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7-8 | LESSON PLAN

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Lesson 1

Managing sustainable red meat production

AUSTRALIAN CURRICULUM CONTENT



Analyse how people in design and technologies occupations consider ethical and sustainability factors to design and produce products, services and environments. (ACTDEK029, AC9TDE8K01)

Analyse how food and fibre are produced in managed environments and how these can become sustainable. (ACTDEK032, AC9TDE8K04)

Generate, test, iterate and communicate design ideas, processes and solutions using technical terms and graphical representation techniques, including using digital tools. (ACTDEP036, AC9TDE8P02)

LESSON OBJECTIVE

Students will learn about how red meat is produced in Australia in an ethical way, giving consideration to social values, sustainability and profitability.



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LESSON OVERVIEW

Activity 1.1	On-farm considerations and management	25 mins
Activity 1.2	What is there to consider?	25 mins
Activity 1.3	Case studies: Australian producers	30 mins
Activity 1.4	Online learning task: The importance of dung beetles	10 mins

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Answers	17-21



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Lesson 1

Resources and equipment

ACTIVITY 1.1 – On-farm considerations and management

1. Butcher's paper.
2. [Mick and Nola Alexander, 'Bindaree' Garnant QLD \(6.39\)](#).
3. [Worksheet 1.1a – Management and considerations](#).

ACTIVITY 1.2 – What is there to consider?

1. Computer/digital device access.
2. [Worksheet 1.2a – What is there to think about?](#)
3. [Top 5 innovative ways to store and save water during a drought](#).
4. [GHG emissions - the facts](#).
5. [How can livestock be a part of the climate solution? The natural carbon cycle explained](#).

ACTIVITY 1.3 – Case studies: Australian producers

1. Computer/digital device access.
2. [Melinee & Rob Leather 'Barfield Station' Banana QLD \(6.34\)](#).
3. [Worksheet 1.3a – Barfield Station](#).
4. [Worksheet 1.3b – Case study template](#).
5. [Jenny & Paul O'Sullivan, Beef and Lamb Producers, South Gippsland VIC \(1.53\)](#).
6. [Deb & Fergus O'connor, Beef Producers, Gippsland VIC \(2.05\)](#).
7. [Paul Crock, Beef Producer, South Gippsland VIC \(2.25\)](#).

ACTIVITY 1.4 – Online learning task: The importance of dung beetles

1. Computer/digital device access of [Lesson 1 Online learning task](#).
2. [Dung beetles](#).
3. [Watch: The benefits of dung beetles for livestock producers \(6.11\)](#).

ADDITIONAL READING/RESOURCES

- [Responsible sustainable beef production](#).



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Lesson 1

Lesson guide

ACTIVITY 1.1 – On-farm considerations and management

- a. Divide students into groups of four and facilitate a discussion where students imagine they are the owners of a farm. Ask groups to consider the following questions and record their ideas on butcher's paper.
- What do you produce on your farm?
 - Where is your farm located?
 - What do your animals/plants need in order to be productive (inputs)?
 - What happens if they are not provided with these inputs and what can you do to control it?
 - How do you make sure animals and plants are healthy throughout the year/ their lifecycle?
 - Where do you sell your produce?
 - How do you transport your products there?
 - Who are the people that assist you during the year in order to create your product?
 - What would you do if you didn't have enough water on your farm?
 - What would you do if there was a drought in your area?
 - What records or information do you have to keep during the year?
 - What do you do if you are unable to solve a problem on your farm?
- b. Allow time for students to share their responses and generate a list of 'considerations' that they have thought of in a central area.

- c. Students will now have some simple ideas of the management decisions and considerations that farmers may need to make to operate a successful farm. As a class, view the video clip [Mick and Nola Alexander, 'Bindaree' Garnant QLD \(6.39\)](#) and provide students with Worksheet 1.1a – *Management and considerations*. Students will observe a range of considerations, observations and operations related to the Bindaree property. As students hear the provided terms on their worksheets, they should tick the relevant boxes. (Answers on page 17)

ACTIVITY 1.2 – What is there to consider?

- a. Provide students with Worksheet 1.2a - *What is there to think about?* and allow them time to read and highlight the information, and complete the provided questions. Students will require computer/digital device access to view source materials for the activity.
- [Top 5 innovative ways to store and save water during a drought.](#)
 - [GHG emissions - the facts.](#)
 - [How can livestock be a part of the climate solution? The natural carbon cycle explained.](#)
- (Answers on page 17)

Lesson guide continued next page



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Lesson 1

Lesson guide *continued*

ACTIVITY 1.3 – Case studies: Australian producers

- a. As a class, view the video clip [Melinee & Rob Leather 'Barfield Station' Banana QLD \(6.34\)](#). Students complete Worksheet 1.3a – *Barfield Station* as they view the clip, to create a profile of the considerations of these producers. (Answers on page 18–19)
- b. Divide students into pairs and nominate one of the three case studies to each pair. As their video clip is showing, students take notes about the considerations of their producer/s on Worksheet 1.3b – *Case study template*. These video clips highlight Australian red meat producers who are leading the way in sustainable production. N.B. Discuss with students completing Case study 3 that this study does not address water, soil/plants and animals considerations. Students completing this study must assess what the focus of the producer is and record the term 'unknown' for areas not discussed on their template.

Case study 1	Jenny & Paul O'Sullivan, Beef and Lamb Producers, South Gippsland VIC (1.53)
Case study 2	Deb & Fergus O'connor, Beef Producers, Gippsland VIC (2.05)
Case study 3	Paul Crock, Beef Producer, South Gippsland VIC (2.25)

- c. Direct pairs to present their findings to another pair of students who studied an alternative farm, to gain an understanding of how different producers are targeting sustainability considerations and goals on their particular farms.

- d. Reconvene as a class and discuss the main points of each of the three case studies that were profiled. (Answers on page 19–20). Encourage students to think about what was similar and different between the farms and main considerations. As a class, produce a summary about each farm in a central area. Discuss:

- What were the considerations that the producers were most concerned with on their farm?
- How were these considerations being actioned/addressed? (What the farmers were doing and how they were doing it)
- Why were the producers giving consideration to these things? (Why are these important considerations?).

(Answers on page 19–20)

- e. Compare the management strategies and goals of these producers with what students know about traditional farming practices. Generate a class discussion about what assists modern day farmers in making different choices and decisions regarding sustainable practices. Record these points in a central area. (Answers on page 21)

ACTIVITY 1.4 – Online learning task: The importance of dung beetles

- a. Students access the Online learning task 1 and answer the questions on dung beetles. (Answers page 21)



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Lesson 1

Student resources

ACTIVITY 1.1 – On-farm considerations and management

Worksheet 1.1a	Management and considerations
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ACTIVITY 1.2 – What is there to consider?

Worksheet 1.2a	What is there to think about?
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ACTIVITY 1.3 – Case studies: Australian producers

Worksheet 1.3a	Barfield Station
Worksheet 1.3b	Case study template

ACTIVITY 1.4 – Online learning task: The importance of dung beetles

Lesson 1 Online learning task	The importance of dung beetles
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Worksheet 1.1a

Management and considerations

Mick and Nola Alexander, 'Bindaree' Garnant QLD

Use the QR code or link to access the video clip on [Mick and Nola Alexander's](#) farm.



Tick off the management strategies and considerations associated with this farm.



Reticulated water	Dung beetles
Breaking paddocks	Stopped drenching
Grazed for 1-2 weeks per year	Drought mitigation
Recovery period	700-800 head of cattle
Electric fencing	Destocking
Soil testing	Finishing (fattening cattle)
Apply lime	Supplementary feeding
More plants growing	Community consideration



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Worksheet 1.2a

What is there to think about?

Farmers (primary producers) are responsible for producing the food and fibre that is needed by people worldwide.



The population is expected to reach 10 billion by 2050, so farmers have a challenging job to produce increasing amounts of food and fibre, whilst managing the land and water in a sustainable way.

Sustainability on a farm means producing food and fibre in a way that is: profitable to the farmer; protects the environment so that it can continue to support production in the future; and also considers social issues related to farming, such as animal welfare, ethical trade, etc.

Red meat production (beef, lamb and goats) can impact the water, soil and air. Farmers need to consider their practices carefully so that they do not deplete the land, but instead, work with it in such a way to ensure that it can continue to support production for many years to come.

Worksheet 1.2a continued next page



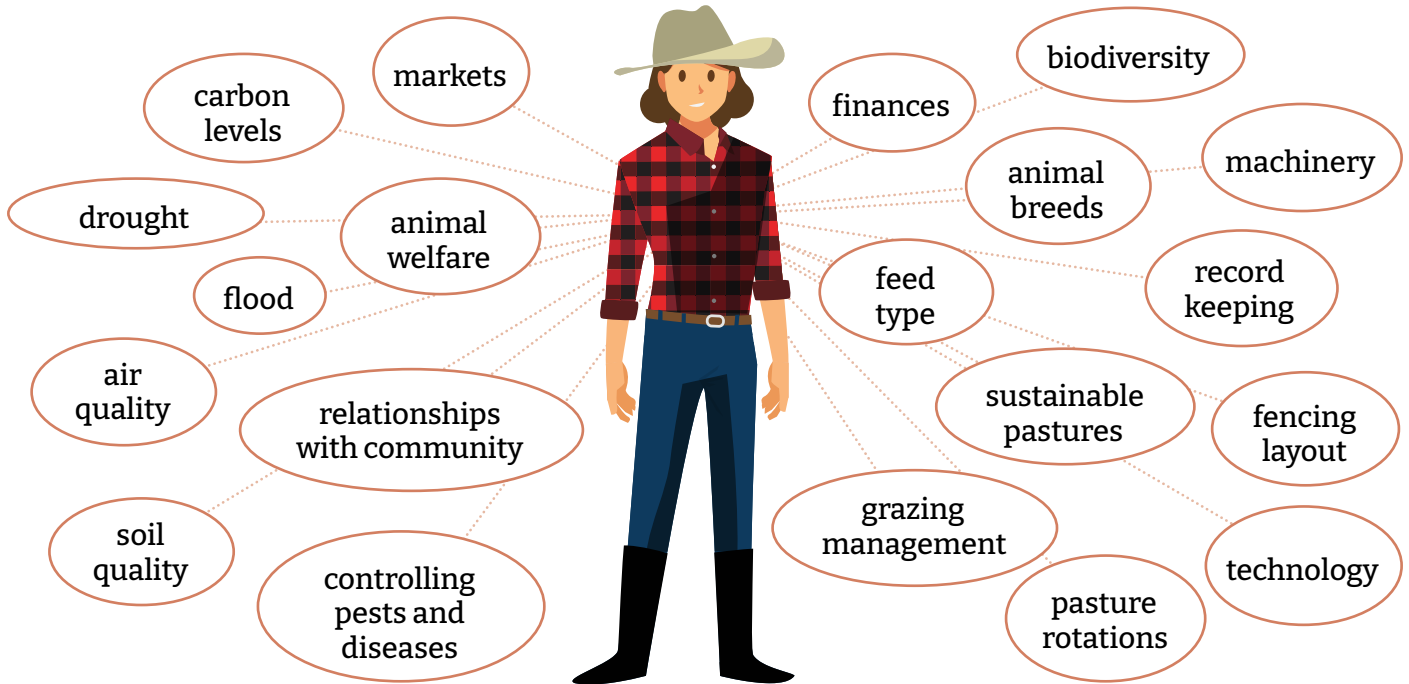
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Worksheet 1.2a continued

Worksheet 1.2a

Managing a farm is a complex job. Decisions need to be made on a day-to-day basis, but long-term planning and goal setting is important too. Some important considerations on a farm might include:



Did you know?

- Australian red meat production has halved its greenhouse gas (GHG) emissions since 2005.
- The amount of water used to produce a kilo of beef has reduced 65% since 1985.
- Australia's grazed agricultural lands are increasing in woody vegetation cover and the conversion of primary forest to other land uses has also declined by more than 90% from 1990 levels, meaning more carbon storage and habitat for biodiversity.



Worksheet 1.2a continued next page



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Worksheet 1.2a continued

Worksheet 1.2a

Managing water

Having enough good quality water is essential to successful farming. Animals consume water (cattle drink between 22–85 L/head/day and sheep between 1–11.5 L/head/day¹ (see [references](#)), and plants need water to grow and develop.

Farmers need to consider a number of water related aspects on their farm, including how animals access water. Animals may drink from troughs, dams, rivers or creeks. Livestock can cause damage to waterways, causing erosion and creating pollution with their wastes as they access water, therefore farmers may need to manage these issues by fencing off areas near creeks and rivers. If animals have to travel too far to access water, it can affect their weight gain as they are using more energy, therefore, farmers also need to consider the distances that animals are travelling. In Australia, it is also very important for farmers to think about methods of storing and saving water in times when it is limited, like during a drought.



Managing the soil

Farms that have healthy, nutrient rich soils with desirable structure and microbial activity will be able to grow plants (such as pastures) that help animals to grow and develop - and are therefore profitable for the farmer.

Producers have a number of decisions to make about managing the soil on their farms. Animals can compact the soil with their hard hooves and also cause erosion. This can result in poor plant growth and issues with water movement in the soil. Farmers therefore need to consider the number of animals they have in a certain area (stocking density) and how long the animals feed in a paddock at any given time to ensure that groundcover is maintained (grazing period). Farmers can focus on the sustainability of their soil by assessing the types of soil in different areas, the amount of nutrients, and the number of organisms within the soil, to determine if they need to improve or treat their soil in a particular way.



Managing the air

In Australia, greenhouse gas emissions (GHG) from agriculture are falling. In fact, the Australian beef industry has more than halved GHG emissions since 2005. With investment in innovative emissions reduction practices and technologies, the red meat and livestock industry will be carbon neutral by 2030 (CN30), and play a key role in the climate solution.

Worksheet 1.2a continued next page



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Worksheet 1.2a

Worksheet 1.2a continued

Questions:

- a. Access the following link to the secondary source and identify the [Top 5 innovative ways to store and save water during a drought.](#)

Method	Innovation to store and save water
1	<p>Answer: _____</p> <p>This system transports water directly to the roots. It uses 50% less water than overhead irrigation.</p>
2	<p>Answer: _____</p> <p>Having one or two larger dams on a farm rather than multiple smaller ones. This will reduce evaporation losses.</p>
3	<p>Answer: _____</p> <p>Determining when and how to irrigate, based on how much water your crop has used.</p>
4	<p>Answer: _____</p> <p>Using groundwater and addressing salinity issues associated with it.</p>
5	<p>Answer: _____</p> <p>This method adds nutrients to the soil while conserving water. It helps with reducing evaporation.</p>

Worksheet 1.2a continued next page



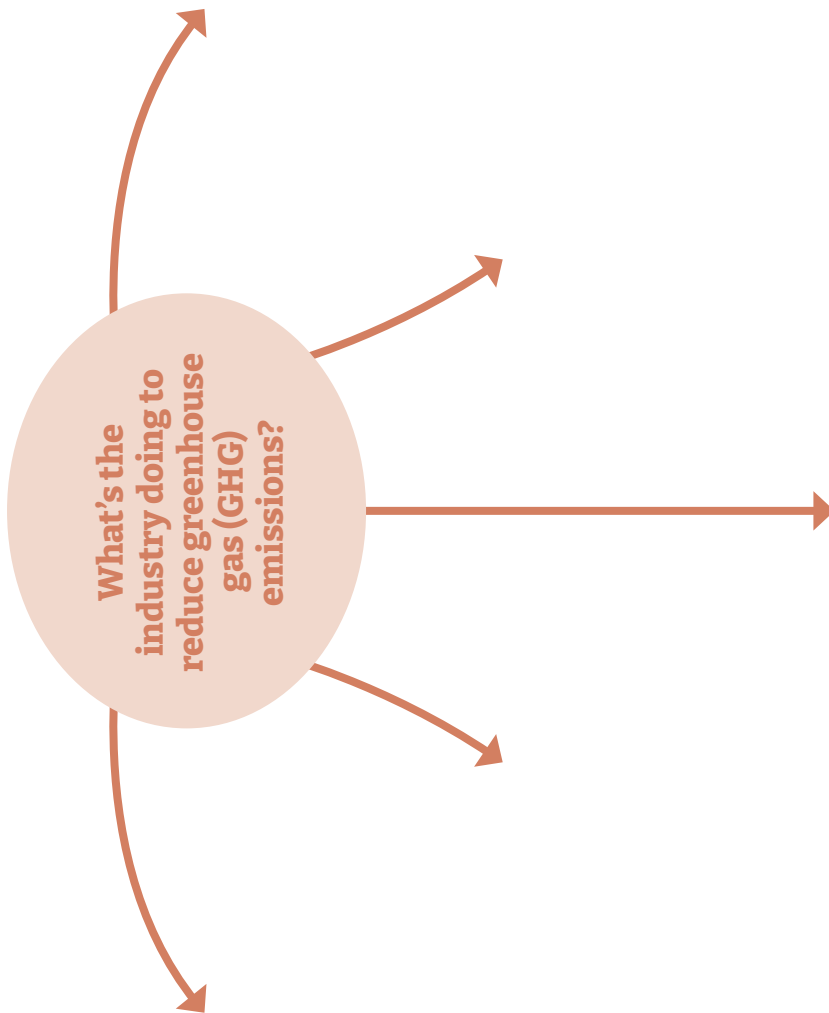
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Worksheet 1.2a continued

Worksheet 1.2a

- b. Access the link [GHG emissions - the facts](#) and complete the mind map detailing: What's the industry doing to reduce greenhouse gas (GHG) emissions? Add five points to the diagram.



Worksheet 1.2a continued next page



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Worksheet 1.2a continued

Worksheet 1.2a

- c. View the video clip [How can livestock be a part of the climate solution? The natural carbon cycle explained](#) (1.50) to learn about livestock farming and greenhouse gas production. Pause the clip at 00:50 and draw a labelled flowchart of the natural carbon cycle, and then view the rest of the clip.

The natural carbon cycle flowchart

A large, empty rectangular box with a thin orange border, intended for the student to draw a labelled flowchart of the natural carbon cycle.



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Worksheet 1.3a

Barfield station

The producers at Barfield Station, Melinee and Rob Leather have a business strategy to ensure they have a sustainable farming operation. This means that they have to look after their environment, cattle and people.

Watch the video about [Barfield station](#) to answer the following questions.

a. Mark the location of the station on the map.



b. Record the following data:

Number of farms	
Number of hectares	
Number of animals	

c. Listen for the following aspects of looking after the cattle on the station and fill in the missing word.

Sufficient _____ of good quality feed

An adequate supply of good _____ water

d. Animal welfare is important to the producers at Barfield station. List some of the strategies that are used on the farm to ensure the animals are being treated well.

e. Animals from the station go to different markets. What can't the cattle that go to the grasslands EU market have in their systems?

f. Identify if records are kept to show how the animals have been treated on the station?

Yes

No

Worksheet 1.3a continued next page



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Worksheet 1.3a

Worksheet 1.3a continued

The producers at Barfield Station have worked to improve their productivity and environmental footprint.

g. List some ways that the producers are observing these improvements on their property.

h. To address the goal of being carbon neutral by 2030, the producers have targeted a number of goals. Identify at least 3 of these goals:





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Worksheet 1.3b

Case study template

Considerations are factors that people care about or think are important

Case study number	
Producer/s name	
Farm location	

Identify what is produced on the farm:

Identify if there are any considerations to water management:

Identify any considerations to plants and soil on the farm:

Identify any considerations given to the animals:

Summarise some of the main actions taken to improve the farm:



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Activity 1.1

On-farm considerations and management

Worksheet 1.1a – Management and considerations

All boxes should be checked by the conclusion of the video.

Activity 1.2

What is there to consider?

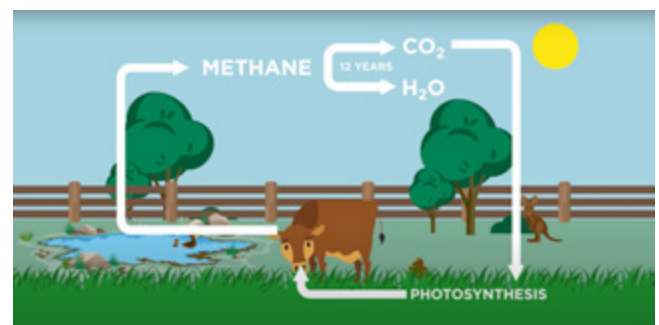
Worksheet 1.2a – What is there to think about?

Method	Innovation to store and save water
1	Answer: Drip irrigation This system transports water directly to the roots. It uses 50% less water than overhead irrigation.
2	Answer: Control dam evaporation Having one or two larger dams on a farm rather than multiple smaller ones. This will reduce evaporation losses.
3	Answer: Irrigation scheduling Determining when and how to irrigate, based on how much water your crop has used.
4	Answer: Desalination Using groundwater and addressing salinity issues associated with it.
5	Answer: Compost This method adds nutrients to the soil while conserving water. It helps with reducing evaporation.

b. Mind map should include:

- Improvements in feeding practices.
- Improved ways of handling manure.
- Improved genetics and animal management.
- Sequestering (storing) carbon in the land.
- Using high-quality feed to improve productivity and reduce emissions.

c.





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Activity 1.3

Case studies: Australian producers

Worksheet 1.3a – Barfield Station

a. Mark the location of the station on the map.



b. Record the following data:

Number of farms	3
Number of hectares	17,500
Number of animals	4,500 head

c. Listen for the following aspects of looking after the cattle on the station and fill in the missing word.

Sufficient supply
of good quality feed

An adequate supply of good
quality water

d. Animal welfare is important to the producers at Barfield station. List some of the strategies that are used on the farm to ensure the animals are being treated well.

Adequate supply of feed and water; low
stress stock handling; pain relief; using new
technologies .

e. Animals from the station go to different markets. What can't the cattle that go to the grasslands EU market have in their systems?

No use of hormones

f. Identify if records are kept to show how the animals have been treated on the station?

Yes

No



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Answers 1.3 continued

Activity 1.3

Worksheet 1.3a – Barfield Station

a. In the box below, list some ways that the producers are observing these improvements on their property.

Groundcover has improved.

Biodiversity of species is improving.

b. To address the goal of being carbon neutral by 2030, the producers have targeted a number of goals. Identify at least 3 of these goals:

- Soil sampling
- Looked at cattle numbers
- Looked at inputs
- Using solar power
- Planting leucaena plants

Worksheet 1.3b – Case study template

Case study 1

Producer name	Jenny and Paul O’Sullivan
Farm location	South Gippsland, VIC
What is produced	Beef and lamb
Considerations to water	Fenced off the creek and planted native vegetation
Considerations to plants and soil	Planted trees to keep the soil in place and prevent losses; now have shade and shelter for their livestock and wildlife biodiversity; they preserve an area of native vegetation
Considerations to animals	Healthy, well performing animals; planted trees for shade and shelter
Summary	Have planted and utilised trees on the farm to protect the soil and also to support the animal’s wellbeing



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Answers 1.3 continued

Activity 1.3

Case study 2

Producer name	Deb and Fergus O'Connor
Farm location	Gippsland, VIC
What is produced	Beef cattle
Considerations to water	Have a large dam; fenced and tree lined; high level of biodiversity present; have tested the water quality (very high quality); 6000 trees have been planted that protect the water
Considerations to plants and soil	Look after the soil to produce grass and support livestock in a sustainable way
Considerations to animals	Eat good quality food all year round and stay with their social group; cattle have access to high quality water; shade and shelter is provided
Summary	Consideration to clean water; tree planting to support beef production; and ensure quality grazing

Case study 3

Producer name	Paul Crock
Farm location	South Gippsland
What is produced	Beef cattle
Considerations to water	Unknown
Considerations to plants and soil	Drawing more carbon out of the atmosphere than what they produce; significant consideration to maintaining the cyclical nature of the carbon cycle; 70,000 trees have been planted; propagated native trees
Considerations to animals	Unknown
Summary	Producing sustainable beef with a significant focus on the carbon cycle

- d. **What were the considerations that the producers were most concerned with on their farm?**
Suggestions include: Producers were focused on the health and well being of their livestock, the quality of the water and soil, and the ability to support natural cycles on their farms. Biodiversity was an important consideration.
- **How were these considerations being actioned/addressed? (What the farmers were doing and how they were doing it).** Suggestions include: Significant tree planting; fencing to protect waterways; consideration of groundcover at all times and a focus on planning.
 - **Why were the producers giving consideration to these things? (Why are these important considerations?)** Suggestions include: These considerations are beneficial from a profitability and productivity perspective, as well as a means of supporting the environment to ensure sustainable production in the future.

Answers 1.3 continued next page



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Answers 1.3 continued

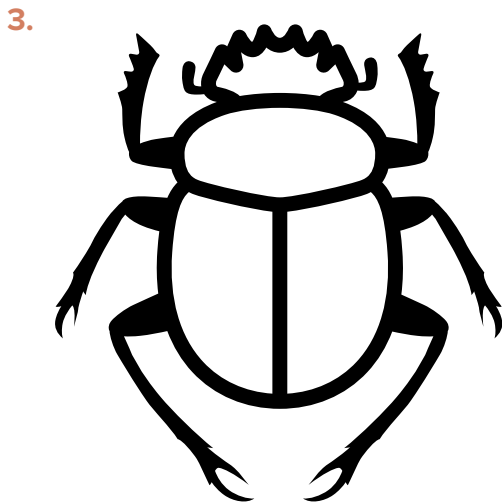
Activity 1.3

- e. Suggestions to discuss: Traditional farming practices included: maximising profit with less consideration (or knowledge) of the long term environmental impacts and consequences of overuse of resources; greater dependence on chemical application to animals, plants and soil to improve productivity and manage pests and disease; removal of vegetation to create more arable farming areas with less understanding of the susceptibility to erosion, salinity and water quality. Modern farmers can utilise data and technology to provide them with detailed quantitative information about environmental impacts and productivity (such as nutrient levels, climate and weather data, animal weight gains). This information allows farmers to make informed decisions and plan for the future. It provides them with a clear indication of how their farming practices are impacting the sustainability of the farm.

Activity 1.4

Online learning task: The importance of dung beetles

1.
 1. Sequester carbon in the soil, assisting producers to reduce emissions.
 2. Improve soil health in grazing systems.
 3. Reduce the spread of diseases and insect pests, including flies and parasites.
 4. Increase pasture health and productivity.
 5. Reduce nutrient run-off into waterways.



4. Dung beetles break down the faeces on the top of the soil, drying out the dung juices. This leaves no food source for the fly larva and, therefore, fly numbers decrease.