

Investor's Guide to the Queensland Beef Supply Chain



Ernst & Young Australia Operations Pty Limited
111 Eagle Street
Brisbane QLD 4000 Australia
GPO Box 7878 Brisbane QLD 4001

Tel: +61 7 3011 3333
Fax: +61 7 3011 3100
ey.com/au

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Sources used in obtaining the information, based on which we performed our analysis to reach certain conclusions and points of view that are included in this guide, are outlined in references section of this report.

This is an introductory guide to assist investors in understanding opportunities within the Queensland beef supply chain. This guide details the varied operations of supply chain participants, highlights industry trends, and identifies key success factors and relevant benchmarks.

Australia offers investors the opportunity to gain exposure to one of the leading global agriculture sectors with high growth potential, low sovereign risk and sophisticated infrastructure. Queensland is the largest beef producer in Australia and has a cattle herd that comprised of almost half (~42% in 2017) of the total Australian herd (ABS). Queensland has a robust and diverse beef cattle industry, with multiple market options and extensive infrastructure to support the industry.

Varied operating models across the State's three grazing regions produce a range of products for both domestic and export markets. These factors create a range of investment opportunities that are not available in any other beef region across Australia and the world. The Queensland beef supply chain has opportunities to suit a wide range of investors depending on their preferences for investment type, liquidity, risk and returns.

Vertical & Horizontal Integration

A trend toward vertical integration and industry consolidation in Australia's beef sectors has emerged in recent years. Vertically and horizontally integrated business models provide opportunities to develop competitive advantages such as supply chain efficiencies and economies of scale.

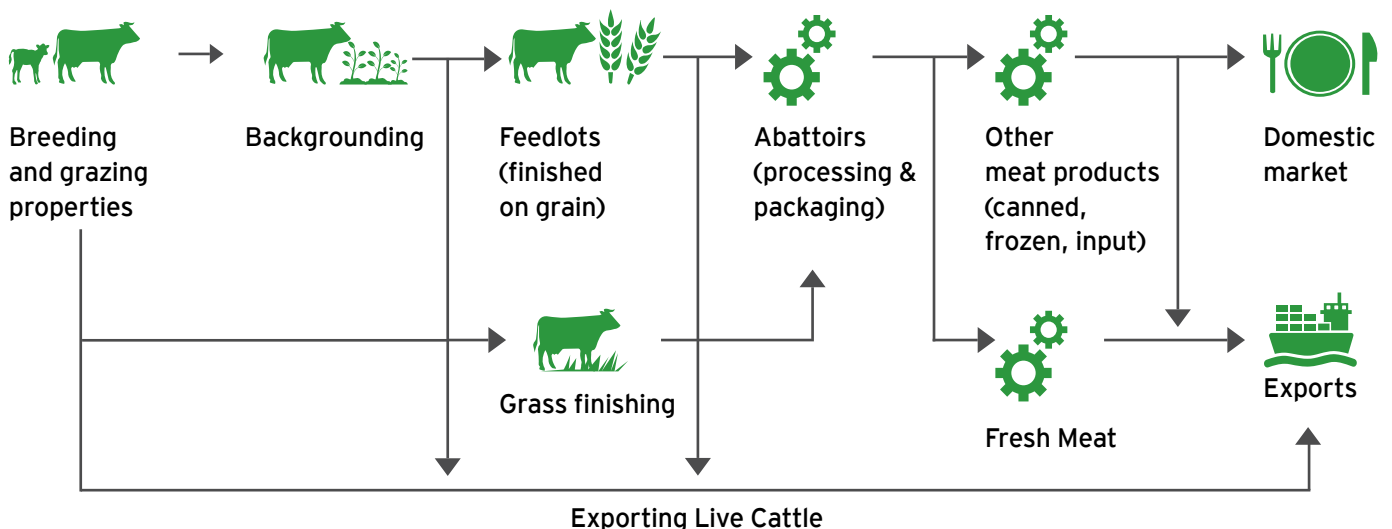
Horizontal integration involves expanding within the same stage of the supply chain. While vertical integration involves expanding into new supply chain stages.

AgTech

Agricultural Technology (AgTech) is a burgeoning area of investment. Investment in AgTech has been driven by opportunities to implement digital and technological innovations to support industry growth, development and performance.

Supply Chain Operation	Description
Breeding and grazing properties	Beef cattle breeding and grazing operations comprise the breeding and raising of weaner cattle. Success of breeding operations is contingent on building and managing the genetic composition, health and reproductive performance of a herd and the implementation of sustainable land management practices.
Backgrounding properties	Backgrounding is the process of preparing weaner cattle for feedlots or grass finishing. Backgrounding properties “group and acclimatise animals prior to entry into a feedlot or intensive finishing system” (MLA). Backgrounding properties raise cattle on grass for a period of time or until they reach a weight target. Backgrounding cattle entails implementation of sustainable land management practices and managing the health of cattle including feeding, watering and supplementation.
Grass finishing properties	Grass finished cattle are fattened on pasture prior to sale for processing. Pasture finishing is generally conducted in more productive areas, as an alternative to feedlotting.
Beef cattle feedlots	Feedlots are used to finish cattle on grain prior to sale for processing. Feedlots fatten cattle on grain for a specific period of time or until a weight target is reached.
Beef processors	Beef processors are responsible for the slaughter and butchery of cattle for sale to wholesale, retail and export markets.
Agricultural services	The beef sector uses services across the whole supply chain, including stock and station agents, veterinarians, transport services, geneticists, natural resource management consultants, and business consultants.
AgTech	AgTech is a growing industry equipping the beef cattle supply chain with hardware and software tools to assist in improving the efficiency and effectiveness of farm operations. Software applications include precision agriculture, animal data, predictive analytics, digital supply chain, digital marketplaces and farm management software. Hardware development includes the introduction of smart irrigation, robotics, drones, automation and production sensors.

The Queensland Beef Cattle Supply Chain



Investment Opportunity: Breeding and Grazing Properties

The cattle breeding and grazing industry is dominated by owner operators and family farms

- ▶ Concentration of owner operator and family style businesses creates an investment opportunity for vertical integration with downstream supply chain operators (backgrounding, grass finishing, feedlots and meat processors)
- ▶ A cash investment can increase financial flexibility for operators to improve productivity and/or to pursue growth opportunities
- ▶ Analysis of primary producer financial data indicates

an opportunity to improve overall performance through economies of scale enabling reduction in marginal cost (ABARES, 2016)

- ▶ Investment in breeding and grazing properties can assist in securing supply for Intra-industry investors (foreign and domestic)
- ▶ Investors with a lower risk appetite may consider investment in breeding and grazing real estate to gain exposure to land asset type returns through investment options such as land purchase and lease back arrangements.

	Key success factors	Key Metrics/ Benchmarks
Financial Performance	<p>Herd size influences the per unit production cost and commercial viability of business operations. Economies of scale allow breeders to amortise costs over a larger number of production units (animals).</p> <p>The value of unpaid labour is significant for beef cattle primary producers (including breeding and grazing properties) generally and is negatively correlated with the scale of the production system (ABARES, 2016). The concentration of owner operator and family style business models within the industry increases reliance on unpaid labour. This may lead to a misrepresentation of the cost base when evaluating the commercial viability an investment. Similarly, banks are usually reluctant to lend where they perceive a grazier to be heavily reliant on debt. Graziers will often find it difficult to obtain debt financing for more than 50% of their purchase.</p>	<ul style="list-style-type: none"> ▶ Rate of return ▶ Herd size ▶ Unpaid labour costs ▶ Debt-to-equity ratio
Herd management	<p>Branding Rate is an indicator of how many calves are branded as proportion of mated cattle. Specifically for breeders this will directly correlate to the turn-off rate for a production system (Martin et al. 2013).</p> <p>Breeders that consistently meet herd nutritional requirements, manage their pasture sustainably and are agile to changes in weather will generally achieve a low cattle mortality rate. MLA Farm Survey data indicates that producers with lower rates of variability in the death rate outperform their competitors.</p>	<ul style="list-style-type: none"> ▶ Branding rate ▶ Cattle death % ▶ Turn-off rate

Case Study

Rural Funds Group and Camm Agricultural Group

- ▶ Rural Funds Group (RFG) a Real Estate Investment Trust (REIT), acquired the Natal Downs, Longton and Narellan cattle properties from Camm Agricultural Group (Camm) for \$50 million in October 2017 (CapitalIQ).
- ▶ A sale and leaseback arrangement meant Camm retained property management rights for 10 years.
- ▶ RFG sought a quality beef-producing asset with growth potential through capital improvements (RFG, ASX Release, 2017). This acquisition also represented a further diversification of their portfolio.
- ▶ The Camm properties were identified as quality assets, with strong supply chains and abundant opportunities to materially increase capacity, productivity and output through water infrastructure upgrades (RFG, ASX Release, 2017).
- ▶ The Camm family’s track record of successfully managing a large portfolio of cattle properties was a key factor for RFG to ensure their vision for improved productivity could be realised (Beef Central, 2017).

Key success factors		Key Metrics/ Benchmarks
Genetics	<p>Reproductive rates, growth and condition, carcass weight and quality are all proven to be heritable traits (Fennessy et al. 2014). The genetic composition of a herd is a major determinant of the market value of cattle once sold.</p> <p>Location affects how appropriate a breed is due to weather conditions such as rainfall, heat, and access to biomass. The appropriate breed composition for a location will determine the sustainability of operations.</p>	<ul style="list-style-type: none"> ▶ Breed (type) ▶ Estimated breeding values ▶ Reproductive rates
Property size and location	<p>The location of operations is a significant determinant of climatic variability (see below), affecting factors such as operational strategy, volatility in returns and breed composition.</p> <p>The proximity of production systems to key markets will determine the transport and logistics cost.</p> <p>Property size will affect the unit production cost and carrying capacity of a farm. The land scale required to maintain a financially viable herd size will vary depending on climatic factors.</p>	<ul style="list-style-type: none"> ▶ Geographical location ▶ Proximity to downstream operators ▶ Carrying capacity
Environment	<p>Climatic conditions, such as average rainfall, directly affect the productivity of grazing land. Arability of land determines breeder access to biomass and water which are key factors in livestock reproductive rates, production volumes and beef quality.</p> <p>Climatic cycles are largely affected by location and climatic variability is a key risk in grazing operations. Stocking rate has a direct short term positive correlation with financial viability, though in the medium to long-term, it will have a direct negative correlation with the sustainability of pasture growth and consequently the operation as a whole. Grazing management practices can maximise pasture growth and the long term sustainability of operations allowing for improved management of climate variability.</p>	<ul style="list-style-type: none"> ▶ Average rainfall/overland flow (and/or access to bores and other water sources) ▶ Normalised difference vegetation index (NDVI) ▶ Biomass measures ▶ Drought history ▶ Weather and climate forecasts ▶ Stocking rates

Transaction values for Australian beef properties, 2010-17



Source: Capital IQ, EY Analysis

Queensland cattle properties range in value from around \$2 million to \$5 million through to hundreds of millions of dollars, based on factors including size, location, on-farm infrastructure, yield and climatic history. The average sale price between 2010 and 2018 was \$56 million.

Investment Opportunity: Backgrounding Properties

Backgrounding operations are used to raise cattle on grass prior to finishing. This process assists with the transition of cattle into intensive finishing systems.

- ▶ Backgrounding cattle is undertaken in the majority of cases whether grain or grass finished
- ▶ Vertical integration of backgrounding operations, up and down the supply chain provides an opportunity to gain scale, amortise costs and increase productivity
- ▶ Integration with downstream operators such as feedlots and processors can reduce offtake risk, minimise fixed costs per head, and may enable improved responsiveness to changes in consumer demand
- ▶ Analysis of primary producer financial data indicates an opportunity to improve overall performance through economies of scale enabling reduction in marginal costs (ABARES, 2016)
- ▶ Technology can be used to increase productivity, environmental sustainability and business continuity. Effective use of data (e.g. data from hardware sensors or NDVI satellite imagery) can improve pasture and herd management
- ▶ Investors with a lower risk appetite can invest in breeding and grazing real estate to gain exposure to land asset type returns through investment options such as land purchase and lease back arrangements

	Key success factors	Key Metrics/ Benchmarks
Financial Performance	<p>Herd size influences the per unit production cost and commercial viability of business operations. Economies of scale allow breeders to amortise costs over a larger number of production units (animals).</p> <p>The value of unpaid labour is significant for beef cattle primary producers (including backgrounding properties) and is negatively correlated with the scale of the production system (MLA Farm Survey Data). The concentration of owner operator and family style business models within the industry increases reliance on unpaid labour. This may misrepresent the cost base when evaluating the commercial viability of an investment.</p>	<ul style="list-style-type: none"> ▶ Rate of return ▶ Herd Size ▶ Unpaid labour costs
Herd management	<p>The dietary composition (types of grass, supplementation, etc.) of the cattle while backgrounding will affect the health and weight gain of the animal. Live weight gain and daily weight gain are the best measurements of backgrounding performance.</p>	<ul style="list-style-type: none"> ▶ Daily weight gain ▶ Live weight gain (Final body weight (BW) minus Initial BW)
Genetics	<p>Live weight gain, carcase weight and quality are all proven heritable traits. The genetic composition of cattle being backgrounded on pasture will affect the weight gain.</p>	<ul style="list-style-type: none"> ▶ Breed (type) ▶ Genetics and feeding performance

Case Study

Australian Country Choice and Acton Land & Cattle

- ▶ Australian Country Choice (ACC) acquired a 51% stake in Acton Land & Cattle (Acton), a large vertically-integrated beef producer, for an undisclosed amount in July 2015.
- ▶ ACC and Acton operate Acton's pre-transaction assets under a joint venture arrangement. Acton's assets comprise of 135,000 head of cattle (including 70,000 breeders) spread across 1.5 million hectares in Queensland, including backgrounding country and feedlots (CapitalIQ).
- ▶ The transaction allows ACC to expand its production capacity and increase its presence in the lucrative branded beef market, both domestically and internationally (ABC News, 2015).
- ▶ The intra-industry purchase enables ACC to expand their existing backgrounding and feedlot operations. Synergies are generated from the combination of compatible assets and supply chains. It was unlikely that an operational restructuring of the business would have produced the returns sought by a financial sponsor (e.g. private equity firms).

	Key success factors	Key Metrics/ Benchmarks
Property size and location	<p>The location of backgrounding operations differs from breeding and finishing locations. Weather and access to biomass affect accessibility to pasture and the commercial viability of a finishing operation.</p> <p>The proximity of backgrounding to breeding and downstream markets (e.g. finishing and feedlots) will determine transport and logistics costs.</p> <p>Property size will affect the unit production cost and carrying capacity of a farm. The land scale required to maintain a financially viable herd size will vary depending on climatic factors.</p>	<ul style="list-style-type: none"> ▶ Geographical location ▶ Proximity to upstream and downstream operators ▶ Carrying capacity
Environment	<p>Weather conditions such as average rainfall affect the ability to maintain grazing land and pasture growth. Arability of land determines access to biomass and water sources, which is key to the carrying capacity of a backgrounding operation. Sensitivity to climatic variability is an indicator of how backgrounders are able to manage risk of drought and have continuity of business.</p> <p>Stocking rate has a direct short term positive correlation with financial viability, though in the medium to long-term, it will have a direct negative correlation with the sustainability of pasture growth and consequently the operation as a whole. Grazing management practices can maximise pasture growth and the long term sustainability of operations allowing for improved management of climate variability.</p>	<ul style="list-style-type: none"> ▶ Average rainfall/overland flow (and/or access to bores and other water sources) ▶ NDVI ▶ Biomass measures ▶ Drought history ▶ Correlation between returns and climatic cycles ▶ Weather and climate forecasts ▶ Stocking rates

Case Study

Queensland Investment Corporation and NAPCO

- ▶ Queensland Investment Corporation (QIC) acquired an 80% stake in the North Australian Pastoral Company (NAPCo) for approximately \$300 million (CapitallQ). NAPCo's holdings include 5.8 million hectares of property supporting nearly 180,000 cattle (NAPCo website).
- ▶ QIC's investment rationale was the rapidly growing appetite for beef, especially premium products, in Asia (Beef Central, 2016). NAPCo was identified as an ideal target due to its strategically-located assets and the strength of its management team (QIC; AFR, 2016).
- ▶ QIC's acquisition was successful because the fund respected the knowledge and experience of the existing management team (who retained a 20% stake). The investors supplied the capital, and allowed the people who best understood the business to use it productively.
- ▶ The private equity model was suitable for this transaction because it provided exposure to agriculture through aggregated funds from a group of investors that historically had not invested in the sector, including superannuation and sovereign wealth funds.

Image: CCA



Investment Opportunity: Grass Finishing Properties

Grass finishing businesses have a similar operating model to backgrounding operations, with the main difference being the location. Grass finishing operations generally use an agile supply model often procuring many of their cattle from saleyards.

- ▶ Vertical integration with upstream operations is an opportunity to reduce supply risk, reduce fixed costs and maximise marginal returns prior to processing
- ▶ Supply contracts can reduce offtake risk, and enable improved responsiveness to changes in consumer demand
- ▶ Analysis of primary producer financial data indicates an opportunity to improve overall performance through economies of scale, enabling marginal cost reduction (MLA Farm Survey Data)
- ▶ Technology can be used to increase productivity, environmental sustainability and business continuity. Effective utilisation of data (e.g., data from hardware sensors or NDVI satellite imagery) can improve pasture and herd management
- ▶ Investors with a lower risk appetite may consider investing in grazing real estate to gain exposure to land asset type returns through mechanisms such as land purchase and lease back arrangements.

	Key success factors	Key Metrics/ Benchmarks
Financial Performance	<p>Herd size influences the per unit production cost and commercial viability of business operations. Economies of scale allow breeders to amortise costs over a larger number of production units (animals).</p> <p>The concentration of owner operator and family style business models within the industry increases reliance on unpaid labour. This may misrepresent the cost base when evaluating the commercial viability of an investment.</p>	<ul style="list-style-type: none"> ▶ Rate of return ▶ Herd size ▶ Unpaid labour costs
Herd management	<p>The dietary composition (access and types of grass, supplementation etc.) of the cattle while finishing will effect the health and weight gain of the animal. Live weight gain and daily weight gain are the best measurements of grassfed performance.</p>	<ul style="list-style-type: none"> ▶ Daily weight gain ▶ Live weight gain (Final BW minus Initial BW)
Genetics	<p>Live weight gain, carcass weight and quality are all proven heritable traits. The genetic composition cattle being finished on pasture will affect the weight gain.</p>	<ul style="list-style-type: none"> ▶ Breed (type) ▶ Estimated Breeding Values
Property size and location	<p>The location of grassfed finishing properties differs from breeding and backgrounding locations. Weather and biomass affect accessibility to pasture and the commercial viability of a grassfed finishing operation.</p> <p>The proximity of finishing to backgrounding operations and downstream markets (e.g. processors) will determine transportation and logistics costs.</p> <p>Property size will affect the unit production cost and carrying capacity of a farm. The land scale required to maintain a financially viable herd size will vary depending on climatic factors.</p>	<ul style="list-style-type: none"> ▶ Geographical location ▶ Proximity to upstream and downstream operators ▶ Carrying capacity

Key success factors		Key Metrics/ Benchmarks
Environment	<p>Weather conditions such as average rainfall affect the ability to maintain grazing land and pasture growth. The location of grassfed finishing operations needs to be in areas that are more fertile with more biomass per head in comparison to backgrounding and breeding operations. In a grassfed finishing operation access to pasture needs to be sufficient to increase the weight of cattle to a level which is commercially viable when compared to feedlots.</p> <p>Stocking rate has a direct short term positive correlation with financial viability, though in the medium to long-term, it will have a direct negative correlation with the sustainability of pasture growth and consequently the operation as a whole. Grazing management practices can maximise pasture growth and the long term sustainability of operations, allowing for improved management of climatic variability.</p>	<ul style="list-style-type: none"> ▶ Average rainfall/overland flow (and/or access to bores and other water sources) ▶ Normalised Difference Vegetation Index ▶ Biomass measures ▶ Drought History ▶ Correlation between returns and climatic cycles ▶ Weather and climate forecasts ▶ Stocking rates

Case Study

Shauna Hills

- ▶ Shauna Hills is a 6,014 ha property located near Rolleston in Central Queensland.
- ▶ The property sold for \$10.8 million, or \$1,787 per hectare at Beef 2018.
- ▶ The transaction represents a domestic intra-industry acquisition, with Shauna Hill’s rich grasslands being used to support existing breeding operations.
- ▶ The on-farm water infrastructure had been recently upgraded, with 16 dams and a flowing bore pumping water to 36 troughs around the property and supporting extensive buffel grass coverage (Rowley, 2018).
- ▶ The pasture coverage and extensive water infrastructure network meant it was identified as an ideal grass finishing property.



Investment Opportunity: Beef Cattle Feedlots

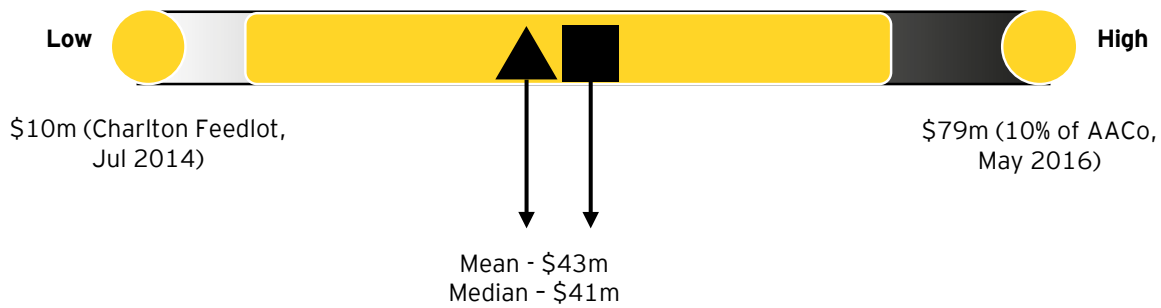
A major determinant of the success of Beef Cattle Feedlots is the cost of feeder cattle and grain (upstream costs) as well as the price of beef (downstream revenue).

- ▶ Vertical integration can help reduce the risk of industry fluctuations in the upstream costs of feeder cattle and/or grain
- ▶ Economies of scale can increase margins through reducing the average cost per head of cattle
- ▶ Automation creates an opportunity for feedlot operators to reduce their cost base by minimising their labour force
- ▶ Predictive data analytics provides an opportunity for feedlots to optimise production processes and reduce the volatility in cattle weight and specifications after exiting a feedlot

	Key success factors	Key Metrics/ Benchmarks
Financial Performance	<p>Feedlots are heavily impacted by volatility in downstream prices and upstream costs. Vertical integration can assist in minimising the impact of fluctuations in supply and demand.</p> <p>High upstream cost exposure means feedlots need to be agile with the ability to scale their operations depending on market forces. Supply volatility increases the importance of the ability for feedlots to increase and reduce the scale of operations based on changes in the market (EY Industry Analysis, 2018). However, this agility will be compromised by exposure to fixed costs. The ability to change feed blends and sources of cattle will also assist in managing fluctuations in upstream costs.</p>	<ul style="list-style-type: none"> ▶ Rate of return ▶ Volatility in returns ▶ Upstream costs
Feeding Performance	<p>The composition of feed and supplements for the cattle will have a direct effect on the daily weight gain and quality characteristics of the meat.</p> <p>Price penalties are imposed by purchasers when cattle do not hit predetermined, contracted weight and quality specifications. Compliance with specifications can be a key determinant of the performance and commercial viability of feeding operations.</p>	<ul style="list-style-type: none"> ▶ Daily weight gain ▶ Live weight gain (Final BW minus Initial BW) ▶ Fat Score (processor level)
Vertical Integration	<p>Purchases account for 80.7% of industry costs with two thirds of these purchases being cattle (IBISWorld, 2017, Beef Cattle Feedlots in Australia). The other major cost for feedlots is the cost of feed (predominately grain). The financial performance of feedlots is very sensitive to upstream costs. Weather events such as drought can simultaneously increase the cost of grain and cattle.</p> <p>A feedlot can reduce its exposure to supply and demand volatility by vertical integration with upstream and downstream operations. There is a significant opportunity to reduce costs through vertical integration with grain farming operations, processing facilities, and/or breeding/backgrounding properties. Although vertical integration in the context of feedlots often involves acquisition by a processor, the same benefits in terms of price and supply stability can also be achieved through a joint venture (e.g. feedlot operator Mort & Co's joint venture with producer Sundown Pastoral for the Gunnee feedlot) or through contractual supply arrangements.</p>	<ul style="list-style-type: none"> ▶ Cattle prices ▶ Beef price ▶ Grain Price

Regulatory Compliance	Feedlots must be licensed and compliant with government regulation to operate. Increased animal-welfare and environmental regulation have increased the important of maintaining awareness and compliance with regulation.	<ul style="list-style-type: none"> ▶ Regulatory compliance measures
Location	<p>The location of a feedlot facility will determines the cost of transport and logistics. Proximity to farming operations and backgrounding facilities reduces costs and increases sustainability of operations. Reducing the stress of cattle through transporting them over a shorter distance has further animal welfare benefits.</p> <p>Beef cattle feedlots require access to water to maintain the health of the cattle.</p>	<ul style="list-style-type: none"> ▶ Proximity to upstream and downstream operators ▶ Access to water sources

Transaction values for Australian feedlots, 2010-17



Source: Capital IQ, EY Analysis

Recent feedlot transactions have frequently involved acquisitions by processors as part of vertical integration strategies. Six feedlot only transactions closed between 2010 and 2017, at an average value of \$43 million (Capital IQ, EY Analysis).

Investment in feedlots

Feedlots sit in the middle of the beef cattle supply chain. Often investment in a feedlot will be from an intra-industry investor looking to vertically integrate. While generally owning a larger portion of the supply chain allows for increased value to be realised, upstream and downstream operators can have different motivations.

Processors

Investment in a feedlot can provide processors a secure and more consistent supply. Control over the upstream supply of cattle enables cost savings through optimised operation scheduling and reduced exposure to market prices.

Breeding and backgrounding cattle properties

Investment in a feedlot can provide breeding and backgrounding properties risk mitigation against times of drought, allowing animals to be finished when pasture is deficient. Additionally, finishing all cattle through a feedlot can enable an increase in the breeding herd ultimately increasing yearly turnoff. Through the use of a feedlot a wider range of markets can be achieved resulting in reduced risk from single market reliance. It should be noted that these benefits can be also achieved without investing in a feedlot through longterm supply contracts and collaborations.

Snapshot

Image: ALFA



Investment Opportunity: Beef Processors

The cost and supply volatility of fed cattle has a significant impact on the profitability of the processing industry.

- ▶ Vertical integration can help reduce the volatility in price and supply of fed cattle
- ▶ Scaling operations by increasing production and distribution, if there is adequate supply, reduces marginal costs and assists in increasing returns
- ▶ Automation creates an opportunity for processors

to reduce the cost of labour and also increase regulatory compliance by improving safety

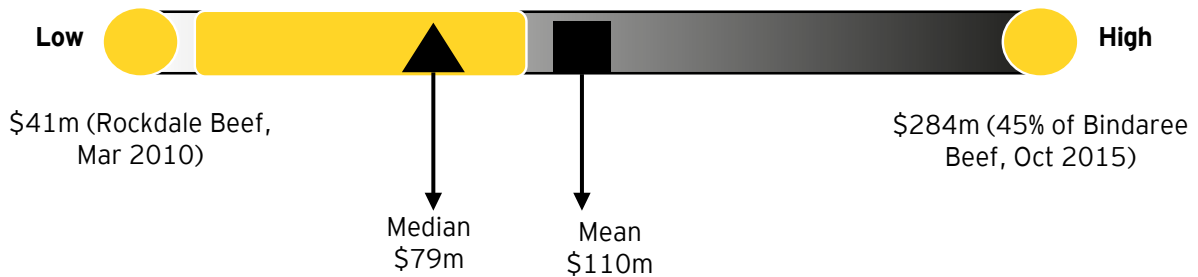
- ▶ Advances in imaging technology such as the proposed application of DEXA objective carcass measurement technology can be used across the supply chain to increase quality compliance and efficiency
- ▶ Technology can be implemented to help optimise the production process and minimise labour costs.

	Key success factors	Key Metrics/ Benchmarks
Operational Agility & Financial Performance	<p>Processors are exposed to fluctuations in downstream prices and upstream costs. Economies of scale can assist in minimising the impact of fluctuations in supply and demand through increased bargaining power and the ability to execute supply and offtake agreements.</p> <p>High upstream cost exposure mean changes in demand for beef or supply of cattle are significant determinants of the commercial viability of beef processing. Low supply chain integration/ transparency impacts supply continuity, increasing the risk of periodic shutdown and the subsequent cost. Continuity of supply will generally increase total throughput increasing the amortisation of fixed costs.</p> <p>With approximately two-thirds, (almost 70% in 2017 (ABS, DAWR)) of processed beef being exported, fluctuations in the Australian dollar can have significant impact. Fluctuations in the US dollar can also have a major impact, given that many supply contracts for manufacturing meat are denominated in that currency. Currency fluctuations of other major beef exporters may have an impact, with Brazilian imports being boosted by a sliding currency in 2017.</p>	<ul style="list-style-type: none"> ▶ Rate of return ▶ Volatility in returns ▶ Upstream costs ▶ Exchange rates
Regulatory Compliance	<p>Government regulation in meat processing is high due to the risk exposure of food safety and animal welfare. Occupational Health and Safety regulation is also a key component of processors compliance due to the risks to safety associated with the work conducted.</p>	<ul style="list-style-type: none"> ▶ Regulatory compliance
Vertical Integration	<p>A processor may be able to reduce its per unit cost through integration with other supply chain participants. Integration with upstream operators enhances continuity of supply and reduces the risk/cost of intermittent shutdown.</p>	<ul style="list-style-type: none"> ▶ Contracts and linkages with supply chain participants
Technology	<p>Automation opportunities enable reduction of labour costs and increase safety. Technology can be implemented to assist in meeting regulatory compliance and integration with upstream and downstream beef supply chain participants. Objective carcass measurement through digital imagery can be used to increase quality compliance, consistency of product and manage cattle health.</p>	<ul style="list-style-type: none"> ▶ Technological sophistication

Key success factors		Key Metrics/ Benchmarks
Supplier & Customer Relationships	<p>Strong supplier relationships can assist in reducing volatility of supply and increasing the quality compliance of cattle received. Relationships with downstream customers improves business continuity. Established relationships with key export markets is a key determinant of revenue with over 55% of Australian meat sales being to foreign markets (IBISWorld C1111).</p> <p>Strong customer relationships improve processors market insights and ability to target production at high demand or high value products.</p>	<ul style="list-style-type: none"> Existing relationships, contracts and market channels
Plant Size & Location	<p>The location of a processor will determine the cost of transport from feedlots and access to downstream markets. Proximity to customers, key ports and upstream supply chain operators can reduce logistics costs of meat processing to yield improved margins.</p>	<ul style="list-style-type: none"> Geographical location Proximity to upstream and downstream operators

High establishment, operational and compliance costs of processing facilities, allied to the generally slim margins earned by processors, means that a rigorous due diligence process would be required to establish the viability of any proposed new facility. Given the current spate of excess capacity at Queensland abattoirs, investing in existing facilities, especially for the adoption of productivity-enhancing infrastructure, should be strongly considered as an alternative to establishment of a new facility.

Transaction values for Australian processors, 2010-17



Source: Capital IQ, EY Analysis

Nine transactions closed between 2010 and 2017. The average price amongst deals with reported values was \$110 million. The completed transactions were almost exclusively intra-industry acquisitions, underpinned by the large processors.

Case Study

New Hope Investment and Kilcoy Pastoral Company

- ▶ New Hope Investment (New Hope), a large Chinese agribusiness company, acquired Kilcoy Pastoral Company (KPC), a Queensland export abattoir, for approximately \$100 million in December 2013 (CapitalIQ).
- ▶ New Hope was seeking to enter the Australian beef supply chain in order to capitalise on the lucrative market for premium imported beef in China (ABC News, 2017).
- ▶ New Hope's rationale was to capitalise on growing demand for high quality Australian beef by leveraging its extensive domestic supply chains to increase market access for, and profitability of, Australian beef in China (ABC News, 2017).
- ▶ The investment enabled KPC to upgrade equipment and employ additional staff to meet new demand generated by New Hope's network of partners, customers and suppliers (ABC News, 2017).
- ▶ An intra-industry sale to an international buyer enabled improved access to a key export market. New Hope's domestic Chinese supply chains created efficiencies that would be very difficult to replicate for an Australian trade buyer or private equity firm.

Investment Opportunity: Agricultural Services

Agricultural services have a wide array of offerings including stock and station agents, veterinarians, transport services, geneticists, natural resource management consultants and business consultants.

- ▶ Technology is both an opportunity and a threat to services in the beef cattle supply chain. New innovations can simultaneously increase the demand for one service while reducing the demand for another
- ▶ Regulatory changes create opportunities in the market for new disciplines. This is demonstrated through the increasing environmental regulation driving increased demand for specialist environmental consultants.

Key to the success of operators in agricultural service includes:

- ▶ The ability for operators to predict and adapt to changes in technology
- ▶ Adaptability to changes in demand for services arising from consumer preferences and technological innovations
- ▶ Understanding the regulatory landscape in order to exhaust potential opportunities provided by the ever-changing regulatory environment.

	Key success factors	Key Metrics/ Benchmarks
Financial Performance	Historic financial performance of a service can provide an indicator of profitability and potential future demand.	<ul style="list-style-type: none"> ▶ Revenue growth ▶ Rate of return
Technological Changes	Evaluating if there are technological solutions offered that potentially reduce the criticality of the service being provided. Will technology drive increased uptake of a service?	<ul style="list-style-type: none"> ▶ AgTech Offerings ▶ Service demand drivers
Regulatory Changes	Changes in regulation may affect the demand for skilled labour. For example: <ul style="list-style-type: none"> ▶ Consultancies can assist industry operators with regulatory compliance ▶ Increasing environmental regulation impacts demand requirements for environmental scientists. 	<ul style="list-style-type: none"> ▶ Regulation
Consumption Preferences	Change in beef prices will determine the marginal propensity for market operators to spend money on services. Industry growth is a significant driver of future demand at each stage of the supply chain.	<ul style="list-style-type: none"> ▶ Cattle prices e.g. EYCI ▶ Beef prices e.g. OTH
Existing Relationships	Strong relationships with industry stakeholders allows service providers to stay abreast of changes to trends in the industry, and changes in demand for services.	<ul style="list-style-type: none"> ▶ Existing relationships ▶ Industry knowledge

Case Study

Investment in agricultural technology companies

- ▶ New Zealand-based, ASX-listed CropLogic acquired Tasmanian agricultural IoT company Ag Logic for an undisclosed sum.
- ▶ CropLogic and Ag Logic both provide precision agriculture solutions to improve crop yields through data-driven decision making.
- ▶ The platforms administered by both companies have the potential to improve the efficiency of grazing operations by providing detailed, on demand insights into pasture quality and life cycle stage.

Investment Opportunity: Agricultural Technology

AgTech has the opportunity to add significant value throughout Queensland’s beef cattle supply chain. Benefits of AgTech may include production optimisation, reduction in costs, and increased integration and collaboration. Technological innovations can be used to manage risk by facilitating pasture and herd management, assisting with regulatory compliance, and increase responsiveness of operators to changes in supply and demand among other areas.

Major determinants of the success of technology in this industry includes:

- ▶ **Industry Uptake:** Engaging with industry participants is critical to developing a solution that meets the needs of key stakeholders
- ▶ **Mobility and integration:** The ability to integrate new technology with existing physical and/or digital infrastructure reduces costs to the user and increases the likelihood of mainstream adoption.

Key success factors	Description
Capital Flexibility	Capital flexibility is a key determinant of the success in developing technological solutions due to changing requirements through the technology development process and subsequent resource demand.
Value Proposition	Technology that can demonstrate a potential return on investment is a key driver of success. How will the technology add value to the intended customer, is there a clear positive value proposition?
Industry involvement	Developing technology that meets the needs of stakeholders is critical to uptake of the technology. Involving industry stakeholders at the early stages of development will assist in production a solution that is user friendly and fit-for-purpose.
Infrastructure	Is there existing infrastructure to support the implementation of the technology at scale?
Beef prices	Changes in beef prices will determine the marginal propensity for market operators to invest in new technology. Industry growth is a significant driver of future demand at each stage of the supply chain.
Regulatory environment	Regulation can be a key driver behind the demand for new technology that assists operators with regulatory compliance.
Mobility and integration	The ability for digital solutions to be mobile and be integrated with other technology is an important demand driver. This affects the up-front cost of implementing a technology as well as its long-term scalability and sustainability.

Case Study

JBS Australia and Scott Technology

- ▶ JBS Australia (JBS), Australia’s largest meat processor, acquired a 50.5% stake in Scott Technology (Scott), a New Zealand designer and producer of industrial machinery, for \$94 million (Mergermarket).
- ▶ Scott developed industrial robots for quickly and efficiently boning up to 600 sheep carcasses an hour, with the technology being adapted for cattle and pig carcasses. The incorporation of X-ray, Computed Tomography Scanning and weighing technology means the robots can adapt to different carcass shapes and sizes, processing with a 90% accuracy rate thanks to machine learning software (Garfield, 2016)
- ▶ JBS has pursued the development of the boning technology due to its potential to significantly reduce labour costs, workplace injuries and meat wastage (Garfield, 2016). However, its deployment for beef processing remains a few years off, as the size, weight and greater variability amongst cattle carcasses means the technology requires significantly more development (Garfield, 2016).

Investment in Innovation



Innovation in Australian agriculture creates ongoing growth, productivity gains, and competitiveness. Comparatively the beef industry has been slow to adopt new technologies due to high barriers of entry, such as cost, infrastructure requirements and telecommunication limitations.

Industry bodies and Cooperative Research Centres (CRCs) play a major role in fostering innovation. An example of this is the Meat and Livestock Australia Donor Company (MDC) which is funding current and new technologies such as livestock mustering robots, animal feeding monitors and carcass x-ray measurement systems for abattoirs (MLA 2017). MDC sponsored projects have the additional benefit of the Australian Government matching contributions from the project initiator up to 50%.

Deployment of technologies such as these are expected to create hundreds of millions of dollars' worth of cost savings and productivity benefits (Health 2018). However, deployment to date has been limited due to resistance to change amongst the grazing community.

Walk-over Weighing

Walk-over weighing is a technology which has been increasingly adopted to accurately record weights on individual cattle. This allows their health to be monitored remotely, and informs decisions with respect to feeding intensity and turnoff.

Carcass Measurement Technology

The DEXA technology uses x-ray scanning to provide timely, accurate, transparent and objective information on the lean meat, bone density and fat composition of a carcass. This information is beneficial for processors as it allows for better understanding of a carcass before it is processed. As a result, processors can optimise carcass sorting and labour requirements, and maximise the efficiency of boning a carcass (MLA 2016).

Automation in Abattoirs

In 2017, a \$3.7m research and development project commenced into the automation of beef boning in Australian abattoirs. This will reduce labour costs and improve the precision of cuts, resulting in better quality meat cuts and less wastage (MLA 2017).

Internet of Things

The Internet of Things (IoT) is the network of physical devices, vehicles, buildings, and other items, embedded with electronics, software, sensors, actuators, and network connectivity that enable these objects to collect and exchange data.

IoT is one of the core foundations of the digital transformation that is happening all around us. It will enable a range of technological advances such as real time reporting with an unprecedented level of detail, remote monitoring, tracking, and providing the information for blockchain, robotics and artificial intelligence solutions.

Blockchain

Blockchain is a network and a database. It is an open, public database that can record transactions between two parties efficiently and in a verifiable and permanent way. It promises to radically speed up transactions and cut costs by establishing trust and the transfer of value without the involvement of traditional intermediaries. Blockchain can enable secure proof of provenance from paddock to plate, and can securely automate repetitive contracts and payments.

Business Models



Sole Trader

100% Owner Operator Model.
The benefit of this model includes that the owner retains full control of the business and associated profits. This business model also accrues primary producer tax advantages. A disadvantage is the owner must completely self fund with their own capital or debt financing. This model puts full responsibility on the owner for all risks (both operational and financial).



Partnership

Partnership of individuals, or family members are owner operators. This model is the most common in the beef industry. Similar to a sole trader an advantage of this model is accrued primary producer tax advantage. A partnership allows operators to share the burden of responsibility. A disadvantage of this model (especially when within a family) can be accessibility of funding.



Company

Legal Entity separate from Shareholders.
Companies are owned by shareholders and taxed at a fixed rate. As a separate Legal Entity, the liability to shareholders is limited. Companies are not able to access primary producer tax advantages.



Trust

Vessel which holds assets and distributes profits for beneficiaries. Holds property, assets or income for the benefit of nominated beneficiaries. Trusts are treated the same way as companies and have associated tax obligations.



Joint Venture

Two or more parties.
Each party usually contributes property, expertise and/or funding for the business. This model allows investors outside of the industry to gain industry exposure.



Co-operative

Entity with multiple members who own, operate and receive benefit from the co-operative.
An advantage of the co-operative business model is enhanced scalability and breadth of operations. Forming a group of members can help to generate other competitive advantages such as economies of scale and improved bargaining power.



Collaborative

Multiple operations owned separately are managed by a single operation.
Farm owners can be passive and receive returns in the form of dividends. Alternatively they can work as an employee of the farm and accrue a salary/wage as well as a dividend.

Queensland Beef Supply Chain: Trends and Indicators

MLA Eastern Young Cattle Indicator (EYCI)	<p>The EYCI is a general benchmark for cattle markets determined using saleyard prices from across Queensland, New South Wales, and Victoria. It includes sale data from young cattle, with C2 and C3 (carcase fat) scores and weights between 250-520kgs live weight. The EYCI is measured in cents/kilogram of carcase weight* (c/kg cwt). (MLA)</p> <p>*Carcase weight is determined by multiplying the live weight by the dressing percentage.</p>	<p>The EYCI increased 79.2% between 2014 and 2017, as turnoff rates fell from their peak during the ongoing drought. This constrained supply and inflated market prices.</p>
Herd size	<p>The Australian herd size is correlated with the EYCI. Understanding the current state of the Australian herd and its position in the herd rebuilding cycle provides insight into the availability of supply.</p>	<p>Australia's herd is undergoing a rebuilding phase after the 2013-2016 drought resulted in record turnoff rates (peaking in January 2015). Australia's herd size was 25.0 million in 2016, below the 10-year average of 27.6 million (EY Analysis).</p>
Herron Todd White Queensland Grazing Property Index (QGPI)	<p>The Herron Todd White QGPI is an index of median prices for grazing property sales greater than 2,000ha in Queensland. It illustrates changes in property values over time, with a base year of 1996.</p>	<p>After increasing five-fold between 1999 and 2009, prices eased significantly in the aftermath of Queensland's resources boom, which inflated land values in prime grazing areas. Although the index has demonstrated volatility in years since, it remains more than 400% higher than 1999 (Herron Todd White).</p>
Live export price	<p>Live export prices give an indication of live export market strength.</p> <p>MLA reports prices at the Port of Darwin and at the Port of Townsville. Live export prices are measured as cents/kilogram of live weight (c/kg lwt).</p>	<p>Export prices have increased significantly over the past four years, with c/kg lwt price of light heifers at Darwin and Townsville growing at an annualised 9.3% and 13.5% respectively (MLA).</p>
Grain Prices	<p>Grain is a key input to feedlots, accounting for approximately 30% of input costs (IBISWorld A0143). Grain prices can impact turn off rates and profitability. Common grains include wheat, barley, corn and soybeans.</p>	<p>Record harvests led to lower prices across 2016 and 2017. Markets have since stabilised, trending towards long run values.</p>
Over the Hook (OTH)	<p>Over the hook indicators give an indication of market demand. The MLA OTH indicator is generated using processor cattle grids and weighting them on their daily throughput. There are many different OTH indicators produced by various organisations for specific categories of meat.</p>	<p>As the US herd recovers and market supply has increased the OTH indicator for Queensland MSA Grainfed 100 day steers has decreased (MLA).</p>
Foreign exchange rate	<p>A majority of Australia's beef is sold into export markets, and as such, changes in exchange rates can cause demand fluctuations. A reduction in the value of the Australian dollar against an importing country's currency will mean that the actual cost incurred by the importing country will be reduced. This would tend to have a positive impact on export demand.</p>	<p>The Australian Dollar has steadily declined since mid-2013. A weaker relative currency has coincided with surging export demand from economies such as China, Japan and the United States.</p>

Where to find opportunities?

The method of finding the right investment opportunity to suit your needs will vary depending on an array of factors. This may include the investment type, size, and location.

Trade Conventions

Trade conventions, such as Beef Week, can be a key generator of transaction activity. Trade conventions provide a platform to showcase breed quality, supply chain development and beef products. These events facilitate investor understanding of the complexity of beef supply chains, and the value they can create.

- ▶ For Domestic investors trade conventions are used to evaluate different opportunities through the supply chain. Trade conventions facilitate broadening your network and displaying your business to both operators within the industry and investors outside of it.
- ▶ For Foreign investors these events provide an opportunity to develop a greater understanding of the Australian Beef Industry and see a range of operators through the supply chain which allows them to analyse potential investment opportunities and benchmark similar supply chain operators.

Where to find help

Queensland Government	The Queensland Government provides a range of services to help promote sustainability, innovation, and support to the agriculture sector. The Government has extensive research capabilities and develop best practice and informational guides over a wide range of topics.
Industry Bodies	There are a number of industry bodies such as Meat and Livestock Australia (MLA) and the Australian Meat Processors Corporation (AMPC) who produce reports and tools to help assist producers in the beef-cattle industry.
Professional Services Firms	These firms provide specialist advice through agribusiness teams that advise in areas such as supply chain optimisation, digital integration, transaction advice and growth opportunities.
Specialist Agricultural Services	Specialist services provide industry advice across a number of areas including but not limited to soil-testing, grazing management, performance analysis. These services may assist in due diligence processes and are able to provide industry expertise through the evaluation of investment opportunities.
Trade and Investment Queensland (TIQ)	TIQ works with primary producers, industry organisations and international agencies to improve trade relations with, and market access for Queensland businesses. TIQ can help primary producers by providing market intelligence for a range of sectors, and make introductions to create opportunities in new markets.
Transaction Advisory Services	Firms with specialist transaction advisory teams are able to provide technical investment advice. These firms specialise in providing advice including but not limited to mergers and acquisitions, valuations, equity raising, and due diligence processes.
Austrade	The Australian Trade and Investment Commission (Austrade) provides a range of services to international and Australian businesses. Austrade can provide extensive information and relevant networks to foreign investors.

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‘Investor’s Guide to the Queensland Beef Supply Chain’ is part of the document series ‘The Investment Outlook for the Queensland Beef Supply Chain’ developed by EY on behalf of the Queensland Department of Agriculture and Fisheries. This document series explores the existing and growing opportunities for the Queensland beef industry. It consists of:

- ▶ Strategic Drivers of the Queensland Beef Supply Chain
- ▶ The Existing Queensland Beef Supply Chain
- ▶ Future Outlook for Queensland Cattle and Beef Products
- ▶ Investment Analysis of the Queensland Beef Supply Chain
- ▶ Investor’s Guide to the Queensland Beef Supply Chain
- ▶ Queensland Beef Producer Investment Guide



Wade Hansen
Partner
Assurance
Oceania Agribusiness Leader

+61 7 3011 3333
wade.hansen@au.ey.com



Ruth Ahchow
Partner
Economics, Regulation and Policy

+61 3 9288 8000
ruth.ahchow@au.ey.com



Angus Blackwood
Partner
Transaction Advisory Services

+61 7 3011 3333
angus.blackwood@au.ey.com

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