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## **AACo's Northern Beef Value Chain: Analysis of performance and interventions**

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AACo is one of northern Australia's largest beef producers. The new Livingstone beef processing facility represents the formation of a new value chain component for the company, the success of which could also help facilitate the broader development of an alternative marketing channel for the northern cattle industry. A speculative analysis of the AACo northern beef value chain suggests that it may be difficult to achieve sufficient levels of chain surplus despite an existing high level of coordination between stages. The main obstacles to performance indicated include poor quality transport infrastructure, climate variability, the relatively low value of the specific targeted beef market, and the cost of skilled labour in the region. Potential interventions are suggested, but further analysis will be required after all stages of the value chain become fully operational to confirm the findings of this study, and potentially provide greater evidence for effective targeted interventions.

### **Introduction and rationale for study**

Cattle production is a major industry in northern Australia. The region accounts for 60% of the nation's beef cattle herd and contributes an estimated \$4.6 billion to the economy (Gleeson et al., 2012). Meatworks and live export are the two fundamental marketing channels available to beef cattle producers in northern Australia (Bortolussi et al., 2005). The majority of beef production in the region occurs in Queensland, with producers in the Northern Territory and the north of Western Australia largely reliant on the live export trade (Gleeson et al., 2012). A key obstacle to the further development of the beef export industry in these areas has been a lack of local processing facilities (Burrow, 2014).

There are significant disadvantages associated with an industry focused on live export with few feasible alternative supply chains into which stock may be redirected (Poppi, 2014). Northern cattle producers are particularly sensitive to live export demand shocks. For example, the 2011 Indonesian ban on live exports caused major losses in capital value and significantly reduced income across the industry (Paton, 2014; Hassall & Associates Australia, 2006). Simultaneously, there are major opportunities for growth in the export beef sector. Growing consumption of animal products in developing nations may result in higher future demand for Australian beef, particularly from China and other Asian countries that northern Australia is geographically well placed to supply (Gleeson et al., 2012). This suggests that there is considerable value in public policy supporting efforts to increase participation in this market.

AACo is one of northern Australia's largest beef producers. The company manages over 450,000 cattle over 7 million hectares of land across the Northern Territory and Queensland. Its operations include farming, breeding, growing, backgrounding, feedlotting, and, most notably, a recently opened beef processing facility located in Livingstone Valley, south of Darwin. This is the only such facility in the Northern Territory (AACo, 2015a, 2015b, 2014, 2013a). The facility will primarily produce manufacturing beef for the export market, potentially helping to encourage a move towards systems that can produce cattle for slaughter rather than just lighter live export animals (AACo, 2015b; Burrow, 2014). An analysis of AACo's new northern beef value chain can help identify public and private

interventions to assist with the success of this initiative, to the benefit of the wider northern Australian beef industry.

The value chain mapping sections of this report are prepared after the Valuelinks methodology, as outlined in Springer-Heinze et al. (2008). The overall framework for the analysis of this value chain is adapted from Chopra and Meindl (2013).

### Northern beef value chain map

A map of AACo's northern beef value chain is provided in Figure 1. The value chain is highly vertically integrated, with AACo facilities performing each of the stages outlined (AACo, 2015c).

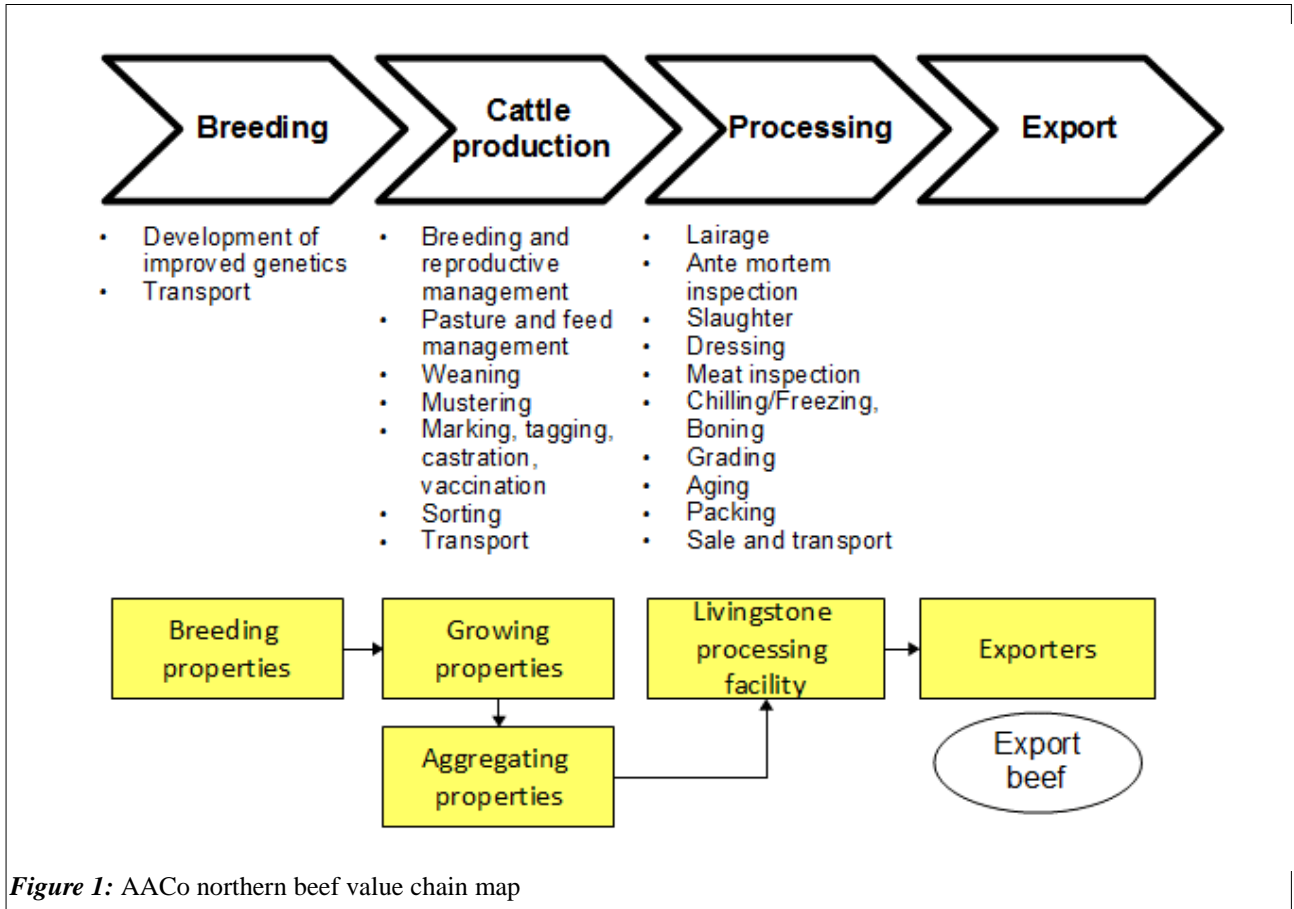


Figure 1: AACo northern beef value chain map

Relevant data for volumes, values, and costs are not yet available since the Livingstone facility is not fully operational. Further, previous financial reports only include aggregate figures for AACo's wholesale beef division, which mainly captures higher value-added branded beef products that are not the focus of this value chain.

### Assessment of value chain strategy

Responsive value chains provide high service levels, short lead times, and a range of innovative products and quantities, whereas efficient supply chains produce and supply a smaller range of products at the lowest possible cost (Chopra and Meindl, 2013). That is, the former is focussed on identifying and satisfying well-defined customer demands, whilst the latter is focused on logistical efficiency which is one component of value chain formation. AACo's northern beef value chain

strategy, as revealed through recent annual and financial reports, is primarily focused on efficiency, suggesting it is better characterised as either a supply chain or a low-value value chain.

AACo's strategic focus satisfies the majority of Fisher's (1997) criteria defining an efficient (rather than responsive) chain strategy (see Figure 2). For example:

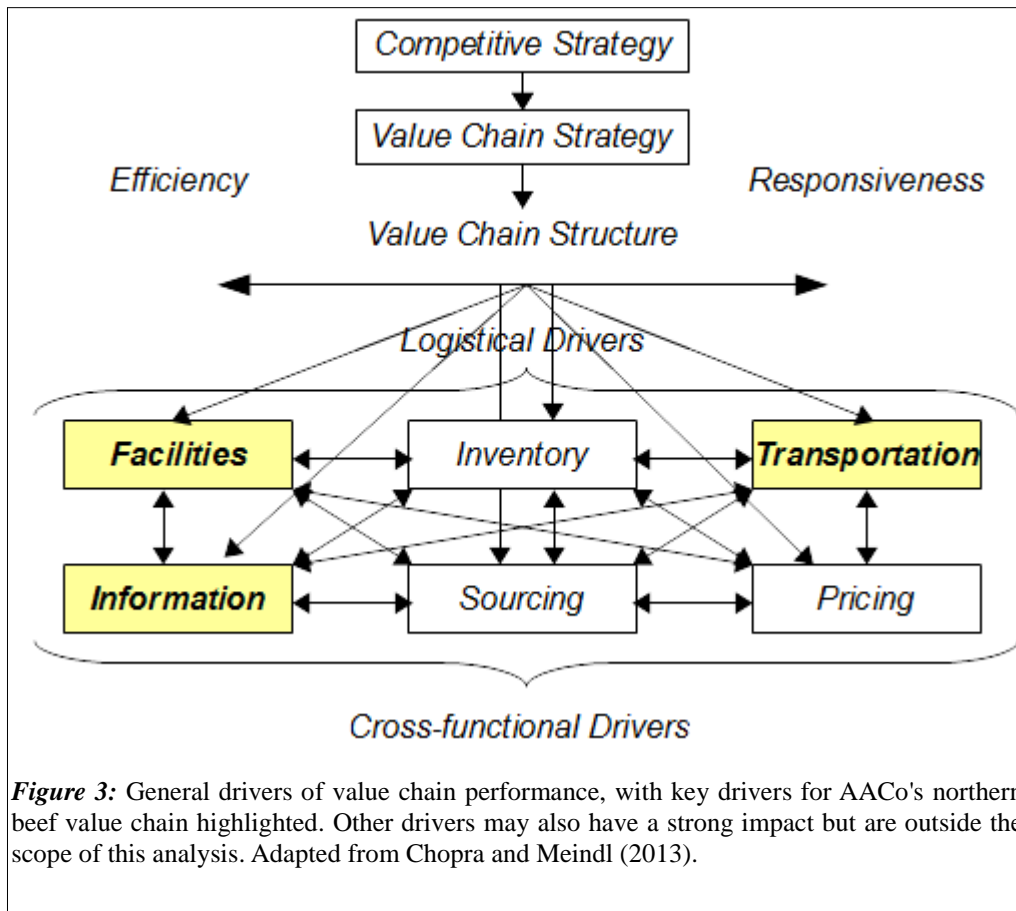
- The firm has an overall goal to increase the efficiency of its supply chain;
- Cost and quality are key focuses of production. A main driver of the development of the Livingstone facility was to reduce total logistics costs otherwise incurred in moving cattle to eastern Australian abattoirs (whilst the company also invests in genetic improvements and other initiatives to improve both efficiency and product quality over time);
- The company has a stated target of maximising the utilisation of its assets (AACo, 2014, 2013a).

An efficiency-focused strategy is also indicated by the firm's pursuit of vertical integration and the decision to develop the Livingstone facility. A high degree of uncertainty in *both* demand and supply requires a responsive chain strategy (Chopra and Meindl, 2013). Developing the beef value chain in an area that would otherwise be reliant on live exports is intended to help insulate that company from fluctuations in the live market (AACo, 2013a). From a supply perspective, vertical integration strategies, such as those pursued by AACo, may also result from a desire to reduce uncertainty and increase efficiency (Blair and Kaserman, 1983). High supply uncertainty is characteristic of many agricultural commodities (Chopra and Meindl, 2013). Generally speaking, AACo's strategy attempts to reduce uncertainty to allow for greater efficiency, rather than respond to uncertainty through greater responsiveness.

<b>Primary purpose</b>	Supply markets efficiently at lowest possible cost
<b>Manufacturing focus</b>	High average utilisation rate
<b>Lead time focus</b>	Shorten lead times as long as it doesn't increase cost
<b>Product design strategy</b>	Maximise performance, minimise cost

**Figure 2:** Relevant criteria for physically efficient supply chains. Adapted from Fisher (1997).

## Key drivers of chain performance



**Figure 3:** General drivers of value chain performance, with key drivers for AACo's northern beef value chain highlighted. Other drivers may also have a strong impact but are outside the scope of this analysis. Adapted from Chopra and Meindl (2013).

Chopra and Meindl (2013) list six major drivers of performance (see Figure 3). The most important of these drivers, as they relate to AACo's northern beef value chain, are outlined in Table 1.

**Table 1: Main drivers of performance in AACo northern beef value chain**

<b>Driver</b>	<b>Relevance to AACo value chain</b>
<b>Facilities</b>	The location of processing facilities is a highly influential driver. The lack of nearby facilities has previously restricted production to live exports rather than beef. Other facilities, such as ports, are also critical to effective participation in the beef export market (Burrow, 2014). At the same time, processing facilities require a smooth and reliable supply of livestock (ACCC, 2007). This will make the location of growing facilities very important to the overall performance of this value chain.
<b>Transportation</b>	Efficient transportation is likely to be a key driver of chain outcomes, given the scale and distances involved. Transport requirements include between breeding properties and cattle stations, backgrounding properties, the processing facility, and export ports. The land transport of cattle is strictly regulated, and also has a negative effect on animal condition (Gleeson et al., 2012). Consequently, transportation decisions involve significant direct costs. They also have significant indirect costs in the value chain including quality related price discounts and market access.
<b>Information</b>	The multiple stages and locations involved in this chain makes the effective flow of information between them highly important to align chain output with customer preferences for eating quality and other characteristics. Each beef export location has a range of specific requirements that must also be met in order to participate in the market. These translate into specifications at each stage of the value chain (Mulley et al., 2014). Food safety is also a key source of value in the Australian beef industry, and traceability is also required across the chain in order to preserve market access (Jie and Parton, 2009; MLA, 2014).

## **Achievement of strategic objectives, chain surplus, and chain coordination**

An assessment against specific metrics across the value chain will not be possible until the Livingstone processing facility is fully operational. However, a more general assessment of the value chain design and performance, based on broadly comparable operations within AACo and the wider northern Australian beef industry, will be indicative of the value chain's performance once mature.

### ***Is the chain achieving strategic objectives in relation to its key drivers?***

Efficiency was identified as the main strategic objective of this value chain. The extent to which this objective is likely to be achieved through the design of AACo's northern beef value chain, in relation to the key drivers outlined previously and Chopra and Meindl's (2013) relevant strategic components, is discussed below.

#### ***Facilities***

**Role:** In general, each stage in this value chain corresponds to a separate facility. AACo maintains separate properties for breeding, growing, and processing (AACo, 2015c). Dedicated facilities generally correspond to greater efficiency, in line with the organisation's strategic objectives (Chopra and Meindl, 2013).

**Location:** The Livingstone facility is located 50 kilometres from the nearest export port in Darwin. The closest AACo growing properties are located approximately 50 kilometres from the Livingstone facility, but are intended mainly as aggregating assembly points for cattle prior to processing. The next nearest are between 150 to 700 kilometres further away (AACo, 2015c) (Figure 4). Cattle will be sourced from an area including the Kimberley, Alice Springs, and Western Queensland (AACo,

2015b). This broad distribution is characteristic of native pasture based methods of production in the region that require very large, extensive properties (Burrow, 2014). The reduced efficiency of having widely distributed facilities might thus be compensated for by the lower-cost method of cattle production that it facilitates. The Livingstone processing facility is geographically well placed to access key export markets. Transport costs for cattle from growing properties to the processing facility will also be substantially reduced compared to those incurred in moving cattle to eastern Australian abattoirs as previously required (AACo, 2013a). However, Gleeson et al. (2012) outlines a number of potential issues associated with the location. These include the lack of a feed-on industry in the region, restricting production to relatively low value manufacturing beef products; and the high salaries required to attract skilled labour to the area. These issues may have a strong impact on the achievement of strategic objectives in this stage of the value chain. In particular, high salaries or a lack of skilled labour may lead to prohibitively high processing costs (Gleeson et al., 2012).

### **Transportation**

Design of transportation network: AACo's Pell and Tortilla properties are intended to serve as intermediate aggregation points in the transportation network to allow for holding and sorting of cattle prior to processing. These properties are located approximately 50 kilometres south of the processing facility (AACo, 2015c). It is unclear what the effect of this design will be on chain efficiency. Transportation of cattle from growing properties directly to the processing facility might involve fewer costs directly related to transport and loading times by avoiding this intermediate step. However, a distinguishing feature of these facilities is year-round accessibility (AACo, 2015c). Their use as aggregation points could thus help smooth the supply of animals, particularly over the wet, as well as allow for a more efficient sorting process than might be possible at individual growing properties.

Choice of transportation mode: AACo does not report transport costs separately. However, transport is a major expense for northern Australian beef producers in general, representing as much as 40% of the market price of cattle (Cattle Council of Australia, 2014; Williams, 2015). Due to a lack of appropriate infrastructure, transportation choices throughout this value chain are constrained and may be neither efficient nor responsive. Roads are the only mode of transport available in most of the region (Infrastructure Australia, 2015). A large number of these roads are unsealed, which severely limits access during the wet season. Many roads and bridges may also have weight limits. Poor quality transport infrastructure increases transport times and related expenses, affecting both direct freight costs and animal condition (Gleeson et al., 2012). The effect of these constraints on transportation costs is likely to limit the achievement of efficiency objectives across the chain.

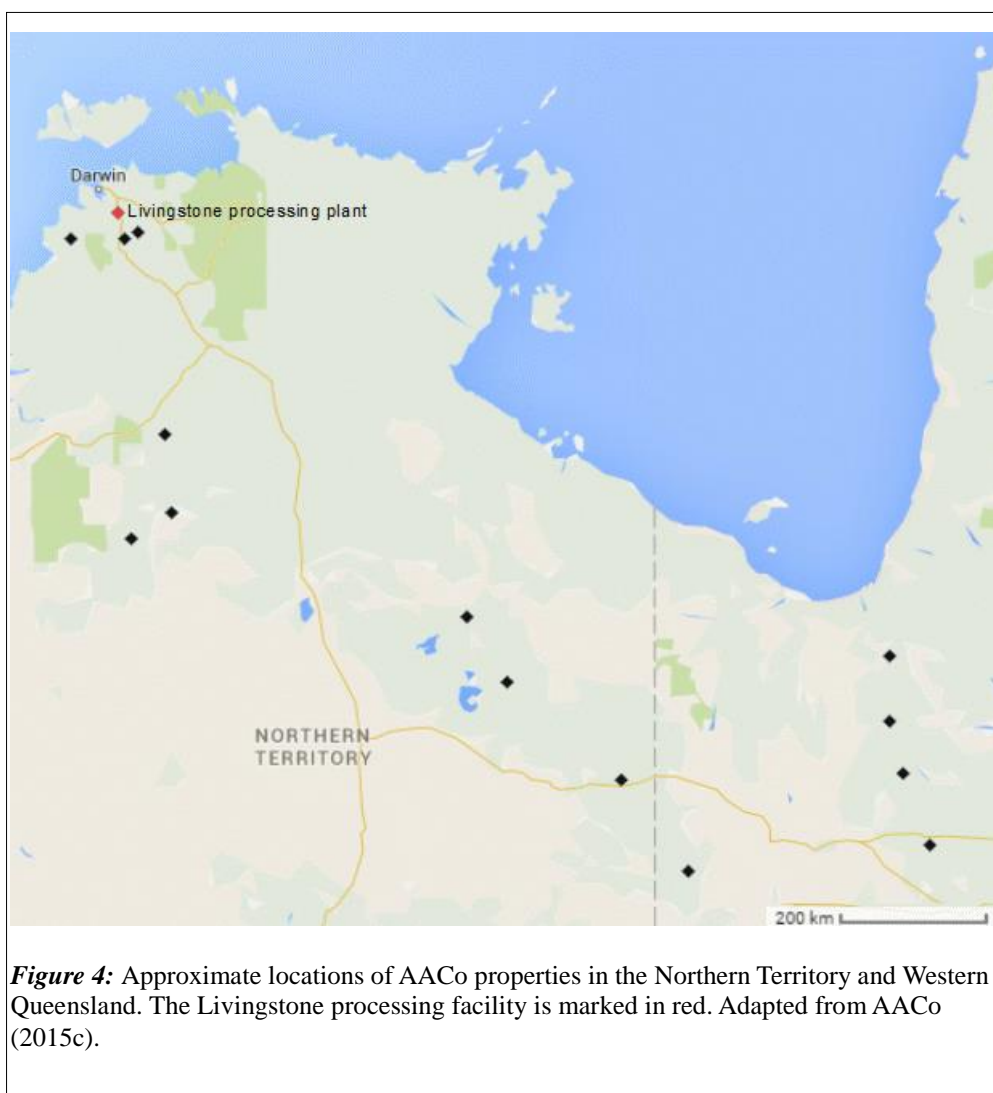
### **Information**

Coordination and Information Sharing: A detailed discussion of the general level of coordination and information sharing achieved in this chain is provided in the following section. The organisation also participates in a range of quality assurance programs, such as Meat Standards Australia, which is intended to increase responsiveness to customer requirements (AACo, 2015a; MLA, 2014b).

Sales and Operations Planning: AACo does not publish details of its demand forecasting systems. Obtaining this information from the organisation would allow for an estimate of forecast error and variance from plan, which in turn would support an assessment of the accuracy of overall production and inventory planning. The technologies noted below, and the level of coordination and information sharing discussed in the following subsection, does suggest that relevant sales and production information is likely to be shared effectively across the chain.

Enabling Technologies: AACo operates a range of specialised software and equipment intended to support information sharing across the chain. For example, a single, centralised, web based system called StockFusion is used to manage all aspects of livestock inventory data and reporting across all facilities (AACo, 2013b). Although this value chain is intended, at least initially, to source cattle only from AACo growing properties, the organisation has also implemented an online portal to share kill feedback, carcass performance, production, benchmarking, and contract information with other producers (AACo, 2015b).





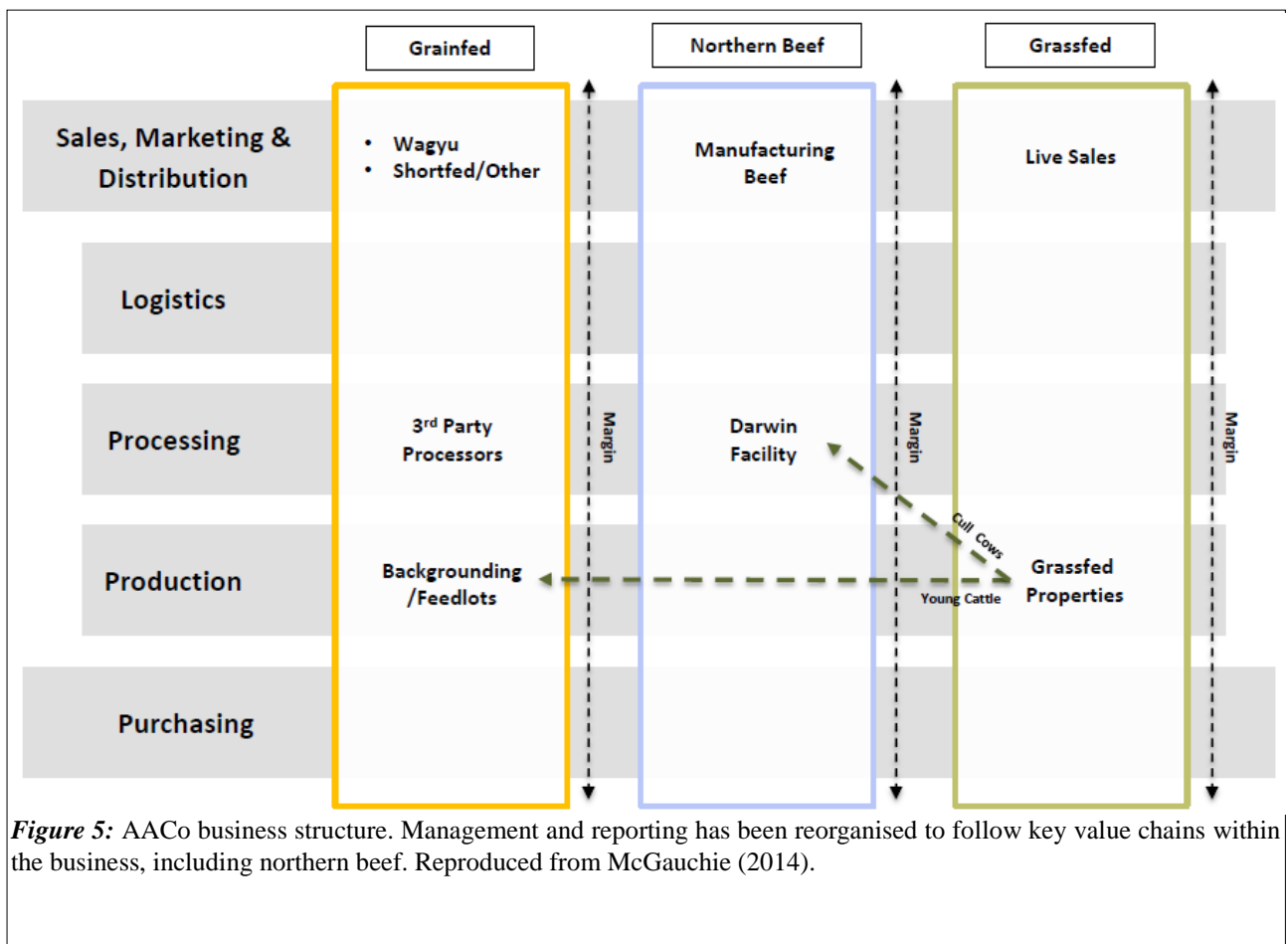
**Figure 4:** Approximate locations of AACo properties in the Northern Territory and Western Queensland. The Livingstone processing facility is marked in red. Adapted from AACo (2015c).

### ***What level of coordination has been achieved in the chain?***

Chopra and Meindl (2013) describe chain coordination as being characterised by effective information sharing between each stage, with decisions made that take into account their broader impact across the chain. A lack of coordination may be due to by a range of obstacles but ultimately reflects conflicting objectives, or a delayed and distorted information flow, between stages. Achieving a high level of coordination is important to the overall performance of a value chain, since close alignment between stages, or participants, is key to increasing profits, eliminating unnecessary costs, adding value, and facilitating a market-driven “pulling” of goods through the chain (Gooch, 2006).

The high degree of vertical integration present in this value chain may assist with avoiding many common obstacles to coordination. The integration of all key chain stages and functions into one organisation places them under the control of a single senior management team. This is supported by a business structure that is intended to align management and reporting across the value chain (Figure 5), and the investments in enabling technologies outlined above. This should help ensure necessary information sharing and that organisational decisions take into account their end-to-end implications. In this sense, the vertical integration strategy pursued by AACo should support a high level of coordination in the value chain. The actual extent to which this avoids incentive and behavioural obstacles depends on the specific structure of incentives and Key Performance Indicators (KPIs) in place at each level of management. Information on this is not publicly available.





**Figure 5:** AACo business structure. Management and reporting has been reorganised to follow key value chains within the business, including northern beef. Reproduced from McGauchie (2014).

### ***Is the chain generating surplus?***

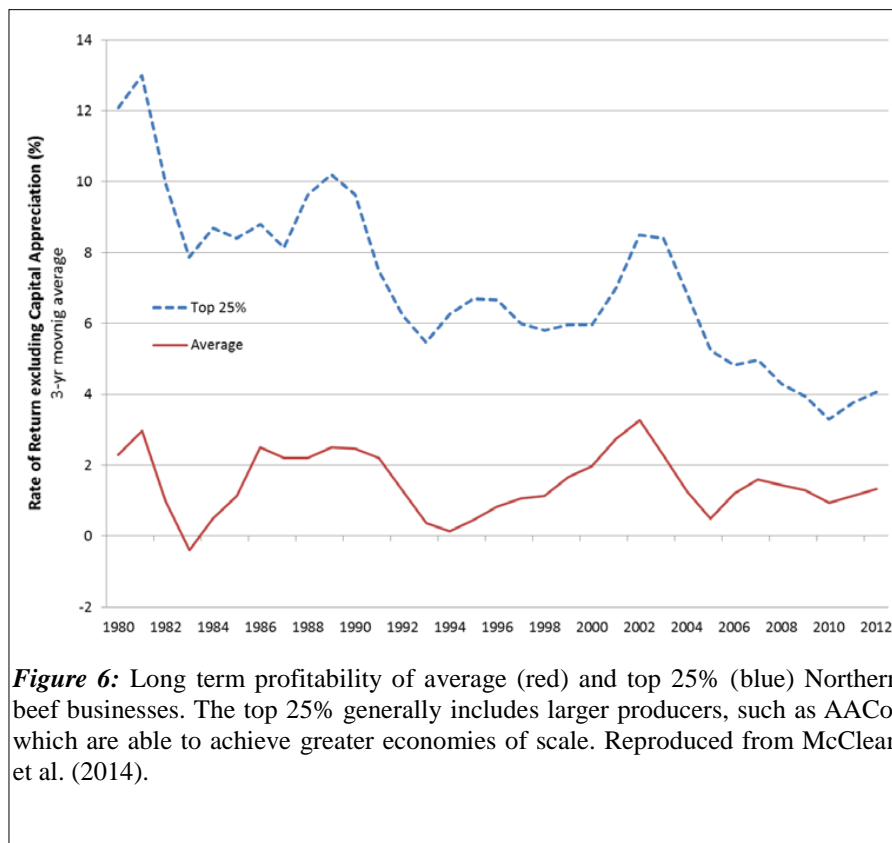
Chain surplus can be divided into consumer surplus and supply chain profitability components (Chopra and Meindl, 2013). Since this value chain is not yet fully operational, a direct and specific assessment of chain surplus is not yet possible. However, the potential for this chain to generate surplus can be suggested by an analysis of comparable operations.

Both the northern Australian beef industry in general and AACo's current operations appear to generate consumer surplus. 85% of northern Australian beef is exported, representing the majority of the nation's total (Gleeson et al., 2012). The FOB unit value (\$/kg) and overall quantity of Australian beef exports have both grown consistently over the last five years (ABARES, 2014). AACo's total beef exports have also grown, including to the US manufacturing beef market that this value chain will target (AACo, 2014). This suggests that consumer surplus is successfully being generated by the existing industry in the key markets that the value chain will participate in.

Details on the specific costs of production at each stage are not reported by AACo or comparable organisations. However, AACo's branded beef division, which serves higher value customers with greater margins than the manufacturing beef market, achieved a gross margin in 2014 of 9%. This was based on an average sale price of \$9.18/kg and cost of production of \$8.35/kg (AACo, 2014). The price of manufacturing meat (90CL) for the US market, which will be a major product of this value chain, has varied between around \$4 - \$7 kg over the past 3 years (McGauchie, 2014; MLA, 2015). This suggests that AACo will need to capture major efficiencies within its northern beef value chain if it

hopes to achieve comparable returns.

Profitability appears to be a significant issue for northern beef producers, the broader beef processing industry, and AACo itself. On balance, northern beef cattle farms are not financially sustainable. Although properties with a large herd size (such as those operated by AACo) have been profitable over the long term, performance has decreased significantly (see Figure 6) (McClellan et al., 2014). The Australian processing industry has higher costs than in competitor countries, and processors generally only achieve small and volatile margins (ACCC, 2007; Gleeson et al., 2012). Of additional concern is the fact that AACo's overall operations also continue to deliver negative returns. The company reported a \$39.9 million loss in 2014, which it attributed mainly to poor seasonal climate conditions (AACo, 2014). There thus appears to be only minimal (if any) supply chain profitability in the northern beef industry at large.



**Figure 6:** Long term profitability of average (red) and top 25% (blue) Northern beef businesses. The top 25% generally includes larger producers, such as AACo, which are able to achieve greater economies of scale. Reproduced from McClellan et al. (2014).

## Main obstacles to value chain performance

This analysis suggests a range of key obstacles that may constrain performance in AACo's northern beef value chain, including:

- Poor quality transport infrastructure and the considerable distances involved;
- Climate effects on production, particularly drought;
- The relatively low value and margins of the manufacturing meat produced by the chain;
- Lack of skilled labour increasing already-high processing costs.

## **Some suggested interventions**

### ***Invest in the development of improved transport infrastructure***

Improving and upgrading the condition of roads in the region would reduce transport costs and improve seasonal access to critical facilities in the chain, helping to maintain the supply of cattle needed for the processing facility to operate efficiently. Infrastructure Australia (2015) recommends a range of improvements for the region. These include widening, realigning, and sealing roads and upgrading bridges, to improve safety, accessibility for heavy vehicles, and increase capacity and overall efficiency.

This intervention has the potential to deliver significant benefits. Infrastructure Australia (2015) reports that a 250km trip on a critical road in the Northern Territory can currently take a heavy vehicle 14 hours to complete due to severe corrugations. Transport costs per kilometre for B-double trucks, for example, are as high as \$4.10 at 40km/h but fall to \$2.35 at 100km/h (Higgins et al., 2015). Clear reductions in the direct costs of transport can thus be achieved through investments in road infrastructure that increase transport efficiency.

The main difficulty with this intervention is in attracting the necessary funding. The Commonwealth Government recently announced a \$100 million Northern Australia Beef Roads Fund, but the Northern Territory alone has a budget shortfall of around 40% simply for required road maintenance (Infrastructure Australia, 2015; Prime Minister of Australia, 2015).

### ***Use sustainable irrigation to facilitate the production of higher value beef and help reduce seasonal variability***

Mosaic irrigation has been suggested as a feasible and sustainable method of growing forage crops on-property in this region, which could then be used as to support the production of higher quality finished cattle (Grice et al., 2013). From a more public perspective, there are also a range of water infrastructure projects that could increase water supplies and potentially allow for the establishment of feedlotting operations (Joint Select Committee on Northern Australia, 2014).

Feed-on operations facilitated by these schemes could allow access to higher value markets with higher margins, potentially improving the profitability of the value chain. The use of irrigation would also provide a lower-cost alternative feed source to transported grain, reducing seasonal variability and helping manage the effects of drought on production. Facilities close enough to the plant could provide steady throughput during periods when transport is difficult. The exact benefits of these schemes require considerable detailed analysis, but available evidence suggests considerable potential benefits. Grice et al. (2013) estimate average return on investment of mosaic irrigation schemes as between -5% to 44%, depending on the specific situation, and AACo (2014) reports higher premiums associated with sales of high quality branded beef.

This intervention may be best facilitated through cooperation between AACo and a dedicated customer in a target market prepared to directly invest in, or contractually underwrite, the required facilities. Critically, this would also provide a dedicated buyer for premium beef, produced to close customer specification, greater evidence of value chain formation, and a clear signal of AACo's ability to generate higher value returns. Whether such an alliance can deliver these benefits is likely to rest largely on the identification of a partner who is both willing and appropriate, since the degree of compatibility between organisations is critical in supporting effective value chain management (Gooch, 2005).

### ***Establish coordinated training schemes for local residents and invest in amenities to improve liveability***

Providing training programs to locals could be used as a long term strategy to avoid the high costs otherwise associated with attracting skilled labourers to remote areas, and can deliver additional social and economic benefits to the region (Neithe & Butler, 2010 in Gleeson et al., 2012; Gleeson et al., 2012). Reducing processing costs could be critical to the profitability and competitiveness of this chain, given the relatively high costs compared to international competitors. A partnership between relevant

government bodies and AACo has previously been identified as a potential key driver for the facilitation of these outcomes (ACIL Tasman, 2012). However, long term investments in services and amenities would also be required to help encourage population growth (Joint Select Committee on Northern Australia, 2014).

## Conclusions

Northern Australian cattle producers have historically been heavily reliant on the live export trade. Long transport distances to abattoirs have made participation in alternative beef markets financially prohibitive in many cases. The construction of AACo's Livingstone beef processing facility near Darwin represents both the formation of a new value chain for the organisation, and a first step towards establishing a viable beef industry in the area. Although initially focused on AACo cattle, the potential success of the business venture could provide impetus for further development of a valuable alternative marketing channel in the region.

In depth analysis will not be possible until the Livingstone facility is fully operational. However, a preliminary analysis of AACo's northern beef value chain suggests that it is highly vertically integrated, with a strong organisational focus on efficiency, and key drivers of performance that include facilities, transportation and information. Nevertheless, the historical performance of AACo's broadly comparable operations, northern beef producers, and the processing industry in general suggests that it may be a challenge to generate significant chain surplus, at least in terms of supply chain profitability, despite an apparent high level of chain coordination.

Any intervention in this value chain should be focused on key obstacles to performance and may include initiatives targeted at improving transport efficiency, enabling access to higher-value beef markets, and reducing seasonal variability and labour costs. In general, however, these activities require additional funding, but given that the potential economic and social benefits extend region wide, additional efforts to support the success of the value chain may be justified. More detailed analysis after full-scale operation of the value chain has commenced would be valuable to both confirm the findings of this study, and potentially provide greater evidence for specific, targeted intervention.

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