

## **Paper Title**

ArcGIS for Certified Crop Advisers (CCAs): A Training Program

## **Authors' Names**

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## **Paper Abstract**

Certified Crop Advisers help farmers make decisions about growing crops. ArcGIS is a tool that is finding its way into more CCA toolkits. We developed this hands-on workshop for CCAs on how to use ArcGIS to manage and analyze data and help make decisions on farmers' fields. The workshop is designed for a two-day session with an optional third day for more advanced users. The workshop emphasizes practical applications of the software to solve problems common to Midwest agriculture production. While the workshop is designed with Midwest agriculture examples, its modular design allows for inclusion of examples from other regions as needed. This talk will discuss the development of the workshop and demonstrate one or more of the hands-on modules and accompanying instructor notes. The workshop is part of the educational materials produced by the Foundation for Agronomic Research, made possible via contributions from supporting companies and organizations.

## **Paper Body**

The Certified Crop Adviser Program (CCA) is one of the professional certification programs offered by the American Society of Agronomy (ASA). It is a voluntary program providing a base level of standard through testing and raising that standard through continuing education. There are currently over 14,800 CCAs internationally.

To become a Certified Crop Adviser (CCA), one must pass an International exam and a local board exam, have 2 to 4 years of advising experience with farmer/grower clients, be supported by letters of recommendation, and sign a code of ethics.

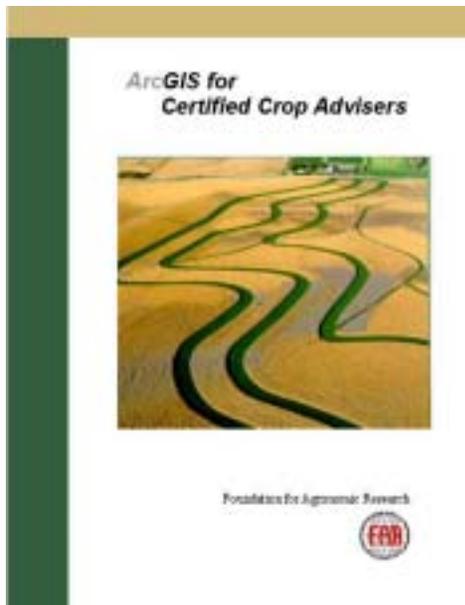
The minimum competency exams stress knowledge and skills in: Nutrient Management, Soil and Water Management, Pest Management, and Crop Management. The Performance Objectives documents outline competencies and objectives for these subject matter areas. After demonstrating minimum competence by passing the exams the Certified

Crop Adviser maintains certification status by attaining a minimum number of Continuing Education Units (CEUs) during each two-year certification cycle.



The continuing education program of the Certified Crop Adviser program provides learning opportunities for CCAs to improve their knowledge and skills as crop advisers. Educational programs can be offered by individuals with appropriate credentials, and may be submitted for CEU review and course assignment to either local or the International CCA boards. The continuing education program for CCAs defines the subject matter and "cutting edge" learning needs of agricultural professionals. These are the additional educational areas that CCAs will find useful in building on their competencies demonstrated when they passed the certification exams.

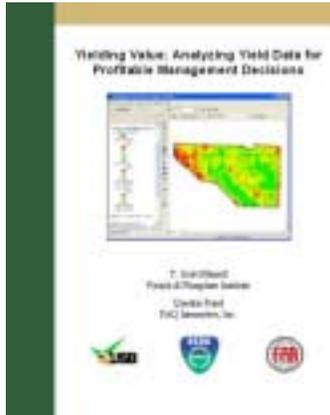
In order to maintain certification status, a CCA, must complete at least 40 CEUs in a two-year cycle with a minimum of 5 CEUs in each of the 4 categories of Nutrient Management, Soil and Water Management, Pest Management, and Crop Management. In addition, up to 5 CEUs of the 40 CEU total maybe attained in the Professional Development category although this category has no minimum credit requirement.



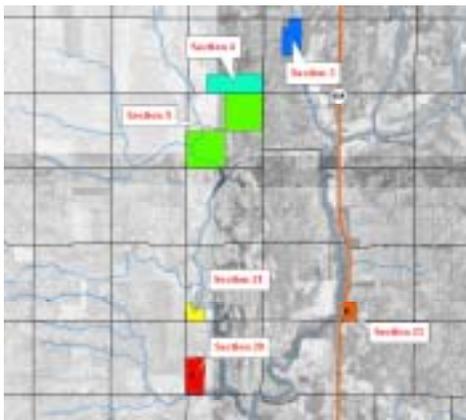
Through the leadership of the Foundation for Agronomic Research (FAR), we developed a two-day workshop titled "ArcGIS for CCAs". The objective of the workshop was to integrate the educational areas outlined in the CCA program's continuing education guidelines with the range of skills necessary to run ArcGIS. Two concepts drove this integration. The first was that in order for CCAs to dedicate their time to learning GIS skills, the training needed to fulfill their continuing education obligations as a CCA. The second concept was that applied training, training that used data and examples typical of the learners' work experience, would be better received than generic or unrelated examples found in many training programs. This second concept was reinforced through my experience in teaching ESRI products to a variety of agricultural audiences from farmers to researchers to agribusiness professionals.

Specifically, the CCA workshop builds on an earlier workshop developed for the Illinois Society of Professional Farm Managers and Rural Appraisers. In this initial custom workshop, exercises were developed to get users familiar with the tools and terminology of the ArcGIS applications ArcMap and ArcCatalog. The exercises featured datasets and tasks that typified datasets and objectives of the target audience. The response to this customized training program was well received. Each of the workshops offered to the Illinois Society of Professional Farm Managers and Rural Appraisers has been filled to capacity. The attraction of this applied training methodology comes from the need to "hit the ground running" with a GIS in small and medium sized firms.

The design of the CCA workshop was a bit more involved in that it directly ties in the continuing education educational areas outlined by the CCA program. The CCA workshop is also a work in progress. We have developed and piloted some modules, but we continue to work in additional examples and data sets for different crop growing regions and advances in university site-specific management research.



The initial modules for the workshop come from FAR's project with the USDA to develop training programs to help farmers and their crop advisers use the massive amounts of data resulting from precision farming applications. As FAR looked at what farmers needed most, the decision was to focus on yield data analysis and soil test data analysis. Dr. Scott Murrell of the Potash & Phosphate Institute designed some analyses to evaluate one year's yield monitor data and multiple years' data for the same field. The Yielding Value module became the model for future modules for training CCAs on the innovative use of GIS in their work with farmers.



While the Yielding Value module is a representative example of a majority of the workshop exercises, we have also added exercises on non-precision farming applications

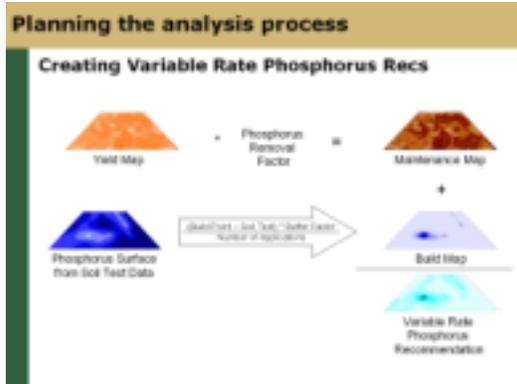
of GIS. Too many times CCAs think of GIS in the narrow scope of precision farming concentrating on mapping yield or creating variable-rate crop nutrient maps. The workshop features several exercises that broaden the use of GIS to mapping customers, demographic data for a specific trade region, and how to pull in data from internet and local sources.

All of the modules in the workshop contain an instructor manual, slide set with notes, step-by-step exercises, and data sets.

The instructor manual is designed to allow others to take the materials developed and teach the module in their own workshop. It includes the module learning objectives, discussion of the other materials provided, and sample questions to stimulate discussion of the topic.



The slide set with notes introduces each module including the CCA educational areas covered and the GIS tools and techniques used in the exercises. In many cases the data set is discussed and a brief demo can be used to help guide learners through the more advanced exercises.



The step-by-step exercises walk users through the steps necessary to complete the task. Each step is explained and/or illustrated. Exercises that are designed to cover more advanced topics include less detail for basic tasks, e.g. Open the Soil Tests attribute table instead of right-click on the Soil Tests data layer in the table of contents and click Open Attribute Table from the popup context menu. This allows learners with some basic skills to concentrate on the advanced tasks instead of being bogged down in step-by-step tedium.

GIS for Controlled Cases: All users

- In the Name field at the top of the General tab, type **Soil Interp**. Click OK. The error message is displayed in the table of contents.
- Use the **Output** text box and drag a rectangle around the fields of the form.

This is already a view of the field. We may want to zoom back to the view from here to start. To make this easier, we will create a spatial bookmark.

- Click **View** in the menu bar at the top of ArcMap. Click on **Bookmarks**. Then click on **From**.

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GIS for Controlled Cases: All users

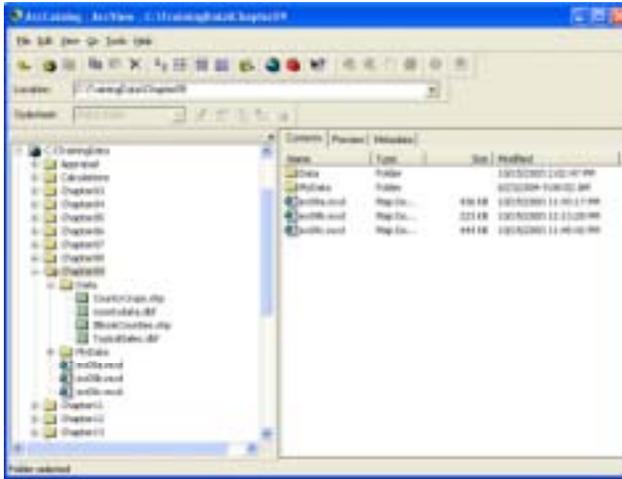
- Type **All Fields** in the Bookmarks Name and click OK. Next we will save the current view to store into a specific data layer.
- Find the **Save Layer as Spatial Bookmark** (Save) button in the popup context menu. Click **Save as Layer**.

Zoom to Layer as you do in the previous for data type. It is useful for a number of reasons, but one key reason is to find where the data is in the map.

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The data sets contain the data and meta data necessary to complete the exercises. Each module consists of one or more exercises. Multi-exercise modules build on the work done in the proceeding exercise to complete the module objectives. While the exercises build

on one another the structure of the data sets allows a learner to start each successive exercise with a “clean slate” just in case the learner had trouble with an earlier exercise.



The ArcGIS for Certified Crop Advisers workshop will continue to evolve as new modules are designed, developed, piloted, and revised. The feedback from initial modules has been very supportive of the concept. CCAs seem to appreciate the direct application of GIS to the issues and opportunities facing them in their profession. Ultimately, the benefit of these workshops will come to the farmer as their crop advisers become proficient with GIS software tools to improve management decisions.

## Acknowledgements

I want to acknowledge the Potash & Phosphate Institute and the Foundation for Agronomic Research for their role in supporting the development of this training program including agronomic support, financial support, and an organizational culture that supports the exploration and application of new technologies toward the goal of feeding a growing world population more efficiently.

I would also like to thank ESRI's Max Crandall, Nick Thomas, and Mark Stewart for their assistance in applying the ArcGIS tools to the problems and opportunities presented to CCAs.

## References

ASA, International Certified Crop Adviser Program, FAQ Sheet,  
<http://www.agronomy.org/cca/faq.html>

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