

Unit 10

Understand Agricultural Organic Production

Unit code: M/600/9130

QCF Level 3: BTEC National

Credit value: 10

Guided learning hours: 60

● Aim and purpose

This unit aims to introduce learners to the skills and knowledge needed for agricultural organic production, and how these can be applied in practice. It is designed for learners in centre-based settings looking to progress into the sector or onto further/higher education.

The learner will develop their understanding of organic production principles and practices. They will consider how organic practices affect the health of soil, crops, animals and the environment and apply organic methods with a crop context.

● Unit introduction

In this unit learners have the opportunity to review the guiding principles that form the basis of organic farming, and consider the practices that farmers adopt to adhere to these principles. The unit covers the development of organic farming over time, with particular reference to some of the key people and organisations in this and the previous century. The term 'organic' is used generically in the context of this unit, so that complementary philosophies such as biodynamic agriculture can be considered.

Throughout the unit, learners will observe and reflect on how organic farming methods affect the health of soil, animals and the environment, and how they differ from non-organic farming practices and management. Learners will have the opportunity to be involved with organic farm enterprises practically as well as experience visits, talks and discussions.

On completion of this unit, learners will appreciate and understand the principles and methods of organic farming, and be able to apply what they have been taught in a vocational context within an organic farm enterprise.

● Learning outcomes

On completion of this unit a learner should:

- 1 Know the development of organic farming practices
- 2 Understand how to manage soil using organic principles
- 3 Be able to apply organic methods to crop production
- 4 Know how to apply organic methods to livestock production.

Unit content

1 Know the development of organic farming practices

Historical background: food production pre-industrial revolution eg farming methods, 3 field system/ strips, fallow, Norfolk 4 course rotation; post-industrial revolution eg Enclosure Acts, intensive methods, chemicals, industrial farming, increase in population, production increases due to First and Second World Wars; key people eg Stapledon, Steiner, Rusch, Lady Balfour, Sykes; sustainability eg UN Declaration 1987; development of organic standards; permaculture; conversion

Organisations: role of Government departments eg Department for Environment, Food and Rural Affairs (DEFRA), Department of Agriculture and Rural Development Northern Ireland (DARDNI), Welsh Assembly Government; Soil Association; Linking Environment and Farming (LEAF); European Union; other relevant organisations eg The Henry Doubleday Research Association (HDRA), Organic Farmers and Growers (OFG), Rothamsted Research, The Organic Research Centre – Elm Farm, Biodynamic Agricultural Association (BDAA), International Federation of Organic Agriculture Movements (IFOAM); costs of membership or subscriptions to organic certification bodies

2 Understand how to manage soil using organic principles

Soil processes: soil properties and types; structure; micro-organisms eg bacteria, fungi; macro-organisms eg earthworms, nematodes; chemical properties eg pH, cations, anions, exchange capacity; soil erosion; biological properties eg nitrogen cycle, carbon cycle,; biological nitrogen fixation, mycorrhiza; organic matter; humus

Soil fertility: natural fertility eg essential elements, plant nutrients; manures eg green manure, animal manure, breakdown in soil; leaching; compost; crop rotations eg legumes current environmental legislation eg closed seasons for spreading organic manures; current restrictions regarding the use of external inputs eg low solubility mineral fertilisers

3 Be able to apply organic methods to crop production

Soil management: conversion process eg fertiliser and pesticide residues; soil degradation; cultivation systems, timing of crop planting; fallow management; stockless systems; potential problems eg nitrate leaching following ploughing of legume rich grassland

Crop rotation: reasons for crop rotation; crop choice and diversity; weed control methods eg mechanical cultivations, timing, shading, crop competition, mulching, hand weeding; potential weed control problems eg incomplete control, disturbing ground nesting birds; pest and disease control eg cultivar resistance and tolerance, biological control, natural predators, beetle banks, permitted pesticides; potential pest and disease control problems eg inappropriate use of biological control agents, breakdown of single gene cultivar resistance; health and safety; personal protective equipment (PPE)

Quality requirements: achievement of market standards for organic crops

4 Know how to apply organic methods to livestock production

Livestock management: choice of livestock eg cattle, sheep, pigs, poultry, others; breed selection; welfare and current legislation and codes of practice; grazing systems; stocking rates; use of legumes; potential problems; markets and outlets eg quality requirements; breeding eg closed systems, mating, weaning; role of livestock and manures in crop rotations; health and safety; zoonoses; biosecurity; PPE

Health: preventive management; role of veterinary medicine and restrictions of use; grazing management for parasite control; health plans; homeopathics; animal welfare

Nutrition and feeds: permitted crops eg for grazing, feeding; by-products; home grown use; current permitted inclusion rates for non-organic feedstuffs

Assessment and grading criteria

In order to pass this unit, the evidence that the learner presents for assessment needs to demonstrate that they can meet all the learning outcomes for the unit. The assessment criteria for a pass grade describe the level of achievement required to pass this unit.

Assessment and grading criteria		
To achieve a pass grade the evidence must show that the learner is able to:	To achieve a merit grade the evidence must show that, in addition to the pass criteria, the learner is able to:	To achieve a distinction grade the evidence must show that, in addition to the pass and merit criteria, the learner is able to:
P1 describe the development of organic farming practices [IE]		
P2 list the main national and international organic organisations	M1 describe the influence of organic organisations on organic farming methods	D1 evaluate the influence of organic organisations on organic farming methods
P3 explain the factors that are important in maintaining healthy soil in an organic context		
P4 illustrate factors that increase fertility of the soil	M2 discuss, using appropriate examples, how cropping has benefited soil fertility in an organic farm	D2 discuss, using an appropriate example, how a farm could wholly or partly convert to organic production
P5 plan soil management using organic principles [CT, EP]		
P6 prepare a crop rotation that applies organic methods to a selected site [RL, TW]		
P7 describe how animals are managed in organic production systems	M3 evaluate, using an appropriate example, the marketing of livestock produce on an organic farm.	D3 make recommendations for one livestock enterprise to convert to organic production.
P8 identify suitable sources of feed for selected organic livestock.		

PLTS: This summary references where applicable in the pass criteria, in the square brackets, the elements of the personal, learning and thinking skills. It identifies opportunities for learners to demonstrate effective application of the referenced elements of the skills.

Key	IE – independent enquirers	RL – reflective learners	SM – self-managers
	CT – creative thinkers	TW – team workers	EP – effective participators

Essential guidance for tutors

Delivery

Delivery of this unit will involve practical and written assessments, visits to suitable locations and will link to work experience placements.

Tutors delivering this unit will need to establish strong links with organic farm enterprises in their locality, irrespective of size. There may be a limited number of farms, so it is essential for tutors to establish links before learners begin their programme. Where visits to organic livestock enterprises are undertaken, suitable biosecurity precautions should be taken to limit the potential of spreading diseases to livestock.

Learners should also be encouraged to establish links with organic farms themselves so that they may experience first hand methods of managing a farm organically. Where learners are from a non-organic background, as will probably be the case for the majority, tutors should have a suitable non-organic farm available for comparison purposes, especially where it might lend itself to case study work.

Health and safety issues relating to working with machinery, crops and livestock on organic farms must be stressed and reinforced regularly, and risk assessments must be undertaken before practical activities and before learners visit any organic production premises. Learners must be made aware of potential zoonoses and must have access to appropriate personal hygiene facilities, especially where livestock or vermin may be encountered. When carrying out practical tasks, learners must wear the appropriate PPE and adhere to safe systems of work.

Learning outcome 1 introduces the concepts of organic farming, and needs to be delivered at the start of the unit. Coverage should include the various people who have influenced and developed organic farming methodology over the years.

Learning outcome 2 introduces organic farming management and is likely to be delivered after learning outcome 1. It is essential that learners have experience of different organic enterprises. Delivery should include regular farm crop walks, visits and guest speakers in order for learners to observe and discuss soil management philosophy.

The delivery of learning outcome 3 could be integrated with that of learning outcomes 1, 2 and 4. Learners will need to have seen and experienced organic crop management from the beginning of this unit, which will generally mean the autumn season. However, as an alternative, this learning outcome could be delivered in the spring to coincide with spring-sown crops and crop growth.

Learning outcome 4 can be integrated with the other learning outcomes. Learners will need to experience a year's cycle of events, for example where there is an organic dairy herd, learners should observe and experience production stages such as calving, health treatments, milking, reproductive methods, feeding and grazing. In the case of organic sheep production, tutors need to highlight the key production essentials such as lambing, health and nutrition.

Outline learning plan

The outline learning plan has been included in this unit as guidance and can be used in conjunction with the programme of suggested assignments.

The outline learning plan gives **an indication of the volume of learning it would take the average learner** to achieve the learning outcomes. It is **indicative and is one way of achieving the credit value**.

Learning time should address all learning (including assessment) relevant to the learning outcomes, regardless of where, when and how the learning has taken place.

Topic and suggested assignments/activities and/assessment
Introduction to unit and unit overview.
Assignment 1: Introduction to Organic Farming (P1, P2, M1, D1)
Tutor introduces the assignment.
Practical sessions: farm walks on an organic enterprise, talk by an organic farmer.
Theory sessions: farming methods through the ages, industrial revolution and population increase, development of industrial agriculture and science.
Theory session: key people in the organic movement, philosophy of organic farming, biodynamic farming, role of organic organisations.
Assignment 2: Soil Management (P3, P4, P5, M2)
Tutor introduces the assignment.
Practical sessions: farm walks, visits, green manure techniques.
Theory session: soil constituents and processes, soil organisms, organic matter.
Theory session: soil fertility, manures, crop management.
Assignment 3: Crop Production (P6, D2)
Tutor introduces the assignment.
Practical sessions: crop walks, visits, talks.
Theory session: rotations, crop choice, conversion to organic methods.
Theory session: crop establishment methods, crop health, control methods.
Assignment 4: Livestock Production (P7, P8, M3, D3)
Tutor introduces the assignment.
Practical sessions: visits, talk by veterinary surgeon concerning permitted livestock treatments, farm practicals.
Theory session: choice of animals, breeding system, grazing, marketing produce.
Theory session: animal health, preventive medicines, homeopathy.
Theory session: nutrition, home grown crops.
Unit review.

Assessment

Evidence for this unit could be derived from a variety of sources. Where possible, to ensure assessment is fair, the size and complexity of any tasks should be the same for all learners. Work placements on organic enterprises could be a useful source of assessment opportunities for learners. Work placements should be monitored regularly in order to ensure the quality of the learning experience. It would be beneficial if learners and supervisors were made aware of the requirements of this unit before any work-related activities are undertaken, so that naturally occurring evidence can be collected at the time.

Some evidence for this unit could be derived from group work, practicals or guided discussion. If these methodologies are used, then each learner's individual contribution will need to be evidenced, possibly via an assessor's observation (Examples of suitable assessor's observations and witness testimonies are available on the Edexcel website, www.edexcel.com).

To achieve a pass grade, learners must meet the eight pass criteria listed in the assessment and grading criteria grid.

For P1, learners need to show how organic farming in the UK has gradually increased as an alternative to other methods of farming that rely on artificial inputs. Learners will be expected to cite, as examples, key people who have been prominent in the development of organic farming methods, especially since the second World War.

For P2, learners need to state the various national and international organisations that have been, and are, key promoters of biodynamic and organic farming. This could be linked with P1, and evidence could take the form of a table. For P3, learners are expected to consider the importance of soil in organic farming. Their explanations will need to include the role of organic matter and the interaction of soil organisms such as detritivores. Evidence could take the form of a presentation based on independent research and practical activities. P4 is a logical follow-up to P3, and assessment of these two criteria could be linked. Learners would need to have practical experience of organic farm cropping in order to appreciate the importance of soil management. A comparison with a non-organic farm may be beneficial. P5 allows learners to put into practice some of the organic principles studied in relation to soil management, and could either form part of a case study or be used to plan organic soil management methods. For P6, a case study of an organic farm could form the basis of assessment. Alternatively, an example of a non-organic farm converting to organic methods could be used. For P7, learners need to study the management of livestock on an organic farm. A non-organic farm converting to organic livestock production could be used, following learners' studies regarding organic livestock methods. P8 could link with P6 to form a useful case study. As a minimum, learners should provide evidence for at least one class of livestock.

To achieve a merit grade, learners must meet all the pass grade criteria and the three merit grade criteria.

For M1, learners need to cover the range of organisations that have been, and are, connected with organic farming. For M2, learners will need to discuss, from research and practical observation/activity, the effect of crops on soil fertility and the link between methods such as livestock manures, growing legumes, green manuring and composting. For M3, learners will evaluate, using an appropriate example, the marketing of livestock produce on an organic farm. This could form part of a case study of an organic livestock enterprise.

To achieve a distinction grade, learners must meet all the pass and merit grade criteria and the three distinction grade criteria.

For D1, learners need to research the role of the major organisations involved in organic farming. Learners need to demonstrate effective evaluation skills in relation to the influence of at least two organisations, in order to differentiate the evidence from that generated for M1. If learners wish to study the influences of prominent individuals, for example Lady Eve Balfour, they need to demonstrate how these individuals influenced organisations and, in turn, how the organisations influenced organic production. For D2, learners could take a non-organic farm as a case study exercise and discuss its conversion to organic methods. D3 could link with D2 or stand alone.

Programme of suggested assignments

The following table shows a programme of suggested assignments that cover the pass, merit and distinction criteria in the grading grid. This is for guidance and it is recommended that centres either write their own assignments or adapt any Edexcel assignments to meet local needs and resources.

Criteria covered	Assignment title	Scenario	Assessment method
P1, P2, M1, D1	Introduction to Organic Farming	Describe the development of organic production, and show how various organisations influence organic farming. Reference could be made to key people.	Independent research. Written evidence. Practical observation.

Criteria covered	Assignment title	Scenario	Assessment method
P3, P4, P5, M2	Soil Management	Compare and contrast soil profiles on an organic farm with those on a farm using non-organic methods. Compare the methods of maintaining and improving soil fertility used on both types of farm, and suggest where improvements could be made.	Case study. Practical observation. Written evidence.
P6, D2	A Crop Rotation for an Organic Farm	Prepare a suitable rotation for cropping on a farm that is preparing to change to organic production, using crops that can be used for selling, for livestock and maintaining soil fertility.	Practical observation. Written evidence.
P7, P8, M3, D3	Livestock Production	Select a livestock enterprise and describe its management for an organic farm. The enterprise will need to grow most of its feed for the livestock on the farm. Plan the conversion from managing livestock on a non-organic farm to managing them on an organic farm.	Practical observation and case study. Written evidence.

Links to National Occupational Standards, other BTEC units, other BTEC qualifications and other relevant units and qualifications

This unit forms part of the BTEC land-based sector suite. This unit has particular links with:

Level 2	Level 3
Introduction to Crop Establishment	Element AgC9.1 Prepare and monitor sites for cultivation Element AgC9.2 Cultivate sites for planting crops Element AgC10.1 Monitor and maintain the healthy growth of extensive crops Element AgC10.2 Minimise risks to crops from pests, diseases and disorders Element AgC11.1 Prepare planting equipment Element AgC11.2 Plant and establish extensive crops Element AgC12.1 Maintain and control harvesting operations Element AgC12.2 Prepare harvested crops
Assist with Agricultural Crop Production	Understand Principles of Plant Science
	Understand Principles of Soil Science

Essential resources

Learners will need access to organic farm enterprises with both crops and livestock. These may be on the same or different farms. Transport to farm enterprises will be essential, as well as PPE, access to personal hygiene facilities and suitable clean working clothes.

Tutors delivering this unit must possess a suitable agricultural qualification. They will need to establish links with organic farms in their area, where learners can observe, and, ideally take part in practical activities during their course of study. Tutors should also have a good working knowledge of the organic sector together with evidence of technical updating. There should be links to a non-organic farm so that learners can make suitable comparisons with organic farm management and methods.

Learners will need access to suitable library and internet resources regarding agricultural organic production.

Employer engagement and vocational contexts

This unit focuses on organic farming methods and management, so tutors will need to establish links with a range of local organic farm enterprises so learners can experience as wide a variety of organic methodology and philosophy as possible. Learners should be encouraged to look for any work experience opportunities on organic farms. Some enterprises may just involve the sale of organic produce, but, whatever the situation, learners will experience the philosophy behind organic farming methods.

Indicative reading for learners

Textbooks

Balfour E B – *The Living Soil* (Universe Books, 1976) ISBN 087663269X

Blake F – *Organic Farming and Growing: A Guide to Management, 3rd Edition* (The Crowood Press, 1994) ISBN 1852238380

Conford P – *The origins of the organic movement* (Floris Books, 2001) ISBN 0863153364

Davies B, Eagle D and Finney F – *Soil* (Farming Press, 2002) ISBN 0852365594

DEFRA – *Fertiliser Recommendations for Agricultural and Horticultural Crops, 8th Edition* (The Stationery Office Books, 2008) ISBN 0112430589

Finch H, Samuel A, Lockhart J and Wiseman A – *Lockhart and Wiseman's Introduction to Crop Husbandry: Including Grasslands, 7th Edition* (Butterworth-Heinemann, 1993) ISBN 0080420028

Forbes J and Watson D – *Plants in Agriculture* (Cambridge University Press, 1992) ISBN 0521427916

Lampkin N – *Organic Farming, 2nd Edition* (Old Pond Publishing, 2002) ISBN 1903366291

Meier U – *Growth Stages of Plants* (Blackwell Science, 1997) ISBN 3826331524

Nix J – *Farm Management Pocketbook* (The Andersons Centre, 2009) ISBN 0954120159

Pretty J, *Regenerating Agriculture* (Earthscan publications, 1995) ISBN 853831980

Raymond F and Waltham R – *Forage Conservation and Feeding, 5th Edition* (Farming Press, 2002) ISBN 0852363508

Sattler F and Wistinghausen E – *Bio Dynamic Farming Practice* (Biodynamic Agricultural Association, 1992) ISBN 0951897608

Soffe R – *The Agricultural Notebook, 20th Edition* (Blackwell Science, 2003) ISBN 0632058293

Thear K – *Organic Poultry* (Broad Leys Publishing, 2005) ISBN 0906137365

Witney B – *Choosing and Using Farm Machines* (Land Technology, 1995) ISBN 0952559609

Youme D, Wilkinson J and Younie D – *Organic Livestock Farming* (Chalcombe Publications, 2001)
ISBN 0948617454

Journals

The British Grassland Society

Farmers Guardian

Farmers Weekly

Grassland Science

Journal of Soil and Water Conservation

Smallholder

Websites

www.cat.org.uk

Centre for Alternative Technology

www.defra.gov.uk

Department for Environment, Food and Rural Affairs

www.environment-agency.org.uk

Environment Agency

www.fwi.co.uk

Farmers Weekly Interactive

www.leaf.org.uk

Linking Environment and Farming

www.organicfarmers.org.uk

Organic Farmers and Growers

www.rbi.co.uk

Reed Business Information

www.riverford.co.uk

Riverford Organic

www.soilassociation.org.uk

Soil Association

www.woof.org.uk

World Wide Opportunities on Organic Farms

Delivery of personal, learning and thinking skills (PLTS)

The following table identifies the PLTS opportunities that have been included within the assessment criteria of this unit:

Skill	When learners are ...
Independent enquirers	researching the development of organic farming
Creative thinkers	planning for organic conversion
Reflective learners	developing sustainable farming methods
Team workers	engaged in case studies
Effective participators	engaged in practical activities and discussions.

Although PLTS opportunities are identified within this unit as an inherent part of the assessment criteria, there are further opportunities to develop a range of PLTS through various approaches to teaching and learning.

Skill	When learners are ...
Independent enquirers	carrying out independent research
Reflective learners	visiting organic farms and being actively engaged in organic farming
Team workers	carrying out case study work
Self-managers	forging links with organic enterprises in their locality.