 9-21: Coming together slower than planned. Will be done in October. |

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| Site-specific modeling results | Pubs will be developed related to the modeling work. | Jeff, Dev, Atul | Oct 2012 and ongoing | 9-21: Findings will be presented at ASA. A book chapter near completion. |
| INDICATORS of SUCCESS for UPCOMING YEAR | | | | |
| Still speaking and working well together | | | | ✓ |
| Crop model results online and survey results synthesized | | | | |
| Spatial results analyzed by group | | | | |
| Start N and future climate scenario work | | | | |
| 2-4 pubs from obj 1 including decision calendar | | | | |
| Data on hub | | | | |

Objective 2

| TASKS | YEAR 1 PROGRESS | LEAD | ANTICIPATED DATE OF COMPLETION | ACTUAL PROGRESS |
|--------------------------|---|------------------|--------------------------------|--|
| Producer Survey | The survey was deployed and results will be in mid-summer. | Tonya? Linda? | | |
| Analyze results | | Jean | End of 2012 | 9-21: Cleaning up data and analysis. |
| Publications | | | Ongoing through year 2 | 9-21: The first paper is out. Jean will be publishing 3 journal articles for her PhD by March! |
| Advisor Survey | The survey was deployed and preliminary results are in. | Linda | | |
| Analyze results | | | Obj 3 meeting/ End of 2012 | 9-21: Will have it done by Obj 3 meeting. |
| Publications | | | Ongoing through year 2 | 9-21: First paper is out for review and 2 others are in progress |
| Network Analysis | The target watersheds for the pilot have been identified, but the questions still need to be finalized. | Maria | | |
| Finalize methods | | | Dec 2012 | 9-21: Questions and sampling method has been finalized |
| Do pilot | | | Dec 2012 | 9-21: The first group of producers will be surveyed in Dec. |
| Conduct network analysis | | | Spring 2012 | 9:21: On track |

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| Climatologist Interviews | 22 interviews completed. Most of the interviews have been completed and transcribed. | Lois | | |
| Analyze interviews | | Adam | Summer 2012 Fall 2012 | 9-21: Preliminary analysis completed. More rigorous analysis to be completed this fall. |
| Publish paper | | Adam | End of 2012 Spring 2013 | 9-21: He will write 2-3 articles to graduate on time! |
| Focus Groups | | Linda and Tonya | | |
| Pilot focus group session | | Linda | July 2012 | 9-21: Went really well! |
| Focus groups in selected pilot states (up to 3 sessions per state) | | Linda, Tonya | End of January 2013 | 9-21: Will do in Indiana and Nebraska. |
| INDICATORS of SUCCESS for UPCOMING YEAR | | | | |
| Still speaking and working well together | | | | ✓ |
| Establishing focus groups in test states (prior to developing and helping to enhance tools) | | | | ✓ |
| Concepts and important prelim info to engage future users | | | | |
| Crop model results online and survey results synthesized | | | | |
| Key publications out for Obj 2 | | | | |

Objective 3

| TASKS | LEAD | ANTICIPATED DATE OF COMPLETION | ACTUAL PROGRESS |
|--|---|--------------------------------|--|
| Tool development | | | |
| Identify and prioritize decisions that tools will address | | Fall 2012 | |
| Develop 1-2 prototype tools from site-specific modeled output and/or existing datasets | | Dec 2012 | |
| Design conditional probabilities and outcomes for decision tree/logic scheme used within tools | | April 2013 | **NOTE: This task only applies depending on tool development direction. Will refine as needed. |
| Development of delivery system | | | |
| Link users to existing data products and relevant resources | Hart | | |
| Develop calendar of training/dissemination opportunities | State climatologists with help from Larry and Melissa | October 2012 | |
| Other website development tasks | Chad | | |
| | Larry | ongoing | |
| INDICATORS of SUCCESS for UPCOMING YEAR | | | |
| Still speaking with and working well together | | | |
| Identify audience for tools | | | |
| Tools and uses developed conceptually and audiences identified | | | |
| Successfully determine what we can actually deliver, doable, actionable model | | | |
| 1-2 prototype tools deployed | | | |

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| Developing compelling use for industry | |
| Talk about and act upon how to provide value to ag community beyond just a tool (what do they need from us in addition to what do we have to offer) | |
| Better understanding among all team members about use of tools – agencies, NGOs, etc. – others who are on peripheries of production ag | |
| Have reached out to organizations that support sustainable ag – food companies, retail companies, etc. | |
| More farmer involvement | |
| U2U will have become an information source used by extension educators | |
| Submit complementary grant proposals | |