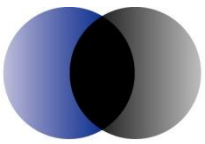
# An economic analysis of the live exportation of cattle from northern Australia

Prepared for WSPA

**Released October 2012**



ACIL Tasman

Economics Policy Strategy

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# Glossary

| | |
|---|---|
| ABARE | Australian Bureau of Agricultural and Resource Economics and Sciences |
| ABS | Australian Bureau of Statistics |
| ADB | Asian Development Bank |
| AE | Adult Equivalent |
| BSE | Bovine spongiform encephalopathy |
| CEPA | Comprehensive Economic Partnership |
| CSIRO | Commonwealth Scientific and Industrial Research Organisation |
| DEEWR | Department of Education, Employment and Workplace Relations |
| DFAT | Department of Foreign Affairs and Trade |
| EBIT | Earnings Before Interest and Tax |
| FDI | Foreign Direct Investment |
| FTE | Full Time Equivalent |
| GAIN | USDA Foreign research report |
| GDP | Gross Domestic Product |
| GFC | Global Financial Crisis |
| IMF | International Monetary Fund |
| JV | Joint Venture |
| MLA | Meat & Livestock Australia |
| NZ | New Zealand |
| OECD | Organisation for Economic Co-operation and Development |
| QE2 | Quantitative Easing 2 |
| SWT | Shipped Weight |
| USDA | US Department of Agriculture |

# Executive summary

## Key points

Australia's live cattle export markets are prone to considerable government intervention. This creates significant market risks for Australian producers reliant on the trade. Also, Asian consumer preferences are changing and the growth in demand will be for high quality, safe and convenient beef products, sold in modern urban and regional retail outlets.

Our analysis suggests that a northern beef processing market, processing up to 50 per cent of the number of animals currently exported live from Northern Australia, could be viable if certain risks are adequately managed, without requiring significant ongoing Government financial contributions.

## Northern cattle industry

If a northern processing market, operating in conjunction with the live trade, were to be established:

- The profitability of Northern cattle producers could increase significantly and market risks would be reduced:
  - Earnings before interest and tax could increase by up to 245 per cent for some Northern producers, from being able to sell heavier steers to a regional processor
  - This does not include additional revenue from the sale of surplus females for which there is currently no market
  - Having access to a surplus female market would reduce the average age of the cow herd, improving cow fertility and survival, and further increasing profitability
  - A reduction in market risks from ongoing Indonesian Government intervention in the industry in the pursuit of beef self-sufficiency
  - Producers would also be able to pursue alternative markets, based on the relative competitive advantages conferred by their properties and management capacity
- The flow-on effects of a domestic beef processing industry to the Northern Australian economy would be substantial:
  - Processing up to 400,000 head per annum, would increase the gross regional product of the areas currently reliant on the export trade by up to $204m per annum
  - Over 1,300 additional full-time equivalent jobs would be created

## What needs to be done?

- The building of Australian northern beef producers' capacity to meet alternative cattle market specifications
- The Australian Government could work with domestic private and/or foreign interests to secure an investment in beef processing capacity in the north of Australia:
  - Foreign interests could be encouraged to consider investing. The premise of inviting foreign investment is that a profitable and productive Northern Australian beef industry is the most efficient and reliable way to improve South East Asian, and in particular Indonesian, food security. It would provide a stable source of beef and free up agricultural resources for other, more economically efficient, food production uses
  - Also having an Indonesian investment in Australia would encourage Indonesia to take into consideration the impacts of changes to its beef market policy on the Australian industry more than it may currently do
- The benefits to South East Asia from an investment in a northern beef processing facility could be significant:
  - A portion of the labour employed at the plant could be migrants
  - There would be technology and training transfers between Australia and Asian interests
  - South East Asia would have a stable, safe and high quality source of beef for its population, to complement its own beef production

– Some of the more labour intensive aspects of beef processing (preparation of specific cuts, small goods production and packaging) could be undertaken in Asia, using early-stage processed beef from a Northern Australian plant
– It would free up resources for other types of food production where Asia has greater competitive advantage

ACIL Tasman was commissioned to analyse the costs and benefits of increasing the amount of Australian cattle processed domestically that would otherwise be exported live. The brief for this analysis was not to produce a definitive evaluation of the feasibility of a northern processing market, but to analyse under what circumstances a processing facility could be viable and the flow-on impacts to the industry and Northern economy such a market might have.

To conduct this analysis we:

- Established a counterfactual case where live exports continue taking into account market and policy trends
- Analysed what conditions would improve the viability of a regional processing market
- Analysed the costs and benefits of processing more cattle domestically, including an analysis of the:
  - Impacts on producers
  - Regional economic and employment impacts from a greater level of domestic livestock processing

ACIL Tasman's approach was that for a domestic processing market to be sustainable, it has to be able to:

- Offer producers a competitive price for the cattle that they would supply
- Offer investors in processing facilities in the region a competitive risk-adjusted rate of return on their investment
- Not subject the Government to an open-ended liability to support the market

The purpose of the report is to advise industry and government of the potential impacts and provide a possible broad strategy to realise the benefits. It also aims to stimulate further debate and analysis that may lead to the establishment of a northern beef processing market.

## The economics of live animal exports

The Indonesian Government has a policy objective of achieving self-sufficiency in beef production. Under this policy, self-sufficiency is defined as

90 per cent of domestic beef consumption produced from cattle raised in Indonesia. Beef self-sufficiency has been a long standing Indonesian Government policy and while previous target dates for achieving self-sufficiency have been missed (2005 and 2010), there appears to be a strong political will to achieve it now. There are a number of vested interests in Indonesia lobbying hard for this policy to be supported. The recent suspension of the trade from Australia appears to have increased the desire in Indonesia to pursue beef self-sufficiency.

The Indonesian beef self-sufficiency policy aims to reduce live cattle and beef imports to approximately 42 per cent of 2010 levels by 2014 (approximately 220,000 head of cattle, with a maximum live weight of 350kg).

This policy has serious implications for the beef industry in Northern Australia. Irrespective of the technical capacity to meet these targets, the Indonesian Government has already demonstrated its willingness to pursue its ambitions, with live cattle imports restricted to (and enforced at) 350kg live weight, and live cattle and processed meat quotas (that are subject to constant review and changes).

This is occurring at a time when consumer preferences in Indonesia are slowly changing. Increasingly, imported Australian processed beef will be substituted for locally slaughtered products; particularly as major urban and regional modern retail outlets increase their market share.

The supply of livestock to live export markets is specialised, as there are few alternative markets that would take large quantities of animals if one of the main live export markets closed. The recent suspension of the live cattle trade by Australia highlighted this specialisation. The level of specialisation is not generally as high for importing countries because:

- Alternative live animal supplies can sometimes be found (where phytosanitary restrictions allow it) or domestic supply can be increased
- Imported chilled and frozen products can often be substituted for live meat (some imported frozen beef is being sold in Indonesian wet markets after being thawed out)
- Consumers can substitute other forms of meat protein, such as chicken and fish (or plant based proteins), for beef

The Australian economy is better off participating in this distorted trade, if the alternative is no trade at all. However, it seems possible that more meat could be processed in Australia from animals that would otherwise be exported live.

## What are the benefits of processing more cattle domestically?

There are a number of economic benefits that would accrue to producers and the Australian economy if more animals were processed domestically. Based on processing up to 400,000 head of cattle, the majority of which would otherwise be exported live at lighter weights:

- A beef processing market in the North of Australia would contribute an additional $204m to the regional economy
- An additional 1,300 jobs would be created in the northern regions (see preliminary modelling results in Table 1)

The detailed results of our economy wide modelling of the impacts of processing more cattle in the north of Australia, using a number of labour market and ownership assumptions are shown in Table 1.

Table 1 **The projected economic impacts for total Northern Australia under each Scenario (including a scenario where an increase in pastoral production comes from increased revenue from surplus female and heavy cattle sales)**

| | 1 Standard Tasman Global labour market | | | | 2 Unconstrained labour market | | |
|---|---|---|---|---|---|---|---|
| | 2012–13 | 2013–14 | 2014–15 | | 2012–13 | 2013–14 | 2014–15 |
| **Real regional income improvements** | A$m | A$m | A$m | | A$m | A$m | A$m |
| Local investment in 400,000 head NT processing capacity | 25.45 | 27.95 | 30.16 | | 55.72 | 62.08 | 68.07 |
| Local investment in 400,000 head NT processing capacity plus an increase in pastoral production | 135.44 | 148.36 | 161.47 | | 207.55 | 231.81 | 256.45 |
| Non-local JV investment in 400,000 head NT processing capacity | 5.42 | 7.52 | 9.39 | | 30.50 | 35.97 | 41.15 |
| **Non-local investment in 400,000 head NT processing capacity plus an increase in pastoral production** | **115.66** | **128.17** | **140.92** | | **180.32** | **203.82** | **227.86** |
| **Employment** | FTE jobs | FTE jobs | FTE jobs | | FTE jobs | FTE jobs | FTE jobs |
| Local investment in 400,000 head NT processing capacity | 58.1 | 61.1 | 63.3 | | 545.3 | 579.2 | 610.2 |
| Local investment in 400,000 head NT processing capacity plus an increase in pastoral production | 161.4 | 176.4 | 189.4 | | 1,319.8 | 1,450.5 | 1,577.7 |
| Non local JV investment in 400,000 head NT processing capacity | 46.7 | 49.6 | 51.9 | | 442.5 | 473.7 | 502.5 |
| **Non-local investment in 400,000 head NT processing capacity plus an increase in pastoral production** | **146.3** | **161.2** | **174.2** | | **1,193.7** | **1,323.8** | **1,451.2** |

*Notes:* Northern Australia comprises the Northern Territory plus the Kimberley and Pilbara Statistical Divisions. "Local" means 100% locally owned capital. "Joint Venture" means a 50/50 joint venture arrangement between owners situated in the Rest of Australia and overseas (i.e. all non-NT origins). FTE = full-time equivalent. One FTE job is equivalent to one person working full-time for one year, or two people working 0.5 of a full-time job. Standard Tasman Global Labour Market is designed to capture the reality of labour markets in Australia, where supply and demand at the occupational level do adjust, but within limits.

*Data source:* ACIL Tasman modelling

For some northern beef producers, access to alternative markets could increase earnings before interest and tax (EBIT) by up to 245 per cent (see Table 2). This is based on actual benchmarking data from northern beef properties and the enterprise changes they could make if they had access to a northern beef processing market:

- This increase in producer profitability does not include:
  - The ability to sell surplus females and heavy cattle that at present do not have a market and hence have limited value
- Creating a market for surplus females would provide the incentive to significantly improve herd performance, as producers could sell meat from lower performing females and replace them with selected younger cows from each calving. This would:
  - Increase herd fertility
  - Reduce cow mortality

The results in Table 2 show that for some producers who are currently reliant on the live export trade, a regional market for steers could significantly improve the profitability of their businesses by allowing them to produce more saleable beef.

Table 2 **Potential pastoral profitability increases where an alternative processing market is available**

| | Current live export market dependence | Regional processing available |
|---|---|---|
| | Per AE | Per AE |
| **Financial indicators** | | |
| **Gross Profit** | $98.82 | $97.57 |
| **Enterprise Expenses** | $35.51 | $31.08 |
| **Overhead Expenses** | $58.91 | $51.31 |
| **Total Expenses** | $94.42 | $82.39 |
| **EBIT** | **$4.40** | **$15.18** |
| **Performance indicators** | | |
| **Total AE** | 10,000 | 10,000 |
| **Total Breeders** | 4,600 | 3,588 |
| **Total Weaners** | 2,300 | 1,794 |
| **Net male weaners** | 1,075 | 839 |
| **Age of turnoff** | 1 | 3 |
| **Average male sale weight(kg)** | 284 | 400 |
| **Average $/kg price** | $1.51 | $1.34 |
| **Weaning rate** | 50% | 50% |
| **Death rate** | 6.5% | 6.5% |

*Data source: Holmes and Company*

*Note: AE or Adult Equivalent is based on a 450kg steer at maintenance. It is a method of standardising the cattle on a property to a single comparable measure. For example a 500kg lactating cow would be considered to be 1.5 AEs.*

- In the event that the Indonesian market closed or was disrupted, Australian processed beef could be distributed to the numerous and expanding existing markets currently serviced by Australia
- Market risks would be reduced substantially, which could lead to greater investment in the Northern beef industry, where they are now reliant on the live trade

## What needs to be done?

To process more cattle domestically, abattoirs need to be established within reasonable transport distance from the major Northern production regions; that is, somewhere in Northern WA or Northern NT.

Livestock processing is a labour intensive, high capital cost industry that produces small margins per head processed. There are three critical risks that need to be managed:

- Supply of cattle
- Supply of cattle at suitable slaughter weight
- Indonesian meat trade policy

Seasonality of supply of cattle at suitable weights can be managed in two ways:

- Improving supply performance:
  - Improving rangeland management practices
  - Changing herd structure to increase fertility and survival, increase weight gain, and improve meat quality
  - Change business management practices
- Setting the processing capacity to optimise utilisation and profitability. We believe that a processing market of approximately 400,000 head per annum could achieve reasonable average rates of monthly utilisation. This capacity is likely to be spread across two facilities located in the north of the Northern Territory and/or northern WA

In the medium term we believe that the live trade will need to continue to play a role in the northern cattle industry, providing a market for light feeder steers, and to accommodate the large seasonal variations in cattle supply that a processing market would not be able to manage.

We estimate the capital costs of sufficient processing capacity to process up to 400,000 head of cattle per annum would be approximately $160m and that this would produce a commercially attractive rate of return with no on-going government support required.

Australian governments could contribute to the development of a northern processing market through the provision of services and infrastructure that at present are the responsibility of the Australian and State and Territory governments to provide. What is required is a re-prioritisation of a number of standard government activities:

- Assistance with environmental and planning approval
- Assistance with the connection and supply of utilities
- Support for training of staff (particularly support for Indigenous workers)
- Research and development directed at producing cattle that increase the marketing options of producers, particularly a regional processing market
- Greater investment in regional infrastructure, such as roads

A part of this strategy would be to encourage foreign investors to consider investing directly in Northern Australian beef processing infrastructure.

This would have a number of benefits for both the Australian and foreign investors, as it would:

- Put the Australian industry on a more secure footing, creating confidence for pastoralists to invest in productivity improvements
- Provide South East Asian consumers with a competitively priced, safe and high quality source of beef

- Provide opportunities for technology and training exchanges between producers, feedlot and process workers in Australia and the foreign investor's country of origin
- Provide access to permanent skilled and semi-skilled jobs in regional Northern Australia, for both Australian and foreign workers

## Strategy

We believe that a number of steps will need to be taken together to increase the viability of greater domestic processing of cattle and provide northern producers with wider market options. While the central strategy will be the construction of regional processing capacity, there will be a number of other activities that will be needed to assist growers take advantage of alternative markets and reduce the risks of operating a processing facility.

Having access to a regional processing facility will dramatically change the incentives for cattle producers, assisted by research bodies, to target increasing the value of the beef produced in the north of Australia. This will redirect research priorities, business management practices and bull breeding objectives. A broad range of activities and those best able to undertake them are shown in Table 3.

Table 3 **Strategy**

| Stage in the supply chain | What needs to be done | By whom |
|---|---|---|
| **Increasing capacity to supply slaughter weight cattle** | | |
| Determine the amount of cattle that are and could reach a minimum of 400kg lwt by the age of 3 | Survey cattle breeds, areas, pasture species that are achieving and could support a higher growth rate sufficient to meet slaughter targets | Department of Agriculture, CSIRO, producers |
| Range land production | R,D and E in nutrient management, improved grazing techniques, new varieties | WA, NT and Australian Government DPIs. CSIRO with industry contributions (MLA) |
| Grazing management | R,D and E in improved remote sensing, improved on-farm infrastructure, improved producers' grazing skills | Producers, Private Consultants Departments of Primary Industries |
| Herd structure changes | Reduced proportion of females, improved stock monitoring | Producers |
| Cattle genetics | Align breeding to alternative market specifications | Producers, beef cattle studs |
| Business management | Improve monitoring and performance of business, herd performance, etc. | Producers, Private Consultants Departments of Primary Industries |
| **Grow out** | | |
| Agistment<br>Backgrounding<br>Transferring to grow-out properties | Identify on and off property or speciality grow-out areas | Producers<br>New investors |
| **Infrastructure** | | |
| Infrastructure | Improved all weather access facilities on farm | Producers |
| Staff | Training and recruiting | Agrifood Skills Australia, Indigenous agencies, DEEWR |
| Transport | Expand all-weather access roads | All levels of Government |
| **Processing** | | |
| Encourage foreign and Australian private equity interests in plant | • Identify and contact potential foreign and Australian private equity partners<br>• Develop investment strategy including infrastructure investments | DFAT, Office of the Minister of Foreign Affairs and Trade, WA and NT Governments, Australia Indonesia Business Council, Beef industry representatives |
| Construction | Establish optimum processing site, establish scale, etc. | JV partners with assistance from Australian government |
| Operations | Recruit staff, run plant | JV partners |
| Marketing | Acquire cattle, sell meat and by-products | JV Partners, agents, etc. |
| Cold chain logistics | Ship to destination | JV partners, wholesalers |

*Data source*: ACIL Tasman

# 1 Introduction

ACIL Tasman was commissioned to investigate the potential costs and benefits of processing in Australia some of the northern cattle currently exported live.

This report does not make any recommendations regarding the continuation of the trade; rather it focuses on the costs and benefits of increasing the amount of livestock processed in Australia that would otherwise have been exported live.

ACIL Tasman's brief was not to produce a definitive assessment of the commercial viability of a Northern cattle processing plant, there are a number studies completed or underway that are looking at this. Also the commercial viability of a processing plant is conditional on a wide range of factors specific to each plant and location. Rather, we were asked to determine under what conditions a northern processing market would be viable. To do this we considered:

- The potential producer impacts
- The key risks that would need to be managed to improve the commercial viability of a northern processing market, and who is best placed to manage these risks
- The economic impact of the development of processing capacity in the north on the affected northern economies

The purpose of the report is to advise industry and government of the potential impacts and provide a possible broad strategy to realise the benefits. It also aims to stimulate further debate and analysis that may lead to the establishment of a northern beef processing market.

ACIL Tasman's approach was that for a northern beef processing market to be sustainable it has to:

- Improve the profitability of Northern beef producers, so that they have strong commercial incentives to sell cattle to this market
- Not be dependent on ongoing government support (that is the plant has to produce a competitive commercial rate of return)

The report considers the impact of increasing the number of Northern cattle processed in Australia that would otherwise have been exported live. This includes an assessment of:

- Potential farm level affects
- The viability and conditions under which Northern Australian processing facilities would be built

- The economic impact of processing cattle in the north of Australia
- The steps that need to be taken to increase the likelihood that processing facilities would be built in the north of Australia

# 2 The Economics of live cattle exports

There are significant subsidies, tariffs and quotas placed on the trading of food in many countries. These measures are in place to protect local producers and processors from international competition. The costs of these measures often fall on local consumers, who respond to the increase in prices by consuming less of the product. These measures distort domestic and international food production and distribution, and generally reduce the allocative efficiency of food production around the world.

The reason domestic processors and producers are protected is that they are generally less efficient than the large-scale modern producers and processors located in foreign countries. If they were competitive, they would not need protection. These local facilities produce fresh (wet) meat that is consumed on the same day it is processed, due to low availability of refrigeration, which is a form of competitive advantage. They benefit from relatively low labour costs but it is unlikely that this fully compensates for the low productivity rates of these facilities.

The effect of protective measures on local producers and processors is that retail costs rise and consumption falls. At present, Indonesian consumption of beef is reported to be between 1.6 and 2.0kg per head per annum. This is low by the standards of developed and a number of developing countries.

The most significant problem associated with supplying markets with this level of government intervention, is sovereign risk.

In Indonesia, there are fewer religious reasons that live exports are preferred over processed meat. In many parts of Indonesia the demand for live cattle is due to the lack of reliable power and refrigeration (commercial and domestic). This is changing as GDP grows, infrastructure improves and domestic refrigeration becomes as prevalent as mobile phones, motor bikes and wide-screen TVs. Where the demand for wet meat persists, domestic cattle, produced locally, are likely to increasingly be the dominant supply for this market.

This is why it is important for Australian producers to maintain access to the live trade in the short term, but begin to supply the local, higher quality, modern retail markets as they grow.

The majority of the growth in demand for beef in Indonesia will come from a rising, affluent, urban middle class in major urban centres. This is a well-established consumption pattern in most developing countries. The rising middle classes will have a strong preference for higher quality meat products sold in convenient ways in modern retail outlets. The wet market consumption may decline slowly, but it is more likely that the move away from wet markets will accelerate.

As this demand changes, local abattoirs, whose main competitive advantage is their proximity to wet markets and therefore final consumption, will diminish. This means an increasing proportion of beef will be processed in modern facilities in Indonesia and Australia. The proportion of Australian live cattle imports processed in small and micro-abattoirs in Indonesia is likely to fall further, as the recommendations of the Farmer Review are implemented.

If left to its own devices, the beef market will probably encourage the establishment of competing supply chains. Each supply chain will seek to exploit some real or perceived competitive advantage. Some will locate abattoirs in Indonesia and source live cattle from the lowest-cost points of the Australian production regions. Other supply chains will establish large-scale modern processing facilities in Australia, reducing transport costs but incurring higher labour costs.

For Australian beef producers, this will mean a large reduction in market risks, as a domestic processor based in the north will provide access to a range of other markets if there are any disruptions to the Indonesian market. In Indonesia, modern processing facilities would be able to source either domestic cattle or Australian cattle where it is economically viable to do so. This will probably be from areas very close to the ports with the shortest sailing times between Indonesia and northern Australia.

However, the market faces significant distortions from both the Australian and Indonesian governments. That is, there are significant intervention risks.

The overarching problem facing the trade in live cattle and beef products is the self-sufficiency policy being pursued by Indonesia. The problem is that 'self-sufficiency' does not necessarily deliver 'food security'. If we assume that food security is the overarching policy objective, then it should be pursued in the most cost-effective way, adjusted for risk. It is unlikely that Indonesian self-sufficiency in beef will be either efficient, or any less risky, than having a reliable supply of beef from a range of sources, including both imports and domestically produced beef.

Indonesian self-sufficiency policies have already created a great deal of volatility in Australian live and meat markets. Suspensions of the issuing of

import permits and the imposition of live weight restrictions and quotas have significantly disrupted the trade. Indonesia has a stated goal of beef self-sufficiency by 2014, but recent domestic cattle census results have led the Indonesian Government to believe it may be able to achieve self-sufficiency by as early as 2012.

It is unlikely that it is in Indonesia's, or Northern Australia's, long-term interests to be so reliant on the live trade. It is in Indonesia's best interests to meet its rising beef consumption per capita from a stable and profitable beef industry in northern Australia, which complements its own beef and wider food industries. Likewise Australia's interests lie in ensuring that Indonesia's consumption of beef continues to rise, and Australia's market share rises with it.

Increasing Indonesia's demand for beef is dependent on stable supplies of safe, high quality (good value) red meat, increasingly sold through modern retail outlets. Therefore, it is in Indonesia's interests for the Australian cattle herd to continue to rebuild following the droughts of 2003 and 2010. However, with up to 25 per cent of the herd in areas dependent (partially, or in some cases fully) on the live trade, continued restrictions on the importation of processed beef and the uncertainty of the live trade, provide disincentives for Australian producers to invest in herd rebuilding and productivity improvements.

# 3 Current situation

The beef herd is rebuilding as seasonal conditions improve, but there is an apparent decline in existing live export markets and few alternative markets are emerging.

Australian domestic consumption is projected to remain relatively constant and likely to grow only in line with population growth. The growth in beef output from any increase in the size of the national herd, will have to be exported.

Meat export trends reflect the state of the herd, but there is likely to be growing demand for beef from the rising middle-class markets in Southern and Central Asia, China, India and Russia. The beef price is likely to be underpinned by strong competition for beef production inputs: land, labour and capital. This will come from a need to increase the production of staple food items as the world population grows; the expectation is that 70 per cent more food will be required by 2050.

But Australian beef producers will continue to face strong competition from other major beef producers: South American countries, the US and India.

Australia will need to identify and exploit any opportunities to generate more value from the beef industry to continue to be competitive in export markets.

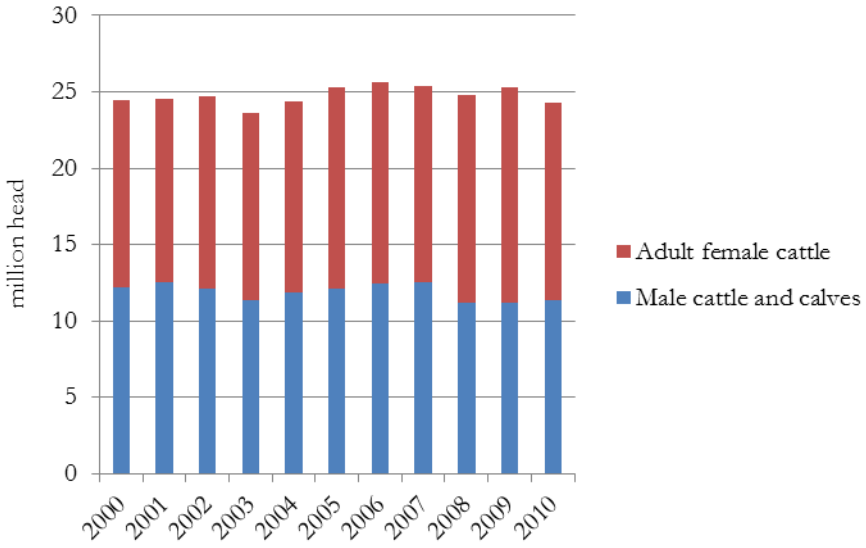
## 3.1 The Australian cattle herd

### 3.1.1 National numbers

National beef cattle numbers in Australia, not including dairy cattle, were at 24.2 million head in 2010 (see Figure 1). By state this involved 2.3m in Western Australia, 1.9m in the Northern Territory, 11.3m in Queensland, 1m in South Australia, 5.1m in New South Wales, 2.1m in Victoria and 0.5m in Tasmania.

Over the last ten years, national beef cattle numbers have been stable, moving between 23.6 and 25.6 million head. Drought conditions in 2003 and 2010 induced a contraction in numbers. The national herd is expected to recover in 2011-2102, due to better seasonal conditions and predicted positive long-term returns for beef (McRae, Vial, & Garling, 2011). It appears that the national herd has entered a period of rebuilding, as total throughput and female cattle slaughter rates declined in 2009-10 and again in 2010-11. Figure 1 breaks the total herd down into numbers of adult females and males and calves. It can be seen that in 2008 the female herd had started to rebuild.

Figure 1 **Total Australian beef cattle herd broken down into adult female cattle numbers and male cattle and calves, 2001 to 2010**

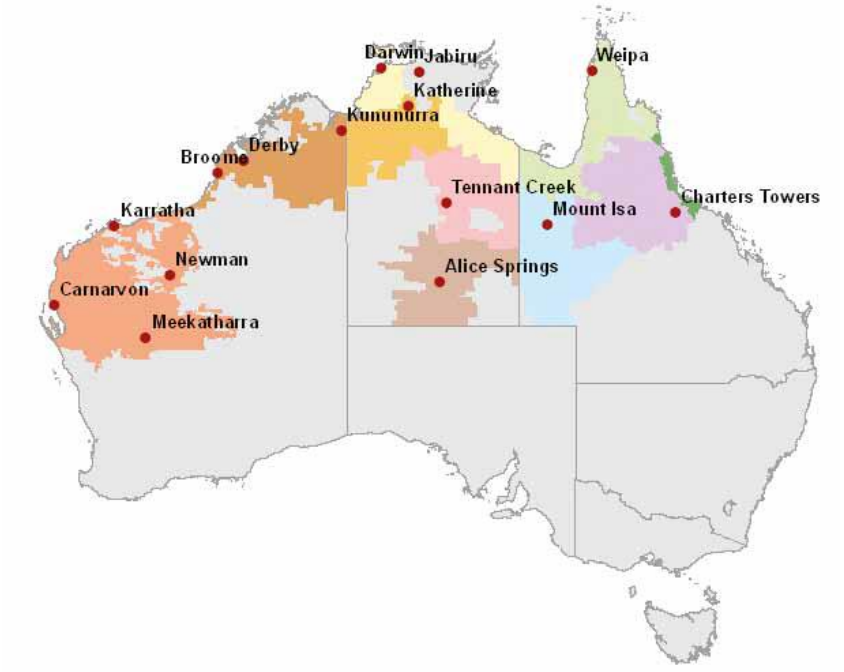



*Source: ABARES*

### 3.1.2 Northern Australian cattle herd

The northern region of Australia, as indicated in Figure 2, comprising the northern pastoral region of Western Australia, the Northern Territory and northern Queensland, predominately produces cattle for the live export market. This is an area of about 4 million square kilometres that, as at 30 June 2011, was home to an estimated 6.7 million head of beef cattle. This figure can be broken down into 1.1 million cattle in northern WA, 2.1 million cattle in the NT and the remaining 3.5 million cattle in northern Qld (ABARES, 2011). Meat and Livestock Australia (MLA) is projecting herd growth in the northern regions of Australia over the next few years as producers rebuild drought depleted herds. However, they note the uncertainty that is currently surrounding the live trade to Indonesia, which may affect herd numbers in this area over the long term.

Figure 2 **Northern Australia live cattle export regions**




*Source:* (ABARES, 2011)

ABARES' survey of beef cattle producers in the northern export regions of Australia (2011), estimated that there are 1,459 farming businesses in this area with more than 100 head of cattle. In 2011, it was intended that 1.8 million head of cattle in the northern cattle herd would be turned-off, for all purposes. This intention was broken down into 33 per cent of cattle going to the live Indonesian export market and one per cent to other live export markets; 31 per cent were to go directly to domestic slaughter; while use for both feedlots or backgrounding and stores or breeders, would each account for nine per

cent. The remaining 17 per cent were destined for transfer to other properties (ABARES, 2011).

The survey revealed that 660 of the businesses in this region were intending to send live exports to Indonesia in 2011. The live export trade to Indonesia was found to be concentrated, with the largest 78 exporting businesses representing 65 per cent of trade. Western Australia, and its main regions of the Pilbara-Gascoyne and Kimberley, and the upper half of the NT, were identified as highly dependent on the export trade to Indonesia.

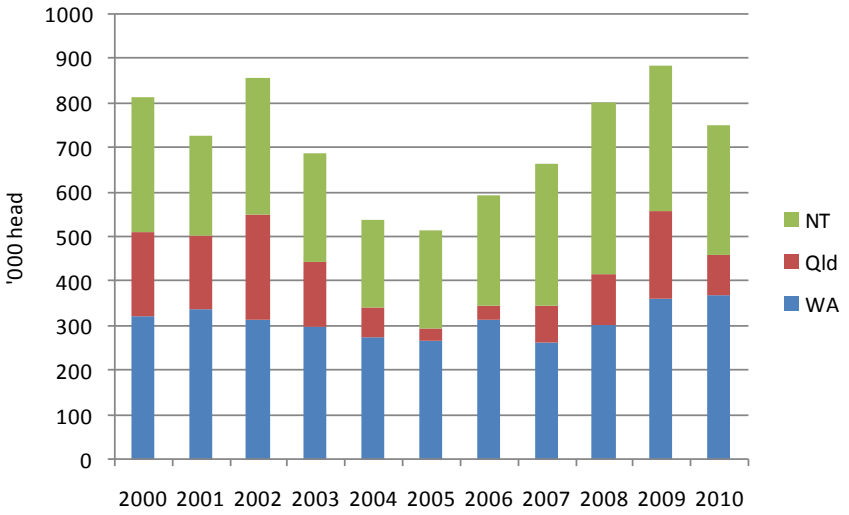
An interesting statistic from the survey was the number of family-run versus corporate businesses. Corporate farms accounted for nine per cent of exporting businesses, but in 2011 were responsible for 30 per cent of cattle exports.

## 3.2 Live Export Trends

### 3.2.1 State of origin and destination

On a state basis in 2010, nearly half of the live exports of cattle from Australia came from WA, followed by 39 per cent from the NT and 12 per cent from Queensland (see Figure 3). The value of this industry to Australia in 2010-11 was around $500 million; down from 2009-10, primarily due to volume.

Figure 3 **Northern Australian live cattle exports by state of origin, 2000 to 2010**



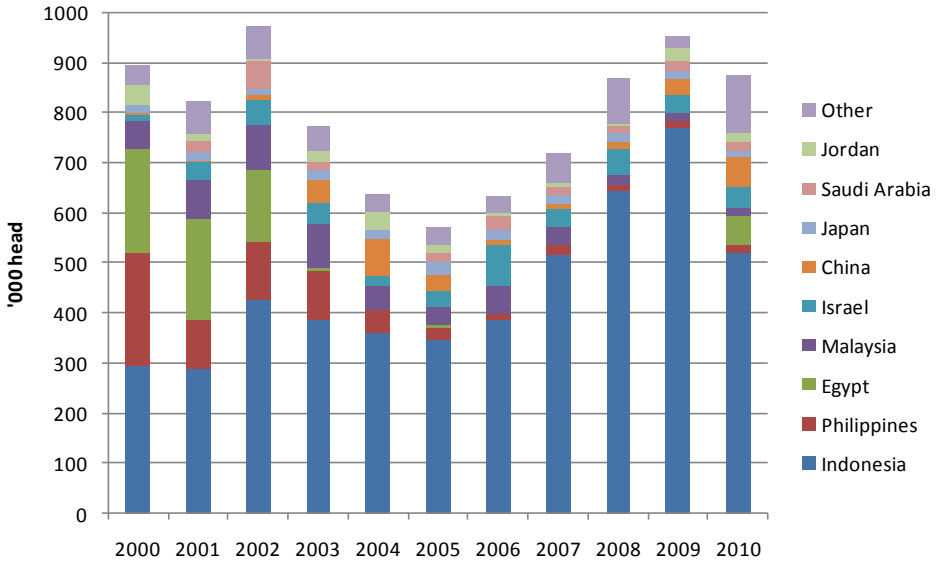

*Data source:* ABS

The majority of live exports of cattle from Australia over the last 10 years have gone to Indonesia, especially in the last 5 years (see Figure 4). Of note is the

decrease in live exports to the Philippines, Malaysia and Egypt over the last 10 years.

MLA (2011) attributes the decreased demand from the Philippines to substitution of boxed beef. The appreciation of the Australian dollar against the Philippine peso and Malaysian ringgit over the years 2002-2005, coupled with rising Australian cattle prices, doubled the price of Australian cattle in these countries. Major market share in the Philippines was lost as cheaper beef and buffalo meat was imported from India and Brazil, replacing Australian beef imports. In Egypt the live export trade completely fell away in 2005, as the Egyptian economy collapsed and its currency fell 50 per cent against the Australian dollar (Martin, Van Mellor, & Hooper, 2007).

Figure 4 **Australian live cattle exports by destination, 2000 to 2010**




*Data source:* ABS

### 3.2.2 Indonesia

The fluctuations in the live export trade to Indonesia over the past 10 years can be attributed to a range of factors; international events, domestic circumstances and government policy.

When the 1998-99 Asian credit crisis struck, live exports to Indonesia crashed; but they started a strong recovery at the beginning of 2000 (MLA, 2011). Exports to Indonesia slowed in 2003, before starting to significantly rise again in 2006. This was also the experience of the market as a whole; it was due to a culmination of the appreciation of the Australian dollar, high Australian cattle prices (more sold domestically), competition from other meat exporters and

slower economic growth in importing countries (Martin, Van Mellor, & Hooper, 2007).

Indonesia's increasing demand for Australian live beef since 2006 can be attributed to increasing incomes and smaller domestic herds. The trend prompted the Indonesian government in 2010 to encourage self-sufficiency by restricting import permits and enforcing weight restrictions (MLA, 2011).

Live cattle exports to Indonesia from northern Australia in 2011 were expected to be 597,000 head, which is equivalent to 33 per cent of intended beef cattle turn-off for the region as a whole (ABARES, 2011), with much higher proportions for the north of the NT and WA.

## 3.3 Live export prices

Recent live export and domestic saleyard prices have mutually trended upwards. Export prices per head received for live cattle between the years of 2005 and 2009, have been steady at around $650; however, in 2010 they significantly increased, to an average of $707/head for the year. They continued to climb in the first half of 2011, averaging $755/head (ABS).

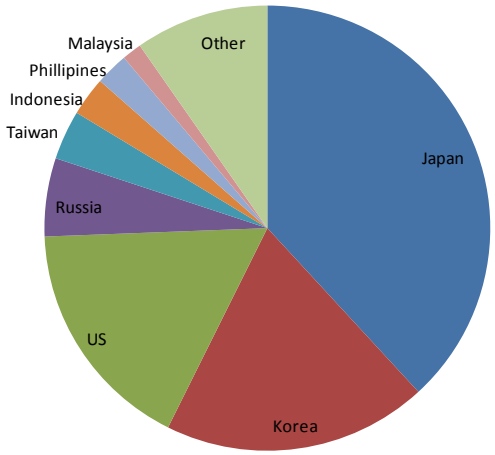
Weight restrictions have restricted the number of cattle available in Australia for export to Indonesia, while the reduction in import permits has, at times, created shortages of cattle in Indonesia's feedlots. Both of these factors have induced higher prices for lighter cattle. This current situation will only be exacerbated when there are good seasons in Australia and producers are turning off heavier cattle that will be unsuitable for the live Indonesian market (McRae, Australian Cattle Industry Projections 2011, 2011).

## 3.4 Meat Export Trends

### 3.4.1 Beef meat export destinations

Australia's beef meat export market has been less volatile than the live market over the last ten years. Although affected by some similar factors, such as the Australian exchange rate and global events, it reaches a more diverse range of markets. Export levels were lower in 2010 than in 2009, down 0.5 per cent to 922,800 tonnes (shipped weight). Last year the major destinations for Australian processed beef were Japan, Korea and the United States (Figure 5).

Figure 5 **Top 10 Australian beef export destinations in 2010**

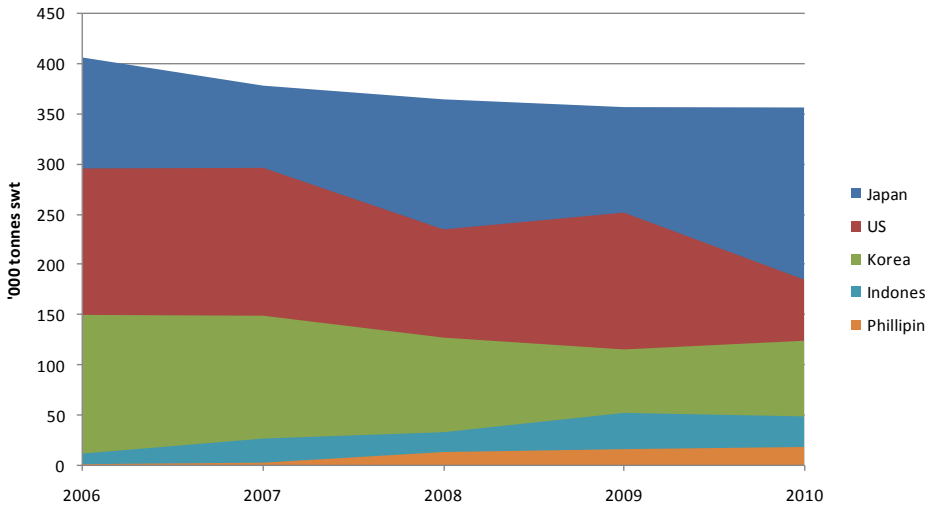



*Data source:* DAFF

Exports to Japan have been steady for the last couple of years, a good result considering its hard economic conditions (see Figure 6). However, it has been reported that Japan's import volumes from the US were up by 4 per cent year on year in 2010 (McRae, 2011).

Beef exports to Malaysia, Singapore and the Philippines have started to grow steadily again, after a significant downturn over the years 2002 to 2005. The markets in these South East Asian countries, and also in Indonesia, will continue to grow as their economies develop. Another region of note is the Middle East, where imports of Australian beef and veal in 2010 increased by 54 per cent over the previous year. MLA cites this rapid expansion as due to the significant growth in foodservice outlets and sales.

Figure 6 **Australian beef exports to key destinations, 2006 to 2010**




*Source:* DAFF

## 3.5 World meat demand

An important consideration in assessing the economic value of increasing the number of cattle processed domestically that would otherwise have been exported live, is the ability to sell additional processed meat in international markets. Disposing of this meat is dependent on the amount of processed meat that would be substituted for domestically processed meat in current live export markets. As section 4.2 shows, the level of substitution is increasing, so that the net quantity of additional meat that could be directed to alternative markets is likely to be small.

Potential increases in consumption in South East Asia from increased productivity growth in the northern herd, would also mean that little, if any, additional meat processed domestically would need to be sold into alternative markets.

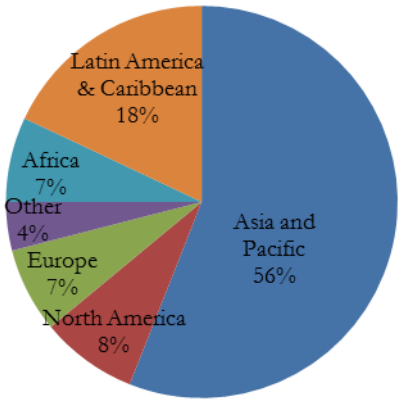
Future population and income growth will increase the global demand for livestock products. Predictions indicate that per capita food consumption will increase most rapidly in Eastern Europe, Asia and Latin America over the period 2011 to 2020, and that most of the demand growth for meat products will stem from the large Asian economies, Latin America and oil exporting countries (see Figure 1). Meat products here includes beef, pork, poultry and sheep; more specifically, global beef production is projected to grow by 8.67 million tonnes and sheep by 2.84 million tonnes between 2011 and 2020 (OECD-FAO, 2011).

The 56 per cent estimated increase in demand for Asia and the Pacific region (see Figure 1), represents approximately 34 million tonnes of meat. This figure

is on par with a report by the Australian Farm Institute (Dalton & Keogh, 2007) on the changing demand for animal protein in Asia. It projected an increase in meat consumption in Asian nations of 32.2 million tonnes (note: inclusive of beef, pork and chicken only) between the years 2007 and 2020. Beef consumption was projected to increase 7.1 million tonnes.

In a global context, on average between 2008 and 2010, the total world consumption of beef and veal was 64.6 million tonnes. Australia itself produced 2.12 million tonnes of beef and veal in 2009, and exported 1.37 million tonnes (approximately 65 per cent). Total world consumption of sheep meat was 12.7 million tonnes, and Australia produced 424,500 tonnes and exported 197,900 tonnes (approximately 47 per cent) of traded sheep meat (OECD/FAO, 2011) (ABARES, 2010).

Figure 7 **Projected increase in meat demand over the period 2011-2020**




*Source:* OECD/FAO 2011

### 3.5.1 Growth drivers

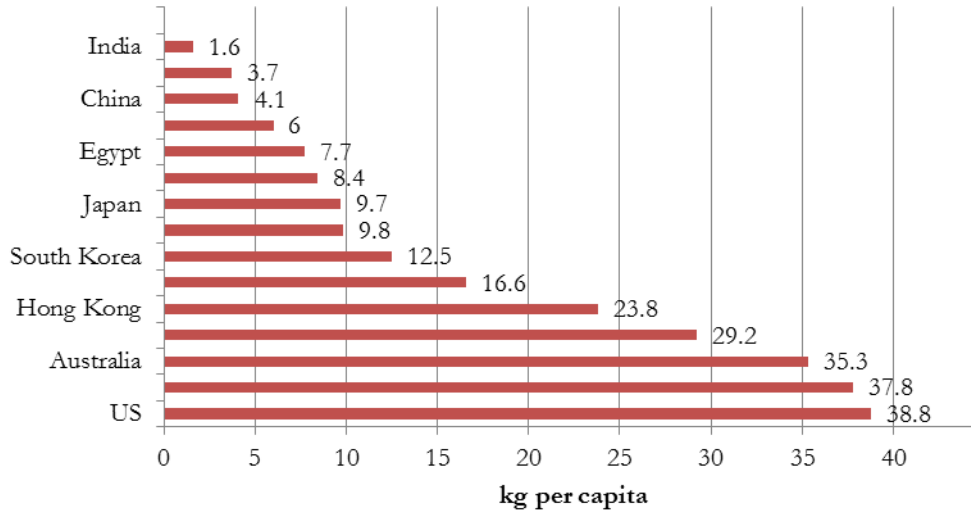
Population and income growth are two major drivers of greater consumption of meat for the future. Obviously as our world population grows, so too does the amount of food needed to feed everybody. The United Nations projects that by the end of 2020 there will be 7.7 billion people on earth, representing an annual increase of 1 per cent over the next decade. Of note is that estimated growth rates in the least developed countries are greater than 2 per cent per year. This is an important consideration, because per capita incomes in many of these least developed countries could rise by 50 per cent over the next ten years, giving their people greater capacity to purchase additional food (OECD-FAO, 2011).

OECD-FAO (2011) modelled the effect that positive or negative income growth in all countries and regions may have on demand for various food products. Beef and veal are the products most affected by income growth movements. A 1 per cent increase in income growth per annum would increase demand for beef and veal by 2.02 per cent. Going the other way, a 1 per cent decrease in income growth per annum would lower demand for beef and veal by 2.07 per cent.

### 3.5.2 Current beef consumption

World consumption of beef, averaged from 2008-2010, is estimated to be 64.6 million tonnes, representing per capita consumption of 6.6kg (OECD-FAO, 2011). Figure 8 shows beef and veal consumption on a per capita basis in 2010, for those countries of significance to Australia, including Australia itself. This graph, however, does not include the major beef consuming countries in South America; Uruguay 62.1 kg, Argentina 55.8 kg, Paraguay 35.6 kg, Chile 23.6 kg and Colombia 19.2 kg (USDA, April 2011). Over the past five years Brazil, Australia, Hong Kong, South Korea, Iran and Taiwan have all had strong consumption patterns.

Figure 8 **Consumption of beef per capita 2010**




*Source:* (USDA, April 2011) and (OECD-FAO, 2011)

### 3.5.3 Indonesia

Indonesia's population in 2010 was close to 240 million people and growing at a rate estimated to be 1.029 per cent per annum (The World Bank Group, 2011). It also has strong GDP growth, more than doubling in the period between 2003 and 2009 (Deblitz, 2011). Beef consumption in Indonesia has also been increasing, despite beef prices increasing by around 50 per cent

between 2004 and 2009. Constant per capita consumption suggests this increase is being driven by population growth (Deblitz, 2011). Per capita consumption of beef in Indonesia is estimated at 1.6kg and projected to stay steady at that level to 2020 (OECD-FAO, 2011). Sheep meat consumption in Indonesia is estimated by OECD/FAO to be 0.5kg per capita, increasing slightly to 0.6kg per capita by 2020.

The Australian Farm Institute (Dalton & Keogh, 2007) estimates that Indonesia's consumption of beef over the years 2007 to 2020 will increase by 202,000 tonnes, based on an expected population of around 260 million people in 2020. The estimate uses a population growth figure of 1.41% and an expected per capita consumption of 2.7 for 2020.

### 3.5.4 The domestic market

Australia's consumption of beef fully recovered in 2009 and 2010 from the decrease experienced a couple of years before due to the economic slowdown (Meat and Livestock Australia, 2011). Forecasts suggest that total beef use in Australia will increase by 10,000 tonnes per annum (7 per cent) between 2010 and 2015, a slight decrease in per capita consumption, after expected population growth is factored in. (McRae, Australian Cattle Industry Projections 2011, 2011).

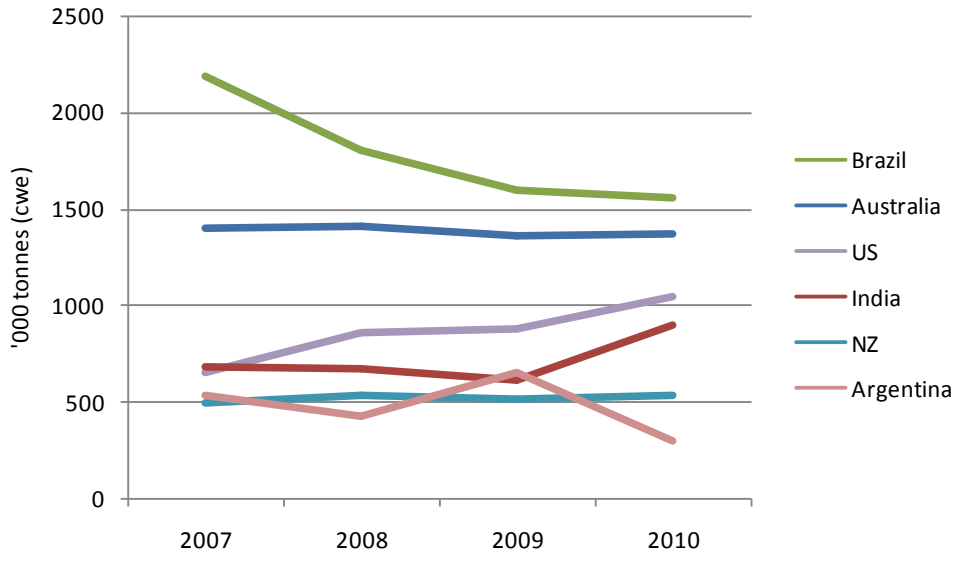
### 3.5.5 The unknown

OECD-FAO (2011) notes several issues and uncertainties that could have major impacts on the supply, demand and trade in meat markets. Their potential effects have not been quantitatively measured, but they could impact significantly upon international and domestic meat markets.

There are three main areas. Firstly, an animal disease outbreak (such as Foot and Mouth disease or Bovine spongiform encephalopathy) that cannot be contained, would have detrimental effects on exporting countries' domestic and international markets, especially those larger exporting countries, such as Australia, Canada, the US and Brazil. Secondly, currency, commodity values and political instability in regions such as North Africa and the Middle East, which are large importers of sheep, beef and poultry, could impact world meat trade. The other consideration is the impact that the production of meat has on the environment. New legislation in a carbon constrained future may affect the growth of the sector.

## 3.6 International competition

Figure 9 **Total exports of beef by the major exporting countries, 2007 to 2010**




*Data source:* USDA

### 3.6.1 South America- Brazil, Argentina and Uruguay

Brazil is currently the world's leading exporter of beef, followed by Australia, then the United States and India (see Figure 9). Brazil's recent falling export numbers are in line with its current herd rebuilding (after peak slaughter rates in 2006 and 2007), surging domestic demand and a strong currency. The major markets that Brazil is servicing at the moment include: The Middle East and Russia (McRae, Australian Cattle Industry Projections 2011, 2011) (MLA, 2011).

Argentina and Uruguay have both lost their competitiveness in the global market. Extremely high slaughter rates in 2009, primarily of their breeding female cattle, have depleted their national herds and recovery is expected to take many years.

### 3.6.2 India

India has the biggest beef herd in the world. With greater than 300 million head of cattle in 2010, it is nearly double the size of the next largest herd, belonging to Brazil.

In 2010, India supplied the Philippines with 42 per cent of its imported beef products, followed by Australia at 22 per cent, Brazil at 14 per cent and the US 9 per cent (McRae, Australian Cattle Industry Projections 2011, 2011). India's

strong export growth is forecast to continue, due to comparatively low prices and a good exchange rate, plus strong global demand.

### 3.6.3 US

Exports of beef from the US in 2010 increased 19 per cent year on year, as it continues to make its way back into the international market after the discovery of BSE in the US herd in 2004. Current export levels are still sitting below pre-2004 levels, indicating that the US has the potential ability to produce more meat for export. The low US dollar is assisting the United States' competitive position.

# 4 The counterfactual

The preparation of an estimate of the potential costs and benefits of transitioning all, or a portion, of the beef cattle currently exported live to domestic processing, requires an assessment of the prospects of the live animal export industry. In economic terms this is the counterfactual case, which is what would happen if the industry were to continue as it currently is, with no significant change to the Australian Government's live cattle export policy.

There are a number of factors that have to be considered when establishing a robust counterfactual case where live exports continue in much the same way as they have done for a number of years:

- The ability of live animal exporters to comply with export permit requirements
- The supply of suitable animals to export
- Changes to consumer preferences in live export importing countries
- Changes to importing countries' live import policies
- Animal welfare attitude trends in Australia and in importing countries

Exporters are now being granted export permits for Indonesia by the Australian Government, if they can demonstrate that:

- The animals can be tracked through the export supply chain to the point of slaughter
- Australian animals will only be transported, held, handled and slaughtered in facilities that meet World Animal Health recommendations
- They will collect and make public data on consignments they take to market, including where animals are fattened, how they are transported and where they are slaughtered (Minister for Agriculture, Fisheries and Forestry, 2011)

Perhaps the most fundamental change brought about by the new permit requirements, is that where any non-compliance is detected, suspensions will apply to individual exporters and not the industry as a whole. Therefore, in some respects, in the absence of any systemic failures being detected, the industry faces fewer risks from welfare breaches than before the suspension in 2011.

The supply of suitable cattle is unlikely to diminish significantly, as the Australia northern cattle herd size appears stable in the medium term, unless there are any large seasonal variations.

## 4.1 Consumer preferences

This section reviews the trends in consumer preferences for processed meat and Australian live cattle imported and processed locally. Irrespective of any importing country policy changes, consumers are showing a strong preference for imported processed meat from Australia over locally processed Australian meat.

### 4.1.1 Potential changes to Indonesian beef demand

#### The Indonesian economy

The following data have been obtained from the Trends of the Selected Socio-Economic Indicators of Indonesia, May 2011, published by BADAN PUSAT STATISTIK (Statistics Indonesia).

Indonesia is an archipelago of 17,504 islands (estimates vary), with a population of 245.6 million on 6,000 of these islands. Indonesia comprises:

- 33 Provinces
- 497 Districts/Municipalities
- 6,699 Sub-districts
- 77,548 Villages

Clearly this nation of islands faces logistical issues in reaching all of its population with food and in particular beef products.

#### Population and demographics

Beef consumption trends are influenced by general population growth and changes to the wealth and geographic distribution of the population. The more urbanised the population, the greater the consumption of conveniently packaged foods, including beef. Greater levels of urbanisation also reduce the logistical problems of supplying beef across such a large archipelago.

The 2011 estimate of population growth is 1.068% per annum, which is close to the median growth rate for the world, and similar to Australia's (1.15%). The population is not concentrated in cities, with only 44% of the country urbanised. The biggest cities are:

- Jakarta (the capital) 9.121 million
- Surabaya 2.509 million
- Bandung 2.412 million
- Medan 2.131 million
- Semarang 1.296 million (2009 data)

Of the 116.5 million strong labour force, 38.3% work in the agricultural sector.

A 2008 study estimates that there are 67,220 sq km (2008) of irrigated land. The land-use statistics in the CIA World Factbook show that of Indonesia's 1.9 million kms in 2005, land-use was:

- Arable land: 11.03%
- Permanent crops: 7.04%
- Other: 81.93%

### Economic situation

Indonesia has weathered the global financial crisis relatively smoothly, because of its heavy reliance on domestic consumption as the driver of economic growth. However, the Jakarta composite index was hit strongly by the uncertainty of the GFC in 2009, but has subsequently recovered. Increasing investment by both local and foreign investors is supporting solid growth.

The government initially made economic advances under the first administration of President Yudhoyono (2004-2009), introducing significant reforms in the financial sector, including tax and customs reforms, the use of Treasury bills, and capital market development and supervision. His reform agenda was interrupted by corruption scandals and the departure of a widely-respected finance minister.

Indonesia struggles with poverty[1], unemployment, inadequate infrastructure, poor governance at times, a complex regulatory environment and unequal resource distribution among regions. Many consider Indonesia to be a stable market because of the size of its domestic demand, adequate foreign currency reserves and strong FDI, but it is exposed to risks of populist policies and potentially high inflation.

[1] Although, 13.3% of families are below the Indonesian government defined poverty line, the threshold income is considerably lower than that for developed nations.

Indonesia's debt-to-GDP ratio in recent years has declined steadily, because of increasingly robust GDP growth and fiscal stewardship. Over the past 10 years, Indonesia has posted average real GDP growth rates of 5.2% per annum (a 3.7% per annum real increase in per capita incomes). In recent years, the three leading credit agencies have upgraded credit ratings for Indonesia's sovereign debt to one notch below investment grade and a further upgrade is achievable. In the World Economic Forum's 2010-2011 Global Competitiveness Index rankings, Indonesia rose 10 spots to 44th place – the list's third-biggest mover.

The 2011 IMF World Economic Outlook noted that Indonesia is seeing both credit and asset price growth. In Indonesia, this credit is mostly flowing as FDI into industry and infrastructure, but some is fuelling the growth in asset prices. Output in 2011 was above its pre-GFC trend.

A quote from: "Investing in Indonesia: Another Asian 'Tiger' Roars Ahead" by Tony D'Altorio, Investment U Research, Monday, 29 November 2010:

> **Indonesia's Middle Class**
>
> Americans largely continue to view Indonesia as a commodities-based economy. But private consumption now makes up about two-thirds of its economy.
>
> It does have an abundance of natural goods, such as coal, tin and palm oil. But its commodities sector has actually underperformed this year.
>
> Instead, the consumer sector took off, thanks to the 60 million low-income Indonesian workers projected to join the middle class in the coming decade. If so, that will make the country one of the fastest growing consumer markets, after only China and India.
>
> Market research company, Euromonitor, expects that to continue. It sees the number of Indonesian households with $5,000-$15,000 in annual disposable income, growing from 36% of the population this year to over 58% by 2020.
>
> The Asian Development Bank (ADB) also recently noted growth in Indonesia shifting from urban centres on the main island of Java, to other parts of the country. And poverty reduction in such rural areas is much bigger than in the urban areas.
>
> Big retailers, banks, vehicle makers, insurers and consumer goods producers are tapping the growth. In return, they are posting record profits this year.
>
> The only downside to investing in Indonesia is the possibility of a short-term stock bubble. Thanks to QE2, some U.S. dollars could rush in there in search of higher returns.

This quote sums up the drivers of optimism in the Indonesian economy. A growing middle class, the hope that this will spread out of the cities and relatively solid economic fundamentals, underpin positive forecasts.

## Income and employment

The country has unemployment of 7.1%, which is not particularly high given the state of the world economy. Its definition of employment (working at least one hour per week), however, is not difficult to achieve, and, even by this measure, 22% of workers younger than 24 are not employed.

The table below shows average weekly earnings by province, to demonstrate the disparity of regional incomes. The average difference in regional income is 14%:

Table 4 **Monthly average wage of employees by province, Rupiah (nominal)**

| Province | 2009 (August) | 2010 (August) | Annual growth | Regional difference in income |
|---|---|---|---|---|
| Aceh | 1,425,874 | 1,518,761 | 6.5% | +8% |
| Sumatera Utara | 1,309,950 | 1,345,692 | 2.7% | -5% |
| Sumatera Barat | 1,486,012 | 1,529,383 | 2.9% | +8% |
| Riau | 1,409,259 | 1,477,399 | 4.8% | +5% |
| Kepulauan Riau | 1,894,354 | 1,343,750 | -29.1% | -5% |
| Jambi | 1,265,498 | 1,283,126 | 1.4% | -9% |
| Sumatera Selatan | 1,199,841 | 1,512,410 | 26.1% | +7% |
| Kepulauan Bangka Belitung | 1,225,969 | 1,123,908 | -8.3% | -20% |
| Bengkulu | 1,417,675 | 1,275,242 | -10.0% | -10% |
| Lampung | 1,074,386 | 1,938,174 | 80.4% | +37% |
| DKI Jakarta | 1,914,089 | 1,998,864 | 4.4% | +42% |
| Jawa Barat | 1,350,783 | 1,443,200 | 6.8% | +2% |
| Banten | 1,557,231 | 1,057,607 | -32.1% | -25% |
| Jawa Tengah | 964,198 | 1,269,381 | 31.7% | -10% |
| DI Yogyakarta | 1,209,054 | 1,116,971 | -7.6% | -21% |
| Jawa Timur | 1,034,150 | 1,648,618 | 59.4% | +17% |
| Bali | 1,446,512 | 1,492,353 | 3.2% | +6% |
| Nusa Tenggara Barat | 1,320,529 | 1,382,667 | 4.7% | -2% |
| Nusa Tenggara Timur | 1,454,380 | 1,521,483 | 4.6% | +8% |
| Kalimantan Barat | 1,218,006 | 1,312,590 | 7.8% | -7% |
| Kalimantan Tengah | 1,368,009 | 1,436,331 | 5.0% | +2% |
| Kalimantan Selatan | 1,334,028 | 1,430,640 | 7.2% | +1% |
| Kalimantan Timur | 2,130,317 | 2,183,167 | 2.5% | +55% |
| Sulawesi Utara | 1,312,412 | 1,381,022 | 5.2% | -2% |
| Gorontalo | 1,253,915 | 1,341,504 | 7.0% | -5% |
| Sulawesi Tengah | 1,281,882 | 1,307,620 | 2.0% | -7% |
| Sulawesi Selatan | 1,248,952 | 1,402,904 | 12.3% | -1% |
| Sulawesi Barat | 1,214,604 | 1,303,949 | 7.4% | -8% |
| Sulawesi Tenggara | 1,331,987 | 1,284,319 | -3.6% | -9% |
| Maluku | 1,565,528 | 1,636,982 | 4.6% | +16% |

| Province | 2009 (August) | 2010 (August) | Annual growth | Regional difference in income |
|---|---|---|---|---|
| Maluku Utara | 1,577,607 | 1,595,501 | 1.1% | +13% |
| Papua | 2,159,590 | 1,995,259 | -7.6% | +41% |
| Papua Barat | 1,938,737 | 2,238,738 | 15.5% | +59% |
| **Indonesia** | **1,322,380** | **1,410,982** | **6.7%** | |

*Data source:* Selected Socio-Economic Indicators of Indonesia, May 2011, published by BADAN PUSAT STATISTIK (Statistics Indonesia)

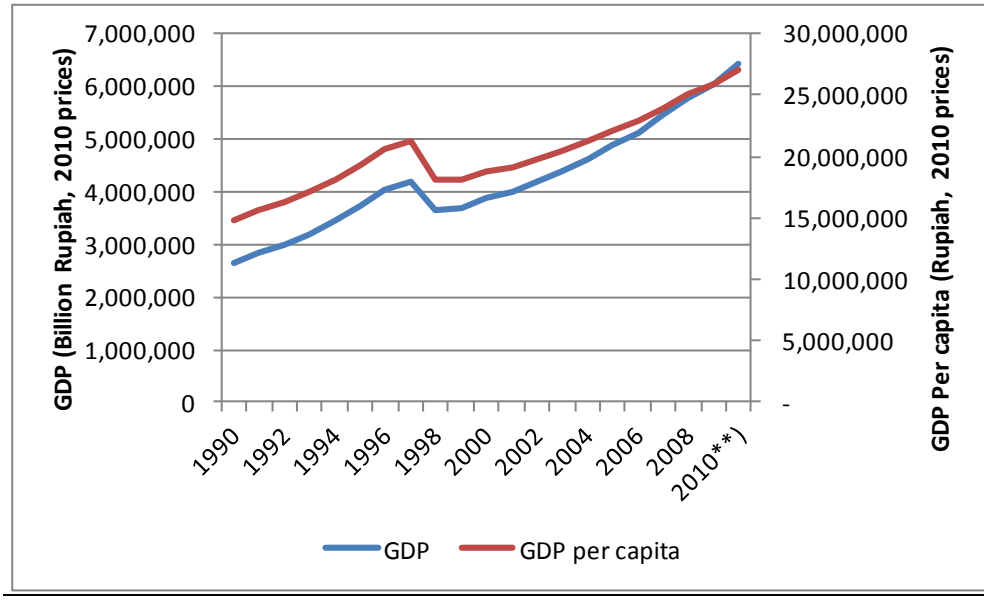
## Prices

In 2009, average weekly expenditure on meat increased by 14.2%, while at the same time, consumption declined by 5 to 14%, depending on the type of meat. In late 2010, increasing inflation (7 per cent in 2010, up from 2.8% in 2009), driven by higher food prices, posed an increasing challenge to economic policymakers.

## GDP

Indonesia has posted 3.7% per annum real growth in GDP per capita.

Chart 1 **GDP and GDP per capita over time (2010 Rupiah)**




*Data source:* Selected Socio-Economic Indicators of Indonesia, May 2011, published by BADAN PUSAT STATISTIK (Statistics Indonesia)

*Note*: 2009 and 2010 data are preliminary estimates

### Market changes resulting from increased incomes

The US Global Agricultural Information Network (GAIN) report on Indonesian Retail Food Sector highlighted the growth of modern retail outlets. Since a Presidential Decree in 1999, which allowed Carrefour (a French retailer) to increase its outlet numbers in Jakarta, the growth of modern retailers has been rapid. The companies most involved in this growth are Carrefour, Giant, Lotte (formerly Makro) and Lion Superindo.

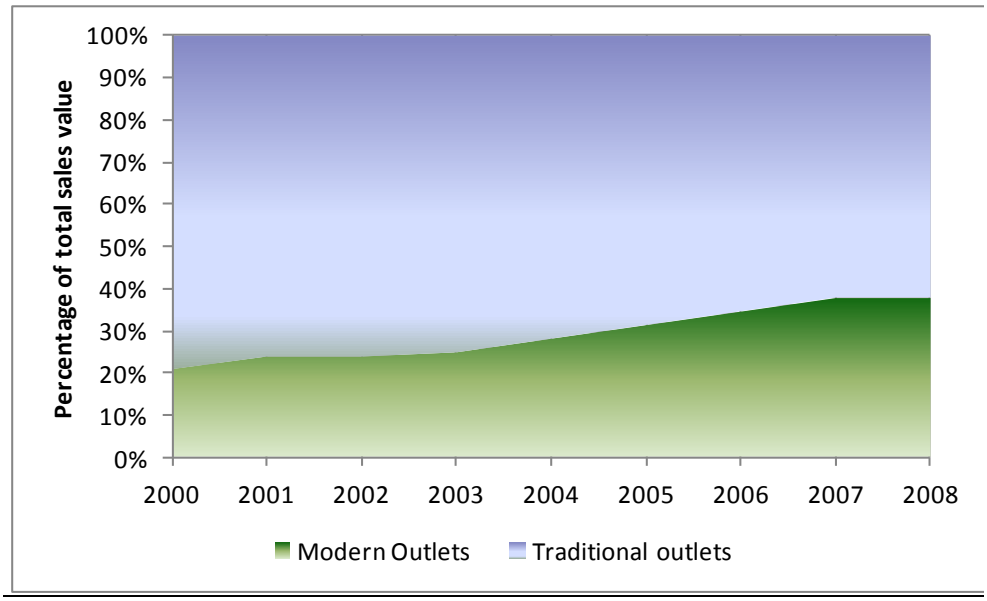
Presidential Decree 111/2007 protected certain markets from foreign investment (a negative investment list). It stated that supermarkets under 1,200 square metres and mini-markets less than 400 square metres can only be owned by domestic investors. A new negative investment list was signed by President Yudhoyono on 25 May 2010; the changes included clarifications (for example a continuous review of closed sectors for increased market access) alongside limited liberalisation. The new decree replaces the previous list.

National retail chains generally start out in Jakarta, then move out to other Javanese cities, before moving to other islands in the archipelago. The growth of foreign-owned retail outlets is displacing the protected traditional and wet markets. This is because information technology and changing life styles are impacting on consumers' perceptions of quality and value and the way they purchase daily necessities.

The US GAIN report on the Indonesian retail food sector, describes modern retail supermarkets and hypermarkets as being generally located as anchor stores in shopping centres. Increasing numbers of Indonesians are shopping at these stores, particularly middle and upper income consumers. Nonetheless, the majority of Indonesians continue to shop at the traditional outlets, which are near to their homes and workplaces.

In general, grocery products contribute about 65% of the sales from modern outlets. The GAIN report reproduces a chart from AC Nielsen showing the market share of modern outlets and wet markets (defined as wet markets and traditional grocery stores), this chart is shown below:

Chart 2 **Market shares of modern and traditional outlets**




*Note:* Modern Outlet: hypermarket, supermarket, mini-market
Traditional market: wet market, independent grocery store
*Source:* AC Nielsen in US GAIN Report on Indonesia: Retail Food Sector

Hurdles to be overcome by Indonesia include a lack of infrastructure; this includes, but is not limited to, poor port facilities, weak supply chain management, and a lack of cold chain facilities; problems that also create a drag on the wider distribution of processed meat. In addition to this, the GAIN report indicates that non-transparent and unpredictable customs clearance procedures, which are costly and cumbersome, can create problems for products with limited shelf-life if they are held at port.

## 4.2 The Australian processed and live cattle import trends

The data used in this analysis was:

- GDP per capita is in PPP in constant prices, obtained from the IMF (http://www.imf.org/external/data.htm) (date accessed 7-09-2011)
- All numbers of live exports are sourced from LiveCorp, which uses Australian Bureau of Statistics data: (http://www.livecorp.com.au/Facts_and_Stats.aspx) (date accessed 7-09-2102)
- All values for the meat trade were sourced from the UN Com Trade database: (http://comtrade.un.org/db/dqQuickQuery.aspx?cc=011&px=S3&r=36&y=all&p=458&rg=2&so=9999&qt=n (date accessed 7-08-2012)

The codes for the UN Comtrade data were:

- Australia 36, Egypt 818, Indonesia 360, Malaysia 459, Philippines 608, Qatar 634
- Bovine meat 011

The Indonesian live cattle imports were converted to a meat equivalent, using conversion factors of:

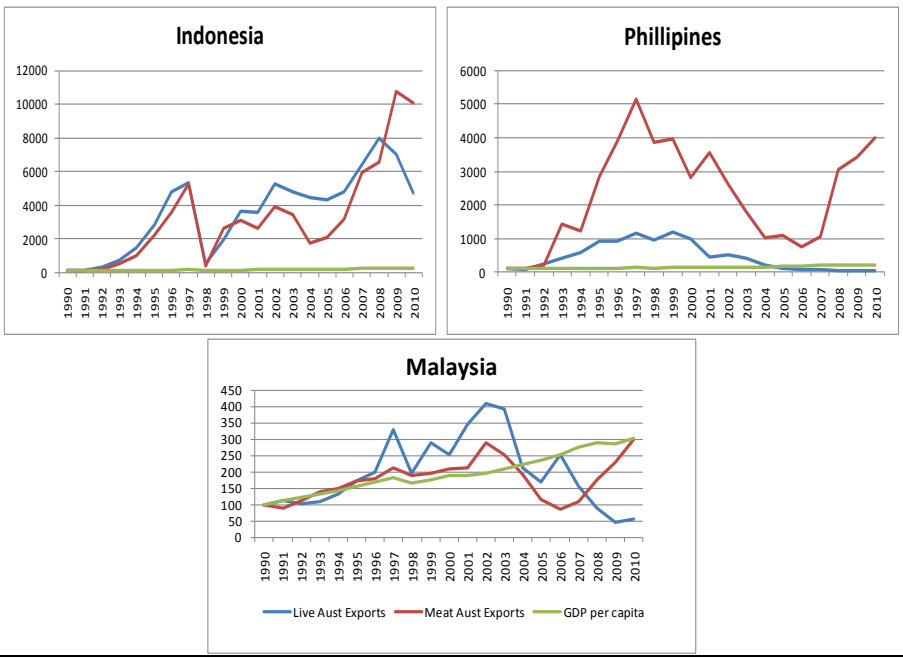
- 450kg average live weight x 51 per cent dressing percentage, between 1990 and 2008
- 350kg average live weight x 49 per cent dressing percentage, for 2009 and 2010

The change was due to the cattle live weight restrictions introduced by the Indonesian Government in 2009, which set the maximum live weight for live cattle at 350kg. Other live cattle importing countries used only the 450kg conversion factor. These trade restrictions in Indonesian have contributed to the substitution of live with processed beef products from Australia.

Once the data was assembled and converted, it was reported as an index, where 1990 = 100. This allowed greater representation of year on year volatility for live sheep and cattle and meat exports to selected countries.

All of the major live cattle importing countries show a recent rise in beef imports from Australia and a fall in the live cattle index.

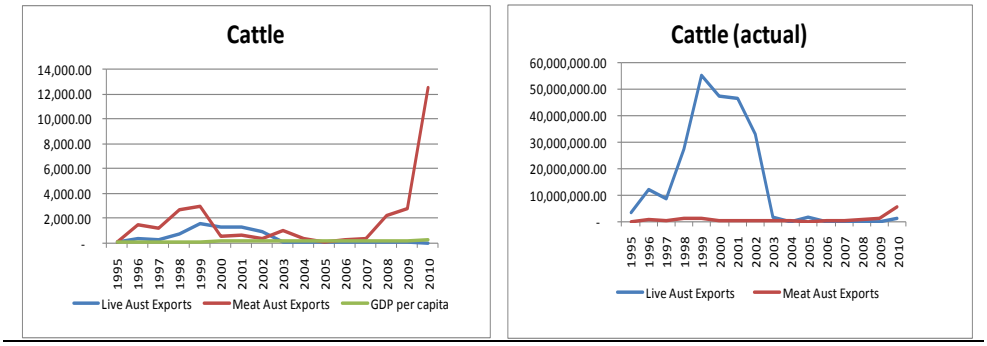
Chart 3 **Indexes for live cattle, beef and GDP for selected countries**




*Data source:* UN Comtrade, ABS

Egypt has been reported separately, due to differences in the index year. There has been a significant increase in the beef import index from Australia, although the increase started from a low base.

Chart 4 **Egypt: cattle indexes and actual amounts for live animals, meat and GDP**




*Data source:* UN Comtrade, ABS

## 4.3 Indonesia's food security policy

In addition to the consumer preference changes in Indonesia, driven mostly by increasing incomes and development of regional infrastructure, the prospects of the live cattle trade are dependent on Indonesian trade policy. A significant influence on that policy is concern about food security in the country. These concerns have become particularly acute following the food price spikes in 2008 and again in 2011.

### 4.3.1 Background – the push for self-sufficiency

The Indonesian Government believes that its push towards food security will further strengthen its hand both in international diplomacy and politically, as part of a national strategy.

The country has a genuine commitment to maintain overall stability of food security, since Indonesia signed a Letter of Intent (LoI) with the UN's Food and Agriculture Organization in March 2009. This was a commitment to support global programs on food security and agricultural development in other developing countries, especially within the framework of South-South Cooperation, the technical cooperation of developing countries, and the targets related to the Millennium Development Goals (MDGs).

Food security policy in Indonesia relates to paddy rice supply and a further nine (9) major food commodities, including beef. Observers from various political, economic and social institutions consider that Indonesian agricultural policy, at the national, regional and global levels, needs to be rearranged. They

contend that food security and agricultural development should be put back into focus as the mainstream policies of national development.

### 4.3.2 What Food Security really means to Indonesia

To Indonesia, Food Security is measured by three important indicators. These are:

- **Availability**, which means that there is enough food measured by quantity, quality and safety, to meet the needs of the entire population of Indonesia
- **Distribution**, which means food supplies are available to all areas at stable and affordable prices
- **Consumption**, i.e. that households are able to access and consume adequate foodstuffs with good nutrition

The Indonesian Food Security target is to meet domestic priority needs for staple food cultivation and production that meet the quality standards of domestic and international food safety; increasing diversity of available foods (food diversification); and increasing the income of farmers and other agribusiness practitioners by 2025. Quantitative measures for each target in the food security program refer to the targets set in the National Food Security Policy.

### 4.3.3 Self Sufficiency: the Concept of Blueprint (DG of Animal Husbandry and Health)[2]

The Indonesian definition of beef self-sufficiency is when local resources can fulfil 90% of consumption demand, which leaves an opportunity for imports to satisfy the remaining 10%. This concept means there is not necessarily a Quota Policy, rather an aim to increase domestic production up to 90% of demand.

One of the principles of the Beef Self-Sufficiency Program is that meat is produced in accordance with the technical requirements of: Safe, Healthy, Intact and Halal (ASUH). Safe means free from contaminants and residues; Healthy means free from potential disease; Intact means no mixture with other meats; and Halal means meeting the rules of Islam.

The concept of self-sufficiency is most of all intended to empower local farmers, so that technical activities related to increasing population and livestock production are devoted to local livestock and the native community in Indonesia. The current Indonesian viewpoint is that cattle farming,

[2] The Indonesian Blue Print can be found at http://ditjennak.go.id/regulasi%5Cblueprint.pdf and the General Guidelines for Self Sufficiency Program Beef 2014 can be found at http://www.datainfonak.net/download.php?file=permentan19_2010.pdf

conducted by more than 6 million households, is still "underperforming". For example, the calving interval for local cows is lengthy at roughly 21 months; self-sufficiency is expected to reduce this to 16-18 months. Likewise, the relatively low weight of local carcasses (only 150 kg) is expected to increase to 176 kg; and the birth rate must increase from 24% to 30% at least. It is clear that significant productivity improvements could be made that, with only small increases in each of a combination of production factors, would substantially lift beef turn-off.

Indonesia first set 2005 as the date to achieve self-sufficiency; it then revised the date to 2010; and then again to 2014, which is the current target date.

To work toward self-sufficiency the Indonesian Government has developed a Blue Print[3], which details a number of trade and production policies and projections for domestic production and the importation of live and processed beef. Table 5 contains the domestic supply and import projections in the Indonesian beef self-sufficiency blue print. It shows the country's aspiration to reduce imported feeder steers from approximately 740,000 head in 2010 (probably based on the calendar year, which may explain the discrepancy with the Livecorp FY cattle export statistics for 2010) to approximately 240,000 head in 2014.

The legislation underpinning Indonesia's beef self-sufficiency policies is the Regulation of the Minister of Agriculture of the Republic of Indonesia no. 19/Permentan/OT.140/2/2010, concerning general guidelines for the Beef Self-Sufficiency Program in 2014.

The targets established in the Blue Print can be summarised as:

- Increasing the population of beef cattle to 14.2 million prior to 2014, with an average growth of 12.48% (possibly already achieved if the 2011 cattle census is accurate)
- Increasing domestic production of meat to 420.3 thousand tons in 2014, an average annual increase of 10.4%
- Successful reduction of cattle and beef imports to only 10% of total consumption
- An increase in employment as a result of population growth and increased livestock production, of 76 thousand persons/year
- Increased revenue for cattle ranchers at least equivalent to the minimum wage in each province

[3] Indonesia's Blue Print for Self-sufficiency can be found at: http://www.ditjennak.go.id/regulasi%5Cblueprint.pdf (date accessed 15-07-2012)

Table 5 **Indonesian self-sufficiency cattle population and production assumptions**

| Description | Year | | | | | R (%) |
|---|---|---|---|---|---|---|
| | 2010 | 2011 | 2012 | 2013 | 2014 | |
| Local Cows | 283.0 | 316.1 | 349.7 | 384.2 | 420.4 | |
| Growth (%) | | 11.7 | 10.6 | 9.9 | 9.4 | 10.4 |
| Local Supply Quantity vs. Total Supply (%) | 70.2 | 75.5 | 80.5 | 85.3 | 90.0 | 82.8 |
| Total Import | 120.1 | 102.4 | 84.7 | 66.3 | 46.7 | |
| Supply from Feeder Cattle Equals to Meat (thousand tons) | 46.4 | 35.2 | 26.8 | 20.3 | 15.4 | |
| Supply from Feeder Cattle (thousand tons) | 260.1 | 196.9 | 149.0 | 112.8 | 85.4 | |
| **Supply from Feeder cattle (thousand head)** | **743,142** | **562,571** | **425,714** | **322,285** | **244,000** | |
| Growth (%) | | (24.0) | (24.0) | (24.0) | (24.0) | (24.0) |
| Total Beef imports | 73.8 | 67.2 | 57.9 | 46.0 | 31.2 | |
| Growth (%) | | (8.9) | (13.8) | (20.7) | (32.1) | (18.9) |
| Total Meat Supply (thousand tons) | 403.1 | 418.5 | 434.4 | 450.5 | 467.4 | |
| Growth (%) | | 3.8 | 3.8 | 3.7 | 3.7 | 3.8 |
| Consumption (thousand tons) | 338.7 | 351.9 | 365.4 | 379.2 | 398.3 | |
| Deviation between Local Production & Consumption (thousand tons) | (55.7) | (35.8) | (15.7) | 5.1 | 22.1 | |
| Deviation between import with local production deficiency (thousand tons) | 64.4 | 66.7 | 69.0 | 71.4 | 68.8 | |

Data source: http://www.ditjennak.go.id/regulasi%5Cblueprint.pdf

To assist in achieving these targets, the Indonesian Government has included the following investment goals in the Blue Print. It is clear that there will be considerable Government and industry assistance directed to beef cattle productivity improvements in Indonesia.

Table 6 **Investment Scheme within Blueprint**

| Sectors | Government (10%) | Private (20-30%) | Farmers (60-70%) |
|---|---|---|---|
| Population Increase and Productivity of Beef Cattle | Infrastructure | Feed production equipment and Drugs | Cages-Related |
| | Seeds and Breeding | Cages | Livestock |
| | Innovations, Information, Institutional supports | Warehouse / cold storage | Feed and Drugs |
| | Import Policy for meat and calves | Equipment | Equipment enclosure and supporting material |
| | | Livestock | |
| | | Feed and Drugs | |
| | | Sewage and meat treatment plant | |

Data source: http://www.ditjennak.go.id/regulasi%5Cblueprint.pdf

The anticipated Government investment in cattle agribusinesses will include:

- Provision of seeds
- The activities of research, assessment, development and extension
- Advisory services on various aspects of breeding, reproduction and feeding
- Maintenance management, and
- Institutional development.

It appears as though the private sector has yet to show a high level of interest in the development of calving operations and this still requires government facilities.

The private sector can also invest in the fields of farming, brood-stock business, mini-feed mills, the meat processing industry, leather, and compost. The expectation is that the private sector will partner with farmers who are calf producers.

However, investment in meat processing is still constrained by less functional slaughterhouse (RPH) facilities being offered as public services. A significant number of RPHs are publicly owned in Indonesia. Nowadays RPH policy is oriented toward increasing private investment, to improve the quality of the meat produced domestically. However, there are constraints on the consolidation and modernisation of RPHs in Indonesia, as a number of consumers prefer fresh drained meat and not frozen. This is why part of the Blue Print is to improve cold chain infrastructure, through Government assistance and by encouraging the private sector to make investments in this area.

### 4.3.4 Livestock Census 2011

The results of the beef cattle, dairy cattle and buffalo census (dated mid-2011) carried out by BPS, revealed that the total number of cattle in Indonesia at that time was around 14.8 million[4]. This was a surprise to the academics, experts, even the government itself, because the total actually far exceeded the assessment previously made by the government (Ministry of Agriculture). In 2010, the government estimated a population of 12.6 million cattle, as the basis for the self-sufficiency program in 2014, when the beef cattle population was expected to be 14.2 million. With this recent census data, there is the potential to achieve self-sufficiency in a year or two, around 2012 or 2013.

## 4.4 The cost of Indonesian beef self-sufficiency

One of the biggest threats to the pursuit of self-sufficiency is its cost to the Indonesian economy and any fiscal pressures that may place on the Government. In a study of the welfare impacts of a range of broad self-sufficiency policies that could be pursued by the Indonesian Government, Vanzetti, Setyoko, Trewin and Permani (2010) concluded that restriction of live cattle and beef imports to meet self-sufficiency policies would reduce Indonesian welfare by $458m[5].

Other policies aimed at achieving self-sufficiency analysed by Vanzetti, et al (2010), included:

- Restriction on imports of live cattle
- Domestic beef production subsidies
- Funded by aid agencies

The results of the study by Vanzetti, et al (2010) are contained in Table 7.

Table 7 **Welfare impacts of alternative scenarios**

| | $m |
|---|---|
| Restrictions on imports of live cattle | -380 |
| Restrictions on imports of live cattle and beef | -458 |
| Domestic subsidy 70% | -20 |
| Productivity improvement | 196 |

*Data source*: *(Vanzetti, Setyoko Rakhman, Trewin, & Permani, 2010)*

[4] See http://www.datainfonak.net/index.php?page=berita&action=detail&idberita=256 (date accessed 15-07-2012)

[5] According to the authors, the change in welfare can be decomposed into three effects, namely economic efficiency, terms of trade, and endowment (labour, capital) effects. The terms of trade effects are remarkably small, less than one per cent for most simulations, regardless of the Armington values used (Vanzetti, Setyoko Rakhman, Trewin, & Permani, 2010)

Vanzetti, et al (2010) also questions the cattle census statistics and whether, and to what extent, live cattle imported for short-term feeding are included in the count of Indonesian cattle:

> One possibility of why livestock and meat statistics are being unreliably reported is that the self-sufficiency definition can be misleading, when the product can be in different forms. For example, production in the case of Indonesian beef should be that from cattle in Indonesia that have not been imported for the purposes of relatively short-term fattening and slaughtering for beef ('beef on the hoof') (Vanzetti, Setyoko Rakhman, Trewin, & Permani, 2010).

Using a measure of self-sufficiency ratio of, production/production plus imports, if Indonesian authorities are including meat from cattle imported for short-term fattening, the level of self-sufficiency currently being achieved could be overstated.

Using 2010 figures, total production was recorded as approximately 403kt. If the quantity of live export meat was approximately 46kt and meat imports were approximately 73kt (see Table 5), the current self-sufficiency ratio is somewhere between 68 and 74 per cent, depending on the meat yielded on average from imported cattle after short feeding in Indonesia.

Therefore to achieve self-sufficiency an additional 91,500 tonnes will have to be produced domestically, which is an increase of approximately 32 per cent in domestic beef production. Based on a slaughter live weight of 400kg, this equates to an additional 620,000 suitable slaughter cattle that will be required by 2014 from the domestic herd.

To put this in perspective, if there is no increase in productivity, a herd of approximately 17m head will be required to produce the additional slaughter cattle. If a 5 per cent increase in productivity is made (heavier slaughter weights, increased calving and fertility) a herd of approximately 14.84m head is required.

## 4.5 Counter factual summary

Beef demand is likely to rise as incomes grow. The growth in demand will be for good quality, safe, convenient beef sold in modern retail outlets. Indonesia has a very large potential to consume more beef, due to:

- Increases in income per capita
- Beef consumption increases are starting from a low base
- Modern retail outlets are gaining market share and will invest in cold chains, packaging and marketing of beef products to increase demand

There are signs in the international trade data that there is an increase in the consumption of Australian processed beef in some live export countries. At

best, live export trends are likely to remain constant, but may fall as incomes rise and modern retailing expands at the expense of traditional beef retailing methods.

However, Indonesia has a long standing policy of beef self-sufficiency that it appears determined to pursue. The suspension of live cattle exports from Australia in 2011 probably increased this determination. At current levels of consumption, self-sufficiency could be achieved (although there is considerable debate about this). If Indonesian demand grows in line with expected increases in GDP per capita, however, it appears highly unlikely that self-sufficiency can be achieved.

Pursuing self-sufficiency also appears costly to the Indonesian economy.

It appears that the export of live animals from the north of Australia is constrained by:

- Increasing substitution of processed beef for beef from live exports
- Indonesia's pursuit of a self-sufficiency policy
- Most other markets appear to be static in their demand for live cattle and the development of new markets for northern cattle is unlikely

We have chosen to use a static live cattle market, at approximately 2010-11 numbers from Northern Australia, for the counterfactual to this analysis. However, Indonesian determination to pursue self-sufficiency may make this counterfactual appear conservative.

# 5 Producing cattle in the north of Australia

This section of the report has been prepared to examine the variability of production that a northern processing market may face and the key drivers of this variability. It also reviews the known financial performance of beef enterprises across the region and how this may change if a regional processing market is established.

The seasonality profiling of cattle supply was used as one of the sensitivity analyses in the financial modelling of a northern processing facility.

Analysing the financial performance of producers also assists in determining what price a northern market may have to offer producers to supply suitable cattle. The price a facility would need to pay is not just to compete with the live trade, but to also provide a suitable risk-adjusted rate of return on investment to maintain and grow cattle numbers in the North.

## 5.1 Seasonal production

Northern range-land cattle production faces significant seasonal and other production risks. The area is extensive and subject to seasonal management limitations on the movement of cattle within and between properties and export markets, due to the wet season. Large market risks faced by Northern cattle production are based on low-density rangeland grazing, subject to high levels of seasonality of supply (both across and between seasons). ACIL Tasman commissioned Grain Growers Information Services to prepare an analysis of the seasonality of supply of cattle from the region and what factors underpin it.

Rainfall and biomass data was collected and compared to live exports by port, to determine seasonal cattle turn-off variation. Cattle exports were based on ABS data between 1988 and 2011. The live cattle export data was used as a proxy for cattle turn-off, as the cattle usually have a relatively short transition from property to port. Therefore, the cattle that are exported are usually sent to export when they are of sufficient weight; the timing depends on when they can physically be moved, taking into account the reduced access to farms and across regions in the wet season.

A detailed report of the results of the modelling, by port zone, can be found in appendix B.

The data was also analysed for variations of rainfall and biomass from year to year. The results showed a high level of variability, with coefficients of variation for wet season rainfall and biomass production (see Table 8).

The correlations for each port zone are summarised as:

Table 8 **Summary statistics of rainfall, biomass production and live cattle exports from selected Northern ports**

| Indicator | Result |
|---|---|
| **Darwin** | |
| Export duration | Mid-March to Mid-December (270 days) |
| Export peak | June |
| | 80 days after peak of seasonal biomass production |
| | 130 days after seasonal rainfall peak – i.e. driest period |
| Rainfall CV (wet season) | 0.5 |
| Biomass CV (wet season) | 0.2 |
| **Northern WA** | |
| Export duration | Mid-March to Mid-December (270) |
| Export peak | May |
| | 60 days after seasonal biomass peak |
| | 130 days after seasonal rainfall peak |
| Rainfall CV (wet season) | 0.5 |
| Biomass CV (wet season) | 0.2 |
| **North Qld** | |
| Export duration | Mid-March to Mid-December (270) |
| Export peak | May |
| | 50 days after seasonal biomass peak |
| | 110 days after seasonal rainfall peak |
| Rainfall CV (wet season) | 0.5 |
| Biomass CV (wet season) | 0.33 |
| **Central WA** | |
| Export duration | Mid-Sept to Mid-April (210 days) |
| Export peak | December |
| | 20 days after biomass trough |
| | 70 days after seasonal rainfall peak |
| Rainfall CV (wet season) | 2.1 during summer, 0.8 during spring and winter |
| Biomass CV (wet season) | 0.25 during summer and 1.75 during the rest of the year |

*Data source*: GrainGrowers Information Services

In summary, there is considerable seasonal variation in live cattle exports, which is driven by:

- Accessibility after the wet
- But not before the cattle have had sufficient time on feed to meet export specifications

It is also clear that there is considerable variability between seasons, as measured by the coefficient of variation of biomass production and rainfall between seasons. This means that these constraints on the supply of cattle will vary considerably between years, making annual supply also highly variable.

In the supply of cattle through the export ports, Darwin had the lowest level of seasonality, peaking at approximately 25,000 head on average per month during the dry season, falling to 15,000 during the wet season. WA northern ports had the highest variability, with exports virtually ceasing during the dry months.

This modelling was used to construct a number of seasonality profiles for the processing plant financial model. A detailed description of the seasonality scenarios tested in the modelling can be found in 6.3.7.

## 5.2 Financial performance

Until 2010-11, Australian beef producers responded to poor seasonal conditions by increasing beef cattle turn-off and reducing the number of cows mated – contracting the herd. During 2009-10, conditions began to improve and in 2010-11conditions were excellent. This has led to a rebuilding of the herd in Northern Australia.

In 2010–11, excellent pasture conditions resulted in a reduction in beef cattle turn-off in northern Australia, as producers continue to build cattle numbers. Also, increases in the numbers of cows mated and higher branding rates are expected to result in a further increase in the number of calves branded by northern Australian beef cattle producers.

Table 9 **Herd statistics**

| Northern Australia | all farms | | |
|---|---|---|---|
| | 2008–09 | 2009–10p | 2010–11z |
| Change in beef cattle numbers | 2.2% | 4.2% | 3.3% |
| Cows and heifers mated (no.) | 625 | 633 | na |
| Calves branded (no.) | 442 | 462 | 398 |
| Beef cattle purchases (no.) | 63 | 62 | 51 |
| Beef cattle sales (no.) | 393 | 405 | 388 |
| Change in sheep numbers | -0.7% | -4.3% | 0.7% |
| Area operated as at 30 June (ha) | 22,444 | 23,966 | na |
| Area cropped (ha) | 104 | 105 | 119 |

*Data source:* Thompson, T and Martin, P 2011, Australian beef: Financial performance of beef cattle producing farms, 2008–09 to 2010–11, ABARES report prepared for Meat and Livestock Australia, Canberra, June.

## 5.3 2009-10 Financial Performance

The cash position of northern cattle producers has worsened, despite excellent seasonal conditions. On average, farm cash income in northern Australia was reduced from $79,481 a farm in 2008-9 to $39,120 in 2009-10.

This decrease has resulted from a small drop in the prices received for cattle sold, reduced transfer of stock off-farm, lower crop receipts and a small increase in farm costs. Farm debt has increased and consequently interest payments were higher. Dry conditions at the start of the financial year led to a 25% increase in expenditure on fodder. Expenditure on cattle purchases increased as re-stocking began.

## 5.4 2010-11 Financial Performance

Farm incomes are expected to be higher in the 2010-11 financial year. Farm cash income is expected to increase from $39,120 to $60,100 per farm. However, this projection does not include the financial impact of the Australian Government's suspension of the live trade to Indonesia in the final month of the financial year. It may be that revenues may be down in the 2010-11 financial year and government compensation will be received in the 2011-12 financial year.

Table 10 **Financial performance (average per farm), northern beef industry**

| | 2008–09 | 2009–10p | 2010–11z |
|---|---|---|---|
| **Farm cash receipts** | | | |
| Beef cattle | $278,615 | $275,060 | $275,300 |
| Beef cattle transferred off–farm | $46,516 | $40,620 | na |
| Crops | $31,831 | $25,850 | $37,700 |
| Sheep and lambs | $6,329 | $6,470 | $7,900 |
| Wool | $8,588 | $7,160 | $8,500 |
| Total cash receipts | $411,773 | $384,370 | $358,500 |
| **Farm cash costs** | | | |
| Beef cattle purchases | $39,227 | $40,670 | $30,600 |
| Chemicals | $5,876 | $4,710 | $5,800 |
| Contracts | $11,973 | $14,410 | $12,000 |
| Fertilisers | $3,151 | $2,150 | $2,400 |
| Fodder | $20,519 | $25,310 | $14,900 |
| Fuel, oil and grease | $24,184 | $22,270 | $21,200 |
| Handling and marketing | $8,543 | $8,290 | na |
| Hired labour | $17,968 | $20,980 | $13,800 |
| Interest | $47,404 | $49,060 | $56,800 |
| Repairs and maintenance | $29,254 | $31,250 | $33,900 |
| Total cash costs | $328,106 | $344,120 | $298,400 |
| **Farm financial performance** | | | |
| Farm cash income | $79,481 | $39,120 | $60,100 |
| Farm business profit | $16,831 | $(22,750) | $5,500 |
| Rate of return | | | |
| - excl. capital appreciation | 0.9% | 0.5% | 1.1% |
| - incl. capital appreciation | 0.2% | -1.8% | na |

*Data source:* Thompson, T and Martin, P 2011, Australian beef: Financial performance of beef cattle producing farms, 2008–09 to 2010–11, ABARES report prepared for Meat and Livestock Australia, Canberra, June.

There is expected to be a slight reduction in the numbers of cattle sold in this financial year, as herds are being rebuilt. There has been a slight increase in cattle prices, meaning that overall revenue is expected to be similar to previous years.

Farm cash expenses are expected to be lower than in the previous year, because of lower expenditure on fodder and beef cattle. Interest rates rose in 2010, increasing the farm debt costs. Flooding has increased repair costs for some properties.

Clearly, the reduction in numbers sold is the result of inventory build-up, so the cash profit is lower than the accounting profit, which will reflect that balance sheet (inventory) values are increasing.

## 5.5 Profitability by target market

In 2009-10, the average farm income of northern producers decreased, regardless of the target market. This was due to the impact of seasonal conditions, with the farm costs determining the overall profitability. The ABARES report states (p20):

> Producers which sold for slaughter realised a higher average beef cattle price in 2009-10 than producers targeting other markets. This reflects the more finished state of cattle sold for slaughter. In addition, in both southern and northern Australian producers in 2009-10 that targeted the direct for slaughter market experienced the least variation from the average farm cash income for the previous three years, than producers targeting other markets.

The data behind this assertion are shown on Table 11 below.

Table 11 **Physical and financial performance indicators, grouped by main market targeted**

| Northern Australia, 2009-10 Average per farm | | Direct for slaughter | | Feedlot | | Live export | | Breeders for store | |
|---|---|---|---|---|---|---|---|---|---|
| | **Unit** | 3 year average | 2009-10 | 3 year average | 2009-10 | 3 year average | 2009-10 | 3 year average | 2009-10 |
| Number of beef cattle, 30 June | Head | 2,027 | 1,902 | 1,127 | 1,026 | 8,511 | 10,071 | 926 | 792 |
| – bulls | % | 2% | 2% | 2% | 2% | 2% | 2% | 2% | 2% |
| – cows | % | 42% | 36% | 45% | 42% | 49% | 45% | 50% | 47% |
| – replacement heifers | % | 10% | 9% | 9% | 8% | 11% | 12% | 11% | 13% |
| – calves | % | 17% | 19% | 22% | 24% | 16% | 22% | 20% | 18% |
| – other | % | 30% | 36% | 22% | 24% | 22% | 19% | 17% | 20% |
| Number of cows mated | Head | 804 | 700 | 507 | 405 | 3,559 | 4,270 | 443 | 342 |
| Branding rate | % | 71% | 76% | 73% | 77% | 63% | 64% | 71% | 70% |
| Number of beef cattle purchased | Head | 103 | 73 | 77 | 82 | 126 | 158 | 37 | 18 |
| Number of beef cattle sold | Head | 486 | 477 | 355 | 325 | 1,593 | 1,705 | 319 | 231 |
| – direct for slaughter | % | 93% | 92% | 13% | 12% | 6% | 11% | 9% | 12% |
| – to feedlots/backgrounding | % | 2% | 5% | 81% | 84% | 0% | 2% | 2% | 3% |
| – for live export | % | 1% | 0% | 1% | 0% | 88% | 87% | 1% | 4% |
| – to breeders or for store | | 4 | 3 | 5 | 3 | 5 | 1 | 87 | 82 |
| | | | | | | | | | |
| Average price received for beef cattle | $/hd | $830.00 | $770.00 | $658.00 | $596.00 | $590.00 | $567.00 | $614.00 | $524.00 |
| **Farm financial performance** | | | | | | | | | |
| Farm cash income | $ | $118,466 | $81,208 | $59,398 | $13,611 | $90,683 | $(113,162) | $41,517 | $6,653 |
| Farm business profit | $ | $77,976 | $(200) | $(7,825) | $(25,769) | $160,678 | $53,631 | $(58,512) | $(48,325) |
| Rate of return – excluding capital appreciation | % | 1.7% | 0.8% | 0.8% | 0.4% | 1.8% | 1.2% | -0.5% | -0.6% |

*Data source:* Thompson, T and Martin, P 2011, Australian beef: Financial performance of beef cattle producing farms, 2008–09 to 2010–11, ABARES report prepared for Meat and Livestock Australia, Canberra, June.

## 5.6 Financial performance of live exports

In early 2010, the Indonesian government began to enforce a 350 kg weight limit on live imports, while at the same time reducing the availability of permits for 2010. Despite this, 2009-10 saw a slight increase in exports to Indonesia, on the back of strong export performance overall.

Table 12 **Live export physical and financial performance, Australia, average per farm**

| | 2007-08 | 2008-09 | 2009-10 |
|---|---|---|---|
| Area operated, 30 June | 79,870 | 113,634 | 139,307 |
| Area sown to crops | 50 | 130 | 194 |
| Number of beef cattle, 30 June | 3,608 | 5,340 | 6,595 |
| – bulls | 2% | 2% | 2% |
| – cows | 51% | 44% | 46% |
| – replacement heifers | 11% | 11% | 11% |
| – calves | 15% | 18% | 24% |
| – other | 20% | 25% | 17% |
| Number of cows mated | 1,515 | 2,144 | 2,837 |
| Branding rate | 68% | 66% | 67% |
| Number of beef cattle purchased | 63 | 141 | 160 |
| Number of beef cattle | 766 | 1,158 | 1,308 |
| – direct for slaughter | 9% | 8% | 9% |
| – to feedlots/backgrounding | 0% | 0% | 1% |
| – for live export | 84% | 89% | 88% |
| – to breeders or restockers | 7% | 3% | 2% |
| | | | |
| Average price received for beef cattle ($/hd) | $616 | $598 | $568 |

Data source: Thompson, T and Martin, P 2011, Australian beef: Financial performance of beef cattle producing farms, 2008–09 to 2010–11, ABARES report prepared for Meat and Livestock Australia, Canberra, June.

The area operated (per farm, on average) has increased substantially; this is the result of a diversion to live trade from alternative markets. The average number of beef cattle sold per farm increased by 13% in 2009-10 to 1,308 head.

There was a 20% increase in beef cattle purchases in 2009-10, which was 163% higher than the 2007-8 figure. Other cash costs have increased, in particular fuel and hired labour.

The northern Australian live exporters are currently building their herds following drought, and as is shown in Table 11 – the average cash income of a northern live exporter was minus $113,200 but its accounting profit was stronger at $53,600.

Table 13 **Live export financial performance, Australia, average per farm**

| | 2007-08 | 2008-09 | 2009-10 |
|---|---|---|---|
| **Farm cash receipts** | | | |
| Beef cattle | $471,971 | $691,960 | $743,200 |
| Crops | $4,203 | $149,310 | $135,400 |
| Sheep and lambs | $12,323 | $14,460 | $8,200 |
| Wool | $6,530 | $3,850 | $3,000 |
| Total cash receipts | $624,609 | $1,189,240 | $1,183,500 |
| | | | |
| **Farm cash costs** | | | |
| Beef cattle purchases | $55,563 | $102,930 | $124,100 |
| Chemicals | $4,347 | $10,800 | $18,600 |
| Contracts | $25,359 | $57,700 | $54,900 |
| Fertilisers | $12,814 | $39,820 | $22,300 |
| Fodder | $37,999 | $76,150 | $77,700 |
| Fuel, oil and grease | $50,537 | $60,910 | $73,900 |
| Handling and marketing | $26,093 | $16,230 | $24,400 |
| Hired labour | $56,269 | $99,550 | $116,800 |
| Interest | $35,451 | $104,690 | $109,300 |
| Repairs and maintenance | $48,499 | $80,520 | $87,400 |
| Total cash costs | $639,810 | $1,126,430 | $1,175,500 |
| | | | |
| **Farm financial performance** | | | |
| Farm cash income | $(16,497) | $66,120 | $8,300 |
| Farm business profit | $51,123 | $67,890 | $96,206 |
| Rate of return | | | |
| – excl. capital appreciation | 1.2% | 1.5% | 1.5% |
| – incl. capital appreciation | 3.0% | 0.7% | -3.2% |

Data source: Thompson, T and Martin, P 2011, Australian beef: Financial performance of beef cattle producing farms, 2008–09 to 2010–11, ABARES report prepared for Meat and Livestock Australia, Canberra, June.

## 5.7 The effect of restrictions on the live trade on cattle producers

The lack of alternative markets for Northern Australian cattle producers has a significant impact on the structure of herds, bull breeding objectives, costs and ultimately the profitability of beef production. The decision by Indonesia, in 2009, to restrict cattle imported live to an average of 350kg live weight, has further compounded the risks faced by Northern cattle producers.

The following sections are based on a report prepared by Holmes and Company for ACIL Tasman to review the current profitability of Northern beef producers that are reliant on the trade, and the impact that access to domestic processing may have on their businesses.

Holmes and Company was also asked to model the impact that access to alternative markets may have on the profitability of producers reliant on the live export trade.

### 5.7.1 Background

The current market access issues impacting on the northern live export trade (LET), have resulted in short-term financial stress for businesses supplying that market. Many of these businesses were already in a precarious financial position before the crisis; the hardships resulting from it will precipitate foreclosure and a change of business ownership in most of those cases over a period of time (McCosker, McLean, & Holmes, 2010). This is no more than a simple case of business risk management, in this case, market risk. The responsible management of market risk involves an objective analysis of other market options.

This section attempts to provide some background on how to do this and presents some potential outcomes, with particular reference to the Pilbara, Kimberley and Katherine regions. Of necessity, the analysis to follow is based on principles, because individual business circumstances vary so widely. This analysis will be based on comparing the outcomes of three different scenarios:

- Business as usual. That is, continuing to supply the LET.
- Supplying eastern or southern markets with feeder (semi-finished) or killable cattle
- Supplying a local killing works

To be able to supply alternative markets, certain production system features must be available. As these are a mandatory pre-requisite, they will be addressed first.

### 5.7.2 Specific alternate market considerations

To supply alternative markets, additional production system features are required that will dictate the potential adoption rate, even if businesses are keen to supply. The five most important requirements (not necessarily in order) are discussed in the following sections.

#### Genetics

This is an extremely important area, because it has big implications for market acceptance of the final product and the profitability of producing it on the property. Unless the genetics issue is addressed properly, all other discussion on alternative markets is largely irrelevant.

At present there are no premiums and discounts in the live export trade (LET) for a range of quality traits that are available in most other beef markets. This means that the cattle producers' breeding objectives, where producers have them, are based on production traits such as fertility and survival in the harsh northern climate. There is a widespread perception that the genetic profile of herds supplying the LET has to be dominated by the Brahman breed and this happens in practice. This perception is usually promoted by LET agents based on perceptions of the Indonesian market, albeit with slight regional differences.

The dominant breeds are Braham and Droughtmaster and fertility usually drives bull selection.

Other breeds, particularly Droughtmaster and Charbray, are used in the Pilbara. In the Kimberley, the traditional Kimberley Shorthorn is still relatively common and in the top end of the Northern Territory and the Gulf country of Queensland, the Brahman influence is either 100% or close to it.

It is debatable whether the Brahman contribution needs to be as high for the LET. For other markets, it almost certainly needs to be lower for a range of reasons, including eating quality and the killing yield resulting from regional phenotypes. The question is, how much lower? The consensus from technical experts operating in far northern regions, suggests that a maximum of 75% Brahman is all that is required, and even that may be an overestimate. The remaining contribution can come from other tropically adapted breeds, such as the Droughtmaster or composite breeds. This issue is critical to the success of a strategy aimed at less reliance on the LET. A balance has to be struck between survival, productivity and market access. A small number of individual family and corporate businesses in the far north have already worked out how to strike this balance, demonstrating that it can be done successfully.

In doing so, these businesses have also benefited from the heterosis (hybrid vigour) advantage of the introduction of another breed. If this introduction results in a herd genetic profile of 75% Brahman, 25% other, the heterosis advantage is likely to be in the order of 5%, all of which goes straight through to the bottom line, on top of the market access advantages.

Breed composition is one issue, the other is genetic merit. Experience suggests that the majority of bulls purchased for use in commercial herds in the far north, come with no objective information on their genetic merit. If this is the case, only one in four bulls purchased will improve the genetic potential of the herd and its consequent earning capacity over time. This is a serious issue if it is recognised that a bull purchased today will influence the earning capacity of the herd for the next 15 years. The annual cash cost of bull replacement is both high and transparent. A far-northern herd running 3,000 breeders is likely to have an annual bull replacement cost of $80,000 minimum, which is the second biggest cash expense in the business, just behind direct herd costs and just ahead of capital expenditure. The magnitude and transparency of this figure leads many businesses to treat bulls as a commodity where lowest cost dominates purchasing decisions. This is largely reflective of the price signals set by the LET where there is little reward for producing higher quality animals.

Many seedstock businesses understand this and cater for this market. Many, if not the majority, of bulls bred and produced for far northern beef production, come from Queensland-based seedstock businesses. The most recent figures available suggest that the adoption rate of Group BreedPlan by Queensland seedstock businesses is close to 11%. Given that some of those businesses will only be adopting it for marketing purposes, rather than letting it drive genetic direction, the overall genetic scene is problematic.

It is especially problematic for commercial businesses seeking superior genetics, where the long-term direction is positive and quantifiable. Generational interval determines a large part of the selection pressure that bull producers can exert on a stud's genetics. Therefore, it may take six to seven years for studs to produce enough high-performance bulls to service the northern cattle herd if alternative markets became available.

Confirmation of this is quickly and readily obtained through Breed Society web page searches. A search in the Brahman breed for seedstock businesses placing heavy emphasis on fertility, and explaining how and why they go about this, will be quick but less than substantive. The same applies to other potential breeds acceptable for the far north. A search for data on long-term genetic trends for a comprehensive range of EBV's, on the same websites, will yield a similar result. That is not to say that there are not seedstock businesses out there heading down this path. It does say, however, that there are too few of

them to supply those commercial herds in the north that now, or in the future, take profit-driven genetic direction seriously.

The breeding objectives that would suit a northern cattle producer seeking to supply a domestic slaughter market would include:

- Low birth weight
- High 200, 400 and 600 day growth rate
- High fertility
- Disease and pest resistance

This situation is unlikely to change in the short term. For those businesses with the need and/or inclination to do so, breeding their own bulls is a practical and realistic lower-cost alternative for both producers supplying the LET and any alternative market. A suggested protocol (summarised) for this is as follows:

- Implement National Livestock Identification System technology, rather than just compliance. Use this for recording purposes.
- Select the "best" yearling heifers from a given year's drop on visual appraisal.
- Purchase the best industry bull, of a suitable alternative breed, that the budget will allow, with a full suite of objective information directed towards the target market.
- Control the mating of the heifers to this bull. Restrict mating to no more than nine weeks and then pregnancy test.
- Re-mate those heifers that have reared a calf; spay and cull the rest. Do this with the same bull or a more recent purchase. Purchase a new "stud" bull every third year.
- Retain those heifers that have reared a calf on the first two pregnancies, plus their bull and heifer calves.
- Feed the best of the heifer calves back into the "stud" nucleus and use the best of the bulls in the commercial herd.
- Repeat the process annually, continuing to feed in heifers from the commercial herd. Stabilise the nucleus at the required numbers to eventually supply the whole commercial herd. As a guide, there will need to be about 6 females in the nucleus for every bull replacement required.

This protocol, applicable to both exclusive LET businesses and others with more than one potential market, will result in a significantly lower bull cost per calf born (see Table 14). It has the additional bonus of placing the selection emphasis on the critical profit drivers of reproductive rate and survival. If cow numbers are reduced to make way to grow-out more cattle, some of the labour could be redeployed into a bull breeding program.

In addition, the genetic direction in other characteristics, such as growth and carcass characteristics, is likely to be positive through bull selection, moderated by adaptability. All up, it is highly likely that the strategy will deliver more to the bottom line than the random use of unselected industry bulls. Estimates indicate that genetic progress in beef cattle for any given market, proceeds at 2% at full adoption and implementation. Some adoption here goes a long way towards addressing the declining terms of trade for agricultural products, which, long term, are close to 2%.

To provide some perspective on bull costs per calf weaned, the data in Table 14 are presented. These data use two variables, annual female mating load (vertical axis) and years of use (horizontal axis). The assumptions are that the bulls are purchased for $2,500, have a residual value of $0, as there is currently no market for them, and achieve a 50% weaning rate, which will be substantiated below. For information, the cost of production of a herd replacement bull in the above protocol is likely to be circa $400.

Table 14 **Bull Cost per Calf Weaned**

| | Years of Use | | | | | |
|---|---|---|---|---|---|---|
| | 1 | 2 | 3 | 4 | 5 | 6 |
| 20 | $250 | $125 | $83 | $63 | $50 | $42 |
| 30 | $167 | $83 | $56 | $42 | $33 | $28 |
| 40 | $125 | $63 | $42 | $31 | $25 | $21 |
| 50 | $100 | $50 | $33 | $25 | $20 | $17 |
| 60 | $83 | $42 | $28 | $21 | $17 | $14 |

*Data source*: Holmes and Co

This discussion on genetics has been placed first because it is applicable to any market option. All the benefits are virtually free and permanent and there is nothing to lose with this approach.

### Balance of country

It is a given that there has to be a certain amount of country on any property that is capable of growing cattle out. Country specific to the requirements of running breeding cows is different, because all that is required is maintenance feed. Growing animals requires more than just maintenance feed.

More specifically, for a complete change in the production system, there has to be sufficient growing country to accommodate the entire year's production. If less than that, some reliance on the LET will remain. Some businesses, keen to explore alternative market options, may consider the purchase of additional growing country. This is a viable alternative, provided the business is analysed on a consolidated basis. If not, the performance of the breeding property will suffer at the expense of the growing property. Perspective and overall

consolidated objectives need to be paramount if this decision is being contemplated.

### Growing season growth potential

There are distinct regional differences in the growth potential of country in the growing season. This is generally referred to in terms of kilograms of live weight gain per growing season. This is a major constraint and will be an important consideration when determining alternative markets. For example, the Pilbara is generally regarded as an 80 kg region. If this is known and quantified, the implications can be used to determine whether the alternative markets on offer are a proposition or not. For example, it may be necessary to add another 240 kg of live weight to a steer weaner to make it acceptable, either as a feeder steer or to be killable. In an 80 kg region, that would mean the steer would be about three years of age and almost certainly unacceptable as a prospective feeder steer. On the other hand, it may still be accepted by a killing works. In reality, most of the country in the far north will only be capable of producing light feeder steers.

The following table shows the birth weight and annual weight gain achievable in the majority of Northern cattle production regions. At an average birth rate of 40-50 kg, a calf is weaned off its mother at 120 -130 days at a live weight of approximately 180kg. Each year the animal gains weight, predominately in the wet season. In the Pilbara, the weight gain in an average year is 80kg (although this is highly dependent on the season). This means that at 2 years of age, the animal is under the weight limit for the LET. Keeping the animal another 12 months in average conditions, means that the animal reaches a slaughter weight of 400kg by the time it is 3 years old.

Table 15 **Calf weights, annual weight gain and potential markets**

| Age | LWT | Annual Kg/ LWT gained | Markets | |
|---|---|---|---|---|
| | | | Current | Alternative |
| Birth | 40 | 140 | | |
| Weaning ( 5 months) | 180 | 80 | | |
| 1 year | 280 | 80 | LET | |
| 2 years | 320 (but <350) | 80 | LET | Light feeder |
| 3 years | 400+ | | | Slaughter |

*Data source*: ACIL Tasman

These weights are based on average animal and seasonal performance. There will be considerable variation around these means (between animals and between seasons). However, reliance on the LET means that there is a disincentive to produce high weight-gain animals (high performance animals), due to the risk that they may exceed the 350kg limit before they are mustered

at 2 years old. The same risks are also present during periods of above average seasonal conditions.

#### Transport access

For access to other markets, holding over some, or all, of each year's drop for additional growth is a mandatory pre-requisite. For the LET, there is a problem created by the current 350kg export weight limit cap. To ensure that this is not exceeded, it is essential to have all-weather access to trucking yards. If growing steers are in a paddock with access to these yards, they can be mustered, weighed and trucked in a timely manner, to avoid exceeding the cap. If not, the entire production system requires a much higher level of management and incurs the associated risk. For alternative markets, the same principle applies; timely trucking so as to stay inside market specifications, is essential. Not all businesses in the far north have all weather access.

#### Distance to markets.

Despite the issues raised in the above three points, the absolute distance to market may conspire against the success of any alternative strategy. Having said that, the only region likely to be affected in this regard is the Kimberley, and this will be the case only if the feeder steer market is being considered.

The fact is that the majority of the country involved in the LET is suitable for breeding only, or, at best, growing out animals to an unfinished state. There is no empirical evidence to support this statement, but, nevertheless, it stands. If this statement is accepted, it follows that any animals that will be grown-out to a heavier weight will be more likely to enter a feedlot, rather than a killing works. It is therefore incumbent on interested businesses to develop some liaison with target feedlots about their ultimate target market. This concept is well established and practised by businesses in the south that supply feedlots exclusively. Their production systems are designed to optimise profit within the boundary fence and produce an animal that will both add value to the lot feeder and have acceptable specifications for the ultimate market. This concept is foreign to most northern businesses, but is, nevertheless, an important component of any thinking involving alternative markets.

### 5.7.3 Regional constraints

The region most constrained by all the data and additional considerations in this report is the Kimberley. It is constrained primarily by the inherent low productivity of the country and its distance to alternative markets. It is possible to argue that, at the present time, if it were not for the LET, there would be almost no beef industry in the Kimberley. And yet, the inherent problems with

that trade conspire against Kimberley businesses achieving economic sustainability.

As will be shown, the LET seems to attract excessively high selling costs. Much of this is associated with freight, but a fair proportion is based on the reliance on agents. This is not to denigrate the role or value adding potential of agents, but it is interesting to note the regional differences. The top end of the Northern Territory has the lowest selling costs and, although not apparent from the data, the reason for this is that more businesses in this region enjoy direct relationships with exporters and bypass the agent system. In the other regions, there is a widespread perception that it is essential to involve agents in the selling process to ensure timely access to the boat in port. In addition, the issue of guaranteed payment is alive and well, based on some businesses having had adverse experiences in the recent past. The combination of these two perceptions may, or may not, be real, but nevertheless, they are hard to shift.

It is also important to take into account that the Pilbara region suffers from significant climate risk. Its latitude is too low to guarantee a wet season every year, and too high to rely consistently on winter rain. Statistically, the Pilbara will experience a failed wet season to some degree every 4$^{th}$ year. The business and herd recovery time from these events is between 2 and 3 years. Herd inventories and business performance are more volatile than in other regions as a result.

### 5.7.4 Data & data analysis

Before an analysis of alternative strategies is possible, it is necessary to understand the financial and production performance characteristics of the businesses and herds supplying the LET, as they stand at the moment. This is necessary to form a base level of performance, against which the merit or otherwise of alternative markets can be compared. This is the reason for the presentation of the following data.

The other region to be used for comparison purposes is Central Australia. Extensive data are available for this region and it is employing a production system that could be adopted by some businesses currently supplying the LET. It is also an extensive rangeland region with some important common production system features.

It is important to state that the data employed in this analysis are coming from family only businesses, with a high likelihood of above-average performance for the region. The reason for this is that they are sufficiently profit driven to want to benchmark the performance of their businesses. As a general guide, these data are likely to be comparable to the top 20% performance of ABARE data. The term of the data collection for these three regions varies, between a

minimum of three years and a maximum of nine years. Having this level of historical data in the analysis ensures that seasonal and market variations are included in the 'average' results.

The representation of the data is shown in Table 16, expressed as the total number of adult equivalents (AE) and businesses under management.

Table 16 **Total AE and businesses under management**

| | Katherine | Kimberley | Pilbara |
|---|---|---|---|
| Total AE managed | 22,383 | 72,320 | 42,155 |
| Total Businesses | 8 | 6 | 7 |

*Data source*: Holmes and Co

It is important to consider both the number of AEs and the number of businesses used to represent any region, to ensure a high probability of regional representation. The geographic location of the businesses within the region should also have an even spread. Some trouble has been taken to ensure compliance with these requirements.

The unit of measurement at the herd level is the AE, which, by definition, is a 450kg non-reproductive beast at maintenance. The unit of measurement in extensive rangeland production systems is usually the individual animal or AE, rather than per unit area. The reason for this is that rangeland stations have prescribed carrying capacities, which cannot be exceeded if the natural resource base is to remain stable. For this reason, the stocking rate is not a primary driver of profit, unlike the situation in southern regions. In extensive rangeland regions the emphasis is, or should be, on individual animal performance. It is also important not to confuse stocking rate with carrying capacity. Carrying capacity increases assume the development of unutilised country, while the stocking rate assumes running more animals on existing utilised country.

Financial and production data are collected from each business annually and after an extensive error-checking process, are compiled into a set of management accounts, with associated key performance indicators (KPI's) at the whole business and herd levels. These management accounts differ from compliance accounts in the following important ways:

- Current market values are used for all assets, rather than written down values, historical values or artificial natural increase values.
- Useful economic life depreciation rates are employed rather than depreciation rates prescribed by the ATO.
- Owner wages are standardised to avoid the distortion created by large variations in personal drawings.
- All leased assets are capitalised to avoid the distortion that off-balance sheet items can introduce to returns on assets.

### 5.7.5 Results

Results will be presented firstly at the whole business level, followed by the herd level. Table 17, Table 18 and Table 19 show whole business performance by region, using the three major financial statements: income, cash flow and the balance sheet:

Table 17 **Whole Business Income by Region**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| Sales | $523,369 | $1,100,924 | $1,176,027 | $933,440 |
| Inventory change | $60,287 | ($20,852) | ($38,244) | $397 |
| Gross profit | $583,656 | $1,080,072 | $1,137,783 | $933,837 |
| Enterprise expenses | $266,348 | $315,407 | $241,563 | $274,439 |
| Gross margin | $317,308 | $764,665 | $896,220 | $659,398 |
| Overhead expenses | $249,283 | $746,748 | $695,836 | $563,956 |
| Earnings before int & tax | $68,025 | $17,916 | $200,384 | $95,442 |

*Data source*: *Holmes and Co*

Table 18 **Whole Business Cash flow by Region**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| Sales | $523,369 | $1,100,924 | $1,176,027 | $933,440 |
| Purchases | $105,102 | $36,112 | $93,807 | $78,340 |
| Enterprise expenses | $266,348 | $315,407 | $241,563 | $274,439 |
| Overhead expenses | $164,618 | $615,627 | $592,376 | $457,540 |
| Capital expenditure | $169,404 | $90,386 | $138,390 | $132,727 |
| Cash flow before int & tax | ($182,103) | $43,392 | $109,892 | ($9,606) |

*Data source*: *Holmes and Co*

Table 19 **Balance Sheet by Region**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| **Assets** | | | | |
| Cash and Cash Equivalents | $4,139 | $145,569 | $64,445 | $71,384 |
| Fodder/Grain on Hand | $4,673 | $2,051 | $940 | $2,554 |
| Livestock | $2,039,438 | $4,523,393 | $4,086,875 | $3,549,902 |
| Plant & Equipment | $384,356 | $563,070 | $493,604 | $480,344 |
| Land & Infrastructure | $4,897,535 | $8,315,102 | $3,776,291 | $5,662,976 |
| Total Assets | $7,330,141 | $13,549,185 | $8,422,155 | $9,767,160 |

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| **Liabilities** | | | | |
| Overdraft | $317,674 | $250,507 | $339,239 | $302,474 |
| Term Loans | $818,975 | $1,880,152 | $194,594 | $964,573 |
| Other Loans | $528,842 | $0 | $117,888 | $215,577 |
| Total liabilities | $1,665,491 | $2,130,659 | $651,720 | $1,482,624 |
| Net assets | $5,664,650 | $11,418,526 | $7,770,434 | $8,284,536 |
| Equity % | 74% | 89% | 80% | 81% |

*Data source: Holmes and Co*

For any business, including a northern beef business, the following essential financial requirements exist. The business must be able to:

- Fund ongoing operating expenses
- Fund annual capital expenditure
- Fund all financing costs, including bank interest
- Fund income tax liabilities when applicable
- Provide for future liabilities. In most cases this will be independent retirement and business succession for family run beef businesses, but may also include child education, long service leave, etc.
- Repay debt principal over time

Clearly, the data presented in the above three tables are problematic from a whole business perspective. Given that available cash is the primary consideration, businesses in all three regions have insufficient cash to fully fund all their requirements. A quick check of the balance sheet will show that the average interest payment will be around $118K at current interest rates. The cash flow statement shows that there is no cash available to pay that interest, any tax applicable and the annual provisioning for future liabilities such as succession and retirement. Although capital expenditure has been accounted for in the cash flow statement, qualitative evidence suggests that this figure is understated against the true capital expenditure needs of the business. The observations just described are broad-brush.

A more specific and robust definition of long-term economic sustainability is as follows: For any business, in any industry, anywhere, the total business return must exceed the after-tax cost of debt. The total business return is calculated by adding the annual appreciation/depreciation in total asset values at market, to the return on assets. The former will dominate the sum in the long term. The cost of debt is the *de facto* cost of capital but, because the interest component of debt is tax deductible, the cost of debt should be looked at on an after-tax basis. Wealth creation in Australian agriculture is more about land ownership than what you do with the land, which is entirely consistent

with any other form of property investment. Provided the cash flows from ownership activities can fully fund the cost of ownership, it will all work out. Table 20 presents data from the above argument:

Table 20 **Total Business Return & After-Tax Cost of Debt**

| | Katherine | Kimberley | Pilbara |
|---|---|---|---|
| Total Business Return | 13.5% | 0.9% | 3.6% |
| After-Tax Cost of Debt | 5.4% | 6.4% | 5.8% |

*Data source*:

Data from the Katherine region are misleading, in that almost the entire business return was driven by rising land prices due to the proximity to Darwin. Return on Assets (ROA) was very low.

In summary, the data presented show that northern beef businesses supplying the LET:

- Can only just cover operational expenses from income.
- Have negative cash flows after capital expenditure commitments are met
- Cannot fund finance costs, including bank interest.
- Pay no tax
- Have no capacity to retire debt principal
- Do not meet their cost of capital
- Have no capacity to fund future liabilities

The majority of beef businesses in these regions are living off eroding equity and have been doing so for some time. This is a slippery slope. As a general statement, the average farm business anywhere in Australia cannot afford to let equity slip below around 85% for too long. Banks will never be concerned at the 85 per cent level; the real issue is that the average business performance does not provide sufficient surplus cash for all the other funding requirements, after 15 per cent debt has been serviced, just at the interest only level.

Northern beef businesses not only have weaker business performance and cash flows, their equity averages 81 per cent. This is unsustainable. If this situation is not addressed, equity will eventually erode to the point where a forced sale is mandated by the bank. This process can take anything up to 60 years to reach the end point. The process is slow and insidious and can be delayed by off-farm income, increasing land prices in nominal terms and a prolonged run of favourable conditions. Nevertheless, it is relentless if the business fails to meet the minimum standards described here.

Herd specific performance is now shown in Table 21, Table 22 and Table 23 on a per AE basis:

Table 21 **Beef Herd Income per AE**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| Gross sales | $78 | $74 | $124 | $92 |
| Inventory change | $26 | $12 | ($18) | $7 |
| Income | $104 | $87 | $106 | $99 |
| Enterprise expenses | $49 | $24 | $34 | $36 |
| Gross margin | $55 | $63 | $72 | $63 |
| Overhead expenses | $43 | $65 | $69 | $59 |
| Ebit | $11 | ($2) | $4 | $4 |

*Data source*: Holmes and Co

Table 22 **Beef Herd Cash flow per AE**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| Gross sales | $78 | $74 | $124 | $92 |
| Purchases | $26 | $10 | $15 | $17 |
| Enterprise expenses | $49 | $24 | $34 | $36 |
| Overhead expenses | $28 | $47 | $53 | $43 |
| Cash flow | ($26) | ($6) | $22 | ($3) |

*Data source*: Holmes and Co

Table 23 **Beef Herd Key Performance Indicators**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| Price Received/Kg Beef | $1.65 | $1.43 | $1.45 | $1.51 |
| Cost of Production/Kg Beef | $1.23 | $1.05 | $1.28 | $1.19 |
| Operating Margin/Kg Beef | $0.42 | $0.38 | $0.18 | $0.32 |
| Gross $/Head Sold | $537 | $435 | $441 | $471 |
| Kg Beef/AE | 79.8 | 82.0 | 86.4 | 82.7 |
| Kg Beef/Head Sold | 330 | 306 | 303 | 313 |
| AE/Labour Unit | 3,219 | 2,348 | 1,256 | 2,274 |
| Enterprise Size (Annual Avg AE) | 5,241 | 14,464 | 11,432 | 10,379 |

*Data source*: Holmes and Co

The above 3 tables describe the beef herds in the far north for those businesses supplying the LET. While these data are interesting, they are less than helpful unless referenced to some universal benchmarks consistent with achieving economic sustainability at the whole business level. For this to happen, a primary target needs to be achieved in the long-term.

EBIT/AE needs to exceed $40.

Assuming a herd size of around 10K AE, an EBIT/AE of $40 would result in a whole business EBIT of $400K. As previously stated, the average interest liability is $118K, leaving $272K pre-tax. After tax this would be close to $190K. When annual capital expenditure of $133K is deducted from this, the balance is $57K. If all of this was allocated to debt principal repayment, the debt would take 26 years to retire, with no capacity for provisioning for future liabilities. Clearly $40 EBIT/AE is the minimum requirement, which will rise for smaller herds and fall for larger herds.

All other herd specific KPI's are derived from, or contribute to, EBIT/AE and provide diagnostic information on either absolute expenses or kilograms produced. A detailed explanation of how to use these to diagnose the status of the herd goes beyond the terms of reference of this report, but some broad comments can be made

If absolute expenses are an issue, they are almost always related to poor labour efficiency. Labour related expenses have long tentacles through the cost structure of the business, because too many staff generally means too many other material things that either depreciate or cost something to operate, like motor vehicles and motor bikes. That is why labour efficiency is always considered a major KPI. The current benchmark in this area is that one full-time labour unit should be able to manage 2,300AE. This equates to 800 breeders and all followers. Although this benchmark is threatening to many businesses, it is based on what the top 20% are achieving and is therefore do-able, provided there are no serious constraints imposed by the geography of the property. Labour efficiency can be optimised by simplifying the production system and eliminating non-productive practices. Labour saving infrastructure, like stock laneway systems, is also very important.

If the cost of production is uncompetitive it is almost always a function of too few kilograms being produced. Labour efficiency aside, around 80% of the operating expenses of a northern beef business are fixed and are unresponsive to pruning. The remaining discretionary expenses are generally related to the herd and, as many of these have some productivity implications, any attempt at pruning is generally counter-productive. The emphasis therefore should be on the kilograms produced, rather than the cost of doing so. It is almost impossible to achieve a $40 EBIT/AE unless the cost of production is less than $1/Kg live weight.

Additional KPI's have been collected for the far north. These KPI's have been deemed critical to any analysis aimed at improving productivity in these regions and are presented in Table 24:

Table 24 **Beef Herd Additional KPI's**

| | Katherine | Kimberley | Pilbara | Average |
|---|---|---|---|---|
| Weaning % | 45.9% | 50.9% | 58.7% | 51.8% |
| Mortality % | 4.5% | 9.8% | 5.2% | 6.5% |

*Data source*: Holmes and Co

Some care needs to be taken when interpreting the KPI's in Table 24. Weaning and mortality percentages are difficult to collect accurately. Weaning percentage can be contributed to from cleanskins born the year before and there is always a reasonable level of uncertainty as to how many cows were mated to produce those weaners. Mortality percentage is always the balancing item in the livestock trading account and is therefore a derived figure.

The data in Table 24 should therefore be regarded as a guide only. As more accurate data are collected over time, it is likely that the mortality percentage will increase. It is important to state all this, because these KPI's are used as assumptions in the analysis to follow. Weaning percentage is most likely to be the most accurate figure in Table 24 and has the most reliance put on it in the assumptions.

In summary, the principal factors conspiring against economic sustainability for businesses supplying this trade are:

- Geographically, the bulk of this trade is supplied from a band of country extending about 400 km inland from the coast, from the Pilbara to Cape York. This is high rainfall country, where the soils are heavily leached and nutrient poor. For reasonable herd productivity to be achieved, heavy expense in herd supplementation is required, and this expense is one of the contributors to an uncompetitive cost of production.
- Again geographically, this band of country, with its inherent profile of heat, humidity, poor nutrient status, cattle tick and buffalo fly, requires a high component of Brahman genetics in the herd for survival purposes. As there is a trade-off between survival and production, production is less than optimal.
- The specifications of the trade demand the production of lighter animals. This has significant implications for herd structure, particularly the fact that this type of herd requires a large number of breeders to produce the kilograms sold. As most of the herd expenses are directed towards breeders, herd costs are higher and the kilograms sold are insufficient to cover those costs and produce the cash flows needed to fully fund operations into the future.

Additional assumptions for the analysis are being drawn from Central Australia and the key data employed for this purpose are presented in Table 25 and Table 26:

Table 25 **Central Australia Beef Herd Income**

| Central Australia Beef Herd Performance Per AE | |
|---|---|
| Gross sales | $123 |
| Inventory change | ($15) |
| Income | $107 |
| Enterprise expenses | $21 |
| Gross margin | $87 |
| Overhead expenses | $56 |
| Ebit | $31 |

*Data source*: Holmes and Co

Table 26 **Central Australia Beef Herd KPI's**

| Central Australia Beef Herd Key Performance Indicators | |
|---|---|
| Price Received/Kg Beef | $1.40 |
| Cost of Production/Kg Beef | $0.93 |
| Operating Margin/Kg Beef | $0.47 |
| Gross $/Head Sold | $549 |
| Kg Beef/AE | 91.0 |
| Kg Beef/Head Sold | 383 |
| AE/Labour Unit | 1,911 |
| Enterprise Size (Annual Average AE) | 8,226 |

*Data source*: Holmes and Co

These Central Australian data have been selected to assist with this analysis for the following reasons:

- They are available
- They are representative of a production system that aims at a higher turnoff weight, with fewer breeders being run
- They are drawn from an extensive rangeland production system, where many of the features and constraints are common to regions farther north

It is important to understand that the Central Australian data represent 12 years of actual performance, seven of which were significantly influenced by one of the worst droughts in living memory. Droughts of this magnitude have a statistical frequency of 30 years, so one needs to consider whether the performance of the Central Australian herds needs to be taken as read, or inflated to compensate for this extraordinary drought.

### 5.7.6 Analysis

Implicit in this analysis is that both stocking rate and carrying capacity will remain constant between options. This means that significant changes in herd structure result. For example, if the male portion of the natural increase is retained for an older and heavier turnoff, breeders will have to be sold to create room for growing out. As a general guide, one breeder will need to be sold for every two male weaners retained beyond yearling age.

This change in herd structure has significant implications, because the majority of the herd expenses are directly proportional to the number of breeders being run. In other words, most of these direct expenses are incurred by the presence of the breeders. So, if the age and weight of turnoff is increased, fewer breeders are being run to produce more kilograms of beef. Absolute direct expenses will fall and some of the overhead expenses will also fall, because breeders are more labour-intensive. When this new cost structure is applied to additional kilograms produced, a fall in the cost of production is inevitable.

For businesses considering other markets, a systematic appraisal of the following factors should be made initially:

- Availability and suitability of country to grow cattle out to heavier sale weights if required, taking into account growing season potential.
- Changes in herd structure and the potential need for additional infrastructure, particularly all-weather access facilities.
- Genetic composition of the herd.
- Distance to markets.

Some businesses will be able to tick all 4 of these boxes, but many will not and will have no choice but to maintain a dominant or exclusive reliance on the LET. For these businesses, it will be necessary to make a serious attempt to improve the efficiency of operations for the reasons discussed above. Two options will be examined to contrast with the base model of the existing LET:

- **Option 1**. Change the target market to feeder steers in the south or east.
- **Option 2**. Supply a local killing works.

### 5.7.7 The contribution of surplus female sales

The assumptions above are male progeny based, but one of the biggest issues in the profitability in commercial beef herds anywhere is the contribution to revenue made by surplus female sales; in fact, it is the super-profit because male progeny sales are generally equal to total operating expenses. In theory, and in a perfect world, they should be roughly 50% because that is the gender split at birth. However, most females are retained for many years in a self-replacing herd and the attrition rate (deaths and culling for various reasons),

erodes the 50% theoretical maximum. In well managed southern temperate herds, the figure is close to 40%. In the north, in the long-term, it ranges from 0-20%. The difference between north and south is a function of the difference in weaning and breeder mortality rates. The market options for surplus female sales are also a big issue. In the south, blue ribbon special female sales and producer/producer sales, allow many businesses to capture premiums. Surplus females can also be sold into slaughter markets but often at a slight discount to steers.

In the north, especially since the 350 kg weight cap was imposed, there may be no market options for the surplus females. This reduces the incentives to reduce cow mortality rates, increase cow turnover (cull at 7-8 years or when fertility and calf rearing rates begin to fall). At present, average cow death rates in northern herds are about 10 to 13 per cent, which means that there are few if any surplus females to sell from the herd each year.

A lack of markets for females is further exacerbated by the LET restriction on pregnant females. This means that where surplus females may be available to sell, they must be accompanied by an authorised veterinarian certificate stating the cow has been assessed and is not in calf.

For any serious analysis of the contribution of surplus female sales, there are 2 given assumptions:

- The fertility and breeder mortality KPIs of the herd must be able to produce surplus females in the first place.
- A market outlet (preferably local) must be there to accept them.

The impact of this issue is large and the modelling is complex and falls outside the scope of this report. Firstly, it takes time and expense to improve the KPIs for the surplus females to be there and the details of the local killing works in relation to females has to be known. All that can be meaningfully said on this issue is that it has more potential to produce outcomes that are significantly more favourable, than almost any other factor.

The assumptions that could be used for this analysis are potentially infinite, but the changes used for male progeny are as follows, keeping all other assumptions constant:

### Option 1: Feeder steers

| | |
|---|---|
| Male progeny sale weight: | 320 kg |
| Male progeny sale price/kg: | $1.65 |
| Age at sale (years) | 2+ |

### Option 2: Killed locally

Male progeny sale weight: 400 kg
Male progeny sale price/kg: $1.45
Age at sale (years) 3+

The results are shown in Table 27:

Table 27 **Cohort 1 - Other markets available. Options 1-2**

| | Base (LET) | Option 1 | Option 2 |
|---|---|---|---|
| | Per AE | Per AE | Per AE |
| **Gross Profit** | $98.82 | $96.62 | $97.57 |
| **Enterprise Expenses** | | | |
| **Animal Health** | $3.94 | $3.57 | $3.25 |
| Mustering | $9.01 | $8.17 | $7.42 |
| Selling Costs | $10.38 | $12.46 | $9.34 |
| Supplements | $12.18 | $11.61 | $11.07 |
| Total | $35.51 | $35.81 | $31.08 |
| **Overhead Expenses** | | | |
| Administration | $7.31 | $7.31 | $7.31 |
| Depreciation | $6.70 | $6.70 | $6.70 |
| Fuel & Lubricants | $7.69 | $6.97 | $6.34 |
| M/Vehicle Expenses | $3.97 | $3.60 | $3.27 |
| Rates & Rents | $1.75 | $1.75 | $1.75 |
| R & M General | $7.27 | $6.59 | $5.99 |
| Wages | $24.22 | $21.96 | $19.96 |
| Total | $58.91 | $54.88 | $51.31 |
| **Total Expenses** | $94.42 | $90.68 | $82.39 |
| EBIT | $4.40 | $5.94 | $15.18 |
| | | | |
| **Total AE** | 10,000 | 10,000 | 10,000 |
| **Total Breeders** | 4,600 | 4,062 | 3,588 |
| **Total Weaners** | 2,300 | 2,031 | 1,794 |
| **Net male weaners** | 1,075 | 950 | 839 |
| **Age of turnoff** | 1 | 2 | 3 |
| **Average male sale weight(kg)** | 284 | 320 | 400 |
| **Average $/kg price** | $1.51 | $1.45 | $1.34 |
| **Weaning rate** | 50% | 50% | 50% |
| **Death rate** | 6.5% | 6.5% | 6.5% |

*Data source: Holmes and Company*

Transport costs are included in the selling cost line under enterprise expenses. The transport costs include the net difference between transporting the cattle to south or east (deducting the LET transport costs). This line also includes

cattle-selling-agent fees. Where cattle are sold into domestic markets they can, and often are, sold direct to processors, avoiding agents' fees. Where agents are involved, the non-LET agents' fees appear to be lower, due to increased competition from the numerous domestic agents operating in this market.

Transport costs play an important role in access to alternative markets in Northern Australia. However, transport costs are often offset by the heavier weights of animals being delivered to domestic slaughter markets.

For the sake of simplicity, it is assumed in the above analysis that the inventory change in the herd is zero and therefore the gross profit figure is essentially the cash flow calculation of sales minus purchases. No account has been taken of the fact that in the two alternative market options, fewer breeders will be run and the likelihood of their weaning and death rates improving is quite good.

The above analysis and the outcomes presented should be reasonably transparent. They reinforce the principle explained earlier, that changes in herd structure can result in more saleable beef being produced per breeding unit. This can be achieved by:

- Growing steers out on property displacing breeders
- Maintaining breeding herd but retaining steers to higher live weights, through transferring to grow out properties or contract feedlotting

There are of course many combinations of the two strategies above, but the common constraint is access to markets that accept higher live weight cattle. This not only increases the gross revenue produced from the male progeny of the herd but also is likely to have a significant positive effect on business profitability, by increasing the value of surplus females, which under an LET have no value.

Increasing saleable meat per cow has a profound impact on the end result. In the analysis presented, most of the expense reduction associated with running fewer breeders has been done on a simple pro-rata basis. Taking the expenses a line at a time with fewer breeders being run:

### Enterprise Expenses

- Animal health costs will fall because there will be fewer ear tags, vaccinations, castrations, etc.
- Mustering costs will fall because there will be fewer breeders to muster and the growing animals will be mustered less often.
- Selling costs will rise, mainly as a function of the increased distance to alternative markets. This is offset to some degree by the fact that there are more opportunities to sell direct into these markets, therefore reducing commission.

- The cost of supplements will fall, because the breeders consume most of these. Growing animals still require supplements, but at a much lower level.

**Overhead Expenses**

- Administration will not change.
- Here, depreciation has been set as unchanged, even though, in practice, it may do so. Vehicles and bikes will be used less with fewer breeders, thus increasing useful economic life. However, the changes are likely to be small.
- Fuel and motor vehicle expenses will fall with fewer breeders. This is mainly a function of the frequency of bore runs and stock movements.
- R & M will fall, mainly as a function of less vehicle, plant and equipment use. It can be argued that there will also be less pressure on infrastructure.
- Wages are problematic and the perfect world case has been presented. The calculations are easy if one labour unit is being shed. However, if fewer breeders result in the need for 0.4 fewer labour units, for example, it is not so easy. In reality, in this example, the surplus labour would probably be retained.

All of this is reinforced by cross checking with the Central Australian data, where the end product is bullocks destined for slaughter. All the major KPI's are significantly superior and it is almost exclusively a function of the higher turn off weight and associated herd structure change.

It is apparent that the differences between option outcomes are large, relative to the base case. The analysis was based on the average of aggregate data for the entire live export region. To add perspective on a regional basis, the following comments are provided:

- The Pilbara would have difficulty in matching the outcomes in the model because of the inherent climate risk.
- The Kimberley would also have difficulty, but more so because of the lower productivity of the country and distance to markets.
- The top end of the Northern Territory should have no difficulty in emulating or exceeding the analysis results.
- The Gulf country of Queensland would not be far behind the top end NT performance, before capital expenditure. In this region, some management intensification involving capital expenditure would be necessary to achieve the model outcomes.

### 5.7.8 Summary

The key issue here is that lot of the country supplying the LET is poorly productive, which mandates a cattle breeding choice that is also poorly productive for the sake of survival, although the extent this holds true needs to be tested further. At present, there is no incentive to test this as the LET

market specifications demand the sale of a light animal. The combination of these two factors makes it very difficult to achieve a level of profitability that will ensure economic sustainability in the long-term. Perversely, the current LET crisis may bring this situation into a sharper focus through the analysis of alternative market options.

A report prepared by McCosker, McLean and Holmes (2010), highlighted the effect the LET and the 350kg weight restriction is having on Northern beef producers:

> The region supplies the live export trade for cattle exclusively and this trade has the potential to constrain profitability unless producers are aware of the issue. The restraint comes from the fact that the preferred animal is light and when cattle are sold much below 350kg, the cost of production is rendered uncompetitive through too few kilograms being produced.

Each alternative market option analysed in this report produces a better bottom-line result than the status quo.

For any reasonable level of adoption of more attractive alternative markets, businesses need to understand the implications that a change in herd structure has on potential profit and, particularly, how it is mediated through a change in cost structure. The current mindset of most businesses is dominated by price received and it is particularly difficult for them to understand why it may be more profitable to retain an animal that can be sold now for $2.00/kg live weight and sell it a year or two later for $1.50/kg. There also has to be a deeper understanding of how critical the reproductive rate is in a beef production system.

# 6 The financial viability of a northern Australian beef processing industry

## 6.1 Feasibility of establishing a Northern beef abattoir

A report was published by the RIRDC in November 2010, which was a pre-feasibility assessment of a Northern Western Australian beef abattoir. The findings were that while it would be beneficial to beef producers, it almost certainly would not be financially viable and would require ongoing government support.

The key factors that affected the viability of the abattoir were:

- A minimum efficient scale of at least 400 head per day

- The live export trade is a low-cost competitor to Australian processed meat; if an abattoir were built, the surrounding industry would need to commit to the processing alternative to keep capacity utilisation high
- Seasonal supply factors present a challenge for ensuring efficient utilisation of an abattoir
- Agistment (and other supply chain elements) should be considered as a pre-requisite for an abattoir
- Live export customers may not be able to adjust as quickly as the strategy would require

### 6.1.1 Key facts

The study provided the following useful information and observations:

- An abattoir in the Kimberley region, producing 400h/d, would have a capital cost of $33.85m (+/- 30%) plus land costs (land + access)
- To generate ongoing cost-effectiveness for producers, there would need to be competition offered at the abattoir; for example, through more than one processor operating separate boning rooms in a common facility under a "service kill" model
- Mothballed plants in Katherine and Batchelor were considered for re-opening
- Financial data at the end of the report will be put into a spreadsheet and different scenarios will be analysed.

Using the RIRDC report as guide, ACIL Tasman produced a detailed financial model of a northern beef processing plant. The following sections describe the model and the results of some assumptions regarding size, cattle and beef prices and seasonality of supply.

## 6.2 Northern Australia Abattoir Feasibility Model

For the assessment of the financial and economic viability of an abattoir in Northern Australia, ACIL Tasman constructed a financial model of an abattoir. The base assumptions (capital expenditure, useful economic lives of assets, labour costs per day, other operational expenditure costs) were broadly sourced from the 2010 costs set out in the Rural Industries Research and Development Corporation report: "Feasibility of Establishing a Northern Western Australian Beef Abattoir" (RIRDC Publication No. 10/214, November 2010).

The sales model of the abattoir in the Rural Industries Research and Development Corporation (RIRDC) report was a contracted kill in which there was a cost-plus formula, which determined the revenue of the business. This cost-focused model ensures that there is a gross profit on each sale and some

contribution to the fixed costs of the business. However, cost-plus pricing does not maximise the profitability of the business, and it may set a price that no cattle producer is willing to pay – given a live export alternative. Demand, price and cost risk in the RIRDC model remains with the cattle producers.

ACIL Tasman's financial model sets the abattoir owner as the risk taker, buying in live cattle and selling processed meat onto the world market. There are more risks in this type of model – that the price for processed meat may be low in comparison to costs, that the price of live cattle may be high, and that seasonality may mean that the facility is under-utilised for significant periods of time.

This means that the required rate of return from the facility would need to include a substantial risk premium, to adequately compensate those that contribute the capital for the risks incurred. Managing some, or all, of these risks, particularly those stemming from Indonesian trade policy, would reduce the risk premium required and make a Northern beef processing plant more attractive as a commercial investment.

## 6.3 Key Assumptions

### 6.3.1 Inflation

The RIRDC model was in 2010 prices. ACIL Tasman has adjusted all figures to money of the day, to enable financial modelling. The inflation rates assumed were:

Table 28 **Inflation indices**

| | CPI | Agricultural output price changes | Labour cost changes | Capital cost changes |
|---|---|---|---|---|
| 2011 | 3.6% | 13.6% | 4.0% | 1.8% |
| 2012 and ongoing | 2.9% | 3.0% | 3.0% | 2.9% |

Data source: *ACIL Tasman assumptions*

### 6.3.2 Capital expenditure

ACIL Tasman sourced the non-land capital costs from the RIRDC model, and applied a factor of 0.75; this represents capital efficiencies in scaling-up the production capacity of the plant from the 400 head per day assumed in the RIRDC report. For example, where the capacity is 400 head per day, the capital costs are the same as the RIRDC estimate. A capacity of 800 head per day incurs a capital cost 75% higher than the RIRDC estimate and a capacity of 200 head per day incurs a capital cost 37.5% lower (50% *0.75) than the RIRDC estimate.

Box 1 **Capacity**

Nominally the model has been set to a capacity of 1,000 head per working day. As part of ACIL Tasman's modelling, the optimum capacity has been calculated but the economies of scale mean that for capacity more is better. The main determinant of the optimum capacity is the availability of sufficient live cattle, and the capital cost – influenced by the scaling factor of 0.75. In reality, there are no abattoirs much larger than 1,200 head per day – labour shortages and other factors would come into play. The maximum capacity has therefore been set at 1,000 head per day. This means that the optimum capacity is always at this limit, provided there are sufficient live animals available to utilise this capacity.

Depreciation has been calculated on a straight line basis over the useful economic lives (UELs) of the assets. These UELs were sourced from the RIRDC report. Land is not depreciated.

Table 29 **Useful Economic Lives of assets**

| Asset class | UEL (years) |
|---|---|
| Infrastructure | 25 |
| Building works | 25 |
| Process Equipment | 15 |
| Services | 10 |
| Other assets | 3 |
| Capitalised Major periodic maintenance | 5 |

*Data source*: ACIL Tasman estimates

The net assets of the business have been estimated as:

Table 30 **Net Asset Table ($'000s, MOD)**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Land | $4,123 | $4,123 | $4,123 | $4,123 | $4,123 | $4,123 | $4,123 | $4,123 | $4,123 | $ 4,123 | $4,123 |
| Infrastructure | $ 0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Building works | $20,343 | $19,495 | $18,648 | $17,800 | $16,952 | $16,105 | $15,257 | $14,410 | $13,562 | $12,714 | $ 11,867 |
| Process Equipment | $16,469 | $15,292 | $17,375 | $15,966 | $18,871 | $17,154 | $15,436 | $13,719 | $12,002 | $10,285 | $8,567 |
| Services | $9,350 | $8,311 | $7,272 | $6,233 | $5,195 | $4,156 | $3,117 | $2,078 | $1,039 | $0 | $12,444 |
| Capitalised MPM | $1,319 | $989 | $660 | $330 | $ 0 | $ 1,522 | $1,141 | $761 | $380 | $0 | $1,756 |
| Net Book Value | $51,604 | $48,211 | $48,078 | $44,452 | $45,141 | $43,059 | $39,074 | $35,090 | $31,106 | $27,122 | $38,757 |

*Data source*: ACIL Tasman estimates

### 6.3.3 Labour Costs

#### Unit rates

Labour unit costs have been sourced from the RIRDC report, and updated to money of the day values. The average staff cost in 2012 was:

Table 31 **2012 Pay rates**

| Personnel | Annual wage |
|---|---|
| Slaughter staff | $53,554 |
| Boning room | $53,554 |
| Maintenance | $58,909 |
| Administration | $74,976 |
| Inspectors | $74,976 |
| On-costs | 39% |

*Data source*: ACIL Tasman estimates

#### Staff numbers

Adjustments were made to the number of administrative and maintenance staff to reflect the capacity of the facility (in the same way that asset cost was increased). A "scaling factor" of 0.85 was used to estimate economies of scale – at larger capacities the abattoir will have a higher degree of automation and less labour will be required per unit of output.

Staff numbers reflect both the capacity and also the utilisation of the facility. Staff numbers for different roles were varied to reflect capacity and seasonal conditions – using the factors stated in Table 32: Personnel types were classified as variable, semi-variable and fixed. At 50% plant utilisation 100% of the fixed staff would be employed, 75% of the semi-variable staff and 50% of the variable staff.

Table 32 **Flexibility of staff numbers**

| Staff type | Variability | Scaling factor |
|---|---|---|
| Slaughter staff | Semi-Variable | 0.5 |
| Boning room | Semi-Variable | 0.5 |
| Maintenance | Semi-Variable | 0.5 |
| Administration | Fixed | 0 |
| Inspectors | Variable | 1 |

*Data source*: ACIL Tasman estimate

Overall, labour costs depend strongly on the utilisation of the plant, with the annual cost shown in the section on Profit and Loss (P&L), 6.5.6 on page 76.

### 6.3.4 Live cattle

The annual production of suitable live cattle is assumed to be 550,000 head per year. Live cattle have been assumed to weigh a minimum of 400 kg and beef cattle are priced at $1.34 per kg in the base case –nine per cent of cattle are assumed to be heifers and they are priced at $1.20per KG and 19 per cent of cattle are expected to be older cattle priced at $1.10 per KG. The weighted average live cattle cost is $1.34 per kg or $536 per animal. Prices are based ex-farm gate.

The model has been tested for its sensitivity to both the weight and price assumptions. The results of the model are very sensitive to the price of live cattle.

The carcass weight is dependent on the live weight. If the live weight is below 400Kg, the dressing percentage is 48%[6], otherwise it is 52%. The meat yield from a carcass (after it has been dressed) has been assumed to be 70%.

### 6.3.5 Transport cost

The model has been tested with a range of transport costs, including a cost of $0.0981 per net tonne kilometre, based on the costs of moving freight by B-Double between Melbourne and Brisbane – B-triples and road trains would be more efficient than this. The actual delivery costs will depend on the eventual location, proximity to port and supporting infrastructure.

### 6.3.6 Other costs

Legal and statutory costs, as well as utilities, are expected to cost approximately $1.6 million per annum.

On review of the model it was determined that using the RIRDC report as a basis for the costs of the abattoir, may be understating the fixed cash costs of the business. Marketing costs, buyers, distribution and other overheads represent 13% of total costs for the industry, according to the IBISWorld report "Meat Processing in Australia", dated April 2009; whereas these were very low in the RIRDC report. Accordingly, other expenses of some $6.8 million have been included in the model as fixed costs.

Interest costs are scenario dependent (for example, the level of initial debt funding or the level of cash generated by the business), using a nominal

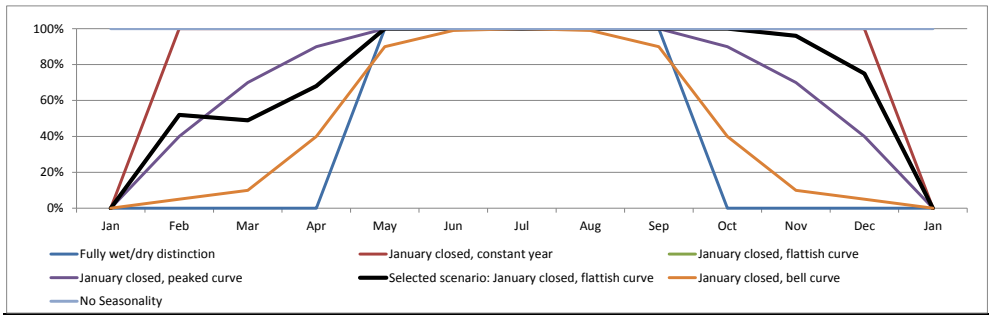
[6] Dressing percentage is the weight of the carcass as a proportion of the live weight of the animal after the internal organs, hide and head have been removed. The meat yield is the amount of meat able to be removed from the carcass after it has been dressed, expressed as a proportion of the carcass weight.

interest rate of 10% per annum for long-term debt, 12% per annum for short-term debt and 5% per annum for positive cash balances.

### 6.3.7 Seasonality

The abattoir is subject to the seasonal availability of live cattle and at certain times of the year the plant will suffer reduced utilisation. The modelled scenarios are shown in Figure 10.

Figure 10 **Seasonality profile (% of maximum capacity each month)**




*Data source:* ACIL Tasman assumption

ACIL Tasman has modelled a variety of seasonal scenarios. They affect the utilisation of the plant and thus profitability. The seasonality also interacts with the optimum level of capacity and ACIL Tasman is testing the extent to which the two interact.

The selected scenario (represented by the bold black line in Figure 10) is based on the seasonal variation experienced by the live export market. That is, the same monthly percentages of total live exports from the North Australian ports was applied to the total number of cattle processed by the facility modelled in this section.

### 6.3.8 Revenue

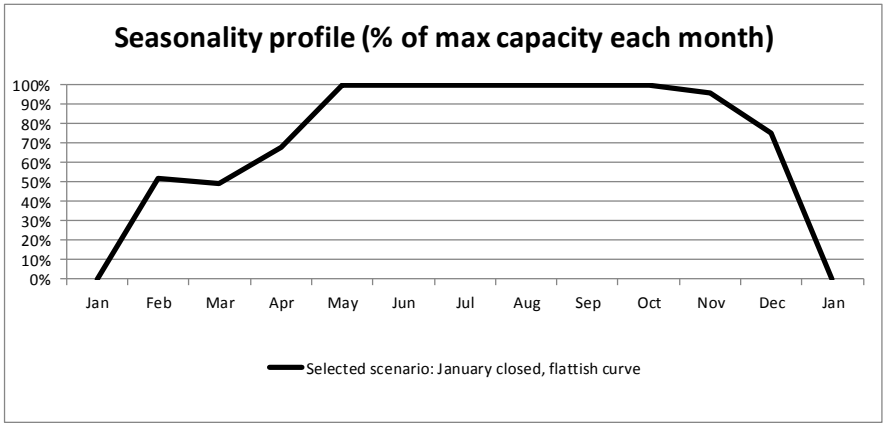
Revenue is based on the prevailing world price for processed meat; in the base case this is assumed to be $4.55 (weighted across the carcass) per kilogram FOB. The profitability of the business is very sensitive to this assumption. The revenue of the business is also potentially limited by the availability of live cattle (seasonality, or more generally by lack of adequate supply) and the scale of the initial investment in capacity.

## 6.4 Summary of results

The results on the next page show the NPV and IRR for the model under the key assumptions described above. The following section discusses the sensitivity of the model to changes in these assumptions.

Table 33 **Summary of assumptions and results**

| **Cattle seasonality** | **Jan** | | **Feb** | **Mar** | **Apr** | **May** | **Jun** | **Jul** | **Aug** | **Sep** | **Oct** | **Nov** | **Dec** | **Jan** | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Selected scenario: January closed, flattish curve | | 0% | 52% | 49% | 68% | 100% | 100% | 100% | 100% | 100% | 100% | 96% | 75% | 0% | |
| Percentage of total | | 0% | 6% | 5% | 7% | 11% | 11% | 11% | 11% | 11% | 11% | 10% | 8% | 0% | |
| **Per company** | | | | | | | | | | | | | | | |
| **Capex** | | | | | | | | | | | | | | | |
| Total capex cost | $ | 81.03 | Million | | | | | | | | | | | | |
| Maximum abattoir capacity | | 1,000 | | | | | | | | | | | | | |
| Abattoir capacity | | **1,000** | Head per day, 220 days max | | | | | | | | | | | | |
| Scaling factor for capex | | 0.75 | For a 100% increase in capacity capex would increase by 75 percent | | | | | | | | | | | | |
| Equity Investment | $ | 54.38 | Million | | | | | | | | | | | | |
| Average gearing 2012-2022 | | 0.3% | | | | | | | | | | | | | |
| | | | **Average** | | | | | | | | | | | | |
| **Input costs** | | **2012** | **2012-2022** | | | | | | | | | | | | |
| Cattle available for slaughter | | 550,000 | 550,000 | | | | | | | | | | | | |
| Cost per kilo ($/Kg MOD) | $ | 1.36 | $ 1.58 | | | | | | | | | | | | |
| Average live weight | | 400 | 400 | | | | | | | | | | | | |
| Dressing percentage | | 52% | 52% | | | | | | | | | | | | |
| Yield | | 70% | 70% | | | | | | | | | | | | |
| Meat per head (Kg) | | 145.6 | 145.6 | | | | | | | | | | | | |
| Transport costs per NTK meat | $ | 0.0920 | | | | | | | | | | | | | |
| **Revenue Assumptions** | | | | | | | | | | | | | | | |
| Weighted meat price/Kg | $ | 4.55 | | | | | | | | | | | | | |
| **Other assumptions** | | | | | | | | | | | | | | | |
| WACC (nominal Vanilla) | | 10.56% | | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| **For investment in 1 company** | | | | | | | | | | | | | | | |
| IRR | | 11.98% | | | | | | | | | | | | | |
| NPV | $ | 26.6 | Million | | | | | | | | | | | | |




*Data source*: ACIL Tasman estimates

It should be noted that this financial model has been prepared, not to provide a definitive statement of the financial viability of a processing facility, but to explore key sensitivities, and to test, under a set of assumptions, if a facility could produce a competitive rate of return for investors.

The model was also constructed to explore the key sensitivities of meat processing, and how they are affected by the Northern beef production characteristics. Ultimately, the model has provided some insights into why a facility does not operate servicing the Northern beef industry and how some of the constraints on the building of a facility could be addressed.

## 6.5 Sensitivity of results

The financial results of the abattoir are most sensitive to its capacity, and particularly the key costs, such as labour and cattle purchases.

The metrics used to measure the effect of sensitivities is the NPV of cash flows, discounted by a Nominal Weighted Average Cost of Capital (WACC) of 10.56%. The impact of parameters on the project IRR has also been reported.

### 6.5.1 Economies of scale

Since there are economies of scale in both labour and capital costs, the sensitivity of the results to the capacity of the abattoir is important. Table 34 shows that a plant with a 600 head per day capacity has a NPV of minus $19.3 million. The maximum capacity has been set at 1,000 head per day due to potential constraints on the availability of cattle.

Table 34 **Sensitivity of results to production capacity**

| | NPV (10.56% Vanilla WACC) | IRR |
|---|---|---|
| 0 | $(281.3) | -100.00% |
| 200 | $(185.9) | -100.00% |
| 400 | $(90.5) | -100.00% |
| 600 | $(19.3) | 0.50% |
| 800 | $4.2 | 8.37% |
| 1000 | $26.6 | 11.98% |
| 1200 | $26.6 | 11.98% |

*Data source:* ACIL Tasman

The sensitivity shows that by increasing the capacity of the abattoir, efficiencies of scale can be obtained and the marginal profit per animal creates a greater contribution to fixed costs. The key drivers of these results are:

- The profit per head slaughtered
- The overall level of capital costs
  - – and how capital costs scale with capacity

### 6.5.2 Cattle weights

The plant is highly sensitive to the live weight of the animal. This is one of the most important variables of the plant. A 12.5 per cent increase in the live weight of the animal (400 to 450 kg lwt) doubles net return of the plant.

Table 35 **Sensitivity to live weight**

| | NPV (10.56% Vanilla WACC) | IRR |
|---|---|---|
| 300 | $(108.3) | -100.00% |
| 350 | $(49.1) | -7.65% |
| 400 | $26.6 | 11.98% |
| 450 | $51.3 | 15.29% |
| 500 | $76.0 | 18.03% |
| 550 | $100.6 | 20.40% |

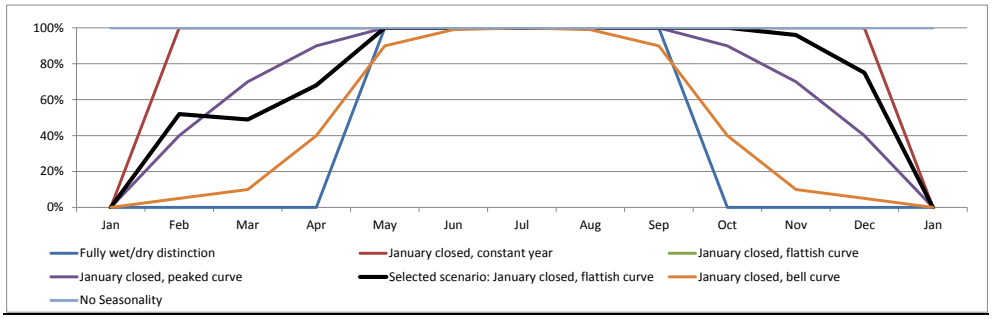
*Data source:* ACIL Tasman

### 6.5.3 Seasonality profile

The abattoir would be subject to seasonal availability of cattle, and unless there is sufficient supporting infrastructure near the abattoir, it is possible that operations could be severely affected during the wet season of October to April.

A number of different seasonal profiles were modelled, with different levels of utilisation per month under each scenario. These profiles are shown in Figure 11:

Figure 11 **Seasonality profiles modelled**




*Data source:* ACIL Tasman estimates

The extent to which seasonality affects the profitability is shown in the sensitivity table below:

Table 36 **Sensitivity of results to seasonality**

| | NPV | IRR |
|---|---|---|
| Fully wet/dry distinction | $(106.1) | -100.00% |
| January closed, bell curve | $(1.7) | 7.06% |
| January closed, flattish curve | $26.6 | 11.98% |
| No Seasonality | $33.9 | 13.01% |

*Data source:* ACIL Tasman

The presence of fixed cash costs throughout the year (notably "Other" costs, which represent 5.5% of cash costs) means that there is higher profit when the abattoir can operate evenly throughout the year. If capacity were not constrained to 1,000 head per day, and if fixed costs were not significant to total costs, then the abattoir would find it financially advantageous to operate only at peak periods – opening when high utilisation can be guaranteed.

The table below shows the relationship between capacity and seasonality:

Table 37 **Sensitivity of results to seasonality and production capacity**

| NPV | Capacity (head/working day) | | | | | | |
|---|---|---|---|---|---|---|---|
| | **$-** | **200** | **400** | **600** | **800** | **1000** | **1200** |
| Fully wet/dry distinction | $(274.3) | $(240.6) | $(207.0) | $(173.4) | $(139.7) | $(106.1) | $(106.1) |
| January closed, bell curve | $(275.7) | $(172.3) | $(84.1) | $(25.7) | $(12.9) | $(1.7) | $(1.7) |
| January closed, constant year | $(283.9) | $(192.1) | $(100.3) | $(23.8) | $(0.7) | $20.8 | $20.8 |
| January closed, flattish curve | $(281.3) | $(185.9) | $(90.5) | $(19.3) | $4.2 | $26.6 | $26.6 |
| January closed, peaked curve | $(280.7) | $(184.4) | $(88.1) | $(18.1) | $5.7 | $28.4 | $28.4 |
| No Seasonality | $(285.6) | $(183.4) | $(81.3) | $(14.8) | $9.9 | $33.9 | $33.9 |
| IRR | Capacity (head/working day) | | | | | | |
| | **$-** | **200** | **400** | **600** | **800** | **1000** | **1200** |
| Fully wet/dry distinction | -100.0% | -100.00% | -100.00% | -100.00% | -100.00% | -100.00% | -100.00% |
| January closed, bell curve | -100.0% | -100.00% | -100.00% | -3.02% | 3.95% | 7.06% | 7.06% |
| January closed, constant year | -100.0% | -100.00% | -100.00% | -1.69% | 7.26% | 11.10% | 11.10% |
| January closed, flattish curve | -100.0% | -100.00% | -100.00% | 0.50% | 8.37% | 11.98% | 11.98% |
| January closed, peaked curve | -100.0% | -100.00% | -100.00% | 1.05% | 8.70% | 12.26% | 12.26% |
| No Seasonality | -100.0% | -100.00% | -100.00% | 2.49% | 9.59% | 13.01% | 13.01% |

*Data source:* ACIL Tasman

### 6.5.4 Transport costs per/kg finished product

Transport costs have been calculated assuming that the beef would be shipped through the port of Darwin. The alternative is for the meat to be transported through the port of Brisbane, which would be a road transport distance of approximately 1,900km. Based on a net km charge for this trip of $0.0981/kg, if the plant had to transport to Darwin, the cost of this transport would reduce the IRR to approximately 5 per cent.

However, a portion of this transport cost would be passed on to beef producers in the form of a lower farm gate price for the cattle. To maintain an IRR of 10 per cent or greater if the beef had to be transported through Brisbane the plant would have to offer $1.25 per kg live weight to producers.

The amount of product produced from 400,000 animals would be approximately 94,000 tonnes over a 10 month period. This equates to 9,400 tonnes per month. At 18 tonnes per container, the number of containers that

would need to be shipped out of Darwin could be up to 500 per month. ACIL Tasman believes that this would be sufficient to attract a regular container ship trade from this port.

### 6.5.5 Detailed results

The aim of producing a financial model of a northern abattoir was not to establish a definitive statement of the financial returns of such a facility. That is for others to determine, most likely as part of a due diligence process, if sufficient interest is generated in a facility. Rather, the objective of this exercise was to test the financial sensitivities of a northern abattoir, explore key risks and determine relative returns that might be generated in relation to the risks incurred.

The financial model was also used to estimate the likely economy-wide inputs and outputs of the plant, to allow ACIL Tasman to use those estimates to quantify the impact of the plant using our general equilibrium (GE) model.

The base case scale of the model was processing 200,000 head per annum. However, we used the model to calculate the inputs and outputs of a 400,000 head market (either one or two plants).

At the time of preparing this report, there were plans for a facility to be built in the Livingston Valley, 50km south of Darwin, by the Australian Agricultural Company Ltd (AACo, 2011). AACo has announced that the plant will process up to 1,000 head per day (approximately 200,000 per year (AACo, 2011).

However, this capacity would not process only cattle that would have otherwise been exported at an earlier and lighter weight. A portion of the cattle would be surplus females (heifers and cast-for-age cows[7]). We believe that the principle market for the AAco plant will be surplus females, however the plant is believed to be able to process a range of different cattle types.

We have assumed in our modelling that nine per cent of the total cattle processed would be surplus heifers and 19 per cent would be cast-for-age cows. This is based on simple herd structural modelling, detailed in section 8. The remainder of the cattle processed would be steers (and a small proportion of bulls) of various live weights at or over 400kg.

The following table shows the broad availability of cattle that would otherwise be exported live from the region, and the number of cattle processed (including the proposed AAco facility). The herd numbers are based on the

[7] Cast-for-age cows are cows that are considered too old to retain for breeding

June 2011 Northern beef producers' survey, conducted by ABARES following the suspension of the live trade to Indonesia.

It is based on the following ABARES cattle regions:

- Kimberley
- Pilbara-Gascoyne
- Barkly-Tennant Creek
- Victoria River District-Katherine
- Top End-Roper River-Gulf

One of the assumptions in the calculations in Table 38 is that some of the cattle currently being sold direct to processors from these regions would be diverted to the proposed processing facilities. It is likely that a small number of these cattle would be processed in the region, as there are very large transport costs to take them to the nearest processing plants in Townsville or southern Australia. The cattle that are currently being transported out of the region are likely to be those where the additional live weight of the cattle over live export weights, is sufficient to cover the additional transport costs with a small profit margin. Quite often these cattle are young females who have been spayed and kept to put on weight when seasonal conditions are favourable.

Table 38 **Cattle herd and intended turn off 2011**

| | | Number of cattle |
|---|---|---|
| | Beef cattle as of 30 June 2011 | 2,877,000 |
| A | Cattle intended for live export | 537,000 |
| B | Cattle intended to be sold direct to domestic processing now | 158,000 |
| C | Cattle intended for feedlots and back grounding | 21,000 |
| D | Total beef cattle turn off (A+B+C) | 698,000 |
| E | Proposed processing capacity | 600,000 |
| F | Processing capacity– less those cattle that would be processed domestically anyway (E-B) | 442,000 |
| G | Cattle that could potentially be processed that would otherwise have been exported live | 442,000 |
| H | Remainder– exported live from the region (A-G) | 95,000 |

*Data source: (ABARES, 2011)*

This table does not show the additional supply of suitable slaughter cattle derived from surplus female sales. This could be substantial over time. Also there is likely to be a supply increase, resulting from the development of a market for surplus females. This supply response is likely to come from less productive females being sold to make way for more productive cows and heifers. The extent of the additional supply was not within the scope of this

report, but would only increase the economic impact of the plant and make the expansion of a regional processing sector more attractive.

As this number grows, it is likely that row G in the table will be made up of a mixture of suitable steers and surplus females. The relative proportions will vary depending on seasonal conditions.

Another assumption used in these calculations is that 320,000 (60 per cent) of the 537,000 cattle currently exported live, could be taken from 300-320kg LWT to 400kg LWT by retaining them for another year. This would be highly dependent on seasonal conditions and improving the capacity of producers to increase steer live weights through improved range land and grazing management.

### 6.5.6 Profit and Loss

The forecast net profit of the business is positive, but small. After the first year the gross profitability is stable at roughly 12%. This is below the (nominal) expected return on investment that would be expected for an investment carrying these risks; although we have calculated this return based on holding the price paid to producers constant.

The income tax expense relates mostly to deferred tax expenditure – which reflects the difference between the assumed tax deduction on asset purchases and the accounting depreciation. The tax authorities allow faster "tax depreciation" than has been assumed for the accounting depreciation, which means that a future liability to tax has been created – this is shown as a liability in the balance sheet, and a current-year expense (especially large in the opening year of the forecasts).

Based on the cash flow and profit and loss statement, the retained income per annum, ranging from $10 million to $16 million, could be distributed to shareholders as dividends.

Table 39 **Forecast profit and loss account**

| All values in Australian $'000s | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Net sales | $43,755 | $163,455 | $168,195 | $173,073 | $178,625 | $183,257 | $188,571 | $194,040 | $200,265 | $205,457 | $211,415 |
| Other income | | | | | | | | | | | |
| **Total revenue** | $43,755 | $163,455 | $168,195 | $173,073 | $178,625 | $183,257 | $188,571 | $194,040 | $200,265 | $205,457 | $211,415 |
| Purchases | $30,226 | $112,915 | $116,190 | $119,560 | $123,395 | $126,595 | $130,266 | $134,043 | $138,344 | $141,931 | $146,047 |
| Labour costs | $7,357 | $19,839 | $20,434 | $21,047 | $21,678 | $22,329 | $22,999 | $23,689 | $24,399 | $25,131 | $25,885 |
| Transport Cost | $909 | $3,400 | $3,502 | $3,607 | $3,726 | $3,826 | $3,941 | $4,059 | $4,194 | $4,307 | $4,436 |
| Depreciation | $3,393 | $3,393 | $3,625 | $3,625 | $3,934 | $3,984 | $3,984 | $3,984 | $3,984 | $3,984 | $4,387 |
| Interest expense | $367 | $200 | $(641) | $(1,431) | $(2,081) | $(2,864) | $(3,776) | $(4,739) | $(5,752) | $(6,811) | $(7,255) |
| Other expenses | $3,866 | $5,885 | $6,058 | $6,235 | $6,417 | $6,605 | $6,798 | $6,997 | $7,202 | $7,413 | $7,630 |
| **Total costs and expenses** | $46,118 | $145,632 | $149,168 | $152,643 | $157,069 | $160,475 | $164,212 | $168,034 | $172,371 | $175,955 | $181,129 |
| **Pre-tax income (net income before tax)** | **$(2,363)** | $17,823 | $19,027 | $20,430 | $21,556 | $22,782 | $24,359 | $26,005 | $27,894 | $29,502 | $30,286 |
| Income tax expense | $1,095 | $3,543 | $5,708 | $6,129 | $6,467 | $6,834 | $7,308 | $7,802 | $8,368 | $8,851 | $9,086 |
| **Net income** | **$(3,458)** | **$14,280** | **$13,319** | **$14,301** | **$15,089** | **$15,947** | **$17,051** | **$18,204** | **$19,526** | **$20,652** | **$21,201** |
| Dividends Proposed | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **Retained Income** | **$(3,458)** | **$14,280** | **$13,319** | **$14,301** | **$15,089** | **$15,947** | **$17,051** | **$18,204** | **$19,526** | **$20,652** | **$21,201** |

*Data source:* ACIL Tasman estimates

### 6.5.7 Balance Sheet forecasts

The balance sheet for the business is unremarkable. It is dominated by the fixed assets of the business, which average 60% of total assets.

The significant liabilities are accounts payable – based on 30 days' worth of accumulated expenses and the deferred tax liability created from the tax depreciation on the assets.

Table 40 **Forecast balance sheet**

| | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Cash and cash equivalents | $0 | $11,420 | $25,393 | $43,656 | $58,180 | $76,297 | $97,228 | $119,147 | $142,207 | $166,346 | $175,552 |
| Accounts receivable | $5,394 | $20,152 | $20,736 | $21,338 | $22,022 | $22,593 | $23,248 | $23,923 | $24,690 | $25,330 | $26,065 |
| Total | $5,394 | $31,572 | $46,130 | $64,994 | $80,202 | $98,890 | $120,476 | $143,070 | $166,897 | $191,676 | $201,617 |
| Property, plant and equipment | $54,996 | $54,996 | $58,488 | $58,488 | $63,111 | $65,013 | $65,013 | $65,013 | $65,013 | $65,013 | $81,035 |
| Less: accumulated depreciation | $(3,393) | $(6,785) | $(10,411) | $(14,036) | $(17,970) | $(21,954) | $(25,939) | $(29,923) | $(33,907) | $(37,891) | $(42,278) |
| Total | $51,604 | $48,211 | $48,078 | $44,452 | $45,141 | $43,059 | $39,074 | $35,090 | $31,106 | $27,122 | $38,757 |
| Total Assets | $56,998 | $79,783 | $94,207 | $109,446 | $125,343 | $141,949 | $159,550 | $178,160 | $198,003 | $218,797 | $240,374 |
| | | | | | | | | | | | |
| Accounts payable | $3,164 | $11,191 | $11,517 | $11,853 | $12,230 | $12,555 | $12,921 | $13,298 | $13,721 | $14,085 | $14,496 |
| Income taxes payable | $0 | $1,474 | $1,600 | $1,771 | $1,881 | $2,029 | $2,203 | $2,377 | $2,551 | $2,726 | $2,694 |
| Short-term debt | $1,821 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Dividends payable | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Total | $4,985 | $12,665 | $13,117 | $13,625 | $14,111 | $14,584 | $15,124 | $15,675 | $16,272 | $16,811 | $17,190 |
| Deferred tax liabilities | $1,095 | $1,920 | $2,573 | $3,003 | $3,324 | $3,511 | $3,520 | $3,375 | $3,096 | $2,699 | $2,695 |
| Total Liabilities | $6,080 | $14,585 | $15,690 | $16,628 | $17,435 | $18,095 | $18,644 | $19,050 | $19,368 | $19,510 | $19,886 |
| | | | | | | | | | | | |
| Common stock | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 | $54,376 |
| Retained earnings | $(3,458) | $10,822 | $24,141 | $38,442 | $53,531 | $69,478 | $86,530 | $104,733 | $124,259 | $144,911 | $166,111 |
| Total Shareholders' Equity | $50,918 | $65,198 | $78,517 | $92,818 | $107,908 | $123,855 | $140,906 | $159,110 | $178,636 | $199,287 | $220,488 |
| Total liabilities and shareholders' equity | $56,998 | $79,783 | $94,207 | $109,446 | $125,343 | $141,949 | $159,550 | $178,160 | $198,003 | $218,797 | $240,374 |

*Data source*: ACIL Tasman estimates

### 6.5.8 Cash Flow Statement

The cash flow statement shows the initial equity investment of $55 million dollars, which is the NPV of capex over the next ten years. Because of the timing of capex, this mostly generates enough operating cash in the early years

that debt is not needed throughout the model. The size of the initial equity investment obviates the need for debt, but should this investment be reduced debt would be needed and interest expenses would be incurred.

In general, the abattoir is expected to generate a small positive cash flow of $1 million to $6 million per annum, with a major periodic maintenance in the eleventh year pushing the cash flow back into the red. This cash flow would accrue to the equity investors, but it represents a small return on the invested capital.

Table 41 **Forecast cash flow statement**

| | | 2012 | 2013 | 2014 | 2015 | 2016 | 2017 | 2018 | 2019 | 2020 | 2021 | 2022 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Net sales | | $43,755 | $163,455 | $168,195 | $173,073 | $178,625 | $183,257 | $188,571 | $194,040 | $200,265 | $205,457 | $211,415 |
| Less | Increase in accounts receivable | $(5,394) | $(14,758) | $(584) | $(601) | $(685) | $(571) | $(655) | $(674) | $(767) | $(640) | $(735) |
| **Cash collected from customers** | | $38,360 | $148,697 | $167,611 | $172,471 | $177,941 | $182,686 | $187,916 | $193,365 | $199,497 | $204,817 | $210,681 |
| **Plus** | Cash investment income | $0 | $102 | $641 | $1,431 | $2,081 | $2,864 | $3,776 | $4,739 | $5,752 | $6,811 | $7,255 |
| **Total cash collections** | | $38,360 | $148,800 | $168,252 | $173,902 | $180,022 | $185,550 | $191,692 | $198,104 | $205,249 | $211,628 | $217,936 |
| Cost of goods sold | | $(42,358) | $(142,039) | $(146,183) | $(150,448) | $(155,217) | $(159,355) | $(164,004) | $(168,789) | $(174,139) | $(178,781) | $(183,997) |
| Plus | Increase in inventories | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Less | Increase in accounts payable | $3,164 | $8,027 | $326 | $336 | $377 | $325 | $366 | $377 | $423 | $364 | $411 |
| **Total direct cash inputs** | | $(39,195) | $(134,012) | $(145,857) | $(150,112) | $(154,840) | $(159,030) | $(163,638) | $(168,412) | $(173,716) | $(178,417) | $(183,586) |
| Cash taxes paid | | $0 | $(1,244) | $(4,930) | $(5,527) | $(6,037) | $(6,500) | $(7,124) | $(7,773) | $(8,473) | $(9,072) | $(9,121) |
| Plus | Cash interest paid | $(367) | $(303) | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Plus | Other cash payments | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **Total other cash outflows** | | $(367) | $(1,547) | $(4,930) | $(5,527) | $(6,037) | $(6,500) | $(7,124) | $(7,773) | $(8,473) | $(9,072) | $(9,121) |
| **Operating cash inflow (outflow)** | | $(1,201) | $13,241 | $17,465 | $18,263 | $19,146 | $20,020 | $20,930 | $21,919 | $23,060 | $24,138 | $25,228 |
| **Investing activities** | | | | | | | | | | | | |
| Capital expenditures | | $(54,996) | $0 | $(3,492) | $0 | $(4,622) | $(1,902) | $0 | $0 | $0 | $0 | $(16,022) |
| **Financing activities** | | | | | | | | | | | | |
| Increase(decrease) in long-term debt | | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Increase(decrease) in common stock | | $54,376 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| Dividends Paid | | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| | | | | | | | | | | | | |
| **Cash generated from financing activities** | | $54,376 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 | $0 |
| **Net change in cash** | | $(1,821) | $13,241 | $13,973 | $18,263 | $14,523 | $18,118 | $20,930 | $21,919 | $23,060 | $24,138 | $9,206 |
| | | | | | | | | | | | | |
| **Opening Cash Balance** | | $0 | $(1,821) | $11,420 | $25,393 | $43,656 | $58,180 | $76,297 | $97,228 | $119,147 | $142,207 | $166,346 |
| **Closing Cash Balance** | | $(1,821) | $11,420 | $25,393 | $43,656 | $58,180 | $76,297 | $97,228 | $119,147 | $142,207 | $166,346 | $175,552 |

*Data source:* ACIL Tasman estimates

## 6.6 Financial modelling summary

The financial modelling shows that a plant could produce a positive return and pay cattle producers a good price for their cattle, based on the EBIT per AE that some producers could achieve as shown in section 5.7.5. The modelling shows that the plant is highly sensitive to:

- The live weight price paid to producers for the cattle
- The cost of transport for the meat
- The live weight of cattle

We have assessed the sensitivities of the transport and live weight of the cattle, using a constant price paid to the producer for the cattle. In reality, additional transport costs (or other costs) would be partially passed back to producers in the price paid for cattle. At $1.34 the impact of a plant on producers is substantial, which means that if some of the additional costs, particularly transport of meat, where incurred, were passed back on to producers, it would erode some, but not all, of the additional profitability of access to the market. That is, even if the meat had to be transported to Brisbane, rather than being exported out of Darwin, and these costs were passed on to cattle producers, those producers would still be financially better off than if they were reliant solely on the live trade.

The results of the abattoir financial model were used to inform a set of assumptions that allowed a run of the Tasman Global economic model. This allowed its use to assess the economic contribution to the Northern Australian economy of the establishment of a processing facility. The following section describes the model, the assumptions used and the net effect of a processing plant and associated cattle producer productivity gains on the regional economy.

# 7 Economic impacts of processing cattle in the North

ACIL Tasman has taken the results of the farm-level economic modelling and the financial modelling of processing 400,000 head in the north of Australia and used them as shocks for our economy wide economic model. Using several methodologies such as this, is standard modelling practice as the separate modelling exercises are brought together into one economy wide model.

In this case, we have used the financial model of the plant to assess a 200,000 head facility to demonstrate the viability of a plant this size. The CGE modelling is based on a 400,000 head regional slaughter market.

## 7.1 Scenarios

A range of scenarios have been analysed to aid in understanding the potential wider economic impacts of moving some of the cattle from the live export trade to a meat processing facility for export. A number of key variables affect the projected economic impacts, including:

- The capacity and location(s) of an abattoir
- The farm-gate price of cattle sold through each channel
- The average farm-gate weight of cattle sold through each channel
- The possibilities for producers to undertake better herd management to increase the number and/or weight of cattle sold
- The potential of post farm-gate agistment or feedlotting services to increase the average weight of slaughtered cattle
- The availability of suitable labour (either by tapping unemployed or underemployed labour locally, or through increased migration from overseas or other parts of Australia)
- The ownership of the abattoir.

In total, eight scenarios have been analysed for this report. These comprise two core scenarios (called A and B), under two alternative labour market assumptions and two alternative ownership assumptions for the abattoir.

The two core scenarios that have been assessed are:

- **Scenario A:** 400,000 cattle processed by several abattoirs, or one large facility located in the Northern Territory, with the remainder sold through live export
  - The 400,000 head processed are assumed to come first from the NT, with the remainder sourced proportionately to their exports from the Kimberley and Pilbara regions
  - This scenario also assumes that all of the cattle slaughtered would have been exported live. This scenario has been included to show the value to the economy of processing cattle domestically, compared to exporting them live (that is the full value of exporting the cattle live has been included in the counterfactual case in the modelling)
- **Scenario B:** As per Scenario A but with the presence of the abattoir enabling producers to increase the number and/or weight of their saleable cattle without incurring additional significant input costs
  - This scenario assumes, more realistically, that 320,000 of the cattle would have been exported live, and 80,000 (20 per cent) would have

had little or no value as they are surplus females that currently have no regional market

When undertaking CGE modelling, a key issue in estimating the impact of a project or policy is determining how the labour market will clear.[8] As discussed in Appendix A, increases in the demand for labour associated with an abattoir can be met by three mechanisms: increasing migration from the rest of Australia; increasing participation rates (or average hours worked); and by reducing the unemployment rate. The first two mechanisms are driven by changes in the real wages paid to workers, while the third is a function of the additional labour demand relative to the reference case. Given the low-to-moderate unemployment rates across Northern Australia, changes in the real wage rates account for most of the additional labour supply in the policy scenarios relative to the reference case.

Each scenario has been analysed with two assumptions regarding the availability of labour, namely:

1. Standard *Tasman Global* labour market — where the scenario is analysed using the default representation of the Australian labour market, which has a range of constraints on the availability and mobility of labour through the functional forms and elasticities.
2. Unconstrained labour market — in which the average real wage is assumed to remain the same as the reference case and the supply of labour is unconstrained (but maintaining the constraints on the supply of land, capital and natural resources).

It is the view of the authors that the standard *Tasman Global* labour market assumptions provide a realistic, although potentially conservative, view of the potential future employment impacts as a result of the policy scenarios — particularly in light of the tight labour market in the Northern Territory.

However, if a major economic downturn happens in the region or if, as part of the policy, measures are undertaken to alleviate some of the constraints on the labour market, then it is possible that the future employment (and consequent economic) outcomes could be significantly higher than those projected using the standard labour market assumptions. In such a case, employment outcomes may approach those projected under the unconstrained labour market scenarios, which the authors consider to be an upper bound on the possible labour market impacts.

[8] CGE models place explicit constraints on the availability of factors and the nature of the constraints can significantly change the magnitude and sign of the results. In contrast, most other tools used to assess economic impacts, including I-O multiplier analysis, do not place constraints on the availability of factors. Consequently, these tools tend to overestimate the impacts of a project or policy.

Finally, two ownership assumptions have been analysed. The first assumes that the abattoir is 100 per cent locally owned (owners reside within the economic regions used in the model). The second assumes that the project is 100 per cent non-locally owned and is a 50/50 joint venture between a foreign investor and an investor from the Rest of Australia. At the time of this report, the authors deem that the non-local ownership is deemed to be the more likely to eventuate, should an abattoir be built and operated.

In summary, the broader economic impacts have been analysed under eight scenarios. These are the four scenarios A.1, A.2, B.1 and B.2, under the two alternative ownership assumptions – Local and Joint Venture.

It should be noted that the CGE modelling does not predict whether or not a meat processing facility is economically viable for the individual stakeholders (this is the role of the detailed financial modelling), rather it attempts to measure the broader economic impacts for the community from the interaction of the current live export and likely meat processing industries with other industries (especially the competition for labour).

## 7.2 Economic impacts – Summary

Table 42 presents the projected impacts on real income and employment for Northern Australia under each of the eight scenarios. The projected impacts for each of the three regions modelled are presented in Appendix A.

A few things are evident from the results in Table 42:

- First, based on the detailed estimates of the alternative routes to market and the local content embodied in each stage, an abattoir adds more value to the regional economy compared to live export.
  - As shown in Appendix A11A, however, under Scenario A, there is some reallocation of resources between the individual regional economies. In particular, in the absence of any productivity benefits for the producers, the regions without the abattoir will experience a small loss in their total real incomes and employment, as they lose the local value added associated with the live export trade as well as receive a lower farm gate price.
- Second, the projected benefits are sensitive to the availability of appropriate labour.
- Third, there are significant economic gains associated with the potential improvements in the productivity of producers as a result of the presence of an abattoir (enabling producers to sell previously uneconomic cattle and to undertake better herd management practices)

- Fourth, the ownership assumptions have a significant impact on the projected increase in real income, but a less significant impact on the projected employment outcomes[9].

Table 42 **Projected economic impacts for total Northern Australia under each Scenario**

| | 1 Standard Tasman Global labour market | | | | 2 Unconstrained labour market | | |
|---|---|---|---|---|---|---|---|
| | 2012–13 | 2013–14 | 2014–15 | | 2012–13 | 2013–14 | 2014–15 |
| **Real income** | A$m | A$m | A$m | | A$m | A$m | A$m |
| **Scenario A1** (Local) – live export plus 400,000 head NT processing capacity | 25.45 | 27.95 | 30.16 | | 55.72 | 62.08 | 68.07 |
| **Scenario B1** (Local) – as per Scenario A plus an increase in farm gate production | 135.44 | 148.36 | 161.47 | | 207.55 | 231.81 | 256.45 |
| **Scenario A2** (Joint Venture) – live export plus 400,000 head NT processing capacity | 5.42 | 7.52 | 9.39 | | 30.50 | 35.97 | 41.15 |
| **Scenario B2** (Joint Venture) – as per Scenario A plus an increase in farm gate production | 115.66 | 128.17 | 140.92 | | 180.32 | 203.82 | 227.86 |
| **Employment** | FTE jobs | FTE jobs | FTE jobs | | FTE jobs | FTE jobs | FTE jobs |
| **Scenario A1** (Local) – live export plus 400,000 head NT processing capacity | 58.1 | 61.1 | 63.3 | | 545.3 | 579.2 | 610.2 |
| **Scenario B1** (Local) – as per Scenario A plus an increased in farm gate production | 161.4 | 176.4 | 189.4 | | 1,319.8 | 1,450.5 | 1,577.7 |
| **Scenario A2** (Joint Venture) – live export plus 400,000 head NT processing capacity | 46.7 | 49.6 | 51.9 | | 442.5 | 473.7 | 502.5 |
| **Scenario B2** (Joint Venture) – as per Scenario A plus an increase in farm gate production | 146.3 | 161.2 | 174.2 | | 1,193.7 | 1,323.8 | 1,451.2 |

*Notes:* Northern Australia comprises the Northern Territory plus the Kimberley and Pilbara Statistical Divisions. "Local" means 100% locally owned capital. "Joint Venture" means a 50/50 joint venture arrangement between owners situated in the Rest of Australia and overseas. FTE = full-time equivalent. One FTE job is equivalent to one person working full-time for one year, or two people working 0.5 of a full-time job.

*Data source:* ACIL Tasman modelling

### 7.2.1 Locally owned abattoir

Over the first three years of operation, the presence of a 100% locally owned abattoir(s) in Northern Australia is projected to increase the real incomes of residents in Northern Australia by an average of:

- $27.8 million per year under Scenario A.1 (or $62.0 million per year if the labour market is unconstrained)
- $148.4 million per year under Scenario B.1 (or $231.9 million per year if the labour market is unconstrained)

[9] As the model is assessing regional economic impacts, the delineation is between ownership from within the region and ownership from outside the region, either in the rest of Australia or from overseas

To place these numbers in perspective, the change in real income is equivalent to an annual average increase for all residents in Northern Australia of $86 and $458 per person per year, under Scenarios A.1 and B.1 respectively.

With respect to employment, over the first three years of operation, the presence of an abattoir in Northern Australia is projected to increase employment by an average of:

- 61 full-time equivalent (FTE) jobs per year under Scenario A.1 (or 578 FTE jobs per year if the labour market is unconstrained)
- 176 FTE jobs per year under Scenario B.1 (or 1,449 FTE jobs per year if the labour market is unconstrained).

### Joint venture abattoir(s)

If, as is deemed more likely, the abattoir(s) is owned by a joint venture between a current non-Northern Australian processor and a foreign investor, then over the first three years of operation the presence of an abattoir in Northern Australia is projected to increase the real incomes of residents in the region by an average of:

- $7.4 million per year under Scenario A.1 (or $35.9 million per year if the labour market is unconstrained)
- $128.3 million per year under Scenario B.1 (or $204 million per year if the labour market is unconstrained).

To place these numbers in perspective, the change in real income is equivalent to an annual average increase for all residents in Northern Australia of $23 and $396 per person per year, under Scenarios A.1 and B.1 respectively.

With respect to employment, over the first three years of operation the presence of an abattoir(s) in Northern Australia is projected to increase by an average of:

- 49 full time equivalent (FTE) jobs per year under Scenario A.1 (or 473 FTE jobs per year if the labour market is unconstrained)
- 161 FTE jobs per year under Scenario B.1 (or 1,323 FTE jobs per year if the labour market is unconstrained).

# 8 Farm level impact of domestic Northern processing

There are significant potential farm level effects that would flow from the establishment of a Northern processing facility. At present, cattle producers in the North face an uncertain and potentially volatile cattle market, due to

potential beef market policy changes in Indonesia and no viable alternative markets of sufficient size to divert cattle to.

Based on the work prepared for this report by Holmes and Co, and earlier work on the profitability commissioned by MLA, access to regional processing plants could increase EBIT per AE by over 300 per cent. This is before including longer term, but potentially greater, gains from improving overall herd productivity.

Having access to regional processing would provide:

- Reduced reliance, if required, on the Indonesian cattle and beef market, which is likely to lead to greater investment in productivity
- A market for surplus females and heavy cattle, which will allow greater selection pressure to be put on the female portion of the herd. This will:
  - Improve herd fertility and weaning rates
  - Reduce female mortality rates
  - Allow greater selection pressure to be applied to a range of production traits (although bull selection generally has a greater influence over most genetic trait improvements in the herd)
- Opportunities for beef producers to target particular markets based on individual competitive advantage (within the physical production constraints of a generally harsh environment). This creates incentives for producers to invest in genetics to improve meat quality

The following stock schedules show how a typical herd producing cattle for the live trade would look after 5 or 6 years. Figure 12 shows a typical Northern beef herd stock schedule, where:

- The total number of cows mated is stable at approximately 6400 (12,500 AE)
- All surplus steer weaners are raised to meet the live trade specifications of <350kg at one to two years old
- Bulls are mated at approximately 2.3 per cent
- Thirteen per cent of heifer weaners are sold, with the rest retained to maintain a constant cow herd. Heifer sales are assumed to be either to the live trade or re-stockers
- Total cow death rate is 12 per cent
- 50 per cent of cows wean a calf each year

Based on the indicative sale prices, the average price per kg of live weight sold is $1.27.

Figure 12 **A typical herd structure without alternative markets to the live export trade**

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | Cow death rate | 12% |
| | | | | | | | | | | | | | | | | | | | | | Non breeder death rate | 4% |
| | | | | | | | | | | | | | | | | | | | | | Weaning per centage | 50% |
| | Start | | | | | | | Sales | | | | | | | | | | | End | | | |
| Start | No | $/hd | Total | Nat In | Purchase | Value | Total | NO | KG | $ / kg / LWT | | Total | | Month | Deaths | Rations | No | $/hd | Total | End |
| **Cows** | | | | | | | | | | | - | $ - | | | | | | | | Cows |
| Heifers | 1382 | 700 | 967400 | 691 | | | | | | | - | $ - | | | 166 | | 1216 | 700 | 851312 | Heifers |
| Mixed Age | 5000 | 900 | 4500000 | 2500 | | | | 703 | 500 | $0.20 | 351,500 | $ 70,300 | | | 600 | | 3697 | 900 | 3327300 | Mixed Age |
| Total | 6382 | 1600 | 5467400 | 3191 | | | | 703 | | | 351,500 | $ 70,300 | | | 766 | | 4913 | | 4178612 | |
| Weaners | | | | | | | | | | | - | $ - | | | | | | | | Weaners |
| M | 1530 | 500 | 765000 | | | | | | | | - | $ - | | | 61 | | 1469 | 500 | 734400 | M |
| F | 1530 | 500 | 765000 | | | | | | | | - | $ - | | | 61 | | 1469 | 500 | 734400 | F |
| | | | | | | | | | | | - | $ - | | | | | | | | |
| Total | 3060 | | 1530000 | | | | | | | | - | $ - | | | 122 | | 2938 | | 1468800 | Total |
| Steers | 1468.8 | | | | | | | 1410 | 320 | $2.10 | 451,215 | $ 947,552 | | | 59 | | | | | Steers |
| Heifers | | | | | | | | | | | - | $ - | | | | | | | | Heifers |
| Total | 1468.8 | | | | | | | 1410 | | | 451,215 | $ 947,552 | | | 58.752 | | | | | Total |
| Calves | | | | | | | | | | | - | $ - | | | 128 | | 3063 | 400 | 1225344 | Calves |
| Bulls | 150 | 4000 | 600000 | | 20 | 4000 | 80000 | | | | - | $ - | | | 20 | | 150 | 4000 | 600000 | Bulls |
| Mixed age | | | | | | | | | | | - | $ - | | | | | | | | Mixed age |
| | | | | | | | | | | | - | $ - | | | | | | | | |
| | | | | | | | | | | | - | $ - | | | | | | | | |
| | | | | | | | | | | | - | $ - | | | | | | | | |
| Total | 150 | | 600000 | | 20 | | 80000 | | | | - | $ - | | | 20 | | 150 | | 600000 | Total |
| Total | 11061 | | 7597400 | 3191 | 20 | | 80000 | 2113 | | | 802,715 | $ 1,017,852 | | | 1094.6 | | 11064 | | 7472756 | Total |

*Data source:* ACIL Tasman

Figure 13 shows what the same herd might look like, after following the establishment of a regional processing facility. It is based on exactly the same AE number as the herd structure depicted in Figure 12.

We would expect, based on the ability to increase selection pressure on the females of the herd and run a few cows, that:

- Weaning rates could increase by 5 per cent
- Cow mortalities could fall by 4 per cent, due to a reduced average age of the females in the herd and improved selection for survival

Under this scenario, the average live weight price received is $1.23, which is a small reduction in the average price received per head when supplying the live trade. Under an alternative market scenario, gross revenue increases as more beef is produced per AE.

This does not take into account cost savings by having to run fewer cows, as indicated in section 5.7.

Figure 13 **A typical herd structure with access to alternative markets**

| | | | | | | | | | | | | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | | | | | | | | | | | | Cow death rate | 8% |
| | | | | | | | | | | | | | | | | | | | | | Non breeder death rate | 4% |
| | | | | | | | | | | | | | | | | | | | | | Weaning per centage | 55% |
| | Start | | | | | | | Sales | | | | | | | | End | | | | | | |
| Start | No | $/hd | Total | Nat In | Purchase | Value | Total | NO | KG | $ / kg / LWT | | Total | | Month | Deaths | Rations | No | $/hd | Total | End | | |
| **Cows** | | | | | | | | | | | - | $ - | | | | | | | | Cows | | |
| Heifers | 1450 | 700 | 1015000 | 798 | | | | 153 | 400 | $1.20 | 61,200 | $ 73,440 | | | 116 | | 1181 | 700 | 826700 | Heifers | | |
| Mixed Age | 4050 | 900 | 3645000 | 2228 | | | | 801 | 550 | $1.10 | 440,550 | $ 484,605 | | | 324 | | 2925 | 900 | 2632500 | Mixed Age | | |
| Total | 5500 | 1600 | 4660000 | 3025 | | | | 954 | | | 501,750 | $ 558,045 | | | 440 | | 4106 | | 3459200 | | | |
| Weaners | | | | | | | | | | | - | $ - | | | | | | | | Weaners | | |
| | | | | | | | | | | | - | $ - | | | | | | | | | | |
| M | 1452 | 500 | 726000 | | | | | | | | - | $ - | | | 58 | | 1394 | 500 | 696960 | M | | |
| F | 1452 | 500 | 1452000 | | | | | | | | - | $ - | | | 58 | | 1394 | 500 | 696960 | F | | |
| Total | 2904 | | 2178000 | | | | | | | | - | $ - | | | 116 | | 2788 | | 1393920 | Total | | |
| Steers 2yo | 1394 | 600 | 836352 | | | | | | | | - | $ - | | | 55.757 | | 1338 | | | Steers 2yo | | |
| Steers 3yo | 1338 | 600 | 802897.9 | | | | | 1338 | 400 | $1.34 | 535,265 | $ 717,255 | | | | | | | | Steers 3yo | | |
| | | | | | | | | | | | - | $ - | | | | | | | | | | |
| Total | 2732.1 | | 1639250 | | | | | 1338.1632 | | | 535,265 | $ 717,255 | | | 55.757 | | 1338.16 | | | Total | | |
| Calves | | | | | | | | | | | - | $ - | | | 121 | | 2904 | 400 | 1161600 | Calves | | |
| Bulls | 122 | 4000 | 486000 | | 16 | 5000 | 80000 | | | | - | $ - | | | 16 | | 122 | 4000 | 486000 | Bulls | | |
| Mixed age | | | | | | | | | | | - | $ - | | | | | | | | Mixed age | | |
| | | | | | | | | | | | - | $ - | | | | | | | | | | |
| | | | | | | | | | | | - | $ - | | | | | | | | | | |
| | | | | | | | | | | | - | $ - | | | | | | | | | | |
| Total | 122 | | 486000 | | 16 | | 80000 | | | | - | $ - | | | 16 | | 122 | | 486000 | Total | | |
| Total | 11258 | | 8963250 | 3025 | 16 | | 80000 | 2292.1632 | | | 1,037,015 | $ 1,275,300 | | | 748.92 | | 11258 | | 6500720 | Total | | |

*Data source:* ACIL Tasman

## 8.1 Adoption of productivity improvements

The adoption rate across the approximately 1,400 cattle production businesses reliant on the trade in the North is difficult to predict. The three main barriers to adoption are likely to be:

- Close proximity to ports and long distances to processing facilities
- Inability to be able to put on 80kg per steer between 2 and 3 years old
- Large variations in seasonal conditions between years, making investments in producing heavier steers more risky

# 9 Why is Government involvement necessary?

The substantial benefits available to the industry from a Northern beef slaughter market raise the question—why should there be any need for government assistance? That is, if the benefits are so great, why isn't the industry investing to realise these benefits itself?

The answer to this is twofold:

- Large extraordinary government assistance does not appear to be required
- The assistance that is required is that which is routinely provided by Government. It requires reprioritisation or alignment with a coordinated

strategy to develop a meat processing industry in the north of Australia, which would unlock considerable value across the whole of the economy

Governments in Australian have assumed the responsibility for the provision of open access infrastructure, some research and development, and international trade negotiations. The current Labor Government also has a stated policy position of attracting foreign investment to develop Australian resources. The Liberal-National coalition also supports the use of foreign investment to develop Australia's economic assets.

The provision of a modest amount of these services is required to make an investment in processing facilities in the north viable by reducing the risks. These are not extraordinary public investments, but may require some reprioritisation or realignment, with an industry-wide strategy to develop a northern processing market.

There also appear to be market failures acting to reduce the level of investment in the northern beef industry: the risk of sudden changes to Indonesian beef and cattle trade policies reduces the incentives to invest in processing cattle that were previously exported live. This risk is being capitalised into the value of northern production assets, such as land, that reduce the capacity of the industry to make the necessary productivity improvements in cattle production. It also restricts the amount of capital that could be raised to fund the development of processing facilities.

This risk also reduces the incentives for other investors to invest in developing a processing market in the north of Australia.

# 10 How can more cattle be processed in Australia?

There are four main constraints on processing animals in the north of Australia that would otherwise be exported live. They are:

1. Increasing producer capacity to meet processing specifications for the animals they produce
2. Improving infrastructure, including all weather access
3. Establishing feedlots (not essential and likely to follow the establishment of a processing facility anyway)
4. Establishing a processing capacity

Each of these issues is dealt with in more detail in the following sections.

## 10.1 Increase producer capacity to meet market specifications

Critical to the viability of a northern abattoir is increasing the capacity of northern producers to produce cattle of the highest possible weight and condition, as early as possible. For a processing plant to be viable it needs to source cattle at a minimum of 400kg lwt at 3 years of age.

However, meeting these grades is not only important for a processing facility. Being able to consistently meet this specification would give Northern beef producers greater flexibility in the markets where they could sell their cattle. Heavier, younger cattle would not only improve the viability of a local meat processing market, these cattle would also be attractive for sale to others to grow the cattle, particularly southern based finishing (growing out to higher weights) enterprises.

With access to alternative markets, Northern livestock producers have greater incentives and the financial capacity to invest in improving grass-fed beef production. This is the cyclical nature of the problem. Improving weight gain would make a local processing market more viable and having access to a local market will create incentives for producers to produce heavier cattle. Each is dependent on the other.

If the AAco plant is established as proposed, a market for surplus females will significantly improve the profitability of Northern beef producers. Some of this increase in profitability will be retained by producers and be reinvested in the business. This reinvested capital will be important in assisting producers meet alternative market specifications.

There are four key components in building producer capacity to enable cattle to be produced to alternative market specifications. They are:

- Range land management
- Grazing management
- Genetics
- Business management

### 10.1.1 Range land management

Greater research and extension is needed to improve the production of dry matter suitable for cattle from Northern range lands. There is already a large body of research being conducted, but the establishment of alternative markets would provide an opportunity to review this work and align it with the wider range of markets that would be available for northern beef producers.

The objectives of the research should be to:

- Increase annual weight gain
- Improve capacity to 'grass' finish cattle
- Reduce seasonal variability
- Monitor dry matter (grass) production and better match stocking rate to dry matter production
- Manage and ameliorate soil nutrient deficiencies where possible
- Improve dry matter production and management using remote sensing technology and monitoring and management software
- Improving the quality of dry matter on offer for livestock

Improving the quality of dry matter will increase in importance as producers seek to add weight to young stock to meet market specifications. Under the current market conditions, a greater proportion of the final weight of the animal is gained prior to weaning. However, if animals are going to be prepared for alternative markets, a larger portion of the weight will be gained post-weaning. For example, preparing a 320kg steer for live export means that 70 per cent of the animal's weight is gained before weaning (220 kg/320kg: see Table 15). When the animal is retained for another 12 months to reach 400kg, 55 per cent of the animal's turn off weight is reached pre weaning.

As the animal is required to put on more weight post-weaning, it will need access to higher quality feed for a longer period. Therefore, greater emphasis will need to be placed on increasing the amount of higher quality feed for longer, to achieve the desired weight and condition score.

### 10.1.2 Grazing management

There is not much use in improving the quality and quantity of dry matter production if it is poorly utilised. Improving grazing management will require the:

- Identification of higher quality feed on offer at any time of the year
- Improving assessment of likely weight gain (to meet target market specifications and coordinate mustering, transport, etc.)
- Allocating stock to grass lands to optimise value achieved per tonne of dry matter produced

Grazing management also influences the quality and quantity of dry matter produced.

### 10.1.3 Genetics

To be able to meet the specifications for alternative markets, Northern beef producers will need to consider whether the genetics of their herds are suitable. Perhaps the biggest consideration is the level of Brahman strain. As stated in

section 5.7, the Brahman percentage of Northern herds could be reduced to 75 per cent or less to improve meat quality. This is particularly so when the proportion of females in the herd is reduced, allowing less emphasis to be placed on survival of the female and more on growth rates of progeny (provided birth weights do not increase and lead to higher levels of dystocia).

Breeding enough higher performance composite bulls for the Northern herd to change genetics, could take up to 6 or 7 years, given the length of breeding intervals and the combinations of selection traits that would need to be introduced.

In summary, the breeding objectives for a Northern herd would slightly reduce emphasis on survival and increase growth rate and fertility.

### 10.1.4 Business management

Business management of Northern herds would need to change to reflect the herd and marketing changes required to meet the new specifications for alternative markets. Greater emphasis will have to be given to performance recording, genetic selection and monitoring, grazing management, range land management and marketing.

Where alternative markets are available, the business managers will have to change focus to maximising the weight of saleable meat per unit of input (FTE, AE, Cow, etc.). Greater attention will also need to be directed to maximising the returns from surplus females, for which there is no market at present.

Producers will also need to establish whether, and where, to finish cattle. They will need to assess the capacity of existing land holdings to meet market specifications, or whether country more suitable to finishing cattle will have to be acquired, leased or, alternatively, the cattle agisted.

## 10.2 Improving infrastructure

One of the major constraints on the development of a northern abattoir is the risk associated with not being able to source cattle throughout the year. The major constraint on this is the:

- Availability of all-weather roads
- The extent to which stock handling facilities on properties can be accessed from all-weather roads
- The availability of cattle depots, where cattle can be held for short periods prior to slaughter (where live weight and condition score is at least held)

Being able to predict and monitor water flows and flooding on property, is also an area that will need to be improved to reduce the seasonality of cattle supply in the Northern areas. Flood plain mapping and flood modelling using rainfall and contour models, are being developed and introduced by some innovating Northern cattle businesses. This not only allows cattle to be moved prior to flooding, making them more accessible, it also refines grazing management, as cattle can be shifted to grazing areas in a more timely fashion as flood waters recede and grasses begin to grow. Moving cattle early to fast growing forage following flooding, has the potential to increase weight gain as cattle have longer grazing on highly digestible grasses (before the grasses mature and digestibility declines).

### 10.2.1 Feedlots

This analysis has been conducted on the assumption that the cattle being processed in the proposed facility would be raised and finished on grass exclusively. This is unlikely to be the case. The addition of feedlotting does not negatively affect the economic analysis used in this report. The evolution of a feedlot industry will have a modest but positive impact on the economic impact on the region of processing more cattle locally due to the additional output that it would produce and the regional goods and services it would consume.

A number of cattle will be finished in intensive feed regimes in the North if a processing facility is built. This will be because:

- Seasonal conditions prevent cattle being grass fed in some of the regions, some of the time
- There is a financial incentive to feedlot the cattle, because the value of additional beef is greater than the cost of the feedlotting, inclusive of the feed used
  - There is an improvement in the quality of the beef due to feedlotting (young, improved fat cover and intra-muscular fat, etc.)
- It improves the level of utilisation of the processing plant and therefore the marginal value of the cattle in the feedlots is higher. Some of this value is shared with the producer, making feedlotting financially viable. Increasing utilisation would be the result of:
  - Feedlots reducing seasonal variation of supply (reducing the impact of the wet season)
  - Reducing the impact of variations in seasonal conditions on the supply of suitable cattle for processing

It is likely that if a feedlotting industry developed in conjunction with the processing plant, it would add to the regional economic impact that the plant would have. However, this impact would be modest and dependent on the:

- Amount of locally-grown feed used in the plant
- The additional employees it would require
- The value it would add to the cattle under the conditions listed above, where it would be financially viable to feedlot the cattle

This is little doubt that a feedlot industry would add some value to the processing plant. This is shown in the seasonal variation impacts in the processing plant financial model results, discussed in detail in section 6.5.3.

However, the base case used in this analysis is a grass-fed regime.

## 10.3 Establishing processing capacity

Essential for the ability of northern beef producers to access alternative markets, is the availability of regional processing capacity. The financial model prepared for this project, and detailed in section 6.2, shows that a Northern beef processing facility could be financially viable, make a significant contribution to the Northern Australian regional economy and would create a number of new jobs. However, the returns may not be sufficient to fully compensate investors for the risks of this type of investment. This explains why a there are no Northern abattoirs operating at present. Skilled and semi-skilled labour is also likely to be a significant constraint in the current labour market.

However, the substantial economic and employment benefits do not create the justification for the establishment of fully publicly funded regional processing facility(s). This would expose the Australian and/or affected State and Territory Governments to potentially open-ended liabilities.

In our view, the most appropriate course is to establish a joint venture between Australian interests and foreign investors, to build and run one or more meat processing plants in the North of Australia. As the model in section 6.2 shows, the capital required would be approximately $160 million, with the plant able to cover all operating and capital costs.

Indonesian interests are likely to be the most responsive to an initial approach seeking their involvement. This is because the advantages for Indonesia are likely to be substantial:

- In the long-term a profitable and productive Northern Australian beef herd integrated into the Indonesian beef market, is likely to be a more efficient way of improving beef security than self-sufficiency
- Indonesian labour is likely to be required to reduce the labour constraints in the North of Australia. This would provide employment opportunities consistent with the objectives of the Indonesian beef self-sufficiency Blue Print

- A JV with Indonesian interests (public or private) would allow technology transfers between the Northern Australian facility(s) and the Indonesian processing industry
- A portion of the Indonesian abattoir workforce could also be rotated through the plant under training programs and then return to their Indonesian plant

This does not mean that the meat products from the plant should be produced exclusively for the Indonesian, or any other single market, as the meat produced from the plant could be sold into a number of growing markets around the world. Rather, exporters/importers targeting the Indonesian market would compete with other buyers for the products from the abattoir.

One of the additional benefits of the establishment of a Northern processing capacity is the opportunity for employment and training for Indigenous Australians in the region. Therefore an important contribution to the establishment of the facilities could be a contribution from an Australian agency and/or Indigenous enterprise, to underwrite, in the first instance, the employment and training of regional Indigenous people.

In summary, the Australian beef industry, in association with the WA, NT and Australian Governments, could prepare a comprehensive plan to be presented to the Indonesian Government, under the CEPA negotiations, to integrate the Australian and Indonesian beef industries. This should be part of a wider beef industry adjustment package, designed to assist Northern beef producers to meet the specifications of alternative beef markets and improve profitability.

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# A Detailed economic impacts

## A.1 Locally owned abattoir results

Table A1 **Projected economic impacts under Scenario A (Local) – live export plus 400,000 head Northern Territory processing capacity**

| | A.1 Standard Tasman Global labour market | | | | A.2 Unconstrained labour market | | |
|---|---|---|---|---|---|---|---|
| | 2012–13 | 2013–14 | 2014–15 | | 2012–13 | 2013–14 | 2014–15 |
| Real income | A$m | A$m | A$m | | A$m | A$m | A$m |
| Northern Territory | 35.25 | 36.62 | 37.80 | | 69.53 | 74.61 | 79.38 |
| Pilbara SD | –1.44 | –1.43 | –1.41 | | –1.47 | –1.44 | –1.40 |
| Kimberley SD | –8.35 | –7.24 | –6.22 | | –12.34 | –11.09 | –9.91 |
| **Total Northern Australia** | **25.45** | **27.95** | **30.16** | | **55.72** | **62.08** | **68.07** |
| **Employment** | FTE jobs | FTE jobs | FTE jobs | | FTE jobs | FTE jobs | FTE jobs |
| Northern Territory | 74.2 | 76.3 | 77.3 | | 637.4 | 665.6 | 690.1 |
| Pilbara SD | –0.9 | –0.9 | –0.9 | | –3.5 | –3.5 | –3.4 |
| Kimberley SD | –15.1 | –14.3 | –13.1 | | –88.5 | –82.9 | –76.5 |
| **Total Northern Australia** | **58.1** | **61.1** | **63.3** | | **545.3** | **579.2** | **610.2** |

*Note:* FTE = full-time equivalent.

*Data source:* ACIL Tasman modelling

Table A2 **Projected economic impacts under Scenario B (Local) – live export plus 400,000 head Northern Territory processing capacity with an increase in farm gate production**

| | B.1 Standard Tasman Global labour market | | | | B.2 Unconstrained labour market | | |
|---|---|---|---|---|---|---|---|
| | 2012–13 | 2013–14 | 2014–15 | | 2012–13 | 2013–14 | 2014–15 |
| Real income | A$m | A$m | A$m | | A$m | A$m | A$m |
| Northern Territory | 115.76 | 125.55 | 135.43 | | 186.49 | 206.75 | 227.26 |
| Pilbara SD | 4.38 | 4.82 | 5.31 | | 4.25 | 4.72 | 5.23 |
| Kimberley SD | 15.30 | 18.00 | 20.73 | | 16.81 | 20.34 | 23.96 |
| **Total Northern Australia** | **135.44** | **148.36** | **161.47** | | **207.55** | **231.81** | **256.45** |
| **Employment** | FTE jobs | FTE jobs | FTE jobs | | FTE jobs | FTE jobs | FTE jobs |
| Northern Territory | 154.0 | 165.4 | 174.8 | | 1,281.4 | 1,393.0 | 1,500.1 |
| Pilbara SD | 0.6 | 1.0 | 1.3 | | 1.7 | 3.1 | 4.6 |
| Kimberley SD | 6.8 | 10.0 | 13.3 | | 36.7 | 54.5 | 73.0 |
| **Total Northern Australia** | **161.4** | **176.4** | **189.4** | | **1,319.8** | **1,450.5** | **1,577.7** |

*Note:* FTE = full-time equivalent.

*Data source:* ACIL Tasman modelling

## A.2 Joint venture owned abattoir results

Table A3 **Projected economic impacts under Scenario A (Joint venture) – live export plus 400,000 head Northern Territory processing capacity**

| | A.1 Standard Tasman Global labour market | | | | A.2 Unconstrained labour market | | |
|---|---|---|---|---|---|---|---|
| | 2012–13 | 2013–14 | 2014–15 | | 2012–13 | 2013–14 | 2014–15 |
| Real income | A$m | A$m | A$m | | A$m | A$m | A$m |
| Northern Territory | 14.95 | 15.86 | 16.62 | | 44.27 | 48.44 | 52.35 |
| Pilbara SD | -1.12 | -1.04 | -0.95 | | -1.40 | -1.34 | -1.26 |
| Kimberley SD | -8.41 | -7.29 | -6.27 | | -12.37 | -11.12 | -9.94 |
| **Total Northern Australia** | **5.42** | **7.52** | **9.39** | | **30.50** | **35.97** | **41.15** |
| **Employment** | **FTE jobs** | **FTE jobs** | **FTE jobs** | | **FTE jobs** | **FTE jobs** | **FTE jobs** |
| Northern Territory | 62.7 | 64.8 | 65.8 | | 534.8 | 560.3 | 582.5 |
| Pilbara SD | -0.8 | -0.8 | -0.8 | | -3.5 | -3.4 | -3.3 |
| Kimberley SD | -15.1 | -14.4 | -13.1 | | -88.8 | -83.2 | -76.7 |
| **Total Northern Australia** | **46.7** | **49.6** | **51.9** | | **442.5** | **473.7** | **502.5** |

*Note:* FTE = full-time equivalent.

*Data source:* ACIL Tasman modelling

Table A4 **Projected economic impacts under Scenario B (Joint venture) – live export plus 400,000 head Northern Territory processing capacity with an increase in farm gate production**

| | B.1 Standard Tasman Global labour market | | | | B.2 Unconstrained labour market | | |
|---|---|---|---|---|---|---|---|
| | 2012–13 | 2013–14 | 2014–15 | | 2012–13 | 2013–14 | 2014–15 |
| Real income | A$m | A$m | A$m | | A$m | A$m | A$m |
| Northern Territory | 95.95 | 105.30 | 114.81 | | 159.25 | 178.74 | 198.63 |
| Pilbara SD | 4.45 | 4.91 | 5.42 | | 4.32 | 4.80 | 5.34 |
| Kimberley SD | 15.26 | 17.96 | 20.69 | | 16.75 | 20.27 | 23.89 |
| **Total Northern Australia** | **115.66** | **128.17** | **140.92** | | **180.32** | **203.82** | **227.86** |
| **Employment** | **FTE jobs** | **FTE jobs** | **FTE jobs** | | **FTE jobs** | **FTE jobs** | **FTE jobs** |
| Northern Territory | 139.0 | 150.2 | 159.6 | | 1,155.5 | 1,266.4 | 1,373.8 |
| Pilbara SD | 0.6 | 1.0 | 1.4 | | 1.8 | 3.2 | 4.7 |
| Kimberley SD | 6.8 | 10.0 | 13.3 | | 36.5 | 54.2 | 72.7 |
| **Total Northern Australia** | **146.3** | **161.2** | **174.2** | | **1,193.7** | **1,323.8** | **1,451.2** |

*Note:* FTE = full-time equivalent.

*Data source:* ACIL Tasman modelling

The economic impacts of a policy, project or other activity can be estimated using a variety of economic analysis tools. Those most often utilised generally being input-output (I-O) multiplier analysis and computable general equilibrium (CGE) modelling. The selection of the right tool is critical to the accuracy of the estimated impacts and depends upon the characteristics of the project/industry. Sometimes it requires a range of tools.

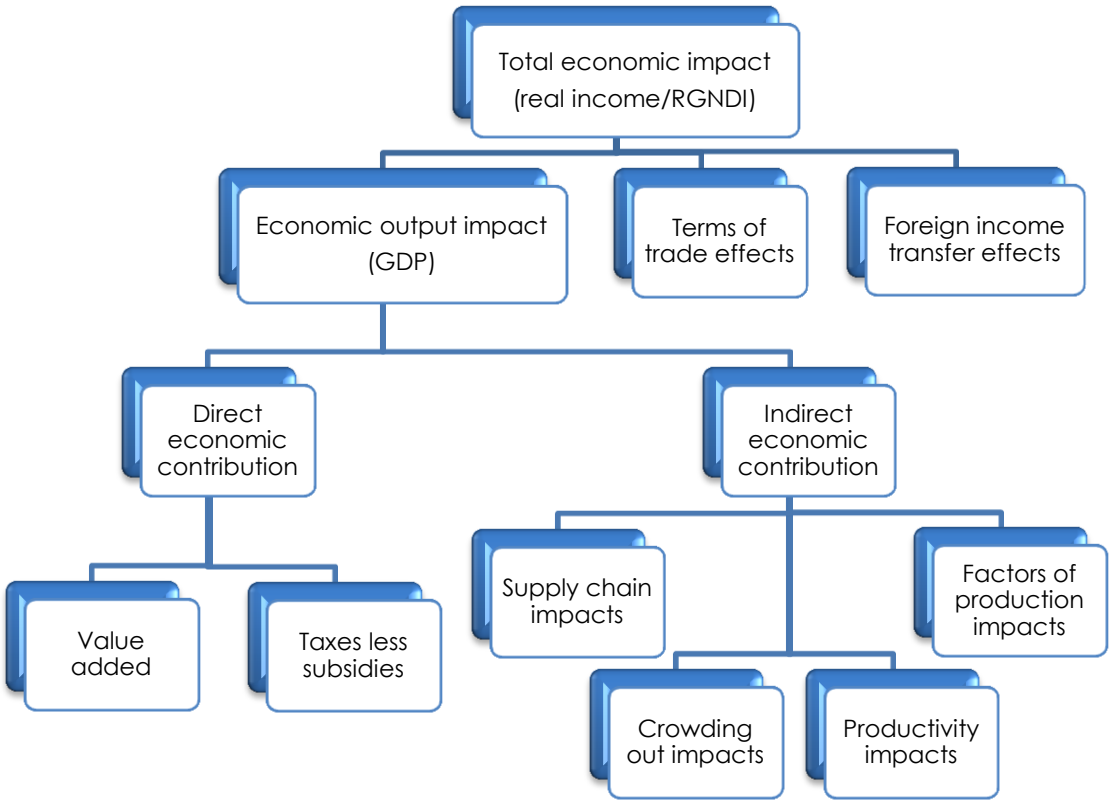
Fundamentally, although various aspects of a policy or project – such as the number of jobs or the size of the investment expenditure – are of relevance to certain stakeholders, the key aggregate measure of the impact of a project is the extent to which the total wealth of the economy has changed as a result of it[10]. Typically this is measured by real gross national disposable income (RGNDI), although real gross domestic product (GDP) and consumer surplus (among others) can also be important aggregate measures, depending on the nature of the policy or project being analysed.

The main factors that need to be considered when analysing the economic impacts of a project or policy include:

- the direct and indirect contribution to the economy as a result of the activities associated with the project
- any 'crowding out' implications, which is where the use of scarce resources in one project means that resources are diverted from other productive activities, potentially 'crowding out' those activities by delaying or preventing them from occurring
- any productivity effects generated as a direct result of the policy or project activities – particularly any enduring productivity changes or productivity spillovers to other activities not directly associated with the project or policy
- any changes to the factors of production in the economy
- any welfare implications associated with changes in terms of trade or foreign income transfers
- whether there is a dynamic element to the size of any of the above effects (due to different phases of the project for example).

[10] Analysis of any non-market impacts (such as the loss of biodiversity, changes in air quality, social justice implications, etc.) may also be relevant in assessing the full implications of a project or policy.

Figure A1 **Estimating the economic impact of a project or policy**




*Source:* ACIL Tasman

Figure A1 shows these components graphically. Some of these effects may have negligible impact, while others may be very significant. An understanding of the relative size of these effects helps determine the most appropriate tool(s) for the analysis.

For many projects, static estimates of the direct economic contribution and supply chain implications can be obtained through the use of I-O multipliers. Estimating the size of other components using multiplier techniques, is either not possible or very complex, as is estimating the economic impacts through time. In contrast, most CGE models are able to estimate all of the components shown in Figure A1 and dynamic CGE models are able to estimate the impacts through time. The greater complexity of CGE models introduces a range of additional uncertainties, but they enable a much broader range of economic impacts to be considered within a single framework, when compared to using I-O multipliers.

In comparing the regional economic benefits associated with cattle being sold through a local meat processing facility compared to live trade, a range of factors must be considered, including:

- The farm gate value of cattle (including any additional cattle that currently cannot be sold)
- The value of any additional herd management options available to producers
- The availability of suitable workers in the region (or that can be attracted to the region) without impinging on other activities
- The local value added by the live export industry, versus the value that could be added by a meat processing facility
- The ownership of the capital invested in a meat processing facility and the amount of profits that stay in the local economy.

These injections and flow-on effects will result in changes in consumption and welfare for the people of Northern Australia. Due to the nature of the impacts CGE modelling has been chosen as the preferred tool to undertake the economic impacts assessment in this report, rather than I-O multiplier analysis.

## A.3 The *Tasman Global* CGE Model

For this analysis, ACIL Tasman's CGE model, *Tasman Global*, has been used to estimate the impacts of the construction and operation activities associated with the development of a Northern Abattoir to replace current live animal exports. *Tasman Global* is a large scale, dynamic, computable general equilibrium model of the world economy that has been developed in-house by ACIL Tasman. *Tasman Global* is a powerful tool for undertaking economic analysis at the regional, state, national and global levels. More detail of the *Tasman Global* model is provided in Appendix C.

CGE models mimic the workings of the economy through a system of interdependent behavioural and accounting equations, which are linked to an input-output database. These models provide a representation of the whole economy, set in a national and international trading context, starting with individual markets, producers and consumers and building up the system via demands and production from each component. When an economic shock or change, such as the establishment of an abattoir, is applied to a model, each of the markets adjusts according to the set of behavioural parameters, which are underpinned by economic theory. The generalised nature of CGE models enables a much broader range of analysis to be undertaken (generally in a more robust manner) compared to I-O multiplier techniques, which are also often applied in economic impact assessments.

### A.3.1 Database aggregation

The database underpinning the model contains a wealth of sectoral detail. The foundation of this information is the set of input-output tables that underpin the database. Industries and regions in the model can be aggregated or

disaggregated as required for a specific project. For this project the model has been aggregated to:

- five economies, namely the Northern Territory, the Pilbara Statistical Division, the Kimberley Statistical Division, the Rest of Australia and the Rest of the World.
- 45 industries/commodities as presented in Table A5.

The aggregation was chosen to provide the maximum detail possible for the key industries in the Northern Australian economy.

Table A5 **Industry/Commodity aggregation used in Tasman Global modelling**

| | Industry/Commodity | | Industry/Commodity |
|---|---|---|---|
| 1 | Crops | 24 | Other mining |
| 2 | Northern Cattle | 25 | Alumina |
| 3 | Live export | 26 | Primary aluminium |
| 4 | Northern abattoir | 27 | Other nonferrous metals |
| 5 | Feedlotting and agistment | 28 | Non-metallic minerals (including cement, plaster, lime, gravel) |
| 6 | Other cattle, sheep, goats and horses | 29 | Chemicals, rubber, plastics |
| 7 | Dairy cattle, sheep for wool, silk worm cocoons | 30 | Textiles, clothing and footwear |
| 8 | Other animal products | 31 | Wood and paper products; publishing and printing (excluding furniture) |
| 9 | Forestry | 32 | Fabricated metal products |
| 10 | Fishing | 33 | Motor vehicles and parts |
| 11 | Bovine meat products | 34 | Other manufacturing |
| 12 | Other meat products | 35 | Water |
| 13 | Dairy products | 336 | Construction |
| 14 | Other processed food | 37 | Trade services (includes all retail and wholesale trade, hotels and restaurants) |
| 15 | Coal | 38 | Other transport and transport services |
| 16 | Oil | 39 | Water transport |
| 17 | Gas | 40 | Air transport |
| 18 | Electricity | 41 | Communications services |
| 19 | Petroleum & coal products | 42 | Other business services (including financial, insurance, real estate services) |
| 20 | Iron & steel | 43 | Recreational and other services |
| 21 | LNG | 44 | Government services (including public administration and defence) |
| 22 | Iron ore | 45 | Dwellings |
| 23 | Bauxite | | |

## A.4 Micro industry approach

To accurately assess the economic impacts or economic contribution of a project, such as an abattoir, it must be accurately represented in the model's

database. An accurate representation can be guaranteed by establishing the proposed project as a new 'micro' industry in the database.

The micro industry approach is so called because it involves the creation of one or more new, initially very small, industries in the *Tasman Global* database. The specifications of each of the micro industry's costs and sales structures are directly derived from the financial data for the project to be analysed. At the outset, the new industry is necessarily very small so that its existence in the *Tasman Global* database does not affect the database balance or the "business-as-usual" reference case outcomes.

Using the micro industry approach for project evaluations is the most accurate way to capture the detailed economic linkages between the project and the other industries in the economy. This approach has been developed by ACIL Tasman because each project is unique, relative to the more aggregated industries in the *Tasman Global* database.

Consequently, one of the industries identified in Table A5 is the operational phase of a Northern Australia abattoir with its own input cost structure, sales, employment, tax revenues and emissions, based on detailed information developed by ACIL Tasman for this analysis. (In addition, the database also identified the construction phase of an abattoir with its own input cost structure.)

## A.5 Measures of macroeconomic impacts

Although changes in real economic output are useful measures for estimating how much the output of an economy may change under different industry or policy scenarios, differences in the **real income** of a region are more important, since they provide an indication of the change in economic welfare of the residents of a region. Indeed, it is possible that real economic output can increase with no, or possibly negative, changes in real income. In *Tasman Global*, changes in real income at the national level are synonymous with real gross national disposable income (RGNDI) reported by the ABS.

The change in real income is equivalent to the change in real economic output, plus the change in net foreign income transfers, plus the change in terms of trade (which measures changes in the purchasing power of a region's exports relative to its imports). As Australians have experienced first-hand in recent years, changes in terms of trade can have a substantial impact on people's welfare independently of changes in real GDP. The change in real income (as projected by *Tasman Global*) is ACIL Tasman's preferred measure of the change in economic welfare of residents.

## A.6 The Tasman Global model

ACIL Tasman's computable general equilibrium (CGE) model *Tasman Global*, is a powerful tool for undertaking economic impact analysis at the regional, state, national and global level.

There are various types of economic models and modelling techniques. Many of these are based on partial equilibrium analysis that usually considers a single market. However, in economic analysis, linkages between markets and how these linkages develop and change over time can be critical. *Tasman Global* has been developed to meet this need.

*Tasman Global* is an analytical tool that can capture these linkages on a regional, state, national and global scale. *Tasman Global* is a large-scale computable general equilibrium model, which is designed to account for all sectors within an economy and all economies across the world. ACIL Tasman uses this modelling platform to undertake industry, project, scenario and policy analyses. The model is able to analyse issues at the industry, global, national, state and regional levels and to determine the impacts of various economic changes on production, consumption and trade at the macroeconomic and industry levels.

## A.7 A dynamic model

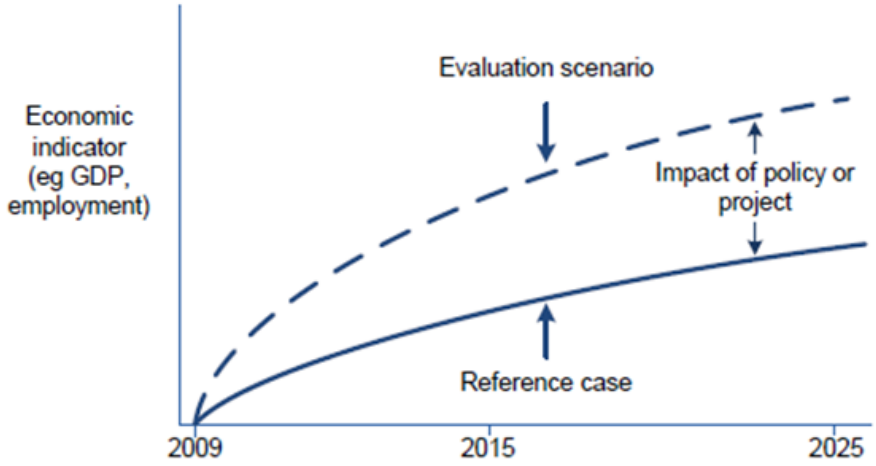
*Tasman Global* is a model that estimates relationships between variables at different points in time. This is in contrast to comparative static models, which compare two equilibriums (one before a policy change and one following). A dynamic model, such as *Tasman Global,* is beneficial when analysing issues where both their timing and the adjustment path that economies follow, are relevant in the analysis.

In applications of the *Tasman Global* model, a reference case simulation forms a 'business-as-usual' basis with which to compare the results of various simulations. The reference case provides projections of growth in the absence of the changes to be examined. The impact of the change to be examined is then simulated and the results interpreted as deviations from the reference case. (See Figure A2).

### A.7.1 The database

A key advantage of *Tasman Global* is the level of detail in the database underpinning the model. The database is derived from the latest Global Trade Analysis Project (GTAP) database, which was released in 2008. This database is a fully documented, publicly available, global data base, which contains complete bilateral trade information, transport and protection linkages among regions for all GTAP commodities.

Figure A2 **Illustrative scenario analysis using Tasman Global**




*Source:* ACIL Tasman

The GTAP model was constructed at the Centre for Global Trade Analysis at Purdue University in the United States. It is the most up-to-date, detailed database of its type in the world.

*Tasman Global* builds on the GTAP model's equation structure and database by adding the following important features:

- dynamics (including detailed population and labour market dynamics)
- detailed technology representation within key industries (such as electricity generation and iron and steel production)
- disaggregation of a range of major commodities, including iron ore, bauxite, alumina, primary aluminium, brown coal, black coal and LNG
- the ability to repatriate labour and capital income
- a detailed emissions accounting abatement framework
- explicit representation of the states and territories of Australia
- the capacity to explicitly represent multiple regions within states and territories of Australia.

Nominally the *Tasman Global* database divides the world economy into 120 regions (112 international regions plus the 8 states and territories of Australia); although in reality the regions are frequently disaggregated further. ACIL Tasman regularly models projects or policies at the statistical division (SD) level, as defined by the ABS, but finer regional detail has been modelled when warranted.

The *Tasman Global* database also contains a wealth of sectoral detail, currently identifying up to 70 industries (Table A6). The foundation of this information is the input-output tables that underpin the database. The input-output tables

account for the distribution of industry production to satisfy industry and final demands. Industry demands, so-called intermediate usage, are the demands from each industry for inputs. For example, electricity is an input into the production of communications. In other words, the communications industry uses electricity as an intermediate input. Final demands are those made by households, governments, investors and foreigners (export demand). These final demands, as the name suggests, represent the demand for finished goods and services. To continue the example, electricity is used by households – their consumption of electricity is a final demand.

Each sector in the economy is typically assumed to produce one commodity, although in *Tasman Global*, the electricity, diesel and iron and steel sectors are modelled using a 'technology bundle' approach. With this approach, different known production methods are used to generate a homogeneous output for the 'technology bundle' industry. For example, electricity can be generated using brown coal, black coal, petroleum, base load gas, peak load gas, nuclear, hydro, geothermal, biomass, wind, solar or other renewable energy-based technologies – each of which has its own cost structure.

The other key feature of the database is that the cost structure of each industry is also represented in detail. Each industry purchases: intermediate inputs (from domestic and imported sources), primary factors (labour, capital, land and natural resources), as well as paying taxes or receiving subsidies.

Table A6 **Sectors in the *Tasman Global* database**

| | Sector | | Sector |
|---|---|---|---|
| 1 | Paddy rice | 36 | Paper products, publishing |
| 2 | Wheat | 37 | Diesel (incl. nonconventional diesel) |
| 3 | Cereal grains nec | 38 | Other petroleum, coal products |
| 4 | Vegetables, fruit, nuts | 39 | Chemical, rubber, plastic products |
| 5 | Oil seeds | 40 | Iron ore |
| 6 | Sugar cane, sugar beef | 41 | Bauxite |
| 7 | Plant– based fibres | 42 | Mineral products nec |
| 8 | Crops nec | 43 | Ferrous metals |
| 9 | Bovine cattle, sheep, goats, horses | 44 | Alumina |
| 10 | Animal products nec | 45 | Primary aluminium |
| 11 | Raw milk | 46 | Metals nec |
| 12 | Wool, silk worm cocoons | 47 | Metal products |
| 13 | Forestry | 48 | Motor vehicle and parts |
| 14 | Fishing | 49 | Transport equipment nec |
| 15 | Brown coal | 50 | Electronic equipment |
| 16 | Black coal | 51 | Machinery and equipment nec |
| 17 | Oil | 52 | Manufactures nec |
| 18 | Liquefied natural gas (LNG) | 53 | Electricity generation |
| 19 | Other natural gas | 54 | Electricity transmission and distribution |
| 20 | Minerals nec | 55 | Gas manufacture, distribution |
| 21 | Bovine meat products | 56 | Water |
| 22 | Meat products nec | 57 | Construction |
| 23 | Vegetables oils and fats | 58 | Trade |
| 24 | Dairy products | 59 | Road transport |
| 25 | Processed rice | 60 | Rail and pipeline transport |
| 26 | Sugar | 61 | Water transport |
| 27 | Food products nec | 62 | Air transport |
| 28 | Wine **a** | 63 | Transport nec |
| 29 | Beer **a** | 64 | Communication |
| 30 | Spirits and RTDs **a** | 65 | Financial services nec |
| 31 | Other beverages and tobacco products **a** | 66 | Insurance |
| 32 | Textiles | 67 | Business services nec |
| 33 | Wearing apparel | 68 | Recreational and other services |
| 34 | Leather products | 69 | Public Administration, Defence, Education, Health |
| 35 | Wood products | 70 | Dwellings |

***a*** A detailed beverage database and model structure covering 52+ alcoholic and non–alcoholic sub–categories and alternative sales channels is also available.

*Note*: nec = not elsewhere classified

### A.7.2 Detailed energy sector and linkage to *PowerMark* and *GasMark*

*Tasman Global* contains a detailed representation of the energy sector, particularly in relation to the interstate (trade in electricity and gas) and international linkages across the regions represented. To allow for more detailed electricity sector analysis, and to aid in linkages to bottom-up models, such as ACIL Tasman's *GasMark* and *PowerMark* models, electricity generation is separated from transmission and distribution in the model. In addition, the electricity sector in the model employs a 'technology bundle' approach that separately identifies twelve different electricity generation technologies:

- brown coal (with and without carbon capture and storage)
- black coal (with and without carbon capture and storage)
- petroleum
- base load gas (with and without carbon capture and storage)
- peak load gas
- hydro
- geothermal
- nuclear
- biomass
- wind
- solar
- other renewables.

To enable more accurate linking to *PowerMark*, the generation cost of each technology is assumed to be equal to their long run marginal cost (LRMC), while the sales price in each region is matched to the average annual dispatch weighted prices projected by *PowerMark* – with any difference being returned as an economic rent to electricity generators. This representation enables the highly detailed market-based projections from *PowerMark* to be incorporated as accurately as possible into *Tasman Global*.

### A.7.3 Factors of production

Capital, land, labour and natural resources are the four primary factors of production. The capital stock in each region (country or group of countries) accumulates through investment (less depreciation) in each period. Land is used only in agriculture industries and is fixed in each region. *Tasman Global* explicitly models natural resource inputs as a sector specific factor of production in resource-based sectors (coal mining, oil and gas extraction, other mining, forestry and fishing).

### A.7.4 Population growth and labour supply

Population growth is an important determinant of economic growth, through the supply of labour and the demand for final goods and services. Population growth for the 112 international regions and for the 8 states and territories of Australia represented in the *Tasman Global* database is projected using ACIL Tasman's in-house demographic model. The demographic model projects how the population in each region grows and how age and gender composition changes over time. It is an important tool for determining the changes in regional labour supply and total population over the projection period.

For each of the 120 regions in *Tasman Global*, the model projects the changes in age-specific birth, mortality and net migration rates, by gender for 101 age cohorts (0–99 and 100+). The demographic model also projects changes in participation rates by gender, by age, for each region, and, when combined with the age and gender composition of the population, endogenously projects the future supply of labour in each region. Changes in life expectancy are a function of income per person, as well as assumed technical progress on lowering mortality rates for a given income (for example, reducing malaria-related mortality through better medicines, education, governance, etc.). Participation rates are a function of life expectancy as well as expected changes in higher education rates, fertility rates and changes in the work force, as a share of the total population.

Labour supply is derived from the combination of the projected regional population by age, by gender, and the projected regional participation rates by age, by gender. Over the projection period, labour supply in most developed economies is projected to grow slower than total population as a result of ageing population effects.

For the Australian states and territories, the projected aggregate labour supply from ACIL Tasman's demographics module is used as the base level potential workforce for the detailed Australian labour market module, which is described in the next section.

### A.7.5 The Australian labour market

*Tasman Global* has a detailed representation of the Australian labour market, which has been designed to capture:

- different occupations
- changes to participation rates (or average hours worked), due to changes in real wages
- changes to unemployment rates, due to changes in labour demand
- limited substitution between occupations by the firms demanding labour and by the individuals supplying labour; and

- limited labour mobility between states.

*Tasman Global* recognises 97 different occupations within Australia – although the exact number of occupations depends on the aggregation. The firms who hire labour are provided with some limited scope to change between these 97 labour types, as the relative real wage between them changes. Similarly, the individuals supplying labour have a limited ability to change occupations in response to the changing relative real wage between occupations. Finally, as the real wage for a given occupation rises in one state relative to other states, workers are given some ability to respond by shifting their location. The model produces results at the 97 3–digit ANZSCO (Australian New Zealand Standard Classification of Occupations) level.

The labour market structure of *Tasman Global* is thus designed to capture the reality of labour markets in Australia, where supply and demand at the occupational level do adjust, but within limits.

Labour supply in *Tasman Global* is presented as a three stage process:

1. labour makes itself available to the workforce based on movements in the real wage and the unemployment rate
2. labour chooses between occupations in a state based on relative real wages within the state; and
3. labour of a given occupation chooses in which state to locate, based on movements in the relative real wage for that occupation between states.

By default, *Tasman Global*, like all CGE models, assumes that markets clear. Therefore, overall, supply and demand for different occupations will equate (as is the case in other markets in the model).

### A.7.6 Greenhouse gas emissions

The model has a detailed greenhouse gas emissions accounting, trading and abatement framework that tracks the status of six anthropogenic greenhouse gases (namely, carbon dioxide, methane, nitrous oxide, HFCs, PFCs and $SF_6$). Almost all sources and sectors are represented; emissions from agricultural residues and land-use change and forestry activities are not explicitly modelled but can be accounted for in policy analysis.

The greenhouse modelling framework not only allows accounting of changes in greenhouse gas emissions, but also allows various policy responses, such as carbon taxes or emissions trading, to be employed and assessed within a consistent framework. For example, the model can be used to measure the economic and emission impacts of a fixed emissions penalty in single or multiple regions whether trading is allowed or not. Or, it can used to model the

emissions penalty required to achieve a desired cut in emissions, based on various trading and taxation criteria.

### A.7.7 Model results

*Tasman Global* solves equations covering industry sales and consumption, private consumption, government consumption, investment and trade. The model therefore produces detailed microeconomic results, such as:

- output by industry
- employment by industry; and
- industry imports and exports.

*Tasman Global* also produces a full range of macroeconomic results, for each Australian and international region, including:

- total economic output – i.e. gross domestic product (GDP), gross state product (GSP) and gross regional product (GRP)
- total employment
- gross national product (GNP)
- private consumption
- public consumption
- investment and savings
- imports; and
- exports

# B Chronology of events since the preparation of this report

The report was prepared between July and November 2011. Since that time a number of events have taken place that are of relevance to readers of this report. Table B1 lists a number of the main events and activities that are of relevance to this report.

Table B1 **Chronology of events since this report was prepared**

| Event | Date |
|---|---|
| Indonesia introduces the need for pedigree information on all breeding cattle sent to Indonesia | August 2012 |
| Indonesia introduces 5 per cent tariff (retrospective to January 2012) | July 2012 |
| Indonesia maintains live cattle and beef quotas | July 2012 (Ministerial meeting in Darwin) |
| ABARES releases northern beef study http://www.regional.gov.au/regional/ona/files/20120621-abares-final-report.pdf | May 2012 |
| AAco acquires land for the proposed abattoir | May 2012 |
| AAco receives development approval for the Darwin abattoir | April 2012 |
| Queensland Government releases Northern Australian abattoir feasibility study http://www.daff.qld.gov.au/documents/AnimalIndustries_Beef/NQ-abattoir-study.pdf | February 2012 |

# C Seasonality of beef production in Northern Australia

One of the most significant features of cattle production in the north of Australia is the impact of the wet season on production and logistics. There are two impacts the climatic variations in the north have on cattle production:

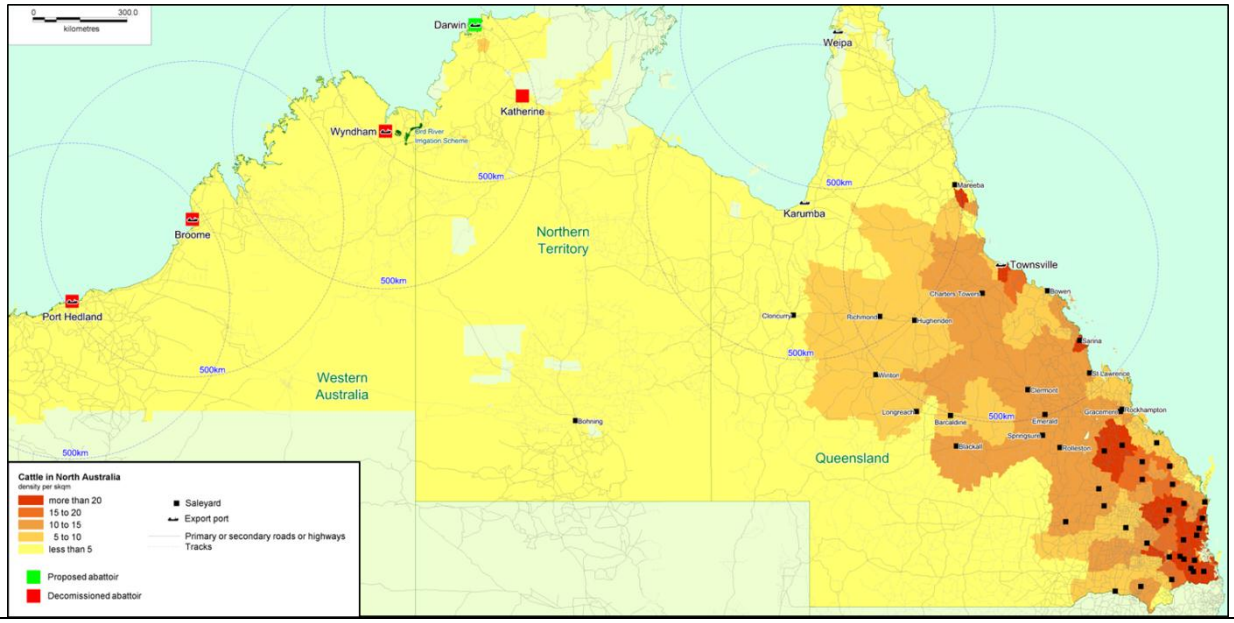
- During the wet season, movement of cattle and vehicles is extensively constrained by the extent and intensity of rainfall between October and March
- The huge variations in rainfall between the wet and dry, coupled with the poor water holding capacity of the soils, drives large variations in the quantity and quality of cattle feed available during the year

These two factors combined are responsible for the large seasonal variation in cattle supply. To analyse this seasonality of supply we have commissioned GrainGrowers Information Services division to prepare an analysis of the seasonality of live cattle exports by port, and the seasonality of rainfall and biomass production for defined areas within the Northern cattle production region.

This analysis provides guidance on the extent to which a processing facility may experience seasonality of supply of suitable cattle through a calendar year and between years.

To assess the seasonality of the supply of cattle, a series of cattle production regions were defined using a judgement of the likely port that they would naturally be shipped from, if transport to port was the main consideration. Figure C1 shows the herd densities, and the live export ports in the North of Australia.

Figure C1 **Herd density and infrastructure in the Northern Australian beef production region**

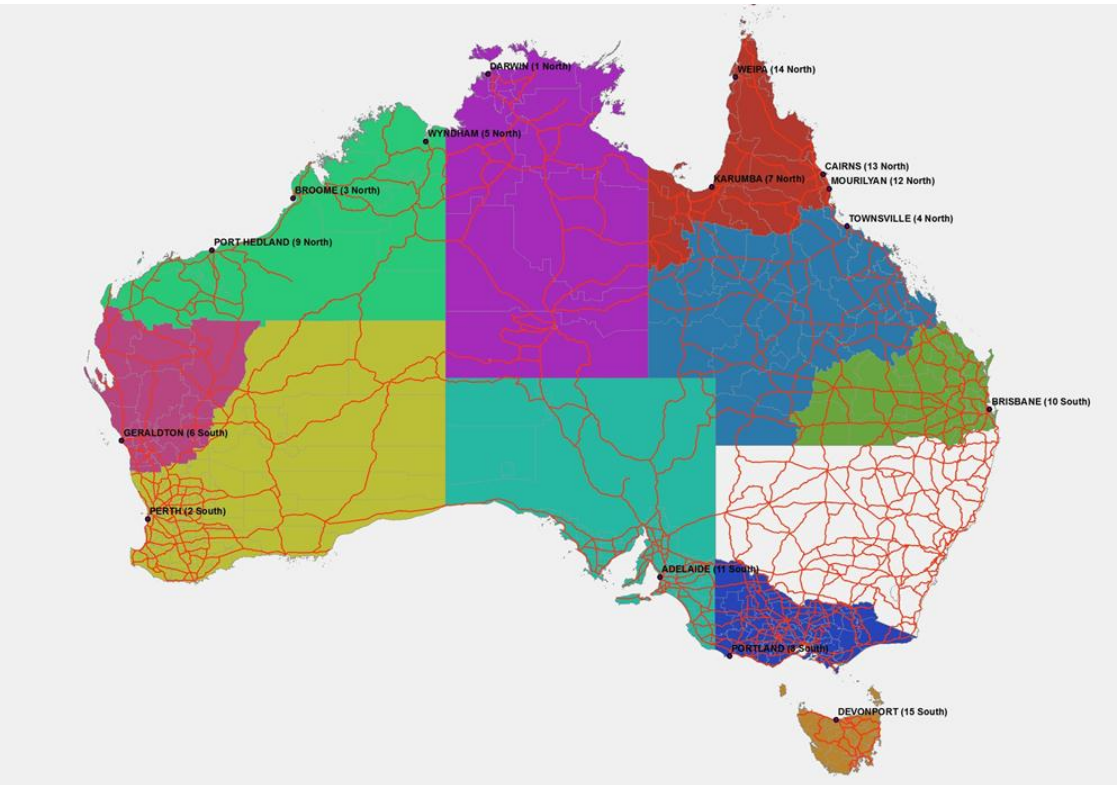



*Data source:* ACIL Tasman

It is worth noting that cattle are often aggregated on properties (depots) prior to shipment. Depending on the timing of the arrival of the ship, the preparedness of the cattle for shipment and the location of the property, depot and port, not all cattle will be shipped from the nearest port all the time. Also, if there are insufficient cattle to fill a ship in port, the marginal value of acquiring the cattle to complete the shipment is high. This means that small numbers of cattle can be moved long distances to fill ships as the marginal value of the shipping costs of the additional cattle is low, which offsets the large road transport costs that may be incurred to bring the cattle to the ship.

Given these caveats, an approximate map of the natural live cattle port zones was prepared (see Figure C2).

Figure C2 **Approximate cattle supply zone and export ports**[11]



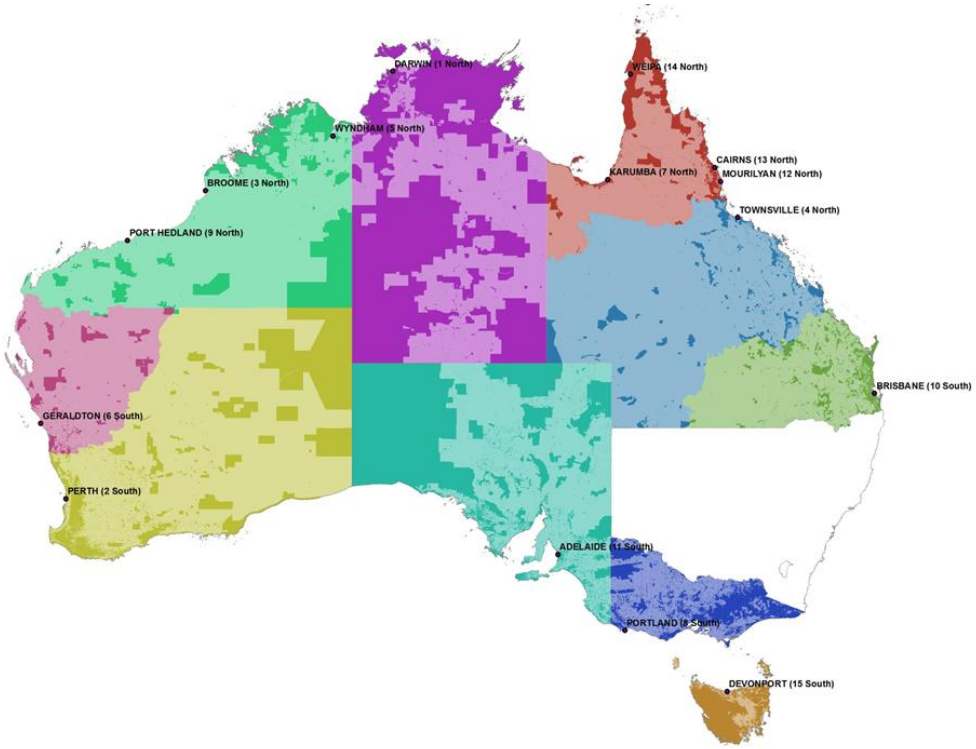

*Data source:* GrainGrowers Information Services 2011

After the port zones were identified, an approximation of the agricultural areas of each zone was estimated using a non-agricultural area mask. Defining the agricultural land area allowed a calculation of seasonal average rainfall and biomass production to be calculated[12].

[11] Principal Territories in maps 2 and 3 are defined by State Boundaries. Boundaries of three discrete territories within WA and QLD were defined by reference to Local Government Area boundaries, major roadways and distance between adjacent ports (or groups of ports in the case of Northern WA and Northern QLD)

[12] Biomass (used interchangeably to represent NDVI – normalised difference vegetation index values within the range of 0 to 1) is used as a surrogate for carrying capacity, pasture availability or feed on offer

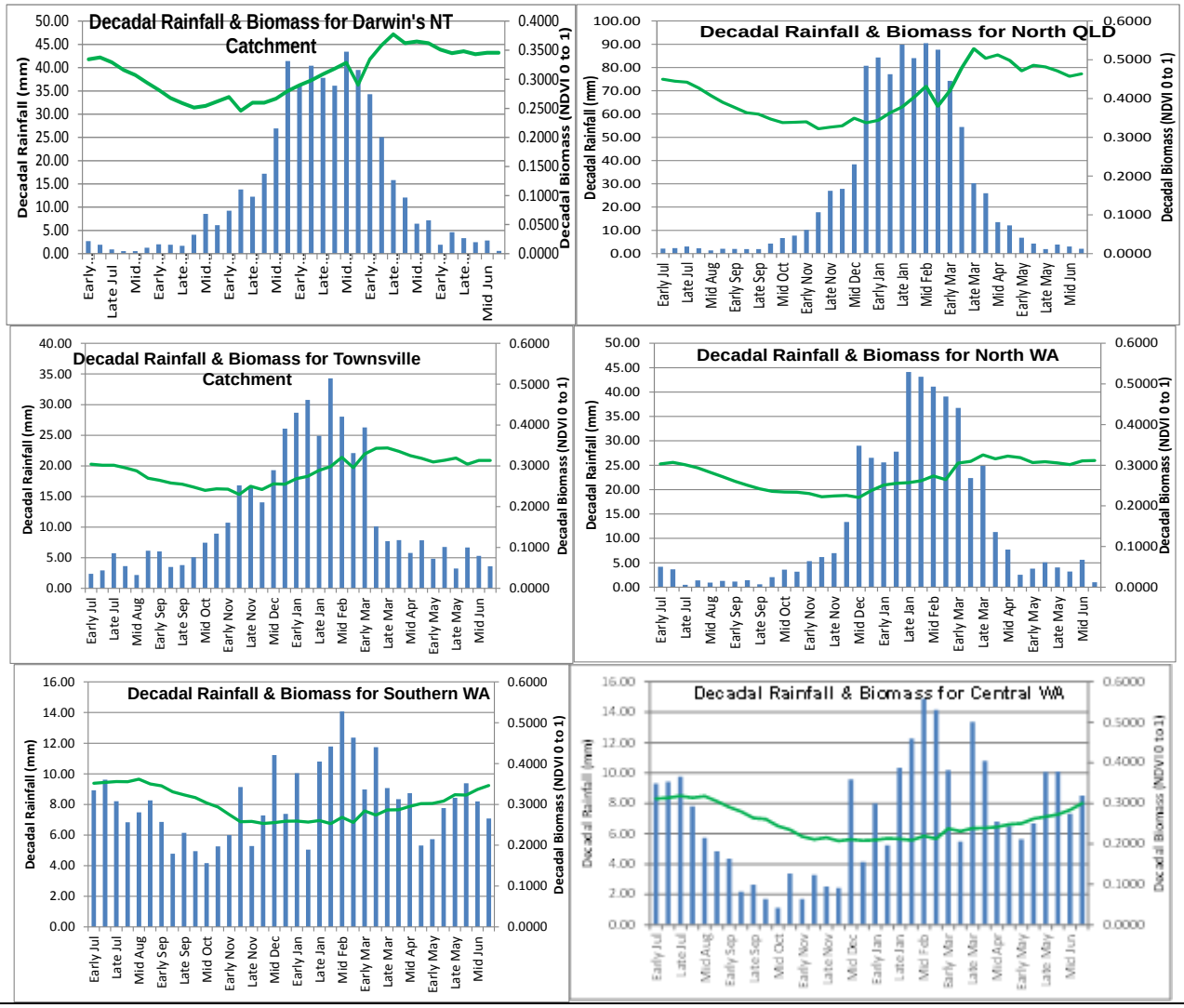
Figure C3 **Cattle supply zones and land use**




*Data source:* GrainGrowers Information Services 2011

The following charts show the average monthly (in 10 day or decadal averages) rainfall and biomass production in each of the 'port zones'. Not all port zones have been included in Figure C4. The port zones that have been chosen show the difference in monthly rainfall distribution and biomass production between the north and south of Australia.

Figure C4 **Average monthly rainfall and biomass index levels for selected live export port zones**



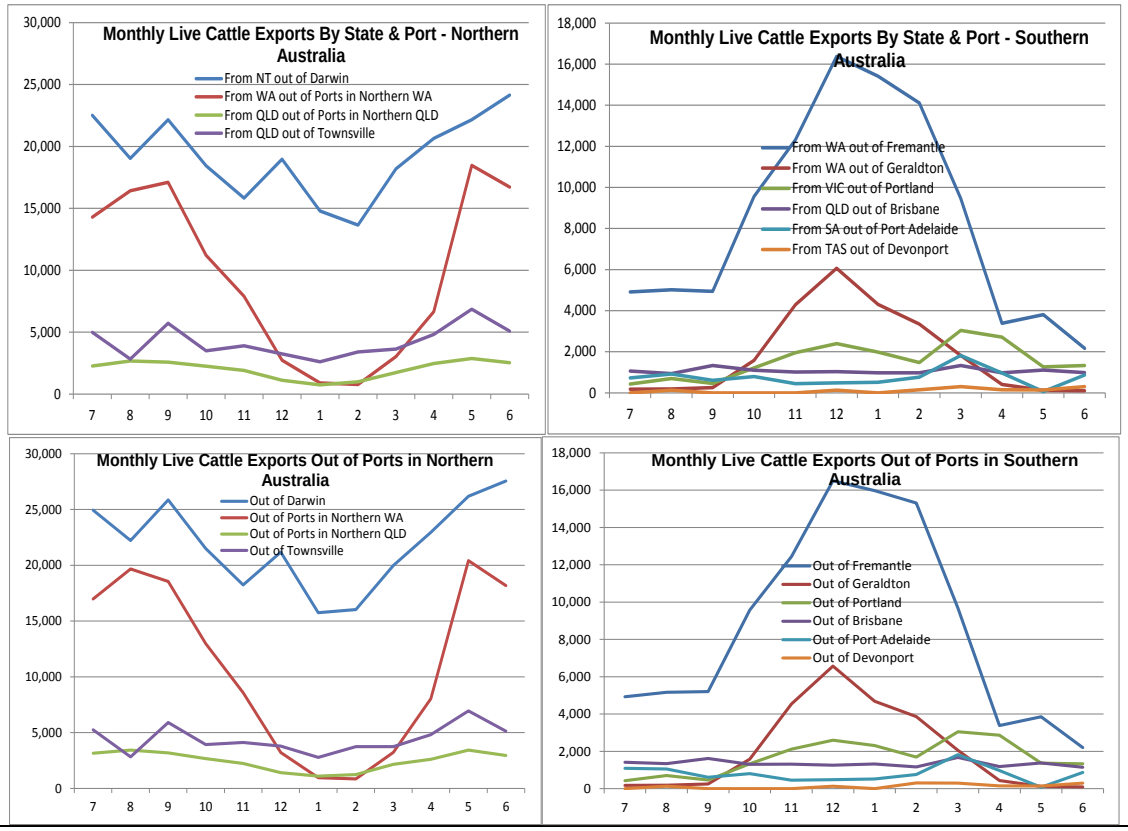

*Data source:* GrainGrowers Information Services 2011

As part of the analysis, live cattle exports by port, by month, between 1992 and August 2011, were analysed using ABS data acquired for this project. The ABS data included cattle exported by port of origin and state of origin of the cattle. In most instances, the large majority of the cattle exported from the port were from the state in which the port was located.

It is clear from the data that there is substantial seasonality in exports in the northern ports, with the Northern WA ports showing the greatest seasonal variation. What is also apparent in the charts is the highly negative correlation between the exports from northern and southern ports. That is, when seasonal conditions reduce the supply of cattle from the north, some of those cattle are sourced from southern ports.

The southern port that supplies most of the cattle during the wet season is Fremantle in WA.

Chart C1 **Average monthly exports of cattle by port (northern and southern ports)**

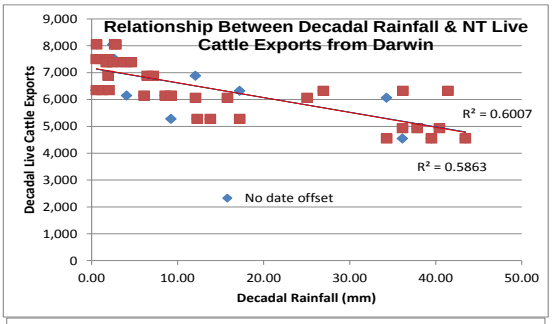


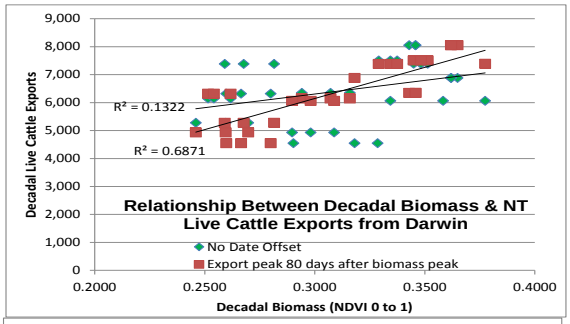

*Data source:* GrainGrowers Information Services

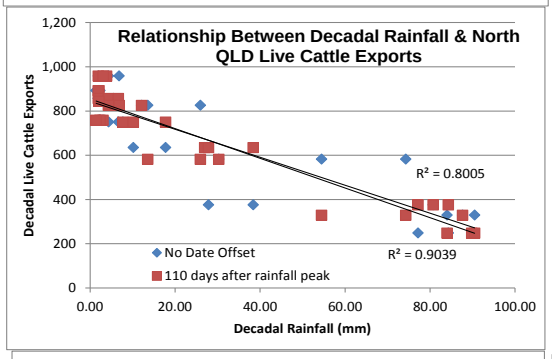
It must also be noted that the exports of cattle from the south contain a small proportion of breeding cattle.

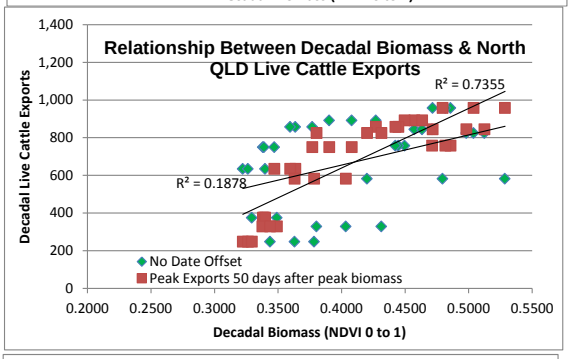
The results of the climate analysis were then compared to live cattle exports by port, to test the extent of the correlation between the number of live exports by port and seasonal variations between months.

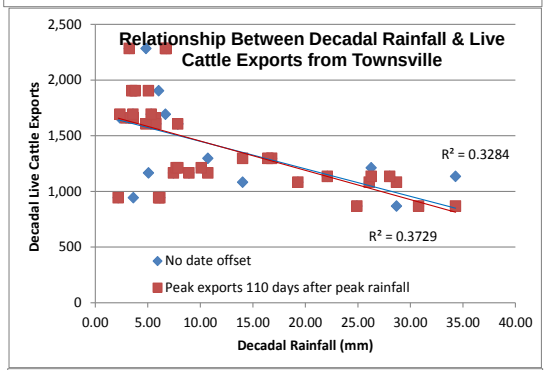
## Chart C2 The relationship between live cattle exports rainfall and biomass by port zone

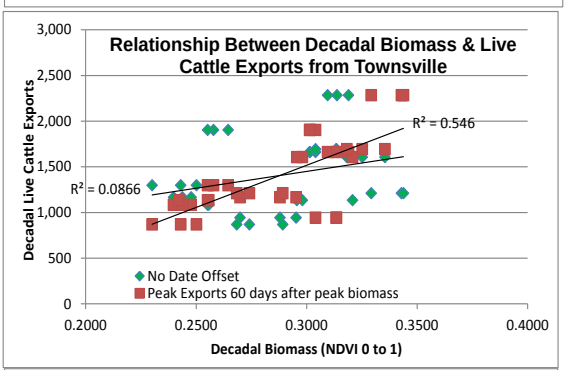


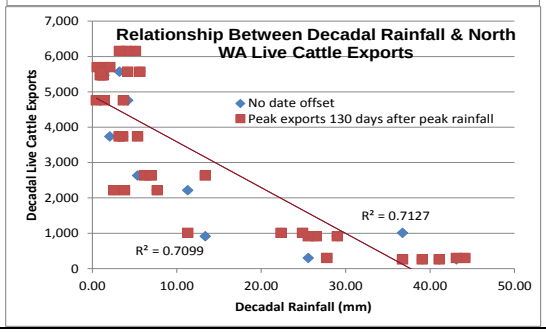



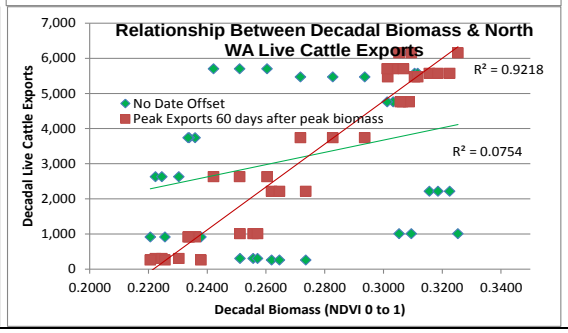




*Data source:* GrainGrowers Information Services 2011

When the correlation between monthly rainfall, biomass and live cattle exports are compared, it becomes clear that rainfall and biomass are highly correlated with the supply of cattle. Rainfall influences supply of cattle by physically restricting cattle movements in the wet season. Therefore cattle are only able to move on all-weather roads, and when other roads dry out enough to allow stock trucks to move about.

Biomass affects cattle supply, as cattle have to have access to feed of sufficient quality to make export specifications. Therefore cattle have to have sufficient time on higher quality feed during the wet season to grow to maximum allowable weights but come in under the 350kg live weight limit.