SUPERVISOR'S USE ONLY

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NZQA

Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 1 Agricultural and Horticultural Science 2025

91930 Demonstrate understanding of how soil properties are managed in a primary production system

Credits: Five

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of how soil properties are managed in a primary production system.	Explain how soil properties are managed in a primary production system.	Evaluate how soil properties are managed in a primary production system.

Check that the National Student Number (NSN) on your admission slip is the same as the number at the top of this page.

You should attempt ALL the questions in this booklet.

If you need more room for any answer, use the extra space provided at the back of this booklet.

Check that this booklet has pages 2–12 in the correct order and that none of these pages is blank.

Do not write in the margins (////). This area will be cut off when the booklet is marked.

YOU MUST HAND THIS BOOKLET TO THE SUPERVISOR AT THE END OF THE EXAMINATION.

Achievement

TOTAL 11

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INSTRUCTIONS

Read **ALL** instructions before answering.

You must answer **ALL** parts of this assessment.

Ensure reference to a **relevant** Māori concept or value, related to soil management, is included in your responses. One or more concepts may be appropriate.

Note: 'soil properties' refer to physical, chemical, and biological properties of soil.

QUESTION ONE: Fertiliser application

Name a primary production system of your choice.

Primary production system: Dairy

(a) How is fertiliser applied in your named primary production system?

Fertiliser is applied by a trailer system to evenly spread out the fertiliser throughout paddocks to nourish the soil and therefor showing respect to the cows by giving them the right nutrition via grass.

(b) Explain how fertiliser impacts soil properties.

Fertiliser gives soil the nutrients it needs to grow healthy grass/plants. It contributes to improving soil quality and makes the grass nutritious for the cows.

(c) Justify why soil tests should be carried out before applying fertiliser.

In your answer consider:

- chemical and biological soil properties
- how applying fertiliser after a soil test can improve plant growth.

It is important to test soil first as then you can figure out how much fertiliser you need. if there is already enough nutrients in the soil fertiliser isnt always needed and too much nutrients isnt good either. if you have very poor nutrients like nitrogen, phosphorus and potassium and you put too little fertiliser the grass isnt gong to grow to the standard you need it at. To show manaakitanga and guardianship to the cows it is important the soil gets the right amount of nutrients. After a soil test, applying fertiliser can help to grow stronger and healthier plants with the right chemical properties.

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Ensure reference to a **relevant** Māori concept or value, related to soil management, is included in your responses. One or more concepts may be appropriate.

Note: 'soil properties' refer to physical, chemical, and biological properties of soil.

QUESTION TWO: Compost

A vegetable grower has sandy soil and is using compost to improve their soil.

(a) Describe how compost is made.

Compost is made by incorperating organic nutrients like food scraps etc that decomposes into the soil to give it extra nutrients and can make more quality soil.

(b) How can adding compost increase nutrient levels in the soil?

Adding compost into soil increases nutrient levels by using the nutrients from something that was already grown/ living and then putting it into the soil so the it can then use those nutrients to create stronger and healthier plants.

The grower is considering replacing compost with a combination of fertiliser and irrigation.

(c) Evaluate the application of compost, compared to irrigation and fertiliser application.

In your answer consider:

- the long-term effects on the soil
- vegetable growth.

Applying compost to soil is fairly easy, compared to irrigation and fertiliser can sometimes be more expensive depending on how large on an area you are wanting to cover. Irrigation and fertiliser requires the right weather and machinery. The long term effects are that with compost once the soil uses up all the nutrients that is it unless you continue to add more, with irrigation it can basically be applied all year round and through winter it wont need to be used. Fertiliser is quick and easy to apply but also can depend on the weather for how quick it will work. Showing leadership towards the plants by using the right system is important, aswell as recognising when the soil isnt getting enough nutrients and what can be done to improve it. Compost is good for reusing nutrients for plant growth and fertiliser is a quick application but can take longer to see results but with irrigation it can make sure the soil is also getting enough moisture.

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Ensure reference to a **relevant** Māori concept or value, related to soil management, is included in your response. One or more concepts may be appropriate.

Note: 'soil properties' refer to physical, chemical, and biological properties of soil.

QUESTION THREE: Soil structure and water

Name a primary production system.

Primary production system: Dairy

For your primary production system, choose a management practice from the list below that may help to improve drainage of the soil.

- Installing a drainage system
- Cultivation
- Application of lime
- Application of effluent
- Using a multi-species sward

Chosen management practice: Cultivation

(a) With reference to your chosen primary production system, describe how this management practice is carried out.

For dairy cows to get enough nutrients and grass, there must be enough airflow through the soil to grow plants. Cultivation is the process of turning the soil so that more airflow is able to come through the soil and nutrients is evenly spread. The cultivationwill allow the soil to flip and then settle with more airflow added.

(b) How does this management practice improve one physical and one biological property of soil?

Biological property:

The cultivation means that the soil is able to hold enough nutrients e.g nitrogen, phosphorus and potassium to grow healthy plants but the soil is also able to breathe and its not full of water and even too much nutrients as too much nutrients isnt good either.

Choose a second management practice from the list above.

Second management practice: installing a drain system

(c) For your chosen primary production system, which of your two management practices is more effective in improving soil structure and drainage?

Justify why the grower should use this management practice, with reference to plant growth.

In my opinion cultivation is a better management practice for soil structure and drainage as it improves both, whereas installing a drain system only mainly helps with drainage. By making sure all properties of soil health is taken care of it shows manaakitanga to the plants and dairy cows. Cultivation can improve poorly structured soils whereas installing a drain system wont do that and depending on the drain system you use sometimes it can actually damage or effect the soil structure more. The grower should use cultivation to improve plant growth in my opinion as it has a higher chance in improving both soil structure and dranage and it is able to be done mulitple times if needed once the grass/ plants have been eaten down whereas a drain system is usually put in once and stays there, and sometimes can end up not working.

Achievement

Subject: Agricultural and Horticultural Science

Standard: 91930

Total score: 11

Q	Grade score	Marker commentary
One	A4	The candidate shows an understanding of fertiliser application and how fertiliser adds nutrients to the soil that the plants can then use for growth. They have named several nutrients that plants need for growth. Explaining why the plant needs these specific nutrients would have elevated the response to Merit.
Two	A3	The candidate shows a basic understanding of how compost impacts the soil properties. They mention that compost is decomposed organic material, e.g. food scraps and these add nutrients to the soil. Describing how microbes break down the organic material releasing the nutrients held in it would have enhanced the response.
Three	A4	The candidate shows a basic understanding of the process of cultivation. They have described how cultivation turns the soil, opening up the pores to allow for better drainage and aeration. For a merit response, candidates should clearly link how aeration affects microbial growth and how these changes influence the rate of plant processes.