



**ALBERTA INSTITUTE
OF AGROLOGISTS**

2018

Crop Production Practice Standard



Approved by AIA Competence Committee

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Preface

This practice standard is part of the continuing effort by the Alberta Institute of Agrologists (AIA) to meet its obligations under the *Agrology Profession Act*. The *Act* specifies that the Institute must establish, maintain and enforce standards of practice as part of the profession's role in protecting the public in matters related to agrology.

This document was created by a Practice Area Expert Committee (PAEC) consisting of four regulated members of the AIA. Members were selected for their expertise and long-standing practice in Crop Production and for their recognition as experts within this area.

This practice standard forms the basis upon which practice reviews will be conducted by the AIA to assist members in ensuring that their professional practice meets a standard that outlines the knowledge, work experience, skills and performance required for professionals practicing in Crop Production.

This document will be reviewed on a periodic basis to ensure it is up-to-date with current industry standards and state of knowledge for the practice area.

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1. Introduction

This practice standard applies to regulated members of the Alberta Institute of Agrologists (AIA) who practice or intend to practice in the "Crop Production" practice area (PA). It defines expectations and outlines requirements regarding professional practice within the PA. Documentation of these requirements provides necessary assurance to the public that the Agrology profession has identified the requirements for competent practice and members have a standard upon which to assess their professional practice and identify potential learning needs in their continuing competence program.

This practice standard forms the basis for implementation of a practice review protocol for this PA. Members working within this PA will be able to request a review of their professional practice based on this practice standard. Such a review will provide valuable input for areas of improvement.

1.1 Objectives

The objectives of this practice standard include the following:

- To identify and to define the knowledge requirements (education, experience, skill sets) and performance requirements for professional practice within the PA;
- To provide documentation of the requirements indicated above so that regulated members of AIA may assess their practice against this standard and thereby identify learning needs to ensure they meet the standard;
- To provide a standard against which members' professional practice may be reviewed by a peer review committee to assist them in identifying areas that may need improvement;
- To provide a mechanism whereby AIA can demonstrate to the public that the profession is managed in a manner that protects public interests in matters related to Crop Production work conducted by regulated members of the AIA.

1.2 Definitions

Competence: The ability to perform certain tasks in one's professional practice based on educational training, skills, and work experience in a manner that meets performance objectives as defined in a practice standard.

Core Knowledge Area: A general area of knowledge consisting of one or more specialized subject matter areas that are required for practice within a PA, for example: "Soils", "Vegetation", "Water", etc.

Performance: The exercise of knowledge in one's professional practice that demonstrates the required ethical conduct and wise judgment as specified within a practice standard.

Practice Area: A unique functional area of professional practice within the agrology profession that requires specialized knowledge, based on education, work experience, and skill sets.

Practice Area Expert Committee: A committee of experts who have demonstrated through their professional practice that they have a comprehensive understanding of the requirements for professional practice in a PA.

Practice Review: A process whereby a peer review panel examines a regulated member's professional practice against a practice standard with the intent of providing input on practice improvement.

Practice Standard: A document that outlines the requirements and expectations for professional practice within a PA.

Professional Practice: The competent and ethical provision of specialized knowledge, recommendations and assessments based on one’s educational training, work experience, and skill sets while being accountable to one’s peers as a regulated member of a professional regulatory organization.

Regulated Member: A member in good standing with the Alberta Institute of Agrologists who holds one of the following designations: P.Ag., RTAg, A.I.T, or A.T.T.

Skill: An ability that has been developed over multiple years of work experience in one’s professional practice.

Subject Matter Area: A specialized area of knowledge required for professional practice within a PA, for example: “Soil Chemistry”, “Plant Physiology”, “Introductory Hydrology”, etc.

Experience: Knowledge or practical wisdom gained from what one has observed, encountered, or undergone.

2. Scope of the Practice Area

The Crop Production practice area involves a multidisciplinary and integrated approach to managing land producing agricultural crops to ensure the long-term sustainability of our food production systems. This involves understanding and applying principles of agronomic best management practices, farm business management and economics, and environmental quality management. Practitioners make decisions that operate over a variety of time scales from immediate problem solving related to seasonal crop performance, to multi-year crop rotation planning. The practice area occurs within a rapidly evolving industry that demands practitioners stay current with new research, technologies and regulations. Practitioners provide validation of new information and play an important role in extending that information to producers by providing advice and receiving feedback on effectiveness of crop production strategies and recommendations. Practitioners may be involved in several specific crop production activities that include nutrient management; insect, weed and disease management; crop rotation development and implementation; soil conservation; water quality management; harvest management and grain storage; and, technology and equipment management. Practitioners may also be involved directly or indirectly in crop breeding and applied research trials to assist in varietal selection for specified geographic regions.

The Crop Production practice area can be grouped into four *focus areas* which vary by crop type: annual crops, perennial crops, agroforestry and horticulture. Annual crop management focuses on cereals, oilseeds, pulses and special crops (e.g., sugar beets) and annual forages while perennial crop management focuses on perennial forage as hay and fodder for animal feed and for forage seed production. Please refer to the Rangeland and Pasture Management Practice Standard for management of perennial forages in a pasture grazing system. Agroforestry focuses on tree management and the production of wood and fiber in a woodlot setting as opposed to large forest management areas. Horticulture focuses on production of fruit and vegetables along with ornamental species of plants.

2.1 Core Activities Within the PA

Members practicing within the Crop Production PA may be active within one or more core activities. These activities include cropping system management; soil fertility and nutrition management; irrigation management; pest assessment and control; plant breeding and crop improvement; and applied research.

2.1.1 Cropping System Management

Cropping system management involves an integrated multiplicity of tasks to manage a cropping system. Such tasks include crop variety selection and rotation development; assessing water use

efficiency and field water balance; seedbed preparation, seeding rates and dates; tillage and residue management; weed control, insect management and disease management; economic analyses for decision making; marketing crop products; harvest and grain storage management; and recommendation of crop inputs and technologies. In addition, understanding climatic-crop interactions is an important consideration in decision making and risk management (i.e., to recognize and to understand the in-season precipitation, plus temperature on soil moisture, and hence crop growth).

2.1.2 Soil Fertility and Nutrition Management

Soil fertility and nutrition management involve considering multiple soil and crop interactions to achieve maximum economic return while minimizing nutrient losses to the environment. Activities include the taking and interpretation of soil, tissue and manure samples, an understanding of crop uptake and removal, an understanding of nutrient losses to the environment and under which conditions they might occur, the interpretation and application of provincial guidelines under the *Agricultural Operation Practices Act*, and an understanding of production potential and the cost of both organic and inorganic nutrient applications. Practitioners are familiar with and implement the principles of 4R Nutrient Stewardship (i.e., right source, right rate, right time, and right place) and understand the implications of response, maintenance and uptake recommendations and their impact on profitability.

2.1.3 Irrigation Management

Irrigation management is a complex and multifaceted process that ensures that the agronomic (e.g., soil fertility, pest control), technical (irrigation systems and associated technology), human (manager's skills, knowledge, and decision making), and water factors that control plant growth are considered in achieving optimal and profitable crop production. Proper irrigation management depends on accurate irrigation scheduling that minimizes problems related to the misapplication of water.

2.1.4 Pest Assessment and Control (Weeds, Insects, Diseases)

Pest Assessment and Control is a diverse area as it pertains to weeds, insects, diseases of field and horticulture crops, either as individual pests or complex pest issues. Tasks involved include: field scouting, proper use of a sweep net, accurate identification of the pest and a determination of infestation level. Once pest identification and threshold levels have been assessed, knowledge of the pest life cycle, yield potential and potential impact and risk and resulting economic value must be assessed. If control is deemed necessary, a review of appropriate control measures can be taken. These may include an integrated review of cultural and pesticide options with an understanding of rates, tank mixtures, timing, maximum residue limits, pre-harvest intervals, and resistance management for long term crop sustainability. Practitioners take into account the presence of beneficial species that can influence pest populations and consider how pesticide recommendations may affect these species.

2.1.5 Plant Breeding and Crop Improvement

Plant breeding and crop improvement involves identifying and breeding new and desirable traits in crop species. The activity requires a thorough knowledge of crop genetics and breeding methods as well as an understanding of disease and insect pest life cycles. Plant breeding and crop improvement may be conducted to enhance yield potential, water and nutrient efficiency; increase disease resistance; increase resistance to insect damage; develop herbicide tolerance (e.g., HTC canola); or to enhance beneficial characteristics of crop products, such as nutrient content and/or bioproducts for non-food purposes. Pedigreed seed production knowledge is also critical to production and introduction of new genetics. Practitioners involved in this activity usually work in either a public or private research facility.

2.1.6 Applied Research

Practitioners are often called upon for their advice regarding new products, cropping system change management, and/or input change(s) to agricultural production systems. Basic understanding of agricultural research methods, field research plot design (e.g., randomization and replication), statistical analyses, (field) data interpretation and extension of such information constitute required knowledge within the Crop Production Practice Area for those involved in this activity.

3. Knowledge Requirements

Knowledge requirements are technical or scientific areas of knowledge that are essential to professional practice within the PA (Table 1). These requirements consist of core knowledge areas consisting of one or more specialized subject matter areas that are foundational to the PA.

The specification of subject matters within each required core knowledge area provides assurance that members working within the PA have the necessary fundamental knowledge to practice. The subject matters within each core knowledge area represent specific scientific or technical knowledge relevant to the PA activities. Subject matter knowledge is usually obtained through educational training in a degree or diploma program; however, subject matter knowledge may also be attained via work experience, self-study or non-adjudicated industry courses (i.e., short courses). To assure the public that practitioners have indeed acquired knowledge outside of an educational degree or diploma program, such knowledge needs to be validated through a challenge exam process implemented by the AIA.

It is the responsibility of members to review Table 1, conduct self-assessments and identify how their knowledge and expertise aligns with the required subject matters. Members who do not meet a required subject matter within a core knowledge area related to their professional practice are required to address the deficiency before practicing unsupervised in relation to that core knowledge area. Members are expected to work toward updating their knowledge where they are lacking specific subject matters for the activities related to their practice. ***Where regulated members do not meet a knowledge requirement for a subject matter, they are required to address the deficiency in one of the following ways:***

1. **Seek Advice and Direction:** Members lacking specific knowledge in required subject matters must recognize the limits of their expertise and seek advice and direction from a qualified professional,
2. **Complete Challenge Exam(s):** To validate that subject matter knowledge has been gained through work experience, self-study or non-adjudicated industry courses, a member will be required to either (i) write a professional practice examination supplied by the AIA; or, (ii) to appear before a panel of peers to complete an oral examination supplied by the AIA, or
3. **Pursue Formal Education and Training:** Obtain credit in a formal course from an appropriate educational institution or from an industry course approved by the AIA (e.g., CCA certification courses; Certified Crop Science Consultant program through the University of Saskatchewan). Such courses must have an adjudicated examination to document knowledge attained.

It is important to note that some practitioners may not need to demonstrate knowledge in all core knowledge areas identified in Table 1. For example, those practitioners who do not practice in pest management are not required to demonstrate knowledge in subject matter areas related to pests.

3.1 Core Knowledge Areas

Several core knowledge areas have been identified as being foundational to practice within the PA (Table 1). These include core knowledge in crops; soils; water; pests; economics; and research methods. Each core knowledge area consists of several subject matter areas which identify specific scientific or technical disciplines. For example, the core activity of “fertility and nutrition management” requires core knowledge within crops and soils, specifically, the subject matters of plant nutrition and soil fertility.

Subject matter areas consist of both required subject matters and recommended subject matters. Required subject matters represent the minimum credible knowledge required for the given core knowledge area and are mandatory for members who wish to provide professional advice or services related to the core knowledge area.

Recommended subject matters represent knowledge that is not mandatory but provide increased depth of knowledge related to the core knowledge area. These subject matters are highly recommended and have been identified to provide direction to members for their continuing competence program.

3.1.1 Crops

A knowledge of crops, both physiology and life cycle, is necessary for the understanding of crop production maximization and limitations. This includes, but is not limited to, an understanding of the suitability of crops in the Alberta climate, both weather and economic. All production decisions will stem from the basic understanding of how a crop will perform under specific conditions, as such it is necessary to have a very solid understanding of the crops with which a professional will provide advice to a client.

3.1.2 Soils

A knowledge of the fundamental fertility, physical, biology, chemistry characteristics of soil is necessary to the understanding of plant growth potential and limitations and to understand the relationship of soils to ground and surface water resources. Soil chemical properties including salinity, acidity and mineralogy; soil physical properties including soil structure, density, strength, water capacity and dynamics resulting from management practices such as tillage, as well as influence on soil temperature; and, soil biological properties such as microbial communities and other organisms and their activities all play a role in crop growth. An understanding of soil fertility relates to essential plant nutrients, and the proper management of fertilizers. In addition, an understanding of soil profile development and morphology is important to identify key limitations within the root zone of individual soil profiles.

3.1.3 Water

Conserving and managing water for optimum crop growth under dryland and irrigated conditions requires two different knowledge sets. Under dryland conditions conservation tillage practices and crop residue management are the key factors in conserving soil moisture, reducing evaporative water loss, and reducing soil erosion. Understanding changes in soil structure and compaction, and how these factors might impact water infiltration are important for soil water management.

Under irrigation, timing of application and the amount of water applied are the key parameters for good irrigation management. Irrigation management consists of four major elements:

1. Knowledge of soils: how they hold water and how water moves through them (texture, water holding capacity, permeability, infiltration rates, internal drainage,) and crops (types, characteristics, annual water requirements, and daily use);

2. Knowledge of irrigation systems;
3. Methods for measuring soil water status (gravimetric,) or instrument based);
4. Estimates of irrigation system application efficiencies, including capabilities and limitations;
5. Methods for estimating daily crop water use (plant, soil, or climate-based methods).

In both cases knowledge of soil physical properties and crop types and development is important.

3.1.4 Pests

A knowledge of pests (weeds, insects, disease) is necessary to the understanding of best management practices to ensure correct procedures and products are utilized for crop establishment and growth to achieve the desired result (food or feed). The proper identification of pests, an understanding of when and how pests may affect plant growth, how these pests and other crop interactions may impact plant health and survival are key elements to Crop Production.

3.1.5 Economics

A knowledge of economics is necessary to the understanding of how crop production decisions are influenced by changes in economic and farm business management considerations. An understanding of production costs, risk and profitability in crop production are essential. Economics provides the ability to analyze and compare the profitability of different cropping and livestock choices/scenarios under differing circumstances. This aids in understanding what type, quantity and quality of product to produce.

3.1.6 Research and Development

A knowledge of research methods is necessary to the understanding of how to develop credible studies and how to interpret published research results. Crops, livestock and their production environments are complex and integrative environments, having multiple variables that change in time and space. As a result, practices and research results developed in one location may not be directly transferable to the operation at hand. Interpreting the validity of research results is critical to effective practice within this PA.

Table 1. Core knowledge areas, required subject matter areas and recommended subject matter areas for the Crop Production practice area

Core Knowledge Area	Required Subject Matter Areas	Recommended Subject Matter Areas
Crops	<ul style="list-style-type: none"> • Introductory Crop Science • Crop Nutrition OR Crop Physiology <p><i>And at least one from the following focus areas*:</i></p> <ul style="list-style-type: none"> • Annual Crops (Cereals, Oilseeds, Pulses) • Perennial Crops (Forages) • Horticultural Crops (Fruits, Vegetables, Ornamentals) • Agroforestry 	<ul style="list-style-type: none"> • Cropping Systems • Environmentally Sustainable Agriculture • Integrated Pest Management • Equipment and Operational Practices • Crop Rotations

Soils	<ul style="list-style-type: none"> • Introductory Soil Science • Soil Fertility <p><i>And at least one from the Recommended Subject Matter Areas for the Soils core knowledge area.</i></p>	<ul style="list-style-type: none"> • Soil Physics • Soil Chemistry • Soil Microbiology • Soil Conservation and Management
Water	<ul style="list-style-type: none"> • Irrigated or Dryland Crop Water Use • Irrigation Management** 	<ul style="list-style-type: none"> • Introductory Hydrology • Soil Physics • Agrometeorology • Watershed Management • Water Conservation and Management • Cropping Systems
Pests	<p><i>At least one of the following***:</i></p> <ul style="list-style-type: none"> • Weed Science • Entomology • Plant Pathology 	<ul style="list-style-type: none"> • Integrated Pest Management • Pesticide Management • Cropping Systems
Economics	<ul style="list-style-type: none"> • Introductory Agricultural Economics 	<ul style="list-style-type: none"> • Farm Business Management • Agribusiness • Commodity Marketing • Cost of Production • Current Market Prices and Options
Research and Development^z	<ul style="list-style-type: none"> • Experimental Design^z • Statistical Methods^z • <i>Knowledge in Core Knowledge Area within which member is conducting research^z</i> 	
<p>* Corresponding to the member's practice in annual crops, perennial crops, horticultural crops or agroforestry.</p> <p>** Irrigation management is required for those working in irrigated cropping systems.</p> <p>*** At least one of the three corresponding to the focus of the member in either weed management, insect management or disease management.</p> <p>^z Required for members conducting research trials.</p> <p><i>Knowledge of a subject matter area may be based on an individual course or be part of multiple courses. For example, knowledge in crop nutrition may be obtained via a crop nutrition course or through portions of other courses such as introductory plant science, crop physiology, or crop specific courses.</i></p> <p><i>Subject matter at a senior level can be substituted for that at an introductory level.</i></p>		

4. Work Experience

Work experience represents a source of knowledge that is gained through professional practice rather than through education. Such experience facilitates development of skill sets and attaining of knowledge needed to be competent within one’s practice. Development of these skill sets and acquisition of knowledge takes time working in an environment where feedback is available to hone one’s skills and acquire experiential knowledge.

Three levels of work experience are recognized within the Practice Standard. These include:

- a) Junior Level (0 to < 3 years) – The junior level of experience coincides with entry level personnel who have recently graduated from an appropriate educational program or have recently begun offering professional services in the PA. This work experience is conducted under supervision by qualified practitioners within the PA. Practitioners at the junior level are considered to have limited experience to provide wholly unsupervised professional services.
- b) Intermediate level (3 to < 15 years) – The intermediate practitioner no longer requires complete direct supervision and has developed skills and obtained the necessary experiential knowledge to take responsibility for their work. Intermediate practitioners may act as mentors for junior personnel and may also seek mentoring from senior level personnel.
- c) Senior level (\geq 15 years) – Senior level practitioners generally provide supervision to intermediate and junior personnel. They are often recognized as knowledge experts by their peers and are often sought after for advice and counsel.

Members will ensure they have sufficient work experience to conduct the work and accept responsibility for the work they do. The time frames indicated in Table 2 are provided for guidance. Career progression and work experience may vary by individual.

Table 2. Typical years of work experience and examples of job duties and responsibilities.

Level of Experience	Examples of Typical Job Duties	Key Responsibilities
Junior (typically < 3 years)	<ul style="list-style-type: none"> • Data collection and compilation • Field scouting • Soil sampling • Job shadowing of intermediate and/or senior personnel • Preliminary data analysis and interpretation • Learning nature of the business • Supervised recommendations • Building contacts • Attending industry meetings • Professional development 	<ul style="list-style-type: none"> • Self-development and demonstration of initiative • Being flexible to different work environments • Being part of team environment • Recognizing the limits of one's knowledge and seek to advance one's knowledge. • Taking responsibility for one's job duties and overall work performance

Intermediate (typically 3 to < 15 years)	<ul style="list-style-type: none"> • Data analysis, interpretation, making recommendations and reporting • Identify business improvements • Supervise and mentor junior personnel • Develop business plans, recommendation plans • Progressive development of business clients • Conduct sales and/or marketing presentations 	<ul style="list-style-type: none"> • Provide guidance and training to junior personnel • Analyze and recognize industry trends • Manage clients • Identify risk and manage accordingly
Senior (typically ≥ 15 years)	<ul style="list-style-type: none"> • Conduct technical presentations • Exercise leadership role in industry • Strategic planning • Provide a trusted and reputable source of technical and operational expertise • Reporting • Professional role model 	<ul style="list-style-type: none"> • Provide guidance and training to intermediate personnel • Administrative and technical supervision of personnel • Coordinate with senior management regarding business strategies, etc.

4.1 Skill Sets

Certain skill sets and capabilities enhance competency within a given PA. Application of scientific or technical knowledge requires skill sets which have been identified under this practice standard (Table 3). Skill sets are tied to effective functioning within the PA and are usually developed during work experience.

Members practicing in this PA are required to evaluate their skills and capabilities against the information in Table 3, and if deficiencies are identified, should target their individual continuing competence programs to address those deficiencies.

Table 3. Skill sets useful for practice within the PA

Skill Sets	Description
Understanding and applying legislation, regulations, policies and standards	It is important for practitioners to stay current with legislation, policies and standards relevant to the PA. Practitioners must ensure clients are informed of standards and regulations that (may/do) impact their operations presently and in the future. In addition, practitioners take an active role to help guide and formulate policy change(s).

Communications and problem solving	Communication and problem solving are vital skills for the practitioner working in this PA. Communication needs to be at a level understood by those with concerns (layman's terms) to ensure recommendations can be understood and followed. Problem solving is necessary to ensure all avenues of possible causes have been evaluated to ensure conclusions are valid. This skill set involves critical information evaluation/interpretation and analysis; integration of knowledge gained with client's specific situation in formulating response(s); understanding that options, as opposed to one answer only, may be required (not always black/white but trade-offs need be considered). Effective communication is important for capturing the value of a member's service offering.
Extension and technology transfer	This skill set involves keeping current with research, new products and trends in the PA; providing relevant research information to aid one's clients in their operations; evaluating new products and technologies; formulating messaging to clients to enhance their operations; and, engaging in opportunities that lead to increased effectiveness in communication skills.
Field assessment skills (crop scouting; soil sampling; tissue sampling)	Field assessment skills are critical to ensure data collection methods and sampling strategies are credible and provide useful information. Proper procedures must be followed to ensure accurate identification, and that accurate analyses are conducted for proper diagnosis to provide recommendations. Practitioners regularly update skills by attending field days and workshops; they stay current on diagnostic techniques and learn about emerging issues. Practitioners have regular interaction with field practitioners and leading experts to improve existing skills and knowledge.
Data collection, management and quality control	Recommendations and advice depend on quality data and the ability to access those data. To ensure consistency, and when doing comparisons, the data need to be collected according to set protocols. Practitioners recognize the benefit of organizational skills and record keeping management; they subscribe to the practice of quality control management and best practices; and, they ensure records and files are backed-up, decipherable to others and enduring.
Synthesize, analyze and interpret field and laboratory data	The abilities to synthesize, analyze and interpret field and laboratory data are essential to developing sound recommendations. Practitioners work to hone and enhance their data interpretation skills and their ability to focus on pertinent data extension. In addition, practitioners recognize testing methodologies used and potential strengths or weakness in such testing methods. They interact with their data source to gain understanding of reports/data collected

	and how the data were generated and reconcile their interpretation with the report source and formulate messaging for ease of extension to client
Understanding agricultural field equipment capabilities and limitations	Field capabilities and limitations of agricultural equipment must be understood. Basic knowledge is necessary to understand how products (seed, fertilizer, pesticide) are applied at the rates that are needed. Practitioners engage in field days and trade shows that present/provide learning opportunities related to field equipment. It is important for the practitioner be aware and conversant in a client's operating equipment. Practitioners may provide "change information" and suggestions to a client as needed in the operation. In addition, practitioners must remain current with changes in equipment and technology and how these may present new opportunities within the client's operations.
Documentation	Practitioners must understand client needs and understanding of data and then generate a recommendation based on the level of need/understanding. Practitioners should strive to develop a system to track recommendations that are made, especially when no monetary exchange takes place. In the event of a complaint, the onus is on the practitioner to document and provide supporting evidence for the recommendation.
Product recommendations	Making product recommendations is a key part of professional practice within the PA. Practitioners must be aware and knowledgeable of new products in the market place, and testing of new products; develop network of contacts within industry that provide a conduit to new information and products; understand limitations and fit of new products within a client's operation; be conversant in recommendations of use for any products discussed or suggested; and, understand liability/warranty of use and the responsibility that is bestowed upon the professional. In addition, practitioners must be familiar with and be able to use a variety of technology driven decision making tools.
Ethical practice	Members adhere to the Code of Ethics for the profession as they make recommendations to their clients. The Code of Ethics states, " <i>The Profession of Agrolgy demands integrity, competence and objectivity in the conduct of its members while fulfilling their professional responsibilities to the public, the employer or client, the profession and other members.</i> " (See Appendix B)

5. Performance Requirements

In addition to the General Practice Standard that applies to all AIA members (see Appendix), specific performance requirements have been developed for this PA. This practice standard

identifies knowledge, work experience and skill set requirements for competent practice and defines the performance expected of regulated members participating in the practice area.

The following performance requirements outline the expectations of the professional practicing within the Crop Production PA. Failure to comply with these expectations may be considered as constituting unprofessional conduct under the Agrolgy Profession Act.

Regulated members stay current with research, legislation, directives, guidelines, industry standards and other reference documentation related to Crop Production.

Regulated members:

- Regularly review the reference material used to support their practice and obtain most current versions when available.
- Attend and provide presentations at conferences workshops and updates, field days, crop walks and tours related to Crop Production.
- Communicate with regulators, research scientists, educators and other practitioners to ensure they remain current with current Crop Production knowledge and trends.

Regulated members understand the limits of their knowledge, skills and experience and seek the expertise of other professionals where necessary.

Regulated members:

- Make appropriate scientific, technical, practical and logistical decisions based on their education and experiential knowledge in Crop Production.
- Apply their skills and use sound judgement in an ethical manner.
- Seek advice and input from other professionals when their expertise is insufficient to make competent decisions and recommendations.

Regulated members clearly understand their role within the practice area.

Regulated members:

- Understand their role in a Crop Production work and do not exceed the boundaries of that role.
- Do not conduct Crop Production work that is beyond their expertise and work experience level unless under the direct supervision of a qualified regulated professional.
- Only accept responsibility for another professional's work when confident that the professional has completed the work in a competent and ethical manner.

Regulated members clearly understand the economic, environmental and social impacts of their recommendations to clients.

Regulated members

- Understand the economic impact of their recommendations to their client(s) aiming to leave a client in a better financial, environmental and social impact position than before the recommendation was made.

- Seek to validate product information. In the absence of Government regulations for product efficacy, members look first to independent Western Canadian research, then to research in Great Plains soils, and finally to manufacturer results.
- Ensure product recommendations fall within industry accepted guidelines such as the Pest Management Regulatory Agency, Maximum Residue Limits and 4R Nutrient Stewardship.

Regulated members strive for continuous improvement.

Regulated members:

- Seek advice from other professionals to enhance their knowledge of Crop Production practices.
- Participate in knowledge sharing with other members to advance professional practice in Crop Production.
- Document best management practices in Crop Production and implement these practices where feasible.
- Focus their CCP activities to improve their practice, through identification of deficiencies and/or new knowledge areas wanted to be gained.

Regulated members review the requirements of this practice standard and address any practice deficiencies through their ongoing continuing competence program.

Regulated members:

- Conduct self-assessments based on education, work experience, skill set, and performance requirements indicated within this practice standard.
- Review their self-assessment with a senior qualified professional.
- Identify any deficiencies and develop a plan to address them.
- Participate in the AIA continuing competence program as required by the *Agrology Profession Act*.
- Discuss this practice standards with their fellow colleagues working within the practice area.
- Provide feedback and/or suggestions to the AIA regarding this Practice Standard.

6. Suggested Reference Material

The following is a list of some recommended reading material relevant to the Crop Production PA in Alberta. It is not intended to be an exhaustive list.

Crops

Agriculture and Agri-Food Canada website: Agroforestry
<http://www.agr.gc.ca/eng/science-and-innovation/agricultural-practices/agroforestry/?id=1177431400694>

Agroforestry and Woodlot Extension Society website:

<http://www.awes-ab.ca/>

Alberta Agriculture and Forestry website: Horticulture

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7. Summary

This document describes the educational requirements, work experience, skill set and performance expectations for professional practice within the Crop Production practice area of the Agrology profession. It provides direction to members of the Alberta Institute of Agrologists who are practicing or who wish to work within this practice area to ensure they are qualified to conduct work in this area.

Members practicing within this practice area are required to review this document and assess their knowledge, work experience, skill sets and performance against the requirements and expectations herein. Where deficiencies are noted members are expected to develop a plan to address these deficiencies through their individual continuing competence programs. Members are expected to understand the limits of their own knowledge and expertise and seek additional advice and professional support as required.

This practice standard will form the basis of ongoing practice reviews conducted by the Institute and the basis for review should a member be subject to a complaint. It is the responsibility of the member to be aware of the contents of this practice standard.

APPENDIX A

The following General Practice Standard applies to all registered members of the AIA. This General Practice Standard is to be adhered to as well as this detailed practice standard for the Crop Production practice area.

GENERAL PRACTICE STANDARD FOR ALL REGISTERED MEMBERS OF THE ALBERTA INSTITUTE OF AGROLOGISTS

The General Practice Standard applies to all registered members of the Alberta Institute of Agrologists. The purpose of the document is to describe the duties and responsibilities that are incumbent upon each member of the profession. It is the responsibility of each registered member to conduct themselves in accordance with these standards. Registered members will be measured against these standards by the Institute, the public, employers, clients and colleagues. The Standard describes the values of the Institute and the profession, and the expectation for each registered member.

PROFESSIONAL RESPONSIBILITY

Each registered member of the Alberta Institute of Agrologists (AIA) is required to uphold the standards and reputation of the agrology profession and professional principles.

Indicators

The registered member has a duty to protect the public and to conduct his or her work with an appropriate standard of care.

Standard of care: Standard of care is the legal duty to exercise the watchfulness, attention, caution and prudence that a reasonable professional in the same circumstances would exercise. If a professional's actions do not meet this standard the professional may be found negligent or to have committed unprofessional conduct.

The registered member is personally responsible and accountable for ensuring that his or her agrology practice and conduct meet the requirements of the practice area(s), practice standards, current legislation, regulations and policy.

The registered member will practice with honesty, integrity and respect, and comply with the AIA's Code of Ethics.

The registered member will sign or co-sign a report only if he or she is willing to accept full responsibility for the contents of the report.

The registered member may delegate portions of the work to competent practitioners under the registered member's direct supervision. The registered member will accept responsibility for that work and provide additional quality assurance/quality control to determine the sufficiency of that work. Registered members will not sign any document for which they will not take full responsibility for the contents of the document.

The registered member will hold the public interest paramount and endeavor to put service above gain and excellence above quantity.

COMPETENCY

The registered member will practice only in an area(s) where the member has demonstrated competence.

Indicators

The registered member will only practice unsupervised in the practice area(s) where the member's education, skills, and experience fulfill the practice area qualifications and the registered member believes he or she is competent. If a registered member's education, skills, and experience do not meet the requirements of the practice area, the member will practice *only* under the direct supervision of a qualified, registered professional who is competent to do the work and who will give appropriate direction to the registered member.

The registered member, if called upon by the profession, a judicial review or a court ordered request, must be able to clearly demonstrate the knowledge and skill sets gained to enable them to practice in any practice area(s) in which the member deems himself or herself competent to practice.

The registered member will undertake continuing professional development (CPD) with the majority of the CPD hours directly relevant to his or her practice area(s). The registered member commits to reporting his or her CPD activities on the member profile as activities are completed.

The registered member will continually update his or her scientific and standard industry practice knowledge related to the member's practice area(s).

The registered member will demonstrate critical thinking when planning, implementing and evaluating all aspects of the work and making any recommendations as a professional.

The registered member is able to show his or her reasoning in reaching decisions through accurate and clearly written documentation.

The registered member will advise the AIA of any changes to his or her practice area(s), particularly when a new practice area is chosen. The registered member will specify the knowledge and skills that have been acquired to support work in the new practice area.

PROVISION OF SERVICE TO THE PUBLIC, A CLIENT OR AN EMPLOYER

The registered member will promote the qualified, competent and ethical professional role and accountability of agrologists to the public, other professionals, and themselves.

Indicators

The registered member will prepare accurate, concise and clearly written reports and correspondence that are appropriate for the intended audience.

The registered member will communicate clearly and respectfully with a variety of people, including his or her employer, colleagues, clients, members of the public and regulators.

The registered member will advise the client if the work is outside of his or her practice area(s) and if the member will be unable to fulfil the terms of reference for the work.

The registered member will make a referral to seek advice, and enter into collaborations with other professionals in situations which require expertise that extend beyond the member's competence.

The registered member will avoid situations where a conflict of interest exists or where the duties and loyalty owed by a member to one party likely will be, is, has been, or perceived to be, in conflict with the duties or loyalties the member owes to another party.

The registered member will extend public knowledge of their area of expertise whether it is in agriculture, the environment, food sciences or life sciences, and promote factual and accurate statements on matters regarding these areas.

STEWARDSHIP

The registered member will advocate and practice good stewardship of all agricultural and environmental resources based on sound scientific principles.

Indicators

A registered member will consider monetary issues, social values, rational application of sound science, lesson of valid experiences, economic impacts to the geographic region, and impacts on future generations when conducting his or her work.

A registered member will inform the client or employer of any action planned or undertaken by the client or employer that he or she believes is detrimental to good stewardship or in breach of known legislation, regulations or policies.

SAFETY

The registered member understands his or her obligation for promoting public and worker safety and considers the health of the environment, health of the consumer, industrial safety, construction safety and the general operational safety of projects.

Indicators

A registered member will demonstrate concern for the immediate and long-term direct effects of agricultural and environmental practices on the safety of workers by being aware of, and evaluating risks.

A registered member will balance the claims of producers and needs and wants of a consuming public against the potentially competing claims for safety of the environment and the interests of individuals and businesses affected by their proximity to agricultural operations. The registered member is aware that the public expects and demands a safe supply of food, not only for current use but also for future generations.

APPENDIX B

CODE OF ETHICS

“The Profession of Agrology demands integrity, competence and objectivity in the conduct of its members while fulfilling their professional responsibilities to the public, the employer or client, the profession and other members.”

Members should be aware of any other laws and responsibilities in regard to other business and voluntary activities which may impact their ethical conduct.

Guidelines to the Ethical Responsibilities of Agrologists

The purpose of the following guideline is to clarify the intent of the Code of Ethics and the understanding of the nature of the professional obligations that arise out of the document. Throughout, it is recognized that membership is a right granted by the public to the regulated member (member) to practice Agrology in such a way that the public interest is served. It is also understood that, just as the individual member has an obligation to conduct business in an ethical and competent manner, colleagues and the Institute share the moral responsibility of protecting their Agrologists and the field of agrology against any unfounded and unjust criticisms.

1) Among the regulated member’s professional obligations to the public are the responsibilities:

a) To practice only in those practice areas where the member’s training, ability, and experience make him/her professionally qualified.

The public has given a right to the Professional with the trust and expectation that those activities are undertaken with competence. A member will not make misleading statements regarding his/her qualifications. A member will actively pursue professional knowledge upgrading specific to their practice area(s) in order to remain competent in his/her field of expertise. A member will make referrals to seek advice, and enter into collaborations with other professionals in situations which require expertise that extend beyond the individual member’s competence.

b) To express a professional opinion only when it is founded on adequate knowledge and experience, and where the member has an understanding of the situation and context in which this opinion is being offered.

Members must clearly distinguish among facts, assumptions and opinions in their preparation of reports and professional statements. Professional opinions should be clearly stated and should include clear indications of the constraints that apply to the opinion, and the relevant qualifying circumstances, facts and assumptions.

Members should exercise care that work they conduct cannot in any way be seen to support or make possible any morally suspect or illegal purposes. In the extreme, this caution might cause a member to refrain from association with enterprises or individuals whose objectives and probity are subject to questions.

Members who act as expert witnesses and provide opinion evidence for the purpose of litigation should not take a partisan position. Agrologists must provide evidence as impartial experts and must not do so as advocates of their client or employer. While acting as an expert witness, a member’s role is to assist the judge/jury/panel with technical matters which are beyond the expertise of the tribunal.

c) To advocate and practice good stewardship of all agricultural and environmental resources based on sound scientific principles(s).

Stewardship requires making complex choices based on a variety of relevant but not necessarily compatible factors. Good stewards must consider, but not necessarily be limited to: monetary matters, social values, the rational application of sound science, the lessons of valid experience, impacts on the economic health of the community at large, and the impacts on future generations. Because of the position of public trust, a member's duty is to uphold professional principles above and beyond the demands of employment.

Conflict may arise between a member's duty to uphold professional principles and the duty to serve the needs of an employer or a client. Members must distinguish between the role they play as Agrologists and the role management plays. Managers have prerogatives and privilege for making decisions based on a wider range of constraints than those that might be appropriate for an Agrologist. The member must not confuse the role of providing others with information upon which to base a decision with the role of being responsible for making the decision him or herself.

If a member believes there is a serious conflict between the requirements of employment and a member's professional principles, a member should inform/or consult the Registrar or any other appropriate persons about the conflict. Members may seek advice and support for the position from the Institute.

d) To extend public knowledge of agriculture and the environment and to promote truthful and accurate statements on sustainable agricultural systems and environmental matters.

Members should strive to develop appropriate involvement with schools, agencies and organizations insofar as such outreach activities can help ensure the dissemination and discovery of sound and appropriate agricultural environment knowledge. Members should attempt to correct misleading or erroneous statements on agricultural matters whenever and wherever such statements are encountered.

e) To have proper regard for the safety of others in all work.

Members must understand their obligation for promoting safety. Members should consider the impact the exercise of their professional duties will have upon the health of the environment, industrial safety, and health of the consumer, construction safety and the general operational safety of completed projects. Members must demonstrate concern for the immediate and long-term direct effects of agricultural and environmental practices on the safety of workers by being aware of and evaluating risks.

The public expects and demands a safe supply of food, not only for current but also for future generations. Members must balance the claims of producers and consuming public against the potentially competing claims for safety of the environment and the interests of individuals and businesses affected by their proximity to agricultural operations.

2) A member's responsibility to the client or Employer is:

a) To act conscientiously and diligently in providing professional services.

Members should endeavour to put service above gain and excellence above quantity. If a member becomes aware of errors or omissions in his/her work, he/she must report the same to his/her client or employer, and immediately work to remedy such errors or omissions.

Expect as required by law, to maintain the confidentiality of client and employer information unless given the explicit consent of the client or employer.

b) A member should consider all information received from a client or employer as confidential unless such information is in the public domain.

Information obtained during and specific to a professional contract situation is confidential and must not be disclosed to others or used by the members outside that contracted situation without the consent of the client or employer. However, technical expertise gained by a member through work may be used in subsequent projects without consent from other parties.

c) To obtain a clear understanding of the client's or employer's objectives.

Members must clearly understand the objectives of the client or employer. Members must make inquiries regarding such objectives to ensure that professional services are provided in the context of complete and accurate information. It is recommended that all oral communication that is material to the delivery of professional services be confirmed in writing.

d) To inform the client or employer of any action planned or undertaken by the client or employer that a member believes is detrimental to good stewardship or in breach of known laws or regulations.

It is a member's duty to advise a client or employer of the consequence of questionable actions and inform the client or employer of the facts that lead the member's belief that the action is detrimental to good stewardship.

e) To refuse any assignment that creates a conflict of interest.

A conflict of interest exists where the duties and loyalty owed by a member to one party are, are likely to become, or to a reasonable, informed and objective observer would appear to be in conflict with the duties or loyalties the member owes to another party.

A member should not accept an assignment in which he/she has a personal or business interest unless that interest is disclosed and approved by the client or employer.

Where a member is in a position of providing professional services to more than one party with different interests in the same or related matter, the member must explain the significance of acting for more than one party to each of the affected clients or employer(s) (the parties) and obtain the written consent of the parties to continue working for more than one party. If any of the parties fail to give their consent the member must then determine whether it is possible to act on behalf of a subset of the parties without conflict. If conflict cannot be eliminated by acting only on behalf some of the parties, then the member should advise all the parties that he/she cannot continue to act for any of them in the matter that generates the conflict of interest.

Members must also advise the parties that no information received in connection with the common matter from the one can be treated as confidential so far as any of the other parties are concerned.

f) To not accept compensation from more than one employer or client for the same work, without the consent of all.

Members need to distinguish between the data or product, which becomes the property of the client; and the process or technical experience, which remains the property of the member.

3) The Agrologist's Responsibility to the Profession is:

a) To inspire confidence in Agrology by maintaining high standards in conduct and work.

A member must keep in mind that the work of an Agrologist is continuously open for public scrutiny and it is the responsibility of each individual to build and maintain a positive image of the field and the profession. Not only must a member perform his/her duties of employment to a high level of excellence, but the conduct of that member must also be of high standard.

b) To support activities for the advancement of the profession.

Members have an obligation to participate in the activities of the Institute (i.e., meetings, elections, holding office, mentoring) as the individual members situation and opportunities allow.

Members need to be constantly aware they are Agrologists and should, by their conduct, provide a positive image of the profession. Each member must be prepared to personally promote Agrology in personal contacts and communications, and to participate in specific promotional initiatives organized by the professional organizations.

c) Where a member believes another individual may be guilty of infamous or unprofessional conduct, negligence or breach of the Agrology Profession Act or bylaws:

to raise the matter with that individual and

if not resolved or if otherwise deemed necessary to inform the Registrar of the Institute in writing.

A member should ensure that the facts and understanding of the misconduct are correct. Consultation with a colleague or Registrar is encouraged if it may help clarify the issue. Members should make every effort to raise and resolve the issue in a candid and professional manner. Agrologists should note that only in exceptional circumstances is it inappropriate to raise such a matter with the other member if done courteously and politely.

d) To state clearly on whose behalf professional statements or opinions are made.

A professional opinion or statement prepared by an Agrologist is for a specific situation and set of circumstances. The content of a professional opinion should include the context in which it is made.

e) To sign and seal only those plans, reports, and other documents for which the members are professionally responsible and which were prepared by or under the direction of the member.

Members who affix their seal and/or signature assume responsibility for and understand the document. The responsible professional must have exercised sufficient control and association with the document so he/she can sign and seal the document based on personal knowledge. Members will not associate themselves with documents, reports or statements that misrepresent, distort or omit material facts. Members should familiarize themselves with information that details the procedures and protocols that are associated with the use and practice of sealing professional works.

4) A member's professional responsibility to other members is:

a) To abstain from undignified or misrepresentative public communication with or about members.

Conduct between members should be characterized by respect, courtesy, honesty, and good faith. Direct and honest criticism between professionals is acceptable and professional debate is encouraged when characterized by fairness and propriety.

Members should be courteous when criticizing the work of another member and be as careful with a colleague's reputation as they would be with their own. Members will advise another regulated member in advance if they are reviewing/critiquing the other's work for a specific project. An individual member will not make statements or representations on behalf of the Institute without prior authorization.

b) To give credit for professional work to whom credit is due.

Members should always acknowledge the work and contributions of others when directly using that work in whole or in part. Members should clearly understand and appreciate that the unpaid use of marketable processes and technology developed by another member could jeopardise that other member's livelihood.

Members will follow the rules and law of copyright. Members will secure releases for any data, process (es), and publication(s) obtained from written or electronic sources.

c) To share knowledge and experience with other members.

Each member has a duty to new members and to the future of the Institute to be available as a mentor for new members. Individual members should offer and seek out constructive professional discussion and debates with colleagues to maintain a vibrant and progressive profession.

Code of Ethics, Revised September, 2010