

August 2022

Report to LiveCorp and Meat & Livestock Australia

The economic contribution and benefits of the Northern live export cattle industry

Final report



About ACIL Allen

ACIL Allen is a leading independent economics, policy and strategy advisory firm, dedicated to helping clients solve complex issues.

Our purpose is to help clients make informed decisions about complex economic and public policy issues.

Our vision is to be Australia's most trusted economics, policy and strategy advisory firm. We are committed and passionate about providing rigorous independent advice that contributes to a better world.

Suggested citation for this report

ACIL Allen, 2022, The economic contribution and benefits of the Northern live export cattle industry, Prepared for LiveCorp and Meat & Livestock Australia

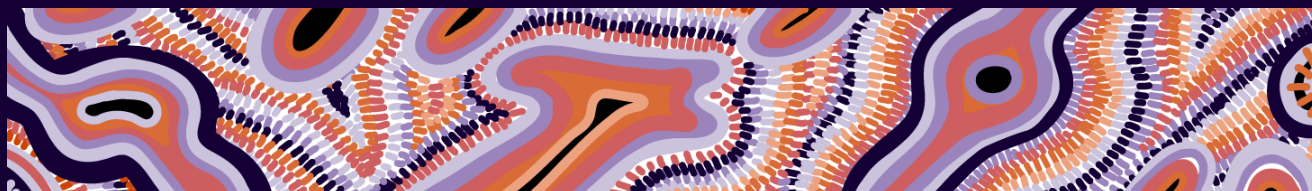
Reliance and disclaimer The professional analysis and advice in this report has been prepared by ACIL Allen for the exclusive use of the party or parties to whom it is addressed (the addressee) and for the purposes specified in it. This report is supplied in good faith and reflects the knowledge, expertise and experience of the consultants involved. The report must not be published, quoted or disseminated to any other party without ACIL Allen's prior written consent. ACIL Allen accepts no responsibility whatsoever for any loss occasioned by any person acting or refraining from action as a result of reliance on the report, other than the addressee.

In conducting the analysis in this report ACIL Allen has endeavoured to use what it considers is the best information available at the date of publication, including information supplied by the addressee. ACIL Allen has relied upon the information provided by the addressee and has not sought to verify the accuracy of the information supplied. If the information is subsequently determined to be false, inaccurate or incomplete then it is possible that our observations and conclusions as expressed in this report may change. The passage of time, manifestation of latent conditions or impacts of future events may require further examination of the project and subsequent data analysis, and re-evaluation of the data, findings, observations and conclusions expressed in this report. Unless stated otherwise, ACIL Allen does not warrant the accuracy of any forecast or projection in the report. Although ACIL Allen exercises reasonable care when making forecasts or projections, factors in the process, such as future market behaviour, are inherently uncertain and cannot be forecast or projected reliably.

This report does not constitute a personal recommendation of ACIL Allen or take into account the particular investment objectives, financial situations, or needs of the addressee in relation to any transaction that the addressee is contemplating. Investors should consider whether the content of this report is suitable for their particular circumstances and, if appropriate, seek their own professional advice and carry out any further necessary investigations before deciding whether or not to proceed with a transaction. ACIL Allen shall not be liable in respect of any claim arising out of the failure of a client investment to perform to the advantage of the client or to the advantage of the client to the degree suggested or assumed in any advice or forecast given by ACIL Allen.

© ACIL Allen 2022

ACIL Allen acknowledges Aboriginal and Torres Strait Islander peoples as the Traditional Custodians of the land and its waters. We pay our respects to Elders, past and present, and to the youth, for the future. We extend this to all Aboriginal and Torres Strait Islander peoples reading this report.



Goomup, by Jarni McGuire

Contents

Executive summary	i
1 Introduction	1
1.1 Background	1
1.2 Objective	2
1.3 Methodology	3
1.3.1 Input-output analysis	3
1.3.2 Econometric model	4
1.3.3 Desktop review and qualitative analysis	4
2 Results	6
2.1 Economic contribution of the Northern live cattle export industry	6
2.1.1 National summary statistics	6
2.1.2 State and regional impacts	8
2.2 Regional case studies	11
2.2.1 Broome (Kimberley region), Western Australia	11
2.2.2 The Charters Towers – Ayr – Ingham region, Queensland	18
2.2.3 Barkly, Katherine and Daly-Tiwi-West Arnhem regions, The Northern Territory	27
2.3 Impact of a reduction or a cessation of cattle live exports	36
2.3.1 Historical and projected live export volumes	36
2.3.2 Historical and projected head of cattle slaughtered	37
2.3.3 Relationship between the price of cattle and the stock of slaughter cattle	37
2.3.4 Price and gross value production (GVP) of the cessation of the industry	38
2.3.5 GVP industry impact of live export cessation	41
2.3.6 Total industry impact of live export cessation	43
2.3.7 Land value impact of live export cessation	43
2.4 International trade and comparative advantage	45
2.4.1 Snapshot of live export cattle trade, 2020-21 and projections	45
2.4.2 Comparative advantage	46
2.4.3 Australia's market and trading partners	47
2.4.4 Relative cost of production – Australian systems	50
2.4.5 Relative cost of production – international competitors	53
3 Conclusion	54
3.1 Key findings	54
3.1.1 Value and importance to the Australian economy and regional communities	54
3.1.2 Comparative advantage of the Northern Australian live export industry	57
3.1.3 Impact of a material reduction or cessation of live export trading	59
3.2 Benefits to industry	59
4 Future research and recommendations	60

Contents

Appendices		61
A	References	A-1
B	Input-Output Analysis	B-1
B.1	Direct economic contribution	B-1
B.2	Indirect economic contribution	B-2
B.3	Overview of Input-Output tables	B-3
B.4	Multiplier types	B-3
	<i>B.4.1 Multiplier effects</i>	B-4
	<i>B.4.2 Multipliers</i>	B-4
B.5	Limitations of Input-Output analysis	B-5
Figures		
Figure ES 1	The live export cattle industry (2020-21)	ii
Figure 1.1	Modelled cattle supply chain with annual transport volumes by millions of head (m) and millions of tonnes (mt) of beef (live export industry in grey box)	1
Figure 1.2	Live export cattle numbers and value over time by jurisdiction with a focus on Northern Australia	2
Figure 2.1	The live export cattle industry's value add across Australian industries (upper bound)	7
Figure 2.2	The Kimberley region, WA	11
Figure 2.3	RAI indicators for the Kimberley region	12
Figure 2.4	The Great Northern Highway (in red on map (left)). Broome Port (top right) and Wyndham Port (bottom right)	13
Figure 2.5	Northern beef cattle by destination in the Kimberley Region (2011-2015)	14
Figure 2.6	Distribution of the live export industry value add impacts across other regional industries in the Kimberley region (upper bound)	15
Figure 2.7	Distribution of the live export industry full-time equivalent employment impacts across other regional industries in the Kimberley region (upper bound)	15
Figure 2.8	SWOT analysis for the live export industry in the Kimberley region	17
Figure 2.9	The Charters Towers – Ayr – Ingham region in Queensland	19
Figure 2.10	RAI indicators for the Charters Towers – Ayr – Ingham region	20
Figure 2.11	Distribution of the live export industry value add impacts across other regional industries in the Charters Towers – Ayr – Ingham region (upper bound)	22
Figure 2.12	Distribution of the live export industry full-time equivalent employment impacts across other regional industries in the Charters Towers – Ayr – Ingham region (upper bound)	22
Figure 2.13	Regional infrastructure linkages (Charters Towers circled in red)	24
Figure 2.14	SWOT analysis for the live export industry in Charters Towers – Ayr- Ingham region	26
Figure 2.15	Snapshot of the NT live export cattle industry, 2020-21	27

Contents

Figure 2.16	The three regions of focus (Barkly, Katherine and Daly-Tiwi-West Arnhem) in the NT	27
Figure 2.17	RAI indicators for the Northern Territory	30
Figure 2.18	The road and rail network for livestock transportation in the NT	31
Figure 2.19	Live exports ship at Darwin Port	32
Figure 2.20	Distribution of the live export industry value add impacts across other regional industries in the Northern Territory (upper bound)	33
Figure 2.21	Distribution of the live export industry full-time equivalent employment impacts across other regional industries in the Northern Territory (upper bound)	33
Figure 2.22	SWOT analysis for the live export industry in the NT	35
Figure 2.23	Live exports, historical and projected (head of cattle), Australia	36
Figure 2.24	Cattle slaughtered; historical and projected (head of cattle)	37
Figure 2.25	GVP impact on existing industry of lower cattle prices, NPV \$ million	38
Figure 2.26	Cattle price reduction by scenario relative to baseline for three elasticities	39
Figure 2.27	Lost cattle industry GVP due to price reduction by scenario relative to baseline for three elasticities	40
Figure 2.28	Lost GVP resulting from the cessation of the industry	41
Figure 2.29	Lost GVP resulting from the cessation of the industry	42
Figure 2.30	GVP impact resulting from the cessation of the industry, NPV	43
Figure 2.31	NT revenue per hectare of NT grazing land under different scenarios	44
Figure 2.32	NT value per hectare, NPV, Dollars	44
Figure 2.33	NT value per hectare, Percentage change	45
Figure 2.34	Value of Australian live feeder/slaughter cattle imports to Indonesia	46
Figure 2.35	Share of global live cattle exports (2019)	48
Figure 2.36	Australian live cattle exports by destination	49
Figure 2.37	Head of cattle exported overtime from Australia, Argentina and Brazil	49
Figure 2.38	Costs by category in Australian Northern vs Southern cattle systems (2019-20)	50
Figure 2.39	Cost, price and margin in Australian Northern vs Southern cattle systems	51
Figure 2.40	Rate of return in Australian cattle systems	51
Figure 3.1	National industry contributions by key industries	54
Figure 3.2	Industry contributions (LHS) and number of cattle (RHS) by Northern regions	56
Figure 3.3	Industry contributions (LHS) to regional agriculture fisheries and forestry and regional gross product (RHS)	57
Figure B.1	EBITDA is equivalent to the SNA93 definition of gross operating surplus	B-1

Contents

Tables

Table 1.1	Assumptions underlying the land value impact calculations	4
Table 2.1	National indirect contribution by industry	7
Table 2.2	Contribution to Northern Territory and regions	8
Table 2.3	Contribution to Queensland and regions	9
Table 2.4	Contribution to Western Australia and regions	10
Table 2.5	Comparative demographic statistics for the Kimberley region	12
Table 2.6	Comparative demographic statistics for Charters Towers – Ayr – Ingham region	19
Table 2.7	Comparative demographic statistics for Barkly, Katherine and Daly-Tiwi-West Arnhem	28
Table 2.8	Assumptions underlying the land value impact calculations	43
Table 2.9	Northern Australia live exporter regulatory costs by category (estimated, 2014-15)	52
Table 3.1	Industry contributions in Northern (18 regions) and the rest of Australia	55
Table 3.2	Industry contributions in the 18 regions Northern Territory, Queensland and Western Australia*	55

Boxes

Box 2.1	Support for Indigenous participation in the cattle industry	17
Box 2.2	A focus on regional economic development	20
Box 2.3	Live export infrastructure in Charters Towers	25
Box 2.4	Economic development in the Barkly region	29
Box 2.5	Rail infrastructure and the NT cattle industry	31
Box 2.6	The Northern Territory Cattlemen’s Association – Pastoral Real Jobs program	34
Box 2.7	Australian exports to Indonesia	48
Box 4.1	ABS definitions of value add	B-2

Executive summary

LiveCorp and MLA commissioned this research to assist the live export cattle industry in understanding how the Northern Australia live export cattle trade contributes to the economy and openly demonstrate the economic benefits in Northern Australia.

The primary objectives of the research were to demonstrate how the trade contributes by:

- identifying the value and importance of the Northern live cattle industry to the Australian economy and Northern Australian regions and communities
- estimating the impact of a material reduction or cessation of the industry's activities
- assessing the industry's comparative advantage relative to South East Asia and other global competitors.

A range of different methods were used to achieve these objectives, these included:

- Input-Output analysis to quantify economic contribution at national, state and regional level.
- Econometric modelling to understand the impact of reduction/cessation over time using different scenarios.
- Desktop review and qualitative analysis of available information to understand the notion of comparative advantage and the dynamics of the global live export cattle market.
- Desktop review for three regional case studies showcasing industry and value beyond economic contribution.

The cattle industry is an important industry in Australia's agriculture, fisheries and forestry sector. A large proportion of the herd is located in Northern Australia, where extensive grazing lands form part of Australia's comparative advantage in production scale and cost. Live cattle exports are part of the cattle industry supply chain, and 70% of the Northern Australian herd are produced for live exports. Refer Figure ES 1.

This analysis shows that live cattle exports contributed \$1.4 billion in gross domestic product (GDP) and 6,573 full-time equivalent (FTE) jobs to the Australian economy in 2020-21 (upper bound estimate). Approximately half the contribution was made in the 18 Northern regions examined. Refer Figure ES 1.

The industry contributes an average \$37 million value-added per annum to each of 18 Northern regions in WA, the NT and Queensland. Contribution is greatest in Katherine, Kimberley, Barkly, Outback Queensland and Darwin regions.

Beyond the direct economic benefits that live export cattle bring to Northern Australian communities, there are intangible benefits that accrue to regions through ancillary services such as transportation, feed mills or veterinary services, social services and opportunities for Indigenous Australians. These are showcased in three case studies.

Three scenarios were modelled considering the beef price and live export industry revenue impacts. The Net Present Value loss over 20 years on both the Australian beef industry and cattle industry is between \$2.8 and \$4.2B (50 per cent reduction in numbers of live export cattle by 2030), \$5.6 and \$8.3B (100% cessation by 2030) and \$8.1B (100 per cent cessation in 2023).

The research indicates a reduction or cessation of live cattle trading extends to the broader beef industry and impacts will not be limited to Northern Australia.

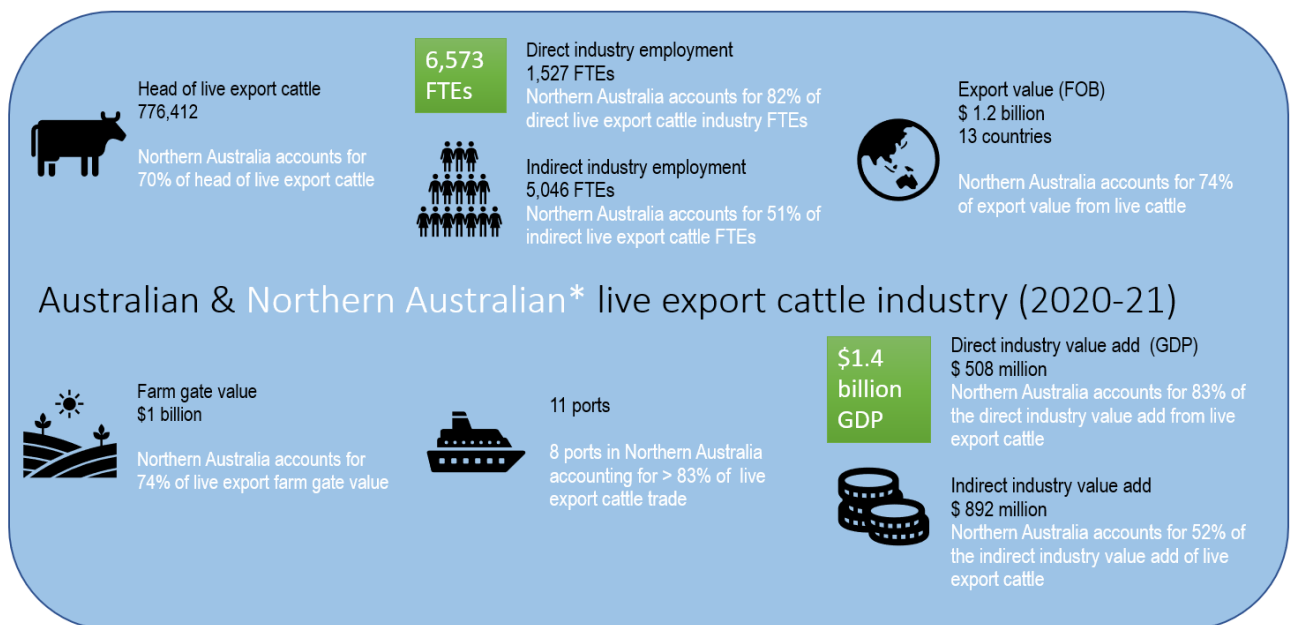
This research reinforces the key drivers for Australia’s comparative advantage in live export cattle are:

- proximity to key South East Asian markets
- consistency in quantity and quality of live animals
- alignment with market requirements
- high biosecurity standards.

In particular, there are synergies between the Northern Australia systems and Indonesia (Australia’s largest market), with mutual benefits flowing due to Australia’s large grazing land base versus Indonesia’s lack of land and Indonesia’s lack of access to suitable cold chain infrastructure.

Further research is needed to provide more accurate estimates and understand where and who makes the most significant contributions and what adjustments are possible/required to adapt to changing market and climatic conditions.

Figure ES 1 The live export cattle industry (2020-21)



Note: * Northern Australia consists of 18 regions across Qld, WA and NT

Source: ABS, ABARES, ACIL Allen

Introduction 1

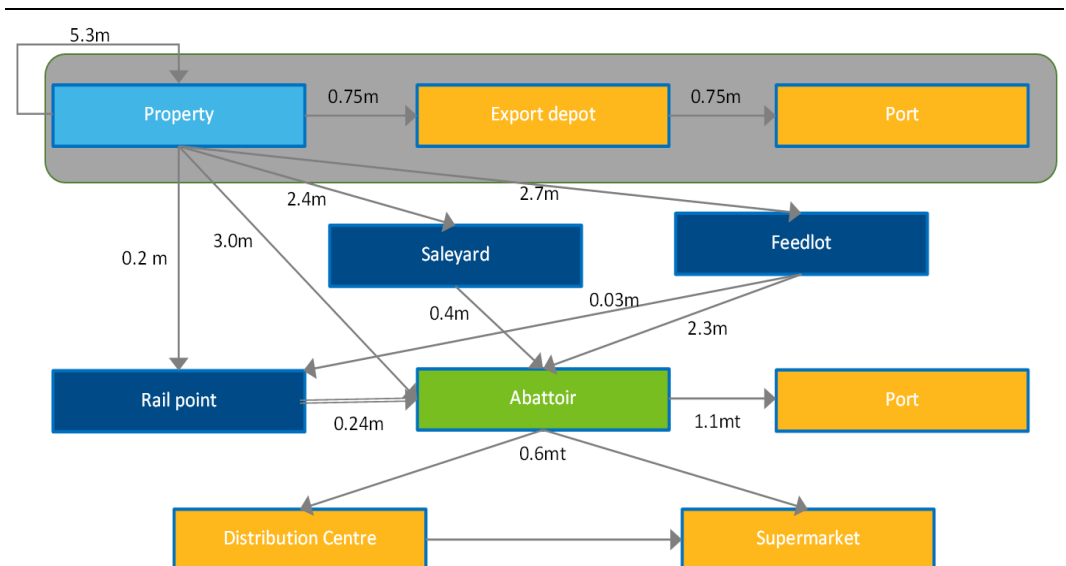
1.1 Background

The cattle industry is an important industry in Australia’s agriculture, fisheries and forestry sector. A large proportion of the herd is located in Northern Australia, where extensive grazing lands form part of Australia’s comparative advantage in production scale and cost. Live cattle exports are part of the cattle industry supply chain and the predominant destination for cattle produced in Northern Australian (Figure ES.1). Figure 1.1 shows the Australian cattle supply chain.

The live cattle export industry experiences volatility in production and market conditions. Nonetheless the industry has grown considerably over the past decade since the temporary cessation in 2011. It regularly supplies 800,000 to 1 million cattle with a free-on-board value of \$1 billion to 1.5 billion per annum (Figure 1.2).

Understanding the economic contribution and how the live cattle export industry operates nationally and regionally is vital for government and industry.

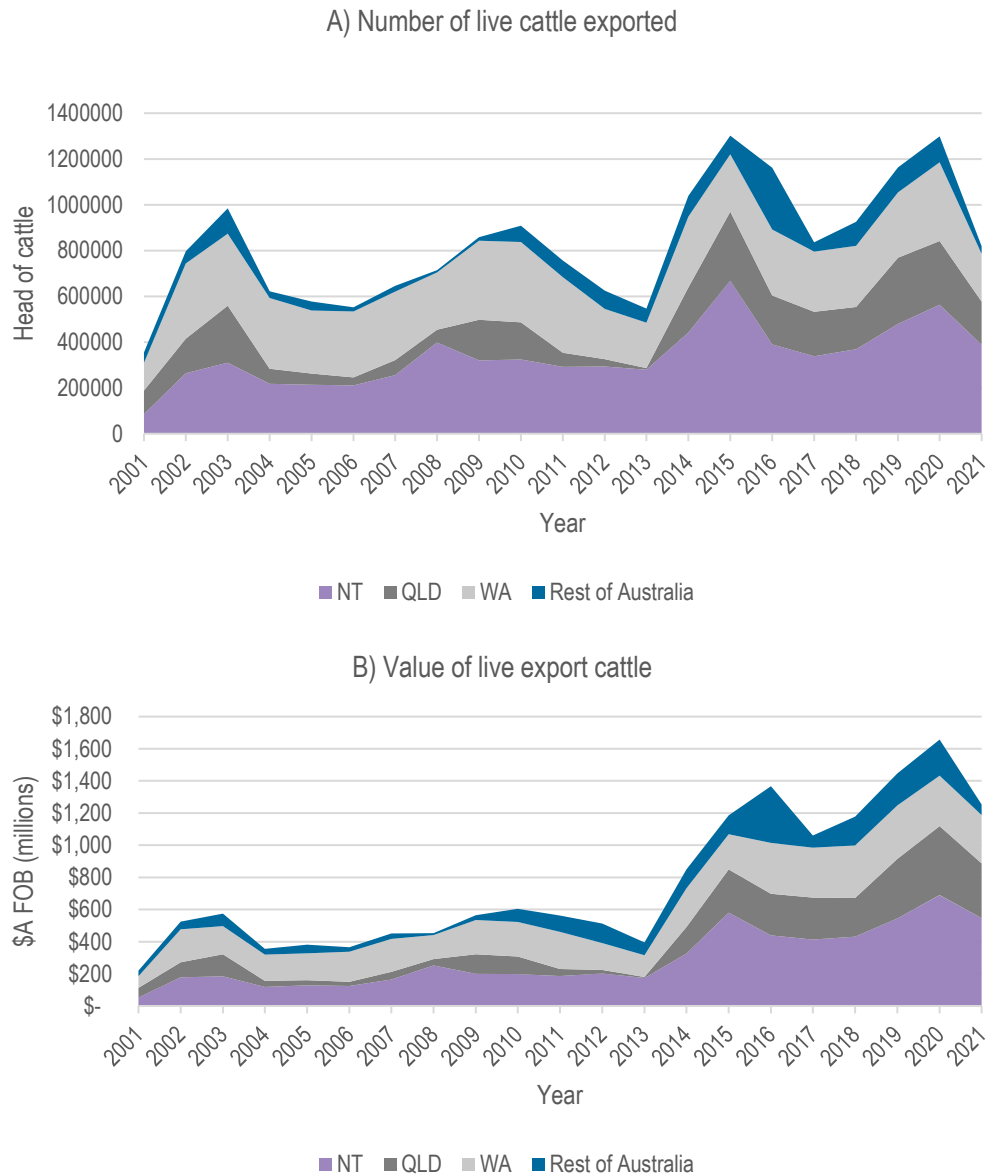
Figure 1.1 Modelled cattle supply chain with annual transport volumes by millions of head (m) and millions of tonnes (mt) of beef (live export industry in grey box)



Source: CSIRO TRANSIT model beef cattle movements (2009-13) using live export data from 2014-15.¹

¹ Higgins et al, 2017, TraNSIT: Unlocking options for efficient logistics infrastructure in Australian agriculture, CSIRO.

Figure 1.2 Live export cattle numbers and value over time by jurisdiction with a focus on Northern Australia



Source: ABS

1.2 Objective

This study aims to assist live cattle exporters in understanding how the Northern live cattle export industry contributes to and openly demonstrates the economic benefits in Northern Australia.

There are three main outputs of this project:

- The value and importance of the Northern live cattle industry to:
 - The Australian economy
 - Northern Australian regions and communities
- An assessment of the comparative advantage of the industry relative to:
 - South East Asia
 - Other global competitors

- An estimate of the impact of a material reduction or cessation of the industry's activities.

The objectives have been achieved but the availability of public data limits the assessment of comparative advantage.

This project uses a range of different methodologies to achieve its objectives. Each technique is summarised below, and further detail is available where relevant in the appendices. The Input-Output analysis and econometric modelling was successful in achieving its outcome. There are a range of results on the economic contribution of the live export cattle industry and several different scenarios for the possible cessation or phasing out of the industry over time.² The impacts of these findings are highlighted in the case studies. The desktop review and qualitative analysis and assessment of comparative advantage and case studies were successful, although is limited in the availability of public reports and information.

1.3 Methodology

1.3.1 Input-output analysis

Input-Output (I-O) analysis can report the economic contribution of an industry using key measures:

- Value added — this measures the contribution of the industry to the size of the economy (i.e., its contribution to Gross State Product or Gross Domestic Product) by measuring the impact of the industry on wages, salaries, profits and indirect taxes. Value added is the preferred measure of economic contribution.
- Employment — this measures the industry's contribution in terms of the number of direct and indirect jobs (as full-time equivalent FTE) supported.

Further details on the analytical technique are provided in Appendix A.

The estimated value added and employment contributions from the industry to the national, state and regional economies are outlined in the sections below and are presented as direct impacts and broader economic impacts (indirect impacts) for an upper and lower bound.

- Upper bound is the impact including the direct effects plus flow on effects from inter-industry purchases plus the flow on effects from working spending.
- Lower bound is the impact including the direct effects plus flow on effects from inter-industry purchases.

The analysis was conducted for the 2020-21 financial year using the Australian Bureau of Statistics (ABS) Statistical Area 3 (SA 3)³ level data, allowing for sufficient detailed information across 18 regions in Northern Australia. Other ABS data used for this analysis includes the National Accounts Input-Output data and additional industry level data from ABS⁴ and ABARES.

Key assumptions in the analysis include information on the cost of transport, which the project reference group provided, and include:

- Cattle travel to the nearest port in that state from the centre of the SA3

² This modelling was completed prior to recent industry concerns around Foot and Mouth Disease and Lumpy Skin Disease.

³ The ABS reports that "Statistical Areas Level 3 (SA3s) are geographic areas built from whole Statistical Areas Level 2 (SA2s). They are designed for the output of regional data, including 2021 Census of Population and Housing data. SA3s create a standard framework for the analysis of ABS data at the regional level through clustering groups of SA2s that have similar regional characteristics. Whole SA3s aggregate to form Statistical Areas Level 4 (SA4s). There are 359 SA3s covering the whole of Australia without gaps or overlaps."

⁴ This includes the use of ABS Census data from 2015-16.

- Transport costs are calculated at \$1.20 - \$1.40 per deck per kilometre
- A road train is made up of 6 decks (2 decks per trailer) and can generally transport 30 head of cattle per deck (with an approximate weight of 330kg/head).

1.3.2 Econometric model

We examined the data available and determined appropriate econometric and statistical analyses such as regression analysis to investigate the relationships between causal and determined variables such as herd numbers, volumes, prices and land values over time.

Price impacts

An econometric model is estimated to model the impact of the increased supply of cattle to the slaughter market due the potential cessation of the live export cattle industry.

The econometric model estimates the elasticity between the volume of cattle slaughtered and the price of cattle. This elasticity is then used to project the impact of additional head of cattle sent to slaughter on the price of cattle. This is compared with a baseline price projection to estimate the gross value lost across the whole industry. Impacts are produced using both a mid-point and upper and lower bound elasticity to reflect the statistical uncertainty around the estimated coefficient.

The data used for this analysis was based off ACIL Allen projections⁵ of ABS and ABARES data on the beef cattle and live export cattle markets developed as part of the work ACIL Allen completed for AgriFutures Australia Limited on the \$100 billion project.⁶

Land value impacts

To estimate the impact of the cessation of the live export industry on grazing land in the Northern Territory we adopt a financial approach that estimates the net present value of the impact on revenues generated per hectare of land both before and after the cessation of the industry.

The key assumptions for this analysis are provided in Table 1.1.

Table 1.1 Assumptions underlying the land value impact calculations

Variable	Value
Grazing land in NT (sq km)	615,000
Hectares	6,150,000
NT Live exports (head)	400,000
Share of total live exports	32 per cent
Weight Average Cost of Capital (WACC)	7 per cent

Source: ACIL Allen

1.3.3 Desktop review and qualitative analysis

Desktop review and qualitative analysis – including stakeholder consultation – was used to collect and analyse information for the international trade and comparative advantage and the case studies.

⁵ The projections mean that the results from the I-O analysis and the results from the econometric modelling are not directly comparable.

⁶ ACIL Allen, 2019, Agriculture – a \$100 billion sector by 2030, Report to AgriFutures Australia.

International trade and comparative advantage

To investigate relative regional and international comparative advantage we assessed cost of production (where data is available) across the Northern and Southern region in Australia. We examined recent research to report the relative cost of production of cattle in Asia (and to a lesser extent our competitors such as Brazil).

Case studies

Case studies are useful to demonstrate intangible benefits and complement the I-O analysis and the econometric modelling by highlighting the more human elements of community and society and the importance of industry in maintaining sustainable regions in Northern Australia.⁷

The case studies chosen were informed by the relative economic importance of live exports across the Northern regions. Three case studies focus on areas where live exports are a significant contributor to the economy both directly and indirectly, these include the Kimberley region in Western Australia, the Charters Towers – Ayr -Ingham region in Queensland and the Northern Territory.

⁷ The case studies each use data from the ABS (SA2-, SA3- and LGA-level data), the Department of Agriculture, Water and the Environment, the National Skills Commission, the Regional Australia Institute (RAI) and ACIL Allen's I-O analysis.



2.1 Economic contribution of the Northern live cattle export industry

The economic contribution of the live cattle export industry to the size of the national economy is measured by the impact of the industry on wages, salaries, profits and indirect taxes.

Economic contribution extends beyond the direct value added by live exporters to those who work in other sectors of the economy and in other regions. These significant contributions are generated indirectly by industry's use of intermediate inputs and increased consumption demand from spending as well as the income (wages and salaries) of those in other industries and other regions.

The results are presented as a range (bounds) in the method used (Input-Output analysis). The lower bound includes the flow on effects of live export cattle purchasing from other industries or the direct plus the estimated contribution associated with the supply chain. The upper bound estimate then adds the impact of those industries' resulting additional spending (or the consumption induced effect) to the lower bound associated with direct workers and workers within the supply chain spending the wages and salaries.

2.1.1 National summary statistics

In 2020-21 the Australian live cattle export industry directly contributed \$508 million of value add and employed 1,527 FTEs.⁸

Total (indirect plus direct) contribution had an upper bound of more than \$1.4 billion value add and employed 6,573 full time equivalents (FTEs) and a lower bound of approximately \$1 billion and 4,573 FTEs. These impacts flow across other industries (Refer Table 2.1 on overleaf for a breakdown across industries). These numbers are larger than direct contributions because they include the economy's flow-on effects from live export cattle. This represents 0.07 per cent of national gross domestic product and 2.99 per cent of the value add from agriculture, forestry and fishing sector.

Using the professional, scientific and technical services industry as the example (refer row highlighted in green in Table 2.1 overleaf), the live export cattle industry indirectly contributes to the value add of the professional services. It adds \$65 million of economic value and supports 457 FTE jobs through the flow on effects from live exporter purchases from the professional services

⁸ This data is based on official Census data and includes anyone who identifies as being employed by the live export including the landholder/producer. As some properties or businesses are more than just live export cattle producers this number may appear to be lower than numbers reported from other data sources such as industry survey data. For example, a farmer may be employed in the live export cattle industry at less than a full time equivalent if they spend time employed in other income generating activities (other farming or non-farming activities).

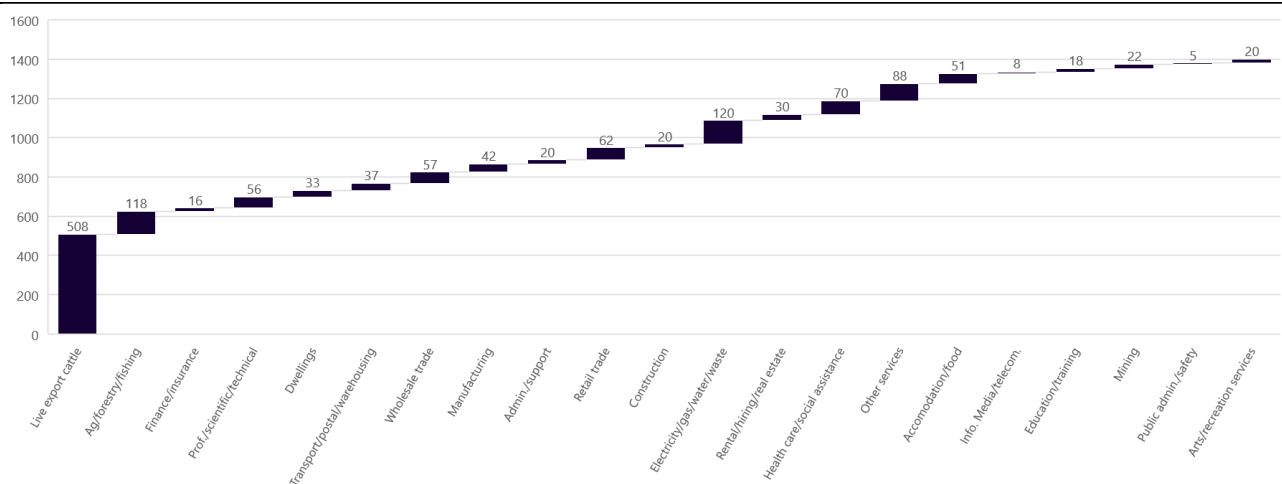
industry (lower bound). This increases to \$88 million and 614 FTE jobs when the impact of the resulting additional spending and jobs created are also included (upper bound).

Table 2.1 National indirect contribution by industry

Industry impacts	Lower bound		Upper bound	
	Indirect value add (\$ millions)	Indirect employment (# of FTEs)	Indirect value add (\$ millions)	Indirect employment (# of FTEs)
Agriculture, forestry and fishing	109	803	118	862
Mining	12	15	16	20
Manufacturing	38	214	56	357
Electricity, gas, water and waste services	23	75	33	107
Construction	29	215	37	279
Wholesale trade	41	191	57	264
Retail trade	12	127	42	461
Accommodation and food services	5	62	20	267
Transport, postal and warehousing	47	281	62	382
Information media & telecommunications	9	33	20	74
Financial and insurance services	73	204	120	338
Rental, hiring and real estate services	20	68	30	98
Ownership of dwellings	0	0	70	0
Professional, scientific and technical services	65	457	88	614
Administrative and support services	38	147	51	214
Public administration and safety	5	43	8	66
Education and training	1	6	18	162
Health care and social assistance	0	5	22	201
Arts and recreation services	1	10	5	54
Other services	9	92	20	225
Total indirect stimulus	536	3,047	892	5,046

Source: ACIL Allen

Figure 2.1 The live export cattle industry’s value add across Australian industries (upper bound)



Source: ACIL Allen

2.1.2 State and regional impacts

This section presents the direct and indirect value add and employment impacts for Northern Territory, Queensland, Western Australia, and for each 18 SA3 regions by jurisdiction used in the analysis and classified for the purposes of this project as Northern Australia.⁹

Northern Territory

In 2020-21 the cattle live export industry directly contributed \$213 million of value add and employed 522 FTEs in the Northern Territory.¹⁰ Total (indirect plus direct) contribution had an upper bound of more than \$363 million value add and employed 1,275 full time equivalents (FTEs). These impacts flow across other industries. These numbers are larger than direct contributions because they include the economy's flow-on effects from live export cattle (refer Table 2.2).

The industry contributed 1.5 per cent of gross state product and 40 per cent of the value add from agriculture, forestry and fishing sector in the Northern Territory. From a regional perspective, the SA3 region of Barkly is highly dependent on the contribution of the live export industry, accounting for 22-per cent of gross regional product. The contribution of live export cattle to the agriculture, forestry and fisheries sectors in Alice Springs, Barkly and Katherine regions is between 47 and 61-per cent.

Table 2.2 Contribution to Northern Territory and regions

	Direct		Indirect*		Total		
	Cattle head	Value add (\$ millions)	Employment (# of FTEs)	Value add (\$ millions)	Employment (# of FTEs)	Value add (\$ millions)	Employment (# of FTEs)
Northern Territory**	306,566	213	522	150	753	363	1,275
Alice Springs	30,093	21	51	10	56	30	107
Barkly	116,161	81	198	19	85	100	283
Daly - Tiwi - West Arnhem	14,083	10	24	3	15	13	39
East Arnhem	0	0	0	0	0	0	0
Katherine	146,229	101	249	42	178	143	427
Rest of NT***	0	0	0	77	419	77	419

* Upper bounds.

** National total also includes the indirect contribution of live exports in other areas of Australia that has not been broken out in these tables.

*** Where cattle for live export exists

Source: ACIL Allen

⁹ ACIL Allen worked with the project reference group to determine the inclusion of SA3 regions for the analysis. Some regions such as Cairns North, Cairns South, Daintree, Whitsundays and Mackay (in Queensland) are excluded as they are smaller, more urban areas where the economy is primarily focused on other industries such as tourism. Rockhampton and Central Highlands are also excluded from the analysis.

¹⁰ This data is based on official Census data and includes anyone who identifies as being employed by the live export industry including the landholder/producer. As some properties or businesses are more than just live export cattle producers this number may appear to be lower than numbers reported from other data sources such as industry survey data. For example, a farmer may be employed in the live export cattle industry at less than a full time equivalent if they spend time employed in other income generating activities (other farming or non-farming activities).

Queensland

In 2020-21 the live cattle export industry directly contributed \$111 million of value add and employed 403 FTEs in Queensland.¹¹

Total (indirect plus direct) contribution had an upper bound of more than \$302 million value add and employed 1,605 full time equivalents (FTEs). These impacts flow across other industries. These numbers are larger than direct contributions because they include the economy's flow-on effects from live export cattle (refer Table 2.3).

The industry represents 0.08 per cent of gross state product and 3.2 per cent of the value add from agriculture, forestry and fishing sector. From a regional perspective, the contribution of live export cattle to the agriculture, forestry and fisheries sectors in Bowen Basin – North, Far North, Outback – North and Outback South regions is between 5 and 10 per cent.

Table 2.3 Contribution to Queensland and regions

	Direct		Indirect*		Total		
	Cattle head	Value add (\$ millions)	Employment (# of FTEs)	Value add (\$ millions)	Employment (# of FTEs)	Value add (\$ millions)	Employment (# of FTEs)
Queensland**	189,691	111	403	191	1,202	302	1,605
Innisfail - Cassowary Coast	1,013	1	2	0	3	1	5
Tablelands (East) - Kuranda	5,641	3	12	3	25	7	37
Bowen Basin - North	36,424	21	77	11	64	32	141
Far North	19,823	12	42	6	33	17	75
Outback-North	50,891	30	108	12	63	42	171
Outback-South	52,968	31	112	16	92	47	204
Charters Towers - Ayr - Ingham	16,309	10	34	7	41	17	75
Townsville	753	0	2	0	3	1	4
Rest of QLD***	5,870	4	15	136	878	140	893

* Upper bounds.

** National total also includes the indirect contribution of live exports in other areas of Australia that has not been broken out in these tables.

*** Where cattle for live export exists

Source: ACIL Allen

¹¹ This data is based on official Census data and includes anyone who identifies as being employed by the live export industry including the landholder/producer. As some properties or businesses are more than just live export cattle producers this number may appear to be lower than numbers reported from other data sources such as industry survey data. For example, a farmer may be employed in the live export cattle industry at less than a full time equivalent if they spend time employed in other income generating activities (other farming or non-farming activities).

Western Australia

In 2020-21 the cattle live export industry directly contributed \$97 million of value add and employed 328 FTEs in Western Australia.¹²

Total (indirect plus direct) contribution had an upper bound of more than \$218 million value add and employed 966 full time equivalents (FTEs). These impacts flow across other industries. These numbers are larger than direct contributions because they include the economy's flow-on effects from live export cattle (refer Figure 2.4).

The industry represents 0.06 per cent of gross state product and 3.43 per cent of the value add from agriculture, forestry and fishing sector. From a regional perspective, the contribution of live export cattle to the agriculture, forestry and fisheries sectors in West Pilbara, East Pilbara, Kimberley and the Gascoyne regions is between 15 and 32 per cent.

Table 2.4 Contribution to Western Australia and regions

	Direct		Indirect*		Total		
	Cattle head	Value add (\$ millions)	Employment (# of FTEs)	Value add (\$ millions)	Employment (# of FTEs)	Value add (\$ millions)	Employment (# of FTEs)
Western Australia**	200,716	97	328	121	639	218	966
Kimberley	108,419	48	162	35	172	83	334
East Pilbara	11,045	6	20	2	8	8	27
West Pilbara	11,045	6	20	2	9	8	29
Mid West	37,072	20	66	12	57	32	124
Gascoyne	16,567	9	30	6	34	14	64
Rest of WA***	16,567	9	30	65	359	74	388

* Upper bounds.

** National total also includes the indirect contribution of live exports in other areas of Australia that has not been broken out in these tables.

*** Where cattle for live export exists

Source: ACIL Allen

¹² This data is based on official Census data and includes anyone who identifies as being employed by the live export industry including the landholder/producer. As some properties or businesses are more than just live export cattle producers this number may appear to be lower than numbers reported from other data sources such as industry survey data. For example, a farmer may be employed in the live export cattle industry at less than a full time equivalent if they spend time employed in other income generating activities (other farming or non-farming activities).

2.2 Regional case studies

This section provides three detailed case studies across Northern Australia. Each case study is designed to showcase how integral the live export cattle industry is in these regional economies, how it interacts with other parts of the economy and the local communities. These case studies look to the less tangible benefits of value and employment that an industry brings to a region including the relationships with Indigenous Australians. Each case study also focuses on a different component of the live export cattle supply chain e.g., production, ancillary services such as transportation, feed mills or veterinary services.

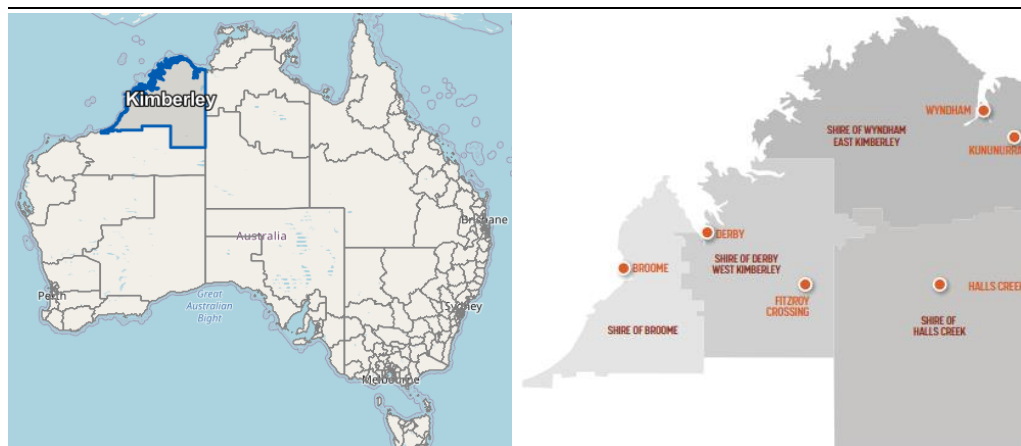
2.2.1 Broome (Kimberley region), Western Australia

This case study focuses on Broome, in the Kimberley region and the traditional lands of the Yawuru people.

Background

The Kimberley region (refer Figure 2.2) comprises nearly 17 per cent of Western Australia (419,300 square km) and consists of steep mountain ranges and flatter grasslands in the southern end used for cattle grazing. Around 44 per cent of the land area (186,300 square km) is used for agriculture, of which 99.9 per cent is livestock production. There are some small horticulture holdings. The non-agricultural land is largely reserved for nature conservation and water. The region is comprised of four local government areas: Broome, Derby-West Kimberley, Halls Creek and Wyndham-East Kimberley. Broome Shire accounts for more than 50 per cent of the Kimberley region's economy.¹³

Figure 2.2 The Kimberley region, WA



Source: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/51001>
<https://developmentwa.com.au/projects/residential/broome-north/investor-information>

People, employment and the regional economy

The Kimberley region is home to an estimated 36,000 people, of whom 39.8 per cent live in Broome and 41.6 per cent are Aboriginal or Torres Strait Islander people.¹⁴ Around 16,000 people are employed, and 1,600 are unemployed.¹⁵ In the 2018-2019 financial year, there were 16,500

¹³ Refer: <https://developmentwa.com.au/projects/residential/broome-north/investor-information>

¹⁴ <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=51001>

¹⁵ <https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021>

people working 25,700 jobs.¹⁶ Of all employed people in the Kimberley region, 21.4 per cent had multiple jobs. The three largest employing sectors in the region were health care and social assistance (16.1 per cent of all jobs in the Kimberley region), accommodation and food services (11.8 per cent) and retail trade (8.8 per cent).

The agricultural industry provided 1,472 jobs, equal to 5.7 per cent of all jobs in the region. Breaking this up into the four local government areas, Broome provided 644 jobs in agriculture, forestry and fishing, Derby-West Kimberley provided 97 jobs, Halls Creek provided 37 jobs and Wyndham-East Kimberley provided 694 jobs. Other key industries include tourism and offshore oil and gas exploration.

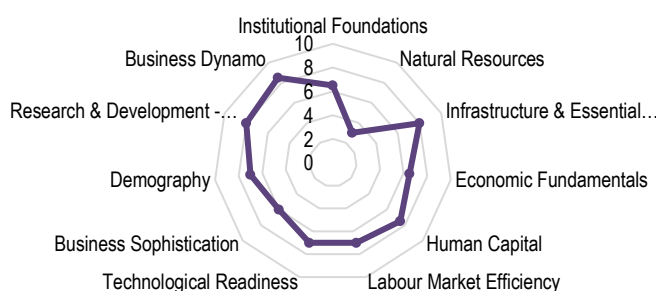
The Regional Australia Institute (RAI) themes ranks local government agencies according to 11 themes, on a scale of 1 to 10 (with 10 meaning that the LGA is in the lowest decile for that theme). The areas in which the LGAs in the Kimberley rank highly compared to other LGAs across Australia are natural resources, business sophistication, institutional foundations and economic fundamentals. The Kimberley region does not rank as well in business dynamo, research and development, and infrastructure and essential services. These thematic ranks are shown in Figure 2.3; note that the lower the number, the better the ranking.

Table 2.5 Comparative demographic statistics for the Kimberley region

	Kimberly	WA	Australia
Median age	33.1	37.6	38.0
Aboriginal or Torres Strait islander	41.6%	3.1%	2.8%
Median employee income	\$48,096	\$50,925	\$52,425
Labour force participation	57.5%	62.9%	60.3%
Unemployment	8.7%	2.9%	3.9%
Year 12 or equivalent education	38.3%	51.7%	51.9%

Source: ABS: Labour Force, Australia 2022, 2019-20 estimates and 2015-16 census data. Kimberley unemployment date found at: WA economic profile, February 2022.

Figure 2.3 RAI indicators for the Kimberley region



Source: <https://insight.regionalaustralia.org.au/>

¹⁶ <https://www.abs.gov.au/statistics/labour/jobs/jobs-australia/latest-release> “Table 11. Western Australia spotlights by local government areas”

Infrastructure

The Great Northern Highway links the principal towns in the Kimberley. This is the main corridor for freight movement within the region, between the Kimberley and the rest of Western Australia, and between Western Australia and Northern Territory.¹⁷ Broome International Airport located in the town is also home to the heliport.

Broome is the main deep-water port servicing the Kimberley region run by Kimberley Ports Authority. The wharf is shared between livestock export ships and ships for other industries, such as offshore oil and gas exploration and pearling. In 2017-18, 928 vessels visited the Port, 34 per cent of these were related to oil, gas and large commercial trade.¹⁸

In 2021, 28 vessels were loaded with 103,532 head of cattle between February and November.¹⁹ Cattle are also exported through Wyndham port in the north of the Eastern Kimberley.

The Kimberley Meat Company processing plant north of Broome started in 2016 and closed in 2021. The company announced it would re-open in April 2022²⁰. There is a micro abattoir with capacity for 50 head of cattle on Kildo Station.²¹ The closest large-scale abattoir is over 2,400 kilometres from Broome.

Figure 2.4 The Great Northern Highway (in red on map (left)). Broome Port (top right) and Wyndham Port (bottom right)



Source: https://en.wikipedia.org/wiki/Great_Northern_Highway#/media/File:Great_Northern_Highway_route_map.png and <https://www.kimberleyports.wa.gov.au/>

¹⁷ Refer: <https://kdc.wa.gov.au/our-region/live-kimberley/infrastructure-and-services/>

¹⁸ Refer: <https://developmentwa.com.au/projects/residential/broome-north/investor-information>

¹⁹ Refer: <https://www.kimberleyports.wa.gov.au/news-and-media/community-news/2021/november/port-of-broome-cattle-exports>

²⁰ Refer: <https://www.abc.net.au/news/rural/2022-04-13/kimberley-meat-company-abattoir-to-reopen-cooperative-shelved/100988790>

²¹ Refer: <https://www.abc.net.au/news/2021-05-01/wa-abattoir-closure-kimberley-meat-company/100108858>

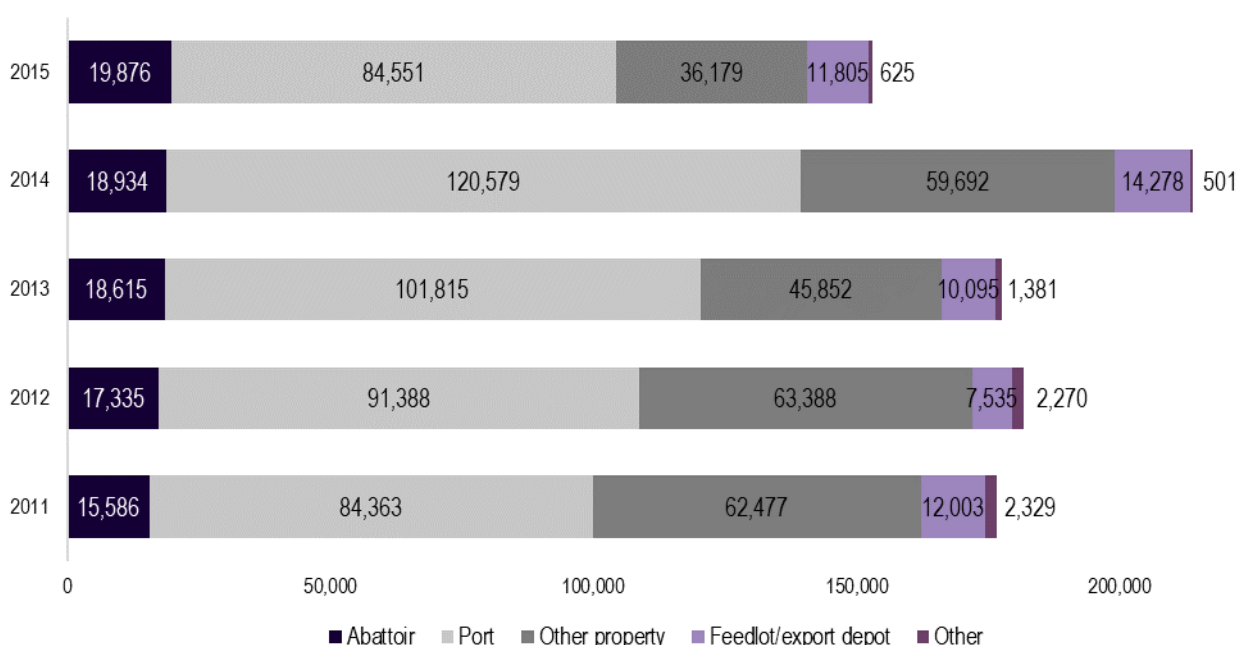
Cattle and the live export industry in the Kimberley region

In 2014 there were 93 pastoral stations with an average area of 230,406 hectares in the Kimberley.²² Some of the largest stations and herd sizes in Western Australia are found in the Kimberley as it has relatively reliable rainfall and sustainable native pastures.

In 2016, there were 609,000 head of cattle across the Kimberley region.²³ Around 210,000 (or one-third of the cattle) were in Derby – West Kimberley, another 180,000 were in Halls Creek, around 150,000 were in Kununurra and the remaining 60,000 were in Roebuck. Figure 2.5 below shows the movement of cattle in the Kimberley region to their destination over the years 2011 to 2015.

From 2016 to 2021, an average of 98,700 live cattle were exported each year from Broome port, which is 11 per cent of the total live cattle exported from Australia. An average of 22,000 cattle were exported from Wyndham port, equal to 2 per cent of Australia's annual cattle exports. On average, 68 per cent of cattle exported from Broome went to Indonesia, 23 per cent to Vietnam, and smaller proportions went to Malaysia, the Philippines and Thailand; 99 per cent of cattle exported from Wyndham went to Indonesia and 1 per cent to Vietnam.²⁴

Figure 2.5 Northern beef cattle by destination in the Kimberley Region (2011-2015)



Source: ACIL Allen (2017) from NLIS data. Report available at: <https://www.agric.wa.gov.au/r4r/northern-beef-development-project>

Note: 2015 is part year only and data may be underestimated

The live export industry produces 31.6 per cent of the Kimberley region gross value of agricultural production, representing 7.8 per cent (\$262.2 million) of gross regional production.²⁵

The results of the I-O analysis estimate that the direct economic contribution of the live export industry in this region accounts for \$48.0 million in direct value add, \$34.8 million indirect value add and 334 full time equivalent jobs. Combining both direct and indirect effects, the Kimberley region

²² Refer: [https://www.agric.wa.gov.au/export-services/western-australian-beef-industry?page=0_per cent2C2](https://www.agric.wa.gov.au/export-services/western-australian-beef-industry?page=0_per%20cent2C2)

²³ <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02015-16?OpenDocument>

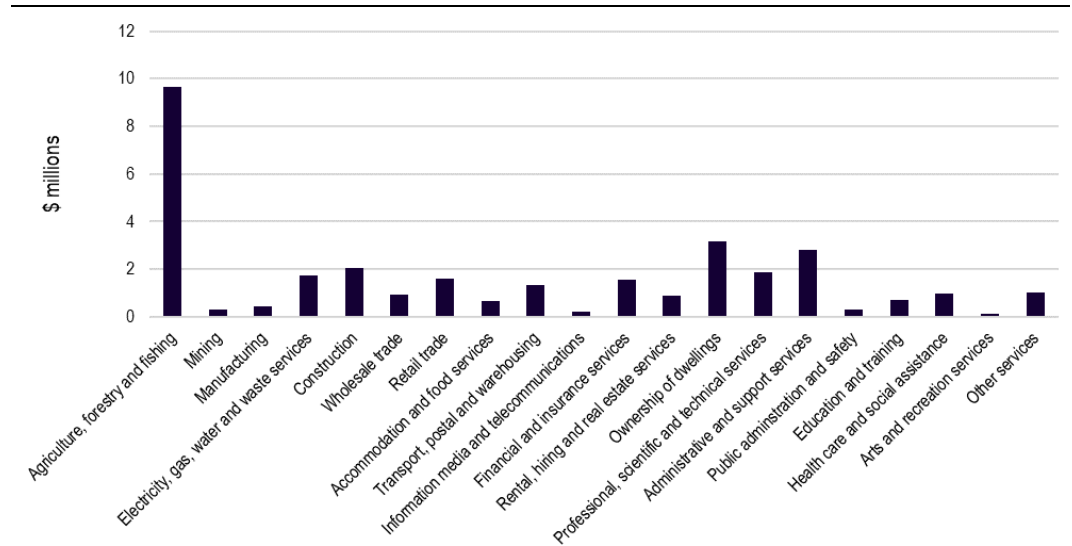
²⁴ <https://www.awe.gov.au/biosecurity-trade/export/controlled-goods/live-animals/live-animal-export-statistics/livestock-exports-by-market>

²⁵ ACIL Allen I-O analysis

contributes 37.9 per cent of value add and 34.6 per cent of employment impacts of the live export industry in Western Australia.

The live export industry contributes \$9.7 million value add to the agriculture industry in the Kimberley region, \$3.7 million to the transport and warehousing industry in the region and \$2.8 million to the region's administrative and support services industry. Refer Figure 2.6.

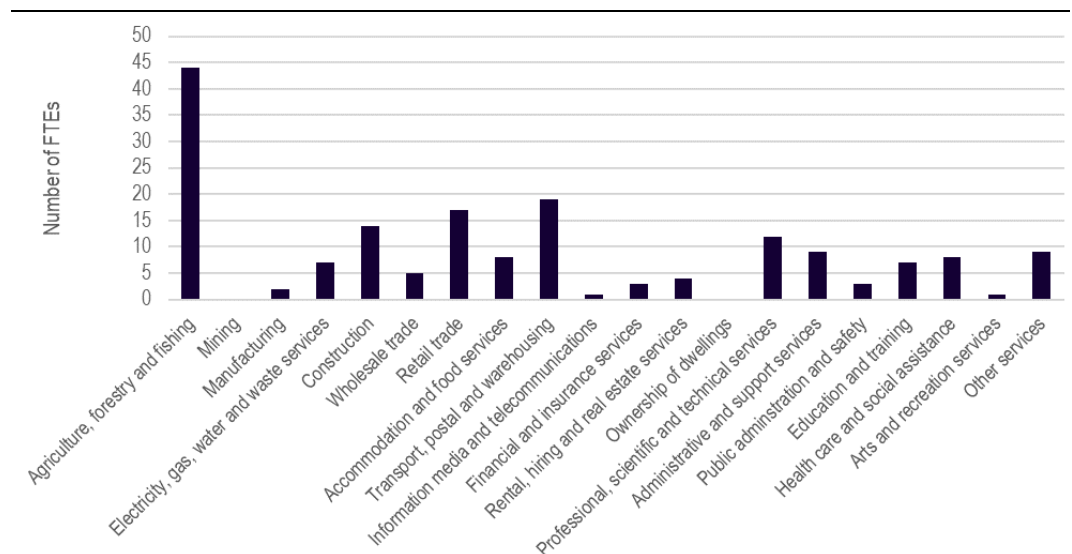
Figure 2.6 Distribution of the live export industry value add impacts across other regional industries in the Kimberley region (upper bound)



Source: ACIL Allen, I-O analysis.

The live export industry provides 162 full-time-equivalent jobs directly within the industry, as well as 172 full-time-equivalent jobs through its indirect effect on other industries, including 44 jobs in agriculture, forestry and fishing, 19 in transport, postal and warehousing, 17 in retail trade, 14 in construction and 12 in professional, scientific and technical services. Refer Figure 2.7.

Figure 2.7 Distribution of the live export industry full-time equivalent employment impacts across other regional industries in the Kimberley region (upper bound)



Source: ACIL Allen, I-O analysis.

Allied services

Broome acts as a service centre for the live export industry, with registered establishments (RE), veterinary services and the port. The proportion of turnover that businesses such as these in Broome derive from live export trade is dependent on the economy's reliance on live exports. A 2011 report²⁶ states that the following businesses derive greater than 70 per cent of their turnover from live exports:

- *Mustering contractors*
- *Helicopter contractors for mustering*
- *Road transport of sale cattle to depots near ports and for paddock carting*
- *Suppliers of hay and pellets to both export yards and live cattle ships*
- *Export yards and depots*
- *Casual labour employed in ports for loading cattle ships*
- *Live cattle vessels – crews, demand for supplies and fuel oil, return on assets as few alternative business opportunities for specialised shipping*
- *Fencing contractors – pastoralists are deferring decisions to develop infrastructure (sic)*
- *Stock and station agents supplying fencing materials and husbandry supplies and who may also have exposure to lending to pastoral businesses.*

Kingwell, R (ed), 2011.

Anecdotal evidence (2011)²⁷ from the Kimberley suggests that if permanent closure of the live trade with Indonesia occurred then:

- A local hay producer for pastoral leases and export yards was expecting to lose over \$1 million in sales
- A local car dealership was forecasting lost vehicle and spare parts sales of \$0.5-1.5 million in 2011
- A local saddlery supplier was expecting a loss of 20 per cent in annual turnover if rodeos and shows became poorly attended by pastoralists.

Indigenous participation in the live export industry

The live export industry in the Kimberley region provides jobs for many Indigenous people living in the area. About 15 per cent of WA's northern pastoral industry workforce identifies as Indigenous.²⁸

On 1 February 2022, the Yawuru people took over pastoral operations at Roebuck Plains Station, approximately 30 kilometres from Broome in the West Kimberley. Prior to this, the Indigenous Land and Sea Corporation (ILSC) was managing the pastoral operations via a lease agreement since 2014. Traditional owners hope the milestone agreement will boost Indigenous employment on country. The ILSC handed back ownership of the pastoral lease to native title holders Nyamba Buru Yawuru (NBY) in 2014.

²⁶ Kingwell, R (ed), 2011, The economic importance to Western Australia of Live Animal Exports. Department of Agriculture and Food, Western Australia. Available at: [https://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3810370c704a9fa73b2c5bc148257ab60007f82f/\\$file/5370.pdf](https://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3810370c704a9fa73b2c5bc148257ab60007f82f/$file/5370.pdf)

²⁷ Kingwell, R (ed), 2011, The economic importance to Western Australia of Live Animal Exports. Department of Agriculture and Food, Western Australia. Available at: [https://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3810370c704a9fa73b2c5bc148257ab60007f82f/\\$file/5370.pdf](https://www.parliament.wa.gov.au/publications/tabledpapers.nsf/displaypaper/3810370c704a9fa73b2c5bc148257ab60007f82f/$file/5370.pdf)

²⁸ Refer: https://www.agric.wa.gov.au/r4r/northern-beef-development-project?page=0_per%20cent2C0

Box 2.1 Support for Indigenous participation in the cattle industry

The WA government’s Northern Beef Development program aims to assist the northern WA cattle industry to be more profitable, resilient and sustainable through supporting local job creation and regional economic prosperity. It has three key projects: Land, Livestock and Labour which focus on a range of research and Aboriginal Economic Development (AED) issues through the Department of Primary Industry and Regional Development (DPIRD). The project:

- Coordinates the Aboriginal Pastoral Academy
- Engages with Aboriginal enterprises to develop alternative business models including grazing licences, agistments, and sub-leases, to attract investment into the Aboriginal pastoral estate and create job opportunities.
- Assists with the divestment of Aboriginal Lands Trust pastoral stations back to local community ownership.

Source: https://www.agric.wa.gov.au/r4r/northern-beef-development-project?page=0_per cent2C0

The Aboriginal Pastoral Academy provides an intensive training program to help young Indigenous people gain the necessary skills and experience to join the ‘job-ready’ pastoral industry workforce and continue along a supported career path.²⁹ The training provided is in line with the Yawuru people’s traditional values and wellbeing philosophy.

A SWOT assessment of live exports in the Kimberley region

The strengths, weaknesses, opportunities, and threats (SWOT) of the live export industry in the region are presented in Figure 2.8.

Figure 2.8 SWOT analysis for the live export industry in the Kimberley region



Source: ACIL Allen

The Kimberley region’s expansive grasslands are a strength for the industry. The land is well suited to cattle grazing and have good access to international markets (namely, Asia), with Broome and Wyndham providing live export port facilities. While the region has good access to export facilities,

²⁹ <https://www.agric.wa.gov.au/news/media-releases/aboriginal-pastoral-academy-creating-jobs-and-changing-lives>

the sheer geographical distances cattle must travel to reach at scale slaughter markets (>2,400km to the nearest abattoir) is a weakness, mainly if the option to live export cattle were to cease. These distances expose numerous supply chain inefficiencies and fragmentation issues requiring resolution. The export-oriented nature of live cattle also means that the region and product are trade-exposed and subject to the uncertainties and volatilities of export markets.

If live export trade continues there are opportunities to drive future demand in ASEAN countries and elsewhere for high quality products. However, trade barriers and uncertainties are also significant threats for an industry which is dependent on international markets.

Key threats include climate change and environmental factors – in particular, extreme weather events like drought that can severely impact producers. In response to environmental factors the industry faces an increased likelihood that domestic regulatory intervention will continue, with the potential for environmental legislation targeting the red meat industry's high level of carbon emissions and water consumption key areas of concern. The live export industry also faces social license issues around animal welfare considerations. The threat of the cessation of the live export cattle from Australia is a real and significant concern for cattle in the Kimberley.

Opportunities exist to improve innovation, through investing in herds and increasing the quality of its outputs.

Opportunities for quality improvement include improving inputs and management, such as focusing on breeding genetics, land management and fodder.³⁰ Structuring herds' genetics with flexibility to target the domestic and/or export markets, as Hancock Agriculture has done in its new Kimberley Cattle Station "Liveringa," allows cattle stations to take advantage of the opportunities presented by live export and slaughter markets.³¹

2.2.2 The Charters Towers – Ayr – Ingham region, Queensland

This case study focuses on the Charters Towers – Ayr – Ingham region and evaluates the economic contributions from the cattle export industry in a big regional services area near Townsville, which acts as a livestock export hub, in Northern Queensland. Charters Towers – Ayr – Ingham statistical area includes Townsville.

Background

Charters Towers – Ayr – Ingham is situated on the traditional land of the Gudjal (pronounced Goodjal) people and encompasses four Local Government Areas (LGAs): Burdekin, Charters Towers, Hinchinbrook and Palm Island (refer Figure 2.9). It has a land area of approximately 76,210 square kilometres, which is approximately 4.4 per cent of Queensland's total land area.³² An estimated 87.3 per cent of the region's land area is used for agricultural production, including 84.8 per cent for livestock production and 2.4 per cent for cropping.³³ The remaining 12.7 per cent of land is used for nature conservation, water, and intensive uses. The Burdekin River supplies the Region's water needs.

³⁰ <https://kdc.wa.gov.au/our-region/live-kimberley/primaryindustries/>

³¹ <https://www.hancockagriculture.com.au/locations/liveringa/>

³² Australian Bureau of Statistics (2022). Region summary: Charters Towers – Ayr – Ingham. <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=31801>.

³³ Potatoes have been grown commercially for many years. A wide range of other crops including, Grapes, Citrus, Asparagus, Melons, Mangos, Heavy Vegetables (pumpkin, potatoes, onions), Winter and Summer Cereals, Grain Legumes, Sugarcane, Irrigated Pastures, Silage and Haylage are grown in the Charters Towers Region. Refer: <https://www.charterstowers.qld.gov.au/business/economic-and-tourism/agriculture-food>

Figure 2.9 The Charters Towers – Ayr – Ingham region in Queensland



Source: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/31801>

People, employment, and the regional economy

Charters Towers – Ayr – Ingham has an estimated resident population of 42,000 people.³⁴ As shown in Table 2.6, the population of this region is older, poorer, less educated and less likely to be employed than the populations of Queensland as a whole and of all of Australia. The level of participation in the labour force is also lower than the national average. This presents a useful backdrop against which to examine the contribution of the live export industry in the region, which provides employment and value addition to what might otherwise be a disadvantaged area.

Table 2.6 Comparative demographic statistics for Charters Towers – Ayr – Ingham region

	Charters Towers – Ayr – Ingham	Queensland	Australia
Median age	44.6	37.8	38.0
Aboriginal or Torres Strait Islander	13.46%	4%	2.8%
Median employee income	\$44,966	\$50,925	\$52,425
Labour force participation	55.2%	61%	60.3%
Unemployment	7.5%	4.5%	3.9%
Year 12 or equivalent education	33.3%	-	51.9%

Source: ABS: *Labour Force, Australia 2022, 2019-20 estimates and 2015-16 census data*. Queensland Treasury: *2021 Queensland Regional Profiles*.

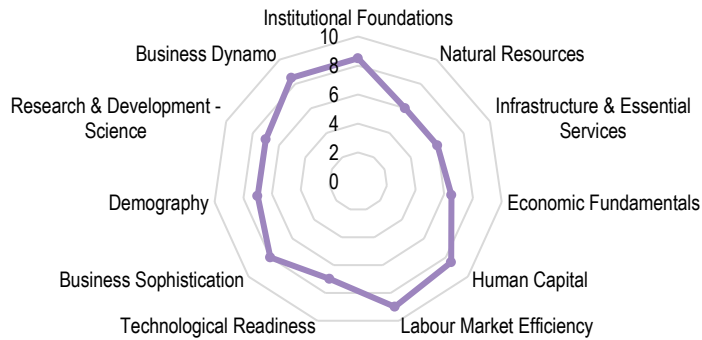
The three largest employing sectors in the region are agriculture, forestry and fishing, which provides 17.2 per cent of jobs in the Charters Towers – Ayr – Ingham region, healthcare and social assistance, which provides 11.1 per cent of jobs, and education and training, which provides 9.9 per cent of jobs in the region. Mining and transport, postal and warehousing are also large employers.

Local Government areas within the Charters Towers – Ayr – Ingham region have been ranked by the Regional Australia Institute in accordance with several thematic categories; a composite ranking for the region is shown in Figure 2.10. The LGAs within the region rank better in natural

³⁴ Queensland Treasury (2022, p.5). Queensland Regional Profiles: Charters Towers – Ayr – Ingham. Accessed 12 April 2022: <https://statistics.qgso.qld.gov.au/qld-regional-profiles>.

resources, infrastructure and essential services, and economic fundamentals compared to other LGAs across Australia. However, the region ranks somewhat poorly in areas such as labour market efficiency, business dynamo and institutional foundations. The lower the rank the higher the relative performance of the region.

Figure 2.10 RAI indicators for the Charters Towers – Ayr – Ingham region



Source: <https://insight.regionalaustralia.org.au/>

Box 2.2 A focus on regional economic development

The Charters Towers Council is focused on regional economic development. The Queensland government estimates that in order to maintain living standards and account for population growth the economy needs to grow in terms of real output by 80 per cent over the next two decades. Council plans to achieve this by focus on its areas of strength mining, agriculture, education and tourism.

The most recent Economic Development Plan (2012-17) highlights the need for the region to focus on its competitive strengths in these areas as a long term basis for economic growth. It is strategically located to take on a greater role as a service centre to mining and agricultural development and regional supply chains if critical mass can be built. It notes that to realise these opportunities the region needs to unlock land supply and remove other constraints (such as an aging population) to enhance the development of the region.

Recent agricultural supply chain analysis (KPMG, 2019) highlights increasing demand for agricultural products across key markets, including South East Asia, China and the Middle East. With respect to Charters Towers, the work identified priority products, including intensive beef cattle, legumes and pulses.

Source: <https://www.charterstowers.qld.gov.au/business/regional-development> and CSIRO, 2019, *Charters Towers: A living transitions roadmap*. Available at: https://www.qld.gov.au/__data/assets/pdf_file/0014/124502/trasion-roadmap-charters-towers.pdf

Infrastructure

Charters Towers is located at the crossroads of the Flinders Highway and Gregory Developmental Road which are authorized for multi combination vehicle use. The port of Townsville is accessible in 90 minutes. In addition to its strategic adjacency to the port of Townsville, which accounts for most of Queensland’s live export of beef cattle,³⁵ the region is just 1,300 kilometres north of the

³⁵ Queensland Government (2018). Future Outlook for Queensland Cattle and Beef Products. Accessed 12 April 2022: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain/resource/b30e866b-56ae-4aec-b76e-ff6d3a2caa9c>.

port of Brisbane. It also has reliable rail and air access, which facilitates its role as part of the Townsville livestock export hub.

The cattle industry in Charters Towers – Ayr – Ingham is connected to the state-wide livestock rail network, which has an annual capacity of 286,000 head of cattle, supports the port of Townsville. Livestock is also transported through a high-capacity road network.³⁶

Overleaf shows the freight rail network used by the livestock industry to transport cattle to the ports in Townsville and Brisbane. The state's road network is also used to transport livestock and bulk commodities, and in 2016 the Australian Government provided \$100 million to upgrade key cattle transportation routes across the state network.³⁷ Coal mining facilities within and adjacent to the region are similarly connected and can supply all six export ports on Australia's East coast.³⁸

Cattle and the live export industry in Charters Towers – Ayr – Ingham

The majority of the region's livestock turn-off is destined for the processing and export centres of Townsville and Brisbane, and a large amount of livestock transport is conducted across the Queensland's regional rail network. Charters Towers – Ayr – Ingham connects to the rest of the regional rail network through the Northwest freight line, along which livestock, bulk agricultural commodities and mining products are transported to Townsville for processing and export.

The live export industry produces 2.1 per cent of the Charters Towers – Ayr – Ingham region gross value of agricultural production, which itself represents 26.2 per cent (\$791.8 million) of gross regional production.³⁹ The results of the I-O analysis estimate that the direct economic contribution of the live export industry in this region accounts for \$9.5 million in direct value add, \$7.0 million indirect value add and 75 FTEs. Combining both direct and indirect effects, the Charters Towers – Ayr – Ingham region contributes 5.5 per cent of value add and 4.7 per cent of employment impacts of the live export industry in Queensland.

Agriculture is important to the economy of the Charters Towers – Ayr – Ingham region, especially in relation to cattle. The Townsville North Queensland region as a whole has a cattle population of more than 520,000, representing approximately 5 per cent of Queensland's total cattle herd of 10.5 million, which itself accounts for more than 40 per cent of Australia's total cattle population.⁴⁰ In 2016, the Charters Towers local government area (comprised of Charters Towers and Dalrymple) alone had a cattle population of 425,462, followed by Burdekin (comprised of Ayr and Burdekin) with 53,148, and Hinchinbrook (comprised of Ingham and its surrounds) with 19,489, for a total regional herd of 498,100.⁴¹

From 2016 to 2021, around 28 per cent of Australia's exports of live cattle (or 247,000 heads of cattle) were exported through the port of Townsville. The ports of Brisbane and Alma each represented around 1 per cent of Australia's total live cattle exports. Focusing on Townsville port, on average, 53 per cent of live cattle exports went to Indonesia, 45 per cent to Vietnam, and one

³⁶ Queensland Government (2018). Strategic Drivers of the Queensland Beef Supply Chain. Accessed 20 April 2022: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain>.

³⁷ Queensland Government (2018). Strategic Drivers of the Queensland Beef Supply Chain. Accessed 2 May 2022: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain>.

³⁸ Aurizon (2022). Coal. Accessed 2 May 2022: <https://www.aurizon.com.au/what-we-deliver/coal>.

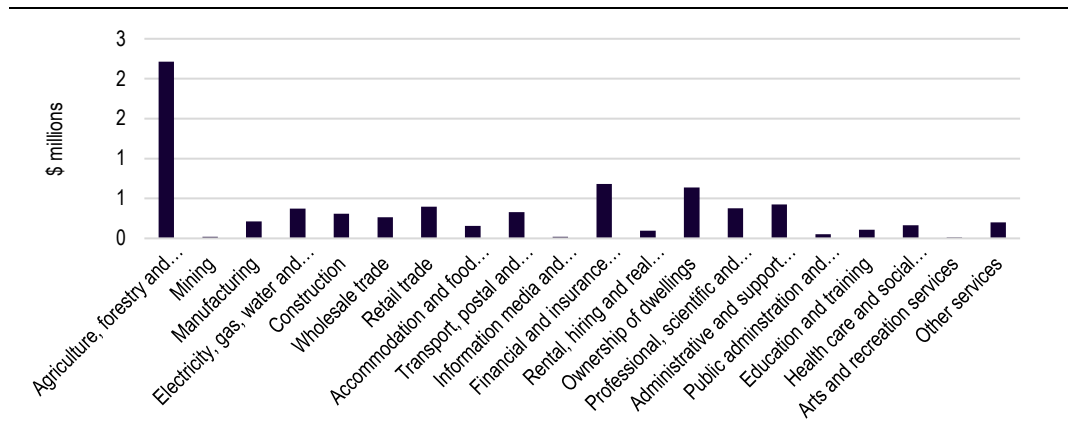
³⁹ ACIL Allen I-O analysis

⁴⁰ Australian Bureau of Statistics (2021). Agricultural Commodities, Australia. Accessed 20 April 2022: <https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/2019-20>.

⁴¹ Australian Bureau of Statistics (2018). Agricultural Commodities, Australia and state/territory and LGA regions, 2015-16. Accessed 20 April 2022: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02015-16?OpenDocument>.

per cent to the Philippines.⁴² Around 55 per cent went to feedlots, 44 per cent straight to slaughter and one per cent to productive uses.

Figure 2.11 Distribution of the live export industry value add impacts across other regional industries in the Charters Towers – Ayr – Ingham region (upper bound)



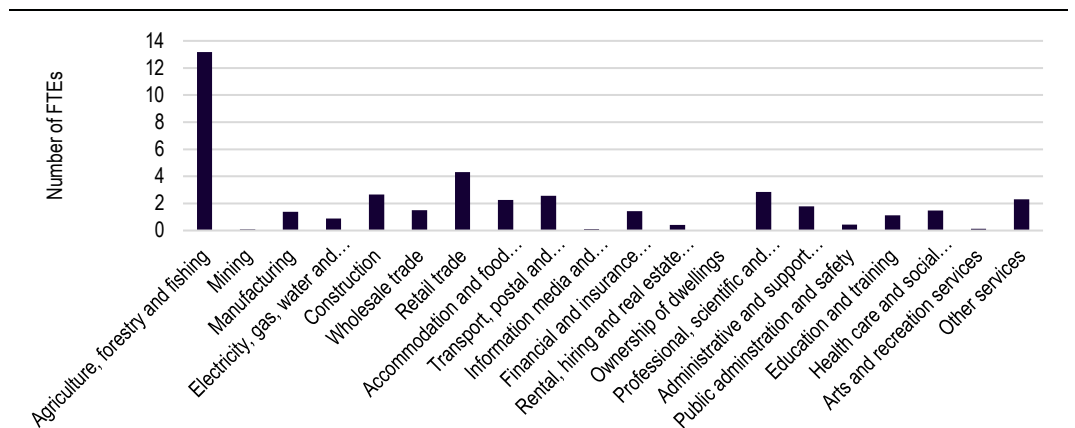
Source: ACIL Allen

The live export industry provides 34 full-time equivalent (FTE) jobs directly within the industry in the Charters Towers – Ayr – Ingham region and provides 41 FTE jobs through its indirect effects on other industries in the region.

Figure 2.11 shows that the live export industry contributes \$2.21 million in indirect value addition to other industries in the agricultural sector in Charters Tower – Ayr – Ingham, as well as indirectly adding \$0.68 million in financial and insurance service, and \$0.64 million in ownership of dwellings.

Indirect full-time equivalent employment impacts are shown in Figure 2.12 overleaf. ACIL Allen estimates that the live export industry contributes 13.2 FTE jobs in other agricultural industries, 4.3 FTE jobs in retail trade, 2.85 FTE jobs in professional, scientific and technical services and 2.66 FTE jobs in construction.

Figure 2.12 Distribution of the live export industry full-time equivalent employment impacts across other regional industries in the Charters Towers – Ayr – Ingham region (upper bound)



Source: ACIL Allen

⁴² <https://www.awe.gov.au/biosecurity-trade/export/controlled-goods/live-animals/live-animal-export-statistics/livestock-exports-by-market>

A regional services centre

Charters Towers – Ayr – Ingham is a key component of the Townsville regional services hub within North Queensland that facilitates the transportation of mining outputs as well as livestock and bulk commodity products from the agricultural supply chain. The region is heavily dependent on the agricultural sector for employment and value creation. Employment in beef cattle farming represents 10.8 per cent of employment in Charters Towers and represents 88.2 per cent of agricultural employment. The region has a mature agriculture services centre (saleyards, supplies, professional services),⁴³ as well as large scale fodder producing enterprises; and Queensland Government Department of Agriculture and Fisheries research group focused on beef production research.

Mining and transport, postal and warehousing, at 4.1 and 3.1 per cent of employment, respectively, are also large employers.⁴⁴

The Northern Australia Infrastructure Facility (NAIF) extended its mandate to agricultural projects in 2018,⁴⁵ providing greater scope for co-ordination between the agriculture and mining supply chains, particularly through new infrastructure projects in the region. Major investments in the region's agricultural sector include a recent capital works project partly financed by NAIF,⁴⁶ and a multi-user rail project that will restore the Greenvale-Yabulu line, which runs through parts of the Charters Towers region.⁴⁷

This project will help to link silicon fertiliser mining operations with regional processing and export centres in Charters Towers and Townsville and will also provide access routes for several other industries in the region seeking to jointly operate it.

The interaction of several different industries is a strength that underpins the processing and exporting of livestock, bulk agricultural commodities and mining outputs produced within Charters Towers – Ayr – Ingham. Through their shared usage of the regional rail network and related transportation services, the operations of the cattle, cropping and mining industries in the region are linked, and the reliable and efficient supply chain underpins investment decisions and promotes market access for the industries in the region. Being adjacent to Townsville, the region has close access to a seaport, airport and state-wide rail networks, all of which provide it with both domestic and international market access. Figure 2.13 above shows the major trajectories of freight as it travels around the region on the road, rail and port infrastructure.

⁴³ Refer: <https://www.charterstowers.qld.gov.au/downloads/file/664/charters-towers-economic-development-plan-2012-2017>

⁴⁴ Townsville Enterprise Limited et al (2019, pp. 146-148). North Queensland Agricultural Market and Supply Chain Study. Accessed 4 May 2022: <https://crcna.com.au/resources/publications/north-queensland-market-and-agricultural-supply-chain-study>.

⁴⁵ Queensland Government (2018). Investment Analysis of the Queensland Beef Supply Chain. Accessed 2 May 2022: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain>.

⁴⁶ Northern Australia Infrastructure facility (2021). Annual Report. Accessed 2 May 2022: https://naif.gov.au/wp-content/uploads/2021/10/NAIF_AnnReport2021_1410-Final.pdf.

⁴⁷ Agripower (2020). Agripower's \$633M Rail project with QLD state government. Accessed 2 May 2022: <https://agripower.com.au/agripowers-633m-rail-project-with-qld-government/>.

Figure 2.13 Regional infrastructure linkages (Charters Towers circled in red)



Source: Queensland Government (2018): <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain>.

Box 2.3 Live export infrastructure in Charters Towers

The Dalrymple Saleyards and Equestrian Centre is owned by Charters Towers Regional Council and is located at the junction of several large cattle producing regions including Charters Towers, Tablelands, Etheridge, Flinders, Barcaldine and Isaac with a combined 2 million plus head of cattle (2020).

Dalrymple Saleyard's infrastructure and services include two full deck cattle weighbridges, vehicle weighbridge, vehicle wash down facilities and dipping and washing facilities for cattle. Dalrymple Saleyards is registered for the assembly and holding of live export cattle as well as providing a marketing facility for cattle and horses.

The Dalrymple Saleyards competes to be the third largest cattle handling facility in Queensland, and its expanded holding capacity is very beneficial to the live export industry. Council is currently developing a master plan for the saleyards with expected recommendations to be made in 2022.



Source: <https://www.charterstowers.qld.gov.au/business/economic-and-tourism/beef-cattle-industry>;
<https://www.charterstowers.qld.gov.au/downloads/file/723/ct-beef-overview-pamphlet>; <https://www.charterstowers.qld.gov.au/dalrymple-saleyards-advisory-committee/dalrymple-saleyards-master-plan-advisory-committee> and picture from ABC News available at: <https://www.abc.net.au/news/2016-09-13/cattle-dalrymple-saleyards/7838368?nw=0>

A SWOT assessment of live exports in Charters Towers – Ayr - Ingham

The strengths, weaknesses, opportunities, and threats to the live export industry in the region are presented in Figure 2.14 overleaf. The live export industry adds good value to the Charters Towers – Ayr – Ingham region and leads to further value creation in other industries, as well as jobs. The positioning close to other industries such as mining mean that the live export industry can make the most of a strong freight transport network.

The region's road and rail infrastructure, plus strategic location near Townsville port, mean that Charters Towers is ideal for positioning as a live export regional hub; this is a clear strength for the region. The region's lack of innovation (or 'business dynamo') and less efficient labour market are weaknesses in the region. The live export industry should focus on the opportunities such as genetic breeding initiatives and new technologies, which present new avenues for creating value in agriculture. The region's aging demography and low human capital present threats to this opportunity for innovation and the industry should work to mitigate the risks of stagnation and 'brain drain' in the region.

Figure 2.14 SWOT analysis for the live export industry in Charters Towers – Ayr- Ingham region

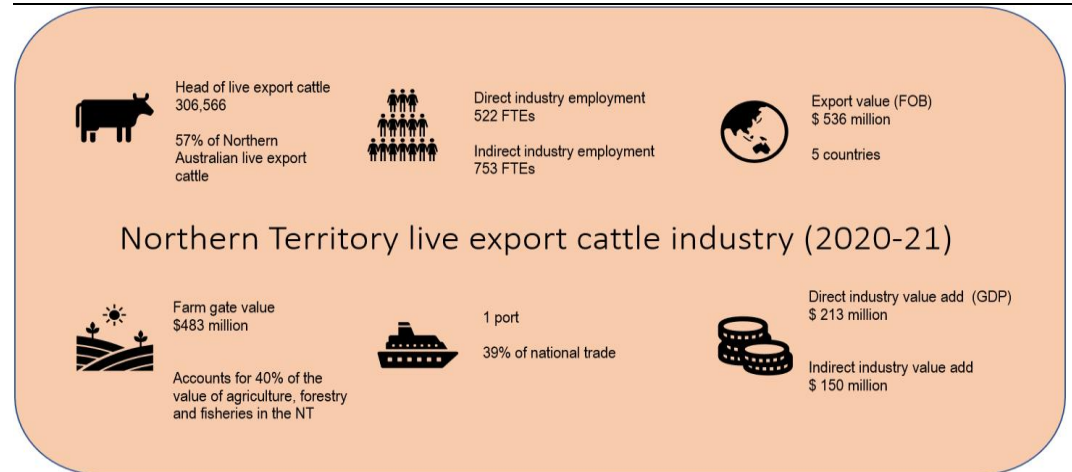


Source: ACIL Allen

2.2.3 Barkly, Katherine and Daly-Tiwi-West Arnhem regions, The Northern Territory

This case study draws together three regions in the Northern Territory (NT) to tell the story of the live export cattle supply chain from cattle station to port. Figure 2.15 below provides a snapshot of the NT live export industry in 2020-21.

Figure 2.15 Snapshot of the NT live export cattle industry, 2020-21



Source: ABS, ABARES and ACIL Allen

Background

The NT comprises 18 per cent of Australia (1,348,100 square km). Much of the NT is relatively flat, with long mountain ranges in Central Australia and tropical savanna in the northern portion of the NT.

Figure 2.16 The three regions of focus (Barkly, Katherine and Daly-Tiwi-West Arnhem) in the NT



Source: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70202>

The Barkly region covers 303,200 square km, making up 21 per cent of the NT's land area. The Barkly is predominantly made up of the Barkly Tablelands, a rolling plain of grassland in the East of the Northern Territory. The semi-arid savanna of Mitchell grass is well-suited to beef cattle grazing. This, combined with the sparse population, has resulted in very large cattle stations the size of small European countries. Around 57 per cent of the land area (182,500 square km) is used for agriculture, all of which is livestock production. The non-agricultural land is reserved for nature conservation and water.

The Katherine region comprises 24 per cent of the NT's land area (326,300 square km). The diverse ecosystems in Katherine region range from dry, open savanna woodland to tropical riverine ecosystems. Around 54 per cent of the region is used for agriculture, all of which is livestock

production, with 41 per cent of the area reserved for nature conservation and 4 per cent used for water.

The Daly – Tiwi – West Arnhem region covers 112,294 square km, making up 8.3 per cent of the NT’s land area. Indigenous protected land area makes up 16.2 per cent of the region and 17.4 per cent of the region is comprised of national parks, including around half of Kakadu National Park, which stretches across the Daly – Tiwi – West Arnhem region and the neighbouring Katherine region to the South.

In the Darwin region⁴⁸, which is just 3,200 square km (less than one per cent of the NT), 38 per cent of the land is used for nature conservation, 22 per cent is water, 20 per cent of the land is used for livestock production and 16 per cent is used for intensive uses.

People, employment and the regional economy

The Barkly, Katherine and the Daly-Tiwi-West Arnhem regions have a high proportion of Aboriginal and Torres Strait islanders (refer Table 2.7). Although median income levels are not dissimilar to those across Australia (except for Daly-Tiwi-West Arnhem), workforce participation rates are low and unemployment rates are high. The regions have relatively younger and less educated populations than the NT as a whole or the nation.

The Barkly is home to 6,000 people, roughly half of whom live in Tennant Creek. There are 16 Indigenous language groups in the Barkly region, the largest of which is Warumungu. Indigenous people make up 63% of the population of the region, and beef cattle farming is a main driver of the regional economy, with 13% of employed people working in cattle farming, making it the largest industry of employment.⁴⁹ The agricultural industry provides around 300 jobs, which is 14 per cent of all jobs in the region. Around 2,700 people are employed and 200 people are unemployed.⁵⁰

Table 2.7 Comparative demographic statistics for Barkly, Katherine and Daly-Tiwi-West Arnhem

	Barkly	Katherine	Daly – Tiwi – West Arnhem	NT	Australia
Median age	30.1	30.8	31.9	31.7	38.0
Aboriginal or Torres Strait Islander	63.2%	49%	68.3%	25.5%	2.8%
Median employee income	\$49,790	\$47,494	\$36,702	49,925	\$52,425
Labour force participation	49.3%	48.4%	41.9%	73.7%	60.3%
Unemployment	14%*	8.7%*	21.2%*	4.1%	3.9%
Year 12 or equivalent education	24.9%	27.6%	23.5%	42.9%	51.9%

Note: * unemployment rates are as at 2016.

Source: ABS: Labour Force, Australia 2022, 2019-20 estimates and 2015-16 census data.

⁴⁸ Includes Darwin City, Greater Darwin, Litchfield and Palmerston.

⁴⁹ <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70202>

⁵⁰ <https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021>

Box 2.4 Economic development in the Barkly region

A new project to build the world's largest solar farm in Powell Creek, in the North of the Barkly region, is planned for completion by 2027. The construction of the solar farm is expected to bring 2,000 jobs to the region for the 4-year construction period, which should temporarily reduce the region's dependence on the live export industry. A project to rehabilitate Peko mine will extract iron ore from 3.75 million tonnes of magnetite tailings. With extraction limited to 350,000 tonnes per year by rail capacity and port constraints, the project is expected to last 10 years and should provide employment to people residing in the Barkly, particularly in the transportation industry. Mineral exploration is continuing in the area, with the potential for further mining projects in the future.

Source: : <https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021> and <https://www.barkly.nt.gov.au/discover-the-barkly/invest> <https://reneweconomy.com.au/sun-cable-unveils-staggering-scale-of-worlds-biggest-solar-and-battery-project/> <https://www.abc.net.au/news/2022-05-06/peko-mine-rehab-project-leftover-ore-tennant-creek/101039790>

The Katherine region is home to 18,700 people, 48.9 per cent of whom identify as Indigenous.⁵¹ Around 9,900 people are employed and 600 people are unemployed.⁵² The top three industries of employment are defence, local government administration and beef cattle farming. The agricultural industry provides around 600 jobs, which is 9 per cent of all jobs in the region.

Around 17,900 people live in the Daly – Tiwi – West Arnhem region and 68 per cent of the population in the region identify as Indigenous. Around 6,700 people are employed and 670 people are unemployed.⁵³ Agriculture is a small part of the region's economy, representing just 7.2 per cent of the gross regional product. The Daly – Tiwi – West Arnhem region is comprised of four Local Government Areas: Coomalie, Tiwi Islands, West Arnhem, and West Daly, as well as Unincorporated NT.

Darwin is home to 136,800 people, of whom only 8.7 per cent are Indigenous.⁵⁴ Around 47,400 people are employed and 2,300 people are unemployed.⁵⁵ The top three industries of employment are state government administration, defence and hospitals. The agricultural industry provides around 600 jobs, which is 1 per cent of all jobs in the region.

The Regional Australia Institute ranks local government agencies according to 11 themes. Figure 2.17 overleaf shows the median ranks for LGAs within each region in the Northern Territory; note that the lower the number, the better the ranking. The areas in which the LGAs in the Barkly region rank highly compared to other LGAs across Australia are natural resources, demography and institutional foundations. The region does not rank as well in infrastructure and essential services, human capital, labour market efficiency, technological readiness, R&D and business dynamo. Katherine's LGAs rank highly in labour market efficiency and economic fundamentals; they rank more poorly in infrastructure and essential services, business dynamo and demography.

⁵¹ <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70205>

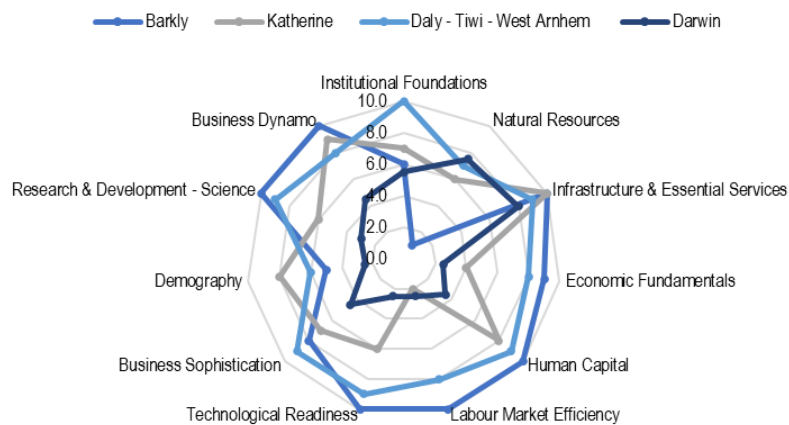
⁵² <https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021>

⁵³ <https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021>

⁵⁴ <https://www.abs.gov.au/census/find-census-data/quickstats/2016/701>

⁵⁵ <https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021>

Figure 2.17 RAI indicators for the Northern Territory



Source: <https://insight.regionalaustralia.org.au/>

According to the RAI themes, the Daly – Tiwi – West Arnhem region’s strengths are its demography (with a strong Indigenous population) and natural resources (with a large proportion of the region made up of protected land areas). The region’s weaknesses are its institutional foundations, infrastructure and essential services, human capital, business sophistication and research and development. Darwin’s LGAs are stronger in economic fundamentals, labour market efficiency, technological readiness and demography; they are weaker in natural resources and infrastructure and essential services.

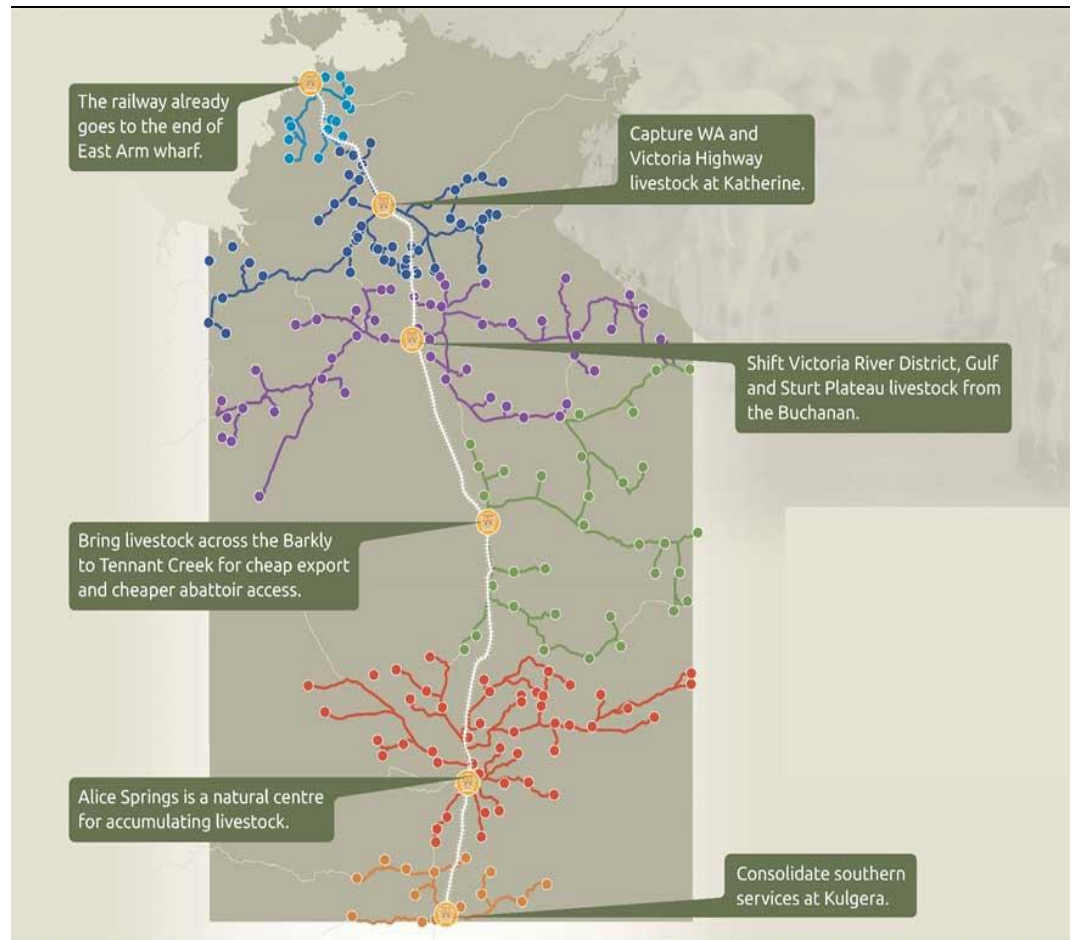
Infrastructure

The road and rail network across the Northern Territory is designed to transport freight from the regional areas into Darwin and ready for export by ship. The Barkly Highway links Tennant Creek and Mount Isa, while the Stuart Highway links Tennant Creek with Darwin, Katherine, Alice Springs and South Australia. Tennant Creek, the main town of the Barkly region, is strategically placed to link the East Coast, Southern Australia and Darwin.

Tennant Creek is also located on a freight railway line that links the North and South of Australia. Cattle for live export are therefore taken from the Barkly region to Darwin by road, or can be taken by road then rail. As shown in Figure 2.18 overleaf cattle can be transported by road to Tennant’s Creek (along the network of roads shown in green) and then onwards to Darwin by rail freight (along the railway line shown in white).⁵⁶ A development study into a multi-modal facility and rail terminal is underway, which brings the possibility of further construction and infrastructure in the future.

⁵⁶ <https://industry.nt.gov.au/publications/primary-industry-publications/newsletters/regional-newsletters/rural-review/nt-rural-review-november-2021/back-on-track-the-role-of-rail-in-transporting-livestock>

Figure 2.18 The road and rail network for livestock transportation in the NT



Source: <https://industry.nt.gov.au/publications/primary-industry-publications/newsletters/regional-newsletters/rural-review/nt-rural-review-november-2021/back-on-track-the-role-of-rail-in-transporting-livestock>

Note: The spots and lines on this map depict the NT's cattle stations and the roads that would be used to access the nearest railhead. The colours represent the catchment areas for the railheads.

Box 2.5 Rail infrastructure and the NT cattle industry

It's been more than 20 years since livestock travelled by rail in the NT – a recent study conducted by the NT Department of Industry, Tourism and Trade, suggests that there are huge cost savings for producers to use the rail network in tandem with trucking. A model of the Northern Territory's cattle stations and key beef cattle destinations was developed to examine most cost-efficient method of moving livestock between each origin and destination. Livestock transport movements over the last decade were used. Of the 1,068,000 head that move around the Territory on average each year, nearly 30% travel between locations that could benefit from a rail service. Weighted average savings were calculated of \$30.96 per head, representing savings of over \$8.6 million per annum.

Source: <https://industry.nt.gov.au/publications/primary-industry-publications/newsletters/regional-newsletters/rural-review/nt-rural-review-november-2021/back-on-track-the-role-of-rail-in-transporting-livestock> and <https://www.abc.net.au/news/rural/2021-09-10/savings-transporting-nt-cattle-by-rail/100451458>

Darwin is the Territory's main deep-water port and is run by Darwin Port Operations, part of the Landbridge Group. There is a dedicated live export wharf in the port of Darwin (refer Figure 2.19). As Australia's nearest port to Asia, Darwin Port is strategically positioned as Australia's 'northern gateway' for Australasian trade. Darwin International Airport is the home of many local charter air services and also contains a heliport. In 2020-21, 1,416 vessels visited the port; 105 of these were livestock carriers.⁵⁷ Around a third of the vessels were barges, and most of the other vessels were ships related to oil and gas. The port of Darwin is the busiest live export port in the world.⁵⁸

Figure 2.19 Live exports ship at Darwin Port



Source: <https://live-production.wcms.abc-cdn.net.au/cba1cee1d3ce2fd777a2a73cb4c995c9>

Cattle and the live export industry in the NT

With some 220 pastoral leases covering 602 000 square kilometres of prime grazing land in the NT the live export industry's value chain stretches right across the NT. Most beef cattle are reared on large cattle stations around Alice Springs, the Barkly, Katherine and right up towards Darwin. Darwin, with its dedicated live export facilities, acts as a funnel for live exports across the NT.

The live export industry produces 57 per cent of the Barkly region gross value of agricultural production, which itself represents 38 per cent (\$168 million) of total regional output.⁵⁹ The I-O analysis results estimate the direct economic contribution of the live export industry in this region accounts for \$81 million in direct value add, \$15 million in indirect value add and 262 full time equivalent jobs, which is 13 per cent of the FTE employment of the region. Combining direct and indirect effects, the Barkly region contributes 29.2 per cent of value add and 24.1 per cent of employment impacts of the live export industry in the Territory. Indirectly jobs created by live exports include up to 15 FTEs in retail trade in Barkly, 12 in agriculture and 10 in other services.

Katherine is also reliant upon the live export industry which produces 46 per cent (\$306 million) gross agricultural production. The industry contributes \$143 million in gross value add to the Katherine economy and employs 472 FTEs. The feed mill in Katherine, National Feed Co., produces stock feed used for cattle stations across the Northern Territory. Nearly half of the indirect gross value add (\$19 million) of the live export industry in Katherine is attributed to the agriculture,

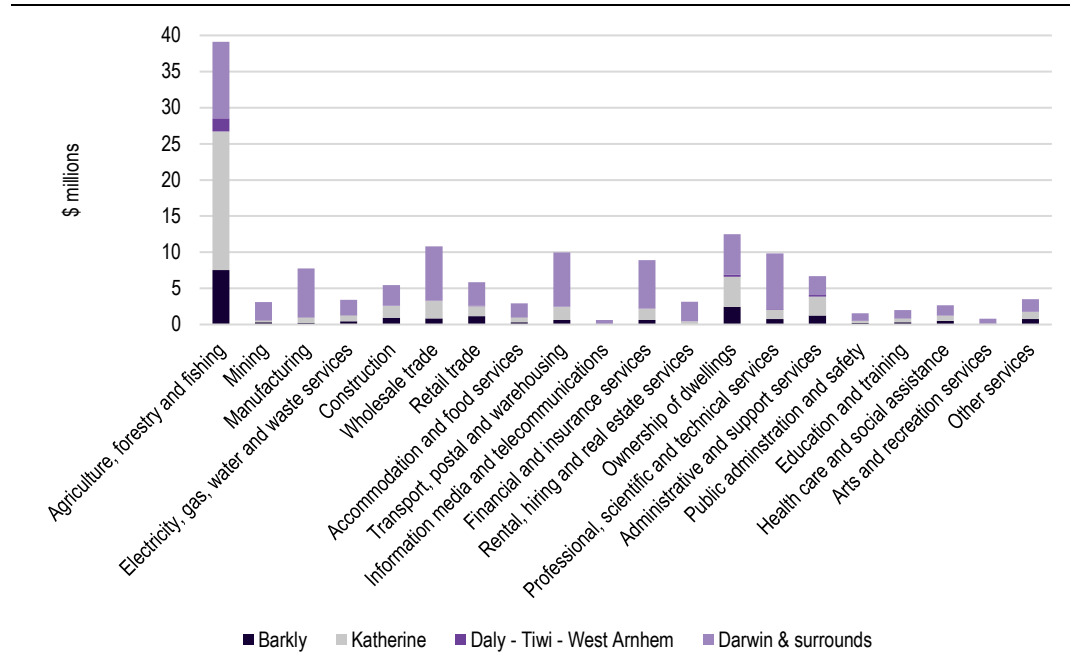
⁵⁷ <https://www.darwinport.com.au/trade/vessel-visits>

⁵⁸ NT Live Exporters Association cited in: [10https://www.ntca.org.au/about-us](https://www.ntca.org.au/about-us)

⁵⁹ ACIL Allen I-O Analysis

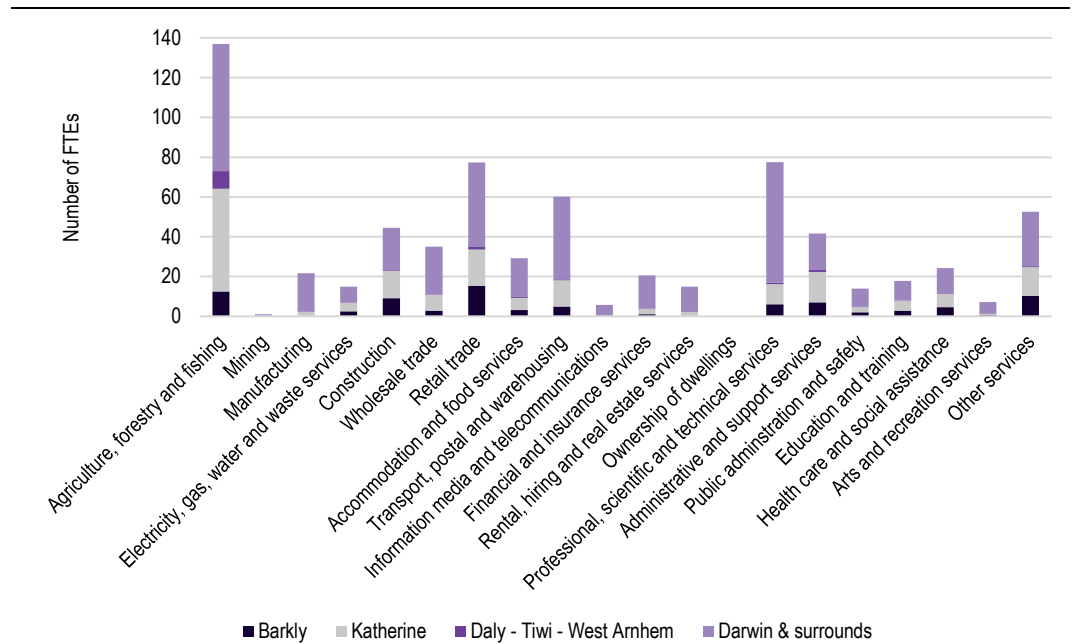
forestry and fisheries sector. Indirectly jobs created by live exports in the Katherine region include up to 52 in agriculture, 18 in retail trade, 15 in administrative services and 15 in other services.

Figure 2.20 Distribution of the live export industry value add impacts across other regional industries in the Northern Territory (upper bound)



Source: ACIL Allen I-O analysis

Figure 2.21 Distribution of the live export industry full-time equivalent employment impacts across other regional industries in the Northern Territory (upper bound)



Source: ACIL Allen, I-O analysis

The Daly – Tiwi – West Arnhem region has only 10 per cent of the cattle herd of the Barkly and Katherine regions but the live export industry produces 15 per cent of the region’s gross value of agricultural production, which itself represents 7.2 per cent (\$85 million) of total regional output.⁶⁰ The results of the I-O analysis estimate that the economic contribution of the live export industry in this region accounts for \$9 million in direct value add, \$2.5 million indirect value add and 37 full time equivalent jobs. Combining both direct and indirect effects, the Daly – Tiwi – West Arnhem region contributes 3.8 per cent of value add and 3.4 per cent of the employment impacts of the live export industry in the NT.

Box 2.6 The Northern Territory Cattlemen’s Association – Pastoral Real Jobs program

The NTCA, acknowledging the large number of Aboriginal and Torres Strait islanders in cattle regions offers the Pastoral Real Jobs (PRJ) program. This program, in partnership with the Indigenous Land and Sea Corporation (ILSC), has been running since 2008 and provides training and support for young Indigenous people who want to work in the cattle/pastoral industry. It is a two-year program consisting of learning, accredited industry recognised training and workplace and cultural guidance. It aims to place up to 30 young people a year in employment. The program staff actively engage with local communities and schools to recruit Indigenous youth through presenting the history and influence of Indigenous people in the NT pastoral industry. NTCA reports the following outcomes of the PRJ:

- Participants are trained and mentored to develop their personal capacity to work at industry level standards
- Indigenous young people are placed into jobs on NT cattle stations (17-28 years old)
- Opportunities are provided for skilled Indigenous trainees to have a lasting role in the NT pastoral industry
- The NT pastoral industry is assisted in meeting labour requirements in a changing age demographic
- Mutual cross-cultural awareness is fostered between non-Indigenous and Indigenous young Australians living and working together on NT cattle stations
- A rise in role models within Indigenous Communities, based on the heritage of Aboriginal Stockmen, has been cultivated
- A range of cultural, social, economic and environmental benefits have been delivered to participants and their families, along with communities and organisations.



Source: <https://www.ntca.org.au/programs/real-jobs-program>

Alternative cattle markets to live export are limited in the NT. Recent high prices in live export markets have led to tough market conditions for abattoirs in the region.⁶¹ The Batchelor abattoir, 100 kilometres south of Darwin, closed from 2003 to 2019, and again from December 2020 to July 2021, but has since reopened. AACo’s Livingstone Beef processing facility, located 50 kilometres south of Darwin, has suspended operations since 2018.⁶² Without an operating abattoir in NT the main alternative available to producers is shipping to a South Australian or Queensland abattoir.

⁶⁰ ACIL Allen I-O analysis

⁶¹ <https://www.abc.net.au/news/2021-06-17/nt-batchelor-meatworks-set-to-reopen-after-six-month-closure/100213414>

⁶² <https://aaco.com.au/operations/livingstone-beef>

Trucking animals these kinds of distances (over 1,500 km from Tennant Creek to Townsville and, more than 2,000km from Tennant Creek to Adelaide) is challenging for livestock and costly. Recent work by the NT government suggests that with suitable rail infrastructure in place transport of cattle to an Adelaide abattoir would be \$145 per head less than the cost of road transport.⁶³ The rail northward to port would also reduce the cost of transport of cattle by \$2.86 per head.

From station to ship: the NT live export supply chain

From cattle stations as large as some European countries in the Barkly region, to the Katherine feed mill, to the Darwin Port livestock export terminal the NT is geared towards cattle production.

The NT accounts for 57 per cent of the Northern Australian live export industry, and the farm gate value is \$483 million and export value of 537 million. The port of Darwin exports more live cattle than any other port in Australia. The live export cattle industry contributes a total value add of \$363 million to the economy and provides 1,275 FTEs in the NT. This accounts for 40 per cent of the gross value add of the agriculture, forestry and fisheries sector in the NT and 1.5 per cent of the gross state product for the NT.

A SWOT assessment of the NT live export industry

The strengths, weaknesses, opportunities, and threats to the live export industry in the region are presented in Figure 2.22. The NT live export industry trades off its strengths in natural resources and its comparative advantage of grazing land and proximity to export markets. Its main urban centres, Katherine and Darwin have high levels of labour market efficiency than other regions.

Figure 2.22 SWOT analysis for the live export industry in the NT



Source: ACIL Allen

There are considerable weaknesses in the NT wide provision of infrastructure and especially essential services outside of urban areas. This goes to a further issue of underutilized human capital especially in regional communities as high numbers of young people are lacking education and are generally unemployed. Harnessing these younger workers such as through the NTCA’s PRJ program is a way to use the strength of the cattle industry to overcome some of the weaknesses across the NT.

⁶³ See: <https://industry.nt.gov.au/publications/primary-industry-publications/newsletters/regional-newsletters/rural-review/nt-rural-review-november-2021/back-on-track-the-role-of-rail-in-transporting-livestock>

2.3 Impact of a reduction or a cessation of cattle live exports⁶⁴

This section considers the impact of the cessation of Australian cattle live exports⁶⁵ from 2022-23 on the Australian beef industry. Specifically, we seek to estimate the impact of separate scenarios around the cessation of the cattle live export industry on:

- The number of cattle slaughtered in the domestic market.
- The price impact and associated loss of value of the increased supply of cattle slaughtered in the domestic market.
- The potential impact on the value of grazing land in Northern Australia due to the cessation of cattle live export.

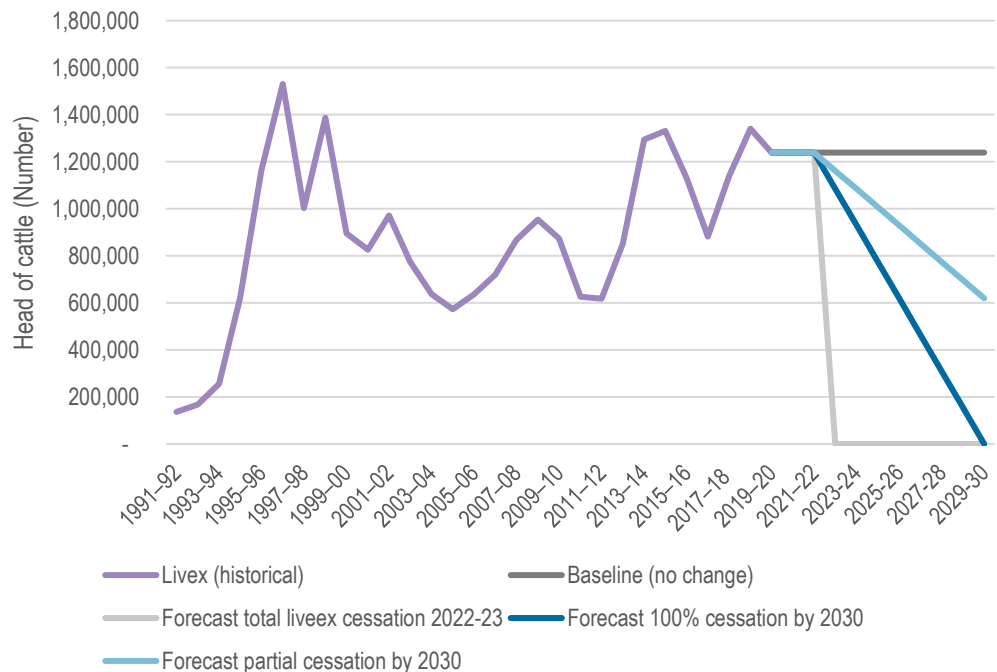
Three separate scenarios are modelled as part of this exercise:

- A complete cessation of cattle live export commencing 2022-23
- A gradual phasing out to 50 per cent of current levels by 2030 (partial cessation)
- A gradual phasing out to 100 per cent of current levels by 2030.

2.3.1 Historical and projected live export volumes

Figure 2.23 shows the historical number of cattle live exports from 1991-92 to 2019-20 as well as projections to 2029-30 under the three live export scenarios. In 2019-20, Australia exported 1.24 million head of live cattle. Under the business as usual scenario (base scenario) we forecast annual live exports of 1.24 million head of cattle annually. This is equivalent to the average of the 2017-18 and 2019-20 financial years.

Figure 2.23 Live exports, historical and projected (head of cattle), Australia



Source: ACIL Allen

⁶⁴ This modelling was completed prior to recent industry concerns around Foot and Mouth Disease and Lumpy Skin Disease.

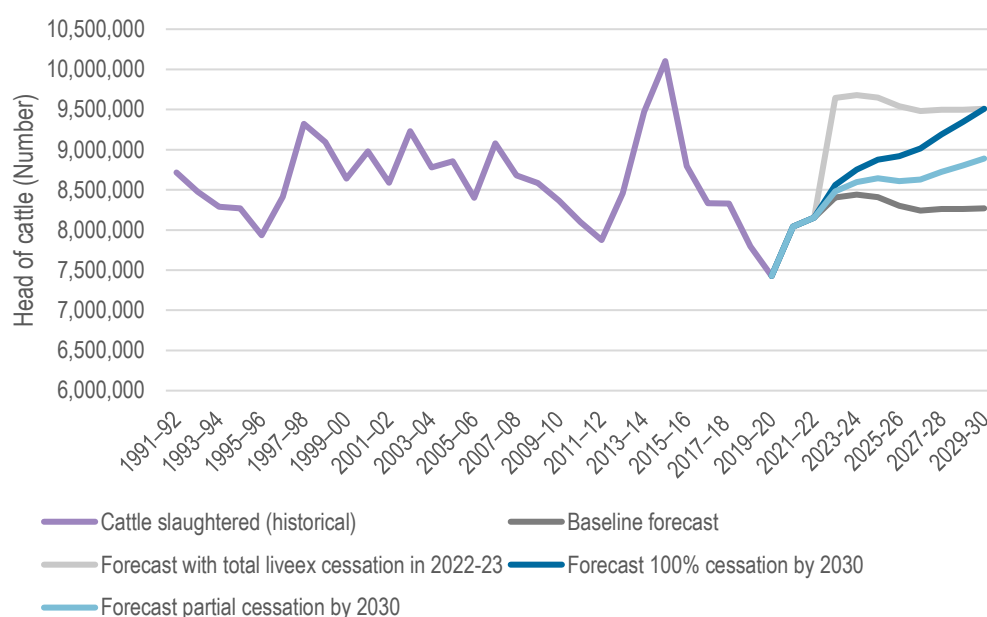
⁶⁵ Cattle live exports (excluding dairy and breeder cattle).

Under the complete cessation of the industry starting immediately, live exports drop to zero from 2022-23 and remain there over the whole forecast period. Under a partial cessation by 2030, live exports decline to 0.62 million by 2030.

2.3.2 Historical and projected head of cattle slaughtered

The total number of cattle slaughtered in Australia in 2019-20 was 7.43 million. This is projected to change depending on the different live export scenarios. Under the business as usual scenario, the total number of cattle slaughtered is projected to increase to 9.51 million head of cattle by 2029-30. Under complete cessation by 2030, the number of cattle slaughtered is projected to increase by 15.0 per cent in 2030 to 9.51 million head of cattle. Under the partial cessation scenario, the supply of cattle slaughtered is projected to increase by 7.5 per cent to 8.89 million head of cattle by 2030. This is presented in Figure 2.24.

Figure 2.24 Cattle slaughtered; historical and projected (head of cattle)



Source: ACIL Allen

2.3.3 Relationship between the price of cattle and the stock of slaughter cattle

A simple econometric relationship was estimated between the real price of cattle and the number of cattle slaughtered. The regression used annual data from 1991-92 to 2019-20, a total of 29 data points. The model was estimated in log-log form to interpret the estimated coefficient as an elasticity.

The coefficient on the stock of cattle was estimated to be -0.131. This means that a 1 per cent increase in the stock of cattle leads to a 0.13 per cent reduction in the price of beef.

For the purposes of the modelling, we also allow an upper and lower bound of the elasticity to reflect the statistical uncertainty surrounding the estimated coefficient. The impacts are estimated under an assumed price elasticity of -0.065 and -0.25.

It is important to note that the estimated coefficient is subject to a high degree of uncertainty. For this reason, the estimated price impact of the increased supply of cattle slaughtered will have a high degree of uncertainty associated with it.

2.3.4 Price and gross value production (GVP) of the cessation of the industry

The impact of the average price of beef in Australia is calculated by multiplying the estimated elasticity by the percentage change in the number of head of cattle slaughtered in any given year. The results are shown for each of the three scenarios and elasticities in Figure 2.26 for cattle prices and revenue in Figure 2.27.

Figure 2.26A overleaf shows the impact on price of an immediate cessation on live exports commencing in 2022-23. Under this scenario, the average price of cattle declines by about 2 per cent almost immediately. Under the more elastic assumption, the price decline approaches 4 per cent.

Figure 2.26B overleaf shows the price impact of the 100 per cent live export cessation by 2030. Under this scenario, the price decline is more gradual, reaching the same level as the immediate cessation scenario but only in 2030.

Under the more moderate partial live export cessation by 2030 scenario (see Figure 2.26C overleaf), price impacts are more muted, reflecting the fact that there is a smaller increase in the annual supply of cattle to be slaughtered.

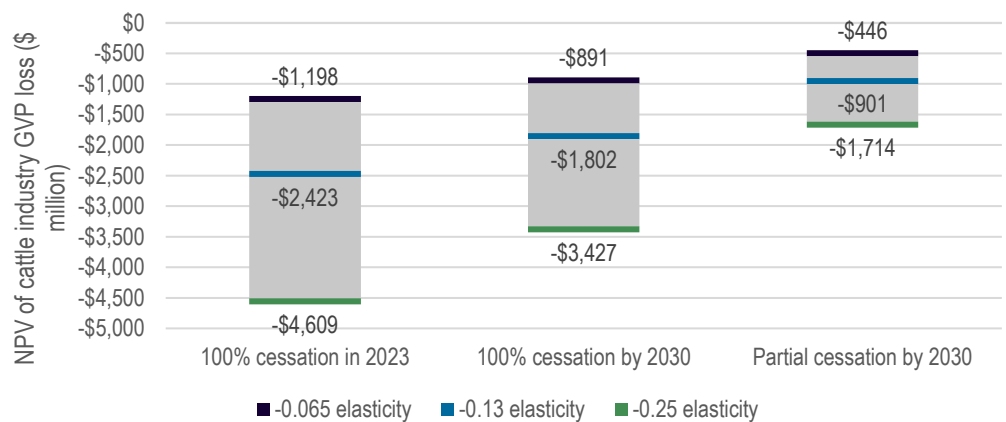
Figure 2.27 on page 40 shows the revenue loss (GVP) to the existing domestic cattle market of the price decline in the average cattle price. Under the immediate cessation scenario, annual gross value lost reaches \$256 million under the medium elasticity assumption and \$505 million under the high elasticity assumption.

Under the 100 per cent cessation by 2030 scenario, the trajectory of lost GVP takes a more gradual path, similar levels to the immediate scenario in 2030. Under the partial scenario, annual gross value lost reaches \$133 million under the medium elasticity assumption and \$253 million under the high elasticity assumption.

Figure 2.25 below converts the annual losses into a single Net Present Value (NPV) figure. The analysis uses a 20-year forecast horizon and a 7 per cent discount rate.

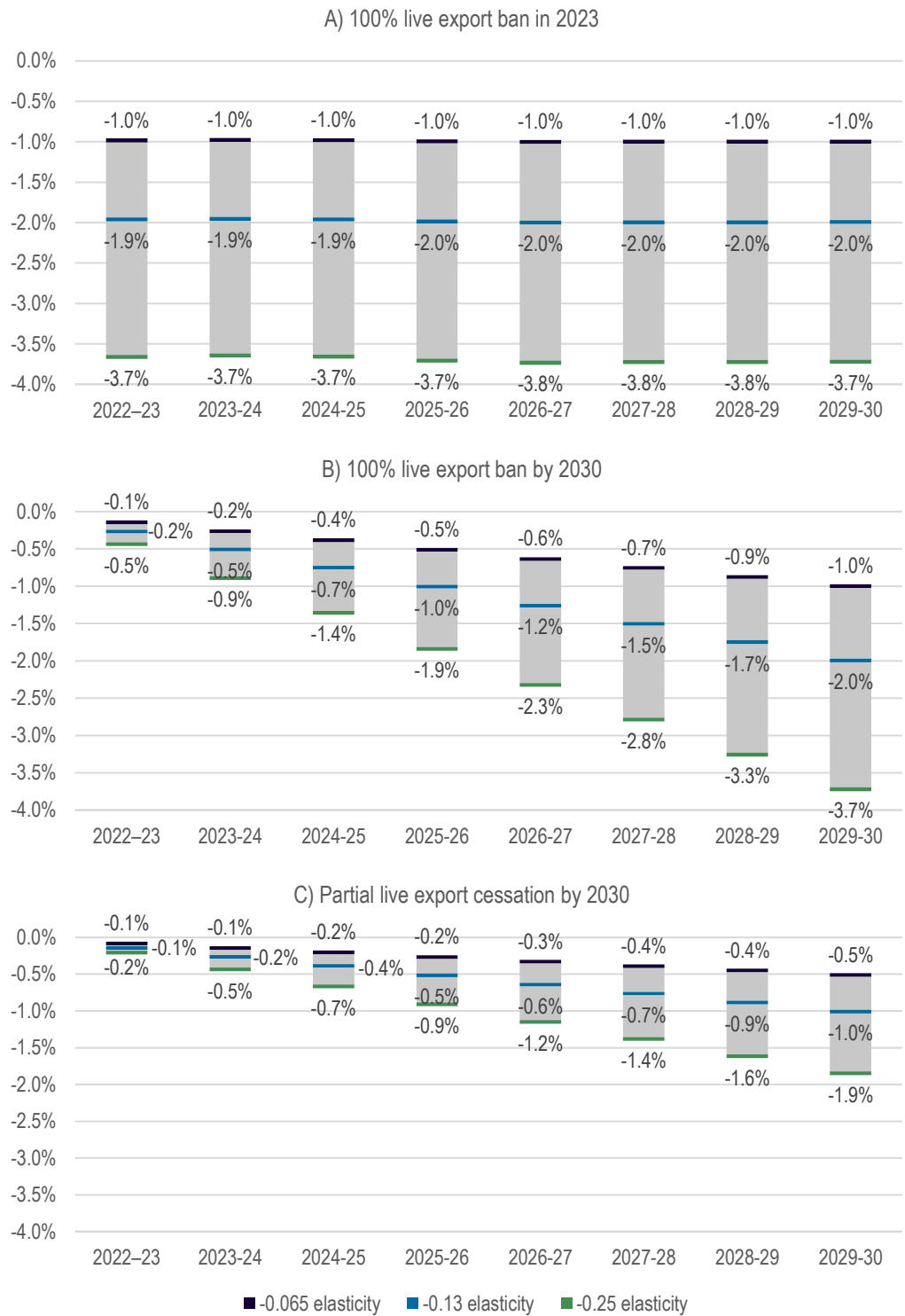
The figure shows that the largest losses are incurred in the 100 per cent immediate cessation scenario, with a total loss of value of \$2.4 billion under the medium elasticity assumption. This rises to \$4.6 billion under the high elasticity assumption. The smallest loss of value occurs under partial cessation.

Figure 2.25 GVP impact on existing industry of lower cattle prices, NPV \$ million



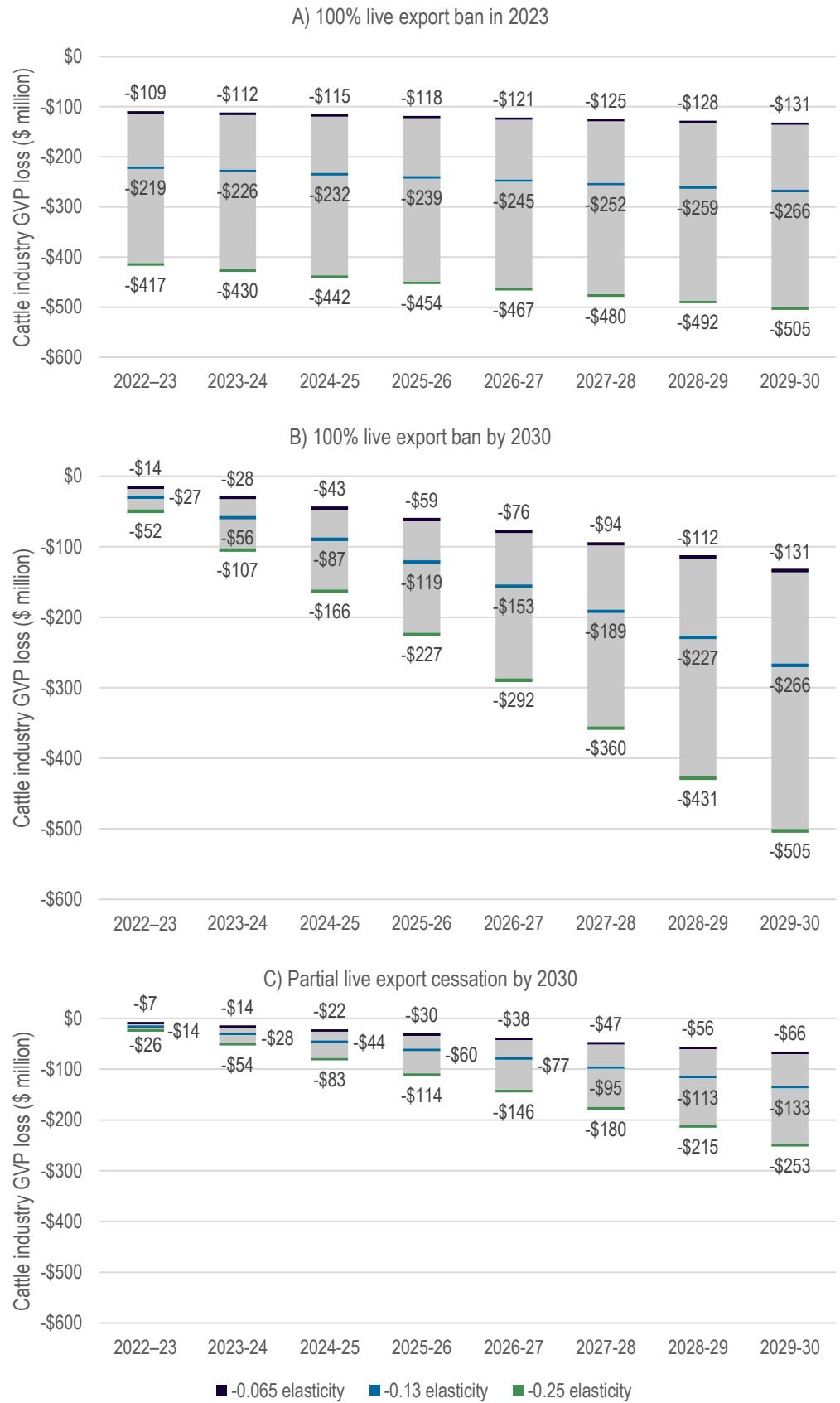
Source: ACIL Allen

Figure 2.26 Cattle price reduction by scenario relative to baseline for three elasticities



Source: ACIL Allen

Figure 2.27 Lost cattle industry GVP due to price reduction by scenario relative to baseline for three elasticities



Source: ACIL Allen

2.3.5 GVP industry impact of live export cessation

The previous section measured the impact of the live export cessation on the existing market for domestic cattle through the channel of lower cattle prices. This section considers the loss of value resulting from cessation of live exports. This loss of value occurs through the following channels:

- By diverting cattle from live export to the domestic market, there is a significant reduction in the effective price per kg of meat achieved.
- The meat of the formerly exported cattle is discounted to reflect market preferences.
- The diverted cattle are subject to additional costs such as the cost of transport to the nearest abattoir for slaughter.

Figure 2.29A on page 42 shows the annual loss of revenue (Gross Value Product) to the live export industry from a 100 per cent live export cessation in 2023. Under the medium elasticity assumption, annual revenue losses (GVP) to the industry will reach \$737 million dollars per annum (medium elasticity) because of the cessation.

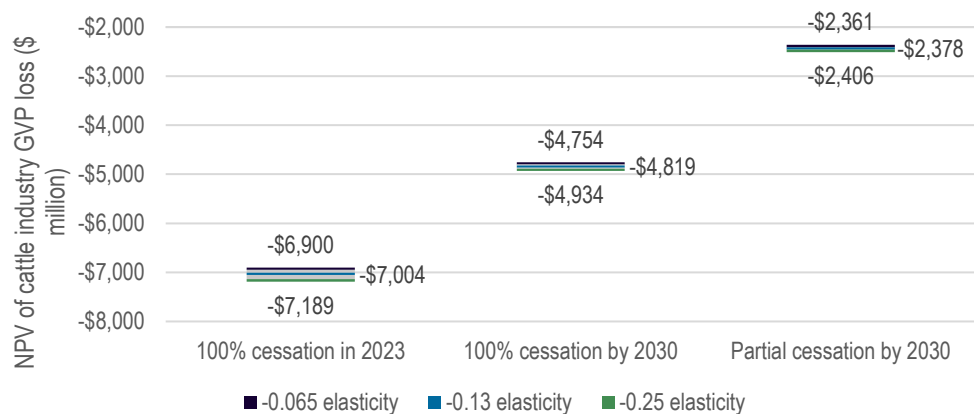
Figure 2.29B shows the annual loss of GVP to the live export industry from a 100 per cent live export cessation by 2030. Under the medium elasticity assumption, annual revenue losses (GVP) to the industry will increase steadily from 2022-23 reaching \$700 million (medium elasticity) per annum.

Figure 2.29C shows the annual loss of GVP from partial cessation on live exports by 2030. Under this scenario, the annual lost revenue will reach \$345 million (medium elasticity) by 2030.

The NPV of the stream of annual losses for each of the three scenarios and three elasticity assumptions are shown in Figure 2.28 below. The NPV of the lost GVP under the immediate 100 per cent cessation scenario is estimated to be \$7 billion for the medium elasticity assumption.

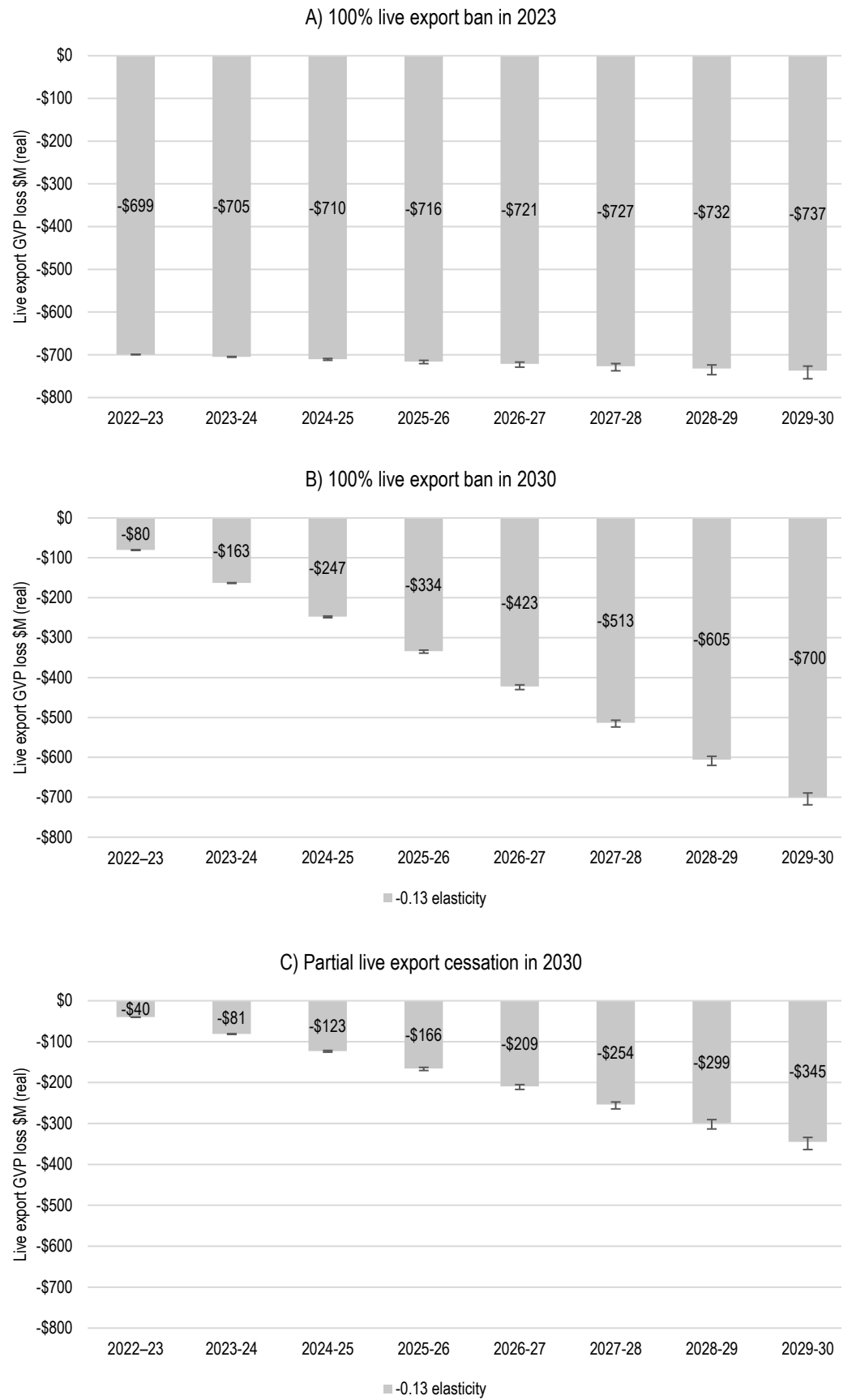
Under the gradual phasing out to 100 per cent by 2030, the NPV of total revenue lost is \$4.8 billion. This falls to \$2.4 billion under the more moderate partial cessation scenario.

Figure 2.28 Lost GVP resulting from the cessation of the industry



Source: ACIL Allen

Figure 2.29 Lost GVP resulting from the cessation of the industry

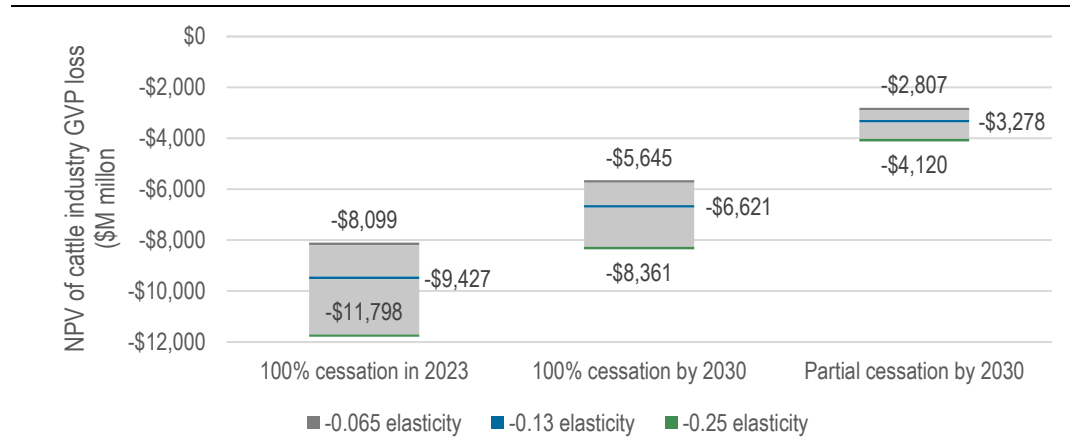


Source: ACIL Allen

2.3.6 Total industry impact of live export cessation

The total impact of losses both on the existing domestic beef industry and the live export industry are shown in Figure 2.30. Under the 100 per cent immediate cessation scenario, the NPV of lost revenue or gross value product amounts to \$9.4 billion (assuming the medium price elasticity or price impact). Under the 100 per cent cessation by 2030 this loss declines to \$6.6 billion. Under the partial scenario total losses decline further to \$3.3 billion.

Figure 2.30 GVP impact resulting from the cessation of the industry, NPV



Source: ACIL Allen

2.3.7 Land value impact of live export cessation

This section considers the impact on the value of grazing land in the Northern Territory resulting from the three separate live export cessation scenarios.

The approach taken is to value the stream of cashflows from operations both before and after the live export cessation.

The change in the value of the land is that which would be required to occur to ensure that the expected rate of return from land ownership remains the same after the introduction of the live export cessation as that available under the base case of no live export cessation. Refer Table 2.8.

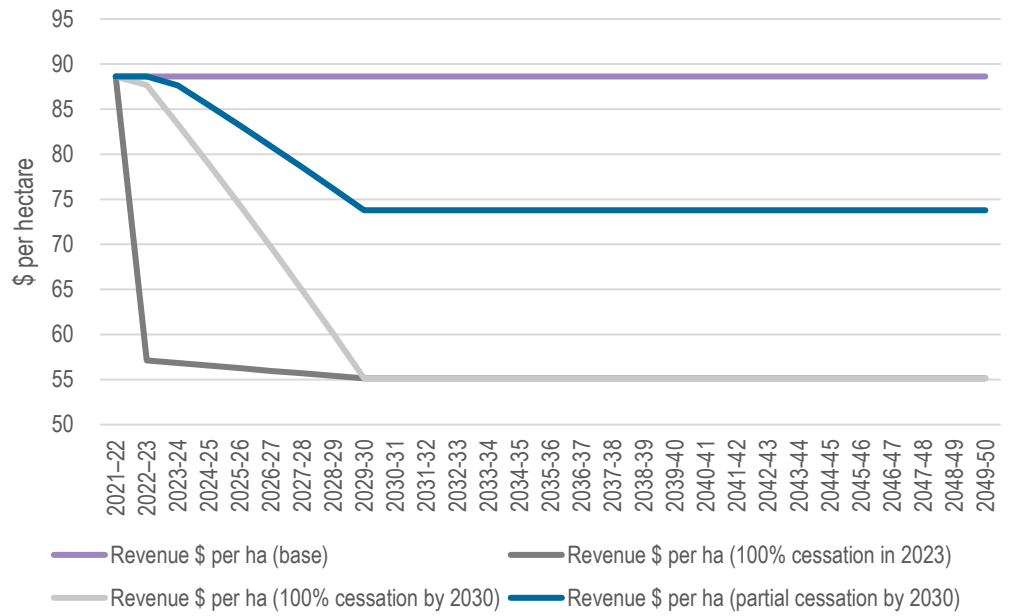
Table 2.8 Assumptions underlying the land value impact calculations

	Value
Grazing land in NT (sq km)	615,000
Hectares	6,150,000
NT Live exports (head)	400,000
Share of total live exports	32 per cent
Weight Average Cost of Capital (WACC)	7 per cent

Source: ACIL Allen

Figure 2.31 shows the revenue per hectare under the business as usual and three separate live export cessation scenarios. Under the business as usual case, grazing land in the Northern Territory generates \$89 per hectare of revenue. Under the gradual 100 per cent cessation by 2023, the revenue per hectare falls initially to \$57 and then reduces further by 2030, equating with the 100 per cent cessation scenario by 2030, where revenue per hectare falls to \$55. Under partial cessation by 2030, total revenue per hectare falls to \$74 as a result of the live export cessation.

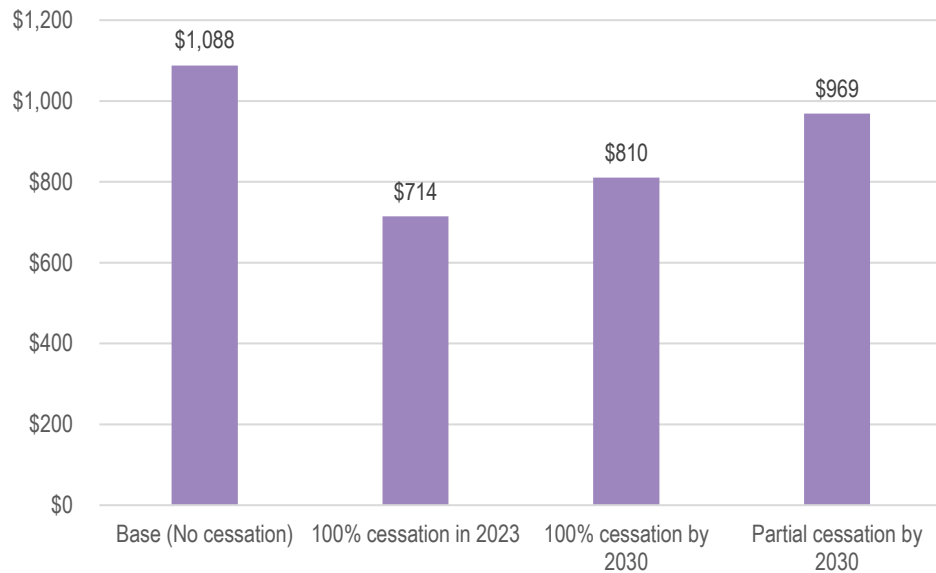
Figure 2.31 NT revenue per hectare of NT grazing land under different scenarios



Source: ACIL Allen

Figure 2.32 shows the NPV of the stream of cashflows per hectare to NT grazing land under the base case and the three separate scenarios. As expected, the biggest impact occurs after the total and immediate cessation.

Figure 2.32 NT value per hectare, NPV, Dollars

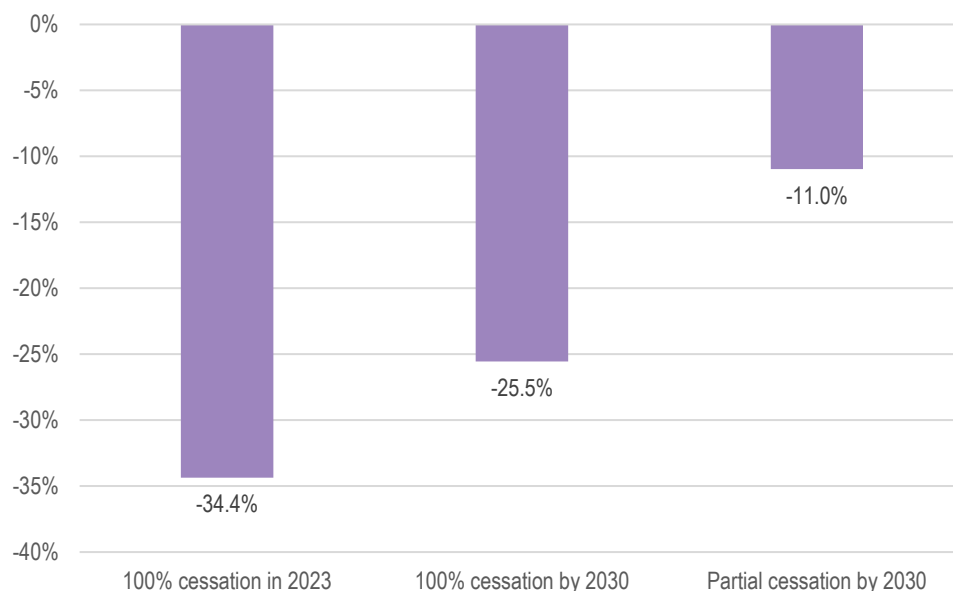


Source: ACIL Allen

Figure 2.33 shows the percentage change in the value of NT grazing land resulting from the live export cessation.

Under the 100 per cent cessation from 2023, the value of NT grazing land is expected to decline by 34 per cent. This decline is reduced to 26 per cent if the total cessation is introduced gradually by 2030. Under partial cessation by 2030, the expected reduction in land value falls to just 11 per cent.

Figure 2.33 NT value per hectare, Percentage change



Source: ACIL Allen

2.4 International trade and comparative advantage

This section uses publicly available data to assess the dynamics of the global market for live export cattle, focusing on Australia’s comparative advantage relative to our Asian neighbours and other countries that Australia competes with for market share.

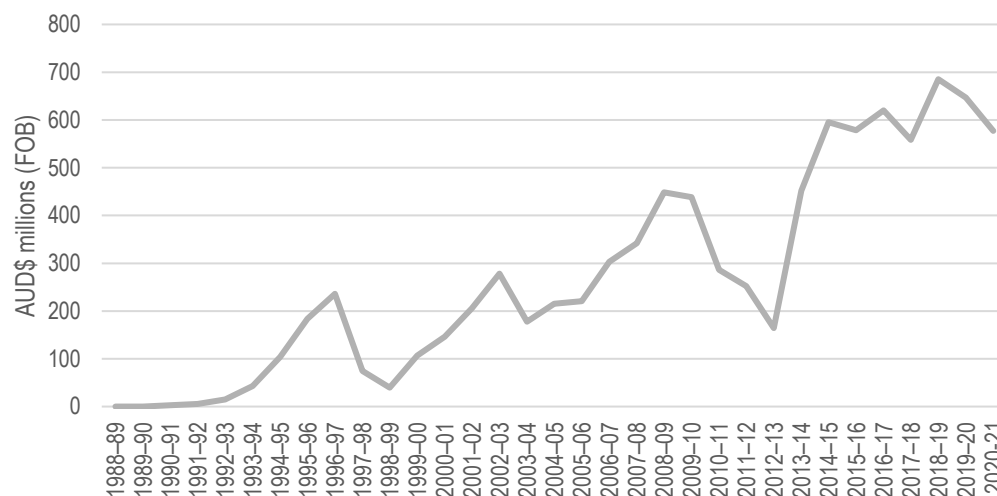
2.4.1 Snapshot of live export cattle trade, 2020-21 and projections

2020 was a challenging year for live export cattle due to high cattle prices and exchange rates weakening consumer purchasing power in Australia’s largest market, Indonesia (refer Figure 2.34 on page 49).⁶⁶

In 2020, total live cattle exports fell 19 per cent driven by a 26 per cent fall in feeder exports. There was a slight rise in exports of slaughter cattle. Indonesian imports declined by 28 per cent and Israeli imports by 52 per cent but growth rates of 11 per cent and 27 per cent was witnessed respectively in Vietnam and Malaysia.

Global demand for live cattle in 2021 is currently forecast to be similar to the reduced levels of 2020. However, demand in Australia’s key export region of South-East Asia is expected to see growth of around 10%. Cattle imports into the MENA region are forecast to grow around 4%, with increases in 2021 in all countries except for Turkey and Saudi Arabia.

⁶⁶ Refer: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

Figure 2.34 Value of Australian live feeder/slaughter cattle imports to Indonesia

Source: ABARES 2022, *Agricultural commodities: March quarter 2022*

A recent study by ABARES⁶⁸ which looks back at drivers for live export cattle imports to ASEAN countries notes that “significant potential for cattle export expansion and diversification” into markets other than Indonesia and Vietnam although this is highly dependent on productivity growth in Northern Australia. Other important factors for export market expansion include:

- investment in in-country feedlot industries for lighter-weight cattle
- increase in uptake of supply chain risk mitigation strategies such as foreign direct investment and long term contracts.

Chilcott et al (2020) concurs that there is overreliance on South East Asian markets and trade policies are subject to change in Indonesia and Vietnam which opens Australian live exporters up to significant risks.⁶⁹ Chilcott et al also see weakness in Australia’s regulatory compliance specifically with respect to supply chain compliance (due to the complexity of Exporter Supply Chain Assurance Scheme (ESCAS)), the low wage levels of staff who work in South East Asian countries where Australian regulatory requirements must be enforced (leads to reduced incentive to comply) and the cost of compliance with Australian regulations reduces Australia’s competitiveness as alternative suppliers are not subject to these costs.⁷⁰

2.4.2 Comparative advantage

Comparative advantage refers to the products that a country can produce more cheaply or easily (i.e., at a lower opportunity cost, not necessarily at a greater volume or quality) than its trading partners.

⁶⁷ Refer: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

⁶⁸ ABARES, 2022, Australia’s biosecurity market access an agricultural exports, case study of cattle exports to ASEAN countries, available at: <https://www.awe.gov.au/abares/research-topics/trade/case-study-of-Australias-cattle-exports-to-ASEAN-countries#download-the-report>

⁶⁹ Chilcott et al, 2020, Northern beef situation analysis, Report for CRC for Northern Australia, available at: file:///C:/Users/alobb/Downloads/CRCNA_NA%20Beef%20Situational%20Analysis_%20July%202020.pdf

⁷⁰ Chilcott et al, 2020.

Although unseen and frequently overlooked, opportunity costs represent the potential benefit/s that is missed out on when choosing one alternative over another. The country with the lower opportunity cost, and therefore the smallest potential benefit lost, holds the comparative advantage.

The comparative advantage of Australia's northern beef industry, including the live cattle industry and beef meat exports, lies in some key factors:

- The proximity of Northern Australia to key markets, particularly South East Asia; most of our markets are in countries no more than 10 transport days away. This helps to reduce transport costs and with respect to live animals to minimise the journey time so as to maintain the animals health and condition.
- Australia has the ability to provide a consistent quantity and quality of live animals and meat due to our large industry and stable economy.
- Northern Australia has bred cattle for live export that meet the market requirements of customers in terms of the physical animal itself and that animals ability to survive in the climate of the importing country
- Australian cattle are relatively free of pests and disease, specifically Foot and Mouth disease.

Synergies exist between the systems in Northern Australia and Indonesia with mutual benefits flowing due to:

- proximity to market
- Australia's large grazing land base versus Indonesia's lack of land
- Indonesia's lack of access to suitable cold chain.⁷¹

The comparative advantage that Indonesia holds with the live cattle trade is their ability to fatten and process Australian cattle due to their relatively lower costs for feed and labour in comparison to Australia's operations. Indonesia's government has supported the development of a domestic beef feedlot and processing industry for regional economic development.⁷²

2.4.3 Australia's market and trading partners

Australia held over ten per cent market share in live cattle exports in 2019⁷³ second only to France (Figure 2.35). Markets that import Australian live cattle are dominated by Asia. Indonesia is consistently the largest importer (Figure 2.36).

⁷¹ Refer:

https://www.mla.com.au/contentassets/d358fb903c724339bc09574e0057221d/w.liv.0189_final_report.pdf

⁷² Refer:

https://www.mla.com.au/contentassets/d358fb903c724339bc09574e0057221d/w.liv.0189_final_report.pdf

⁷³ FAO data

Box 2.7 Australian exports to Indonesia

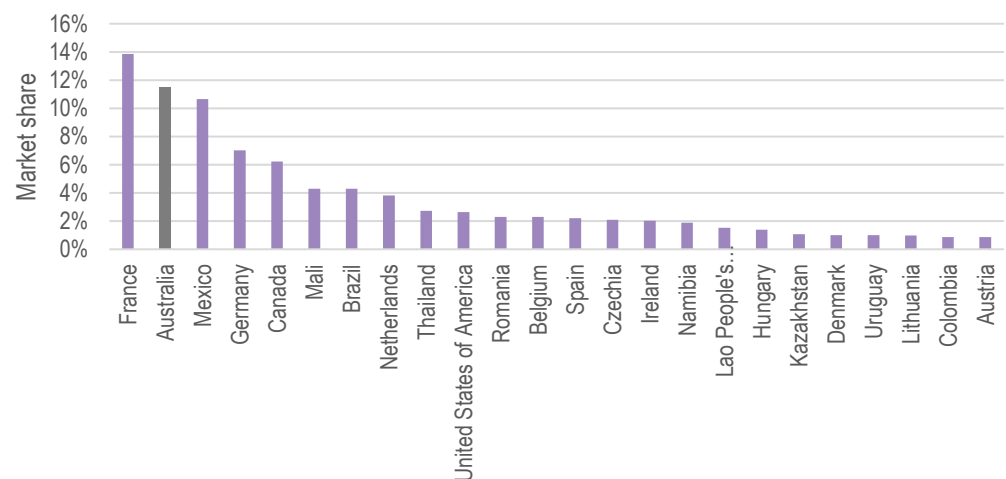
Indonesia is Australia's largest market for live export cattle and accounts for about 45 per cent of export volume. Indonesia has a quota agreement with Australia with a 0 per cent import tariff up to 598,000 head of male cattle and 2.5 per cent import tariff outside the quota.

Australian live cattle represent about 25 per cent of total Indonesian beef consumption and is expected to grow at 11 per cent per annum from 2025. Beef from live cattle is supplied through wet markets – which is becoming increasingly competitive with cheaper products like Indian buffalo which has higher profit margins for wet market sellers. The Covid-19 pandemic, combined with high Australian cattle prices and a weakening Indonesian exchange rate have reduced demand for cattle imports with a 31 per cent reduction in shipments from Australia in 2020-21.

In the event that Australia ceased live cattle exports to Indonesia, it may be that the short-term response by Indonesia would be to import more processed beef, although India and potentially Brazil (pending changes in the livestock disease status of that nation's beef herd) are likely to be more competitive suppliers of low-value processed beef than Australia. There is a real risk the net result of such a decision would simply be a loss of overall markets for Australian beef. Indonesian government policy has a focus on increasing local beef production and has introduced a '3 per cent breeder feeder' import policy, which requires 3 per cent breeders on total feeders imported.⁷⁴

Source: Australian Farm Institute (2016)⁷⁵ and MLA (2021)⁷⁶

Figure 2.35 Share of global live cattle exports (2019)



Source: FAO STAT. 2021.

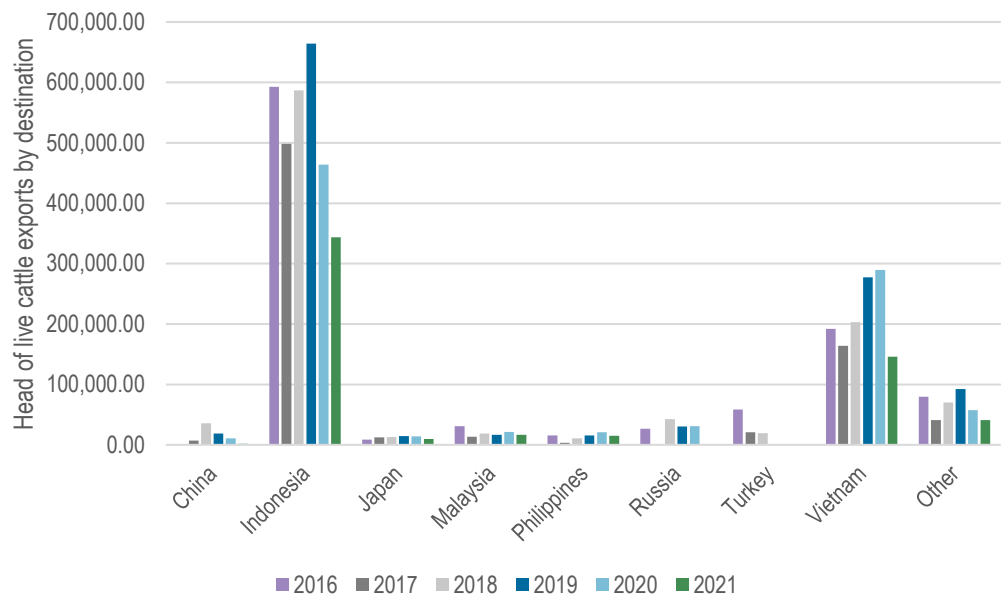
⁷⁴ The policy was halted due to Covid-19.

⁷⁵ Refer:

https://www.mla.com.au/contentassets/d358fb903c724339bc09574e0057221d/w.liv.0189_final_report.pdf

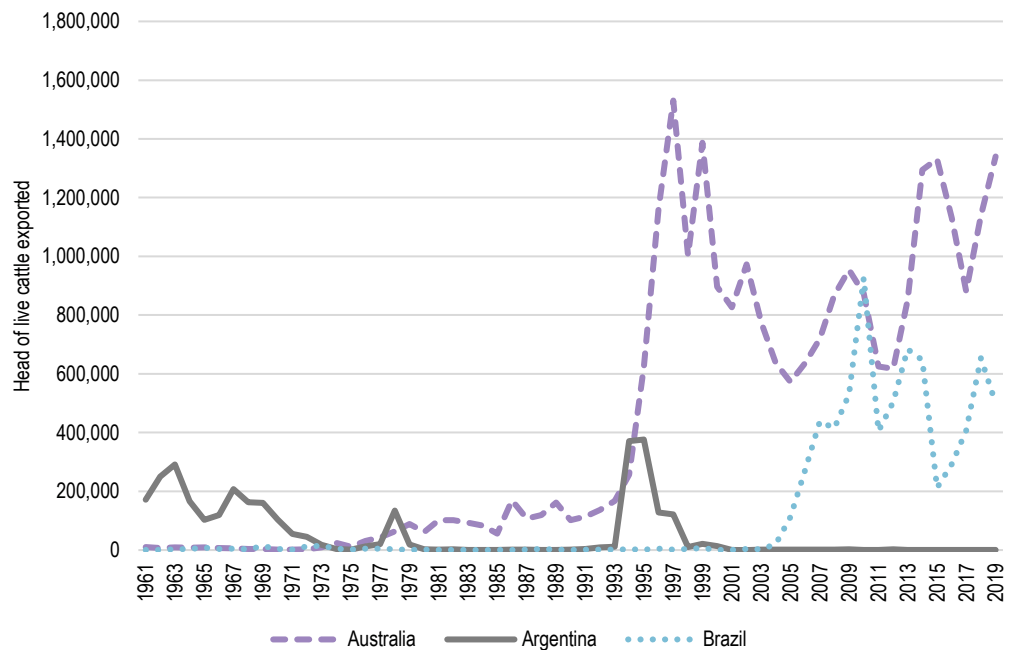
⁷⁶ Refer: https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/november-2021/2021-indonesia-market-snapshot-red-meat_111121_distribution.pdf

Figure 2.36 Australian live cattle exports by destination



Source: DAWE, 2021 (cattle live exports for slaughter and feeder purposes only)
 Note data for 2021 is not available for the full year

Figure 2.37 Head of cattle exported overtime from Australia, Argentina and Brazil



Source: FAO STAT, 2021

MLA projections for 2021 suggested that Australian live cattle exports will face competition from European and South American suppliers, focusing on Brazil and Uruguay.⁷⁷

Live cattle exports from Brazil to Vietnam is likely to continue following the first shipment in September 2021. Falling cattle prices will narrow the price difference between Australian and Brazilian cattle.⁷⁸

Indian Buffalo Meat (a substitute) will continue to be a key competitor for Australian live cattle, particularly in South-East Asia. Indian live cattle exports are estimated to increase in the next decade.⁷⁹

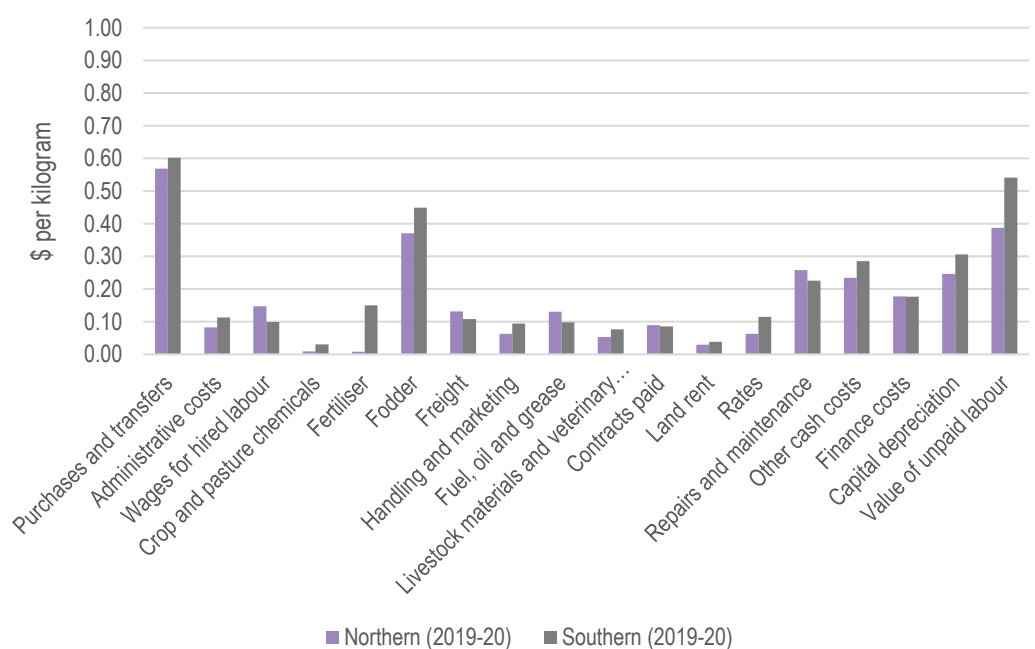
Indian live cattle exports are estimated to account for around 32% of global live cattle exports in 2021

Source: GIRA.⁸⁰

2.4.4 Relative cost of production – Australian systems

The cost of production in Northern Australia is generally less than Southern systems. Figure 2.38 shows the costs by category in 2019-20 with the exception of the cost of wages, repairs and maintenance and contracts. However, the margins received by businesses in these systems depend highly on the beef price (refer Figure 2.39 overleaf), which is influenced by supply as the cattle herd has been in rebuild phase following drought. Northern Australia's rebuild is behind the rest of the country meaning prices are even higher in the North.

Figure 2.38 Costs by category in Australian Northern vs Southern cattle systems (2019-20)



Source: ABARES 2021, *Financial performance of livestock farms, 2018–19 to 2020–21*.

⁷⁷ Refer: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

⁷⁸ Refer: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

⁷⁹ Refer: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

⁸⁰ Refer: <https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

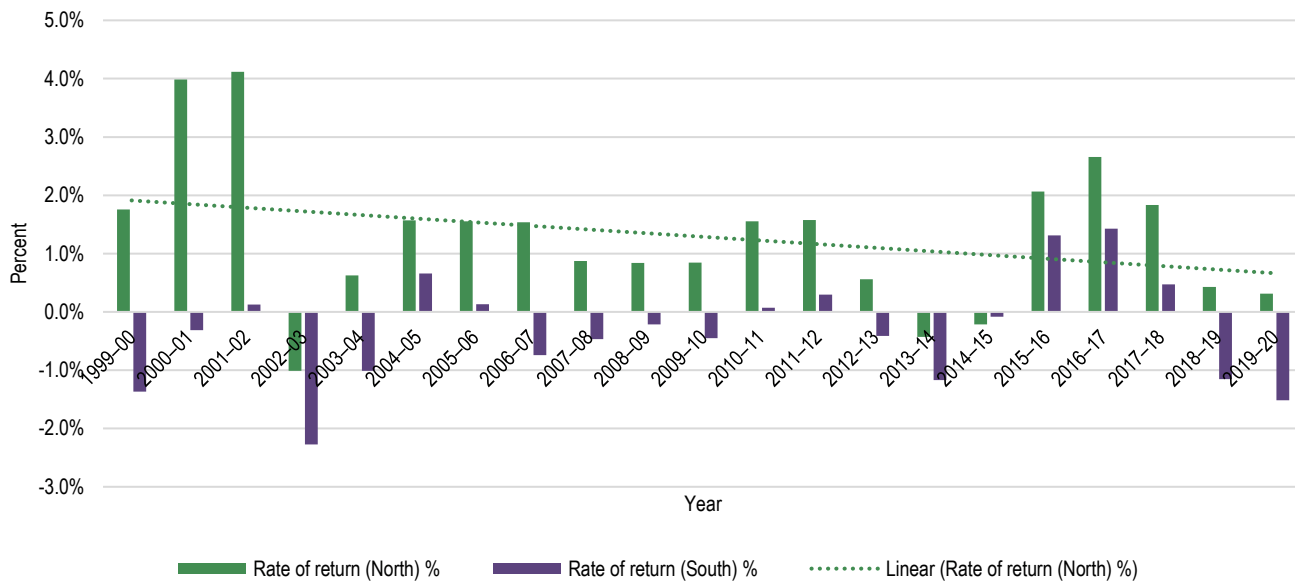
Figure 2.39 Cost, price and margin in Australian Northern vs Southern cattle systems



Source: ABARES 2021, *Financial performance of livestock farms, 2018–19 to 2020–21*.

Looking at the rate of return⁸¹ across the two systems over time (Figure 2.40), shows that Northern system businesses can generate a higher return to all capital used by the business. This includes what is borrowed or leased. Relative to Southern systems the trend is declining over time.

Figure 2.40 Rate of return in Australian cattle systems



Source: ABARES 2021, *Financial performance of livestock farms, 2018–19 to 2020–21*

⁸¹ Where the rate of return is calculated by expressing profit at full equity as a percentage of total opening capital. Rate of return represents the ability of the business to generate a return to all capital used by the business, including that which is borrowed or leased. Rate of return is calculated excluding capital appreciation.

Regulatory costs

Australian regulatory costs are typically higher than the global average. Table 2.9 overleaf details the government influenced costs and charges in 2014-15 for a Northern Australian live exporter. In 2011 the Exporter Supply Chain Assurance System, (ESCAS) was introduced adding approximately 2 per cent to enterprise expenses between 2008-09 and 2014-15.⁸² Live export businesses incur approximately 70 per cent of their business costs in purchasing cattle and regulatory costs account for about 30 per cent of costs after the purchase of livestock.⁸³

Table 2.9 Northern Australia live exporter regulatory costs by category (estimated, 2014-15)

Cost category	Estimated regulatory cost (\$/head)	Notes
Depot fee	\$0.50	AQIS requirement for cattle to spend 4 days in a depot for inspection purposes
Fodder costs (depot)	\$4.90	Includes fuel excise, fodder transport regulations (state based) and AQIS costs for depot fodder
Ear tag and associated labour	\$1.05	Requirement under the NLIS
Third party veterinarian	\$3.50	AQIS requirement
Road transport	\$6.00	Includes fuel excise and animal welfare and OHS regulations
AQIS charge	\$2.50	AQIS requirement
LiveCorp levy	\$3.30	Assumes a live cattle weight of 350kg and a levy rate of \$0.0095238/kg.
Sea freight	\$37.50	AQIS and AMSA regulation
Fodder costs (voyage)	\$5.00	AQIS and AMSA regulation
Administrative costs	\$0.40	Associated with regulation including AQIS, superannuation, tax and corporation laws, export documentation etc.
ESCAS costs	\$9.00	
Total regulatory costs	\$73.60	

Source: Adapted from ProAnd (2016)

⁸² ProAnd Associates (2016) Regulatory costs in Red Meat and Livestock Industry, Report to MLA. Available at: <https://www.mla.com.au/globalassets/mla-corporate/research-and-development/documents/industry-issues/final-june-2016-proand-assoc-regulatory-costs-report.pdf>

⁸³ ProAnd Associates (2016) Regulatory costs in Red Meat and Livestock Industry, Report to MLA. Available at: <https://www.mla.com.au/globalassets/mla-corporate/research-and-development/documents/industry-issues/final-june-2016-proand-assoc-regulatory-costs-report.pdf>

2.4.5 Relative cost of production – international competitors

2018 Global Agri-Benchmark Network Results⁸⁴ note Australia has moderate operating costs and high opportunity costs of land, labour and infrastructure. Australia achieves higher overall productivity in years of higher beef prices, enabling the high opportunity costs to be covered through returns. Australian Northern systems performance is comparable to pasture/rangeland systems in South America and Africa mainly due to access feed. Australian grazing systems production costs are generally above global averages.⁸⁵

Brazil, like Australia operates a pasture based production system, but cattle prices are lower than Australia due to lower domestic incomes in Brazil and reduced access to export market due to disease concerns.⁸⁶

ACCC reports “Australia’s comparative advantage in cattle production is largely due to a pasture based production system” which has lower input costs relative to more intensive systems such as those in the USA.⁸⁷ The Northern system lacks grain and has considerable workforce constraints. This leads to the region’s comparative advantage in live export relative to the value adding activities in beef processing. This is further highlighted when you include the relatively lower wage rates in meat processing and wholesaling as in Australia’s live cattle trading partners.

⁸⁴ Refer: https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/agri-benchmark/mla_agribenchmark-beef-results-report_jan-20182.pdf

⁸⁵ Refer: https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/agri-benchmark/mla_agribenchmark-beef-results-report_jan-20182.pdf

⁸⁶ Refer: https://www.accc.gov.au/system/files/ACCC_per_cent20Cattle_per_cent20and_per_cent20beef_per_cent20market_per_cent20studyFinal_per_cent20report.pdf

⁸⁷ Refer: https://www.accc.gov.au/system/files/ACCC_per_cent20Cattle_per_cent20and_per_cent20beef_per_cent20market_per_cent20studyFinal_per_cent20report.pdf

Conclusion 3

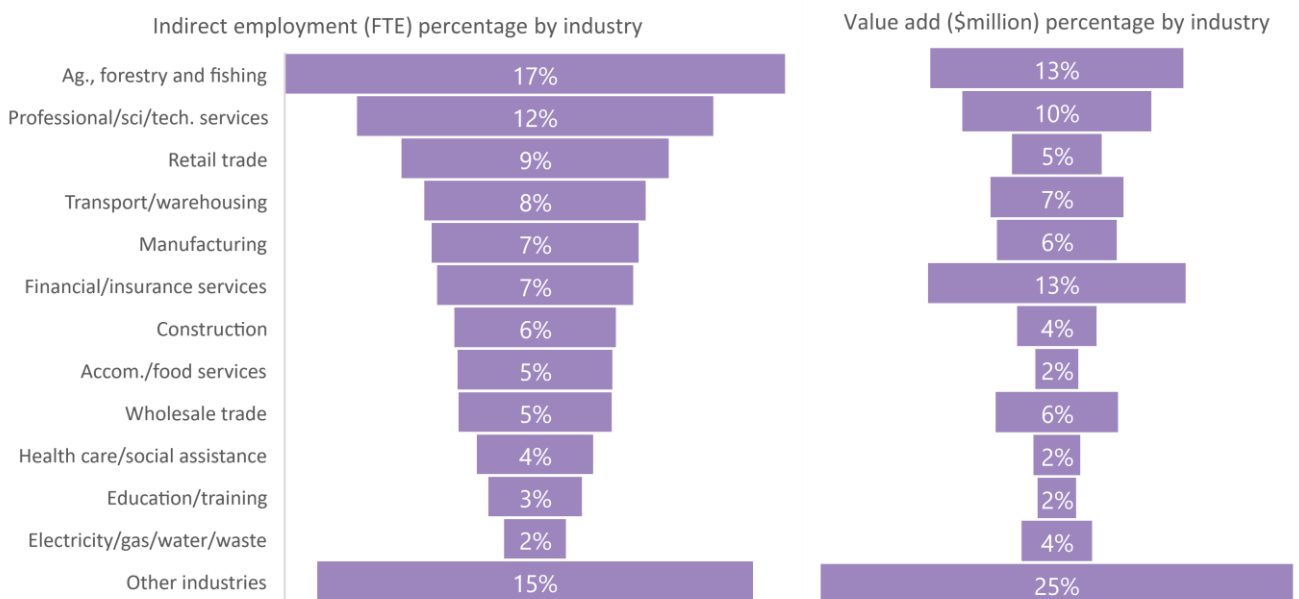
3.1 Key findings

3.1.1 Value and importance to the Australian economy and regional communities

The **economic value** of the northern live cattle trade was estimated using Input-Output Analysis to establish the direct and indirect economic contribution to Australia and 18 regions in 2020-21. This analysis allows economic contribution estimates to extend beyond direct value added by live exporters to other sectors of the economy.

Nationally the analysis shows live cattle exports contributed \$1.4 billion and 6,573 FTEs to the Australian economy in 2020-21 (upper bound estimate). \$508 million and 1,527 FTEs were contributed directly by live export. The flow-on into the wider economy created an additional indirect value add of \$862 million and 5,046 FTEs across 20 major industries. Half the additional indirect value add is generated in the five industries and three quarters in ten industries. The flow on impact from value adding and employment varies between industries, reflecting their different labour intensities (Figure 3.1).

Figure 3.1 National industry contributions by key industries



Source: ACIL Allen

While concentrated in Northern Australia, economic contribution is nationwide. 52 per cent of value and 61 per cent of employment is generated in the rest of Australia (Table 3.1 below). Overall northern live cattle trade represents 0.07 per cent of national GDP and 2.99 per cent of the value add from agriculture, fisheries and forestry.

Table 3.1 Industry contributions in Northern (18 regions) and the rest of Australia

	Direct		Indirect*		Total	
	Value add	Employment	Value add	Employment	Value add	Employment
	(\$ millions)	(# of FTEs)	(\$ millions)	(# of FTEs)	(\$ millions)	(# of FTEs)
Northern Australia Regions	\$408	1,209	\$185	938	\$594	2,146
Rest of Australia	\$100	318	\$707	4,108	\$807	4,426
All of Australia	\$508	1,527	\$892	5,046	\$1,400	6,573

* Upper bounds

Source: ACIL Allen

State/territory economic contribution is distributed across three jurisdictions. The value added contribution is highest in the Northern Territory. Employment contribution is highest in Queensland. Employment contribution in Queensland is driven by higher indirect contributions and interactions with the cattle industry outside northern Queensland cattle regions (Figure 3.2).

The live exports contribution is greatest in the Northern Territory where it accounts for 40 per cent of value add from agriculture, fisheries and forestry and 1.5 per cent of gross state product. In Queensland and Western Australia, the industry contributions are 3.2 per cent and 3.43 per cent of value add from agriculture, fisheries and forestry and 0.08 per cent and 0.06 per cent of gross state product respectively, reflecting their larger, more diverse economies.

Table 3.2 Industry contributions in the 18 regions Northern Territory, Queensland and Western Australia*

	Cattle Head	Direct		Indirect**		Total	
		Value add	Employment	Value add	Employment	Value add	Employment
		(\$ millions)	(# of FTEs)	(\$ millions)	(# of FTEs)	(\$ millions)	(# of FTEs)
NT Regions	306,566	\$213	522	\$74	334	\$287	856
QLD Regions	183,821	\$107	389	\$55	324	\$163	713
WA Regions	184,149	\$88	298	\$56	280	\$144	578
Northern Australia regions	674,536	\$408	1,209	\$185	938	\$594	2,146

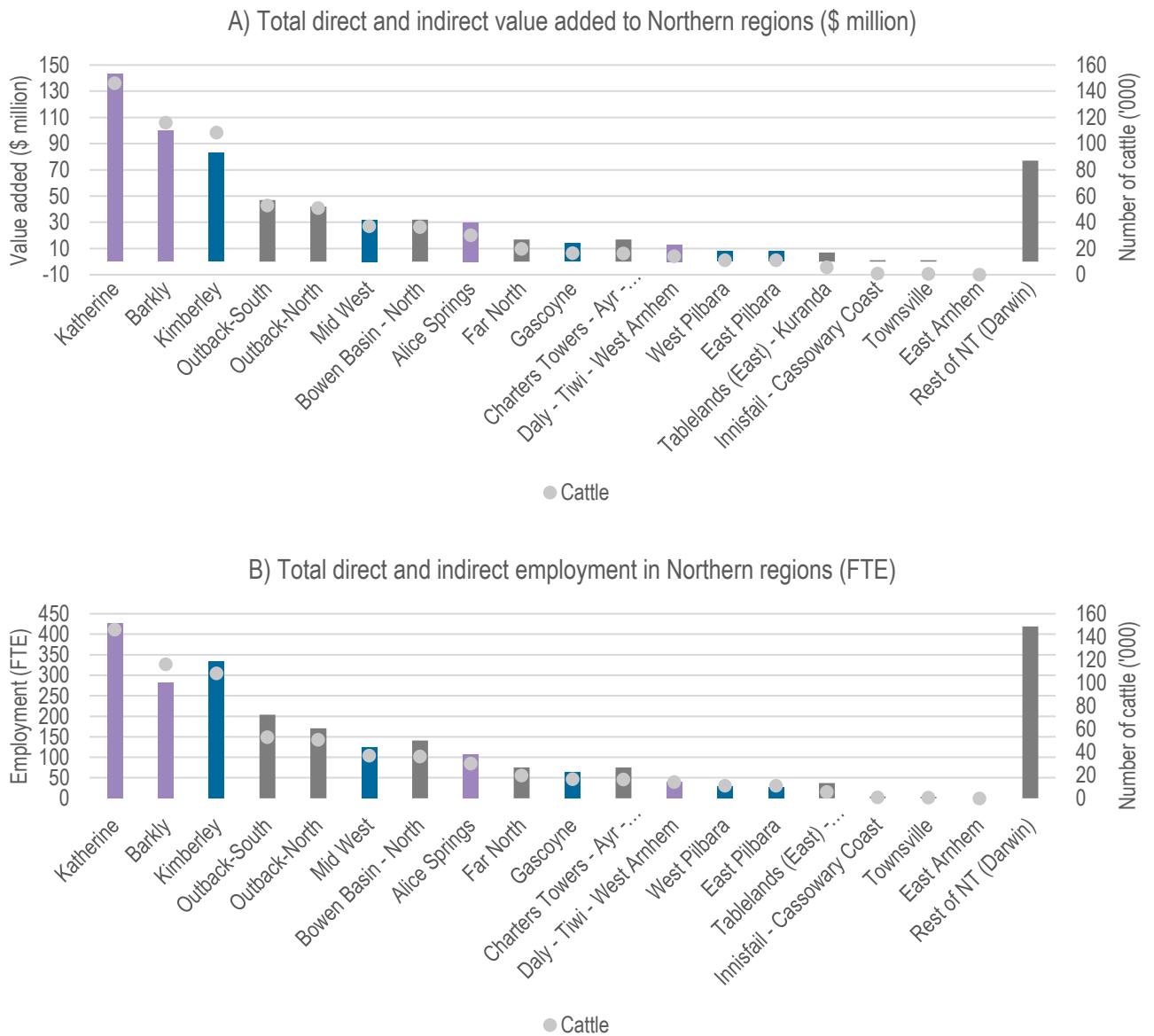
* There are regions in each state/territory that are not included in the analysis – these are included in Table 3.1 above, for Rest of Australia.

** Upper bounds

Source: ACIL Allen

In **regional Northern Australia** the economic contribution is widely but not evenly distributed (Figure 3.2). Three regions contribute 55 per cent of value add and 49 per cent of employment: Katherine, Barkly and Kimberley. When combined with the Outback North and Outback South these five regions contribute approximately two thirds of the total value add and employment. All other regions have economic contributions other than East Arnhem.

Figure 3.2 Industry contributions (LHS) and number of cattle (RHS) by Northern regions



Source: ACIL Allen

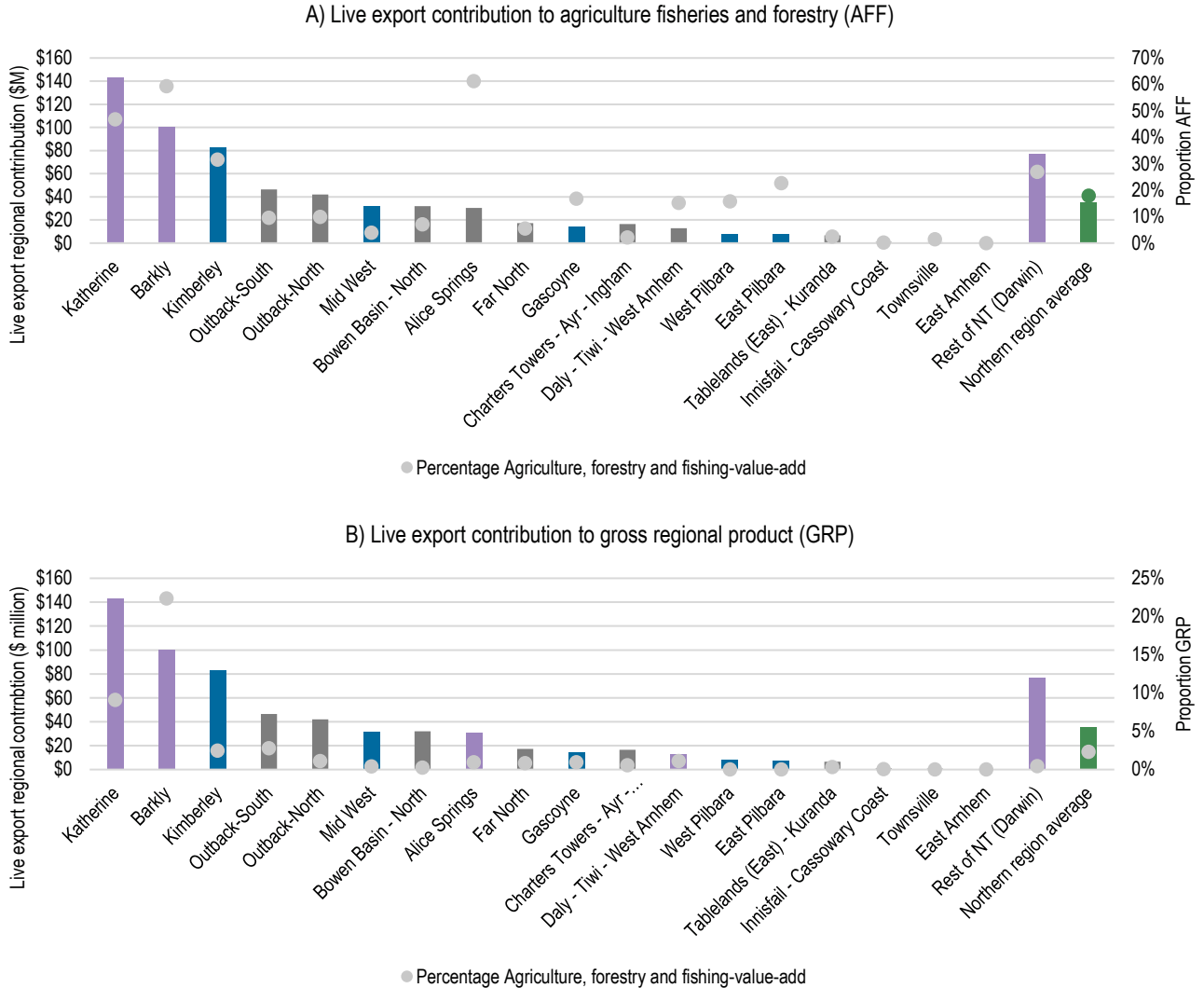
Live export contributes an average of \$37 million value added annually to each region in **Northern Australia**. Ranging from \$143 million in Katherine to \$0 million in East Arnhem. The differences relate to each region’s overall size, area of grazing land used (for live export) and whether live cattle aggregation and port operations occur.

In terms of **agriculture, fisheries and forestry**, live export’s contribution is above the 17.8 per cent average in the four largest live cattle producing regions and Darwin (location of the largest live export port). Live export is also proportionally above average in the Alice Springs and East Pilbara (Figure 3.3A).

The aggregation and loading of ships make a significant contribution in Northern regions. In the NT this is concentrated in the Darwin and Katherine regions. In Western Australia northern port operations concentrate in the Kimberley (Broome) and to a lesser extent West Pilbara and Mid-West. In Queensland these activities are distributed with more regions involved in aggregation and not necessarily in the regions where the port is located. The presence of live export contributes to a region’s ability to provide shared services for agriculture, fisheries and forestry.

The annual **gross regional product** contribution averages 2.30 per cent for live exports in Northern regions (Figure 3.3B). The most dependent regions are Katherine (9.10 per cent) and Barkly (22.36 per cent). Contribution is also above average in the Kimberley (2.46 per cent), Outback South Queensland (2.76 per cent).

Figure 3.3 Industry contributions (LHS) to regional agriculture fisheries and forestry and regional gross product (RHS)



Source: ACIL Allen

3.1.2 Comparative advantage of the Northern Australian live export industry

The success of the Northern live export cattle industry reflects on Northern Australia’s comparative advantages over both Southern Australian and international systems. These advantages are built on Northern Australia’s low opportunity costs in relation to key factors, including geographic position and both the quality and quantity of Australian livestock. This intersects well with the relative strengths of export destination markets, particularly Indonesia where the comparative advantage is in processing Australian cattle imports.

Northern Australia’s comparative advantage in the industry stems from a few main factors conducive to maximising the value generated from live cattle export.

The proximity of Australia to its largest export destination markets is highly beneficial in terms of transportation costs and duration, the latter works to reduce the likelihood of damages to animal welfare that can result from the effect of travel on livestock health and condition.

Another factor is the extent to which Australia is capable of providing both a consistent level of quality and a large quantity of live cattle. This is enabled by the region's large amount of land dedicated to grazing.

Additional factors supporting the industry's relative position include the compatibility of the live animals with the climates of the destination markets, allowing Australia to provide cattle matching the requirements of customers in those markets. Australian cattle are also generally free of disease. Together, these factors underpin the industry by reducing the opportunity costs of producing cattle for live export in Northern Australia.

Some risks affecting how Australia can make the most of its comparative advantages include its reliance on specific markets. Trade is primarily confined to a few large customers in South-East Asia whose trade policies are subject to change and regulatory compliance costs that can influence competitiveness relative to other suppliers.

Having the second-largest share of the global market at 11.5 per cent in 2019, Australia is a major exporter of live cattle, behind France at 14 per cent, with most other competitors accounting for considerably smaller shares. Indonesia is the largest customer, importing a full quarter of its domestic beef consumption from Australia; this represents half of Australia's live cattle export volume but has declined in recent years due to the Covid-19 pandemic, rising prices and currency depreciation. Indonesia lacks sufficient grazing land to support domestic consumption, and lacks access to a cold chain, but has comparative advantage in processing Australian cattle due to cost advantages in labour and feed. Other major destinations for exported Australian live cattle are largely concentrated in Asia (particularly the South-East) and the Middle East.

Australian exporters face competition primarily from nations such as Argentina, Brazil and India, and from nations capable of exporting beef substitutes such as Indian buffalo products. Competition for Australian beef products would likely intensify in the event of ceased live exports abroad. As the composition of demand shifts to processed beef products, Australia lacks the same degree of comparative advantage in the cost of production, making other nations more competitive suppliers.

Northern Australian cattle systems have a cost advantage over Southern systems, which is reflected in higher margins and indicates the extent to which Northern businesses can generate relatively high returns. Margins are also affected by supply factors that prices are a function of, such as herd depletion and rebuilding. The Northern industry has enjoyed a notable but declining differential in the rate of return compared to Southern Australia. Costs in Australia are affected by the costs associated with regulatory compliance, estimated to be \$73.60 per head of cattle in the live export industry.

Australia performs moderately well relative to international competitors in terms of cost but has limited scope for comparative advantage in processing activities that require a relatively large amount of grain and labour inputs. The opportunity costs of the live export industry in Australia are consequently quite low, as it does not require such an intensive production system. In effect, the international comparative advantage for Australia stems from the presence of constraints required for value addition in beef processing activities.

3.1.3 Impact of a material reduction or cessation of live export trading

A reduction or cessation in live cattle export trading will require the industry to divert resources to other uses. The project estimated the impact of the Australian cattle industry absorbing the diversions under three scenarios: a 50 per cent reduction (partial cessation) by 2030 and 100% cessation immediately (2023) or by 2030.

Reduction and cessation result in live cattle being sent to domestic slaughter for consumption in Australian or overseas export markets. Modelling of historic cattle price elasticities indicates a 1.0 per cent to 3.7 per cent fall in cattle prices for cessation and 0.5 per cent to 1.9 per cent fall for a 50 per cent reduction in live exports. The estimated impact on Australian beef industry GVP in 2030 is \$131 to \$505 million and \$66 to \$253 million per annum respectively.

The live export industry also experiences losses due to price differentials between the domestic and live export markets. The modelled estimates are \$737 million (100 per cent cessation 2023), \$700 million (100 per cent cessation by 2030) and \$345 million (50 per reduction by 2030) per annum in 2030 (-0.131 price elasticity).

The Net Present Value over 20 years of the total impact on the Australian beef industry and cattle industry is between \$2.8 billion and \$11.8 billion, depending on the elasticity and scenario. The impact of an immediate cessation is greatest because the losses commence in 2030.

A reduction or cessation of live cattle trading also has the potential to impact land value. The industry impacts modelled were used to estimate the 20 years' Net Present Value of cattle revenue per hectare from the 615,000 km² of grazing land in the Northern Territory. Assuming no further improvements or income from other uses, cattle income per hectare declines between 11.0 and 34.4 per cent under the three scenarios.

3.2 Benefits to industry

The report provides an estimate of the live export industry's economic contribution at the national and state/territory scale and 18 Northern Australian regions. By using the well-established Input-Output analysis method and the ABS' SA3 regions the value added, and employment estimates:

- are presented in a widely accepted form
- allow comparison between the regions
- can be readily repeated in the future.

The estimates provide the industry's contribution to various sectors (including agriculture, fisheries and forestry) and the wider regional, state/territory and national economy. The case studies deepen the understanding of contribution by illustrating where the industry fits into regions and how cattle and other industry drivers vary across Northern Australian regions.

The estimates and case studies provide an essential resource for industry and government. They do this by demonstrating the industry's value and importance, providing insight into what issues to engage those outside the industry on, and informing how the industry and regions can develop into the future.

The analysis of a material reduction or cessation of live cattle trading shows the resulting impact extends beyond the live export industry to the beef industry and regions, both in Northern and Southern Australia. The report outlines the basis of the live cattle industry's comparative advantages. While these are shared, to some degree, with the beef industry, there will be considerable adjustment required throughout the supply chain and regions if there is a material reduction or cessation of live cattle exports.

Future research and recommendations

4

The report provides an overview of the live export industry's importance and value in 18 Northern regions. Further research will provide more information on employment and value added in businesses and regional locations across the (live) cattle supply chain, in Northern and Southern Australia. Future research should include analysis of:

- spatial and temporal cattle movements to establish sources, transportation routes and destinations
- financial profiles of businesses in the supply chain to establish reliance and contributions
- regional community attitudes to live cattle exports to determine the ESG contributions and issues
- adaptation options for businesses and regions to adapt to a reduction or cessation of live cattle exports.

While the report indicates a reduction or cessation will negatively impact the Northern (live) cattle industry and regions, the estimates range considerably. This is in part due to the information available. Similarly, while the comparative advantage of the Northern (live export) cattle industry is known, the lack of information limits quantified economic analysis. Research can utilise the additional information recommended above to analyse:

- the relationship between the live cattle and beef industries
- the potential of the live cattle industry to supply the beef industry and associated costs
- where and what types of businesses will be impacted by reduction/cessation of the trade
- what the potential of alternative land uses and enterprises are for businesses and regions in response to climatic and market shocks.

Appendices



- AAC0, 2021, Livingstone Beef, available at: <https://aaco.com.au/operations/livingstone-beef>
- ABARES, 2021, Financial performance of livestock farms, 2018-19 to 2020-21, available at: <https://www.awe.gov.au/abares/research-topics/surveys/livestock>
- ABARES, 2022, Australia's biosecurity market access an agricultural exports, case study of cattle exports to ASEAN countries, available at: <https://www.awe.gov.au/abares/research-topics/trade/case-study-of-Australias-cattle-exports-to-ASEAN-countries#download-the-report>
- ABARES, 2022, Beef and veal: March quarter 2022, available at: <https://www.awe.gov.au/abares/research-topics/agricultural-outlook/beef-veal#live-exports-to-resume-growth-through-outlook-period>
- ABC, 2016, cattle at Dalrymple saleyards in North Queensland, available at: <https://www.abc.net.au/news/2016-09-13/cattle-dalrymple-saleyards/7838368?nw=0>
- ABC, 2021, Batchelor abattoir set to reopen in July, after six-month closure, available at: <https://www.abc.net.au/news/2021-06-17/nt-batchelor-meatworks-set-to-reopen-after-six-month-closure/100213414>
- ABC, 2021, Record-high meat prices see Kimberley Meat Company abattoir close its doors for 2021, available at: <https://www.abc.net.au/news/2021-05-01/wa-abattoir-closure-kimberley-meat-company/100108858>
- ABC, 2021, Study shows a return of NT cattle transported by rail could save producers big money, available at: <https://www.abc.net.au/news/rural/2021-09-10/savings-transporting-nt-cattle-by-rail/100451458>
- ABC, 2022, Peko mine rehabilitation project to process 3.75 million tonnes of leftover ore near Tennant Creek, available at: <https://www.abc.net.au/news/2022-05-06/peko-mine-rehab-project-leftover-ore-tennant-creek/101039790>
- ABS, 2016, 2016 Census Quickstats: Barkly, available at: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70202>
- ABS, 2016, 2016 Census Quickstats: Barkly, available at: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70202>
- ABS, 2016, 2016 Census Quickstats: Charters Towers – Ayr – Ingham, available at: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/31801>
- ABS, 2016, 2016 Census Quickstats: Daly – Tiwi – West Arnhem, available at: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70203>
- ABS, 2016, 2016 Census Quickstats: Katherine, available at: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/70205>

ABS, 2016, 2016 Census Quickstats: Kimberley, available at: <https://www.abs.gov.au/census/find-census-data/quickstats/2016/51001>

ABS, 2017, Agricultural Commodities: Australia 2015-16, available at: <https://www.abs.gov.au/AUSSTATS/abs@.nsf/DetailsPage/7121.02015-16?OpenDocument>

ABS, 2021, Agricultural Commodities: Australia 2019-20, available at: <https://www.abs.gov.au/statistics/industry/agriculture/agricultural-commodities-australia/2019-20>

ABS, 2021, Jobs in Australia, available at: <https://www.abs.gov.au/statistics/labour/jobs/jobs-australia/latest-release>

ABS, 2022, Labour Force, Australia, available at: <https://www.abs.gov.au/statistics/labour/employment-and-unemployment/labour-force-australia/latest-release>

ABS, 2022, Region summary: Barkly, available at: <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=70202>

ABS, 2022, Region summary: Charters Towers – Ayr – Ingham, available at: <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=31801>

ABS, 2022, Region summary: Daly – Tiwi – West Arnhem, available at: <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=70203>

ABS, 2022, Region summary: Katherine, available at: <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=70205>

ABS, 2022, Region summary: Kimberley, available at: <https://dbr.abs.gov.au/region.html?lyr=sa3&rgn=51001>

ABS, 2022: Region summary: Australia, available at: <https://dbr.abs.gov.au/region.html?lyr=aus&rgn=036>

ABS, 2022: Region summary: Northern Territory, available at: <https://dbr.abs.gov.au/region.html?lyr=sa4&rgn=702>

ABS, 2022: Region summary: Queensland, available at: <https://dbr.abs.gov.au/region.html?lyr=ste&rgn=3>

ACCC, 2017, Cattle and beef market study, available at: <https://www.accc.gov.au/system/files/ACCC%20Cattle%20and%20beef%20market%20studyFinal%20report.pdf>

ACIL Allen, 2019, Agriculture – a \$100 billion sector by 2030, Report to AgriFutures Australia, available at: <https://www.agrifutures.com.au/wp-content/uploads/2019/08/19-025.pdf>

AEC Group, 2013, Charters Towers Region Economic Development Plan 2012-17, available at: <https://www.charterstowers.qld.gov.au/downloads/file/664/charters-towers-economic-development-plan-2012-2017>

AFI, 2016, Enhancing the competitiveness of the Australian livestock export industry, available at: https://www.mla.com.au/contentassets/d358fb903c724339bc09574e0057221d/w.liv.0189_final_report.pdf

Agripower, 2020, Agripower's \$633M Rail project with QLD State Government, available at: <https://agripower.com.au/agripowers-633m-rail-project-with-qld-government/>

Aurizon, 2022, Coal, available at: <https://www.aurizon.com.au/what-we-deliver/coal>

Australian Government, Department of Agriculture, Water and the Environment, 2022, All Livestock Exports, available at: <https://www.awe.gov.au/biosecurity-trade/export/controlled-goods/live-animals/live-animal-export-statistics/livestock-exports-by-market>

Barkly Regional Council, 2022, Discover the Barkly – Invest, available at: <https://www.barkly.nt.gov.au/discover-the-barkly/invest>

Charters Towers Regional Council, 2020, Beef Cattle Industry, available at: <https://www.charterstowers.qld.gov.au/business/economic-and-tourism/beef-cattle-industry>

Charters Towers Regional Council, 2020, Beef Processing Investment Opportunity, available at: <https://www.charterstowers.qld.gov.au/downloads/file/723/ct-beef-overview-pamphlet>

Charters Towers Regional Council, 2021, Dalrymple Saleyards Master Plan Advisory Committee, available at: <https://www.charterstowers.qld.gov.au/dalrymple-saleyards-advisory-committee/dalrymple-saleyards-master-plan-advisory-committee>

Charters Towers Regional Council, 2022, Agriculture and Food, available at: <https://www.charterstowers.qld.gov.au/business/economic-and-tourism/agriculture-food>

Charters Towers Regional Council, 2022, Regional Development, available at: <https://www.charterstowers.qld.gov.au/business/regional-development>

Chilcott et al, 2020, Northern beef situation analysis, Report for CRC for Northern Australia, available at: https://www.kpca.net.au/wp-content/uploads/2020/09/CRCNA_NA-Beef-Situational-Analysis_July-2020-1.pdf

CRCNA, 2019, North Queensland market and agricultural supply chain study, available at: <https://crcna.com.au/resources/publications/north-queensland-market-and-agricultural-supply-chain-study>

CSIRO, 2019, Charters Towers: A living transitions roadmap, available at: https://www.qld.gov.au/_data/assets/pdf_file/0014/124502/transition-roadmap-charters-towers.pdf

Darwin Port, 2021, Vessel visits, available at: <https://www.darwinport.com.au/trade/vessel-visits>

DAWE, 2021 (cattle live exports for slaughter and feeder purposes only)

Development WA, 2022, Broome North, Investor information, available at: <https://developmentwa.com.au/projects/residential/broome-north/investor-information>

FAO STAT, 2021

Higgins et al, CSIRO, 2017, TraNSIT: Unlocking options for efficient logistics in Australian agriculture, available at: <https://www.awe.gov.au/sites/default/files/sitecollectiondocuments/ag-food/publications/transit-agriculture-final-report.pdf>

Kimberley Development Commission, 2021, Primary industries, available at: <https://kdc.wa.gov.au/our-region/live-kimberley/primaryindustries/>

Kimberley Development Commission, 2022, Infrastructure services, available at: <https://kdc.wa.gov.au/our-region/live-kimberley/infrastructure-and-services/>

Kimberley ports Authority, 2022, Kimberley Ports, available at: <https://www.kimberleyports.wa.gov.au/>

Kimberley ports Authority, 2022, Port of Broome Cattle Exports, available at: <https://www.kimberleyports.wa.gov.au/news-and-media/community-news/2021/november/port-of-broome-cattle-exports>

MLA, 2018, How are global and Australian beef producers performing? Global agri benchmark network results 2018, available at: <https://www.mla.com.au/globalassets/mla-corporate/prices-->

[markets/documents/trends--analysis/agri-benchmark/mla_agribenchmark-beef-results-report_jan-20182.pdf](https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/agri-benchmark/mla_agribenchmark-beef-results-report_jan-20182.pdf)

MLA, 2020, Fast Facts, Australia's beef industry, available at :

<https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/fast-facts--maps/2020/mla-beef-fast-facts-2020.pdf>

MLA, 2021, Beef and sheepmeat, Market snapshot: Indonesia, available at:

https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/os-markets/export-statistics/november-2021/2021-indonesia-market-snapshot-red-meat_111121_distribution.pdf

MLA, 2021, Industry Projections 2021: Australian cattle, available at:

<https://www.mla.com.au/globalassets/mla-corporate/prices--markets/documents/trends--analysis/cattle-projections/feb2021-mla-australian-cattle-industry-projections.pdf>

NAIF, 2021, Annual Report 2020-21, available at: [https://naif.gov.au/wp-](https://naif.gov.au/wp-content/uploads/2021/10/NAIF_AnnReport2021_1410-Final.pdf)

[content/uploads/2021/10/NAIF_AnnReport2021_1410-Final.pdf](https://naif.gov.au/wp-content/uploads/2021/10/NAIF_AnnReport2021_1410-Final.pdf)

National Skills Commission, 2021, Small Area Labour Markets, available at:

<https://www.nationalskillscommission.gov.au/topics/small-area-labour-markets#DecemberQuarter2021>

NT Department of industry, Tourism and Trade, 2021, Back on track – the role of rail in transporting livestock, available at: <https://industry.nt.gov.au/publications/primary-industry-publications/newsletters/regional-newsletters/rural-review/nt-rural-review-november-2021/back-on-track-the-role-of-rail-in-transporting-livestock>

NTCA, 2022, About Us, available at: <https://www.ntca.org.au/about-us>

NTCA, 2022, Real jobs program, available at: <https://www.ntca.org.au/programs/real-jobs-program>

ProAnd Associates, 2016, Regulatory costs in Red Meat and Livestock Industry, Report to MLA.

Available at: <https://www.mla.com.au/globalassets/mla-corporate/research-and-development/documents/industry-issues/final-june-2016-proand-assoc-regulatory-costs-report.pdf>

Queensland Government, 2018, Investment Outlook for the Queensland Beef Supply Chain, available at: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain>

Queensland Government, 2018, Report 1: Investment Analysis of the Queensland Beef Supply Chain, available at: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain/resource/a4d88660-fe09-4670-8052-1e5b1694baf7>

Queensland Government, 2018, Report 3: Future Outlook for Queensland Beef and Cattle products, available at: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain/resource/b30e866b-56ae-4aec-b76e-ff6d3a2caa9c>

Queensland Government, 2018, Report 4: Strategic Drivers of the Queensland beef Supply Chain, available at: <https://www.publications.qld.gov.au/dataset/investment-outlook-for-the-queensland-beef-supply-chain>

Queensland Treasury, 2022, Queensland Regional Profiles: Charters Towers – Ayr – Ingham, available at: <https://statistics.qgso.qld.gov.au/qld-regional-profiles>

RAI, 2022, Barkly, available at: <https://insight.regionalaustralia.org.au/>

RAI, 2022, Charters Towers – Ayr – Ingham region, available at: <https://insight.regionalaustralia.org.au/>

RAI, 2022, Daly – Tiwi – West Arnhem, available at: <https://insight.regionalaustralia.org.au/>

RAI, 2022, Katherine, available at: <https://insight.regionalaustralia.org.au/>

RAI, 2022, Kimberley region, available at: <https://insight.regionalaustralia.org.au/>

Renew Economy, 2022, Sun Cable unveils staggering scale of world's biggest solar and battery project, available at: <https://reneweconomy.com.au/sun-cable-unveils-staggering-scale-of-worlds-biggest-solar-and-battery-project/>

WA Department of Agriculture and Food, 2011, The Economic Importance to Western Australia of Live Animal Exports, available at: [https://www.parliament.wa.gov.au/publications/tailedpapers.nsf/displaypaper/3810370c704a9fa73b2c5bc148257ab60007f82f/\\$file/5370.pdf](https://www.parliament.wa.gov.au/publications/tailedpapers.nsf/displaypaper/3810370c704a9fa73b2c5bc148257ab60007f82f/$file/5370.pdf)

WA Department of Primary Industries and Regional Development, 2021, Aboriginal Pastoral Academy creating jobs and changing lives, available at: <https://www.agric.wa.gov.au/news/media-releases/aboriginal-pastoral-academy-creating-jobs-and-changing-lives>

WA Department of Primary Industries and Regional Development, 2021, The Western Australian beef industry, available at: <https://www.agric.wa.gov.au/export-services/western-australian-beef-industry?page=0%2C2>

WA Department of Primary Industries and Regional Development, 2022, Northern Beef Development, available at: <https://www.agric.wa.gov.au/r4r/northern-beef-development-project>

Input-Output Analysis B

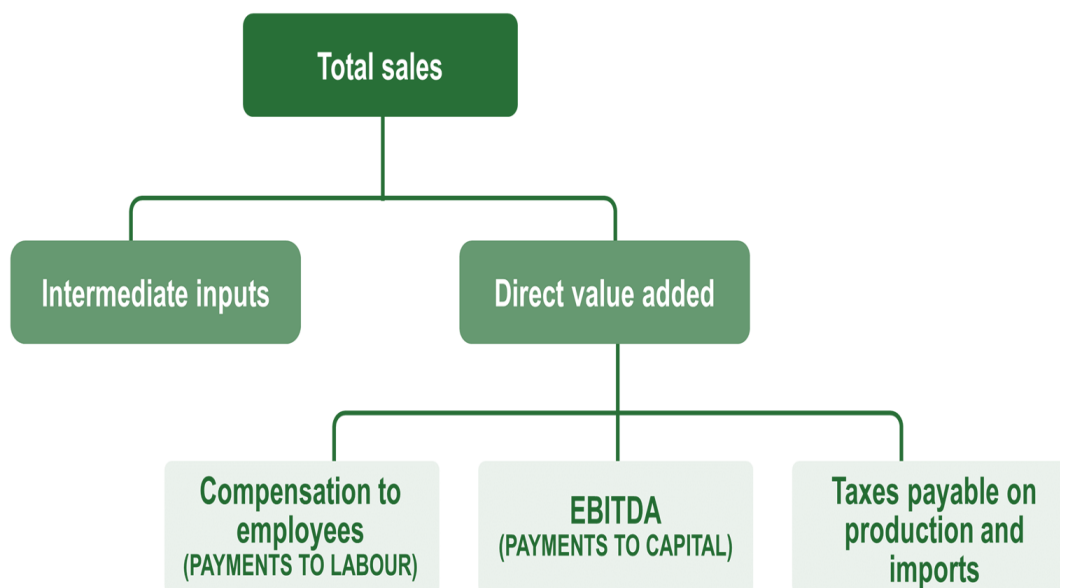
B.1 Direct economic contribution

The standard measure of economic contribution is the extent to which it increases the value of goods and services generated by the economy as a whole – in other words, the extent to which it increases economic activity as measured by gross domestic product (GDP). An economy has a range of factors of production (including labour and capital stock) and access to various intermediate inputs. By using the factors of production appropriately industries add value to intermediate inputs by converting them into a range of goods and services more suited for use by consumers or other industries. An industry or business' contribution to GDP measures the total value added generated and is defined as the income that an industry or business generates, less the cost of the inputs that it uses to generate that income, plus certain taxes paid.

The direct contribution of an industry or a company to the Australian economy can therefore be estimated by determining their payments to the factors of production plus the taxes (less subsidies) payable on production and imports. This is shown graphically in Figure B.1.

The box overleaf provides a summary of the definitions used by the ABS as part of the System of National Accounts 1993 (SNA93).

Figure B.1 EBITDA is equivalent to the SNA93 definition of gross operating surplus



Source: ACIL Allen

Box 4.1 ABS definitions of value add

An industry's direct contribution to Gross Domestic Product or Gross State Product is well defined under the standard national accounting framework used by the Australian Bureau of Statistics (ABS), which is known as the System of National Accounts 1993 (SNA93). SNA93 recognises three different measures of value added:

- Value added at Purchasers' Prices. This is defined as output valued at purchasers' prices, less intermediate consumption valued at producer prices. This measure is equivalent to the traditional measure of value added at market prices.
- Value added at Basic Prices. In this measure, the output is valued at basic prices while intermediate consumption is valued at producer prices. In the case of beer production this measure excludes beer excise as they are viewed as production taxes levied on output.
- Value added at factor Cost. This measure excludes all production taxes net of subsidies. In other words, it excludes all production taxes – such as payroll taxes, fringe benefit taxes etc – and not just those that are levied on output.

The measure of value added to be used depends on the nature of the analysis that is to be conducted. When presenting an industry view of GDP for example, the ABS uses value added at basic prices and adds an aggregate estimate of net taxes on products in question to give a total measure of GDP at purchasers' prices (ABS 1999).

B.2 Indirect economic contribution

Indirect effects are a broader notion of the economic contribution that includes supply-side effects of agriculture expenditure beyond the direct component. For example, when a farmer buys fertiliser, indirect effects are generated for the businesses supplying the product, the transporter who made deliveries to the supplier, the electricity company and other businesses that provided the inputs required to operate the supplier's business. To fully measure the indirect effects, account should also be taken of changes in incomes which may feed through to further changes in domestic demand.

The intermediate inputs used by an industry (fertilisers used by farmers, for example) can be sourced either from within the Australian economy or from foreign economies. If purchased from within the Australian economy, then the portion of value added embodied in the intermediate input is indirectly associated with the activity of the purchaser. The calculation of the indirect contribution quickly becomes difficult as one considers that value-added embodied in the intermediate inputs of the intermediate input. For example, to make the fertilisers used by farmers, consider the feedstock used in the fertiliser manufacturing, and the raw materials used in the feedstock, and so on.

Input-output tables and the associated 'input-output multipliers' can be used to estimate the indirect economic contributions. Input-output multipliers are summary measures generated from input-output tables that can be used for predicting the total impact on all industries in the economy of changes in demand for the output of any one industry. The tables and multipliers can also be used to measure the relative importance of the production chain linkages to different parts of the economy.

It should be noted that some of the assumptions underpinning input-output multipliers can be an impediment to credible analysis. Understanding these assumptions is necessary to prevent the inappropriate application of input-output multipliers – for example, in situations where economic constraints are present or when the profile of a business or project differs substantially from the industry average. We do not consider that these conditions apply for the purpose of this analysis and that the use of input-output multipliers to estimate the economic footprint of the cattle live

export industry is appropriate. Further information on input-output tables and the calculation of multipliers can be found in ABS Catalogue number 5246.0.

Lower and upper bounds

In this report we have estimated the likely lower and upper bounds of the indirect economic contribution of the cotton industry's activities. The lower bound estimate, derived from the 'Simple Multipliers,' captures only the value added and employment associated with the supply chain of each purchase stream (see below for details). Consequently, they provide a conservative estimate – or lower level bound – of the indirect economic contribution of intermediate inputs. The difference between these estimates and the direct economic contribution are commonly referred to as the 'production induced' contribution. The estimate from simple multipliers indicates the embodied economic contribution of various production chains.

The upper bound estimate of the impact of the cotton industry, derived using 'Total Multipliers,' captures the effects of inter-industry interactions and also captures the impacts of the purchasing decisions made by workers employed throughout the industry's supply chain. This effect is commonly referred to as the 'consumption induced effect.'

B.3 Overview of Input-Output tables

Input-output tables provide a snapshot of an economy at a particular time. The tables used in this analysis were for the 2020-21 financial year to coincide with the year of the analysis.

Input-output tables can be used to derive input-output multipliers. These multipliers show how changes to a given part of an economy impact on the economy as a whole. A full set of input-output multipliers for each region were estimated for the purpose of this analysis.

The input-output multipliers allow rigorous and credible analysis of the economic footprint of a particular facility, industry or event for the region of interest. Although input-output multipliers may also be suitable tools for analysing the impact of various types of economic change, caution needs to be adopted in their application for this purpose. Misuse of input-output multipliers for the purpose of impact analysis has led to scepticism of their general use in favour of other tools such as computable general equilibrium (CGE) modelling. Notwithstanding this, they are still eminently suitable for understanding the economic linkages between a given facility or industry to gain an appreciation of the wider interactions of the industry beyond its direct contribution.

B.4 Multiplier types

Input-output multipliers estimate the economic impact on a region's economy from a one dollar change in the final demand for the output of one of the region's industries. Generally, four types of multipliers are used:

- Output – measures the impact on the output of all industries in the economy
- Income – measures the effect on the wages and salaries paid to workers within the economy
- Employment – measures the jobs creation impact, and
- Value-added – measures the impact on wages and salaries, profits and indirect taxes.

The sum of wages and salaries, profits and indirect taxes for a given industry provides a measure of its contribution to the size of the local economy – its contribution to gross regional product (GRP). The value added multiplier can therefore also be considered to be the GRP multiplier (or GSP multiplier or GDP multiplier).

Input-output multipliers are a flexible tool for economic analysis. Their flexibility stems from the different forms of each multiplier type. For each region, multipliers were estimated in the following forms:

- initial effects
- first round effects
- industrial support effects
- production induced effects
- consumption induced effects
- simple multipliers
- total multipliers
- type 1A multipliers
- type 1B multipliers
- type 2A multipliers
- type 2B multipliers.

B.4.1 Multiplier effects

When additional sales to final demand are made, for example through increased exports or sales to the public, production increases to meet the increased demand, and this is the initial effect. Since production increases to exactly match the increased final demand, the increase is always equal to one (noting that the multipliers are defined in terms of a one dollar increase in final demand).

The industry producing the additional output makes purchases to enable itself to increase production, these new purchases are met by production increases in other industries, and these constitute the first round effect. These first round production increases cause other industries to also increase their purchases, and these purchases cause other industries to increase their production, and so on. These 'flow-on' effects eventually diminish, but when added together constitute the industrial support effect.

The industrial support effect added to the first round effect is known as the production induced effect. So far this chain of events has ignored one important factor, the effect on labour and its consumption. When output increases, employment increases, and increased employment translates to increased earnings and consumption by workers, and this translates to increased output to meet the increased consumption. This is the consumption effect.

B.4.2 Multipliers

The simple and total multipliers are derived by summing the effects. The simple multiplier is the sum of the initial and production induced effects. The total multiplier is larger because it also adds in the consumption effect. So far, all the effects and multipliers listed have had one thing in common, they all measure the impact on the economy of the initial increase in final demand.

The remaining multipliers take a different point of view, they are ratios of the above multiplier types to the initial effect. The type 1A multiplier is calculated as the ratio of the initial and first round effects to the initial effect, while the type 1B multiplier is the ratio of the simple multiplier to the initial effect. The type 2A multiplier is the ratio of the total multiplier to the initial effect, while the type 2B multiplier is the ratio of the total multiplier less the initial effect to the initial effect.

Given the large number of multiplier types to choose from, output, income, employment and value added multipliers, and each with numerous variations (simple, total, type 2A, etc.) it is important that the analysis uses the most appropriate multipliers. Usually, the multipliers that include consumption effects (i.e., the added impact that comes from wage and salaries earners spending

their income) are used. These are the total and type 2A multipliers. The total and type 2A multipliers will generally provide the biggest projected impact. Simple or type 1B (which omit the consumption effect) may be used to provide a more conservative result.

B.5 Limitations of Input-Output analysis

Although input-output analysis is valid for understanding the contribution a sector makes to the economy, when used for analysing the potential impacts of a change in production of a particular sector, input-output analysis is not without its limitations. Input-output tables are a snapshot of an economy in a given period, the multipliers derived from these tables are therefore based on the structure of the economy at that time, a structure that it is assumed remains fixed over time. When multipliers are applied, the following is assumed:

- prices remain constant
- technology is fixed in all industries
- import shares are fixed.

Therefore, the changes predicted by input-output multipliers proceed along a path consistent with the structure of the economy described by the input-output table. This precludes economies of scale. That is, no efficiency is gained by industries getting larger – rather they continue to consume resources (including labour and capital) at the rate described by the input-output table. Thus, if output doubles, the use of all inputs doubles as well.

One other assumption underpinning input-output analysis which is worth considering is that there are assumed to be unlimited supplies of all resources, including labour and capital. With input-output analysis, resource constraints are not a factor. It is thus assumed that no matter how large a development, all required resources are available, and that there is no competition between industries for these resources.

It is important to understand the limitations of input-output analysis, and to remember that the analysis provides an estimate of economic contribution of a facility or industry, not a measurement of economic impact if the facility or industry shut down or did not exist.

Melbourne

Suite 4, Level 19; North Tower
80 Collins Street
Melbourne VIC 3000 Australia
+61 3 8650 6000

Canberra

Level 6, 54 Marcus Clarke Street
Canberra ACT 2601 Australia
+61 2 6103 8200

ACIL Allen Pty Ltd
ABN 68 102 652 148

acilallen.com.au

Sydney

Suite 603, Level 6
309 Kent Street
Sydney NSW 2000 Australia
+61 2 8272 5100

Perth

Level 12, 28 The Esplanade
Perth WA 6000 Australia
+61 8 9449 9600

Brisbane

Level 15, 127 Creek Street
Brisbane QLD 4000 Australia
+61 7 3009 8700

Adelaide

167 Flinders Street
Adelaide SA 5000 Australia
+61 8 8122 4965