Next Generation Higher National Unit Specification

Crop Production Management (SCQF level 8)

Unit code: J7A8 48

SCQF level: 8 (32 SCQF credit points)

Valid from: session 2024–25

Prototype unit specification for use in pilot delivery only (version 2.0) August 2024

This unit specification provides detailed information about the unit to ensure consistent and transparent assessment year on year.

This unit specification is for teachers and lecturers and contains all the mandatory information required to deliver and assess the unit.

This edition: August 2024 (version 2.0)

Unit purpose

This unit builds learners' knowledge of the science behind crop production, and develops their skills in the reasoned decision-making required for managing crops in the agricultural industry. The unit covers:

- crop physiology
- crop quality
- plant protection
- storage
- precision technology
- the environmental considerations of crop production

It is aimed at learners with a specific interest in arable farming and those who want to enhance their understanding of agricultural practice.

Entry to the unit is at your centre's discretion. While learners do not need to have previous skills or experience before they start the unit, they would benefit from some familiarity with farming processes and a scientific interest in the sector.

The unit could build upon pre-existing knowledge from the unit Principles of Crop Production at SCQF level 7. Learners would benefit from previous study of relevant agriculture or science subjects at SCQF level 7 or above.

It is a mandatory unit in the Higher National Diploma (HND) in Agriculture, and can also be taken on a stand-alone basis.

If learners study the unit as part of HND Agriculture, they may be able to progress to related degree-level study. Alternatively, they may want to go directly into employment in an agricultural business.

Unit outcomes

Learners who complete this unit can:

1 explain scientific principles of crop production
2 apply scientific principles of crop production to choose appropriate methods of crop husbandry
3 compare contrasting crop production enterprises for their contribution to food security, and environmental and financial sustainability

Evidence requirements

Learners must provide the following evidence:

Outcome 1

In this outcome, learners explain the scientific basis of crop production, identify relevant principles, and use them to explain how decisions have an impact on various aspects of crop production. This outcome will assess knowledge, but also the ability to handle different types of information, for example, extracting information from tables, graphs, diagrams and text.

Outcome 2

In this outcome, learners identify a question or problem relevant to crop production management. Learners then:

- identify potential solutions/ interventions
- quantify the effect of applying the potential solutions/interventions
- consider the practicality of the solutions/interventions tested

Outcome 3

Learners evaluate crop production enterprises, and compare them in terms of productivity, environmental impact and food security. They make suggestions on how to minimise adverse environmental impacts while contributing to food security and ensuring the enterprise remains economically viable.

Knowledge and skills

The following table shows the knowledge and skills covered by the unit outcomes:

Knowledge	Skills
Outcome 1 Learners should understand: ♦ the scientific principles of crop production	**Outcome 1** Learners can: ♦ use scientific principles to apply crop and grassland husbandry practice
Outcome 2 Learners should understand: ♦ how to apply scientific principles of crop production, and how to manipulate them to alter crop production outcomes	**Outcome 2** Learners can: ♦ use scientific principles to understand how manipulating practices can affect crop production outcomes ♦ plan and carry out an experiment, and interpret the data produced ♦ handle data and use it to support a theory and/or argument
Outcome 3 Learners should understand: ♦ how contrasting crop production enterprises contribute to food security and environmental sustainability while remaining economically viable	**Outcome 3** Learners can: ♦ evaluate different enterprises in terms of a variety of criteria ♦ address questions about environmental impact and food security ♦ reflect on how different agricultural systems contribute to environmental sustainability and food security ♦ consider the financial implications of these practices

Meta-skills

The structure of the unit encourages you to apply a holistic approach to content delivery and assessment, in line with the integrated nature of agriculture, and for learners to develop meta-skills intrinsically.

Self-management

This meta-skill includes:

- focusing: improving strategies to maintain focus in different classroom situations — including traditional lecture sections, activity-based learning, individual study time and group work, and self-directed study — to achieve the desired results and meet deadlines
- initiative: asking testable questions and building scenarios to address them; justifying decisions during formative and assessed work; showing these skills during class and group work
- adapting: developing openness and adaptability by problem-solving production and/or performance problems; being flexible while working with others; learning about new ways to assess information; understanding how agricultural environments and decisions connect with and influence the wider world

Social intelligence

This meta-skill includes:

- communicating: improving communication skills, both written and oral; putting forward ideas during assessments and class work; communicating professionally with staff and peers to arrange meetings, explain absences, ask questions, facilitate group work and manage potentially challenging interpersonal situations
- collaborating and leading: participating in group activities and facilitating strong peer-to-peer relationships; taking individual and collective responsibility for progression of projects; showing empathy for colleagues in difficult circumstances

Innovation

This meta-skill includes:

- curiosity: exploring further research topics of interest; developing new interests through participation in class exercises, both practical and theoretical
- creativity: developing robust approaches to answering questions; reflecting on scenarios and considering how they might have done things differently compared with the presented solution, and thinking about whether this would have altered the outcome
- sense-making: participating in activities throughout the year involving data gathering and analysis, and using collected or provided information to apply learned concepts to real-world or hypothetical situations
- critical thinking: assessing the value of information sources and their applicability to different situations; understanding how to use them

Literacies

Learners develop core skills in the following literacies:

Numeracy

Learners develop numeracy skills by:

- collecting data using various techniques and measurement scales
- using data supplied to carry out relevant calculations or conversions
- interpreting data presented in various forms (tables, graphs, summary statistics)
- handling data and carrying out analysis to quantify differences or associations
- interpreting the outcome of analyses to make conclusions relevant to the subject matter

Communication

Learners develop communication skills by:

- improving written and oral communication with peers while carrying out group work
- improving written and oral communication with lecturers and members of the wider agricultural and rural business community to obtain information for learning, such as during classes, through email enquiries, or during farm visits or work experience

Digital

Learners develop digital skills and computer literacy by:

- producing assessment evidence, as well as engaging with learning materials and course content
- using computers and software to handle, manipulate and analyse data

Delivery of unit

This is a mandatory unit in HND Agriculture. There may be opportunities to integrate delivery and assessment of this unit with the unit Professional Development at SCQF level 8.

The notional design length for the unit is 160 hours. However, the amount of time you allocate to each outcome is at your discretion. We suggest the following distribution of time, including assessment:

Outcome 1 — explain scientific principles of crop production
(40 hours)

Outcome 2 — apply scientific principles of crop production to choose appropriate methods of crop husbandry
(80 hours)

Outcome 3 — compare contrasting crop production enterprises for their contribution to food security, and environmental and financial sustainability
(40 hours)

Additional guidance

The guidance in this section is not mandatory.

This is a mandatory unit in HND Agriculture. It can also be studied on a stand-alone basis.

Approaches to delivery

As you deliver the unit, you should arrange visits to a range of crop production enterprises (possibly including farms, and storage and processing facilities) as well as teaching the theoretical knowledge.

Ideally, learners should have the opportunity to do a practical experiment for outcome 2, but if this is not possible, they can do it as a thought experiment driven by existing data.

Explain scientific principles of crop production (outcome 1)

You cover:

- crop physiology, using grass, cereals and specialised field crops as examples
- buildings and principles of storage
- crop protection, including integrated pest management
- produce quality and farm assurance
- soils and nutrient management
- machinery and precision methods

Apply scientific principles of crop production to choose appropriate methods of crop husbandry (outcome 2)

You look at:

- experimental design
- data handling
- data interpretation

Compare contrasting crop production enterprises for their contribution to food security, and environmental and financial sustainability (outcome 3)

Your comparisons cover:

- crop production systems
- food security
- biodiversity
- carbon efficiency

Approaches to assessment

Outcome 1

You should present learners with a series of short assessments to assess their knowledge and their ability to handle different types of information in different formats. Each assessment should be short, but can cover more than one topic, including but not limited to those in the list below:

- crop physiology
- crop protection
- soils and nutrition
- machinery
- farm buildings
- produce quality
- environmental impacts of crop production

Outcome 2

Learners will apply knowledge gained in outcome 1 to solve or investigate problems associated with crop production. Learners will carry out one small-scale experiment (likely in groups), which could include any topic mentioned in outcome 1. Experiments may include on-farm observations, field trials, glasshouse trials or data-led (for example, desk-based) studies.

Individual learners should produce a report on their experiment and investigations. They should also produce a brief summary of their findings as a group or individually, which they could present in any agreed format, including a(n):

- poster
- talk
- webcast
- podcast
- infographic
- knowledge exchange
- outreach leaflet

Outcome 3

Learners could write a report where they consider a crop production business unrelated to those compared on visits or in class, and suggest how to minimise adverse environmental impacts while contributing to food security and continuing economic viability. The crop production business could be a college farm, home farm, visited farm or a theoretical business, provided learners can obtain all the necessary details. Other methods of assessment may also be applicable.

Equality and inclusion

This unit is designed to be as fair and as accessible as possible with no unnecessary barriers to learning or assessment.

You should take into account the needs of individual learners when planning learning experiences, selecting assessment methods or considering alternative evidence.

Guidance on assessment arrangements for disabled learners and/or those with additional support needs is available on the assessment arrangements web page: www.sqa.org.uk/assessmentarrangements.

Information for learners

Crop Production Management (SCQF level 8)

This information explains:

- what the unit is about
- what you should know or be able to do before you start
- what you need to do during the unit
- opportunities for further learning and employment

Unit information

This unit builds your knowledge of the science behind crop production, and gives you the opportunity to develop your skills in the kind of reasoned decision-making necessary for managing crops in the agricultural industry. During the unit, you explore:

- crop physiology
- crop quality
- plant protection
- storage
- precision technology
- the environmental considerations of crop production

It is aimed at learners with a specific interest in arable farming and those who want to enhance their understanding of agricultural practice.

You do not need any previous skills or experience before you start the unit, but you would find it helpful to be familiar with farming processes and to have a scientific interest in the sector.

The unit could build upon your pre-existing knowledge if you have already completed the unit Principles of Crop Production at SCQF level 7 or a similar qualification. You would find it helpful to have studied relevant agriculture or science subjects at SCQF level 7 or above.

This unit is a mandatory unit in the Higher National Diploma (HND) in Agriculture. You can also study it on a stand-alone basis.

The unit involves class and lab work, along with farm visits and observations. You can be assessed in various ways, including short assessments and reports on experiments and investigations, some of which you can do as part of a group.

Throughout the unit, you develop meta-skills to enhance your employability in the agricultural sector. There are opportunities to develop meta-skills in:

- self-management
- social intelligence
- innovation

If you study the unit as part of HND Agriculture, you may be able to progress to related degree-level study. Alternatively, you may want to go directly into employment in an agricultural business.

Administrative information

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Superclass: SD

History of changes

Version	Description of change	Date
2.0	Amended evidence requirements of outcome 1 and outcome 2.	August 2024

Note: please check SQA's website to ensure you are using the most up-to-date version of this document.