**NZQA**

**Approved**

Achievement standard: 91009 Version 3

Standard title: Demonstrate geographic understanding of the sustainable use of an environment

Level: 1

Credits: 3

Achievement standard: 90160 Version 5

Standard title: Demonstrate knowledge of the impact on the environment of primary production management practices

Level: 1

Credits: 3

Resource title: Keep it green

Resource reference: Geography VP-1.3 v2 & Agricultural and Horticultural Science VP-1.5 v2

Vocational pathway: Primary Industries

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Vocational Pathway Assessment Resource

Achievement standard: 91009

Standard title: Demonstrate geographic understanding of the sustainable use of an environment

Level: 1

Credits: 3

Achievement standard: 90160

Standard title: Demonstrate knowledge of the impact on the environment of primary production management practices

Level: 1

Credits: 3

Resource title: Keep it green

Resource reference: Geography VP-1.3 v2 & Agricultural and Horticultural Science VP-1.5 v2

Vocational pathway: Primary Industries

Learner instructions

# Introduction

This assessment activity requires you to demonstrate geographic understanding of the sustainable use of an environment. You will also demonstrate your knowledge of the impact on that environment of primary production management practices.

You are going to be assessed on how comprehensively you demonstrate geographic understanding of the sustainable use of an environment, and the impact primary production management practices have on that environment.

The following instructions provide you with a way to structure your work so you can demonstrate what you have learnt and achieve success in this standard.

Assessor/educator note: It is expected that the assessor/educator will read the learner instructions and modify them if necessary to suit their learners.

# Task

The Regional Council is concerned about the growth of primary production such as horticulture, viticulture, and dairying in a selected environment. You have been asked by the Regional Council to prepare a report that they can use to make decisions for the future. Use the following headings and instructions to create a report about one type of primary production.

Choose one type of primary production involving significant land use in a selected environment as the focus for the following tasks.

## Why and How

Describe why and how the selected environment is used by your chosen type of primary production by doing the following:

* Identify and describe natural and cultural features of this environment that show why it is well suited for your chosen type of primary production. You could consider aspects such as climate, soil, water, relief, transport, employment and towns with related industry and services. Maps and diagrams can be used to support your description.
* Describe activities related to your chosen type of primary production that show how people use and manage the selected environment. You may use visual resources to support your description.

## Consequences and management practices

Describe and fully explain the consequences on people and the selected environment of your chosen type of primary production. Use specific detailed evidence, geographic terminology and concepts to support your answers:

* Fully explain the consequences on people of using your selected environment for your chosen type of primary production. Consider both positive/negative/long term and short term consequences and consider people in both rural and urban areas within your selected environment.
* Fully explain the consequences on your selected environment of your chosen type of primary production. Consider both positive/negative/long term and short term consequences.
* Choose at least two management practices used in your chosen type of primary production that clearly have positive and/or negative impacts on the environment. Explain how each management practice impacts on the environment including the consequences for the environment.
* Compare and contrast the impact on the environment of your management practices. Identify the key points of difference for each management practice and describe how they impact on the environment.

## Sustainability

Describe and fully explain the sustainability, or otherwise, of the continued use of this environment for your chosen type of primary production. Sustainability can involve conserving resources, reducing pollution, and conserving biodiversity, ecosystems, and the landscape.

Use specific detailed evidence, geographic terminology and concepts to support your answers to the following:

* Identify the risks to the environment if poor management practices are used.
* Fully explain the current actions taken to reduce negative impacts on the environment and/or changes that can be made that benefit the environment. For example, focus on actions taken to conserve resources and reduce pollution.
* Is your chosen type of primary production a sustainable use of this environment? Fully explain your decision with reference to the future use of this environment.

# Resources

Useful websites include:

<http://www.nzs.com/new-zealand-articles/business/sustainable-farming.html>

<http://www.mfe.govt.nz>

<http://www.mpi.govt.nz>

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Resource reference: Geography VP-1.3 v2 & Agricultural and Horticultural Science VP-1.5 v2

Vocational pathway: Primary Industries

Assessor/Educator guidelines

# Introduction

The following guidelines are supplied to enable assessors/educators to carry out valid and consistent assessment using this internal assessment resource.

As with all assessment resources, education providers will need to follow their own quality control processes. Assessors/educators must manage authenticity for any assessment from a public source, because learners may have access to the assessment schedule or exemplar material. Using this assessment resource without modification may mean that learners' work is not authentic. The assessor/educator may need to change figures, measurements or data sources or set a different context or topic. Assessors/educators need to consider the local context in which learning is taking place and its relevance for learners.

Assessors/educators need to be very familiar with the outcome being assessed by the achievement standard. The achievement criteria and the explanatory notes contain information, definitions, and requirements that are crucial when interpreting the standard and assessing learners against it.

# Context/setting

This activity requires learners to demonstrate comprehensive knowledge of the impact on a selected environment of primary production management practices, and comprehensive understanding of the extent to which a type of primary production is a sustainable use of that environment. People and environment interaction is the explicit objective of these standards.

# Conditions

This is an individual assessment activity, but learners could work in groups to develop their understanding of related primary production management practices and sustainable use of a selected environment.

# Resource requirements

Learners will need access to:

* primary producers to investigate farm management practices
* maps of the selected environment
* publications from the Ministry of Primary Industries and Ministry for the Environment
* primary producer magazines
* the internet.

# Additional information

The selected environment needs to be clearly characterised by the chosen form of primary production, for example Marlborough District/viticulture, Hawke’s Bay/horticulture, Taranaki/dairy farming. The size of the selected environment needs to be carefully considered and could be influenced by the type of primary production studied.

It is advisable that learners have the opportunity to interview people within the selected environment, and to visit relevant farms to gather information about primary production and management practices.

# Assessment schedule: Geography 91009 – Keep it green

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates geographic understanding of the sustainable use of an environment by one type of primary production by:* describing why and how people use the selected environment for one type of primary production

For example, the learner describes:* the geographic features of an environment which have influenced why it is particularly well suited for the chosen type of primary production, including key natural/cultural features e.g. climate, relief, availability of water, support industries and infrastructure

*South Taranaki has reliable rainfall and mild temperatures to ensure year round grass growth. The fertile volcanic soils are free draining and together these two factors result in high quality pasture.** how dairy farming activities use the selected environment e.g. irrigating with water and dairy shed effluent on to the land, applying fertilisers, planting shelter belts and riparian vegetation, oversowing, fencing, rotation of stock to protect pastures.
* describing the consequences of this use of the selected environment on both people and environment

For example, the learner describes:* + the positive and/or negative consequences of the chosen primary production on people

*Dairy farming provides a range of jobs for people in the area. The on farm jobs depend on the size of the farm; on larger farms the farmer can employ sharemilkers, herd managers etc. Contractors are also employed for work on the farm including digging drains, cutting grass for silage/hay, spreading lime etc. Employment off the farm but directly linked to the dairy farm includes vets who … dairy companies/tanker drivers, herd testers … Dairy farming can negatively affect people through use of sprays, fertilisers etc. spreading beyond the farm boundary ... Dairy farming can lead to pollution of streams and this impacts on people downstream …** + the positive and/or negative consequences on the selected environment

*The positive consequences of dairy farming can include improved soil fertility … The negative consequences are mostly related to soil damage and water pollution. Pugging is common especially in winter when the cows damage the soil and stop grass growing in areas around gates and troughs. This is a major impact in areas with high winter rainfalls and high stock numbers.*Refer also to the learner evidence in the 90160 schedule below.* describing the sustainability, or otherwise, of the selected environment with continued use by the chosen type of primary production

For example, the learner:* + identifies the risk to the environment and actions currently taken to minimise impacts on the environment. Relevant practices need to focus on the type of primary production as a sustainable use of the selected environment. Current actions could include descriptions of how a runoff is used for stock in winter to protect valuable pasture land, selection of fertilisers and timing of application, rotational grazing to protect pasture, planting trees in erosion prone areas such as hills, stream boundaries etc.
	+ provides an indication as to the sustainability or otherwise of the selected environment.

*Dairy farming is a sustainable use of the environment. Trees have been planted along river banks and these areas have been fenced to keep stock out. This helps protect the streams from becoming polluted with stock effluent and erosion of the banks. If the farmers reduce pugging they protect the soil and maintain maximum pasture growth which is vital for continued dairy farming.*Please note that the learner may describe how the use of the selected environment for the chosen primary production is not sustainable in the long term.*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates in-depth geographic understanding of the sustainable use of an environment by one type of primary production by:* describing why and how people use the selected environment for one type of primary production

For example, the learner describes:* the geographic features of an environment which have influenced why it is particularly well suited for the chosen type of primary production, including key natural/cultural features e.g. climate, relief, availability of water, support industries and infrastructure

*South Taranaki has reliable rainfall and mild temperatures to ensure year round grass growth. The fertile volcanic soils are free draining and together these two factors result in high quality pasture.** how dairy farming activities use the selected environment e.g. irrigating with water and dairy shed effluent on to the land, applying fertilisers, planting shelter belts and riparian vegetation, oversowing, fencing, rotation of stock to protect pastures.
* explaining the consequences of this use of the selected environment on both people and environment

For example, the learner explains, using specific details:* + the positive and/or negative consequences of the chosen primary production on people

*Dairy farming provides a range of direct and indirect jobs for people in the South Taranaki area. The larger dairy farms can employ farm managers, herd managers, sharemilkers etc. On the small farms the owner/farmer might work alongside a sharemilker. Workers on the farms visited were earning between $35,000-$50,000, but it depended on the package … Contractors are also employed for work on the farm including digging drains, cutting grass for silage/hay, spreading lime etc. Sometimes these contractors can have a negative effect on others in the community when moving large vehicles between farms and obstructing traffic. This is a common problem on the smaller rural roads in the South Taranaki. Employment off the farm but directly linked to the dairy farm includes vets who … dairy companies/tanker drivers, herd testers … Dairy farming can negatively affect people through use of sprays, fertilisers etc. spreading beyond the farm boundary causing ...* * + the positive and/or negative consequences on the selected environment

Specific evidence for the selected environment must be provided e.g. herd size, types of fertilisers/grass seeds used, soil type, river names etc.The main environmental impacts are either on water or soil quality e.g. effluent pollution of waterways, excessive runoff of fertilisers in to streams resulting in plants blocking streams, compaction of soil through pugging resulting in reduced pasture growth.Air and noise pollution can also be considered.Refer also to the learner evidence in the 90160 schedule below.* explaining the sustainability, or otherwise, of the selected environment with continued use by the chosen type of primary production

For example, the learner explains:* + actions currently taken to minimise impacts on the environment. Relevant practices need to focus on the type of primary production as a sustainable use of the selected environment. Sustainability or otherwise must be explicitly addressed Current actions could include explanations of how a runoff is used for stock in winter to protect valuable pasture land, selection of fertilisers and timing of application, rotational grazing to protect pasture, planting trees in erosion prone areas such as hills, stream boundaries etc.

*Dairy farmers must maintain high levels of environmental management if they are to be sustainable. Pasture management techniques such as rotational grazing, using a runoff … can protect the soil by reducing pugging and soil compaction especially in the winter. Rotation grazing and break feeding can also protect pastures by monitoring pasture use and regrowth … Maintaining soil quality and fertility will result in maximum pasture growth and overall profitability of the farm ... Any activities that result in harm to the environment will directly impact on the sustainability of dairy farming. Evidence from farms visited in the South Taranaki region show dairy farming to be a sustainable use of this environment.*Please note that the learner may explain how the use of the selected environment for the chosen primary production is not sustainable in the long term.*The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive geographic understanding of the sustainable use of an environment by one type of primary production by:* describing why and how people use the selected environment for one type of primary production

For example, the learner describes:* the geographic features of an environment which have influenced why it is particularly well suited for the chosen type of primary production, including key natural/cultural features e.g. climate, relief, availability of water, support industries and infrastructure

*South Taranaki has reliable rainfall and mild temperatures to ensure year round grass growth. The fertile volcanic soils are free draining and together these two factors result in high quality pasture.** how dairy farming activities use the selected environment e.g. irrigating with water and dairy shed effluent on to the land, applying fertilisers, planting shelter belts and riparian vegetation, oversowing, fencing, rotation of stock to protect pastures.
* fully explaining the consequences of this use of the selected environment on both people and environment, using geographic terminology and concepts and showing insight

For example, the learner fully explains, using specific detail and geographic terms and concepts:* + the positive and/or negative consequences of the chosen primary production on people. A full explanation will ideally include economic and social consequences for people both directly and indirectly employed in the chosen type of primary production

*The dairy industry is a major employer in the South Taranaki area when considering both on and off farm employment. Many of the region’s dairy farms have amalgamated resulting in very large farms that rely on farm and herd managers, sharemilkers etc., and also rural contractors. Workers on the farms visited were earning between $35,000-$50,000, this is above the average annual wage but it depended on the package and the farm manager was earning over $70,000 …The wage package is important for employees as it often includes accommodation, petrol etc. The recent drought could have a negative consequence if it impacts on dairy production and ultimately wages … flow on effect to the local economy through … The interaction between local rural contractors and the dairy farms is significant as they often undertake large jobs such as establishing pastures or spreading lime by truck or topdressing without interrupting the day to day running of the farm … Most of the dairy processing also occurs in this area with three Fonterra plants, this is a major employer for the area … Many aspects of the dairy farm rely on off farm workers such as …** + the positive and/or negative consequences on the selected environment

Specific detailed evidence for the selected environment must be provided e.g. herd size, types of fertilisers/grass seeds used, soil type, river names etc.The main environmental impacts are either on water or soil quality e.g. effluent pollution of waterways, excessive runoff of fertilisers in to streams resulting in plants blocking streams, compaction of soil through pugging resulting in reduced pasture growth. A full explanation should recognise all significant impacts.Refer also to the learner evidence in the 90160 schedule below.* fully explaining the sustainability, or otherwise, of the selected environment with continued use by the chosen type of primary production, using specific detail, geographic terms and concepts

For example, the learner fully explains:* + actions currently taken to minimise impacts (identified in previous section) on the environment. Relevant practices need to focus on the type of primary production as a sustainable use of the selected environment. A future focus is evident.

*Dairy farmers are currently using a variety of methods and new technologies to reduce environmental impacts and ensure future sustainability of dairy farming in South Taranaki. Degradation of the environment would impact on both plants and animals and seriously reduce the sustainability of dairying ... Buffer strips separate paddocks and streams reducing the runoff of effluent reaching the streams after being sprayed over the land. The timing of fertiliser application can also reduce runoff rates, these are lowest in spring as ... Rivers and streams have been fenced and planted to reduce erosion and ensure stock cannot access these areas … A strategy for sustainable environmental management has been developed by the dairy industry and this ensures that farmers are well informed of the latest practices aiming for future sustainability … The goal is to use farming practices which maintain or improve the natural resources ...**The Resource Management Act is a key piece of legislation aimed at protecting the environment and it is enforced by local councils.**Current practices and evidence of farmers’ responses to negative environmental impacts will result in dairy farming being a sustainable use of the South Taranaki in the future. However, due to the potential risks …*Please note that the learner may fully explain how the use of the selected environment for the chosen primary production is not sustainable in the long term.*The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.

# Assessment schedule: Agricultural and Horticultural Science 90160 – Keep it green

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| Evidence/Judgements for Achievement | Evidence/Judgements for Achievement with Merit | Evidence/Judgements for Achievement with Excellence |
| The learner demonstrates knowledge of the impact on the environment of primary production management practices by:* describing the impact on the environment of primary production management practices

For example:The learner identifies at least two primary production management practices, and describes how each practice impacts on an aspect of the environment.*Grazing management of the pasture - over-grazing of the pasture compacts the soil, altering draining patterns due to poor aeration and can lower soil fertility due to the loss of topsoil.**Indiscriminate/incorrect disposal of animal effluent - effluent entering streams following the washing of cow dung and urine off dairy yards into open drains, or through poorly functioning oxidation ponds, can cause pollution of the water and excessive plant and algae growth. Allowing stock access to waterways breaks down river banks, and effluent in the waterways can lead to excess vegetation growth which can choke the streams and/or waterways. Water quality in rivers is degraded by effluent.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates detailed knowledge of the impact on the environment of primary production management practices by:* explaining the positive and/or negative impact on the environment of primary production management practices

For example:The learner identifies at least two primary production management practices, and describes how each practice impacts on an aspect of the environment, and explains why it is considered a positive and/or negative impact.*Grazing management of the pasture – over-grazing of the pasture compacts the soil, alters drainage and aeration and lowers soil fertility. Soil compaction with its reduction of airspaces and the subsequent inability of water to drain through the soil, reduces plant growth due to reduced oxygen levels and reduced water availability. Soil compaction means water sits on the soil surface unable to drain and provides a good environment for soil pathogens. Plant roots find it difficult to penetrate the soil due to the lack of air spaces and the loss of topsoil reduces the fertility of the soil, making it less suitable for plant growth. Soils with good grazing management have better drainage, aeration, and earthworm numbers, and better retention of nutrients because the soil pores have not been damaged or destroyed.**Indiscriminate/incorrect disposal of animal effluent - effluent that is incorrectly disposed of can cause pollution of nearby rivers and streams. There is an increased growth of bacteria due to the increase in nutrients from the effluent that take up the dissolved oxygen in the water, preventing fish and other living things from absorbing it. The effluent can also carry pathogenic diseases. Eutrophication and algal bloom occurs, killing fish.**The above expected learner responses are indicative only and relate to just part of what is required.* | The learner demonstrates comprehensive knowledge of the impact on the environment of primary production management practices by:* applying knowledge of the positive and/or negative impact on the environment of primary production management practices. This may involve comparing and contrasting the impact on the environment of these practices

For example:The learner identifies at least two primary production management practices, and describes how each practice impacts on an aspect of the environment, and explains why it is positive or negative.The learner compares and contrasts two management practices in terms of the impact on a specified part of the environment, e.g. the intensive dairy farmer sprays effluent onto his pastures as opposed to using oxidation ponds; the learner explains why spraying onto the pasture is preferred despite it having some limitations, then the learner compares and contrasts this method with the use of oxidation ponds to dispose of the stock effluent.*Spraying effluent back onto pasture vs using oxidation ponds - each management practice impacts soil, water and living things to different extents.**Flat land is a requirement for effective effluent application. On hilly country oxidation ponds are generally utilised.**Soil type will determine effluent management practice utilised. Sandy soils are unsuitable for effluent application as there is too great a risk of leaching as the soil has poor water holding capabilities, so therefore oxidation ponds are generally utilised. Silt/clay loam soils should not leach and should hold the nutrients/effluent more effectively, so effluent application can be utilised.**The farmer will get the benefits of the nutrients in the effluent when applied back onto pasture as opposed to losing them if using oxidation ponds.**There may be a greater labour input with effluent spreaders/sprayers with moving the sprayer, than with oxidation ponds. While the oxidation pond option may be a less labour intensive system, the set up costs are higher and there can be still undesirable discharges to the rivers/streams if they overflow. Land for the oxidation ponds is taken up and the nutrient value of the effluent is lost.**The above expected learner responses are indicative only and relate to just part of what is required.* |

Final grades will be decided using professional judgement based on an examination of the evidence provided against the criteria in the Achievement Standard. Judgements should be holistic, rather than based on a checklist approach.