R&D Plan for the
RIRDC Rare Natural Animal Fibres Program
2003 – 2008
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Animal Fibres Program
2003-2008

A report for the Rural Industries Research
and Development Corporation

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Contents

1. Purpose of the Plan .................................................................................................................................1
2. Framework of the Plan ...............................................................................................................................1
3. Vision .......................................................................................................................................................1
4. Background ..............................................................................................................................................2
   4.1 Industry Situations – Summary ............................................................................................................2
   Alpaca .................................................................................................................................................2
   Cashmere .............................................................................................................................................2
   Mohair ...................................................................................................................................................2
   Other Fibres .........................................................................................................................................3
   4.2 Industry Organisations ..........................................................................................................................4
   Alpaca ...................................................................................................................................................4
   Cashmere ...............................................................................................................................................4
   Mohair ...................................................................................................................................................4
   4.3 Research and Development .................................................................................................................5
   4.4 Outcomes from RNF Plan 1998-2003 .................................................................................................5
5. SWOT Analysis ........................................................................................................................................6
   Goal 1: Develop New Opportunities .......................................................................................................7
   Goal 2: Stimulate Industry Partnerships and Adoption .......................................................................8
   Goal 3: Increase Competitiveness, Capability and Capacity ..................................................................8
7. Annual Operating Plans ...........................................................................................................................9
8. Recent Publications .................................................................................................................................9
9. Industry Contacts .......................................................................................................................................9
Attachment 1 ..................................................................................................................................................10
   Project achievements ...............................................................................................................................10
Attachment 2A ............................................................................................................................................12
   SWOT Information .................................................................................................................................12
   Strengths ...............................................................................................................................................12
   Weaknesses ............................................................................................................................................12
   Opportunities ........................................................................................................................................12
   Threats ...................................................................................................................................................12
Attachment 2B ............................................................................................................................................13
   SWOT Analysis - Strategy Development ..............................................................................................13
   Using Strength to Take Advantage of Opportunities .........................................................................13
   Using Opportunities to Overcome Weaknesses ................................................................................13
   Minimising Weaknesses to Avoid Threats .........................................................................................13
Attachment 3 ...............................................................................................................................................14
   RIRDC Reports .....................................................................................................................................14
Attachment 4 ...............................................................................................................................................15
   Industry Contacts .................................................................................................................................15
1. Purpose of the Plan

The Rare Natural (Animal) Fibres (RNF) plan has three main purposes:

1. to provide clear signals documenting the R&D needs and priorities for rare and natural animal fibre industries pertaining to cashmere, mohair, alpaca and other RNF fibres

2. to encourage and support continuing discussion and interaction between the industries, RIRDC, the facilitators of research, development and extension and commercial investors for the benefit of all sectors of these industries

3. to produce R&D strategies and document performance indicators to measure success.

2. Framework of the Plan

The framework of the RNF Plan is within the RIRDC Corporate Plan (2003-2008) which has been formulated taking into account the PIED Act (1989) and the federal government’s four national research priorities and seven rural research priorities. The three goals produced in this RNF Plan reflect the four goals of the RIRDC Corporate Plan.

Industry priorities were sorted via industry associations and from individual contributors. This plan has then been developed in consultation with the Australian Cashmere Growers Association Ltd, Mohair Australia Ltd and the Australian Alpaca Association and has been endorsed by RIRDC’s Rare Natural Animal Fibre Advisory Committee. The plan should be regarded as a living document that can be reviewed at any time and updated as circumstances required.

3. Vision

To achieve profitable RNF industries which are based on international competitive standards of highly productive animals, increasing value-added processing, manufacturing of some finished products in Australia and favourable marketing in Australia and other countries.
4. Background

4.1 Industry Situations - Summary

**Alpaca**

Alpaca is a soft handle, hard wearing, warm/lightweight fibre. Fineness can range from an average/superfine grade of 21-22 microns and courser in older animals. There are more than 22 natural colour combinations. The alpaca fleece has medulated fibres which in the Huacaya phenotype can be as high as 46% in adults and 26% in the Suri phenotype.

Current production of alpaca fibre in Australia is from an estimated population of 50,000 ranging from 2 kg greasy fleece yearly weight for weaners to 5 kg for adults. Australian production in 2002 was in excess of 30 t. Most alpaca fibre is produced and processed in Peru with small quantities being produced in other South American countries such as Chile and Bolivia. The total world production is about 4,000 t per year.

The Australian Alpaca industry continues to move from a breeder to a commercial commodity phase with new retail opportunities developing. Prices for top good quality males are from $15,000 to $50,000 plus while average stock prices are falling with female and males around $5,000. Wethers sell from $350 to $600. World price of the common grades of alpaca fibre is $7 to $18 per kg. In Australia the Australian Alpaca Co-operative pays over $40 per kg for superfine fibre.

**Cashmere**

Cashmere is a luxury fibre commanding some of the highest prices in the world of textiles. It is the fine, soft downy undercoat found on most goats (average 16 to 17 microns) and is associated with a course guard hair (up to 40 - 100 microns). Australian cashmere growth is of superior length, softer to handle, of higher tensile strength and possesses a unique lustre compared with that harvested in most parts of the world.

Current production in Australia is from approximately 150 farmers and is 10 to 12 t (hair – in) per annum. This volume represents 0.15% of the world production with China, (about 50%), Iran, Afghanistan and Outer Mongolia being the highest producers.

The fibre comes from domestically raised cashmere bearing goats. These goats may be dual purpose being raised for both fibre and meat. Many are utilised in weed control and some of these not shorn due to a variety of managerial and financial...
constraints. Many of the feral goat population have cashmere fibres but to date only insignificant quantities have been recovered from skins of slaughtered goats.

The average yield of cashmere is mainly from 50 to 300 g per goat per annum but quantities of about 1 kg have been recorded. The average farm gate price for fine grade was $100 per kg in 2001.

Mohair

Mohair is a smooth lustrous fibre from the Angora goat which resists felting and imparts warmth with little weight to fabrics. Fineness can vary from 19 microns to 29 microns in kid Angoras with adult fibre measuring over a wide range but up to 35 microns or higher depending on genotype and environment.

Current production in Australia is around 250 tonnes per annum. This volume represents 3.5% of world production which is concentrated in South Africa. Other countries producing mohair include USA, Argentina, Turkey, France, New Zealand and Lethoso.

Mohair fleece weights per goat increased in the 1990’s due to the introduction of the Texan and South African Angora genotypes. The combination of these traits with the existing Australian genotype has reduced kemp and medulation levels significantly, with a resulting major improvement in overall mohair quality.

The yield per shearing, with two shearings per year, can range from 900 g for the first fleece (usually Fine Kid) to 4.0 kgs for mature does. The average price per kg in 2002 was $7.72, with a top of $27.30 for A length Fine Kid.

Other Fibres

Other rare animal fibre R&D can be included in the sub-program. These include fibre from rabbit, camel and llama.

Angora fibre from the Angora rabbit is smooth and lustrous with a diameter of 11 to 15 microns. About 8,500 t is produced annually in the world with China and Chile the largest producers. There was in 2001 an importation of French Angora Rabbit into NSW for fibre production.

Camel hair has softness and strength and is composed of hair and an inner down type fibre. Most of the world-wide camel hair comes from Bactrian (two humped) camels and the soft, downy winter coat is from 18 to 26 microns. Australia has the highest (200-300,000) feral camel (one humped dromedaries in the world and some fibre is harvested from skins as a by-product from meat processing. World production of camel hair is about 2,000 t, mainly from China and Mongolia.
Llama fibre is usually coarser (30 to 36 microns) than alpaca and has similar colour characteristics. The fibre is most highly medulated and stiffer than alpaca fibre. There has been little interest in harvesting fibre in Australia. On the world scene most llama are raised in Peru (500 to 600 t fibre per annum) and Bolivia.

4.2 Industry Organisations

Alpaca

The major Alpaca industry organisation is the Australian Alpaca Association which was established in 1990 and currently has 2000 members. The Australian Alpaca Cooperative Limited has grown strongly recently and is a major player in marketing alpaca fibre through six strategic manufacturing partners.

Cashmere

The Cashmere industry has a national coordinating body – The Australian Cashmere Growers Association Limited – which was established in 1980 and is owned and funded by cashmere growers. There are currently 300 members. Most activities (eg promotion, training) are organised on a regional basis by elected committees.

The marketing arm of the Association is the Australian Cashmere Marketing Corporation which was established in 1986. The Corporation markets now almost all the fibre grown in Australia by a private-treausy system to ensure both that more than one buyer participates in a sale, and that prices are maximised.

Mohair

The Mohair industry organisation representing all sectors of the industry is Mohair Australia Ltd. The company was established in 1993. There are currently about 500 members of the organisation. The organisation is arranged on a state and regional basis with activities focused on local members and regional promotion of the industry coordinated at this level.

Membership categories for the organisation have been structured to accommodate the various interests of people involved in the industry including stud breeders, commercial fibre producers, brokers and processors. Commercial producers have the opportunity to join Mohair Australia through payment of either a commercial membership fee or via payment of the voluntary fibre levy on a minimum of 1000kg of mohair.
4.3 Research and Development

The Rural Industries Research and Development Corporation (RIRDC) is a statutory Corporation of the Commonwealth established under the Primary Industries and Energy Research and Development Act 1989. RIRDC's predecessor, the Australian Special Rural Research Council, was in place when in 1989 a Goat Fibre Levy was introduced by the Commonwealth at a level of 1.5% of the sale value of goat fibre up to a limit of 0.5% of the average gross value of production of goat fibre. In 2002/2003, $39,718 was collected from the Goat levy.

The RIRDC sub-program - Rare Natural (Animal) fibres - is financed partly by that levy, a voluntary contribution from the Australian Alpaca Association (AAA) plus Commonwealth fundings. In 2002/2003 $20,000 was provided by AAA.

4.4 Outcomes from RNF Plan 1998-2003

The previous Plan had five objectives that had a total of 19 targets. During the past five years there have been 17 research projects that addressed 15 of these targets. Another four research projects that were developed within objectives and strategies as priorities were identified during those years. Another target was achieved by the annual publication of the progress of all projects.

Of the 21 projects 11 were conducted with industry participation and/or resources and 13 were contracted following submission and 8 by commission.

A summary of outputs or outcomes is given in Attachment 1

The main lessons learnt in the implementation of the 1998-2003 plan were:

- The Plan provided an effective system in providing guidelines for researcher priorities.
- However the numbers of target were too large given the size of funding for the sub program
- Targets can be too prescriptive with the attainment depending sometimes on factors such as climate and overseas prices. Inclusion of only performance indicators seem more relevant in measuring success in future plans
- Some targets could not be realistically addressed by R&D alone but were dependent on industry associations priorities or by the preferred inputs of investors along the supply chain
- Sound outcomes occurred or are occurring when projects are implemented alongside industry inputs. Those inputs have been appropriately funded within a project
- There was insufficient emphasis on measuring adoption although this can be quite difficult, for example, for processing outputs that are usually commercially adapted or adopted in confidence.
5. SWOT Analysis

The RNF industries have strengths, weaknesses, and opportunities and threats (Attachment 2A) This information is used as the basis for appraisal and then development of industry strategies for R&D (Attachment 2B). The information and analysis are directed mainly to those factors that can be influenced by R&D through RIRDC. Other factors that affect industry such as overseas market prices, changes in international textile fashion, competition from other countries are not really influenced by Australian R&D and therefore not included specifically in the strategy development. The challenge is to improve productivity along the supply change and identify market signals. Strategies can relate to one or more of the industries (goat/alpaca).

The Plan is based on strategies identified in Attachment 2B. These strategies have been allocated to the three Goals of the Plan acknowledging there are interactions and inter-relationships between some of these strategies and goals.

The measures of success include project identification, implementation, analysis and reporting. Acceptance, adoption and commercialisation will be monitored and measured during and after the project has been completed. Specific performance indicators are given for each strategy.

**Goal 1: Develop New Opportunities**

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use research and industry capability for livestock improvement particularly innovation technology in genetics and reproduction and in the utilisation of products other than fibre</td>
<td>• Increase in the average weight and/or decrease in fibre diameter and increase utilisation of other non-fibre products to obtain greater returns</td>
</tr>
<tr>
<td>• Use textile technology knowledge for value adding from fibre</td>
<td>• Identification and exploitation of fibre characteristics that can assist the processing and marketing of products</td>
</tr>
<tr>
<td>• Develop more international linkages to improve identification of market signals</td>
<td>• Level of communication with, and travel to, international selling, processing and marketing forums and enterprises</td>
</tr>
</tbody>
</table>
### Goal 2: Stimulate Industry Partnerships and Adoption

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Use industry partnerships and communication resources to facilitate greater adoption and commercialisation of R&amp;D outputs</td>
<td>• Number of projects planned and implemented with industry. Evidence of commercialisation and adoption during and after project</td>
</tr>
<tr>
<td>• Raise productivity to encourage retention of large-scale producers and the introduction of new investors to stimulate more rapid and effective adoption and commercialisation</td>
<td>• Increase in number or size of large-scale producers to lead industry</td>
</tr>
</tbody>
</table>

### Goal 3: Increase Competitiveness, Capability and Capacity

<table>
<thead>
<tr>
<th>Strategy</th>
<th>Performance Indicators</th>
</tr>
</thead>
<tbody>
<tr>
<td>• Identify impediments and develop diversification into RNF production by better grazing and management systems</td>
<td>• Increased number of farms to include RNF livestock in the production system</td>
</tr>
<tr>
<td>• Identify and develop drought and disease management strategies to increase production and minimise environmental effects</td>
<td>• New technical information disseminated to industry</td>
</tr>
<tr>
<td>• Facilitate more training and/or education to increase research capacity</td>
<td>• Include post graduates in projects or provide scholarships</td>
</tr>
</tbody>
</table>
7. Annual Operating Plans

Annual operating plans will allocate funds to address the goals/strategies of the Plan.

For the 1998-2003 Plan the funds per project ranged between $5000 and $255,708 with an average $51,100.

8. Recent Publications

A list of publications of recent final reports of RIRDC’s projects from the sub-program are given in Attachment 3.

9. Industry Contacts

A list of industry contacts and the name of members of the RIRDC’s Rare Natural (Animal) Fibres Advisory Committee are given in Attachment B.
## Attachment 1

### Project achievements

<table>
<thead>
<tr>
<th>Status</th>
<th>Brief Title</th>
<th>Objective*</th>
<th>Outputs/Outcomes</th>
</tr>
</thead>
<tbody>
<tr>
<td>Final Report 98/99</td>
<td>Mohair Blends</td>
<td>2</td>
<td>Blends commercially produced but no markets in USA</td>
</tr>
<tr>
<td>Final Report 98/99</td>
<td>Recording Scheme-Cashmere</td>
<td>4</td>
<td>Only two producers identified with suitable data sets. Phase 2 of the Project did not proceed</td>
</tr>
<tr>
<td>Final Report 98/99</td>
<td>Marketing of Mohair</td>
<td>1</td>
<td>Eleven recommendations. Some adopted</td>
</tr>
<tr>
<td>Final Report 98/99</td>
<td>Economics of Goat Enterprises</td>
<td>3</td>
<td>Strategic extension output to improve rate of adoption</td>
</tr>
<tr>
<td>Final Report 99/00</td>
<td>Detection of Johne’s Disease</td>
<td>4</td>
<td>Developed more sensitive tests which are now used for market assurance</td>
</tr>
<tr>
<td>Terminated 99/00</td>
<td>Fibre in Goatmeat Crosses</td>
<td>2</td>
<td>Terminated due to management constraints</td>
</tr>
<tr>
<td>Final Report 00/01</td>
<td>Publishing Goat Notes</td>
<td>5</td>
<td>Book distributed to industry association members and sold to other producers</td>
</tr>
<tr>
<td>Final Report 00/01</td>
<td>Fibre/Wool Blends</td>
<td>2</td>
<td>New products and processes developed</td>
</tr>
<tr>
<td>Final Report 00/01</td>
<td>Weeds and Goats</td>
<td>5</td>
<td>Book sold extensively. Reference for producers and veterinarians. High uptake</td>
</tr>
<tr>
<td>Final Report 00/01</td>
<td>Mohair Business Plan</td>
<td>3</td>
<td>Some recommendations accepted. Other still under consideration</td>
</tr>
<tr>
<td>Final Report 01/02</td>
<td>Classing of Alpaca Fibre</td>
<td>2</td>
<td>An initial minimum clip preparation standard that was well adopted by industry after state wide workshops</td>
</tr>
<tr>
<td>Status</td>
<td>Brief Title</td>
<td>Objective*</td>
<td>Outputs/Outcomes</td>
</tr>
<tr>
<td>------------</td>
<td>--------------------------</td>
<td>------------</td>
<td>----------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>Final Report 01/02</td>
<td>Reproduction in Alpaca</td>
<td>4</td>
<td>Improved knowledge of reproduction and technology protocols for embryo transfer</td>
</tr>
<tr>
<td>Final Report 02/03</td>
<td>Mohair Harvesting</td>
<td>2</td>
<td>Documentation of the price loss due to short and cotted fibre via analysis of information from producers, brokers and fibre buyers. Project continuing</td>
</tr>
<tr>
<td>Final Report 02/03</td>
<td>Drought Feeding Goats</td>
<td>4</td>
<td>Review and publication of a manual on drought feeding. Validation occurring</td>
</tr>
<tr>
<td>Final Report 02/03</td>
<td>Cashmere Down Production</td>
<td>2</td>
<td>Contributing components to fleece production identified</td>
</tr>
<tr>
<td>Final Report 02/03</td>
<td>AI in Alpacas</td>
<td>4</td>
<td>Technology development. Further explanation required for adoption</td>
</tr>
<tr>
<td>Final Report 02/03</td>
<td>Processing of Alpaca Fibres</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>Progeny Testing Mohair Sires</td>
<td>4</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>Benchmarks for Cashmere</td>
<td>2</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>Diversification into Fibre Goats</td>
<td>3</td>
<td></td>
</tr>
<tr>
<td>Current</td>
<td>Worm Resistance in Goats</td>
<td>3</td>
<td></td>
</tr>
</tbody>
</table>

* Objective 1  To obtain better returns by market development
Objective 2  To expand value adding and product development in Australia
Objective 3  To increase supply of animals and fibre
Objective 4  To improve production efficiencies
Objective 5  To enhance information transfer
Attachment 2A

SWOT Information

Strengths

• Australia has roughage that is well grazed and utilised by goats and alpaca with some positive effects on the environment
• Unique fibres are produced that blend well with traditional fibre for niche markets
• A high standard of research capability is present in livestock and textiles and there is sound management expertise in leading producers and processors
• Industry leaders are keen to participate in R&D and there are a number of publications that disseminate information widely

Weaknesses

• Productivity per animal is low
• Insufficient population size to influence major world fibre markets
• Research capacity (size) is small
• Resistance to diversification to production of some rare natural fibres

Opportunities

• Improving genetics and reproduction
• Fostering appropriate value adding in processing
• Identifying impediments in increasing industry size and diversification opportunities
• Developing more international linkages for researchers and industry leaders
• Utilising livestock products other than fibre

Threats

• Droughts
• Exotic and endemic diseases
• Reduction of research capacity
• Decrease in the number of large – size producers
Attachment 2B

SWOT Analysis - Strategy Development

Using Strength to Take Advantage of Opportunities

- Use research and industry capability for livestock improvement particularly using innovative technology in genetics and reproduction and in the utilisation of products other than fibre
- Use textile technology innovations for value adding from the fibre
- Develop more diversification into RNF production by flexible grazing and management systems
- Use industry partnerships and communication resources to facilitate greater adoption and communication of R&D outputs

Using Opportunities to Overcome Weaknesses

- Develop more international linkages to improve identification of market signals
- Facilitate more training and/or education to increase research capacity
- Identify impediments to diversification of some rare natural fibres

Minimising Weaknesses to Avoid Threats

- Identify and develop drought and disease management strategies to increase productivity and minimise environmental effects
- Raise productivity to encourage retention of large-scale production and the introduction of new investors to stimulate more rapid and effective adoption and commercialisation
Attachment 3

RIRDC Reports

Australian Cashmere-Attributes & Processing R02/112 (2002, 69 pgs)
Business Plan for the Australian Mohair Industry R01/093 (2001, 51 pgs)
Developing Faure Island Goats for Long Stapled Cashmere R97/037 (1997, 46 pgs)
Economics of a Commercial Angora Goat Enterprise R97/011 (1997, 57 pgs)
Economics of a Commercial Cashmere Goat Enterprise R97/010 (1997, 55 pgs)
Extent & Source of Short & Cotted Mohair R02/108 (2002, 68 pgs)
Grower Adoption of Clip Preparation Standards for Australian Alpaca Fibre R02/016 (2002, 53 pgs)
Improved Marketing of Mohair Fibre R99/179 (2000, 44 pgs)
Improving The Efficiency of Reproduction & Breeding in Alpacas R02/097 (2002, 28 pgs)
Increasing Production of Mohair & Cashmere R98/138 (1998, 29 pgs)
Innovative Processing of Rare Natural Fibres R98/118 (1998, 17 pgs)
Johne’s Disease in Goats R98/135 (1998, 42 pgs)
Mohair Blend Worsted Manufacture R01/091 (2001, 7 pgs)
Nutrition of Goats During Drought R03/016 (2003, 70 pgs)
Palatability & Potential Toxicity of Australian Weeds to Goats R00/139 (2000, 166 pgs)
Properties and Performance of Goat Fibre R98/022 (1998, 80 pgs)
Attachment 4

Industry Contacts

Australian Cashmere Growers Association Ltd (ACGA)
PRESIDENT: Andrew James
EXECUTIVE OFFICER: Carolyn Gould
Phone/Fax: (02) 9629 2390

Mohair Australia Ltd (MA)
PRESIDENT: Geoffrey Pfitzner
c/- ABRI, University of New England, Armidale NSW 2351
Phone: (02) 6773 3557

Australian Alpaca Association Inc. (AAA)
PRESIDENT: Kerry Dwyer
PO Box 1076, Mitcham North, Victoria 3132
Phone: (03) 9877 0770

RIRDC Rare Natural (Animal) Fibres Advisory Committee
MEMBERS: Alan Smith (Chairperson)
Noel Waters (ACGA), Andrew James (ACGA), Pamela Goble (MA), Denise Riches (MA), Wendy Jones (AAA), David Williams (AAA), Peter McInnes (RIRDC)
PO Box 4776, Kingston ACT 2604
Phone: (02) 6272 4029