



Benchmarks for New Animal Products
Alpaca, Buffalo and
Rabbit Production and
Duck Processing

**A Report for The Rural Industries Research
and Development Corporation July 2001**

By Wondu Holdings

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Foreword

This study is about benchmarks for new animal product industries. It aims to improve the standard of business management in new animal product industries through the derivation of business enterprise benchmarking data at the production and processing levels. It is the second in a planned three-year series of studies covering several new animal product enterprises.

The report provides insights into management practices and processes employed by alpaca, buffalo and rabbit producers. We also examine duck processing, an industry with significant potential both at the local and export market level.

These industries are at an early stage of development and in transition as they adjust to growth and frequently volatile economic conditions. Despite the difficulties facing these industries it is apparent that excellence in farm management and processing practices, coupled with improved marketing and more innovation, can generate profitability and viability. RIRDC's role is to help producers and processors to create more efficient supply chains.

This project was funded from RIRDC Core Funds which are provided by the Federal Government.

This report, a new addition to RIRDC's diverse range of over 700 research publications, forms part of our New Animal Products R&D program, which aims to accelerate the development of viable new animal industries.

Most of our publications are available for viewing, downloading or purchasing online through our website:

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purchases at www.rirdc.gov.au/eshop

Peter Core
Managing Director
Rural Industries Research and Development Corporation

Acknowledgments

This study was conducted with the significant cooperation of alpaca, buffalo, rabbit and duck producers and processors who responded to the survey. In our field visits we obtained valuable insights into commercial practices and the reality of problems and conditions faced by producers and processors. Some producers put significant work into their responses to the survey. The cooperation of some international duck processors is gratefully acknowledged. In addition, we received valuable help from the industry associations.

The Manager of the New Animal Products Sub-Program, Dr Peter McInnes, helped keeping us informed of new developments in the industry .

Preface

There are four parts to this report:

Part A: Alpaca Production Benchmarks

Part B: Buffalo Production Benchmarks

Part C: Duck processing

Part D: Rabbit production

This report follows on from benchmarking studies on emus and ostrich production and processing and an *Inception Report* produced in March 2000 and which describes the design of an effective benchmarking program for the new animal product industries.

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Part A

Alpaca Production Benchmarks

Executive Summary

Market values for traded livestock underpin profitability in the alpaca industry.

Almost 50% of respondents were generating enterprise profits in excess of \$40,000 in 1999-2000.

Marketing and innovation are strengths of the alpaca industry, though there is room for improved feedback from the market about livestock and fibre performance.

This section describes the results of a survey of the work practices, processes and general operating environment faced by alpaca producing enterprises in the year ended June 2000 in Australia and New Zealand. Because the survey sample numbers are small [16] and non-sampling errors large the estimates should be treated with caution. The sample used here is representative of the top 5% of producers in the industry, which we estimate, account for about 50% of stock numbers.

The average farm surveyed had 118 breeders [Hembra] and 170 total alpaca. A couple of relatively large enterprises boosted the average and the median breeder number was 63. Most operators are planning to increase stock numbers over the next 4 years, with the average stock number per enterprise increasing by over 110% to around 360 animals. Most enterprises were concentrated on breeding of livestock for other producers and therefore market values for traded livestock clearly underpin profitability in the industry.

Almost 50% of respondents indicated enterprise profits of \$40,000 or more, indicating the industry is among the more profitable in the new emerging animal industries, but there were significant differences in profitability of the largest 25% of respondents and the smallest 25%. The smallest 25% generated losses. There is broad evidence of economies of scale up to around 100 breeders, though the small number of responses suggests caution in extending the results obtained here to the industry as a whole. The large enterprises tended to be specialist farms with a high level of dependency on their alpaca enterprise for total income. Nearly all respondents rated their enterprises as largely sustainable, both economically and environmentally. One very profitable operator, however, rated their enterprise as 'quite unsustainable' in terms of economic and financial performance with their existing product focus on trade in livestock. Most enterprises were fully owned by the managers and there were only a couple of contract operators, though stud service fees account for a significant part of enterprise income on several farms.

Production systems involved typically extensive pasture based grazing systems with a few operators using feed supplements, but feed supplements typically represented 10% or less of total costs.

The average price received for live females sold was \$10,100 with a significant range from \$50,000 to \$4,000. For males [both entire and castrates] the average price was \$640, ranging from \$2,000 to \$300. The wide range between male and female prices is somewhat typical of the early stages of industry development when there is a shortage of breeding stock. Average fibre prices received were \$24.20/kg for Huacaya Alpaca fibre, the dominant breed, and \$60/kg for Suri Alpaca fibre.

Compared to other new animal industries there is relatively strong emphasis among alpaca enterprises on marketing and innovation. Marketing expenditure accounts for 5-10% of costs and allocated

Widespread interest in fast release strategies suggests the industry is well placed to quickly adopt genetic improvements and better work practices

The average alpaca producer is allocating the equivalent of 36 hours of labour to each animal or 64 hours per breeder.

Labour productivity needs to be improved substantially to less than 5 hours per breeder.

Minimum size operation is probably 50 breeders

labour hours on most farms. Almost all operators have regular checks on quality and guarantee performance of animals sold. The one area of weakness in marketing was in obtaining feedback about market requirements. Most operators indicated feedback about market requirements was infrequent.

Most operators indicated they had a computer less than 2 years old and are connected to the Internet. This asset, combined with a preparedness to introduce change, make full use of research and industry bodies and a general interest in introducing new products and ideas underpins a relatively high innovation score for the industry. A particular strength is the widespread interest (compared to other new animal industries) in the use of fast release strategies, which should, for example, enhance the speed of adoption of genetic improvements and new processing technologies.

Alpaca producers face particular challenges in moving from a growth industry based on livestock trading to one based on the harsher reality of product sales of fibre in a highly competitive global fibre and textile market. At present there is not much information about how prices will respond to increased supply and this is an area for further research. When the inevitable structural adjustment pressure does emerge producers will have the option to:

1. Exit the industry and allocate labour and resources to an alternative enterprise; or
2. Shift the product and marketing focus from sales of livestock to sales of fibre or other product or service; or
3. Adjust work practices, processes and structure; intensify marketing and improving productivity to preserve enterprise viability.

A major area of vulnerability for the alpaca industry is in the productivity of labour. The average survey respondent is allocating the equivalent of 36 hours/animal [inclusive of females and males] and 64 hours/breeder to alpaca activities, with some operators well above these levels. With labour expenses charged at say \$20/hour it is clear that existing work practices can only be sustained with continued sales of livestock at relatively high prices. Labour productivity and growth in productivity are the most critical variables in Australian agriculture and it is an area of significant variation among alpaca enterprises. The average alpaca farm allocated some 3000 hours/year to their alpaca production enterprise, which is equivalent to almost two full-time labour units.

The economic and technical challenge for producers is to get to a minimum sized economic operation of probably 100 active breeders and to achieve production benchmarks of:

- 4 – 5 kg/head of fibre with fibre diameter of less than 22-23 micron.
- Growth in labour productivity of 5-10%/year, aiming to achieve labour productivity of less than 10 hours/breeder
- Continuation of existing good marketing practices, but greater insistence on better feedback from buyers about the performance of product and animals sold.

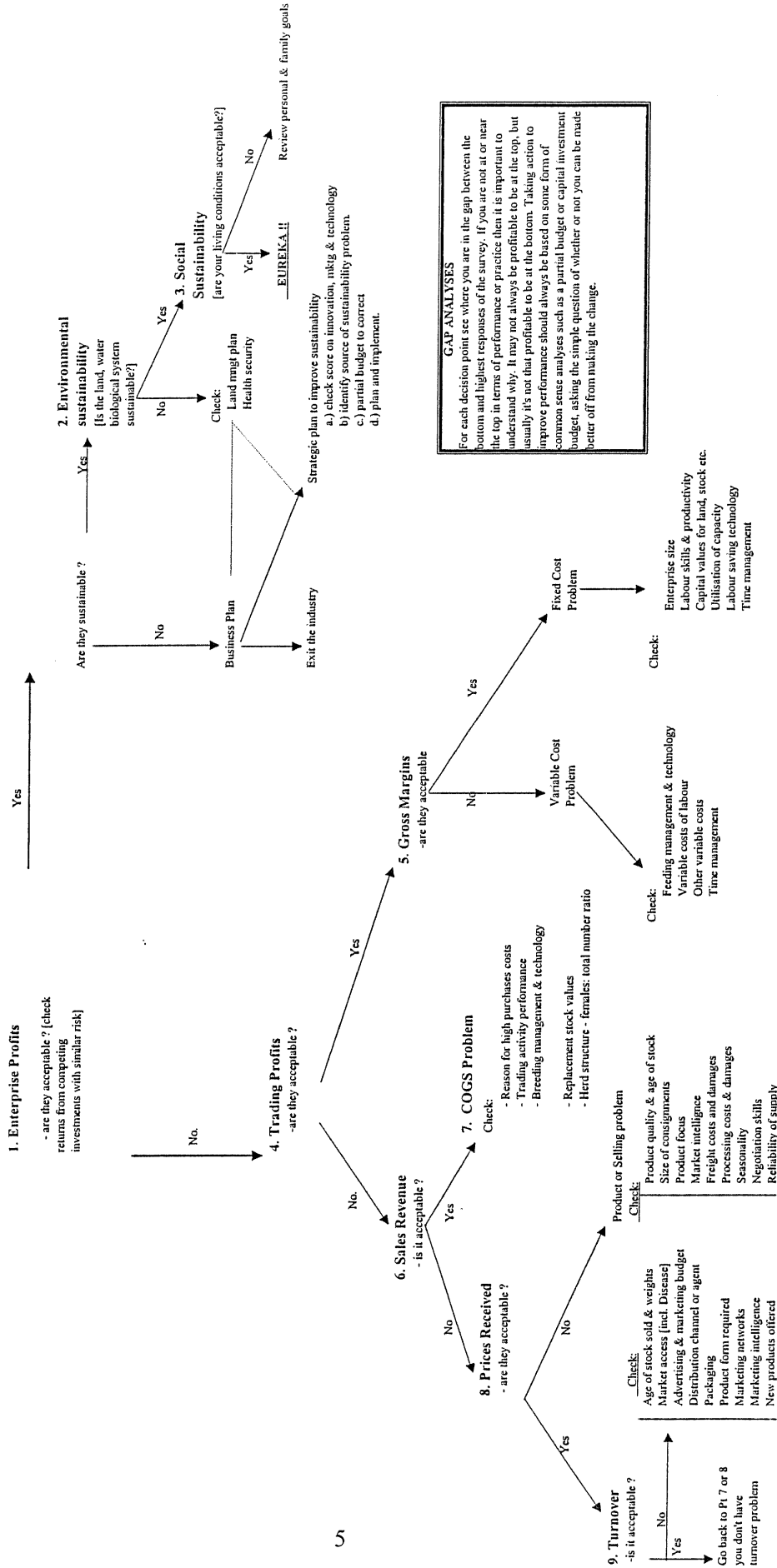
- Introduction or continuation of genetic improvement.

As an aid to the interpretation of benchmarking results and improved decision-making we attach the following framework, which sets out the linkages between profitability, costs and technical and marketing processes as well as sustainability. Respondents may work their way progressively through the framework, recognizing that this is a simplified diagram, not a tool that should be used decisively because individual situations vary significantly. In most cases a business plan should be prepared to respond to specific issues or to prepare a response to gaps in performance.

Simplified decision framework

SIMPLIFIED FRAMEWORK FOR THE INTERPRETATION & MANAGEMENT OF BENCHMARK RESULTS

Copyright



Note: 1 COGS is cost of goods sold or purchases adjusted for stock values.

2 This is a simplified decision making framework. It should not be used to make specific business decisions without full consideration of the unique situation, environment and resources facing a business. Normally, these decisions would be made with the assistance of an accountant or business management advisor.

1. Introduction

This survey of alpaca production enterprises in Australia and New Zealand was designed to give producers some insights into work practices and outcomes and the general operating environment of their industry. The results should be interpreted with more than the normal level of caution as the sampling numbers are small (16 producers) and therefore the sampling error is large and non-sampling errors were also high, reflecting non-response to some questions and the generally undeveloped data collection and business planning systems that exist in the industry. Nevertheless, alpaca enterprises do have better developed information and communication systems than most other new animal industries in Australia and they are therefore well placed to engage in an effective business planning process to improve productivity and perhaps sustain profitability, which is relatively high.

The survey [detailed in Annex A1] covered three basic management practices:

1. Customer management
2. Innovation and capacity to change
3. Production operations management

Responses were most complete for the marketing and innovation practices, which were all of a judgmental or qualitative nature. Responses for production operations were generally incomplete and for this reason not all specific question responses are reported as disclosure may have breached our policy on confidentiality.

The estimated number of alpacas in Australia in 1998-99 was 20,000 (McKinna 1999 – RIRDC Report No. 99/53), rising to 30,000 in 2001 (Australian Alpaca association). Respondents to this survey held about 2,720 alpacas, including 1,888 breeders, which could have accounted for about 11-12% of total alpacas in Australia in that year. Most respondents indicated their intentions to expand production significantly over the next 4 years, by over 110 % on average, suggesting total numbers of around 65,000 in 2005, which could be producing 165,000 kg of fibre.

Australian stock numbers account for less than 1% of the world herd which is around 3.2m head, almost 80% of which are in Peru. In this context expansion plans for the Australian herd would not appear to pose serious medium term problems for the price of alpaca fibre, which is set in a world market, but the impact on livestock prices is a different issue because of the greater influence of local factors. The alpaca is used for a range of purposes including fibre, household pets, guard for the protection of other more vulnerable stock (e.g. Breeding sheep) and as a source of meat. In Australia, meat use is rare and most enterprises remain focused on live animal trading with fibre the ultimate objective.

Respondents to this survey are what might be termed industry leaders, above average in size and probably more typical of what the whole industry could look like in another 10-15 years. The average herd of respondents was 170, including 118 breeders, which is substantially higher than the all industry average, which could be around 12-15 breeders. The survey respondents are representative of a top group comprising about 70 alpaca producers who, we estimate, could account for about 12,000 alpacas, equivalent to almost 50% of total Australian stock numbers in 1999-2000. This group, equivalent to about 5% of enterprises, accounts for 50% of production and probably an even larger share of industry profits.

Annex A3 contains the summary statistics for each of the survey questions, which are presented according to standard distribution metrics including the average, high, low, mode and median response.

The distinguishing feature of the alpaca industry is the dominant role of livestock trading and associated stud service fees in profits. Product sales of fibre and meat represent a small, though growing share of alpaca enterprise income. This product focus reflects the continuation of relatively

high livestock prices (the average female sold by respondents in 1999-2000 realized \$10,083) as the industry continues to grow through natural increases from a relatively low base. Import restrictions further underpin supply constraints.

2. Marketing Management

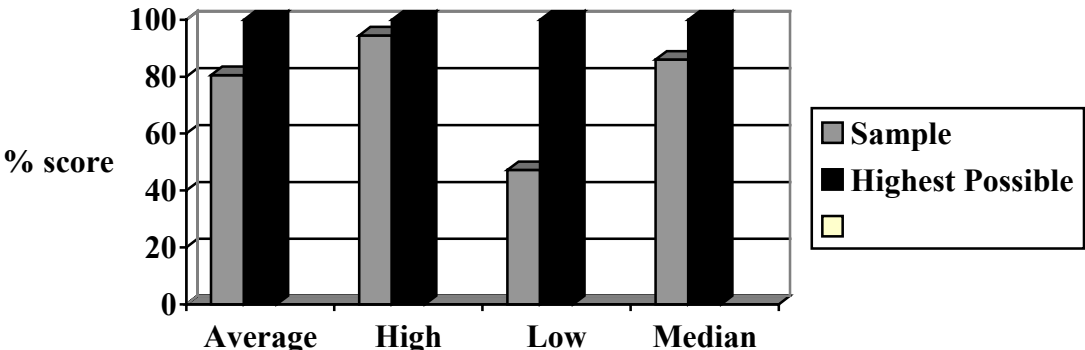
Compared to other new animal industries the alpaca industry has a very strong and widespread emphasis on marketing with most respondents allocating 5-10% of total expenditure and more than 10% of labour hours to marketing. Enterprises with low overall labour productivity (that is, high hours/breeder) tended to have a relatively high allocation of labour to marketing, but this was not universal and a couple of enterprises had a high allocation of labour to marketing and high productivity of labour. This produced high profitability. The indicative 10% of hours to marketing implies an average of about 12 hours/breeder on marketing, equivalent to almost 1400 hours for an enterprise with 118 breeders. This is close to one full-time labour unit. A question that will become increasingly relevant to alpaca producers is whether or not marketing functions should be undertaken internally or outsourced through, for example, wool and livestock brokers or other specialized marketing agents and advisors.

The average aggregated marketing emphasis score for alpaca operators was about 80% out of a maximum possible of 100% and that's well above most other new animal industries that we have examined. These scores are based on aggregation of a directional series of multiple-choice questions about various customer management practices undertaken by producers¹.

The strong marketing emphasis in the industry translates into significant strengths in the form of a low and almost universal defect rate of less than 1% and the willingness of operators to provide a performance guarantee. There was only one firm not providing a performance guarantee.

The main marketing weakness of the alpaca enterprises is lack of feedback from buyers about product and livestock performance. This is a traditional problem in Australian agriculture and often attributed to the presence of statutory marketing arrangements (which don't exist in the Australian alpaca industry) or lack of skills in marketing or concentration of ownership in the processing and broking functions. The problem may become more serious with increased emphasis on fibre sales for revenue and this is, therefore, an area for further attention in the industry. One option would be to initiate a supply chain study to examine in detail and improve the logistics through which information is passed back and forth along the supply chain.

Chart A1: Marketing Emphasis in Australian Alpaca Industry



¹ See Annex A2, Measurement Method Notes for more detailed description of assessment method.

3. Innovation

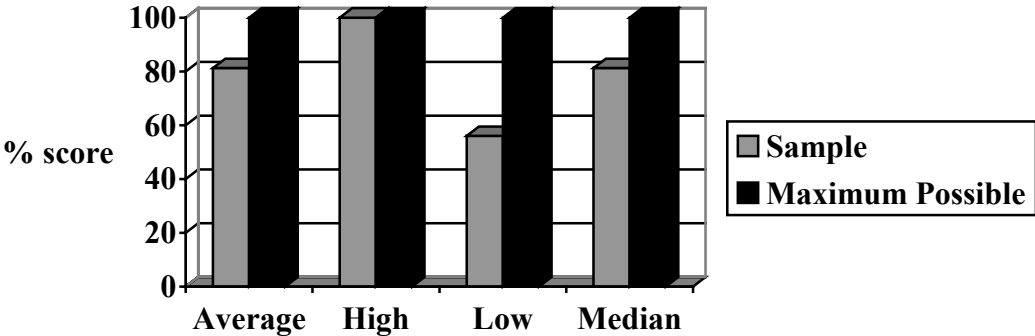
Innovation is gaining increasing recognition as an essential attribute of firms with a sustainable future in any industry, but more particularly in agriculture and with new industries where capacity to adjust and adopt new and improved work practices and introduce new products and genetics is essential.

As it is with marketing the alpaca industry scores highly in regard to innovation and preparedness to change and adopt improvements.

The average aggregated innovation score was around over 80% and 2 operators had scores of 100%, which is the highest level of innovation for all new animal industries that we have surveyed. These businesses introduced more than 10 new ideas over the year to alter significantly the way they operate their alpaca businesses. The focus for change for one business was on sales and marketing and product development and for the other it was on feed and nutrition. Both of these firms also had very high labour productivity, high marketing scores and high profits. It is of some interest that there was only one respondent out of 16 that indicated feed and nutrition was a focal point for change. Feed supplementation and nutrition management is not widely practiced in the alpaca industry and it is an area for improvement particularly in terms of improved fibre yields and prices for fibre, which are likely to reward fibre strength.

Innovative operators are regularly introducing change to their operation, particularly in the area of improving or introducing new and improved strains of livestock and products. These operators actively seek leadership of technological advances such as fast release of new products and new livestock strains and they consistently make use of suppliers, customers and research to achieve this.

Chart A2: Innovation in the Australian Alpaca Industry



4. Production Operations Management

Most respondents run an owner-managed enterprise based on extensive use of pastures with minimal feed supplementation. Feed supplements typically account for less than 10% of total expenditure. Stud service fees are also an important source of revenue for large enterprises.

The average farm surveyed had 118 breeding females, 14 fertile males and 38 followers for a total of 170 head. Plans for expansion were widespread, but smaller operators are planning to expand their numbers by over 300% over the next 4 years compared to around 100% for the large operators.

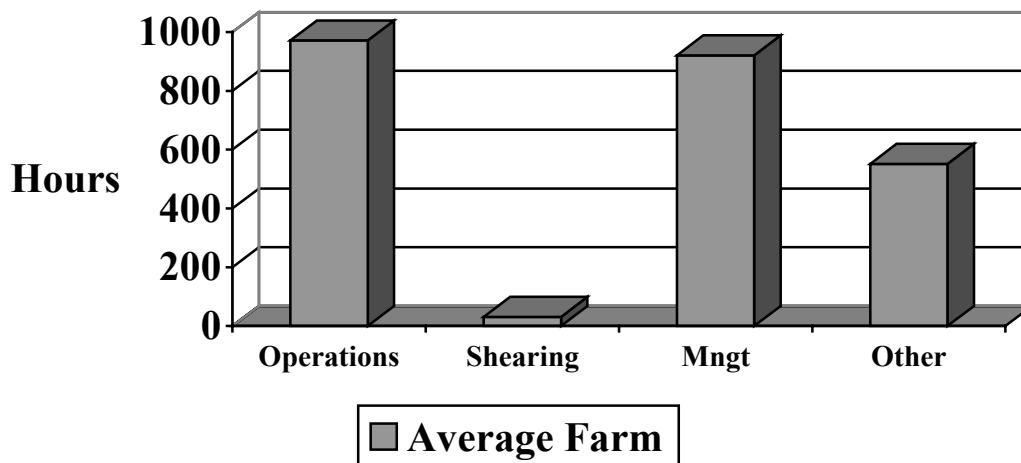
Most operators reported profits, and 44% of operators reported profits of more than \$40,000, though 20% also reported a loss for the 1999-2000 year. All firms with above average stock numbers also reported the highest profits of \$40,000 or more. All firms that reported losses had stock numbers below average and below the median number of 60 breeders. Although the numbers are small, these statistics suggest economies of scale exist, perhaps up to around 100 breeders, maybe more.

The average price received for live females sold was \$10,100 with a significant range from \$50,000 to \$4,000. For males the average price was \$640, ranging from \$2,000 to \$300. Average fibre prices received were \$24.20/kg for Huacaya Alpaca fibre, the dominant breed, and \$60/kg for Suri Alpaca fibre.

In regard to animal production the average alpaca live-weight was 61 kg; produced a fleece with weight of 2.5 kg, fibre length of 91 mm and diameter of 24 micron. There were 12 females/male at mating and death rates were near zero. Annual veterinary costs were around \$40/animal.

Labour productivity reflects work practices and structure of the enterprise. Most labour hours for the average enterprise were allocated to breeding and general farm operations (31% of total hours allocated), closely followed by management (30%) and other (17%), the latter including marketing and administration.

Chart A3: Allocation of Labour in Australian Alpaca Production: Average Enterprise

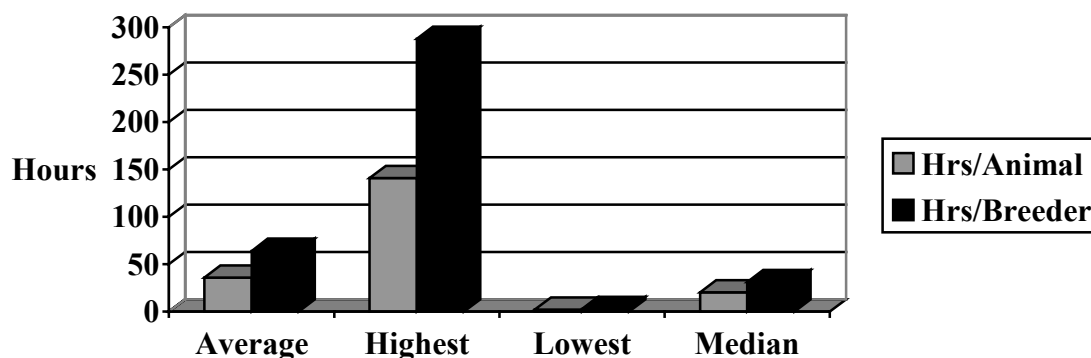


The productivity of labour is an area of major importance to all agricultural enterprises, livestock in particular which tends to be more labour intensive than cropping. From the responses we estimate a couple of partial indicators of labour productivity: hours/per total animal and hours/breeder. These two indicators are highly correlated. We found significant variation in labour productivity, ranging from a low of 2.6 hours/breeder to over 200 hours, with a median of 31 hours.

More generally, though not always, the larger enterprises had higher productivity of labour. The largest four firms were allocating about 14 hours/breeder compared to over 50 hours/breeder for the smallest four firms. Labour productivity appears then to be an important source of economies of scale. The survey did not examine in detail the actual work practices that underpin these differences in productivity. The percentages of costs allocated to marketing and operations were generally similar across small and large enterprises. There was a significant difference between the largest and smallest four enterprises in their percentage of total income derived from the alpaca enterprise, with the largest firms deriving almost 70% of their income from the alpaca enterprise compared with 20% for the smallest four firms. The very large enterprises derive 100% of their income from alpacas.

A useful target for producers would be to aim to improve the productivity of their labour by 5-10%/year with a view to reaching 10-14 hrs/breeder unit. Regular improvements in labour productivity would enhance capacity to deal with a downturn in livestock prices, but clearly improvements in labour productivity should also be

Chart A4: Labour Productivity in Alpaca Production



accompanied by improvements in fibre yields, quality and prices received for fibre. The ultimate aim is to improve total productivity and prices received. Some of the practices that could be examined in improvement of labour productivity include:

- 1.) **Better time management.** Record and question and analyse every labour using activity; consider doing a time management training course;
- 2.) **Labour saving paddock and yard designs.**
- 3.) **Improve technical performance of animals.** Increased animal growth rates and fleece weights and supplementary feeding may help. Improved genetics also has potential.
- 4.) **Whole-farm planning and management.** A major challenge in productivity improvement is that there is no single or one-off action that works. Instead, high productivity comes from systematic attention to every single work practice in each and every year.

Annex A1: Questionnaire

Survey Of Alpaca Production Practices & Outcomes [Year Ended 30/06/00]

1 Preliminary Details

1.1 Industry and Enterprise Details

Industry	<u>Alpaca Production</u>
What percentage of your income comes from your alpaca enterprise?	<u> %</u>

1.2 Enterprise Size

Animal Type	Present Stock Numbers
Number of breeding females	
Number of fertile males	
Number of others	
Total animals	

1.3 Breeder Group [Tick one or the main group on your farm]

Animal Breed Type	
Suri Alpaca	
Huacaya alpaca	
Huacaya and Suri Crossbred	
Llama	

1.4 Data Collection & Analyses Methods

Method of Recording	
No records kept	
Hand written cash book	
Computerised cash records	
Hand written stock breeding & production records	
Computerised stock breeding & production records	

Marketing and Sales

Please tick the box that best describes your answer to the question.

2.1 What percentage of your budgeted alpaca expenditure is spent on marketing and sales? ²	Less than 1% <input type="checkbox"/>	1% to 5% <input type="checkbox"/>	5% to 10% <input type="checkbox"/>	More than 10% <input type="checkbox"/>
2.2 What percentage of labour hours spent on alpaca are spent on marketing and sales?	Less than 1% <input type="checkbox"/>	1% to 5% <input type="checkbox"/>	5% to 10% <input type="checkbox"/>	More than 10% <input type="checkbox"/>
2.3 What level of feedback do you get about market requirements and the performance of your products	None <input type="checkbox"/>	Infrequent feedback <input type="checkbox"/>	Regular feedback <input type="checkbox"/>	Comprehensive part of business <input type="checkbox"/>
2.4 How often do you check the quality of the products you sell? ³	Never <input type="checkbox"/>	Have once <input type="checkbox"/>	Occasional <input type="checkbox"/>	Always <input type="checkbox"/>
2.5 What is the rate of product return or defect % for alpaca deliveries? ⁴	More than 10% <input type="checkbox"/>	5% to 10% <input type="checkbox"/>	1% to 5% <input type="checkbox"/>	Less than 1% <input type="checkbox"/>
2.6 Do you provide performance guarantees?	Never <input type="checkbox"/>	Have once <input type="checkbox"/>	Occasional <input type="checkbox"/>	Always <input type="checkbox"/>
2.7 How often do you attend industry functions or trade fairs, field days or seminars or fairs?	Never <input type="checkbox"/>	Once per year <input type="checkbox"/>	2-5 times per year <input type="checkbox"/>	More than 5 times per year <input type="checkbox"/>
2.8 Do you spend time or money to improve marketing and selling skills?	Never <input type="checkbox"/>	Have once <input type="checkbox"/>	Occasional <input type="checkbox"/>	Always <input type="checkbox"/>
2.9 How do you negotiate prices and selling conditions for your products	No negotiation. The buyers know the price and that's final. <input type="checkbox"/>	Have once negotiated a different price to that which was first offered <input type="checkbox"/>	Occasionally, but not always do we do some negotiation. <input type="checkbox"/>	Always <input type="checkbox"/>

² Includes brokerage commission, advertising and promotion

³ Quality checks are checks of the product for defects

⁴ Defect rate is the % of animals or their products that are returned to you or classed as defective

3. Innovation and Capacity to Change

Definition: A “*Change Project*” is any planned program or set of activities you have designed to alter fundamentally the way you do business. For instance changes to the way you market your animals or products or changes to the size of your operation or a switch from selling live animals to selling products (eg fleece) from those animals.

Please tick the box that best describes your answer to the question.

3.1 How many new ideas have you introduced in the past 12 months to improve performance?	None <input type="checkbox"/>	1 to 5 <input type="checkbox"/>	5 to 10 <input type="checkbox"/>	More than 10 <input type="checkbox"/>
3.2 What is the main focus of the new ideas you are introducing to your business?	Product development <input type="checkbox"/>	Sales and marketing <input type="checkbox"/>	Feeding and nutrition <input type="checkbox"/>	Knowledge and skills <input type="checkbox"/>
	New breeding technique <input type="checkbox"/>	Data recording <input type="checkbox"/>	Building or infrastructure improvement <input type="checkbox"/>	Other <input type="checkbox"/>
3.3 What is the main reason you are changing your business?	To reduce costs <input type="checkbox"/>	To better satisfy our customers <input type="checkbox"/>	To grow the business <input type="checkbox"/>	Other matters <input type="checkbox"/>
3.4 Do you employ fast release strategies to speed up development and release of new strains of livestock, new products or new customer service strategies	No. There is a natural livestock and products development <input type="checkbox"/>	Sometimes. We imitate the innovators <input type="checkbox"/>	Frequently. We see the advantage of being a leader in this area <input type="checkbox"/>	Always. We seek leadership in the development of new products <input type="checkbox"/>
3.5 Do you make use of industry bodies, suppliers, research scientists and customers to get new product ideas	Never <input type="checkbox"/>	Have once <input type="checkbox"/>	Occasionally <input type="checkbox"/>	Always <input type="checkbox"/>
3.6 To what extent do you introduce new information and communication technology?	We do not have a computer & are not on the Internet <input type="checkbox"/>	We have a computer but are not on the Internet <input type="checkbox"/>	We have a computer at least 2 years old and are on the Internet <input type="checkbox"/>	We have a computer that is less than 2 years old and are on the Internet <input type="checkbox"/>

4. Farming Operations Management

This section of the survey covers operations and associated costs and revenue.

4.1. Enterprise Structure

The farming system we use is best described as	Intensive feeding system <input type="checkbox"/>	Extensive with some feed supplements <input type="checkbox"/>	Fully extensive, no supplements <input type="checkbox"/>	Other. Please detail
The enterprise structure is best described as	Traditional production – we sell the animals/fibre to traders <input type="checkbox"/>	Integrated From breeding to finished product <input type="checkbox"/>	Mainly breeding of livestock for other producers. <input type="checkbox"/>	Processing of finished product <input type="checkbox"/>
Our management structure is mainly	We own and manage all animals <input type="checkbox"/>	We own animals & an independent company manages them <input type="checkbox"/>	We are a management company <input type="checkbox"/>	Other <input type="checkbox"/>
The main product focus is on	Fibre <input type="checkbox"/>	Live animals <input type="checkbox"/>	Other. Please specify <input type="checkbox"/>	

4.2. Profitability

Trading Profit.

Please enter the names of the products/animals that you sell, the units that you sell it in and the prices received per animal or other product

Product type (e.g. fibre, animal)	Prices received (dollars \$/per unit)	Trading Profit
Product 1	\$ /	\$
Product 2	\$ /	\$
Product 3	\$ /	\$
Product 4	\$ /	\$

NOTE: Trading profit is your livestock trading profit amount. The data from your taxation return should have this information.

4.2.1. Net Profit.

What is your net profit for the alpaca enterprise after deducting all costs for the financial year 1999-2000?

Realised a loss	\$0-\$5,000	\$5,000-\$20,000	\$20,000-\$40,000	Greater than \$40,000
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2.2. Stock Numbers

What are your stock numbers now and how do you project them for the next five years

Animal Type	2000	2001	2002	2003	2004
Breeding females					
Fertile males					
Other					
Total	0	0	0	0	0

4.2.3. Technical Parameters

Parameter	Your animals
Average Alpaca weight [kilos]	kilos
Typical Fibre colours [white/fawn/brown/black/grey]	colours
Average annual fleece weight [kilos]	kilos
Average fibre length [mm]	mm
Average fibre diameter [microns]	microns
Percentage of flock sheared [%]	%
Ratio of fertile males to 10 females at mating	: 10
Average time between birth and next mating of female[days]	days
Adult death rate [% of flock]	%
Juvenile death rate [% animals born alive that die within 6 months of age]	%

4.2.4. Feed and Nutrition

Animals	Feed costs/ per kilogram	Average kilograms of feed per day	Total feed costs
Breeding females	\$ /kg	/day	\$0
Fertile males	\$ /kg	/day	\$0
Other	\$ /kg	/day	\$0
Total	\$ /kg	/day	\$0

Thinking about your feeding practices, answer the following questions by ticking the box that best describes your situation:

(a.) On average, how much do you feed your alpacas each day?

Less than 350 grams	350-450 grams	450-550 grams	More than 550 grams
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b.) What is the average cost of feed used in your enterprise?

Less than \$0.10/kg	\$0.10-\$0.15/kg	\$0.15-\$0.20/kg	\$0.20-\$0.25/kg	More than \$0.25/kg
<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(c.) What percentage of total costs does feed represent?

4.2.5. Veterinary and health

(a.) Do you have an animal health security strategy to prevent the introduction of diseases to the farm?

	No	Occasional inspections are carried out	We check most potential diseases	We have a systematic program to control disease
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b.) Do you monitor animal growth?

	No	Occasionally	Regularly	Systematic weighing and monitoring program
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(c.) What are your annual costs of veterinary (e.g. vaccination medication) \$ /per animal \$ /annum

4.2.6. Labour

(a.) Please assist us to estimate the number of hours taken to complete various production activities. For example, you may require one person for 3 hours a day to complete the feeding function. This will be entered as 1 person in column 1 and 365*3=1095 hours in column 2. Enter the labour costs per hour for this function in column 3. If you are an owner/manager, please indicate the labour cost per hour at which you value your time.

Function	Number of people employed	Hours worked per person per annum	Labour costs per hour	Total labour costs per annum
Breeding and raising			\$	\$0
Shearing			\$	\$0
Yarn Production			\$	\$0
Management			\$	\$0
Other			\$	\$0
Total	0.00	0		\$0

(b.) What percentage of total costs does labour represent? %

4.2.7. Revenue

(a.) What is the expected average annual growth in revenue for your enterprise over the next 10 years?

	We are winding down	0-10%	10%-20%	More than 20%
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

(b.) What is the expected average annual growth in your enterprise costs over the next 10 years?

	We are winding down	0-10%	10%-20%	More than 20%
	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

4.2.8. Overall Sustainability

How sustainable are your existing management practices in terms of their long-term impact on your land, water and biodiversity resources ?	Quite unsustainable <input type="checkbox"/>	We have some concerns <input type="checkbox"/>	Not in a position to judge <input type="checkbox"/>	Largely sustainable <input type="checkbox"/>	Fully sustainable <input type="checkbox"/>
--	---	---	--	---	---

How sustainable are your existing management practices in terms of their long-term impact on your economic and financial position?	Quite unsustainable <input type="checkbox"/>	We have some concerns <input type="checkbox"/>	Not in a position to judge <input type="checkbox"/>	Largely sustainable <input type="checkbox"/>	Fully sustainable <input type="checkbox"/>
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Annex A2: Notes on Methodology

The data analyzed and the conclusions reached are based on a small sample size of 16 responses, including 1 from NZ. The sample size in such surveys is always a limiting factor and may unduly influence results. In addition, the responses received are subject to significant non-sampling errors. Only 2 or 3 producers were able to respond fully to the questionnaire. Only a couple of producers had knowledge of trading profit. Several producers had no idea of labour used in their alpaca enterprise, suggesting planning and managerial control in the industry is limited, particularly where herd sizes are small. The largest producers, however, keep computerized stockbreeding and production records and cash. Non-sampling errors are therefore relatively lower with large producers.

1. Table 1: Marketing

The accumulated responses are based on the simple sum of the scores for multiple choices in Section 2 of the survey. This approach assumes equal weighting for each of the 9 questions, with a maximum score of 36 indicating a very significant emphasis on marketing activities. Multiple choice answers were structured in order of the priority that the alpaca operator gave the issue/practice and answers were given a score of 1-4.

For example: Questions 1&2 in the Customer Management Section asked your expenditure of time/money on marketing and provided four multiple-choice answers

- | | |
|-------------------|-----------------|
| (1) less than 1% | Focus Score = 1 |
| (2) 1 – 5% | Focus Score = 2 |
| (3) 5 – 10% | Focus Score = 3 |
| (4) more than 10% | Focus Score = 4 |

Please note that the score reflects the degree of emphasis and direction of resource allocation and there are no implications regarding competence or ability or validity.

2. Table 2. Innovation and Change – this is based again on a series of multiple choice questions regarding the number of change projects introduced, fast release strategies, use of suppliers and introduction of new information and communication technology. A maximum score of 16 is possible. Again, this approach assumes equal weighting for each of 4 questions, with a maximum score of 16 indicating a very significant emphasis on innovation and change.

Chart 2 shows the aggregated response to questions 3.1, 3.4, 3.5 and 3.6 only of Section 3 of the survey.

3. Statistical Descriptions

a. Average or arithmetic mean ... the sum of the numbers included in the particular sample set of data, divided by the number of observations in the particular sample set.

b. Mode ... this is the most frequently observed value of measurements in the particular sample set.

c. Median ... this is the middle value or the value that divides the set of observations in half, 50 percent of measurements being above (or equal to) and 50 percent being below (or equal) to it.

Annex A3: Detailed Statistical Tables

ACTIVITY		Average	High	Low	Mode	Median	
GENERAL	Percentage of income from enterprise	35%	100%	1%	100%	20%	
	Size	Number of breeding females	118	591	27		63
		Number of fertile males	14	58	2		6
		Number of others	38	100	3		26
Total animals		170	697	50		85	
Breed Type	Type				Huacaya alpaca		
	Data Collection		Computer stock breeding and production records	Computer cash records	Computer stock breeding & production records	Computer stock breeding & production records	
MARKETING	Percentage of costs on sales and marketing	More than 10%	More than 10%	Less than 1%	From 5% to 10%	From 5% to 10%	
	Percentage of labour on sales and marketing	From 5% to 10%	More than 10%	Less than 1%	More than 10%	From 5% to 10%	
	Feedback level on market requirements	Regular feedback	Comprehensive part of the business	No feedback	Infrequent feedback	Infrequent feedback	
	Quality check regularity	Always	Always	Never check quality	Always	Always	
	Defect rate %	Less than 1%	Less than 1%	1% to 5%	Less than 1%	Less than 1%	
	Provision of performance guarantees	Always guarantee	Always guarantee	Never guarantee	Always guarantee	Always guarantee	
	Attendance at industry, trade fairs, field days, seminar events	More than 5 times/year	More than 5 times/year	From 2-5 times/year	More than 5 times/year	More than 5 times/year	
	Expenditure to improve marketing and selling skills	Occasionally spend money on this	Always spending money on this	Never spend money on this	Occasionally spend money on this	Occasionally spend money on this	
	Negotiation of selling conditions	Occasionally, but not always	Always negotiate conditions	No negotiations, buyers know the price	Occasionally, but not always	Occasionally, but not always	
	MARKETING SCORE	29	34	17	31	31	
INNOVATION	Number of change projects	1 to 5 change projects in the past 12 months	more than 10 change projects	No changes made	1 to 5 change projects	1 to 5 change projects	
	Focus of change projects				Sales and marketing changes		

ANNEX A3 [Continued]						
INNOVATION		Average	High	Low	Mode	Median
	Reason for change				To help grow our alpaca business	
	Employment of fast release strategies	Frequently	Always, we seek to be the leader	Sometimes, but we tend to imitate the innovators	Always, we seek to be the leader	Frequently
	Use of industry bodies	Occasionally make use	Always make use	Never	Occasionally make use	Occasionally make use
	New information and communication technology	Computer less than 2 years old and are on the Internet	Computer less than 2 years old & on Internet	Computer, but are not on the Internet	Computer less than 2 years old & on Internet	Computer less than 2 years old & on Internet
	TOTAL INNOVATION SCORE	13	16	9	13	13
PRODUCTION	Farming System				Extensive system, with some feed supplements	
	Enterprise Structure				Mainly breeding of livestock for other producers	
	Management Structure				We own and manage all animals	
	Product Focus				Live animals	
PROFIT	Price Live Female Animal [\$/head]	10,083.33	50,000.00	4,000.00	8,000	7,000.00
	Price Live Male Animal [\$/head]	642.86	2000.00	300	300	400.00
	Price Stud Service Fee [\$/head]	800	1000	500	1000	850.00
	Fibre-Suri Alpaca [\$/kg]	60.00				60.00
	Fibre-Huacaya alpaca [\$/kg]	24.20	35	10		25.00
	Total Trading Profit [\$]	87,800.00	228,500.00	23,000.00		50,000.00
	Total Net Profit	\$5,000-\$20,000	Greater than \$40,000	Realized a loss	Greater than \$40,000	\$20,000

ANNEX A3: [Continued]

	Average	High	Low	Mode	Median
STOCK NUMBERS					
Breeding Females 2000	117	591	24		60
Breeding Females 2001	144	700	27		65
Breeding Females 2002	172	800	25		90
Breeding Females 2003	210	900	20		130
Breeding Females 2004	250	1000	20		195
Fertile Males 2000	11	50	2		6
Fertile Males 2001	12	50	2		7
Fertile Males 2002	16	73	3		7
Fertile Males 2003	19	100	3		7
Fertile Males 2004	21	100	4		10
Total 2000	168	697	44		85
Total 2001	204	810	47		106
Total 2002	248	920	47		136
Total 2003	302	1020	36		198
Total 2004	356	1120	44		295
TECHNICAL					
Average alpaca live-weight [kilos]	61	70	45	65	64
Typical fibre colours [white/fawn/brown/black/grey]				White	
Average annual fleece weight [kgs]	2.50	3.50	1.40	3.00	2.10
Average fibre length [mm]	91	100	75	100	93
Average fibre diameter [microns]	24	27	21	25	25
Percentage of flock sheared [%]	96	100%	80%	100%	100%
No. of females/male at mating	12	30	4	10	10
Average time between birth and next mating of female [days]	42	365	14	14	21
Adult death rate [%]	0	2	0	0	0
Juvenile death rate [%]	0	3	0	0	0
FEED					
Feed for Breeding Females					
- Feed cost per kg	\$0.35	\$0.50	\$0.14		\$0.18
- Feed consumption [kgs/day/animal]	0.78	1.50	0.25		0.69
- Total Feed Costs [\$A]	\$4,082.41	\$9,125.00	\$1,000.00		\$2,069.55
Feed for Fertile males					
- Feed cost per kg	\$0.35	\$0.50	\$0.14		\$0.38
- Feed consumption [kgs/day/animal]	0.70	1.30	0.25		0.63
- Total Feed Costs [\$A]	\$472.56	\$985.50	\$266.00		\$319.38
Feed for Other					
- Feed cost per kg	\$0.28	\$0.50	\$0.14		\$0.20
- Feed consumption [kgs/day/animal]	0.60	1.30	0.25		0.25
- Total Feed Costs [\$A]	\$2,135.08	\$4,562.00	\$182.50		\$1,660.75
Feed Total					
- Feed cost per kg	\$0.38	\$0.50	\$0.25		\$0.40
- Feed consumption [kgs/day/animal]	0.37	0.50	0.02		0.44
- Enterprise Feed Costs	\$4,343.57	\$14,052	\$0.00		\$3,995.75

ANNEX A3: [Continued]

		Average	High	Low	Mode	Median
FEED	Total feed as % of total costs	10.05%	50.00%	0.00%	0.00%	5.60%
VETERINARY	Animal health security strategy	Systematic program to control diseases	Systematic program to control diseases	None		Systematic program to control diseases
	Monitor animal growth	Regularly monitor growth	Systematic weighing and monitoring program	Occasional monitoring animal growth		Regularly monitor growth
	Vet. costs per animal/pa	\$40.29	\$100.00	\$0.00		\$36.00
	Total veterinary costs/year	\$3,820	\$9,900	\$720		\$3,000
LABOUR	Employees in Operations	1	3	1		1
	Employees in Shearing	3	5	1		3
	Employees in yarn production		2			
	Employees in Management	1	2	1		1
	Employees in other	2	2	1		2
	Total Employees	7	11	3		7
	Hours pp/pa in Operations	972	2288	24		850
	Hours pp/pa in Shearing	31	112	10		21
	Hours pp/pa in yarn production		60			
	Hours pp/pa in Management	921	2288	60		730
	Hours pp/pa in Other	522	1460	8		300
	Total hours/enterprise	3087	10284	192		2375
	Labour costs/hr-operations	\$15.41	\$48.00	\$10.00		\$12.00
	Labour costs/hr shearing	\$26.04	\$90.00	\$10.00		\$16.00
	Labour costs/hr yarn	\$31.50	\$48.00			
	Labour costs/hr - mngt	\$22.55	\$50.00	\$10.00		\$15.00
	Labour costs per hr in Other	\$19.86		\$10.00		\$15.00
	Total Enterprise Labour Costs					
	Operations	\$23,203	\$45,000	\$2,330		\$22,470
	Shearing	\$1,580	\$3,600	\$400	3600	\$1,260
	Yarn production		\$1,920			
	Management	\$21,159	\$48,000	\$1,680		\$14,400
	Other	\$20,310	\$57,600	\$1,830		\$15,600
	Total for Alpaca Enterprise	\$45,432	\$134,160	n.a.		\$33,250
	Labour as % of total costs	57.22%	90.00%	15.00%	90%	50.00%
	Labour hours per animal	35.75	140.88	2.00		20.38
	Labour hours per breeder	64.38	277.95	2.59		31.12
REVENUE	Expected annual revenue growth over next 10 yrs	From 10-20%/year	More than 20%/year	From 0-10%/year	More than 20%/year	From 10-20%/year
	Expected annual cost growth over 10 yrs	From 10-20%/year	More than 20%/year	From 0-10%/year	From 0-10%/year	From 10-20%/year
	Environmental sustainability	Largely sustainable	Fully sustainable	Some concerns	Largely sustainable	Largely sustainable
	Economic Sustainability	Largely sustainable	Fully sustainable	Quite unsustainable	Largely sustainable	Largely sustainable

Part B

Buffalo Production Benchmarks

Executive Summary

This section describes the results of a survey of the work practices, processes and general operating environment faced by buffalo producing enterprises in the year ended June 2000 in Australia. Because the survey numbers are small (13 responses) and non-sampling errors large the estimates should be treated with caution.

Enterprise profitability was typically low at zero to \$5,000, but buffalo operators rely mainly on other income for viability. One operator demonstrated that good profits can be achieved and are sustainable.

The median buffalo enterprise surveyed had 28 breeding females, running with 2 bulls and 24 follower animals for slaughter and replacements of breeders. There is, however, significant variation around the median with some responses from the Northern Territory approaching 1300 head. All enterprises were self replacing herds involving breeding and growing out to about 2 years of age when they were slaughtered at a live-weight of 450 kg, which sold for about \$1.20/kg. The median yield of carcass meat was 50%, but the largest and most profitable operator achieved 60% from animals with live-weights less than 400 kg at 18 months of age.

Production systems are all extensively managed and supplementary feeding is rare or non-existent. The product focus is on meat and live animals, with one operator emphasizing dairy products. All businesses were fully owned by the managers and there was no evidence of contract growing.

The operator views on their long-term financial situation varied from fully sustainable to having some concerns. All respondents considered the enterprise to be environmentally sustainable. The highest reported net profit for 1999-2000 was over \$40,000, but the median was \$0-5000. **Most businesses running buffalo relied on other income** to support the buffalo enterprise, which typically accounted for no more than 5% of total business income.

Accounting for 70% of total costs labour is a key factor in enterprise profit and productivity of labour is a key performance indicator for a buffalo enterprise. Most small enterprises need to substantially improve the productivity of their labour.

In 1999-2000 there was still an overhang from the 1998-99 Asian economic crisis which had an adverse impact on product prices received and, consequently, on overall profitability in that year. Recent increases in beef prices are having a positive effect on buffalo meat and enterprise profitability. However, the *variation* in sustainability amongst different buffalo producers can be partly explained through enterprise size and their differing attention to marketing, innovation and particularly, to labour management.

Labour costs accounted for about 70% of total costs, but there was significant variability in the number of hours spent managing and handling animals. **Labour productivity averaged over 8hrs/animal year, but varied from 0.5 hours to over 20 hours/animal/year.** With labour valued at about \$18/hour it is clear that those firms with high productivity are well placed to create viable buffalo enterprises, while those with low productivity will find it difficult to survive with anything other than relatively high meat, hide or live animal prices. Alternatively, these enterprises need to consider focusing on higher valued added products, such as dairy, where relatively high product prices are achievable. Northern Territory enterprises feature relatively large herd sizes and achieve high levels of labour productivity of 1 hr/animal/year or less.

Labour productivity depends on work practices, structure and size. It also requires a basic understanding that labour hours including owner operator labour has an opportunity, if not cash, cost to it.

Customer and supplier feedback is important to maintain a high understanding of what markets want and will pay.

Improved data collection and information management will improve work practices.

The most profitable operations allocate few resources to marketing (often less than 1% of costs), but they do get good feedback on market requirements and tend to put quite a bit of effort into quality control and negotiation of acceptable prices from traders who undertake the marketing activities. They also tend to make regular checks on quality. Marketing is a major problem for southern buffalo enterprises, which suffer from a unique confluence of negative forces arising from poor work practices, small size, distance from live export markets and 'old technology' breeding practices.

Buffalo operators are not that innovative and this poses problems for early and widespread adoption of genetic improvements and improved work practices. Innovation differentiates producers and enables them to achieve higher labour productivity, to access markets and secure better prices. The most profitable operators made use of industry bodies, suppliers, research scientists and customers to get new ideas and marketing information.

Labour productivity and growth in productivity are the most critical performance indicators in Australian agriculture and it is an area of significant variation among buffalo enterprises. While productivity generally increases with the size of the enterprise, there was still significant variation in productivity amongst operations of the same size.

The economic challenge for buffalo producers is to get to a minimum sized economic operation of probably at least 100 active breeders and to achieve production benchmarks of:

- Labour at less than 1 hour/animal/year.
- Calving rates in excess of 90%.
- 0-1% death rates
- Live-weights in excess of 450 kgs at less than 2 years of age with dressed yields of 55% or more.
- Either spending money on marketing or making extensive contact and use of people with marketing skills and then driving a hard bargain on prices.

All producers reported defect or reject rates of less than 1%.

Variability in **animal health security is an area for improvement** with only one producer having a systematic health security programme. Several producers need to substantially improve their data collection, storage and retrieval facilities. These producers lack basic knowledge of their own labour and animal productivity and trading profitability. The top couple of producers, who also tended to have higher labour productivity, had computerized stockbreeding and production records and would be in a position to engage in advanced breeding selection and management.

1. Introduction

The survey of production practices and outcomes of water buffalo (*Bubalus bubalis*) operations in Australia was designed to give operators a benchmark of a variety of business practices employed by operators in their industry. The practices surveyed were:

1. Customer management
2. Innovation and capacity to change
3. Production operations management

The survey sent to buffalo producers was similar to that sent to other new animal producers, a copy of which is contained in Annex A1 of Section A of the Report.

The Australian buffalo industry is still recovering from the Brucellosis and Tuberculosis Eradication Program (BTEC), which was initiated in the mid-1980s to eradicate these diseases, resulting in a decline of over 90% in herd numbers, which were believed to be around 300,000 head in the early 1980s. (McKinna 1999). The most recent estimates (Year 2000) suggest herd numbers of about 43,000, with over 95% in the Northern Territory (NT) (Territory Business Magazine Dec. 2000). In 1998-99 there were 838 buffalo slaughtered in the NT, an increase of 110% on the previous year (Office of Resource Development 2000). Over the same period 1288 live buffalo were exported to Asia, representing an increase of 8% on the previous year. More recently, however, live exports are reported to have increased substantially with regular shipments of 60 head every fortnight to Brunei alone. (Territory Business Magazine 2000). For 2000-01 the value of industry turnover is estimated to be approaching \$1.5m at the farm gate level.

For this study we received 13 responses with an average of 179 head for a total of 2327 head, representing about 5.5% of the total buffalo population. Over the next four years, however, respondents plan to increase numbers by about 50% to around 260 head/enterprise, with most of the expansion taking place in the NT where herds tend to be already larger and more profitable. There are substantial differences in size and performance of the herds in the NT (3 responses) compared with those in the southern states (10 responses). Annex B1 contains the detailed statistical results. For the southern states the median and mode observations are a closer reflection of this group, while for the NT the 'high' performance is the appropriate benchmark. Nevertheless, because both groups are focused clearly on buffalo for meat the larger sized, better performing NT herds are the benchmarks for what is achievable.

The water buffalo has been used traditionally in four major uses: as a working animal; as a milking animal; as a source of meat; and as a source of hides. More than 5% of the world's milk is sourced from the water buffalo and over 95% of world buffalo milk is produced in Asia with India the biggest producer (Ligda 1998). Over the past decade, however, there has been growing interest in buffalo meat and the Australian industry is developing with a greater focus on this market. The major buffalo meat producers include India, Pakistan, China, Nepal and Thailand which, are all developing countries with very low unit labour costs.

The Australian buffalo herd is derived from the relatively small Swamp buffalo of South-East Asia. Over the past decade the larger Riverine buffalo has been introduced and, through heterosis, crosses are reported to have increased live growth rates by 40% (RIRDC Report No. 00/165). But there is great diversity within even the Riverine breed with, for example, the Murah breed regarded as the 'Holstein-Friesian' variation of the water buffalo industry with high volume yields of high fat content milk even when fed low concentrates (Indian Dairy Industry 2000).

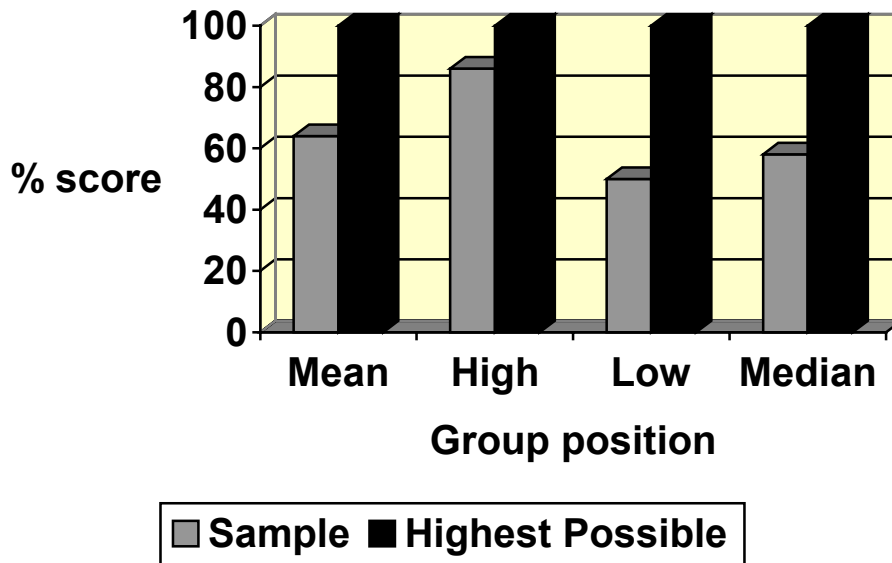
2. Marketing Management

Compared to other new animal product enterprises that we have surveyed the typical buffalo enterprise has considerably less emphasis on marketing. Most buffalo enterprises allocate less than 1% of their costs and labour to marketing compared to between 1 and 5% for emu producers and over 10% for ostrich producers. The overall marketing focus, however, varied significantly from an aggregate score of less than 25% through to an average 50 % and high of 80%. [Chart B1] [Annex A2 in Part A of this report describes the scoring method for alpacas, which is the same method used for all other animals]. The percentage was based on a series of quantifiable multiple-choice questions about various marketing practices undertaken by buffalo producers. Unlike other industries, however, where we observed a positive relationship between economic sustainability and marketing focus, there is not the same relationship in the buffalo industry. Some of the most profitable buffalo businesses allocate few resources to marketing. The top operators tend to be in the Northern Territory and they are large enterprises that rely on traditional traders to buy their stock for live export. Nevertheless, these same top operators reported regular checks of quality and defect or return rates of zero or less than 1%. When it comes to guarantees of performance, there are few enterprises showing any interest in this practice.

While most producers allocated less than 1% of their labour hours and expenditure to marketing, there was significant disparity in the results. Smaller operators tended to report relatively higher allocations of more than 5%. Marketing is reported by several respondents in the southern states to be a serious constraint on their development and this has prompted some to exit the industry. It is evident that there are economies of scale in marketing and this is a source of competitive advantage for large enterprises, which tend to be located in the Northern Territory. Solutions for small enterprises reside with cooperative marketing, increased size or increased added value. Some smaller producers report integrating forward, processing their own stock and selling meat for prices as high as \$12/kg for eye fillets.

Other value adding options exist in switching the product focus to milk where there is reported to be a price premium market for gourmet cheeses, yoghurts and high fat content milk. Ligda (1998) observes that most of the major breeds of water buffalo are kept in Asia primarily for milk production and work, with meat as a by-product. It is evident that the greatest price premiums for buffalo products are for milk, not meat where prices are similar to beef. The product focus has significant implications for genetic improvement programs, which may need to focus on meat in the NT and more on dairy and other exotic products in the southern states.

Chart B1: Marketing Emphasis in Australian Buffalo Industry



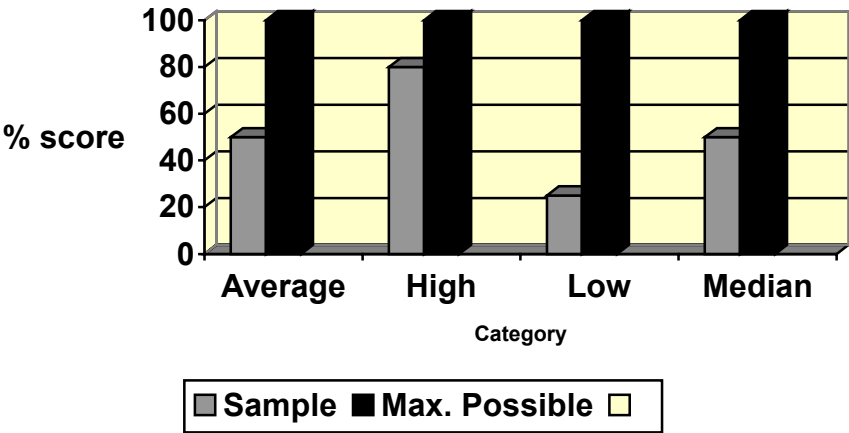
The marketing strengths of the buffalo industry include the defect rate of less than 1%; regular feedback on market requirements; and a tendency to negotiate selling conditions and attend industry events and gather information from researchers and suppliers. More generally, however, as an industry with relatively low marketing capability the best prospects may reside with trade in live animals with traditional stock agents handling the selling activity.

3. Innovation in the Australian Buffalo Industry

Innovation is increasingly recognized as an important, if not critical attribute of firms with a sustainable future in any industry, but with firms in agriculture in particular, where competition, volatility and regulations and subsidies can have a severe impact on prices.

Most buffalo producers are introducing 1-5 ‘change projects’ each year. This is about the same as other new animal product industries. We define a ‘change project’ as any planned program or set of activities that have been designed to alter fundamentally the way the producer does business. The average aggregate percentage results for innovation, however, were fairly low at 50%, although there was a significant range of 25% to 80%. Highly innovative buffalo enterprises emphasise change in sales and marketing, which is a weakness or point of vulnerability in the industry (Section 2 above). These same enterprises were also regularly introducing change to other practices. But a few producers are almost transfixed and apparently immobilised when it comes to new ideas and practices. Unless they make urgent changes to their work practices this group is destined to exit the industry because their existing level of productivity and profitability is unsustainable (Refer Section 4).

Chart B2: Innovation in the Australian Buffalo Industry



The major weakness of the industry is in resistance to introducing new strains of buffalo livestock, and new products for those with more vertically integrated operations. While there were a couple of exceptions, some 40% of respondents consider there is a natural livestock and product development process (one producer reported using AI) and therefore they don’t employ fast release strategies to speed up development and release of new strains of livestock. This resistance, which is most prevalent in the NT, is a constraint to the adoption of new technologies such as artificial insemination and multiple ovulation and embryo transfer breeding methods, which offer the prospect of increased live-weight growth rates of 40% (Refer to Tatham 2000). New strains of the Riverine breed also offer significant potential to improve milk production of the predominant Swamp breed. These techniques have great potential to improve the competitiveness of the Australian buffalo industry, but there would need to be a comprehensive extension program accompanying any measure to improve genetic evaluation and breeding.

Most buffalo enterprises have a computer less than 2 years old and are on the Internet, implying they have the infrastructure for good stock breeding and production records, even though they don't make full use of it. There was only one respondent not on the Internet and without a computer. We have noted elsewhere that NT producers suffer a disadvantage in access to the Internet, though satellite technology would seem to have growing potential for this group.

A couple of producers did rate highly on the adoption of new products and techniques and were active in developing new products and new markets, including access to European Union meat markets. The key innovative strength of the buffalo industry is its constant use of suppliers, research scientists and customers to design and get new ideas for strains of buffalo, livestock, new buffalo products and new support services. Unfortunately, the available information and ideas from this infrastructure are not readily transformed into work practices. Also, the industry is very small, with few specialist consultants or advisors.

4. Production Operations Management

All buffalo operators surveyed run an owner-managed and fully integrated breeding and growing enterprise. While meat was the dominant product focus, animals were sold to either the live animal traders or meat processors. There was just one enterprise focused on dairy and another intending to switch into dairy. With the exception of one enterprise, the buffalo dairy farm, all enterprises operate under fully extensive conditions with zero feed supplements. There is little doubt that this management method suits and is efficient for the typically large NT enterprise, but for the smaller herds in the southern states, and particularly if there is milk production involved, supplementary feeding may be viable and contribute to improved productivity. While the water buffalo is recognized worldwide for its metabolic efficiency in converting low grade feed and crop residues to high quality milk and meat this does not necessarily mean feed supplementation is unviable. The Indian Dairy Industry and Ligda refer to gains from better feeding. Further research in measuring response to feeding for both meat and dairy strains could be useful, including study into the interaction with different breeds of buffalo.

In regard to profitability, the most profitable enterprises are in the NT, with net profits exceeding \$40,000/enterprise, but the typical enterprise has a profit of \$0-\$5,000, with a couple reporting losses. Record keeping in this area is not strong and few operators have knowledge of their enterprise trading profits. The average price received for live cattle was \$1.20/kg, with one operator receiving \$1.42/kg.

The average live-weight of buffalo sold by respondents was 450 kgs, yielding about 50% when dressed and sold at 2 years of age. One large enterprise realized a yield of 60% from animals with live-weights of 340 kgs sold at 18 months. The typical dressed weight yields reported here are 5.5% lower than reports from other research in Australia (Lignin refers to research indicating 53% for Australian buffalo) and research in Brazil for Mediterranean type buffalo indicating yields of 55.5%.

Calving rates were typically around 85-90%, with lower rates of 70-75% on the larger NT properties.

Only one operator, the largest and most profitable, practises dehorning.

There is considerable variation in labour costs and labour productivity. This reflects the limited recognition, understanding or recording of labour among most enterprises, despite the fact that labour accounts for 70% of costs in the typical enterprise. Many respondents, particularly on the smaller enterprises in southern states, have limited or no understanding that there is an opportunity cost to their own labour. This implies they are indifferent to a choice between one hour of work and one hour of leisure! Labour costs varied from \$0/hour, through to \$5/hour and \$20/hour. The productivity of labour varied from an extraordinary 21 hours/animal/year to less than 1 hour/animal/year on the large NT enterprises. There are economies of scale in buffalo production and they reflect mainly the superior productivity of labour for large enterprises. This is perhaps the most critical issue for small enterprises in the southern states to contend with. Smaller enterprises may be able to offset their labour productivity disadvantage by the following actions:

- **Better time management.** Record and question and analyse every labour using activity; consider doing a time management-training course; evaluate labour saving paddock and yard designs.
- **Improve technical performance of animals.** Increased animal growth rates, earlier turnoff and, maybe, supplementary feeding may help. Improved genetics also has potential if accompanied by improved record keeping and monitoring of weights and performance.
- **Switch into higher valued product.** The prices for buffalo dairy products realize much higher price premiums over traditional dairy products than does buffalo meat over traditional beef substitutes.

• **Whole-farm planning and management.** A major challenge in productivity improvement is that there is no single or one-off action that works. Instead, high productivity comes from systematic attention to every single work practice in each and every year.

For the future most buffalo producers are expecting revenue growth of around 0-10%/year, accompanied by cost increases of the same level. This implies little improvement in the productivity of labour and capital. There were exceptions, however, with the largest and most profitable operator expecting to increase revenue by 10-20%/year over the next 10 years, with costs increasing by 0-10%/year. This implies significant growth in productivity for the top operator.

Although most operators are reporting low levels of profitability, they tended to rate their enterprises as largely sustainable from an economic perspective. In regard to environmental sustainability, all operators rated their enterprise as largely or fully sustainable.

The animal health security practices employed by respondents ranged from virtually zero through to one respondent having a systematic program to control disease. Most operators had no animal health security strategy and this is an area for improvement. This doesn't mean the buffalo industry is any more or less health conscious than, for instance, the beef industry. But there is a level of complacency in animal health security that suggests a high level of risk and vulnerability should there be an outbreak of an exotic disease.

A simplified, but more detailed, decision framework for managing trading revenue and costs in response to benchmark data is shown in Part A.

5. Conclusions

The economic challenge for buffalo producers is to increase enterprise size, particularly for those that are focussed on meat. Equally important, however, is to improve the productivity of labour and adopt programs that facilitate regular, not just one-off, increases in productivity. These improvements are unlikely to be achieved with improvement to any one practice. Instead, the best operators are likely to give comprehensive attention to a combination of time management and work practices, feeding management and turn-off age, genetic improvement and record keeping.

Annex B1: Detailed Responses Tables

Buffalo Production Responses

	Question	Average	High	Low	Mode	Median
GENERAL	Percentage of income from buffalo enterprise	12%	60%	1%	1%	5%
Size	Number of breeding females	63	329	3	12	28
	Number of fertile males	5	22	1	1	2
	Number of others	110	973	4	4	24
	Total animals	179	1324	10		50
Data Collection	Method of recording data	Computer cash records	Computer stock breeding & production records	No records kept	Computer cash records	Computer cash records
MARKETING	Percentage of costs on sales and marketing	1% to 5%	5% to 10%	Less than 1%	Less than 1%	Less than 1%
	Percentage of labour on sales and marketing	Less than 1%	More than 10%	Less than 1%	Less than 1%	Less than 1%
	Feedback level on market requirements	Regular feedback	Complete, part of the business	None	Regular feedback	Regular feedback
	Quality check regularity	Always	Always	Occasional	Always	Always
	Defect rate %	Less than 1%	Less than 1%	5 to 10%	Less than 1%	Less than 1%
	Provision of performance guarantees	Have on one occasion	Always	Never	Never	Never
	Attendance of industry events	2-5 times/year	More than 5times/year	Never	Occasional	Occasional
	Expenditure to improve marketing skills	Never	Always	Never	Never	Have on one occasion
	Negotiation of selling conditions	No negotiation, buyers know the price & that's final	Always	No negotiation, buyers know the price & that;s final	Occasionall y, but not always	Occasionally, but not always
	TOTAL MARKETING EMPHASIS max 36		23	31	18	20

Annex 2: [Continued]

	Question	Average	High	Low	Mode	Median
INNOVATION	Number of change projects in past year	1 to 5 each year	More than 10 changes/year	No changes	1 to 5 each year	1 to 5 each year
	Focus of change projects				Sales and Marketing	
	Reason for change				Customer Pressure	
	Employment of fast release strategies	Sometimes, but we tend to imitate the innovators	Always, we seek leadership	No, there is a natural livestock & development process	No, there is a natural livestock & development process	No, there is a natural livestock & development process
	Use of industry bodies	Occasionally	Always	Never	Always	Always
	New information and communication technology	We have a computer at least 2 years old and are on the Internet	We have a computer less than 2 years old and are on the Internet	We do not have a computers and are not on the Internet	We have a computer less than 2 years old and are on the Internet	We have a computer less than 2 years old and are on the Internet
	TOTAL CHANGE ACTIVITY max 16	8	12	4	8	8
PRODUCTION	Farming System				Fully extensive	
	Enterprise Structure				Traditional-sell animals to traders	
	Management Structure				We own and manage all the animals	
	Product Focus				Meat	
PROFIT	Price Live Animal [\$/kg live]	\$1.19	\$1.42	\$0.90		\$1.20
	Price Carcass Product 1[\$/]	\$2.18	\$2.50	\$1.85		\$2.18
	Price Carcass Product 2[\$/]	\$3.00	\$3.00	\$3.00		\$3.00
	Total Net Profit	\$0-\$5,000	Greater than \$40,000	Realized a loss		\$0-\$5,000
Sustainability	Environmental sustainability	Largely sustainable	Fully sustainable	Largely sustainable	Largely sustainable	Largely sustainable
	Economic Sustainability	Largely sustainable	Fully sustainable	We have concerns	Fully sustainable	Largely sustainable

Annex 2: [Continued]

	Question	Average	High	Low	Mode	Median
STOCK NUMBERS	Breeding Females 2000	68	329	3		24
	Breeding Females 2001	80	394	5		30
	Breeding Females 2002	141	732	6		35
	Breeding Females 2003	167	766	6		30
	Breeding Females 2004	162	768	6		40
	Fertile Males 2000	5	22	1		1
	Fertile Males 2001	5	22	0		1
	Fertile Males 2002	7	22	1		1
	Fertile Males 2003	8	22	1		2
	Fertile Males 2004	8	22	1		1
	Total 2000	172	1,324	10		50
	Total 2001	157	1,053	11		50
	Total 2002	201	1,094	12		53
	Total 2003	263	1,344	12		60
Total 2004	260	1,368	12		59	

TECHNICAL	Average Buffalo liveweight [kilos]	451.00	700.00	320.00		450.00
	Average dressed weight of slaughtered animal	236.56	360.00	180.00		225.00
	Implied Yield	56.25	60.00	0.00		50.00
	Average age at slaughter [years]	2.40	5.00	1.50		2.00
	Average hide produced by buffalo in square metres	31.67	50.00	5.00		40.00
	Calving rate %	87.50	100	70		90
	Adult death rate [% of flock]	1.50	5.00	0.00		1.00
	No. of females/bull at mating	24	40	6		25
	Culling rate	7.90%	50.00%	0.00%		30.00%
	Dehorning [% of calves dehorned]	18	100	0.00		0.00
	Dehorned older animals [%]	3	30	0.00		0.00

FEED					
	Feeding rate on average/day	Less than 1kg	Less than 1kg	Less than 1kg	Less than 1kg

**Annex 2
[Continued
VETERINARY**

Question	Average	High	Low	Mode	Median
Animal health security strategy	Occasional inspections	Systematic program	No strategy	No strategy	Check most diseases
Monitor animal growth	Occasionally monitor	Systematic weighing and monitoring	No monitoring of growth	Occasionally monitor	Occasional monitor
Vet. costs per animal	\$3	\$10	\$0	\$5	\$5
Annual vet. costs total	\$422	\$1300	0	1000	200

LABOUR Employee numbers in:

Breeding & raising	2	4	1	1	1
Slaughter	1	2	1	1	1
Other handling	3	5	1	2	2
Management	1	2	1	1	1
Other	1	1	1	1	1
Total Employees	3	9	0	5	3

Hours per employee in:

Breeding & raising	78	168	20		50
Slaughter	95		2		39
Other handling	151	356	40		142
Management	162	356	40		125
Other	100	100	100		100
Total enterprise	632	1512	80		382

Labour costs per hour in:

Breeding & raising	\$13	\$20	\$5	\$15	\$15
Slaughter	\$24		\$5	\$20	\$20
Other handling	\$16	\$20	\$10	\$15	\$15
Management	\$15	\$20	\$5	\$20	\$18
Other	\$13	\$20	\$5		\$13

Labour costs per year in

Breeding & raising	\$1,457	\$6,720			\$750
Slaughter	\$3,030	\$14,240			\$770
Other handling	\$3,934	\$14,240			\$1,575
Management	\$510	\$1,000			\$750
Other	\$625	\$2,000			\$250
Total enterprise	\$8,113	\$29,560			\$3,350

Labour costs as % of total costs	76.67	90.00	70.00	70.00	70.00
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Labour hours per animal	8.02	21.11	0.31		5.17
Labour hours per breeder	27.25	95.50	0.40		12.50

REVENUE

Expected annual revenue growth over 10 yrs	10-20%	More than 20%	0%-10%	0%-10%	0%-10%
Expected annual cost growth over 10 yrs	10-20%	More than 20%	0%-10%	0%-10%	0%-10%

Part C

DUCK PRODUCTION BENCHMARKS

Executive Summary

The Australian duck industry is estimated to have a wholesale value in excess of \$40m /year with good prospects for growth in both domestic and export markets.

New breeds and hybrid ducks offer the prospect of significant gains in growth as well as higher percentages of high priced breast meat. Breeding and feeding offer the prospect of significant improvements in productivity and value added per duck.

This section describes the results of a survey of the work practices, processes and general operating environment faced by duck processing enterprises in the year ended June 2000. Because the survey numbers are very small and from different countries, with large non-sampling errors the estimates should be treated with caution.

The duck industry is among the most important in the new animal products portfolio of RIRDC, with an estimated wholesale value of around \$41m/year from 5.25m ducks slaughtered in Australia, with good prospects for growth in both the domestic (current per capita consumption is about 0.5kg/annum) and export markets, provided internationally competitive levels of productivity can be achieved. The Australian market share of the \$420m world export market is less than 0.5%.

There are significant economies of scale in duck processing in developed economies. In Australia, over 80% of the market is held by two processors. In the US and UK the dominant suppliers have market shares of 35% or more. But the cost advantage of economies of scale is being diluted by low capacity utilization rates of less than 75% and this, in turn, increases unit costs and reduces the ability to compete on the more price competitive international markets. Processors with growth strategies may need to outsource live ducks to improve capacity utilization rates.

The enterprises indicated slaughter levels ranging from 1.8m to 2.4m, with an average capacity utilization ratio of 72%, but ranging from 60 to 80%. All enterprises were specialist processors and operating throughout the year. Most enterprises were operating as the principal trader and processor and typically owned all ducks processed, although one operator was commission slaughtering. The domestic market accounted for most sales and this was typically more than 95% of total sales.

Self replacing flocks typically involved breeding and growing out to about 7 weeks of age when they were slaughtered at a live-weight of 2.98 kg. But hybrid ducks in the US are reported to be producing 3.7 kg ducks at 7 weeks of age, a 25% increase on the average response. The median yield of finished carcass meat was 66%. Prices range from around \$1.70/kg finished weight in Thailand through to \$9.50/kg in the USA and \$4.00 kg in Australia. Significant price premiums exist for particular cuts of duck meat such as the breast filet and therefore the proportion of breast meat in the finished carcass is an important source of added value. Again, hybrid ducks in the US are reported to yield much higher percentages (21%) of breast filets than the respondents (15-16%). Breeding and feeding are important factors in producing a competitively priced live duck for the processors.

Labour costs accounted for an average 13% of total processing costs, but there was significant variability in the number of hours spent

Processors rate highly on their marketing emphasis and innovation score. They have particular strengths in quality control and supply chain integration.

managing and handling animals. **Labour productivity in processing averaged over 33 ducks/hour, but varied from 25 to 50/hour.** With labour valued at about \$16/hour, and significant capital tied up in large duck processing enterprises, it is clear that those firms with high productivity are well placed to create viable duck processing enterprises, while those with low productivity will find it difficult to survive with anything other than relatively high product prices. High productivity performance is required for penetration of the more price sensitive export markets, which are growing fastest in China, Hong Kong and other Asian markets.

Duck processors score highly on our marketing and innovation emphasis. Most operators are in daily contact with their customers and from 5 to 10% of labour hours are allocated to marketing activities. They all comply with formal quality assurance programmes and HACCP procedures and are members of supply chain structures that provide regular and complete feedback on product performance. Defect rates are all reported to be less than 1%.

Duck processing operators show a high preparedness to change their business operations with the emphasis of change on product quality, which includes, for instance, compliance with HACCP procedures, safety inspection and changing packaging and labelling rules. Innovation differentiates processors and enables them to achieve higher labour and capital productivity, to access markets and secure better prices. The most profitable operators made use of industry bodies, suppliers, research scientists and customers to get new ideas and marketing information.

The economic challenge for duck processors is to get to a minimum sized economic operation of probably at least 1m ducks/year and to achieve processing benchmarks of:

- Labour at 35+ducks/hour.
- Excellence in quality control and packaging with HACCP essential.
- Less than 2.5% mortality rates for those with integrated operations.
- Live-weights of more than 3 kgs at less than 7 weeks of age with dressed yields of 66% or more.
- Breast meat filet proportions of 20%.
- Participation in formal integrated supply chain structures.
- Reject rates of less than 1%.
- Competitively priced purchased inputs, itself a function of excellence in farm production.
- Capacity utilization rates of at least 75-80%.

A key issue to consider in increasing capacity utilization rates and improved productivity is whether or not this is achieved most efficiently through vertically integrated structures or outsourcing live animals from specialized production farms. Those who come up with the most efficient solution to this issue appear to have good prospects for expansion in both local and export markets.

1. Introduction

The survey of duck processing was designed to give operators a benchmark of a variety of business practices in their industry. The practices surveyed were:

1. Customer management
2. Innovation and capacity to change
3. Processing operations management

The survey sent to duck processors is available on request from the author or RIRDC.

Australian duck production is estimated to have been around 5.25m head slaughtered in 1999-2000, and has been growing at about 17%/year on the estimated 3.8m slaughtered in 1997-98 (CSIRO 1998). In the US, production is estimated to be around 40m/year (University of Minnesota 2000) and in the UK at 18million (Viva 2000). But some 90% of world ducks are produced in Asia and China in particular. And it is people of Asian origin in developed countries that are now driving much of the growth in consumption in Australia and North America. Current Australian consumption is about 0.5kg/capita and this accounts for 95% of Australian output.

Australian exports represent about 5% of output, and are valued at about \$2m/year, which is less than 0.5% of our estimate of world duck exports of about \$420m in 1999⁵. World duck exports account for about 2.3% of world poultry exports including chickens and geese meats and eggs. The major importing countries are China P.R. (including Hong Kong), Japan, Germany, Austria and Mexico. In 1997 Russia was a major importer, but has subsequently declined as a major market. There appears to be significant two- way trade in duck meat with a number of countries (e.g. Thailand, Vietnam) involved in both imports and exports.

The duck industries in developed and developing economies have vastly different structures, reflecting the significant differences and costs of capital and labour. In developed economies, the meat processing industry is dominated by a few major operators, often with market shares of 20% or more. In Australia, two operators account for over 80% of production. In the US, one operator accounts for 35%, with a similar structure in the UK. Nevertheless, the presence of smaller operators in these countries suggests there is a place for small processors with very good management and highly focussed marketing practices. For example, there are operators in Australia with processing levels of less than 100,000 /year. The average processor in the UK has throughput of about 1.125m/year (Viva 2000). In developing countries there are numerous small farms typically accounting for a large share of output. In Bangladesh, for instance, there are 26,000 duck farms running 13.6m ducks, an average of just over 500 per farm.

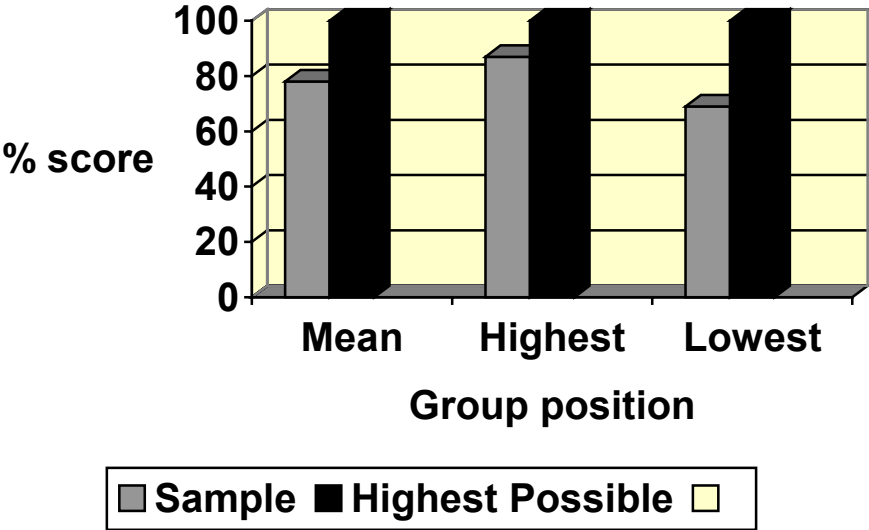
The duck is raised primarily for meat, though eggs and feathers are important for some enterprises, particularly in developing countries or as by-products in developed countries. In addition, there are a number of producers involved in ornamental varieties.

⁵ According to the FAO, world duck meat exports were valued at \$US193.1m in 1998, representing 2.3% of world poultry meat and egg exports.

2. Marketing Management for Duck Processing

Compared to other new animal product enterprises that we have surveyed the typical duck processing enterprise places much greater emphasis on marketing and the associated logistics and skills. This is to be expected as most duck processors are building their own brands, which typically requires significant marketing resources. Most processors allocate between 1% and 5% of their costs and between 5% and 10% of labour hours to marketing. The overall marketing focus, however, varied significantly from an aggregate score of 69% through to an average 78 % and high of 87%. [Chart C1] [Annex A2 for method]. Detailed results are shown in Annex C1. The marketing emphasis percentage was based on a directional series of quantifiable multiple-choice questions about various marketing practices undertaken by duck processors ⁶. Some of the distinguishing features of duck processing marketing practices include the compliance with formal quality assurance schemes; HACCP health management procedures; daily contact with customers; membership of supply chain delivery structures with full and regular reports on performance; marketing negotiation skills; and preparedness to invest in skills to improve their marketing performance. These features are major attributes of the respondents and provide them with capacity to both preserve their share of domestic markets and penetrate growing export markets. These attributes are also underlying sources of economies of scale and entry barriers to competitors with anything less than a very thorough marketing presence.

Chart C1: Marketing Emphasis in Duck Processing



The one area of marketing weakness where there could be potential for improvement is in the provision of performance guarantees for products, though the impact may not be substantial in view of the low level of defect or return rates (less than 1%) and membership of formal supply chain delivery arrangements. Where guarantees may take on added importance is in export markets where suppliers will be less known to buyers and supply chain linkages may be less developed.

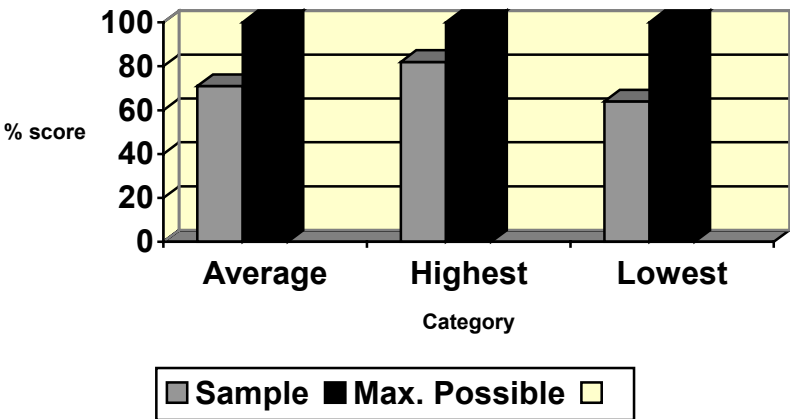
⁶ See Notes on Methodology (Annex 1) for more detailed description of assessment method.

3. Innovation in Duck Processing

Innovation is increasingly recognized as an important, if not critical attribute of firms with a sustainable future in any industry, but with firms in food, fibres and agriculture in particular, where competition, volatility and regulations and subsidies can have a severe impact on prices.

Most duck processors are introducing 5-10 ‘change projects’ each year. This is well above the average of other new animal product industries in Australia, though as with marketing, comparisons of processor and producer practices need to be treated with caution. We define a ‘change project’ as any planned program or set of activities that have been designed to alter fundamentally the way the enterprise does business. The average aggregate percentage results for innovation was over 70%, ranging from 64% to over 80% for the most innovative enterprise. Most processors emphasise quality and grading improvements in their changes, which were being prompted by a combination of cost competition, re-alignment of strategy and restructuring.

Chart C2: Innovation in Duck Processing



Duck processors may be able to gain an edge through e-commerce. None of the respondents had e-commerce facilities on their web sites, which were all set up for promotion and provision of information only. E-commerce, though more demanding for perishable goods, may play a more important role in export markets.

4. Processing Operations Management

All processors surveyed run year round operations with limited external sourcing of animals and reliance on integrated breeding and growing and processing enterprises. One operator was commission processing, but only as a minor part of the facility. Meat was the dominant product focus, with by-products such as feathers and offal of less importance.

Some of the key processing metrics are shown in Table C1.

The average live-weight of ducks processed by respondents was 2.95 kg, yielding about 66% when dressed and sold at an estimated 7 weeks of age. In regard to the live-weights it is relevant to note the performance of hybrid Pekin ducks in the US where Metzger Farms reports live-weights of 3.7 kg at 7 weeks of age, 25% above the survey average. ⁷ Metzger also indicate breast fillet percentages of 21% compared to 15-16% for the survey respondents. The relatively high price of breast fillets means that considerable value is added by ducks with high proportions of these cuts.

METRIC	AVERAGE	HIGH	LOW
Duck live-weight at slaughter [kg]	2.95	3.00	2.85
Hot-dressed weight[kg]	1.96	2.10	1.80
Finished weight [kg]	1.95	2.05	1.85
Yield of saleable cuts [%]			
Breast meat	15.44	16.00	15.00
Maryland	17.50	19.00	16.00
Other	67.06	69.00	65.75
Number slaughtered/year	2,250,000	2,700,000	1,800,000
Batch size slaughtered	8,937	13,000	3,500
Meat losses [%]	Lees than 1.00%	Less than 1.00 %	Less than 1.00 %
Capacity utilisation [%]	71.25	80.00	60.00
Labour Productivity [ducks processed/hr]	31	44	24

There was significant variation in our estimate of labour productivity, as measured by ducks processed/hour. This estimate was derived from estimated enterprise hours and the number processed. Other things equal, variations in labour productivity reflect work practices and technology. High labour productivity is achieved through excellent work practices and usually the latest technology and high capital investment. It is an area for close examination by processors.

There are economies of scale in duck processing in developed economies and they are very evident by the high level of market concentration with a few large enterprises accounting for large market shares in most developed country markets. This is a critical issue for new entrants to contend with. They need nothing short of formal quality assurance, supply chain management expertise, marketing expertise and HACCP compliance. On the other hand, existing operators are well placed to secure their competitive positions by continually strengthening these features.

An important challenge for duck processors is to improve their capacity utilisation ratios, which are too low for export-oriented businesses. The cost advantages of economies of scale can be turned into a

⁷ Refer to Metzger Farms web site at <http://www.metzgerfarms.com/comm.htm>

disadvantage with low capacity utilisation rates. A recent study for the Australian government⁸ on food manufacturing efficiency indicates firms with average capacity utilisation rates of 75-90% were more likely to be export oriented than those with low rates. The average duck processor indicated capacity utilisation rates of 72% and this would suggest reduced export orientation, which would reflect, in part, a cost disadvantage caused by high unit costs of capital. Duck processors need to consider ways of improving capacity utilisation rates including increased outsourcing of live ducks for processing. This strategy would have implications for quality control and cost control of duck production, but these are issues that can be dealt with by good farm management and supply chain integration. Nevertheless, it is relevant to note that a major problem for Australian food manufacturers has been sourcing good quality inputs at competitive prices. Processors who do elect to outsource more live ducks may need to provide technical support and training for suppliers to ensure quality standards are maintained. Feed, breed and labour management are critical issues to content with at the farm level.

For the future duck processors indicated they are planning to increase capacity utilisation rates.

5. Conclusions

The economic challenge for duck processors is to increase capacity utilisation rates, improve labour productivity and penetrate growing, but cost competitive, export markets. Equally important, however, is to maintain their current emphasis on marketing and innovative work practices. Improved breeding and increased use of hybrids would also seem to be a growing requirement for internationally competitive levels of productivity.

⁸ Instate Pty Ltd 2000, 'Exporting Australian Processed Foods', Report for Agriculture, Fisheries and Forestry – Australia (AFFA), Commonwealth Government of Australia, Canberra

Annex C1: Detailed Responses Tables: Duck Processing

	Question	Average	High	Low	Mode
GENERAL	Percentage of income from duck processing	100%	100%	100%	100%
MARKETING	Percentage of costs on sales and marketing	1% to 5%	5% to 10%	Less than 1%	1% to 5%
	Percentage of labour on sales and marketing	5% to 10%	More than 10%	1% to 5%	5% to 10%
	Evaluate post sales performance	We did on one occasion	Occasionally	Never	Occasionally
	Feedback on market requirements	Comprehensive, we are part of supply chain	Comprehensive, we are part of supply chain	Comprehensive, we are part of supply chain	Comprehensive, we are part of supply chain
	Quality check regularity	Always, we have formal quality assurance program	Always, we have formal quality assurance program	Always, we have formal quality assurance program	Always, we have formal quality assurance program
	Defect rate %	Less than 1%	Less than 1%	Less than 1%	Less than 1%
	Provision of performance guarantees	Occasionally, but not always	Always	Never	Occasionally, but not always
	Customer contact	We are in constant, almost daily contact	We are in constant, almost daily contact	Each customer is contacted each week	We are in constant, almost daily contact
	Attendance of industry events	2-5 times/year	More than 5times/year	2-5 times/year	2-5 times/year
	Overseas Travel	Often, at least once per year	Often, at least once per year	Often, at least once per year	Often, at least once per year
	Expenditure to improve marketing skills	Always, it is part of our regular business activities	Always, it is part of our regular business activities	Always, it is part of our regular business activities	Always, it is part of our regular business activities
	Negotiation of selling conditions	Always engage in negotiations	Always engage in negotiations	Occasionally, but not always	Always engage in negotiations
	Market research activity	We carry out regular market research	We have a very systematic approach to market research	We carry out regular market research	We carry out regular market research
	TOTAL MARKETING EMPHASIS max 52	41	45	36	20
INNOVATION	Question	Average	High	Low	Mode
	Number of change projects in past year	5 to 10 each year	5 to 10 each year	1 to 5 each year	5 to 10 each year
	Change in change projects	Up to a 20% increase in changes this year	Up to a 50% increase in changes this year	Up to a 20% increase in changes this year	Up to a 20% increase in changes this year
	Focus of change projects				Quality and Grading

Reason for change				Customer Pressure
Number of new labour saving techniques or new machine technologies	More than 5 this year	More than 5 this year	More than 5 this year	More than 5 this year
Process changed most				Quality and grading
Employment of fast release strategies	Sometimes, we lead and see advantages in being first	We are very innovative and seek to be the leader in developing new processing methods	Sometimes, we lead and see advantages in being first	Sometimes, we lead and see advantages in being first
Use of suppliers, research scientists and clients for designs and ideas	Sometimes, we use them	Always using suppliers, scientists and clients	Never use them	Sometimes, we use them
Expenditure on training to improve capacity to change	Occasionally, we allocate resources to this	Always, it is a regular part of our business activities	Occasionally, we allocate resources to this	Occasionally, we allocate resources to this
New information and communication technology	We have our own web site that is used for information purposes only	We have our own web site that is used for information purposes only	We have our own web site that is used for information purposes only	Own web site that is used for information purposes only
TOTAL CHANGE ACTIVITY max 28	20	23	18	

**PROCESSING
MANAGEMENT**

Seasonality				All year round
Enterprise Focus				Processing of ducks
Management Structure				Principal trader and processor and typically own all the ducks processed in our factory
Marketing Focus				Mainly domestic, some export
Commission slaughter fee	\$1.94	\$2.90	\$2.20	
By-product revenue [\$/head]	\$0.00	\$0.33	\$0.00	\$0.00

**Annex 2:
[Continued]**

	Question	Average	High	Low	Mode
TECHNICAL PROCESSING METRICS	Liveweight at slaughter [kg]	2.95	3.00	2.85	
	Hot dressed weight [kg]	1.96	2.10	1.80	
	Finished dressed weight [kg]	195	2.05	1.85	
	Yield of meat cuts:				
	-Breast meat %	15.44	16.00	15.00	
	-Maryland %	17.50	19.00	16.00	
	-Other %	67.06	69.00	65.75	
	Number of animals slaughtered	2,250,000	2,700,000	1,800,000	
	Batch size slaughtered	8,937	13,000	3,500	
	Meat losses from bruising, contamination etc. %	Less than 1	Less than 1	Less than 1	
	Capacity utilization %	71.25	80.00	60.00	
	LABOUR PRODUCTIVITY	Employees in slaughter, feather removal and waxing	12	22	5
- in boning & packing		24	37	8	
- in By-products		11	12	9	
- in chilling & freezing		6	8	5	
- in administration and overheads		6	10	3	
Hours worked per person/year					
- tradespersons		1473	1710	1210	
- administration		1897	2080	1710	
Labour costs/hr [\$]					
-slaughter etc.		16.23	16.92	15.50	
- boning etc		16.30	17.21	15.50	
- by-products etc		16.13	16.51	15.50	
-chilling & freezing		16.38	17.50	15.50	
- overheads	19..50	30.00	15.50		

Annex 2: [Continued] Question

	Average	High	Low	Mode
LABOUR PRODUCTIVITY				
Total hours per enterprise	76,468	92,190	47,880	
Ducks processed/hour	31	44	24	
STATUTORY COSTS ^a				
Inspectors on the premise	1	1	1	1
Average cost/hour of inspectors [\$]	40	44	36	
Veterinary costs/hr of inspections [\$]	94	107	85	
Production levies [\$/kg]	0.00	0.00	0.00	
Inspection costs for domestic market [\$/kg]	na	00	na	
Export inspection costs [\$/kg]	na	na	na	
EXPENDITURE ALLOCATIONS ^a				
Total Expenditure	14,496,467	21,600,000	6,425,000	
Allocation of Expenditure - % of Total				
Purchases %	55	58	52	
Labour	13	21	8	
Packaging	5	6	4	
Services	4	5	3	
Inspection		1		
Industry levies	0	0	0	
Consummables	1	2	1	
Depreciation	3	7	2	
Repairs & maintenance	2	3	1	
Administration	1	1	0	
Interest	1	2	0	
Other	14	20	2	
OUTLOOK				
Growth in capacity utilization %/year	11	12	9	
Growth in unit labour costs over next 5 years [%/year]	8	12	3	
Note a:	Responses were converted to \$A at the rate of \$A1.00 = 0.375 UK Pounds and 0.59 US Dollars			

Part D

RABBIT PRODUCTION BENCHMARKS

Executive Summary

Enterprise profitability was typically low at zero to \$5,000, but rabbit enterprises rely mainly on other income for viability.

One operator demonstrated that acceptable profits can be achieved and are sustainable with excellent feed, labour and marketing management.

Accounting for 85% of total cash costs, feed selection and management is the key factor in rabbit enterprise profitability. Most small enterprises could reduce unit feed costs significantly with bulk buying.

This section describes the results of a survey of the work practices, processes and general operating environment faced by Australian rabbit producing enterprises in the year ended June 2000. Because the survey numbers are small (8 responses out of a population of about 60) and non-sampling errors large the estimates should be treated with particular caution.

The median rabbit enterprise in the sample had 48 breeding does (dominated by NZ White breed), running with 2 bucks and 24 follower animals, grown for slaughter and replacements of breeders. There was, however, significant variation around the median, ranging from 15 to 150 does/enterprise. Revenue from the typical rabbit enterprise accounts for about 8% of total business income, but again with significant variation ranging from 1% up to 100%. Most enterprises were self replacing herds involving breeding and growing out to about 12 weeks of age when they were slaughtered at a carcass-weight of 2.73 kg, which sold for about \$6.50/kg.

Production systems were mainly based on the dry manure disposal method with either compacted dirt or concrete. There were only two 'wet system' enterprise. Some operators had developed modifications including worm pits under the elevated cages. The product focus is mainly on meat. All businesses were fully owned by the managers and there was no evidence of contract growing.

The operator views on their long-term financial situation varied from fully sustainable to having some concerns, with most indicating it was still too early to make a decision on viability. The typical rabbit enterprise, however, is planning a threefold increase in numbers over the next four years. The highest reported net profit for 1999-2000 was over \$30,000-40,000, but the median was \$0-5000.

The Australian farmed rabbit industry is still at a very early stage of development. Several operators who received the survey indicated they had ceased production and others were involved only in a subsistence operation. The variation in sustainability amongst different rabbit enterprises can be explained by three factors – feed, labour and marketing management.

Feed costs accounted for 85% of total cash costs on the typical enterprise, with significant variability, from 35% to 95%. This reflected variation in feeding rates, which ranged from less than 150 grams/day for growers through to 350—450 grams. For bucks and does the feeding rate was typically 225grams/day. More generally the feeding rates appear low and this has implications for productivity. Average feed costs were always more than \$0.25/kg and sometimes as high as \$0.50/kg. The costs of feed appear high for some operators and there is potential to save through bulk buying to get the unit cost down closer to \$0.30/kg. This action alone could reduce unit cash costs for some enterprises by over 35%, but it may only be achievable by relatively large enterprises or cooperatives.

Labour productivity depends on work practices, capital investment, structure and size. It also requires a basic understanding that owner operator labour has a cost to it.

Price negotiation skills are likely to be increasingly important as producers adjust into larger enterprises

Improved data collection and information management will improve work practices.

As with most new animal enterprises there is a very limited understanding of labour productivity and labour record keeping is poor. This comes from a basic neglect of the opportunity cost of labour, which most operators infer to be zero. There is clearly an opportunity cost of labour and some operators were able to estimate this to be around \$10-13/hour, with labour costs accounting for over 60% of total costs. There was significant variation in the number of hours spent managing and handling animals. **Labour productivity averaged over 32hrs/doe/ year, but varied from 9 hours to over 100 hours/doe/year.** International benchmarks indicate less than 7.5 hours/doe/year. With labour valued at about \$11.50/hour it is clear that those firms with low productivity will find it difficult to survive with anything other than unrealistically high meat prices or to switch their focus to trade in high valued breeding stock. One respondent indicated the optimum sized rabbitry to be around 200 does, with 500 does capable of being run by one full time labour unit, implying labour productivity of 5hrs/breeder/year.

Most enterprises allocate few resources to marketing (often less than 1% of costs), but they do get regular feedback on market requirements and tend to check quality. Most operators don't engage in much negotiation of prices and rely heavily on traders who undertake the marketing activities.

Rabbit producers indicated they were introducing many changes (typically 5-10 major changes during 1999-2000) to the way they run their enterprises and this coupled with access to the Internet and new computers would tend to enhance their capacity to cope with change. Most operators are planning significant expansions of their operations and this will require new investment and improved feed, labour and marketing practices. The one area of weakness that shows up in respect of innovation is the lack of fast release strategies to speed up development and release of new and improved breeds. This limits the impact of any new strains that could be extended through AI and induced ovulation and embryo transplants. Associated with this is a general lack of use of computerized stock breeding records, despite the widespread access to computers.

The economic challenge for rabbit producers is to get to a minimum sized economic operation of at least 200 active does, preferably 500 with:

- Labour at less than 5 hour/breeder/year, without comprising output/doe.
- 8 progeny (kittens)/female/year and 8 litters/year.
- 0-1% death rates
- Feed costs of less than \$0.30/kg without compromising nutrient content.
- More money on marketing or make extensive contact and use of people with marketing skills and then driving a hard bargain on prices.

1. Introduction

This survey of production practices and outcomes of farmed rabbit operations in Australia was designed to give operators a benchmark for a variety of operating practices employed in their industry. The practices surveyed were:

1. Customer management
2. Innovation and capacity to change
3. Production operations management

The survey sent to 65 rabbit producers was similar to that sent to other new animal producers, a copy of which is contained in Annex A1 of Section A of this Report. Detailed statistics from the survey are shown in Annex D1.

The Australian farmed rabbit industry is in the early stages of development, perhaps as a replacement for the wild rabbit industry, which has declined significantly with the spread of rabbit calicivirus disease (RCD) (refer to McKinna 1999 and Foster 1999). This has resulted in a decline of over 90% in Australian rabbit meat production, which was believed to be almost 2000 tonnes in the early 1980s. Foster estimated production from the Australian farmed rabbit industry to be 106 tonnes, valued at \$0.62m in 1998-99 with an average farm gate price of \$7.42/rabbit for 115 farms running 57 does. For this study we received 8 responses with an average of 53 does for a total of 424 head, representing about 6.5% of the total number of does. Over the next four years, however, respondents plan a threefold increase in the number of does/enterprise to around 189 does. This is a major expansion that has potential to increase the number of optimal sized rabbit enterprises and improve profitability providing full attention is given to feeding, breeding, labour and marketing management.

The rabbit has been used traditionally in three major uses: as a pet; as a source of fur, fibre and pelt for garments and textiles; and as a source of meat. All survey respondents were focused on meat or sale of live animals for breeding and ultimately meat production. Several non-respondents indicated they were involved in rabbits for pet and show purposes only and this appears to be a significant industry on its own.

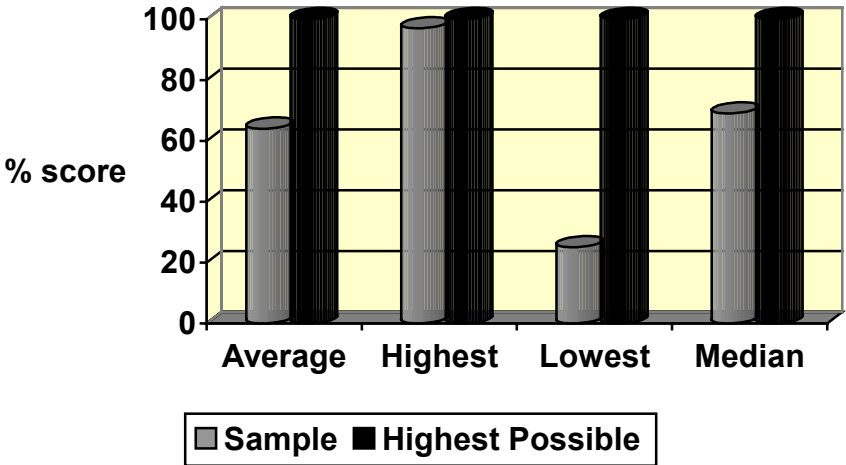
According to Foster world production of farmed rabbit meat was around 1 million tonnes (1.5 million tonnes, including wild rabbit) in 1998 and growing at around 2.5 per cent each year. Australian production therefore represents a negligible proportion of world output, which is dominated by China (31% of world output), Italy (22%), Spain (12%) and France (9%). About 6% of world rabbit production is exported and in 1998 this was estimated by the FAO to be valued at \$US142.5m.

Although widely recognized for their high fecundity it is equally the ability of the rabbit to convert low value plant protein into high valued animal protein that adds great value and interest in development of the industry. (FAO 1986). Only the chicken and turkey have higher energy and protein conversion efficiency than the rabbit, but these animals require higher valued grain to realize their conversion efficiency, whereas the rabbit can convert relatively low valued, cellulose-rich plants. Against this background it is a natural development for there to be great interest in breeding and feeding of rabbits because these are the sources of its comparative advantage over other animals farmed for meat. And because intensive feeding and breeding are usually associated with intensive labour there is equal interest in the productivity and cost of labour.

2. Marketing Management

Compared to other new animal product enterprises that we have surveyed the typical rabbit enterprise has about the same emphasis on marketing, which is not that strong. Most rabbit enterprises allocate less than 1% of their costs to marketing compared to between 1 and 5% for many other new animal enterprises. The overall marketing focus, however, varied significantly from an aggregate score of less than 25% through to an average 63 % and high of over 90%%. [Chart D1] [Annex A2 for method]. The percentage was based on a series of quantifiable multiple-choice questions about various marketing practices undertaken by rabbit producers⁹. When it comes to guarantees of performance, rabbit enterprises are relatively strong on this attribute with most enterprises providing occasional guarantees and some always guaranteeing performance. Most operators reported defect rates of less than 1%, but indicated defects of more than 10%.

Chart D1: Marketing Emphasis in Australian Rabbit Industry



While most producers allocated less than 1% of their expenditure to marketing, there was a tendency to allocate a greater % [from 1% to 5%], of enterprise labour hours to marketing. There are some economies of scale in marketing and this may be a source of competitive advantage for large enterprises, which can spread costs across a larger quantity of output, though the largest operator was also allocating more than 10% of labour to marketing. In view of the planned expansion in enterprise numbers unit costs of marketing would be expected to fall.

The marketing activity of greatest variability is in the negotiation of selling conditions. A couple of operators always negotiate prices and selling conditions, but most simply accept the price offered by the buyer as the best and final price. This attitude may reflect, in part, a well-informed industry as most operators indicated they were receiving regular feedback about market requirements.

The marketing strengths of the rabbit industry include the general willingness of operators to provide performance guarantees; to achieve defect rates of less than 1%; and the presence of regular feedback on market requirements. More generally, however, the industry performance on marketing is mediocre and highly variable with extremes in marketing emphasis. Producers intending to expand their stock numbers will need to lift their marketing and sale negotiation skills or establish good working relationships or partnerships with competent brokers and selling agents.

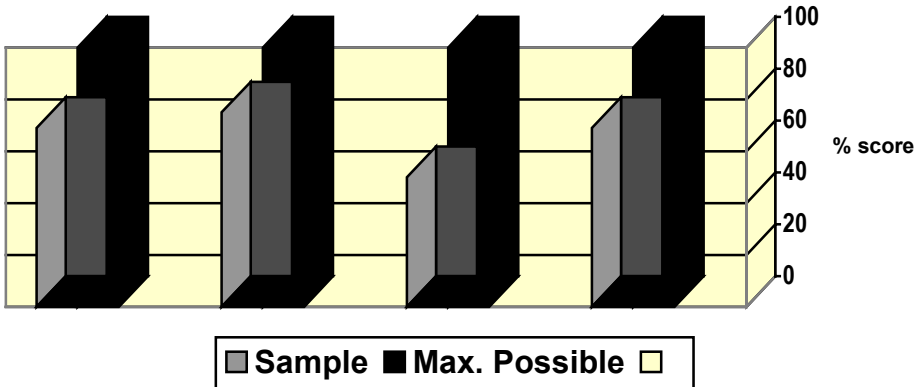
⁹ See Notes on Methodology (Annex A2) for more detailed description of assessment method.

3. Innovation in the Australian Rabbit Industry

Innovation is increasingly recognized as an important, if not critical attribute of firms with a sustainable future in any industry, but with firms in agriculture in particular, where competition, volatility and regulations and subsidies can have a severe impact on prices. For the farmed rabbit industry in particular, innovative practices in feeding, breeding, labour saving practices and construction of cages are likely to have potentially high returns. The planned expansion in stock numbers will place pressure on all of these areas.

Most rabbit producers are introducing 5-10 ‘change projects’ each year and this is a relatively high, almost the highest, level of change compared to other new animal product industries. We define a ‘change project’ as any planned program or set of activities that have been designed to alter fundamentally the way the producer does business. The average aggregate percentage results for innovation in the rabbit industry were relatively high at 68%, and were it not for the general absence of fast release strategies such as artificial insemination and embryo transplants and new product development, the industry would have been rated the most innovative of all new animal industries. Most rabbitries emphasise changes to feed and nutrition and acquisition of new skills and knowledge as the focus of their innovative activity. This is a positive factor in view of the importance of feed and nutrition and all round management expertise.

Chart D2: Innovation in the Australian Rabbit Industry



The major weakness of the industry is in resistance to fast release strategies, including introducing new strains of improved stock, and new products for those with more vertically integrated operations. While there were one or two exceptions, over 50% of respondents consider there is a natural livestock and product development process (one producer reported using AI) and therefore they don’t employ fast release strategies to speed up development and release of new strains of livestock. This resistance is a constraint to the adoption of new technologies and new breeds, which offer the prospect of breeds better adapted to the Australian environment. The FAO emphasise the need for genetic improvements to focus on local environmental conditions, which vary considerably.

Most rabbit enterprises have a computer less than 2 years old and are on the Internet, implying they have the infrastructure for good stock breeding and production records, even though they don’t make good use of it, because most operators also indicated they use hand written stock breeding and production records.

The key innovative strength of the rabbit industry is the relatively high and consistent innovative score for all respondents, with little variation between respondents, indicating an industry that is capable of adjusting to new conditions and larger sized operations.

4. Production Operations Management

All rabbit operators surveyed run an owner-managed and fully integrated breeding and growing enterprise. Meat from the NZ White breed was the dominant product focus, though sales for household pet purposes were also reported from small operators. A number of non-respondents indicated they were focused on the pet market and breeding of animals for show purposes.

In regard to profitability one operator indicated a profit of \$30-40,000/enterprise, but the typical enterprise has a profit of \$0-\$5,000, with a couple reporting losses. Financial record keeping could be improved as few operators have detailed knowledge of their enterprise trading profits. The average price received for rabbit meat was \$6.50/kg, with little variation in this price. Live rabbits ranged from \$9.50 up to \$75.00 for stud bucks and \$50 for stud does.

The average live-weight of rabbits sold by respondents was 2.60 kgs, when sold at just under 12 weeks of age. Some of the key technical results are shown below in Table D1. A feature of the results is the high variability between operators, as expressed by the co-efficient of variation.¹⁰ This variability suggest there is significant potential to improve industry performance by simply concentrating on some of the key technical efficiency ratios.

	Average	High	Low	Co-efficient of variation ^a
Slaughter wt (kg)	2.60	3.25	1.40	24.72
Age at slaughter (weeks)	11.67	13.00	9.00	11.71
Rabbits/litter	8	9	6	13.36
Litter/doe/year	7	9	3	24.24
Number weaned per litter	6	8	3	28.59
Culling rate %	19	30	10	54

The variability in the technical ratios shown above reflects a combination of environmental factors unique to specific enterprises and differences in feeding management. There is considerable variation in feeding levels and feed costs, which accounted for up to 95% of cash costs, but as low as 35%. Feeding rates for does were indicated to be an average of 222 grams/doe/day, which was well below the highest respondent of 320 grams and 350-380 grams indicated by the FAO for European conditions. Some of this variation reflects differences in the intensity of the operation with some operators using grazing and concentrates as a supplement and others operating at a low level of breeding. Feed concentrate costs were all above \$0.25/kg, but ranged from just over \$0.30 cents to \$0.50 cents. There appears to be significant potential to reduce unit costs of feed without compromising on nutrient content. The rabbit is recognized for its ability to convert feed of various types and qualities, ranging from brewers waste to citrus pulp etc. (refer to FAO). There are also economies of scale in feed purchasing and small operators located within close proximity of each other could consider group purchasing of feed.

There is considerable variation in labour costs and labour productivity. This reflects the limited recognition, understanding or recording of labour among most enterprises, despite the fact that labour accounts for 68% of costs in the typical enterprise. Many respondents, particularly on the smaller enterprises, have limited or no understanding that there is an opportunity cost to their own time. This

¹⁰ Co-efficient of variation is estimated as the standard error of the sample, divided by the mean. Generally, levels above 20% indicate a result with increasing variability. The small sample size can produce high variability, but we suspect from general inquiry there is very high variation in the technical performance ratios of the Australian rabbit industry.

implies they are indifferent to a choice between one hour of leisure and one hour of labour! Labour costs, where nominated varied from \$10/hour, through to \$20/hour. The productivity of labour varied from an extraordinary 104 hours/doe/year to less than 10 hour/doe/year on the largest enterprises. This compares to the 1986 FAO estimate of 8 hours/doe with equivalent or better technical performance by the doe in terms of output. There are economies of scale in rabbit production and they reflect mainly the superior productivity of labour for large enterprises. This, in turn, reflects a combination of skill, experience and capital investment. Labour productivity is perhaps the most critical issue for small rabbit enterprises deal with and particularly for those intending to expand production. Smaller enterprises may be able to offset their labour productivity disadvantage by the following actions:

- 1.) **Better time management.** Record and question and analyse every labour using activity; consider doing a time management-training course; evaluate labour saving cage and shed layout designs.
- 2.) **Improve technical performance of animals.** Increased animal growth rates, earlier turnoff and increased supplementary feeding may help.
- 3.) **Switch into higher valued product.** The prices for rabbits for pets may realize much higher price premiums than rabbit meat, but this is strictly a small sized business.
- 4.) **Whole-farm planning and management.** A major challenge in productivity improvement is that there is no single or one-off action that works. Instead, high productivity comes from systematic attention to every single work practice in each and every year.

For the future most rabbit producers are expecting significant revenue growth of around 10-20%/year, accompanied by cost increases of the same level. These growth rates will place significant pressure on management expertise to arrive at international competitive labour productivity levels and general productivity improvements. Foster (1999) indicates the investment in an optimal sized rabbitry is around \$250,000 to \$300,000. Generating an acceptable rate of return on this size of investment will require complete attention to feed, labour and marketing management, accompanied by a fair bit of innovation in feeding and labour in particular.

Most operators indicated they were still not in a position to judge the overall economic sustainability of their rabbit enterprise.

In regard to environmental sustainability, all operators rated their enterprise fully sustainable.

The animal health security practices employed by respondents typically involved a systematic program to control diseases and movements of stock and people around the operations. Annual veterinary costs averaged \$1.32/grown rabbit.

A simplified, but more detailed, decision framework for managing trading revenue and costs is shown in Part A on page xii.

5. Conclusions

The economic challenge for Australian farmed rabbit producers is to increase enterprise size to a minimum of 200 does, while simultaneously improving feeding and labour productivity substantially, without exposing the enterprise to over-investment in plant and equipment. Debt financing cannot be contemplated without achieving competitive levels of labour productivity and feeding costs. Equally important, however, is to adopt programs that facilitate regular, not just one-off, increases in productivity. These improvements are unlikely to be achieved with improvement to any one practice. Instead, the best operators are likely to give comprehensive attention to a combination of time management and work practices, feeding management and turn-off age, genetic improvement and record keeping, as well as continuation of the innovative approaches to management that are a feature of the industry. Investment in marketing skills is likely to be worthwhile.

Annex D1: Detailed Responses Tables

Rabbit Production Responses

	Question	Average	High	Low	Mode	Median
GENERAL	Percentage of income from rabbit enterprise	32%	100%	1%	1%	8%
Size	Number of breeding does	53	150	15	15	48
	Number of fertile males	9	15	4	6	9
	Number of others	177	650	4	4	70
	Total animals	239	810	33		94
Data Collection	Method of recording data	Hand written stock breeding & production records	Computer stock breeding & production records	Hand written stock breeding & production records	Hand written stock breeding & production records	Hand written stock breeding & production records
MARKETING	Percentage of costs on sales and marketing	1% to 5%	More than 10 %	Less than 1%	Less than 1%	Less than 1%
	Percentage of labour on sales and marketing	1% to 5%	More than 10%	Less than 1%	From 1% to 5%	From 1% to 5%
	Feedback level on market requirements	Regular feedback	Complete, part of the business	None	Regular feedback	Regular feedback
	Quality check regularity	Occasional	Always	Occasional	Always	Always
	Defect rate %	Less than 1%	Less than 1%	More than 10%	Less than 1%	Less than 1%
	Provision of performance guarantees	Occasional guarantees	Always guarantee	Never guarantee	Always guarantee	Occasional guarantees
	Attendance of industry events	Once per year	2-5 times/year	Never attend	2-5 times/year	Once per year
	Expenditure to improve marketing skills	Have on one occasion	Always	Never	Occasional	Occasional
	Negotiation of selling conditions	Have once negotiated a different price to that which was offered	Always	No negotiation, buyers know the price & that;s final	No negotiation, buyers know the price & that;s final	No negotiation, buyers know the price & that;s final
	TOTAL MARKETING EMPHASIS max 36		23	35	9	

Annex D1: [Continued]

	Question	Average	High	Low	Mode	Median
INNOVATION	Number of change projects in past year	From 5 to 10 change projects each year	From 5 to 10 change projects each year	From 1 to 5 change projects each year	From 5 to 10 change projects each year	From 5 to 10 change projects each year
	Focus of change projects				Feed and nutrition	Feed and nutrition
	Reason for change				To grow our business	
	Employment of fast release strategies	No, there is a natural livestock & product development process	Frequently, we see an advantage in being a leader	No, there is a natural livestock & product development process	No, there is a natural livestock & development process	No, there is a natural livestock & development process
	Use of industry bodies	Occasionally we use them	Always make use	Never make use	Occasionally we use them	Occasionally we use them
	New information and communication technology	We have a computer less than 2 years old and are on the Internet	We have a computer less than 2 years old and are on the Internet	We have a computer less than 2 years old and are on the Internet	We have a computer less than 2 years old and are on the Internet	We have a computer less than 2 years old and are on the Internet
	TOTAL CHANGE ACTIVITY max 16	11	12	8	11	11
PRODUCTION	Farming System				Dry system – removal of litter	
	Enterprise Structure				Integrated from breeding to finished product	
	Management Structure				We own and manage all the animals	
	Product Focus				Meat	
PROFIT	Price Live Animal [\$/head]	\$25.74	\$75.00	\$9.50		\$15.00
	Price Carcass Meat[/\$/]	\$6.50	\$7.00	\$6.00		\$6.50
	Total Trading Profit					
	Total Net Profit	From \$0-\$5,000	From \$30,000 to \$40,000	Realized a loss	From \$0-\$5,000	From \$0-\$5,000

Annex D1: [Continued]

	Question	Average	High	Low	Mode	Median
Sustainability	Environmental sustainability	Fully sustainable	Fully sustainable	We have some concerns	Fully sustainable	Fully sustainable
	Economic Sustainability	Not in a position to judge	Fully sustainable	We have some concerns	Not in a position to judge	Not in a position to judge

STOCK NUMBERS	Breeding Does 2000	57	150	15		37
	Breeding Does 2001	86	200	12	150	54
	Breeding Does 2002	125	400	6	150	106
	Breeding Does 2003	158	600	12		139
	Breeding Does 2004	189	800	6	150	145
	Fertile Males 2000	7	10	3	10	8
	Fertile Males 2001	11	30	4	6	7
	Fertile Males 2002	16	60	5	5	10
	Fertile Males 2003	20	90	5	5	10
	Fertile Males 2004	8	22	1		1
	Total 2000	158	810	18		79
	Total 2001	188	810	29		74
	Total 2002	228	810	35		115
	Total 2003	266	810	35		150
	Total 2004	301	920	35		160

TECHNICAL	Typical Adult Rabbit Size at Maturity	Large 6.5-7.0kg	Large 6.5-7.0kg	Medium 4.0-6.5 kg	Large 6.5-7.0kg	Large 6.5-7.0kg
	Main breed				NZ White	NZ White
	Females/male at mating	9	15	6	10	9
	Number in Litter	8	9	6	8	8
	Number weaned/litter	6	8	3	8	6
	Litters/female/year	7	9	3	7	7
	Average cage area per adult [sq metres]	0.63	1.20	0.50	0.50	0.50
	Number of cages per rabbitry	144	200	50		2.00
	Cages per doe	2	3			2
	Slaughter wt [kgs]	2.60	3.25	1.40		2.73
	Average age at slaughter [weeks]	11.67	13.00	9.00		12.00
	Average rate of weight gain at slaughter [grams]	50	80	28		45
	Culling rate [% females sold each year]	19.00	30.00	10.00	30.00	15.00
	Adult death rate [%]	2.25	5.00	0.00		2.5

**Annex D1:
[Continued]**

FEED

Question	Average	High	Low	Mode	Median
Feeding rate for breeding females [grams/day]	222	320	120		225
Feed for males [grams/day]	197	320	120		150
Feeding rate for growers [grams/day]	150-250	350-450	Less than 150		150-250
Average cost of feed [\$ per kg]	More than \$0.25	\$0.50	\$0.30		More than \$0.25
Feed costs as % of total cash costs [excl. labour]	71	95	35		85

VETERINARY

Animal health security strategy	Have a systematic program	Have a systematic program	Check most diseases	Have a systematic program	Have a systematic program
Monitor animal growth	Regular monitoring	Regular monitoring	Occasional monitoring		Regular monitoring
Vet. costs per mature rabbit/year	\$1.32	\$3.75	\$0		\$0.76
Annual vet. costs total	\$140	\$300	\$0		100

LABOUR

Employee numbers in:

Breeding & growing	1	2	1	1	1
Operations	1	2	1	1	1
Other handling	1	2	1	1	1
Management	1	1	1	1	1
Total Employees	2	5	1	1	1

Hours per employee/year in:

Breeding & growing	732	1560	312		547
Operations	217	364	80		208
Other handling	604	1000	208		604
Management	740	1460	50		725
Total enterprise	1243	2371	na		1404

Labour costs per hour in:

Breeding & growing	\$13	\$15	\$10		\$13.50
Operations	\$11	\$12	\$10		\$11
Other handling	\$10	\$10	\$10		\$10
Management	\$12.50	\$15	\$10		\$12.50

Labour costs per year in

Breeding & growing	\$9,570	\$16,896	\$3,600		\$8,212
Operations	\$2,000	\$2,080	\$1,920		\$2,000
Other handling	\$2,080	\$2,080	\$2,080		\$2,80
Management	\$3,975	\$7,200	\$750		\$3,975
Total enterprise	\$14,246	\$19,566	\$8,212		\$14,960

Annex D1:
[Continued]

Question	Average	High	Low	Mode	Median
Labour hours per rabbit	15	55	2		8
Labour hours per doe	43	104	9		32

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