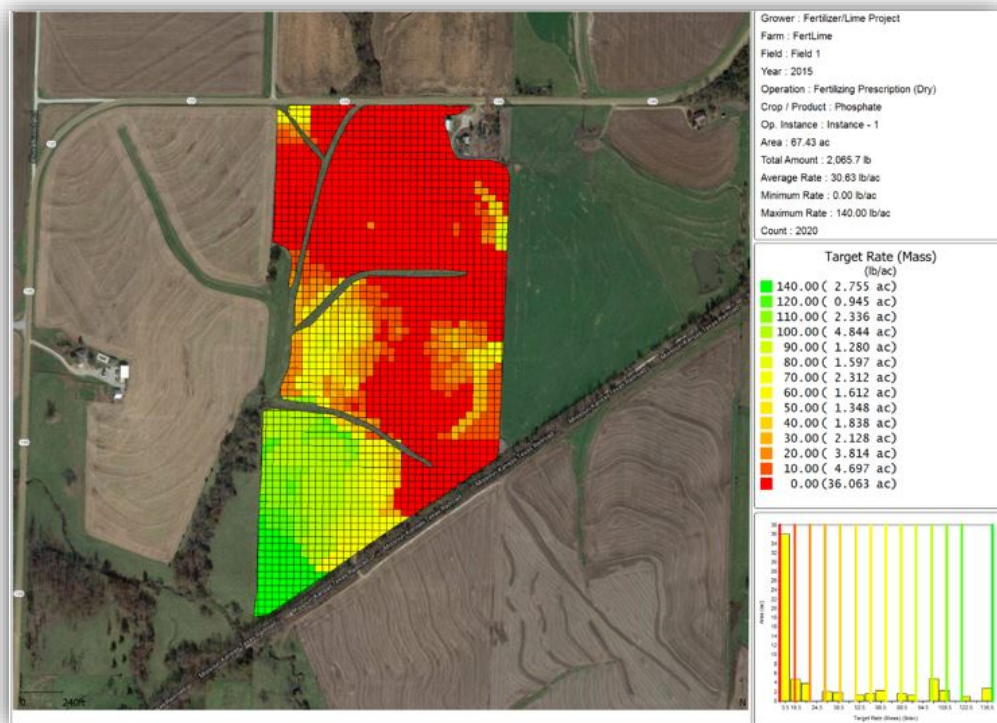


Precision Agriculture Specialist Exam

PERFORMANCE OBJECTIVES

The American Society of Agronomy

International Certified Crop Adviser Program



Effective October 1, 2018

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Precision Agriculture Specialist (PASp) Performance Objectives

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Foreword

The International Certified Crop Adviser (ICCA) Program developed the Precision Agriculture (PAsp) Specialty Certification to meet the growing demand for qualified advisers with focused knowledge and skills in precision agriculture. The Precision Agriculture Specialty is an additional specialty certification that builds upon the basic components of the International CCA Certification, to demonstrate the Crop Adviser's proficiency in working with the Precision Agriculture concepts/technology and building it into a holistic management model.

This specialty, like others within the CCA program falls under the five major pillars of a CCA's knowledge, which include Nutrient Management (*4R Nutrient Management Specialty*), Soil and Water Management, Integrated Pest Management (*Resistance Management Specialty*), Crop Management (*Sustainability Specialty*), and Professional Development. Not all CCAs work extensively on precision agriculture, but focus on other aspects of crop advising. The PAsp Specialty allows those CCAs who advise on precision agriculture to become more visible and recognized for their integrated systems thinking and approach.

The ASA and ICCA Program are based on agronomic principles and practice, including the latest discoveries and new approaches. We encourage comments and suggestions concerning possible modifications to this first edition of the Precision Agriculture Performance Objectives. Comments on this document should be sent via email to: certification@sciencesocieties.org.

The ASA and ICCA Program would like to thank the many volunteers who contributed to the writing of this document, which were comprised of a broad-based group of professionals from industry, private consulting, government, and academia. This type of program would not be possible without their dedication to the precision agriculture discipline within the profession of agronomy and the ICCA program.

Precision Agriculture Specialty

Performance Objective Committee

October 2018

Notes on Exam Format and Conversions

The Performance Objectives (POs) are the basis for the specialty exam, and thus relative to the CCA exam it will contain more in depth and complex questions. Potential examinees should look at the verbs associated with each PO to determine the type of information that may be asked about each topic area. For example, the verb “list” would be considered a much less complex idea than a verb such as “interpret”. The format of the exam will be multiple choice questions with only one correct answer. The questions may contain tables, figures, and data that you will be asked to interpret.

Examinees should be able to convert between metric and English units and vice versa, as well as understand SI units. Conversion factors will be provided for questions within the exam.

Precision Agriculture Specialty

Performance Objectives

Proficiency Area 1: Precision Agriculture: Approach, Concepts, and General Process/Cycle

Competency Area 1. General Concepts

1. Define Precision Agriculture.
2. Outline major components of a Precision Agriculture system/cycle.
3. Explain specific workflow tasks within each component of a Precision Agriculture system/cycle.

Competency Area 2. General Approach and Processes

1. Identify agronomic problems that can be addressed by precision agriculture practices.
2. Assess and select appropriate processes for a given situation to solve agronomic problems.

Proficiency Area 2: Data Collection, Tools, and Technology

Competency Area 1. Spatial and Temporal Data

1. Define general concepts and tools used in assessment of within-field spatial and temporal variability.
2. Identify and assess the importance of abiotic and biotic stresses and/or factors in crop management and agronomic data sources.
3. Evaluate available information and generate a plan for collecting spatial and temporal data:
 - a. Understand how to adjust sampling strategies based on stresses observed in the field.
 - b. Design measurement protocols for collecting abiotic and biotic data needed to make precision recommendations.
 - c. Evaluate how spatial and temporal patterns and stresses and/or factors assist in identifying problems and modifying recommendations.
 - d. Recognize and assess the strengths and weaknesses of different interpolation methods, how different methods can be used to estimate values in non-sampled areas and the importance of creating accurate site-specific recommendations.
 - e. Understand how/when adaptive sampling is used and the strengths/weaknesses of this sampling approach.
 - f. Understand how spatial and temporal variability influences precision recommendations.

Competency Area 2: Use of Tools and Sources of Information

1. Define, explain and evaluate the uses of mapping and navigational tools in Precision Agriculture.
2. Compare and contrast the strength and weaknesses of unmanned aerial vehicles (UAV), satellite, and traditional manned aircraft.
3. Explain how telematics and wireless technology may be used in collecting, analyzing and distributing prescriptions.
4. Explain the use of application control systems and assess the usefulness of information acquired.
5. Explain how robotics could/can be used in precision agriculture.
6. Be able to explain the use of QA/QC in data acquisition and use summary statistics to identify outliers.

Proficiency Area 3: Data Analysis and Prescriptions

Competency Area 1: Data Analysis to Develop Recommendations

1. Describe the importance of data management, data analyses, and result interpretation in precision farming.
2. Evaluate data analysis outcomes including collecting, cleaning, and stewardship.
3. Determine soil testing and nutrient recommendation use in prescriptions.
4. Develop site-specific crop management practices.
5. Use sound agronomic scientific information in the development of prescriptions.

Proficiency Area 4: Communication, Evaluation and Adjustment

Competency Area 1: Economics of Precision Ag, Evaluation of Site-Specific Management and Return on Investment

1. Evaluate and be able to explain to clients the potential benefits and disadvantages of using precision technologies compared to a traditional approach.
2. Identify metrics needed to measure and evaluate the success of site-specific agricultural recommendations.
3. Explain the value of decision support systems commonly used in production agriculture.
4. Identify and communicate the need for additional data to support or improve recommendations.

Competency Area 2: On-Farm Evaluation Basics (Trials and Field Surveys)

1. Identify and assess the appropriate agronomic objectives for on-farm evaluations.
2. Communicate precision farming requirements and successes to all partners.

3. Communicate the value of individual on-farm trials to the client, as well as an assessment of the results.
4. Communicate the farmer's needs to the technology/precision service provider and the agronomist/applicator/sprayer.