final report

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Building resilient supply chains for the Western Australian Beef Industry

Abstract

The profitability of the Western Australian beef industry has been struggling. There appear to be opportunities for growth but barriers exist preventing development of production capacity and value. The purpose of this project was to identify and quantify the opportunities, assess barriers preventing growth and identify capability gaps that if filled could provide a pathway to growth.

When considering ways to increase beef industry value in Western Australia, and across the whole of northern Australia for that matter, a range of initiatives spring to mind. It is tempting to quickly focus into specific limitations and adjustments based on what currently happens or on immediate short term opportunities. Although these activities are probably valid it is important not to miss the longer term strategic opportunities for the beef industry.

This project starts with a broad holistic assessment of the entire industry opportunity, then considers capability gaps and barriers within sectors of the industry that limit realisation of the broader opportunity.

Boxed beef exports are only 30% of the total W.A. boxed beef sales but considering live export makes up 39% of the W.A. beef industries volume, the state is competing on the global market and therefore needs to be competitive globally. How well the industry can strengthen existing value chains and develop new ones into world competitive value chains will determine the growth opportunity into the future.

Questions were raised during the study such as; how well is W.A. aligned to leading beef markets? How world class are W.A. supply chains in realising the value the world has become accustomed to pay for the combination of quality, safety, traceability and sustainability that Australian beef can deliver? How big is the opportunity for new value chains? Does extracting a few more dollars per head of profit along the value chain make WA a world competitive industry?

This project considers the resources within W.A. and estimates the extent to which these resources are being leveraged to create industry value.

The economic modelling conducted at a detailed level indicates an opportunity to increase profitability of the W.A Beef industry by 360%. This represents an increase of $298/head for 25% of Northern cattle and an average of $88/head across the state’s annual production. This includes an increase in production of 66,800 AE’s for the state. This opportunity is based on using existing natural resources and infrastructure and does not assume building any new production capacity.

Executive Summary

1.1 Introduction

The Western Australian Beef Stocktake Report identified that for the Western Australian beef industry to become competitive it needs to "effectively change from being commodity focused and production pushed to being market focused and market driven". There exist a number of opportunities to do exactly this. For example, increasing numbers of cattle from the Pilbara, Kimberly and Gascoyne, could enter the slaughter supply chain to build diversified production pathways and market opportunities in addition to live export and could play a key part in the development of new profitable and sustainable export markets. However along with these opportunities exists a number of challenges, lacks in capability and barriers to change which need to be addressed first.

This report identifies opportunities for growth in volume and value, in particular the growth of boxed beef export markets as this is key to the long term viability of the W.A. beef industry. It also identifies the barriers for each of these growth opportunities and the capabilities required to overcome them. One of the key focuses being the alignment of the northern and southern supply chains and the development of a more integrated and diversified supply chain which has boxed meat exports as a key component for growth of new markets.

1.2 Northern and Southern WA Alignment

Southern Western Australian beef production is highly seasonal with an oversupply in spring and summer and undersupply in autumn and winter. Abattoirs and feedlots do not operate at consistent levels throughout the year and infrastructure is significantly underutilised. Northern supply is naturally complementary to periods of short supply in the south. Greater integration between southern agricultural and northern pastoral beef production would support development of key industry capabilities like backgrounding and year-round feedlotting. This integrated approach would give rise to export growth, Infrastructure utilisation and increased market options.

A range of barriers exist. However many of these barriers are actually removed because of complimentary capabilities between Northern and Southern WA. Others are merely matters of perception and could be easily overcome. The key barriers highlighted were:

- Perception that northern cattle cannot meet higher value market specifications however tests performed as part of this project demonstrated that well finished northern cattle can perform acceptably with 97% of cattle in the test meeting acceptable MSA eating quality grades.
- Perception that transport from north to south is prohibitive even though cattle are already transported regularly to Fremantle and have at times been transported to Eastern states profitably.
- Southern WA has no backgrounding or supplemental feeding and limited critical mass to scale up significantly. However with the support of cattle from the central and northern parts of the state this barrier would be overcome.

- Northern WA has a high reliance on the domestic supermarket trade which has caused the value of beef to decline. They also tend to only send cattle south as a fire sale and the South see these cattle as a hindrance. A supply pathway which sent high quality Northern beef south would overcome both of these barriers.
- Northern WA has a harvest mentality which doesn't support an integrated supply chain and Southern WA has high spot prices injected at times for live export which tends to destabilise the development of new production pathways. A more collaborative relationship between North and South which was committed to long term industry sustainability rather than short term gain would overcome these barriers.

All supply channels across W.A. were mapped at a detailed level and validated by commercial participants in each sector. A range of alternative channels and opportunities for new growth were identified that addressed many of the barriers mentioned here.

1.3 Results from Economic Modelling

A number of new and adjusted supply pathways were modelled and while a number of options were considered, the results reported here took a conservative approach using existing natural resources and infrastructure and did not assume any new capital to build production capacity.

The overall result was a combined increase in EBIT across North and South WA of $163/Hd representing a 240% increase from current production. The Northern and Southern WA opportunities with their associated supply pathways are detailed in Figure 1 and Figure 2 below showing a $127/Hd EBIT increase for Northern WA representing a 240% increase from current production and a $148/Hd EBIT increase for Northern WA representing a 370% increase from current production.

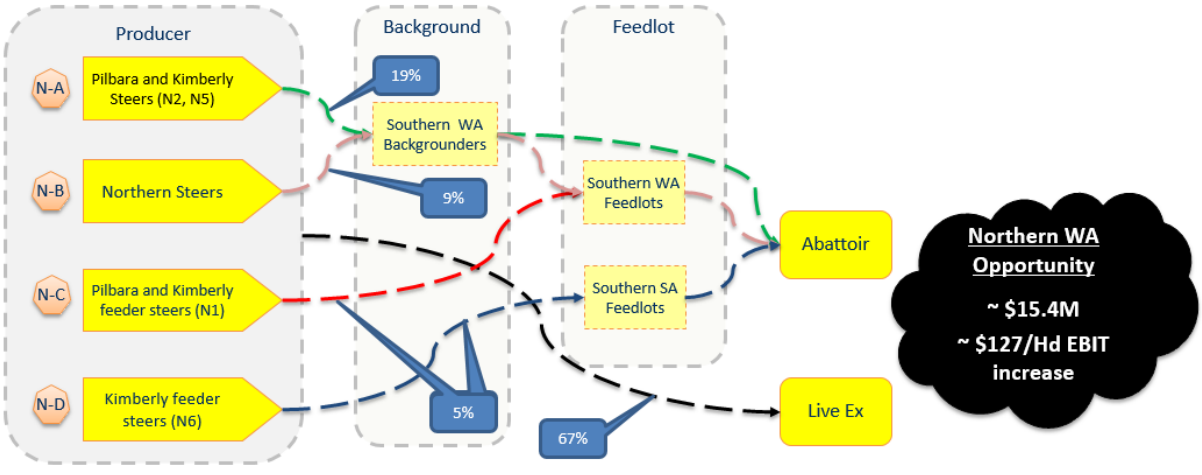


Figure 1: Northern WA supply chain pathways

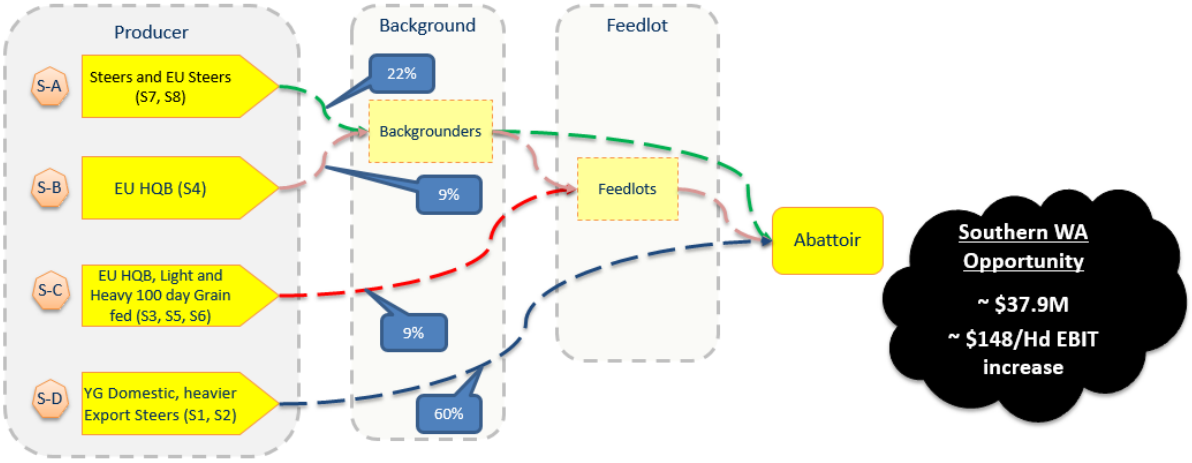


Figure 2: Southern WA supply chain pathways

This combined economic model included an increase in production of 66,800 AE's for the state. These were attained by a range of factors including:

- Increasing production through better use of existing forage.
- Increasing utilisation of existing feedlot and processing capacity.
- Increasing weight of cattle when sold for southern backgrounding.
- Reducing the weight of cattle when transported from rangelands regions (reducing transport costs, increasing growth rate and reducing age).
- Increasing value of beef through better nutrition and market compliance.

The key pathways considered in this model were:

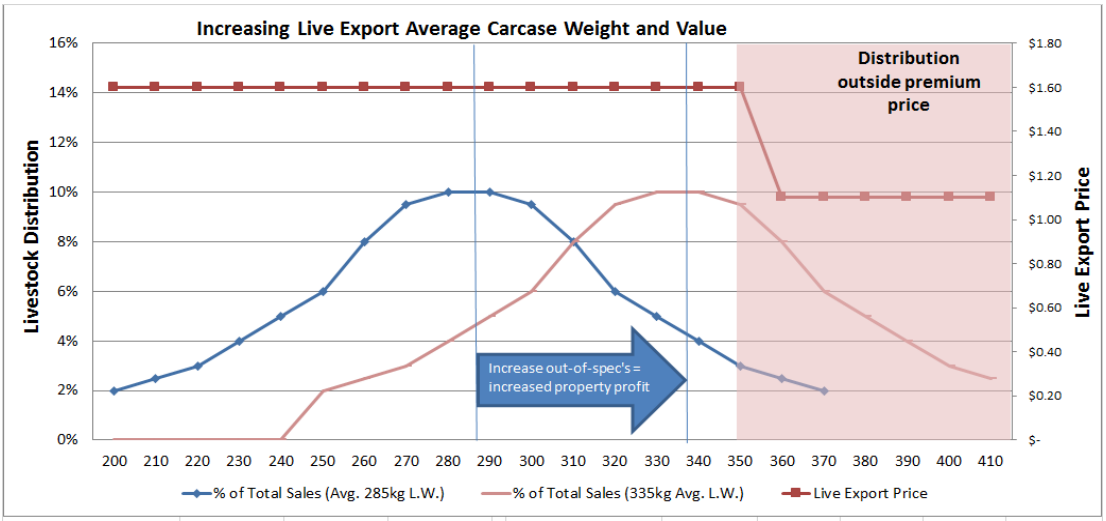
- Grass-fed steers - diversifying their market options by modifying the turnoff time and breeding season.
- Heavy grass-fed steers - developing a pathway for producers in southern WA to supply steers => increased profit per head and creating a supply chain for autumn.
- EU HQB - developing pathways in WA and SA => giving the producer more market options and price negotiation.
- Jap OX bullocks – developing an alternative market where cattle don't meet EU specification accessing light steers from the northern regions of WA during the winter and spring.
- Light 100 day Grain fed – producing supply over winter and summer.
- Heavy 100 Day Grain fed – developing from current YG stock.

1.4 Other key findings

A range of other key findings were also developed throughout the project. While not used in the final economic model, these do provide useful insights into some of the many options available. Some of these considered building new production capacity which looked at increasing production volume, suppling to new northern abattoir, expanding feedlot capacity, increasing volumes of existing cattle through new supply channels and market price

equivalence between northern and southern cattle with similar quality grades. These are detailed throughout this report and appendices. Some of the key findings were:

- Increasing processors head killed per year by 50% produced an increased profit by 105% for a plant with $2M monthly fixed costs or up to 570% for a plant with $2.5M monthly fixed costs.
- Underutilisation of resources - Feedlots and Abattoirs have 40% underutilised resources and Southern Rangelands has 12%.
- Production management - requires multiple market options, market intelligence and capability to adapt production systems to access alternative market channels.
- The development of an EU bullock supply pathway – this was identified to be slightly more profitable than the Jap Ox bullock but would require a higher level of investment in processor accreditation.
- Growing live export animals deliberately higher than Indonesian specs – this scenario focuses on total kilograms of production value, not price per kilogram. Growing animals larger so a larger percentage fall into a market which pays $0.75/Kg less than the Indonesian market is more profitable per property. Figure 3 below shows the effect of this whereby the increased Kgs multiplied by the reduced sale price still makes the producer between $21 and $30/Hd additional profit.



Price Scenario 1	Indonesia <350kg - $1.60		$1.10 >350kg
Average Kg/head	Value/ Head	Sale $/kg	% >350 kg
285	$ 448	$ 1.57	7.5%
335	$ 478	$ 1.43	40.0%
Increased value/head:	$ 30		

Price Scenario 2			Indonesia <350kg - $1.85	$1.10 >350kg
Average Kg/head	Sales Value	Kg's Sold	Value/ Head	Sale $/kg	% >350 kg
285	$ 1,544,850	855,000	$ 515	$ 1.81	7.5%
315	$ 1,608,863	945,000	$ 536	$ 1.70	22.5%
Increased value/head:			$ 21		

Figure 3: The economic effect of growing animals larger

1.5 Capability Analysis

Comparison of a range of capabilities was undertaken and summarised in Figure 4 below. W.A. has relatively good natural resources and infrastructure to support industry value. Some of the key lacks in capability at the production level and their impacts are highlighted below:

- Underutilisation of pasture resources => Cattle are turned off earlier than required at lighter weights when prices are lowest, all combining to minimise profit.
- No backgrounding sector => Markets for older backgrounded cattle (PR, Grass OX) that reward product value are unavailable; Feedlots trying to develop year round programs for YG, YP and PR cattle are unable to be established; and processors ability to diversify markets are hindered due to a narrow range of livestock specifications being supplied.
- Limited leverage of high quality grain (via feedlots) – no ability to manage dry times, turn cattle off faster, enable out of season supply as well as support backgrounding to utilise surplus feed or enable access a wider range of markets.
- Intermittent volume of animals => Underutilisation of infrastructure resulting in a higher cost of producing beef.
- Minimal development of long term strategic export markets and customers => Limited value for animals resulting in an elevated cost of production of the entire industry.

Production capabilities like those mentioned above are the first to be considered. However, they are not the major weakness in realising the value opportunity in Western Australia. The way in which the different sectors of the chain align to use the natural resources and the degree to which supply chain links worked to realise value was the biggest gap. Key capability disablers included lack of engagement and initiative of participants based on lack of trust and confidence. Communication, information sharing around market signals and development of critical mass in sectors of the chain were important opportunities to improve connection between supply side and demand side of the chain. New approaches within existing and new business models have been proposed to overcome some of these gaps in capability.

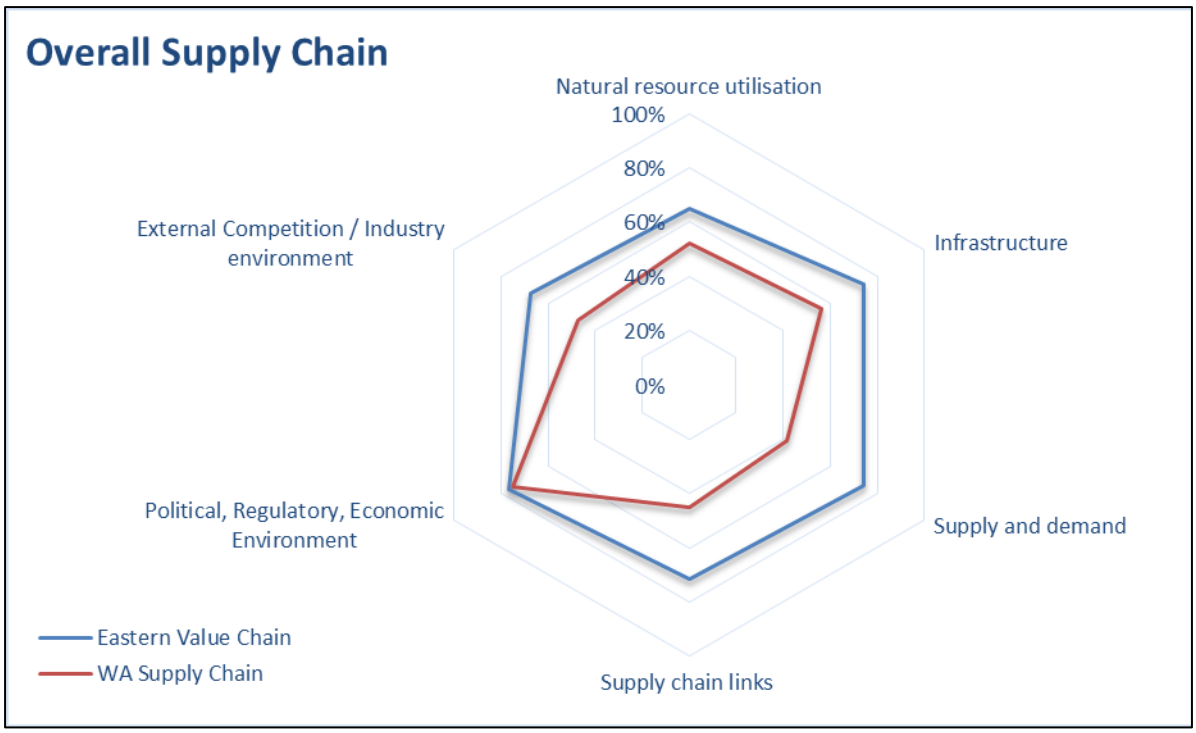


Figure 4: Capability comparison

1.6 Boxed beef exports and Diversified markets

Investment in capability for multiple pathways is important to remain competitive and even viable into the long term. This requires the development of infrastructure, relationships, markets, risk management strategies and capability to supply those market specifications.

There are opportunities to increase market diversification for northern cattle. This could include better access to existing domestic markets but will only be sustainable with the development of new export markets for Western Australian beef. The major challenge and risk for all sectors of W.A. supply chain is moving from a narrow mix of markets in the left part of Figure 5 below to a more diversified mix of markets and livestock specifications. If carcases fall outside one market specification the alternative market and price, although less valuable, is still financially viable. This provides the ability to adjust market specifications to meet changing demand.

This is already a proven model in the Eastern states seen below on the right of Figure 5 where a wide range of markets exist for cattle which don't meet a particular specification. If the WA beef industry, shown on the left, is to grow, it will need to move to more of an Eastern states model.

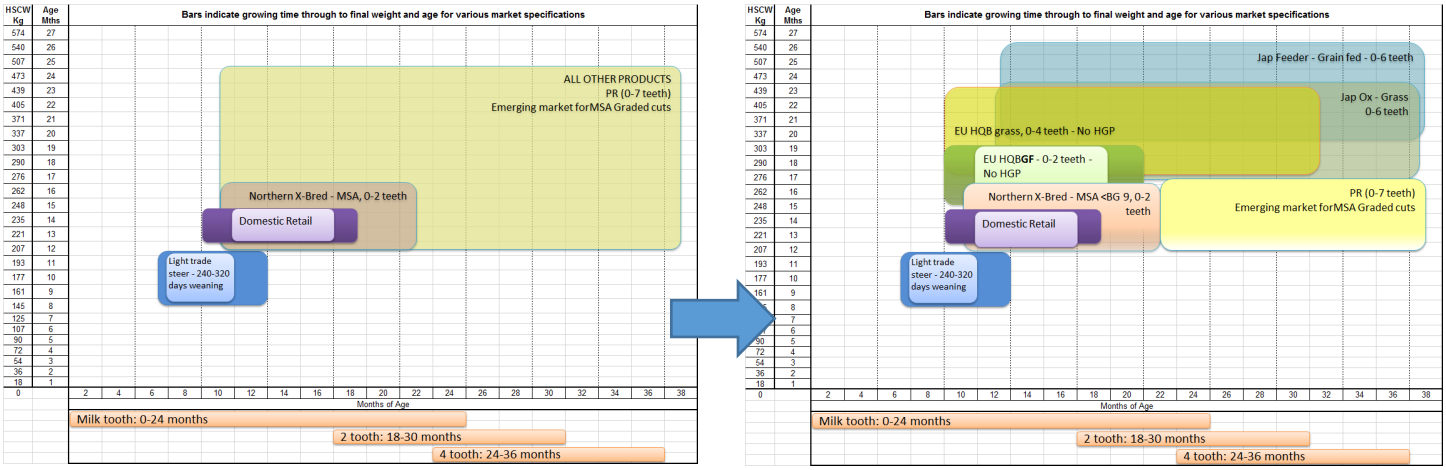


Figure 5: Moving from a narrow mix of markets (left) to a wide range of markets (right)

This transition summarises the significant gridlock and barrier to growth in W.A. There is a risk for processors to pay a premium for 1-2 new market specifications if they have not yet developed those markets. There is a profit risk for producers when they miss the new market specification as they transition their production system and livestock. The processor loses money if they don't get the right livestock to supply the new markets. The producer loses if they don't meet the new specifications. These risks, coupled with low industry confidence makes it difficult to start the transition process. A number of different business models were identified to support transition.

In WA the domestic market outside of retail contracts is focused on price before quality. This leaves export boxed beef as the only realistic option for growth and the development of export markets that reward value should be a high focus for the WA Beef Industry.

The fact that global demand for protein is increasing combined with the fact that Australia is a key provider of red-meat protein to the world puts Australia in a unique and exciting situation if it can position itself successfully. For W.A., boxed beef exports have increased significantly over the past year showing increased demand but are still 30% lower than volumes exported 5 years ago highlighting the potential growth still possible. Larger markets are decreasing but new markets are emerging and increasing in value. This increased diversification of global demand requires agile supply chains to match demand.

Western Australia produces high quality beef and has available resources to increase production. Consideration of providence and other unique attributes of W.A. should be considered and are an opportunity to develop new niche export markets to help compete with Eastern state economies of scale. A number of small eastern states processors have developed vibrant export supply chains using a mix of northern and southern livestock and have been able to compete effectively over a long period of time.

Glossary

Term	Definition
Aggregator	A company that increases the volume of beef produced through one entity, increasing their negotiation powers. This reduces the number of suppliers which a processors or feedlots could deal with.
Critical mass	The critical mass is the volume required to push a population over the “critical mass point”, initiating the self-sustaining growth dynamic for a supply pathway (Centola, 2012). If the supply pathway cannot reach the critical mass the system is destined to fail.
Equilibrium	A point which opposing forces are balanced. For example where the number of suppliers entering and exiting are identical.
Elasticity of Demand	A measure of the responsiveness of demand to changes in price, such as when there is a large variation in quality demand and a small change in price the product is said to be elastic.
Passive participant	A supply chain participant who has not incurred any expense during establishment but obtains the benefit once established. These participants are important as they build critical mass that supports the initial development.
Law of supply and demand	This refers to the interaction between supply and demand and there effect on price. As the demand for a product increases the price increases where there is no increase in supply.
Mutual reciprocity	a situation or relationship in which two people or groups agree to do something similar for each other, to allow each other to have the same rights, etc. : a reciprocal arrangement or relationship
Self- sustainable supply chain	A self- sustainable supply pathway has been developed to a critical mass to ensure the pathway maintains growth of in own accord. The risk mitigation between a weak and strong self- sustainable supply chain needs to be considered, as if there are developed too rapidly the equilibrium may only be short however if number of participants may be compromised.
Self-forming Supply Chains	Implies that natural development and growth of a supply chain will occur as market signals identify a viable business proposition for companies to participate. In some situations large gaps in capability or capacity limit supply chains from forming. Government intervention in a third world economy to build non-existent infrastructure is an example a supply chain that is not self-forming. But once that infrastructure is established the ability for new supply chains to form of their own will is possible, making them self-forming.

Supply Chain	A system of organisations, people, activities, information, and resources involved in moving a product to an end customer.
Supply Chain Captain	Leader of the supply chain who controls market relationship.
Supply Pathway	A description of the path a product or product inputs take through different sectors of an industry to an end customer. The focus is on the process flow and does not consider people or organisations.

Contents

2 Introduction

The Western Australian beef industry has faced significant challenges in its attempts to grow into a competitive industry and in 2009 an analysis and review of all the factors influencing prices and costs in the Western Australian industry was detailed in an industry report known as “The W.A. Beef Stocktake Report”. One of the weaknesses identified by the report was an industry that was inefficient with high costs. This is partly due to the current slaughter capacity being underutilised as well as high labour, regulatory and transport costs.

The industry’s gross value of production in 2011/12 was $517 million, a reduction of more than 15% from 2010/11 ($609 million) (source DAFWA). This is a result of a steady reduction in both cattle sent for live export and slaughter over the previous two years. Currently almost 70 per cent of the beef processed in Western Australia is consumed domestically. In contrast the Australian beef industry as a whole exported 66% of total processed beef in 2011/12 (DAFF/ABS).The volume of beef exported from WA has also steadily declined in recent years.

The Stocktake report identified that for the Western Australian beef industry to grow into a competitive industry it needs to “effectively change from being commodity focused and production pushed to being market focused and market driven”. Western Australia cannot compete against eastern states in the commodity beef market due to its small scale and high cost of production relative to the rest of the Australian industry. This is why the Western Australian industry must look towards higher value market opportunities for export growth.

Many attempts have been made over the years to increase industry value and competitiveness without success. However certain capabilities required to build new supply chains and diversify markets were missing and lack of confidence by industry participants to develop these new capabilities occurred. A Catch-22 or stalemate situation arose requiring some external intervention to provide a way forward and explains the lack of industry growth.

The Stocktake report identified suboptimal areas of industry that should be addressed but more insights were required to identify priorities and enabling solutions.

Alternative approaches that consider development and alignment of capability across the supply chain may identify new value that could improve supply chain profitability. For example, increasing numbers of cattle from the Pilbara, Kimberly and Gascoyne, could enter the slaughter supply chain to build diversified production pathways and market opportunities in addition to live export and could play a key part in the development of new profitable and sustainable export markets.

3 Objectives

This project provides insights around drivers of the current industry situation and identifies opportunities for future investment into the Western Australia beef industry to achieve sustainable increases in supply chain value.

Specifically this report aims to:

- Quantify the opportunity for growth in volume and value of boxed beef export markets to increase the viability of the W.A. beef industry.
- Identify barriers to industry growth.
- Identify strategies that could build needed capabilities.
- Provide recommendations to aid in the development of viable supply chains and market options.

All of the objectives were addressed.

4 Methodology

4.1 Building new supply chain value

The W.A. Beef Stocktake report and more recent reports referenced in 5.1.1 show that all sectors are suffering. Reallocation of profits from one sector to another is short term and not sustainable and as such is not a concern of this project. The primary focus of this project is identifying opportunity to create new value, then identifying potential strategies to realise that new value. If new value strategies were easy they would already have been implemented. So a secondary focus is identifying barriers to implementation and ways to manage risk associated with developing new value.

4.2 General approach

The project team conducted in-depth value-chain analysis in collaboration with supply chain participants in each supply chain sector including Cow-calf production, backgrounding, finishing, feedlotting, live export and processing. This analysis included:

Semi-structured interviews and observations with individuals and groups of industry participants in commercial and industry based meetings were held over an 18 month period. These provided first hand insights into industry constraints, capacity challenges and barriers to change which give rise to or are a result of behaviours and perceptions.

Economic analysis was undertaken **using** the Beef Value Optimisation Program (BVOP) developed by MLA in collaboration with the Western Australian Beef Council and Department of Agriculture and Food Western Australia. This is an excel based modelling tool used to quantify production and processing costs for a range of market pathways and

investigate potential market opportunities including the additional potential value and impacts on the existing marketplace of these new alternative pathways. Reference materials and supporting evidence used to validate the model assumptions is included in section 12 ”*Appendix – Economic Modelling*”.

Mapping the value-chain components included mapping capabilities, barriers to realising potential value, participant interactions in each sector in terms of alignment to market demand, market signals and information transfer, along with impact of business models. Based on the initial analysis more detailed modelling was conducted identifying opportunities for intervention that offered the most potential for growth, would have a large impact, and presented opportunity to establish critically deficient capability both physical and relational.

4.3 Action Research approach

Action research is an interactive inquiry process that balances collaborative problem solving actions with data-driven analysis or research to understand underlying causes (Reason & Bradbury, 2002). Rather than develop a premise to explain the state of the W.A. beef industry at the start of the project, coupled with corrective actions or interventions based on this premise, an action research approach was used to explore and understand the deeper industry issues around longer term sustainability. As more understanding was gained during the investigation in collaboration with participating companies, root causes were identified, enabling future predictions about personal and organizational change.

Barriers to engaging commercial participants through the project limited the positive commercial impacts but provided valuable insight into the deeper underlying issues across the industry. Some of these barriers are described in Section 9 “*Industry environment and barriers to change*” and have been addressed in part since the project’s completion. Future activities have been recommended in Section 11 to be undertaken in collaboration with commercial partners and recommend employing the action research method described below.

Action research challenges traditional social science by moving beyond reflective knowledge created by outside experts sampling variables, to an active moment-to-moment theorizing, data collecting and inquiry occurring in the midst of emergent commercial structure. “Knowledge is always gained through action and for action. From this starting point, to question the validity of social knowledge is to question, not how to develop a reflective science about action, but how to develop genuinely well-informed action” (Torbert 2002).

4.4 Project stages

Three general stages were undertaken including:

Stage 1 – Evaluation of current situation.

Stage 2 – Identification of economic opportunities.

Stage 3 - Capacity, capability and confidence Building.

Northern research activities identified the need for diversified markets and increased understanding of existing market options and strategic opportunities.

Southern research activities identified opportunity for out-of-season supply to access underutilised grass resource but highlighted intervention activities around business model innovation and value chain alignment that would be required to support this opportunity.

Whole of W.A. research activities considered the effectiveness of each sector and its impact up and down the value chain on confidence and management of risk for each member in the value chain. Capability gaps in high impact areas of supply chain infrastructure were identified as opportunities for intervention that would benefit the entire value chain.

5 Current Situation

This section summarises the current industry situation and market opportunities. These formed the basis of potential strategies to improve the industry's value.

5.1 Context

Southern Western Australian beef production is highly seasonal with an oversupply in spring and summer and undersupply in autumn and winter. The processing sector has adapted to this highly seasonal supply by killing large volumes of cattle through spring and summer and operating at minimal cost and volume through the winter. Supplies of cattle for the stable domestic market are sourced from grass feeders in the spring and summer seasons and feedlots in the winter and autumn. As a result abattoirs and feedlots do not operate at consistent levels throughout the year. On average infrastructure is significantly underutilised which limits financial returns to well below potential.

The highly seasonal supply in Southern Western Australia and the limited utilisation of cattle from Northern Western Australian has led the processing industry to focus on a narrow range of domestic cattle specifications which limits opportunities for market diversification.

The Western Australian domestic retail trade is focused on yearling cattle. Processor procurement strategies revolve around these type of cattle and other cattle specifications are regarded as secondary. The limited market options have led to a concentration of production and processing around times of abundant pasture and results in peaks and troughs of supply and demand. This distinct seasonality is not seen in other states where more diverse market opportunities exist, supported by more diverse supply chains to service those opportunities.

Northern supply is naturally complementary to periods of short supply in the south. Greater integration between southern agricultural and northern pastoral beef production would support development of key industry capabilities like backgrounding and year-round

feedlotting but various attempts have had limited and only short term success. A range of deeper issues are limiting the opportunities.

Traditionally the quality of northern cattle has been a real and perceived barrier to successful integration of cattle supply; and continued improvement in genetics and management is still required. However, the widespread adoption and acceptance of the Meat Standards Australia (MSA) grading system is demonstrating that well finished northern cattle can perform acceptably. Complementary supply alignment between north and south has the potential to create opportunities to develop new markets and demand that would help realise existing but untapped value from the states beef production.

5.1.1 Western Australian beef industry profitability

Even when live exports were going strong in the past the profit generated from live export were not enough to break even on a net profit basis (Kimberly and Pilbara RD&E project – code B.NBP.0628 2009-10 in Figure 9). The report indicated the majority of northern beef businesses are not economically sustainable over the 2009 and 2010 financial years.

Further studies in 2013 indicated that whilst profits before financing are largely unchanged (on average over the 12 year period analysed), after financing, performance is deteriorating due to increased debt with no increase in profit.

Profitability of the top performers has declined over the longer term, suggesting that industry profitability is decreasing (Northern Beef Report 2013 – Northern beef situation analysis, Bush Agribusiness Pty Ltd, Holmes & Co.).

Even if this profit situation changes in the short term with the opening of Vietnamese, Chinese and other live export markets a number of risks limit confidence to invest in northern beef enterprises. Reliance on market access controlled by fickle government policy, intermittent sea freight transport and lack of capability to access alternative markets makes investment required for globally competitive infrastructure less than attractive.

5.1.2 Live export and boxed beef market differences

The live export markets are critical for northern Australia and will continue to be so. However, volatility and changing market dynamics, reflected in Figure 6 will require supply chains that are as equally adaptable. Although exports of boxed beef also fluctuate (Figure 7) the volume and value have remained stable in comparison.

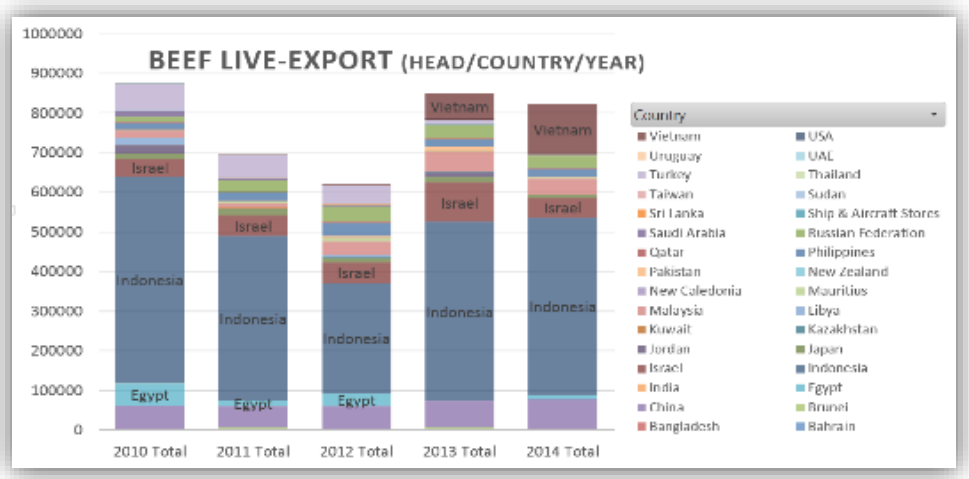


Figure 6: Five year fluctuation in live-export market volume and destination

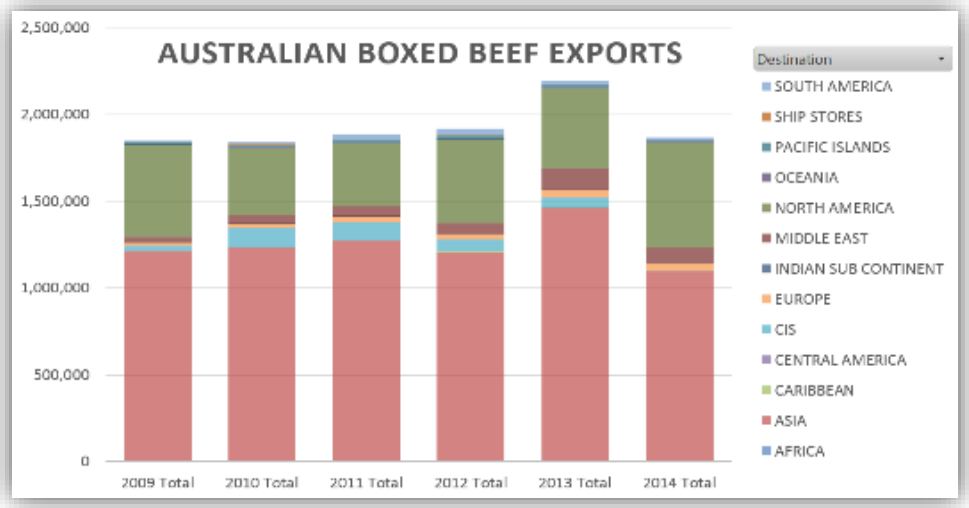


Figure 7: Australian exports of boxed beef by volume and region

Boxed beef market stability is due in part to the individual supply chains abilities to adapt and re-channel or adjust market specifications to meet changing demand. Building infrastructure and capabilities that allow the value chain to adapt is part of its sustainability and competitive advantage.

Limited diversity increases risk and makes it more difficult to justify investment in infrastructure that will value-add the product. This gridlock that holds the supply chain economy in its current state is discussed in section 9.4.

5.1.3 Infrastructure and financing

Both the production and processing sectors have been constrained by capital and at the time of this study a number of processors were in the midst of re-structure or up for sale. This has had an impact on limiting investment in developing new capability. New investment in both production and processing sectors has occurred since then and may improve some of the financing barriers mentioned later in section 9.5.

5.2 Insights guiding project development

5.2.1 Industry positioning to address global protein demand

Global demand for protein is increasing as summarised in United Nations EBA Working Paper No. 12-03. A study identifying the impact of a growing middle class on demand for animal proteins was summarised in the Enough Report. Figure 10 summarised the findings with a forecast 60% increase in demand for meat, milk and eggs. Further projections highlighted large increases in productivity from agricultural supply chains are required to meet this demand.

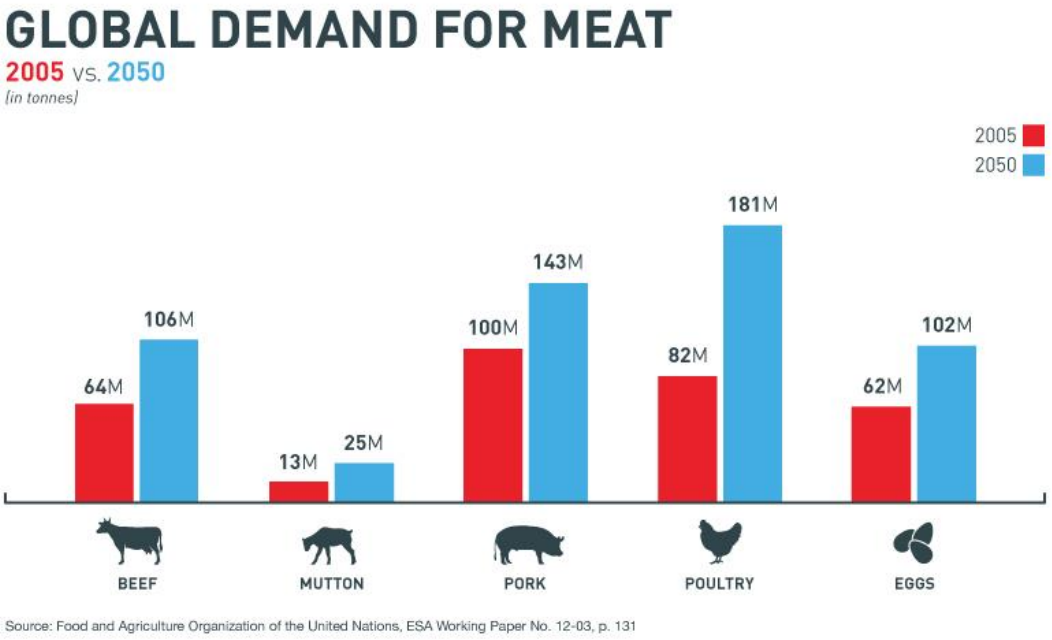
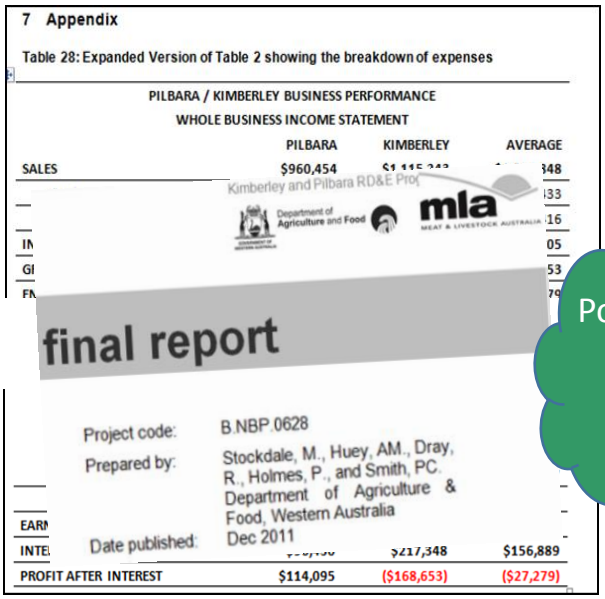


Figure 8: Global demand for meat to 2050 (UN Food and Agriculture Organisation)

Australia is a key provider of red-meat protein to the world and will continue to be for the foreseeable future. However, competitive supply from other Australian supply chains, and globally, as well as non-meat protein sources will increase the importance on developing competitive and efficient value chains. The key question is whether Western Australian red-meat supply chains can position themselves in the market to realise the highest possible value for Western Australian beef and whether that will give a competitive position in terms of cost of production or niche market positioning.



7 Appendix

Table 28: Expanded Version of Table 2 showing the breakdown of expenses

PILBARA / KIMBERLEY BUSINESS PERFORMANCE

WHOLE BUSINESS INCOME STATEMENT

	PILBARA	KIMBERLEY	AVERAGE
SALES	$960,454		
		$217,348	$156,889
PROFIT AFTER INTEREST	$114,095	($168,653)	($27,279)

Kimberley and Pilbara RD&E Proj

Department of Agriculture and Food

mla MEAT & LIVESTOCK AUSTRALIA

final report

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Positioning for the future?

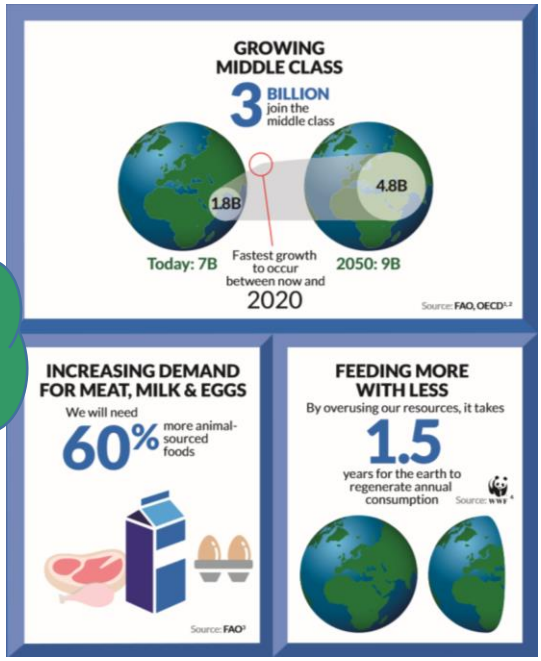
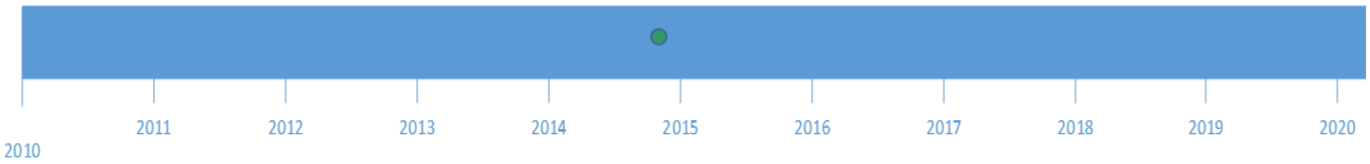


Figure 9: Northern pastoral profitability struggles even with strong live-export markets

Figure 10: Increasing global protein demand to 2020 (Enough Report_020314)



5.2.2 Fostering globally competitive value chain capability

This project considers the Western Australian value chains in light of the global markets and competition to service our customer markets both in the short term and longer term. A question posed is “How well are Western Australian beef supply channels to market positioned to remain globally competitive?”.

The Figure 11 summarises a live export value chain on the left and boxed beef value chain on the right in terms of capability developed within Australia. The live export results reflect the studies referenced already. The northern boxed beef supply chain on the right summarises value that could be generated based on findings from this project.

The key differences include the increase in value generated for the producer sector, the total value generated within Australia, and just as importantly the capability developed within sectors of the value chain that can provide flexible and agile supply through different production pathways as market demands change.

The news headlines (a snapshot in time) in the bottom of Figure 11 reflect the ongoing investment in capability that competing countries are making. As these capabilities develop, the ability to respond to market changes and even to influence market changes through increased capability build competitive advantage for those value chains.

No one pathway to market is the best at the exclusion of all others. The key message is that investment in capability for multiple pathways is important to remain competitive and even viable into the long term.

Figure 11: Development of capability in all industry sectors underpins agility to remain globally competitive

Significant investment is required to build capability along the chain. This includes development of infrastructure, relationships, markets, capability to supply those market specifications, communication strategies, and finally critical mass.

New global value chains increase competiveness and sustainability by maximising the value they realize from the natural resources. Global customers are willing to pay prices for Australian beef that generates value along the supply chain well above that of current WA value chains.

An objective from this project was to identify the possible supply chain scenarios that could create new value, then quantify the potential opportunity and prioritise the likely areas for development. Economic modelling of the state's production systems was undertaken to support these objectives.

5.3 Industry sector alignment

Aligning industry sectors helps identify new value opportunities and generate a more competitive value proposition. This project considered current industry capabilities and potential gaps in capability that limit initiatives that could bring about a step change in realising new value.

The elements required in each sector to support the development of new market opportunities were considered. Economic analyse of different combinations of supply channel alternatives were investigated to identify the most realistic and profitable pathways for a range of risk levels. Options were considered to build financial stability throughout the supply chain in a way that reduces market development risk. Insights were communicated with industry participants to improve confidence in new growth options.

Options for the development of resilient beef supply chains that can access new increased value from export markets were considered. A review of international market opportunities for Western Australian beef highlighted new export market opportunities. Initial investigations determined the feasibility of accessing high value export markets such as the European Union (EU) market among others. Production requirements were considered for new supply chains that can deliver boxed beef to a range of export market opportunities. New capabilities required to underpin the development of these market focused supply chains were also considered.

6 Value chain approach

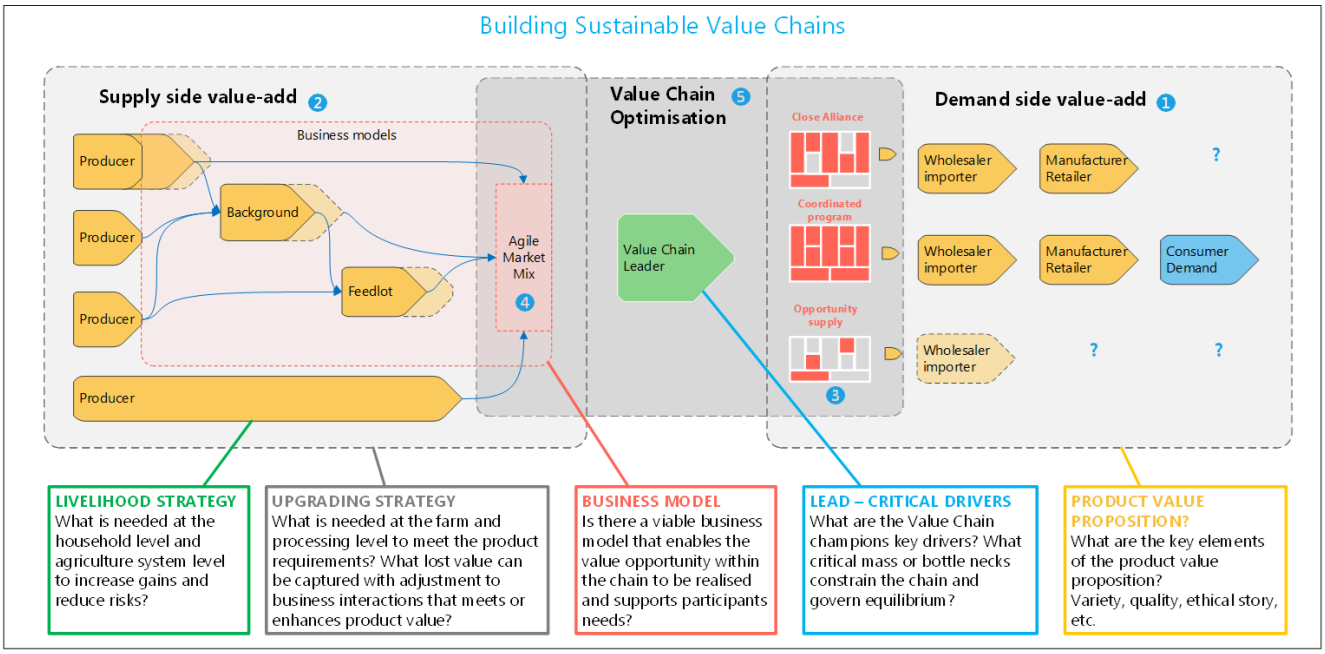


Figure 12: Building sustainable value chains

6.1 Scoping stage

New value chains have a fragile starting phase and a critical mass required to be self-sustaining. An important first step in establishing market and sales mix priorities is to quantify the value chain leader's objectives ❺ - *Value Chain Optimisation*. This plays 2 key roles:

- It provides a foundation of the types of volume and value of product available to support the initial demand side evaluation in ❶ - *Demand side value-add*.
- It focuses development of supply strategies in ❷ - *Supply side value-add* that takes into account cost, value, capacity, and complementarity trade-offs.
    - A key part of this is addressing the Upgrading Strategy and Business Model as these indicate missing value that can be realised to make the chain more competitive.

Sensitivity drivers around mix of product and market requirements need to be identified early to build into the next stage.

6.2 Development / Implementation stage

The key of this phase is aligning physical supply to meet specific customer product mix. Product sales development in ❸ - *Customer-Supply Models* considers the balance of product to customers so that supply side constraints and value opportunities are better aligned to build a more agile supply mix ❹ - *Agile market mix for customers*.

6.3 Capability development across value chains

Initial alignment of demand and supply sides has broad optimisation of the value chain at ❺ - Value Chain Optimisation. The opportunity to create new supply chain value begins at this stage where we put full focus on optimising supply and demand alignment of developing pathways. Upgrading Strategy and refinement of Business Models focuses on refining and aligning physical capability to an improved value proposition. All these activities build agility and resilience into the value chain.

7 Economic Analysis

7.1 Purpose

A few constraints govern the size of the growth opportunity that exists for a profitable Western Australian beef industry. These governing factors are realities that cannot be adjusted and can be narrowed to two primary questions:

1. What is the production capacity (supply volume) of the state?
2. What is the size of the market opportunity (demand volume) willing to pay a competitive price that maintains profitability for the whole value chain?

In a perfect value chain (unhindered by lack of capability) production and market demand will find an equilibrium resulting in one of the two following outcomes:

The production system will operate at 100% - If market demand is greater than production capacity.

The production system will operate at less than 100% - If production capacity is greater than market demand, finding some fluctuating equilibrium range based on interactions between the following factors:

- Cost of production and the impact of efficiencies of scale.
- Price elasticity of the product group where a decrease in price increases consumption.

If capability is lacking, production will not supply the full market opportunity. For example, if producers can supply high quality beef but processors lack the capability to develop high value markets, production will not reach those markets that are willing to pay a realistic price for that product. Economic modelling helped identify the maximum opportunity within the production constraints. Although it is not intended to target the maximum opportunity, knowing the size of the opportunity has a number of benefits:

Creates a vision of the large opportunity that exceeds lower performance expectations by industry.

Gives incentive to proceed where value realised to date is much less than potential.

Provides strategic direction that either focuses up activities to:

- Refine existing capabilities where only a small value opportunity exists OR
- Encouraging disruptive new value chain developments where large opportunity exists and non-existent capabilities require development over time.

Set realistic outcomes for value chain development activities. Some supply chain initiatives in the past have resulted in unprofitable outcomes due to producing outside the governing constraints and the capability required for sustainable equilibrium. Understanding these constraints helps realistic planning.

Provides a benchmark to quantify success as initiatives are implemented.

7.2 Methodology

The economic modelling used the BVOP model and was underpinned by data obtained from DAFWA and a wide range of other industry sources. The Microsoft Excel based economic model maps the operational costs across a range of production scenarios at each step in the supply chain including compliance to a range of market and customer specifications. Once the raw production data and constraints have been developed a range of alternative scenarios can be run with what-if analysis to help identify and test alternative new supply channels and potential new business models considering realistic production constraints and profitability. A more detailed description of the model and data sets is included in Appendix – Economic Modelling on page 82.

A series of scenarios were run showing the effect on profitability for each sector in the supply pathway. The model was specifically used to:

- Cost out existing and new supply chain pathways to the end markets.
- Prioritise pathway scenarios based on economic situation at the time.
- Measure impact of volume changes to each market pathway and impact depending on flexibility of different business models and agricultural systems.
- Consider risks to new supply pathways.
- Run sensitivity analysis in a dialogue with participants to develop risk management strategies.

Given the meat industry is more dynamic as a result of globalisation, more agile supply chains are required to adjust and adapt to changing market pressures. The impact of market flexibility was modelled as a component of the various value propositions and enabled the development of risk profiles.

7.3 Introduction to value proposition

A baseline or current state was mapped for each sector of the chain. From there opportunities to create new value were identified, starting with:

- Simple adjustments to existing practices within established supply channels

AND progressively built to include-

- New products for new markets where alternative supply channels and business models would be required.

7.3.1 Managing existing turnoff – optimising existing production for profit

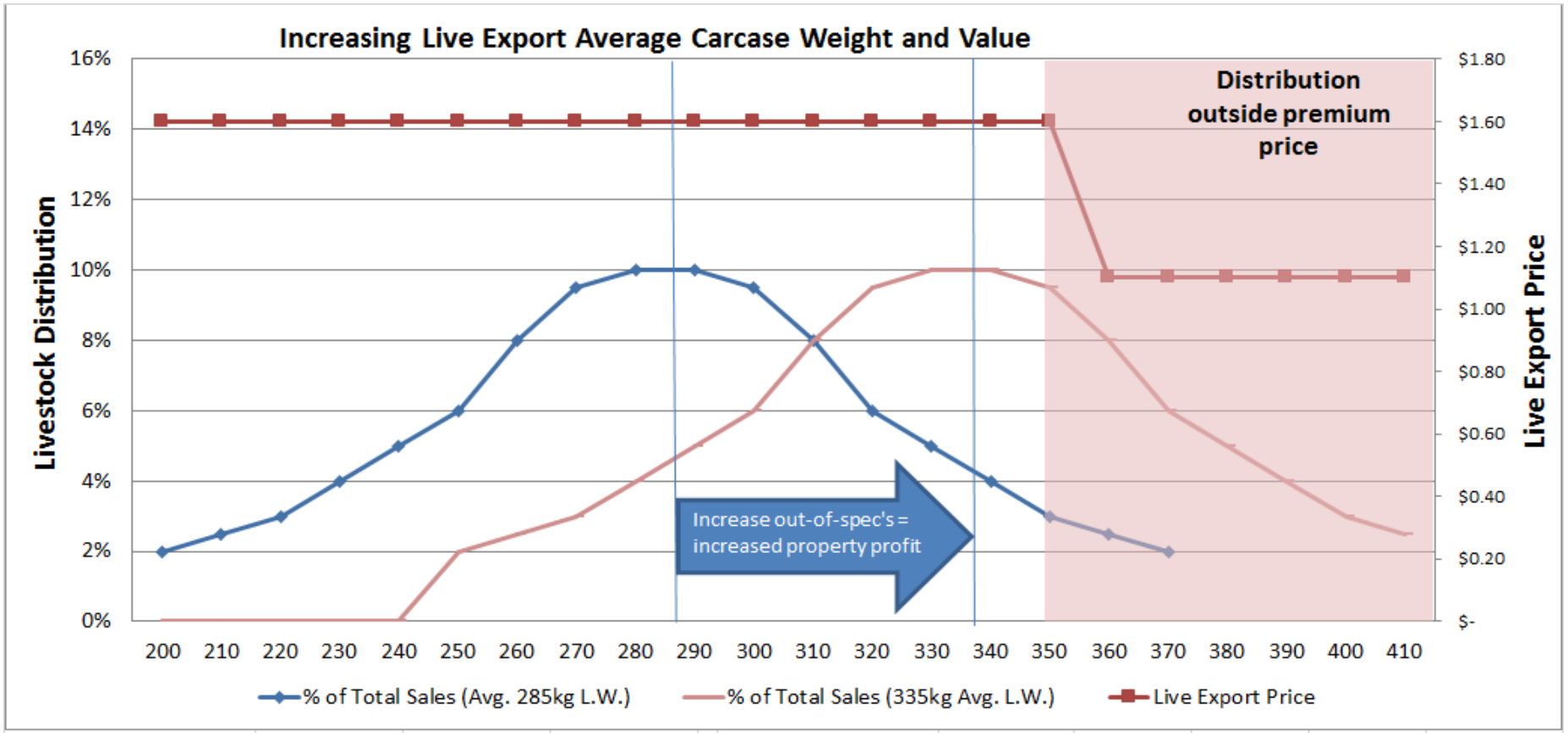
At a preliminary level there are options such as the example in **Error! Reference source ot found.** where producers could improve profitability of existing production systems within existing markets.

Livestock exceeding the 350 kilogram weight limit for Indonesian markets over the 2011-13 period were not eligible for Indonesia. A much reduced price was available if lucky enough to get access to these lesser alternative markets. This resulted in average live weights sold onto boats of around 280 kilograms. Such low weights underutilise the production potential making these markets barely profitable.

A very simple and more profitable market alternative was to target an increased weight and purposefully exceed the Indonesian weight restriction for a larger percentage of the cattle causing them to fall into other export market specs. Increasing the average weight sold increased overall profit. Depending on the price differential between prime price and overweight price, the optimum percentage of over-weight (out of spec) cattle was as high as 40% and improved return across all animals sold by $30/head. In other words, the cattle was sold to markets other than Indonesia where the price per kg was less but because the number of Kgs was much higher, for little extra cost to the producer, the overall profit per head was greatly improved.

The commercial example summarised in

Figure 13 below**Error! Reference source not found.** shows the change in optimum percentage of cattle grown overweight as the price differential between prime and out of spec markets changes. This represents a significant change to bottom line profit performance. However, unreliability of boat schedules and livestock gain did not remove all the risk. As this strategy is still not that reliable, alternative markets and supply channels besides existing out-of-spec live export were considered in the next section.



Price Scenario 1	Indonesia <350kg - $1.60			$1.10 >350kg
Average Kg/head	Value/ Head		Sale $/kg	% >350 kg
285	$	448	$ 1.57	7.5%
335	$	478	$ 1.43	40.0%
Increased value/head:	**$**	**30**		

Price Scenario 2			Indonesia <350kg - $1.85		$1.10 >350kg
Average Kg/head	Sales Value	Kg's Sold	Value/ Head	Sale $/kg	% >350 kg
285	$ 1,544,850	855,000	$ 515	$ 1.81	7.5%
315	$ 1,608,863	945,000	$ 536	$ 1.70	22.5%
Increased value/head:			**$ 21**		

Figure 13: Managing turnoff weight to market mix improves profit (2011-12 prices)

7.3.2 New production supply channels for northern cattle

Producer management controls include a number of options for managing enterprise profitability such as direct and indirect production costs, herd reproduction rates and live weight gain per hectare. Property production modelling shows that maximising the weight of each animal sold is a significant contributor to profitability. The challenge with this is accessing markets that will purchase heavy northern cattle. Heavy cattle are not eligible for live export in a lot of cases or market access requirements change, making a single production strategy risky.

Managing market risk has become just as big a factor as direct production costs. Given producers limited experience in this area they are less willing to engage in activities downstream from the property gate. The project considered a number of alternative business models including working examples in other states that could give northern production flexibility to supply alternative market channels without having to invest in capability past the property gate.

Given the lack of profitability over the past few years and the volatility in live export markets, a number of other supply channels have been considered. Economic modelling identified alternative market channels that can add new value to the whole supply chain. In addition comparison of risk between existing and new supply channels has been considered.

New supply channel scenarios included integration of different sectors of the chain including production, backgrounding, feedlots, abattoir and live export. Given the backgrounding and feedlot industries in W.A. are either non-existent or very seasonal, development of new capabilities are required to support new supply chains. The bulk of production in W.A. currently is to domestic YG markets. The backgrounding and feedlot sectors are not a major part of these channels.

Other pathways summarised in the figure would support a wider range of cattle specifications to a wider number of export market. This increased diversity of production options would help manage profit risk from environmental and market pressures.

A number of supply chain pathways have been summarised in Figure 14 for northern and southern regions and indicate seasonal turnoff times. Progressive development of these paths would only be as participants build confidence. Barriers to pathway development are discussed more in “*Industry environment and barriers to change*” in section 9 on page 61.

Figure 14: Supply channels modelled and validated with commercial trials

Southern Pathways	
Pathway	**Turnoff Season**
1. YG domestic Steers	Winter
2. YG domestic Steers	Winter
3. Heavier Export steers	Winter
4. EU Backgrounding & Feedlotting (WA)	Autumn
5. EU Feedlot Pathway (WA)	Any
Northern Pathways	
Pathway	**Turnoff Season**
1. Steers Backgrounded in WA (Southern)	Late summer and Autumn
2. Pilbara & Kimberley steers backgrounded in Southern WA	Spring and Summer
3. Pilbara & Kimberley steers relocated as Bullocks	Winter and Spring
4. EU steers Backgrounded in WA	Winter

The new northern cattle value opportunity was estimated at $298 EBIT per head in

Figure 15 for the whole supply chain. This value is only for northern cattle sent to new markets. The value increase was based on an additional 20,000 head from northern properties processed in abattoirs giving efficiency gains in abattoir.

Indirect benefits were not included like increases in live export prices caused by shortening supply to live export due to having alternative markets. This price effect was observed for some large producers implementing these strategies in WA over the past 2 years and equated to an additional $0.15-0.35/kg live weight due to ability to negotiate.

Figure 15: Summary benefit areas by diversifying existing northern cattle supply chains

Supply chain Benefit	Current	Proposed	Opportunity
Transport Costs	$ 162	$ 97	-$ 65
Cost reduction benefit			$ 65
Increased utilisation of backgrounders	$ 15	$ 32	$ 17
Increased utilisation of feedlots	-$ 4	$ 8	$ 12
Increased carcase weight	$ 11	$ 65	$ 54
Increased number of head processed	$ 11	$ 102	$ 91
Development of new markets	$ 11	$ 38	$ 28
Other Benefits			$ 31
Increased profit			$ 233
Total EBIT Benefit			**$ 298**

The key areas of benefit in the table are summarised here:

Reduced transport costs – Reducing the weight of cattle when transported from the north decreases the cost of transport over the life of the animal

Increased utilisation of backgrounders – Increasing the utilisation of pasture on backgrounding properties reduces the costs associated with producing a kg of beef

Increased utilisation of feedlots – Maximising the utilisation of feedlot capacity will decrease the fixed costs per head for the feedlot.

Increased carcase weight – These costs are reported on an EBIT basis and account for the increased feed cost required to produce the extra weight.

Increased processing numbers – The volume processed could be increased through modifying the time of turnoff to increase the carcase weight of cattle processed, resulting in a decrease fixed cost per head.

Development of new markets – Development of a consistent export boxed beef market will foster the development of a strategically aligned supply chain to supply of the market opportunity

Other benefits – The other benefits possible are displayed in Figure 16.

A more detailed breakdown of the increases in value within each of these areas is explained in more detail in Figure 16.

Figure 16: List of benefits and opportunities for the WA supply chain

Benefit	Description
Transport costs	Reducing the weight of cattle when transported from the north decreases the cost of transport over the life of the animal
Shift in sale weight	Increasing the sale weight of cattle increases profit, even if some heaver cattle fall out of the highest paying specification
Reduced variation of weight	Through decreasing the variation in weights at sale more cattle will meet the ideal specification
Processing fixed costs per head	Increasing the volume processed in a plant decreases fixed costs per head processed.
Increased weight of cattle processed	Increasing the weight of animals processed decreases operating costs per kilogram processed
Increased utilisation of available pasture	Increasing the pasture utilisation reduces the costs associated with producing a kg of beef
Increased communication	Increased information transfer will increase suppliers confidence
Increased consistency of supply	An increased consistency of the supply will reduce the variations in throughput and increase confidence in the processing sector
Reliance on domestic market has limited market variation	The lack of a consistent supply of cattle increased the processors reliance on domestic markets limiting export opportunities
Increased boxed beef sales	Development of a consistence of export boxed beef market foster the development of a strategic supply chain to supply of the market opportunity
Critical mass	The critical mass is the point which a strategic supply chain becomes self-sustaining.
Rate at which Critical mass is obtained	The rate at which a critical mass is achieved, affects the long term sustainability of the supply chain.
Increasing utilisation of feedlot capacity	Maximising the utilisation of feedlot capacity will decrease the fixed costs per head for the feedlot.
Increasing volume processed	The volume processed could be increased through modifying the time of turnoff to increase the carcase weight of cattle processed, resulting in a decrease fixed cost per head.
Supply chain aggregator	A supply chain aggregator may need to be required to reduce the risks associated with the supply chain development

7.3.3 Market suitability of northern cattle

A range of barriers to developing new market channels were observed during the study. One of these is the perception that northern cattle cannot meet higher value market specifications. Although this used to be the case, properties that have invested in better genetics and improved management practices are able to deliver cattle suitable for higher value markets.

A number of trials were run during this project that feed northern cattle through the channels in Figure 14 and produced acceptable MSA eating quality grades. Data from other parallel trials for northern W.A. cattle was also assessed.

Figure 17: MSA grading requirements for Northern Bos Indicus cross cattle

HSCW	n	MSA MB	n	Oss	n
		150	0	150	3021
200	160	200	2	200	1474
250	2533	250	668	250	19
300	1441	300	675	300	9
350	341	350	2224	350	5
400	62	400	799	400	5
>400	4	>400	100	>400	0
	4537		4468		4533

Figure 18: Northern W.A. cattle can produce acceptable MSA eating quality results

Boning Group	n	
1-4	188	4%
5-7	3612	80%
8-11	607	13%
Ungrade	134	3%
	4541	

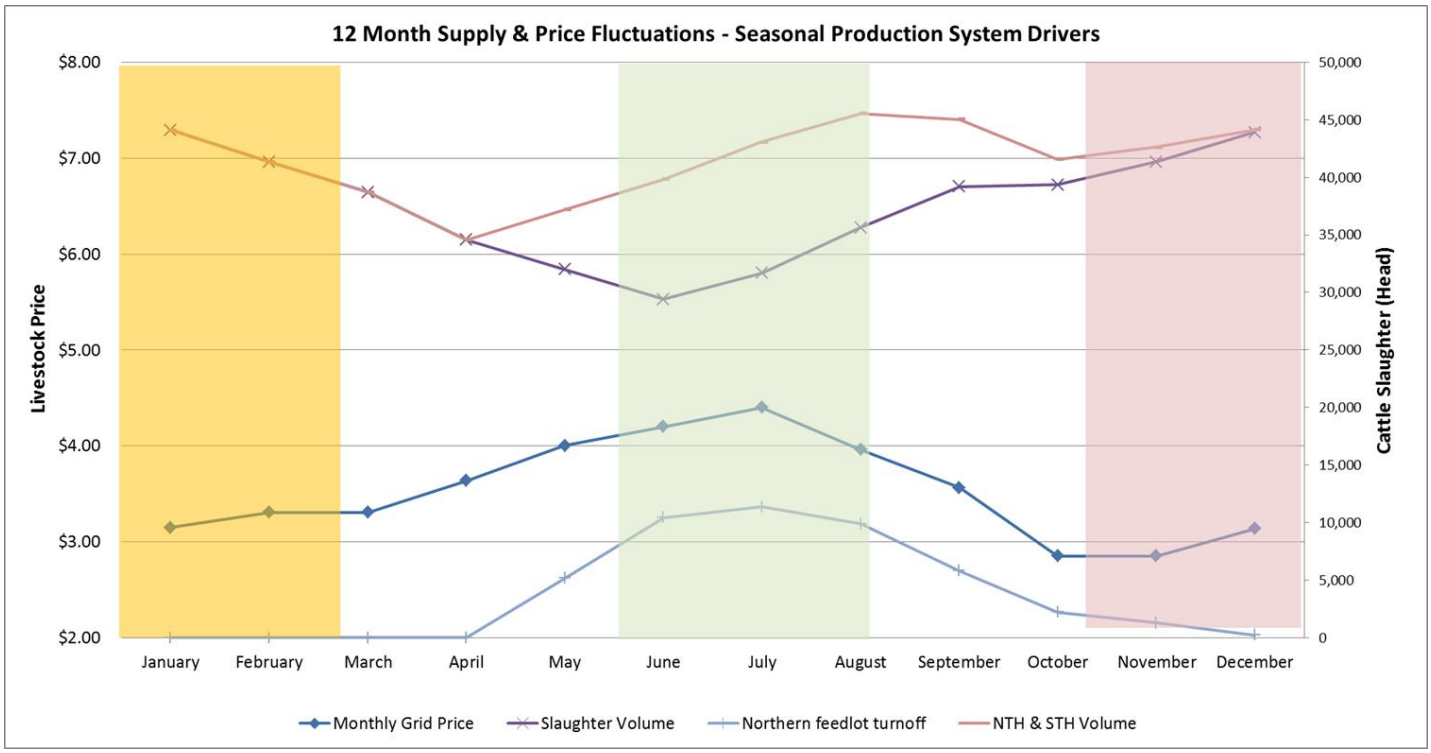
A range of barriers including communication channels, reliability, capable enterprises in each sector, critical mass to name a few have prevented this market from developing. The barriers and new capability required are discussed further in section 8 and 9. The key point here is that an opportunity does exist that is significant enough for the state to be further developed.

7.3.4 Benefits of an integrated approach to value chains

The northern and southern beef region environments, production practices and management cultures are polar opposites in many ways which contributed to the lack of integration in the past. Connections and trading between the two regions has been on an opportunistic basis with little are no increase in value created. To expand the point, when live export markets disappear, northern cattle are sold south in fire sale markets as a last resort. The low cost

boxed beef outputs are purchased as commodity trimmings by wholesalers and traders in the same opportunistic way. No real value is generated and these situations are certainly not sustainable. However, the same types of cattle grown in north east Australia are sold through channels with more sophisticated connections and capabilities on an ongoing sustainable basis to valuable export markets. Significantly greater value is being generated.

Figure 19: Seasonal synergies between southern and northern W.A. cattle turnoff



Opportunities exist to create new value and are summarised in Figure 20. The value opportunity to develop these supply linkages and associated capabilities are quantified in the next section and highlight the opportunity for the industry.

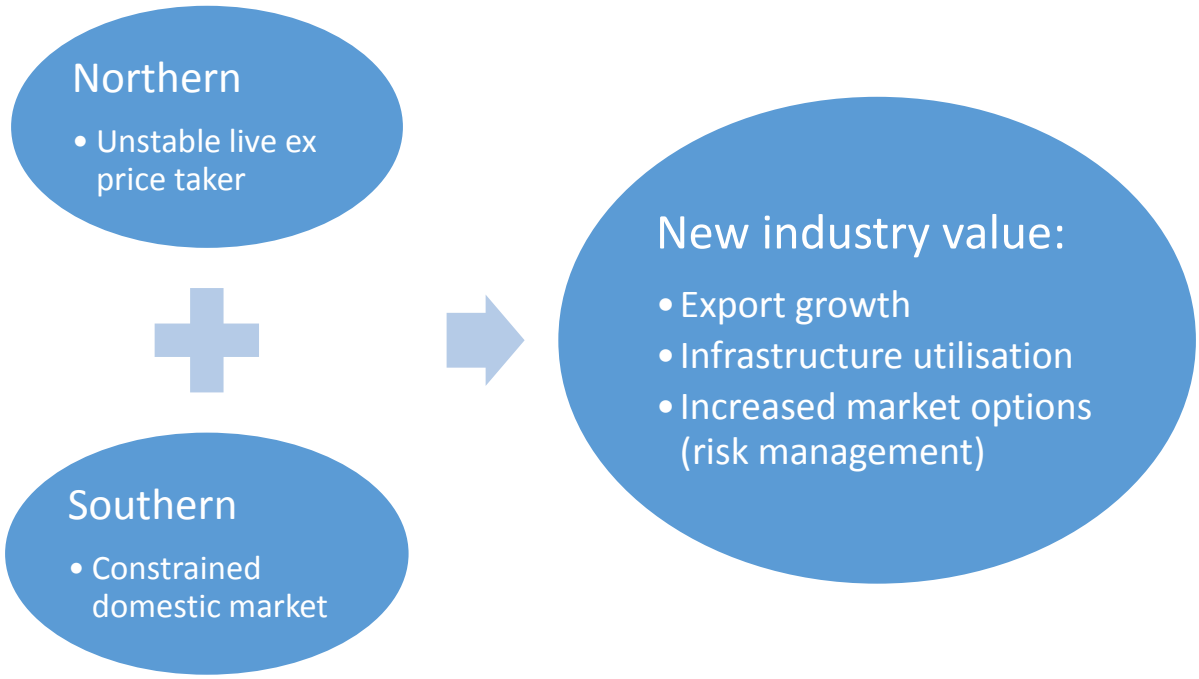


Figure 20: Subtle synergies between north and south represent new industry value and growth

7.4 Industry value proposition

The economic modelling conducted at a detailed level is summarised in Figure 21. The table shows the current baseline EBIT value per head by production sector on the left. Northern and Southern systems are reported separately and combined to give an average value. The new scenarios are summarised in the three columns on the right, indicating the per head increase in value that could be generated. The blue line indicates the total value to industry and the growth increase generated by developing these new supply channels.

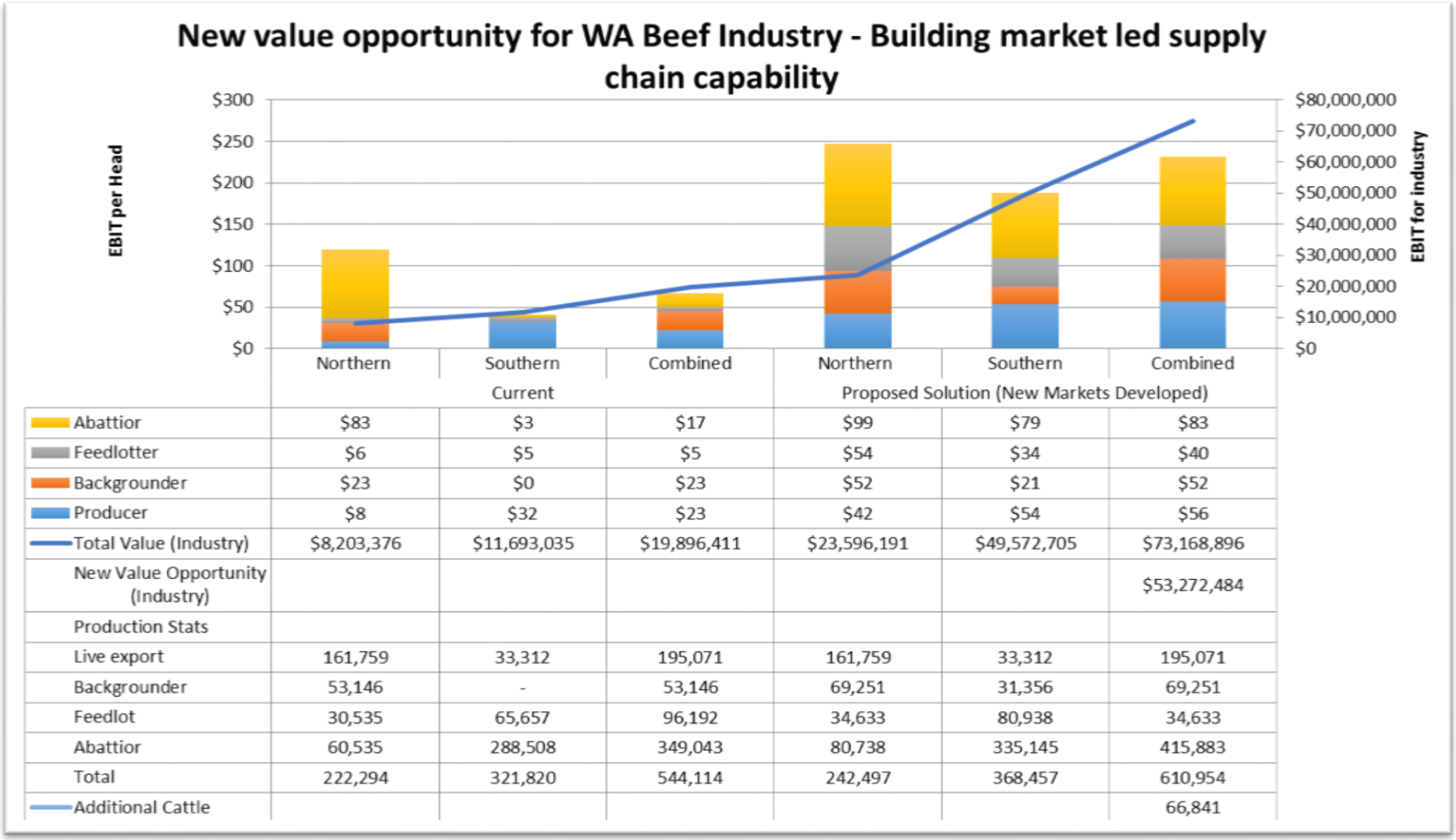
The results indicate an opportunity to increase profitability of the W.A Beef industry by 360%. This represents an increase of $298/head for 25% of Northern cattle and an average of $88/head across the state's annual northern and southern combined production. This includes an increase in production of 66,800 AE's for the state. This opportunity is based on using existing natural resources and infrastructure and does not assume building any new production capacity.

The description of the scenarios is explained in the next section (Section 7.5 "*Scenarios*"). New value is based on better alignment of resources along the whole chain. Market forces and a number of barriers across the industry have prevented this alignment in the past. They are addressed in Section 9.

In addition to these benefits there are a number of opportunities to build new production capacity which would increase the opportunity beyond that identified in this project. For example, increasing production volume, supply to new northern abattoir, expanding feedlot capacity, increased volumes of existing cattle through new supply channels, market price equivalence between northern and southern cattle with similar quality grades, among other opportunities.

This project was completed prior to the opening of the Darwin abattoir. At that time only cattle from the Pilbara and Western Kimberly regions were close enough to abattoirs in Southern WA and South Australia to consider diversified supply to include abattoirs. The proximity of the Darwin abattoir to all regions in the Kimberly could become another viable market option, depending on livestock quality and market access.

Figure 21: New value opportunity for the WA beef industry under current production constraints



	Current			Proposed Solution (New Markets Developed)		
	Northern	Southern	Combined	Northern	Southern	Combined
Abattior	$83	$3	$17	$99	$79	$83
Feedlotter	$6	$5	$5	$54	$34	$40
Backgrounder	$23	$0	$23	$52	$21	$52
Producer	$8	$32	$23	$42	$54	$56
Total Value (Industry)	$8,203,376	$11,693,035	$19,896,411	$23,596,191	$49,572,705	$73,168,896
New Value Opportunity (Industry)						$53,272,484
Production Stats						
Live export	161,759	33,312	195,071	161,759	33,312	195,071
Backgrounder	53,146	-	53,146	69,251	31,356	69,251
Feedlot	30,535	65,657	96,192	34,633	80,938	34,633
Abattior	60,535	288,508	349,043	80,738	335,145	415,883
Total	222,294	321,820	544,114	242,497	368,457	610,954
Additional Cattle						66,841

7.5 Scenarios

7.5.1 Drivers of scenario value

Each scenario considered changes to a range of operational and management practices. These were applied to varying degrees in each scenario and are summarised individually here:

Increase utilisation of current resources – Across the supply sectors increased utilisation of resources helped to reduce fixed costs per kilogram of production. In the following areas:

1. Production potential – Opportunity to increase production through better use of existing forage.
2. Increased utilisation of feedlot capacity.
3. Increased utilisation of processing capacity.
4. Effect of reduction of cost per kilogram produced and increased infrastructure utilisation on whole of value chain profitability.

Shift in production calendar – **financial impact was modelled using** the Beef Value Optimisation Program (BVOP) and the following adjustments were made:

1. Increasing weight of cattle when sold for southern backgrounding.
2. Reducing the weight of cattle when transported from rangelands regions, In order to:
    a. Reduce the cost of transport.
    b. Increase the quality of production by increasing growth rate and reducing age at slaughter.
    c. Increase value of beef through better nutrition and market compliance.

Transition domestic product into new export markets – export prices and specifications based on actual Eastern States markets were used to model the impact on supply chain profitability by changing the following:

1. Increase volume exported.
2. Access to export markets accepting increased carcase weight and age will reduce cost of production.

7.5.2 Supply pathway considerations

In developing the specific scenarios which were run through the BVOP modelling process, a number of elements associated with each supply pathway were firstly considered. These considerations which are outlined below helped shaped the scenarios.

Grass-fed steer value - The sale of grass fed steers from breeding properties in WA comprises the majority of cattle currently produced by the southern Ag region. This is shown by the Winter YG sales and Heavier YG animals being sold through the production system. The value of these animals to the industry could be increased if producers diversified their market options by modifying the turnoff time and breeding season.

YG domestic Steers - The YG domestic pathway supplying steers during the spring and summer represents the current situation which occurs in southern WA. This market will still need to be maintained to ensure the current customers have a constant supply of beef. However a proportion of production can be modified to increase weight and the supply of cattle during other seasons of the year.

Heavier Export steers - Developing a heavy grass fed steer pathway for producers in southern WA to supply steers with a body weight of more than 475kg live weight to the processing sector. This supply pathway could increase value in the following ways:

- Decreasing production costs per kg;
- Increasing the profit per head for steers processed through the abattoir caused by an increased weight processed per head and decreasing the fixed costs per kilogram;
- Increasing the supply of cattle during the autumn;

EU Feedlotting (WA) - The development of EU HQB pathways in WA and SA by backgrounding would increase carcase weight and access higher value markets. Developing supply pathways to multiple end markets (WA and SA) gives the producer more market options and price negotiation. Note the distance from east Kimberly to Southern WA and SA are almost the same.

Steers Backgrounded in WA (Southern) - This supply pathway would be developed to sell Jap OX bullocks as an alternative market where cattle don't meet EU specification. Backgrounding in the northern ag region or southern irrigated pastures would be required to support this product. Accessing light steers from the northern regions of WA during the winter and spring would be ideal for this market.

EU steers Backgrounded in WA – The development of an EU bullock supply pathway has been identified to be slightly more profitable than the Jap Ox bullock. This is due to an increased value of steers when sold over the hook. However the development of this supply pathway would require a higher level of investment in processor accreditation.

Light 100 day Grain fed - The supply of lighter steers to feedlots currently only occurs about 9 months of the year due to the price paid for grass fed cattle during the rest of the year. This section has been split into the winter and summer to show the affect which the price paid for grain fed steers per kilogram can have on the profitability of the supply pathway.

Heavy 100 Day Grain fed - This supply pathway is utilising a proportion of steers normally sold for slaughter as YG animals. These steers would be placed on feed for 100 days to increase the weight and the saleability of meat produced. It is expected that this benefit

could be increased depending on the genetic potential of steers on feed and where there beef could be sold.

7.5.3 Scenarios used in overall model

A range of scenarios were run through the BVOP model throughout the project including derivatives of those discussed in the previous section as well as others which proved in the end to be unviable or otherwise unprofitable. The scenarios are described in Figure 22 for Southern WA and Figure 24 for Northern WA. Selected combinations of these scenarios were then run together to gain a total value proposition. These are depicted in Figure 23 and Figure 25. For example, scenarios N2 – *Pilbara - Backgrounding in Southern WA* and N5 – *Kimberly – Backgrounding steers to Southern WA*, which send Pilbara and Kimberly steers to the Abattoir via Southern Backgrounders, were combined as part of the Northern model and comprised 19% of the total production numbers.

The results of these two combined models, Combined Northern WA and Combined Southern WA, form the basis of the results shown as 'Proposed Solution (New Markets Developed)' for Northern and Southern in Figure 21.

Northern WA Scenarios

Figure 22: Northern WA Supply Pathway Options & Barriers to Engagement

#	Supply Pathway Options	Description	BARRIERS TO ENGAGEMENT			
			$ Funding	Market Access	Communication	Supply Constraints
			Access to funding/Capital Availability	Market intel. and development capabilities to create demand.	Effective communication and information sharing along the chain.	Correct market specifications, business models and profitability.
	Pilbara					
N1	Feeder steers, Feedlotted in Southern WA	Steers 350 - 450kg relocated from the Pilbara for feedlotting and processed in WA.	✓	✓	×	✓
N2	Backgrounded in Southern WA	Steers relocated as weaner and backgrounded Southern WA then processed as grass fed PR animals.	✓	✓	×	✓
N3	Light Pilbara Bullocks	Steers < 550kg relocated to Southern WA for processing.	×	✓	×	✓
N4	Heavy Pilbara Bullocks	Steers < 550kg relocated to Southern WA for processing.	×	×	×	✓
	Kimberley					
N5	Backgrounding steers to Southern WA	Weaner Steers relocated into WA for backgrounding and sold to processors either as grown steer.	✓	×	×	✓
N6	Feeder Steers to SA	Steers relocated from the Kimberley and feedlotted in Southern SA.	×	✓	×	×
N7	Slaughter Steers to SA	Bullocks (> 550kg live weight) relocated to SA for Processing.	×	✓	×	×
N8	Feeder Steers to Southern WA	Steers relocated from the Kimberley and feedlotted in Southern WA.	?	×	×	×
N9	Heavy Slaughter Steers to Southern WA	Bullocks (>550kg live weight) relocated to Southern WA for Processing.	?	×	×	×
N10	Light Slaughter Steers to Southern WA	Bullocks (<550kg live weight) relocated to southern WA for Processing	?	×	×	×

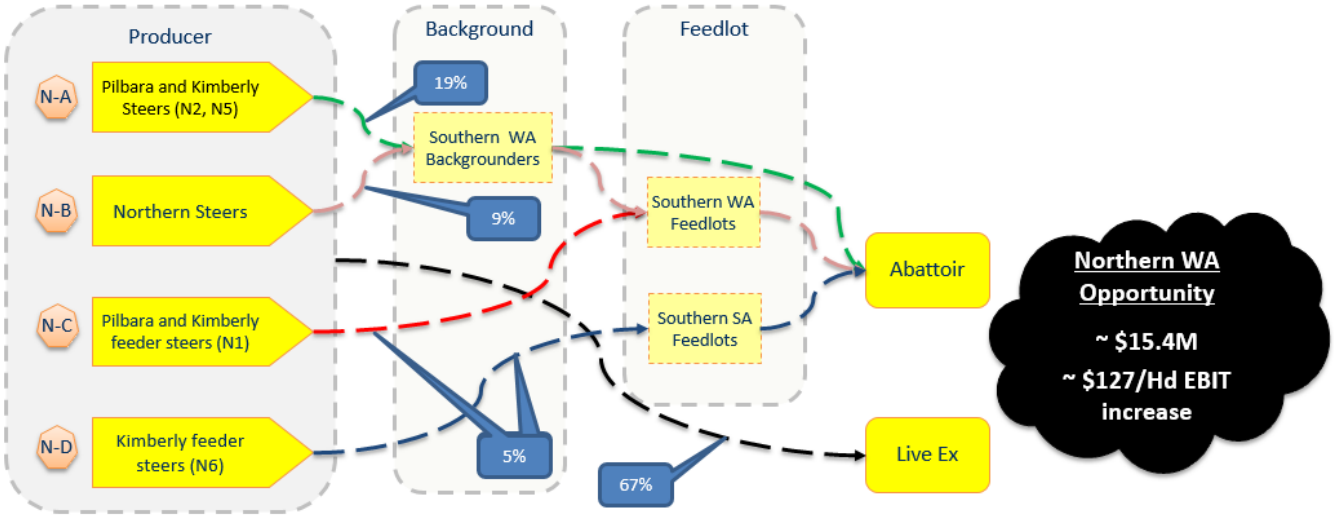


Figure 23: The Northern WA supply pathway scenarios used

Southern WA Scenarios

Figure 24: Southern WA Supply Pathway Options & Barriers to Engagement

#	Supply Channel Options	Description	ENGAGEMENT BARRIERS			
			$ Funding	Market Access	Communication	Supply Constraints
			Access to funding/Capital Availability	Access to markets and market information, building confidence, trust and collaboration	Effective Communication up and down the Supply Chain, trust and collaboration.	Supply to get enter the market. Propose new business model with SC Champions.
	Pilbara					
S1	YG Domestic Supply	YG steers <450kgs sold for processing	✓	✓	×	✓
S2	Heavier export steers	Grass fed steers >450kgs sold for processing	✓	✓	×	×
S3	EU HQB Feedlot	EU accredited steers Feedlotted and processed in WA	×	×	×	×
S4	EU HQB - Backgrounding & Feedlotting	EU cerified steers backgrounded, feedlotted and processed in WA	×	×	×	×
S5	Light 100 day Grain fed Steer	Grainfed steers feedlotted and sold for processing at liveweights <500kg	✓	✓	×	✓
S6	Heavy 100day Grain fed steers	Grainfed steers feedlotted and sold for processing at liveweights >500kg	✓	×	×	×
S7	Steers backgrounded in WA	Steers Backgrounded and processed in WA as 500 to 650kg bullocks	×	×	×	×
S8	EU steers backgrounded in WA	EU grass fed steers backgrounded and processed in WA	×	×	×	×

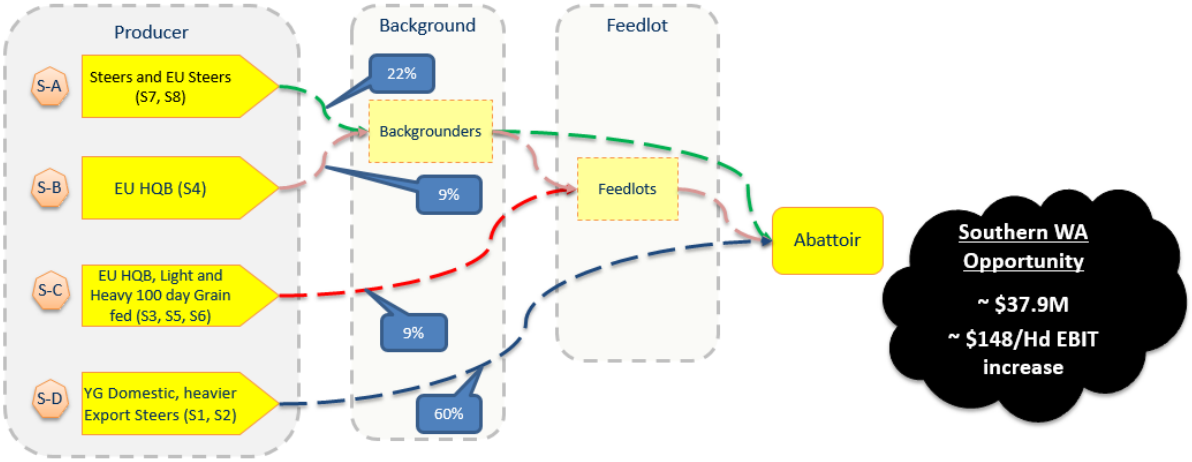


Figure 25: The Southern WA supply pathway scenarios used

7.6 Drivers of Value

7.6.1 Fixed and variable cost impact

Improving utilisation of processing facilities in Western Australia may increase the sustainability of the entire state's beef industry. Increasing the number of cattle killed per year will improve efficiency and allocation of fixed costs resulting in a decreased operation costs per head. The data in Figure 26, represents the likely magnitude of benefit per head through increased processing volumes based on three plant fixed cost estimates.

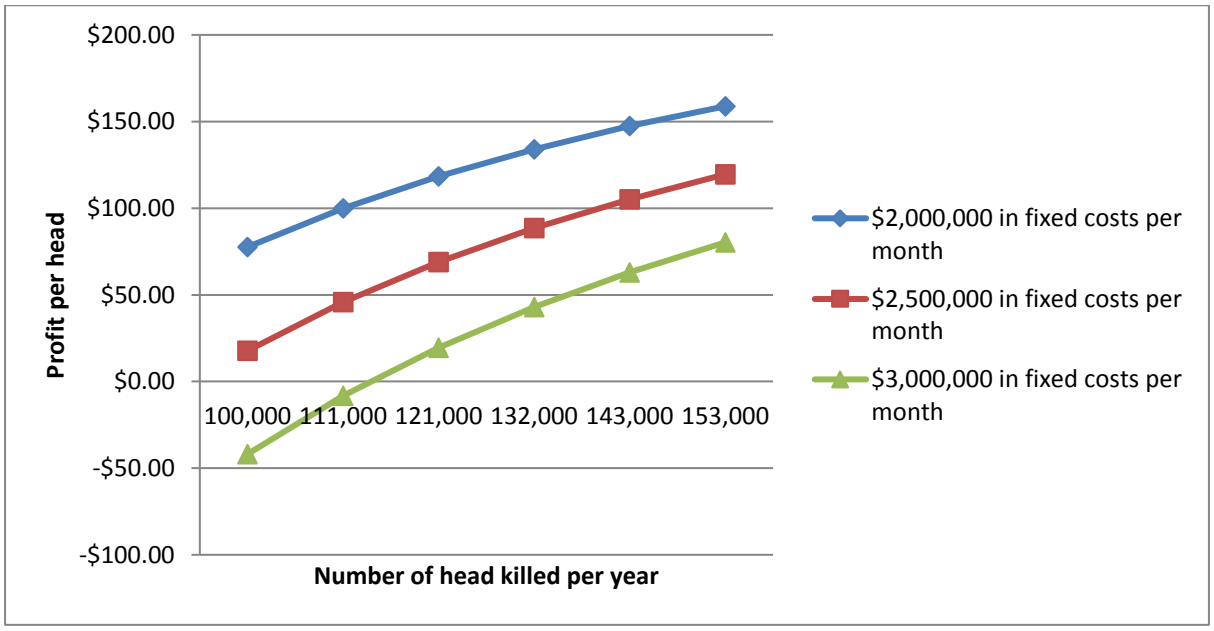


Figure 26: Impact of fixed cost allocation on increasing infrastructure utilisation

The benefit from increasing the number of cattle killed in an abattoir per year may allow for an increased livestock price per kilogram. Other factors come into play but the key point is

that increased processing volumes improve the ability of the supply chain to compete as a result of reduced cost per kilogram produced.

7.6.2 Infrastructure and resource utilisation increases

This section identifies how well the Western Australia beef supply chain is utilising their infrastructure. Comparison of Eastern state case studies provided insights to enhance W.A. performance. In comparison with eastern states, WA infrastructure is vastly underutilised. It is estimated that the processing sector is currently exporting 47% less product than in 2008. This cattle is being processed in other states or exported live and in both cases the Western Australia industry is losing value

During the semi-structured interviews with eastern states supply chains it was estimated that the feedlots and abattoirs in Queensland are utilising 90 to 100% of their total capacity. The supply chains facilitated this performance by improving utilisation of backgrounding and production properties beyond a producers cashflow constraints. Different business models such as this are considered in section 10.

The utilisation of production operations for breeding, backgrounding and feedlotting cattle could be increased. Production potential was mapped as part of the project. A summary of results are included in Figure 27 and identify that there is potential for increased production in targeted areas. Initiatives that develop both the Northern and Southern supply chains around better utilisation of existing infrastructure were considered.

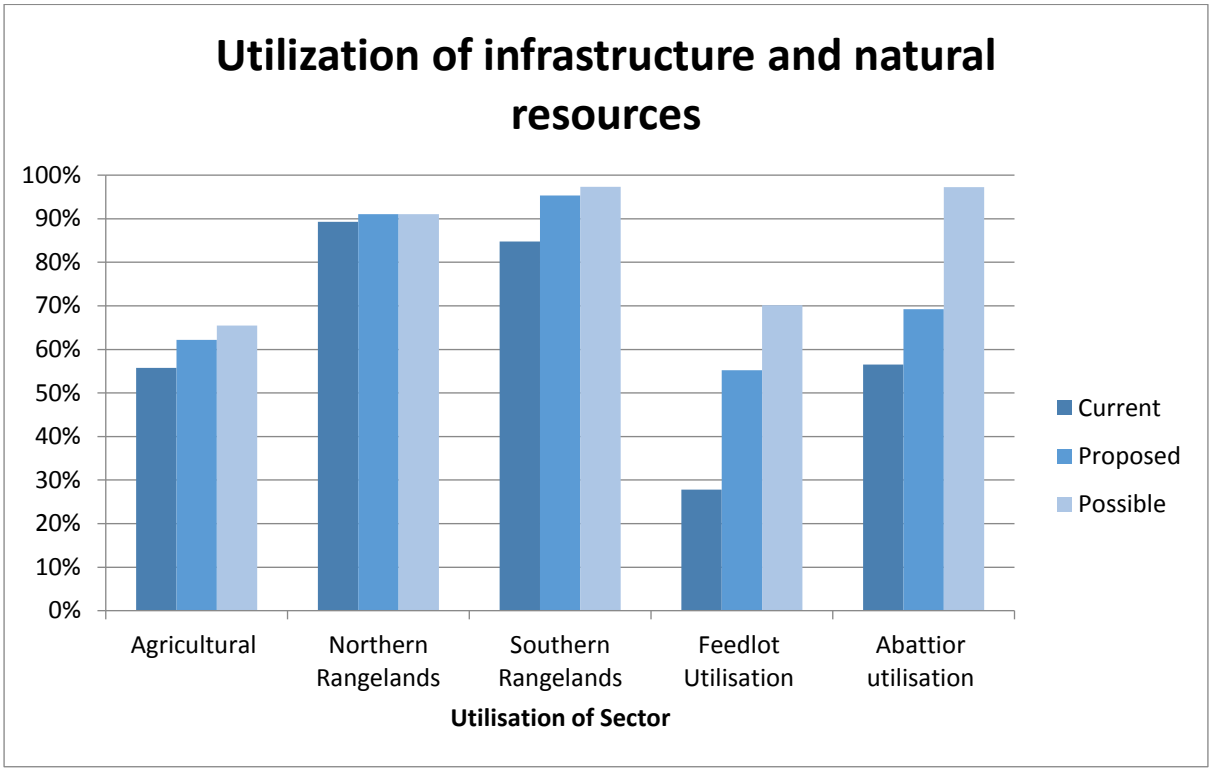


Figure 27: Targeted use of underutilised resources and infrastructure

Value chain mapping identified the areas of the southern and northern regions of the state that could grow value. The graph shows potential based on modelling data from a range of sources detailed below.

Agricultural regions

- Station Stocking rates (data since 1985 per property in northern WA & if it is a mining or pastoral lease). This information collected as part of the pastoral lease agreement.
- DSE carrying capacity of unimproved, and every years recorded carrying capacity.
- NLIS animal transfers to calculate the total number of animals being relocated and the data collected through the RD&E project to compare the results of mortality rates and reproduction rates.
- Looked into the rainfall to match the stocking densities with good seasons and bad seasons.

- Southern WA regions
    - Total number of animal movements for the last 5 years.
    - Pastures from space data was refined to show average growth since 2001. This showed the current utilisation and growth of green matter every week.
    - Beef cattle production census data was used to show the max production possible in WA.
    - Total hectares per area coupled with all the other data.
    - Rainfall and seasonality data for the last 120 years showing the seasons which received above or below average rainfall.
- Feedlot
    - ALFA (Australia Lot Feeders Association) conducts a survey every quarter of its members to show the current capacity and animals on feed this data was used to show the variation in animals on feed during different years.
    - The NLIS data supported (where possible) the total number of animals which were moved on and off feedlots.
- Abattoir capacity
    - The total number of animals processed for the last 5 years was calculated using the NLIS movements.
    - Processing capacity of Abattoirs was supplied by DAFWA, from a survey which provided the max processing capacity.
    - Export data supplemented these values where possible.

7.6.1 Capacity opportunities

Capacity opportunities were mapped for all regions across WA, the results of which are highlighted in Figure 28. Future implementation projects could utilise this supporting information to target areas for greater growth potential.

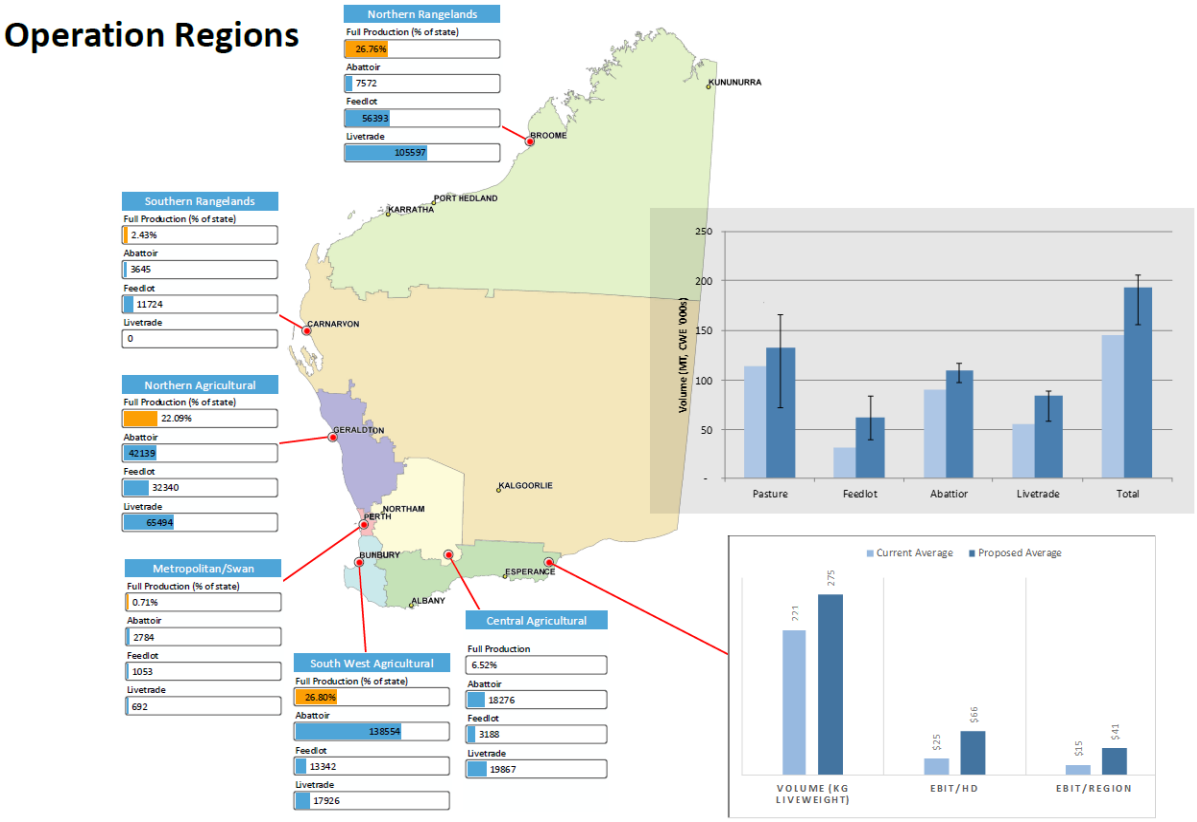


Figure 28: Mapping of production potential by region

7.6.2 Producer management options

Development of completely different systems for a portion of a property's production could give access to higher value. However, this requires multiple market options, market intelligence and capability to adapt production systems to access alternative market channels.

Alternative channels will not be an option for some producers. However, the benefits realised by the leaders by growing new markets will indirectly help everyone by generating increased demand.

7.7 Market Development

To realise the benefits outlined earlier in this report a number of export market developments will be required. This section summarises the current market mix in Western Australia and market development opportunities based on changing global markets.

7.7.1 Export Market summary

Figure 29 and Figure 30 summarise the export boxed beef markets currently being accessed by W.A. processors. Figure 30 shows there is an increase in export volume of 12% on the past 3 year average. Although this indicates a positive outlook in export demand, it is still 30% down on volumes exported 5 years ago.

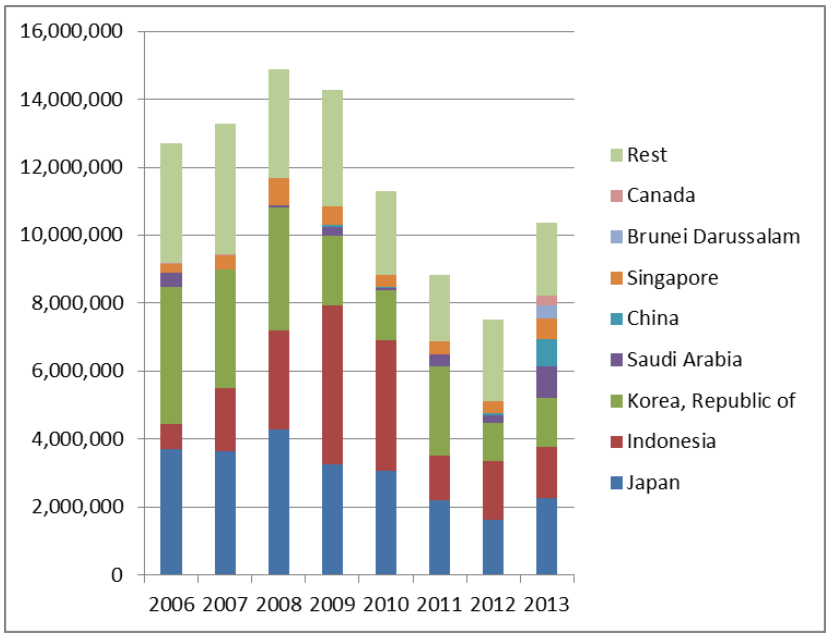


Figure 29: W.A. market mix as a portion of total export volume by year

Observations from eastern state exporters indicate that there is an increase in the complexity of export markets as international buyers become more selective in the mix of cuts they require.

Although a very short term snapshot, the mix of destinations making up 80% of the export volume has increased from the same 5 or 6 countries over the past 10 years to 9 in 2013. Japan, Korea and Indonesia show the largest declines in volume while China is the fastest growing export market; albeit a small portion of total volume at this stage. These trends are consistent with eastern states.

Figure 30: WA Export Market Mix

	Carcase Equivalents	Market Mix	Growth on 3 year average
Japan	10,255	21.8%	-2%
Indonesia	6,848	14.5%	-34%
Korea, Republic of	6,621	14.1%	-16%
Saudi Arabia	4,216	9.0%	334%
China	3,636	7.7%	2623%
Singapore	2,758	5.9%	63%
Brunei Darussalam	1,771	3.8%	463995%
Canada	1,340	2.8%	#DIV/0!
Rest	9,627	20.5%	-7%
Total	47,071	100.0%	12%

7.7.2 Key Opportunities and Challenges

The following are considered opportunities and challenges:

- Export country licenses – are the biggest limitation to export growth in W.A. as processors lack market access to countries like China, EU and Russia. Accreditation is limited in part by the plant infrastructure requirements for some countries. Chinese listing is held by one W.A. processor and another has been waiting almost 12 months for final approval, while the third is unable to apply due to slaughter and boning being done on different premises. EU listing requires separate slaughter and boning amenities as well as exclusion of cardboard from the pack off area. Both these requirements involve significant capital investment for a market that W.A. producers are not yet accredited for.
- Export competitiveness with the east is reported by processors to be impossible at some times of the year due to eastern seasonal advantages and volume. However, investigation of alternative niche supply channels with a point of difference and brand proposition could provide more reliable opportunities than current opportunistic sourcing methods.
- China market growth has been the fastest for Australian beef over the past 2 years. Market research with other Australian exporters indicates the market has the flexibility to take a range of cattle types. Although W.A. processors have focused on the supply of YG product, reflecting domestic focused purchasing, eastern state companies have had success in marketing 0-6 tooth grass and grain feed which creates a much wider range of options. This could prove beneficial in filling out W.A.'s current narrow livestock specification range but will require ongoing collaboration along the chain to build this breadth of supply capability.
- Limited export market for YG product due to high cost of production requires focus on older cattle types in order to build exports. This requires a diversification in procurement beyond current domestic procurement strategies. That in itself creates risk as market development initiatives need to sustain supply.

- YP and GFYP markets are a potential diversification away from domestic YG and may be an opportunity for pastoral cattle. This market could be linked with WALFA WA Beef Brand concept. Potential markets for this product include;
    - Domestic sale of prime cuts.
    - 8 cut full sets to higher value markets such as Japan.

7.8 Managing risk involved in developing new supply chains

Diverse markets provide greater and more stable value. However, developing diverse markets from a very narrow market mix makes change and growth strategies risky for the beef industry.

The carcase specifications for Western Australia's three boxed beef markets is summarised in Figure 31. The "All Other Products" specification returns a low value to the supply chain and is not profitable. Only very narrow and tight production processes are able to produce the "light trade and Domestic Retail specifications" that reward the value chain appropriately. Producers cannot afford to fall outside these narrow specifications and remain profitable.

Initial investigation indicated there are opportunities to increase market diversification for northern cattle. This involves better access to existing domestic markets but also includes the development of new export markets for Western Australian beef and is summarised in Figure 31 as "Northern Cross-bred". As this emerging pathway develops discussions with participants in each sector of the industry could help identify barriers to development and growth of other market opportunities.

7.8.1 Narrow market mix

The domestic market which accounts for at least 70 per cent of WA boxed beef sales has historically consisted of two key markets, retail young beef trade and manufacturing beef (for sausages, hamburgers and value-added products). Figure 32 reflects the diversity of markets that exist in the Eastern States due to a solid mix of domestic and export market demand. There are opportunities to develop some of these markets in W.A.

Each of the WA beef processors has a slightly different mix of business, but all are focused on a solid domestic market to underpin their viability. The three largest processors are supported by stable retail supermarket contracts. These retail needs are reflected in their livestock purchasing behaviours where clear market signals are only given for their domestic requirements and all other cattle are purchased on a base price and sorted into market categories post the carcase slaughter floor.

The main market categories are:

- Retail – MSA Yearling product is very similar to east coast retail trade product. Long term there is an opportunity to substitute Southern YG product with selected Pastoral cattle and find higher value markets for southern cattle.
- YG product is the most expensive to produce relative to older YP and PR cattle. YG is the largest focus in WA.

- Marketing MSA PR cattle – is a new focus for processors and indicates a diversification in procurement and sales strategies.
- Local Butchers – processors state that the PR product being produced is destined for local butcher shops looking for a lower price point product to compete with the supermarkets.

7.8.1 Domestic price risk impacts behaviour

The WA market appears to be price sensitive with cheap deals on cuts promoted weekly by retailers. This could be driven by the cheaper "overflow product" from eastern processors that is readily available. Retail companies like "The Spud Shed" who supply discount fruit and vegetables are gaining significant share of the fresh meat market, indicating the general demand for price competitive alternatives is high. Growth of the Spud Shed's meat range including beef indicates the focus on price. Given boxed beef is the only option for growth, development of export markets that reward value have to be developed.

7.8.2 Diverse markets minimise risk

The same specification grid in Figure 32 reflects a wide range of markets for Eastern states supply chains that all pay premiums. If carcases fall outside one market specification the alternative market and price, although less valuable, is still financially viable.

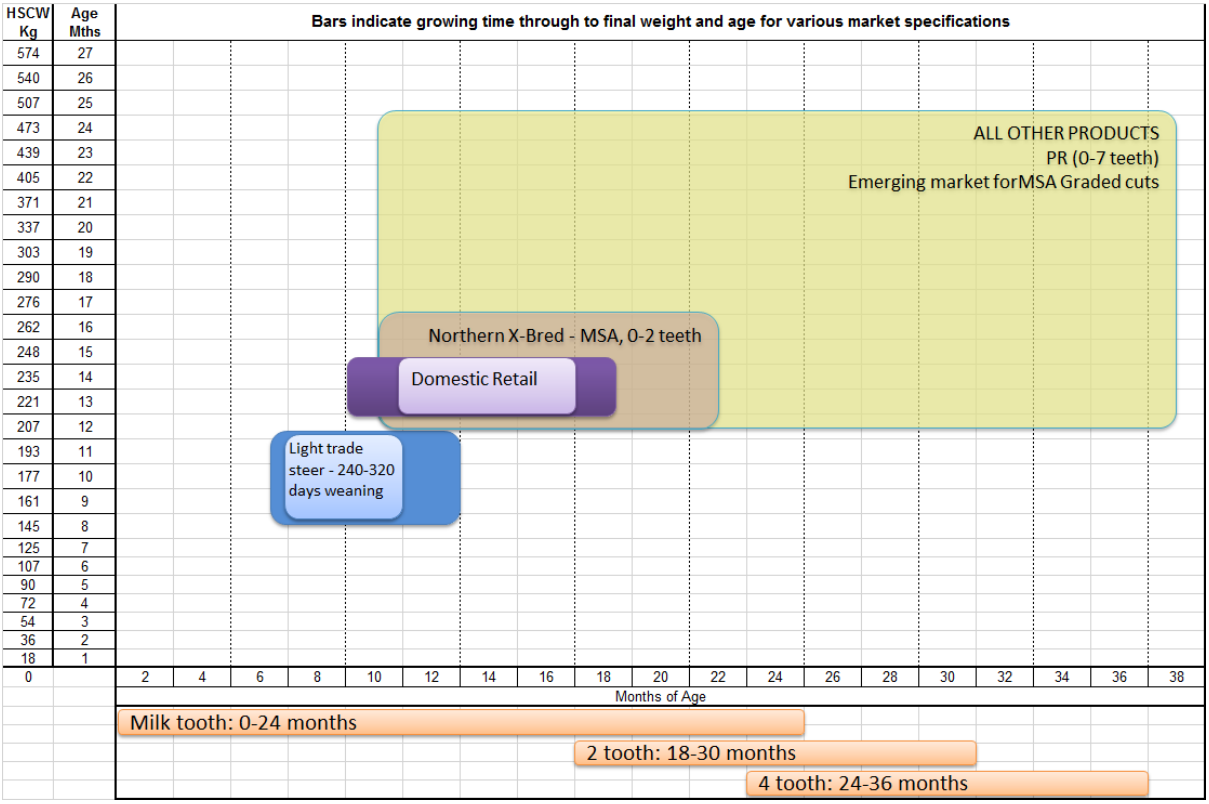


Figure 31: Predominate WA boxed beef market specifications

The market development process when only one or two new markets (not necessarily overlapping) are being built from a narrow mix is much more challenging. Customers are testing the supplier specifications and producers are learning how to meet the specifications. The risk is that cattle fall out of spec to the lowest possible value and incur severe penalties. Given the poor stability and lack of confidence in the market neither processor nor producer wants to take that risk. The inertia for change is great because of this.

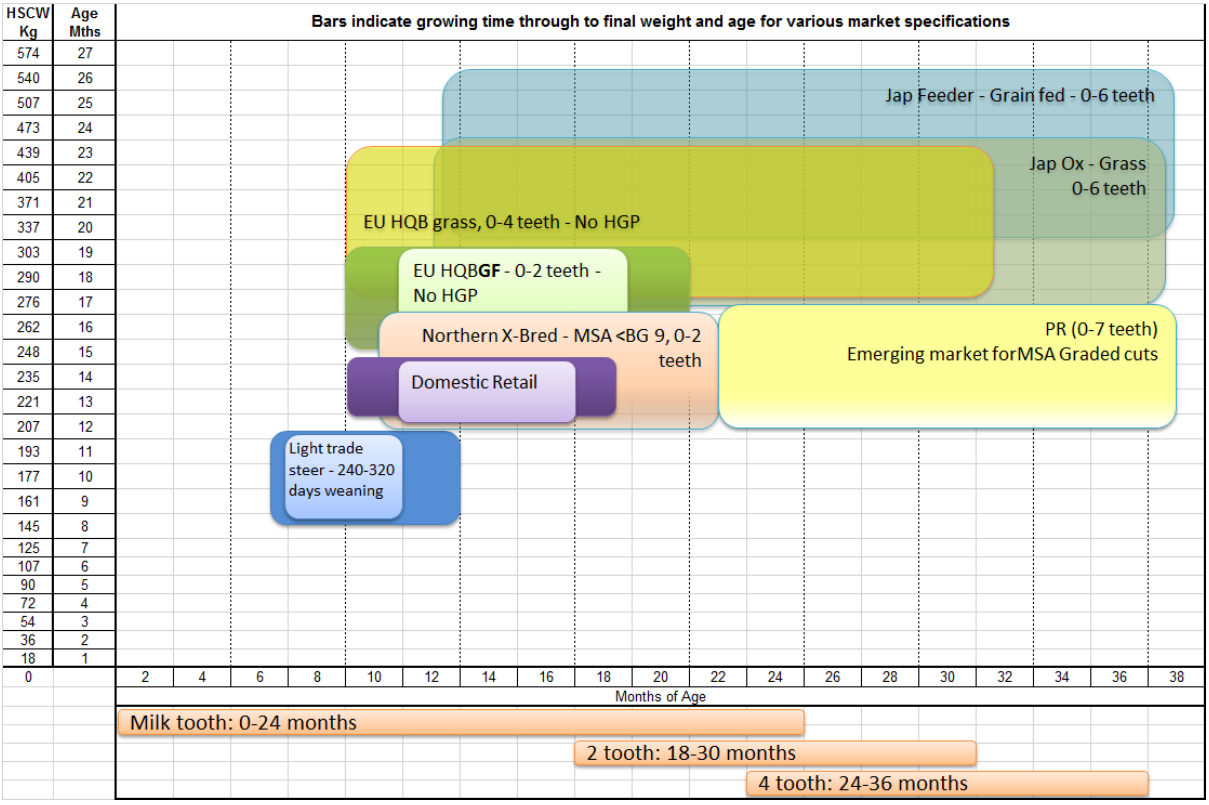


Figure 32: Diverse eastern states boxed beef market specifications

Part of the strategy when developing new supply chain scenarios was to order the development of markets that progressively fill out and overlap existing markets to reduce risk.

In addition, a range of capabilities are required to support new value chain developments. This includes development of production capability in backgrounding and feedlot sectors as well as improved market signals and information sharing between demand and supply. Every supply chain has gaps in capability. However, some supply sectors within WA are almost none existent. As a result, some significant gaps in capability exist and will hinder development of new supply channels if not addressed.

This next section describes the capability analysis that was undertaken to identify capability needs and support new value chain initiatives.

8 Capability Mapping

8.1 Overview

The degree to which a supply chain creates value is impacted by the capabilities developed that help leverage available resources for maximum value across the entire supply chain from production to end consumer. Part of this project included a preliminary assessment of the WA beef industry capabilities. Opportunities to support new capability were identified that could underpin new value.

The Figure 33 summarises the groups of capabilities that impact on realising value and the framework used to assess industry capability. Resource capabilities include tangible physical resources such as genetics, land assets, infrastructure and processing facilities. In addition less obvious, but in some ways more important capabilities (S.C. signals and connectedness) describe the way in which information and market signals are communicated along the supply chain. These information sharing and market signal activities help leverage physical capabilities to align with markets to realise value. The third tier in the figure describes the wider market forces in which the value chain operates. These include external competition such as other value chains (Eastern states beef, international competition, other protein sources) and political and regulatory forces such as market access, exchange rates and economic policy. Although this last section has an impact, it exerts the same force across all supply chains and as it is difficult to influence, does not have any focus in this study.

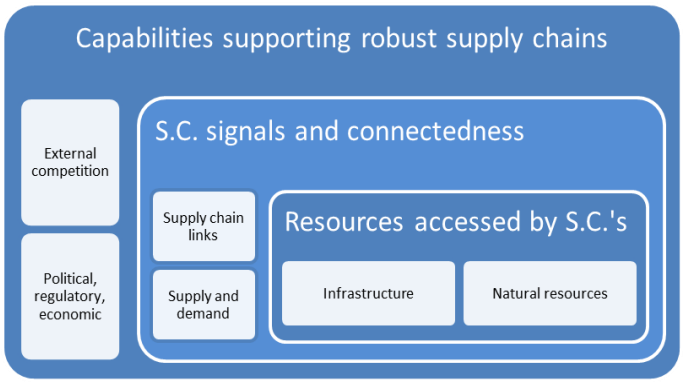


Figure 33: Capability groups used to assess value chain effectiveness

Well-developed capabilities help more accurately identify, align with, and access maximum market opportunity for the natural resources. These effectively minimise risk and increase confidence to invest in further capability development. A lack of capability along the value chain has two major impacts:

- Limits the ability to realise potential value
- Limits in severe cases (and in the case of WA Beef) the development of new capability due to high risk created by capability gaps. This lack of opportunity results

in a catch-22 situation that requires specific intervention to overcome barriers to growth.

8.2 Methodology

Findings from interviews conducted with commercial participants over the 18 month period were mapped to a series of capability criteria. Degree of capability in each area was based on a 3 score Likert scale with 1 being the least developed through to 3 being most developed capabilities. 37 capabilities where identified across the 5 capability areas. The degree to which each level of a capability was observed was recorded. The degree to which each level was expressed across the state was then estimated based on these observations over the 18 months.

Note this survey technique is not a validated measurement tool. It is designed to help summarise the observations across the project and to identify general capability gaps where development support would help overcome barriers to growth of new value. The discussion created by the results is more important than the numerical value itself.

The matrix of criteria used to assess capability is summarised in Section 14 “Appendix – Capability Mapping” on page 86.

To assist in identifying opportunities for WA a case study was conducted of supply chains in eastern states using the same metric to identify successful alternative supply chains and how they function. Comparative case studies highlighted gaps in capability that if developed could help establish new self-sustaining supply pathways.

	Overall Supply Chain
Capability Group Summary	Natural resource utilisation
	Infrastructure
	Supply and demand
	Supply chain links
	Political, Regulatory, Economic Environment
	External Competition / Industry environment
Operational Productivity	**Natural resource utilisation**
	Resource quality (Pasture, Genetics & Grain)
	Resourse costs
	Resource Management
	Input utilisation
	Infrastructure
	Capacity
	Utilisation
	Quality capability
	Logistics
	Procurement strategy
	Access to capital
Strategic Productivity	**Supply and demand**
	Competitors / Critical mass
	Market Perceptions
	Competitive Advantage
	Market Options
	Market Importance
	Product diversity
	Income Distribution
	Supply chain links
	Relationships
	Supply chain communication
	Business Models
	Trust & Collaboration
	Cross-sector understanding
	Supply chain coordination
	Access to capital
	Risk management
Industry Environment	**Political, Regulatory, Economic Environment**
	Trade Policy
	Industry Support
	Phytosanitary/Health/Food safety
	External Competition / Industry environment
	Critical Mass
	Business model innovation
	Competitive Advantage
	Cross-industry Competitiveness
	Within-industry Competitiveness
37	**Total capabilities used across all groups**

Figure 34: Specific capabilities by capability group

8.1 Summary results

The results are summarised in Figure 35Figure 36. Given the environment and industry size is completely different in eastern states, the Western Australian industry should not be expected to copy exactly or ever expect to be like the eastern states industry. However, a number of barriers to development of capability in WA have been successfully addressed in these other value chains and give useful insights included in the recommendations.

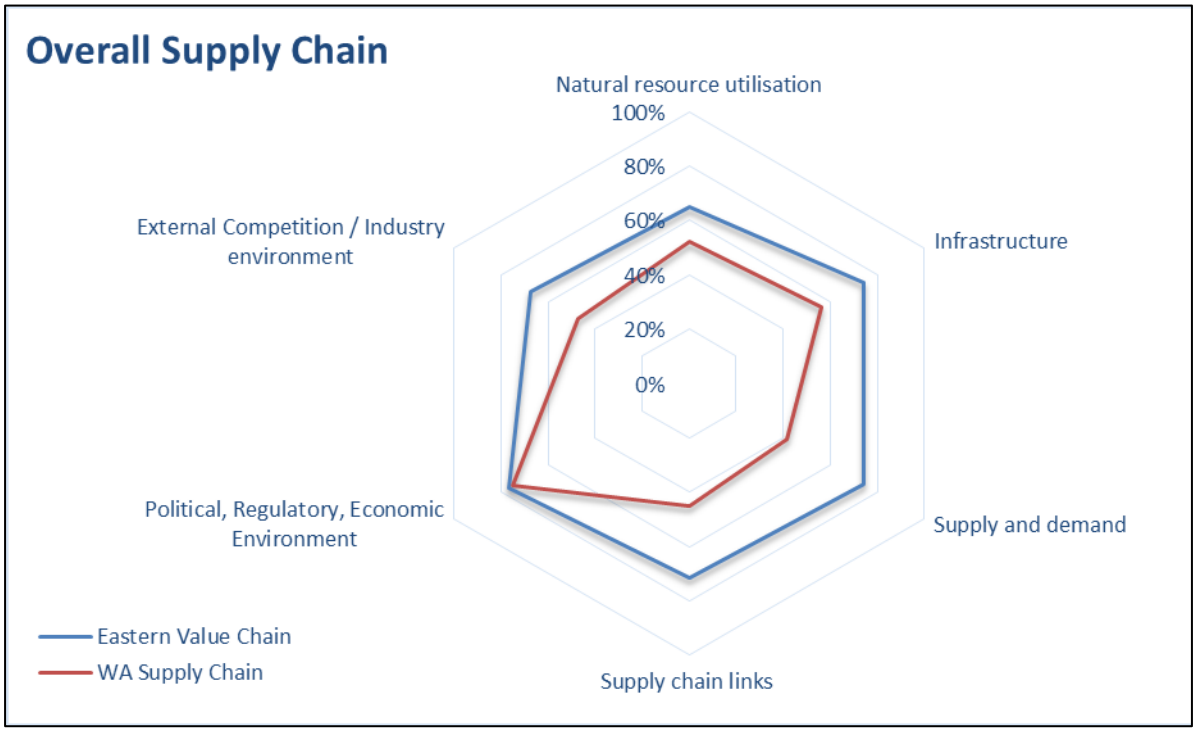


Figure 35: Capability group comparison between Western Australian Beef supply chains and eastern states case study value chains

The overarching summary is that, in comparison with other well developed value chains, W.A. has a relatively good degree of natural resources and infrastructure to support industry value. However, the major weakness in realising this value is the way in which the different sectors of the chain align to use those resources. As a result the overall competitiveness of the industry relative to other beef industry's and other resources competing for the same breakup of each capability group is included in Figure 36 and more detailed explanations of each capability are detailed in section 14.

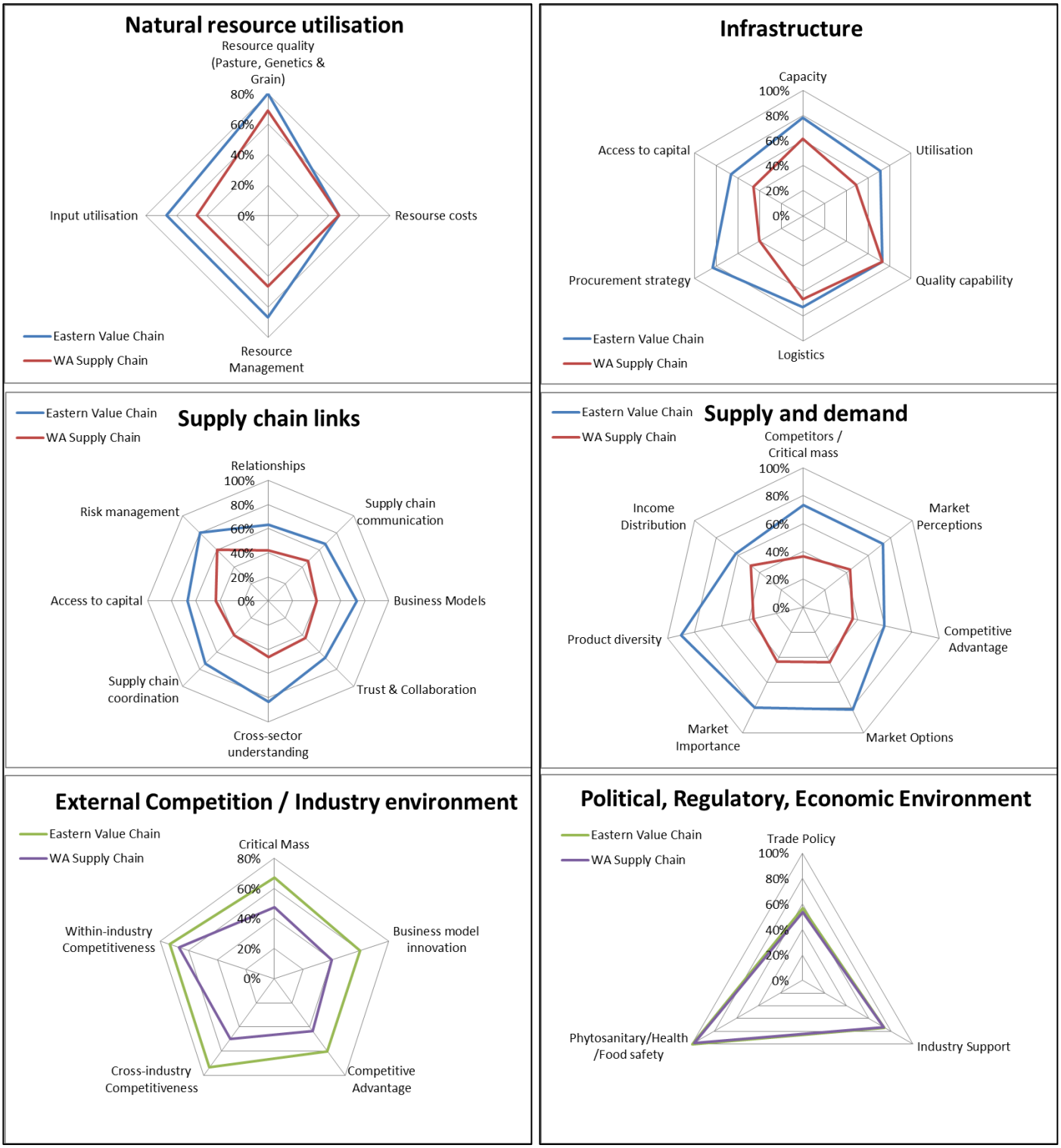


Figure 36: Detailed summary of capability ratings within capability groups

8.2 Capability Impacts

A summary of capabilities are shown in Figure 32. The more detailed findings are attached in Section 14. Barriers to development of these capabilities is just as important and have been summarised in section 9.

Figure 37: Impact of deficient capabilities on access to new value

Deficient capability	Description	Sector	Impact
Utilisation of natural resources and infrastructure			
Underutilisation of pasture resources	Pasture growth in the south is not fully utilised in some regions and seasons.		Cattle are turned off earlier than required at lighter weights when prices are lowest, all combining to minimise profit.
No backgrounding sector	Backgrounding in the broadest sense involves the growing out of animals where weight is increased at the lowest cost for weight gain.	Producer	Northern producer's background but predominately on properties purchased for that sole purpose. Almost no backgrounding exists in southern WA. As such there is no market for producers to sell or retain ownership of yearling cattle. In a good season extra pasture is not utilised as cattle are not traded in this way. Markets for older backgrounded cattle (PR, Grass OX) that reward product value and cost of production aren't established so anyone risking the purchase of cattle to background will only do it opportunistically when producers off-load at below cost.
		Feedlot	The feedlot sector has tried to develop year round programs for YG, YP and PR cattle. This has been hindered by lack of market pull. If markets were developed a backgrounding sector would need to be developed. Feedlots run 6 months of the year supplying yearling cattle through the winter. For small programs outside this turnoff they have had to develop their own backgrounding operations. But this is niche and does not create an additional supply pathway for the wider industry that increases market agility.
		Processors	Lack of a backgrounding sector limits processors ability to diversify markets due to the wider range of livestock specifications required.
Limited leverage of high quality grain	Grain feeding provides a significant buffer to manage dry times, turn cattle off faster, enable out of season supply as well as support backgrounding to utilise surplus feed, as well as enable access a wider range of markets	Feedlot	Feedlotting is considered opportunistic in W.A. and only utilised to fill gaps in out-of-season domestic grass fed markets. Lack of a viable year-round feedlot industry and associated markets creates a large gap that limits the supply chains agility and resilience.
Underutilisation of infrastructure	Limited use of current facilities results in a higher cost of producing beef.	All Sectors	Intermittent volume well below capacity in all sectors increases cost of production, retention of trained staff and is not competitive in the export market.
Supply chain alignment and connectedness			
Narrow range of preferred livestock	Processors claim they can take any animal. This is different to requiring specific market specs	Producer	A narrow range of market specifications limits the supply chains ability to adjust production in response to environmental changes and market price fluctuations. These limitations increase the risk of adjusting narrow (less than optimum) practices to

Deficient capability	Description	Sector	Impact
specifications	and paying competitive rates that align to costs of production, resulting in a range of specs delivered across the industry that optimise value from different production systems.		broaden market specs.
Minimal development of long term strategic export markets	Strategic export markets should enable development of export markets and customers required to support industry growth have been opportunistic at best and have not enabled the development of reliable and adaptable supply chains	All Sectors	Weak or non-existent market signals
Minimal development of strategic export customers	Customer relationships that require larger volumes of beef during peak times of production	Processing	Limited value for animals which are not Southern YG cattle. This has resulted in low value for older heavy animals. Resulting in an elevated cost of production of the entire industry.
Unclear market signals	A few supply specs exist with little	All Sectors	Supply has been focused on narrow “programs”.
Limited understanding of in market consumer needs	Companies that focus resources and skills to work in market with customers gain insights about consumer needs, flexibility and opportunities for product solutions not obvious to the customer. This can provide opportunities to negotiate supply that better suits the production chain.	Processing	One-way communication of product needs from a third-hand customer limits ability to package the best solution for the supply chain when an alternative could be formulated with deeper customer insights. Given the fragile state of WA supply chain capabilities incorporating any extra flexibility impacts positively to build critical mass.
Lack of market agility	Supply Chain’s focus on one market, within the ability to rapidly change	All Sectors	A narrow domestic product range is 70% of boxed beef production focus. Development of new markets has been limited by weak financial position but this is changing. No service kill has prevented development outside of the 3 export processors.
Limited sales options for producers	Very few markets available for producers to sell animals through.	Producers	Heavy reliance on agents. The agent sector could resist interventions that are not managed well and appear as a threat to agent income.

Deficient capability	Description	Sector	Impact
Limited initiative from producers to seek alternative market options	The production sector has traditionally had limited ability to control commodity markets	Producers	Dynamic Alignment surveys profiled a large population of the production and feedlot sector identifying a very small percentage willing to be innovative and take initiative to try alternative channels while the majority looked for direction from others. Is this due to reliance on agents to secure kill space and finance, no other markets existing and no alternatives? Would a percentage of these work well in a more integrated supply chain over time?
Limited business model options	Business models differ in their suitability to company culture and capability and the industry structures in which new value chains are being developed.	All Sectors	Results from Dynamic Alignment surveys indicated the majority of the production sector do not behave innovatively and prefer to be lead. So business models that take leadership in managing the supply differently to optimise value opportunity and enable producers to join that leadership and benefit will generate new value faster than existing business model constraints.
Poor livestock procurement planning	Knowing what the country can produce, costs of production for alternative production cycles to match new markets and balancing market price with profitable production are required in planning processing volumes and the resultant market signals required to obtain that volume.	Processing	Shortages of cattle through the winter put the processing sector under financial pressure which limits their ability to gain momentum and financial strength required to communicate clear market signals. Lack of understanding at the processor level of what is possible in the production system creates gaps between market need, correct pricing and setting of market signals that will create change. The gap results in lack of confidence at all points in the supply chain.
Lack of engagement of participants along the supply chain	Connection initiated by value chain leaders sets a direction and through communication of reliable information that enables suppliers to make decisions, should build trust and engagement.	All sectors	Lack of connection, and confidence limits trust and produces low levels of constructive communication. The resulting limited engagement hinders value chain adjustment, agility and innovation to access new value. New initiatives
Lack of critical mass	Critical mass refers to the size a company, market sector or industry needs to reach in order to efficiently and competitively participate in the market. This is also the size required to sustain growth and efficiency.	Livestock supply	Limited market options and limited critical mass create abnormal market volatility as participants enter and exit the market. Participants lose confidence. Forward planning new initiatives becomes risky. Backgrounding is the most obvious sector lacking critical mass but all sectors lack critical mass to some degree.
Limited competition	Healthy competition encourages increased value as participants in the chain have to fight harder to	Processing	Multiple market options provide fall back alternatives.

Deficient capability	Description	Sector	Impact
	obtain inputs.		

9 Industry environment and barriers to change

Developing strategies for increased growth and profitability is not that simple otherwise industry would have already done it. Sometimes barriers are too significant. A range of barriers need to be considered and overcome in order for the value proposition outlined previously to be achieved. This section identifies barriers to realising the value opportunities.

9.1 Northern barriers to change

- There is a perception that northern cattle cannot fit into higher value boxed beef markets although this project demonstrated grading of good cattle for MSA. The underlying driver is more around supply risk and price negotiation and requires increased collaboration towards confidence building for both seller and buyer.
- There is a perception that transport from north to south is cost prohibitive. However:
    - Freemantle is the largest live export port for cattle; AND
    - Eastern states supply channels breed in the gulf, background in the central and southern QLD and slaughter in southern Queensland and NSW.
- A harvest mentality in Northern Australia does not support development of integrated supply chains that aim to produce a high value product to a tight product specification and time frame.
- Reliance on the domestic supermarket trade has limited the demand for cattle other than YG ciphers. The high cost and seasonal nature of YG product in W.A. has constrained the processors ability to compete on export markets and secure high value export markets resulting in decline in value of beef produced.

9.2 Southern barriers to change

- High reliance on spring and summer pastures for yearling growth without any supplemental feeding.

- Limited backgrounding that could grow weaners out and extend turnoff times into autumn. It is acknowledged market specifications (dentition) for domestic retail doesn’t encourage this.

- Small enterprises and heavy reliance on agents requires an extra effort to identify and align with suppliers that have enough critical mass and willingness to invest in new pathways.

- Perception that Northern cattle supplied into southern markets is a hindrance. If managed well, they are an important ingredient in developing critical mass for new markets that both Bos Indicus and Bos Taurus breeds will benefit from.

- Limited critical mass to scale up significantly without the support of cattle from the central and northern parts of the state.

- Live export for southern cattle injects high spot prices into the market at times and destabilises development of new production pathways.

9.3 Narrow supply base

Eastern supply chains have flexibility and access to a wide range of markets or end users as shown in Figure 38. Horizontal and diagonal links depict diverse trading relationships that provide many options for the flow of product to the downstream users. This is an important capability which provides options to respond to changing global market demands. The narrow WA supply channel is depicted as the central channel in Figure 38Figure 39. Narrow market focus in WA is a limiting capability and makes it difficult to develop new supply channels that recognise and reward value along the whole chain.

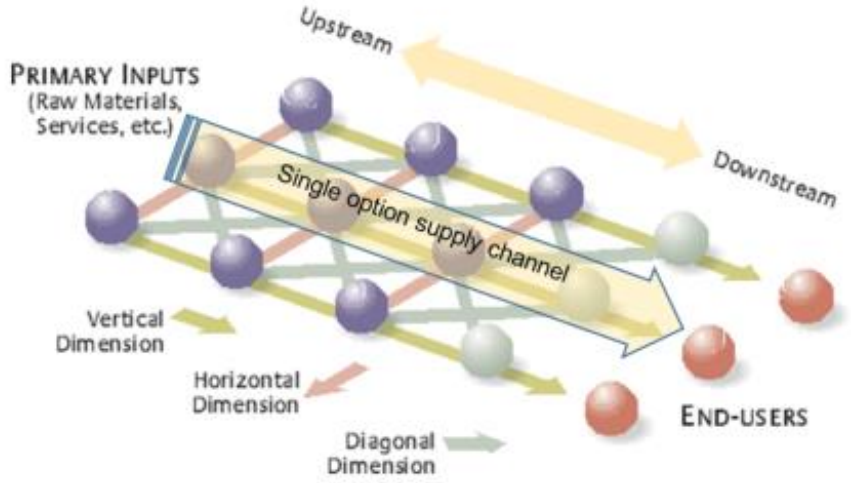


Figure 38: Narrow vertical and horizontal supply options weaken competitiveness and value creation

The domestic retail market has been pivotal in providing a base of supply to secure southern production. However, these are the most expensive cattle to produce. Without development of markets for lower cost cattle specifications suitable for higher value export markets like YP and S categories, Western Australian beef will not be as globally competitive on price as it needs to be to grow production to a critical mass.

9.4 The gridlock situation

A number of factors across the supply chain make it difficult to realise the large opportunities identified. Both the demand and supply sides require something new. Livestock supply side needs clear signals and compelling reason to diversify from current practices. Demand side needs to invest in new markets to develop increased value but requires livestock of the right specifications, as well as continued supply for existing domestic contracts. Both sides need the other to take a position for new growth but both sides have limited financial backing to support the higher risk investment. Along with this are the communication and confidence barriers from existing ways of dealing opportunistically to survive. Specific examples listed here contribute to the gridlock situation:

- Processors have found it difficult to source livestock over the winter half of the year. This has resulted in a lack of confidence to develop new markets that would take livestock from existing short supply.
- Lack of diversity of supply specifications and diversity of markets has limited processors ability to respond to changes in export market demand and pricing.
- Lack of market opportunities that can afford the price to attract new livestock specifications has reduced confidence to publicly develop new markets due to potential impact on livestock market behaviour.
- Current transactional business models (see section 10, “Alternative business models”) that rely heavily on agents (with a focus on short term best price) have contributed to a lack of communication. This has led to reduced levels of confidence for investment at the production level over a period of time.
- Due to the industry’s current financial situation, supply chain participants are generally only willing to accept low levels of risk, limiting their willingness to modify production to new supply pathways.
- There is a high level of risk involved in producing new products for new markets. This is due to the fact that there is no room for error in meeting market specifications in Western Australia due to lack of market alternatives. Animals that fall outside of the existing market specifications don’t have a home in another similar value market. (Refer to market specification diagrams in the Current Situation).

9.5 Processing capacity barriers to development of new export boxed beef markets

It is believed in some circles, and mentioned in the Stocktake Report, that there is not enough processing capacity in Western Australia. If more plants were developed, livestock prices would likely increase but in fact this would only make the situation worse, not better. This is because other factors besides capacity are the drivers, in particular the processing plant’s capacity to sell existing product to viable markets. Additional processing plants would not address this issue.

This background considers the processing capacity in W.A. which any new developments would need to access on a service kill or other arrangement to grow boxed beef exports.

New markets have not been developed because:

1. The 3 processors (plus new Tier 1 plant) able to develop new export markets have been forced to focus on other activities:

    a. Harvey had been in a holding phase while the company had been for sale. This has focused them on servicing the reliable and profitable domestic market. Production volume has suffered but has been topped up where ever possible with opportunistic export sales of commodity product. Investment in marketing or new supply pathways to service new markets has been too risky. With barely enough volume to supply domestic contracts through the winter months, investment in new markets with already short supply would have put the balance sheet at further risk. This has prevented development of any new market led supply pathways.

b. Western Meat Packers has been recovering from the loss of their Coles beef slaughter contract and has reinvented their business with value-adding contracts for Coles retail ready mince and beef cuts. This has driven more volume of lower quality cattle through their slaughter plant to service their Coles mince contracts. Although Westerns have space to process more cattle, their value-adding business requires a lot of attention and cannot fail which places development of any other export boxed beef markets on hold in the short term.

c. V&V Walsh have the slaughter contract for Woolworths beef and lamb which makes up the majority of their abattoir production. They have just managed a very large infrastructure expansion to produce retail ready meat for Woolworths. This is their core focus. Any other boxed beef exports are opportunistic in that they only require low quality cattle supply. The plant does not have a full range of export licenses so the opportunity to develop higher value export markets is limited.

d. Processors like Borello have just gained Tier 1 export listing but this only gives access to lower value markets. These markets will not compensate for the value lost when cattle targeted for premium domestic YG markets fall out of spec due to age etc.

2. Service kills are a real option through Westerns and V&V Walsh (excluding China) for some profitable export markets. However, there are no market lead supply chains in operation outside these processors. Furthermore, there is a lack of capability for self-forming supply chains to develop new boxed beef export markets.

3. In the absence of developing new markets, lack of market demand will limit sustainable development.

4. A range of new approaches including investment attraction from international markets or collaborative business models with international market channels should be explored. Further discussion is needed around the types of support that could be available to build capability for market lead development in the initial and ongoing stages of these types of initiatives.

9.6 Critical Mass

The concept of **critical mass** was introduced as a factor in influencing the current industry dynamics.

The critical mass is the volume required to push a population over the “critical mass point”, initiating the self-sustaining growth dynamic for a supply pathway (Centola, 2012). If the supply pathway cannot reach the critical mass, the system will not overcome external pressures forcing product flow back to previous channels, prices and trading methods.

Future intervention activities need to consider the impact of critical mass. To the extent possible, development and support activities should quantify the volume of trade required in new market channels to develop a sustainable critical mass. The eastern states feedlot industry is a good example. Enough infrastructure and market volume demand has been

developed that even after widespread feedlot downturn occurs for a few years, the industry recovers and rebuilds un-assisted as world markets re-engage.

The degree of change required to sustain improvements and new market channels should be considered in the following ways:

1. Critical mass required to support each sector of the industry including emerging sectors.

2. Export volumes required of certain carcase specifications to support capability development in particular sectors of the industry.

3. Barriers to development activities including external market forces which become more significant without critical mass.

Traditional spot market transactions lead to an adversarial environment characterized by winners and losers. Numerous opportunities exist for external factors to hamper the effectiveness and efficiency of organizations' operations; and ultimately their long term success. This could be termed an external locus of control. An external locus of control allows the adversity of others, plus a host of other factors, to negatively influence organisations' success. In the challenging agri-food industry, allowing external factors to impact the interfaces that exist between businesses can severely reduce their long term competitiveness (Pg. 15 Gooch 2005). Increased critical mass limits the effects of these external factors.

9.6.1 Critical mass barriers in W.A.

- Livestock market price elasticity is high due to a small critical mass of slaughter cattle. Single companies can impact pricing almost immediately. Traditional business models make is easier to dictate demand to minimise price.
- The inconsistency of the live export market makes northern producers vulnerable to market closures.
- Development of backgrounding and feedlotting industries requires market demand and longer term market signals to reach a minimum critical mass that both producer and processor risks are minimised.

9.6.2 Considerations for W.A.

- The development of self-sustaining supply pathways in the general market requires a minimum critical mass of participants and volume to create a market equilibrium. Development of support programs need to consider how a critical mass will be achieved.
- Niche markets will require less critical mass to develop but will be influenced by external pressures but still need to be considered when developing risk management strategies.
- The development of potential niche market channels or specific product programs will require leadership to step outside of the current status quo of product flow from production to market.

9.7 Supply chain leadership

A wide number of northern and southern producers were surveyed in a parallel piece of work conducted by Gattorna Alignment. The work profiled each sector of industry and showed that the producer sector look to the downstream members of the chain to provide direction. As an example, it is common to hear producers ask the question; “What markets are you selling to and what specification do you want me to supply?”. Given there is minimal leadership from the producer sector, the feedlot and processing sectors need to lead the initiative. This could include increased engagement between supply sectors and clearer market signals leading to better alignment of product specification and volumes to new markets.

It is critical, particularly for the supply chain leaders to understand there is a large value opportunity available that no company is receiving at the moment. Secondly, in some cases where new value is large but requires new capability and risk, then increased collaboration will be required to overcome the barriers.

In some cases different business models and alternative intervention strategies are required to overcome what natural market forces will not address. For example, some producers will always chase the money, while others would like to invest in infrastructure to create new value but it is too risky without some form of downstream commitment.

10 Alternative business models

A business model is the design of organisational structures to enact a commercial opportunity. It describes the businesses rationale to create, deliver and capture value in economic, social and cultural contexts (Business Model Generation, A. Osterwalder, Yves Pigneur, Alan Smith 2010).

The way in which businesses interact within and between sectors in a supply chain is influenced by the business models. Depending on the environment, some business models are more likely to support the development of new value than others. Barriers to realising

new value mentioned earlier could be overcome more effectively by adjusting the way businesses along the chain interact.

10.1 Business models considered

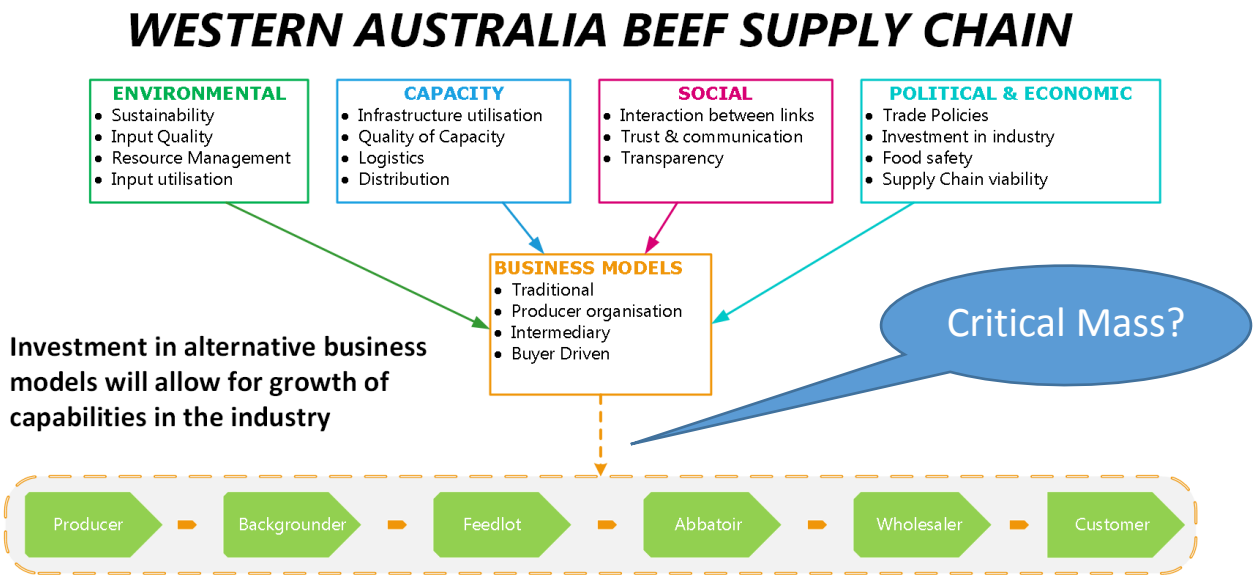


Figure 39: Business model considerations relative to Industry characteristics

A number of alternative business models and supply chain structures were considered at a preliminary level to address some of the barriers that are limiting growth. These are listed here in Figure 39 and included in Section 15 “Appendix – Business Models“. The most realistic and easily implemented model out of those reviewed is the aggregator or intermediary model described here.

10.2 Intermediary or aggregator model

A study of different business models was undertaken as part of the project and is included in section 15. An aggregator business model operating in Queensland has been able to successfully align the producer sector with end markets and has practical application to Western Australia. A buying company (the aggregator) has been setup to purchase livestock in the producer sector and aggregates livestock from many properties and markets them as a portfolio of livestock to processors. The aggregator takes ownership of livestock across a range of sectors and regions summarise in the “Aggregator Ownership” dotted box in the figure.

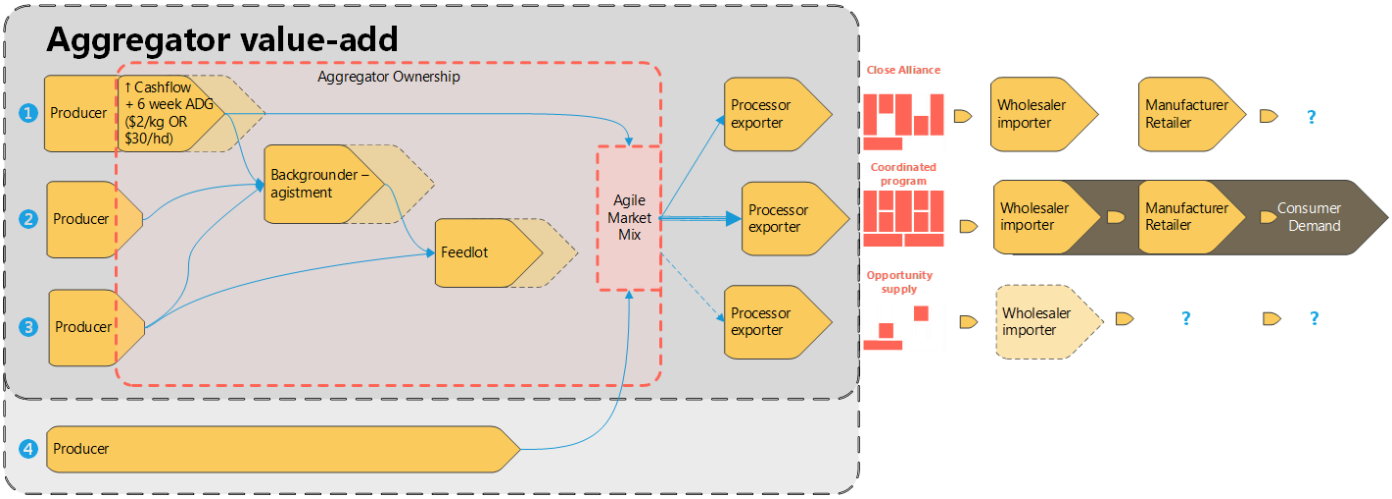


Figure 40: Aggregator business model interaction with supply sectors

Taking ownership of the livestock gives a range of options to add value to the livestock and to the supply chain that isn’t possible with a typical agency or traditional transactional model. Traditional transactional sales of livestock into the system shown by the bottom producer bar in the figure still occurs but does not make up the critical mass the aggregator uses to negotiate with the processor sector.

Having a critical mass of volume gives the aggregator a critical mass with enough diversity to manage peaks and troughs internally and most importantly to provide a volume of livestock to a range of processors. Based on market needs and price they are able to commit to longer term contracts and supply volumes that a single producer is not able to achieve.

This is quite different to a livestock agent model where sales are still only on a property by property basis and without the ability to commit to large volumes over a period of time.

The benefits are summarised in the following table.

Figure 41: Example benefits of Aggregator business models to the whole supply chain

Area of benfit	Example descriptions within the supply chain
Cashflow	• Taking forward ownership of livestock while still on the property allows primary production to utilise available resources to maximise growth and value without limitation of cashflow. • Producers are still able to finish livestock to the best of their ability • Transfer of ownership allows the aggregator to move and transfer livestock in a more controlled way to the next stage in the chain or to the end customer. • The end customer needs volume supplied on certain days and reliable supply is criitcal to bulding the longer term relationship that allows for market clairity in the bottom of the table.
Natural resource utilisation	• Primary production can utilise available resources to maximise growth and value without limitation of cashflow.
Resource risk management	• Pasture backgrounding and feedlot systems provide surge capacity shown by the shaded sections in each sector of Figure 40. As customer market requirements or seasonal impacts require adjustment, transfer of livestock between sectors are possible to meet the demnd pressures.
Critical mass	• Coordinating a larger volume of livestock through certain pathways gives critical mass to see investment in capability within those sectors. • Provides a wider range of supply chain options to producers. • Having 80,000 livestock under management with the one aggregator makes them much more relevant and important to processor planning.
Planned market specifications and forward market clarity	• Sales agreements with end market are possible because of the importance of aggregator size and supply significance to the processors. Flexibility in managing supply allows the production system to alocate livestock to a breadth of markets and across multiple processor markets, giveiing an agile market mix in Figure 40.

11 Application to WA value chain development

11.1 Key Findings

11.1.1 Results from Economic Modelling

A number of new and adjusted supply pathways were modelled and while a number of options were considered, the results reported here took a conservative approach using existing natural resources and infrastructure and did not assume building any new production capacity.

The overall result was a combined increase in EBIT across North and South WA of $163/Hd representing a 240% increase from current production. The Northern and Southern WA opportunities with their associated supply pathways are detailed in the figures below showing a $127/Hd EBIT increase for Northern WA representing a 240% increase from current production and a $148/Hd EBIT increase for Northern WA representing a 370% increase from current production.

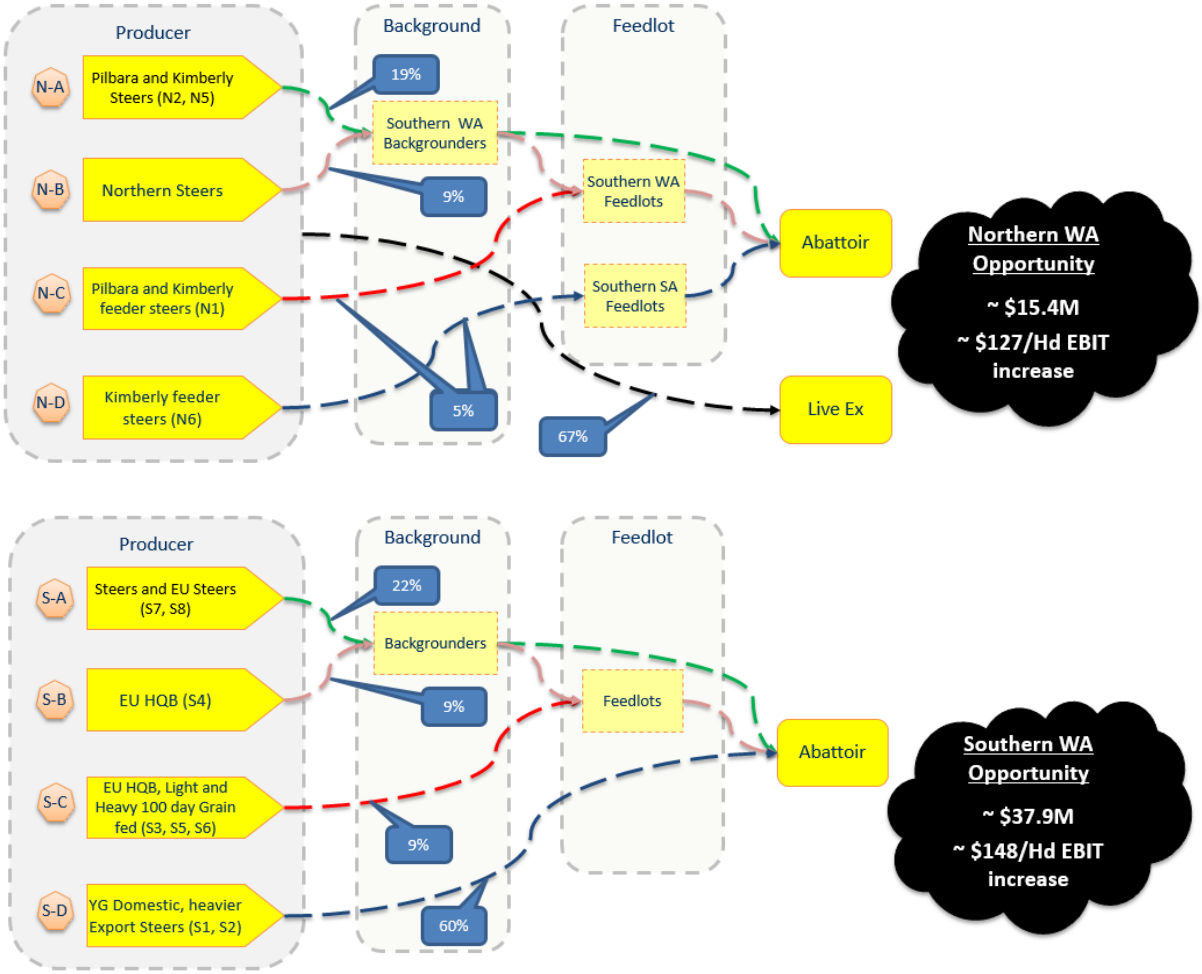


Figure 42: Increase in EBIT across North and South WA

This combined economic model included an increase in production of 66,800 AE's for the state. These were attained by a range of factors including:

- Increasing production through better use of existing forage.
- Increasing utilisation of feedlot and processing capacity.
- Increasing weight of cattle when sold for southern backgrounding.
- Reducing the weight of cattle when transported from rangelands regions (reducing transport costs, increasing growth rate and reducing age).
- Increasing value of beef through better nutrition and market compliance.

The key pathways considered in this model were:

- Grass-fed steers - diversifying their market options by modifying the turnoff time and breeding season.
- Heavy grass-fed steers - developing a pathway for producers in southern WA to supply steers => increased profit per head and created a supply chain for autumn.
- EU HQB - developing pathways in WA and SA => giving the producer more market options and price negotiation.
- Jap OX bullocks – developing an alternative market where cattle don't meet EU specification accessing light steers from the northern regions of WA during the winter and spring.
- Light 100 day Grain fed – producing supply over winter and summer.
- Heavy 100 Day Grain fed – developing from current YG stock.

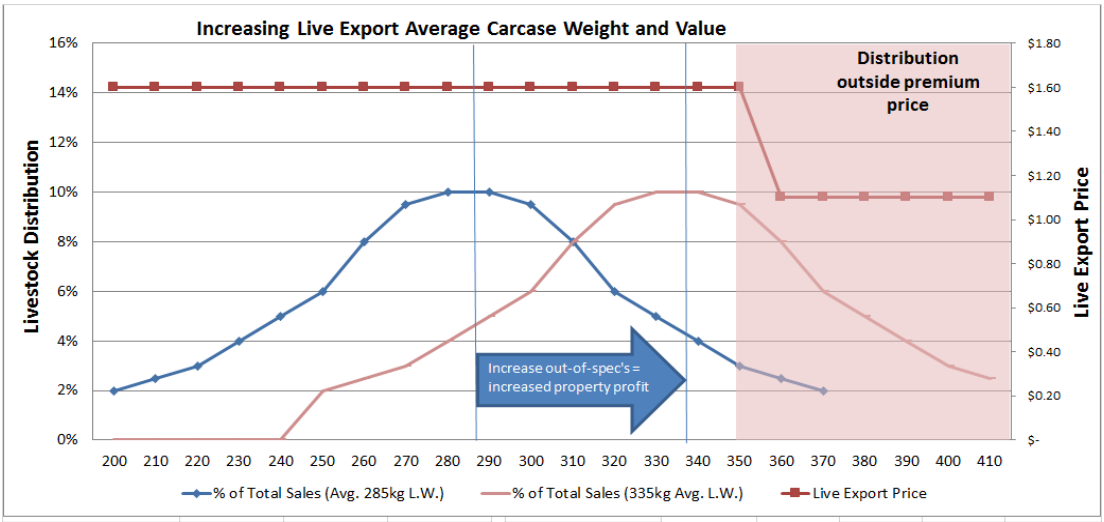
11.1.2 Other key findings

A range of other key findings were also developed throughout the life of the project. While not used in the final economic model, these do provide useful insights into some of the many options available. Some of these considered building new production capacity which looked at increasing production volume, suppling to new northern abattoir, expanding feedlot capacity, increasing volumes of existing cattle through new supply channels and market price equivalence between northern and southern cattle with similar quality grades. These are detailed throughout this report and appendices. Some of the key findings were:

- Increasing processors head killed per year by 50% produced an increased profit by 105% for a plant with $2M Fixed costs or up to 570% for a plant with $2.5M fixed costs.
- Underutilisation of resources - Feedlots and Abattoirs have 40% of underutilised resources and Southern Rangelands has 12%.
- Producer management - requires multiple market options, market intelligence and capability to adapt production systems to access alternative market channels.
- The development of an EU bullock supply pathway – this was identified to be slightly more profitable than the Jap Ox bullock but would require a higher level of investment in processor accreditation.
- Growing live export animals deliberately higher than Indonesian specs – this scenario looks at the effects of growing animals larger such they fall into a market which pays up to $0.75/Kg less than the Indonesian market. The figure below shows the effect of

this whereby the increased Kgs multiplied by the reduced sale price still makes the producer between $21 and $30/Hd additional profit.

Figure 43: Economical effect of growing larger animals



Price Scenario 1	Indonesia <350kg - $1.60		$1.10 >350kg
Average Kg/head	Value/ Head	Sale $/kg	% >350 kg
285	$ 448	$ 1.57	7.5%
335	$ 478	$ 1.43	40.0%
Increased value/head:	$ 30		

Price Scenario 2			Indonesia <350kg - $1.85		$1.10 >350kg
Average Kg/head	Sales Value	Kg's Sold	Value/ Head	Sale $/kg	% >350 kg
285	$ 1,544,850	855,000	$ 515	$ 1.81	7.5%
315	$ 1,608,863	945,000	$ 536	$ 1.70	22.5%
Increased value/head:			$ 21		

11.2 Recommendations

Level 1 Value chain developments – focused on building base levels of capability

1. Market insights:
    a. Understanding strategic considerations for different export markets.
    b. How these markets get assembled in a mix of markets to enable stability of market signals back up the supply chain.
2. Market development strategies:
    a. Consider the limitations of supply chain capabilities (continuity of supply, quality, risks, critical mass required versus what's capable).
    b. Match procurement models to:
3. Purposeful market signals:
    a. Development of the data and information required to provide appropriate market signals.
    b. Identify target audience (broad OR select participants).
    c. Selection of appropriate communication methods (fax, e-mail, online portal with deeper data sharing – leading into next area).
4. Connectivity along the chain:

a. Collaboration of some sort (level and return on investment in higher level of collaboration).

b. Help to define the risk reward for greater collaboration.

5. Risk management capabilities:

    a. Identify risks to manage (focus on both internal and external risks).

    b. Implement tools to enable more informed risk management.

    c. Communicate risks along the chain to create greater awareness of whole of chain challenges.

6. Supply chain sector strengthening:

    a. Awareness program.

7. Support to development of business models:

    a. Aligning physical constraints in supply chain with market requirements.

    b. E.g. number of participants/critical mass required:

        i. Value chain developing (Boutique/niche OR mainstream).

        ii. Level of agility required in market and impact that has on supply requirements.

8. Dynamic Alignment:

    a. Tools for selecting appropriate groups of participants for the above activities.

9. Development of people competencies in order to create increased company capability to lead, then support the above programs/activities to a point of self-sustaining.

Level 2 Value Chain developments – more sophisticated and require a base level of stability/capability:

1. In market innovations that strengthen linkage between WA value chains and end customers:

    a. Product development support that strengthens longer term relationship enabling :

        i. greater planning in Australia.

        ii. engagement of the production sector of value chain to a degree to help build confidence.

2. A range of other physical alignment activities including suggested options for development of new channels in Figure 44.

Engaging new value chains – Critical considerations

Supply Pathway Options	Supply Chain Captain	Description	CAPABILITY FOR ENGAGEMENT			
			$ Funding	Market Access	Communication	Supply Constraints
			Access to funding/capital availability	Market intel., development capabilities to create demand	Effective comms, info sharing along chain.	Correct market specs, business models and profitability.
Pilbara						
Feeder steers, Feedlotted in Southern WA	[illegible]	Steers 350- 450kg relocated from the Pilbara for feedlotting and processed in WA.	✓	?	=	✓
Backgrounded in Southern WA	[illegible]	Steers relocated as weaner and backgrounded Southern WA then processed as grass fed PR animals.	✓	?	x	✓
Light Pilbara Bullocks	TBA	Steers < 550kg relocated to Southern WA for processing.	=	?	=	✓
Heavy Pilbara Bullocks	TBA	Steers < 550kg relocated to Southern WA for processing.	x	x	x	✓
Kimberley						
Backgrounding steers to Southern WA	[illegible]	Weaner Steers relocated into WA for backgrounding and sold to processors either as grown steer.	✓	=	=	✓
Feeder Steers to SA	TBA	Steers relocated from the Kimberley and feedlotted in Southern SA.	x	✓	x	x
Slaughter Steers to SA	TBA	Bullocks (> 550kg live weight) relocated to SA for Processing.	=	✓	=	=
Feeder Steers to Southern WA	TBA	Steers relocated from the Kimberley and feedlotted in Southern WA.	?	=	=	=
Heavy Slaughter Steers to Southern WA	TBA	Bullocks (>550kg live weight) relocated to Southern WA for Processing.	?	x	x	x
Light Slaughter Steers to Southern WA	TBA	Bullocks (<550kg live weight) relocated to southern WA for Processing	?	=	=	=

- Who is the lead (where is the market influence)?
- What are the entry points to supply chains
- How do others in the SC engage?
- What are the funding and information sharing mechanisms?
- How is this addressing commercial reality?
- What capability is being created?

Figure 44 : Suggested options for the development of new channels

11.3 Intervention Initiatives:

A number of value chain initiatives are being proposed to develop key capabilities and support growth of new value for the W.A. beef industry in the table below. A number of smaller projects have been identified that would build capability to support a few larger flagship projects. A number of interventions have been identified in the supply chain work to date and associated projects could be developed in conjunction with identifying and engaging appropriate participants.

These would help to achieve the following:

- Increase market demand that rewards the inherent value currently being lost
- Develop additional high value beef export markets – build market insights capability to do this
- Build capability in supply pathway links through improving coopetition between sectors
- Develop strategies to increase the utilisation of natural resource and infrastructure in conjunction with the above…..

Figure 45 : Intervention initiatives

	Intervention	Description	Capability gap to address	Impact	Barriers to success
1.1	**Development of new business models**	Support to leaders with the drive, capability and influence to build alternative models for transfer of product and ownership along the supply chain to support new capability. The following models at least should be considered: (1) Aggregator; (2) Cap and collar direct consignment.	A lot of producers with the production capacity to improve performance don't want to put in effort. A business model that accesses this capacity and adds capability to manage supply and specification will create value for the producer and for the value chain.	1. Consolidate supply of larger volumes increasing relevance and influence with processors. Building processor confidence in supply for new markets. 2. Aggregator models could take control of cattle movements across a wide region, building buffers in production while still guaranteeing delivery of fixed volumes per week to processors. 3. Other benefits besides price (cash flow, risk management, information and decision support) take focus of pressures limiting change.	Processor lack of interest in increasing plant throughput will kill development of an aggregator model as they will focus on historic behaviours of talking down price at the expense of volume. Business models developed by processors will build some capability but may reduce competition required to keep the industry striving for value that models not aligned to a single processor will create.
1.2	**Development**	The producer sector tends to		1.	Lack of market pull and

	Intervention	Description	Capability gap to address	Impact	Barriers to success
	of risk management tools for production sector	focus on getting the best out of current supply chain mechanics and cycles.			market signals will have the producer calling the shots about what can and can't happen instead of the market. Narrow "program" focused activities tend to be production led – ("what can and can't be done"). Dialogue along the chain starts in production and falls over. Instead these tools need to support production in managing risk towards market led specs.
1.3	**Development of supply chain value tools for processor**	Processors struggle to source cattle for half the year. As they develop new year round markets they want to understand flexibility of regional production capability and cost implications for alternative supply arrangements. This knowledge can support development of realistic markets.	Processors rely on agents to supply the majority of livestock and have limited investment in direct procurement strategies. They have limited knowledge of cattle availability from each region and what alternative production is possible. They don't know what is possible but want to build relationships with producers and	1. Talk clearly with producers about supply opportunity and what they have to do to access it. 2. Enable more constructive direct supply relationships.	These tools are only part of the capability building process and must be coupled with activities to align the value chain and support delivery of in-spec supply.
	Development of a mix of new markets	Development of a range of customers is required to realise full value for each carcase type and for a mix of carcases.	Existing WA export markets have tended to be short term, or low value specifications. These markets don't support development of a range of carcase specifications required to build production systems and infrastructure that have surge capacity and built in risk management or fall-back options.	1.	

	Intervention	Description	Capability gap to address	Impact	Barriers to success
	Develop year-round grain-fed programs	Coordination between processors and feedlots to markets with a short-fed product on a year round basis.	Feedlotting is viewed as opportunistic in winter to supplement domestic grass-fed limitations. High quality W.A. grain and feedlot infrastructure could create year-round cattle supply.	1. Development of backgrounding would be required to supply feedlots 2. A feeder steer market would develop requiring backgrounded cattle 3. Alternative markets (above) would emerge for cow-calf operators giving confidence to utilise excess feed by holding cattle longer OR agisting cattle. This encourages horizontal networks to establish. 4. Feedlots would become a buffer in dry seasons that is not currently utilised 5. Would increase production capacity of the state beyond seasonal supplementation of grass 6. Enables finishing of northern Bos Indicus cattle to higher markets specifications 7. More diverse markets could be supplied due new capability for a wider range of livestock specs	Grain feeding is risky and needs market pull to initiate. Sourcing backgrounded feeder cattle from North and South both have challenges. Feedlots require cash for full ownership. Custom feeding increases communication and control points and destabilises alignment when agents and mixed market signals and cash flow pressures undermine development initiatives.
	Niche market developments	Development of specialist markets creates a high profile and good news story. These smaller markets are less reliant on broader industry behaviours to align.		1.	Niche markets need to be picked carefully to see that full carcase value can be managed over the longer term. Smart marketing to overcome the pitfalls of managing the whole carcase is essential to sustainability.
	Develop backgrounding capabilities	A number of companies (seed sales, agistment) have interest in supporting producers in the northern ag region to better utilise their land for	Development of a small backgrounding industry could emerge	1.	Keeping supply within niche value chains limits industry wide opportunity to participate and build critical mass at an industry level.

	Intervention	Description	Capability gap to address	Impact	Barriers to success
		backgrounding.			

Figure 46: Sources of data used during the modelling

Data	Information /Data type	Reference
Cattle Prices	South Australia cattle grids	Producer A, (2013)
	MLA NLRS services	**Meat & Livestock Australia (2012)**
Southern Production Data	Esperance Beef Producers Survey	**Jones and Ryan (2006)**
	Red sky benchmarking project	**Red Sky Agricultural Pty Ltd (2013)**
	SWWA Economic Summary	**Department of Agriculture and Food (2014)**
	Nutritional Requirements Cattle	**CSIRO (2007)**
	Female turnoff & retention rate	**Australia Bureau of Statictics (2014)**
Northern Production Data	Personal communications	Producer B, (2013) Producer C, (2014) Producer D, (2014) Producer E, (2013)
	Pilbara Steer Growth rate Trial 1994-1996	**Fletcher, McIntyre, Nickels, Cridland, and James (1996)**
	RD & E project	**Stockdale, Huey, Dray, Holmes, and Smith (2012)**
	ABS Statistics	**Australia Bureau of Statictics (2014)**
	Kimberley land uses	**McAuliffe (2011)**
	Pilbara Benchmarking Average	**Holmes & Co (2012)**
Feedlot Production Data	Personal Communications	Feedlot Manager, A (2014)
	Feedlot Utilisation	**Australia Lot Feeders Association (2014)**
	Historical WA grain prices	**Jumbuck Consulting (2014)**
	AWB Bid sheet	**AWB (2014)**
Transport costs	NSW stock transport company	Company A, (2013)
	WA Stock transport company	Company B, (2013)
	Transport Distanced	**Google (2013)**
Production potential	Pastures from Space	**CSIRO (2014)**
	Estimation of pasture growth	**Donald et al. (2010)**
	Estimation of pasture growth	**Donald et al. (2004)**
	DSE Utilisation	**Davies, McDonald, and Orchard (2005)**
	Competing land uses	**Department of Agriculture and Food (2014)**
	Cattle stations stocking rates	**Department of Agriculture and Food (2014)**
Cattle turnoff	Cattle turnoff numbers	**Department of Agriculture and Food (2014)**
	Meat Females in WA	**Australia Bureau of Statictics (2014)**
	WA Live export cattle	**Department of Agriculture and Food (2014)**
	ABS Live cattle export	**Australia Bureau of Statictics (2014)**
Abattoir Data	Max Processing capacity	Processor A, (2014)
	Cattle & Sheep Meat processing Review	**Burggraaf and Manners (2005)**

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12 Appendix – Economic Modelling Described

Milestone 3 - Attachment.pdf

13 Appendix – Modelling Assumptions

The following are the main variables used to estimate the profit margin for producers, backgrounders, feedlotters and processors for alternative supply channels:

- Number of head
- Live weight and carcase weights
- Weight for age
- Fixed and variable production costs in each sector from breeding to processing and export
- Market specifications and sales values

13.1 Production Capacity

The production capacity of Western Australia was calculated to estimate the utilisation of the natural resources and infrastructure in the state. The process of calculating the utilisation of grasslands, feedlots and abattoirs is displayed below.

13.1.1 Grassland Utilisation

The production of grass fed animals in Western Australia was conducted using a number of different data sets. The following provides a summary of the calculations and sources of the data:

- The pastures from space data has been used to identified the estimated dry matter growth per Shire per month (Pastures from space).
- A 60 percentile, 50 percentile and 35 percentile range was then calculated using these values
- The number of head per region was then calculated using the registered cattle movements per year from each region
- An estimation of the underutilisation of each region was calculated to identify areas of opportunity

This report only contains a high level summary of the results obtained however a detailed methodology and results can be obtained in DAFWA, 2014.

13.1.2 Feedlot utilisation

The utilisation of feedlots in Western Australia was calculated using data provided by DAFWA from ALFA (Australia Lot Feeders Association). The following was the processed used:

- The yearly average head numbers was calculating using statistics from 2005 to 2013.
- The total capacity of feedlots over the same period was then calculated.
-

13.1.3 Abattoir utilisation

The utilisation of beef abattoirs in WA was conducted through identifying the number of head processed and compared to the maximum processing capacity of the state. The background figures were provided from DAFWA a detailed methodology of the sources of the information can be found in (DAFWA, 2014).

The main purchases of calculating the production and processing capacity has enabled a baseline to be established for production improvements to be compared.

13.2 Domestic and Export Volumes

The volumes of beef sold to domestic and export a customer currently, the maximum volume and proposed solution was calculated in the following was:

13.2.1 Current Volume

The current volume produced was calculated to identify the benchmark which any additional markets need to grow on. The following identifies the data and methods used during this process:

- The volume of beef exported from WA over the last 10 years was obtained from DAFWA which identified the variation in exported volumes.
- The number of cattle produced was collected during the grassland utilisation calculations.
- The numbers were then modelled using the BVOP model to estimate the volume of beef produced on a yearly bases.
- The export volume was then subtracted from the total volume produced providing the differentiation between domestic and export volumes.

13.2.2 Maximum Volume

The maximum volume produced in WA was calculated using the following methods:

- The estimated average number of head produced in WA as calculated during the production capacity section was modelled through the BVOP model.
- This modelling allowed an estimated maximum volume produced through from grasslands feedlots and the abattoir sector.
- These calculations allowed a max benchmarked to be set to ensure the proposed solution doesn't required additional volume than can be produced.

13.2.3 Proposed solution

The proposed solution was calculated by estimating the critical mass required to develop an aggregator or self-sustaining production supply chain. The following is a description of the method used:

- The equilibrium point of an export beef market was assessed.
- The point of satiation of where the market maintains moderate growth was calculated for the self-sustaining scenario. This reduces the chance of the market commitment reducing over time.
- The aggregator scenario was calculated through maintain a higher level of growth as it requires a lower point of equilibrium as the aggregator can reduce the rate of fallout, whilst increasing free-riders.

14 Appendix – Capability Mapping

This section includes examples of the detailed data capture and reporting methods used to collect information from interviews and observations and to document the observed capabilities.

Figure 47: Capability Group definitions and explanations

Types of Capabilities	Definition
A Capability is the ability to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services	
Natural resource utilisation	**Considers the type and quantity of natural resources available to create supply chain value and how efficiently they are produced to supply the best end market. Resource limitations may limit access to higher value markets. There is a maximum potential value the resources are able to generate.**
Infrastructure	**How much of the natural resources potential value is realised depends firstly on the infrastructure capabilities available to increase value of the natural resource along with how well they are utilised.**
Supply and demand	**Describes market demand. Quantifies the economic forces exhorted along the supply chain on both the supply and demand side that impact price and volume. This includes the impact of diversity of products and markets as well as amount and type of competition.**
Supply chain links	**Describes the degree and nature of connectedness between participants in each supply chain sector to coordinate and aligned the supply chain to realise the maximum value of resources in the market. Behaviours, cultures, information transfer methods and market signals along the chain enable or disable coordination of resources to access the best market value by responding effectively to market demand.**
Political, Regulatory, Economic Environment	**Represents broader external factors not easily influenced that impact on the supply chain. Their impact on other supply chain interventions should be considered but will not be the main focus of supply chain interventions.**
External Competition / Industry environment	**Represents external factors to the value chain that exert competition for supply chain viability.**

Figure 48: Capability question matrix

Types of Capabilities	Definition	Base State		Interim Steps		Target State	
A Capability is the ability to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services		**Limited or poor level of capability**		**Some evidence of capability being enjoyed**		**Well developed capability evident more often than not**	
Natural resource utilisation	**Considers the type and quantity of natural resources available to create supply chain value and how efficiently they are produced to supply the best end market. Resource limitations may limit access to higher value markets. There is a maximum potential value the resources are able to generate.**		58%		29%		14%
Resource quality (Pasture, Genetics & Grain)	The quality/productivity/market suitability of inputs available makes them competitive and profitable within the supply chain. Does not refer to the utilisation and efficiency of usage.		30%		34%		36%
Northern Producers	Rangeland and higher Bos Indicus content cattle	Participants are utilising only low quality natural resources which is limiting the expansion of the supply chain.	50%	Participants are utilising moderate quality natural resources.	30%	Participants are utilising high quality natural resources which is advancing supply chain sustainability and value.	20%
Recourse costs	ROI on resource investment (productivity versus capital cost) adds to supply chain competitiveness.		70%		20%		10%
Northern Producers		The supply chain is utilising resources with high input costs with a low return.	70%	The supply chain is utilising resources with a moderate return on investment.	20%	The supply chain is utilising resources with a high return on input costs (land tax, land leases, purchase price).	10%
Infrastructure	**How much of the natural resources potential value is realised depends firstly on the infrastructure capabilities available to increase value of the natural resource along with how well they are utilised.**		39%		36%		24%
Supply and demand	**Describes market demand. Quantifies the economic forces exhorted along the supply chain on both the supply and demand side that impact price and volume. This includes the impact of diversity of products and markets as well as amount and type of competition.**		83%		15%		3%
Supply chain links	**Describes the degree and nature of connectedness between participants in each supply chain sector to coordinate and aligned the supply chain to realise the maximum value of resources in the market. Behaviours, cultures, information transfer methods and market signals along the chain enable or disable coordination of resources to access the best market value by responding effectively to market demand.**		76%		18%		6%
Political, Regulatory, Economic, Competitiveness	**Represents broader external factors not easily influenced that impact on the supply chain. Their impact on other supply chain interventions should be considered but will not be the main focus of supply chain interventions.**		38%		38%		12%
External Competition / Industry environment	**Represents external factors to the value chain that represent competition for supply chian viability.**		90%		10%		0%

Figure 49: Natural resource and Infrastructure capability definitions

Types of Capabilities	Definition		Base State		Interim Steps		Target State		
A Capability is the ability to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services			**Limited or poor level of capability**	**1**	**Some evidence of capability being enjoyed**	**2**	**Well developed capability evident more often than not**	**3**	**Total**
Natural resource utilisation	**Considers the type and quantity of natural resources available to create supply chain value and how efficiently they are produced to supply the best end market. Resource limitations may limit access to higher value markets. There is a maximum potential value the resources are able to generate.**			58%		29%		14%	52%
Resource quality (Pasture, Genetics & Grain)	The quality/productivity/market suitability of inputs available makes them competitive and profitable within the supply chain. Does not refer to the utilisation and efficiency of usage.			30%		34%		36%	69%
Resourse costs	ROI on resource investment (productivity versus capital cost) adds to supply chain competitiveness.			70%		20%		10%	47%
Resource Management	The management of resources throughout the supply chain			70%		20%		10%	47%
Input utilisation	The affect of natural resources on the quantity and quality of product produced in terms of value generated from inputs.			60%		40%		0%	47%
Access to Capital	Refers to internal capacity investment to help value-adding of resources as compared with capital in Supply and Demand section.			60%		25%		15%	52%
Infrastructure	**How much of the natural resources potential value is realised depends firstly on the infrastructure capabilities available to increase value of the natural resource along with how well they are utilised.**			50%		31%		19%	56%
Capacity	Indicates the amount of infrastructure currently available in the supply chain. This also refers to the human capacity to manage the infrastructure to value-add the natural resource inputs.			35%		45%		20%	62%
Utilisation	Indicates how well the asset is being used (ROI) and what sort of demand there is for the infrastructure. Higher utilisation is healthier.			58%		38%		5%	49%
Quality capability	Degree to which infrastructure can increase value of the resource.			20%		40%		40%	73%
Logistics	The physical infrastructure available for the flow of product between links in the chain.			40%		20%		40%	67%
Procurement strategy	The geographical area which the supply chain can obtain its product from for a specific market, the more widespread the less vulnerable the supply chain is to the effects of natural disasters.			80%		20%		0%	40%
Access to capital	Refers to internal capacity investment to help value-adding of resources as compared with capital in Supply and Demand section.			70%		23%		8%	46%

Figure 50: Supply and Demand capability definitions

Types of Capabilities	Definition	Base State		Interim Steps		Target State		
A Capability is the ability to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services		**Limited or poor level of capability**	**1**	**Some evidence of capability being enjoyed**	**2**	**Well developed capability evident more often than not**	**3**	**Total**
Supply and demand	**Describes market demand. Quantifies the economic forces exhorted along the supply chain on both the supply and demand side that impact price and volume. This includes the impact of diversity of products and markets as well as amount and type of competition.**		81%		16%		4%	41%
Competitors / Critical mass	The number of competitors in a market place impacts on maintaining a stable level of competition. No competitors can lead to overcontrol or manipulation of the market.		90%		10%		0%	37%
Market Perceptions	The views of supply chain participants to which markets are available and the affect if they don't meet the market specifications.		80%		10%		10%	43%
Competitive Advantage	A competitive advantages is developed when a supply chain acquires or develops ability to outperform competitors. This can be either the ability to produce at a cheaper price, suppling a unique product or a better business process.		90%		10%		0%	37%
Market Options	Access to a broader range of markets stimulates supply chain viability due to greater demand for product. A range of sales avenues are available for each sector in a supply chain to sell to the next downstream sector/sectors. A wider range of sales options usually increases the range of product specifications the seller can choose to		80%		18%		5%	44%
Market Importance	Importance of market focus on growth of the supply chain.		70%		30%		0%	43%
Product diversity	As well as having a range of markets to sell to, the Diversity of products is also important. A wider range of products demanded gives more flexibility to specialise and create a point of difference. It also reduces the risk in targeting a new market as product falling outside market spec fits into another spec with enough value to make		90%		10%		0%	37%
Income Distribution	This considers 2 traits: - Degree of cash flow throughout the year for each sector of the supply chain and how it affects management actions. - The distribution of profit relative to normal agricultural supply and demand.		65%		25%		10%	48%

Figure 51: Supply Chain Link capability definitions

Types of Capabilities	Definition		Base State		Interim Steps		Target State		
A Capability is the ability to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services			**Limited or poor level of capability**	**1**	**Some evidence of capability being enjoyed**	**2**	**Well developed capability evident more often than not**	**3**	**Total**
Supply chain links	**Describes the degree and nature of connectedness between participants in each supply chain sector to coordinate and aligned the supply chain to realise the maximum value of resources in the market. Behaviours, cultures, information transfer methods and market signals along the chain enable or disable coordination of resources to access the best market value by responding effectively to market demand.**			76%		18%		8%	45%
Relationships	Confidence displayed between members of the chain and demonstrated awareness of the others importance to growth by the strength of relationships to identify and align to create value.			80%		15%		5%	42%
Supply chain communication	Management and control of product between each link of the supply chain.			70%		20%		10%	47%
Business Models	Different business models suit particular supply chains. Themore different business models the more dynamic the indsutry, the greater the confidecne and the more customisable and diverse the supply chain landscape.			80%		20%		0%	40%
Industry wide summary of business model options	The degree to which non-traditional business models are evident indicate the level of entreprenuerialship and leadership in the industry to try new ways of creating value. Models such as Aggregators/intermidiaries, cooperatives, service kills, alliances, profit sharing are possible.		A traditional buyer led business model exists with no evidence of alternative business models being utilised.	80%	There are a number of different business models being tried with varying degrees of success.	20%	Different business models are working with some highly refined. Industry is aware of different options and has confidecne to try adjusting	0%	40%
Trust & Collaboration	Through the development of confidence in relationships, trust will develop over time. The establishment of trust in a supply chain can then allow participants to collaborate to increase the efficiency of the supply chain. This section is used to identify the point at which the supply chain interactions have accomplished.			80%		10%		10%	43%
Building trust & confidence			Each sector of the chain lacks confidence and is overly risk averse.	80%	There is some confidence in each sector with small amounts of collaboration but still very limited.	10%	The relationship has matured and there is a high level of collaboration between sectors of the supply chain.	10%	43%
Cross-sector understanding	The knowledge imbedded in the industry to allow each sector to understand the requirements of other links in the supply chain at a high level.			60%		40%		0%	47%
Supply chain coordination	The knowledge available to allow for the adequate control of the supply chain to maximise product value to the final customer.			80%		20%		0%	40%
Access to capital	Amount of available capital has a significant impact on how entities trade, when and how they buy or sell and the type of risk they are prepared to take to increase value, along with their appetite for new business models.			80%		10%		10%	43%
Risk management	Quantifies the level of risk participants are willing to take on. Also includes a measure of the amount of risk present in the business and between industry sectors.			80%		10%		27%	60%

Figure 52: Political and External capability definitions

Types of Capabilities	Definition		Base State		Interim Steps		Target State		
A Capability is the ability to perform or achieve certain actions or outcomes through a set of controllable and measurable faculties, features, functions, processes, or services			**Limited or poor level of capability**	**1**	**Some evidence of capability being enjoyed**	**2**	**Well developed capability evident more often than not**	**3**	**Total**
Political, Regulatory, Economic Environment	**Represents broader external factors not easily influenced that impact on the supply chain. Their impact on other supply chain interventions should be considered but will not be the main focus of supply chain interventions.**			23%		28%		48%	75%
Trade Policy	The political regulations effect the supply of product for export and domestic consumption.			50%		40%		10%	53%
Industry Support	Support from government for new business and agricultural developments.			20%		40%		40%	73%
Phytosanitary/Health/Food safety	The safety requirements for inventory produced through the supply chain and the affect it has on the potential markets.			0%		5%		95%	98%
External Competition / Industry environment	**Represents external factors to the value chain that exert competition for supply chain viability.**			61%		32%		6%	47%
Critical Mass	Critical mass here talkes about the entire indsutry. This is different to the critical mass of one sector in Supply and Demand capability group. Here it is size of value chain relative to competitors provides an economy of scale advantage or disadvantage. Momentum and driving forces behind production also impact on			90%		10%		0%	37%
Business model innovation	Diversity of business models evident in the supply chain to support access to new value			80%		20%		0%	40%
Competitive Advantage	A competitive advantages is developed when a supply chain acquires or developed an ability to outperform their competitors. This can be either the ability to product the same product at a cheaper price, suppling a specific product which you competitors cant or a better business process.			55%		38%		0%	43%
Cross-industry Competitiveness	Included all sectors of chain here. This summarises the states compeititveness relative to other industries competing ofr the same land use. In a sense this is a measure of all other capabilities combined to generate a level of value relative to alternative land use.			50%		50%		0%	50%
Within-industry Competitiveness	This summarises the states compeititveness relative to other states. In a sense this is a measure of all other capabilities combined to generate a level of value relative to competing beef value-chains/indsutries.			30%		40%		30%	67%

15 Appendix – Business Models

SSC - Milestone 4 Report_Business Models.pdf

16 Appendix – Market Development

Milestone 3 Report - Northern Beef.pdf