The Beginning of a New Generation of Soil and Plant Analysis Recommendation Software

B. Green¹, P. Flaten² and P. Routledge³

Enviro-Test Laboratories: Calgary¹, Saskatoon² and Winnipeg³

Abstract

Soil and plant analysis recommendation software has been available for several years, but its use has been low until the last few. User-friendly, multi-function software is now available from a number of sources and even more capable versions are anticipated. Enviro-Test Laboratories’ software, pcF.A.R.M.s&p, is profiled to demonstrate the progress to date.

Key words

soil testing, plant analysis, software

Introduction

Soil analysis recommendation software has been available to fertilizer dealers, crop consultants and producers since the 1980s. Use of this software was minimal, however, until the mid-1990s. The last 2 years, its use has exploded. Competition within the retail fertilizer industry and the laboratory industry, user-friendly improvements in personal computer and internet hardware and software, and the move to optimizing crop yields and input costs have all contributed to this change.

In the past, the source of this software was the soil testing laboratories, governments, and private software firms. These software packages had limited capabilities, were often considered user-unfriendly, and transmission/downloading of results was slow.

Now, the three major labs servicing the Canadian prairies (Enviro-Test, Norwest and Agvise) have their own software. Emailing results from the lab to the user takes seconds, as does saving and importing the results into the software. Government software such as Alberta Agriculture, Food and Rural Development’s AFFIRM is available. A number of software development companies have products that allow mapping and the use of a lab’s recommendation software or the development of recommendations by the user.

New providers of recommendation software are the fertilizer manufacturers and retailers. Westco has developed proprietary software for use by Agricore, Saskatchewan Wheat Pool, and the Co-ops. Cargill Inc. is in the process of developing software that can be used by their outlets across North America. And Phosyn plc receives plant and soil analysis results by email from
labs around the world and make recommendations for their foliar micronutrient product line. The reports are put in the dealer’s password-protected mailbox, which s/he accesses via the internet.

Although the various software products have different capabilities, they are all far-advanced and much more user-friendly than the products of old. Furthermore, there seems to be a race to develop even better products; including plant analysis recommendation software and soil analysis recommendation software that can handle manure application.

This paper will concentrate on Enviro-Test Laboratories’ pcF.A.R.M.s&p as an example of the recommendation software available today.

Why Develop Recommendation Software?

Less than 15% of Prairie fields are soil tested and the main reason appears to be that the producer, and often the fertilizer dealer or consultant, does not agree with the target yields and/or the nutrient recommendations provided by the lab. Historically, they had some justification for this position. Target yields and nutrient recommendations provided by the labs are based on regional crop yield potential and soil and environmental factors, albeit considering a particular field’s nutrient levels. Thus they may not adequately reflect the situation in a particular field. Actual spring soil moisture and precipitation, fertilizer application method, cultivation, pest pressure, as well as historical fertilization and cropping practices affect yield potential and nutrient recommendations and can vary significantly from field to field let alone across a Soil Climatic Zone.

Soil testing is not an exact science. To begin with, a pound or two of soil is being asked to reflect the nutrient status of tens-of-millions of pounds of soil. But, in the hands of a good agronomist or fieldperson that knows the historical and present farming practices of a field, the soil test can provide good quality target yields and nutrient recommendations. To do his/her job in a time-effective manner, however, the agronomist/fieldperson needs the appropriate software. Thus, Enviro-Test began the development of pcF.A.R.M.s&p.

pcF.A.R.M.s&p (personal computer Fertility Analysis and Recommendation Management software for soils & plants)

pcF.A.R.M.s&p is written in, and contains a run-time version of, Microsoft Access. The minimum requirement is a 4x86DX computer with 16 MB RAM and Microsoft Windows 95.

Soil and plant analysis results are emailed to the recipient as attachments, with numerous fields included in each attachment. The user must save the attachment to the “C:\pcFARM” directory, then import the results into the soils or plant portion of the program, using the “Import” button.

The “Set Up This Program” section allows the user to enter their name, address, etc. and indicate whether to use their name and logo or “Enviro-Test laboratories” over the recommendations.
pcF.A.R.M.s&p is provided free-of-charge to dealers and crop consultants who send their soil and plant samples to Enviro-Test.

pcF.A.R.M. for soils

The user can edit information about that field (acres, legal location, etc.), previous crop and rotation. The user can change the target crop and yield (and protein content if a cereal or forage grass), if the producer changes their mind, or to more adequately predict crop yield potential in that field. Actual spring soil moisture can also be entered as inches of available water or depth of moist soil to improve the predicting of yield potential. The soil climatic zone, too, can be changed should this be deemed appropriate.

The user can work with one or two crops, or one crop with two target yields at the same time, but also create any number of scenarios using the “Copy Scenario” and “Add Scenario” buttons.

After generating the recommendations, the user can edit the histogram indicating whether the nutrients are sufficient, marginal or deficient for that crop. The user can also edit the recommendations and the comments.

The recommendations can be edited by nutrient and yield, by nutrient for all yields, and by creating and using an Edit Default. The Edit Default function allows the user to set up a pick list of changes that will be made for each nutrient for all yields, by crop. If north of town tends to be wetter than south of town, for example, the user can set up an Edit Default in the pick list called North of Town. The attributes of which may be to increase the nitrogen recommendation by 10%, increase the phosphorus recommendation by 5 lb/ac, change the potassium recommendation to a fixed value of 15 lb/ac, etc. By contrast another default can be set up for South of Town that will lower the nutrient recommendations. Defaults can also be set up for various crops, direct versus conventional seeding, slope position, and so forth.

Although the reports can be produced with the user’s name over Enviro-Test’s recommendations, any editing of recommendations by the user forces their name over the recommendations. The same occurs when the user edits the histogram. This makes the user responsible for all changes to the report.

The comments can be edited and new ones added. Comments not related to the soil test can also be added. Comments, for example, addressing potential herbicide residue problems, weed type and location in the field, fungicide recommendations, etc.

pcF.A.R.M. for plants

This portion of the pcF.A.R.M.s&p software is for plant analysis. As with the soils program, the user can edit information about that field (acres, legal location, etc.). The crop, plant part sampled, and growth stage can also be edited.
After generating recommendations, the histogram and comments can be edited, as can the recommendation for each nutrient separately. Edit Defaults can be setup, but they work differently than in the soils program.

For example, as a dealer may carry two foliar copper products, one fast and one slow-entry into the plant, they will want to put both into the copper pick list. They can enter each along with the crop type it is to be applied to, the ml/ac of product recommended, the recommended crop growth stage for application, the spray water volume, etc. When this Edit Default is selected, this information is included on the Plant Analysis report, making it more reader-friendly and reducing the possibility of application error. Again, the user’s name will show over the recommendations and/or histogram when they have been edited.

Where will we go from here?

Enviro-Test released pcF.A.R.M. (which had only the soils program) in March of 1999 and pcF.A.R.M.s&p in September of 1999. During the Fall 1999 soil sampling season more than 140 dealers and crop consultants across the Prairies used pcF.A.R.M.s&p. Many others used software from other sources. The rapid adoption of this technology therefore indicates it is being well received. Considering the competitive nature of the retail fertilizer industry and the laboratory industry, and the need for producers to optimize crop yields and input costs, it is likely improvements in soil and plant analysis recommendation software will continue for the next several years.
Figure 2. To edit the histogram the user moves the tabs with the mouse.

Figure 3. Setting up the Edit Defaults on pcF.A.R.M. for soils.