A REVIEW OF THE CURRENT STATUS OF GOAT RESEARCH AND DEVELOPMENT IN SOUTH AFRICA

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ABSTRACT

Large areas of South Africa are only suitable for animal production off natural veld, and it is in these ecosystems that the goat has the biggest potential. Developing this potential, however, will require a co-ordinated and multi-functional approach where subject matter specialists work together as a team.
Past research and development initiatives in South Africa have concentrated largely on the improved Boer goat and the South African Angora. These are examples of highly successful research and development ventures where partnerships between stock owners, breeders, State institutions, Breed Societies and the product industry led to the development of breeds that are in demand both locally and internationally. The Boer goat was developed by selecting and improving indigenous goats, and the South Africa Angora was the result of crossbreeding and selection using imported stock and locally selected goats. The work done at Grootfontein Agricultural Development Centre, and the ongoing Angora research and development programme are examples of effective service delivery to the mohair industry.
This paper reviews the role of Breed Societies, clubs and interest groups, State and Parastatal research and development centres and Universities as key stakeholders, and discusses some successful and less successful technology transfer and development initiatives. Past failures have often been due to insufficient information on production environments and markets, and insufficient consultation with local communities and farmers. Such initiatives must be "needs-driven".
Feedback from two recent workshops, one on the commercialization of indigenous goats and products, and the other on research and training strategies, shows that there is sufficient capacity to serve the industry. More attention, however, needs to be given to promoting the use of goat meat, milk and milk products, selection and breeding for cashmere, and the curing and processing of skins as value-added products. The work done by the Agricultural Research Council (ARC) Animal Nutrition and Products Institute, and the development of a hardy milk goat and production system at the Medical University of Southern Africa (Medunsa) illustrate the value of an integrated systems research and development approach.
An urgent reassessment is needed of the current capacity of Provincial Agricultural Development Centres for service delivery, and for more partnerships between State, Parastatal and private sector organizations to ensure integrated service delivery to the goat industry

INTRODUCTION

Large areas of South Africa are only suitable for extensive animal production off natural veld and, with the possible exception of the Karoo, it would often be economically or ecologically more viable to farm with more than one livestock species. Most of the natural vegetation requires a balanced utilization by a combination of browsers and grazers for sustainability and this is not possible with a single species approach. In addition, animal diseases and parasites often add to the burden of the stockowner and make it imperative to farm with hardy adapted breeds. The role of goats especially needs to be reassessed.
Goats, sheep and cattle were introduced to South Africa by migrating tribes and were usually kept in combinations. To this day, the largest concentrations of goats are found in the areas where these tribes and ethnic groups settled. The introduction of exotic breeds of farm animals from the 17th century onwards led to an erosion of the local breeds in some cases, and to the development of a few hardy composites. Today, South Africa has a fairly wide variety of indigenous and locally developed breeds,

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as well as a variety of adapted exotic breeds, and it is possible to match animals and combinations of animals with production systems. In theory, therefore, it should be possible to find a combination that is suited to both the environment and the management capabilities of the farmer. Goats are very often a useful and necessary component of such combinations, but, to a large extent, this resource is currently under-utilized.

THE POTENTIAL OF GOATS

With the exception of the Improved Boer goat and the South Africa Angora, goats are often taken for granted and the potential of these small ruminants has not been used as effectively as it might be.

Coetzee (1998) reviewed the total slaughtering of goats during 1997 as a percentage of the number of goats available at the time. While the statistics may be outdated, and while they may not reflect informal slaughter and use, the formal consumer pattern has remained fairly unchanged.

TABLE 1: TOTAL SLAUGHTERINGS DURING 1997 AS A PERCENTAGE OF THE TOTAL NUMBER OF GOATS (Coetzee, 1998)

Province	Number of goats	Number slaughtered	Percentage (%)
Western Cape	258 059	10 381	4.02
Northern Cape	446 925	656	0.15
Free State	74 815	3 273	4.37
Eastern Cape	3 220 618	20 712	0.64
KwaZulu Natal	833 129	871	0.10
Mpumalanga	81 814	201	0.25
Northern	1 017 024	21	0.00
Gauteng	13 986	81	0.58
North West	727 733	315	0.04
Total	6 674 103	36 511	0.55

Animals slaughtered in the formal sector are largely Boer goats and surplus Angora goats, with very few unimproved goats. Effectively, only 0.55% of the total goat population are slaughtered and consumed by the formal sector. In 1997, gross income from slaughtered goats generated R 3578 443 . The average carcass weight was 13.5 kg and the average selling price R 7.26 per kg (Information from the S.A. Meat Industry Company, as cited by Coetzee, 1998).

No information is available about the average herd structure. However, some estimates of productivity are possible. Assuming a fairly steady population of about seven million goats, and conservative production parameters, it is possible that between one and two million goats are slaughtered each year. Therefore as the official abattoir statistics show only a small proportion of these, it can be assumed that most are slaughtered in the informal sector. This is an unquantified and valuable contribution to the protein nutrition of the rural population.

Commercialization of goat meat production, by increasing the percentage slaughtered in the formal sector, has the potential to increase income generated from goats. To achieve this, more attention must be given to the promotion of goat meat, and market development to increase consumer demand, and to encourage stockowners to *farm* with goats, rather than to just keep them.

Goats currently offer the biggest scope for improvement and development in the animal agriculture industry. This includes the commercialization of the unimproved indigenous goat resources as well as the development of value-added traits and products.

Table 2 gives details of the current distribution of goats in South Africa. The majority of the goats are unimproved indigenous types, and it is this resource that has the biggest potential for research and development (R&D).

TABLE 2: GOAT STATISTICS FOR THE NINE PROVINCES IN SOUTH AFRICA
(Source: Directorate of Animal Health, National Department of Agriculture, 1999)

Province	Number of goats	Primary use	Potential value at 5% slaughter and 13.5kg carcass sold for R 7.26 per kg
Northern	302 866	Meat	R 1 484 165
North West	1430879	Meat	R 7 011 929
Gauteng	9073	Meat, fibre, milk	R 26 052
Mpumalanga	52908	Meat	R 259 236
KwaZulu Natal	615920	Meat, fibre, milk	R 301 831
Free State	153123	Fibre, Meat	R 750 364
Northern Cape	594954	Fibre, meat	R 291 550
Eastern Cape	2 565 115	Fibre, meat	R 1 257 027
Western Cape	197 920	Milk , meat	R 969 906

THE MOHAIR INDUSTRY

The mohair industry is commercially the most important part of the goat production sector. South Africa is the most important producer of mohair, and in 1999 provided 62% of world production. Mohair was exported to 18 countries, the most important of which were the United Kingdom, Taiwan, Italy and France. As mohair is a luxury fibre, the industry tends to go through cycles of good and subsequently poor prices for mohair, depending on the vagaries of the fashion industry. Since 1990, world production has declined steadily, but at a slower rate in South Africa than in the rest of the world. Sales in 1999 were the best in six years, and we hope that this is the start of an upward trend. (Mohair South Africa, 1999).

THE ROLE OF BREED CLUBS, SOCIETIES AND RECORDING AND REGISTERING AUTHORITIES

Organized Breed Societies and clubs can be seen as key stakeholders in the development of the potential of breeds, and the Improved Boer goat and the SA Angora goat are typical examples of what can be done. At the same time, however, one must guard against over emphasis on non-productive traits that may have a negative effect on the breed. Breeders of recorded and registered animals are also an important link in the improvement chain. Improved genetic material must, however, find its way back to the commercial sector where it can be used to increase the production of meat, milk and fibre. Where Breed Societies do not exist, breeder clubs and interest groups fill this role. The recent emergence of the Kalahari red goat is a typical example. This goat was selected from indigenous stock and has been bred by a group of enthusiasts for a number of years. It has now been recognized as a hardy meat-producing breed with export potential to markets where there is a preference for solid red goats. The Farm Animal Conservation Trust (FACT) has recently published a booklet on the indigenous breeds of livestock in South Africa (Ramsay, Harris & Kotzé, 1999).

All concerned stakeholders must ensure that they protect the local animal population from unauthorized imports. In particular, great care must be taken that no animals, semen or embryos are imported that can transmit such diseases as Caprine Arthritis Encephalitis Virus (CAEV) or Scrapie. For example, it is known that goats have been imported into Zimbabwe and Mozambique in the past that were infected with CAEV, and had to be destroyed.

CERTIFICATION OF POTENTIAL AND GENETIC VALUE

The growing demand for locally developed South African breeds has made it necessary to have a formal mechanism to guarantee the genetic quality of exports. A number of goat breeders are taking advantage of the market demand for Boer goat and Angora goat genetics, but there is currently no guarantee on the genetic quality of the animals, semen or embryos, if this material is not exported with Breed Society certification. This market could broaden to include other indigenous goat breeds, as well as some of the composite breeds currently under development (for example, the hardy milk goat and the white cashmere-producing goat), and should be accessible to all stakeholders. Exporting poor quality genetics could jeopardise the market for all concerned. It is therefore important to be able to verify genetic purity and quality. This calls for effective recording, registration and certification, which will be a team effort between the veterinary, identification, breeding and recording sectors.

Breed Societies and interest groups will be called upon to play a key role in this process, and to develop a system that can incorporate both registered breeders as well as the commercial and traditional stock owner sectors while ensuring that minimum breed standards are maintained. Such breed standards should be specified in terms of production and disease resistance characteristics, rather than visual phenotypic traits, that are less relevant to the value of these breeds.

TABLE 3: BREED SOCIETIES, FORMAL AND INFORMAL STRUCTURES

Breed	Organised structure	Contact details	Contact person
SA Boer goat	Boer goat Breeders' Society	P O Box 282 SOMERSET EAST 5850 society@studbook.co.za	Boetie Malan
Savannah goat	Savannah Goat Breeders' Club	P O Box 106 DOUGLAS 8730 Fax +27-53- 2982931	Lubbe Cilliers
Kalahari Red	Kalahari Red Goat interest group	P O Box 3 De AAR 7000 albiehorn@hotmail.com	Albie Horn
SA Angora	Angora Goat Breeders' Society	P O Box 50 JANSENVILLE 6265 info@studbook.co.za	Blake Hobson
Milch goat Saanen Toggenburg British Alpine	SA Milk Goat Breeders' Society	P O Box 873 BLOEMFONTEIN 9300 society@studbook.co.za	Mervyn Swart
Gorno Altai (Cashmere)	Interest groups	CSIR TEXTEC, P.O. Box 1124 Port Elizabeth 6000 abraun@ csir.co.za	Albie Braun
Saffer goat (Cashmere)	In development		Albie Braun
Unimproved veld goats	Farm Animal Conservation Trust (FACT)	Private Bag X2 IRENE 0062 cobus@iapi.agric.za	Cobus Fourie

RESEARCH AND DEVELOPMENT

Two workshops on goats were recently held in South Africa: the first on the commercialization of indigenous goat production and products (Smuts, 1997); and the second on research and training strategies for goat production systems (Webb, Cronje & Donkin,1999). These highlighted the fact that much research and development (R&D) information is available, but that it is often not getting to the consumer or to the producer/owner in a user-friendly form. There is also a need to develop the potential of leather, cashmere, and processed meat and milk products and to investigate and develop markets.
Ambitious projects very often fail because of a lack of market research and information on the production environment. We can no longer afford to make mistakes, such as the introduction of goat milk production into areas where it is not traditionally consumed; or the development of a goat project in a heartwater area, unless the breed of goat has some resistance, or the disease can be controlled effectively.

REGIONAL GOAT RESEARCH AND DEVELOPMENT INITIATIVES

The SADC region has its share of successes and failures as far as goat R&D is concerned and it is important to have access to this information. In many cases, information and technology can be shared, and adapted for local use, thus avoiding a repetition of expensive mistakes. Biotechnology such as Artificial Insemination (AI) and Multiple Ovulation and Embryo Transfer (MOET) may also have its place in R&D, but such techniques have to be used sensibly. Goats are prolific breeders and the use of AI should only be considered where a composite breed is being developed, or where this enables access to quality genetics from rams that would otherwise not be affordable. MOET offers the possibility of collecting embryos for export markets, adding value to specific goat resources such as the improved Boer goat. But again, this must be done in a responsible way to ensure that only quality genes are involved, and that all the necessary health protocols can be complied with. This would require the establishment of an embryo collection centre, which would be an expensive undertaking.

It is important to take stock of the available resources and information, and the capacity of resource centres, development centres and research institutes for service delivery. It is also important to co-ordinate R&D initiatives more effectively to avoid duplication and to ensure that inputs are pooled in partnerships that will either directly or indirectly benefit the stockowner.

This paper reviews the current situation in South Africa, the goat resources, the R&D work being done, as well as the capacity for service delivery. In the process, successful and unsuccessful R&D ventures are also reviewed and this information is used to formulate a way forward for the goat industry in the country.

THE CAPACITY FOR GOAT RESEARCH AND DEVELOPMENT IN SOUTH AFRICA (CURRENT RESEARCH AND DEVELOPMENT ACTIVITIES)

South Africa has extensive capacity for goat research and development, but currently these resources and programmes are largely uncoordinated and poorly funded.
Table 4 gives details of Government, Non-Governmental Organizations (NGO) and private facilities involved in R&D. Table 5 gives details of Training and Extension facilities. Most of the Provinces have the potential to do the necessary Farm Systems Research and Extension (FSR-E), and to make the relevant information available to stock owners and producers. These initiatives can and should be supported wherever possible.
The development of the Mohair industry is a good example of how State, NGO and Private sector co-operation and co-ordination has led to the effective development of this industry (Mohair South Africa, 1999). The work done by Grootfontein Agricultural Development Center in this regard is well worth reviewing and is attached to this paper as an Annexure.
Unfortunately, many Provinces may have the potential, but lack manpower and financial capacity for effective service delivery. It is here that public and private sector partnerships should be considered. There is also a need to co-ordinate both information and technology, to get it to the client in a user-friendly form. Market research and development in particular needs to be co-ordinated more effectively.

SUCCESSFUL GOAT RESEARCH AND DEVELOPMENT PROJECTS AND TECHNOLOGY

Historically, the most successful project in South Africa has been the development of the Improved Boer goat. Started in the late 1920's and early 1930's (Ramsay, Swart, Olivier & Hallowell, 1999), it was a combined effort between breeders, the Breed Society and Government. The quest for a uniform meaty goat led to the development of what might be claimed to be the only true "meat goat" in the world. Campbell (1984) and Casey (1985) showed that the improved Boer goat has the potential to convert low quality grazing, shrubs, bushes and thorn trees into nutritious high quality meat, and the fact that the Improved Boer goat is in demand in many countries bears witness to its meat producing capability. This is a good example of adding value to an indigenous breed, and should also be used as an incentive to promote the meat quality of other indigenous breeds. Care must, however, be taken to always remain focused with such initiatives. Management practices and intensification have resulted in a loss of maternal behaviour in some herds, as well as a loss in general hardiness.

Two farmer-driven projects have been equally successful in developing the white Savannah goat and the Kalahari red goat. Both breeds were developed in arid areas, and the hardiness of the animals has not been compromised in the process. Similar development initiatives could lead to the improvement of other promising veld goat types.

The development of the Angora goat is also a good example of how an introduced exotic breed has been evaluated and bred for conditions in certain areas of the country. This development was also a joint effort between breeders, the Breed Society, the Mohair Board and Government (Grootfontein Agricultural Development Institute). (See Annexure).

CASHMERE RESEARCH AND DEVELOPMENT

Work is currently being done by the Agricultural Research Council (ARC), the Animal Nutrition and Products Institute (ANPI), the Council for Scientific and Industrial Research (CSIR) Textile Technology Institute, the Eastern Cape Department of Agriculture, and a private farmer, to develop the cashmere production capacity of indigenous and composite goat breeds. This is a team effort, illustrating the value of partnerships and the flow of benefits to all sectors. Production is, however, not sufficient at present to justify the development of a goat for cashmere production alone. The researchers and developers should rather concentrate on a dual-purpose goat: either a milk or meat goat, with an added value of quality cashmere production. This would be in accordance with the use of cashmere goats elsewhere in the world. It is also important to incorporate an effective system for recording and evaluating the animals from the onset, and the inputs of the ARC recording and evaluation team at Grootfontein will be a critical factor in the long-term stability and success of this initiative.

LEATHER RESEARCH AND DEVELOPMENT

A paper at the International Conference on Goats in 1992 described how the leather industry had been developed in India to become the fourth largest export industry within a period of about ten years. Most of the skins used were from goats, and these skins had previously been thrown away (Rao & Rao 1992). Although South Africa has far fewer goats than India, the potential for developing small-scale leather work is very great.

In South Africa, preparatory research into small-scale technologies to preserve and process skins has been another highly successful venture. A team-effort between the Leather Research Institute (LRI), the ARC ANPI and private individuals has led to the development of a home tanning training module and kit, and guidelines for the preservation of skins destined for more sophisticated tanning and processing (glove leather, fashion garments, book binding leather, tourist curios). Goats are readily slaughtered in the informal sector, and it here that large quantities of skins are still going to waste, probably more than a million each year. Attention needs to be given to the promotion of correct skinning, preservation and storage of skins, as well as an effective collection system. This might require the establishment of collection centres where none exist, and this should be linked to the possible development of service centres that provide training, information, genetic material, AI and natural breeding, and marketing services. Sadly, the LRI has closed its doors. This is a severe blow for the goat leather industry in particular, and it can only be hoped that a regional initiative to make better use of the Institute may lead to its reopening .

AI AND EMBRYO COLLECTION AND TRANSFER TECHNOLOGY

The development of AI and embryo technology has been successful in the developed (commercial farming) sector where there was a need for such services. The freezing of goat semen can be a problem, and fresh or chilled and extended semen can be used on synchronised ewes. The main application is in intensive units, such as milk goats (provided that superior semen can be identified); and where the intention is to collect embryos. It is important to realise that the success of such technology is largely dependent on good herd health and husbandry. Many of the less successful ventures have been as a direct result of poor nutrition and management

THE MEDUNSA MILK GOAT PROJECT

The development of a hardy composite milk goat at the Faculty of Veterinary Science of the Medical University of Southern Africa (Medunsa) is an example of how the traits of two breeds can be combined to develop a breed for a specific farming system. Indigenous goats are tolerant of internal and external parasites and are also resistant to heartwater in areas where this is an endemic problem. They do not, however, have the milk production potential of the milk breeds such as the Saanen and British Alpine. By crossing Saanen and Indigenous goats and selecting the progeny for parasite tolerance, heartwater resistance and improved production, it has been possible to develop a hardy composite for small farm systems. Supportive research into feeding and management is important in such projects, as a system has to be developed around the animal. This system must also include appropriate milking, preservation and processing technology, and it is here that partnerships are useful. It is also important to stabilise the composite breed. The crossbred milk goat has been developed from two breeds, and the best combination in such cases is often a 50:50 cross as this is the easiest to establish and stabilise. (Donkin, Stewart, MacGregor, Els & Boyazoglu 1992; Donkin, Boyazoglu, Els, MacGregor, Ramsay & Lubout 1996; Donkin & Boyazoglu 2000).

PERFORMANCE TESTING OF GOATS

A National Goat Performance Testing Scheme was started in 1970. Interest and participation in the scheme dwindled, largely because participants could see no visible benefits. The advent of the goat export industry has seen a revival in recording and evaluation. This has also been reflected in the number of registered Boer goat breeders.

Ramsay, Smit & Casey (1987) reviewed the potential of the unimproved goat as an alternative to the improved Boer goat in environments where problems such as protozoal diseases, conditions such as foot-rot and parasites and toxic plants were limiting factors. The goats in this trial were all recorded and evaluated on the National Scheme and the data were used to show that the unimproved goat actually produced more meat per unit area than Boer goats. Using recording and evaluation data, it should be possible to select for optimal animal size within a production environment. In this way, unimproved ecotypes could be improved within their respective environments.

SUCCESSFUL GOAT DEVELOPMENT INITIATIVES

- The development of the improved Boer goat
- The development of the South African Angora
- The upgrading of local goats in the Eastern Cape with Angora goats
- The use of goats to control bush encroachment
- The use of goats to control weeds
- The use of goats in plantations
- The development of goat products and product technology

UNSUCCESSFUL GOAT DEVELOPMENT INITIATIVES

Development initiatives that attempted to introduce improved Boer goats into areas where heartwater is a problem have not been successful. A number of projects have been initiated in the developing areas of the country in the past, and most did not succeed . This was firstly because of disease and parasite problems, and secondly because some were initiated in areas where the goat had no real status in the traditional sector. In addition, other projects failed because there was insufficient community consultation, involvement and support.

PROFESSIONAL AND INDUSTRY SUPPORT POTENTIAL

South Africa has a well-developed commercial and industrial sector, with the capability of supporting many development projects with expertise and technology. Many of the organizations and people are listed in the Tables appended. However, there are also feed suppliers, equipment suppliers, veterinary and pharmaceutical companies, consultants, and many others. In addition there are professional associations, such as the South African Society of Animal Science, and the South African Veterinary Association, whose members have areas of expertise that may be relevant. Both of these organizations publish scientific journals.

ACCESSING FINANCIAL AND RESOURCE ASSISTANCE FOR GOAT DEVELOPMENT

One difficulty related to goat development programmes is the association of goat production with poverty. It was Gandhi who is reputed to have called the goat "the poor woman's cow". In general people do not want to be associated with poverty. This can be a handicap in terms of getting sponsorship for goat development projects. Commercialization is necessary to improve incomes from goats and to awaken interest. Some industries set a portion of their profits aside for development projects, and the means of eliciting support must be more readily accessible. People involved in goat development projects need to know whom to approach for assistance, what kind of proposal to submit, and in what format.

As the need for poverty alleviation in Southern Africa becomes more acute, and hopefully becomes more clearly acknowledged, people may be able to perceive the importance of development of the goat production sector, so that resources will be made available.

CONCLUDING REMARKS

Of all the farm animal genetic resources in South Africa, it is the goat that has the biggest potential for development. This includes value-added products, product development, market development and the development of a goat meat and milk consumption culture. One of the most important lessons to be learnt from past development initiatives is to ensure that they should be "needs driven", and that they are supported by the stakeholders/clients from the outset. Too many projects in the developing animal agriculture sector have failed because of insufficient consultation, breed and production environment evaluation and market research. Although there are areas where additional research and development is needed, there is a wealth of information already available. This information needs to be consolidated and converted into a format that will enable all levels of producers and owners to use it effectively.

The capacity of Provincial Agricultural Development structures for service delivery needs to be re-evaluated as a matter of some urgency and State, Parastatal and Private sector role players should be encouraged to establish partnerships in the interests of an integrated approach towards goat R&D.

The establishment of a regional network will further enhance the capacity for information on farm systems and development initiatives that have been successful. This information should lead to the more effective use of R&D funds in the region and to the identification of key issues of mutual importance and interest.

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TABLE 4. - STATE/PROVINCIAL GOAT RESEARCH AND DEVELOPMENT FACILITIES

Province	Facility	Production environment	Current activities	Contact person
Northern	Messina ADC	Arid sweet bushveld	Mixed production systems Bush control	JJ Jordaan Towoomba ADC Private bag X 1615 Warmbaths 0480 +27-12-7362250
	Mara ADC	Arid sweet bushveld	Comparison of boer and unimproved goats Integrated production systems Bush control	J J Jordaan
	Delftzyl ADC	Mixed sweet/sour bushveld	Integrated production systems Fluoride tolerance (with MEDUNSA) Selection preferences	J J Jordaan
	Towoomba ADC	Sourish mixed bushveld	Bush control Integrated systems Selection preferences	J J Jordaan
North West	Potchefstroom	Highveld sourveld	Farm systems research	Dr Chris de Brouer NW Province Department of Agriculture Private Bag X 804 POTCHEFSTROOM 2520 Vkcd@potch!.agric.za
	Armoedsvlakte	Sweet bushveld	Management and grazing systems Control of bush	Dr Chris de Brouer
Free State	Glen ADC	Mixed Themeda veld	Farm systems	Dr Johan Erasmus

Province	Facility	Production Environment	Current activities	Contact person
Mpumalanga	Nooitgedacht ADC	Highveld sourveld	Highveld sourveld grazing systems	Mr. K B Dongo Department of Agriculture P.O. Box 3 ERMELO 2350 Kosy@nooitgd1.agric.za
	Athol ADC	Highveld sourveld	Sourveld grazing systems	K B Dongo
	Figtree project	Leobombo flats grassveld	Indigenous goats Bush control	K B Dongo Len Coetzer
Kwa Zulu Natal	Makhathini	Coastal sandveld	Evaluation of indigenous goats (Zulu ecotype) Integrated small farm systems	Steven Goetze KZN Department of Agriculture
	Bartlow Combine	Sweet bushveld	Evaluation of indigenous goats (Zulu ecotype)	William Gertenbach KZN Dept. of Agriculture P/Bag X 9059 PIETERMARITZBURG 3200 Gertenbach@dae.kzntl.gov.za
	Cedara ADC	Natal Midlands – largely planted pastures	Evaluation of crossbred indigenous – Saanen goats for milk production Farm systems research and development Zulu goats on kikuyu pastures Cashmere from Zulu goats	Brigid A Letty KZN Dept of Agriculture and Environment Affairs P/Bag X 9059 PIETERMARITZBURG 3200 Lettyb@dae.kzntl.gov.za Iona B Stewart KZN Dept of Agriculture P/Bag X 9059 PIETERMARITZBURG 3200 Stewart@cedara.kzntl.gov.za
Northern Cape	Grootfontein ADC	Arid Karoo veld	Farm systems research and development – Angora goats Breeding and improvement of fibre quality	Dr Gretha Snyman Grootfontein ADI P/Bag X 529 MIDDELBURG 5900 Dier6@karoo1.agric.za

Province	Facility	Production environment	Current activities	*Contact person*
Eastern Cape Province	Dohne ADC	Valley bushveld	Boer goat research and development	Dr W Henning Dohne ADI Private bag X 15 STUTTERHEIM 4930 Willie@dohne.agric.za
Eastern Cape	Adelaide ADC		Farming systems with Boer goats Cashmere production potential	Joshua Roux Cradock Experimental Station P O Box 284 CRADOCK 5880
	J C Steyn	Valley bushveld	Integrated farm systems (Cattle and Boer goats; Game and Boer goats)	Joshua Roux Adelaide Experimental Station P O Box 142 ADELAIDE 5760
	Steekpoort		Cashmere production – production of white cashmere	Joshua Roux
	Koopmansfontein		Cashmere from Boer goats	Joshua Roux
Western Cape province	Elsenburg		Milk goats	Dr Paul King Dept of Agriculture : Western Cape Private Bag X1 ELSENBURG 7607

TABLE 5: PARASTATAL AND UNIVERSITY GOAT RESEARCH AND DEVELOPMENT FACILITIES

Province	Facility /Institute	Current Activities	Contact person/persons
Northern	University of Venda	Farm systems research	A E Nesamvuni Department of Animal Science University of Venda P/Bag X 5050 THOHOYANDOU 0950
	University of the North	Farming systems research Socio economic aspects Potential of agro forestry – shrubs and tree legumes	L R Ndlovu Department of Animal Production Faculty of Agriculture Private Bag X 1106 SOVENGA 0727 Ndlovul@unin.unorth.ac.za
Gauteng	University of Pretoria Department of Animal and Wildlife Sciences	Physiological, Nutritional and Socio-economic research	Prof P B Cronje / Prof. N H Casey Department of Animal and Wildlife Sciences University of Pretoria PRETORIA 0002 pbcronje@postino.up.ac.za
	University of Pretoria , Faculty of Veterinary Science, Animal Production and Ethology (Work started at the Department of Animal Health and Production, Medical University of Southern Africa (Medunsa) and transferred to the University of Pretoria.	Crossbreeding Indigenous goats with Saanen Cost effective rations for milk goats Resistance to heartwater Tick tolerance Anatomy and physiology of indigenous goats Tolerance of high fluoride levels Out-of-season breeding Etc.	Prof. E. F. Donkin Faculty of Veterinary Science, University of Pretoria Private Bag X04 Onderstepoort 0110 Telephone: +27-12-5298363 Fax: +27-12-5298396 ndonkin@op.up.ac.za
	University of Pretoria Faculty of Veterinary Science – Department of Theriogenology Dept of Production Animal and Community Health	Assisted Reproduction – AI, MOET, IVF	Prof. Johan Terblanche Dr Eben du Preez Private Bag X04 Onderstepoort 0110 Jterblan@op.up.ac.za Edupreez@op.up.ac.za
	ARC Animal Improvement Institute	• Recording and performance evaluation of small stock • Characterization of indigenous goats • Conservation • Assisted reproduction technology • Exportation of genetic material	Graham Hallowell Antoinette Kotze Cobus Fourie Jean Rust Dr F de Villiers Private Bag X2 IRENE 0062

TABLE 5: PARASTATAL AND UNIVERSITY GOAT RESEARCH AND DEVELOPMENT FACILITIES

Province	Institute / Facility	Current R&D activities	Contact person
Gauteng	ARC Animal and Products Institute	Products research – skins, meat, milk products Commercialization of goats	Merida Smuts Private Bag X2 IRENE 0062 Merida@iapi.agric.za
	ARC – Onderstepoort veterinary Institute	Development of herd health protocols and systems; Small farm systems research and development; helminths.	Jenny Turton Mary Lou Penrith Adriano Vatta Private Bag X05 Onderstepoort 0110 +27-12-5299154 Jenny@moon.ovi.ac.za Adriano@moon.ovi.ac.za
	ARC – Range and forage Institute	Farmers for Africa support system – farms systems research – sheep and goats for small farming development Feeding systems	Dr Derrick Swart Jan Meyer
Mpumalanga	Loskop South Genetic resource center – ARC Animal Production Institute	Farm systems research Indigenous goat gene pool	Ephrahim Matjuda Irene Animal Improvement Institute Private Bag X2 IRENE 0062
KwaZulu Natal	University of Zululand	Farm systems research Indigenous goats	Prof E Collins Lusweti University of Zululand Privare Bag X 1001 KWA DLANGEZWA 3886 Ecollins@pan.uzulu.ac.za
	University of Natal, Pietermaritzburg	Nutrition research	Steven Slippers School of Agricultural Sciences and Agribusiness University of Natal P/Bag X 01 Scottsville 3209 Slippers@nu.ac.za
Western Cape	University of Stellenbosch	Nutrition of Milk goats Boer goat research	J D Thornton/ Prof. S J Schoeman Dept of Animal Science University of Stellenbosch STELLENBOSCH 7600
Free State	University of the Orange Free State	Assisted reproduction research Breeding and evaluation plans	Prof. Johan Greyling Prof. Gert Erasmus Department of Animal Science UOFS P O Box 339 BLOEMFONTEIN 9300 hester@landbou.uovs.ac.za

TABLE 5: PARASTATAL AND UNIVERSITY GOAT RESEARCH AND DEVELOPMENT FACILITIES

Province	Institute/Facility	Current Activities	Contact person/s
Eastern Cape	University of Fort Hare	Grazing and selection patterns Farm systems research Comparisons of communal and commercial goat farming systems	Prof. Jan Raats Department of Livestock and Pasture Science Fax: 040 6531730 Raats@ufhu.ufh.ac.za
	Institute for Leather Research Rhodes University	Research into processing and product development	Dr Clive Jackson-Moss International School for Tanning Technology P O Box 2085 GRAHAMSTOWN 6140 Michael Ginn LRI P O Box 185 GRAHAMSTOWN 6140
Eastern Cape	CSIR Division of Textile technology	Fibre research Angora Cashmere	Albie L Braun CSIR TEXTEC P O Box 1124 PORT ELIZABETH 6000 Abraun@csir.co.za
Western Cape	University of Stellenbosch	Goat AI and MOET	Dr Danie Barry Department of Human and animal Physiology University of Stellenbosch STELLENBOSCH 7600
Northern Cape	Grootfontein Agricultural college	Angora goat R&D AI and MOET	Dr M A Snyman Grootfontein ADI P/Bag X 529 MIDDELBURG 5900 Dier6@karoo1.agric.za

ANNEXURE
SERVICE TO THE MOHAIR INDUSTRY BY GROOTFONTEIN:
CURRENT RESEARCH PROJECTS

Gretha Snyman
Grootfontein ADI, P/BAG X529, Middelburg (EC), 5900, South Africa

This document includes a short review of the research that is currently being done at Grootfontein with regard to Angora goat and mohair production in South Africa, as well as some new projects that are in the planning phase. Some of the work done in the past is also mentioned. All the work that is being done at Grootfontein is done in co-operation with the mohair industry. For this purpose, there is the Angora Goat Liaison Committee which meets annually on the Angora Goat Experimental Farm near Jansenville. This committee consists of representatives from Grootfontein (scientists, college staff, extension officers, veterinary surgeons, etc), the Mohair Growers' Association, Mohair South Africa, Stud Breeders, CMW (Cape Mohair & Wools), BKB (Agricultural Marketing Company), and the Agricultural Research Council (ARC).

Hardiness

Several research projects are currently being done at Grootfontein. The whole issue surrounding hardiness in goats is being investigated. This includes, for example, hormone profiles on those hormones related to the underlying physiological mechanisms influencing hardiness in Angora and Boer goats. Extensive studies on the functioning of the adrenal glands are also done in collaboration with the University of Stellenbosch.

Fine hair project

Two long-term selection experiments are under way at the Jansenville Angora goat experimental farm. The first involves the establishment and evaluation of a genetically fine mohair flock. The exceptionally high mohair prices in the mid 1980's resulted in the SA mohair clip getting stronger, as many animals as possible were kept for mohair production. A relatively large price premium was also paid for finer hair. These were the incentives for the fine hair project, which was started in 1989. A final report on the results of the establishment of the fine hair flock, as well as some results of the evaluation of the fine hair goats will be published soon.

stablishment of a robust goat genotype

The aim of the second project is to develop a hardy goat genotype from crosses between Angora and Boer goats. This goat should produce kemp-free, quality mohair, and should be able to reproduce and produce under sub-optimum environments. This project was started in 1990. Selection for increased body weight and against kemp is carried out in a F2 and a F3 line respectively. Preliminary results look very promising.

Breeding strategies

Our service to Angora goat stud breeders includes the following :

An Angora goat performance testing scheme was established through the co-operation of the stud breeders and officials at Grootfontein. Data collected through this scheme were analysed to estimate much needed genetic parameters for SA Angora goats, which were virtually non-existent. These estimates were used for the construction of selection indices and the formulation of a viable breeding plan for each individual breeder.

Further projects on breeding strategies included a project which was done to determine the repeatability of various subjective and objective hair and body traits in SA Angora goats. This was done from 1991 to 1994 with the collaboration of eight stud breeders.

Performance testing scheme

In the revised breeding policy, more emphasis is placed on body weight and reproductive performance and relatively less on mohair production. For this purpose, we are busy with the implementation of a ewe productivity performance testing scheme, which will be compulsory for registered Angora goat stud breeders.

As far as the commercial producers are concerned, we are involved with several group breeding schemes. Services include performance testing, formulation of breeding plans and selection strategies for the various groups, and the education of the producers in the use of indices and scientifically based selection methods.

Specialized advisory service

Furthermore, Grootfontein also provides a specialized advisory service to the whole mohair industry in Southern Africa, including Lesotho. All aspects regarding breeding, nutrition and management are covered.

New projects

Several new projects are in the planning phase or subjected to preliminary trials at the moment. These include an in-depth investigation into reproduction and kid mortality rate from birth to two tooth age (this was identified as a major problem during the last liaison committee meeting). This project will be done in two phases. The first will be an intensive survey study on 12 farms, and the second will comprise a postal survey involving a wider range of farmers, concentrating on management practices which probably influence reproduction and kid mortality rate. Two other projects involve the investigation of the effects of bypass protein and mineral supplementation on reproductive rate in Angora goats.

Research done in the past

Other work done at Grootfontein in the past on Angora goats include an in-depth investigation into abortions; trials on the manipulation of hair growth, "speenskok" (post-weaning shock) and slow growth rate from weaning to ten months of age; out of season breeding; development of alkali-ionophore-treated grain; energy requirements of Angora kids; effect of nutrition on mohair quality; dip in an oil emulsion to prevent mortalities due to cold spells.

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