How the North West Queensland Beef Industry can Survive and Prosper

A report for

By Colin Burnett

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Executive Summary

The beef industry in north west Queensland (NWQ) is at serious risk of losing future prosperity if basic business management principles, intellectual capital, climate change and the global outlook for beef aren't considered. The following report set out to address how agriculture in the NWQ region can survive and prosper into the future.

Production has traditionally been placed ahead of profit by business owners and managers around the world. This is also present in NWQ. However, this research found that financial profit is key to having a sustainable business. Without this, the business won't be around in the long-term. Moreover, the idea of increasing shareholder wealth is the holy grail to the financial part of business sustainability in NWQ.

This report suggests that business owners need to constantly improve their knowledge base as society changes. This leads into the idea of intellectual capital and how important it is to the beef industry into the future. This report has focused on knowledge that can be brought into the region to improve business performance. Intellectual capital is the first stage of this.

A typical business in NWQ is heavily reliant on both input and output commodity prices. Findings show that hedging against commodity price changes is a major part of business sustainability in NWQ.

Also, there are ways to improve the risk management of the changing and already highly variable climatic patterns across Northern Australia. Agricultural businesses and their management of soils, water, pasture and the environment have an impact on these delicate tropical ecosystems in NWQ.

Lastly, this report suggests that businesses need to address the changing global image of beef and red meat producing businesses. As to how to engage and interact with the community, business ethics and quality of product are major factors in surviving and prospering in NWQ.

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Foreword

My family and I own and manage an 83,000 hectare (ha) beef cattle enterprise consisting of two stations located in NWQ. My brother, sister and I are fourth generation beef producers and our family have been invested in agriculture for about as long as we can trace back. I'm 31 years old with extensive and lifelong knowledge in the NWQ beef industry. I also have a Bachelor of Business, majoring in Marketing.

We have been owners of Lara Downs at Julia Creek since year 2000 and Mt Norman Station at Richmond since 2005. Before that we were located in Central Queensland. We have a proud connection with our land and want to look after it while running a sustainable business.

We are sole primary producers with little in terms of diversification aside from some crossbred cattle, and different soil and pasture types between properties.

After the passing of my father, we all were thrown into a higher level of management within the business. Having identified the weakest parts of our business, I embarked in a journey of personal development striving to solve these. This has led me to become more involved with industry bodies such as Department of Agriculture, and Nuffield Australia has also been a great recent part of that. I decided to study this topic to further our business, other businesses around us and owners and managers within our community.

In the last 12 months, I have travelled to New Zealand, The Netherlands, Ireland, Belgium, France, England, Scotland, Northern Ireland, The Philippines, Singapore, China, Germany, and the USA. Major highlights were visiting progressive businesses in the UK in the height of summer, learning about many aspects and the scale of China and highly sustainable, low cost businesses in countries such as Ireland. I constantly related the different business models from around the world to the ones at home in NWQ.

Acknowledgments

There are a lot of people and organisations who helped me along my Nuffield journey and should be acknowledged.

Firstly, thanks to Department of Agriculture in Queensland (DAF), Bernie English, Joe Rolfe, Rob Caird and Alison Larard, in helping me refine my topic throughout the Nuffield application process.

I'd like to give thanks to my three investors, ANZ Bank, Australian Agricultural Company (AACO) and Consolidated Pastoral Company (CPC), for allowing me to travel the world studying agriculture. They have been helpful in allowing me to travel and interact in agricultural industries in many countries. Without their help, such a study and essential report findings from overseas would be impossible.

I would like to also give special thanks to my family for the support along the Nuffield experience. They accepted my goals in studying global agriculture and my want to bring that knowledge back to our family business. Also, for stepping in and covering my position in the business along the way.

To all the friends, hosts, businesses and Nuffield people I met along the way, many thanks for your help.

In New Zealand, where I spent some personal travel, I would like to give thanks to Jana Fransbach, Mike and Hamish Ryan, John and Judy Duncan and Giles Mclean.

Also, thanks to hosts and friends in Ireland, Northern Ireland, Scotland and France where I went to on my personal travel.

Finally, I would also like to thank my Nuffield mentor Michael Lyons (2015 Scholar) for his help along the way and contribution back to collaboration groups such as Nuffield.

Abbreviations

AACO – Australian Agricultural Company

BOM – Bureau of Meteorology

CSIRO – Commonwealth Scientific and Industrial Research Organisation

CPC – Consolidated Pastoral Company

DAF – Department of Agriculture, Queensland

EYCI – Eastern Young Cattle Index

GDP – Gross Domestic Product

Ha – Hectare

HGP – Hormone Growth Promotant

MLA – Meat and Livestock Australia.

NWQ – North West Queensland

QLD – Queensland

QCCL – Queensland Country Life

TMR – Total Mix Ration

Objectives

This report sets out to identify what is required for the survivability of beef producers in NWQ, and to create a framework for businesses throughout the region to help with this, including:

- To investigate the key determinants ensuring future business survival for farmers in NWQ.
- To investigate how businesses globally manage changes in climate patterns that NWQ can learn from.
- To identify the role of NWQ businesses in their society in relation to consumer demands and ethical standards in order to remain relevant as well as sustainable.

Chapter 1: Introduction

North West Queensland (NWQ) or the Gulf Savannah covers an area of 72,000 square kilometres (Figure 1). The region is defined by a variation of soils with highly variable rainfall patterns. Natural disasters also frequent the region with drought, flood and fires making a major difference to output. Mining, agriculture and tourism are the biggest industries in the region.

Figure 1 Map of Queensland (Source: online)

Through most of the land area, beef is by far the most profitable and practical farming activity compared to broadacre cropping and other livestock such as sheep. As of December 2014, there were 10.5 million head of cattle in Queensland (QLD) with an output of $5.07 billion in the economy (Department of Agriculture and Fisheries, 2015). QLD is the biggest beef producing state in Australia with it being the third biggest export from the state (Meat and Livestock Australia (MLA)). There are also other types of farming in NWQ including hay production, some grain and silage, other livestock including goats and sheep. This is all done in a sub-tropical climate, with annual rainfall all predominantly over summer months with a long dry season.

NWQ beef businesses include breeding, backgrounding and finishing beef systems. Many businesses combine all three providing cattle to a variety of different domestic and export

markets throughout the year. A breeding property will typically be owned with a background one to value-add progeny before selling along the supply chain. Other stations focus on buying in backgrounding stock and growing them to a feedlot or finished size. Some stations also have the capability and flexibility of breeding and finishing stock.

The greatest challenges for NWQ are the climate, population and location to market. Seasonal sub-tropical climatic patterns determine stocking rates, weight gains, breed type of cattle, market price fluctuations and times of the year when a business can sell.

There are also tremendous opportunities in NWQ. There's a large area for growth in the agriculture, tourism and mining industries. New technology, increased farmer knowledge and demand for food is driving business efficiency in the region which could grow the state's GDP greatly. This means there are great future opportunities for farming businesses to diversify and reduce risk. As farming techniques improve, it will attract trained professionals like any developing parts of the world. This will collectively grow the economy and population of rural Australia.

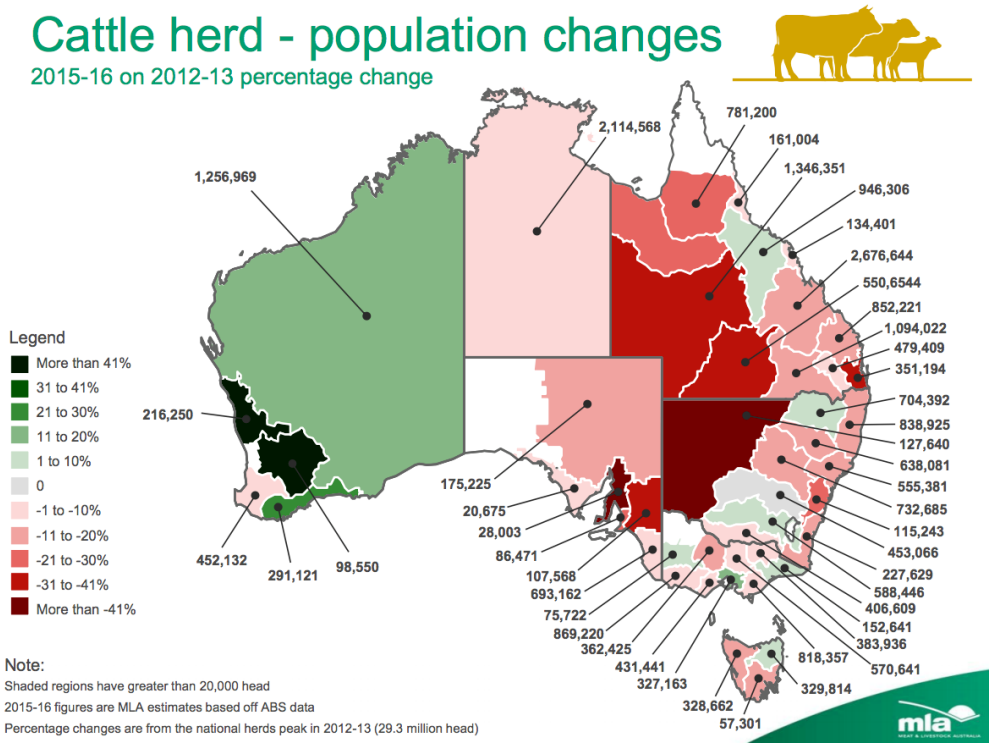

Figure 2: Livestock Grazing in Queensland (MLA)

There is a long, proud history of beef in NWQ. The land and climate are most suited to livestock farming businesses and are both family and corporate owned. To many families, their livelihood is hugely dependant on producing cattle or sheep. Improved financial management,

adapting to climate change and well-considered business ethics are all essential to the business sustainability moving forward in NWQ.

The overall objectives of this report are to identify the key areas that will impact the survivability of beef producers in the NWQ. In order to answer this objective this report aims to investigate the key principles for farming in NWQ to ensure future business survival; to investigate how businesses globally manage changes in climate patterns that NWQ can learn from; and finally, to identify the role of NWQ businesses in their society in relation to consumer demands and ethical standards.

Chapter 2: Principles of Survival

Persistence and adaptation are a major part of farming and grazing in NWQ and key for landholders' survival. It is known that to survive in any business in the long-term, it must make a profit.

Production versus profit

To start, what is profit? Profit is simply income minus expenses in a business after each period. Profit can also be described as 'earnings' which can be used for such things as retained as cash or reinvested into the business.

"To make agriculture sustainable, the grower has got to be able to make a profit" Sam Farr

Globally, there are far too many businesses in agriculture that focus on production instead of profit. This has also been identified as a strong phenomenon in NWQ and is a major hurdle for long-term business prosperity. More production doesn't necessarily mean the more money in the bank at the end of the year. The key is to focus on the profit margin. A profit margin is what's left after expenses are subtracted from income in business over a period. A good profit margin in the northern Australian beef industry is 3% Return on Asset (MLA, 2017). This percentage return is used widely by producers in the beef industry across Northern Australia as a target.

Measuring a businesses' financial performance and utilising data, such as weight gains and calving percentages, collected on farms can support profitable decision-making instead of driving production without assessing the costs. The average costs of production for beef in Northern Australia is 210 AUD cents/liveweight (MLA, 2017). Current tools to support decision-making on farms include financial advisors, apps, financial software packages and grower groups.

Using technology to improve profits

An example of farms utilising new technology to support profitable decision-making are Ryan Farms in New Zealand. Ryan Farms are owned and managed by brothers Mike and Hamish Ryan and families in Southland on the bottom of the South Island of New Zealand. The business has grown rapidly from a 300-acre to 7,000-acre land portfolio in the past two decades. The farm is currently involved in multiple enterprises – sheep, beef, dairy,

contracting and real estate investments. Ryan's are heavily focused on maximising economic profit. This business pointed out that there is a 'stigma' around making a profit and that it is a major misconception in agriculture.

Figure 3: Ryan Farms, Southland, New Zealand (Source: Author)

Data is a big part of how Ryan Farms operate. The focus on data and recording allows them to incorporate dairy farms, a silage contracting business and a residential property portfolio into one farm business reporting system. All these businesses are profitable, and easily traceable weather, physical and financial data is being used to make informed business decisions.

For example, the Ryan's use the NZ-based 'Farm IQ' 'app for a wide range of information such as predicting weather to receiving their results from the meat processing plant to monitoring farm financial performance. This app helps them to optimise their breeding and finishing regimes to suit specific meat processing plant grids. They are then giving the processor and consumer exactly what they want in terms of carcase conformation, meat yield, weight for age and marbling.

Using genomics to improve profit

The concept of sitting down to a perfectly cooked restaurant rump knowing every detail about the animal it came from might not be so far off (Goodwin, S, 2018). As a producer, this might sound like a difficult and time-consuming thing to do. The good news is that it could all be basically done for us, bar pulling a few strands of tail hair on farm.

Genomics is a globally growing science in agriculture. Within the authors business, Lara Downs is currently involved in a project to identify the potential benefits from selecting top perform fertility, eating quality, performance in a feedlot and tick resistance. If you can use genomic

tools to select replacement heifers as well as the physical traits you like, why not use it? It would be good to know if a 'nice-looking' heifer also has top fertility traits to give as many high performing calves as possible.

Growing shareholder wealth by investing in appreciating assets

There are tremendous advantages from focusing on the bigger picture of maximising shareholder wealth, as a direct result of creating more profit in the business. Growing shareholder wealth is essential for business sustainability long term. In particular, companies use a variety of strategies and investment options to maximise the wealth of their shareholders and create value for customers (IAC Publishing, LLC, 2018).

Investing all profits in depreciating assets such as personal cars is not increasing shareholder wealth (Forbes, 2011). Another example of this is buying a house on land. The house will provide income but lose value until it eventually needs to be replaced. Land however will provide cashflow from such things as farming, grazing livestock, tourism or being leased out. Land has also increased in value over the long term as history shows.

'Focus on income producing assets, that will also increase in value over our lifetime, not decrease' Mike Ryan, Ryan Farms, Mossburn, New Zealand

Making a profit and paying tax are goals rather than things to avoid in business in NWQ. This means that profit and tax should be part sound business planning. The managers of Ryan Farms, Mike and Hamish pointed out that there is no business without profits. Profits need to be made consistently for any business to remain viable. A big focus was also placed on increasing shareholder wealth along with realising profits. The main emphasis was put on investing in assets that appreciate. For example, land which typically appreciates over time and livestock which reproduce. Depreciable assets such as machinery, buildings and fencing and yards were minimised. It brought the point to the fore that whatever is built on the land will typically depreciate, decreasing shareholder wealth. They also pointed out that sustainable profits included looking after your land and keeping business ethics in mind at the same time.

Intellectual capital

This report has identified three basic ideas of how NWQ businesses can ensure long-term business survival; being the investment in appreciating assets, using technology and ensuring a strong business focus on maximising profit. To understand and focus on these areas, a high

level of business acumen and intellectual capital is constantly needed by NWQ business owners moving forward. Intellectual capital is possibly the most important finding in this report.

Intellectual capital can be defined as: 'The total value of an organisation's employee knowledge, skills, business training or proprietary information that may provide the company with a competitive advantage' (Investopedia, 2018).

"Knowledge is power". If knowledge is utilised properly it yields money which is power in today's times. A person who is rich and wealthy is a powerful person. Also, from money comes a status which gives one respect in the society. And if one has respect in the society then that person has everything - Francis Bacon

There is significant scale to increase intellectual capital in NWQ as with other countries. On a positive note though, the level of farmer knowledge is increasing at a healthy rate in this region. Producer groups and also younger people coming into the industry from other parts of Australia have improved business knowledge greatly. An example of using intellectual capital well is the increased financial recording, budgeting and measuring ability in NWQ. Young farmers in particular are now using better financial and environmental knowledge to consistently make profits while looking after the environment.

"A key measure of where your business is at is kilograms up the ramp or kilograms of beef that leaves your property every year. Knowing this and the cost to produce those kilos will give you a clear gross margin" Russell Lethbridge, Werrington Station, Einasleigh, NWQQ

If these figures aren't recorded and analysed, a business could perform better or worse than what the owner expected. Benchmarking is important in any business. With climate and market variability, there will be more challenges to profitability in NWQ over the coming decades than possibly ever before. This report has found that the one and only solution to this is business acumen and knowledge. Basic Business training for risk management and cash flow management are good examples of this. There is no better example of this than Longview Farms in Iowa.

Case Study – Scott Henry and family, Longview Farms, Nevada, Iowa

Longview Farms is a typical mid-west farming enterprise producing corn, soybean and beef. Scott Henry is a fourth-generation farmer in the area. The business has undergone a large expansion over recent years by working with retiring farmers to lease their land.

Figure 4 Longview Farms (Source: Author)

This farming enterprise was a great example of how intellectual capital drives success. The whole family constantly improve their knowledge in the specific area of the business that they manage, such as succession planning and expanding the business through new crop technology. There is a great knowledge base now within the team of business owners and managers. They are focused on increasing shareholder wealth using intellectual capital. This means that they are growing their business through firstly improving their knowledge. They use education to run a business and make sound investment choices.

Commodity trading using forwards

Along with many agricultural businesses globally, beef producers in NWQ are highly exposed to global commodity price changes.

"Northern Australian Producers are at the whim of global commodity prices" (MLA Conference, Singapore, June 2018)

Findings also show that there are numerous ways to identify and manage risk when producing large amounts of commodities. A business in NWQ with 2,000 adult cattle for example may have 1,000 tonnes of beef on hand at any one time. The value of this product is highly volatile, changing weekly if not daily. The value of input commodities into the business such as fodder and fuel are highly volatile as well.

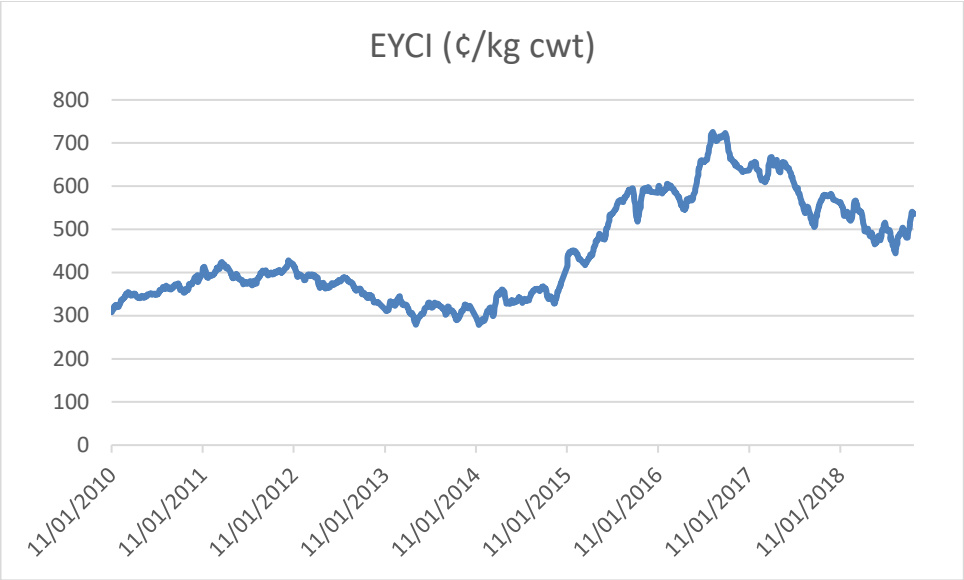

Figure 5: Historical Eastern Young Cattle Index (MLA, 2018)

As seen in Figure 5, the Eastern Young Cattle Index (EYCI) has been highly volatile over the last eight years. It has also been highly volatile over the last decades. This means that essentially, business owners in NWQ are commodity traders. Most time is spent minimising input costs and maximising income from outputs leaving a healthy margin.

"*The volatility of returns in the agricultural sector is more than double the volatility of average returns for businesses in the entire economy, and that includes car manufacturing and food processing*," Mick Keogh.

While sounding quite complex, financial instruments such as forward contracts are simple tools available for managers and business owners to minimise risk and maximise profit in NWQ. A simple example of this is a forward contract to buy fodder needed for the year at a price lower than the breakeven point, ensuring that the business will make a profit from investing in it. For example, recently, there has been a large shortage of molasses throughout QLD due to several factors. Drought has caused increased demand and with molasses already contracted to export, there is a major supply gap. The difficulty of covering this gap year to year is the major variance in domestic demand by farmers year to year. It is impossible to predict demand accurately due to the large variation in the weather. It is however possible to predict how much of an input commodity you will need +/- 50%. Forward purchasing can greatly reduce your variable costs in a business.

Case Study – Meier Farms, Iowa, USA

Figure 6: Meier Farms, Iowa, USA (Source: Author)

An example of a business working well under the pressure of commodity volatility is Curtis Meier Farms in Central Iowa. Curtis and Mike Meier and their family own and operate a mixed cropping and livestock operation. Corn, soybean, pork and beef are the main products from Meier Farms. Meier farms operate a high intensity farming model with a lot of labour going into what is produced. It was surprising when Mike said that he spent most of his time in the office trading commodities. He stated that he normally sold approximately half of his corn crop before harvest at a higher price then up to a quarter during harvest depending on several factors. He used financial instruments such as forward contracts, futures and straight hedges to lower the risk of having to pay exorbitantly high prices for inputs such as grain. This was also the case for selling products they produce as stated previously. As another part of hedging, they had storage for in and out commodities like fertiliser and grain. This gave them options to forward contract and lowered the chance of forced buys and forced sells.

A commodity trading strategy in NWQ is paramount to implement. Graziers spend most of their time researching the market and studying when prices are at their highest and lowest. They also buy hay and cotton seed at its lowest price which is essential for business sustainability.

Chapter 3: Managing Changing Climates

Changing climate patterns are a problem farmers' face globally. Typically, wet periods are getting wetter, and dry periods are getting drier. This is not just a problem for farmers but whole communities. This section discusses climate patterns in NWQ. If the patterns are changing, how much and what will this mean for the future? Mick Keogh, previously from the Australian Farm Institute, says farmers want to be treated as a special case because their industry is so risky due to a variable climate (Keogh, 2017).

The Bureau of Meteorology and Commonwealth Scientific and Industrial Research Organisation (CSIRO) have compiled extensive data using 40 global models to assess climate change across Australia. Their report shows that there are changing climatic conditions in NWQ. For example, data from Trafalgar Station at Charters Towers shows that in recent years there is a longer period of dry weather and longer period of wetter years (Landsberg, R, 2016). In relation to rainfall, NWQ is experiencing five average years (or below average years) followed by five average or above years. Previously, the cycle was one above average year then one below average year in terms of rainfall.

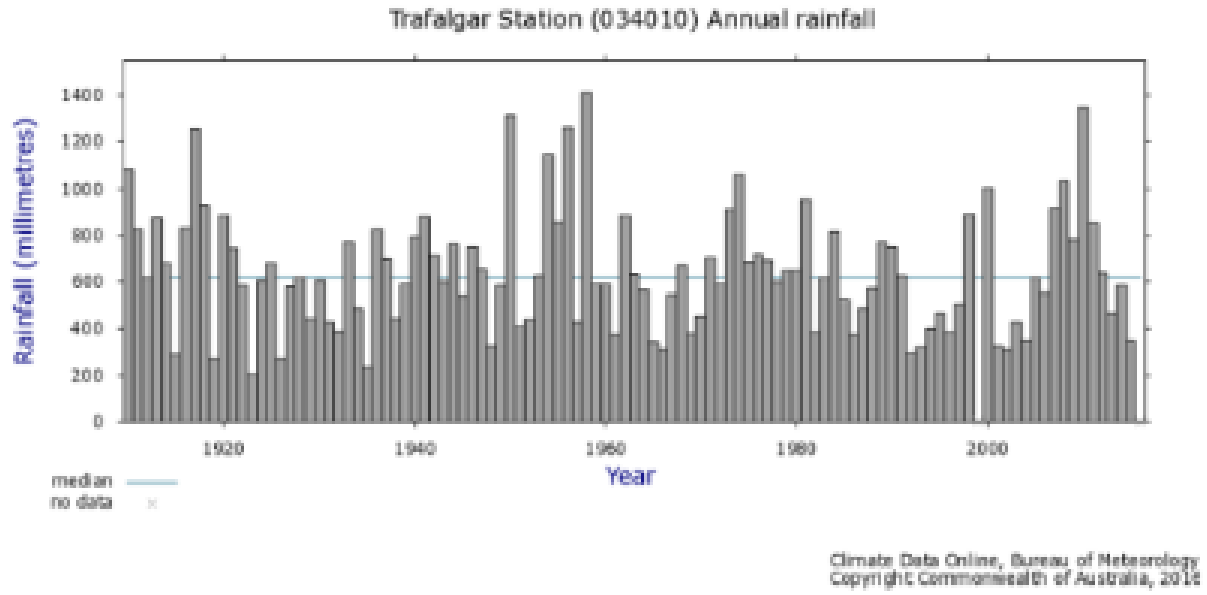

Figure 7: Trafalgar 100-year rainfall data (Bureau of Meteorology, 2016)

Highly-regarded agricultural scientist, Professor Snow Barlow from the University of Melbourne's School of Land and Environment, says agriculture is feeling the effects of a

variable climate, and he's now convinced that climate models can be trusted to forecast warming.

Global warming in NWQ will make it more difficult to farm livestock and also crop land at different times of the year. For example, MLA have found that warmer temperatures have been shown to lead to a production loss in cattle with reduced growth rates.

"If you look at the rainfall patterns, what people forget is that there have been droughts before and there will be droughts in the future, but what we call the evaporative demand - in other words, the amount of water that the atmosphere requires from the plants in order for them to stay alive - increases as the temperature goes up. So, what it means is these droughts can be more intense when the ambient temperature is higher," - Prof. Barlow from the University of Melbourne

The above quote means that as the planet warms up, plants will have less moisture to grow in. If lower rainfall patterns are also experienced, this will make the land less productive and lead to it being more difficult for business to make a profit. If rainfall increases however, as evident is some areas of the world, increased heat could mean the land will be more productive.

Soils – basis of life

Globally, graziers may have less knowledge about soils than arable producers (Baragona, S, 2018). Graziers may know the right stocking rates for their paddocks from experience but not the soil type, composition, moisture holding capacity and mineral base.

Figure 8: Agriculture and soils (Source: online)

A presentation by Plant Health Cure in the Netherlands made it glaringly obvious that soil is the basis of all life. Many graziers in NWQ talk about being grass farmers first, and beef farmers second. NWQ farmers understand the amount of grass they need to grow and keep in reserve to allow for seasonal conditions, but they may not be first and foremostly considering their soil quality. In NWQ, some soil types are already naturally too low in phosphorus and nitrogen levels for sustainable ruminant grazing (MLA, Phosphorous Cycle). Grazing and management techniques need to not just maintain but improve nutrients in soils throughout the region. Studies have shown that feed value in agricultural products is decreasing (Nutrition Security Institute, Figure 9). This is partly due to the depletion in soils that have been farmed for centuries. The startling realisation from this is that degrading soils leads to depleting profits. In NWQ, grazing management should also include maintaining ground cover at all times to retain moisture and mulch in the soil.

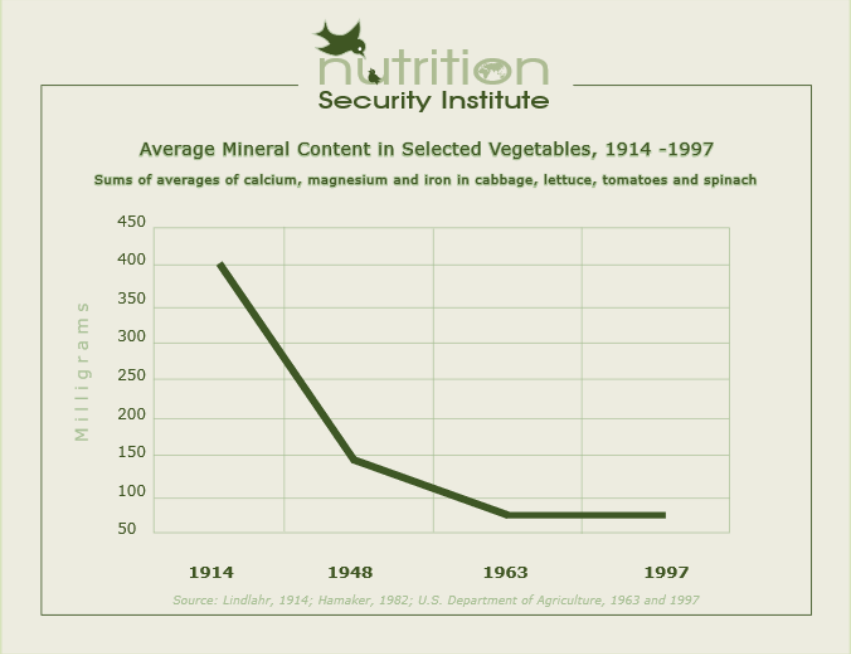

Figure 9: Nutrition in Global Produce, Nutrition Security Institute

Managing tropical grasses

For the best health of a tropical grass plant it needs to be grazed down no shorter than 15cm or six inches. This is a different grazing technique to temperate grasses which grow in different climates such as southern Australia (DPI, 2010). The benefits of this technique include:

- Not removing all the grass biomass. This helps retain moisture and retain nutrients in the soil.

- Drought management. Having a grass reserve to save having to destock quickly in a down market.

New technology such as moisture monitors, satellite ground cover mapping and drones are very helpful in grazing and soil management.

The “Hands Free Hectare” program in England was a trial to understand the role of precision agriculture tools such as drone mapping technology and variable rate fertiliser application and also driverless tractors for optimised grazing management. This technology could be applied to grazing management in NWQ. For example, the typical adage of ‘eat half, leave half ‘ of the grass could be easy to monitor with new technology through assessment of changes in normalized difference vegetation index (NDVI) over time.

An example of this is CIBO labs, an agricultural data analytics company. They use science in remote sensing and machine learning (otherwise known a artificial intelligence) combined with on-farm knowledge to bring new levels of understanding in pasture productivity and land condition.

Mitchell Grass – the basis of business

In NWQ, government extension officers and pasture management specialists describe the essential 3p’s for grasses – they must be productive, palatable and perennial.

Mitchell Grass (*Asterebla spp*) is a palatable, productive perennial grass that is the basis of a good livestock business in NWQ. This is followed by Buffel (*Cenchrus Ciliaris*) and Bluegrass (*Dichanthium sericium)*.

Many properties rely on Mitchell species, however there is little irrigation potential. Grazing management has to be reactive to rainfall patterns and extremely flexible because of the high variance in rainfall.

Case Study: Duncan Farms, Central Otago, New Zealand

Figure 10: Fragile pastures in Central Otago, New Zealand (Source: Author)

Surprisingly, the rainfall in the New Zealand Maniatoto Valley in Central Otago is only ten inches, or 250mm, annually with a winter dominant pattern. This means that the Duncan family have become well adapted to manage grazing of fragile native pastures, particularly on their hill country. They utilise the perennial and annual grasses well by grazing them to a certain height then removing stock until it rains and the grass grows again.

Production feeding – improving a cow's diet

As previously stated, countries such as New Zealand and Ireland typically have temperate grass and legume species like rye grass and clover. Northern Australia's main pastures however consist of tropical grasses and legumes. These tropical species need to be grazed differently and generally have a lower nutritional value due to the structure of the plant. Basically, livestock can't eat as much volume of tropical pastures to meet their daily nutritional needs and require additional supplementation.

Typically, much of the NWQ region has a protein deficiency in pastures throughout the long dry season. Added to that is the poor digestibility of any stalky tropical grass and legume that is left after the grazing off following the main growth season. Generally there is only one growth season for pasture in Northern Australia which can last from April to December (Figure 11) .

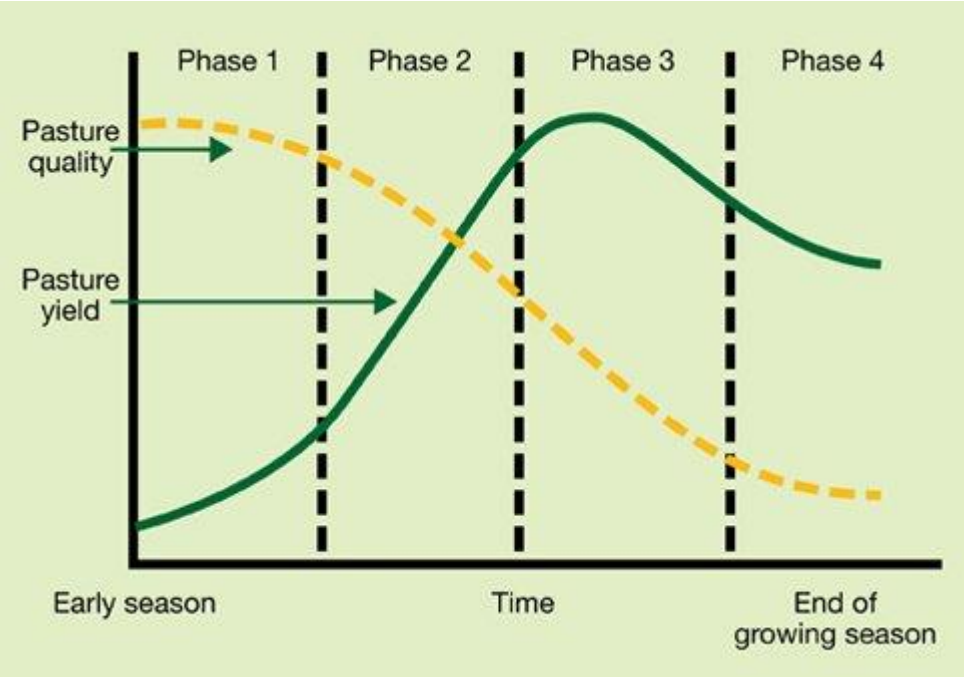

Figure 11 Pasture Growth in Northern Australia (MLA)

'Production feeding' is adding brought-in fodder to an animal's diet in the paddock and can be a solution to drought feeding, which is often used by graziers globally.

For example, the animal might have a diet of 70% pasture and 30% brought-in protein such as cotton seed or sorghum grain. The greatest economic profit when incorporating production feeding into a system will come from when pasture has the highest feed value.

Another advantage of production feeding during the wet season are that input fodder costs can be quite low per tonne of dry matter.

Case Study – Duncan Farms, New Zealand

Figure 12: Freshly Weaned Lambs put into Irrigated Lucerne, Duncan Farms, New Zealand

John, Judy, Johnny and Geraldine Duncan and family own, manage and operate two sheep stations in Central Otago, New Zealand and practice production feeding. Their farms are located in the Maniatoto Valley with Ranfurly being the closest town. This business is primarily livestock focused with a total of 9,500 ewes supplying predominantly the international prime lamb market. The farms also run approximately 150 adult cattle supplying the chilled beef markets. There is some diversification in this business, but the major focus is to produce pasture-fed livestock on both rain-fed and irrigated green feed. Quite often these animals are finished on irrigated pasture through different times of the year.

The Duncan farms also breed stud sheep, holding an annual ram sale. This gives them diversification within their sheep enterprise which doesn't necessarily require a broad range of new skills for management. They also learned more about breeding stud sheep but didn't have to stretch their knowledge further into something they knew little about, such as growing grain crops.

They can irrigate some parts of the farms with all that is grown targeted for feeding livestock. Irrigated Lucerne and other crops such as kale and fodder beet are used for value adding selected mobs of sheep, lambs and cattle. It is common practice to have ewes with their lambs on irrigated pasture. They are mustered, lambs are weaned, and the heavy ones sent to slaughter. The lighter weaners are put back on the irrigated Lucerne and consequently, lost very little weight during the weaning period and are at slaughter weight just three weeks later.

Benefits of production feeding

There can be a significant profit margin from production feeding, along with other benefits relevant to NWQ, such as:

- **Quality of Product**: Some producers can receive a 5% premium if meeting Meat Standards Australia (MSA) guidelines for steak. Lower ossification, better weight for age, better fat scores and marbling are examples of how a grain assisted animal can meet MSA guidelines.
- **Opportunity Cost**: Cattle under a production feeding program can be sent to slaughter earlier than previously achieved. Opportunity cost is a consideration that should be used in all parts of a business. By applying the idea of opportunity cost, production feeding has exponential potential to improve shareholder wealth in NWQ.
- **Hedging with livestock futures and options:** Hedging is a major business tool which can ensure consistent profits. Production feeding gives a business many more options

to utilise these tools. These can support optimising the timing of sale of cattle (can choose when to sell rather than be forced to sell on a potentially depressed commodity market) or when to feed a certain class of cattle through to a prompted sale date.

- **Landcare:** Production feeding gives a business more options in terms of environmental sustainability. A business has the potential to make the same profit running less cattle and some studies have also shown that supplementary feeding means cattle eat less of the poor-quality pasture available which reduces erosion and improves what. If pasture coverage is maintained, there is less erosion.

Filling feed gaps

As discussed, it is common practice globally to fill feed gaps or to feed cattle something other than pasture at the time of year when pasture growth is at its lowest.

Examples from other industries that use production feeding include the Irish beef and dairy herds that are outdoors about six months of the year and shedded over winter and fed silage when pasture growth is poor.

Another example more closely related to NWQ is in the USA where they feed out good-quality silage in the paddocks when the grass isn't sufficient.

In countries with much harsher winters and temperate climates, livestock can be indoors for half of the year with a total mix ration diet (TMR). This is also fairly common practice in NWQ as well as other regions in Australia.

Pasture phase 4 – dry season, pasture quality low, supplements needed for weaners and pregnant cows, new calf drop

Table 3.1. Approximate nutritional value of pasture in different growth phases

Pasture growth phase	Description	Dry matter digestibility* (%)	Energy (MJ ME/kg DM)	Crude Protein (%)
Phase 1	Early, rapid growth	65	9	10–15
Phase 2	Beginning to grow stem, mostly green leaf	55–60	7–8	8–10
Phase 3	Flowering and seed set, growth slows, 10–30% green leaf	50–55	7	6–8
Phase 4	Seed matures and falls, no growth, no green leaf	45–50	5–6	3–6

**Digestibility is based on the dry matter of the feed*

Figure 13: Pasture Feed Gaps in Northern Australia (DAF)

A 2014 study from a trial conducted on a property near Charters Towers demonstrated that reducing feed gaps is the first thing that livestock managers can be proactive about (Landsberg, 2017). A key idea is value adding not cost adding as well. This means that it is important to work out how much it costs to feed versus how much value that it adding to the cow. It can be difficult to determine the profit on these activities without a specific sale date for the livestock.

This finding raised the question of what if our native pastures could contain more legume pastures. This contains greater volumes of energy and protein throughout the dry season than any type of grass. A typical temperate pasture of 75% rye grass and 25% clover leads to greater performance of herds across Australia. In NWQ, producers can use tropical adaptive legumes such as Seca, Verano and Butterfly Pea to make their land more productive.

Carbon neutral

At the 2018 MLA Annual General Meeting in Alice Springs, the then Chief Executive Officer Richard Norton declared that the industry should aim to be carbon neutral by 2030. This prompted a wide range of responses from both ends of the debate. It is possible for producers to act now to reduce emissions and lift productivity by:

- Reducing emissions per unit of production through improved animal genetics and management practices.
- Minimising emissions using improved savannah burning methods in Northern Australia.
- Sequestering carbon into soils and biomass using grazing systems and appropriate vegetation management practices. (McNicholl, D, 2018)

Carbon farming is already an alternative source of income for farmers. The author suggests that there is a chance to become carbon neutral while maintaining and even increasing economic profits in a business in NWQ.

For example, storing carbon in forests, such as the ‘savannah burning projects across Northern Australia’ registered under the Emissions Reduction Fund, have the potential to add to graziers’ profitability.

Savannah burning is when the forest is burnt in winter instead of summer (when it usually burns from lightening or something else). This cooler burn does a lot less damage, protects animals and emits much less carbon as more is sequestered in dead organic matter.

Chapter 4: Awareness of Society

Local community

Are we doing enough to increase focus on how agricultural businesses in NWQ interact with the local community? The author discovered during his research that many businesses are actively improving their relationship with the local community through engagement.

Case Study: Mercer Farms, UK

Figure 14: Rob Mercer at a school handing out home grown fresh produce (Source: Author)

Rob and Alec Mercer and families operate a large-scale, diversified agricultural and property business in central England. Much of their time is focused on producing products that suit their domestic markets. They also focus a lot of their time on the social sustainability part of farming. They invite the public onto farms one day a year. The idea of this open-door policy is to tell the farming story and bridge the gap between producers and consumers.

Ethics

What are business ethics? Ethics are simply rules, principles and standards for deciding what is morally right or wrong when doing business (Cambridge, 2018). Ethics and a social license are essential to a sustainable farming enterprise today. The public want to know that producers are doing the right thing and also interacting in the community in a positive and sustainable way. This is important for producers in NWQ to contribute to.

Fred Appleton (2015 Scholar) studied markets, organic beef production and dehorning and castration. In his final Nuffield report, he came away with a clear understanding that "*your story*" is important in social sustainability of beef production.

Ethics can be a major part of the "story" that a beef producer uses to sell their product and there are examples of technology being used for this. MLA is funding a three-year project led by the University of Queensland to develop a vaccine to reduce the incidence of cattle tick that be used instead of traditional, highly invasive spaying methods. Consequently, there will be no need for spaying which can be a husbandry issue, and it is more socially acceptable. In addition, financially it will reduce the 1-3% deaths from spaying (DAF, QLD) while still allowing farmers to manage the herd. Traditionally there has been little pain relief used on cattle or livestock in NWQ, so this vaccine is more acceptable socially. The cost is AUD $2 per shot but is a first and used for dehorning and castration.

Producing high-quality beef with a social license

Farmers globally are becoming more aware of the importance of the consumer perception of products they grow. Price, country of origin, health and safety, food integrity and transparency, animal welfare, carbon footprint and people's diet choices are just a few of the factors that consumers place importance on globally. These are relevant for the beef industry in Australia (MLA Industry Insights, 2018). Large export markets for Australian beef such as Japan and the USA have similar ethical concerns.

"Consumers' definition of quality is constantly being re-evaluated and redefined" Dr Aine Regan, Irish Farmers Journal

An MLA report (Industry Insights, 2018) has found that beef producers must focus attention on meeting consumer expectations 'sooner rather than later'. With so many international competitors producing and trading beef, Australian beef faces a large threat of losing a foothold in the market. The report outcomes however found that the marketing of meat products must start on-farm to ensure long term viability. Beef producers in NWQ have a positive story for a global marketplace of consumers.

In evolving world markets, beef may struggle to keep a foothold as a protein source compared to other meats such as pork and chicken. Whilst listening to an ANZ Bank presentation in Singapore in 2018, the speaker highlighted that there is a bigger trend from consumers wanting more organic and better-quality produce that complies with ethical concerns mentioned previously. Vietnam for example, has a faster growing middle class than China and their demand for quality beef is growing rapidly.

Consumer perception can often make businesses do less profitable activities just to sell their product. For example, Emily Yeiser Stepp from the National Milk Producers Federation in the USA stated that Hormone Growth Promotant (HGP) or added hormone treatment is highly effective in boosting profitability in dairy cows but isn't popular with modern consumers so is banned from use.

Different global markets have different perceptions about red meat. Below are some consumer perceptions of Australian beef in Japan:

- Well marbled beef and beef in general commands a price premium due to popularity.
- Large and growing marketing for imported beef.
- Beef has a great image of beef due to health benefits as a balanced part of diet.

(MLA, 22/11/2018)

Also, here are some consumer perceptions about beef in Ireland:

- Organic, free range.
- High animal welfare standards.
- No hormones or antibiotics.

(Regan, A, 13/03/2018)

This was a stark reminder that beef producers should focus on the quality of their product firstly, and everything else will follow. From these findings, the two main reasons that consumers tend to eat less red meat however are price and health concerns (MLA Industry Insights, 2018).

This report has found that solid beef markets requiring a high-quality product should be targeted firstly. For Australia, 66% of chilled beef goes to these reliable markets of Japan and the USA (MLA, 2018). A large part of quality remains key indicators such as fat coverage, weight for age, marbling and pasture fed. Ethics and corporate social responsibility are also important contributors to the quality story than previously.

Case Study: Providore Beef

Sam McNiven, based in Hong Kong, is at the forefront of his family owned beef enterprise 'Providore Global' with their signature products under the name Rosedale Ruby based in northern New South Wales. This company is a good example of how clean and green Australian beef can be marketed on the global stage. His company focuses on the 'paddock to plate' story. Great marketing points of the business are the low antibiotic use, free range herds, low stress stock handling and living environment, high-quality beef off grass and sustainably grown grains and high-quality steak. Beef producers could definitely demonstrate how they use best management practices, particularly on social media.

NWQ also produces a high-quality product, with a high proportion of cattle being pasture fed, not grain fed. NWQ producers can meet this growing world demand by focusing on telling the story of low environmental footprint, sustainable production, outdoor grass-fed rearing of cattle, low antibiotic and hormone use and so on.

Focus on product

What can be celebrated is that NWQ has produced a 'clean and green' grass-fed product for a long time. Land clearing is at a minimum in this region compared to other parts of QLD so there is little to no deforestation to produce beef in NWQ, adding to environmental sustainability. Unlike more intensive farming practices, such as dairies in New Zealand and Europe, NWQ beef industry doesn't produce unsustainably high levels of nitrogen and phosphate per hectare. Also, the use of antibiotics and shedding livestock in a highly intensive environment is rare which adds to a clean pasture-based beef image.

As seen in Figure 15, the demand for this quality grass-fed product is growing rapidly across the globe. There is a large part of NWQ that can finish a product that will suit this increased demand both domestically and internationally.

Figure 15: Global Markets for Red Meat, MLA slide

What primary producers can focus more on in NWQ is to market their product line further down the supply chain. An example of this is talking to agents and meat processors about what kind of product they want. Also, benchmarking how their product performs in a feedlot and at slaughter. This can be done with minimal effort compared to value adding in terms of creating a niche, building brand names and markets.

Conclusion

After researching this topic, it's evident that the NWQ region has unique challenges for agricultural enterprises. As a complete study into business sustainability in NWQ, there are several key findings. This report lists essential principles of survival for a primary production business in agriculture in NWQ.

Firstly, an increased focus on profit rather than production is essential for a prosperous business in any business. Agricultural business models in Australia and overseas have shown that it is possible to produce 'more from less' and this is often the most profitable model.

It is also evident that a large focus should be placed on improving shareholder wealth. This may be the most important finding of this research paper. Using increasing shareholder wealth as the primary target for starting a new project is the ideal way to ensure business viability in NWQ.

Commodity hedging is another principle for survival in NWQ. It was identified that a beef business in this region is subject to highly volatile commodity prices, almost daily. Acknowledging this, then learning how to deal with the volatility is key. Basic, and more advanced financial tools can be used by a business owner or manager to maintain profitability.

Increasing intellectual capital is a key principle for survival in NWQ. Farm businesses need managers and owners that focus on improving their knowledge as part of lifelong learning. Knowledge is power and the key to business performance comes from a mindset firstly, then how this intellectual capital is applied in the paddock.

This report concludes that soil is the basis of life in NWQ. Without good soil health there would be limited plant or animal life. Therefore, more research needs to be done on how to best manage and care for soils in NWQ.

Climate change is a major topic across the globe with increasing awareness and importance. Water supply is also an important factor determining profitability in NWQ. Managing sub-tropical rangelands in a highly variable rainfall area requires skill, knowledge and constant learning. With limited rainfall over a small part of the year, much emphasis needs to be put on how to maximise pasture utilisation while maintaining ground cover.

Carbon is an important piece of the puzzle in managing the climate in NWQ. Learning its effect on the local environment, managing it, and how to take advantage of carbon farming is a key finding.

The final section of this report has focused on society awareness. This report has found that business ethics is a part of society awareness that agricultural businesses must focus on. Do key management ideas and models fit in with ethical standards in the industry and society? If not, this can have a large impact on the long-term survivability of a business in NWQ and determine if it prospers or fails.

Consumer perception of beef is also becoming more pronounced in society. Challenges to its health benefits and a cow's effect on the environment is something that producers must directly address. This can be from methods such as small-scale marketing to large-scale marketing campaigns.

Recommendations

1. Focus on profit before production. It is possible to produce more kilograms of beef from the same number of cattle at a higher gross margin by using strategies such as production feeding, strategically using data and data analysis to make better decisions.
2. Consider using shareholder wealth as a target for all stakeholders in an agricultural business in NWQ. Consider this with all new investment projects and during day-to-day management.
3. Continued focus on commodity hedging. Beef production on a primary level is heavily exposed to in and output commodity prices. Consider all types of hedging techniques from the very simple to the advanced.
4. Focus on intellectual capital improvement for managers and business owners. Knowledge is power and lifelong learning will ensure survivability and prospering in NWQ.
5. Graziers need to consider improving knowledge of soils. Soil is the basis of plant and animal life in NWQ and there is room for improvement in this area.
6. Review management techniques with pasture and the highly volatile and changing rainfall patterns in the region.
7. Focus on carbon output and remember a consumers' perception of carbon and farming.
8. Improve social awareness. Improve business image and beneficial interaction with the local community.
9. When targeting a specific market, focus on the quality of the product produced. Do this using all available information, keeping in mind to address current consumer perceptions of beef. For example, when supplying beef to a Japanese market, focus on weight for age, pasture fed, lifetime traceability and high grade well marbled steak.

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Plain English Compendium Summary

Project Title:	How the North West Queensland Beef Industry can Survive and Prosper
Nuffield Australia Project No.:	1813
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Objectives	This report sets out to identify what is required for the survivability of beef producers in NWQ, and to create a framework for businesses throughout the region to help with this, including: • To develop a set of key principles for farming in NWQ to ensure future business survival. • To investigate how businesses globally manage changes in climate patterns that NWQ can learn from. • To identify the role of NWQ businesses in their society in relation to consumer demands and ethical standards in order to remain relevant as well as sustainable.
Background	A fourth-generation beef producer, 31 years old with extensive and lifelong knowledge in the NWQ beef industry. I also have a Bachelor of Business, majoring in Marketing.
Research	This topic was chosen to both further develop the author's business, but other businesses in the regional community. The author travelled to New Zealand, The Netherlands, Ireland, Belgium, France, England, Scotland, Northern Ireland, The Philippines, Singapore, China, Germany, and the USA.
Outcomes	Findings show that a financial profit is key to having a sustainable business in NWQ. Moreover, the notion of increasing shareholder wealth is also critical for business sustainability in NWQ. Business owners need to constantly improve their knowledge base as society changes. This leads into the idea of intellectual capital and how important it is for the industry in the future. A typical business in NWQ is heavily reliant on both input and output commodity prices. Findings show that hedging against commodity price changes is a major part of business sustainability in NWQ.
Implications	There are ways to improve the risk management of the changing and already highly variable climatic patterns across Northern Australia. Agricultural businesses and their management of soils, water, pasture and the environment have an impact on these delicate tropical ecosystems in NWQ. Businesses need to address the changing global image of Beef and red meat producing businesses. As how this engage interact with the community, business ethics and quality of product are major factors in surviving and prospering in North West Queensland.
Publications	Nuffield National Conference, Brisbane September 2019