Mid-South Soybean Board

First Quarter Progress Report

**Title**: A decision tool to analyze risk and return to soybean maturity group and planting date choices in the Mid-South

**Reporting Period**: January 1, 2016 to March 31, 2016

**Project Status**:

OVERVIEW:

Building on recent USB and MSSB funding for developing SOYMAP, a spreadsheet based decision tool that assist producers with comparing agronomic and economic implications of choosing among a set of MG soybean across planting date, location and soil texture, this proposal focuses on risk assessments associated with those decisions. The idea is that a producer can target a profit-maximizing cultivar choice at a particular location that is planted at a specific time. However, since planting intentions don’t necessarily translate to reality given weather conditions or other factors that may impact planting progress, a second decision tool (SOYRISK) is envisioned to compare alternative planting strategies. The tool will calculate a profit-maximizing choice (or baseline) with attendant risk and return implications as well as irrigation needs. The tool then allows user-specific input to assess deviations from the baseline that are tailored to the conditions the producer may face during planting. The tool will allow:

* entering an alternative planting window to see implications of planting the same soybean as the baseline to assess ramifications on expected returns, water use, and risk.
* selecting a level of risk reduction they would like to achieve compared to the baseline to see how much this level of risk reduction would cost and what alternative soybean cultivars to plant and over what range of dates.
* setting an irrigation limit where the tool now finds the profit-maximizing choice and compares it to the baseline.
* entry of the producer’s intended planting schedule and maturity group choice(s) and comparing to the baseline in terms of expected risk, return, and water use.

The tool thus provide the producer with more information about likely changes in returns, risk, and irrigation needs when changing planting date and maturity group with both potentially spread over a range of planting dates or maturity groups (i.e. the producer likely does not plant all soybean using one MG and one planting date but instead plants over the course of several weeks and a range of MG). The tool will use a database of simulated yield, oil and protein content, seasonal sale price, and irrigation needs for analyzing profitability and risk.

WHO ARE THE PARTICIPANTS?

**Michael Popp** is a professor at the University of Arkansas at Fayetteville and the principal investigator. As an agricultural economist, he will coordinate this research project with Dr. Purcell and Mr. Weston Weeks. Dr. Popp’s research focus is on the evaluation of alternative farm enterprises involving innovative and sustainable production methods by analyzing risk-return tradeoffs. Recent efforts have involved evaluation of soybean production practices, modeling of crop agriculture for the state with a view to estimate spatial land use changes with the introduction of switchgrass, energy sorghum and pine (for carbon sequestration), logistics associated with cellulosic energy crops, modeling of pasture and development of decision support software for beef production from a net return and net greenhouse gas emissions perspective. Dr. Popp performed the necessary programming for SOYMAP using simulated data provided by Dr. Montserrat Salmeron a postdoctoral student working with Dr. Purcell.

**Larry Purcell** is a professor at the University of Arkansas at Fayetteville, and he holds the Altheimer Chair for Soybean Research. Dr. Purcell has coordinated the previously mentioned regional project and continues to oversee work of **Dr. Montserrat Salmeron** for recalibrating DSSAT-CropGro using 2012 and 2013 data while validating the model with 2014 data. Dr. Purcell has been at the University of Arkansas for 19 years. Dr. Purcell’s research interests include optimizing the efficiency with which crops use essential resources of light, water, and nutrients through management and genetic strategies.

**Weston Weeks** is a MSc student that finished his program of study in December of 2015 under the direction of Drs. Michael Popp and Larry Purcell. He is familiar with the experimental data set and has performed a risk-return tradeoff analysis for his thesis work. He wants to extend his MSc modeling work to the simulated data and develop a decision tool as described above. He has the necessary spreadsheet skills and will learn the VBA coding skills to develop the user interface.

**Progress Report 15 April 2016 for 1 January to 31 March activities**:

* Weston Weeks was hired as a program associate to begin the process of developing the spreadsheet tool.
* He has learned necessary VBA coding skills to develop the user interface.
* Dr. Montserrat Salmeron has continued recalibration of DSSAT-CropGro with data from 2012-2013 and model evaluation with data from 2014 not only with respect to yield and irrigation need predictions but also oil and protein content information.
* A twelfth location was added to simulation output that was used for SOYMAP and one location was changed.
* A logo for the new decision tool was developed and approved by the Division of Agriculture.



* A user manual and video about SOYMAP was developed and a management guide for SOYMAP was submitted to a journal. These efforts should increase familiarity with SOYMAP while at the same time motivating interest in SOYRISK. Please visit <http://agribusiness.uark.edu/decision-support-software.php> to view the user manual and video clip as well as the recently added feature to receive e-mail updates about SOYMAP.
* SOYMAP has also been featured in the Delta Farm Press and the Farm Journal at <http://deltafarmpress.com/soybeans/soymap-program-great-new-tool-mid-south-producers> and <http://www.agweb.com/farmjournal/article/find-the-soybean-sweet-spot-naa-chris-bennett/>, respectively.

Presentations and Publications:

Purcell, L.C., M.P. Popp, and M. Salmeron. What maturity group to plant: when and where. Tri-state Soybean Forum. Delta Research Center, Stoneville, MS. 8 January 2016.

Dr. Purcell and Dr. Popp also provided a summary of research findings for our previous joint USB/MSSB project and presented the proposal for this project at the Mid-South Soybean Board meeting in Memphis, TN, 12 January 2016.