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SCHOLARSHIP EXEMPLAR



Mana Tohu Mātauranga o Aotearoa
New Zealand Qualifications Authority

Scholarship 2025 Agricultural and Horticultural Science

Time allowed: Three hours
Total score: 24

ANSWER BOOKLET

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

Write your answers 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 2–23 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.

Page 1

QUESTION ONE: The impact of the internet and social media

With reference to ONE primary production system, discuss the impact that the internet and social media has had on the production, marketing, and consumption of your primary product.

In your discussion consider:

- what groups, organisations, companies, or individuals have an online presence relevant to your primary production system
- the benefits the internet and social media have on the primary production system
- the threats the internet and social media pose to the primary production system.

Primary production system: Dairy farming

PLANNING

Begin your answer to Question One here:

B I U     

Social media is a large part of the spread of information around the dairy industry. There are several positive figures in our country that have a positive impact of the production, marketing and consumption of dairy products. One of these is Tangaroa Walker, a dairy farmer and now author who shares his positive experience around dairy farming and his journey to becoming a farmer in NZ. His story is inspiration to people of all ages and shares incredible messages, as well as providing a positive image around dairy farming. His story started when he was a kid, living in a poorer town, and he didn't have much motivation to work hard or try anything new, and he started getting into some troubled things such as drugs and alcohol, and the people around him were bad influences. He moved out onto his uncles dairy farm as a teenager and started working for him, and he shares how much dairy farming changed his life for the better. It taught him to work hard, and be passionate about what you're doing. It is inspiring to young people to get into dairy farming, even if they know nothing, and to give it a crack and see what you get out of it. His journey led him to be incredibly successful, writing an autobiography in 2019, and starting his brand, 'Farm for Life'. His brand shares all about dairy farming in NZ and the ups and downs. He has also developed a farm for life app, that is free, and has workshops and modules for people about everything to do with dairy farming, from fencing, to milking cows, and animal welfare and how to treat animals and cows properly and fairly. The benefit that his story and journey on social media has had on the dairy industry is that he has created a positive image, that people see, and think that dairy farming is a good industry, and it can help troubled people to not only get their life back on track, but provide jobs to people all over the country. He has inspired young people to get involved in the dairy industry, and this is a positive impact that has come from his social media presence because young people and young farmers are the future of the industry, and dairy farming will always continue to thrive as an industry in NZ if young people come together to get involved and keep a positive future alive for the dairy industry. He has also encouraged other farmers to think outside the box and he has been innovative and created break through ideas of dairy farming, for better animal health, better animal welfare, and a positive impact for the mental health of farmers by creating a network of farmers and a place to reach out to on the farm for life app and website that is accessible for any farmers or anyone in the dairy industry who feels trapped and stressed and needs someone to talk to so Tangaroa Walker and his social media presence has had a large, positive impact on the dairy industry.

Aside from the positive impacts of social media, there are several negative, controversial issues that social media has brought to the attention of many people, and misinformation spreads very quickly so people believe it. These negative posts and comments on social media about dairy farming impact the production, marketing and consumption of dairy products because people believe that dairy farming is bad and the image is tainted. Most dairy farmers in NZ comply to the rules and regulations regarding environmental laws, and animal welfare laws, but the tiny amount of farmers that don't, taint the image of all dairy farmers on social media. One of the misinformation issues on social media is that recently around 2020 and 2021, there were many social media posts around bobby calves, and people were saying that the calves are thrown into pens, and treated horribly, then killed at 4 days old. This misinformation caused chaos for dairy farmers and they were being slammed about animal welfare issues, when really, most farmers put in the effort to treat all of their animals, including their bobby calves with respect, even though they are being slaughtered at 4 days old. Posts like these taint the industry, because people began to believe that NZ dairy farmers were ruthless killers that kill babies and don't care about them and most farmers are trying hard to find away around the bobby calf issue, such as using sexed semen so the calves are kept as heifers, and this reduces the amount of bobby calves born, or putting beef straws into the excess cows when they have enough replacements, which means that the calves can be sold for a use, instead of being bobbied. Another picture that went viral a few years ago was a picture of a dairy farm during calving, and there was a paddock of cows that were all in the mud, and looking miserable on a severely pugged paddock, and there was a calf in the mud that had been born recently. This image went viral on facebook and twitter with people going mad about how all dairy farmers need to be fined, and dairy farming is so unfair and that no one should buy any dairy products because of how the cows and calves are treated. Campaigns were started around being vegan because dairy farmers are cruel, when really that was one picture on one farm, that wasn't following regulations and the cows weren't being treated the best but because of this one bad farmer, all dairy farmers in new zealand were taking the wrap for it and this puts a strain on mental health of farmers, which is a negative impact on the industry because farmers work long hours and putting up with slander from misinformed people is stressful. This also encouraged people to go vegan, and avoid dairy products all together, so this was a negative impact on the industry that social media caused, because people were misinformed and told lies about the dairy industry.

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QUESTION TWO: Diversification within primary production systems

A strawberry grower selling high quality fresh fruit, frozen seconds, and strawberry icecream or jam with low quality fruit.

Kiwifruit growers
producing
Hayward, Sungold,
and RubyRed
kiwifruit.

A sheep and beef farmer planting pine trees on steep hill country for logs or carbon credits.

A sheep and beef farmer adding agritourism to their production system, including accommodation and activities, such as horse rides and fly fishing.

A producer growing a range of apple varieties to send to different markets.

With reference to TWO primary production systems, discuss how primary producers have diversified their production.

In your discussion consider:

- how the primary producers have diversified their production
- what the drivers for diversification were
- comparing your TWO production systems' ability to diversify from their current production system.

Primary production system (1): **Kiwifruit industry**

Primary production system (2): Sheep/Beef farmers/industry

PLANNING

- comparing your TWO production systems' ability to diversify from their current production system.

Primary production system (1):

Primary production system (2):

PLANNING

Begin your answer to Question Two here:

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Kiwifruit growers have diversified their production by developing new and improved varieties of kiwifruit, such as Hayward green, sungold and now rubyred kiwifruit. These new varieties have become increasingly popular and the drivers for the diversification were market demands, because consumers were wanting something new, and now it has been developed, demand for the new types, particularly sungold kiwifruit and rubyred has skyrocketed. Countries such as China and India are wanting to buy more and more sungold and rubyred kiwifruit, so the industry has made increased profits due to the innovation and diversification of the industry. The diversification has not only increased the profitability of the kiwifruit industry by increasing the demand of these new varieties, but it has had other benefits in the production of the kiwifruit. The new sungold and rubyred varieties also have increased disease resistance, which is resistance to the most severe and common disease that can infest kiwifruit vines causing huge losses in yield and therefore product, so having the new varieties be more resistant to this disease is a huge benefit to the diversification, because they can save money as it prevents losses in yield due to the disease, which is a positive impact of the diversification on the kiwifruit industry. In 2024, the kiwifruit industry produced \$3.6 billion dollars revenue and 62% of that was from the variety of sungold, which shows the benefits of the diversification of the industry, because market demand is very high, especially in Asia because they want sungold, and sungold is owned by Zespri, a NZ company so they sell licenses which determines who is allowed to grow and supply them with sungold variety kiwifruit, so people in Asia can't supply their own countries with sungold as they don't have rights to the variety, so it must come from NZ which is so good and profitable for the NZ kiwifruit industry.

Another industry that has diversified is sheep and beef farmers, because traditionally sheep and beef farmers just grew sheep and beef for wool and lamb (sheep) and beef cows for beef. More recently, farmers have diversified by recognising that some parts of their property weren't being utilised to their maximum potential as they were too steep, or eroding, so the sheep and cows couldn't be grazed there so there wasn't any profitability of that land. This meant they could diversify and plant this steep, useless land into pine trees and put them into the emissions trading scheme (ETS). The ETS is good for sheep and beef farmers because they can plant some of their land into pine trees, and then depending on how big the area of pines is, they gain a certain amount of carbon credits which they can use to offset their emissions, or sell to someone else to offset their emissions. This is good for the environment because it offsets the greenhouse gas emissions. This diversification of the farm to put some into pines is also good for the farmers because it offsets their emissions so they don't have to buy any carbon credits, or it makes them money because people will buy the carbon credits off them. The driver for this diversification is that farmers want to make profit, and this means utilising every part of their farm, including the knarly little steep parts, that they can't graze with their livestock, so they can plant it and put it into the ETS and therefore maximise all the area on their farm.

Both the kiwifruit industry and sheep and beef farmers have already diversified to an extent, but there is also opportunity to diversify more from their current production system. I think the kiwifruit industry has more potential to increase diversification further, compared to the sheep/beef industry. This is because they are constantly working on new and improved varieties and fruits, such as the current variety in the works, called H14, and the more recent new fruit kiwiberries. Compared to this, the sheep and beef farmers have less opportunity to diversify, however they still could, such as starting some agritourism outfit on the farm, such as a cottage where people can stay, or putting some mountain bike trails through the farm that people could come and pay to use etc. Both industries have the potential to diversify more than their current systems to increase profitability and maximise the use of their farm/orchard.

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QUESTION THREE: Economic sustainability

With reference to ONE primary production system, discuss how primary producers navigate social and environmental expectations to achieve economic sustainability.

In your discussion consider:

- the social factors / expectations influencing the producer
- the environmental factors / expectations influencing the producer
- the positive and / or negative impact the above factors have or may have on the profitability of the primary production system.

Primary production system:

PLANNING

Begin your answer to Question Three here:

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The social expectations of Kiwifruit growers in new zealand are heavily influenced by social media as it spreads information, whether true or not, very quickly and some people believe everything that they see. This means people form opinions based on misinformation that they believe to be true without knowing the whole truth. In the kiwifruit industry there are several controversial issues such as the use of hydrogen cyanadine, also known as Hi-cane, and the use of fertilisers to increase crops. These are social factors because there is a lot of misinformation around social media and people making up things that people then believe, causing a negative impact on the kiwifruit industry and their ability to market and sell their products. The controversy around the use of Hi-cane sprays in the industry negatively impacts the industry. Hi-cane is a spray that growers use to increase budding, as it essentially simulates the effect of a cold frost on the kiwi vines, causing an increase of buds and flowers. This is beneficial to the growers because it increases yield, so they can sell more kiwifruit and therefore increase their profits. The controversy comes with it though because Hi-cane sprays are highly toxic to people, animals and other organisms in the environment. People living near kiwifruit orchards, like in the Bay of Plenty, have made statements and complaints about the use of hi-cane, because when the growers spray it on, there is some that drifts into the air, and this can cause issues as it is highly toxic. These complaints are about the welfare of their children, families and pets, as well as the ecosystems around the orchards. Social media campaigns have spread awareness about this issue, and a proposal was brought forward in 2021 about banning the use of hi-cane in kiwifruit orchards. There was a hashtag of #banhicanne that was trending on social media in 2021, around the time of the proposal to ban it, because people in communities with lots of kiwifruit orchards were feeling unsafe because of the use of hi-cane so close to their homes, and were worried that the sprays blowing into the air could cause them harm. Due to the upheaval around the issue, these protests and proposals were taken to court, and a decision was made in 2022, that Hi-cane would still be allowed in NZ for kiwifruit orchards, but they had to have much tighter restrictions such as how much was sprayed, and it was implimented that growers were only allowed to use Hi-cane once per year in their orchards and no more. This is to reduce the risk of causing harm in the community due to the spray drift and the hi-cane being drifted into the air in communities. The introduction of the hi-cane restrictions are positive for the communities but have impacted the profitability of the kiwifruit orchards because with less hi-cane use, there are less flowers and buds, so less kiwifruit is able to be produced per hectare of orchard, so less profits are made due to less kiwifruit being produced. This is the negative impact that the social issue of the hi-cane restrictions has had on the producers.

There are also environmental issues and expectations that kiwifruit growers have had to navigate and these have impacted on the profitability of the producers. Kiwifruit growers use nitrogen fertilisers to increase the growth of their kiwifruit which increases the yield, and so they sell more and earn more profits, and the increase in yield and therefore profit is greater than the costs associated with the fertiliser, so it is beneficial for the growers. When nitrogen fertiliser is applied too often or at an application rate that is too high, the roots can't absorb all the nitrogen, and so some is leached through the soil and into waterways. This causes algal blooms, and leads to eutrophication. Eutrophication is when the algae takes over the waterway, blocking the sunlight so nothing else can survive, and this leads to the oxygen being depleted from the waterway and so organisms can not survive and so the waterway is contaminated. This decreases biodiversity and disrupts the ecosystem. Nitrogen leaching also causes an increase in the nitrates, NO_3 in the waterways, and sometimes it is increased so severely that a health warning is issued, meaning the nitrates in the water exceed 50mg/L , so the water is unsafe for drinking and swimming. Kiwifruit growers are a part of this environmental issue because they use nitrogen fertiliser on their orchards. In July 2021, a nitrogen cap was introduced so that the nitrogen applied does not exceed 190kg/ha/yr , and according to Ballance, this 'decreased leaching by 30-40%.' This means that growers are using less fertiliser, to reduce the amount of leaching into the soil, and into waterways, but consequently, they are also reducing the profitability of their orchards because less yield will be harvested because the vines don't get as much nitrogen, so they produce smaller, or less kiwifruit as a result, so therefore the environmental expectations are a negative impact on the kiwifruit producers. Another way the growers could mitigate the issue of nitrogen leaching is to use a more modern fertiliser, that has the goal of sustainability in mind when it was developed. Ballance has a nitrogen fertiliser called sustainN, which is urea coated with a urease inhibitor. This means the urea is released slowly and the roots are not overwhelmed with N, so they can slowly absorb all of the nitrogen in small amounts, and therefore according to Ballance, it 'absorbs 20% more nitrogen than regular urea.' 15% of the nitrogen in normal urea is lost due to volatilisation as well. The sustainN reduces the volatilisation losses as well. In 2019, both Ballance and Lincoln Uni carried out trials to test the reduction in volatilisation losses with normal urea compared to sustainN and found that the volatilisation losses and found that it reduced the losses by 48% and 50% respectively. This means less nitrous oxide is emitted to the air, and when using sustainN, 20% more nitrogen is absorbed, so growers can apply 20% less urea if they use sustainN, and have the same impact on the vines, so the growth increases and therefore the yield increases, and they are navigating the environmental expectations because they are reducing the amount of nitrogen leaching by reducing their fertiliser input, while getting the same amount of nitrogen. In 2024, normal urea was $\$795/\text{T}$ and sustainN was $\$844/\text{T}$ so sustainN is more expensive, but less is needed so it maximises the economics of it, increasing the profitability, and reduces the environmental impact, so this is the positive impact that the negative environmental expectations has on the profitability of the kiwifruit producers.

Scholarship

Subject: Agricultural and Horticultural Science

Standard: 93105

Total score: 16

Q	Score	Marker commentary
1	5	The candidate discussed the various social media platforms that farmers and the wider industry have used to raise awareness and support of the industry, and provided supporting examples. The candidate has analysed the benefits and threats that social media has and will continue to have on dairy farming.
2	5	The candidate produced a response where they provided evidence to how sheep and beef and kiwifruit producers have diversified their production. The candidate analysed the difficulties in diversification in both production systems and the opportunities for future diversification.
3	6	The candidate produced a response where they analysed the social and environmental factors that influence the production of kiwifruit. They gave supporting evidence and examples to support their response. The response developed logically.