SNAP-PLUS – NUTRIENT MANAGEMENT SOFTWARE FOR WISCONSIN[1/]

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Abstract

The new CNMP program of the NRCS requires simultaneous integration of five components:

A conservation plan (RUSLE2);
A nutrient management plan (NRCS 590 – P based);
A record keeping program (CNMP);
A manure/wastewater manager (CNMP);
A feed management program (CNMP).

Most of these components are prepared tediously, by hand, often independently of each other. We have linked software programs that deal with conservation planning, nutrient management, record keeping, and manure management into a single software tool called SNAP-Plus, which has a simple user interface and output forms. The outputs of this tool can then be combined into a CNMP. The SNAP-Plus software is based on a widely accepted and easy to use nutrient management tool, SNAP2000; to which we have added the new Wisconsin P Index (PI); a P and K balancer; and the soil erosion estimator RUSLE2. It will require much less time than current nutrient management planning approaches; it will be internally consistent (i.e., rates and forms of fertilizer/manure, crop rotation, etc. will be consistent across all sub models); and electronic input and output of data will be instantaneous, clear, and consistent. This software implements a comprehensive approach to managing manure and nutrients in accordance with the new Wisconsin NRCS 590 Standard by including the PI and RUSLE2. It also facilitates field and farm level "what if" experimentation by providing field-by-field and whole farm views with immediate feedback for management decision-making.

Introduction - The Challenge

The USDA Natural Resource Conservation Service (NRCS) has been mandated to implement Comprehensive Nutrient Management Plans (CNMP) on all Concentrated Animal Feeding Operations (CAFOs) as a requirement for receiving Environmental Quality Incentives Program (EQIP) cost share funds for manure storage (USEPA, 2003). The State of Wisconsin will be incorporating these CAFO federal laws into Wisconsin State Code NR 243 in the near future. Preparing a CNMP requires a significant increase in the amount of time to prepare and assemble necessary documents compared to previous NM planning. The five components - conservation plan, nutrient management

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plan, record-keeping program, manure manager, and feed management - must be prepared simultaneously. Many farms have only one or at most two of these components on hand, and in many cases they are incomplete, inaccurate, and/or out of date.

The time and effort required to make them complete, accurate, and current is difficult for growers, crop consultants and NRCS and state personnel to find. In addition, new nutrient management requirements have been added that further complicate preparation of nutrient management plans (NRCS, 2002). In particular, the Wisconsin P-Index (PI) and RUSLE2, (newest erosion prediction model from NRCS) are difficult to use independently. SNAP-Plus will reduce these difficulties by consolidating data entry and hiding model complexity as much as possible to ease CNMP development.

The Solution for Wisconsin

Software programs needed to produce components of a CNMP in Wisconsin are available: SNAP2000, RUSLE2, the Wisconsin P Index, and the P and K balancer (Figure 1). With some changes, including improved record keeping and output format; these programs have been integrated into a single computer software package.

Advantages of this integration include the following:

- A single interface for input. The user will see a familiar format for data input (65% of nutrient management plans developed in WI use SNAP2000), with some requests for additional information as required for soil erosion, the PI, and P and K balancer. Data would be input electronically and permanently stored and maintained.

- No redundant data entry. Once information is in the program, it will be used by all the subprograms that need it; e.g., field IDs, acres, crop rotation etc.

- Consistent data among all programs. Each program will receive the same information for a given data point; e.g., tons of manure per acre of a given analysis.

- Common output. Each field will have the information reported in a consistent, easy-to-read form; e.g. soil conservation assessment plan, P-based NM plan, P Index values for each field and farm average, soil testing results, etc. and interpretation that can readily be integrated into the CNMP.

- Translation to the field. Operations for each field can be printed on one or two sheets, which can be laminated and left in the tractor cab for the year. For future record keeping, the producer can note any changes directly on the forms, which are then entered to update the NM plan.

- Multi-year view at the field level facilitates long-range planning for manure applications, P and K balancing over rotation, crops to be grown, reducing soil and P loss, etc.

- The programs themselves will serve as record-keepers. Additional field operations and/or changes can be recorded and permanently stored.

- The user can be led to appropriate management practices from a range of options to decrease cost or environmental risk. The program will immediately provide information on the effects that new management practices have on soil loss, PI, manure management, etc.

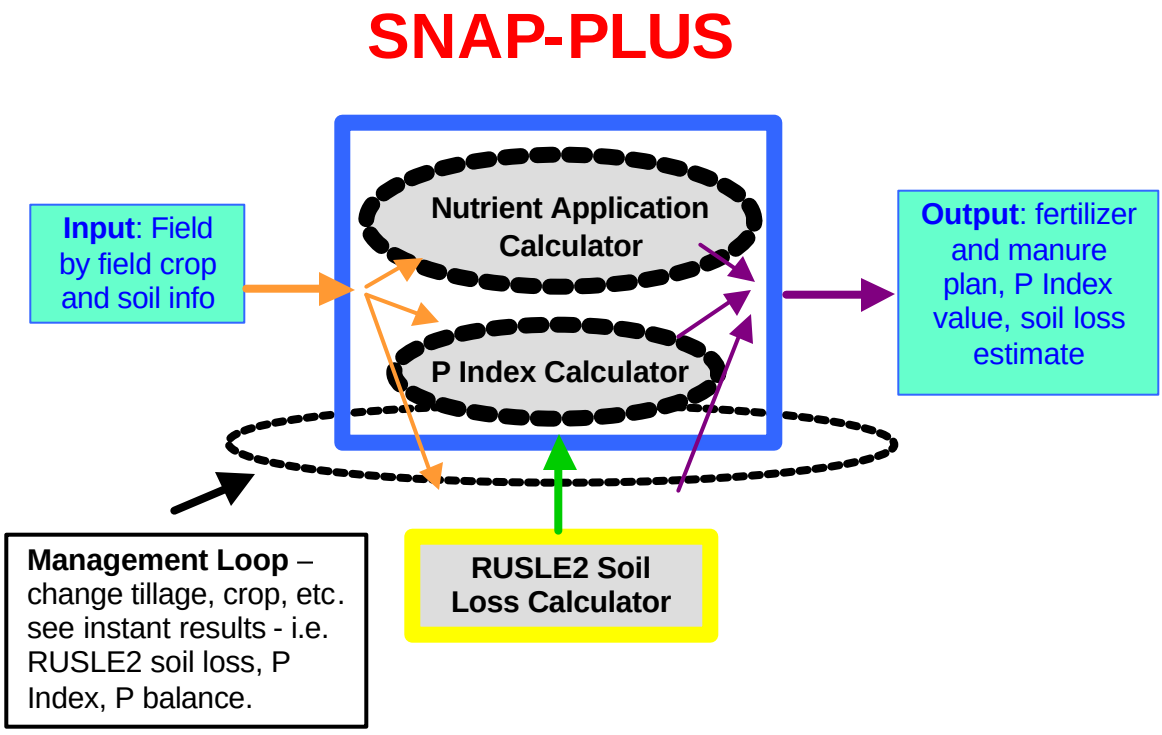
- The program will be approved for use in the NRCS CCE (Common Computing Environment).

- Farm and soil test data from Wisconsin FSA certified labs can be electronically transferred into the program.

- Easy data exchange between farmers and state and federal agencies by electronic means.

- Exportable in different file formats; e.g., .txt, .xml, .html, .pdf, Excel, etc.

Figure 1.



Future Additions

- The program will ultimately accommodate Geographical Information Systems (GIS) data input, manipulation, and map output.

- Transfer data to and from other GIS and NM software programs; e.g., MapWorks, SST, EASI Suite, Manure Management Planner, NRCS Toolkit, etc.

- Interfacing with other nutrient, soil, feed or financial management software programs.

Summary

SNAP-Plus continues to be developed with an anticipated beta version release in early 2004. The program will be available at no cost and downloadable from the UW Soil Science Department website. SNAP-Plus is a standalone program requiring no additional software beyond RUSLE 2, which will be included within the download. Upon completion of the software (summer 2004), training workshops will be provided throughout the state (fall 2004).

References

Natural Resources Conservation Service (NRCS-Wisconsin). 2002. Wisconsin NRCS FOTG Standard 590, Nutrient Management, July 2002. 9 p. NRCS, Wisconsin.

U.S. Environmental Protection Agency. 2003. National Pollutant Discharge Elimination System Permit Regulation and Effluent Limitation Guidelines and Standards for Concentrated Animal Feeding Operations (CAFOs); Final Rule. Feb. 2003. 40 CFR Parts 9, 122, 123, and 412. http://cfpub.epa.gov/npdes/afo/cafofinalrule.cfm