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Regenerative Viticulture - the answer
to a future-proofed New Zealand Wine
industry?

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I wish to thank the Kellogg Programme Investing Partners for their continued support.

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1.0 Executive Summary

There is ever increasing pressure for food and fibre industries to be producing in a sustainable manner. Winegrowers are producing a 'luxury' item in comparison to food producers. Due to this the decisions and actions of the NZ wine industry need to protect the landscape in which they operate as well as their social licence to operate.

This report investigates the current status of sustainable winegrowing in New Zealand and establish whether regenerative viticulture is the answer to a future-proofed industry. The objectives of this study were to:

- Review sustainable wine production in New Zealand and outline its goals and aspirations.
- Determine what regenerative viticulture (RV) means.
- Determine if regenerative viticulture aligns with Sustainable Winegrowing New Zealand's (SWNZ) goals to future-proof the industry
- Investigate whether regenerative viticulture addresses significant issues such as climate change.
- Determine the role, if any, regenerative viticulture may have in the NZ Wine industry.
- Propose a plan of action for the NZ wine industry.

To carry this out a literature review of sustainability and regenerative agriculture/viticulture was completed followed by eight semi-structured interviews with members of the wine industry. A digital survey was also created with 51 participants from the New Zealand wine industry. The interviews were analysed using thematic analysis and the survey was analysed using graphing on *Microsoft Excel*.

The New Zealand wine industry is a world leader in sustainability and is faced with environmental issues like other primary industries in the Food and Fibre sector (Dodds, Graci, Ko, & Walker, 2013; Mariani & Vastola, 2015). Future-proofing the industry was important to participants and there was support for further learning and improvement.

Analysis showed that SWNZ and the focus area goals which make up the framework for the programme, were generally viewed positively and respondents saw SWNZ as playing a role in future-proofing the industry. Regenerative agriculture was not well understood, however there was still considerable support for this farming system. RV was also considered part of the future resilience of the industry. SWNZ and RV were perceived as complimentary concepts though neither provides members a complete solution.

Some recommended steps that could be adopted by New Zealand Winegrowers are:

- Provide New Zealand winegrowers with resources on regenerative viticulture.
- Formation of a specialised regenerative viticulture group.
- Provide New Zealand winegrowers with NZ case studies highlighting vineyards that are going above and beyond.

2.0 Introduction

There is increasing pressure from consumers and markets to show our food and beverages are produced sustainably. Primary industries need to demonstrate they are operating respectfully and are planning for the future. The NZ wine industry is generally viewed as sustainable (Alpha Food Labs, 2021a) however as an industry there is room for improvement and there are areas of concern such as energy usage, fossil fuels and water management (Flores, 2018). These areas of concern are often shared by consumers and that is why Sustainable Winegrowing NZ (SWNZ) is there to guide and certify growers.

Regenerative agriculture (RA) is the new 'buzz' word and has become increasingly popular in countries such as the United States of America, South Africa and New Zealand over the last decade, however it is not well understood (Alpha Food Labs, 2021b; Leask, 2020). People want to know what it means and how to implement it. Regenerative viticulture (RV), like its agriculture counterpart, is becoming more popular and is often viewed as an 'evolved' sustainable growing approach.

Winegrowers are making a 'luxury' product in comparison to essential food producers and need to make sure the decisions about the future of the industry will protect New Zealand wine's social licence to operate. With this in mind many have begun questioning 'why are we farming this way?' and asking, 'is there a better way?'. These thoughts have prompted this report looking at the current status of sustainability for NZ winegrowers and questioning regenerative practices and their potential role in the future.



Figure 1 Fence line planting in a Pinot Noir vineyard, Marlborough 2022.

2.1 Key Abbreviations

- New Zealand: NZ
- New Zealand Winegrowers/Wine: NZW
- RA: Regenerative Agriculture
- RV: Regenerative Viticulture
- SWNZ: Sustainable Winegrowing New Zealand

3.0 Objectives

The objectives of this report are to:

- Review sustainable wine production in New Zealand and outline its current goals and aspirations.
- Determine what regenerative viticulture means.
- Determine if regenerative viticulture aligns with Sustainable Winegrowing New Zealand's goals to future-proof the industry
- Investigate whether regenerative viticulture has the potential to address significant issues such as climate change.
- Determine the role, if any, regenerative viticulture may have in the NZ Wine industry.
- Propose a plan of action for the NZ wine industry.

4.0 Literature Review

4.1 Sustainability and Sustainable Winegrowing New Zealand

The Food and Agriculture Organisation of the United Nations states that “To be sustainable, agriculture must meet the needs of present and future generations, while ensuring profitability, environmental health, and social and economic equity.” (FAO, 2022)

A relatively modern concept, sustainable farming practices were first described in the 1980s (Purvis, Mao, & Robinson, 2019). Its origins are unclear, and it remains open to interpretation, often with a context-specific understanding. The concept of sustainability needs clarifying, but at its core is the idea of preserving natural resources for the future (Kuhlman & Farrington, 2010). Sustainability is often described as having three interconnected pillars or dimensions, Figure 2 (Purvis, Mao, & Robinson, 2019). These pillars aren't always universal and there are different interpretations. The three pillars typically have their own goals and then interact with each other to achieve larger overarching goals.

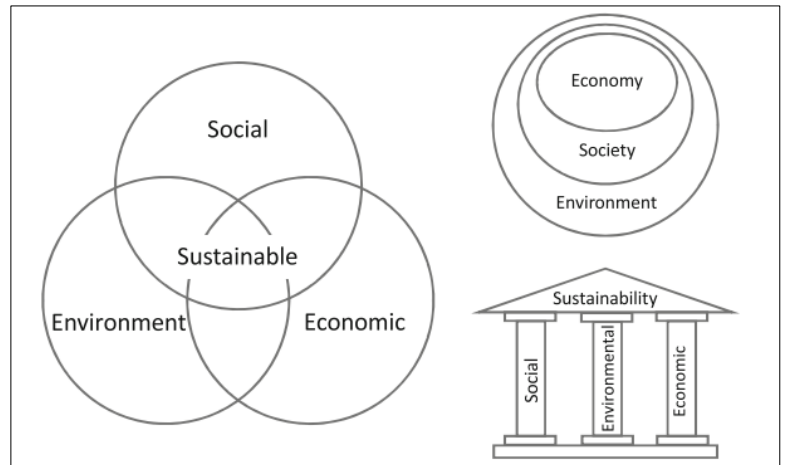


Figure 2 The three pillars of sustainability can be represented in various forms (Purvis, Mao, & Robinson, 2019)

Sustainable winegrowing is driven by consumer and market pressure as well as the industry's concern for issues such as climate change, water, energy usage and chemicals (Flores, 2018). There are numerous recognised sustainability programmes in winegrowing regions around the world addressing the process of winegrowing (Flores, 2018). It is a complex process of agricultural practices, industrial operations, and transport/distribution pathways.

Winegrowing garners less attention than other industries when it comes to practices and impacts (see Figure 3 for an example of this). However it does still have various issues to manage for example the use of fossil fuels and water, the impacts on soil and biodiversity (Barber & Stenning, 2022; Dodds, Graci, Ko, & Walker, 2013). What is positive is that New Zealand stands out in the winegrowing world due to its “outstanding environmental initiatives”.

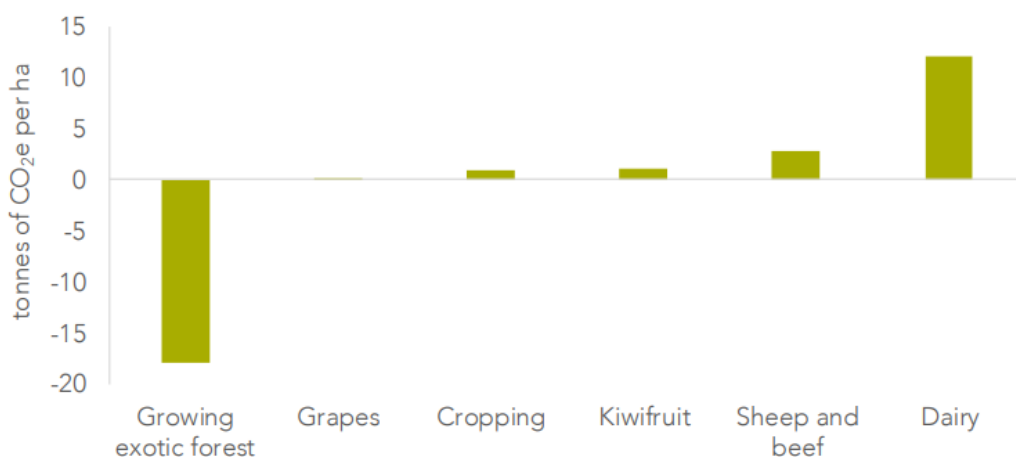


Figure 3 Yearly emissions per hectare for various land uses in New Zealand demonstrates the wine industry is a low producer of emissions compared to other industries (New Zealand Productivity Commission, 2018)

Baird, Hall, & Castka, 2018 state that winegrowing is in fact similar to an industrial process with resource usage and wastage. The process uses water and land while it often relies on chemical inputs and produces emissions. Winegrowing can have a negative impact on the environment often in contrast to consumer perception as a natural product. Often consumers are not concerned nor well informed about the effects of winegrowing, and they frequently associate or confuse sustainable winegrowing with organic production (Mariani & Vastola, 2015). It is important to note that while their practices may be sustainable, organic, and biodynamic production is not synonymous with sustainability (Flores, 2018). In the hierarchy of consumer wine purchasing decisions the overall taste is the most important attribute – not sustainability, Figure 4 (International Food Information Council, 2020; Mariani & Vastola, 2015).

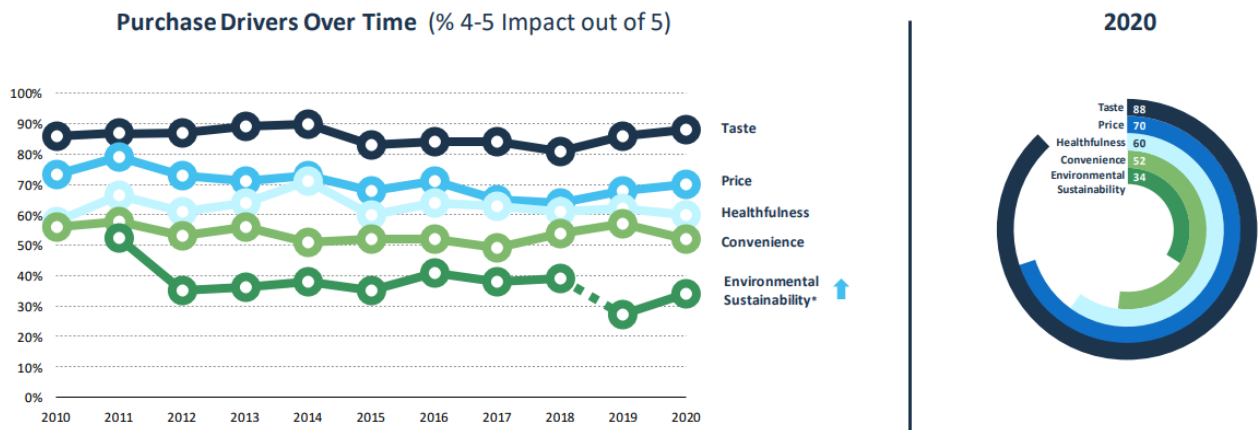


Figure 4 Consumer purchase drivers from the International Food Information Council's 2020 Food and Health Survey (International Food Information Council, 2020)

The wine industry in New Zealand is governed by NZW, a levy-funded industry body. Winegrowing encapsulates growing grapes in the vineyard through to making wine at the winery. NZW has a vision that "Around the world, New Zealand is renowned for its exceptional wines" and their purpose is two-part (New Zealand Winegrowers Inc, 2021):

- To protect and enhance the reputation of New Zealand wine.
- To support the sustainable diversified value growth of New Zealand wine.

SWNZ is a programme within NZW, was established in 1995 by the NZ Grapegrowers Council (precursor to NZW) with the intention to provide growers with certified tools to improve their practices (Legun & Sautier, 2018; New Zealand Winegrowers Inc, 2022a). New Zealand was one of the first countries to establish a nationally adopted sustainability programme and as such the SWNZ is considered pioneering (Mariani & Vastola, 2015).

Over time SWNZ has developed six focus areas that are the framework for the programme. These are based on the UN Sustainable Development Goals (New Zealand Winegrowers Inc, 2022b; United Nations, n.d.):

1. Climate Change – NZ wine industry is carbon neutral by 2050
2. Water - be a world leader in efficient water use and the protection of water quality
3. Waste - NZ wine industry achieves zero waste to landfill by 2050
4. Soil – protect and enhance soil health
5. Plant Protection - Understand, reduce, and mitigate impacts of existing and potential pests and diseases. Be a world leader in sustainable alternatives.
6. People – be and industry of choice for workers

SWNZ requires growers to complete annual questionnaires, submit their spray diary and complete a vineyard register. Every three years they are audited by an independent body (New Zealand Winegrowers Inc, 2022a; New Zealand Winegrowers Inc, 2022b). SWNZ aims for continuous

improvement and provides growers with standards and benchmarks, recognising the programme plays a large role in its social license to operate.

Since the inception of SWNZ there have been many notable milestones reached which show the progress SWNZ has made in the NZW industry, and the steps members are taking on their journey to be more sustainable. Below are some key milestones noted in the 2022 Sustainability Report (New Zealand Winegrowers Inc, 2022a):

- 96% of vineyards are SWNZ accredited in 2022
- 46% of vineyards have reduced herbicide use
- Organophosphates are no longer used
- The use of broad-spectrum insecticides has decreased

4.2 Regenerative Agriculture and Regenerative Viticulture

There currently is no comprehensive scientific definition for RA (Grelet & Lang, 2021a; Schreefel, Schulte, de Boer, Pas Schrijver, & van Vanten, 2022). It is often described as a holistic, systems approach to agriculture with an emphasis on continuous improvement (Gosnell, Gill, & Voyer, 2019; Grelet & Lang, 2021a). It has also been described as 'pragmatic and flexible' as it is not a system with defined permitted and forbidden activities (Grelet & Lang, 2021b).

RA began in the 1980s as a response to the environmental degradation linked to conventional agriculture (Goode, 2022; Gosnell, Gill, & Voyer, 2019). RA is a principles-outcomes based farming system that has been shaped by preceding alternative agriculture systems (Grelet & Lang, 2021a), RA views farms as living systems – a holistic agroecological perspective that shapes RA principles and practices, Figure 5 (Grelet & Lang, 2021a). RA falls into a group of systems that are alternative to mainstream conventional farming. It has very close ties to agroecology (the application of ecological principles to agricultural systems and practices) and could even fall under this umbrella (A Lighter Touch, 2022; Merfield, 2021).

The term 'regenerative' is considered a pointed challenge to the term 'sustainable' (Merfield, 2021). Sustainable implies sustaining, it is possible to be sustainable while also degrading the environment. Regenerative implies a stronger commitment to improvement.

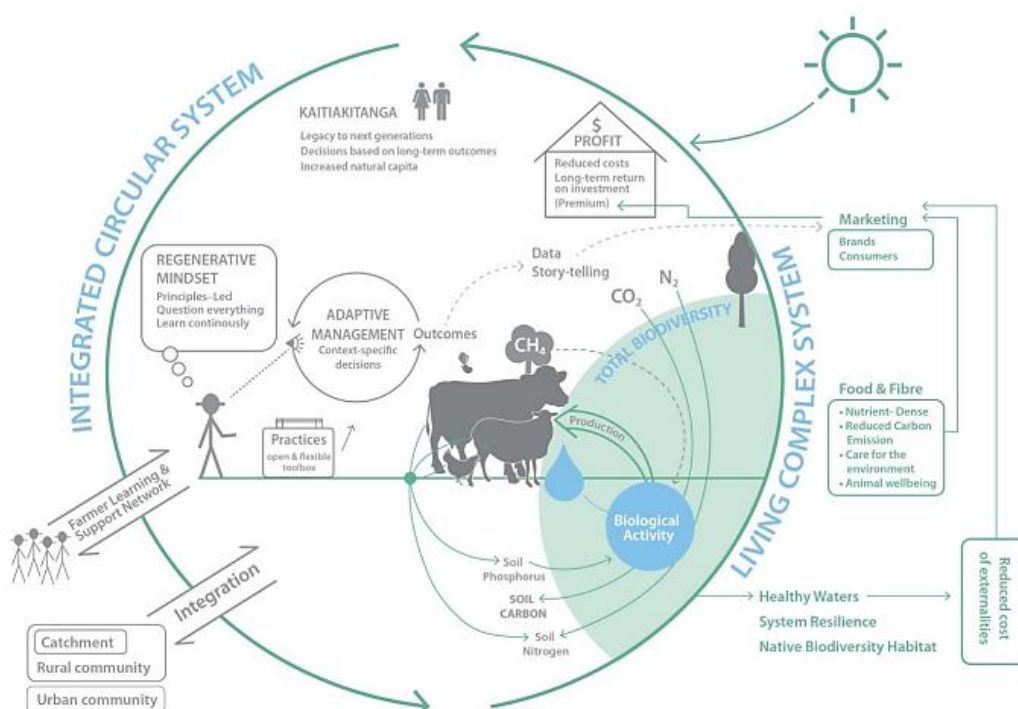


Figure 5 Infographic showing how RA works in a New Zealand setting (Grelet & Lang, 2021a)

The principles that make up RA differ globally and can be established by organisations or individuals (Grelet & Lang, 2021c). A recent study in New Zealand (Grelet & Lang, 2021c) had 21 RA practitioners from the viticulture, arable, dairy and sheep and beef sectors explain their key RA principles. From this a list of 11 regenerative system principles were formed. The principles that are in dark blue relate to farmer mindset/attitude and the light blue are the practical/instructional principles, Figure 6.

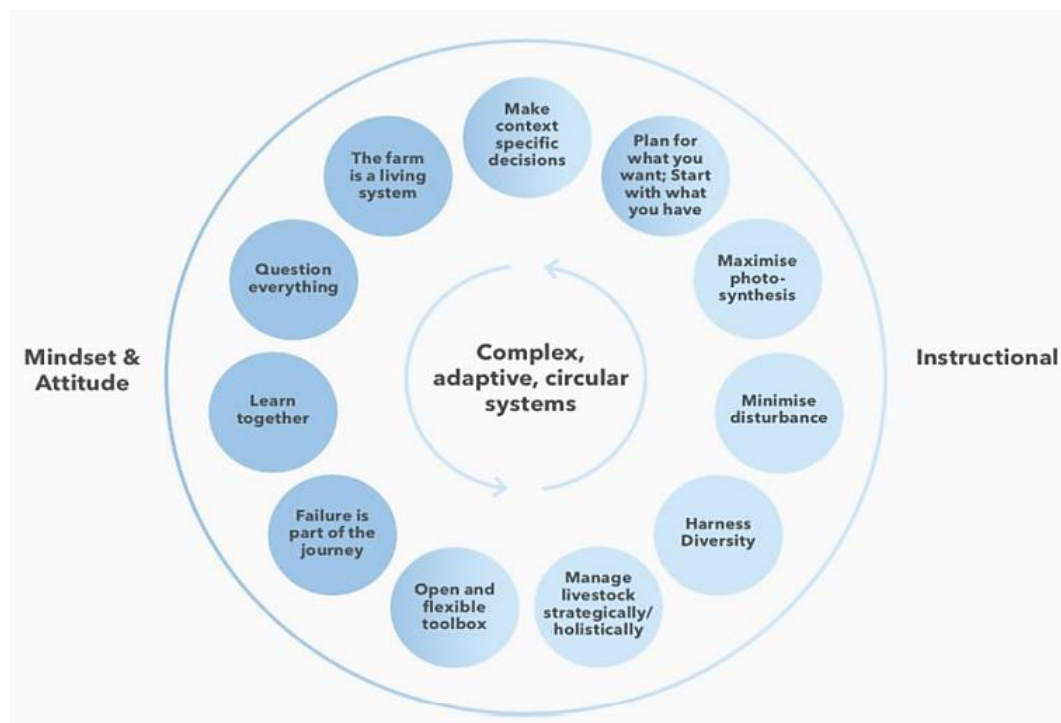


Figure 6 Diagram showing the 11 regenerative principles from the New Zealand focus groups (Grelet & Lang, 2021c)

RA practices often overlap with mainstream or conventional practices and practitioners are encouraged to utilise a broad range of techniques as long as the techniques are benefitting and building up the farm ecosystem (Grelet & Lang, 2021a). One of the principles is to question everything – 'are the techniques currently being used the best?', 'can practitioners develop or adopt new techniques?'. Whilst this mindset and access to a range of tools is beneficial to the farm ecosystem, RA doesn't close off the "conventional toolkit" and if there is a situation where a quick fix is required or a crop needs saving practitioners are free to do so (Grelet & Lang, 2021c).

Knowledge is key in RA. Every farm ecosystem is different, the environment changes and practitioners need to be aware of the context in which they operate (Grelet & Lang, 2021c). Practitioners need to also build knowledge on topics such as ecological processes and soil biology. RA offers the opportunity to learn from others within and outside of the sector.

Whilst considered an alternative agriculture and the movement is still relatively new there is considerable scientific knowledge to support some of the key practices such as no-till and cover cropping (Merfield, 2021). There is however, a lack of research on RA as a whole system rather than its components

The RA movement has been gaining considerable support in recent years and regenerative viticulture is the winegrowing application of this. The main difference is that vines are grown on a permanent trellis system and broad acre techniques can be difficult to transfer to this system (Goode, 2022). In a report for Manaaki Whenua Landcare Research, different sector perspectives were gathered; with the overall consensus being that NZ is not already regenerative and while some aspects are being done well, there is room to improve in others (Grelet & Lang, 2021b).

NZW exports its wine to a wide range of countries, with Marlborough Sauvignon blanc world renowned. There is currently a low environmental footprint, but there is still the desire to improve and this is supported by NZ Winegrowers and SWNZ. Winegrowers have already been steadily improving practices, however, there are numerous aspects to work on such as reliance on non-renewable inputs, lack of clonal diversity, reliance on fungicides and the perception of what a good vineyard looks like.

Richard Leask an Australian Nuffield Scholar posed the question: Is being sustainable enough for Australian Wine? (Leask, 2020). He had become tired of hearing people say they are 'leaving the land in a better position than how they got it' – this is a sentiment frequently heard in the NZW industry. Richard investigated RA systems both broadacre and vineyard case studies; through his report he explored the different principles and how these could be used in a vineyard setting to move away from detrimental practices that are being carried out because its 'how we do it'. He concluded is that as an industry Australian Wine should be moving towards a regenerative system, with a holistic approach, where science and technology is developing to support and measure RA. He believed RV will "have the ability to provide long-term environmental, economic and social benefits".



Figure 7 Cover crop growing in a Chardonnay development block, Marlborough 2021.

Currently there is limited formal adoption of RV internationally. A Market Scan report into RA for both Beef and Lamb and NZW looked at winegrowing in USA, UK and Germany and it appears that there are a few early adopters but it is not widespread (Alpha Food Labs, 2021b). However they noted that RA is rapidly accelerating at grassroots level and in time RV may follow. The two industry bodies also conducted a Consumer Insights report that found there is confusion amongst consumers about what RA means with only 39% having heard of it (Alpha Food Labs, 2021a). However consumers are aware of the environmental issues facing producers, so there is potential that they would be very receptive to RA/RV marketing from New Zealand. NZW is in a position where no other winegrowing country is actively promoting RV and this could be an area where New Zealand wines could excel. The research in the report suggests that consumers would be willing to pay more so the potential is there, however good communication and storytelling will be necessary to capitalise on the opportunities.

5.0 Method

5.1 Interviews

A semi-structured face-to-face interview was developed, see Appendix A. Interviews were carried out over a six-week period, with eight participants. Participants from a range of companies, vineyard management approaches and roles participated. The objective was to gain a diverse set of views, representing different segments of the industry.

Table 1 Company, vineyard management and job type of participants.

Company Size	Company Type	Vineyard Management Approach	Role
Small (<200,000L) *	Family owned	Conventional	Viticulturist
Medium (200,000-4,000,000L)	Corporate	Biodynamic	Vineyard Manager
Large (>4,000,000L)		Sustainable	Vineyard Owner
		Regenerative	NZ Winegrowers
			Auditor

*Liters of wine production per annum

5.2 Thematic Analysis

This is a qualitative method for "identifying, analysing and reporting patterns (themes) within data" (Braun & Clarke, 2006). Five thematic analyses were used to analyse data collected in the different sections of the semi-structure interviews. The topics were:

- Sustainability
- Regenerative viticulture
- SWNZ
- Future-proofing
- The connection between RV and SWNZ.

From the interview transcripts key thoughts and ideas were captured on *Post-it* notes under each topic. Once all ideas were on *Post-it* notes they were arranged into broad themes. These themes were then reviewed with some combined, until a final theme was distilled (Braun & Clarke, 2006). Thematic maps were created using the *Miro* website, allowing links between themes that were observed through this process to be demonstrated.

5.3 Digital Survey

A survey was designed on the *SurveyMonkey* platform and was used to gather thoughts on the connections between the SWNZ focus area goals and the RA principles, see Appendix B. The survey was shared in numerous ways:

- Whitehaven vineyard team
- Whitehaven contract growers
- Marlborough regional viticulture group 'Viti Talk'
- LinkedIn

The survey ran for one month and there were 51 participants.

6.0 Analysis & Results

The following section shows the results of the interviews and survey. The interviews and survey were analysed as described in the methods section. The results of each analysis are explained in this section and will be discussed later in the report.

6.1 Interviews – Thematic Analysis

6.1.1 Sustainability

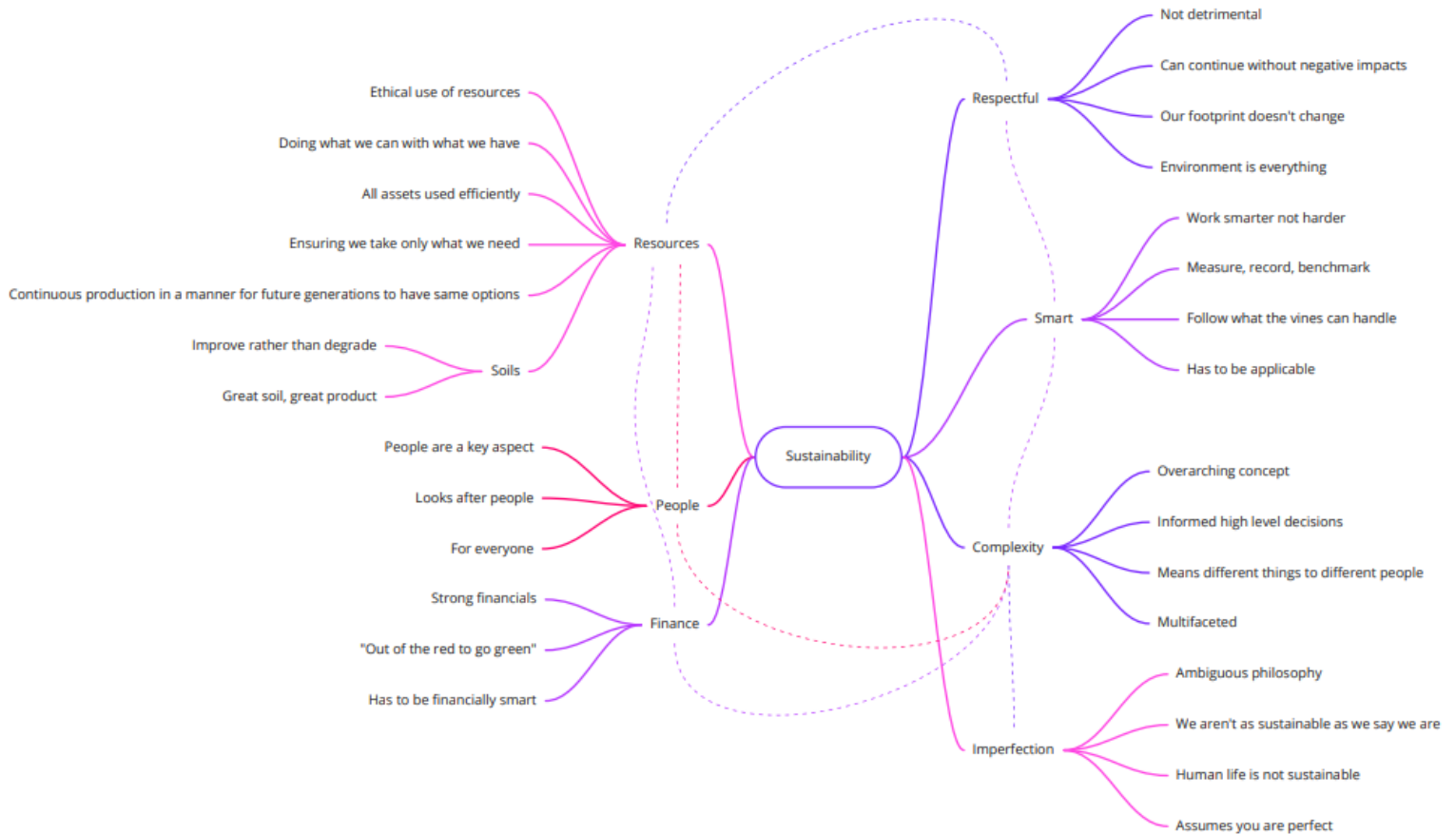


Figure 8 Sustainability themes identified through semi-structured interviews. The links between themes that arose during the interview and analysis process are indicated by the dotted lines.

Participants were asked what sustainability meant to them and what practices they incorporate into their business (if any). Figure 8 above shows seven key themes emerged from the interviews.

There was a strong focus on *resources* and their use. Linked to this there was a strong focus on *people* and how important people are. *Finance* was also linked to resources with two participants commenting that "you can't be green if you are in the red". Other emerging themes were that sustainability is a *respectful* system, practitioners don't want to be causing harm to the system. In order to do this, farmers need to be *smart* and work with the system whilst also looking to find new ways to do things. It also became apparent that sustainability has many meanings and many interconnected components.

These themes were generally positive about sustainability however some participants were 'tired' of the word and there was some feeling that it has been overused. The negative perception toward sustainability was the theme *imperfection*. Sustainability is not a perfect word or system – some participants considered it more of a philosophy than an actionable idea.

6.1.2 Regenerative Viticulture



Figure 9 Regenerative viticulture themes identified through semi-structured interviews. The links between themes that arose during the interview and analysis process are indicated by the dotted lines.

Nine themes emerged from the RV topic in the interviews, Figure 9. Participants were asked what RV meant to them and what practices they currently incorporate (if any) into their business.

Again, there were links between some of the themes that emerged. A lot of time was spent on *soil health* and *ecosystem prosperity* in the interviews. Many participants thought that RV was *vague*, as a farming system it is still developing and to some participants, they found it very narrow or *restrictive*. However, there was a repeating theme that this way of farming is very *logical* and it makes sense as more understanding is gained. There were some very positive themes around *mindset* (of practitioners) and the aspect of *continuous improvement* of the farming system and how beneficial and tangible these are.

6.1.3 SWNZ



Figure 10 Participants feelings about SWNZ were organised into themes identified through semi-structured interviews. The links between themes that arose during the interview and analysis process are indicated by the dotted lines.

Since SWNZ is the dominant sustainability programme in the NZ wine industry, participants had a very good understanding of SWNZ. Participants were asked what they thought about the focus area goals that SWNZ has set for the industry and where these will take the industry. From this, seven themes emerged, five of which were very positive.

Themes emerged showing a *positive direction*, the benefits of data collection and providing members with information, and the opportunities for future expansion/development of the programme.

There were however some unaligned views in the industry. These views were not necessarily negative towards the SWNZ system but were not congruent to the focus areas. This links strongly to the theme of *encapsulating a diverse population*, almost all vineyards are SWNZ accredited so this can range from a few hectares to thousands and of course this will include a very diverse group of people.

6.1.4 SWNZ And Regenerative Viticulture

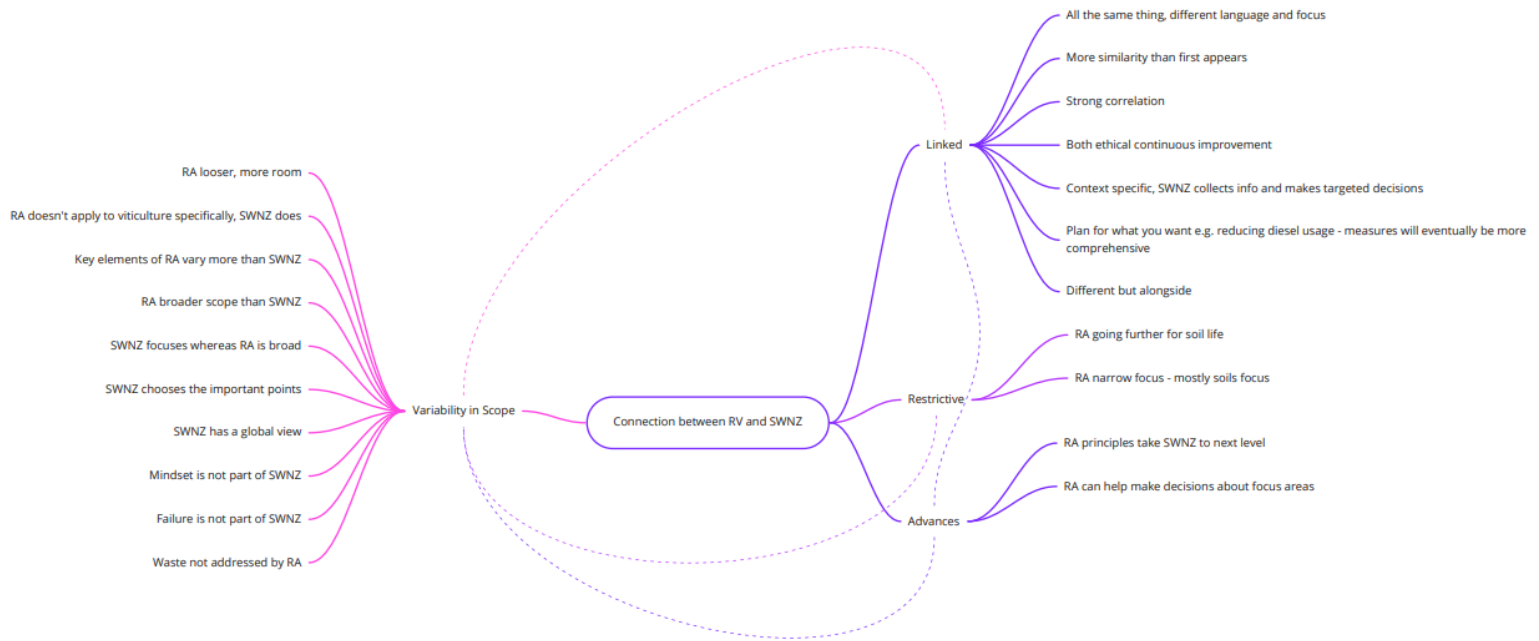


Figure 11 Participants thoughts about the connection between RV and SWNZ were organised into themes identified through semi-structured interviews. The links between themes that arose during the interview and analysis process are indicated by the dotted lines.

Four themes emerged when participants were asked if they see a connection between SWNZ and RV, are they working towards the same goals. This section resulted in a wide variety of views that were able to be encompassed into four wider themes.

The strongest theme that emerged was the *variability in scope* of each programme. This came from views that supported SWNZ and views that supported RV; each system has components that the other doesn't. However, there was also a strong theme that the two systems are *linked* and they have more commonalities than people first see. Two lesser themes that RA is *restrictive* and that RV is the next step beyond SWNZ also emerged.

6.1.5 Future-proofing



Figure 12 Participants thoughts on the concept of future-proofing NZW were organised into themes identified through semi-structured interviews. The links between themes that arose during the interview and analysis process are indicated by the dotted lines.

Participants were asked what future-proofing meant and their opinion on whether RV or SWNZ is the system that will help achieve this.

Themes focused on how people define future-proofing – *Security, Flexibility, Resilience, Finance* and *Consumer Driven*. It was identified that both SWNZ and RV can play a role in future-proofing the industry. The conversations that emerged from these questions went at length were incredibly valuable in defining what this means to participants from the NZ wine industry. It was apparent that this is something each participant had spent time thinking about and it often was linked with succession planning.

6.1.6 Thematic Analysis Summary

Across the five thematic analyses there were numerous key themes that emerged and there were visible links between themes. Most participants were familiar with the topics covered in the interview, though the RV analysis did reveal a range of participant understanding of this farming approach. In general, most participants were positive about the analysis themes. There was an emerging pattern of comments around sustainability and SWNZ fatigue which was of interest and unexpected. On the whole, participants often felt RV and SWNZ would both be useful practices to assist in future-proofing the New Zealand wine industry, with RV considered by some as the "next level" to the existing SWNZ programme.

6.2 Digital Survey

Respondents of the survey held a range of roles in the industry, and they covered a variety of management techniques. 88% of respondents were located in Marlborough.

Respondents were presented with each of SWNZ six focus area goals and asked if any of the RA principles below (1-11) will contribute to achieving the goals. They were also able indicate if they thought the RA principle would/wouldn't help (12-13).

1. Make context specific decisions
2. Plan for what you want; start with what you have
3. Maximise photosynthesis
4. Minimise disturbance
5. Harness diversity
6. Manage livestock strategically/holistically
7. Open and flexible toolbox
8. Failure is part of the journey
9. Learn together
10. Question everything
11. The farm is a living system
12. The regenerative principles won't help achieve this goal
13. The regenerative principles are only part of the solution

6.2.1 Focus Area – Climate Change

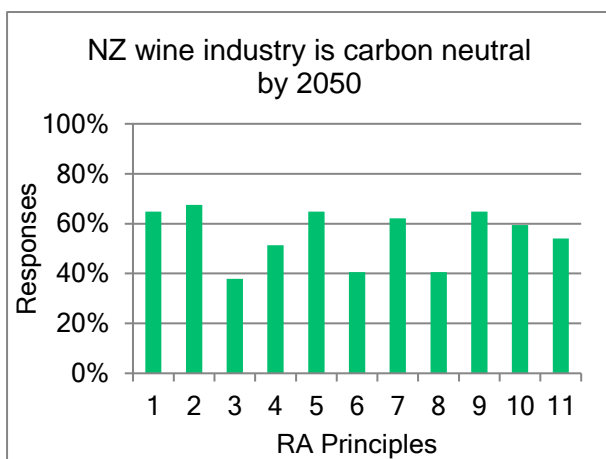


Figure 13 Survey results showing whether participants thought individual RA principles could help achieve the SWNZ goal for climate change

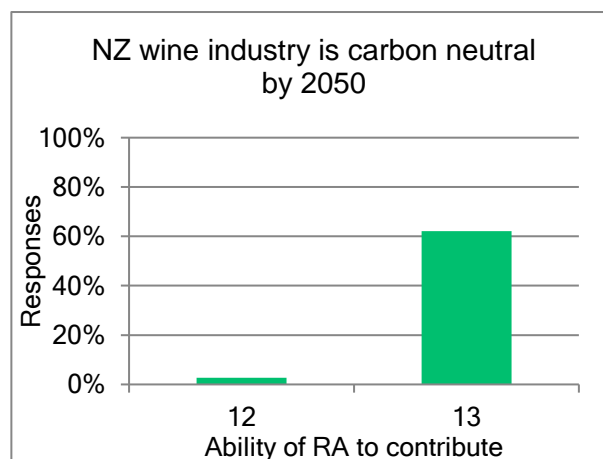


Figure 14 Survey results showing participants overall thoughts on whether RA principles can contribute to achieving the SWNZ goal for climate change.

Only 2.7% of respondents selected number 12 indicating that RA principles won't help achieve this goal, whereas 67% selected number 13 indicating that RA principles are able to play a role in achieving this goal. Participants were able to select more than one answer so the 11 RA principles averaged an overall response rate of 55%. It is interesting to note that three of the RA principles received less than 40% response rate they were numbers three, six and eight. Number six is the management of livestock; livestock are linked to emissions but livestock are not fully integrated into vineyards, only being introduced a few key times in the year. Number three is maximising photosynthesis, this could be important in becoming carbon neutral, using plantings to offset carbon – grapevines alone cannot achieve this but there may be plantings within a vineyard system that can.

6.2.2 Focus Area - Water

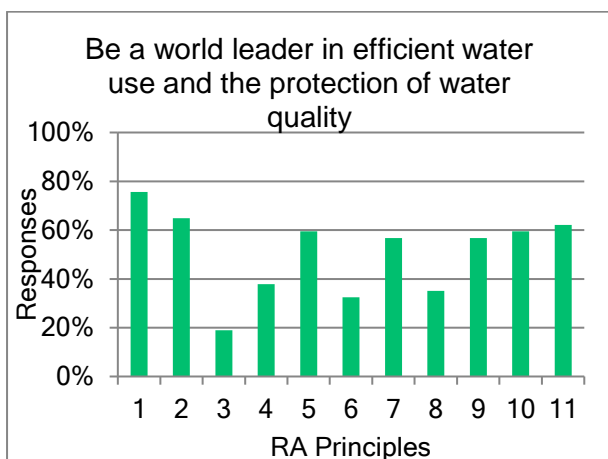


Figure 15 Survey results showing whether participants thought individual RA principles could help achieve the SWNZ goal for water.

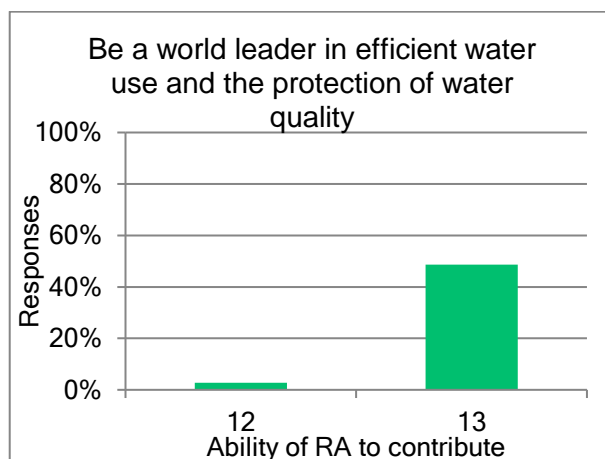


Figure 16 Survey results showing participants overall thoughts on whether RA principles can contribute to achieving the SWNZ goal for water.

Again only 2.7% selected number 12 indicating that RA principles won't help achieve this goal and number 13 was lower in comparison to the climate change goal at 49% showing fewer people think RA principles will help achieve this goal. The overall response rate for all RA principles was 51% response. There was a strong response for number one make context specific decisions. Responses for numbers three, four, six and eight were low, it is understandable participants didn't see a link to the goal with photosynthesis, livestock and failure, however number four is minimise disturbance, it is surprising this had a low response. Undisturbed soils with good coverage should be able to hold moisture and have the potential to contribute to more efficient water use.

6.2.3 Focus Area - Waste

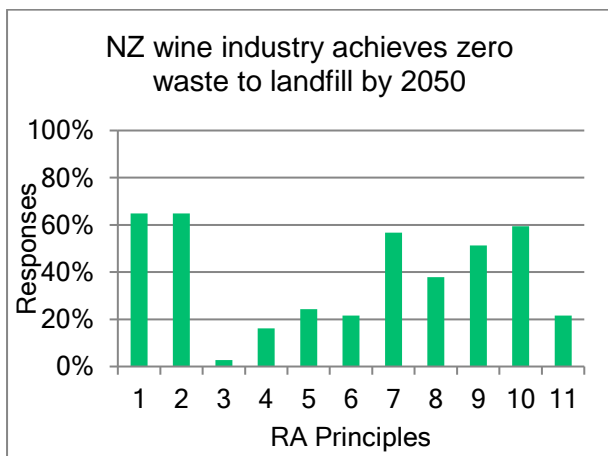


Figure 17 Survey results showing whether participants thought individual RA principles could help achieve the SWNZ goal for waste.

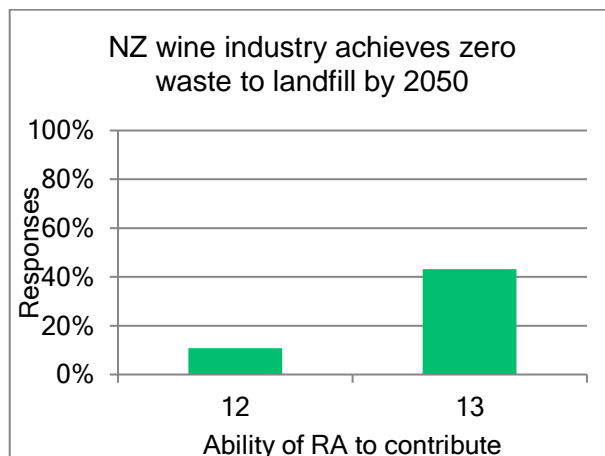


Figure 18 Survey results showing participants overall thoughts on whether RA principles can contribute to achieving the SWNZ goal for waste.

This goal showed noticeably different results with 11% of responders choosing number 12 indicating that RA was not a useful tool for this goal and only 43% thought that RA could help. The overall response rate for the RA principles was only 38%. The graph shows a lack of connection between the SWNZ goal and the RA principles. Numbers one and two are more general RA principles, making context specific decisions and planning for what you want. These could be applied to any of the goals. Number 10 question everything did not get as many responses as expected, questioning materials used and their waste streams should be an important consideration.

6.2.4 Focus Area - Soil

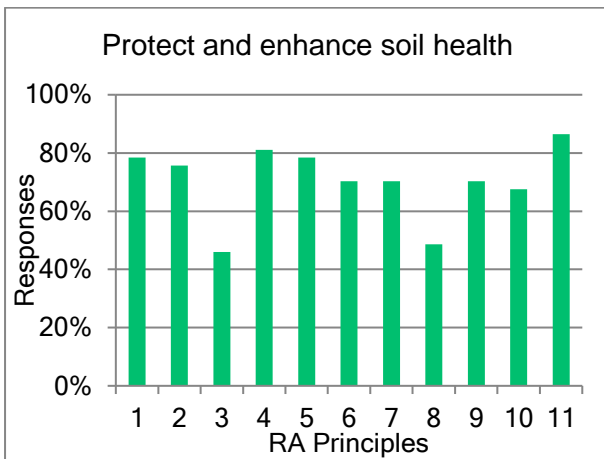


Figure 19 Survey results showing whether participants thought individual RA principles could help achieve the SWNZ goal for soil.

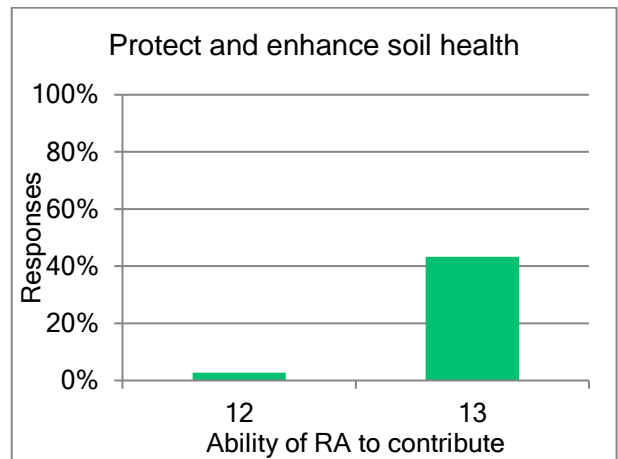


Figure 20 Survey results showing participants overall thoughts on whether RA principles can contribute to achieving the SWNZ goal for soil.

Soil showed the strongest response with the RA principles overall response rate 70%. Soils are often considered the cornerstone of RA so it was expected that responses for this would be high. Only 2.7% selected number 12 indicating that RA was not a useful tool for this goal and 43% thought that RA could help. 43% is lower than anticipated when there are strong perceived connections between the SWNZ goal and the RA principles.

6.2.5 Focus Area - Plant Protection

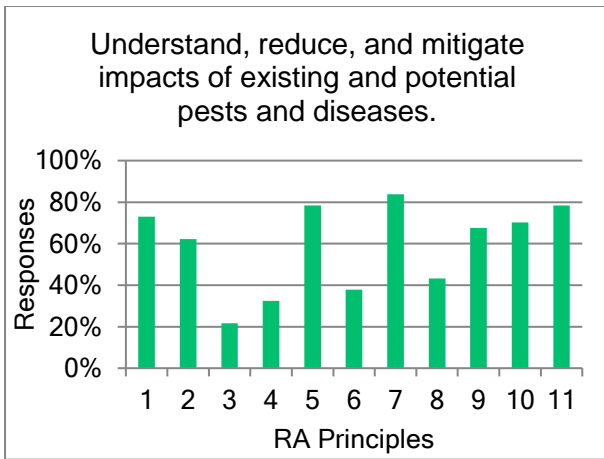


Figure 21 Survey results showing whether participants thought individual RA principles could help achieve the SWNZ goal for plant protection.

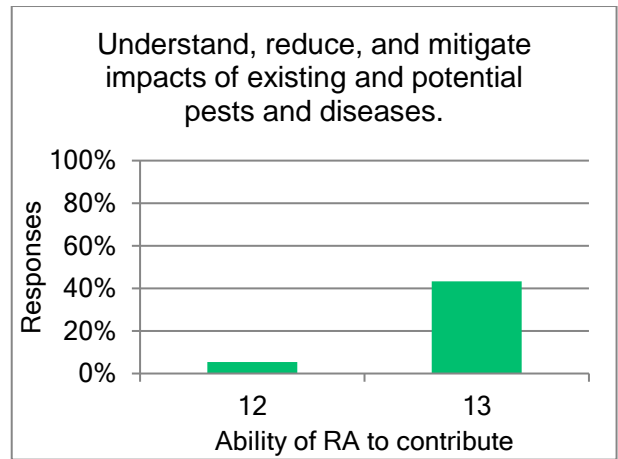


Figure 22 Survey results showing participants overall thoughts on whether RA principles can contribute to achieving the SWNZ goal for plant protection.

There were variable responses for this goal with some of the RA principles showing strong responses and some weak responses. Of interest the RA principle that was most important was the open and flexible toolbox number seven, followed closely by number five harness diversity. Surprisingly number three maximise photosynthesis had the lowest response rate at 22%. The overall average for the RA principles was 59%. The percentage of responses for #12 was a bit higher for this goal at 5.4% indicating more people didn't see RA as the answer.

6.2.6 Focus Area - People

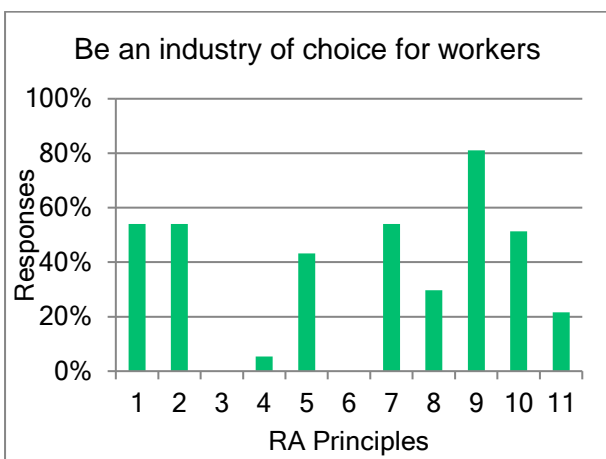


Figure 23 Survey results showing whether participants thought individual RA principles could help achieve the SWNZ goal for people.

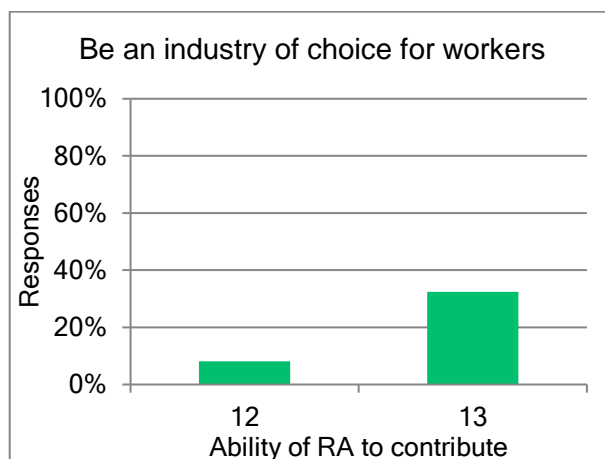


Figure 24 Survey results showing participants overall thoughts on whether RA principles can contribute to achieving the SWNZ goal for people.

This goal had the least responses across all the RA principles with an average response of only 36%, this was coupled with a higher percentage of number 12 at 8.1% indicating that RA was not a useful tool for this goal and the lowest response for number 13 that RA can contribute to this goal at 32%. Some of the RA principle couldn't be applied to this goal numbers three and six maximise photosynthesis and manage livestock. The RA principle most connected to this goal was number nine learn together.

6.2.7 Future-proofing

Respondents were then asked their perception of the future of the NZ wine industry in relation to SWNZ and RV.

SWNZ focus areas will future-proof the NZ wine Industry

62.2% of responders either agreed or strongly agreed that SWNZ focus areas are able to future-proof the NZ wine industry. However, 21.6% of responders neither agreed or disagreed while 16.2% of respondents disagreed or strongly disagreed.

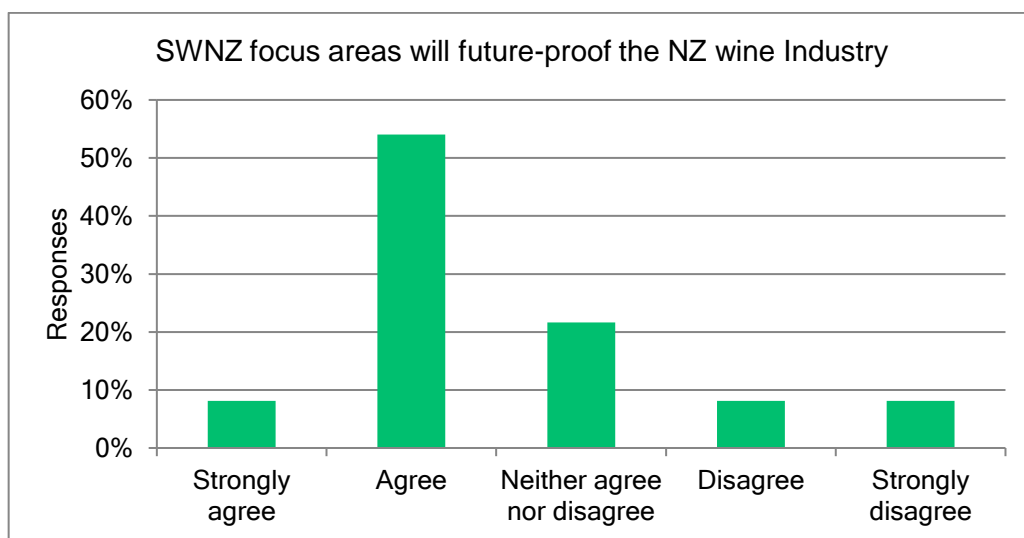


Figure 25 Results from the survey showing participants' opinions on future-proofing the NZ wine industry via SWNZ

Regenerative viticulture will proof the NZ wine Industry

64.9% of respondents agreed or strongly agreed that RV can future proof the NZ wine industry, a very similar result to the previous question. However 29.7% neither agreed nor disagreed and 5.4% disagreed. Interestingly no participants strongly disagreed.

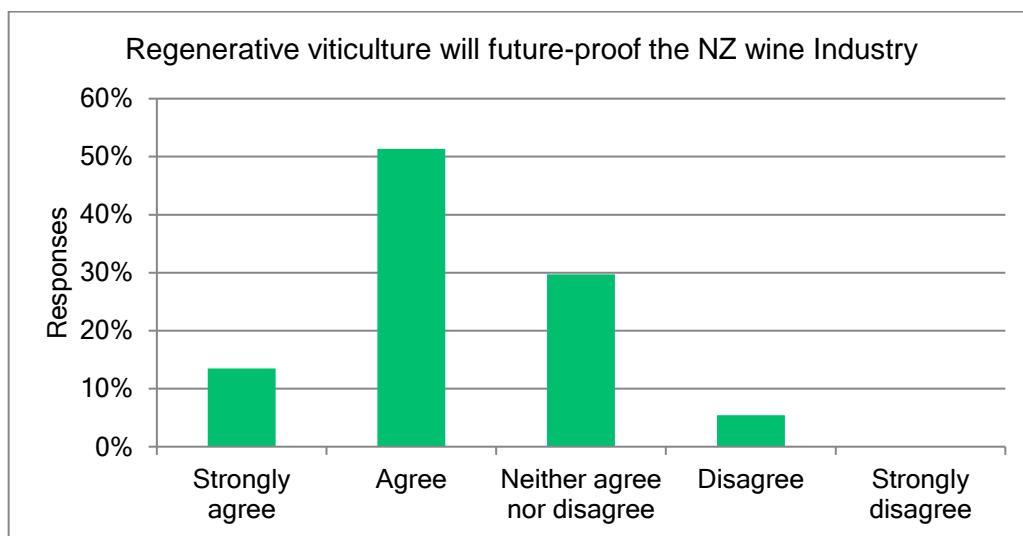


Figure 26 Results from the survey showing participants opinions on future-proofing the NZ wine industry via RV

6.2.8 Digital Survey Summary

As can be seen above there were varying results depending on the focus area. Some of the focus areas were able to be linked to a majority of the RA principles, for example the focus area goal for soil health. In contrast the focus area goals for waste and people had lower responses. For each focus area goal there was a consistent percentage of participants that thought the RA principles wouldn't help achieve the goal. The percentage of people who thought RA principles would help achieve the goal was always higher and the percentage varied for each goal. When asked if SWNZ and RV can future-proof the NZ wine industry there was over 60% agreement for both, though there was still a large portion of the participants that were ambivalent or disagreed.

7.0 Findings and Discussion

7.1 SWNZ Focus Area Goals

It was anticipated that when participants were asked to explain sustainability that they would mention the three pillars; whilst this language wasn't explicitly used, the themes identified did fall within these pillars. Resources, people and finance reflect the three pillars social, economic, environmental (or permutations of these). It was identified that sustainability is a complex system and it is imperfect, this was also reflected in the literature review. It is a concept that can be open to interpretation and it was of interest that during the interviews participants often had a particular aspect that they really focused on, whilst aspects of the pillars were mentioned participants had one that was clearly more important to them. Whilst the thematic analysis didn't show anything too surprising with the interviews it was helpful to see how generally well aligned the wine industry participants were. This may be due to being familiar with SWNZ and the clear messaging it delivers. There will always be people who are not completely satisfied with a concept or group; however the 'negative' comments were not critical, rather questioning and thought provoking.

SWNZ has carefully created the six focus areas for the industry so that NZW are world leaders in the sustainable winegrowing world. The line of questioning around SWNZ was designed to analyse the role of the focus areas, however there was a theme identified - *unaligned*. There are members of the winegrowing community who weren't aligned with the idea of SWNZ. Part of this links to another theme - *encapsulates a diverse population* - SWNZ has been designed to cover the entire wine industry. This means that a 1ha block is treated the same as 1000ha, the way it is designed allows NZ wine to be marketed to the world as sustainable, presenting a united image to the world. Some people would like to see those who go over and above the requirements rewarded and the laggards punished, however that is not how the system is currently designed. SWNZ aims to educate and promote good sustainability practices, taking everyone with them.

Participants spoke positively about how SWNZ's data collection was shaping the direction they are taking with each focus area. Participants find it informative and think that the focus areas are generally moving NZW in a positive direction from which they could expand further. Whilst some consider the focus areas as "aspirational", it is good to have these goals, and as one participant said SWNZ provides the "signposts" on our journey to achieve these. It is possible that some people don't realise the origin of these goals and that could impact peoples' thoughts of the focus areas. As mentioned in the literature review these focus area goals were developed based on the UN Sustainable Development Goals, these goals are described as part of an "urgent call for action by all countries" to address issues such as poverty, health and climate change (United Nations, n.d.). The NZ wine industry has created focus goals so they can play their role in this call to action. What was interesting through the interview process was how many people didn't or couldn't remember the six focus areas. It was anticipated that people wouldn't remember the goals but it was surprising that the focus areas were so easily forgotten.

There were a large number of respondents to the survey who thought the SWNZ focus areas will future-proof the NZW industry. This links to the thematic analysis where one theme was *positive direction*, this encapsulated the thoughts that the industry is on the right track but hasn't necessarily found the answer, or SWNZ can't achieve all this alone, it is part of the puzzle taking NZW into a better future. This was promising however it was only 62.2%; there were also almost a quarter of the respondents who neither agreed nor disagreed. It is this group that is concerning and it would be beneficial for SWNZ and NZW to understand why people feel like this and where they can improve to get more industry support.

7.2 Regenerative Viticulture

Regenerative is the new 'it' word that is being heard increasingly throughout the wine industry. Based on this it was surprising the number of participants who didn't really know much about RA or the principles of RA in New Zealand. To some it was viewed as another "hippy" farming system. Since doing the literature review and thematic analysis it became clear why there is a lack of understanding and knowledge. Without a clear definition it can be a difficult concept to explain to people, as one of the interview participants said, "people like to define and put things in a box so they struggle with regen". This lack of definition and understanding is most likely why there were two somewhat contrasting themes in the analysis – *vague* and *restrictive*. Due to there being no definition many participants found it very vague and open to interpretation. Then there was a group who found it a restrictive concept, this was typically due to their view that it was 'all about soil'. Whilst soil is a very important aspect of RA and this was seen in the thematic analysis, it is not the entire system rather the base on top of which a RA/RV system can be built.

Many of the themes identified were reflective of the 11 principles identified by the NZ focus group study – *positive mentality, soil health, continuous improvement, ecosystem prosperity*. This indicates that while there is an apparent lack of understanding there is knowledge of some of the aspects that make up RA/RV. What was interesting is that there was a recurring theme through the interviews that RA is *logical*. To many people interviewed it was just basic good farming practices that have been around for a long time and had simply been rebranded. This was also reflected in the literature review; RA is another alternative agriculture and is intrinsically linked to the other alternative systems of farming. Due to it appearing like a new concept many viewed it as still *developing*, however the principles behind RA are often based on science, it is simply the system as a whole that is not – yet. What is interesting is how RA has harnessed social media and is actively spreading knowledge, maybe this is why it is still seen as developing because it is still telling its story, the science is trying to catch up. With the use of social media there is potentially less peer-reviewed science backing RA and more citizen science. People learning from others and easily able to connect through social media.

As with SWNZ there were a large number of respondents in the survey who agreed or strongly agreed that RV will future-proof the NZ wine industry, however almost a third of respondents neither agree nor disagree. This may link to a lack of definition or understanding of what RV means, or respondents see it as a tool rather than the answer. What is interesting is that there were no respondents that strongly disagreed with the idea which may indicate that respondents are open to exploring the system and learning more.

7.3 The Connection Between SWNZ and RV

Key to this project was the investigation of the alignment of RV with SWNZ. It was apparent that there was *variability in scope*, this wasn't unexpected, however it was interesting that participants in the interviews tended to focus on the differences rather than the similarities between the two farming approaches.

There are aspects of RV that SWNZ doesn't address and vice versa. Over time SWNZ has developed their focus areas and the questionnaire that growers fill out to become certified is based around these areas. For example, it would be difficult for SWNZ to address grower mindset and encourage failure as part of the learning process and then incorporate this into the certification process. However, SWNZ is there to be educational and informative, supporting growers on their journey. Growers do frequently 'fail' at a particular aspect, but the auditors typically adopt a stance of education rather than punishment – the error/failure needs to be fixed or proof given that they are going to do things differently. This is complimentary to the RA mindset principles.

Another example is people, while SWNZ does have a 'people' focus area, it is actually NZW as an industry body encouraging and supporting industry members through various events, seminars, and competitions e.g., Young Viticulturist of the Year and the NZW Mentoring Programme. Survey results showed a lack of strong connections between the SWNZ people goal and the RA principles. This, combined with the number of times interview participants spoke about needing more focus on people indicates that both SWNZ and RA/RV have room to expand and incorporate more on this topic. A growth opportunity for both systems.

Positively there were many interview participants that saw a link between SWNZ and RV, some thought that they are the same thing whilst others saw them as complementary. These links were supported by the results from the survey where each SWNZ focus area goal was assessed against the RA principles to see if participants saw a connection. In the previous analysis section it became clear that there were differences in responses based on the goal being assessed. There was always a percentage of people that thought regenerative principles won't help achieve the goal, however this percentage was mostly low averaging 5.4% of responses across the questions. In contrast to this there was always a good percentage of respondents who thought that regenerative principles were part of the solution, averaging 45.5% of responses across the questions. Looking at these percentages the 5.4% could indicate a portion of the population that don't understand RV. The 45.5% that saw regenerative principles as part of the solution supports the results of the thematic analysis that showed there was *variability in scope* but there is also a strong theme that SWNZ and RV are *linked*.

Two results showing the least alignment are the goals that address waste and people. This again supports the thematic analysis where these were two examples given by participants about the differences between the systems and where they are or are not addressing these key issues. However as discussed above there may be more connection here than what appears at surface level.

It was not unexpected that the principles of RA reported a strong connection to the protect and enhance soil health goal, with most participants seeing a connection between this goal and all the individual RA principles.

There was one RA principle that was the least applicable to the SWNZ goals – maximise photosynthesis. This is a very specific principle and as a result there was a low percentage of respondents that thought this principle would help the SWNZ goals. For example, maximising photosynthesis doesn't link to SWNZ goal of being an industry of choice. This links to and supports the strong theme of variable scopes from the interviews and it is not a surprising result.

Both SWNZ and RV are affecting change in the NZW industry. One conversation during the interviews prompted some investigation into change management. Currently SWNZ effects top-down change. It is directed by NZW and members subscribe to the system and are assessed on their performance. RA/RV appears to be a bottom-up change, these changes are starting with farmers and communicated through the farming community. There is no authority telling growers that this is what they need to do, they are changing themselves. Burnes (2017), discusses top-down vs bottom-up change ["in a rapidly and unpredictably changing world, top-down, senior-management-imposed change does not work. What is required is for managers and employees, on a day-to-day basis, to have the authority to be able to shape and reshape their part of the organisation to deal with the threats and opportunities presented by an ever-changing environment."](#) (Burnes, 2017). Whilst Burnes speaks to companies this can apply to SWNZ and RV. The more receptive people are to change the more empowered they are to follow through themselves. SWNZ currently is a top-down system that is in place to protect the NZW industry and is well supported in the industry. RV is different, it is emerging bottom-up and arguably it should stay this way, farmers and citizen science are leading the way in making beneficial changes to the growing environment. It is giving growers the flexibility to adapt to their "ever-changing environment", whether this is climate change, social license or policy, the landscape in which they operate is continually changing.

7.4 Future-proofing NZ Wine

'What does future-proofing mean to you?' This was one of the more difficult questions posed in the interview with many participants having to pause and take time to formulate an answer. As mentioned previously the conversations that emerged were thought provoking, this could be because this is such an important concept for individuals, families and businesses alike.

Themes that were identified relating to the concept linked to the pillars of sustainability – social, economic and environment. The participants had a strong focus on business resilience, strongly linking to the theme of *finance*. This is where the idea of *flexibility* fits in, operating in a changing world and needing to be able to adapt to this. All of this provides people with *security* another dominant theme. Not only can links to sustainability be seen but there are also similar links in a RA system. RA is looking to build resilience and genuinely improve the system for the future, continually learning and adapting.

Both SWNZ and RV are seen by participants as playing a role in future-proofing the NZ wine industry. Overall it was considered that there was space for both systems in shaping the future of NZW. However, it also was not overwhelming support for either system when people were viewing through a lens of future-proofing, even though principally both systems are aiming to do this. Potentially there isn't a good definition of what future-proofing means for NZW and as mentioned earlier a lack of understanding of SWNZ and RV.

7.5 Review of Methodology

On reflection whilst this research project has provided insights there is always room for improvement. It would be beneficial to gain the views of the wider industry, 88% of respondents to the survey were located in Marlborough. Whilst Marlborough is the largest region of the NZ wine industry it is also arguably the most conventional. It would be interesting to hear more opinions from the smaller winegrowing regions and understand how they view SWNZ and RV systems. It would also be beneficial to interview more people from the industry and expand this group to include a more NZ perspective.

The survey was a useful tool to gauge the connection people see between SWNZ and RV, however if I were to do this again, I would refine the RA principles section of the survey. Participants were able to choose multiple answers which while it provided good insights it was more challenging to breakdown and analyse. I would also add a question at the end asking participants their perception of which system is preferred SWNZ or RV to future-proof the NZW industry.

In the future it would be beneficial to have some more scientific evidence on RV systems and the impacts they have. This will come with time, however due to the context specific, flexible nature of RV it may be difficult because something that works on a Pinot noir vineyard on clay soils will be very different to Sauvignon blanc on river gravels for example. Without scientific support it may be difficult to convince the majority to consider changing their practices.

8.0 Conclusions

New Zealand has an established world-leading sustainable winegrowing programme. SWNZ is leading the industry on its sustainability journey and with its key focus area goals, it is guiding and driving industry efforts. In essence the industry is an agricultural, industrial process with inevitable impact on the environment. Members' feelings towards SWNZ are mostly positive with members believing it is leading the industry in the right direction. However there is always room for improvement in any system and SWNZ should be aware there are participants that aren't satisfied.

SWNZ and RA/RV have varying scopes, neither covers everything however there is a complementary nature to the systems. RA may not directly address issues like waste but SWNZ does. Used in combination both could be powerful tools for those wishing to pursue improved farming systems. The RA principles can help winegrowers to achieve some of the SWNZ focus area goals but they may not be the only answer. Initially in this project it was considered whether SWNZ could incorporate RV principles into its system. While there may be some that can be slowly introduced, they are different in nature. Primarily SWNZ is a top-down system and while it does provide support and education, it is an audited system. RA/RV appears to be a bottom-up system. It requires a change in the way farmers view their farm systems. It is learning from neighbours and like-minded individuals. It is not regulated and there seems to be little desire for this, as one participant said, "if you think you have achieved regenerative viticulture then you don't understand it". By this they meant that it is a continuous improvement and learning system, there is always something more you can do. However this does not prevent the building of a programme that incorporates RA/RV.

Future-proofing the industry was important to interviewed participants. Both SWNZ and RV can play a role in this but neither is the sole answer. They were viewed as complimentary. Business continuity, adaptability and resilience was important to everyone and the SWNZ focus areas address some of the key issues in the future while RV is helping build natural resilience from the soil up. There may be areas that neither currently address, particularly the financial nature of future-proofing.

Conventional growing systems need to change and adapt as the environment is changing. What used to work today might not work in the future. SWNZ is a framework but currently doesn't provide for the growers who wish to go further. Integrating RV into SWNZ or having a RV programme in some capacity could allow for this and minimise disaffection. If members of the wine industry believe they have 'achieved' sustainability they should be challenged to go further, there is always room for learning and improvement in a changing, dynamic environment.

Question everything. Learn something. Answer nothing.

- Euripides

9.0 Recommendations

Many winegrowers are actively learning and heading in the right direction with room for continuous improvement. Some recommended steps that could be adopted are:

- **Provide RV resources for NZW members.** NZW and/or SWNZ should produce factsheets for members that outline the key information and links to further resources on RA/RV. A factsheet would provide more information to winegrowers that are keen to learn more.
- **Form a dedicated RV group.** Quorum Sense (the NZ RA group) and NZW to form a regenerative group dedicated to viticulture to meet the specific challenges of winegrowing. Small, informal regional RV groups would be a good start.
- **Provide case study NZ vineyards.** SWNZ to share with the industry via open days and newsletters the vineyards that are going above and beyond. Allowing members of the winegrowing community to learn from peers and make valuable connections.



Figure 27 An unirrigated vineyard in Marlborough grown without undervine herbicide usage.

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Appendices

Appendix A - Interview Questions

Interview # _____

Interviewee: _____

This interview is part of a research project I am undertaking through the Kellogg Rural Leadership Programme. The research topic I have decided on is *Sustainability in the New Zealand wine industry; is regenerative viticulture the answer to future-proofing the industry?* I am aiming to interview people from throughout the industry to gather their thoughts and opinions on this topic. Can I have your permission to audio record this interview so I can review it later? All recordings will be deleted at the end of the Kellogg Programme.

Name

Date

1. What does the word 'sustainability' mean to you?
2. How do you manage your vineyard sustainably? (If applicable)
3. How would you describe the Sustainable Winegrowing New Zealand's (SWNZ) 6 focus area goals are? (Have these available for those that aren't aware/can't remember them all)
4.
 - a. Thinking of the future, do you think that SWNZ is targeting the right areas?
 - b. If not is there an area/s that you think should be included? Please explain why
 - c. If yes why do you agree with these focus areas?
5. What does regenerative viticulture mean to you?
6. Please describe for me any regenerative practices you are currently using on your property. (If applicable)
7. Have you heard of the 11 principles of regenerative farming?
 - a. If yes – how would you describe them?
 - b. If no – show them the diagram and discuss
 (Have these available for those that aren't aware/can't remember them all)
8. In what way do you think these principles are aligned with achieving the SWNZ focus area goals?
9. Please identify and explain any gaps between the principles and SWNZ focus areas?
10. What does future-proofing mean to you?
11.
 - a. Do you think the SWNZ focus areas are future-proofing NZW?
 - b. How will/wont the SWNZ focus areas future-proof NZW?
12.
 - a. Do you think regenerative viticulture is able to future-proof NZW?
 - b. How will/wont regenerative viticulture future-proof NZW?

Appendix B - Questionnaire

Regenerative Viticulture and Sustainable Winegrowing

This survey is collecting information for the completion of research project as part of the Kellogg Rural Leadership Program. All answers are collected anonymously.

The research topic is: Sustainability in the New Zealand wine industry; is regenerative viticulture the answer to future proofing the industry?

This survey aims to find out if members of the NZ wine industry see links between the Sustainable Winegrowing (SWNZ) focus areas and the principles of regenerative farming. It also seeks to understand if members believe industry is heading in the right direction to future proof it for the next generations.

If you have any concerns or questions please contact Jess at jessica.wilson@outlook.co.nz

* 1. What is your role in the wine industry?

- Viticulturist
- Winemaker
- Vineyard Manager
- Other (please specify)
- Vineyard Owner/Operator
- Researcher

* 2. Where are you located?

- Auckland/Northland
- Gisborne
- Hawkes Bay
- Marlborough
- Nelson
- Waipara
- Central Otago

Other (please specify)

* 3. How do you define your vineyard system?

- Conventional
- Organic/Biodynamic
- Regenerative
- Other (please specify)
- Sustainable
- I don't have a vineyard

Regenerative Viticulture and Sustainable Winegrowing The relationship between SWNZ focus areas and regenerative principles

If we moved to a regenerative viticulture system will we be able to achieve the SWNZ focus area goals and future-proof our industry?

Below are the 6 SWNZ focus area goals and the regenerative principles are listed below - please select any regenerative principles that will contribute to achieving this goal.

SWNZ 6 focus areas

NZW Sustainability Focus Areas

FOCUS AREAS	FOCUS AREA GOALS
Climate Change	NZ wine industry is carbon neutral by 2050
Water	Be a world leader in efficient water use and the protection of water quality
Waste	Zero waste to landfill by 2050
Soil	Protect and enhance soil health
Pest and Disease	Understand reduce and mitigate impacts of existing and potential pest and disease. Be a world leader in sustainable alternatives.
People	Be an industry of choice for workers

The 11 key principles of regenerative farming



* 4. Which regenerative principles will allow us to achieve the following goal: Climate Change - NZ wine industry is carbon neutral by 2050

- Make context specific decisions
- Plan for what you want; start with what you have
- Maximise photosynthesis
- Minimise disturbance
- Harness diversity
- Manage livestock strategically/holistically
- Open and flexible toolbox
- Failure is part of the journey
- Learn together
- Question everything
- The farm is a living system
- The regenerative principles won't help achieve this goal
- The regenerative principles are only part of the solution

* 5. Which regenerative principles will allow us to achieve the following goal: Water - be a world leader in efficient water use and the protection of water quality

- Make context specific decisions
- Plan for what you want; start with what you have
- Maximise photosynthesis
- Minimise disturbance
- Harness diversity
- Manage livestock strategically/holistically
- Open and flexible toolbox
- Failure is part of the journey
- Learn together
- Question everything
- The farm is a living system
- The regenerative principles won't help achieve this goal
- The regenerative principles are only part of the solution

* 6. Which regenerative principles will allow us to achieve the following goal: Waste - NZ wine industry achieves zero waste to landfill by 2050

- Make context specific decisions
- Plan for what you want; start with what you have
- Maximise photosynthesis
- Minimise disturbance
- Harness diversity
- Manage livestock strategically/holistically
- Open and flexible toolbox
- Failure is part of the journey
- Learn together
- Question everything
- The farm is a living system
- The regenerative principles wont help achieve this goal
- The regenerative principles are only part of the solution

* 7. Which regenerative principles will allow us to achieve the following goal: Soil – protect and enhance soil, health

- Make context specific decisions
- Plan for what you want; start with what you have
- Maximise photosynthesis
- Minimise disturbance
- Harness diversity
- Manage livestock strategically/holistically
- Open and flexible toolbox
- Failure is part of the journey
- Learn together
- Question everything
- The farm is a living system
- The regenerative principles wont help achieve this goal
- The regenerative principles are only part of the solution

* 8. Which regenerative principles will allow us to achieve the following goal: Plant Protection - Understand, reduce, and mitigate impacts of existing and potential pests and diseases. Be a world leader in sustainable alternatives.

- Make context specific decisions
- Plan for what you want; start with what you have
- Maximise photosynthesis
- Minimise disturbance
- Harness diversity
- Manage livestock strategically/holistically
- Open and flexible toolbox
- Failure is part of the journey
- Learn together
- Question everything
- The farm is a living system
- The regenerative principles wont help achieve this goal
- The regenerative principles are only part of the solution

* 9. Which regenerative principles will allow us to achieve the following goal: People – be an industry of choice for workers

- Make context specific decisions
- Plan for what you want; start with what you have
- Maximise photosynthesis
- Minimise disturbance
- Harness diversity
- Manage livestock strategically/holistically
- Open and flexible toolbox
- Failure is part of the journey
- Learn together
- Question everything
- The farm is a living system
- The regenerative principles wont help achieve this goal
- The regenerative principles are only part of the solution

Regenerative Viticulture and Sustainable Winegrowing Future proofing our industry

Are we on the right track to protect and enhance our industry for future generations?

* 10. The SWNZ focus areas will be able to future proof the industry

- Strongly agree
- Disagree
- Agree
- Strongly disagree
- Neither agree nor disagree

* 11. Regenerative viticulture is the way forward to future proof our industry

- Strongly agree
- Disagree
- Agree
- Strongly disagree
- Neither agree nor disagree