Preliminary Agriculture

The Royal Easter Show (SRES)

Curriculum Linked Activities Booklet

In this booklet you will find activities that will link to the units-

- *Overview*
- *Plant production*

You will also find

- *Suggested follow up tasks.*
- *Mock examination questions to complete.*

These activities are aligned with the Stage 6 Agriculture Syllabus and are designed to be **supplemental** to the work completed with your classroom teacher.

It is suggested that you gain as much information as you can while completing these booklets at The Sydney Royal Easter Show (SRES) and at home research any other required information.

By completing these activities and the suggested follow up task, you will have specific real-world examples to use in your examination responses.

Preliminary Outcomes (linked to the activities in the booklet, specific dot points are included with the activity description)

P1.1	describes the complex, dynamic and interactive nature of agricultural production systems
P1.2	describes the factors that influence agricultural systems
P3.1	explains the role of decision-making in the management and marketing of agricultural products in response to consumer and market requirements
P5.1	investigates the role of associated technologies and technological innovation in producing and marketing agricultural products

The enterprises that you will be able to get information on at the show include……

Dairy Production - Milk or Cheese (see Riverina Fresh Working Dairy)

Cattle (Beef) production – Beef (See RAS Show Pies at the Woolworths Ag Discovery Pavilion – producing final product)

Sheep Production – Lamb (MLA in Woolworths Ag Discovery Pavillion) and Wool (Spinning in Sheep Pavilion)

Aquaculture – Oysters (in Woolworth Fresh Food Dome)

Bees – Honey (Bee-Zebo in Arts and Crafts Pavilion)

Pig Production – Pork and bacon

Poultry Production (chicken and duck) – meat and eggs (and duck feathers/down – may be harder)

8.1 Overview and 8.3 Plant Production

Activity ONE – History

To complete this activity, you need to go to the heritage machinery display near the amphitheatre

Syllabus Outcomes: This activity addresses aspects of the syllabus dot points. However, additional details may need to be covered in class or as homework to fully meet the requirements.

Students learn about	**Students learn to**
the impact of physical, biological, social, historical and economic factors on agricultural systems	outline how physical, biological, social, historical and economic factors have impacted on agricultural systems, using examples
changes in the Australian environment that have occurred since the arrival of Europeans	construct a timeline of significant changes in land use practices since the arrival of Europeans to Australia

TASK : Complete the table **on the next page** with FOUR (4) examples of machinery. You can choose to provide four different types of machinery or focus on one type and its evolution over time.

As you walk through the exhibit, consider how advancements in machinery have influenced changes in land use practices over time.

Reflect on the impact of new technology on farming methods and discuss how these innovations have contributed to the evolution of farming systems, both positively and negatively.

Years it was developed or used.	Name / type of machine	Use of machine	How did the use of this machine impact productivity and efficiency on the farm ?	Effect this machine may have on the environment while being used (this can be positive or negative)

Follow-up Activity:

Using the information gathered from the exhibit and your classroom studies on significant changes in farming systems, create a timeline that highlights key developments. Include milestones such as the introduction of new animal breeds, the introduction of chemicals, and advancements in technology. Your timeline should demonstrate how these changes have influenced and shaped farming practices over time.

Activity TWO – Regional Agricultural production

Syllabus Outcomes: *This activity covers key aspects of the relevant syllabus dot points. However, further details may need to be completed in class or as homework to fully meet all syllabus requirements.*

Students learn about	**Students learn to**
The climate patterns and soil resources that influence the distribution of agricultural enterprises (Overview)	Identify the distribution of the main agricultural regions in NSW and their predominant agricultural enterprises
Regionally significant plants *(Plant Production)*	Identify a range of regionally significant plants
Consumer and market requirements for commercial plant products *(Plant Production)*	Recognise the features of plant products that are important to consumers

Some useful terms….

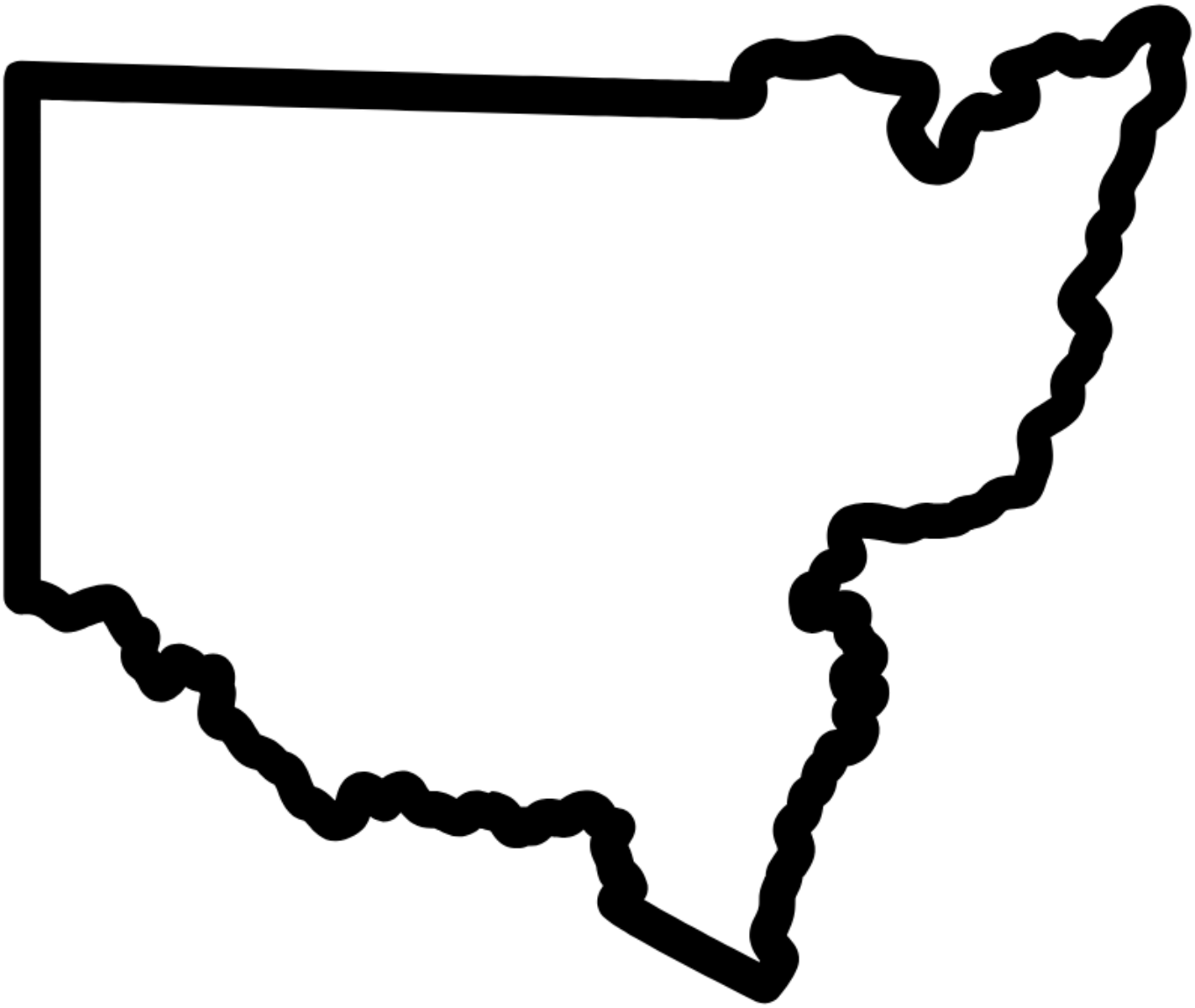
Climatic zone is determined by temperature, sunlight hours, rainfall, humidity etc and reflected in seasons. The climatic zone also affects the type of Soil that is in that area.

Production zone is what can be grown (plants) / raised (animals) is an area and links to the climate.

Go to the District Exhibits in the Woolworths Fresh Food Dome.

Part A: Use the supplied map of NSW **on the next page**.

For EACH region, identify the regionally significant plants and animals and mark these on a map of NSW. You will need to develop a key to represent each plant and animal on the map.



Part B: Select ONE (1) region and identify its most produced plant and animal. (You may need to ask a presenter for this information.)

Region :

Plant	Animal

Part C : Exploring Products:

Pick one plant and one animal product. Visit stalls selling products made from these.

1. ***Engage with the Vendor:*** *Ask what consumers are looking for when purchasing this product. If you prefer not to ask, observe how the product is processed, prepared, or displayed for sale.*

2. ***Reflect on Consumer Choices:*** *Consider what factors might influence a consumer's decision to buy this product. How might they take it home, prepare it, or cook it? What other aspects could impact their purchasing decision?*

Follow up activity

Part A - Climate and Suitability: *Using a map of NSW's climatic regions, answer the following questions:*

Here is a link to a map which uses climatic regions - Australian climate zones | YourHome

1) *Choose ONE (1) plant from EACH region. Explain why this plant is well-suited to the climate of that area.*

2) *Choose ONE (1) animal from EACH region. Explain why this animal is well-suited to the climate of that area.*

Part B-

1) Choose TWO (2) of NSW's main agricultural enterprises and discuss their locations. Link these locations to the corresponding soil types and climate conditions.

2) How do soil type and climate affect the location of intensive and extensive production systems?

3) What other factors can influence the location of agricultural enterprises? For example, access to transport and markets.

4) Choose ONE (1) region of NSW to examine in detail and find the following information ....

- Main land use.
- Number and types of farms
- How much is produced in terms of tonnes / number of head / % of state or country / money

Great information can be found at ABARES : About my region webpage.
http://www.agriculture.gov.au/abares/research-topics/aboutmyregion

REGION :

Activity THREE – Fertilisers and Sustainable Production

Syllabus Outcomes: *This activity covers key aspects of the relevant syllabus dot points. However, further details may need to be completed in class or as homework to fully meet all syllabus requirements.*

Students learn about	**Students learn to**
inorganic and organic fertilisers	select fertiliser(s) appropriate to the soil and the requirements of the crop/pasture
Management for sustainable production	Recognise sustainable management practises, including crop rotation, green manuring, minimum tillage and mulching
the impact of physical, biological, social, historical and economic factors on agricultural systems	outline how physical, biological, social, historical and economic factors have impacted on agricultural systems, using examples
use of technologies in producing and marketing plant products	research and describe a current technology in plant production or marketing

To complete the activities, visit the Woolworths Ag Discovery Pavilion. Look for exhibitors showcasing sustainability and soil health. Pay attention to concepts such as regenerative agriculture or holistic farming, which may be featured on signage or discussed by presenters.

Soils

Visit the Happy Soils stall

This company is about creating a holistic approach to farming, agriculture and soil remediation. They produce and sell 100% organic biological fertilisers.

Quote from the website – "*At Happy Soils, we recognise that embracing a biological approach to farming is key to unlocking higher yields and maximising profitability. By prioritising soil health and fostering ecosystem balance, you can cultivate a thriving agricultural environment that supports sustainable growth"*

Note - Soil ecosystem balance relates to the soil microbes.

1) Using the quote from Happy Soils above, discuss the importance of a biological approach to farming in achieving sustainable agricultural practices. In your response, consider how prioritising soil health and fostering ecosystem balance can contribute to higher yields and/ or profitability.

2) Happy Soils offers several programs to farmers. Choose **one** (1) of the following programs and explain what it involves. Then, discuss how it would benefit a farmer:

- Enhance nutrient availability
- Promote biodiversity
- Enhance carbon drawdown

If this question cannot be completed while at the show, it can be completed using information from their website. https://happysoils.com.au/

3) Happy Soils develops organic biological fertilisers. Choose **one (1)** of their **named** fertilisers and describe its uses and benefits.

4) Create a mind map of the information gained about fertilisers from The Show.

When creating your mind map, ensure it highlights the connection between soil health, fertility, and successful plant growth.

Practice Examination Questions

1) Describe THREE of the changes in the Australian environment that have occurred since the arrival of the Europeans. *(this should be done from positive and negative perspective)* ***(6 marks)***

Key words you could use– *Salinity, erosion, soil compaction, loss of topsoil, loss of soil structure, soil acidification, soil degradation, eutrophication of water ways, sedimentation of waterways, silting of waterways, changes in water courses, development of resistance, increase of weeds, loss of habitat.*

2) *" European settlers had little understanding of the Australian environment. While developing agriculture in this country, their naivety and lack of knowledge had dramatic long-term consequences for the Australian environment."*

i. Identify three (3) examples of the European settler's naivety or lack of knowledge about the Australian environment. **(3 marks)**

ii. Discuss the statement above, using specific examples. **(6 marks)**

3) Outline TWO factors that influence a farm manager's decision when choosing an enterprise for their farm**. (4 marks)**

4) *"Natural resource-based systems are complex and not well understood; and a continuing research effort is critical to the long term sustainability and economic viability of resource based industries" Source Mr Peter Martin CSIRO*

For a natural resource used in agriculture answer the following questions.

Name of resource :

a) Outline the way that the use of the resource differs in Australia today from its use by the Aboriginals prior to 1788. ***(3 marks)***

b) Agricultural production over the last 200 years has altered the Australian environment, in particular natural resources. There is a need for farmers to adopt sustainable farming methods to ensure continued productivity into the future.

Discuss two (2) ways in which agriculture is responsible for the altering of the

natural resource. In your answer include information about the type of agricultural practice, its short and long-term effects on the natural resource**. (5 Marks)**

5) Describe two (2) reasons why Australian farmers find it necessary to apply inorganic fertiliser to their soils. **(4 marks)**

6) Outline the difference between organic and inorganic fertilisers. **(3 marks)**

Marking Criteria

1) Describe THREE of the changes in the Australian environment that have occurred since the arrival of the Europeans. ***(6 marks)***

Criteria	Mark
Identification and clear description of **3 valid** changes that have occurred to environment since the arrival of the Europeans.	**5-6**
Identification and clear description of **2 valid** changes that have occurred to the environment since the arrival of the Europeans. OR identification and brief or unclear description of changes that have occurred to environment since the arrival of the Europeans.	**4**
Identification of **3** valid changes that have occurred to the environment since the arrival of the Europeans OR description of one change and identification of 2 others.	**3**
Description of only ONE change or identification of 2 changes	**2**
A reasonable attempt at the question	**1**

Suggested Answer : *Answer will vary.*

Changes of environment could include: increased erosion, changes to waterways, soil compaction, loss of top soil, loss of soil structure, salinity, water logging, water pollution, increased algae blooms, loss of native plants, changes to soil pH, soil acidification.

1. Introduction of Non-Native Species:
Europeans introduced species such as sheep, cattle, and rabbits. While livestock contributed to the growth of agriculture and the economy, the hard footed animals and overgrazing has led to significant land degradation, soil compaction and erosion, as well as loss of native vegetation. Similarly, rabbits became a pest, causing significant erosion and desertification.

2. Land Clearing and Deforestation:

Large-scale land clearing occurred to establish farms and settlements. This allowed for agricultural expansion, supporting population growth and economic development. However, it also led to habitat destruction, loss of biodiversity, increased erosion and changes to waterways, as well as increased salinity in some regions due to changes in water tables.

3. Water Resource Management:

The construction of dams and irrigation systems enabled intensive agriculture in arid regions, significantly boosting food production and export opportunities. However, these practices disrupted natural river flows, leading to issues such as reduced water quality, loss of wetlands, water logging or salinity and adverse impacts on native aquatic species.

2) " European settlers had little understanding of the Australian environment. While developing agriculture in this country, their naivety and lack of knowledge had dramatic long-term consequences for the Australian environment."

i) Identify three (3) examples of the European settler's naivety or lack of knowledge about the Australian environment. **(3 marks)**

Criteria	Mark
Answer includes **3 valid** examples of European settlers' naivety or lack of knowledge about the Australian environment. Responses must clearly relate to agricultural practices or environmental impacts. Examples should demonstrate an understanding of the long-term consequences on the Australian environment.	**3**
2 valid examples	**2**
1 valid example	**1**

Suggested Answer

1. *Introduction of European farming practices / crops:* European settlers used farming techniques suited to European climates, such as tilling and monoculture cropping, which led to soil erosion, land degradation and reduced soil fertility in Australia's fragile soils.

2. *Introduction of Hard Hoofed Livestock:* Settlers brought sheep and cattle, underestimating the impact of hard-hoofed animals on native pastures and soils, leading to land degradation, soil compaction and loss of native vegetation.

3. *Clearing native vegetation:* Widespread deforestation was carried out to make way for agriculture, which disrupted ecosystems, led to habitat loss, soil erosion and loss of topsoil and increased salinity due to rising water tables.

ii) Discuss the statement above, using specific examples. **(6 marks)**

Criteria	Mark
• Discusses, with reference to the statement. • Demonstrates comprehensive understanding with at least **TWO** specific examples. Positive and negative impacts • Includes clear links between settlers' naivety, agricultural practices, and environmental consequences.	**5-6**
• Discusses, with reference to the statement. • Demonstrates comprehensive understanding with at least **ONE** specific example. Positive and negative impacts • Includes clear links between settlers' naivety, agricultural practices, and environmental consequences.	**4**
Provides at least ONE specific example, with some discussion of long-term consequences, though explanations may lack depth.	**3**
Identifies one or two basic examples, but explanations may be superficial or unrelated to the statement.	**2**
A reasonable attempt at the question	**1**

Suggested answer – Answers will vary

European settlers' lack of understanding of the Australian environment led to significant long-term consequences, as evidenced by their agricultural practices and land management decisions.

One example of their naivety was the widespread adoption of European-style farming techniques, such as tilling and monoculture cropping and reliance on fertilisers. These methods were unsuitable for Australia's nutrient-poor soils, resulting in severe soil erosion and degradation. Over time, this reduced the productivity of the land, required continual application of fertiliser and contributed to desertification in some areas. Another example was the introduction of hard-hoofed livestock such as sheep and cattle. Unlike native animals, these animals damaged the soil structure and native grasses, leading to overgrazing and loss of biodiversity. The impact of overstocking compounded this issue, as

settlers underestimated the land's carrying capacity. Soil compaction, changes to soil structure and salinity is a result in many areas.

Finally, large-scale clearing of native vegetation to establish farmland had profound environmental impacts. this disrupted ecosystems, caused the extinction of native species, and led to salinity problems due to changes in water table levels. These effects are still evident today, as salinity remains a major challenge in Australian agriculture.

In summary, the settlers' lack of knowledge about Australia's unique environment and ecosystems resulted in unsustainable agricultural practices with dramatic and lasting consequences for the Australian environment.

3) Outline TWO factors that influence a farm manager's decision when choosing an enterprise for their farm. **(4 marks)**

Criteria	Mark
Two VALID factors clearly outlined with specific examples and explanations of their influence.	**3-4**
Two VALID factors identified but with minimal or vague explanation.	**2**
One factor Identified with minimal or vague explanation or TWO factors identified	**1**

Suggested Answer

1. Climate and Soil Type:
   A farm manager must consider the local climate and soil type when choosing an enterprise. For example, regions with high rainfall and fertile soils are suitable for enterprises such as dairy farming or horticulture, while arid areas with less fertile soils are more suited extensive enterprises, such as livestock or large-scale cropping. These factors directly influence the viability and productivity of the chosen enterprise.

2. Market Demand and Economic Factors:
   Market demand and potential profitability are critical in deciding an enterprise. For instance, if there is high consumer demand for crops like wheat or niche markets for organic produce, the farm manager may choose enterprises that can supply these markets. Input costs, potential profit margins, and access to buyers also play a role in this decision.

3. Access to markets, transport and associated industries. A farmer needs to consider these and their ease of access or use, depending on whether these things are needed regularly or less frequently. An intensive enterprise will need these more often and readily available.

4) a) Outline the way that the use of the resource differs in Australia today from its use by the Aboriginals prior to 1788. ***(3 marks)***

Criteria	Mark
Clearly explains Aboriginal use of either soil or water and contrasts it with modern use, emphasising a significant difference.	**3**
Describes both Aboriginal and modern use but with limited detail or lacks a clear distinction.	**2**
Mentions either Aboriginal or modern use with minimal explanation.	**1**

Suggested Answer

Water.

1. Aboriginal Use Prior to 1788:
   Aboriginal people used water sustainably, drawing from natural sources like rivers, streams, and waterholes in a way that preserved these ecosystems. They relied on their deep knowledge of the land to find and manage water resources, often using seasonal availability to guide their movements and activities.

2. Australian Use Today:
   Today, water is extensively managed and used for agricultural, industrial, and domestic purposes. Large-scale irrigation systems and dams have been developed to support farming and urban populations. However, this intensive use has often led to over-extraction, salinity, waterlogging, pollution, and degradation of natural water systems.

The key difference is that Aboriginal practices focused on sustainable, small-scale use in harmony with the environment, whereas modern usage prioritises large-scale economic and social demands, often at the expense of natural ecosystems.

Soil :

1. Aboriginal Use Prior to 1788:
   Aboriginal people used soils sustainably through practices like fire-stick farming, which involved controlled burning to encourage regrowth of vegetation and improve soil fertility. These methods supported the natural ecosystem and preserved soil health over generations.

   OR Tilling the land, planting native grasses and shrubs in areas where they could be used and still sustained.

   Their activities were small-scale and designed to work in harmony with the environment, avoiding significant soil disturbance.

2. Australian Use Today:
   Since European settlement, soils have been intensively used for large-scale agriculture, including cropping and grazing. Practices such as land clearing, overgrazing, and monoculture farming have led to soil degradation issues, including erosion, salinity, and nutrient depletion. Modern agricultural practices often rely on synthetic fertilisers and heavy machinery, which can further impact soil health.

   The primary difference is that Aboriginal land management focused on sustainable practices to maintain soil fertility and ecosystem balance, while modern use prioritises productivity and economic gain, often resulting in long-term soil degradation.

4 b) Discuss two (2) ways in which agriculture is responsible for the altering of the natural resource.

In your answer include information about the type of agricultural practice, its short and long term effects on the natural resource. **(5 marks)**

Criteria	Mark
Provides **TWO** clear agricultural practices, each with positive and negative; short- and long-term effects on the natural resource discussed.	**4-5**
TWO agricultural practices mentioned, but one or both lack sufficient detail or clarity about the effects on the natural resource.	**3**
ONE practice discussed in detail, or **TWO** practices with limited explanation.	**2**
A reasonable attempt at the question	**1**

Suggested answer

Soil:

1. Agricultural Practice: Land Clearing for Cropping and Grazing
   The clearing of native vegetation for agriculture is a major practice that alters soil. In the short term, land clearing allows for more area to grow crops and graze livestock, increasing productivity. However, in the long term, this practice leads to soil erosion as plant cover is removed, leaving soil exposed to wind and water. The loss of vegetation also disrupts the natural water cycle, leading to the depletion of soil nutrients and reduced fertility.

2. Agricultural Practice: Intensive Farming and Overgrazing
   Intensive farming, including monoculture cropping and overgrazing by livestock, can degrade the soil by compacting it and depleting its organic matter. In the short term, these practices may boost yields, but in the long term, the soil becomes less fertile, loses structure and the risk of erosion increases. Overgrazing in particular removes vegetation, leading to the loss of topsoil and increased salinity, which can make land unsuitable for farming.

Water:

1. Agricultural Practice: Irrigation

   Irrigation is commonly used to supplement natural rainfall, especially in arid regions. In the short term, irrigation increases crop production, supporting agriculture in dry areas. However, long-term overuse of irrigation can lead to salinity, as excess water causes salts to rise to the surface, damaging the soil and reducing its fertility. Over-extraction of water from rivers and groundwater sources also lowers water tables, reducing the availability of water for both agricultural and natural ecosystem needs.

2. Agricultural Practice: Fertiliser and Pesticide Runoff

   The use of fertilisers and pesticides in agriculture can have a significant impact on water resources. In the short term, fertilisers improve crop yields, and pesticides protect crops from pests. However, in the long term, excess nutrients and chemicals from runoff can pollute waterways, leading to eutrophication, where algae blooms deplete oxygen levels, harming aquatic life. Contaminated water also affects human health and biodiversity, disrupting ecosystems that depend on clean water sources.

5) Describe two (2) reasons why Australian farmers find it necessary to apply inorganic fertiliser to their soils. (4 marks)

Criteria	Mark
Two clear, well-explained reasons with relevant details on how fertilisation helps Australian farmers.	**3-4**
Two reasons mentioned, but one or both lack sufficient detail or clarity.	**2**
One reason identified	**1**

Suggested Answer:

1. Soil Nutrient Deficiency:
   Australian soils are often low in essential nutrients like nitrogen, phosphorus, and potassium, which are vital for plant growth. Due to the nutrient-poor nature of many Australian soils, farmers apply fertilisers to replenish these nutrients and ensure crops receive the necessary elements to grow healthily and produce high yields. Without fertilisation, plants may suffer from stunted growth or nutrient deficiencies, impacting overall productivity.

2. Soil Degradation and Erosion:
   Over time, intensive farming practices, including repeated cropping and grazing, can deplete the natural nutrient content of soils. Additionally, soil erosion can further reduce the availability of essential nutrients in the topsoil. To counteract this, farmers apply fertilisers to restore nutrient levels and maintain soil fertility, helping to ensure long-term soil health and sustainable crop production.

3.

6) Outline the difference between organic and inorganic fertiliser. **(3 marks)**

Criteria	Mark
Clearly outlines the difference between them, one being the source.	**3**
Briefly outlines differences or describes one difference in detail.	**2**
States one difference	**1**

Suggested answer

Organic fertilisers, derived from natural sources like manure and compost, they release nutrients slowly and improving soil health over time, by increasing soil carbon, adding to soil structure and microbes. In contrast, inorganic fertilisers are chemically produced and provide immediate nutrients to plants. While organic fertilisers enhance soil structure and microbial activity, inorganic fertilisers can lead to changes in soil pH and cause soil degradation and pollution if overused.