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Farming in a Pressure Cooker: How pressure impacts farmer decision making

By Corrigan Sowman

2019 Nuffield Scholar

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Executive Summary

Across the world, pressure on our planet's ecosystems is forcing society to "rethink" many of our everyday activities. Technology change is raising questions about where and how food can be produced, and the morality of food production.

Agriculture is at a crossroads; past practices are no longer seen as acceptable, often scrutinised by people with half the facts. The result of this situation is farmers are under pressure. They have more to respond to than there is time, money, or that current technology allows. For some, they are overwhelmed, and this is reflected in their mental wellbeing.

The purpose of this study has been to better understand how the pressure that farmers are experiencing impacts on their decisions making? These decisions underpin how the food is produced, and that is important to society, especially for countries such as New Zealand that rely on the prosperity earned through exporting food.

This study used a four-part process called double diamond design (Banathy, 1996) to complete a broad international investigation into pressure and its effects on the farmer. The aim, to connect how farmers' thinking is influenced by the pressure around them.

Pressure is described using five factors of uncertainty, high stakes, small margins, fast changes and judgement (Evans, 2019).

Historically farmers have managed pressure well through a multitude of management practices. This has provided them a degree of comfort despite their limited control of the biological systems they operate, systems heavily influenced by external factors such as trade. Growth through productivity has offset falling margins. But if growth is constrained through changing regulation and customer pressure, how do farmers adapt?

This study has explored the psychological factors surrounding thinking under pressure and proposed the use of a model to highlight the need for new skillsets that support accepting challenge over reaction to threat. Farmers are conditioned to recognise threat, often interlinked to their sense of purpose and identity.

How the brain responds to threat is important in understanding how best to facilitate practice change in agriculture. This report recommends a need to place the concept of pressure at the centre of future practice change in agriculture. It suggests new skills in thinking under pressure need to be fostered in farmers to underpin performance in a long-term pressure environment. It draws on the science of thinking under pressure and examples already available in New Zealand to highlight that branding food around origin in the future will rely on investing in the thinking skills of those producing it.



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Foreword

In a time of building complexity and an increasing pace of change in the agri-food and fibers sector, it was so refreshing to see a report that focuses on supporting people's effective thinking in times of pressure. All too often, the focus is on the technical or the structural how, and we forget that behavior is driven from within. An incredibly considered report describing that future success will be determined by our ability to think and critically assess during pressure. The power of this research is that it does not focus on a form of change, its focuses on the people and the emotional and mental tools they need to navigate change, regardless of the form change takes.

The research addresses the value of teaching farmers to better understand how their thinking and their wellness connects with their actions, and how their actions will shape the food and fiber they produce. It is a clear signal to all that even in difficult times we have more control than we realise. We need to work hard for that control however and it starts with how we manage our thinking before trying to control external situations. Corrigan beautifully describes it as "becoming comfortable with uncomfortable truths". The change ahead for some will feel brutal but it will come with an incredible amount of opportunity. The success of this opportunity will not be garnered through strong technical skill but through desire to learn and grow.

The personality profiling of the farmer 'type' is incredibly insightful however also scary where it highlights the likelihood of farmers pushing themselves to stages of great fatigue and exacerbating times of pressure. This cycle is dangerous and there is an urgent need to break this cycle.

I have been lucky to connect with Corrigan over the years within the industry but hearing him talk about his travels, his insight, his thinking and then reading the report it reinforced how incredibly committed he is to supporting the wider industry to navigate a positive future. What was most impressive was his ability to adapt, setting out on yet 'another' provenance report he was open enough to see a bigger picture and shift his own thinking and focus, a wonderful example of courage and strong leadership. As a farmer himself, he comes from a place of intimate knowledge and great empathy.

I consistently observe organisations and industry groups forgetting that people are the core of adaption. They claim to have it as a focus, they may even have it as a heading for a project, but there is little evidence of significant application. I strongly encourage industry groups, commercial organisations, producers, and anyone in their ecosystem to pay great attention to this report and actively look to apply. I have no doubt that many will say, "we already know all of this" however, it is important to remember, to know and to not do, is to not know.

Julia Jones



Acknowledgements

He aha te mea nui o te ao. He tāngata, he tāngata, he tāngata

What is the most important thing in the world? It is people, it is people, it is people (Maori Proverb).

The Nuffield experience happens because of the generosity and kindness of people and there are simply too many for me to acknowledge here on this page.

Thank you to my ever-supportive wife Ruth for the opportunity to explore the world this last year while you cared for our boys and family commitments. Your encouragement to challenge myself and guidance while I got lost in the project were essential in getting me to the end. Thank you to my sons' Wylie and Tim for giving dad the chance to travel and for taking such an interest in the places I visited and experiences I had. I am so proud of you two young men.

I am forever grateful to the generosity of my parents Brian and Glenda, brother Sam and sister in-law Cara for allowing me the time away from our family business and for sacrificing your own needs so I could pursue mine. Also, to Simon, Melanie, Stephanie and Mike, our team on farm who kept the milk flowing without me, thanks for your passion, energy and care towards our business every day.

The year offered me the chance to meet many new people and I'm proud to have shared the experiences alongside four other great kiwi blokes, Hamish Marr, Hamish Murray, Cam Henderson and Ben Hancock. Cheers boys for your ongoing support and camaraderie.

Anne, Lisa and Hamish, and all the wider Rural Leaders team, thank you for the opportunity, and for your energy and support this year, I really have appreciated your help along the way.

To my Nuffield contemporaries across the world who hosted me, showed me their countries, and connected me to their networks, I am so very grateful to have met you all. A special thankyou to Ciara, Pat, James, Jeroen, Karen, Heleen, Susan, Bart, Mark and Blake for your hospitality and help across the year.

Thank you to the Nuffield Chile 19 Global Focus Program group, Jake, Sarge, Kerri, Ollavo, Jeroen, James and Phil, it was a privilege to travel with you all for those 6 weeks around the globe and share the experience together.

During my year there were a few special people that really helped me out. Bill O'Keeffe, thanks for the kick start into Legacy and what this project ultimately became. Con Hurley and Mike Murphy for your wise words, challenging ideas and great Irish craic. Sean Brotherson, Michael Rosmann, Andria Jones-Bitton, you three really helped me understand farmer thinking and the why, I'm so very grateful for your insights. Lastly, thanks so much to Julia Jones for your support as I pulled the report together.

Finally, I want to thank our New Zealand and International sponsors of the wider Nuffield Program. It is your faith in the value of growing people that makes this truly life changing opportunity possible.

Corrigan Sowman, March 5th, 2020.



My youngest son Tim on the Nuffield Tractor that features in their school playground.



1.0 Introduction

Agriculture underpins modern society. Technological advancements in food and fibre production, and the advancement of mechanisation has allowed fewer farmers to feed more people, and for more food to be produced from a smaller land area. This has allowed people to seek alternative use of their time rather than being consumed by how to feed and clothe themselves.

As societies across the world urbanise in search of a higher standard of living, a true connection between individuals and where our food comes from becomes more difficult. In addition, modern technology has also brought a new era of globalisation, whereby the exchange of cultures has brought us closer together while also further removing us from the real origins of our food. New technology is also giving people the ability to question where their food comes from and be influenced by others in a whole new way.

Farmers have long held the strong belief that there is a nobility to feeding our society; that the task is important. Yet farmers have often been left behind in terms of social connection with their markets. The challenge for all food producers is we want a customer connection that gives fair reward, feedback, mutual understanding and trust. In reality, many farmers and growers are unlikely to get this directly, and therefore are open to mixed messages, alternative agendas, and confusion.

Today, agriculture is at a crossroads. Pressure on our planet's ecosystems is forcing society to "rethink" many of our everyday activities. Technology change is raising questions about where and how food can be produced, and the morality of food production. Farmers are right at the coal face of this change. Their structures, systems and beliefs of land holding, production methods, value chains, and everyday farming routines have been brought into question. They are feeling judged like never before.

Through my travel as a Nuffield scholar I observed a tone of discomfort among farmers related to this social change. The big changes occurring globally created uncertainty not experienced at the same level before. These changes seemed irrational and hard to fathom for many farmers, and there was a sense of compounding problems, with not enough time available to solve them. In some cases, farmers were starting to question their identity as food producers.

This global theme of farmer discomfort caused by social pressure got me thinking about the recent increase in awareness of farmer mental health and wellbeing. In New Zealand, farmers have experienced increased stress related to financial and environmental pressures (Bayer, 2018), and there has been a higher rate of suicide in rural populations (RNZ, 2019). Similarly, 45% of surveyed Canadian farmers were found to be suffering from high levels of perceived stress (Jones-Bitton *et. al*, 2020); and 30% of surveyed farmers in the USA said mental health is a major problem for them (Morning Consult, 2019).

There is pressure on farmers to make changes to the way that they do things in order to connect back with their customers beyond traditional value chains. However, the way in which farmers think about and are able to deal with these pressures is critical to their mental health and resilience. Ultimately the way in which farmers think drives their behaviour, and consequently shapes how the food and fibre they produce is perceived by customers.



The purpose of this study has been to better understand how the pressure that farmers are experiencing impacts on their decisions making. My aim was to better link the impact of pressure on subsequent farmer actions. My objective is to show the clear linkage between farmer thinking and country of origin food branding.

I developed this study topic through a four-part process called double diamond design (Banathy, 1996). This involved initially a broad international investigation to discover the key trends going on in agriculture, a definition phase where international interviews and reading allowed me to develop the problem with logic, and a final delivery phase in writing this report.

I see there is a need for farmers to embrace new ways of thinking in order to move forward in a positive way at both a personal and societal level. I think that in order for us to make successful change in food production systems, and recognise human wellbeing at the centre of this, we need to think more about how we are thinking. I believe that in order to deal with the change currently effecting food producers, we will need to think our way to success rather than simply produce our way to it; this report explores this idea.

There are parallels with sports and business psychology and I have leaned heavily on the recognised work of New Zealand forensic psychologist Dr Ceri Evans. My international study provided me with a context to better understand the problem, however I have deliberately chosen relevant New Zealand experiences to align my thinking with real life examples that I believe New Zealand farmers and our primary sector can relate to.



2.0 Background

2.1 Understanding the problem

I started this Nuffield Scholarship thinking that the answer to our future prosperity as New Zealand farmers was a technical problem. That the solution lay in connecting the everyday practices we use to produce and harvest food and fibre, with a compelling marketing story to our customers. I felt that because New Zealand was sufficiently different in landscape, cultural identity and production system, we must have a unique origin story that would set our food apart from others around the globe, attracting the price premium we all desire.

After 18 weeks of global travel collecting insights with farmers, marketers, regulators and customers, and 12 months of thinking, reading and reflecting, I now believe that while origin stories are important and likely to be part of our future prosperity; in fact better understanding how farmers think and behave currently is the first step before any change can occur.

What I discovered through many conversations during this scholarship, was a common thread of frustration, fear, and deep concern about where agriculture is heading. The theme I have settled on to best describe this is pressure. What struck my interest was how this pressure was influencing farmers thoughts and behaviour, especially at the collective level.

One of the most useful insights in shaping this report was the suggestion to review the recent history of the All Blacks rugby team and how they have developed their skills to cope with pressure. This led me to the work of Dr Ceri Evans, a recognised New Zealand psychologist who has made an important contribution to changing the All Blacks approach to thinking about how they think.

The book, "Perform under Pressure" (Evans, 2019) allowed me to recognise and better understand the challenges many farmers were experiencing during my international study. Evans explains that "because the mental world seems hard to comprehend, many people don't make an effort to do so. The very thing that is most variable, and has the greatest impact, is often the least pursued".

As a farmer, I find myself at the coal face of a changing agricultural landscape, uncomfortable under pressure, concerned about "how I think", and what that means for the food I produce. I am curious about the opportunity that exists for New Zealand agriculture to be more aware of its thinking and subsequent behaviours. This is not a subject well explored within agriculture and one I found limited material on internationally.

I feel that if we are to succeed in developing a vision for New Zealand food and fibre that sets us apart in the world, the subject of "how we think" must be a foundation of it. The approach of New Zealand rugby has been that "better people make better All Blacks". In other words, focus on the person and the game will follow. I would like us to consider this in the context of big picture agricultural change, are we focusing enough on developing a resilient farmer so that a transformed farming can follow? Are we open to thinking differently in order to support change?



2.2 The state of farmer mental health and resilience

2.2.1 Mental health and wellness trends

Mental health has recently become an important topic in agriculture globally. This follows a trend of increasing awareness about the role of mental health and wellbeing to society in general.

The negative stigma attached to speaking about mental health is now being actively discouraged as a greater understanding develops about disease such as depression and the tragic realities of suicide. "It's ok to not be ok" is a campaign developed in the UK designed to break down this stigma through encouraging people to share their struggles. In New Zealand agriculture, dryland farmer Doug Avery has raised awareness of mental health struggles as he personally dealt with drought and built resilience into his farming business through innovation.

Nuffield Scholar Aaron Naik found in 2015, that "farming communities across the world are struggling with issues of stress and mental ill health and the pressures faced by farmers appear to be increasing".

Statistics about farmer mental health show concerning trends and highlight that this part of our society often lacks access to the critical support networks required. A 2015-16 survey of Canadian farmers found that 45% could be classified as suffering from high levels of perceived stress, 58% met the criteria for anxiety classification, and 35% met the criteria for depression (Jones-Bitton *et. al.* 2020). A similarly timed survey commissioned by the U.S.A. Farmers' Bureau, found 30% of farmers surveyed identifying mental health as a major problem for them, 48% of rural residents said they were experiencing more mental health challenges than a year ago with younger people being the most vulnerable, while 91% of farmers/farm staff said financial issues and fear of losing their farm impacted on their mental health (Morning Consult, 2019).

More recently in New Zealand, a survey in 2018 of critical topics to rural New Zealand by Bayer titled "The state of the rural nation survey" found similar trends. Of the 260 respondents, 70% felt increased stress over the last 5 years to 2018. Financial pressures were the leading issue for 54% of respondents, with 49% citing environmental factors that affected their work and livelihoods as the second most important issue.

One of the significant challenges in agriculture is isolation. An Australian study highlighted "remoteness is a significant factor in mental health and wellbeing of farmers, more so than financial stress, rural factors and recent adverse events (Brew *et. al.* 2016).

Naik's study explained that "Mental health in farming must be tackled both 'upstream' and 'downstream'. In addition to downstream approaches supporting people in immediate or emergency need, farmer populations upstream also need to be targeted with preventative awareness-raising measures".

In New Zealand, Farmstrong has been developed to address farmer wellbeing and in my experience talking to professionals in this subject area internationally, is very highly regarded. This well profiled and professional program focuses on putting the five factors of wellbeing; to connect, give, take notice, keep learning, and be active, into everyday language and culturally acceptable examples for farmers (Farmstrong, 2020). Resources are available for farmers to develop a better understanding of the



foundations for wellness, such as diet, exercise, sleep, accessing help and health support, and healthy thinking.

Data compiled by DairyNZ as part of its own wellness program in the New Zealand dairy sector, highlights some of the challenges. It reports that of participants in its health pitstops (run alongside extension events around the country), 25% report levels of exhaustion, 9% are disengaged with their work, 76% have waist circumferences indicating they are overweight and 55% admit to taking on-farm safety shortcuts (Carver, 2020).

2.2.2 Resilience

The area I am most interested in with relation to the effects of pressure on farmer thinking is to better understand the concept of resilience with respect to how this supports improved thinking patterns. There are mainstream examples of such research, e.g., Dweck (2017) identified that a growth mindset is indicative of a type of resilient thinking; and Duckworth (2019) developed the theory of GRIT as an indicator of a type of resilient thinking leading to greater success. However, both these cases lack the agricultural context that reflects the current pressure demands on farmers.

Resilience is the ability to “thrive in the face of adversity” and is a learned process that can help protect against occupational stresses and mental illness (Jones-Bitton *et. al*, 2020). The Stockholm Resilience Centre describes it as “the capacity of a system, be it an individual, a forest, a city or an economy, to deal with change and continue to develop. It is about the capacity to use shocks and disturbances like a financial crisis or climate change to spur renewal and innovative thinking” (Moberg & Hauge Simonsen, 2011).

Limited data exists around the subject of farmer resilience. A 2019 scoping review of research trends in farmer's mental health identified only 20 out of 341 published papers on the study of resilience during the period 1979 to 2017 (Hagen *et. al*, 2019).

I was fortunate to interview research leader Dr Andria Jones-Bitton who has conducted work with Canadian farmers to better understand their resilience. Her view is that “addressing the gaps in understanding of mental health and resilience amongst farmers is key to supporting agriculture and food systems”. Her study identified a resilience score in Canadian farmers lower than general population norms identified through similar studies in the US. (Davidson, 2018). In my opinion, this indicates that farmer resilience is potentially not of a sufficient level to help manage the pressures of change occurring in agriculture today.

Studies of rural societies in New Zealand by AgResearch also highlight the importance of resilience. They “suggest that resilience not only includes an efficient return to normal” such as after an adverse weather event for example, “but can also provide the basis for community transformation and renewal, with some changes pushing systems to thresholds which require significant change, not just minor adaptations” (Smit & Wandel, 2006).

I think there is a need for a better understanding of resilience thinking at a primary sector level in New Zealand. There are resources which cater to everyday challenges of farmers working within their business (i.e., the Farmstrong toolkit). My concern is how resilience thinking could be a critical element



to successfully working on the business, at the transformation level. We need new and innovative thinking to move rural communities' forwards; away from vulnerable and flawed systems, and into new approaches which will secure the future of agriculture. Can this be achieved in an environment of pressure?



A visit in April 2019 to Beeswax Dyson Farming in the UK provided insights into resilient thinking for my Global Focus Program Group.



3.0 Discussion and Findings

3.1 The five elements of pressure

Farmers today are facing a future of increased complexity arising from new regulatory requirements such as New Zealand's Zero Carbon Bill and changing consumer awareness such as the concern with meat consumption and its link to methane emissions. The challenge is how to balance the needs of the planet with the needs of the people, while at the same time achieving economic prosperity.

Agriculture receives criticism for its degradation of soils, contribution to climate warming, use of animals, exploitive consumption of water, lack of biodiversity, and overuse of chemicals and genetic modification. At the same time, agriculture is critical for supporting the planet's growing population, solving the challenges of malnutrition and food insecurity, and supporting continued urbanisation.

There is a spectrum of solutions proposed to fix the problems of agriculture. Some propose the mass-production of synthetic food protein, rendering many current agricultural production systems obsolete. Others advocate regenerative principles; a return to small family farms, low intensity, organics, carbon farming and a simpler and more "connected" way of life.

In the middle of this lies today's farmer; isolated, confused and feeling judged. Once considered a noble profession, farmers now often feel like they are under the microscope and those doing the scrutinising only have half the facts. The result of this situation is farmers are under pressure. They have more to respond to than there is time, money, or that current technology allows. For some, they are overwhelmed, and this is reflected in their mental wellbeing.

Throughout this report I use the word pressure to describe how these following five factors, ultimately combine to challenge how farmers think and behave. These factors are *uncertainty, high stakes, small margins, fast changes* and *judgement* (Evans, 2019).

This concept of pressure is important, because the discomfort it creates directly challenges farmer's ability to cope with and overcome the problems confronting agriculture.

In agriculture, we have developed many robust systems to overcome some of these pressure factors in our day to day lives and businesses. Many farmers have developed technical skill sets in response to the pressures of low margins, uncertainty and high stakes and they have become comfortable managing this level of pressure. We manage uncertainty in markets through hedging for example, or uncertainty in the weather through irrigation, crop rotation and stored feed. We manage high stakes through careful business planning, attention to debt to equity ratios, mixed business models, and using reputable 1st tier financiers. Small margins are managed through our low costs of production, scale and cooperative type manufacturing and sales models.

However, the world has evolved, and the rate of current change is unsettling, especially as technology allows traditional business models to be disrupted and replaced. Social judgement through new social expectations, scrutiny and fear of political consequence is changing the pressure gradient for farmers. Many farmers, growers, producer groups and marketers I interviewed spoke of the emotions associated with fast change and social judgement. They talked about the expectations they felt society now has



of them. How they were feeling scrutinised now for what they were previously encouraged to do, and how the consequences of past management decisions form the perceptions of agriculture today. Their circle of concern has grown larger while their circle of control and influence has shrunk. They have become more uncomfortable and, in many cases, lack the tools to manage this.

Evans (2019) explains that "if we are intent on realising our potential, we have to accept pressure". He points out that most pressure arises from possible judgements. This helped me to better understand what I had heard from interviews with farmers and growers around the world, and what I was witnessing and feeling here in New Zealand about the change required within agriculture. My observation is that the social pressure (which is judgement), is difficult to process for farmers because it's a relatively new experience.

Historically, farmers have adopted a mindset (like many other businesses), that growth is the answer. However, as growth is now being constrained by new regulation, finance, consumer pressure, and an unpredictable climate, farmers require a different mindset. To develop this mindset, farmers need to better understand how their thinking and wellness connects with their actions, and how their actions will shape the food and fibre they produce. To successfully bridge the gap between consumer and farmer, *resilient* thinking skills are at the heart of the matter.



3.2 The challenge of thinking differently

The recent Situation and Outlook Report for Primary Industries in December 2019 identifies strong growth across the different parts of the primary sector (Table 1) in New Zealand, continuing a positive trend since the dairy downturn in 2015.

Table 1. Primary industries export revenue 2015-21 (NZ\$million). Source: MPI, 2019

						Actual	Forecast
						2019	2021
	2015	2016	2017	2018	2019	2020	2021
 Dairy	14,050	13,289	14,638	16,655	18,107	19,630	19,450
 Meat and Wool	9,000	9,200	8,355	9,542	10,176	10,430	10,680
 Forestry	4,683	5,140	5,482	6,382	6,883	6,000	6,600
 Horticulture	4,185	5,000	5,165	5,392	6,111	6,400	6,530
 Seafood	1,562	1,768	1,744	1,777	1,963	2,090	2,210
 Arable	181	210	197	243	236	260	255
 Other primary sector*	2,417	2,714	2,639	2,709	2,852	3,060	3,140
Total	36,079	37,323	38,220	42,700	46,329	47,870	48,865
% Change year on year	-6.8%	+3.4%	+2.4%	+11.7%	+8.5%	+3.3%	+2.1%

Source: Stats NZ and MPI.

* Other Primary Sector Exports and Foods includes live animals, honey, and processed food.

This is in stark contrast though to how farmers are feeling (Figure 1). A recent survey by Rabobank highlights the concerns dairy farmers have particularly, for the impending government policy changes that will impact on the domestic economy.

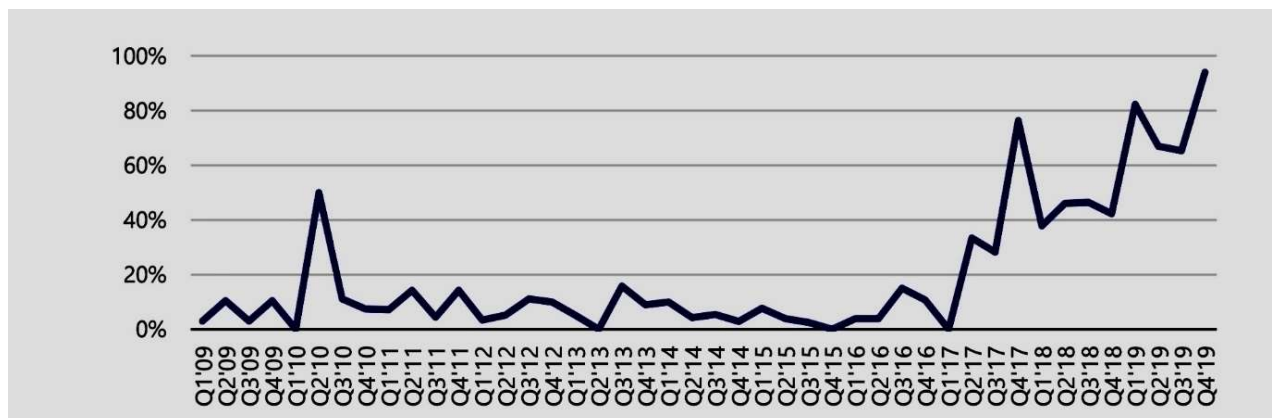


Figure 1. Percentage of dairy farmers attributing their expectation that the economy will worsen over the next 12 months to government intervention/policies. Source: Higgins & Lefroy, 2020

3.2.1 The old model

Traditional economic theory has focused on productivity and growth as measures of creating additional value to a society. Farmers have readily accepted this challenge endorsed by a knowledge that additional production from the land could often be leveraged through a gain in capital value. Market forces have dictated in New Zealand's case, as mainly commodity suppliers of raw and semi-processed products, that we focus on low costs and high volume to maintain a competitive position in global markets.

The structure of this economic system globally has driven many farmers to more intensive production models, often leveraged with bank finance, and more dependent on improving capital land values to underpin viability, and in some international cases, farm subsidies.

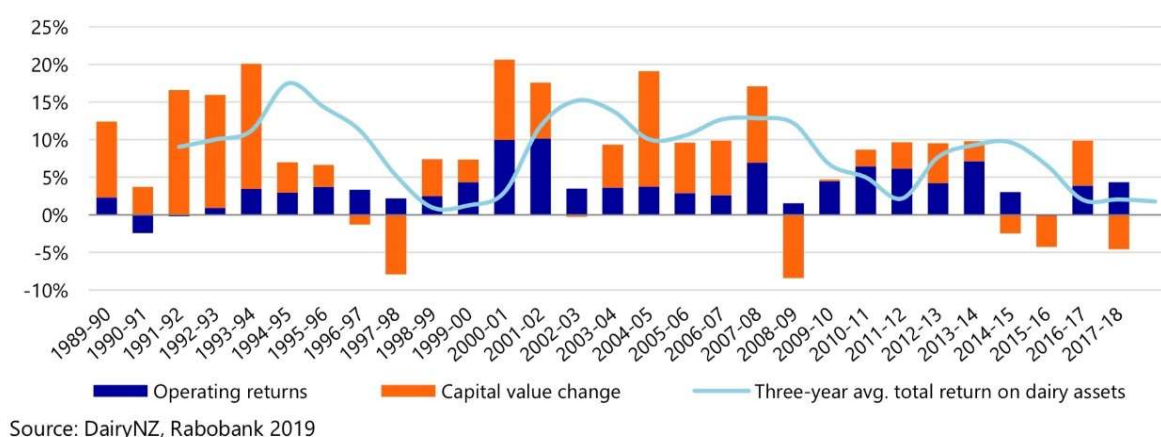


Figure 2. Operating returns and capital gains in the New Zealand Dairy Industry, 1990-2018. Source: Higgins & Lefroy, 2020



Figure 2 shows the situation for New Zealand's dairy sector. Dairy farmers throughout most of this period in New Zealand have enjoyed general freedom in farm practice and have been able to focus on lower cost production models than other parts of the world, while enjoying strong capital gains. These lower cost models have at times traded on heavy use of the surrounding environment and people. For example, water quality degradation, landscape change, intensive outdoor winter grazing, and poor employment practices have had negative impacts on dairy farmers social perception over the last 10 years in New Zealand.

The challenge is that lower cost models have given farmers a sense of control. There has been more certainty (and hence more comfort) in controlling their destiny with cost control suggested Klompenhouwer (personal communication, 9th July 2019). A focus on volume of production has helped to underpin land values. Fonterra's recent asset write downs have reflected the riskier path for farmers of added value consumer brands in faraway markets (TDB Advisory, 2019).

The challenge now is that society is less accepting of the old model, and increasingly it is recognised as not sustainable for our planet. While the old model managed small margins, uncertainty and high stakes in a relatively acceptable and proven way, it cannot manage the fast changes and judgement farmers receive today. So, what is the future?

3.3 A possible future?

In New Zealand, there has been talk for some years around our need to better develop an Origin brand or story. This supports a common political view around shifting more of our produce from a volume focus to one of value.

There was concern when Origin Green was launched in Ireland in 2012, that we had been beaten in the race to position our own story in the global marketplace. For a long time, we have traded on the natural and geographic advantages our country has, such as our landscape, bountiful freshwater, clean air, and our remote and adventurous location, relatively isolated in the South Pacific. But we have not branded across the primary sector in a collaborative way.

Various sectors of food and fibre have developed their own strategies in an effort to align producer practices with social and consumer needs. The dairy sector launched Dairy Tomorrow in 2017 to provide focus and aspiration in the pre-processor space (Dairy Tomorrow, 2017). However, this sector strategy did not interface directly with the consumer. In 2018, Beef and Lamb launched Taste Pure Nature, an effort to align the story of its unique product, across multiple processors, with the consumer in selected markets (Taste Pure Nature, 2019). Horticulture New Zealand is currently refreshing their own strategy but only acts in the pre-processor space also (Horticulture New Zealand, 2020).

When the Labour-led coalition Government was elected into power in New Zealand in 2017, the Minister for Agriculture, the Rt Hon Damien O'Connor voiced a need to unite around a common vision for our food and fibre. A Primary Sector Council was appointed in 2018 and tasked with providing strategic advice. A vision for the future of New Zealand agriculture, titled "Fit for a Better World", was released in November 2019 (Fit for a Better World, 2019). For the first time in New Zealand's food production history, it seeks to provide a coordinated approach to defining our own Origin Story.



Fit for a Better World aspires to “an enriched future by providing the world's most discerning consumers with outstanding, ethically produced food, natural fibres, drinks, co and bioproducts, all sourced from our land and oceans”. It aims to “embrace the Māori concept of Taiao, a deep relationship of respect and reciprocity with the natural world”. It is a commitment “to meeting the greatest challenge humanity faces; rapidly moving to a low carbon emissions society, restoring the health of water, reversing biodiversity loss, and feeding our people” (Fit for a Better World, 2019).

Personally, this is a vision that I agree with. It aligns with the values we hold in our own family business. It is something I would be proud as a New Zealander to share with the world. In a world where many country's hold an advantage over New Zealand in productive capacity, we need to promote ourselves and our products differently. This is a platform to achieve that.

However, there is a significant gap between the model operating today and this vision, and therefore the challenge is how to transition to a new model with confidence. Farmers and growers feel uncomfortable under the pressure of the need for fast change and are also wary of the high stakes of getting it wrong. I observed many instances throughout my travels where the pressure of circumstances has forced farmers to change their systems. For example, the retiring of one million acres in California's central valley from irrigation due to perceived water shortages; the struggles of Argentinean farmers through repeated hyperinflation and political uncertainty; or Irish beef farmers left struggling with low UK demand from the effects of Brexit. There are challenges for Dutch dairy farmers too, grappling with nitrogen limitations and intense scrutiny of their production systems, or the mid-western US grain farmers, suffering yet another difficult harvest on the back of low prices, trade uncertainty, and extreme weather variability.

There are real challenges ahead for New Zealand agriculture if we want to achieve success in the vision outlined in “Fit for a Better World”. The problem is how we cope with the pressure and move forward towards a united goal.

Collectively, we need to understand what types of thinking strategies are required during a period of significant pressure? How can we function collectively, focused on the challenge of developing a better food and fibre sector, when there is a very real threat of failure?



3.4 Identifying with Pressure, The All Blacks example: Changing mindset to achieve performance

In 2007, the New Zealand All Blacks crashed out of the Rugby World Cup against France in the quarter finals. It was a shock defeat for this well-regarded team, leaving New Zealand rugby fans disillusioned.

The All Blacks had been favourites, with highly talented players, and a strong record of performance leading into the event. But under the sort of pressure experienced in a World Cup, they found themselves uncomfortable.

In the subsequent internal review, the All Blacks identified their thinking and coping mechanisms under pressure. The team identified they were making poor decisions which could be described as HOT; Heated, Overwhelmed and Tense (Kerr, 2013).

The All Blacks needed to develop new skills. These were skills beyond their technical play making ability, they were about how they reacted in the moments of pressure, and the subsequent decisions they made. The players described it as "controlling our attention" (Kerr, 2013).

Jump forward to 2011 and the All Blacks were victors against France in the World Cup final 8 points to 7. While spectators were choking under the pressure of yet another possible defeat, the All Blacks were thinking differently. Collectively, they were making cool decisions; logical, fact based, and rational (Evans, 2019).

The All Blacks repeated their world cup victory in 2015. The team have moved away from HOT decision making and are now recognised for their strength in "thinking about their thinking". As Rassie Erasmus, the South African Rugby Coach recognised after the Springboks drew with the All Blacks in a 2019 match, "They are the world's number one team, they're the benchmark" (RNZ, 2019).



3.5 The trouble with HOT thinking in NZ agriculture

This subject of “thinking about how we think” is called metacognition. It is higher order thinking that enables understanding, analysis, and control of one’s cognitive processes, especially when engaged in learning (Dictionary, 2020). The All Blacks recognised their thinking under pressure was heated, overwhelmed and tense. They were acting as though under threat, and this was triggering natural survival instincts in their brains often referred to as fight, flight or freeze behaviours (Evans, 2019).

In New Zealand agriculture currently, often the reaction to the threat of change and increased pressure is similar HOT thinking. Collectively, these instinctive behaviours, with us from birth, can limit our performance. They are a natural human response to keep us comfortable, safe, and alive (Evans, 2019). The trouble is that aggression and confrontation through our natural fight responses can shut down dialogue, negotiation and ultimately the opportunity for achieving positive outcomes. Think how critical this is when we need to engage with someone who doesn’t understand agriculture and the problem we face.

The flight response only puts off facing the reality of the situation; we can run but we can’t hide. How does society perceive us when we are fleeing from our problems in agriculture? Do they think we don’t care?

Perhaps most challenging of all, especially for a country driven to make change and further its position as world class agricultural producers, is we freeze and end up in a state of inertia unable to see the bigger picture.

I see that this situation of pressure and HOT thinking can work as a negative feedback loop (Figure 3).

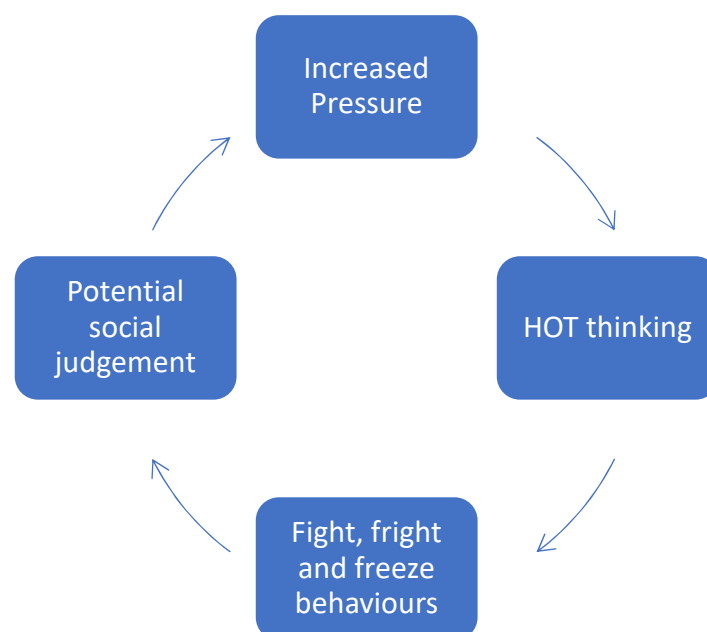


Figure 3. The cycle of pressure



3.6 Are the brains of farmers wired differently?

In order to understand the farming brain, we need to recognise historical and genetic factors which set farming society apart from the general population. The prehistoric emergence of farming was a result of the Agrarian Imperative; a basic human instinct that is the purposeful drive to acquire the territory and resources necessary to undertake agricultural activities that lead to the production of food, fibre and renewable energy (Rosmann, 2010).

This innate drive to work the land and produce food is "in the blood" of farmers. It pushes farmers to take risks in the pursuit of their farming objectives; however, this same drive is associated with a deep sense of failure and depression if the objectives are not met (Naik, 2015).

Rosmann (personal communication, 7th October 2019) suggests there is some evidence that through common genetic markers, and the selection over long periods of time towards certain behavioural traits, that farmers are programmed to want to hold onto their land at all costs. They have therefore evolved to be more alert to threats. Rosmann (2010) found that farmers in the mid-west of the USA were more likely to respond strongly to perceived threats than the general population.

People engaged in agriculture may also be more likely than people in the general population to possess a genetic tendency for behaviours associated with Attention Deficit Hyperactivity Disorder (ADHD) (Rosmann, 2010). "People with ADHD have high energy, and tend to need less sleep than most people, yet they remain vigilant to detect opportunities, they are more likely to take risks and push themselves to their limits" (Rosmann, 2016).

His view is that when farmers perceive their livelihoods are under threat, many will work to a point of fatigue and it is this fatigue that predisposes them to a risk of depression. "Repeated episodes of alarm exhaust our bodies and minds and reduce our production of beneficial hormones. We may begin to feel we have few options and lose hope. In short, we become depressed" (Rosmann, 2016).

Farmers not only work their land, but also live there. In many cases, farms have been passed down through generations. The farm is an annex of, and inseparable part of the farmers identity; therefore, the threatened loss of the farming operation is incredibly stressful. This stress is of a magnitude equivalent to the death of a parent, and close to that of the death of a child (Rosmann 2010). The stakes are high, but also our reaction to the stakes predisposes us to greater risk of mental illness, especially without wellness and healthy thinking.

3.7 Can we control how we think?

The brain interprets pressure in two ways, either as a threat, or as a challenge. It is important to recognise that we need the threat response. It is critical to keeping us alive. But in order to perform under pressure we need the skills to identify false threats and switch our state of thinking to developing internal challenge (Farmstrong, 2018).



3.7.1 The Brain

The brain consists of three main parts, the brain stem, the limbic system, and the cerebral cortex (Figure 4).

At the base of the brain, the brain stem runs the automatic functions of our body (we don't need to think about them).

Our limbic system is where our emotions are regulated, and where we detect threats. It's a part of our brain that doesn't have easy access to language, but it influences our behaviour through motivation and reaction. This is why talking about how we are feeling is so difficult but responding to how we feel isn't.

The cerebral cortex is the outer part of our brain and is broken into two hemispheres, the left and right. This is where we merge our feelings with our thinking. While both hemispheres work together, our right brain is more strongly connected to our limbic system than our left brain (Evans, 2019). In other words, we are designed to act before we think. This is simple evolution, we are programmed for survival first, logical thinking second.

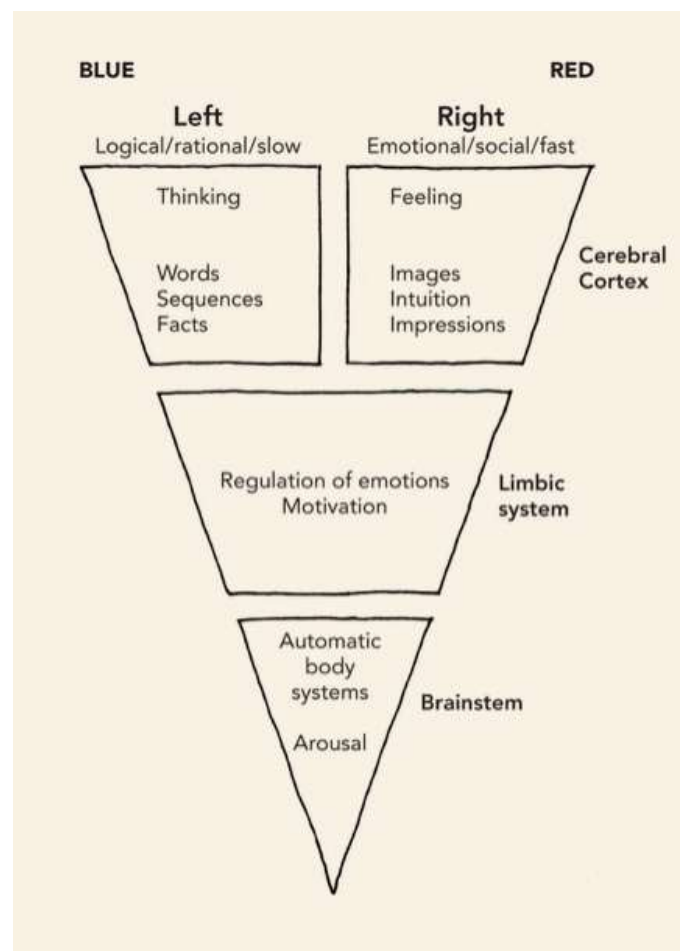


Figure 4. The human brain, structure and function. Source: Evans, 2019.



Our brains are programmed to seek comfort over discomfort; however, this comes at the expense of performance (Evans, 2019). In order to perform under pressure, we need to work towards becoming comfortable with uncomfortable truths and perceptions. Evans (2019) developed a model of RED and BLUE thinking which describes how we think under pressure.

3.8 A model for thinking - Red and Blue Brain

This model helps put “pressure” in context – pressure triggers our reactions and there are two ways to consider it: Threat, where we cross our tolerance threshold; or challenge, where we build resilience. These two responses have very different outcomes.

3.8.1 RED Brain vs. BLUE Brain

The RED mind is our brain stem, limbic system and the right hemisphere of our brain. It is designed to run our organs and body, sense immediate threats and emotional stimulus around us, and above all keep us alive. “The RED system regulates our emotions, and since our emotional self-control directs our behaviour at all times, the RED system sits at the forefront of how we experience the world around us” (Evans, 2019).

The BLUE mind is our left hemisphere where logical and reasoned thinking occurs. “This system is responsible for higher mental functions such as prioritising, planning, abstract thinking, decision making, goal setting and problem solving” (Evans 2019).

3.8.2 Performing under pressure

The RED brain is primarily concerned with “feeling”, while the BLUE brain is focused on “thinking”. The RED brain is fastest, working in the 10's of milliseconds, the BLUE brain is slower, working in the 100's of milliseconds. This is a key point we need to be aware of when considering our actions under pressure (Figure 5).

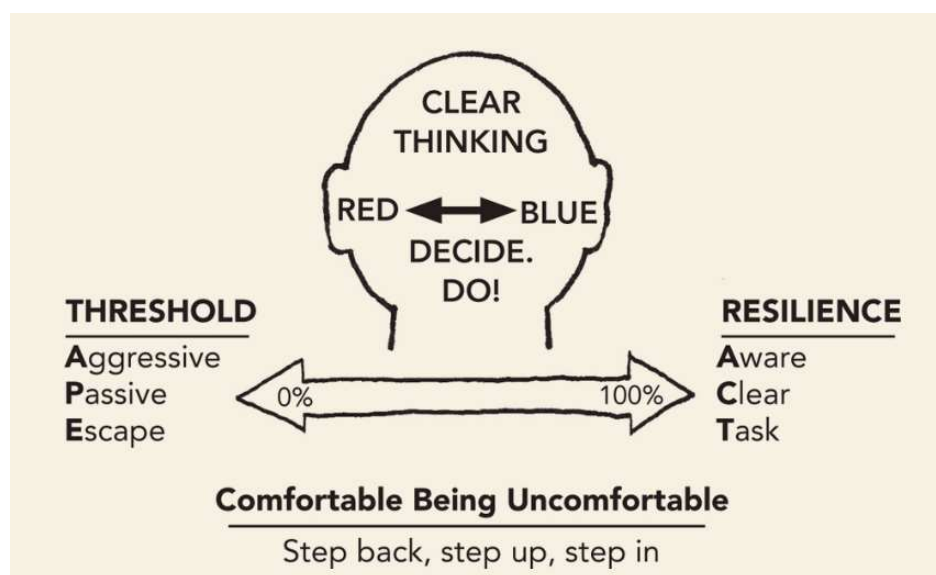


Figure 5. The RED-BLUE model. Source: Evans (2019).



Evans (2019) describes the fight, flight and freeze response as “going APE”; and the role of social judgement as Expectations, Scrutiny and Consequences, or “ESC”. He describes how this works via the acronym ESC-APE – expectation scrutiny and (fear of) consequences drive aggression, passive and escape behaviours. Naturally we are trying to avoid this situation.

When we set a challenge (using our BLUE brain), this consciously requires our minds to stop and think logically. This type of thinking is described as Aware, Clear, Task orientated thinking (ACT) (Evans 2019).

Evans recommends that to perform under pressure we need to **step back** for a minute and get some context of the situation, what's our intention. Once we are clear then we can **step up** and make a commitment to the challenge, this is our motivation. Lastly, we then **step in** and take action, this is our priority. He describes intention, motivation and priority as (IMP)-that together with ACT focuses the Blue brain (IMPACT). This is the key is to shifting external factors to internal ones, creating self-control.

In order to build control, we need to be aware of our triggers and conscious of what frame of thinking we are in. Are we HOT (Red) or in the Cool (Blue), what is our mindset? We can all identify with expectations, scrutiny and (fear of) consequences. In the dairy sector particularly, we feel the expectations placed on us to do the right thing for water quality, we are aware of the scrutiny lobby groups and media have placed on us. We only have to look at the Draft Policy Statement on Freshwater to be afraid of the consequences (Ministry for the Environment and Ministry for Primary Industries, 2018). Consequently, the risk is that our reaction is to go APE. We need instead to activate our Blue brain so that we can move into the space of challenge acceptance.

The important message is that it requires awareness in our ourselves. A better understanding of how we naturally think, and for farmers, what's unique about how we think and behave.

3. 9 Using the Red and Blue model of thinking in agriculture

In my opinion, Evans' model can be powerfully applied to agriculture because it gives us a means to explain how we feel using the science of the brain and thought processes. In this model is a place to find common ground around something we all share, how all people think and ultimately behave.

The confrontation of challenges we face through change in agricultural practice is too often fuelled by emotion as a means to drive action. Social media platforms have provided a wonderful emotional lever. But as Evans model explains, they drive the wrong sort of action. A place to jump straight to *aggressive, passive and escape* behaviours.

Often, agriculture will provide a scientific response (or justification) to the emotional argument around a practice and whether there is a need for change. Unfortunately, this too misses achieving the right action because it doesn't start with what we both have in common, how we may be thinking and perceiving a threat.

I liken this situation to a funnel (Figure 6). Pressure across many interweaving factors and actors is swirling around. There is only one way for it to go. It must pass through our brain. What outcome and actions



result afterwards is only something we can determine. This will be based on how we choose to think about the information we are receiving. Are we using our red brain or our blue one?

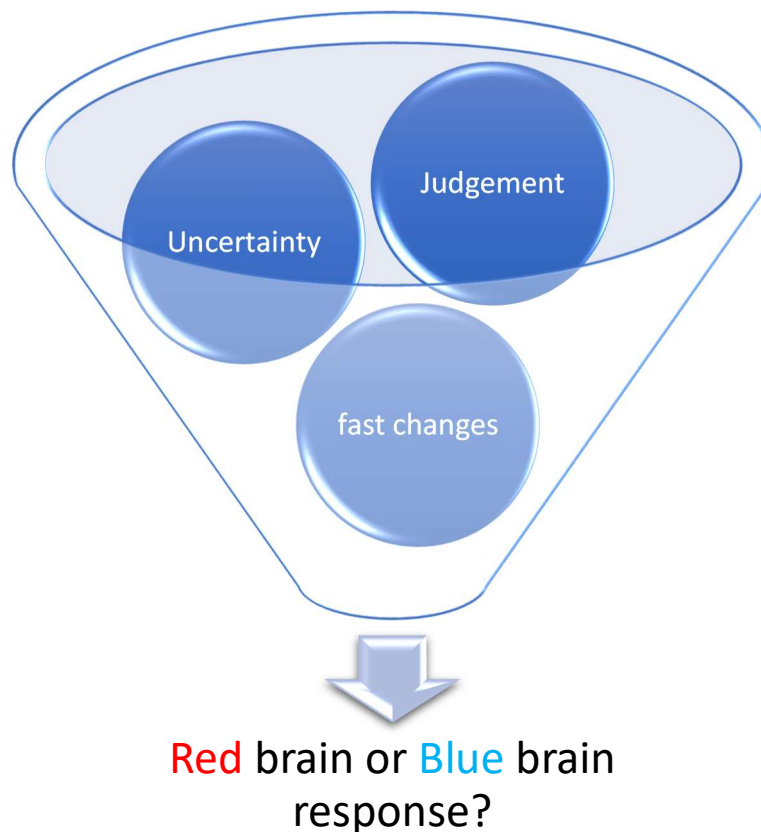


Figure 6. The funnel of pressure

3.9.1 Tools that can help us gain awareness

At the very top of Evans model of the RED BLUE Brain is clear thinking. The simple message is that to shift thinking in response to pressure, this can't happen with a busy overwhelmed mind. We each need to have tools that allow us to gain awareness.

Farmstrong (2020) talks in its resource material to farmers about cognitive switches. Their example of identifying an unhealthy thought is to "catch it, check it and change it". This simple catchphrase is a powerful reinforcement of the "ACT" principle in Evans model.

Evans (2019) comprehensively lists thinking tools to help frame pressure and develop a performance response. For example, techniques to gain focus in the lead up to, immediately before, and during a pressure situation; and methods to review our performance and learn how to respond better next time.



3.9.2 From awareness to understanding

This research has helped me to see that small and simple mind tools are really useful approaches to dealing with pressure from change and how it may influence decision making.

A summarising tool I have created to better understand how pressure affects me is the Awareness, Brain, Context tool or the ABC's of pressure –

- Firstly, we all need **“awareness”** (farmers, processors and marketers, policy and regulators), that pressure has predictable consequences on shaping ones thought processes, and their subsequent actions.
- Facilitating change needs a **“brain”** based approach. We need to use knowledge of the brains' response to pressure to support different communication methods and information flows, appreciating the interwoven nature of pressure surrounding change and the threats that can be naturally perceived.
- Finally, we need to give the threat around the pressure of change better **“context”** by reducing the five pressure factors with an actionable plan. Understanding the “gap” is critical to breaking down the challenge ahead in a less threatening manner.

In my view, the ABC's of understanding how pressure drives decision making helps us to understand pressure at its most basic level.

An additional idea to put pressure in perspective and “breath some awareness” into our thinking, is what I describe as “CPR for thinking clearly”:

- Get clear on the **“challenge”** first – what is the issue in front of me?
- Which **“pressure”** factor is it really driving (e.g., judgement or uncertainty), and what do we know about that factor and the tools we have to control it?
- What **“resilience”** approaches can I use to meet this challenge? What can I control, what can I influence, how can I limit my concern?

3.9.3 Prolonged pressure in agriculture

One of the questions that arises for me from this study is the time horizon of pressure and therefore its intensity. For the farmer or grower, there are daily and seasonal pressures around market, weather, input pricing and staff. But there is also the longer spectrum of “legacy” type pressure for the multi generation family businesses. They are likely hoping to grow rather than diminish the work of those that came before, and to provide the foundation for those perhaps coming next?

What thinking strategies and mindsets do we need to adapt to what could be describe as a period of enduring pressure? Sinek (2019) considers that too often businesses use finite mindsets when explaining an infinite situation. Their actions could only be explained if they were playing a game with known rules and a known end point. But in the game of feeding society, there is no end point, it is infinite, and the rules are changing all the time.

For the farmer or grower, the pressure of change that agriculture is being exposed to is a long-term game. I haven't yet found the examples of what our approach needs to be to this new level of pressure,



other than I am now much more aware that our thinking will be critical to flourishing in this new environment.

To provide an overall context to this report, I have developed the following model to explain healthy thinking's role in connecting the importance of wellness through to the actions that underpin the food we create.

3.10 A Model for Healthy Thinking

The world has many examples of mastery in technical agriculture. Advanced crop rotations for soil health, complex animal breeding programs to develop elite performance, the art and skill in growing the perfect grape for wine. However, the view I have now formed is that our mental and behavioural health skills required to support this technical mastery are not so obvious.

I have developed a model during this study based around my observations (Figure 7). These are that a combination of changes are driving up pressure, effecting farmer thinking, and challenging the actions we will need to be taking to advance modern food production. To be resilient and successful, we need strong thinking underpinned by wellbeing to take the right actions for food that meets the needs of people and planet.

I have considered this model based around a tree metaphor. In New Zealand, we think of trees in our Māori cultural heritage as separating the earth from the sky, allowing the light to shine in. This is the story of Tāne-mahuta. When negative thoughts overwhelm us, it feels like the light goes out. Healthy thinking is focusing on letting the light in.

Depression is a serious problem in global agriculture, and my attempt at a model to explain the role of "thinking about our thinking" should not be interpreted as simplifying this issue. My goal is to contribute to the conversation of mental and behavioural health in agriculture, and hopefully my simple ideas can be built on by others far more qualified in this subject.

Using the tree metaphor, I consider our mind like the trunk. It needs to be strong and well anchored to support our branches. Our branches are the things that connect us as food producers to the world. They are our interactions and behaviours with markets (processors and final consumers), within our communities, with our environment, the soil, plants, animals, water, air, and the people that work alongside us. Our brain and our thinking (the trunk), needs connection through strong and healthy roots. In this model the roots resemble our wellbeing, the things critical to supporting healthy thinking. These roots can resemble exercise, diet, sleep, connection and love, and a cause we give to. Thinking is at the heart of this tree, and the more productive pathways we can establish to feed our branches, the stronger our trunk, the stronger our tree. I call this concept "the resilience tree".



Figure 7. The Resilience Tree Model

3.11 A final reflection

What is clear to me is that agriculture is entering a different environment of pressure on its farmers. Old tools and responses are less effective in this environment. New marketing efforts that provide customer connection and meet changing purchasing habits will require different behaviours and actions in how food is produced. To support this change, we will require approaches to thinking under pressure that have not been common in agriculture before. We are fortunate in New Zealand to have local examples of success from applying these new approaches to thinking under pressure, and trusted professionals who can support us with the tools necessary to make the change.



4.0 Conclusion

Agriculture is entering a new period of change heavily influenced by a better understanding of planetary boundaries, and society's desires for linking nutrition with health and the environment. This study has sought to better understand the pressure that this environment is creating for farmers.

Our tendency in agriculture in the past has been to focus on technical solutions over mental and behavioural ones, however this approach no longer supports a critical element, how we are thinking under the pressure of change drives what we are doing.

I have identified that the pressure farmers feel currently can be better described through understanding the elements that drive it, small margins, high stakes, uncertainty, fast change and judgement.

This report has focused particularly on these last two factors as they appear to be newer for farmers and the methods in agriculture to respond to them, less developed.

I have found that pressure is the roadblock to achieving to our potential. It can overwhelm our logical thinking with fight, flight and freeze behaviours based around perceiving threat.

This study has also identified that farmers are more predisposed to threat triggers than general society through historic selection pressures and some possible common genetic expression. This makes farmers more prone to working to fatigue when facing threat and that this fatigue can make farmers more predisposed to mental and behavioural health issues.

Agriculture is not alone in operating in an environment of pressure and I have incorporated the work of psychologist Dr Ceri Evans to help explain how farmer behaviour under pressure can either be destructive or constructive to dealing with change.

His model of Red and Blue thinking recognises the tendency to react to threats quicker with the emotional part of the brain at the expense of the logical thinking part. Unfortunately, this threats-based approach results in feeding the cycle of pressure. His model offers an insight for agriculture into how changing farmers' approach to pressure, can shift their thinking towards constructive outcomes.

I have recognised that an approach to thinking like this will be a foundation for creating origin stories like the Primary Sector Councils recent vision "Fit for a Better World". Thinking shapes behaviour, decisions and action. It is at the heart of making agriculture successful in a changed world. For New Zealand farmers to reach their potential, they must learn how to perform under pressure.



5.0 Recommendations

5.1 Recognise pressure

I recommend a new approach is required in New Zealand's Primary Sector to recognising how pressure impacts on farmer decision making. Pressure can drive threat and threat will drive behaviours such as fight, flight and freeze that are not constructive to solving many of the problems this sector faces.

Farmers have a heightened response to threat that needs to be better considered in all aspects of change in agriculture. The concept of pressure and its influence on farmer thinking needs to become a central theme when considering farmer behaviour change in this country.

5.2 Respond to pressure

Putting pressure at the heart of change will allow a much greater awareness to be developed around how farmers think about how they think (metacognition). Responding to change under pressure requires a clear head and developed tools to shift behaviours from threat and emotional response to challenge and logic-based thinking.

I recommend the Primary Sector needs much greater focus on building the understanding of how metacognition is pivotal to shifting the debate from emotion to action.

5.3 Learning from within

Learn from those that came before us. All Black Rugby can teach us about their journey to reconcile pressure and build awareness and skills to perform under pressure. The game is different, and the challenges are more complex for agriculture, yet we have a powerful example in New Zealand of how a professional organisation focused on thinking about their thinking to shift their performance to a new level.

5.4 Connect to the big picture

How we think drives our actions and behaviours. This underpins the food we produce, ultimately supporting the characteristics critical to developing a successful Origin Brand. If we are to redefine the crafting of food and fibre in New Zealand around a common story, we must recognise that wellness and action are critically linked through healthy thinking. We need to explain this bigger picture better, wellness isn't a nice to have, it's the roots that ultimately connect our food to the world.



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