

Assessment Schedule – 2024

Agricultural and Horticultural Science: Demonstrate understanding of environmental sustainability in primary production management practices (91931)

Assessment Criteria

Achievement	Achievement with Merit	Achievement with Excellence
<i>Demonstrate understanding of environmental sustainability in primary production management practices</i> involves describing the implications of environmental sustainability for primary production management practices and supporting the description with examples.	<i>Explain environmental sustainability in primary production management practices</i> involves explaining how the implications of environmental sustainability affect decisions on the use of the primary production management practices.	<i>Evaluate environmental sustainability in primary production management practices</i> involves evaluating how the implications of environmental sustainability influence the choice of primary production management practices.

Report topic: New Zealand’s biodiversity

Sample evidence	Achievement	Achievement with Merit	Achievement with Excellence
<p>The following descriptions should be referenced in the candidate’s chosen primary production system.</p> <p><i>Sustainability</i> Environmental sustainability is the ability to maintain an ecological balance in our natural systems while allowing long-term production.</p> <p><i>Impacts</i></p> <ul style="list-style-type: none"> • While pipfruit require less water than some other agricultural land uses, they do require large amounts of water over the growing season, between 250–350 m³ per hectare. Peak irrigation use occurs when water is at its most scarce, potentially leading to low flows in water courses leading to elevated temperatures and biodiversity loss in streams and waterways. • Pipfruit production is a monoculture, which reduces habitat diversity. Production also requires the use of insecticides and pesticides for pest and disease control, further impacting on biodiversity. • Damage to ecological services, such as natural predators, require an increase in spending on chemical control agents, reducing the ongoing sustainability of the orchards. • The use of heavy machinery in orchard maintenance and harvest can lead to soil compaction, reducing soil biodiversity. 	<p>Describes the implications of a management practice on biodiversity.</p> <p>Provides relevant example/s from the primary production system.</p>	<p>Explains impacts that farming has on the environment and explains how management practices positively impact on biodiversity.</p>	<p>Evaluates the choice of a management practice in terms of biodiversity and environmental sustainability.</p> <p>Justifies which of the two management practices will have the greatest impact on improving biodiversity and the sustainability of the selected production systems.</p>

<p>Primary production system: Pipfruit</p> <p>Management practices</p> <p><i>Natural shelter belts</i></p> <ul style="list-style-type: none"> • The provision of natural shelter belts provides ecological refuges and habitat diversification in apple orchards, allowing for greater species diversity. • Natural shelter belts can function as ecological refuges as they are less likely to be disturbed by spraying and mowing and so see a greater range of invertebrates, birds, and reptiles. The variation in microclimates provides food sources and provides a greater range of habitats. Natural shelter belts have been linked to increased numbers and diversity of spiders and harvestmen, which are both important natural predators of pest species. • The provision of natural shelter belts demonstrates manaakitanga in that by providing habitats and refuges to natural predators and parasitoids, they give back ecological services in the form of pest control. <p><i>Integrated pest management</i></p> <ul style="list-style-type: none"> • Integrated pest management (IPM) is the use of several methods to control pests and disease in a holistic manner. • It involves setting action thresholds, monitoring and identification, prevention, and then control, using a range of methods including trapping, biological control, and synthetic sprays if necessary. Shifting from a calendar spray cycle for insects and disease management to an ‘as needed’ schedule based on monitoring has reduced the number of insecticide sprays by 40–50% depending on the region. This has reduced the number of non-target species killed, and coupled with the promotion of natural predators, such as parasitoid wasps, has seen an increase in the invertebrate biodiversity in apple orchards. • The use of IPM demonstrates tūhononga by showing that components in ecosystems are interconnected. By promoting these predator-prey connections growers help strengthen the overall ecosystem. <p><i>Justifies management practice</i></p> <ul style="list-style-type: none"> • IPM will have a greater potential to increase biodiversity than simply providing natural shelter belts as it looks at pest and disease control in a holistic manner rather than simply focusing on the use of chemical sprays. By only controlling pests and diseases when they reach a particular threshold and by actively promoting populations of natural predators, it promotes the health of the whole ecosystem. The reduction in chemical pesticides means they are less likely to leach into waterways and aquifers affecting biodiversity outside of the orchard. The use of natural shelter belts, while potentially increasing biodiversity, can have negative economic impacts due to reduced productivity near the belt due to shading and competition, as well as providing habitats for pests and diseases. The use of IPM can potentially reduce the cost of production, making the operation more economically sustainable and more environmentally sustainable. 	<p>Basic details given but not developed fully.</p>	<p>Discusses the impact these management practices have.</p>	<p>Gives sound reasons for one management system over another.</p>
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N1	N2	A3	A4	M5	M6	E7	E8
Shows no understanding of impacts on biodiversity of a chosen management practice or any relevant Māori value.	Shows minimal understanding of impacts on biodiversity of a chosen management practice or any relevant Māori value.	Shows some understanding of impacts on biodiversity of a chosen management practice and a relevant Māori value.	Demonstrates complete understanding impacts on biodiversity of a chosen management practice and a relevant Māori value.	Explains in some detail the choice of a management practice based on implications of biodiversity with a relevant Māori value.	Comprehensively explains the choice of a management practice based on implications on biodiversity with a relevant Māori value.	Evaluates some aspects of management practices based on biodiversity implications. Gives some reasons along with a relevant Māori value.	Evaluates management practices based on biodiversity implications. Gives comprehensive reasons and relates this to a relevant Māori value.

N0 = No response; no relevant evidence.

Cut Scores

Not Achieved	Achievement	Achievement with Merit	Achievement with Excellence
0–2	3–4	5–6	7–8

Appendix: Authenticity of candidate work

To assess whether a candidate's evidence is genuine, the marker uses their professional judgement, considering all the evidence provided. Where the marker believes there is a possibility the work is inauthentic, they must raise a 'malpractice exception', flagging the issue for further review.

Evidence might be considered inauthentic if:

- large portions of the text are identical to other candidates' work
- the evidence does not match the assessment prompt or task
- the response shows evidence of someone else's input other than the candidate's (e.g., teacher feedback)
- the style or voice of the writing is inconsistent with the rest of the candidate's work
- complex pieces of evidence are copied from other sources but are presented as the candidate's own work, or the evidence is deemed significantly unnatural.

Properly referenced, relevant, and integrated information is acceptable. Uncertainty about the authenticity of evidence should be resolved in favour of the candidate.