

# final report

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## Camel Live Export Supply Chain and Benefit Cost Analysis

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## Abbreviations

ALEC	Australian Livestock Exporters Council
ASEL	Australian Standard for Export of Livestock
BCA	Benefit Cost Analysis
CACIA	Central Australian Camel Industry Association
CIF	Cost Insurance Freight
DOA	Australian Government Department of Agriculture
ESCAS	Exporter Supply Chain Assurance System
FAO	Food and Agriculture Organisation of the United Nations
FOB	Free On Board
LESAG	Livestock Export Standards Advisory Group
MENA	Middle East and North Africa
MERS	Middle East Respiratory Syndrome
MLA	Meat and Livestock Australia
MoUs	(optional) Memorandum of Understanding
NRIA	New Rural Industries Association
OIE	World Organisation for Animal Health
PLU	Portable Livestock Units
SOP	Standard Operating Procedures
UAE	United Arab Emirates

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Michael Clarke  
AgEconPlus Pty Ltd

## Executive Summary

This document is an analysis of the economics of live camel export. It describes the live export supply chain; provides an assessment of the suitability of the current Cattle and Buffalo ESCAS checklist for the live export of slaughter camels; and includes an economic benefit cost analysis of Australian live camel supply.

The world trade in live camels is relatively stable at between 200,000 and 300,000 head per annum. Average prices are around US\$400/head. The trade tends to be between Middle East and North African countries. Australia's cost of supply is estimated to be between US\$1,000 and US\$1,500/head.

Opportunities for Australian export are in small volume higher value niches – breeding stock in the Middle East (approximate sales of 150 head per annum) and slaughter stock in Malaysia where Australia has an advantage in relative proximity and a professional approach to supply (approximate sales of 150 head per annum). Other potential markets, including the US milking sector, may account for a further 50 head per annum if an appropriate supply chain can be established. Live export of Australian camels is a limited opportunity of around 350 head per annum at current supply costs.

The current Cattle and Buffalo ESCAS checklist is relevant to the live export of slaughter camels. The Cattle and Buffalo ESCAS checklist requires few changes or additions. Some R&D will be required to confirm metrics relevant to camels and Quality Management manuals will be required. Ensuring there are appropriate importing country disembarkation feedlots, lairage and slaughter facilities for camels may be an additional cost associated with ESCAS compliance. ESCAS training, supply chain monitoring and audit are all additional costs for camel exporters.

In addition to ESCAS compliance costs for exporters, resources will be expended by government finalising ESCAS guidelines and negotiating health protocols and potentially MoUs with countries intending to import Australian camels. There is also an opportunity cost associated with negotiating market access for camels at the expense of other red meat and livestock priorities.

Benefit cost analysis of Australian live camel supply incorporating ESCAS requirements reveals a total industry present value benefit of \$1.57 million from industry and government investment of present value \$0.41 million resulting in a positive net present value of \$1.16 million over the twenty year period to 2033. While the benefit cost ratio (3.82) is acceptable overall returns are modest.

Investment in development of a live camel export industry may also generate spillover benefits including employment for Aboriginal people living in remote communities and potentially, a minor reduction in environmental degradation caused by wild camels. Spillover benefits have not been quantified in the economic benefit cost analysis.

Risks associated with live camel trade establishment include animal welfare issues that are both real and perceived by activists; irregular supply of wild camels; the need to establish a market for camels that are not suitable for live export; and a diversion of resources away from other industry priorities.

On balance, modest economic returns and substantial risks limit the attractiveness of investment in Australian live camel exports.

## **1 Introduction**

This document is an analysis of the economics of live camel export.

Anecdotally there is strong demand for feeder and slaughter camels from importers (personal communication, Australian Trade Commission, Saudi Arabia). This demand can only be matched if the export process is commercially viable under an Exporter Supply Chain Assurance System (ESCAS).

Consequently, the purpose of the project was to define and describe the camel live export supply chain from property of origin in Australia through to point of slaughter/discharge to breeding units in the Middle East and South East Asia. Once defined the project was then able to develop an economic benefit cost analysis taking into consideration factors, such as regulatory requirements, likely to impact on the break even analysis and alterations required to the Cattle and Buffalo ESCAS checklist for camels for each of its six supply chain elements.

### **1.1 Project Objectives**

Project objectives were to:

- (1) Describe relevant supply chains required to successfully deliver live camels to the Middle East and Malaysia in line with ESCAS requirements. Consideration was given to market requirements including volumes, camel specifications and risks associated with export
- (2) Provide an assessment and refinement of the suitability of the current Cattle and Buffalo ESCAS checklist for camels and provide recommendations for adaption of the checklist
- (3) Undertake an economic benefit cost analysis (BCA) of Australian live camel supply and model parameter inputs that are likely to impact on the BCA.

### **1.2 Method**

The project was delivered through literature review, consultation, supply chain analysis and economic evaluation using benefit cost analysis. A list of literature reviewed is included as an appendix to this analysis. Consultation was completed with camel producers, licensed exporters, the Australian Government Department of Agriculture (DOA) and camel processors. BCA parameters included (a) export volumes and market specifications (b) production and sourcing costs (c) lairage and quarantine costs (currency exchange rates) (e) shipping costs (f) infrastructure upgrades needed to address ESCAS requirements.

## **2 Commercial Camel Sector in Australia**

### **2.1 Species, Population and Location**

Australia is home to the only wild herds of dromedary, single hump, camels in the world. The world trade in live camels is 95% dependent on this species (FAO data <http://faostat.fao.org/>).

Dromedary camels are scattered through the arid interior of Australia with an estimate of 50% in Western Australia, 25% in the Northern Territory, and 25% in western Queensland and northern South Australia (CACIA website <http://www.camelsaust.com.au/>).

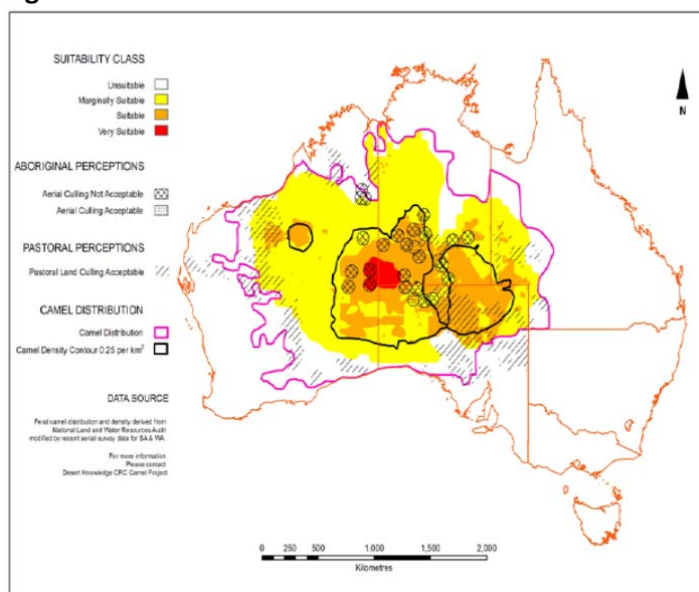
Wild Australian camel populations and their annual growth rates have been estimated by aerial survey since at least 1994. Population estimates have varied from between 600,000 head increasing at 10% per annum in 2001 (Central Australian Camel Industry Association (CACIA) website <http://www.camelsaust.com.au/>) to approximately one million head increasing at 8% per annum in 2008 (Zeng and McGregor 2008).

An up-to-date estimate of the wild camel population was provided by Ninti One Limited (2013) following completion of the Australian Feral Camel Management Project. Ninti One Limited estimated that following completion of a major camel culling program undertaken as part of the Australian Feral Camel Management Project in November 2013, the Australian feral camel population stood at 300,000 head. Ninti One Limited concluded that a population of one million head was an overestimate and that pre-cull the Australian camel population was approximately 600,000 head.

While a population of 300,000 head places an absolute upper limit on live camel export numbers, the real population available for export is significantly lower. Wild Camels need to be in a minimum population density to be a commercial harvest proposition and Zeng and McGregor in Edwards *et al* (2008) note that these areas are limited and that the total camel population available for harvest in 2008, pre a major population cull, stood at between 62,500 and 125,000 head per annum.

Zeng and McGregor's (2008) conclude that commercial utilisation of wild camels should focus on two regions where there were appropriate camel densities – the tri-state border region of South Australia, Northern Territory and Western Australia and the Alice Springs area of the Northern Territory (see Figure 2.1).

**Figure 2.1 Distribution of the Australian Camel Herd**



Source: Zeng and McGregor in Edwards *et al* 2008

It is important to note that Zeng and McGregor's (2008) location and population estimates were pre the Australian Feral Camel Management Project which reportedly halved the total wild camel population (Ninti One Limited 2013).

The supply of feral camels for live export is further limited by both access to Aboriginal land and the suitability of wild stock for export. Approximately half the Australian wild camel population is located on Aboriginal land. Access to this land for commercial activities is required and may or may not be forthcoming. Six in seven wild camels harvested are not suitable for live export due to failure to meet age, gender, weight, body confirmation and condition requirements (Zeng and McGregor's 2008).

Consequently, the annual wild population that a live export industry could currently draw on may be as few as 20,000 to 50,000 head per annum. There has been no attempt to develop an intensely managed camel herd in Australia to supplement the wild population.

## **2.2 Pest Status and Farming Potential**

### **Feral Camel Ownership**

As a general proposition feral camels are not owned by either the landowner or the Crown unless state or territory legislation provides otherwise. State legislation provides for the ownership of feral camels in only two limited situations in NSW and South Australia (Carey *et al* 2008).

However, feral camels can become the property of someone when taken, used or domesticated by the person claiming title to the animal. The taking of possession of the camel can occur by capturing it or confining it and thus acquiring rights to the use of the animal. Relevant state and territory legislation can prescribe that feral camels cannot be taken or used without a relevant licence or permit and this is the case in Western Australia and Queensland (Carey *et al* 2008).

### **Feral Camel Control Responsibility**

There is a variety of state legislative provisions that provide a potential basis for a landholder's obligation to manage feral camels on their land.

Occupiers of freehold land, leasehold land, and certain Aboriginal land in Western Australia are obliged to destroy, prevent and eradicate feral camels on or in relation to their land. In all other jurisdictions, obligations for landholders to manage feral camels will only arise where (Carey *et al* 2008):

- A landholder has a statutory duty of care for the land, and in the circumstances it is reasonable that the duty extends to the management of feral camels
- Conditions attaching to a lease of Crown land require the control or management of feral camels
- A statutory authority, such as a minister, pastoral board, or soil commissioner has issued a direction requiring the landholder to manage feral camels on their land
- land is required to be managed in accordance with a management plan that provides for the management of feral camels

- The landholder has entered into a statutory agreement which creates obligations for the management of feral camels.

### Farming Potential

An appropriate financial return commensurate with other grazing activities appears to be the major barrier to domestication and farming a more intensely managed camel herd. To date there has been limited interest in farming camels. Camels have been purchased and transported to extensive holdings in Queensland and used as woody weed control agents co-grazed with cattle. In addition some pastoralists have held feral camels on large holdings to buffer supply for sale. Otherwise there has been no development of an intensively managed farming sector (Zeng and McGregor 2008).

Camel farming would reduce the risk of an inconsistent supply from wild harvest and may be a precondition of a sustainable and significant live export industry.

### 2.3 Markets Supplied and Production Value

Worldwide commercial camel uses include racing, tourism, ceremonial / beauty purposes and beasts of burden. Camel products include meat, leather, wool, oil and milk. There is a significant world trade in live camels of between 200,000 and 300,000 head per annum but only a small recorded trade in camel meat (New Rural Industries Association (NRIA) <http://www.nria.org.au/Camels>).

The commercial camel sector in Australia was established in the 1980s but has remained small and static since the late 1990s. Industry value and volume data have not been included in official statistics. Camel harvest data assembled by Zeng and McGregor (2008) for 2006-07 shows a total harvest of between 5,000 and 6,000 head with production dominated by pet food supply.

**Table 2.1 Australian Camel Markets and Production Value 2006-07**

Sector	Head Harvested (No.)	Value (\$'million)
Slaughter for human consumption	1,000	1.1 – 1.3
Slaughter for pet food	3,600 – 4,600	0.68 – 1.04
Live export	363	0.27 – 0.36
<b>Total</b>	<b>5,000 – 6,000</b>	<b>1.87 – 2.50</b>

Source: Zeng and McGregor (2008)

Pet food supply is attractive due to low capital costs for establishment infrastructure (Ninti One Limited 2013). Human consumption includes boutique outlets servicing tourism and modest export sales (Zeng and McGregor 2008). Camel meat for human consumption is no longer retailed through the Australian supermarket chains (NRIA <http://www.nria.org.au/Camels>). There is no importation of camel meat into Australia. Live export of camels contributed between \$270,000 and \$360,000 in an industry valued at around \$2.5 million in 2006-07.

There have been numerous attempts to develop both a live export and meat export industry in Australia based on feral camels but these have failed to generate an adequate return on investment (Zeng and McGregor 2008).



## 2.4 Live Exports by Market and Market Access

### Live Exports by Market

Australian live camel export data is piecemeal and incomplete. Table 2.2 provides a summary of total Australian live camel exports by country for the twenty years 1988 to 2007. Table 2.3 shows live camel exports from 2010 to 2013 by export destination and livestock class.

**Table 2.2 Australian Live Camel Exports by Country 1988 to 2007**

Destination	Number	Destination	Number
Brunei Darussalam	991	Saudi Arabia	126
Cuba	24	Taiwan	20
Indonesia	53	Thailand	96
Jordan	160	United Arab Emirates	45
Korea	25	United States	612
Kuwait	122		
Malaysia	2,487		
<b>Total 1988 to 2007</b>			<b>4,761</b>
<b>Annual average</b>			<b>238</b>

Source: CACIA and Camel Exports Pty Ltd in Zeng and McGregor (2008)

**Table 2.3 Australian Live Camel Exports 2010 to October 2013**

Market - stock type	2010	2011	2012	2013 <sup>#</sup>	Total
Indonesia - breeder		18			18
Libya - breeder	99				99
Malaysia - slaughter		24			24
Philippines - breeder	4	10			14
Qatar - breeder			27	215	242
<b>Total</b>	<b>103</b>	<b>52</b>	<b>27</b>	<b>215</b>	<b>397</b>

NB: ESCAS established October 2011

Source: personal communication ABARES, # year to date includes January to October 2013

Review of both tables shows:

- Malaysia has been the major market for live Australian camels. Malaysia is supplied with slaughter stock rather than camels for breeding purposes. Brunei Darussalam, the second most important market also requires slaughter stock. Brunei Darussalam has not purchased Australian camels in the last four years.
- Over the twenty years to 2007 live camel exports averaged a relatively modest 238 head per annum. Since 2010 exports have averaged an even more modest 100 head per annum, mostly for breeding stock. The ten months to October 2013 saw a spike in live camel export sales with Qatar purchasing 215 head for breeding purposes.
- The Australian live camel export trade is inconsistent and opportunistic in nature.

### Camel Specifications by Market

Distinct stock types are required for the Malaysian slaughter market and Middle East breeder supply – Table 2.4. Australia is able to supply both livestock classes.

**Table 2.4 Live Camel Specifications by Market**

Descriptor	Malaysia – slaughter stock	Middle East – breeder stock~
Age	2 to 3 years but up to 10 years	2 to 3 years
Sex and pregnancy status	Mostly male (90% of past shipments). Castrated or spayed stock acceptable. Camels must not be pregnant	Females for breeding and males for slaughter. Bulls must not be in rut
Weight	430 to 470kg (450kg average)	200 to 300 kg with some flexibility
Body confirmation	Stocky thick set animals preferred	Preference for light framed riding camels
Breed	<i>Camelus Dromedarius</i>	<i>Camelus Dromedarius</i>
Body condition	Up to Score 3 <sup>#</sup> ('good' condition)	Up to Score 3 <sup>#</sup> ('good' condition)
Colour	Immaterial	Sandy: Beige / light brown.

~ Includes camels for ceremonial / beauty purposes

# Hump with good development and rising to 10% higher than chest depth. Hump is still sculptured inwards on both sides and still fits over the chest and abdominal area.

Source: <http://www.camelsaust.com.au/liveintro.htm> and industry consultation

### Preference for Australian Stock

Stakeholders were asked why export customers would purchase relatively expensive Australian camels rather than low cost supplies from the Middle East and North Africa (MENA). Reasons provided included:

- Free range status without any of the diseases that have impacted herds in purchasing countries. This includes Middle East Respiratory Syndrome (MERS) that in 2013 was affecting camels in Saudi Arabia (personal communication Australian Trade Commission Saudi Arabia). Australian camels provide fresh genetics to support a change in breeding lines (personal communication Lauren Brisbane, Australian Camel Industry Association and Paddy McHugh, Australian Camel Farm Pty Ltd)
- Australia has been cost effective in the supply of camels into South East Asia – relative proximity and a professional approach to supply provided a comparative advantage relative to alternative sources of supply from MENA countries. However, this market has been eroded by access to alternative low cost sources of protein including Indian buffalo.
- Prestige – it is understood that there is some prestige in the Middle East around having the where-with-all to import 'Australian' camels.
- It is understood that Australian camels are not suitable for racing – they were originally imported for transportation and carrying heavy loads and are not configured for speed (Personal consultation Garry Dann, Territory Camels, Pty Ltd).

## **A Possible Niche – Supply of Camels to the United States**

Australia is the only permissible country from which the US is able to legally source live camels. Review of Table 2.2 shows that the US was Australia's third most important live camel market 1988 to 2007. The US camel milking market for high end health food is at full supply. The US live camel market was un-economic prior to the introduction of ESCAS. In the past the US market was supplied via airfreight and delivery cost to the relevant New York quarantine centre, the only permissible receival place on the US mainland, cost approximately US\$25,000/head. If Australian supply cost could be reduced to between US\$20,000 and US\$15,000/head either through access to a quarantine centre on the US West Coast or seafreight, then there is potential for the reestablishment of small volume US sales (personal communication Lauren Brisbane, Australian Camel Industry Association).

### **Limited Market Access**

Post temporary closure of the Australian live cattle trade with Indonesian in June 2011 and subsequent reopening of export markets for Australian livestock subject to ESCAS compliance in October 2011, Australia has had limited access to live camel export markets. ESCAS requires control of Australian livestock post disembarkation, traceability of animals through the supply chain, animal welfare, reporting and auditing to ensure in country handling and slaughter meet OIE guidelines. Access to export markets also requires protocols to be in place and may require the establishment of a government to government Memorandum of Understanding between the Australian Government and the government of the importing country<sup>1</sup>. Prior to ESCAS, Australia only had formal protocols in place for the live export of camels with Libya and Kuwait (Livestock Export Standards Advisory Group Meeting report, 7 December 2010). Post ESCAS a protocol is in place with Qatar for breeding camels<sup>2</sup>.

### **Industry Policy - Breeder Stock Only**

Industry policy, expressed through the Australian Livestock Exporters Council (ALEC) in 2010 (Livestock Export Standards Advisory Group Meeting report, 7 December 2010) is that exporters only support live export of camels for breeding purposes. Industry has gauged that larger numbers of slaughter animals pose an unacceptable risk that may have wider implications for established and more economically significant live cattle and sheep exports.

It was noted during project consultation that some exporters have asked for this policy to be revised. These exporters note that with appropriate management and ESCAS, suitable supply chains might be established.

## **2.5 Competing Sources of Live Camel Supply**

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<sup>1</sup> In 2014 MoUs are no longer mandatory. However, there are some countries that are choosing to sign these documents and have them in place.

<sup>2</sup> It is noted that ESCAS is not required for breeding livestock. However, there needs to be a guarantee from the exporter that the destination is suitable from a welfare perspective. This may change in the future.

The MENA nations of Saudi Arabia, Egypt, Qatar and the United Arab Emirates (UAE) were the world's largest importers of live camels in 2009, 2010 and 2011 accounting for almost all of the world's recorded imports – Table 2.5.

**Table 2.5 World Live Camel Imports 2009-11**

Country	2009			2010			2011		
	Head	\$US' million	\$/head	Head	\$US' million	\$/head	Head	\$US' million	\$/head
Bahrain	15	0.014	933	16	0.027	1,688	0	0	0
Egypt	37,540	15.104	402	53,271	42.180	792	85,808	30.000	350
Kuwait	8,235	3.640	442	5,000	4.000	800	2,189	1.180	540
Qatar	29,643	3.209	108	111,659	50.570	453	767	0.120	156
Saudi Arabia	92,694	32.110	346	108,839	34.950	321	141,560	48.890	345
UAE	64,102	18.810	293	20,000	5.000	250	25,300	4.900	194
<b>Total/Average</b>	<b>232,229</b>	<b>72.887</b>	<b>314</b>	<b>278,785</b>	<b>136.727</b>	<b>490</b>	<b>255,624</b>	<b>85.09</b>	<b>334</b>

Source: <http://faostat.fao.org/> NB: 2012 and 2013 data not yet available

Camels to supply demand in MENA nations were sourced from nine countries and dominant suppliers were Somalia, Djibouti (adjoins Ethiopia on the Red Sea) and Saudi Arabia – Table 2.6.

**Table 2.6 World Live Camel Exports 2009-11**

Country	2009			2010			2011		
	Head	\$US' million	\$/head	Head	\$US' million	\$/head	Head	\$US' million	\$/head
Bahrain	14	0.007	500	66	0.066	1,000	0	0	0
Djibouti	66,521	24.765	372	53,263	42.176	792	77,879	24.388	313
Egypt	0	0	0	7,736	0.132	17	33,296	10,902	327
Kuwait	4,601	3.427	745	4,711	1.951	414	2,523	1,894	750
Qatar	31,066	21.165	681	10,594	2.939	277	15,978	4,668	292
Saudi Arabia	50,847	27.200	535	84,561	42.501	503	44,068	87,164	1,978
Somalia	500	0.020	40	71,090	20.550	289	108,495	31,133	287
Sudan	8,227	2.282	277	6,599	2.574	390	3,517	1,799	501
UAE	30,000	7,000	233	35,178	16.379	466	8,946	3.299	369
<b>Total/Average</b>	<b>191,776</b>	<b>85.859</b>	<b>448</b>	<b>273,798</b>	<b>129.268</b>	<b>472</b>	<b>294,702</b>	<b>165.210</b>	<b>561</b>

Source: <http://faostat.fao.org/>

Review of world import data shows:

- The live camel trade is dominated by MENA countries. Malaysia was not recorded in the Food and Agriculture Organisation (FAO) statistics between 2009 and 2011. Review of earlier FAO data assembled by Zeng and McGregor (2008) for the period 2000 to 2005 showed the dominance of the same MENA nations and did not record Malaysia as an importer. Malaysia appears to be a niche importer of Australian slaughter stock
- The world import market is dominated by Saudi Arabia then Egypt and Qatar. Qatar is an inconsistent buyer, again between 2000 and 2005 sales oscillated from as few as 417 head to as many as 8,700 camels
- Unit prices for live camels range from a high of \$1,688 for 16 head imported by Bahrain in 2010 (assumed to be racing camels) to lows of \$108 per head for Qatar in 2009. Data for 2005 (not included in the table) shows total imports of 292,000 head at an average

\$US price of \$152. Approximately 80% of imports were purchased by Saudi Arabia at an average unit price of \$119/head.

Review of world export data shows<sup>3</sup>:

- Exports originate from a maximum of nine countries and are dominated by Somalia, Djibouti, and Saudi Arabia
- Average export prices appear to be increasing with a rise from \$448 and \$472 in 2009 and 2010 to \$561 in 2011. The higher 2011 price is dominated by a large number of high priced sales from Saudi Arabia (presumably racing camels)
- Data for 2005 (not included in the table) shows total exports of 281,660 head at an average \$US price of \$140. Approximately half of all exports were sourced from Oman.

### Conclusions on World Trade

The world trade in live camels is relatively stable at between 200,000 and 300,000 head per annum. Average prices are around US\$400/head. The trade tends to be between MENA countries. Zeng and McGregor (2008) concluded ‘while there are opportunities to export Australian camels, the margins are likely to be small unless Australian camels are supplied into high value niche markets’.

## 2.6 SWOT Analysis Australian Live Camel Exports

A simple SWOT analysis is used to draw together characteristics of the commercial camel sector in Australia as it relates to live export – Table 2.7.

**Table 2.7 SWOT Analysis Australian Live Camel Exports**

<p><b>Strengths</b></p> <ul style="list-style-type: none"> <li>• Disease free stock, professionally supplied</li> <li>• Preference for fresh meat from live animals in China, Indonesia, Saudi Arabia and the UAE.</li> </ul>	<p><b>Weaknesses</b></p> <ul style="list-style-type: none"> <li>• Reliant on ephemeral and remote supply</li> <li>• Inconsistent volume and quality</li> <li>• Financial returns do not justify development of a farmed resource</li> <li>• Little infrastructure to support a live trade (point of harvest, export port or shipping)</li> <li>• Lack of strategy to drive an export trade – including sustained support from exporters and government to government export protocols.</li> </ul>
<p><b>Opportunities</b></p> <ul style="list-style-type: none"> <li>• Breeding stock Middle East</li> <li>• Slaughter stock Malaysia</li> <li>• Milking stock US.</li> </ul>	<p><b>Threats</b></p> <ul style="list-style-type: none"> <li>• Low cost suppliers who are able to compete at US\$100/head. Australian cost of supply is US\$1,000 to US\$1,500/head.</li> </ul>

Source: industry consultation and Zeng and McGregor (2008)

<sup>3</sup> The FAO data does not distinguish between camels traded for breeder and slaughter purposes.

Live export of Australian camels is a limited opportunity.

### **3 Supply Chain Description**

#### **3.1 Supply Chain Description, Costing and Performance Standards**

A general seafreight based supply chain to deliver live camels to either the Middle East or Malaysia is described and costed. Central Australia Camel Industry Association (CACIA) Standard Operating Procedures (SOPs) are reported. The relevant Australian Standard for Export of Livestock (ASEL) pertaining to camels is also reported along with recommendations made for ASEL update by the Livestock Export Standards Advisory Group in December 2010. Supply chain analysis is structured around five elements:

- Property of origin Australia including handling requirements
- Land transport of camels in Australia
- Feedlot / holding facility at port, ramp and yards
- Shipping including specific shipping requirements
- Country of receipt and regulatory requirements.

#### **Property of Origin Australia**

*Description and costing:* Property of origin Australia activity includes wild harvest sourcing, holding for partial domestication and internal transport. Wild harvest sourcing requires mustering or tank trapping, equipment and labour. Mustering costs between \$50 and \$100 head in an area with high camel density (>0.5 camels per square kilometre). Harvest is not economically viable at low densities. Feral camels require yarding for up to a week before transporting long distances. Station holding costs are estimated at \$35/head to cover feed, water, management and an annual contribution to the cost of establishing and maintaining a yard facility. Internal station transport costs required to bring camels to a central collection point are estimated at between \$100 and \$150 per head (Zeng and McGregor 2008).

Australian Camel Farms Pty Ltd questioned the need to include an estimate for internal transport costs and the proposed profit margin allowance for the landholder (personal communication Paddy McHugh).

Total property of origin costs, including internal transport costs, are between \$185 and \$285/head and a farm gate price of \$400/head is typically paid to the landholder for camels suitable for live export.

### *SOP for Mustering:*

- Camels have a much larger flight zone than cattle, so mustering pressure can be reduced to encourage camels to move
- Individual capture is not an important technique; vehicles are used as for cattle
- Yard facilities are the same as for cattle, allowing an adequate gate clearance height in the order of 2.4m
- Freshly mustered camels must be allowed to settle for a day, during which they are watered and fed
- The following day camels should be worked through the race and drafted onto a food reward. The recommended stimulus is a length of poly pipe with a loose plastic bag attached which acts as a flapper / rattle. Dogs and electric stock prods are counter-productive and should not be used. Camels require time to see gateways and openings, physical contact is usually not necessary.

### *ASEL Standards and Possible Updates<sup>4</sup>:*

- Cattle ear tags or fire branding are a sufficient means of identification
- Camels suitable for export must not be lame
- For 'hot stuff' risk assessment purposes, camels should be categorised as *Bos indicus* cattle – camels can co-habit with this species and are sourced from the same region
- Camels should have a minimum weight of 150kg and a maximum weight of 850kg
- Slaughter and feeder camels must have been weaned for 30 days before sourcing
- Slaughter and feeder camels must be pregnancy tested during the 320 day period before export and certified as not detectably pregnant by a registered veterinarian or a suitably experienced person approved by CACIA
- Camels must only be sourced for export if they have been conditioned to being handled and to eating and drinking from troughs for a minimum of 10 days and suitable camel domestication practices have been applied.

## **Land Transport**

*Description and costing:* Camels are transported using truck and trailer units designed for cattle. To comply with the Australian Animal Welfare Standards and Guidelines for the Land Transport of Livestock (DOA 2012), larger camels must be transported on a single deck in a seated position. Smaller camels can be transported in two tier crates. Camels are more expensive than cattle to transport on a per head basis. The cost of land transport is a significant impediment to the live camel export industry.

Camels may need to be transported in excess of 1,000km. An allowance of between \$350/head and \$500/head is made for land transport.

### *SOP for Transport<sup>5</sup>:*

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<sup>4</sup> Possible updates are based on recommendations made for ASEL update by the Livestock Export Standards Advisory Group, December 2010

- Camels must be drafted into size groups for transport so that larger beasts do not overlay smaller ones. Cows and calves can be transported together
- Camels naturally lay down during transport and bedding must be supplied to prevent abrasions from road vibrations. Suitable bedding can be dirt, hay or carpet, or a combination of those. A short trip of less than an hour's duration may not require bedding
- Single deck trailers are used and require a gate / bow clearance of 2.3m
- Loading ramps should not be too steep, which means they are in the order of 8m long. The surface should be solid so that it does not make sound or show daylight
- Camels can be transported for 3 days (72 hours), as long as they are fed and watered daily. Unloading for spells is not necessary.

*ASEL Standards and Possible Updates:*

- Stock crate requirements are addressed in the Australian Animal Welfare Standards and Guidelines for the Land Transport of Livestock (DOA 2012) and the CACIA SOPs.

**Feedlot / Holding Facility at Port, Ramp and Yards**

*Description and costing:* The holding of camels at port is necessary for shipment scheduling, voyage conditioning and veterinarian inspection. Ramps and yards used for cattle are appropriate. Costs include agent fees, exporter margins, veterinarian costs, feed, water, port authority and stevedoring costs. A total cost of \$200/head is needed to cover feedlot and associated costs.

Australian Camel Farms indicated that a feedlot only cost of \$5/head per day was a reasonable benchmark (personal communication Paddy McHugh).

Free on Board (FOB) price including property of origin costs, land transport, feedlot and associated costs of between \$750/head and \$1,100/head are appropriate.

*SOP for Holding Yards:*

- A minimum of four days, daily yard handling is recommended<sup>6</sup>
- Camels must have continuous access to water. They may benefit from provision of salt or electrolytes but this is not essential in the short term
- Camels should be fed once per day and this should be as a reward after handling
- Feed should be the same as experienced during road or ship transport. Export cubes are recommended
- Camels will benefit from shade in hot weather
- Wild caught camels should be treated for lice

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<sup>5</sup> Central Australia Camel Industry Association, Standard Operating Procedures (SOPs)

<sup>6</sup> This is a SOP recommendation. The ASEL Standard is for a minimum for 12 hours.



*SOP for Export:*

- Camels should be unloaded in yards and fed and watered prior to loading onto the ship, even if the break is as short as one hour, 3 to 4 hours is ideal
- People presence at the wharf should be kept to a minimum. This should be only the truck driver, export agent and the export veterinarian. Other people should move away so as not to disrupt the load process
- Quiet handling practices must be used, with patience to allow camels to figure out what is required. Limited use of the electrical stock prod under supervision maybe required as a last resort
- In mixed consignments, camels should be loaded first so that there is less pressure and a more optimum ramp angle
- Where there is a large tidal variation, camels should be loaded when the ramp angle from the horizontal is smallest.

*ASEL Standards and Possible Updates:*

- Stocking density / trough space for camels in feedlots should be managed on the same basis as for cattle in holding facilities
- Unless the importing country requirements state otherwise, camels must spend a minimum of 12 hours in a feedlot, starting from the arrival of the last animal within the consignment. This will allow sufficient time to become accustomed to the ship board ration.

**Shipping including Specific Shipping Requirements**

*Description and costing:* The majority of camels for live export have been shipped through Darwin but other ports have included Townsville, Broome, Wyndham and Adelaide. At least one livestock transport vessel currently under construction is being fitted to accommodate a camel deck (personal communication, George Assaf, Al Khalaf Group, Saudi Arabia). Portable Livestock Units built around modified shipping containers may offer a low cost solution for the modification of camels on existing livestock vessels (LiveCorp 2009).

Shipping costs for cattle from the Port of Darwin to Indonesia are approximately \$0.80/kg, on the same basis the cost of exporting camels would be \$400/head (500kg X \$0.80/kg). Insurance is included in this freight cost estimate. Garry Dann from Territory Camels Pty Ltd (personal communication) questioned whether \$0.80/kg was adequate given that camels require more on-board room than cattle.

Australian Camel Farms agree with this cost estimate. Shipping costs to the Middle East are approximately \$500/head (personal communication Paddy McHugh).

*SOP for Shipping<sup>7</sup>:*

- The SOP does not address shipping.

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<sup>7</sup> It is noted that this is addressed in ASEL 3 and 4

#### *ASEL Standards and Possible Updates:*

- Further trial work on shipping camels has been suggested. It is widely acknowledged that for physical and physiological reasons camels need more shipboard space than cattle. A 30% additional space estimate over and above that provided to *Bos Taurus* cattle has been suggested (Livestock Export Standards Advisory Group in December 2010 and subsequently adopted as part of the ASEL).
- Management of pregnant camels is no different to cattle. No special standards are required.
- On board veterinary training, kits and treatments are consistent with those required for cattle. No special standards are required. It is recommended that one hospital pen be provided for every 300 camels loaded (Livestock Export Standards Advisory Group in December 2010).

#### **Regulatory Requirements and Country of Receival Costs**

The above supply chain analysis has been completed up to and including shipping costs. Additional regulatory costs will be incurred by live camel exporters post the introduction of ESCAS, October 2011 if the livestock shipped are slaughter stock. Consistent with ESCAS, exporters retain responsibility for Australian camels destined for slaughter right through the supply chain all the way to slaughter. Regulatory and receival costs borne by either the relevant government agency or the exporter will include:

- Finalisation of the ESCAS checklist for camels – an incomplete internal draft has been developed by an industry and government working group (personal communication, Department of Agriculture)
- Negotiation of protocols/MoUs with importing countries and the opportunity cost of these negotiations compared to progressing other red meat industry market access priorities
- Negotiation of transiting arrangements for camels ultimately destined for other countries
- ESCAS auditing and monitoring – auditing is required before each supply chain commences, for a minimum of the first five camel shipments, and then subsequent audits based on the supply chain risk profile
- Costs associated with ensuring that feedlot at disembarkation, lairage and slaughter facilities meet ESCAS requirements
- R&D to address those components of ESCAS, the SOPs and ASEL Standards that require additional information (e.g. camel welfare performance indicators and Quality Management manuals for yard training)
- Staff training through the length of the supply chain to ensure regulatory requirements are consistently met.

After discussions with the Australian Government Department of Agriculture and industry an allowance of \$100/head is made for regulatory requirements and country of receival costs that must be met by Australian exporters.

A total Australian camel supply cost of \$1,600/head is estimated and this equates to between US\$1,000 and US\$1,500/head (see Table 3.7 below). Informed industry representatives consulted as part of the study believed this to be a reasonable cost of supply.

### 3.2 ESCAS – Changes Required and Estimated Cost of Adoption

In addition to compliance with SOPs and ASEL, camel exporters will need to comply with ESCAS. The suitability of the current Cattle and Buffalo ESCAS for camels is reviewed for all six supply chain elements:

1. Handling of livestock
2. Land transport of livestock
3. Feedlot / holding facility
4. Lairage
5. Slaughter – with stunning
6. Slaughter – without stunning

A separate table based analysis is provided for each element. The checklist was drawn from Appendix D of the Industry Government Working Group on Live Cattle Exports (August 2011).

#### Handling of Livestock

**Table 3.1 ESCAS Handling of Livestock - Changes Required to Accommodate Camels**

ESCAS Cattle and Buffalo Performance Checklist	Alterations required to accommodate camels and their likely cost
1.1 Movement of livestock is carried out calmly and effectively	<ul style="list-style-type: none"> <li>• No change , consistent with CACIA Standard Operating Procedures (SOP)</li> </ul>
1.2 Staff do not try to make animals move (by moving into the flight zone) if they have nowhere to go	<ul style="list-style-type: none"> <li>• No change, camels work best when motivated by food rewards</li> </ul>
1.3 If animals are already moving in the correct direction, they are never hit or have unnecessary pressure put on them	<ul style="list-style-type: none"> <li>• No change, camels respond to kindness and are less likely to cooperate if hit</li> </ul>
1.4 Livestock are not isolated unless necessary.	<ul style="list-style-type: none"> <li>• No change</li> </ul>
1.5 Livestock are not left individually restrained during break times or delays.	<ul style="list-style-type: none"> <li>• No change</li> </ul>
1.6 All individual livestock are observed for signs of lameness, illness and injury during loading, unloading and when in facilities.	<ul style="list-style-type: none"> <li>• No change, individual observation facilitated by small camel load sizes</li> </ul>
1.7 Livestock are never forced to walk over the top of other animals.	<ul style="list-style-type: none"> <li>• No change, SOPs require camels to be drafted into groups of a similar size prior to loading</li> </ul>
1.8 Animals are handled to avoid harm, distress or injury.	<ul style="list-style-type: none"> <li>• No change</li> </ul>
1.9 Downer animals (animals that cannot walk or stand) are identified and provided with special handling and management	<ul style="list-style-type: none"> <li>• No change</li> </ul>
1.10 Livestock are not subjected to procedures that cause pain and suffering.	<ul style="list-style-type: none"> <li>• No change, however objective measures of discomfort are not available for camels. For example cattle vocalise when stressed but there is no equivalent indicator for camels.</li> </ul>
1.11 Electric prodders are not carried or routinely used (only used in emergency).	<ul style="list-style-type: none"> <li>• No change. SOPs note that dogs and electric prods are counter productive</li> </ul>

The ESCAS checklist for cattle and buffalo, Section 1 – Handling of Livestock is appropriate for camels. However R&D will be required to develop welfare performance indicators for camels. Additional costs will include training, monitoring and ESCAS audit.

### Land Transport of Livestock

**Table 3.2 ESCAS Land Transport of Livestock - Changes Required to Accommodate Camels**

ESCAS Cattle and Buffalo Performance Checklist	Alterations required to accommodate camels and their likely cost
2.1 Vessel discharge ramp with non-slip flooring.	<ul style="list-style-type: none"> <li>No change. CACIA SOPs recommend coving the discharge ramp with sand or soil – little or no cost.</li> </ul>
2.2 Vessel discharge ramp sides sufficiently high to prevent escape.	<ul style="list-style-type: none"> <li>No change, SOPs note that yard and discharge facilities suitable for cattle are suitable for camels</li> </ul>
2.3 Livestock are unloaded from vessel by competent stock handlers in a manner that avoids injury and minimises stress.	<ul style="list-style-type: none"> <li>No change</li> </ul>
2.4 Loading and unloading facilities do not have any faults or flaws that will cause injury to the animals.	<ul style="list-style-type: none"> <li>No change</li> </ul>
2.5 The vehicles are suitable for transporting livestock of the class involved and for the distance required.	<ul style="list-style-type: none"> <li>It is noted that due to their height, camels must only be transported in single deck trailers with a clearance sufficient for them to stand comfortably (normally 2.4m). Camels must have a least 150mm clearance over their heads during transport.</li> <li>Transport of camels will be more expensive than cattle/buffalo but this does not necessitate a change to the ESCAS checklist</li> </ul>
2.6 Livestock vehicles are free from faults or flaws that will allow escape or cause injury.	<ul style="list-style-type: none"> <li>No change</li> </ul>
2.7 Discharge ceases if angle of discharge ramp causes livestock to fall or slip during discharge.	<ul style="list-style-type: none"> <li>SOPs note that loading ramps should not be too steep, i.e. approximately 8m long. The surface should be solid so that it does not make sound or show daylight (apply sand or soil).</li> <li>No change in cattle / buffalo ESCAS required to accommodate camels</li> </ul>
2.8 Livestock are loaded and unloaded from vehicles in a calm and efficient manner.	<ul style="list-style-type: none"> <li>SOPs note that it is preferable to allow for loading and unloading in daylight hours, even where artificial lighting is provided and that after a long journey (1, 000kms or more) it can be beneficial to leave the truck or trailer parked at the unloading ramp with gates open and camels walk off at their own pace with no stress</li> </ul>
2.9 Livestock that are unfit for loading, unloading or transport are identified and documented and either treated or humanely disposed of.	<ul style="list-style-type: none"> <li>No change</li> </ul>

The ESCAS checklist for cattle and buffalo, Section 2 – Land Transport of Livestock is appropriate for camels and does not require alteration, addition or refinement. No incremental additional costs are identified. Additional costs will be confined to training, monitoring and ESCAS audit.

## Feedlot / Holding Facility

**Table 3.3 ESCAS Feedlot/Holding Facility - Changes Required to Accommodate Camels**

ESCAS Cattle and Buffalo Performance Checklist	Alterations required to accommodate camels and their likely cost
3.1 Livestock are loaded and unloaded from vehicle in a calm and efficient manner.	<ul style="list-style-type: none"> <li>No change, see Section 2.8 above</li> </ul>
3.2 The number of livestock unloaded does not exceed the capacity of pens and races available.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.3 Holding pens provide enough space for the animals to stand up, lie down and turn around.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.4 The loading and unloading facilities are free of faults or flaws which will cause injury to the animals.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.5 Loading/unloading ramps are not slippery or excessively steep.	<ul style="list-style-type: none"> <li>No change, see Section 2.7 above</li> </ul>
3.6 Pens, races and gates are free from protrusions and sharp edges that can injure animals.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.7 The design and flooring of passageways and races allows for calm and effective animal movement.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.8 Lighting is conducive to animal movement.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.9 Feedlot/holding facility design and lighting enables animals to be inspected.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.10 Clean water is available for all animals.	<ul style="list-style-type: none"> <li>No change, SOPs note that an average sized camel drinks 30 - 40 litres per day. Camels which are dehydrated will engorge themselves on reintroduction to water. Several short e.g. 5 minute, periods of access to water followed by a 30 minute rest, are recommended for the initial drinking session. A camel will rehydrate in a few hours following even severe dehydration.</li> </ul>
3.11 Feed of sufficient quantity and quality is available to all animals.	<ul style="list-style-type: none"> <li>No change, Once camels are rehydrated provide access to low quality hay but definitely not lucerne hay as it will cause bloat in unadapted camels.</li> </ul>
3.12 The feedlot/holding facility is designed so that animals are protected from exposure to adverse weather conditions.	<ul style="list-style-type: none"> <li>No change</li> </ul>
3.13 Animals are inspected twice daily and records are kept.	<ul style="list-style-type: none"> <li>No change, however Quality Management manuals do not currently exist for the essential tasks of selecting and then yard-training wild camels so they are able to be handled in-market on arrival. Production of an appropriate Quality Management manual may be simple or complicated (DOA personal communication)</li> </ul>
3.14 Animals are inspected and drafted on arrival at the facility.	<ul style="list-style-type: none"> <li>No change. Bull camels in rut have no fear or humans and should be live exported. Rut occurs between April and September.</li> </ul>
3.15 Sick or injured animals are humanely disposed of or segregated and treated appropriately.	<ul style="list-style-type: none"> <li>No change</li> </ul>

The ESCAS checklist for cattle and buffalo, Section 3 – Feedlot / Holding Facility is appropriate for camels and does not require alteration or refinement. However Quality Management manuals will be required and the cost of their production is unknown. Camel exporters will be

able to make use of feedlot/holding facilities used for other species, where these exist, in the Middle East and Malaysia. Where in-country facilities already exist, additional costs will include training, monitoring and ESCAS audit.

## Lairage

**Table 3.4 ESCAS Lairage - Changes Required to Accommodate Camels**

ESCAS Cattle and Buffalo Performance Checklist	Alterations required to accommodate camels and their likely cost
4.1 Livestock are loaded and unloaded from vehicles in a calm and efficient manner.	<ul style="list-style-type: none"> <li>No change, see Section 2.8 above</li> </ul>
4.2 The number of livestock unloaded does not exceed the capacity of pens and races available.	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.3 Holding pens provide enough space for the animals to stand up, lie down and turn around.	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.4 The loading and unloading facilities are free of faults or flaws which will cause injury to the animals.	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.5 Loading/unloading ramps are not slippery or excessively steep.	<ul style="list-style-type: none"> <li>No change, see Sections 2.1 and 2.7 above</li> </ul>
4.6 Pens, races and gates are free from protrusions and sharp edges that can injure animals	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.7 The design and flooring of passageways and races allows for calm and effective animal movement.	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.8 Lighting is conducive to animal movement	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.9 Lairage design and lighting enables animals to be inspected	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.10 Clean water is available for all animals in holding pens	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.11 Feed is provided to animals held in excess of 12 hours	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.12 Animals are inspected on arrival at the facility	<ul style="list-style-type: none"> <li>No change, however see Section 3.13 above</li> </ul>
4.13 Animals held in excess of 12 hours are inspected twice daily	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.14 Sick or injured animals are humanely disposed of or segregated and treated appropriately	<ul style="list-style-type: none"> <li>No change</li> </ul>
4.15 The lairage is designed so that animals are protected from exposure to adverse weather conditions	<ul style="list-style-type: none"> <li>No change</li> </ul>

The ESCAS checklist for cattle and buffalo, Section 4 – Lairage is appropriate for camels and does not require alteration or refinement. Where slaughter facilities are rudimentary or non-existent the exporter may incur costs to ensure these facilities are provided. Otherwise lairage costs will be confined to training, monitoring and ESCAS audit.

## Slaughter – with Stunning

**Table 3.5 ESCAS Slaughter with Stunning - Changes Required to Accommodate Camels**

ESCAS Cattle and Buffalo Performance Checklist	Alterations required to accommodate camels and their likely cost
5.1 Slaughter of livestock is carried out calmly and effectively	<ul style="list-style-type: none"> <li>The approach adopted for cattle and buffalo is relevant to camels, no change required</li> </ul>
5.2 A back-up procedure (to stunning) is in place	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.3 The approach to, and floor of the restraining area is not slippery	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.4 Animals are presented for slaughter without being unduly stressed	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.5 The method of restraint employed is appropriate for the size and class of livestock being stunned	<ul style="list-style-type: none"> <li>Research may be needed to establish requirements</li> </ul>
5.6 Restraining equipment is free from obstructions and sharp edges	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.7 The method of restraint employed is working effectively	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.8 Knife sharpening equipment is in working order and well maintained	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.9 Knives are sharpened before beginning the slaughter operation and between animals	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.10 The operation change / pressure / electrical setting (for the stunning equipment) is selected for the animal	<ul style="list-style-type: none"> <li>Current ESCAS guidelines specify a 1.5 Amps electrical charge for cattle a small research project may be required to ensure this is appropriate for camels. Research could be based on the experience of Peterborough Abattoir which is currently stunning camels prior to slaughter.</li> </ul>
5.11 Where pre-stick stunning is used, stunning occurs without delay once the animal has been restrained	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.12 Where post-stick stunning is used, stunning occurs immediately after severing of the throat	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.13 The stunning equipment is correctly applied	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.14 For pre-stick stunning, livestock are stunned in an upright position	<ul style="list-style-type: none"> <li>An R&amp;D project may be required to investigate if this is practical and how it differs from current practice</li> </ul>
5.15 The stun results in the immediate collapse and unconsciousness of the animal	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.16 If the initial stun is ineffective, a re-stun is applied immediately	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.17 Knife used for slaughter is long and sharp enough to sever both carotid arteries	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.18 The cut produces massive pulsatile bleeding from both carotid arteries	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.19 The time between stunning and sticking is no longer than 20 seconds	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.20 Death, indicated by cessation of pulsatile bleeding, lack of corneal reflex and lack of rhythmic breathing, is assured before performing any other procedures	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.21 Animals must not have water thrown on them or be otherwise disturbed prior to confirmed death	<ul style="list-style-type: none"> <li>No change required</li> </ul>
5.22 Where allowed, pregnant females are handled separately and if slaughtered foetuses are not rescued	<ul style="list-style-type: none"> <li>No change required</li> </ul>

The ESCAS checklist for cattle and buffalo, Section 5 – Slaughter with Stunning is mostly appropriate for camels. Some additional research may be required (e.g. amps required for stunning camels, the appropriateness of pre-stick stunning in an upright position, etc.). Assurance that an appropriate slaughter facility exists would need to be established through ESCAS auditing prior to supply chain commencement (as is the current requirement for cattle).

### Slaughter – without Stunning

**Table 3.6 ESCAS Slaughter without Stunning - Changes Required to Accommodate Camels**

ESCAS Cattle and Buffalo Performance Checklist	Alterations required to accommodate camels and their likely cost
6.1 Slaughter of livestock is carried out calmly and effectively	<ul style="list-style-type: none"> <li>The approach adopted for cattle and buffalo is relevant to camels, no change required</li> </ul>
6.2 The approach to, and floor of the restraining area is not slippery	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.3 The method of restraint employed is appropriate for the size and class of livestock being slaughtered	<ul style="list-style-type: none"> <li>Research may be needed to establish requirements</li> </ul>
6.4 Animals are presented for slaughter without being unduly stressed	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.5 Restraining equipment is free from obstructions and sharp edges	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.6 The head is restrained for as short a time as possible prior to sticking, and in no case for longer than 10 seconds	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.7 The head is restrained in a manner which facilitates sticking	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.8 The head of the animal is kept in extension to prevent the edges of the wounds touching until the animal is dead	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.9 The method of restraint employed is working effectively	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.10 Knives are sharpened before beginning the slaughter operation and between animals	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.11 Knife used for slaughter is long and sharp enough to sever both carotid arteries	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.12 The throat is cut using a single, deep, uninterrupted fast stroke of the knife	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.13 The cut produces massive pulsatile bleeding from both carotid arteries	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.14 Death, indicated by cessation of pulsatile bleeding, lack of corneal reflex and lack of rhythmic breathing, is assured before performing any other procedures	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.15 Animals must not have water thrown on them or be otherwise disturbed prior to confirmed death	<ul style="list-style-type: none"> <li>No change required</li> </ul>
6.16 Where allowed, pregnant females are handled separately and if slaughtered foetuses are not rescued	<ul style="list-style-type: none"> <li>No change required</li> </ul>

The ESCAS checklist for cattle and buffalo, Section 6 – Slaughter without Stunning is mostly appropriate for camels. Some additional research may be required (e.g. method of restraint employed is appropriate for the size and class of the livestock being slaughtered). Assurance that an acceptable slaughter facility exists would need to be established through ESCAS auditing prior to supply chain commencement (as is the current requirement for cattle).



## Conclusion on Additional Costs Pertaining to ESCAS

ESCAS checklists for Cattle and Buffalo are consistent with sound practice and are equally applicable to camels. Few changes or additions have been identified. Some R&D will be required to confirm metrics relevant to an additional species and Quality Management manuals will be required. Ensuring there are appropriate importing country disembarkation feedlots, lairage and slaughter facilities for camels may be an additional cost imposition and risk for industry. ESCAS training, supply chain monitoring and audit are an additional cost to exporters.

### 3.3 Commercial Cost of Supply incorporating ESCAS

The proceeding analysis allows for the estimation of a commercial cost of supply of Australian camels incorporating ESCAS requirements. A summary of the above data is provided in Table 3.7.

**Table 3.7 Camel Live Export Supply Costs**

Supply Chain Element	Explanatory comment	Cost Estimate (\$AUD/head)
Property of origin Australia	<ul style="list-style-type: none"> <li>Wild harvest sourcing including mustering or tank trapping, equipment and labour (\$50 to \$100/head)</li> <li>Allowance for on-farm holding including feed, water, management and an annual contribution to the cost of establishing a yard facility (\$35/head)</li> <li>Internal transport on property of origin to bring camels to a central collection point (\$100 to \$150/head)</li> <li>A total cost of between \$185 to \$285/head with a typical farm gate price of \$400/head recognising a return for the landholder</li> </ul>	\$400
Transport to port	<ul style="list-style-type: none"> <li>Camels may need to be transported in excess of 1,000km.</li> </ul>	\$350 to \$500
Feedlot / Holding Facility costs at Australian port	<ul style="list-style-type: none"> <li>Includes agent fees, exporter margins, veterinarian costs, feed, water, port authority and stevedoring costs</li> </ul>	\$200
	<b>Free on Board (FOB) cost</b>	<b>\$1,100</b>
Shipping	<ul style="list-style-type: none"> <li>Shipping costs for cattle from the Port of Darwin to Indonesia work out at \$0.80/kg, on the same basis the cost of exporting camels would be \$400 (500kgX\$0.80/kg)</li> <li>Insurance is included in the freight cost estimate</li> </ul>	400
	<b>Cost Insurance Freight (CIF) cost</b>	<b>\$1,500</b>
Regulatory	<ul style="list-style-type: none"> <li>Finalisation of an ESCAS checklist for camels</li> <li>Negotiation of protocols/MoUs with importing countries</li> <li>ESCAS auditing and monitoring; before supply chain commences, first 5 consignments, additional audits based on risk</li> </ul>	\$100
	<b>Total landed cost - \$AUD</b>	<b>\$1,600</b>
	<b>Total landed cost \$US equivalent</b>	<b>US\$1,000 to US\$1,500</b>

Table 3.7 data is used to inform a live camel export benefit cost analysis.

## 4 Benefit Cost Analysis of Live Camel Supply

### 4.1 Economic Benefit Cost Analysis

The economic benefit cost analysis of live camel supply was completed on the following basis:

- Principles used were consistent with the Council of Rural Research and Development Guidelines for Evaluation (updated 2013) and a 7% central discount rate was applied
- Sales of Australian camels post ESCAS are of limited numbers to higher value niche markets. Post negotiation of appropriate protocols annual sales are approximately 350 head – 150 head each to the Middle East and Malaysia and 50 head to all other markets. These estimates are informed by analysis of historical sales of Australian live camels 1988 to 2007 (see Table 2.2)
- Cost of supply is consistent with the supply chain analysis developed from the literature and reviewed with industry. It includes an allowance for ESCAS compliance costs (see Table 3.7). Profit on supply accrues to property owners in Australia, transporters, feedlot owners, shippers and other players (e.g. fodder providers and veterinarians). Total per head profit on a CIF price of \$1,600/head is estimated at \$500/head
- ESCAS development costs include an allowance for checklist finalisation (\$20,000), protocol negotiation (two key markets) and the opportunity cost to other sectors of the red meat industry (\$250,000). An allowance for research and development (\$200,000) is also made. These costs are consultant estimates only and are not informed by any reliable data.

Table 4.1 provides analysis results.

**Table 4.1 Benefit Cost Analysis Results (7% discount rate, 20 year analysis period)**

Criterion	Result
Present value of benefits (\$'million)	1.57
Present value of costs (\$'million)	0.41
Net present value (\$'million)	1.16
Benefit Cost Ratio	3.82
Internal Rate of Return	24.3

On the basis of the assumptions described, a total industry present value benefit of \$1.57 million is generated from an industry and government investment of present value \$0.41 million resulting in a modest positive net present value of \$1.16 million over the twenty year period to 2033. While the benefit cost ratio (3.82) is acceptable overall returns are modest.

### 4.2 Spillover Benefits and Costs

In addition to the modest net benefit delivered to industry from government and industry investment, there are 'spillover' benefits for the Australian community from developing the live camel export trade. Important spillovers include employment in remote Aboriginal communities and, potentially, a minor reduction in environmental degradation caused by wild camels.

No spillover costs have been identified.

### 4.3 Risk Analysis

Table 4.2 summarises risks associated with developing a camel live export trade identified by industry, welfare advocates, government and from the literature.

**Table 4.2 Risk Analysis – Australian Live Camel Export**

<b>Risk</b>	<b>Source of Comment on Risk</b>	<b>Possible Mitigation</b>
Animal welfare – real and perceived by advocates	Industry Advocates <sup>#</sup>	Ensure ESCAS compliance
Irregular supply – may not be able to fill regular orders and resulting in poor business relationships and loss of trade	Government	Work with landholders, especially Aboriginal communities to ensure buffer stocks in appropriate holding yards
What to do with unsuitable camels – it is illegal to release them back into the wild and as many as 6 in 7 mustered are not suitable for live export	Literature Government	Encourage linked industries such as the pet meat sector
Lack of sustained commercial interest in camel live export from informed exporters	Government	Action by ALEC to demonstrate sustained demand from live exporters (if in fact this demand exists)
Diversion of resources away from negotiation of more pressing international market access priorities for the red meat and livestock industries	Government	Action by ALEC to confirm camel live export is or is not a high priority for industry

# See for example <http://www.liveexportshame.com/news2/index.php/topic,7786.msg9787.html#msg9787>

## 5 Conclusions

Given the modest nature of industry returns and the considerable risks involved with establishing a trade, this study concludes that live camel exporting is at best a low priority niche opportunity.

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## Appendix 1 Consultation List and Questions

Stakeholder	Status
Peter Dundon, Manager Livestock Export, MLA	Telephone correspondence
Sharon Dundon, Manager – Livestock Export R&D, MLA	Telephone and email correspondence
Sam Brown, Chief Executive Officer, LiveCorp	Face to face meeting
Allan Sheridan, Director of Animal Welfare Technical and Legal Matters, Animal Welfare Branch, Biosecurity Animal Division, DOA	Telephone and email correspondence
Clay Mifsud, Agricultural Commodities, Food and Trade Branch, ABARES	Telephone and email correspondence
Mark Morley, Senior Trade Commissioner Australian Trade Commission Saudi Arabia	Face to face meeting
Peter Seidel, Camel Exports Pty Ltd, Palmerston Northern Territory (retired)	Telephone and email correspondence
Lauren Brisbane, Chair Australian Camel Industry Association. Glasshouse Mountains, Qld	Telephone and email correspondence
George Assaf, Al Khalaf Group Saudi Arabia	Telephone and email correspondence
Ahmad Glosheh, Livestock Shipping Services (LSS), Jordan	Telephone and email correspondence
Garry Dann Territory Camels, Alice Springs NT (operates Wamboden Abattoir)	Telephone and email correspondence
Paddy McHugh, Australian Camel Farm Pty Ltd Townsville Queensland	Telephone and email correspondence
David Gifford, Director Colin Crow, International Marketing Executive Meat and Games Pty Ltd, Kalypso Kold Store, Colmsie,	Not involved in camel live export and declined an interview
Quentin Hart, Department of Agriculture Canberra. Previously Project Manager, Ninti One	Telephone and email correspondence
Phil Gee, Senior Consultant, Camel Industry Development, PIRSA	Telephone and email correspondence