

No part of the candidate's evidence in this exemplar material may be presented in an external assessment for the purpose of gaining an NZQA qualification or award.

SUPERVISOR'S USE ONLY

2

91297



Draw a cross through the box (☒) if you have NOT written in this booklet

+



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Level 2 Agricultural and Horticultural Science 2025

91297 Demonstrate understanding of land use for primary production in New Zealand

Credits: Four

Achievement	Achievement with Merit	Achievement with Excellence
Demonstrate understanding of land use for primary production in New Zealand.	Demonstrate in-depth understanding of land use for primary production in New Zealand.	Demonstrate comprehensive understanding of land use for primary production in New Zealand.

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 2–8 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.

Merit

TOTAL 15

Page 1

QUESTION ONE: Irrigation

Identify a region in New Zealand that currently uses irrigation to support a chosen primary production land use.

Region:

Land use:

- (a) With reference to your chosen region, explain how **environmental** and **economic** factors have influenced the decision to irrigate your chosen land use.

B I U     

In Northland the climate is sub-tropical so receives a suitable amount of rainfall and sunshine hours. Although during the summer months the rain tends to decrease meaning the kiwifruit orchards may not receive enough water to keep up the fruit production. These environmental factors have influenced the decision to irrigate the Northland regions kiwifruit orchards. This helps keep the orchards alive and allow for maximum fruit production. There are multiple ways to install an irrigation system and there are a few steps involved to install it. First you need a consent depending on what type of irrigation you are installing. If it requires digging pipes underground to store water or wells etc. then a consent will be needed. Once you have stored water you then need to install the irrigation which can be drip lines, movable sprinklers etc. For a kiwifruit industry the easiest option would be either pipe lines which are pipes that run along each row of the kiwifruits and have small holes around the pipe which allow the water to spray out and keep the vines watered. Or the ones that attach to an overhead wire or roof and spray out water. Economic factors that have influenced the decision to irrigate the kiwifruit orchards is that Kiwifruits are a growing industry and with new varieties which are becoming more popular the demand for kiwifruits are higher. To keep up with this demand they need to keep their orchards alive and producing to their highest extent. Kiwifruits projected net earnings per hectare in 2024/25 is \$18,000 - \$22,000 NZD. If the kiwifruit orchards weren't irrigated the vines wouldn't be able to produce as much fruit and they would be poorer quality. Before the kiwifruit industry in Northland started introducing new varieties, and was a smaller business, they would have been managed to water the orchards manually with hoses ect. Now that they have more vines to care for and the economy for kiwifruits has grown, they have had to install irrigation to keep the business running smoothly.

Irrigation can have some negative impacts on the environment. To remain a sustainable land use into the future, farmers / growers need to consider how to maintain production but also to protect the environment.

- (b) Discuss whether irrigation of your chosen land use can continue sustainably into the future.

Consider **social** and **political** factors to support your discussion.

B I U     

To keep the irrigation for the kiwifruit orchards in Northland to continue sustainably into the future the ways you store water and how much water you are using would have to be a sustainable way. If you are digging big dams all over the over the land and having to cut down trees or native bush this will negatively impact the environment as the wild life in the bushes will disappear and less carbon dioxide will be absorbed by the trees. Social factors such as the growers future generations would be affected by this if the land is used unsustainably because in the future the land may not have much to offer. A more sustainable way to store water is in a water bladder which holds up to millions of tonnes of water in just one bladder, this takes up a bit of land but prevents the growers from having to dig up the soil in areas where trees are growing or there are rolling hills that allows for a different land use in the future such as sheep and beef which would help the land to remain sustainable. Having bladders is more sustainable than having dams and ponds which are liable to dry up during summer months and may not fill up again meaning the kiwifruit growers would need to use the towns supply of water. This results in more costs for the business. The bladders hold the water till it is needed to be distributed, it doesn't dry out. The irrigation that would be most sustainable for the kiwifruit orchards is a pipe line which is a small pipe with holes that runs down each row of kiwifruits and sprays water straight into the dirt. This is the most effective way compared to a sprinkler option of having sprinklers attached to the roof or overhead wires and spray out water onto the vines. This option is less sustainable as it is spraying a large amount of water onto the vines and a lot of it may not reach the dirt where it is most needed for growth of the plant. This is wasting a lot of water and would require more water than a pipe line which sprays the water directly to the dirt around the base of the vine. It is a quicker and more sustainable way to irrigate the land. Political factors that makes the irrigation choice of using bladders to store the water and pipe lines to distribute the water the best is that with the bladders they are preventing the need to waste good land and having to cut down trees and native bush. If the business wanted to keep a sustainable land and protect the environment they will need to keep the trees there. The price of NZU's in June 2025 is around \$59, if they cut down trees they need to pay 1 NZU to the government, think about heaps of trees and the business would just be wasting money when they could be gaining. The business can gain NZU's from the government through planting trees, if they used the land to plant trees rather than digging dams they would become a more sustainable business. They would be able to maintain their production as they have enough water and have the right irrigation system for the business as well as protecting the environment.

Page 2

QUESTION TWO: Market gardens

The location of market gardens is determined by a range of factors. Identify a region in New Zealand used for market garden production.

Region:

- (a) Explain how your chosen region provides the **environmental** and **social** requirements for market garden production.

B I U   ↶ ↷ ?

This region provides the environmental and social requirements for market garden production for example in Warkworth which is close to the Northland region has a slightly tropical climate with reasonable rainfall and good sunshine hours. In Warkworth Auckland they grow capsicums for their market garden production. They grow well in these conditions in the Auckland region. The land is mostly rolling hills with a few flat plains which allows for the growth of the capsicums and easy access. The Auckland region also has the social requirements for market garden production as they are working on sustainability of the business for future generations and also have good access to different docks and airports that allow for quick and easy exports of the market garden production. For example the capsicum business in Warkworth are working on reusing the water as much as possible, environmental sustainability and less carbon emissions. By implementing these practices they are on their way to a more positive future for the generations to come as the land will be used well and it cares for the environment.

- (b) Justify why your chosen region should remain in market garden production, and why it should not be converted to an alternative land use.

Consider **economic** and **workforce** factors to support your justification.

B I U   ↶ ↷ ?

Auckland should remain in market garden production as they have the right climate to grow the market garden production. It should not be converted to any alternative land use as it could be quite hard and an economic factor is that it could be very expensive as most of Auckland is urban. Because of Auckland's urbanization other land uses such as sheep and beef or dairy or forestry would be difficult as there isn't enough green land to plant forestry or for sheep, beef or dairy to graze. A market garden production needs a smaller amount of land as most market garden production are small such as the capsicums. They are usually grown inside greenhouse type buildings which allow for sunlight but block out the outdoor environments such as winds, pests etc. Irrigation is easy for the Auckland region as they receive enough rain to store and have the land to store it too. Other areas such as Northland, Canterbury, Southland could use their land for market garden production but for these other regions other land use options bring more income and fir the environment more. Southland has too rugged landscapes which are best for marino wool, Canterbury would work as it has flat plains but would be too cold for the market garden production and Northland would get too hot or wet for the market garden production to thrive. This is why the Auckland region is best for this land use. Workforce factors such as getting enough employees to care for the market garden production is also ideal in the Auckland region as the location is mostly urbanized which means there are more people in the area that can easily get to their work because there is a highway, compared to more isolated land uses such as in rural areas like Northland which would mean workers would need to drive further to reach their work. Another workforce factor is that many people may want to live in the Auckland as it is an urban area that is close to the airport but also want a job that isn't too unsustainable such as factories which are emitting too much carbon dioxide into the environment. For market garden production the carbon emissions are lower and is a more sustainable business option.

QUESTION THREE: The national dairy herd

The national dairy herd peaked in 2014, and it has slowly declined over the past 10 years.

Total dairy cattle numbers, 2002–2023

Total dairy cattle

Source (adapted): <https://www.stats.govt.nz/information-releases/agricultural-production-statistics-year-to-june-2023-final/>

(a) Explain how **political** and **technological** factors have led to the decline of dairy cattle numbers in New Zealand.

B I U [List] [List] [Undo] [Redo] [Help]

Political factors that have led to the decline of dairy cattle numbers in New Zealand is that cattle produce methane which is a natural thing but many people say this is a cause of global warming. Ways to help with this is to reduce stock numbers which would lead to the decline of dairy cattle numbers. The government have started something called ETS (emissions trading scheme). This is where a business can either earn or pay for NZU's, the price of an NZU in June 2025 is around \$59. If a dairy farmer cut down 1 tree to create more land for his dary cows he would have to pay 1 NZU. If he planted one tree he would earn 1 NZU. It is a way to prevent people from cutting down trees to create more land and creating a more sustainable land. If the dairy farmers cant plant more trees because he doesn't have enough land then the only way to reduce carbon emissions is through reducing stock numbers. This results in the decline of dairy cattle numbers in New Zealand. Technological factors that have led to the decline of dairy cattle numbers in New Zealand is there has been such big technology advancments in the current age that allows for increased advancements in different workforces and land uses. This may be causing dairy cattle owners to convert their orignal land use of dairy cattle to something else that is more profitable because of technological advancements. These factors have led to the decline of dairy cattle numbers in New Zealand.

(b) Evaluate the impact that a reduction in dairy herd numbers would have on future land use.

Consider **economic** and **workforce** factors to support your evaluation.

B I U ☰ ∨ ☰ ∨ ↶ ↷ ?

A reduction in dairy herd numbers would have a big impact on future land use as having less dairy cows means there is spare land that could be used differently in the future, that is more profitable or brings in another source of income. Dairy farms are usually located on rolling hills to flat land so that they can preserve their energy to producing milk rather than walking up and down steep hills. Land like this could be used for sheep and beef, or also kiwifruits, forestry or citrus. Depending on what region in New Zealand there are plenty of options for future land use that could bring in another source of income which is better economically for the dairy farmers because if they are having to reduce herd numbers they will need another source of income or their business could die out and they would have to sell. If they chose to just keep doing dairy cows and nothing else the expenses may overtake the income and the business would go broke. Workforce factors also would impact on the future land use with a reduction in dairy herd numbers are that with less herd numbers, less workers are needed to care for the stock and keep up with the economic side of the business. People would end up jobless if they didn't bring in another source of income. If they brought in another land use as well as keeping the small amount of dairy herd numbers they would be able to keep their workers and possibly have to employ more. This means the business would continue on growing and wouldn't have a chance of going broke. The second source of income would help cover the expenses of dairy cows and the other land use. Dairy farmings projected net earnings for 2024/25 was \$1,050. If they continued with their small amount of dairy cows and started up another land use the net earnings for the business will increase. Another workforce factor is if the dairy herd numbers continue dropping and farmers end up not doing dairy farming anymore, their second land use they had started would mean the workers that were helping with the dairy farming wouldn't end up jobless as there is already a second land use option which still needs workers. They can slowly building on the second land use option and grow the business so that in the future the land wouldn't be wasted. If the dairy farmers were actually reducing herd numbers to end up subdividing the land and retiring that is a massive positive economic impact for the dairy farmer as subdividing land depending on its proximity to central cities, soil type and views can sell from \$250,000 to \$600,000. As he is reducing herd numbers he could end up with quality land to subdivide.

Merit

Subject: Agricultural and Horticultural Science

Standard: 91297

Total score: 15

Q	Grade score	Marker commentary
One	M5	Both economic and environmental factors have been included in the candidate's response. Environmental factors are described in some detail but are missing specific details around the climate of Northland. Economic factors are explained in more detail with numbers given and links between quality and quantity made. The additional information around installing irrigation is not relevant to the question.
Two	M5	Environmental, soil, climate and topography factors of the Auckland region are linked to show how they support successful market garden production. Social factors are explained in more detail with links to workforce, and access to processing and transport plants is explained. Some evidence has been given as to why Auckland should remain in market gardens, but strengths and weaknesses are not clearly identified for both workforce and economic factors.
Three	M5	The candidate has provided good detail around the Emissions Trading Scheme (ETS) and how the political factor may have caused a decline in dairy cattle numbers over time. Technological factors have been mentioned but in limited detail. Discussion of how technological factors have allowed farmers to produce the same milk with less cows would have resulted in a higher grade. The justification has some good ideas, but a lot of general information that is not supported or clearly linked back to the question.