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DEVELOPMENT OF CAMEL INDUSTRIES IN WESTERN AUSTRALIA FINAL REPORT

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Executive Summary

This report documents the progress achieved by the GMS to develop a sustainable camel industry in Western Australia where a substantial number of feral camels reportedly reside within the state's three deserts. The project has proposed a fresh approach to develop the profitable farming of Australian camels for meat, milk, fibre and genetics through a series of eight steps that rely on strong industry involvement. The current supply chain is unlikely to be economically viable. The key to industry viability may lie in restructuring chain management and costs.

The Western Australian Camel Industry Forum was held in Perth on 26 May 2004. Forum participants focused on reducing costs at a number of supply chain points that related to camel location, supply systems that may include strategic holding facilities and partial on-site processing, and the creation of new employment opportunities for remote communities providing a skilled workforce to capture, hold and farm camels. The forum resolved to create a WA Camel Industry Association prior to the June 2004 that would deal with the tasks and challenges ahead. Whether or not industry members elect to continue with the project's recommendations is entirely up to them. The government must now adopt an arm's length approach until formally requested to increase its level of involvement by the anticipated Association.

Introduction

Previous attempts to ignite a viable camel industry in WA have not delivered resonating outcomes. Despite this, the GMS embarked on this initiative as a result of significant interest expressed by suppliers, processors, traders and foreign investors in what they assumed to be sufficient numbers of healthy, crown-owned camels and the existence of markets indicating potential in the Middle East, South East Asia and mid-western United States. Further, the GMS believed that the establishment of a camel industry in WA could provide employment opportunities for remote communities with access to large parcels of suitable, vacant crown land. The project recognised that commercial camel harvesting would lead to reduced pest damage to pastoral sheep, goats and cattle resources.

Industry Background

Camels (*Camelus dromedarius*) were first introduced to Australia in the 19th century to provide freight transport. With the advent of rail and road transport, the original herd of twelve thousand was released into the wild interior where it thrived. The last national survey conducted between 1980 and 1983 estimated a total Australian population of 43,000 and that fifty percent of this wild population was thought to reside inside the Western Australian borders of the Great Sandy, Great Victorian and Gibson deserts (Short *et al.* 1989). However, more recent reports indicate a population of over 250,000 and given the time period between Short's one-off field sampling and now, inference on the WA herd distribution is at best a gross and scientifically untested extrapolation. Transient herds of mixed ages regularly wander onto established properties and tend to reside within the more comfortable domains of pastoral leases. Many producers testify that camels allowed to roam freely often damage essential stock infrastructure and cause natural resource degradation. This may explain why the camel is currently a declared pest in Western Australia. The Central Australian Camel Industry Association Inc. (CACIA) at Alice Springs has served as the dominant industry body in recent history. However, our state departments are increasingly receiving inquiries from exporters and meat processors who desire to deal directly with Western Australia.

An objective assessment of past attempts to establish a WA camel industry indicates failure despite its potential. A review of research reports commissioned by RIRDC between 1999 and 2003 document this potential and reveal a series of shortcomings (Appendix 1). Underpinning this past failure have been attempts to introduce camel meat into an Australian market

dominated by beef, mutton and lamb. Another unsuccessful approach has been to live export feral harvested animals destined for the traditional wet markets of the Middle East where low-value African camels aged 25-30 years are normally traded. The latter is not only unsustainable and detrimental to our state and national gene pool, the projected returns indicate it is a largely unfeasible option and totally neglects the commercial potential of the other camel products. Researchers commissioned to investigate the feasibility of various camel by-products such as leather, have done so by considering camel products as an alternative to those derived from cattle and sheep in markets and/or supply chains that are already well established. The RIRDC reports serve to document the limitations, both biological and cultural, that inhibit our potential camel industries from ever becoming a viable commodity trade at the national and international levels. This GMS project has proposed a fresh approach to develop a range of camel-based industries through a series of eight steps that rely on strong industry involvement (Table 1). Advancement through each of these steps is dependant on the successful outcomes achieved in that directly preceding it.

Table 1 Eight-step plan for the development of WA domesticated camel industries.

Step	Description	Output towards Objective	Completion Date
1	ME Market Scoping Study Phase 1	Objective assessment of current affluent ME markets Notional volume of demand Underpinning requirements for market penetration.	November 2003
2	WA Camel Industry Forum	Discussion of ME market, its implications and appropriate industry structures across the supply chain Industry ownership of development process Initiate dialogue on partnering with key interstate and overseas stakeholders	March 2004
3	Herd demographic survey (See Appendix 3)	Number & distribution of herds across the three major desert habitats in WA. Strategic location of Camelot sites Estimation of potential turnoff figures.	June 2004
4	Pilot Domesticated Camel Farms	Aggregation of genetic pools and inline selection for various production traits Establishing husbandry guidelines Benchmarking various product potentials	September 2004
5	Market Scoping Study Phase 2.	Establish business relationships with foreign supply chain partners Product pre-feasibility studies based on recorded turnoffs	December 2004
6	Investigation of essential support resources	Consultation with potential supply chain members	March 2005
7	Establish WA Camel Association (WACA)	Industry lobby group comprising all involved in supply chain Development of Industry Business Plan	June 2005
8	Legislative Changes	Change declared status to authorised stock	October 2006

Since the demise of Afghan herders, Australian camel management has followed a cattle model. Camels are remarkably different to cattle. Anecdotal claims suggest camels are capable of reasoning and have an extraordinary memory. From the anatomical and physiological perspective, the camel is undisputedly most adapted to its harsh habitat and coupled with its intellect, may explain how and why this “gift to mankind” has managed to thrive in our desert environments. The project has suggested the establishment of strategically-located pilot farms to test alternative camel husbandry methods using the participatory research model. These will be needed to determine best practice management guidelines for the profitable farming of Australian camels for meat, milk, fibre and genetics.

Project Outputs & Outcomes

Product Market Scoping

1. Meat

Past evaluations of market potential in the Middle East (ME) have focused on the live export of animals destined for the wet/traditional meat markets. Exporters have suggested that most, if not all of the meat sold in these traditional markets comes from African animals aged between 25-30 years. Understandably, the consumer that frequents such markets expects to pay an average of US\$ 2.00 per kg for this low quality commodity. However, another source from Saudi Arabia indicated that locally produced camel meat is a scarce and highly valued product that normally attracts a premium of SR20 per kilo in Riyadh hyper- and supermarkets. This led to the commissioning of an independent preliminary survey to determine the potential for the niche marketing of premium, succulent camel meat, hallal-processed to strict specifications in Western Australia, in a select group of lucrative ME markets (UAE, Kuwait and Saudi Arabia). The specifications for this work were developed in consultation with a broad range of industry stakeholders. The survey was completed in late November 2003 and was widely distributed to interested stakeholders as part of a discussion paper in December 2003 (Appendix 2).

The key findings reported indicated:

1. Quality camel meat is not commonly retailed in supermarkets or restaurants in the three territories surveyed

2. Despite the majority of camel meat consumption being limited to wet market sales to less-affluent expatriate communities, dishes containing the meat of two-year-old males are a highly regarded culinary treat at parties hosted by only the most affluent of society. This, combined with the first dot point may present a golden opportunity to market a previously untested but relatively low-risk product to medium to high income earners in Saudi Arabia and the United Arab Emirates
3. The report clearly presents that an aggressive marketing campaign will be required to achieve product differentiation for the cost-effective sale of Australian camel meat into affluent markets
4. Linking camel meat to healthy eating, both in terms of disease free status of Australian herds and low fat content and highlighting its potential to reduce human obesity in the territories surveyed are options that could be raised with respective health departments during future trade delegations to the ME
5. Some of the UAE & Kuwaiti importers interviewed indicated their willingness to be involved in the early marketing stages
6. The report provides intelligence on potential demand volumes for prime cuts but readers must consider these within the context of the assumptions on which they are based
7. Detailed, country-specific lists of key legislative requirements are also provided

The previous meat science work done by CACIA will serve as a significant contribution to the future marketing of prime cuts in the ME and other lucrative markets.

2. Milk

The health and growth benefits of camel milk are well recognised in the ME and have instigated several international research programs to identify its biomedical attributes. Israeli and Swedish research indicates camel milk contains insulin-like proteins that withstand digestion and are absorbed intact. As such, camel milk may prove to be an oral treatment for diabetes. The Dairy Innovation CRC (DICRC) has expressed an interest in becoming involved in the bio-medical assaying of WA camel milk. In a meeting held in Melbourne on 23 January 2003, DICRC indicated their willingness to undertake preliminary testing of milk samples as their contribution to the case to establish a dairy camel industry in the future.

3. Camel Fibre Products

Camel fibres are by-products of the camel meat industry. They include skins

for tanning and wool/hair for weaving. Because of the fibre's structural properties and more so the limited camel turnoffs, the notion of supplying camel skins to the US, European and Asian markets seems remote whether it be for the production of fashion accessories, luggage, garments or bedcovers. A more plausible course of action may be to target the more exclusive outdoor clothing retailers to expand their product line to include premium quality camel leather boots. As indicated in the summarised RIRDC report, domesticated camel production presents the most effective means of improving camel skin quality. As such, the feasibility of such by-products could be investigated shortly after meat processing is established. Further, the manufacture in Australia of the highly-prized camel hair overcoats, traditionally worn by the more affluent males in Middle Eastern societies, may open the way for another boutique industry.

4. Camel Hump Fat and Offal Products

An average 40 kg of fat is contained in the hump of a camel. Previous authors have reported the cosmetic industry maybe interested in using this fat in its moisturising products (Appendix 1). The current market price for this fat is \$2/kg. Further, it was indicated a market for camel feet existed and that returns of between \$25-100 per foot may be obtained. According to speculation, the cooked feet are an Asian delicacy and also contain emulsifier-grade gelatine. Once a realistic estimate of turnoff is available, Australian cosmetic manufactures may be approached regarding the fat and exporters/food processors regarding the feet.

5. Gene Products and Stud Breeding

Several authors have speculated Australia's feral camel population is the last remaining herd on earth to retain its wild vigour and disease-free status. More scientific examination of WA herd status is required. Also the documentation of the selection criteria used by traditional breeders will be imperative to developing this product line.

Industry Mobilisation

The Western Australian Camel Industry Forum took place at the Duxton Hotel in Perth on 26 May 2004. The forum agenda, issues brief and minutes are presented in Appendix 3.

An analysis of work completed prior to the forum clearly suggested that the key to industry viability was supply chain management and costs. If full costing

was applied to the current camel meat supply chain, it was unlikely that a level of viability could be reached. Efforts needed to concentrate on activities to determine the probability that camel enterprises could be structured in a way that was sustainable from an economic perspective. Forum participants were urged to focus on issues of cost reduction at a number of supply chain points. These related to:

- the location and density of camels;
- the development of camel supply chain systems that may include strategic holding facilities and partial on-site processing; and
- the creation of new employment opportunities for remote communities interested in providing a skilled workforce to capture, hold and potentially farm camels.

While important, other issues would commonly be reliant on the development of a viable industry supply chain structure. It was assumed that average per unit returns from camel meat could not be substantially lifted in the immediate term and that the opportunity to act to do so would be limited by current industry supply structures. For instance, efforts to meet camel industry demand at the higher end of the market would be to no avail if issues of supply cost and coordination were not initially addressed. The project believed the steps necessary to better determine the industry's potential viability could be carried out at relatively low cost. Forum participants were therefore advised to consider developing projects, activities and solutions that addressed primary issues.

The meeting was well attended with a final total of 42 registrations. All the key segments of the supply chain were represented at the forum including potential suppliers (Aboriginal communities, past and present pastoralists), service providers (trucking and helicopter mustering), processors (from both WA and SA), meat traders, researchers, regulators and politicians. The superb venue provided the ideal atmosphere for lively and open discussion. Everyone contributed constructively and the forum was able to work its way through the entire agenda at a comfortable pace.

Participants were told that DAWA was keen to support viable new industry development initiatives driven primarily by industry effort. This highlighted the expectation that the forum had to produce a significant and serious private sector commitment to progress the development of a camel meat industry in Western Australia. Without such industry driven resolution, it was made clear that DAWA could not justify continuing with its current level of support.

Towards the end of the day there was an overwhelming consensus that the tasks and challenges recognized as important for the industry's development would be best dealt with through the creation of a dedicated organization, one established specifically to address the needs and progress the interests of a Western Australian Camel Industry. Mr Chris O'Hora was nominated to coordinate the formation of a Western Australian Camel Industry Association prior to the end of June 2004.

With steps 1 and 2 now complete, it is timely for DAWA/GMS to adopt an arm's length approach until formally requested to increase its level of involvement by the anticipated Association. Whether or not industry members elect to continue with the remaining steps presented in Table 1, is entirely up to them. Potential avenues for rejuvenated government involvement may include assistance to access state and federal funding and participation in camel production research. The government may also consider becoming involved through investment attraction, legislative adjustments and infrastructure development to lift industry efficiency and competitiveness.

Project Expenditure

The operating costs associated with the achievement of the steps 1 and 2 are presented in Table 2. The total cost of completing the ME survey, administered by AUSTRADE, was \$21,956. DAWA's Trade and Development Branch contributed fifty percent of this.

Table 2. Actual Project Operating Expenses

ITEM	TOTAL (\$)
ME Survey Consultant Charge	10,978.00
Discussion Paper Production & distribution	3,705.80
Specialist Consultant Charges	2,032.42
Forum Facilitator Charge	1,527.28
Hospitality (working lunches & dinners)	82.68
Forum Venue Hire & Catering (Duxton Hotel)	24.00
TOTAL	18,350.18

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10 June 2004

APPENDIX 1

REVIEW OF RIRDC REPORTS ON THE DEVELOPMENT OF A CAMEL INDUSTRY IN AUSTRALIA

Report 1

Ellard, K and P Seidel. 2000. **Development of a sustainable camel industry.** RIRDC Publ. 99/118 (Project numbers DAW 81A & DNT 19A).

This report is comprised of two sections. The first, authored by Kevin Ellard, is a comprehensive assessment of potential economic and ecological benefits of harvesting feral camels for commercial purposes in Western Australia. Below are the key points.

1. Whether or not WA's estimated population of 100,000 camels is accessible to commercial production is yet to be established. There is no current effective use of camels in WA. About 50% of producers surveyed indicated camels frequented their properties at some time of the year. Camels move on to pastoral properties during dry times in search of water. They are known to concentrate around salt afflicted areas in winter. Little is known about the range and distribution of camels within the desert regions of WA, however the East Pilbara, Wiluna and Laverton regions are considered major concentration areas.
2. Despite being domesticated some 4000 years ago, the potential to improve camel production (meat & milk) through in-line selection remains huge in most of areas in the world.
3. Camels are pseudo-ruminants able to survive on poor pastures better than cattle, sheep and goats because they can select higher quality feed (predominantly browsers), vary their rate of digestion, cover large distances, utilise feed inaccessible to other stock, their protein requirements are at least 30% less than other stock and they require high levels of dietary salt. As such, camels may provide a unique means of utilising salt-affected land for commercial production.
4. Strong interest in the potential benefits of cograzing camels and other stock was shown by producers surveyed. Anecdotal reports from producers in the NT suggest cattle perform better during drought when grazed in paddocks with camels. Further, no difference in cattle performance was noticed during good seasons as camels do not compete with cattle at recommended stocking rates (1 camel per 10 cattle). In

fact, camels (as top-browsers) may open up dense canopies that in turn would promote understorey growth. Ellard's suggestion that further scientific research was required to confirm these claims probably precipitated the work of Phillips and his co-workers (RIRDC Publ. 01/092, Project DNT 20A), the final report covered in this current review.

5. Reproduction is greatly affected by level of nutrition. Both sexes usually reach puberty at three years of age. Peak sexual activity normally occurs between July and November. Average length of gestation is 375 days and inter-calving interval ranges between 15 and 24 months, depending on level of management.
6. Australian camels are relatively disease-free. The two most infectious diseases of camels overseas are camel pox and trypanosomiasis. It is worth noting some early imports were reportedly infected with trypanosomes. Camels are resistant to Foot & Mouth Disease (FMD) but may act as carriers. Regular monitoring of killed animals by qualified vets is recommended to ensure Australia maintains its disease-free status.
7. More than 60% of producers surveyed indicated their interest in developing a camel industry, however inappropriate fencing and current legislation were identified as the major perceived constraints in traditional sheep areas while the cost of industry infrastructure and transport were identified as the major perceived constraints in traditional cattle areas.
8. Regulations governing the capture and grazing of feral animals require further clarification. Any changes to current legislation must be initiated by industry and requires approval by the APB. Camels may be recognised as livestock and their production as a legitimate primary industry.
9. The lack of suitable export abattoirs willing to process camels is a major constraint to industry development. However, recent changes to DPIE policy now allows the export of meat from domestic abattoirs under specific circumstances where the importing country provides written consent. Several factors make the option of using a mobile abattoir impractical and/or uneconomical.
10. Opportunities exist to transport small shipments of camels on existing cattle boats servicing the ME and Asian markets from WA ports (Wyndam, Broome, Dampier, Port Hedland, Geraldton, Fremantle, Bunbury & Esperance).
11. Net returns from camels is largely reliant on method of capture and transport costs from the pastoral region. Bayonet trap yards can significantly reduce capture costs if camels are familiar with the

structure and there are no alternative watering sites in the immediate locality.

12. The weaning weights of camels at one year of age range between 150 - 180 kg and five year weights range between 340 - 430 kg. Slaughter statistics from Alice Springs indicate bull weights ranging between 514 - 635 kg (dressing out at 53%) and cow weights between 470 - 510 kg (dressing out at 48%). Dressing out percentages exclude approximately 40 kg of hump fat. Boning percentages range between 54 - 60%.
13. Dry land dairy production represents a major possibility in WA. Camels on a good nutritional plane and managed in a clean and hygienic environment produce milk that is comparable in quality and taste to that of cattle. Free-ranging camels produce an average of 10 litres per day. This can be increased to between 15-20 litres under intensive production. Further, recent Israeli and Swedish research indicates camel milk contains insulin-like proteins that withstand digestion and are absorbed intact. As such, camel milk may prove to be an oral treatment for diabetes (pharmaceutical by-product).
14. Other by-products include up to \$2/kg tallow for cosmetic production, \$25-100 per foot (Asian delicacy) and \$20/hide (tanning industry).
15. Development of a WA camel industry will rely heavily on the development of export markets. Live export represents an immediate market opportunity for WA pastoralists.

The second section, authored by Peter Seidel, describes the work of the Central Australian Camel Industry Association (CACIA) completed over the last ten years to establish a national camel industry. A brief description of the contents of each of the publications produced with support from various commonwealth and territory bodies is provided. Readers need to contact CACIA for more information. These publications include:

1. Camel. Selected meat cuts and information (1997)
2. Capture and handling of camels destined for the abattoir (1999)
3. Descriptive language for live camel (listed as being *In press*)

These publications are available via the CACIA web site (www.camelsaust.com.au).

Report 2

Warfield, B and L Tume. 2000. **Marketing analysis and plan for the camel industry.** RIRDC Publ. 00/9. (Project numbers DAQ 218A).

This quite lengthy (116 pages) and detailed report describes the potential for developing a domestic camel market in Australia. The report was commissioned on the premise that Australia is home to a significant Moslem population and as such a domestic market analysis was warranted. The key finding that there exists limited domestic trade interest in camel meat should not come as much of a surprise to any Australian, given the abundance of our preferred red meat staples (cattle and sheep). Nevertheless, the report is a useful reference as it provides some export-relevant intelligence. It reiterates some of the general findings reported previously by Kevin Ellard. The authors state there are approximately 19 million camels world wide. According to the 1998 statistics reported from 'selected countries', Somalia has 6.1m, Sudan 3.1m, Mauritania 1.2m, Saudi Arabia 425,000, Egypt 135,000, Jordan 18,000, Mongolia 350,000 and China 350,000 head. The comment Sudanese meat quality is poor as camel are slaughtered at the end of their working life (probably 25 years plus) suggests Australia may be in a position to supply the only quality meat animals in the world should Sudanese practice be the regional norm.

Report 3

Phillips. A, J Heucke, B Dorges and G O'Reilly. 2001. **Co-grazing cattle and camels.** RIRDC Publ. 01/092. (Project numbers DNT 20A).

The overall objective of this research, conducted in the Alice Springs area between 1997 and 2001, was to compare the effect of co-grazing camels and cattle on cattle productivity and assess the resultant vegetation impact.

Despite large shifts in grass and herbage yields that reflected fluctuations in seasonal conditions, no consistent significant differences were recorded in species mix, quantity or ground cover that could be attributed to co-grazing camels and cattle. Browsing of trees and shrubs was also found to be driven by seasonal conditions.

A small degree of dietary overlap was observed during short periods but the co-grazing of camels with cattle did not limit cattle performance. In fact, co-

grazing substantially increased the weight of livestock grazed per unit area. The authors remarked the productivity bonus of co-grazing would probably be even more pronounced in less productive cattle country, such as spinnifex and mulga pastures.

Report 4

MacNamara, K, P Nicholas, D Murphy, E Riedal, B Goulding, C Horsburgh, T Whiting and B Warfield. 2003. **Markets for Skins & Leather from Goat, Emu, Ostrich, Crocodile and Camel Industries.** RIRDC Publ. 02/142 (Project number DAQ 258A).

As suggested by the title, this report covers a wide range of leather types and the amount of attention devoted to camel fibre products is rather limited. However some useful information can be derived from this report.

1. Camel leather is a by-product of the camel meat industry. The harvesting and processing of camel hides in Northern Africa (Saudi Arabia, Somalia, Sudan and Mauritania) is proportional to the slaughter rates for meat. However, as the skins come from older animals, the leather quality is poor due to scarring and improper processing.
2. Tanning is quite common in Saudi Arabia and Egypt but actual statistics don't exist. The major camel tannery in Saudi Arabia is Al Ahli Leather Factory that processes 250 head per day from which they produce 465 square metres of leather for shoe uppers and leather goods, mainly for the local market.
3. In the ME, camel leather is perceived as being inferior to other leathers and the shoes & sandals made from camel are sold to the less affluent of society.
4. Western uses for camel leather include fashion accessories, luggage, garments and bedcovers.
5. The average skin size of a six-year-old Australian camel ranges between 1.6 and 2.8 square metres. Skin thickness varies from 2.5 mm at the belly to 6 mm at the ridge. Camel leather has a high tensile strength.
6. No grading system has been developed for camel skins. During removal the skins are cut in half along the back ridge and sold for US\$ 5.00 per

half. Skins harvested from feral herds are often badly scarred and are discounted. Domesticated production should improve skin quality, processing and sale value.

7. There is only one tannery in Australia that processes camel hides and this is located in South Australia. The tanning cost for a side of skin is A\$ 40.00 and the leather sells for A\$ 75.00 per square metre. If an average side had an area of 2.2 metres. The value adding from tanning equates to A\$125.00.