Updating University of Missouri Soil Test Based Fertilizer and Lime Recommendations Program: Status Report

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Objectives, including relevance of project to Missouri fertilizer/lime use:
- Update and re-write the University of Missouri Soil Test Recommendations Program to include the revisions and updates made by the University of Missouri Soil Fertility Working Group.
- Update the soil test to a web based system that is independent of operating systems, offices systems, and web browsers.

University of Missouri (MU) soil test and fertilizer recommendation program is used by the MU Soil Testing Laboratories located at Columbia and Portageville to provide fertilizer and lime recommendations for row and forage crops to about 40,000 farmers each year. The soil test based recommendations from University of Missouri soil testing labs are being used to apply fertilizer and lime for about 4,000,000 acres of row crops and forages for efficient use of fertilizer and lime, and to achieve economical returns from crop production. In addition, the state and federal agencies such as the Natural Resources Conservation Service (NRCS), Farm Service Agency (FSA), Missouri Department of Natural Resources (MDNR), Missouri Department of Agriculture, and agricultural industry personnel, (crop consultants and fertilizer dealers) and individual producers rely on the MU soil testing database program to get unbiased, research based fertilizer and lime recommendations from University of Missouri.

During the past 15 years, there has been significant research in Missouri and other states on soil testing and crop fertilizer needs relevant to Missouri conditions. Some of that research was due to the result of support by the Missouri Fertilizer and Ag Lime Board.

The Soil Fertility Working Group is the committee charged with reviewing and approving changes to MU recommendations. This committee includes research and extension faculty working on soil fertility issues at MU and the heads of the Columbia and Delta soil testing labs. The members of these committee has been working for the past two years on revising the fertilizer and lime recommendations based on research findings, and has come up with significant updates. Some areas where significant changes have been made in the soil test based fertilizer recommendations include:
- Integrating economics into corn nitrogen recommendations.
- Updates to the buildup equations for soil test phosphorus and potassium.
- Updates on crop removal values.
- Revisions to Missouri lime and magnesium recommendations.
- Changes to the soil test recommendation rating system.
Implementing recommendation changes has been limited by the ability to include the revisions in the MU Soil Testing Database Program that benefits thousands and thousands of growers who receive the fertilizer and lime recommendations from the MU soil testing labs each year. The soil test database program that we currently use is a client based system that was written in VB6. Within the code for this system is where all of our calculations and recommendations are stored. This has limited our ability to implement new calculations and recommendations. Our current program was also written for specific versions of Microsoft Office and this has limited our ability to generate new reports for our customers. One of our biggest challenges is that VB6 is no longer a supported system and every time there is an update to either operating system or Microsoft Office we have to find someone to fix our program. Therefore, the new soil test database program will be developed as a web-based system (independent of the operating systems) with enhancements to include the revisions in the future with ease.

The main objective of this proposal is to provide support for a 0.5 FTE of programmer’s salary for three years. We estimate that it will take three years to design a new system, launch the new system, convert the old data, test the new system, and to support the system in its beginning stages to work out any issues. The programmer will ensure that the future recommendation changes to the MU soil test and fertilizer and lime recommendations can be made in the database. This will allow us to make the change as soon as it goes into effect and make the recommendations available online to be accessed by all citizens of Missouri.

Procedures:

We need three years to design a new system, launch the new system, convert the old data, test the new system, and to support the system in its beginning stages to work out any issues. The new system will have a table in the database for soil calculations, and soil recommendations, this is critical for future updating of the soil recommendations. The new system will be a web based system that is independent of operating systems, office systems, and web browsers. Updating the soil test database programs will include managing lab data with sample identification, developing soil test based recommendation using current revisions, creating soil test reports in user friendly formats, enabling queries of the databases, and generating annual reports. The MU soil testing labs will fund 0.5 FTE of the position and request the fertilizer and lime advisory committee to fund the other 0.5 FTE of the programmer’s salary to re-write the MU soil test database program. I will be mainly working with the programmer in updating the soil test database fertilizer and lime recommendation program with inputs from CO-PIs and members of the MU Soil Fertility Working Group.

Status Report:

A contract has been signed with Center of applied Research and Environmental Systems (CARES), University of Missouri to develop the web-based data base for soil test and recommendations. Mr. James Cutts, Computer Project Manager, CARES has been contracted to develop the database. The progress update on the project provided by the programmer is provided below:
The needs assessment of the soil testing lab database was performed prior to the official start of the project. The assessment was done through meetings with Manjula Nathan and John Stecker of the Columbia soil testing lab and David Dunn and Ann Garcia of the Portageville soil testing lab. A site visit was undertaken at Portageville soil testing lab. This helped the developer understand the material and data flow through the lab as well as determined the immediate needs for additional data collection software there.

The system is being designed as a web-based application which will allow for centralized administration. The use of a web based application will allow significantly easier updates to be provided to end users. The system is also being designed in such a manner that it will support the addition of new tests, centers and testing technologies without the need for significant revision to the application.

Considerable progress has been made in the design of the new database that will underlie the application. The database analysis has taken into consideration the database in use in the Mississippi State's soil testing lab as well as the existing SoilMain database structure. The first draft of the new database structure has been created in Microsoft Visio and has been implemented in the Microsoft SQL database in which the data will finally reside. Initial development of this web-based system has begun. A rough draft of the websites initial layout and navigation system has been implemented in the ASP.Net development environment. These beginning pages of the application are being focused on development of a standard look and feel for the application.

**Budget:**

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