

The economics of beef in Central Queensland

**GROSS MARGINS AND
PRODUCTION NOTES**

Glossary of terms & definitions

AE	Adult equivalent. A method of comparison between animals of different feed requirements with a recognised standard of a single adult animal feed ration, the international standard being a single non-pregnant, non-lactating animal of 455 kilograms live weight (kg Lw).
BMP	Best management practices. Those management policies and practices recommended as most efficient and effective in production.
CQ	Central Queensland. Broad geographic region of eastern Queensland centred on the Tropic of Capricorn including the Rockhampton, Emerald and Biloela regions.
DW	Dressed weight (kg). Weight of animal carcass following dressing.
EBV	Estimated breeding value. The genetic potential of known production traits within an animal.
EU	European Union. An economic federation of European nations, known formerly as the EEC (European Economic Community) and the EC (European Community). Important as a premium, high value market.
HGP	Hormonal growth promotant. Anabolic substance used to promote more rapid growth of cattle, producing higher weight gain at younger finished ages.
HSCW	Hot standard carcass weight. Weight of skinned, pre-boned animal carcass prior to chilling.
kg	Kilograms. Standard unit of measure.
Lw	Live weight (kg). Total weight of animal at any stage of growth and prior to processing.
y.o.	Year/years old. Age of the animal taken from time first born.

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Contents

Glossary of terms and definitions	2
Acknowledgements	2
1 Introduction	4
Central Queensland region	4
Land types	4
2 Property modelling	6
Gross margins introduction	7
Gross margin sensitivities	7
Market specifications	7
3 Property profiles	8
Coastal speargrass store weaner production model	8
Coastal speargrass breeder/store steer production model	11
Brigalow Breeder (EU)	14
Brigalow bullocks trade (Jap Ox)	17
4 Production notes	18
Herd parameters	18
Herd bull ratio	18
Husbandry practices	18
Additional assumptions	19
Appendix 1 Land type descriptions	20
Coastal speargrass land types	20
Brigalow land types	23
Appendix 2 Variable cost inputs	25
Appendix 3 Sale price derivation	26
Web linkages	27
Bibliography	27

This booklet contains technical production, market specific and economic information common to extensive beef production systems of Central Queensland (CQ). Representative property models are used to generate farm enterprise estimates. Cost structure and market price information is applied in order to establish gross margin profitability estimates. The intent of the document is to provide representative gross margins for selected beef production systems across CQ land types.

Central Queensland region

Central Queensland includes the area surrounding Rockhampton and extending inland as far as the central highland region around Emerald. CQ beef production systems typically centre on Brigalow¹ and coastal speargrass² land types. Coastal production systems are found in a narrow strip extending along the coastline from Rockhampton to north of Mackay. The brigalow belt extends inland of Rockhampton, includes the Dawson and Callide Valleys, sweeps west through the Springsure area and extends north towards the Townsville region.

Land types

Land type influences the productive capacity of extensive grazing operations. The land type of a property effectively determines the productive capacity and development potential for that property. Land types typically demonstrate different grass species, soil types and associated carrying capacities as well as different recovery periods from grazing. Further, because different pasture varieties suit different soils, inherent fertility coupled with

water holding capacity determines potential productivity from improved pasture species. Coastal speargrass and Brigalow land types feature prominently in CQ beef production land types³. Figure 1 maps noteworthy Brigalow and Black speargrass regional ecosystems throughout CQ.

Coastal speargrass

Coastal speargrass land types are typified by a mixed range of landforms including mountains, ranges and alluvial plains. Typical tree species in coastal land types include various gum-topped box, swamp mahogany, teatrees, bloodwoods and a large diversity of eucalypt species including poplar gum and ironbark. Typical pasture species include native sorghum, golden beard grass, giant and black speargrass and native legumes. Introduced species commonly used for pasture improvement include Pangola grass, Rhodes grass and Bisset creeping bluegrass. Commonly utilised legumes include seca and verano stylo, wynn cassia and leucaena. Due to much of this land type being unsuitable for finishing stock, the trend has been for this area to produce store cattle suitable for finishing or backgrounding on fertile land types (Murphy, 1995) or more recently in feedlot operations.

Utilisation rates⁴ vary depending on the fertility of the country. The utilisation recommendation (i.e. the amount of total forage load consumed through sustainable grazing) for this land type is around 15% of annual pasture growth.

Detailed information on coastal speargrass land types is provided in Appendix 1.

¹ *Acacia harpophylla*

² Including Black speargrass, *Heteropogon contortus*

³ Although used here in the context of a general description of land type, it is acknowledged that Central Queensland beef cattle properties typically consist of some mixture of other land types. Examples of other land types include Desert uplands and Downs type country.

⁴ Utilisation rate is the proportion of annual pasture growth consumed. Excessive utilisation adversely affects the capacity of the pasture to convert water and nutrients into growth, thereby having detrimental impacts on sustainability. Source: Chilcott, *et. al.* (2005)

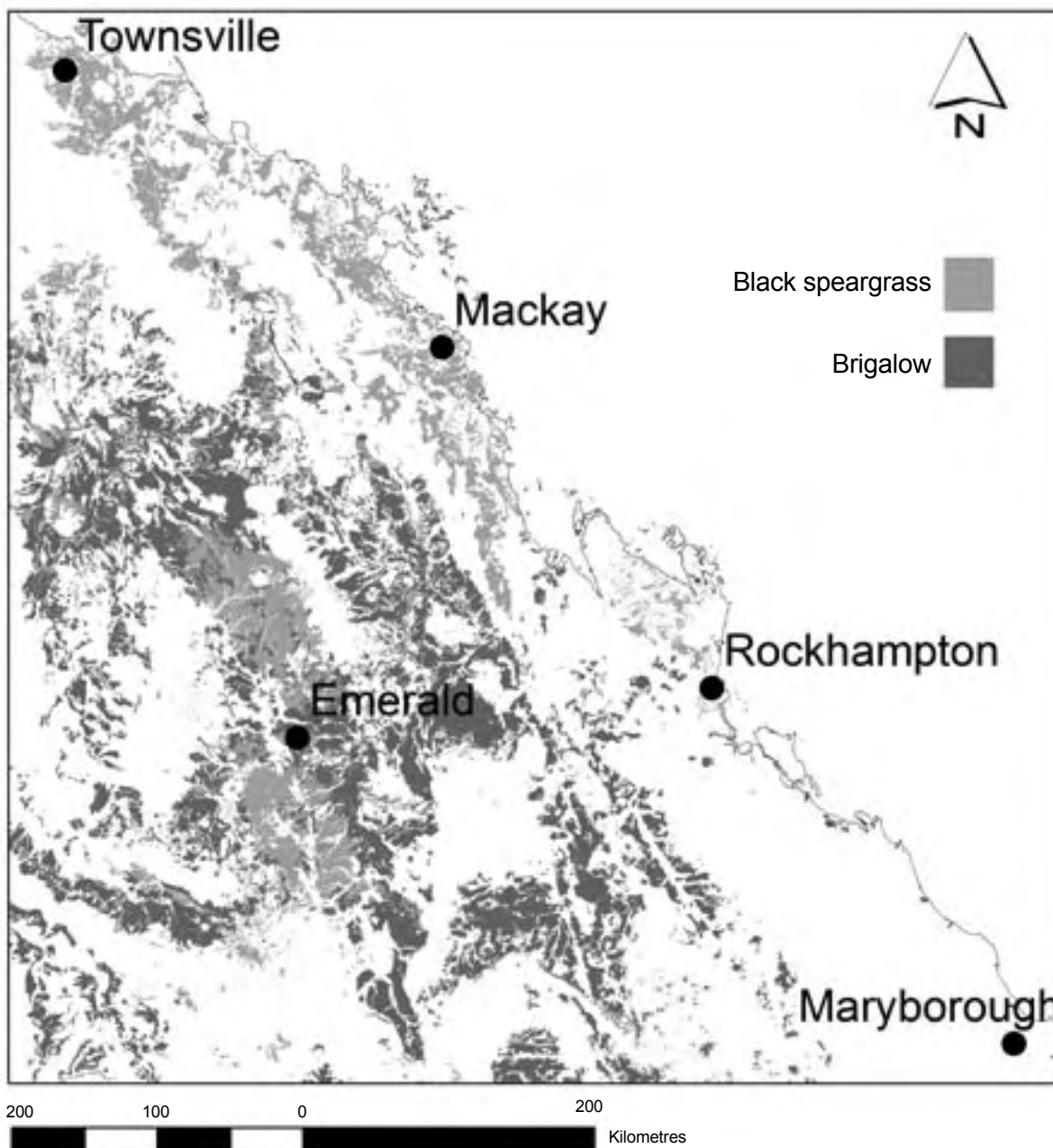


Figure 1:
Brigalow and
Black speargrass
regional
ecosystems
(see inside front cover
for colour map)

Source: Map derived using Version 5.0 of Queensland regional ecosystems mapping (www.epa.qld.gov.au/nature_conservation/biodiversity/regional_ecosystems/introduction_and_status)

Brigalow

Brigalow land types are typified by undulating scrub plains. Brigalow is typically found in association with blackbutt, wilga, yellowwood, belah, bauhinia and poplar box tree species. Native grasses include desert Mitchell, forest bluegrass, Queensland blue and kangaroo grasses. Rhodes grass, buffel grass, green panic, purple pigeon and creeping bluegrass are widely used pasture improvement species. Butterfly pea, caatinga stylo and leucaena are used as legumes for pasture improvement. Due

to generally good soil fertility and high water holding capacity, developed Brigalow country is broadly considered as prime finishing country.

The recommended utilisation rate for the sustainable use of Brigalow country is estimated at around 30% of annual pasture production.

A detailed Brigalow land type description is provided in Appendix 2.

2

Property modelling

Representative models of typical grazing enterprises were developed on information gathered from existing publications, local census data and technical specialists. Beef extension staff were consulted for husbandry and herd management practices typical within the region. Both breeding and trading scenarios were modelled. Estimates of biological production factors including weaning, death rates and bull mating ratios were combined with estimates of herd husbandry costs to produce each of the representative farm models.

For assessing relative returns a number of enterprises, based on land type⁵, were modelled. These included:

1. Coastal speargrass land type operations
 - a. Breeder weaner turnoff
 - b. Breeder store steer turnoff
2. Brigalow land type operations
 - a. Breeder EU steer turnoff
 - b. Jap Ox finish

The Breedcow programme of the Breedcow and Dynama Herd Budgeting Software Package (Holmes, 2005) was used in modelling selected breeding herd structures. The programme was used in estimating optimal adult equivalent numbers and gross profitability.

Breedcow allows changing of parameters for each operation. Breeder mortality rates, weaning rates and sale prices were altered to assess changes on overall profitability. These parameters were changed within the model to derive sensitivity matrices. Current market prices were obtained from commercial operators and saleyards and applied to models.

The computer programme 'Bullocks'⁶ was used to model the gross margin returns of

a bullock finishing operation. Purchase and sales weights and prices were inputted. Other required inputs included dressing percentage, mortality rate, variable costs per head and interest rate. The program calculated gross margin per head, gross margin per adult equivalent, gross margin per head less interest, gross margin per adult equivalent less interest and percentage return per year on capital investment.

The use of adult equivalents to estimate carrying capacity requirements allows comparison of results between different production systems. In order to account for the forage demand of the herd, allowances are made for each animal class, according to the breed, weight and lactation status of the animal. An example is the relatively higher forage requirement for a lactating cow. All animals within the herd are assigned values in proportion to the feed demands of an adult maintenance ration. In this way limiting factors of production including land type and herd feed requirements are accounted for when comparing different herd structures and grazing strategies.

The value of livestock capital is the total value of the retained herd. The opportunity cost⁷ of holding that stock has been estimated by using a notional interest rate of 10 per cent and is termed the opportunity cost of livestock capital. By including the opportunity of livestock capital in an economic analysis, the economic returns from different herd structures, with differing capital requirements, can be compared.

Thus, the use of adult equivalents and accounting for the opportunity cost of maintaining a particular herd structure, allows for direct comparison of gross margins across different land types and herd structures.

⁵A land type is commonly viewed as a distinct geographical area with distinct land forms, native vegetation and grass species

⁶'Bullocks' is one of nine programs contained within the Breedcow and Dynama Herd Budgeting Software Package.

⁷Using that capital invested in cattle for some alternate use such as loan repayment or alternate investment.

Using adult equivalents to account for feed consumption differences among animal classes, allowing for differing capital requirements according to herd structure (influenced mainly by age of male turnoff), allows fair comparison of gross margins across different herd structures.

Selected output for each operation was summarised and is presented in table form⁸. Information includes herd structure, cattle numbers, adult equivalencies, herd valuations and gross margins less interest cost⁹.

Gross margins introduction

The gross margin for an operation within a stable herd structure is equivalent to the gross income received less the variable costs incurred. Variable costs are those directly attributable to an individual animal which vary in proportion to the size of the operation. Examples include animal husbandry and marketing expenses.

Gross margin ratios have been calculated against limiting resource inputs. Gross margin per adult equivalent (AE), giving an indication of gross margin per beast area, enables comparison between different land types.

Gross margin sensitivities

Each gross margin has an attached sensitivity table. The table offers an indication of the effect on gross margins of changes in herd composition parameters and/or pricing. Examples of herd composition changes modelled include breeder mortality and weaning rates. Live weight prices vary the gross margin return and therefore the choice of market is critical to achieving higher returns.

Both breeder mortality and weaning rate affect total herd numbers. The achievement of higher weaning rates will mean that there are higher animal numbers available to the herd – animals available for use as either replacement

stock, for further growing out or immediate sale. A reduced rate of breeder mortality will mean higher numbers of retained breeders available and a reduction in the requirement for replacement weaner heifers to cover breeding herd attrition. Again, sales turnover would be expected to be increased as more animals are available for sale. Prices obviously have gross margin impacts by directly changing the income stream from cattle sales.

Market specifications

Meeting product specification within the selected market enhances supplier reputation for supplying quality product and is critical in achieving price premiums. Markets define preferred product requirement in the form of market specifications. The ability to meet market specifications results in the maintenance of producer premiums for marketed product. Market specifications for European Union (EU) and Japanese Oxen (Jap Ox) cattle classes are outlined in section 3.

⁸Small discrepancies may exist between cost and sales summations and breakdowns due to rounding.

⁹In reporting gross margins less interest, the effect of holding higher valued herds has been accounted for.

3

Property profiles

Coastal speargrass store weaner production model

The coastal speargrass store weaner model is based around a breeding herd of 800 adult equivalents (AE). In line with common current industry practices, breeders are first mated as two year olds. Productive breeders are culled at around eleven year of age. Replacement breeders are bred on property with excess weaner heifers sold directly through saleyards. Surplus weaner heifer and cull cow sales are important in maintaining operational cash flows. Additional bull purchases are made to improve herd genetics. Bulls are retained for a five year productive life.

Average weaning rate is estimated at 65%. Estimated mortality rates are four per cent for breeders and two per cent for steers. An additional allowance of two per cent has been used for normal culling of suspect or underperforming animals from the herd.

The main marketable product from this operation is store weaners for on sale and growing. The age of turnoff is between 6 to 12 months. Achieved weight range is between 180 and 320 kg Lw, with an average weight of 250 kg Lw. Produced weaners are sold through local saleyards.

A typical annual herd production programme timeline is shown in Figure 2.

Month	Husbandry practices/activities
JAN	Mating
FEB	Mating
MAR	
APR	Pregnancy testing, cull breeders, breeder vaccination
MAY	Pregnancy testing, cull breeders, breeder vaccination
JUN	
JUL	
AUG	
SEP	
OCT	Calving
NOV	Calving
DEC	Calving, mating
JAN	Mating, branding, weaner vaccination
FEB	Mating, branding, weaner vaccination
MAR	
APR	Pregnancy testing, cull breeders, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
MAY	Pregnancy testing, cull breeders, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
JUN	Sell weaners
JUL	Sell weaners

Figure 2: Store weaner production programme timeline

Age at start of rating period	Number carried	AE/beast	Total AE for group
Extra for lactating cows	-	0.35	139
Weaners – 5 months	94	0.48	45
Heifers 1 y.o.	89	0.66	59
Heifers 2 y.o.	86	0.8	69
Cows 3 y.o. +	525	0.88	462
Steers 1 y.o.	1	0.69	1
Bulls all ages	18	1.43	26
Total number carried	813	Total AE	800

Table 1: Store weaner operation herd structure adult equivalents

Store weaner operational results

The results for the store weaner operation show an estimated gross margin¹⁰ of \$92.04/AE. Herd structure breakdown, capital herd valuation, gross margins and annual husbandry costs for the store weaner operation are shown in the tables 1-4.

Table 4 shows husbandry costs per head on an annual basis. Prices are derived from market prices and based on general husbandry practices as outlined in the production notes section of this document.

Capital value of herd (after sales)	Total (\$)
Value of cows and heifers	482,119
Value of steers and bullocks	928
Value of bulls 2 years & older	45,780
Total	528,827
Imputed interest on herd capital @ 10%	52,883

Table 2: Store weaner herd valuation

	Value (\$)	\$/Herd	\$/Beast	\$/A.E.
Net cattle sales		155,878	191.81	194.85
<i>consisting of:</i>				
Surplus weaner heifers	34,330			
Breeders	40,943			
Steer weaners	79,738			
Steer sales	809			
Husbandry costs		18,125	22.30	22.66
<i>consisting of:</i>				
Surplus weaner costs	117			
Weaner costs	2,361			
Heifer costs	2,112			
Breeder costs	13,403			
Steer/bull costs	127			
Bull replacement		11,242	13.83	14.05
Gross Margin		126,512	155.67	158.14
GM less interest		73,629	90.60	92.04

Table 3: Store weaner gross margins

Cattle husbandry costs per head (\$)	Weaner	Heifer 1 y.o.	Breeders	Steers/Bulls
Dip, drench, vaccine etc.	\$10.18	\$8.70	\$6.95	\$6.95
Fodder, licks, supplements etc.	\$15.00	\$15.00	\$15.00	
Sold weaner cost (106)	\$1.10			
Total husbandry cost/hd for group	\$26.28	\$23.70	\$21.95	\$6.95

Table 4: Store weaner annual husbandry costs

¹⁰Gross margin quoted net of interest on livestock.

Store weaner operation sensitivities

The gross margin effects of varying herd weaning rate, weaner price and breeder mortality rates are shown in Figures 3 and 4.

Figure 3 shows the effect of weaner price changes. For each given weaner price, higher weaning rates increases gross margin.

Figure 3: Store weaner price sensitivity matrix

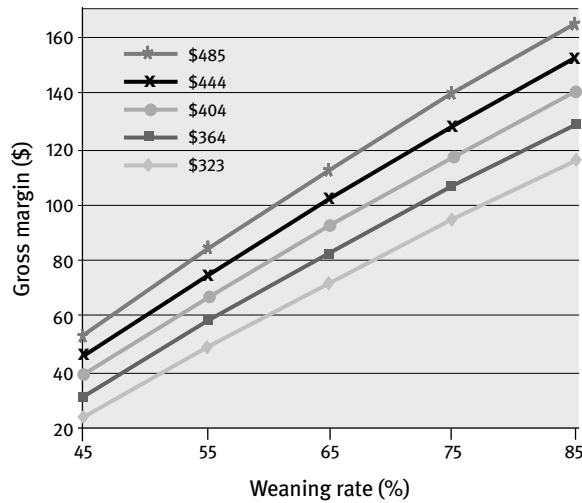
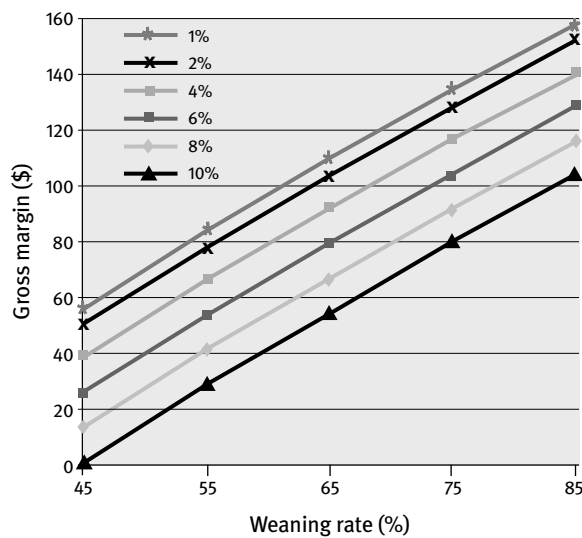


Figure 4 demonstrates the negative gross margin impact of increasing breeder herd mortality rates. For each given weaning rate, increases in the herd breeder mortality rate result in reductions in the gross margin.

Figure 4: Store weaner breeder mortality sensitivity matrix



Coastal speargrass breeder/store steer production model

The coastal speargrass breeder store steer is based around a breeding herd of 800 AE, with replacement breeders bred on property. Additional bull purchases are made to improve herd genetics above the natural rate. Bulls are retained for a five year productive life. Breeders are first mated as two year olds and culled at age eleven. Excess weaner heifers are sold through saleyards. Surplus weaner heifer and cull cow sales are important in maintaining operational cash flows.

Weaning rate is estimated at 65%. Estimated mortality rates are four per cent for breeders and two per cent for steers. An additional allowance of two per cent has been used for normal culling of suspect or underperforming animals from the herd. Such animals are sold through saleyards or directly into processing operations.

The focus of the operation is store steer production. Age of turnoff is between 18 and 24 months of age, with weight ranges up to 440 kg. Average weight is 360 kg Lw.

A typical breeder store steer annual production programme timeline is shown in Figure 5.

Month	Husbandry practices/activities
JAN	Mating
FEB	Mating
MAR	
APR	Pregnancy testing, cull breeders, breeder vaccination
MAY	Pregnancy testing, cull breeders, breeder vaccination
JUN	
JUL	
AUG	
SEP	
OCT	Calving
NOV	Calving
DEC	Calving, mating
JAN	Mating, branding, weaner vaccination
FEB	Mating, branding, weaner vaccination
MAR	
APR	Pregnancy testing, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
MAY	Pregnancy testing, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
JUN	
JUL	
AUG	
SEP	
OCT	Calving
NOV	Calving
DEC	Calving, mating
JAN	Mating, branding, weaner vaccination
FEB	Mating, branding, weaner vaccination
MAR	
APR	Sell store steers, pregnancy testing, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
MAY	Sell store steers, pregnancy testing, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning

Figure 5: Breeder store steer production programme timeline

Table 5:
Breeder store
steer herd
structure adult
equivalents

Age at start of rating period	Number carried	AE/beast	Total AE for group
Extra for cows weaning a calf	–	0.35	124
Weaners – 5 months	260	0.48	126
Heifers 1 y.o.	80	0.66	52
Heifers 2 y.o.	76	0.8	61
Cows 3 y.o. +	469	0.88	412
Steers 1 y.o.	1	0.69	1
Bulls all ages	16	1.43	23
Total number carried	902	Total AE	800

Table 6:
Breeder store
steer herd
value

Capital value of herd (after sales)	Total (\$)
Value of cows and heifers	430,704
Value of steers and bullocks	72,112
Value of bulls 2 years & older	33,325
Total	536,141
Imputed interest on herd capital @ 10%	53,614

Breeder store steers results

The results for the store steer operation shows an estimated gross margin of \$105.33/AE. Herd structure breakdown, husbandry costs, gross margins and herd valuations for the store steer operation are shown in the tables below. Figure 7 shows the breeder mortality sensitivity matrix for this operation.

Table 7:
Breeder store
steer gross
margins

	Value (\$)	\$/Herd	\$/Beast	\$/A.E.
Net cattle sales		171,731	190.29	214.66
<i>consisting of:</i>				
Surplus weaner heifers	30,669			
Breeders	36,578			
Store steers	103,761			
Steer sales	723			
Husbandry costs		20,856	23.11	26.07
<i>consisting of:</i>				
Surplus weaner costs	325			
Weaner costs	6,552			
Heifer costs	1,886			
Breeder costs	11,973			
Steer/bull costs	114			
Bull replacement		12,997	14.40	16.25
Gross Margin		137,879	152.78	172.35
GM less interest		84,265	93.37	105.33

Table 8:
Breeder store
steer annual
husbandry
costs

Cattle husbandry costs per head (\$)	Weaner	Heifer 1 y.o.	Breeders	Steers/Bulls
Dip, drench, vaccine etc.	\$10.18	\$8.70	\$6.95	\$6.95
Fodder, licks, supplements etc.	\$15.00	\$15.00	\$15.00	
Sold weaner cost (106)	\$1.10			
Total husbandry cost/hd for group	\$26.28	\$23.70	\$21.95	\$6.95

Store steer operation sensitivities

The gross margin effects of varying herd weaning rate, weaner price and breeder mortality rates are shown in Figures 6 and 7.

Figure 6 shows the effect of store steer price changes. For each given store steer price, higher weaning rates increase gross margin.

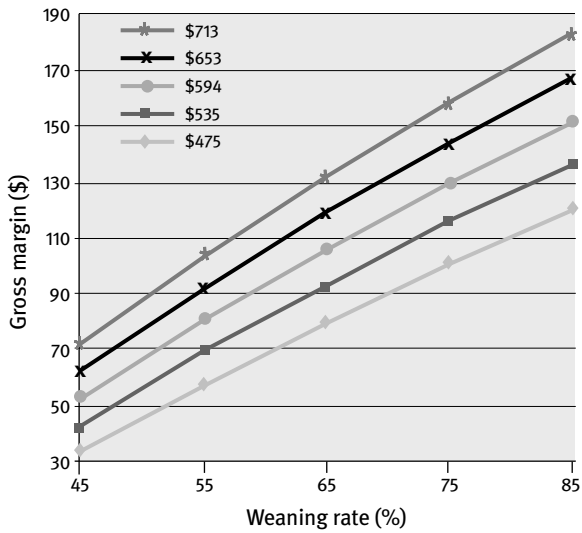


Figure 6: Breeder store steer price sensitivity matrix

Figure 7 shows the negative gross margin impact of increasing breeder herd mortality rates. For each given weaning rate, increases in the herd breeder mortality rate results in reductions in the gross margin.

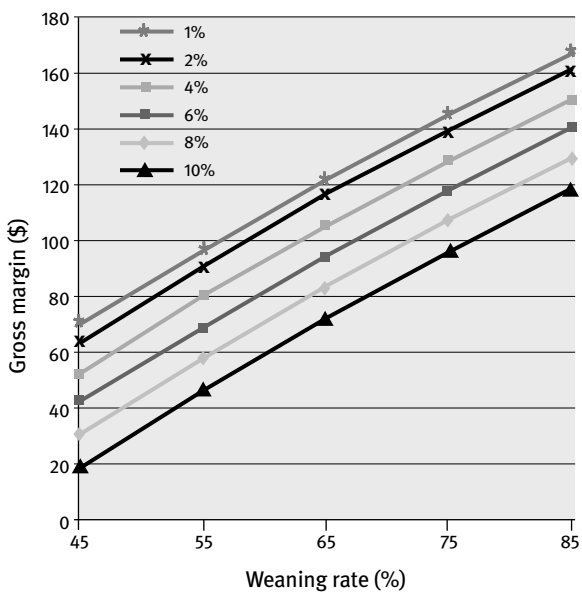


Figure 7: Breeder store steer breeder mortality sensitivity matrix

Brigalow breeder (EU)

The brigalow breeding property model is based around a breeding herd. Replacement breeders are bred on farm. Additional bull purchases are made to improve herd genetics with bulls retained for a five year productive life. Breeders are first mated as two year olds and culled at age eleven. Excess weaner heifers are sold off directly through saleyards.

Higher weaning rates are typical of this country and a weaning rate of 70% has been used. Estimated mortality rates are three per cent for breeders and one per cent for steers. An additional allowance of two per cent has been used for normal culling of suspect or underperforming animals from the herd.

The main marketable product from this operation is finished steers for the European Union (EU) market as defined by the market specifications shown in Table 9. Expected turnoff age is 2 to 2 ½ years in the live weight range of 500 to 620 kilograms. Finished product is sold through regional meatworks for export.

Table 9: EU market specifications

Market	Live	Carcase
European Union	Live weight (kg): 500–620	HSCW (kg): 260+
	Fat score: 2+ - 4-	Fat depth mm: 7–17
	Sex: Steers and heifers	Dentition: 0–4 teeth
	Age: 0–4 teeth	Butt shape: A–C
	Muscle score: A–C	Fat colour: 0–3
	No HGPs permitted	Meat colour: 1A–3
		Eye muscle area: no requirement
		Marbling score: no requirement
		No HGPs permitted

Notes:

Fat score: 1 (0.2mm) to 6 (>32mm) 6 point score
 Fat depth: mm of fat on hot standard carcass at the P8 rump site
 Fat colour standard*: (white) - 9 (yellow) 10 point score
 Muscle score: A (very heavy) - E (light muscling) 5 point score
 Butt shape: A (very heavy muscling) - E (light muscling) 9 point score
 Meat colour standard*: 1A (light) - 7 (Dark) 9 point scale
 Marbling standard*: 0 (devoid) - 6 (excessive) 7 point score

* Aus-Meat quality standard

A typical breeder EU production programme timeline is shown in Figure 8.

Month	Husbandry practices/activities
JAN	Mating
FEB	Mating
MAR	
APR	Pregnancy testing, cull breeders, breeder vaccination
MAY	Pregnancy testing, cull breeders, breeder vaccination
JUN	
JUL	
AUG	
SEP	
OCT	Calving
NOV	Calving
DEC	Calving, mating
JAN	Mating, branding, weaner vaccination
FEB	Mating, branding, weaner vaccination
MAR	
APR	Pregnancy testing, cull breeders, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
MAY	Pregnancy testing, cull breeders, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
JUN	
JUL	
AUG	
SEP	
OCT	Calving
NOV	Calving
DEC	Calving, mating
JAN	Mating, branding, weaner vaccination
FEB	Mating, branding, weaner vaccination
MAR	
APR	Pregnancy testing, cull breeders, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
MAY	Pregnancy testing, cull breeders, breeder vaccination, weaner tick fever blood inoculation/vaccination, weaning
JUN	
JUL	
AUG	
SEP	
OCT	Sell EU steers
NOV	Sell EU steers

Figure 8: Breeder EU production timeline

Age at start of rating period	Number carried	AE/beast	Total AE for group
Extra for cows weaning a calf	–	0.35	114
Weaners – 5 months	299	0.48	111
Heifers 1 y.o.	64	0.66	42
Heifers 2 y.o.	63	0.8	50
Cows 3 y.o. +	401	0.88	352
Steers 1 y.o.	161	0.69	111
Bulls all ages	14	1.43	20
Total number carried	931	Total AE	800

Table 10:
Breeder
EU herd
structure adult
equivalents

Breeder EU operation results

The results for the breeder EU operation show an estimated gross margin of \$155.65/AE. Herd structure breakdown, husbandry costs, gross margins and herd valuations for the breeder EU operation are shown in the tables below. Figure 10 shows the breeder mortality sensitivity matrix for this operation.

Capital value of herd (after sales)	Total (\$)
Value of cows and heifers	362,995
Value of steers and bullocks	160,867
Value of bulls 2 years & older	34,737
Total	558,598
Imputed interest on herd capital @ 10%	55,860

Table 11:
Breeder EU
herd value

	Value (\$)	\$/Herd	\$/Beast	\$/A.E.
Net cattle sales		204,168	219.36	255.21
<i>consisting of:</i>				
Surplus weaner heifers	31,110			
Breeders	32,566			
EU steers	140,492			
Husbandry costs		15,260	16.40	19.08
<i>consisting of:</i>				
Surplus weaner costs	366			
Weaner costs	4,624			
Heifer costs	1,205			
Breeder costs	7,853			
Steer/bull costs	1,212			
Bull replacement		8,530	9.16	10.66
Gross Margin		180,378	193.80	225.47
GM less interest		124,518	133.78	155.65

Table 12: Breeder
EU gross margins

Cattle husbandry costs per head (\$)	Weaner	Heifer 1 y.o.	Breeders	Steers/Bulls
Dip, drench, vaccine etc.	\$10.23	\$8.70	\$6.95	\$6.95
Fodder, licks, supplements etc.	\$10.00	\$10.00	\$10.00	
Sold weaner cost (106)	\$1.60			
Total husbandry cost/hd for group	\$21.83	\$18.70	\$16.95	\$6.95

Table 13:
Breeder
EU annual
husbandry
costs

Breeder EU operation sensitivities

The gross margin effects of varying herd weaning rate, weaner price and breeder mortality rates are shown in Figures 9 and 10.

Figure 9 shows the effect of EU bullock price changes. For each given EU bullock price, higher weaning rates increase gross margin.

Figure 9:
Breeder EU
bullock price
sensitivity
matrix

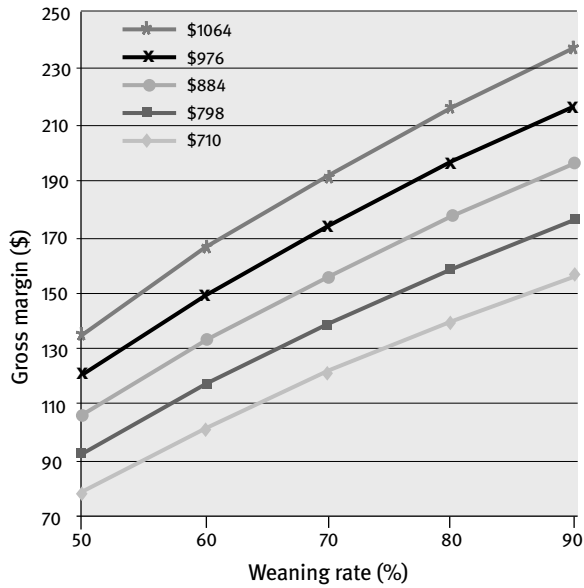
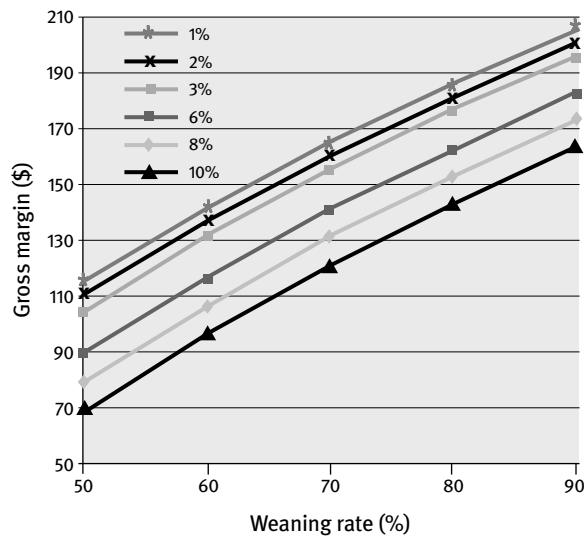


Figure 10 demonstrates the negative gross margin impact of increasing breeder herd mortality rates. For each given weaning rate, increases in the herd breeder mortality rate result in reductions in the gross margin.

Figure 10:
Breeder
EU breeder
mortality
sensitivity
matrix



Brigalow bullocks trade (Jap Ox)

This operation is based around a trading scenario. Stock is bought in from saleyards at around 250 kg Lw and sold in a weight range of 570 to 620 kg Lw. The target market is the Japanese Oxen class as defined by the market specifications outlined in Table 14. Typical time on property would be between 18 and 24 months.

Animals are treated routinely as part of an induction process. Estimated husbandry costs of \$11 per head covers treatment for three day sickness, 5-in-1 and tick vaccinations. An estimated mortality rate of one per cent has been applied. A dressing percentage of 54% has been applied.

Jap Ox finishing operation results

The results for the Jap Ox operation show an estimated gross margin of \$168.61/AE. Results¹¹ per beast and per adult equivalent are shown in Tables 15 and 16.

Table 14: Jap Ox market specifications

Market	Live	Carcase
Japan grass fed fullset	Live weight (kg): 530-750 Fat score: 4 Sex: Steers and heifers Age: Max 42 months Muscle score: A-C	HSCW (kg): 280-420 Fat depth mm: 7-22 Dentition: 0-8 Butt shape: A-C Fat colour: 0-6 Meat colour: 1A-5 Eye muscle area: >56 cm ² Marbling score: no requirement

Notes:

Fat score: 1 (0.2mm) to 6 (>32mm) 6 point score
Fat depth: mm of fat on hot standard carcass at the P8 rump site
Fat colour standard*: (white) - 9 (yellow) 10 point score
Muscle score: A (very heavy) - E (light muscling) 5 point score
Butt shape: A (very heavy muscling) - E (light muscling) 9 point score
Meat colour standard*: 1A (light) - 7 (Dark) 9 point scale
Marbling standard*: 0 (devoid) - 6 (excessive) 7 point score

* Aus-Meat quality standard

Sale price (\$/kg DW)		\$2.92	\$3.02	\$3.12	\$3.22	\$3.32	\$3.42	\$3.52
Sale price (\$/kg Lw)		\$1.58	\$1.63	\$1.68	\$1.74	\$1.79	\$1.85	\$1.90
Purchase prices	\$1.76	\$304.53	\$331.95	\$359.37	\$386.79	\$414.21	\$441.63	\$469.05
	\$1.86	\$277.02	\$304.44	\$331.86	\$359.28	\$386.71	\$414.13	\$441.55
	\$1.96	\$249.52	\$276.94	\$304.36	\$331.78	\$359.20	\$386.62	\$414.04
	\$2.06	\$222.02	\$249.44	\$276.86	\$304.28	\$331.70	\$359.12	\$386.54
	\$2.16	\$194.51	\$221.93	\$249.35	\$276.77	\$304.20	\$331.62	\$359.04
	\$2.26	\$167.01	\$194.43	\$221.85	\$249.27	\$276.69	\$304.11	\$331.53
	\$2.36	\$139.51	\$166.93	\$194.35	\$221.77	\$249.19	\$276.61	\$304.03

Table 15: Jap Ox gross margin per beast

Sale price (\$/kg DW)		\$2.92	\$3.02	\$3.12	\$3.22	\$3.32	\$3.42	\$3.52
Sale price (\$/kg Lw)		\$1.58	\$1.63	\$1.68	\$1.74	\$1.79	\$1.85	\$1.90
Purchase prices	\$1.76	\$168.74	\$183.94	\$199.13	\$214.33	\$229.52	\$244.72	\$259.91
	\$1.86	\$153.50	\$168.70	\$183.89	\$199.09	\$214.28	\$229.48	\$244.67
	\$1.96	\$138.26	\$153.46	\$168.65	\$183.85	\$199.04	\$214.24	\$229.43
	\$2.06	\$123.02	\$138.22	\$153.41	\$168.61	\$183.80	\$198.99	\$214.19
	\$2.16	\$107.78	\$122.98	\$138.17	\$153.37	\$168.56	\$183.75	\$198.95
	\$2.26	\$92.54	\$107.74	\$122.93	\$138.13	\$153.32	\$168.51	\$183.71
	\$2.36	\$77.30	\$92.50	\$107.69	\$122.89	\$138.08	\$153.27	\$168.47

Table 16: Jap Ox gross margin per adult equivalent

¹¹ Results are shown less interest cost.

4 Production notes

Herd parameters

The following herd parameters were applied in formulating the production models and accompanying gross margins.

Table 17:
Applied herd
parameters, by
land type

Herd parameter	Coastal speargrass	Brigalow
Branding rate	68%	73%
Weaning rate	65%	70%
Bull ratio	3%	3%
Breeder mortality	4%	3%
Age at first calving	2	2

Maintenance of such estimates depends upon good animal husbandry practice such as preventative health treatments. Animals are drenched for internal parasites and sprayed regularly for buffalo fly.

Herd bull ratio

Bull ratio was calculated at three per cent for all breeding scenarios. Bull replacement was costed at \$5,000 per head. A bull may be purchased by the manager looking to improve herd genetics at a rate faster than would be achieved by using replacement bulls bred on property. Estimated breeding values (EBVs) -the extra benefit assigned from using particular genetic bull traits- may be used to gauge likely returns.

Husbandry practices

Husbandry practices can be tailored to specific property management practices. The following provides representative best practice applicable to CQ production operations.

Breeding operations

- Weaners are fed weaner pellets for 30 days to start their growth pattern. Weaner meal may also be an option.
- Calves are vaccinated with 7-in-1 initially and again as weaners.
- Weaners are treated with tick vaccine at weaning.
- Bulls are vaccinated against leptospirosis and botulism annually.
- Breeders are vaccinated against leptospirosis and botulism annually.
- Replacement breeders (heifers) receive an additional leptospirosis and botulism vaccination.
- Breeders are fed M8U for a period of 100 days in 30% of all years. Breeders are also sprayed against buffalo fly four times per annum.
- Weaners are sold through central saleyards, whilst culled animals - heifers, cows and bulls are sold directly into meatworks.
- Agent's commission account for 5% of marketing costs of weaners.

Jap Ox finishing operation

- Animals coming onto property are vaccinated against three day sickness.
- Animals coming onto property are vaccinated against tick fever.
- Animals coming onto property are vaccinated with two treatments of 5-in-1.
- Animals are sprayed for buffalo fly four times annually.
- Culled animals are sold directly into meatworks.
- Finished animals are sold to meatworks for further processing and export.

Additional assumptions

- Best management practices (BMP) are used in the running of the beef enterprise business. This includes completion of all recommended veterinary tasks and the feeding of supplementary rations as appropriate.
- Recent market prices are used. Prices should be seen in context of their historic record high levels.
- Animal weights are taken from past publications as well as expert technical advice from extension staff.
- No additional labour has been costed in the current gross margin analyses. All labour is provided from on farm resources.
- All variable costs are based on recommended retail prices (r.r.p) at Rockhampton as at May 2006.

A ppendix 1 Land type descriptions

Coastal speargrass land types

Coastal flats with mixed eucalypts on grey earths



Landform	Alluvial plains with variable terraces, levees, swamps and channels
Woody vegetation	Swamp mahogany, poplar gum, pink bloodwood, blue gum Understorey: broad-leaved teatree
Expected native pasture composition	
Preferred	Native sorghum, forest blue, early spring grass, silky browntop, black speargrass, giant speargrass, kangaroo grass
Non-indicator	Reed grass, pitted blue, golden beard grass, <i>Ischaemum australe</i>
Undesirable	Blady grass, purpletop chloris, green couch, crowsfoot grass, lovegrass, sedges
Annuals	Five minute grass
Suitable sown pastures	Callide rhodes grass, Bisset creeping bluegrass, shrubby stylo (Seca), pangola, green panic, siratro on better soils, para grass grows on swampy plains
Introduced weeds	Giant rats tail grass / weedy sporobolus grasses, sicklepod
Soil	Bleached silty loam (Dermosols and Kandosols) but including clays, earths and poorly developed alluvial soils
Description	Surface: hard-setting Surface texture: silty loam Subsoil texture: light to medium clay
Water availability	Low
Rooting depth	0.5m
Fertility	Low total nitrogen; low phosphorus
Salinity	Low to moderate
Sodicity	Low
pH	Neutral to acid
Utilisation	18%
Enterprise	Breeding / fattening where soils deeper and with high fertiliser application
Land use and management recommendations	Many areas can be developed to sown pastures with high inputs
Land use limitations	Underlain by hardpans and susceptible to summer waterlogging (Poorly drained) Surface turns to bulldust Regrowth when cleared

Coastal sand dunes



Landform	Coastal sand dunes
Woody vegetation	Pink bloodwood, white mahogany (yellow stringybark) moreton bay ash, turpentine, paperbark/teatree, swamp box Understorey: grass tree, grevillias, coast banksia
Expected native pasture composition	
Preferred	Kangaroo grass, giant black speargrass
Non-indicator	Fire grass, <i>Eriochloa</i> spp
Undesirable	Wiregrass, lovegrass
Annuals	
Suitable sown pastures	Bisset creeping bluegrass, indian couch (Keppel and Medway), carribean and shrubby stylos; limited options for pangola and rhodes grasses
Introduced weeds	Molasses grass, lantana, bellyache bush
Soil	Deep yellow, red and brown sands (Tenosols)
Description	Surface texture: loose sand, often bleached Surface texture: sand Sub-soil texture: sand
Water availability	Very low
Rooting depth	Deep (>1m)
Fertility	Very low total nitrogen; very low phosphorus
Salinity	Low
Sodicity	Non-sodic
pH	Neutral to acid
Utilisation	18%
Enterprise	Breeding
Land use and management recommendations	Limited clearing options, fire or chemical treatment of woody regrowth, less use of fire where there is sown pastures
Land use limitations	Low nutritional quality of native pastures High input costs for sown pastures

Teatree plains



Land resource area	Teatree plains
Woody vegetation	Broad-leaved teatree/paperbark, narrow-leaved teatree, pink bloodwood and bull oak with emergent narrow-leaved ironbark, queensland peppermint, poplar gum, ghost gum, grass tree and cabbage palm
Expected native pasture composition	
Preferred	Golden beard grass, black speargrass, giant black speargrass, native legumes (<i>Alysicarpus</i> and <i>Desmodium</i> species)
Non-indicator	
Undesirable	Poverty grass, blady grass
Annuals	Summer grasses (<i>Digitaria</i> and <i>Brachiaria</i> species)
Suitable sown pastures	Pangola grass, Tully humidicola, villose joingvetch on low-lying areas with poor drainage; signal grass, Bisset creeping bluegrass, rhodes grass, caribbean and shrubby stylos on better drained areas
Introduced weeds	Weedy sporobolous grasses
Soil	Either bleached coarse sands or silty surfaced grey and brown sodic duplex soils with debil-debil mounds (Tenosol or Sodosol)
Description	Surface: hard-setting Surface texture: coarse sand or silty loam Sub-soil texture: coarse sand or mottled medium clay
Water availability	Low to very low
Rooting depth	0.6m
Fertility	Very low total nitrogen; very low phosphorus
Salinity	Low
Sodicity	Only texture contrast soil, moderate (0.6 – 0.9m)
pH	Acid
Utilisation	15%
Enterprise	Breeding, occasional growing and fattening using high input sown pastures
Land use and management recommendations	Use fire to control seedlings and woody regrowth. Teatree regrowth following clearing may require deep disk ploughing (15-20cm), blade ploughing or Grasslan treatment. Use fire less frequently in sown pasture systems. Retain trees on bed and banks of streams and larger (shade and shelter) areas of tree vegetation as clumps or strips
Land use limitations	Woody regrowth problems Erosive Access problems due to summer waterlogging Low nutritional value of native pastures; high input costs for sown pastures

Brigalow land types

Brigalow with Blackbutt



Landform	Undulating scrub plains
Woody vegetation	Brigalow scrub with emergent blackbutt or yapunyah. Solid patches of blackbutt or yapunyah tend to occur in this land type where there is a high soil salt load. Understorey: false sandalwood, yellowwood or wilga, sometimes leopardwood, sally wattle or currant bush
Expected native pasture composition	
Preferred	Queensland bluegrass, desert mitchell, forest bluegrass, black speargrass, bull mitchell grass, kangaroo grass
Non-indicator	Native millet, curly windmill grass, brigalow grass, pitted bluegrass, tall chloris, and yabila (star) grass, barbwire grass
Undesirable	Dark wiregrass, fairy grass, slender chloris, bottlewasher grass, purple lovegrass
Annuals	Flinders grass, small burr grass
Suitable sown pastures	Buffel, green panic, rhodes grass, leucaena, shrubby stylo (Seca) or caribbean stylo (Verano or Amiga)
Introduced weeds	Parthenium
Soil	A hard-setting, red to brown, texture contrast soil with a sodic B horizon (brown sodosol)
Description	Surface: hardsetting; Surface texture: sandy clay loam; Sub-soil texture: light to medium clay
Water availability	Low to moderate
Rooting depth	60 cm
Fertility	Low to moderate total nitrogen; moderate phosphorus
Salinity	Moderate to high (below 60cm)
Sodicity	Strongly sodic (below 40cm)
pH	Strongly alkaline
Utilisation	28%
Enterprise	Finishing
Land use and management recommendations	Suitable for sown pastures as the light surface texture responds to small and infrequent rainfall Maintain surface cover to reduce sheet erosion, nutrient loss and pasture rundown Erosion of roads and dams where subsoil left exposed
Land use limitations	Sodic subsoil Poorly drained Hard-setting surface Regrowth problems

Brigalow scrub with mixed softwood species



Land resource area	Undulating scrub plains
Woody vegetation	Brigalow, wilga, belah or yellowwood (belah frequency decreases to the north, yellowwood frequency increases to the north); occasional bottle tree, bauhinia, myall and poplar box Understorey: currant bush, false sandalwood, limebush
Expected native pasture composition	
Preferred	Desert mitchell, forest bluegrass, queensland blue, curly and bull mitchell grass, kangaroo grass
Non-indicator	Brigalow grass, shot grass, curly windmill grass
Undesirable	Fairy grass, wiregrass, curly windmill grass, roly poly burr, galvinised burr
Annuals	Saltbushes
Suitable sown pastures	Buffel grass, Bambatsi panic, creeping bluegrass, leucaena, purple pigeon, Floren bluegrass, butterfly pea, caatinga stylo
Introduced weeds	Parthenium
Soil	Dark brown and grey-brown cracking clay soils (Vertosol)
Description	Surface: strong and fine self-mulching; Surface texture: light to medium clay; Sub-soil texture: medium to heavy clay
Water availability	Moderate to high
Rooting depth	Deep (below 90cm)
Fertility	Moderate total nitrogen; moderate phosphorus
Salinity	Moderate (below 40-90cm, depending on location)
Sodicity	Low (below 60cm)
pH	Neutral to alkaline
Utilisation	30%
Enterprise	Finishing
Land use and management recommendations	Suitable for cropping on soils deeper than 45cm and on slopes less than 4% Suitable for pasture improvement
Land use limitations	Regrowth Salinity can effect rooting depth Moderate erosion hazard when cultivated Surface sealing soils Waterlogging

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ppendix 2 Variable cost inputs

The list of input prices applied for the gross margins is shown in Table 18.

Table 18:
Variable input
prices

Item		Cost	/unit	Notes
LIVESTOCK HUSBANDRY				
Broad spectrum drench	7-in-1	\$ 1.10	/head	
	5-in-1	\$ 0.30	/head	
	Ivomec	\$ 1.60	/head	Based on 1 cent per kilogram per head LW
Tickicide	Tixaflly	\$ 1.30	/head	For 20 ml/head dosage as overspray
Growth promotants	Compudose 400	\$ 6.50	/head	
	Compudose 200	\$ 3.90	/head	
Veterinary	Botulism vaccine	\$ 0.85	/head	
	Leptospirosis vaccine	\$ 0.90	/head	
	Tick fever blood	\$ 3.02	/head	Trivalent recommended
Supplements	M8U	\$ 50.00	/head	Based on 100 days feeding
Biosecurity	NLIS ear tag	\$ 3.36	/head	
FREIGHT/MARKETING COSTS				
	Freight	\$ 3.97	/km	For 200–250 kilometre range double-decker
	Transaction levy	\$ 5.00	/head	
	Sales commission	5%	of sales	
Yard/scale fees	Bulls	\$ 7.10	/head	
	Heifers, cows	\$ 5.45	/head	
	Yearlings	\$ 3.15	/head	

Sources: LANDMARK, MLA, Gracemere saleyards

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ppendix 3 Sale price derivation

Table 19 outlines market sale and purchase pricing used in modelling of CQ beef production systems.

*Table 19:
Beef pricing*

Animal category	Lw (kg)	Price (c/kg LW)	Sales commission (%)	Yard/scale fees (\$)	Transport (\$)	MLA Marketing levy (\$)	Final price /head (\$)
Weaner heifer	220	\$1.76	5.0	5.45	9.00	5.00	348.39
Weaner steer	250	\$2.02	5.0	5.45	9.00	5.00	460.30
1 y.o. heifer	320	\$1.77	5.0	5.45	11.70	5.00	515.93
2 y.o. heifer	450	\$1.65	5.0	5.45	13.20	5.00	681.73
1 y.o. steer	360	\$1.81	5.0	7.10	13.30	5.00	593.62
2 y.o. steer	540	\$1.78	5.0	7.10	14.20	5.00	886.84

Source: www.gracemeresaleyards.com.au

Web linkages

The following are useful for the purposes of building similar gross margin analyses.

<http://www.agric.nsw.gov.au/tools/cattle/index.html> provides market specification information for a range of products and different markets

<http://www.gracemeresaleyards.com.au/saleyards/market-reports/> provides market reports and price information from Gracemere saleyards

<http://www.mla.com.au> provides a cost of production calculator

www.dpi.qld.gov.au/cps/rde/xchg/dpi/hs.xsl/27_119_ENA_HTML.htm is the beef industry page from the Queensland Department of Primary Industries and Fisheries website and covers numerous aspects of beef production

<http://www2.dpi.qld.gov.au/breedcowdynama/2816.html> contains information on Breedcow and Dynama computer programs as well as ordering information

www.epa.qld.gov.au contains a wealth of information on natural resource and vegetation management issues including land type descriptions and regional ecosystems mapping

The above is by no means an exhaustive listing, but serves as a point of reference for users seeking further information.

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