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93105A



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TOP SCHOLAR EXEMPLAR



NEW ZEALAND QUALIFICATIONS AUTHORITY
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Scholarship 2022 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.

Answer all THREE questions from Question Booklet 93105Q and 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 any cross-hatched area (☒). This area may be cut off when the booklet is marked.

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

Question	Score
ONE	
TWO	
THREE	
TOTAL	

QUESTION ONE: Factors impacting the sustainability of New Zealand agriculture

Primary production system:

~~Farm~~ Dairy Farming. Dairy

PLANNING

↓ Emissions
Water ways
Drinking water

- The issues caused by Dairy Farming
 - Why people care & future effects
 - Why farmers should care & market demands
 - Opportunities to become more sustainable
 - Tweaks that pose to future sustainability
- ↑
herd homes groundswell
marketing

Begin your answer to Question One here:

Dairy Farming in New Zealand has many ~~less~~ social issues with becoming more sustainable. The single fact is that to produce a product there ~~are~~ will be ~~less~~ losses. The losses from Dairy can be ~~more~~ significant, which makes it unsustainable into the future.

Dairy Farming ~~one~~ main cause of issues is Nitrogen loss. Through ~~animal~~ cows give urine that is $120\text{kg}/\text{ha}$ in a 0.8m^2 area which is much bigger than the ~~the~~ maximum of $190\text{kg}/\text{ha}$. This causes run off as the soil's grass cannot use all the nitrogen, so it is easily lost through leaching. Leaching or runoff (when water runs off the surface) into ~~soil~~ ground water and surface water is unsustainable. People need water to drink so poisoned fresh water is not something people want. The way farms are being run are unsustainable. To produce the level of milk they need to make a profit, a farm has to be intensified over its natural conditions. This ~~is~~ set up is unsustainable, an artificial system. Intensification requires more water & ~~fertilizer~~ fertilizer to make grass at a rate that is enough for the cows. Higher stocking numbers, need more grass, so needs more water & fertilizer to create a profit.

This is a threat to dairy. That they are in artificially created environments that are not made for that environment. A perfect example is how we have dairy in Canterbury region. They have alluvial free draining soils and have periods of drought. Up to 18 million liters of water per year is added on to one farm (~~as~~ a Aljazeera special). Can this be called good for the environment? Absolutely not. This is unsustainable and is a bad look for new Zealand. ~~This~~

Farmers should care about sustainability. It is ~~not~~ just their future livelihoods but its their kids as well. ~~By~~ Breeding trust from consumers is much easier than ~~scrapping~~ it back. If the market demands sustainability and something that is good for the world, we cannot live with dairy. Emissions from cows look bad, having poisoned fresh water, rivers being clogged ~~&~~ ~~is~~ while having to deal with climate change all looks bad. Those qualities threaten to impact upon our future of dairying. However many farmers know this. People are changing and leading the change to show New Zealand Farming is sustainable to the world. People like Keith Woodward & Tony Allcock are New Zealand leaders of the

NzDair initiative. ~~This~~ It is a way to bring cows off pasture & prevents them from urinating on grass which is the major problem. Issues of water pollution & consumer grievances become ~~much~~ eradicated. Obviously they all cannot be as cows are living beings, which delicate & breath. However it makes as more sustainable, protecting our future in market but also in farming. Not destroying your land is a benefit to you.

There are many threats within the dairy industry. ~~To~~ The groundswell movement is protesting the government about many new rules & regulations, however it can be argued these new costs are unsustainable for them to continue farming. Many in the movement are old school farmers who want their land to be left alone by the government. However there may be a threat to themselves as new environment regulations may be scaring future dairying ~~&~~ by preventing losses. For many by looking into the crystal ball & predicting the future, the market may demand sustainability within the production system. For first time buyers their consumers have world sustainability as their 3rd top value they want in meat products. It is not a far stretch to predict in 10, 15 years time more people ~~will~~ becoming more concise and care about the sustainability factor of

products. Keeping the status quo will not work forever. Dairy farming must become more flexible to new ideas and opportunities to world sustainability. Dairy farming needs to be in the ~~geographic~~ of the world on the right side of history.

The government has one idea about where they want dairy farming to move. Farmers are a massive collective of people who all have different ideas of what is good for the world. Inherently dairy farming has losses & does impact negatively on the world but, ~~tend~~ to produce large volumes ~~that's~~ of milk that is what will happen. However how much a farmer chooses to be sustainable, ~~is~~ ~~at~~ minimum will be government restrictions & requirements but many will surpass this. Knowing or predicting a sectors sustainability is difficult as markets & the world is ever changing. But as seen with model ideas there are opportunities out there to become more sustainable.

In conclusion dairy in New Zealand threatens future sustainability. They have losses that negatively impact the environment around them due to how intense dairy farming has to be to produce a profit. Dairy is not all bad. It literally creates communities though.

its economic benefits and many farmers are ~~struggling~~ becoming more sustainable. Ideas such as models, which get cows off pasture reduce environmental impacts making them more sustainable into the future. In the future ~~dairy~~ may not have a choice about sustainability. The government or in market may force sustainable thinking onto producers. Dairy faces ~~issues~~ within its self. ~~Planning~~ better ~~may~~ be ~~a~~ ~~way~~ how to make the world better may become a ~~dairy farms~~ most crucial message in developing dairy farming to continue selling milk to the world.

QUESTION TWO: Labour issues in the primary production sector

Primary production system:

Apples

PLANNING

- Intro
- Issues Labour availability is having
- Kiwi & RSE workers - quantity & quality differences
- Effects on productivity
 - investment, slowing growth
 - changing into automation
- Conclusion

Begin your answer to Question Two here:

Labour issues has been a long term issue to the apple sector. For the last 5 years labour for many businesses has been an issue, but though COVID this has compounded. Many of their usual labour staff through RSEs were unable to get into the country when they were needed most. New Zealand has a labour shortage overall. The unemployment rate is at 3.7% but the estimated full employment percentage is 4.7% (Labour Bureau). This has meant everyone in every sector is struggling. What is unique about the primary sector is it is seasonal. There are 3 months of the year for apples when a massive work force is required to pick apples off trees. Apples are labour intensive so there is no other options currently than to hire a big workforce for these busy months. This creates an issue. People of New Zealand don't want to work outside in the conditions & hard work are convincing people to not work with apples. To fully discuss labour issues I will evaluate the current state of Kiwi & RSE workers, & then look into the potential productivity effects, though ~~through~~ ~~most~~ on the apple system.

Workers are the crux of the issue. If you don't get enough workers you cannot pick apples off the tree which means you are missing out on revenue. It also impacts upon the quality of apples as instead of being picked in their prime, they are having to stay on longer, till the labour can get to them.

20 years ago the RSE scheme started up. This allowed businesses to plug these seasonal gaps while the islanders were getting high wages (to them). After talking to Thornhill (Nick Bibby) we could understand how highly rated these RSE guys are. Bringing in RSEs are still worth it after paying for accommodation, distance, food & transport while paying them living wage. Not only this but they have the regulations & pastoral care of the workers. It is a significant cost to get them in the country but it is still worth it. Nick Bibby stated an RSE on average would pick 5 bins of apples whereas a ~~New Zealand~~ worker for them only picks 25 bins. This means Kim's workers per box are much more expensive \$65 compared to RSEs \$40. This shows the difference in the quality of labour. RSEs are much better workers. This comes due to a few factors.

They are more motivated to get more money. Many of them have large families so they need to work hard to pick more bins to get that money home to their families. Nick showed pictures of his workers at home. After a couple seasons ~~as~~ RSEs can build houses, build mills, build water pipes. New Zealanders don't have that incentive. The pull for money is more worth than going onto the orchard, or they are simply ~~doing~~ doing the bare minimum in their job. ~~Kiwis~~ have further problems for ~~the~~ the apple industry. Their lives outside of work is much more important. They have families, they have friends. This means days off work, Weddings, funerals, birthdays, family events takes people off work. RSEs don't have this. ~~They~~ They will work 6 days a week every week to make money. Kiwis ~~only~~ only work 4 on average for Thornhill. RSE workers have better quality of labour but also want to work on the orchard which Kiwis do not. Not having RSEs in COVID years impacted largely on the apple sector. However the quantity of RSE workers has been increased. The quota has gone from 16000 → 19,000 for next season. As business in the apple sector grows, more labour units are needed! Without more labour, productivity & growth are stifled. Kiwis are less desirable and orchard work is less desirable for them.

This makes local labour difficult to source.

As the apple sector is struggling for working productivity also decreases. Everything takes longer and everything gets set back. This has set back new planting by 3 months simply because they do not have the labour. This is potentially happening all around the country. The future new apple trees are not being planted as there isn't the labour to do so. Productivity in other places has the potential to increase. By not having enough labour units businesses in the apple sector are looking for other solutions. Automation has become a common theme for many businesses. Taylor recently built a fully automated packhouse for 100 mill. It has made the quality of fruit better through infrared screening of the apples. Taylor has experimented with different automation. Fully automated packhouse & also the use of a cheap to spray instead of people and tractors. This has kept his business productive in the long term as there simply isn't the people to do these jobs. Short term there has been issues, and some org was harmed to get the right practice but it will keep him productive.

The issue is not everyone can do this. It is an incredibly expensive cost to automate. Labour units are still cheaper than machines.

However for some this isn't an option to do nothing. They must keep productivity of producing apples for market to keep them alive. The ~~growers~~ that can't will struggle. New Zealand still has very low unemployment & the apple sector cannot convince many new zealanders to work for them for 3 months. Many growers will be waiting on the government to help them with workers and take low productivity now. Labour is a limiting factor for the apple sector has has many issues to growers. ~~an interesting issue that some~~ Some growers productivity to get apples off trees has been high but due to poor workers, have seen issues with quality of the apples. Taylor has had 2 seasons of poor quality, so even with automation, it does not beat the human touch currently. The future will rely on automation and Labour increases for RSEs to ensure the apple sector is ^{still} ~~producing~~. In conclusion the apple sector struggles with labour. The quality of labour is an issue but also the amount of labour that growers have. This has caused growers to make decisions to create alternatives to keep current & future productivity which has impacted upon the quality of apples. The issue to the sector is that they need so many workers for a short amount of time. Getting people to do that is a struggle and is a problem to many products in the primary sector. Future is difficult to predict, but many will turn to automation to help solve their issues.

QUESTION THREE: Producing for niche markets

Primary production system 1: Apples - Rockit

Primary production system 2: Meat - Fristite

PLANNING

- Intro
- What is a niche market
- how products get into niche market
- how they stay in the niche
- positives & negatives of producers in the niche

Conclusion

Begin your answer to Question Three here:

Most agriculture & horticulture products are not targeting a niche & rather traded as a commodity. It is an interesting conundrum as by saying you get higher prices by being in this market you would expect everyone to be in it. This is not the case though. Not every business has the know, the drive, the passion to get into a niche market.

A niche market is a specific section of market which ~~all~~ producers target a specific section of customers with their products which allows producers to demand higher prices as they ~~not~~ specially met their wants and needs. Cited highly from Fristite meat used a ~~commodity~~ funnel to describe a niche market. Commodity is broad & targets as many customers as possible whereas niche is targeting 5% of customers. This ~~5%~~ niche will be the people with high income to make them willing to spend more to get your product rather than anyone else. Market specific values, brand & marketing is needed to convince them to purchase. Their products must be differentiated from commodity products.

The Rockit has differentiated their product massively to get into market. The most important difference

is they are apart of the snacking game rather than produce. This has been possible due to the innovative thinking from phil allen. He bought the plant variety rights to the rocket apple and proceeded to plant in orchards around the world to completely lock up the rights to him. This means ~~you~~ there is no product like rocket. You buy rocket apples, or you buy nothing. Their product is differentiated so far from apples they aren't even in the produce section.

Firstlite ~~also~~ have to differentiate their product to compete. They produce high quality cuts of meat, but also have a highly valued story behind them. To ~~understand~~ what story is wanted they researched their consumers to the nth degree. They have 5 different consumer types and put more or less effort into each of them. The highest paying is firstlite Jane. This is a ~~working~~ mother 35-55 buying for her family. Her values (which has changed over time) are quality, healthy & then sustainable/world focus. They specially make a story around her. ~~The~~ Firstlite make sure to have grassfed, antibiotic free, world sustainable & ethical practice stickers on the packaging. This differentiates them in the USA from every other meat product.

To stay in the niche products must produce the the market rather than produce &

find a market. Firstlite have taken this to a new level by showing customers exactly the process of how the make products, from bull cow to ~~steak~~. This gives them an additional difference to convince customers to purchase. Firstlite even evolved to make an ~~secret~~ ~~app~~ so customers can easily see their business & firstlite can be completely transparent with them. ~~They~~ If customers want extremely premium services they potentially can. They have a set 100 customers who get the premium steak service, for only \$750 a year get it steaks each month to their door. Market is continually changing so a business must change to target different wants. Firstlite Jane ~~use~~ COVID had sustainability as a number 5 value but is now in third. This has meant firstlite has had to move to continue to target this niche to continue to convince customers to buy their products over someone else.

Reckitt also has these issues. They experimented with cardboard packaging instead of plastic, their operations manager said they hated it! This experiment failed but packaging has become a success story for them. China is their main market, and their culture and values are completely different to ours. They do a lot of giving so creating packaging perfect for giving gives their product a difference. Special Chinese new years, Ramadon & even a minions collaboration

Reaps their product being the one customers go to. Rockit has a high repurchase percentage which is due to their specialness around their product. Being unique and using that in market means the top ~~5%~~^{10%} of income consumers will continue to buy off of them. To further differentiate, they have moved some product to cafes. Instead of a coffee with a biscuit, they want consumers to do coffee & 2 apples. ~~But~~ No other apple company is like this and its all due to ~~the~~ how the products is so different. For growers the PVR creates this niche.

There are ~~many~~ positives for growers to produce for a niche. Higher returns is the first reason, and is the biggest. Gerald hickey stated if returns were not as big as they were, they would not be in the niche. The niche also has a greater price stability. Producers can set a price they want, and ~~not~~ fit the market, which becomes ~~more~~ consistent. ~~This~~ This is due to how they are only targeting people with high income. In times of uncertainty or volatility the rich stay consistant. Even through these times of high inflation both Firstlife & Rockit do not see effects on them in the market. This makes expected income on each season much easier to predict. ~~High~~ High prices are also due to less middleman handling

their products. As they don't want their product to simply be dumped on the market businesses take control of where & when they supply. People cannot take a share out of your product if your producers take full control over the product.

Negatives of supplying to the niche is effort & cost. For ~~your~~ the farm to produce high quality meat it takes 30⁵⁰ longer which requires more feed, more water, more care but it creates a premium. Many people don't want to go through that effort & costs, so take the easy route & dump it into the commodity market. It is also hard for growers to target the market. It requires a large amount of promotion & research to create a buzz about your product but also tailor the product for the customer. Rockit spend 100k of this revenue just on promotion. This keeps the demand very high but also allows them to hire people in their target market. Rockit due to this found Americans are very particular and are less likely to buy NZ labelled fruit, so they made a business decision to only supply american grown rockit apples. These crucial bits of advice to get into & stay in the niche comes at a big cost. Firstlife hires 20 people to be in market which according to gerald hickey is more than all the other meat companies combined. He is niche so he must take this

QUESTION
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expense. New Zealand goes many positives its self. We are naturally set up for many niche values such as grassfed, antibiotic free GMO free and is a safe country, but because at the expense & effort ~~of~~ many producers do not have the drive or passion to produce for the niche. It becomes a lifestyle in the way products are produced differently to give ~~of~~ your product values or an edge over someone else.

In conclusion buyers & producers have to put in time, money and effort to differentiate their product in order to target a niche. A niche isn't for every customer, it is for the ones who can afford it. New Zealand niche producers are not feeding the world, but instead add value into their products. Niche markets isn't for everyone, most buyers ~~simply~~ do not want to put in the effort & expenses that are incurred by going from commodity to niche.

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