BRAGATO RESEARCH INSTITUTE

Viticulture extension strategy

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"Knowledge is like fine wine. The researcher brews it, the scientific paper bottles it, the peer review tastes it, the journal sticks a label on it, and archive systems store it carefully in a cellar. Splendid! Just one small problem: wine is only useful when somebody drinks it. Wine in a bottle does not quench thirst. Knowledge translation opens the bottle, pours the wine into a glass, and serves it."[1]

Acknowledgements

Many thanks to all the growers and extensionists who participated in the study and shared their experience and many valuable insights with me. Also, to those members of the Bragato Research Institute who provided input and feedback on the strategy. Also, thanks to Vance Kerslake of Wine Marlborough for his advice relating to applied research methodology. Recognition is also due for all the Otago University MBA teaching staff, particularly, Gregor Schmalz, Dr Sergio Biggeman and Mike Roberts who respectively increased my knowledge of business strategy, business case analysis and project management considerably. Thanks also to all the many classmates I have met and collaborated with throughout the MBA. It's been a journey and I thoroughly enjoyed meeting you, having a lot of laughs online and learning a little bit about many other industries. Finally, the completion of this report and the entire MBA program would not have been possible without the support and patience of my lovely partner Dr Tanya Rutan and our two dogs Sophia-Rose and Edgar-Allan.

[1] Bennett G, Jessani N (eds) (2011) The knowledge translation toolkit: Bridging the know-do gap: A resource for researchers. SAGE Publications, India

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1 Glossary of terms

Co-innovation	A process involving significant collaboration between key stakeholders, using a range of knowledge and skill bases to research, develop and implement a fit-for-purpose knowledge/outcome (Casey, Rhodes, Payne, Brown, & Dynes, 2015)
Dissemination	Sharing research findings with a wide group of stakeholders in a way that is appropriate for the audience and will facilitate uptake
Experiential learning	Learning by doing – knowledge acquired through experiences, observations and engagement with the surrounding environment (Hoffman, Lubell, & Hillis, 2015)
Extension	Wide scope of activities and processes that enable the transfer of knowledge through formal channels and social networks, leading to the creation and uptake of new ideas, tools, processes, and practices enabling change
Extensionist	Somebody who facilitates knowledge transfer between farmers or growers and scientists
Formal learning	Learning by reading – knowledge is transferred through text from expert to reader (Hoffman et al., 2015)
Grower	In the context of this report, somebody responsible to produce grapes for winemaking and most likely a viticulturist, grower manager or vineyard manager
Knowledge broker	People who act to enable stakeholders to answer their own questions and act based on the best possible knowledge and information (Casey et al., 2015)
Knowledge diffusion	Knowledge exchange – two way sharing and co-construction of knowledge (Turner, Rijswijk, Williams, Barnard, & Klerkx, 2013)
Knowledge transfer eco-system	Set of organisations, groups and individuals connected by directly supporting knowledge transfer amongst New Zealand's wine industry participants and science providers
Social learning	People learning from others – a social process of knowledge distribution among a network of individuals who share a common set of practices, knowledge and decision making contexts (Hoffman et al., 2015)
Technology transfer	Traditional, top down approach to extension where knowledge was passed in one direction from agricultural scientists through extension agents to farmers and growers

2 Executive summary

This report outlines the results of an investigation into extension services for New Zealand's (NZ) wine industry and presents an extension strategy for the Bragato Research Institute's (BRI) consideration.

The purpose of the investigation was to define extension, identify and evaluate the current state of extension services for NZ's wine grape producers and develop an extension strategy to provide a framework through which BRI can further develop their extension program.

Extensionists from several primary sector organisations in NZ and overseas were interviewed to learn about their extension programs and find out how they interact with and share information with their industry. NZ wine grape producers (growers) were also interviewed and surveyed to explore what motivates them to seek out new knowledge, understand how they prefer to receive new information and find out how they share knowledge with others. Both groups (extensionists and growers), were also asked for ideas on how BRI might improve their extension service for growers.

Extension is a process through which knowledge is shared between researchers and producers in the primary sector. Extension is critical to ensure a good return on science investment and for supporting uptake of new knowledge and behaviour change. Traditionally, the process of extension was top down and linear, with knowledge relating to new products, practices and technology being passed from agricultural scientists to producers by extension agents (extensionists). In recent times, extension has evolved in response to the increasing complexity of farming systems and a growing awareness of the negative environmental impacts of intensive farming.

Modern extension programs recognise the importance of a two-way transfer of knowledge between scientists and primary producers and the value of informal (social and experiential) learning pathways for knowledge diffusion. It is the role of extensionists to shape extension programs to facilitate knowledge transfer, improve alignment between research and industry objectives and improve the uptake of research outputs.

Developing and maintaining a strong and broad network with industry and a range of science organisations is fundamental for extension organisations. Furthermore, for national or statewide extension programs, local insight and support is critical for tailoring effective research and outreach activities for individual regions.

NZ's wine growers are typically very collaborative and normally willing to share knowledge with other growers and researchers. This is possibly because growers rely on being able to approach other growers for advice in return and will normally always seek advice from another grower prior to adopting a new practice, product or technology.

Experiential, social and formal learning are all important pathways for NZ's grape growers seeking to acquire new vineyard management knowledge, however, growers are time poor and want information to be easy to access and shared in a way in which the key points are easily recognisable. Verbal communication is a preferred channel.

Extensionists and growers highly value the face to face interactions that occur at industry events like workshops and field visits and the social networking for both groups is as important as the formal transfer of knowledge that occurs at the event.

There is a broad network of groups and organisations that currently provide support to NZ growers and contribute to the wine industry's knowledge transfer eco-system. There does not appear to be much in the way of formal co-ordination between these various individuals and agencies. There is also evidence of a poor alignment between the objectives of science providers and primary sector practitioners in NZ. Extension is the process that can bridge this gap.

The research undertaken for this report suggests there is a significant opportunity for BRI to take a leadership role for viticulture extension in NZ.

The primary focus of the proposed strategy presented in this report is to enhance BRI's knowledge transfer network and provide structure and processes to ensure that new and existing knowledge is shared in a way that the maximum value is extracted for industry and researchers.

Recommended tactics to support the implementation of the strategy have been grouped into two phases. While phase one activities are designed to enhance BRI's extension program using existing resources, phase two offers an exciting opportunity for BRI to expand its current capability, creating positions for two additional team members and enabling the introduction of a BRI led applied science program.

Outputs from an applied science program would generate information to benefit industry, inform future research projects and enhance BRI's direct relationship with growers and winemakers.

We believe that the combination of a structured extension program and applied science program would result in a synergistic effect, boosting BRI's capability and reputation as a research and extension organisation.

The overall strategy offers a framework and tactics that aim to firmly embed BRI as a grower led organisation, working alongside industry in the field and winery, supporting the generation and transfer of knowledge and enhancing the value of NZ's wine industry.

3 Introduction

BRI was established in 2018 after a successful bid by New Zealand Winegrowers (NZWG) for government support through the Ministry of Business Innovation and Employment's (MBIE) Regional Research Institute Initiative. BRI is an independently managed and governed subsidiary of New Zealand Winegrowers (NZWG). NZWG is the national organisation of NZ's grape and wine sector with approximately 1400 grape and wine producing members.

The vision of BRI is to transform the NZ wine industry through research, innovation and extension (Bragato Research Institute, 2019a).

In the brief period since establishment, BRI has been in in recruitment mode, building a team of specialists, scientists and managers. In addition, a significant capital investment was made, with the design and construction of a national research winery, which was completed in February 2020.

The BRI team are currently responsible for working with external science providers, NZ's wine industry and government to prioritise and project manage wine and grape related research proposals and projects. A critical aspect of BRI's work is to ensure that research outcomes are transferred to industry in a way that facilitates uptake and provides benefits to members.

As an industry funded research organisation, it is critical for BRI to ensure that research investment is targeted towards projects that match industry research priorities and that members benefit from outcomes associated with the research. These research outcomes could include new technology and knowledge that may enhance their business and contribute to a sustained competitive advantage.

Although there are various existing channels and organisations through which research results can be extended to industry members, BRI have not yet developed a formal extension strategy.

3.1 Why the need for an extension strategy?

There are three main drivers for the development of an extension plan for BRI.

- The expectation that investment in research will result in outcomes for industry; outcomes will simply not be realised without an effective extension program
- BRI is a new organisation whose appearance has changed the research and extension landscape for the wine industry in New Zealand. It is important that stakeholders understand the role that BRI will have in the wine industry's knowledge transfer eco-system and what services they will offer in extension
- BRI has limited internal resources and an extension strategy is essential to ensure activities are prioritised to deliver maximum benefit for stakeholders

3.2 Strategic consideration

In what activities should BRI direct available resources to enhance the wine industry's knowledge transfer eco-system and demonstrate leadership in the field of extension,

which is expected by its multiple stakeholders, including levy paying industry members, NZWG and NZ government?

3.3 Project objectives

- Address the strategic consideration through the development of an extension strategy for BRI
- Define the term extension and investigate the relevance of extension for BRI and their stakeholders
- Identify and evaluate existing extension channels and industry advisors currently providing support for growers
- Identify BRI's key stakeholders
- Investigate the methods and success of the extension programs currently used by primary sector research organisations in NZ and overseas
- Enhance BRI's network within NZ's wine industry and externally through direct engagement with growers and extensionists as part of the research process

3.4 Key deliverables

- A review of academic literature to explore the meaning and methods of modern-day extension
- Research results, including a survey and interviews of NZ growers and interviews with NZ industry advisors and extensionists from several primary sector research organisations
- Recommendations for a BRI extension strategy, including an implementation plan

3.5 Report overview

Firstly, the research methodology for this study is explained following which, the report moves to describe the meaning of extension in the context of the primary sector and how extension processes may have evolved over time.

Extension is then considered in the context of NZ's primary sector, outlining the importance of extension services for primary producers and researchers and discussing whether research and advisory services are effective in NZ. An examination of extension services in NZ's wine industry is presented, which includes a list of organisations and individuals who are actively involved in advisory services and knowledge transfer to growers.

The results of the interviews and survey are then presented, which offer an excellent insight into what motivates extensionists and growers to seek for or share information, what information sources or channels they find most useful, who they want to hear from and what BRI could do to improve their extension program.

In the analysis section, the key findings from the research are summarised followed by a stakeholder analysis in which BRI's key stakeholders are identified and we consider how an extension strategy could help manage the expectations of their stakeholders. Using all the insights from the research an internal and environmental analysis is completed for

BRI to identify key opportunities, strengths, weaknesses and threats that the strategy must address.

Finally, we present an extension strategy and implementation plan for consideration.

4 Methodology

Research undertaken to inform this report and the development of the extension strategy included:

- Semi-structured interviews with 37 individuals including viticulturists (growers), regional grower organisations and extension specialists from other primary sector organisations in New Zealand and overseas
- a survey of NZ viticulturists (growers)
- review of numerous wine industry internal documents, including the results of previous industry surveys, industry strategic frameworks and the 2018 PwC strategic review of New Zealand's wine industry
- a review of over 30 New Zealand and international publications discussing primary sector extension
- A review of existing extension communication channels
- an internal BRI focus group discussion with the science and management teams

4.1 Interview methodology

During May to June 2020, 37 people were interviewed on the topic of extension. A total of 27, 40-60 minute semi structured interviews were carried out with participants either in person or via video conferencing online. Most of these interviews were one on one, with some peer and small group discussions including 3-4 participants.

The purpose of the interviews was to explore the topic of extension, particularly, the ways in which new knowledge, products, practices and information were accessed, shared and applied by interviewees.

At the beginning of the interview participants were advised of the purpose of the interview and reminded that their participation was voluntary and that the names of participants would not be used in any reporting to protect their privacy.

Objectives of the interview process were to:

- Gain an understanding of what motivates growers or extensionists to search for or share information
- Understand the ways in which information and knowledge are currently shared and whether there is a need to consider alternative channels
- Identify examples of research outputs that have either had exceptional or little value to participants
- Capture ideas and suggestions of ways in which BRI could optimise and improve their extension program
- Establish a direct relationship between BRI and participants

Participants could be grouped into the following categories:

- Growers (20)
    - Senior viticulturists (10), three regions
    - Young viticulturists (10), four regions
- Extensionists (26)
    - International viticulture (3)
    - New Zealand viticulture extension (15)
    - New Zealand primary sector - horticulture or farming (8)

Interview participants had a wide range of experience and roles. They were selected based on either being a NZ based viticulturist (grower) or somebody who was responsible for extending information to growers or farmers either in New Zealand or overseas (extensionist).

The breakdown given above adds up to more than 37 participants. This is because some of the growers were also extensionists, in that they played an active role in sharing information with other growers through their involvement in a regional body or grower group or as a grower manager.

When considering the response given by these growers with mixed roles, it was always clear whether they were responding from the perspective of a grower or an extensionist.

A series of open-ended questions were used to prompt participants according to six main themes:

- motivation to share or find information
- searching for and accessing new information
- sharing information
- barriers to accessing information and implementing new practices
- implementation of research outputs
- improving BRI's extension program

A full list of the interview questions can be found in the appendices (Exhibit 1).

4.2 Survey methodology

A survey was designed to complement the results of the semi-structured interviews and offer a wider group of industry members an opportunity to engage with BRI on the topic of extension. The survey questions are in the appendices (Exhibit 2).

A link to the survey with a brief description was distributed to wine industry participants by email through various electronic newsletter lists in late May to early June. These included NZWG, "What's Fermenting" e-bulletin, BRI's newsletter and several regional newsletters. The survey was kept open for 3-4 weeks and was closed at the end of June 2020.

In total, 46 viticulturists completed the survey. It is not clear exactly how many viticulturists there are in NZ, but it is estimated to be between 200 and 300, which would give a survey response rate of between 15 and 23%.

Responses were received from most regions except for Gisborne and the Wairarapa, each representing about 3% of the national planted area (New Zealand Winegrowers, 2019a). The proportion of responses received from all other regions was similar to each region's proportion of the national vineyard area, with slight over representation from Central Otago and Northland and a slight under representation by Marlborough growers (Exhibit 3).

Just over 60% of survey respondents identified as either a Viticulturist, Vineyard manager or Grower manager (Exhibit 4). A similar proportion were working with a moderate to large area of vineyard, with 64% of respondents having over 101 hectares under their influence and 32% over 500 hectares. Just under 30% represented smaller operations, having less than 50 hectares of vineyard under their influence (Exhibit 5). The term under influence, instead of under management, was used to capture owners, viticulture consultants and grower managers who may not directly manage the vineyard but play a key role in developing the viticulture strategy for those properties.

Most respondents could be considered very experienced, with 61% having more than 11 years of viticulture experience and 54% over 16 years. 83% of responses were from individuals who had over six years' experience in viticulture (Exhibit 6).

5 Results and discussion

5.1 An overview of extension

5.1.1 What is extension?

The term extension, in the context of the primary sector, is used to describe a process by which information is shared between scientists and farmers. The definition of extension can vary between countries, organisations and specialists and has also changed over time.

Examples of extension definitions include:

- the movement of scientific knowledge from universities and research stations to farmers fields (Warner, 2008)
- a service to extend research based knowledge to the rural sector to improve the lives of farmers (Rivera, 2011)
- a discipline that serves as a bridge between the research and the farmers, the aim of which is to bring changes in people through an informal education system (Bongoru, Emodi, & Obiora, 2014)
- a process to promote adoption and enable change in individuals, communities and/or industries involved in the primary sector and with natural resource management (Casey et al., 2015)

5.1.2 Traditional extension

At some point in 19th century, the term extension emerged and publicly funded extension organisations were created in the US and many other countries around the world, including NZ. Extension agents, as they became known, were hired to transfer the outputs

of agricultural science such as the latest mechanical, genetic and chemical technologies to the primary sector (Warner, 2008).

Traditionally, the extension process largely involved a one directional flow of information, where new knowledge was shifted from scientists to farmers. The role of the extensionists was to translate the findings of research and introduce farmers and growers to new technology and practices that would improve productivity and ultimately make their operations more profitable.

The term technology transfer, which is often used interchangeably with extension, is probably used best to describe this traditional, top down approach to extension where knowledge was transferred from agricultural scientists through extension agents to farmers and growers (Hoffman et al., 2015; McEntee, 2013; Miller & Cox, 2006; Rivera, 2011; Warner, 2008; Wick et al., 2019).

The problem with this more traditional approach to extension was that information typically flowed in one direction, from scientists to farmers, without a formal feedback pathway to capture the valuable practical and systems knowledge of producers. This meant there were few opportunities for direct interaction between the two groups and eventually led to a disconnection between industry and the science community (McEntee, 2013; Wick et al., 2019).

5.1.3 Modern extension

Increasingly, extension is being adapted to become a process that facilitates a two-way flow of knowledge and information, recognising the valuable contribution that farmers and growers can make to inform research program design and technology development.

A major catalyst for this shift away from traditional top down extension has been the increasing pressure on the primary sector to transition away from intensive farming due to an growing awareness of the negative environmental impacts and the escalating pressure on producers to do so by consumers and regulatory bodies (Chiffoleau, 2005; Ministry for Primary Industries, 2012; Rivera, 2011; Warner, 2008).

Other reasons include the increasing complexity of farming systems and the technology used to manage them (Casey et al., 2015; Eastwood, Klerkx, & Nettle, 2017; Krishnan & Patnam, 2014; Ministry for Primary Industries, 2012), the value of peer to peer knowledge transfer (Miller & Cox, 2006; Nakano, Tsusaka, Aida, & Pede, 2018), a poor alignment between science and industry objectives (McEntee, 2013) a low ratio of extension agents to producers (Hoffman et al., 2015) and a low rate of adoption of technology or environmentally friendly practices where a short term financial benefit is not clear (Eastwood et al., 2017; Genius, Koundouri, Nauges, & Tzouvelekas, 2014; Hillis, Lubell, & Hoffman, 2018; Krishnan & Patnam, 2014; Lubell, Hillis, & Hoffman, 2010).

In the past, traditional extension had a greater chance of success as the information being transferred to farmers was likely to be of a product, technology or process that could lead to an almost immediate financial benefit to the recipient. Examples include synthetic fertilisers, pesticides or improved planting material.

The challenge for extensionists in modern times is that they are often tasked with trying to influence farmers and growers to reduce inputs or change practices where there is no immediate benefit to the individual farmer. Conversely, the change may even lead to a reduction in profitability in the short term with benefits only realised in the long term or at a community level, rather than at an individual farm level. Examples include tightening water quality regulations requiring more careful use of fertilisers and the removal of certain insecticides that may harm people and beneficial insects.

Modern extension practice has been forced to evolve in response to the challenge of trying to encourage behaviour change in primary producers where the perceived cost-benefit ratio may be high. Modern extension programs have shifted to include more participatory forms of extension including sustainability partnerships which aim to reduce the uncertainty about the cost of implementing sustainable practices (Hillis et al., 2018; Lubell et al., 2010). Today's extension programs are more likely to include a blend of traditional and modern approaches, the ratio of which is dependent on whether the aim of the program is to inform or educate, change attitudes or change behaviours (Casey et al., 2015).

Participatory extension programs are designed so that knowledge can be transferred through formal, social and experiential learning pathways. While traditional extension relied more on formal learning as a channel to push information to producers, today's extensionists recognise the importance of social and experiential learning for producers.

Arguably, the biggest differences between a traditional and modern program are that the latter incorporates processes that enable and enhance a two-way flow of information between researchers and primary producers and the use of a social learning framework.

Social learning, described by McEntee (2013) as knowledge and practice change transferred through social interaction, is now recognised as an extremely important learning pathway for primary producers (Chiffoleau, 2005; Genius et al., 2014; Hillis et al., 2018; Hoffman et al., 2015; Krishnan & Patnam, 2014; McEntee, 2013; Nakano et al., 2018; Warner, 2008; Wick et al., 2019).

Modern extensionists are more likely to play a role of a knowledge or innovation broker and producers co-innovators alongside researchers, regulators and practitioners (Casey et al., 2015; Rivera, 2011; Turner et al., 2013). These terms (refer glossary) invoke a sense of partnership as researchers and primary producers learn from each other to tackle complex farm system level issues and reduce their environmental footprint while remaining profitable in the long term.

Extensionists design outreach activities to enhance networks and facilitate the diffusion of knowledge throughout and researchers are encouraged to conduct on farm trials to allow experiential learning.

This participatory approach to extension is more likely to provide a rich platform for collaboration leading to solutions that embody a diverse range of perspectives,

reflective learning, a longer term change in behaviour and a better return on investment (McEntee, 2013).

So therefore, more modern forms of participatory extension have evolved to support producers to transition toward more environmentally friendly forms of farming, while ensuring their businesses remain profitable and capable of supplying the rest of us with food.

There are many examples across a diverse range of primary producers and countries, where modern, participatory extension programs have found to be very successful, with increased industry engagement and adoption of new technologies and practices (Cadger, Quaicoo, Dawoe, & Isaac, 2016; Chiffoleau, 2005; Genius et al., 2014; Hillis et al., 2018; Hoffman et al., 2015; Krishnan & Patnam, 2014; McEntee, 2013; Miller & Cox, 2006; Nakano et al., 2018; Skinkis, 2019; Warner, 2008; Wick et al., 2019).

The methods and activities to support the process of extension are vast and include the dissemination of written material, workshops, field demonstrations, field trials, production of durable, written resources, the use of websites, expert presentations, education programs, surveys, establishment of industry advisory groups and conferences for example.

5.2 Primary sector extension in New Zealand

Like many other developed countries, NZ has mostly phased out publicly funded primary sector extension programs leaving extension in the hands of industry funded organisations, private consultants, farm advisers and agriculture supply companies. Research is carried out on behalf of the primary sector mostly through Crown Research Institutes (CRI's), industry good bodies, universities and a smaller number of privately owned research companies. Responsibility for the extension of research normally falls on an industry body, often funded through producer levies, or through public-private partnerships for larger scale programs.

In NZ, publicly funded primary sector extension services, including those to support horticulture were mostly replaced with privatized services by the late 1980's (Warrington, Wallace, & Scarrow, 2004). Twenty years later, government and researchers had started to question the effectiveness of privatized extension services mostly due to a significant shift in farming practices and societies awareness of the environmental impact of intensive farming.

In a 2012 report, following a survey of individuals and organisations providing extension services to New Zealand's primary sector, New Zealand's Ministry for Primary Industries (MPI) described a broad diversity of extension organisations, that were operating in a fragmented extension eco-system, where services were thinly spread and individuals had a narrow focus. MPI's view was that ultimately, there was a lack of support for producers facing new environmental and climatic challenges and that these conditions were leading to sub-optimal change in production practices. MPI also suggested there was strong possibility of a disconnect between CRI's and industry advisors (Ministry for Primary Industries, 2012).

Many other studies support MPI's findings, describing a situation in NZ where the links between industry, extensionists and research organisations have weakened since privatisation, leading to poor alignment between industry and science objectives resulting in science outputs whose benefits for industry are less clear and reduced adoption of new knowledge (McEntee, 2013; Turner et al., 2013; Warrington et al., 2004).

The cost to NZ's economy of this disconnection between science and industry and the resulting reduction in uptake of improved production techniques is extremely high. MPI estimated that lifting the average performance of pastoral farmers to that of the upper quartile could increase exports by $3 billion annually (Ministry for Primary Industries, 2012). McEntee (2013), when discussing the poor alignment between science and industry objectives, describes a "system biased toward reports and publications".

5.2.1 What is the current state of extension in the NZ wine industry?

Although New Zealand's wine industry is much smaller than some of the other primary sectors and has a strong national voice in their national industry body, NZWG, there are still a broad range of individuals and organisations offering extension services to industry, suggesting fragmentation could also be an issue for the wine industry (Table 1).

Although it was beyond the scope of this project to investigate the degree of alignment between science providers and wine industry practitioners, it is highly likely that the disconnection found in other primary sectors also affects the wine industry.

Research for New Zealand's wine industry is funded by industry as a proportion of their levy payment to NZWG with additional support from government for selected projects. Extension is mostly funded by industry, with some exceptions where extension and communication has been costed into larger research programs. In the financial year to June 2020, NZWG invested $2.1 million of producer levy funds into research, which was topped up by $5.8 million of government support from a range of innovation and regional support funds (New Zealand Winegrowers, 2020).

Generally, levy paying industry members take a positive view of their research program, with 88% of members surveyed in 2019 rating the industry research program as ok to very positive (New Zealand Winegrowers, 2019b).

In 2015, an independent research company was contracted by NZWG to investigate the value and effectiveness of several key extension channels through which NZWG and researchers were able to transfer knowledge to growers. The study concluded that NZWG had a strong network for extending information to industry with strong push channels including industry magazines, fact sheets, email bulletins and events. The website was a strong pull channel and an excellent resource for members, although finding information on the website could be frustrating and time consuming due to an unreliable search function (Venture research, 2015).

Table 1 includes a summary of advisors who play an active role in providing support to NZ's wine sector, an example of the methods they are using to share knowledge and whether a two-way flow of knowledge from grower to information source is likely. Selected advisory organisations and groups are discussed in greater detail below.

Organisation and actors	Information type	Extension platforms	Information flow	Audience and reach
New Zealand Winegrowers	Advocacy, Research, Marketing, Environment	Spray days, Grape days, website, webinars, workshops, media, industry journal, social media, e-bulletins, young industry competitions, videos, export spray schedule, Vine facts	2-way	Entire wine industry, government, public, media, international markets
Bragato Research Institute	Research, production best practice	Grape days, program workshops, conferences website, media, industry, e-bulletins, journals, social media, science reports, factsheets, webinars, videos, peer reviewed articles, extension personnel	2-way	Entire wine industry, government, media, research organisations
Organic Winegrowers NZ	Research, organic production support, marketing	Organic conference, workshops, website, webinars, factsheets, handbooks, mentoring program, e-bulletins, social media	2-way	Entire wine industry, media
Regional industry bodies	Marketing, advocacy, research, environment	Website, e-bulletin, industry magazines, webinars, workshops, social media	2-way	Wine industry – region wide, Local government, media
Viticulture supply companies	Product, technology and equipment advice, production best practice	Workshops, demonstration days, website, newsletters, sponsorship of industry events, 1 on 1, on vineyard discussions	2-way	Customers, technology developers and researchers
Grower Managers	Viticulture specific advice, best practice and spray program guidance	Grower groups, best practice booklets, contracts, workshops, 1 on 1, on vineyard discussions	2-way	Contract growers
Contract managers	Viticulture specific advice, best practice and spray program guidance	Provide services and equipment, 1 on 1, on vineyard discussions	1-way	Clients

Viticulture consultants	Viticulture specific advice, best practice and spray program guidance	Provide services and may supply equipment, 1 on 1, on vineyard discussions	2-way	Clients, wider wine industry at events and when contracted onto research programs
Plant and Food research	Research	Webinars, seminars, workshops, conferences, peer reviewed articles, Vine facts, factsheets, research reports, industry advisory groups	1-way	Wine industry, research organisations, media, government
Universities and other education providers	Research, education	Education curriculum, seminars, conferences, peer reviewed articles, research reports, industry advisory groups	1-way	Wine industry, students, research organisations, government
Independent researchers	Research	Webinars, seminars, workshops, conferences, peer reviewed articles, factsheets, research reports, industry advisory groups	2-way	Wine industry, research organisations, media
Grower groups	Industry updates, production best practice	Workshops, demonstration plots	2-way	Local growers

Table 1 New Zealand wine industry advisory groups and organisations - actors in the industry's knowledge transfer eco-system

New Zealand Winegrowers (NZWG)

Arguably, NZWG could be considered the most influential extension service for the NZ wine industry. Being the industry body, the organisation is funded through producer levy payments and offers advice, support and information for growers, winemakers and business owners across the entire country.

In addition, NZWG provide financial and in-kind support to regionally based associations who provide support and co-ordinate extension and education activities for their region.

NZWG provide support to members in four main areas – advocacy, research, marketing and environment. Upon the establishment of BRI, it was the expectation of NZWG that BRI would take ownership of research related extension for the industry.

Annually, NZWG deliver several extension events including Grape days, Spray days and until recently the Bragato industry conference. The focus of these events has largely been to extend the results of research and best practice, while many other online and regional workshops share information relating to advocacy, environment and marketing.

NZWG is fully integrated with industry, being funded and governed by levy paying industry representatives. Activities and priorities are determined according to agreed industry priorities and there is a constant two directional flow of information.

Regional industry bodies

Regional organisations supplement the activities of NZWG, providing support to members tailored to regionally specific issues. The level of support varies depending on the size of the region and can include collective marketing opportunities, event management, advocacy, research and education programs.

Like NZWG, regional organisations are closely connected to their local industry, with elected members setting the strategic direction and prioritising the allocation of resources at a local, regional level. The size and ability of regional organisations to deliver benefits to their members varies depending on the size of the wine industry in that region.

Regarding education and activities for members, the focus of most regional organisations is advocacy support relating to regulatory changes along with marketing and event management to promote the collective, regional wine brand. Although some effort is made to deliver extension activities related to grape and wine research, they mostly rely on NZWG to co-ordinate these events. The exception is in Hawke's Bay, where growers have formed HB Vine, a separate industry group to promote and co-ordinate research and extension activities to benefit local industry.

Viticulture supply companies

Many grape growers turn to advisors from their local horticulture supply company for technical advice and support, particularly when it comes to managing fertiliser and agrichemical inputs. Close relationships with a wide range of growers help horticulture supply companies stay in touch with trends and challenges to inform product development and supply chain management. Horticulture supply companies are often actively involved in research to evaluate new products under local conditions.

Grower managers

For many smaller grape growers in NZ, an important source of technical advice is likely to be from the wine company who purchases their grapes. Advice is likely to be received directly via grower managers or grower liaison officers who are employed directly by the wine company. Wine companies will set expectations relating to yield and quality parameters and the company representative will work closely with growers to help them achieve this. The relationships are typically established over many years, given that supply contracts are normally negotiated to last for several years. Grower managers are important actors in the wine industry knowledge eco-system, having a wide network and influence over a large area of vineyards, often across multiple regions.

Contract managers

Contract managers are another important source of advice for smaller growers. The relationship is slightly different to that between a grower manager, in that the grower will be paying the contract manager for advice, services or a combination of both. The

nature of the relationship can range from one where a grower simply pays the contractor to provide labour or equipment to a full contract management arrangement where the grower relies fully on the contract manager to carry out all operations and fully manage the property and annual production cycle. Like grower managers, contract managers are likely to influence the viticulture practices of a large area of vineyards and have a wide network. Additionally, contract managers can provide specialised equipment, labour and capability, which smaller growers may not otherwise be able to access.

Viticulture consultants

Viticulture consultants are another potential source of knowledge and experience to guide growers. It is unknown exactly how many viticulture consultants there are in New Zealand, but the number of full-time, independent consultants across all regions is probably less than 40. Consultants are likely to many years viticulture experience, a broad social network throughout the wine industry and may have experience growing other horticultural crops. Unlike contract managers, consultants are less likely to provide specialist equipment and labour, instead focusing on providing their private and corporate clients with specialist viticultural advice, including guidance during property acquisition, vineyard development, managing crop health and maximizing productivity. On occasion, consultants may be contracted to manage research programs or join industry advisory groups to guide industry research.

Plant and Food Research

Since 2008, Plant and Food Research (PFR), a NZ crown research institute has been the primary research partner of NZWG, being contracted to carry out research on behalf of the NZ wine industry. Research findings have generally been communicated to industry in several ways. These include written reports accessible posted on the NZWG website, presentations by scientists directly to industry at NZWG member events, popular articles published in industry magazines and publication of articles in peer reviewed journals. PFR researchers often develop direct relationships with growers as many trials are carried out in commercial vineyards.

Education providers

Several educational institutions offer courses for students in viticulture and oenology in addition to undertaking viticulture and winemaking research, often in collaboration with NZWG and PFR. Currently, the main education providers for NZ's wine industry are Lincoln University, Auckland University, Nelson Marlborough Institute of Technology and the Eastern Institute of Technology.

5.2.2 Why is extension important for the NZ wine industry?

Like all other primary sector industries in NZ and around the globe, NZ's wine industry faces ongoing challenges relating to climate change, environmental management, competitive markets, rising costs, tightening regulation and pressure from consumers, who expect producers to reduce the environmental footprint associated with grape and wine production .

The news is not all bad with NZ enjoying a reputation as a clean, green producer of high-quality wine and whose geographical location is expected to buffer the country from the worst effects of climate change. Advances in technology are increasing the number of tools available to growers including softer pesticide inputs, smart sprayer technology, a wide range of irrigation scheduling tools and smart tractors.

Extension has an important role to play for NZ's wine industry to ensure industry are kept up to date with the latest technology, products and practices that will contribute to the sustainability of their business. As discussed earlier, extension will also be important to facilitate the transfer of knowledge, ideas and priorities from growers back to researchers to ensure researchers focus their efforts in areas that could further benefit the wine industry.

5.3 Interviews

Results of the interviews are discussed in the following sections by theme. A summary of the key findings from the interviews and survey can be found in the analysis section of this report.

5.3.1 Motivation to share information (extensionists)

Extensionists relied heavily on their networks and relationships to keep in touch with what challenges and risks their industry were facing and what information they might require.

People and agencies in these networks included growers and farmers, governing boards, regional industry bodies and committees, industry advisory groups, informal grower groups, local and national government, research and education partners, colleagues and customers.

Extensionists maintained these connections through regular meetings and facetime.

Most extensionists relied on informal systems for tracking member enquiries and industry issues. Examples of these informal methods given during interviews included:

- "word on the street"
- "rule of three - if I hear it from three growers, then I realise there is an issue to investigate"
- "issues normally rise to the top"

Some extensionists gave examples of more formal systems which included:

- A dedicated phone enquiry service with a linked database
- Regular surveys
- Outputs of industry board strategies that identify research, education and extension priorities
- Tracking website activity

Formal systems to monitor and capture member grower queries were seen by extensionists as a valuable tool for monitoring industry issues and trends over time, but one that required dedicated resources, which were not always available in smaller industry advisory organisations.

Another point raised by some of the extensionists, was that growers often fail to realise it is education, not research that's required as often the knowledge already exists to answer the questions being asked and therefore the extension focus should be on dissemination, not further research.

When offering a national (or statewide) service, local regional support and input is essential for understanding local industry challenges and for planning and executing outreach activities.

In terms of planning for extension programs, the approach ranged between organisations from completely informal and reactive to monthly planning to an annual formal planning process that required stakeholder approval.

5.3.2 Motivation to find information (growers)

The primary drivers for growers to seek new information were to improve efficiency, reduce cost, solve problems and to enable continuous improvement.

Other reasons included:

- optimising yield and quality
- improving profitability
- studying for the young viticulturist competition
- experimenting with new practices
- considering new equipment or technology
- increasing labour costs
- when labour is constrained
- when I am interested in a topic
- wanting to challenge the status quo
- wanting to learn and compare practices and costs from other growers and regions

5.3.3 Searching for and accessing new information (growers and extensionists)

The top five most frequently cited sources that growers turn to when looking information on new practices and technology for their vineyard were:

- **Talking with other growers who have tried it - industry peers, grower groups (68%)**
- **Technical sales representatives (42%) – for technical information and trends ("what are other growers doing?")**
- **Industry magazine (42%) – "sparking ideas", "teaser articles", "includes stories about the people"**
- **NZW website (42%)**
- **Factsheets (26%)**

Interestingly, extensionists also turn to growers for solutions and ideas. Eighty percent of extensionists who answered this question cited growers as an important source of information relating to new ideas and technology. The ways in which this information was accessed included through grower trials and simply getting out and talking to growers.

Growers were seen to be very collaborative and willing to share their experience and ideas and many growers travelled regionally and internationally to pick up knowledge of new practices and technologies.

Science partners were equally important to extensionists as a source of solutions, as was their extensive network with industry people and organisations, including colleagues who are well connected with industry and commercial suppliers.

It is important to note that based on these results, other growers are an important source of information for growers and extensionists are also heavily reliant on growers for finding out about new practices, knowledge and technology.

Social media (growers)

Social media was not often cited by growers as a source of viticulture information. When specifically asked, less than half (about 40%) stated that they did consider social media to be a useful source of information. There were only three examples given; a French Facebook (FB) site for information about viticulture machinery and practices; Quorum sense, a NZ FB site for regenerative agriculture; and NZ Farming, a FB site with lots of content and debate relating to NZ farming practices. Growers who used social media considered this platform as a useful alternative to emails which can often be misdirected or missed and useful as a discussion forum.

The other 60% of growers either didn't use or didn't actively use social media as a source for viticulture related information. Instead, they saw social media as a platform for personal and social use, including sharing and accessing photos. Some did suggest they would consider using social media more if the BRI promoted the channel as a source of useful and relevant information.

5.3.4 Receiving information (growers and extensionists)

A small number of growers and extensionists were asked were asked who they (or their industry) preferred to hear from when being exposed to new information. Both groups gave similar answers; that growers like to hear from other growers and also scientists. That the person delivering the information could relate to local conditions was important for growers. Extensionists suggested that a certain level of trust was important and when scientists were delivering information, they needed to reduce and simplify the results as the following quote from an extensionist being interviewed suggests: **"focus on the results and what's meaningful, not the methodology".**

5.3.5 Sharing information (growers)

When asked how they share information, all the growers interviewed said that they predominately shared information and knowledge with others verbally. This was normally with industry peers or colleagues either by phone or in person over coffee or at an event or through some other social interaction. Very rarely was an example given when information was disseminated by writing.

It was clear in discussion with growers during the interviews that there is a constant and free flow of knowledge and ideas amongst growers. Growers regularly turn to their

industry peers for advice about new practices and technology and for help problem solving. One grower describing the importance of grower to grower knowledge transfer explained, **"sharing information is part of the nature of the wine industry"**

5.3.6 Sharing information (extensionists)

Extensionists were using multiple channels to engage with and share knowledge and information with their industry. It was considered important to take a multi-platform approach when sharing information for several reasons, including:

- **Growers learn and want to receive information in different ways**
- **Information may be shared for different reasons – is it to inform of a problem or induce practice change?**
- **The timing and urgency to get the information to industry**
- **The nature of the topic and sensitivity of the information**
- **The level of engagement required of the audience**
- **The existing knowledge level of the audience for that topic**

Further advice from the extensionists interviewed included:

- **Try sharing information in different ways and seek feedback from growers**
- **When sharing information though written documents, keep in mind that growers do not have a lot of time for reading – "no one has time to read a 5-page pdf and they may not even read a fact sheet"**
- **Where possible, keep audience sizes smaller as engagement levels are likely to be higher enabling a 2-way transfer of knowledge**
- **Timing is critical – "don't talk about botrytis in a dry year"**

A list of the channels that extensionists most frequently mentioned during the interviews is included in Figure 1. It was clear that all extensionists were using a wide of range of channels to address the considerations listed above. Some of the more frequently mentioned channels are discussed below.

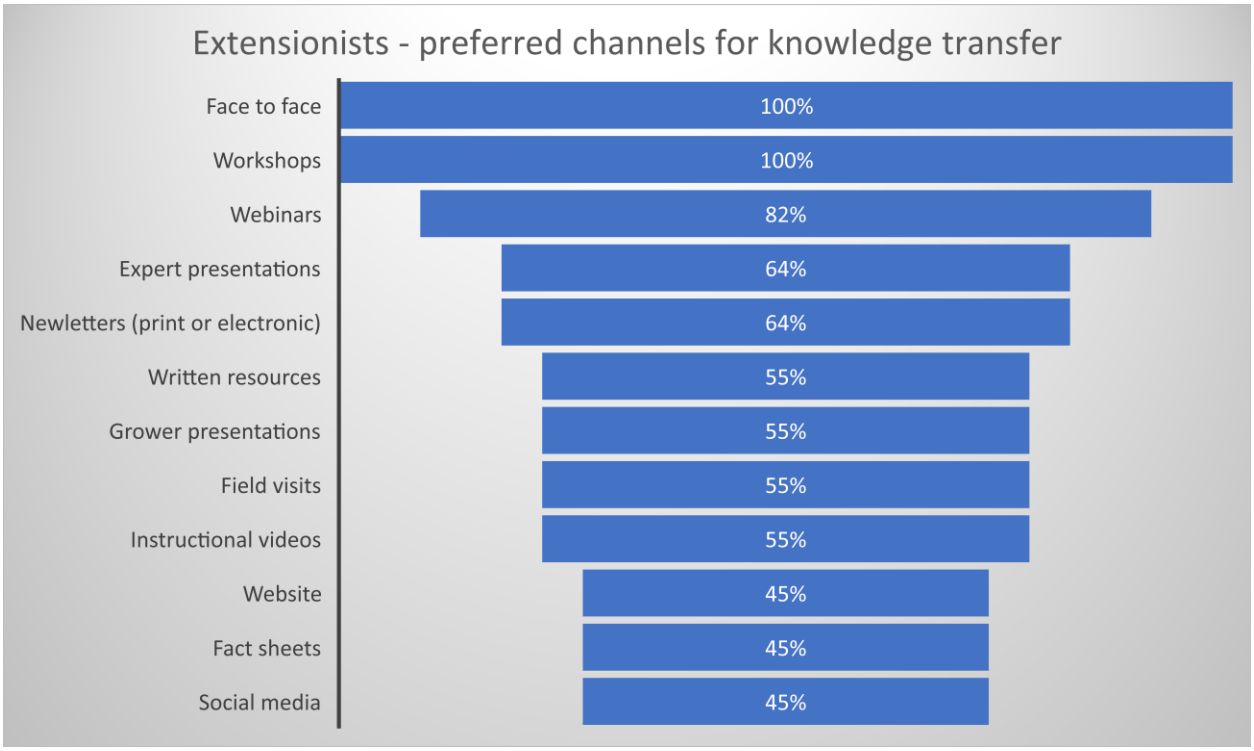

Figure 1 Frequency of channel mentions by extensionists during interviews, used for transferring knowledge to their industry (June 2020)

Face to face interactions with industry were considered very important for knowledge transfer by all extensionists interviewed. This exchange was most likely to take place at a workshop, seminar or field visit.

Based on the results of the interviews and survey, extensionists and growers highly value the face to face interactions that occur at industry events like workshops and the social networking for both groups is as important as the formal transfer of knowledge that occurs at the event.

A wide range of examples of workshops were given which included a mixture of in field and classroom sessions. Workshops were designed to target different segments of industry participants and small group sessions were preferred to enable and encourage discussion amongst participants. The timing of the event was important to consider, so that any information was shared just prior to when the grower would need it and so that it was held at a time of the year and day when growers were most likely to be able to attend.

For levy funded extension organisations, workshops were seen by extensionists as one of the most visible and tangible outputs of an extension program for growers.

Webinars were considered an important channel for 82% of extensionists and will be discussed separately in the following section.

64% of extensionists mentioned the importance of expert presentations (seminars) by scientists or agronomists for industry. These presentations are an opportunity to inject

quality information into the social network of growers where science can validate the benefit (or otherwise) of a product, practice or technology. The actual forum for the seminars varied depending on the information being shared from verbal discussions in the field to more formal presentations at industry events.

Seminars were considered by some extensionists as an important opportunity for growers to interact with researchers and offer feedback on the value and relevance of the information. Feedback from growers could even inform changes in methodology at the early stages of a study to improve the likelihood of useful outputs for industry. Several extensionists mentioned the importance of working with scientists to structure their presentation in a way that is appropriate for growers, with most of the focus on results and what implications they have for growers, with less time spent on methodology.

Over half of the extensionists mentioned the value of having expert growers present to other growers; identify the industry leaders and influencers and have them share their experience and knowledge with other growers. Information shared by growers about new practices and tools was thought to have a bigger impact on an audience of growers compared to presentations by researchers or suppliers. Identifying wine grape producers in NZ who were prepared to share their experience with others was not seen as difficult as NZ growers are seen to be very collaborative, which as one extensionist put it was "a sign of a mature and successful industry"

Dissemination of information by writing was also widely used by extensionists and most likely to be in the form of either printed or electronic newsletters, durable resources posted on a website or factsheets.

Short instructional videos of less than five minutes in duration were also considered an important channel by 55% of the extensionists. Examples given included how to use farm mapping software, a crop calculator or interviewing growers about an interesting topic.

Just under half of the extensionists mentioned their website as an important channel for information transfer and all organisations had a website. The website was considered a central point where all durable, written resources and other information for growers could be stored. Several of the extensionists mentioned that they use other channels such as e-bulletins and social media to try and pull growers to their website.

Although 45% of the extensionists interviewed mentioned the use of social media as a channel for knowledge transfer, almost half of this group acknowledged that social media was mostly used to share information with consumers, not growers. Where social media was used, it was for sharing brief information trying to redirect growers to resources located on the website or to promote events.

<u>Webinars and video conferencing (growers and extensionists)</u>

Almost all the growers who were asked specifically about the use of virtual platforms were supportive of online meetings and webinars. Their experience during the COVID19 lockdown period had been positive with respect to these tools, however they did not want online activities to completely replace physical meetings and workshops.

Comments made by growers about the use of the use of virtual events for extension included:

- Positives
  - efficient use of time - "good use of my time"
  - Reduced cost – presenters and attendees
  - Great being able to access and watch later
  - Excellent for inter-regional knowledge transfer
  - Ability to multi-task
  - Allows access to a wider range of speakers
- Negatives
  - Networking in person not possible (an important aspect of events)
  - Tiring
  - Not suited for growers ("need to be in the vineyard together")
  - Would prefer to meet in person

All the extensionists that were asked about the use of webinars were actively using this platform as a tool to share information with growers. COVID19 had certainly prompted increased use of virtual seminars, even where extensionists may not have used this channel previously. Most were considering increasing the number offered.

Comments from extensionists included:

- Positives
  - Efficient and considerably cheaper than in person seminars
  - Ease of set up – no need to worry about a venue and catering
  - Ability to attract an international audience, connect with a large group and cross regional boundaries
  - Farmers have been surprisingly supportive - "they didn't have to leave the house and could easily leave if the content wasn't relevant"
- Negatives
  - Risk of excluding some growers
  - Lack the social benefit associated with face to face meetings
  - Tiring
- Other advice
  - Remember we are still competing for grower time with other organisations - "growers only have so much bandwidth to take on new information"
  - Limit time to 1-hour max
  - Ensure the delivery is professional and allow enough preparation time to achieve this
  - Ensure webinars are recorded and accessible to growers for future reference
  - Very useful if a busy time of year, the information is concise, and it needs to go out quickly
  - Wouldn't use virtual delivery where the topic was new to the audience or sensitive and a high level of engagement was required

5.3.7 Deciding what to share (extensionists)

As discussed previously, extensionists mostly relied on their social ties to industry and on their professional network to identify what issues industry are facing and therefore what topics to focus their extension efforts on. But how did they decide what information to share when resource was limited?

Extensionist's responses ranged from simply "focus on what's annoying industry" to "filtering information" and their general approach was to remain focused by regularly consulting their organisations or industry's strategic plan. This was so they could ensure that the extension program outputs would be aligned with industry priorities and would contribute in a meaningful way to the goals of the strategy.

Planning an extension program with input from growers was also seen as useful for prioritising extension activities. The degree of extension program planning ranged from mostly informal and short term, based on seasonal cycles or unexpected challenges to a formal plan prepared in advance annually with consultation between extensionists and growers.

One primary sector extensionist explained the importance of engaging industry when designing their extension program by saying, ***"Farmers are our levy payers. The program is for them. They need to clearly understand the strategy, process and understand what the entry point [to the program] is for them".***

Other insights offered by extensionists relating to the design of their extension program and prioritising included:

- **"We allocate budget and resource according to perceived impact and value for members"**
- **"Being realistic about internal resources is important. We outsource to external facilitators and spread work to the regions"**
- **"It's hard to have a presence in regions without an energetic regional rep to co-ordinate with"**
- **"We are not a big team. Resourcing is always hard"**
- **"We face the most pressure when reacting and responding to unplanned events"**

5.3.8 Evaluating the success of extension work (extensionists)

When asked how their organisation measured the success of their extension program, over half of the extensionists responded by saying that measuring success was very difficult and they felt as though they did not do this well.

Exit surveys after events were frequently used by extensionists and were seen to have some use in terms of capturing attendance data and informing design of future events. However, survey data was not considered an indicator of the success of the extension program in that exit surveys after an event give no indication of whether a grower really would change their behaviour because of information received. Follow up surveys were required for that.

Three different examples were offered where a more formal attempt was made to measure success.

The first was by a company that had a formal system in place for tracking member enquiries. By tracking the peak then decline of member queries relating to a topic, the company could surmise that the extension activities had been successful, and growers had received enough information to overcome that problem.

The second example was common amongst extensionists from three different industries and this was the use of an industry wide benchmarking program. A benchmarking program was considered very useful, allowing growers and extensionists to track changes and improvement in productivity across industry, which is linked to the success of certain orchard management practices. As one extensionist explained, "There will always be half the growers above and half the growers below the industry average. People don't want to be on the bottom half, so this drives them to improve".

The final example was where extensionists identified and then intensively monitored a sub-set of poor performers for several months to try and understand whether information from the extension program was reaching them and what factors were preventing them from implementing industry standard yield enhancing practices. The outcome of the study was that the extensionists were able to re-design aspects of the extension program to meet the needs of that segment of growers.

Finally, one extensionist suggested, "perhaps the best indicator of the success of the program is the frequency and type of people that are contacting you".

5.3.9 Barriers to accessing information or implementing new practices (growers and extensionists)

Perhaps unsurprisingly given our technical age, it seems there are very few barriers preventing growers from accessing information. A lack of time was the main issue for about a third of growers, which matched the survey response.

Having to wait for other growers to try it first, was also mentioned by some of the growers, highlighting a need to see that the information or practice was relevant and suited for their conditions prior to considering adoption.

One grower from a smaller region was limited by a lack of access to contractors with specialist equipment and knowledge.

Extensionists on the other hand, felt that the biggest barrier preventing growers or farmers from accessing information was a lack of interest. Extensionists also recognised that their audience had limited time for which many people and organisations were competing for and that the cost to attend events could be a barrier for some. That it was too challenging or time consuming for growers to find information was also offered as a possible reason.

One experienced extensionist, working for a large research organisation, pointed out that their actual audience for extension was only a small segment of industry, about a third of growers. This group were more likely to be engaged and see a future in the industry, "they

see growth, will invest in improvement and the future. They are looking to improve practices and efficiency".

5.3.10 Implementation of research outputs (growers)

When asked to describe any recent research outputs or technology that had had a positive impact for their business, growers offered the following examples

- Mealybug control methods
- Trunk disease management
- Spur pruning Sauvignon blanc
- Satellites for irrigation management
- Irrigation optimisation
- Sprayer optimisation
- Winter soil moisture management

When asked for examples of recent research outputs or new technology that had little value for their business 50% of the growers could not give an example. This probably reflects that growers are more likely to access information about practices or research that is relevant to them and ignore the rest.

For growers that did respond some of the responses included:

- Confusion relating to the optimal spray interval between mealybug buprofezin sprays
- Research with a mismatched timeline to industry needs, where outputs are not expected for many years, but the results are required now
- Disease modelling
- Research that has no conclusion or is irrelevant to my operation
- Expensive, foundational work without practical outputs
- Under vine planting trials to replace herbicide – "we haven't found a solution yet"

5.3.11 Improving BRI's extension program (growers and extensionists)

Growers offered a wide range of ideas when asked what BRI could do to improve their access to knowledge and enhance their ability to innovate. A summary of responses is listed below. There were only a few ideas that were shared amongst growers, perhaps reflecting the diverse range of growers interviewed. Those listed in bold were mentioned by at least 20% of the growers.

- **Regular communication and updates on current and local best practice**
- **Review and dissemination of international research, regularly reporting highlights**
- **Communicate who and what BRI is and what services they will offer**
- **More research that:**
    - **investigates reducing costs**
    - **is regionally specific**
    - **is relevant to smaller growers**
    - **Relates to diversity – investigating Sauvignon blanc alternatives**

    - **Investigates weed spray alternatives**
    - **focuses on practical outputs and benefits**
- More extension on trunk disease
- **Facilitate more workshops**
- Organise workshops targeting or led by young viticulturists
- Improve access to online industry magazines
- Member access to academic publications
- Remain fleet footed and able to respond quickly
- **Facilitate inter-regional learning**
- Mentorship program to link young and experienced viticulturists
- **Facilitate more grower to grower knowledge transfer**
- Improve how information is accessed and stored
- Podcasts
- More open source information
- Monthly webinars for our region
- Ask large companies to internally circulate electronic information
- Improve winegrowing community engagement into research and innovation
- Facebook page with links to more detailed information

Extensionists had the following suggestions for BRI to consider for their extension program:

- Increase online activity. COVID has increased the awareness of the efficiency and reduced cost of virtual extension activities, which offer a cost effective and efficient platform for knowledge transfer to industry.
- **Whatever the method of extension, repeat as required and keep the information easily accessible. Five years from now the industry will have forgotten.**
- **Do not try to develop programming that is always focused on cutting edge technology. It's surprising how many growers lack fundamental knowledge and there is often a huge knowledge gap. Focus on Viti 101.**
- Track questions. If repeatedly being asked the same question by industry, then this should be a trigger for extension activities or the production of a durable resource such as a factsheet.
- **Face to face activities are preferable if you want to improve engagement and are delivering new information or discussing sensitive topics**
- **We try to think hard as a team whenever we are planning our extension activities and you should try to get your team thinking the same way. What information, when, who and through what forum? We spend a fortune on science so important to have an appropriate extension program**
- Improve the access and quality of information, through improvement of the NZWG website and by ensuring research outputs are peer reviewed prior to being shared with industry.

Finally, extensionists from other NZ organisations who are also actively involved in the transfer of knowledge to NZ's wine industry were asked what BRI could do to complement their extension program and how BRI might work together with them. The following responses were received:

- Assist with our technical understanding and access to experts
- **Allow information and insights from our wide industry network to feed into your research program**
- It would be great if BRI could co-ordinate a one stop shop for industry. We would support this
- We would be happy to speak at industry workshops and share the results of our research programs
- **BRI should take ownership of industry research, education and extension – particularly where this knowledge supports growers through changes in regulatory requirements**

5.4 Viticulture extension survey

5.4.1 Usefulness of information sources

Survey respondents were asked to rate various information sources according to their usefulness, specifically, whether the information source was not very useful, somewhat useful or very useful. A weighted average of all responses was calculated by assigning a numerical value to each category. These values were 1 for "not very useful", 2 for "somewhat useful" and 3 for "very useful"

The information sources that survey respondents were asked to rate can be grouped into three learning pathways; these pathways can be defined as formal (learning by reading), social (learning from others) and experiential (learning by doing). Each of these pathways represent a different way for people to learn and acquire new knowledge.

Survey respondents clearly favoured experiential learning, with a mean usefulness score of 2.7 and 68% deeming experiential information sources to be very useful (Table 2).

The top five most valued information sources for NZ growers in this survey were all experiential and related to observing the performance of their vineyard over time (or accessing records to review this) and learning through experimenting on their own vineyard or observing the results of experimentation on others vineyards (Figure 2).

Specifically, 88% of survey respondents rated observations of their own vineyard to be a very useful information source, 80% rated field research trials conducted in their own vineyards as very useful and 78% rated historic vineyard data as very useful (Exhibit 7).

Although social and formal learning sources were rated slightly less useful compared to experiential learning, they were still deemed useful by growers, with mean usefulness scores of 2.2 and 2.3 respectively (Table 2). These results were very similar to those reported following a recent survey of 822 winegrowers in California. In the comparative study, mean usefulness scores of 2.7, 2.6 and 2.4 were calculated for experiential, social and formal learning sources respectively (Hoffman et al., 2015).

Although the results from both surveys were closely aligned when considering the value of information sources grouped under the three learning types, the ranking of individual information sources was mostly different. **The exception was that winegrowers from both**

countries rated observations of their own vineyard as their most valued source of information.

While both US and NZ growers rate experiential learning as their most valued source of information, US growers tended to value social learning higher than formal learning, where NZ growers ranked the latter two almost equally (Table 2; Exhibit 7; Exhibit 8).

It may be that NZ growers are more prepared to learn by reading and are less reliant on learning directly from others than their US counterparts. Our results could also be a reflection of the high level of viticulture experience of those who responded to the survey (Exhibit 6).

	Experiential	Social	Formal
Very useful	68	30	44
Somewhat useful	24	50	43
Not useful	4	11	12
Mean usefulness score	2.7	2.2	2.3

Table 2 Perceived value of information source according to category – percentage of respondents (Viticulture extension survey June 2020). The mean usefulness score has a maximum of 3 (very useful) and minimum of 1 (not useful).

The three formal learning sources most valued by growers were the NZWG export spray schedule, NZWG website and NZWG Vine facts publication with 64-68% of survey respondents rating these as very useful (Exhibit 7).

NZ survey respondents were more divided when it came to the value of social information sources. Other growers, vineyard operators and consultants were the top ranked social information sources with almost all respondents reporting that they found these sources somewhat useful or very useful, with responses distributed fairly evenly between both options (Exhibit 7).

Based on the results of this survey, NZ growers appears to be drawing from a wide range of information sources with the majority ranked at least somewhat useful. The full set of responses for this part of the survey can be found in the appendices (Exhibit 7).

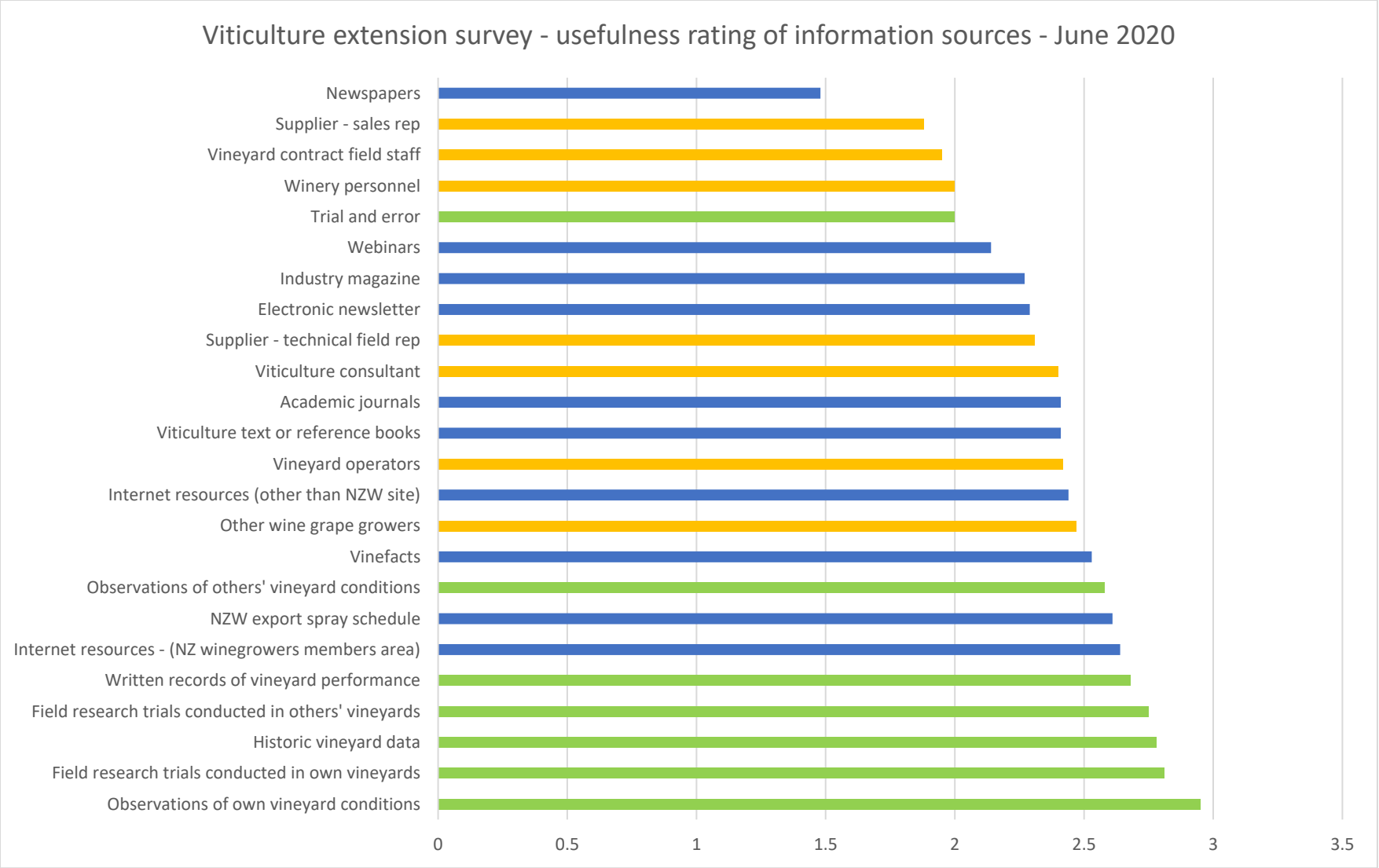

Figure 2 Scores are the weighted average of all responses (the mean usefulness score; 1 = not very useful, 2 = somewhat useful, 3 = very useful). Bars are colour coded by information category (blue = formal, yellow = social, green = experiential)

5.4.2 Other key findings from the survey

Barriers to accessing new information or implementing new practices

- The top two most cited reasons were a lack of time (31%) or financial constraints (18%)
- Other reasons included:
    - Not knowing who to contact or where to find information (13%)
    - Information has not been validated for our site (13%)
    - Hard to find on the NZW website (7%)
    - A lack of practical demonstrations (7%)
- Only 9% of respondents answered that there was nothing or not much stopping them from accessing new information or implementing new practices

Sharing knowledge of new practices or technologies with others

- 96% of respondents prefer to share information verbally. This was most commonly through a face to face interaction (73%), which might be attending an educational gathering (27%), discussion group (16%) or other type of meeting (13%).

Growers provided a total of 68 suggestions for BRI, that might improve the growers' access to new knowledge and enhance their ability to innovate. The top five most frequently mentioned were:

- **Increase seminars and workshops (20%)**
- **Improve the visibility and communication of the practical implications of research including the relevance to growers, cost-benefit analysis, contribution to risk mitigation and how it will help vineyards to perform better (18%)**
- **Improve the NZWG website (15%)**
- **Improve the visibility of research through appropriate dissemination (15%)**
- **Increase webinars (13%)**

When reviewing responses to this section of the survey, there was a definite theme that growers wanted a regular flow of information from BRI, shared in a way that allows the grower to quickly understand the cost, benefit and relevance to their operation.

One grower had the following advice for BRI which is an important reminder of the expectation by stakeholders that BRI provide support to growers in all wine regions: "Come to the regions. Talk with growers. Be accessible and approachable".

When receiving new information growers preferred to hear from:

- Other growers, practitioners and industry experts (47%)
- Researchers and scientists (44%)
- People doing it, trying it and trialing it – growers want to hear firsthand what worked and what didn't (24%)

Generally, growers seem prepared to hear from a wide of range of people, so long as that person has some expertise on the topic they are discussing. **They may seek information about a new practice or product from a researcher or sales representative, but they will turn to a fellow grower to find out if it works.**

When growers have discovered new information and want to try doing something different in their vineyard, over a third of respondents would use some form of a cost-benefit analysis to support their recommendation to either:

- Their manager (48%)
- Themselves (31%)
- The owners (26%)
- Their team (17%)
- Their accountant (12%)

When asked whether they felt as though they were able to contribute to their industries research program, respondents answered:

- Yes (53%)
- No (11%)
- Other (36%)
    - Included not sure, not really, not enough and somewhat
- Growers based in regions other than Marlborough responded in a similar way to this question to growers based in Marlborough
    - Marlborough – Yes (53%), No (12%)
    - Other regions – Yes (53%), No (16%)

When asked to describe any research outputs or new technology that had had a positive impact on their business, 80% of respondents gave one or more examples. Only 7% responded no and 13% left this question blank. There was a wide range of examples given which correspond with the following research topics:

- Grapevine trunk disease research
- Irrigation research
- Pruning mechanisation
- Shaking for botrytis control
- Pre flower leaf removal for botrytis control
- Micro fertigation
- Composting
- Soft mealybug control
- Pre harvest leaf removal for hand picking
- Pruning to limit trunk disease
- Powdery mildew program
- Spraying for pruning wound protection
- Syrah improvement research
- Timing of leaf removal - effect on yield

Conversely, when asked to give examples of recent research outputs or new technology that they felt had little value for their business, 61% of growers either didn't answer, responded no or said that all research has some value. The remainder gave examples of research that was most likely not relevant to them, given their region, variety mix, or scale of business.

Most respondents (74%) attend 2-6 industry events each year. Half of these growers think that there are enough events annually (49%) and the other half would like more industry events in the calendar (51%).

6 Analysis

It is clear from the research that there are significant opportunities for BRI in the area of extension, but that with limited funding and resources, having a clear plan with priorities will be essential. A strategy will help BRI manage their internal resources and the expectations of their key stakeholders.

In this section we will highlight the key findings from the research, complete a stakeholder analysis for the main individuals and organisations who have an interest in the success of BRI's research and extension program and finally, consider external and internal factors that could influence BRI's performance and strategy.

6.1 Key findings from the research

What the literature search revealed

- There are different interpretations of what extension is and the process of extension has changed over time
- Modern extension processes are participatory, utilise social learning and rely on a two-way transfer of knowledge between scientists and producers
- Extension is critical for ensuring a good return on science investment and supporting uptake of new knowledge and behaviour change
- Extension services in New Zealand's primary sector are fragmented and underperforming, meaning not all producers are receiving the support they require to respond to modern farming challenges
- There is evidence of a poor alignment between science providers and primary sector practitioners – extension is the process that can bridge this gap
- Experiential and social learning pathways are extremely important sources of information from which grape growers in New Zealand and California learn about vineyard management
- Producers need the support of science as they navigate challenges including climate change, regulatory pressure associated with the environmental impact of farming and increasing costs

Insights from other extension organisations

- Extension organisations rely on a range of informal and formal systems for tracking and staying in touch with industry issues. Developing and maintaining a strong and

broad network with industry and a range of science organisations is a fundamental part of the process for all extensionists
- Growers and science partners are considered the two most equally important sources of information for extensionists to learn about new practices and technology
- Often it is education, not more research that is required to solve an issue for growers as the information exists and has simply been forgotten or not disseminated appropriately
- For national or statewide extension programs, local insight and support is critical for tailoring effective research and outreach activities for regions
- A multiplatform approach is considered essential for a successful extension program
- Extension programs should be tailored to meet the needs of industry and to match the resources of the extension organisation
- Most extensionists find it difficult to measure the success of their work
- Adoption of webinars as an extension platform has been high amongst extensionists since COVID19. Growers and extensionists are supportive of the platform but don't want webinars to replace face to face events due to the importance of social networking to both groups
- When sharing research results with growers, focus on the results and what's meaningful to growers, not the methodology of the research

<u>Insights from New Zealand's wine grape producers</u>

- Extensionists and growers highly value the face to face interactions that occur at industry events like workshops and the social networking for both groups is as important as the formal transfer of knowledge that occurs at the event
- Most growers are supportive of virtual events and recognise the efficiency with respect to cost and good use of their time, but don't want virtual events to replace physical events, which they value highly
- New Zealand's wine growers normally seek out new knowledge when they have a problem to solve or are looking to improve efficiency and reduce cost
- Growers are time poor and want information to be easy to access and shared in a way in which the key points are easily recognisable. Verbal communication is a preferred channel
- New Zealand's wine growers draw from a wide and varied range of information sources and rate most channels as somewhat useful
- Experiential, social and formal learning are all important pathways for New Zealand's grape growers seeking to acquire new vineyard management knowledge
- Experiential learning may be the most important learning pathway for experienced growers
- Other growers are an important source of information for grape growers, particularly when seeking advice about new practices, products or technologies
- Growers will usually consult with another grower prior to purchasing a new product or implementing a new practice

- Growers want to receive information from people they trust and who can relate to local conditions. This could be other growers or scientists.
- Growers are normally always willing to share their knowledge with other growers and New Zealand's wine industry is considered very collaborative for this reason
- Technical sales representatives, industry magazines, the NZWG website, Vine facts, the export spray schedule and factsheets are important information sources for growers
- Social media is not currently widely used by growers as a vineyard management information source although growers would consider using it more if BRI began to share useful information through this channel
- Growers are more likely to remember research that had a benefit for them, than research where outputs were not relevant to them

Table 3 provides a summary key extension channels available to BRI and ranks the importance of these channels to NZ growers and extensionists based on the results of the survey and interviews.

Extension channel	Importance to growers	Importance to extensionists	Opportunity for BRI
Workshops	High	High	Increase
Seminars	Moderate	High	Increase
Vineyard visits	High	High	Increase
Webinar	Moderate	High	Increase
Discussion group	High	High	Increase
Demonstration block	High	High	Increase
Industry magazines	High	High	Increase
NZWG Website	High	High	Enhance
Conferences	Moderate	Moderate	Maintain
Media	Low	Moderate	Maintain
Factsheets	High	High	Maintain
Email newsletter	Moderate	High	Maintain
Video	Moderate	Moderate	Maintain
Social media	Low	Moderate	Maintain
One on one	High	High	Maintain
Scientific publication	Low	Moderate	Maintain

Table 3 Importance of key extension channels based on interview and survey results

6.2 Stakeholder analysis

BRI has a wide range of key stakeholders as identified in Figure 3. Some of these stakeholders are discussed in more detail in Section 5.2.1.

As the power-interest matrix suggests, levy paying industry members and BRI's internal science team are perhaps the two stakeholder groups that BRI needs to manage the most closely.

Levy payers have a high interest in BRI's research and extension program and their support is critical for BRI's success. Levy paying growers expect that research will benefit them in some way and ultimately, they have the power to reduce financial support for BRI if collectively, they decide BRI's research and extension program is not meeting their expectations.

In terms of their relationship with growers, it seems that BRI is starting from a solid platform, with recent industry surveys suggesting growers are satisfied with the research program (New Zealand Winegrowers, 2019b) and the high level of engagement and positive feedback received from growers who participated in the survey and interviews for this study.

As industry needs will evolve over time and to avoid wasting resources in areas of less importance of industry, it will be critical for BRI to maintain a close relationship with levy payers, regularly seek feedback on the usefulness of the extension program and to regularly review industry research and extension priorities. Industry members have already identified key issues and ranked research priorities in recent surveys, which could be repeated as required (Bragato Research Institute, 2019b).

It's important not to forget internal stakeholders. The BRI science team play a critical role in deciding how to invest the wine industry's research funding, establishing and managing projects and liaising with BRI's science partners. The success of the program reflects on their performance and their knowledge and expertise is fundamental for the research program being a success and staying relevant for industry. The extension program provides a link between the researchers and industry and therefore the extension team need a strong collaborative relationship with the science team and the extension strategy must support BRI's science program and its scientists.

Keeping BRI's and NZWG's senior management and governance groups satisfied is important for continued funding and support for applied research and extension services. Ensuring that the extension strategy supports their goals and objectives is crucial.

BRI's extension strategy must also address the needs of those organisations who have a high interest in BRI but relatively less power to influence decision making. BRI need to work closely with these groups and keep them well informed. These include the research advisory groups (RAC), research partners, regional industry bodies and industry advisors.

Government agencies such as MBIE and MPI are important to consider due to their financial contribution to research and their expectation that research outcomes and subsequent industry benefits are realised.

Industry suppliers, local government and the general public are still key stakeholders for BRI to monitor despite their relatively low interest and power. Public feedback can often lead to regulatory change which affects growers who may require the support of BRI through research and extension and the suppliers have an important role to play in

supporting industry through the development and introduction of new products and technologies to the NZ market.

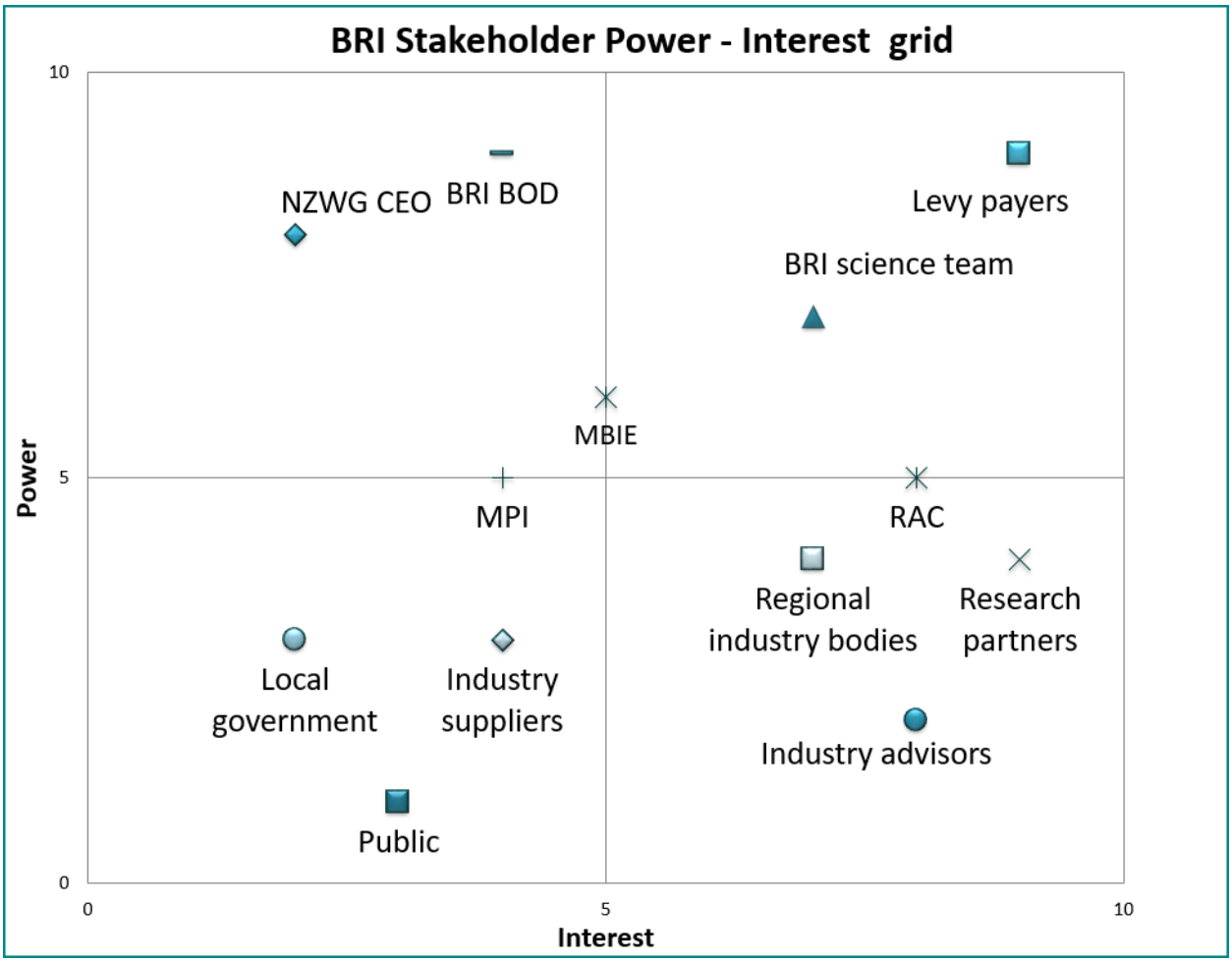

Figure 3 Power-interest analysis for key BRI stakeholders. A higher value denotes higher interest or power. BRI BOD is Bragato Research Institute board of directors.

6.3 Internal and environmental analysis

In June 2020, several members of the BRI science and management team met to discuss internal and macro-environmental factors that could lead to opportunities or risks for BRI relating to their extension program. Some outputs from the discussion were captured in a SWOT analysis and have been included in the appendices (Exhibit 10).

Additionally, further macro-environmental factors potentially affecting BRI's extension program were considered using the ESTEMP strategic framework and are summarised in (Exhibit 9).

Table 4 presents a confrontation matrix in which the key internal and environmental factors affecting BRI are identified with potential tactics summarised. The outputs of this

analysis were used to inform the extension strategy prepared for BRI and presented in the recommendations section of this report.

The key findings of the internal and environmental analysis are discussed below.

Key opportunities

- Skilled industry supportive of research
- Existing extension platforms & network
- High perceived demand for research and extension services

Based on interactions with individuals and organisations in the interview and survey, it seems that NZ's viticulturists and other industry support organisations are very supportive of research and extension and expect that BRI will take leadership in these areas for industry.

Although a relatively young organisation, BRI is already very well situated and adequately connected to become a key organisation in what is already a broad network of industry advisors (Table 1). The existing network offers BRI extensive reach into the entire wine industry and an opportunity to both share and receive information through the network.

There are many existing extension channels and platforms available to BRI to utilise for knowledge transfer that are deemed useful and important to growers (Table 3; Figure 2; Venture research, 2015).

Key strengths

- Collectively, the BRI team have industry experience and strong industry connections
- Dedicated extension resource
- Industry funded

BRI is excellently positioned to develop and deliver a strong extension program to support their industry. Collectively, the BRI team has an extensive network with many direct connections with industry through personal relationships, research advisory boards and their parent organisation NZWG. These connections provide a significant advantage to BRI in terms of keeping informed of industry priorities and receiving feedback on the relevance and success of the extension program.

Investment in a dedicated extension manager was an excellent starting point for the development of an extension program and for continued improvement in this area.

It is also a strength that BRI is largely industry funded as this will mean that BRI will be constantly challenged to ensure the outputs of their research and extension program are meaningful and benefit industry, an expectation is also shared by other key stakeholders.

		Key Opportunities			Key Threats		
		Skilled industry supportive of research	Existing extension platforms & network	High perceived demand for research and extension services	Time poor industry and many agencies competing for growers' time	Financial sustainability of BRI – reliant on industry and government support	Poor quality information reaching industry and wider stakeholders
Key Strengths	Collectively, the BRI team have industry experience and strong industry connections Dedicated extension resource Industry funded	USE STRENGTHS TO MAXIMISE OPPORTUNITIES • Leverage connections and expand network to build trust and partnerships • Utilise full range of existing platforms and use industry knowledge to optimise timing and method to suit audience • Ensure BRI remain connected with industry and stay up to date with industry needs and priorities – deliver what industry want • Take leadership in extension. Set an example for other research and extension organisations			RISK MITIGATION LEVERAGING STRENGTHS • Collaborate with other industry advisory groups – don't compete. Find gaps and deliver information through the most efficient channel • Focus research and extension to address industry priorities. Ensure research has outcomes and impact to secure continued support • Influence the quality of information in the network. Navigate to a central position in the network • Appropriate dissemination of information through the right channel at the right time		
Key Weaknesses	New organisation – lack of brand recognition and experience Small team – limited resources Depend heavily on outsourcing – science, communication and extension	SMART WAYS OF WORKING TO ADDRESS WEAKNESSES • Increase visibility of BRI team – be part of the conversation • Maximise the use of existing platforms and outreach activities funded and organised by others • Maintain focus on industry priorities and optimise extension program to maximise reach with minimal input • Effective collaboration to maximise research and extension opportunities for the good of the industry			QUICK ACTION REQUIRED TO CHECK REAL THREATS • Move quickly to develop reputation as delivering benefit for industry • Improve research and extension program to ensure govt funded research has industry impact and meets objectives • Gain trust from stakeholders by only delivering high quality information and guidance to industry • Collaboration is key. Demonstrate leadership amongst partner organisations to reduce fragmentation and ensure research delivers maximum benefit for industry • Identify gaps, to complement, not compete with other research or extension organisations		

Table 4 - Modified confrontation matrix with suggested tactics used to inform the BRI extension strategy

Key threats

- Time poor industry and many agencies competing for growers' time
- Financial sustainability of BRI – reliant on industry and government support
- Poor quality information reaching industry and wider stakeholders

Given the vast number of other individuals and agencies that currently extend information to grape growers in NZ (Table 1) it appears that that advisory services to growers could be fragmented in a similar way that has been reported in other NZ primary sectors (Ministry for Primary Industries, 2012). It is also clear from the results of the research for this report that a lack of time is a barrier that can prevent growers from accessing information.

To address these threats, it will be critical that BRI collaborates closely with other advisory groups to optimise the timing and platform for delivery of new information for growers rather than competing for growers' time and risking duplication of services.

For continued financial support from industry through their levy funds and government funding agencies, it is expected that BRI can demonstrate clear benefits to stakeholders for their research investment. For this to be possible, the research must be aligned with industry priorities and outputs must address industry problems. As an industry body, BRI has a responsibility to facilitate interactions between researchers and industry to ensure the relevance of research to growers and to ensure the best chance that research results in outcomes that can lift the performance of industry. As the link between industry and scientists, BRI's extension program must seek to address these threats and ensure research results are highly visible to industry and have impact.

A fragmented advisory eco-system and a tendency of growers to seek advice through informal social networks increases the risk that poor-quality information will be circulated. It will be important for BRI to use their position and influence to ensure the quality of information shared with growers remains high and to work with other science and extension agencies to align messaging relating to best practice.

Key weaknesses

- New organisation – lack of brand recognition and experience
- Small team – limited resources
- Depend heavily on outsourcing – science, communication and extension

Despite BRI's position of influence as an industry support agency and its extensive connections with industry, BRI is a relatively new company that is still in the process of building capability and developing strategy. BRI needs to further develop relationships with stakeholders, building trust and a reputation aligned with the organisations mission and purpose.

Due to a small team size, it will continue to be important that BRI leverage existing partnerships and extension platforms and consider using tactics such as social learning and network smart extension, an approach which has already been validated in many other primary sectors in New Zealand and overseas (Hoffman et al., 2015; McEntee, 2013; Skinkis, 2019; Wick et al., 2019).

BRI doesn't need to be the only organisation providing advice and support to NZ's wine industry, they simply need to in a centralised position within the advisory network, thus enabling BRI's team to contribute to the conversation and influence the quality of information and relevance of research for the wine industry.

Based on the findings of the research it appears there is a significant opportunity for BRI to take a leadership role in viticulture extension, working with other agencies, individuals and opinion leaders to enhance the knowledge transfer eco-system, develop an extension program that incorporates aspects of traditional and participatory approaches and ensure research investment is focused on industry priorities and has impact.

A draft extension strategy and implementation plan has been prepared using insights from the research and is presented in the following sections.

7 Recommendations

This section of the report outlines a strategic framework for the BRI extension program and provides recommendations and an implementation plan for the financial year July 2020 – June 2021 (F21).

The objectives and tactics proposed in this extension strategy are intended to support BRI's and NZWG's existing objectives by ensuring that knowledge and technical support is delivered to members to facilitate the sustainable growth of New Zealand's wine industry.

The importance of extension is recognised in BRI's research strategy, with knowledge transfer required if BRI are to achieve their mission statement – "world leading research outcomes from grape to glass" (Bragato Research Institute, 2019a). There is also clear alignment between the proposed extension strategy and the existing research strategy, with both recognising the need to build partnerships and avoid duplication.

The recommendations made in the plan are designed to be achievable based on BRI's current internal resourcing; however, additional tactics are offered for consideration that would require investment in further staff.

We have also drafted a list of the key functions of the extension manager, who will play an important role in implementing the strategy. The list can be found in the appendices (Exhibit 11).

7.1 Definition of extension

Extension is a broad subject for which the precise definition can vary. It is important that BRI adopt a definition of extension for communication with their stakeholders and partners. The following working definition is offered for consideration:

"wide scope of activities and processes that enable the transfer of knowledge through formal channels and social networks, leading to the creation and uptake of new ideas, tools, processes, and practices enabling change"

7.2 Vision for BRI's extension program

To be recognized as a trusted source of quality information and leaders in the wine industry's knowledge transfer eco-system, linking industry and scientists with the knowledge they need to support the sustainable growth of New Zealand's wine industry.

7.3 Key focus areas for F21

- Relationship and network enhancement
- Process improvement
- Information – improve quality, timing, and access
- Enhance inter-regional knowledge transfer
- Establish a BRI led applied science program

7.4 Objectives

1. **Enhance BRI's network and direct relationships** with industry members, industry advisors, industry linked organisations and science partners and ensure that this wide group of stakeholders understand how BRI intends to add value to this existing knowledge transfer network.
2. **Improve how BRI communicates, shares and stores information** to ensure knowledge is shared in a way that it reaches the target audience in the best format to facilitate uptake and durable resources are readily accessible for future reference.
3. **Work collaboratively to facilitate knowledge transfer** throughout BRI's network to foster the wine industry's collaborative and innovative culture and prioritise research investments.
4. **Develop a reputation for delivering high quality information** through appropriate channels at the right time.
5. **Establish a BRI led applied research program for industry**

8 Implementation

Our recommendations are grouped into two phases which could be implemented concurrently with investment in additional staff.

8.1 Phase one

Phase one activities are considered fundamental to establishing a structured and durable extension program for BRI. We believe that the phase one activities should become a core focus for BRI's existing Viticulture Research and Extension manager during F21 and should be achievable without additional resource.

Table 5 offers a full list of recommended priority phase one activities to be targeted for completion in F21. The three key phase one activities are introduced and discussed below.

- **Identify and establish a close working relationship with a small group from each region for research and extension matters**

- Why – improve BRI's reach and impact in all regions. For BRI to achieve and maintain an effective extension program in all wine regions, they will require active participation and support from industry members in each region
- What – an informal extension advisory group or contact person in each region whose role is to help identify annual extension priorities, assist with planning and performing extension activities and provide feedback on the success of BRI's extension program
- How – establish a small, informal working group (or individual) in each region, with regular online meetings
- When – extension advisory groups established in all regions by the end of 2020
- Risks – identifying willing volunteers with adequate time to support BRI led extension activities

- **Introduce a structured, annually reviewed extension plan process that clearly identifies priorities and activities – nationally aligned, regionally specific**
  - Why – taking a structured and planned approach will maximise the impact of knowledge transfer to industry
  - What – An annual process, where priorities are first identified for each region, then a program of extension and communication activities are planned and agreed upon by regional advisors and BRI research staff
  - How – Identify the priority topics and what information is already or will become available over the next 12 months. Then, plan activities to optimise use of existing channels, project extension budgets, timing and ability to reach target audience
  - When – a draft plan is produced by the end of October 2020. Future extension plans should be ready for review and approval in June of each year
  - Risks – unplanned priorities surface because of unforeseen industry challenges
- **Ensure all proposals have a costed, targeted and BRI approved extension and communication plan prior to final approval**
  - Why – to ensure that new knowledge created through research is delivered to industry in a way that maximises impact
  - What - ensure researchers and project managers consider how project outputs should be shared with industry to enable uptake and the realization of research benefits. Considerations should include target audience, timing of delivery and cost
  - How – BRI to establish a standardised process and template for incorporating an extension and communication plan following EOI approval for inclusion in the project proposal
  - When – all new projects from F21 to include a costed extension and communication plan

- Risks – introduces a new and additional requirement for researchers and project managers

Focus Area	Activity	Measure of success
Relationship and network enhancement	Identify key influencers, opinion leaders and organisations to map a knowledge network	Key actors identified and database formed
	Identify and communicate what extension related services BRI can reasonably offer to members	Clear understanding of what extension related activities and services BRI can achieve within each region and stakeholders are aware of these services
	Regular communication with key extension partners and attendance at events, including specific engagement with Maori industry partners	Existing network has expanded and BRI are kept well informed of industry research, development and extension needs
	Identify and establish a close working relationship with a small group from each region for research and extension matters	Regional appointee identified and regular meetings underway
	Identify industry related committees for extension manager to join	Committees identified and membership achieved
Process Improvement	**Introduce a structured, annually reviewed extension plan process that clearly identifies priorities and activities – nationally aligned, regionally specific**	A regionally optimised extension plan is created for F21, that includes guidelines for the annual review process
	Ensure all proposals have a costed, targeted and BRI approved extension and communication plan prior to final approval	All new projects have an extension and communication plan
	Create a single point of contact within BRI for member enquiries and start logging key data associated with these enquiries	Internal system developed for capturing member enquiries
	Annual process to measure and evaluate reach and impact of extension program	Exit survey completed for all F21 BRI led events and other interactions with industry are tracked and reported
	Track costs and time associated with extension activities by category	F21 costs captured to inform future decisions relating to budgeting and resourcing

Information – improve quality, timing and access	Identify priority topics for F21 extension and plan outreach program	Plan created and executed for F21
	Increase and formalise the level of vetting for selected information resources	Clear criteria established for the level of vetting required for all new BRI endorsed written information resources
	Create a national extension calendar which includes planned activities by BRI and other industry extension agencies	Calendar created, published, and maintained for F21
	Website improvement - BRI takes an active role in improving the way research documents are stored on the NZW website to facilitate grower access	Current website resources are reviewed, website layout improved, and clear criteria established for adding new resources
	Review and confirm that recommendations made, following the 2015 NZWG Tech Transfer survey, were implemented	All recommendations confirmed as actioned or discarded
Enhance inter-regional knowledge transfer	Increase BRI representation at regional events	BRI representation at relevant events
	Plan and trial some online activities that will have a cross – regional benefit such as small group discussion forums	A small number of events trialed and evaluated in F21

Table 5 BRI extension strategy - phase one priorities for F21

8.2 Phase two

Phase two recommendations are designed to lift BRI beyond business as usual. These activities would require an investment in additional staff and would need to be phased in over the next 1-5 years. The key recommendation for phase two is for BRI to establish a small science team, led by the extension manager to enable BRI to lead grower facing applied field trials and other research including case studies and literature reviews. Additional phase two tactics are aimed to increase BRI's service offering to key stakeholders.

Table 6 offers a full list of suggested phase two activities to be considered to increase the scope of BRI's extension program and offer additional value for industry members.

Two key activities enabled by the development of a BRI applied research program are discussed in greater detail below. A BRI led applied research program, as outlined in the two key activities below, would require the hire of two additional staff, whose duties would include research and extension activities. It is proposed these staff report to the existing Viticulture Research and Extension manager.

- **Introduce BRI led grower trials and demonstration plots**
  - Why - Opportunity to lead simple, grower inspired applied trials and demonstrate learnings on the vineyard to the wider viticulture community.

Provides a direct connection between growers and the BRI research and extension team
- What – The focus should be on pilot studies and simple field trials. Trials are designed in a way to generate robust, but not excessive, information that will inform outputs relevant to growers and winemakers
- Risks – additional support and outsourcing may still be required, depending on the number, scope, location and timing of field projects
- Risks – will rely on support and participation of growers and winemakers

- **Actively pursue and construct case studies to capture and share examples of innovative practices and new technologies being trialed by growers**
  - Why – A cost-effective method to capture and share existing knowledge between growers, without the need for additional research projects. An opportunity for network enhancement and case study development offers a co-learning opportunity for BRI and growers
  - What – Existing information is gathered from industry and researchers, analysed and reported in a concise, user friendly format
  - Risks – success will rely on the quality of existing knowledge and the willingness of industry participants to share this knowledge

Focus Area	Activity	Benefits
Establish a BRI led applied science program	**Introduce BRI led grower trials and demonstration plots**	Opportunity to lead simple, grower inspired applied trials and demonstrate learnings on the vineyard to the wider viticulture community
	Actively pursue and construct case studies to capture and share examples of innovative practices and new technologies being trialed by growers	Enhanced network and co-learning opportunity for BRI and growers
	Investigate potential for citizen science related projects and data collection	Increased engagement of growers with research and potential low-cost solutions for collecting data
	Investigate how the existing financial benchmarking survey can be enhanced to benefit industry	Increased understanding of the factors that differentiate financial performance and increase the value of survey outputs
Relationship and network enhancement	Information request service for members – BRI will research and promptly supply information by request to members	Increasing ability to become a one stop shop for growers seeking information
	Increased number of events offered at national and regional level including annual technical and innovation workshops	Increased visibility within the grower community and more opportunities to deliver information directly to the audience

	Annual innovation award	Opportunity to celebrate and encourage innovation as well as facilitating grower to grower knowledge transfer
	Actively set up and facilitate discussion groups between member sub-groups	Increase value offering for members, strengthen networks and enhance grower to grower knowledge transfer
	Investigate whether BRI could play a more formal role in education	Potential partnerships between BRI and education providers to offer education to targeted industry segments
Process Improvement	Annual extension survey to members to inform improvements for following year	Improved feedback loop for informing future direction of extension program
Information – improve quality, timing and access	Establish a regular technical meeting in key regions – open forum with research updates and visiting scientists	Regular science updates and direct feedback opportunity for researchers to improve connection between researchers and industry
	Introduce regular podcast series	An additional knowledge transfer channel for time poor growers
	Scan and regular reporting on interesting science and technology	By enabling this extension function, BRI and growers can stay informed of potentially beneficial new practices and technologies
	Regular column in industry magazines to share key findings from a small selection of recent academic papers	A new channel for extending the highlights of relevant and topical international research with growers
	High level summary of all projects on website	Increase grower engagement, awareness and connection with current field research
Enhance inter-regional knowledge transfer	Development of an online inter-regional forum for young viticulturists	Increase BRI connection with young viticulturists and enhance their network and access to new knowledge
	Facilitate regular inter-regional discussion groups	Enhance BRI's network and encourage transfer of ideas and knowledge between regions
	Facilitate periodic inter-regional field tours	Provide a platform for growers to network and share ideas and knowledge

Table 6 BRI extension strategy - phase two possibilities for F21

8.3 Timeline for implementation

A timeline for the implementation of phase 1 and selected phase 2 activities is included in Table 7.

	September	October	November	December	January	February	March	April	May	June
Relationship and network enhancement	Communicate results of extension research and strategy to industry									
	Identify regional extension partners									
				Identify opportunities for additional outreach activities including interregional discussion forums						
Process improvement				Project specific extension plan for new projects						
	Draft F21 regional extension plan							Draft F22 regional extension plan completed		
	Extension program impact assessment and reporting - develop method								Report on extension plan impact	
Information – improve quality, timing and access		Explore options for extension calendar including partner co-operation					Trial extension calendar			
	Website improvement - collaborate with NZWG team and BRI comm's director									
					Review recommendations from 2015 NZWG tech transfer survey and confirm implemented					
							Increase BRI extension related content in industry magazine			
Establish a BRI led applied science program	Recruitment	Staff induction and onboarding complete								
	Shortlist applied project ideas		Project establishment					Project reporting		

Table 7 Suggested timeline for BRI of selected phase 1 and 2 strategy tactics for financial year 21 (July 2020 - June 2021

8.4 Risk management

Potential risks that BRI may face during implementation of the strategy have been identified and are included in Table 8. The impact and likelihood of occurrence are estimated for each risk and mitigation activities proposed for consideration.

Description of Risk	Consequences	Impact	Likelihood	Risk Level	Mitigation Strategy	Mitigation Activities
COVID 19 interrupts ability to plan and execute outreach activities in F21	Less opportunity for BRI to connect with growers and engage in knowledge transfer opportunities	Moderate	Almost Certain	Extreme	Mitigate	Build COVID contingency into planning. Trial and evaluate alternative (virtual) outreach activities
Demand from industry for extension services exceeds capability of team to deliver	Failure to satisfy members and perception of poor service offering	High	Moderate	High	Mitigate	Ensure responding to member enquiries is a priority. Track interactions and build case for additional resource if required
Outputs from applied research projects don't achieve objectives	No benefit for industry and therefore reduced support. Negative effect on BRI brand	High	Moderate	High	Mitigate	Complete due diligence before commencing trial work. Utilise full range of internal expertise and source additional support as required
Minimal internal experience and systems for establishing and running field trials and case studies	Quality of work low and trial objectives not achieved	High	Moderate	High	Mitigate	Utilise full range of internal expertise and source additional support as required
Research and outputs duplicate existing knowledge and resources	No new knowledge generated and investment perceived by stakeholders as wasteful	High	Moderate	High	Avoid	Ensure thorough review of historic information prior to commencing new studies
Key stakeholders don't see the benefit of extension services	Financial support is reduced or removed	Extreme	Unlikely	High	Avoid	Ensure BRI extension program is of high quality and designed to align with industry priorities
Limited industry funds available for applied research and extension and public funding unlikely	Limits scope of BRI applied research and extension program	Moderate	Moderate	High	Mitigate	Careful prioritisation when allocating resources to ensure benefits to industry are likely and highly visible
Limited resources restrict ability to achieve phase one activities in F21	Less chance of achieving strategy objectives	Moderate	Moderate	High	Mitigate	Stay focused. Limit time spent on non-priority activities. Track time for future analysis

Lack of support from BRI science team and science partners to enhance extension for their projects	Disconnection between science and industry. New knowledge not transferred to industry and uptake limited	Moderate	Moderate	High	Avoid	Extension team to work closely with researchers in a collaborative way that ensures a two-way benefit
Lack of demand from industry for BRI extension services	Reduced financial support for BRI extension activities	High	Unlikely	High	Avoid	Ensure BRI extension program is of high quality and designed to align with industry priorities
Partner organisations unwilling to collaborate with BRI	Increased likelihood of duplication and competition for audience time. Reduced network size	Moderate	Unlikely	Moderate	Mitigate	Improve and maintain regular communication with key partners. Maintain a high level of professionalism and ensure BRI is seen as a desirable organisation to work with
Unable to attract suitable staff for phase two of strategy	Unable to implement phase two	Moderate	Unlikely	Moderate	Mitigate	Optimise recruitment strategy, circulate widely and offer a competitive package.
Unable to identify industry volunteers to support BRI initiated trial and outreach activities in the regions	Limits ability of BRI to operate in the regions	Moderate	Unlikely	Moderate	Avoid	Invest time to develop relationships in the regions and ensure potential benefits are clearly communicated
Industry unwilling to share information with BRI for case studies and participate in field trials	Difficult to establish and undertake trial work	Moderate	Unlikely	Moderate	Mitigate	Invest time to develop relationships with industry and ensure potential benefits of partnerships are clearly communicated

Table 8 BRI extension strategy - implementation risk assessment

9 Conclusion

There is a significant opportunity for BRI to take a leadership role in viticulture extension in NZ and an expectation from stakeholders that it will do so.

Through collaboration and partnership, BRI can influence an improvement in the alignment between research objectives and industry needs and enhance knowledge transfer throughout industry and between scientists and growers.

The extension strategy proposed in this report offers a foundation for the development of a viticulture extension program tailored for the benefit of growers and led by BRI.

It is important that BRI carefully monitor the success of any new and existing initiatives and be prepared to continually optimise their extension program based on internal evaluation and feedback from key stakeholders.

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11 Appendices

Exhibit 1 - Themes and prompt questions for semi structured interviews (May-June 2020)

Discussion theme	Prompt questions	Extensionist (E) or grower (G)
Motivation to share or find information	How do you determine what industry needs or what their problems are?	E
	What drives you to look for new information, technology, or ways of doing things?	G
Searching for and accessing new information	Where do you look for solutions – knowledge or technology that may suit industry needs?	G
	What are the top 2-3 ways in which you find out about new practices or technologies relating to vineyard management?	E
	Do you use social media for accessing or finding viticulture management information?	G
	Who do you (or your industry) prefer to hear from when being exposed to new information?	G, E
Sharing information	What are the top 2-3 ways in which you currently share knowledge with others about new practices or technologies?	G, E
	How do you feel about using webinars and video conferencing as a tool for knowledge transfer?	G, E
	How do you decide what to share?	E
	If your industry, organisation or team has grown, what have been the pain points while under-resourced in relation to your extension program?	E
	How does your organization measure the success of your extension work?	E
Barriers to accessing information	What are the top 1 or 2 barriers exist that prevent you (or your industry) from accessing new information or implementing new practices?	G, E
Implementation of research outputs	Could you describe any recent research outputs or new technology that have had a positive impact in your business?	G
	Are there any recent research outputs or new technology that you feel had little value for your business?	G

Improving BRI's extension program	What could our team at Bragato Research Institute do to improve your access to new knowledge and enhance your ability to innovate?	G
	Can you offer any suggestions for improvement to your extension program or tips for BRI to improve theirs?	E
	What can BRI do to complement your extension program and how could we work together?	E

Exhibit 2 Viticulture extension survey questions (June 2020)

Thank you for agreeing to take part in our survey. The information you provide us will be very important in helping shape our viticulture extension program to better serve you in the future. Please be assured that the answers you provide will be held in confidence, and data will only be reported in a way that ensures all respondents remain anonymous.

1. Contact Name (optional)

2. Company Name (optional)

3. Email Address (optional)

4. Select the position title that best describes your main role

- ○ Assistant vineyard manager
- ○ Vineyard manager
- ○ Assistant viticulturist
- ○ Viticulturist
- ○ Grower manager
- ○ Viticulture consultant
- ○ Other (please specify)

5. Years of viticulture experience

- ○ <1 year
- ○ 1-5 years
- ○ 6-10 years
- ○ 11-15 years
- ○ 16-20 years
- ○ > 20 years

6. Vineyard area under management (or under contract for grower managers or consultants)

- ◯ <10 hectares
- ◯ 11-50 hectares
- ◯ 51-100 hectares
- ◯ 101-500 hectares
- ◯ >500 hectares

7. Region - please check all that apply

- ☐ Northland
- ☐ Auckland
- ☐ Waikato
- ☐ Bay of Plenty
- ☐ Hawkes Bay
- ☐ Gisborne
- ☐ Wairarapa
- ☐ Nelson
- ☐ Marlborough
- ☐ Canterbury and North Canterbury
- ☐ Central Otago
- ☐ Waitaki Valley and North Otago

8. Can you rate the usefulness of each of the following information resources for learning about vineyard management?

	Not very useful	Somewhat useful	Very useful	N/A
Written records of vineyard performance	◯	◯	◯	◯
Historic vineyard data	◯	◯	◯	◯
Viticulture text or reference books	◯	◯	◯	◯
Industry magazine	◯	◯	◯	◯
New Zealand Winegrowers Vineyard Spray schedule	◯	◯	◯	◯
Academic journals	◯	◯	◯	◯
Newspapers	◯	◯	◯	◯
Webinars	◯	◯	◯	◯

	Not very useful	Somewhat useful	Very useful	N/A
Internet resources (other than NZ winegrowers members site)	○	○	○	○
Internet resources - (NZ winegrowers members area)	○	○	○	○
Field research trials conducted in others' vineyards	○	○	○	○
Vinefacts	○	○	○	○
Field research trials conducted in own vineyards	○	○	○	○
Electronic newsletter	○	○	○	○
Trial and error	○	○	○	○
Observations of own vineyard conditions	○	○	○	○
Observations of others' vineyard conditions	○	○	○	○
Supplier - technical field rep	○	○	○	○
Supplier - sales rep	○	○	○	○
Other wine grape growers	○	○	○	○
Viticulture consultant	○	○	○	○
Vineyard operators	○	○	○	○
Vineyard contract field staff	○	○	○	○
Winery personnel	○	○	○	○

Other (please specify)

9. What are the top 2-3 ways in which you currently share knowledge with others about new practices or technologies?

10. What are the top 1 or 2 barriers that prevent you from accessing new information or implementing new practices?

11. What could our team at Bragato Research Institute do to improve your organisations access to new knowledge and enhance your ability to innovate?

12. Who do you prefer to hear from when being exposed to new information? Can you give examples?

13. When you have discovered new information and want to try something different, who do you have to convince and how do you try to achieve this?

14. Do you feel as though you are currently enabled to contribute to our industry's research programme, in terms of idea generation, feedback and prioritising research topics?

15. Could you describe any recent research outputs or new technology that have had a positive impact in your business? How did you measure this?

16. Are there any recent research outputs or new technology that you feel had little value for your business? Once again, what measurement did you use to draw this conclusion that efforts resulted in little value?

17. How many industry events do you attend on average each year (total of local, national, international)?

18. Do you feel as though there are enough technical workshops and seminars in your region each year or would you prefer more?

19. Any final thoughts, comments or research ideas that you would like the Bragato Research Institute to consider?

Exhibit 3 - Survey response by region

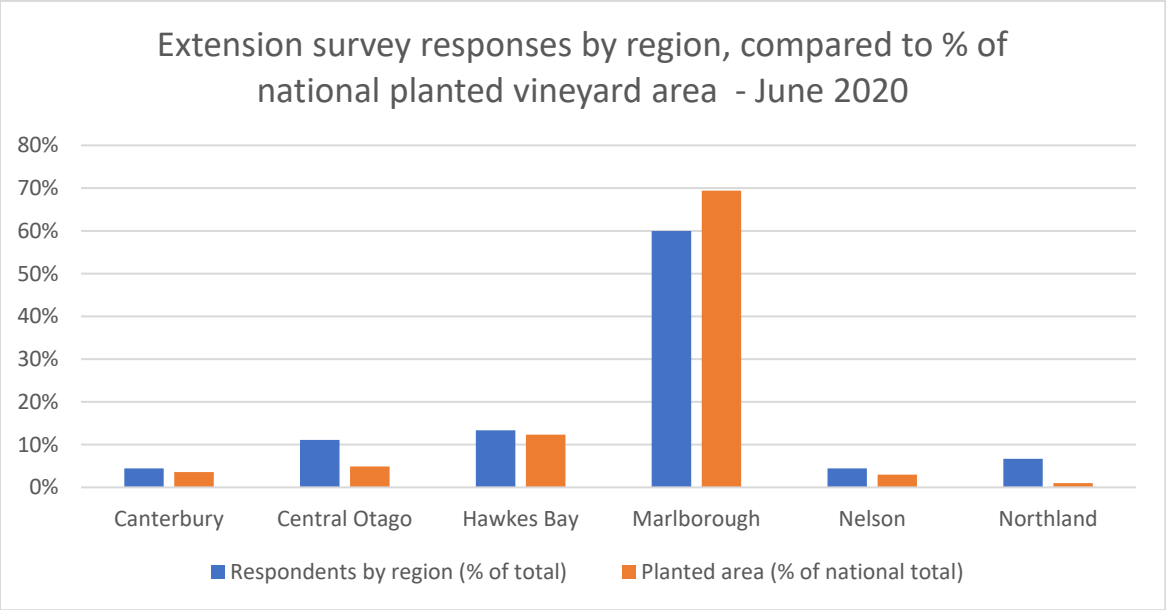

Exhibit 4 Survey response by position title

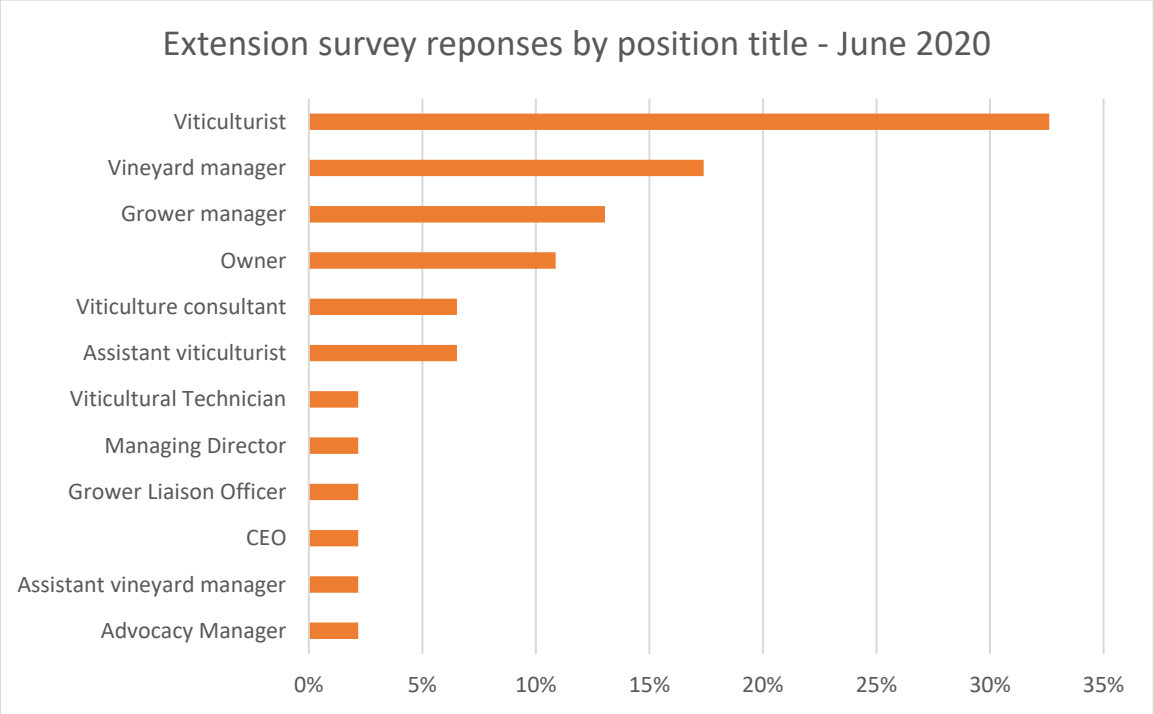

Exhibit 5 Survey response by vineyard area under influence

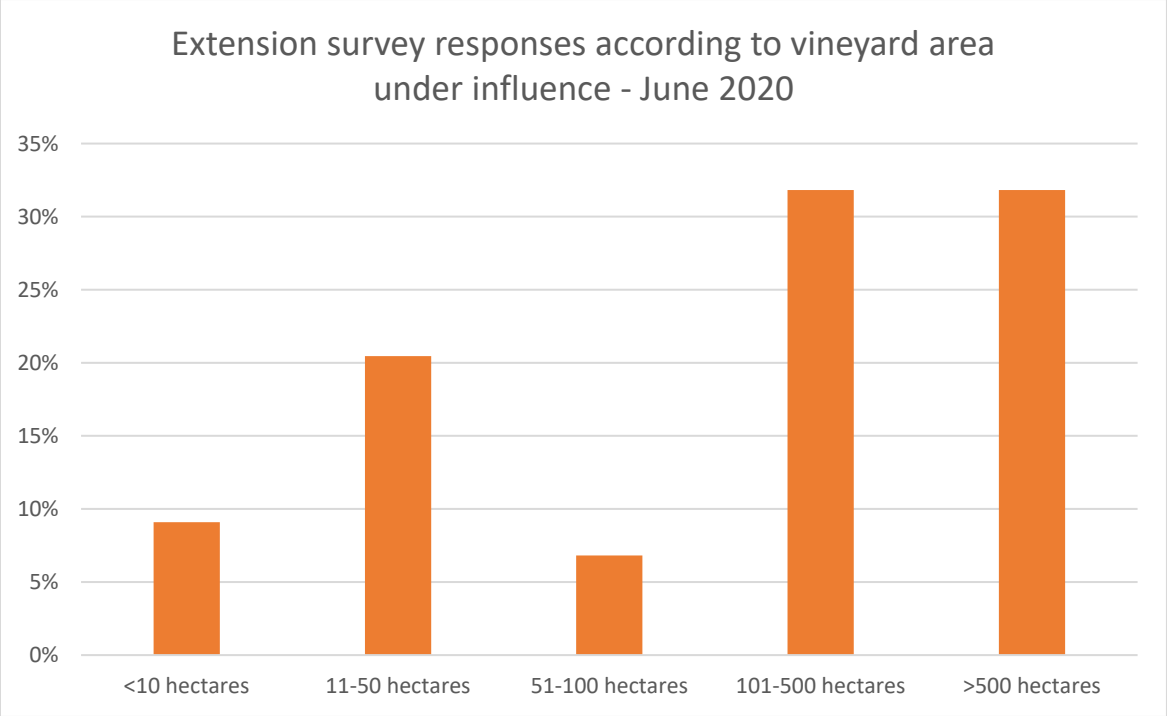

Exhibit 6 - Survey response according to viticulture experience

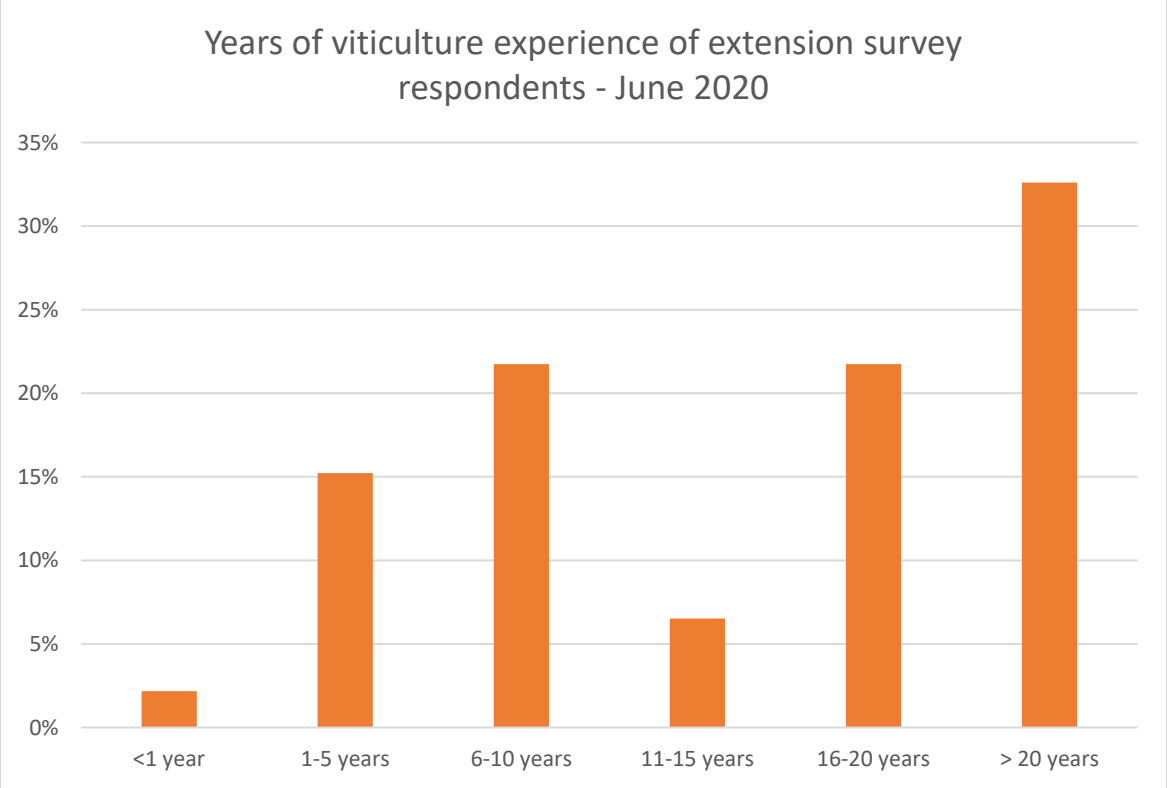

Exhibit 7 Viticulture extension survey – perceived value of information sources (June 2020)

Information type	Information category	Weighted Average	Not very useful	Not very useful	Somewhat useful	Somewhat useful	Very useful	Very useful
Observations of own vineyard conditions	Experiential	2.95	0.00%	0	4.44%	2	88.89%	40
Field research trials conducted in own vineyards	Experiential	2.81	2.22%	1	13.33%	6	80.00%	36
Historic vineyard data	Experiential	2.78	0.00%	0	21.95%	9	78.05%	32
Field research trials conducted in others' vineyards	Experiential	2.75	0.00%	0	24.44%	11	73.33%	33
Written records of vineyard performance	Experiential	2.68	2.27%	1	27.27%	12	70.45%	31
Observations of others' vineyard conditions	Experiential	2.58	2.33%	1	34.88%	15	55.81%	24
Trial and error	Experiential	2	24.39%	10	43.90%	18	24.39%	10
		2.65	**4.3%**	**13**	**24.0%**	**73**	**67.8%**	**206**
Internet resources - (NZ winegrowers members area)	Formal	2.64	2.22%	1	31.11%	14	66.67%	30
New Zealand Winegrowers Vineyard Spray schedule	Formal	2.61	6.82%	3	25.00%	11	68.18%	30
Vine facts	Formal	2.53	11.11%	5	24.44%	11	64.44%	29
Internet resources (other than NZ winegrowers members site)	Formal	2.44	0.00%	0	55.56%	25	44.44%	20
Viticulture text or reference books	Formal	2.41	4.44%	2	48.89%	22	44.44%	20
Academic journals	Formal	2.41	7.50%	3	42.50%	17	47.50%	19
Electronic newsletter	Formal	2.29	4.65%	2	58.14%	25	32.56%	14
Industry magazine	Formal	2.27	8.89%	4	55.56%	25	35.56%	16
Webinars	Formal	2.14	9.09%	4	63.64%	28	22.73%	10
Newspapers	Formal	1.48	60.00%	27	28.89%	13	8.89%	4
		2.32	**11.6%**	**51**	**43.3%**	**191**	**43.5%**	**192**
Other wine grape growers	Social	2.47	4.44%	2	42.22%	19	48.89%	22
Vineyard operators	Social	2.42	4.65%	2	44.19%	19	44.19%	19
Viticulture consultant	Social	2.4	6.67%	3	33.33%	15	37.78%	17
Supplier - technical field rep	Social	2.31	2.22%	1	60.00%	27	31.11%	14
Winery personnel	Social	2	21.43%	9	47.62%	20	21.43%	9
Vineyard contract field staff	Social	1.95	22.22%	10	48.89%	22	17.78%	8
Supplier - sales rep	Social	1.88	18.18%	8	70.45%	31	6.82%	3
		2.20	**11.3%**	**35**	**49.5%**	**153**	**29.8%**	**92**

Exhibit 8 Preferred information sources of California wine growers (Hoffman et al., 2015)

TABLE 2. Survey respondents' ratings of the usefulness of 21 information resources

Information resource	"Very useful" rating (% of all respondents)	Top 10 ratings by region: Central Coast	Lodi	Napa Valley
Observations of own vineyard conditions	89.8	1	1	1
Pest control adviser	72.3	4	2	10
Vineyard field crew	71.2	6	5	2
Other wine grape growers (not family)	71.1	2	7	3
Trial and error	69.5	5	4	5
Field research trials conducted in own vineyard	68.3	7	9	6
Winery personnel	67.9	3	6	9
Observations of others' vineyard conditions	67.2	8	10	4
Other wine grape growers (family)	64.4	9	8	
Viticulture consultant	63.5	10		7
UC Cooperative Extension farm advisor	62.7		3	8
Internet resources	60.5			
University publications	58.7			
Viticulture text or reference books	58.5			
Written records of vineyard performance	56.8			
Field research trials conducted in others' vineyards	55.1			
Trade journals	47.2			
Lodi Winegrower's Workbook	44.4			
Sustainability in Practice (SIP) Workbook	42.5			
California Code of Sustainable Winegrowing Workbook	34.0			
Newspapers	17.2			

Color key: Social Experiential Formal

Exhibit 9 Macro-environmental analysis of factors potentially impacting BRI's extension program (June 2020)

	Opportunities	Threats
E	• Government support for primary industry research and extension • Wine industry and support for research and extension • Continued growth and expansion of wine industry • Increasing costs stimulate interest in new technologies and practices that could reduce direct production costs	• Global and domestic economic uncertainty due to COVID could mean reallocation of funds away from research sector • Government funding requirements mean research outputs not always aligned with industry needs • Increasing costs may discourage investment in industry and limit levy funds for research • Requirement of BRI to be financially sustainable means a greater focus on bidding into contestable research funds where industry science outputs not always a priority
S	• Consumer expectation for wine industry to reduce environmental footprint – industry will require support from research and extension to implement	• Consumer concerns not always based on fact and could cause unnecessary hardship on industry as regulations are tightened and range of inputs allowed are reduced
T	• Rapid and ongoing development of technology for the viticulture sector – technology will require testing under local conditions and suppliers will need support to test and engage with industry • Opportunity to partner with other science organisations, technology and industry to develop new technology to mitigate industry risks	• Low adoption of technology – value offering not clear to growers • Traditional approach to viticulture and winemaking can lead to reduced demand for new technology
E	• High level of expectation from government and industry that research will play a leading role in tackling climate related risks to ensure sustainability of industry	• Climate related constraints could reduce size of industry or appetite for investment in research and extension
M	• Public interest in primary sector research makes media a useful channel for sharing knowledge and improving awareness of the value of research and extension	• Risk of inaccurate and sensational reporting reducing the quality of information in the knowledge network
P	• Government support of primary industry and research sector • Growers require support of research and extension services to optimise inputs	• Local and national government tightening regulation about water quality and pesticide inputs

Exhibit 10 SWOT analysis for BRI extension program (completed with input from BRI science and management team June 2020)

Strengths

- Industry experience
- Industry funded
- Winery
- Location
- Agility
- Diverse network
- Close relationship with industry
- Dedicated extension resource

Weaknesses

- Time poor
- Limited resources
- Inadequate and lack of systems
- Website
- Lack of brand recognition
- Being new – lack of experience
- Dependence on others (researchers and extensionists)
- relationship with other science organisations
- Lack of extension experience

Opportunities

- Existing platforms (Grape days, indsutry magazines, webiste)
- Existing knowledge
- Need for knowledge
- Improved accessibility
- Innovative and progressive industry?
- Current research projects
- Other extensionists
- No requirement to charge for services
- Diverse and skilled industry participants - supportive of research

Threats

- Conservative thinking (industry)
- Misinformation
- Disconnection
- Misinterpretation
- Competition for audience time
- Lack of trust
- Being perceived as Marlborough centric
- Reduced funding

Exhibit 11 BRI extension manager functions

Responding to member enquiries
Monitoring industry and identifying problems
Enhance and maintain industry network
Development and delivery of planned outreach activities
Respond to urgent industry extension requirements
Enhance and maintain extension partner network
Event attendance
Participate in industry committee and advisory groups
Event planning and management
Research, review and disseminate information
Advise on extension program design for individual projects
Contribute to research program design
Internal process design and management
Evaluating and reporting the success of extension activities