

Guidelines for Livestock Farming



Science For A Better Life

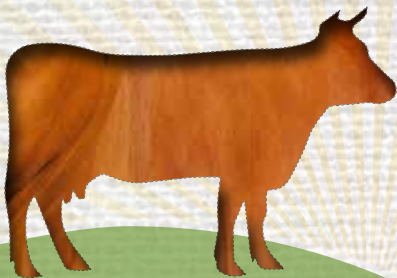


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Guidelines for Livestock Farming



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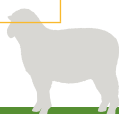
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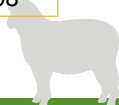
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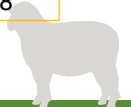
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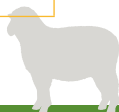
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3. WHY JOIN THE NWGA?

The NWGA is an established organisation and has been the voice of wool farmers since 1929. The NWGA especially has credibility with the national, provincial and local government structures, organised agriculture, as well as international role players such as the IWTO, development trusts and producer organisations in other wool producing countries such as Australia and New Zealand. This network is a big advantage to its members.

Members of the NWGA produce more than 80% of the national clip. Membership of the NWGA is voluntary and there are more than 4 000 paid up commercial members and 756 communal shearing sheds (approximately 15 000 individuals) that are registered as members. Members of the NWGA produce more than 80% of the national clip. Fifty per cent of the 10 000 members of the NWGA are black, emerging and communal farmers. This distinguishes the NWGA from the majority of other organisations in organised agriculture, as the NWGA is representative of all wool farmers in South Africa and recognised and accepted as such by government structures. A memorandum of understanding was drawn up and signed with the Department of Agriculture, Forestry and Fisheries, establishing a framework for future development partnerships. The institutional environment also includes the IWTO, CEO Forum (with the Department of Agriculture, Forestry and Fisheries), Agri SA, Business Chamber, wool structures, municipalities, tertiary training institutions, etc.

The mission of the NWGA is the establishment of sustainable, profitable wool sheep farming in South Africa (more sheep: more wool). It is pursued by way of the following objectives:

a. **Promote an improved policy and legislative environment.**

The NWGA plays an important role as representative organisation to influence policy and legislation to the advantage of wool producers.

The NWGA, as a member of the commodity chamber, has direct access to Agri SA to deal with issues of interest to the wool farmer, exports and tariffs, legislation, predation control, stock theft (with the RPO) and other aspects that require attention. This bargaining power is further strengthened by the formation of strategic alliances and strong interaction with other organisations in the agricultural environment.

Other policy issues include nylon packing, classing standards (Springbokkop), Code of Best Practice, nonmulesing, animal health etc.

b. **The establishment of an effective production environment and the expansion of wool sheep farming to suitable production areas through relevant training and development programmes.**

The NWGA is one of only a few commodity organisations that has a production advisory service. It is delivered under contract with Cape Wools SA, as well as various other contracts with the Departments of Agriculture, development trusts, local municipalities and international donors. The service focuses



on group activities and individual advice is possible on a cost recovery basis. In addition to production advice, an economic analysis service is also rendered. The Code of Best Practice has been approved and farmers have the opportunity to sign a vendor declaration in support of the principles contained in the code. Tertiary institutions have also been requested to include the Code in their training – another NWGA initiative.

The NWGA is an accredited service provider registered with AgriSETA. Training include shearing, wool classing, basic wool sheep production, nutrition, breeding, predation management, animal health, etc.

c. The establishment of an improved market environment

In this respect the focus is on the effective functioning of the market, development of new markets, value-adding and market information.

Various initiatives were introduced by the NWGA via the NWGA Marketing Committee and currently various marketing options are available to farmers, over and above the auction. International and local promotion of wool is also receiving attention, supported by a SAWAMBA levy to fund actions in this regard, including the Campaign for Wool with Prince Charles as international custodian, as well as international research programmes focused on climate change and life cycle analyses of wool and the impact on environment, etc. This is done in co-operation with the IWTO. NWGA management is closely involved with the local and international

promotion of the South African clip and with great success.

d. The establishment of a strong producer organisation

The more the NWGA's membership grows and the more representative the organisation becomes of wool farmers, the stronger its bargaining power within a democracy. A representative voice is essential within a democratic environment and the NWGA is precisely that for wool producers. Communication via the bi-monthly *Wool Farmer* magazine, newsletter and the NWGA website are known and powerful media tools. The NWGA now also holds regional meetings in addition to provincial annual meetings and its national congress, in an effort to improve communication at grassroots level.

e. NWGA training and development programme in communal areas

This programme is funded partially by Cape Wools SA, together with other contracts, and is valued at almost R20 million. No membership fees are used for this programme.

Outside contracts are currently received from the following authorities:

- National, provincial and local government.
- International development funds.
- Other livestock industries.
- AgriSETA.

Five extension officers from the Eastern Cape Department of Rural Development and Agrarian Reform have been seconded to the NWGA.

4. STRUCTURES IN THE WOOL INDUSTRY

The South African wool industry in 1997 restructured to comply with the regulations of the new *Marketing of Agricultural Products Act* of 1996.

The first step was to establish a Wool Forum representing the various affected groups in the industry. The Forum meets twice per year and its

representatives carry their own expenses.

The main functions of the Forum are:

- To create opportunities for industry issues to be discussed.
- To liaise with Government and other organisations.
- To ensure an independent and objective

- information, statistical and support service.
- To establish a viable business environment through the promotion of the necessary research, development and training.
- To promote South African wool.

4.1 Cape Wools SA

Cape Wools SA (CWSA) is a non-profit organisation established by the Forum as its executive arm. Its directors proportionately represent these groups and they are elected from the Wool Forum. CWSA reports to the Forum regarding its activities.

To minimise overhead costs and to make maximum funds available for services and functions required by the industry, CWSA operates with a small staff complement of six and subcontracts some functions, but accepts full responsibility for the planning and management of all functions.

CWSA is the income beneficiary of the Wool Trust and annually submits its budget to the forum. The functions identified by the Forum as essential to the survival of the industry, are:

- **Information and statistics**

CWSA was appointed in terms of the *Marketing of Agricultural Products Act*, to act as the official body for the gathering and processing of industry statistics. CWSA offers a complete statistical and information service for the wool industry through reliable, objective statistics and information pertaining to all aspects of the industry. In order to enjoy the benefits of scale and in a bid to save cost, all computer programming, systems and data capturing are performed in accordance with a contractual agreement with an external service provider.

It is also responsible for supplying statistics to, amongst others, the International Wool Textile Organisation (IWTO), other wool producing countries, the Department of Agriculture, Statistics SA, the Department of Trade and Industries and agricultural economists. Cape Wools also supplies an objective wool typing service to assist producers in determining a realistic value for wool.

Cape Wools has a website, www.capewools.co.za

that provides live results on auction days. It also provides an SMS messaging service regarding the latest price movements to producers with cell phones. In addition, market reports are available via e-mail.

- **Research**

This function is outsourced to research organisations. Research projects are identified through an annual industry survey and planned and funded according to the requirements of a standard protocol, which includes a standardised contract between Cape Wools SA and the research service provider.

- **Production advisory services and training**

The production advisory and training services have been outsourced to the National Wool Growers' Association (NWGA). The main aim of this service is to assist producers to increase production efficiency and profitability in order to maximise income. It involves the transfer of production technology and research results. It also includes development and training with the emphasis on farmers who previously did not have access to such services and the training of shearers. The largest portion of this budget is earmarked for the upliftment of small-scale and emerging producers, mainly in the former Ciskei and Transkei regions.

- **Promotion**

Wool promotion remains a priority and all possible avenues and opportunities are exploited to promote South African wool.

4.2 The Wool Trust

The Wool Trust was established in 1997 in terms of the new *Marketing of Agricultural Products Act* which stipulates that assets accumulated by agricultural boards under the previous dispensation, be transferred to trusts and utilised to the benefit of the relevant industry as a whole.



The Wool Trust Deed stipulates that a minimum of six and a maximum of seven trustees be appointed: one to represent trade, two to represent producers and one to represent the Minister of Agriculture. The other three should be independent specialists in the field of asset and financial management. The Wool Forum appoints the trustees (except the ministerial representative).

The main objectives of the Trust are:

- To protect Trust assets and to use it productively to ensure growth.
- Optimising assets and capital to enable the income beneficiary (Cape Wools) to deliver certain services to industry, which services were entrusted to it by the Wool Forum.

Although it is a discretionary trust (it can decide whether there are sufficient funds available for financing certain services) there are certain

restrictions. The trustees are obliged to ensure that only activities that comply with the regulations of the Trust Deed and which benefit the entire industry, are funded. The Trust also has to report to Cape Wools, the income beneficiary, which ensures effective communication and facilitates financial planning and management of Trust funds.

4.3 The Wool Bureau

The Wool Bureau is a research section conducting wool analyses on behalf of farmers and quality analyses on behalf of various other organisations. Wool samples received from farmers with a view to analysis for production measurement evaluation, are analysed by the bureau and sent to SA Stud Book for inclusion and processing in the Logix Small Stock system.

For more information phone Cape Wools on 041 484 4301 or e-mail capewool@capewools.co.za. Also visit the website at www.capewools.co.za

5. THE RPO'S ACTIVE REPRESENTATION IN INDUSTRY BODIES

The RPO's active representation in industry bodies

The RPO has close ties with and representation in the following institutions in a bid to promote and protect the interests of red meat producers:

- National Agricultural Marketing Council.
- National Agricultural Research Forum.
- Onderstepoort Biological Products (OBP).
- Onderstepoort Veterinary Institute (OVI).
- Wildlife Ranching South Africa (WRSA).
- National and Provincial Stock Theft Forums.
- Organised agriculture bodies.
- Agri SA Industry Chamber.
- Industry Trusts.
- Livestock Producers' Organisation of Namibia.
- Predation Management Forum.
- Breeders' societies.
- National and provincial government departments.
- Education and research institutions.
- Coordinating Committee for Animal Health.
- Red Meat Research and Development SA.
- Other producers' organisations.
- Sheep and Mutton SA.
- International industry organisations.

The RPO represents the interests of the red meat producers on the Red Meat Industry Forum (RMIF), on which all institutions involved in the value chain of the red meat industry are represented. The forum consists of:

- The South African Pork Producers' Organisation.
- Red Meat Abattoir Association.
- South African Feedlot Association.
- South African Federation of Livestock and Meat Brokers.
- National Federation of Meat Traders.
- South African Meat Processors Association (SAMPA).
- South African National Consumers' Union.
- Association of Meat Importers and Exporters.
- South African Hides, Skins and Leather Council (SHALC).
- National Emerging Red Meat Producers' Organisation (NERPO).
- South African Meat Distributors and Allied Workers' Union.
- RPO large stock.
- RPO small stock.

The RPO, together with NERPO, forms the

Federation of Red Meat Organisations of South Africa, which handles the collective interests of primary commercial and emerging red meat producers of South Africa.

Why statutory levies?

Two separate sources of financing, namely the Statutory Levy and the Voluntary Producers' Levy, are used to fund the survival and well-being of primary red meat producers and the red meat industry in general.

The Statutory Levy was implemented within the ambit of the *National Agricultural Marketing Act* and is utilised exclusively to finance the following functions in the interest of the red meat industry:

- Consumer security (food security).
- Consumer communication and education (marketing).
- Product research and development.
- Industry liaison.
- Development of the emerging sector.
- Production development and industry projects.

In terms of the provisions of the *National Agricultural Marketing Act*, an organisation such as the RPO, or any other organisation, is not allowed to fund its organisational functions from the statutory levy.

The primary producer makes the biggest contribution to the statutory levy and if the RPO is not financially empowered to perform its monitoring duties, the paying producer will lose his say as far as the scope and application of the statutory levy is concerned. It is imperative that the RPO will, on behalf of the producer, have a strong say in the Red Meat Industry Forum to ensure that statutory funds are managed in the correct way.

The voluntary levy contribution which is currently expected from producers, amounts to 0,15% of the turnover at the first point of sale. The voluntary levy contribution allows the RPO to undertake various actions of critical importance on behalf of livestock.

Agents and abattoirs enforce the voluntary

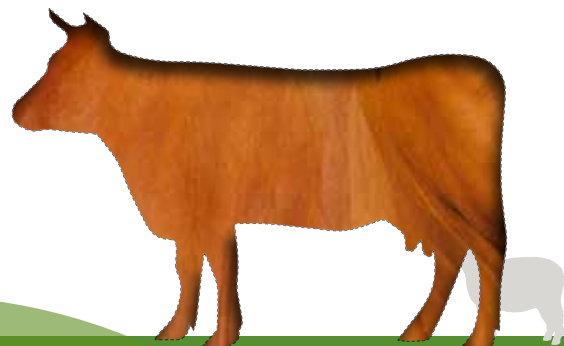
levy within provinces and pay it over to the provincial RPOs, who then pay a set amount over to the national RPO in order to empower the organisation to fulfil its organisational and administrative functions. The rule of thumb is that 70% of the funds are used within the provincial organisations, while 30% are utilised for national actions.

As a primary role-player in the red meat industry, the producer is expected to contribute financially by supporting both the statutory and voluntary levy schemes. Thus capacity is created to address and look after the producer's interests within the overall red meat industry value chain.

Organisational and administrative functions

The following important functions are financed via the voluntary levy in the interests of the producer:

- Provincial and national office and staff.
- Administrative management of national office and provinces.
- Radio talks and TV inserts.
- Marketing of red meat at local level.
- Producer liaison at information days, congresses, through SMS messages, webpage information management, brochures, the *RPO Communicator*, Facebook and the quarterly *Red Meat* magazine.
- Influencing policy at provincial and national authorities.
- Liaison with departments and veterinary services in terms of border and disease control.
- Education of producers and their workers.
- Financing of relevant research projects.
- Management of the National Stock Theft Forum.
- Consumer liaison.





6. DEVELOPMENT PROGRAMME WITHIN THE COMMUNAL PRODUCTION AREAS OF THE EASTERN CAPE - A SUCCESS STORY

(By Louis du Pisani)

This programme started during 1996/97 when the NWGA actively launched an effort within the communal areas for wool producers to join the NWGA as full-fledged members. The first task was to establish Wool Grower's Associations, as well as the development of a long term development programme with the focus on training, backed up by an effective extension programme.

An aspect that required immediate attention was the upgrading of shearing sheds and infrastructure. The primary focus of the programme is to improve the quality and quantity of the wool clip within the communal areas of the Eastern Cape as, at this stage, the wool clip was primarily traded on the informal market at very low prices. An important focus therefore was to give communal producers access to the formal market so that they could benefit from the higher product price. The next step was that more attention should be given to clip preparation, i.e. shearer training, wool classing and packing.

It soon became clear that the focus must be on the genetics of wool sheep within the communal areas in order to improve the quality and quantity of the wool, as well as reproduction. Inevitably, attention had to be given to veld management as well as flock management. From this, the Genetic Improvement Programme known as the 'Ram Project' followed.

An agreement was reached between the then Department of Agriculture in the Eastern Cape and the NWGA, whereby funds were allocated to the NWGA to remove 3 000 home grown rams from the communal areas and to replace them with 3 000 quality rams of genetic superiority. The NWGA signed contracts with breeders within two group breeding schemes to supply 3 000 rams per annum under specific conditions, inter alia, that the NWGA appointed its own independent inspector of rams and that the rams be made available at the value of 1½ wethers. This scheme started during 2002/2003.



The success of this programme can only be described as phenomenal and the wool industry is very proud of what has been achieved. At present there are 846 active Wool Growers' Associations (WGA) within the communal areas of the Eastern Cape, divided into five regions, each with its own executive, each organising its own

annual congress with an attendance of approximately 500 farmers per congress. Each WGA has its own producer number paying annual voluntary membership fees over to the NWGA. Therefore, our producers within the communal areas are full-fledged and appreciated members of the NWGA.

Table 1 illustrates how the volumes (quantity) and quality wool sold on the formal market increased significantly.

Table 1: Increase in volume and quality of wool

Season	Kilogram	Value (R)	National price (c/kg)	Commercial price (c/kg)
97/98	222 610	1 502 908	1 225	675
99/00	336 700	1 965 557	1 102	584
01/02	535 911	6 927 640	2 277	1 293
03/04	2 029 556	17 768 955	2 109	876
05/06	2 222 883	14 954 931	1 695	673
06/07	2 345 991	30 791 496	2 594	1 313
08/09	2 666 933	43 149 706	2 548	1 618
10/11	3 027 276	71 749 104	4 015	2 370
11/12	3 555 077	113 015 898	5 236	3 179
12/13	3 461 937	131 842 578	5 537	3 803
13/14	3 806 993	137 919 368	6 016	3 623

During 1997/1998 only 222 610kg wool with a value of R1 502 908 reached the formal market. This increased to 3 806 993kg with a value of R137 919 368 during the 2013/2014 season. Since 2004/2005 significant improvement has taken place as reflected in the % increase in price in relation to the national average.

During the 2004/2005 season very positive progress took place as reflected in the percentage increase in price in relation to the national price. It is significant that over the past number of years, shearing houses have succeeded in increasing their income in relation to the national average.

Since 2002/2003 more than 30 000 rams have been distributed within the communal areas. Each

year an average of 236 received rams and every fourth year the first group receive rams again. This means that during this period, more than 30 000 self-bred rams were removed from the communal areas.

We must congratulate the communal producers on what they have achieved over a short period of time, for their enthusiasm and their real desire for knowledge and independence. Secondly, we thank our breeders and the suppliers for rams for their loyal support. Then to our production advisors, our appreciation for their hard work and enthusiasm. And lastly, thank you to the Department of Agriculture for their support. This project illustrates that a partnership between Government and a producer organisation is indeed a recipe for success.





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1. FARM MANAGEMENT INFORMATION SERVICE

(By Chrisna Coetsee)

The following questions are often asked:

- Why are some farmers more profitable than others?
- Why do some farm businesses grow and expand, while others struggle to exist?

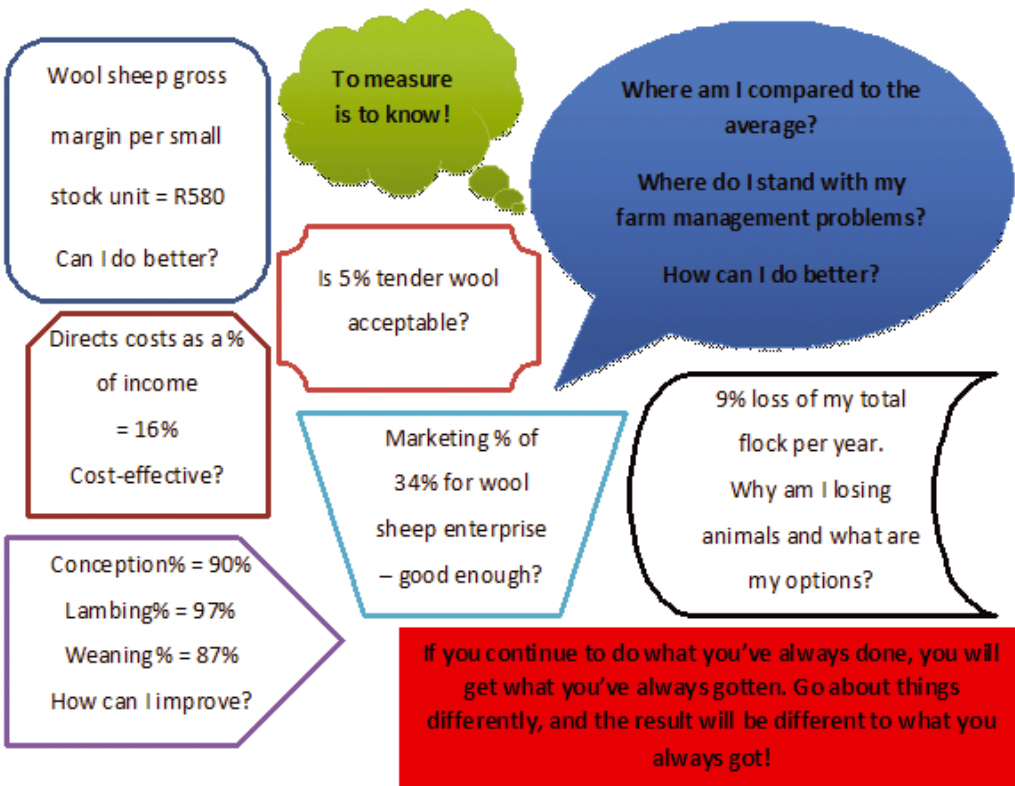
Good or bad luck alone cannot explain the differences observed in the profitability of farms, even when comparing farm units with similar natural and financial resources. Farm business analyses conducted by the NWGA indicate that the top third of farms are highly profitable, while the bottom third often operate at a loss. Why then the difference? The conclusion – because of farm management.

Due to poor recordkeeping many farmers are unaware of the fact that they are operating at a loss. There is no one-plan-fits-all solution to increase profitability. Each farm requires

individual attention. Increased efficiency and profits depend on the successful application of a package of practices, implemented in a logical sequence. The starting point is to analyse the present performance of the business and to make the necessary adjustments.

It is very important that smallscale farmers should understand the importance of measuring. By measuring production and recording it with a reputable service provider such as SA Stud Book, processed information will become available and will put the NWGA in a better position to render a more effective management information service.

The NWGA provides such a farm management information service to livestock farmers. Should you be interested in participating, please contact your nearest NWGA office.



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2. STRATEGIC PLAN FOR PREDATION MANAGEMENT

The executive committee of the Predation Management Forum (PMF) met with experts to map out a strategy for the future. The PMF provides a platform for liaison and coordination of activities of commodity organisations in the livestock and game ranching sectors, aimed at reducing losses incurred as a result of predation by means of ecologically and ethically acceptable methods which protect the biodiversity of South Africa.

Vision

The vision of the PMF is to ultimately facilitate and mediate for an environment that is characterised by:

- Sensible production-friendly legislation on predation management.
- Livestock (meat and fibre) producers and wildlife ranchers empowered to effectively deal with predation management.
- Roleplayers sharing an understanding of the predation management challenge and with an aligned approach to dealing with it.
- Well-informed consumers with an informed opinion towards predation management.
- Supported through a coordinated predation management support services body, partly funded by government, that oversees the execution of strategies and sustains an institutional memory.
- In the process protect the biodiversity of our environment.

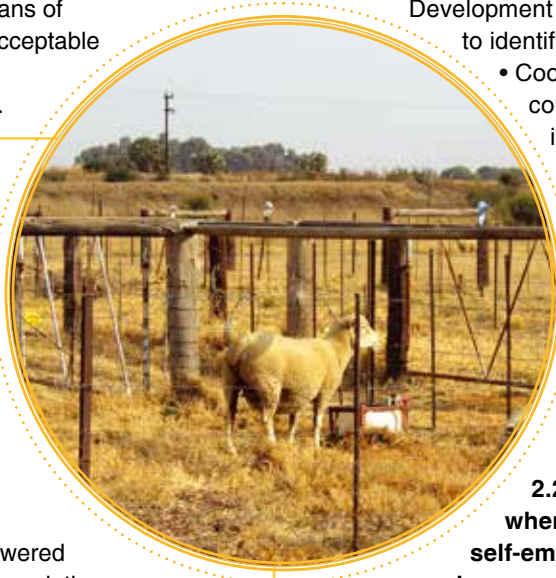
Strategic drivers

The PMF identified four key strategic drivers that will guide the actions of the PMF in the next three years. They are:

2.1 Expand the scientific knowledge base on predation management and build an

institutional national memory.

- Work closely with credible research partners to expand the knowledge base on predation management through annual research projects.
 - Work with Red Meat Research and Development South Africa (RMRDSA) to identify projects for research.
 - Coordinate and arrange to collate any existing data/information that may be relevant from time to time.
- Establish a partnership with a credible organisation to host and maintain the institutional database on predation management in South Africa.



2.2 Create an environment where the producer can be self-empowered to effectively and responsibly deal with predation management in support of economical livestock production.

- Improve accessibility to training.
- Identify, evaluate and list credible predation management agents.
- Ensure the annual update and publication of a predation management best practice manual.
- Actively promote the exclusive use of internationally approved predation management instruments in South Africa

2.3 Establish a mutually committed partnership at senior government level driving a shared strategy in support of predation management.

- Drive an active strategic process to obtain access and establish rapport with top level government officials and politicians.
- Continue to actively influence legislation in support of sustainable economic livestock production.
- Promote optimal government presence at all



- meetings and forums of the PMF.
- d. Capacity development of extension officers on predation management.

2.4 Drive an active communication strategy in support of the mandate.

- a. Produce a DVD that tells the story of predation management in livestock farming and put this to optimal use in promoting the case for responsible predation management.
- b. Establish and maintain an active website that provides information on an array of PMF

activities, information, etc.

- c. Run annual campaigns to educate the public and consumers on predation management.
- d. Promote the Code of Good Practice (CGP) in livestock production and increase producer commitment to the code.
- e. Continuously communicate with producers.

For more information regarding the PMF and the five-year plan, contact the PMF on 041 365 5030, send an e-mail to nwga@nwga.co.za or visit www.pmfsa.co.za.

3. BEST PRACTICES FOR MANAGING PREDATION IN SOUTH AFRICA

By the Predation Management Forum



Livestock farmers have a constitutional right and responsibility to take care of their animals and to protect them from all potential threats such as extreme weather conditions (cold, heat, droughts, fires etc.) as well as theft and predators, of course. This framework focuses on the best ways to manage predation. Livestock farmers will find this helpful in their attempt to protect their animals against predators.

For the best results, everything possible should be done to manage unwanted predators in a socially acceptable, economically viable, ecologically reconcilable and legitimate manner.

Preventive and remedial management measures must be integrated.

Standards for management measures

Preventative measures

- Jackal-proof mesh fence. It is strongly recommended that small stock farmers should fence the entire farm's perimeter with mesh fence.
- Electrical fencing. Electrical fencing can be very useful, but it poses a danger to animals

such as tortoises, pangolins and Cape monitors (*likkewaan*). The electric conductors should be installed in such a way that it would not trap or eventually electrocute these animals.

- Livestock enclosures. A kraal can be made of wire fencing, stones or rough branches.
- Deterrents:
 - Sound deterrents.
 - Light deterrents.
 - Scent deterrents.
 - Livestock protection and deterrent collars.
- Shepherds.
- Protective animals. These animals, just like farm animals, should be managed with the necessary care and attention. They should have free access to food, water and shelter at all times.
 - Male ostriches.
 - Blesbok rams.
 - Donkey stallions will deter black-backed jackal and caracal from the pens.
 - Alpacas can also be used with great success to keep predators away from the livestock.
 - Dogs.

Remedial management measures

- Shooting:
 - Immediate action. It is important to kill the culprit as soon as possible following the predation incident.
 - Specific area. Shooting should be focused on the area where the predation took place.
 - Precision. Make only use of experienced hunters who are trained to kill problem animals.
 - Identification of species. The hunter on the mission to kill a problem animal should identify the species before any action is taken.
 - Careful use of calling equipment.
 - Using infrared searchlights at nighttime.
 - Shooting from helicopters or microlight aircrafts. This should only be done by trained individuals who can identify the predators from the air and kill them.
- Traps with adjustable triggers.
- Live traps.
- The use of poison such as poison as bait or toxic collars.
- Hunting with dogs:
 - Search, find and killing.
 - Search and find. Dogs can be used to track and catch predators. Predators are shot once caught.
 - Search and kill on horseback. Riders follow the track of the predator and chase it into a shelter such as an aardvark hole, where it is shot.

Proper training by qualified people and/or organisations is essential to ensure clear identification of predators responsible for livestock losses and knowledge of sensible predation management measures. Contact the Predation Management Forum for further information on training. It is not only the farmer who should be educated, but also all the farm staff involved in livestock management and production.

Conclusion

Information about comprehensive methods to manage predators provides stock and game farmers with enough options to manage the problem of



predators effectively. It is important to look at the various options and to use more than one option simultaneously. Preventative measures are usually cheaper than remedial measures and protect the producer's livestock and wildlife against attacks from predators.

Farmers in a community should join hands in predator management because predators move over a wide area and one single predator can cause a lot of damage on several farms. It is impossible to get rid of all the predators, but it is possible to manage predation in an ecological, sensitive and economical viable manner.

Visit the Predation Management Forum's website, www.pmfesa.co.za, for the full *Code of Best Practice for managing predation in South Africa*.



4. COST COMPARISON PREDATOR MANAGEMENT METHODS

(By Abraham Landman)

There are costs associated with the different methods of predator management. It is preferable necessary to use a combination of methods to be more effective. The effectiveness of only a few methods was scientifically tested, so this is just for background information.

There might be some methods not included in this article.

4.1 Assumptions

Every farm is different and unique, with the result that it is very difficult to choose a method, given the size of the farm, topography, number of ewes, specific predator problem etc. It was therefore necessary to make a few assumptions in order to do calculations for comparison.

- Farm size: 6 000 hectares (based on a Karoo farm).
- Ewes: 1 000.
- Herd classification: three herds (dry, lambing ewes and replacement).
- Control needed for two herds, lambing ewes and replacement.
- No substitution of any collar was taken into consideration.
- Labour costs for fitting the collars were taken into account.

4.2 Lethal methods

(a) Chopper hunting

This method can be expensive, especially if only a few predators were shot. It is a method that I think should be used to control abnormal numbers that may arise with time in an area and remove the “tricky” animal effectively. Time of day is important, since it is more effective to i.e. fly three hours early in the morning and an hour or two at sunset. Your “tricky” predator can be effectively removed, large areas can be covered and difficult terrain can be managed.



(b) Night hunting

The calculation involves the hiring of a professional hunter at R500 per night and R600 per predator killed, for four nights in a month, for four months in a year, which means 16 nights in a year. If you want to hunt yourself, the initial cost will be about R11 000 for the equipment, plus your fuel and ammunition.

Night hunting is very effective to reduce numbers quickly. It is specie-specific and you can act immediately if there is a problem.

Please use professional people, because it will be better to leave the predator if you are not doing it right. It will only make the predators more shy.



(c) Hunting dogs

The initial cost is calculated for three dogs at R7 500 each and one dog at R5 000 to buy, as well as the construction of kennels. The maintenance cost for a year consists of dog food, veterinary inspections and fuel expenses. It may be that this method is very expensive compared to the other methods, but the team does not have to hunt on only one farm and can be used on other farms in the area to decrease the cost per unit.



(d) Gin traps

This method is probably one of the most effective and a cheaper lethal method. Gin traps cost R200 per unit and usually last very long. If current farm staff do the work, it is not necessary to introduce an additional hunter. If so, the minimum wage must be taken into account for the hunter.

It is important to emphasise the fact that traps are very controversial, so it is vital that traps must be regularly serviced, calibrated to +1,7kg and if set, monitored regularly not to trap innocent animals.

Monitor traps daily! **Do not set traps underneath a fence or in foot paths.** Cost calculation includes fuel and wages for trap monitoring.



4.3 Non-lethal methods

(a) Celmax collars

The purchase price is R5 500 per collar and one collar is required for a herd. Once the herd starts acting abnormally, during theft or a predator attack, the Celmax alarm calls the farmer's cellphone to warn him. The farmer must act and find out what is wrong. The collar has a twelve-month warranty and a battery that lasts approximately eight weeks. A charger is included.

The collar is sometimes not very effective against lynx, which often catches the sheep before it can start running.



(b) E-shepherd collars

The cost is R770 per unit with one collar needed per ten sheep. Batteries last nine to twelve weeks, with maintenance R500 per year.

The E-shepherd device is held with a belt around the animal's neck. The electronic device will be activated when an attack occurs on the sheep. Such an attack triggers a sound alarm emitted by the device. The device also has two lights, which has a stroboscopic effect when the system is activated.



(c) King Collar

The calculation is made at R9 for every lamb in the flock, according to the recommendation. It will be possible to fit only collars for a percentage of the flock to make it cheaper. It is important with the king collar, bells and other collar methods, where the predator gets used to the method, to change the methods every three to four weeks.



(d) Dead-stop collar

This collar of steel will last for a lifetime. Different sizes for large and small sheep are available at ±R29 per collar.

The calculation is done for only 1 000 lambs, from 1 000 ewes.



(e) Owner's Choice collar

The initial cost is R17 per collar and calculations are made for a collar for each lamb on the farm.



(f) Bells (Protect-a-lamb)

Bells are calculated for each lamb on the farm at R13 per bell. As with the other collar methods, it certainly is possible to put bells on for only a percentage of the lambs. A lot of the different methods work only for a while until the predator adapts or gets used to its effects. Thus, use more than one method alternatively.



(g) Modern Shepherd

The cost is R8 000 per unit, and two units were taken into account. More is necessary, but the focus is on the lambing ewes. A bottle of scent should be replaced monthly. The Shepherd works on the sensitive senses of predators in order to keep them away from livestock. **These are:**



- **Sound:** The Shepherd generates an ultra-high frequency sound every 50 seconds that is barely audible to humans and sheep, but extremely irritating to predators. If predators come within a 1km range of the shepherd, it causes them discomfort and even pain.
- **Smell and taste:** The built-in computer program controls the release of specially formulated aromatic fragrance ingredients irritating the predator's smell and taste senses. Every 14 minutes during the night it releases a fine mist of fragrance that is constantly present in the camp.

(h) Fauna Track

The system is marketed for stock theft, but water levels of dams can also be monitored. Use cellphone signals.

The system includes a control station and diverts station, which cost R11 200. A licence fee of R3 000 is payable annually, and rent for two GPS tags and one RF tag per ten ewes.



(i) Agri-Alert

A neck collar with a combination of GPS and activity sensors is included. Camp boundaries or area limits can be set in advance.



The neck collar also activates your phone by SMS if there is disorder. Collars are replaced every two years free of charge.

(j) Hotgroup

The system has several functions such as behaviour monitoring, pasture utilisation and predation management. One collar is used per 200 sheep and it costs R7 800. An amount of R1 888 is used for airtime per year. The alarms are based on science of imitation and are activated if animals act abnormal.



(k) Electric fences

The calculation of the electric fences was done based on a 6 000ha farm boundary fence. (If only the camps for lambing were fenced off with electric fences it could be cheaper, but depending on the farm size the fencing of only part of the farm can be detrimental to the grazing programme.



Camps sometimes need rest, but, because of fencing, the producer is forced to let ewes lamb in the same camp every year.)

An electrical wire near the ground and a top line cost about R2 715 per kilometre (jackal proof separately at about R22 000 per kilometre).

Additional to the construction of the fences, it must be controlled to ensure that it's working and to mend potential holes.

(l) FM Radio

A device that costs R1 200 is set at certain times in the night to switch onto a radio station, alternating with light and sounds.

(m) Lights

Lights with a sun panel are mounted on fences to change the scenery slightly.

(n) Alpacas

Alpacas, at a cost of R6 500 each, can graze with sheep. They are believed to be good deterrents for predators, like donkeys, and are not scared of predators. Your maintenance costs will be your opportunity to make up for the cost of sheep that you keep less to make space for Alpacas.



(o) Anatolian shepherd dogs

The cost is R2 500 per dog with a training cost of R1 500 per dog for one year. The dogs work well, but it takes a lot of time to teach them and it is difficult to move herds between camps. See the article on Anatolian shepherd dogs later in the book. Maintenance costs include dog food and fuel to visit the flock once every two weeks.

The variety of methods is an indication that there is not a specific method that works alone,



and that each farm's circumstances are different. Methods with cellphone signals in certain remote locations are not as effective. It is very important that most of the methods (especially non-lethal) must be used in combination and they must be mingled every three to four weeks to prevent the predator from getting used to it. Evaluate your situation and plan carefully. Know your farm! Use a combination of non-lethal and lethal methods respectively to protect your lambs against an unexpected attack by a predator and to control predator numbers. The goal should not be to eradicate, but to manage

In the wild, the alpha predator like the lion controlled the smaller predator numbers, but because of fencing and more people spread across Africa, we know that "nature" is only in "balance" in nature reserves. It is therefore necessary for the management of excessive numbers. The biggest problem is neighbours who don't support each other in the management of predators. It must be a joint effort and should be approached with responsibility.

Figure 1: Total cost in first year

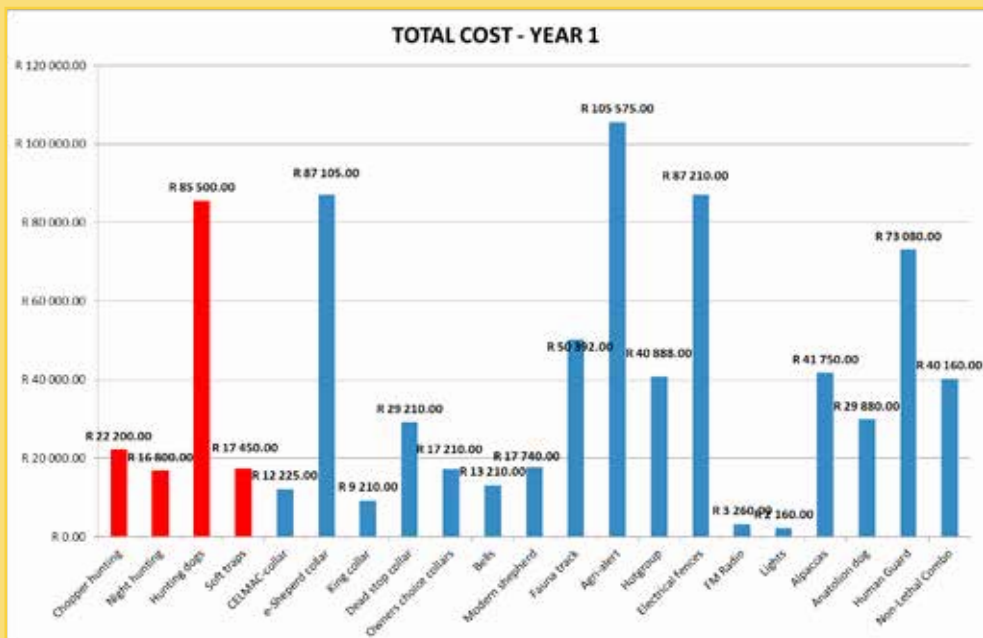


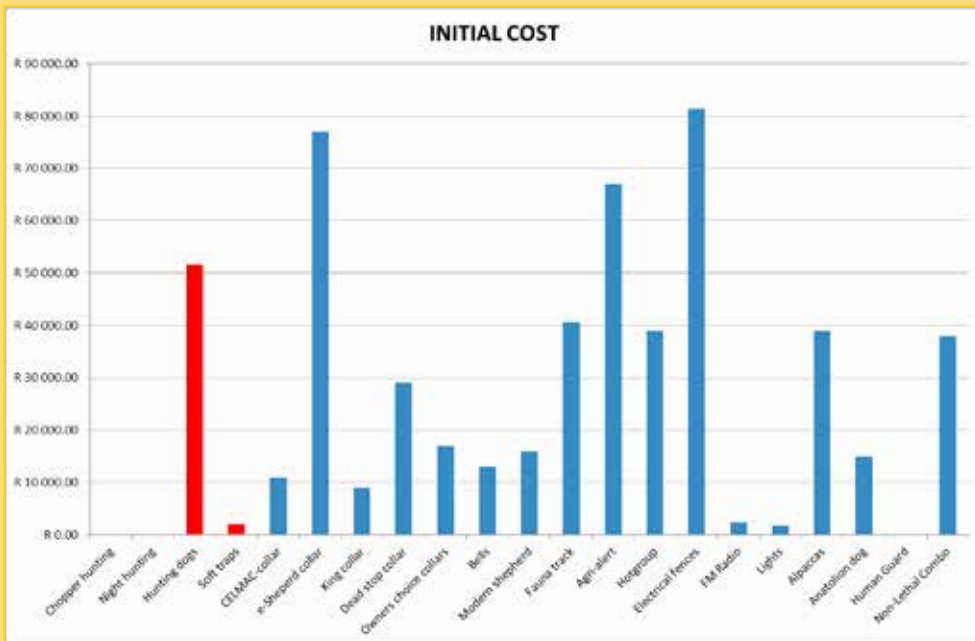
Figure 1 shows the total cost per method for the first year, i.e. this includes the initial cost to obtain the method plus the cost of applying the method. For example, helicopter hunting has no initial cost as this is usually done by a contractor. The method's costs only include operational costs such as fuel and rand per predators. Your gin trap includes the initial cost to buy it, plus your labour to set the trap and fuel for daily visits when the trap is set. The lethal methods (red) are important in the management of predator numbers that are out of balance in nature mainly because of the absence of their natural enemies.

The non-lethal methods are mostly a deterrent at their best. The electric fence is very expensive, but that is because it is only calculated for the first year. The method is a long-term investment and when the initial cost is divided over the number of years it will last, then the cost will be much lower per year. Hounds look very expensive, but if they can be used effectively on more farms, then the costs will come down.

Night hunting refers to the hiring of a professional night hunter and not the use of your own

equipment, it's very selective and is a method that can be used to respond quickly to losses. The human guard is a shepherd for the sheep like in the old days, but the effectiveness is unknown because the pen of sheep is not recommended in most parts of the country because it includes soil erosion, is labour-intensive and animal production can be affected negatively and cause wool contamination. Human guards are extremely expensive compared to other methods because the costs will be repeated every year and therefore cannot be spread over time.

Figure 2: Initial cost



The E-shepherd collars and Agri-alert seem to be the only methods that fall outside the average price range of these systems. Traps have the lowest initial cost, so it is the cheapest to buy. FM radio and lights must always be used in combination with other methods that make it more expensive than traps and only a deterrent against a trap that can manage a damage-causing animal. Figure 2 though, just shows the cost to "get" the method available.

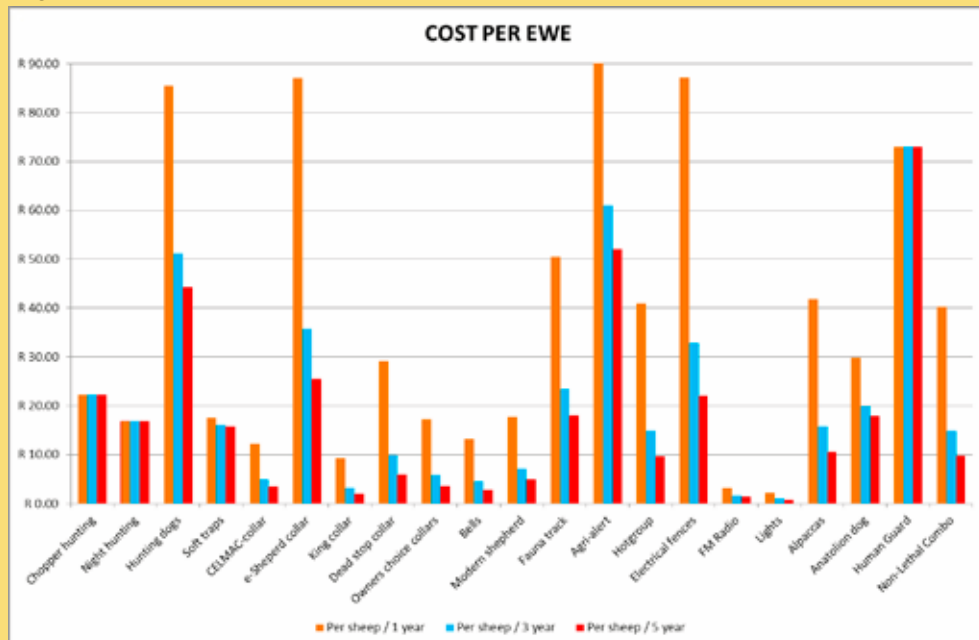
Figure 3: Cost per ewe

Figure 3 shows the total costs per ewe if the initial cost is divided over one, three or five years. In other words, capital expenditure to buy the method is divided over the period used, while the annual cost of applying the method/use each year is taken into account. Only the initial cost is divided over the years. The methods that have not declined over time had no initial cost. It is clear from Figure 3 that the expenses for lethal methods are more or less the same or less than most of the non-lethal methods. There are a number of non-lethal methods that work out cheaper.

4.4 Recommendation

Use non-lethal methods, but remember to do it sparingly and with constant changing, as the predators get used to it in three to four weeks. It will therefore be necessary to acquire more than one method. Lethal methods are needed to

remove excessive numbers of problem predators, as the non-lethal methods mainly swift the problem to the neighbour for a while. Furthermore, it is essential to use the methods responsible and keep the name of our agriculture industry high.

Table 1: Costs: Lethal methods

	Chopper hunting	Night hunting	Hunting dogs	Soft traps	CCLMAC-collar	e-Shepherd collar
Initial cost	R 0.00	R 0.00	R 51 500.00	R 2 000.00	R 11 000.00	R 77 000.00
Maintenance cost/year	R 22 200.00	R 16 800.00	R 34 000.00	R 15 450.00	R 1 225.00	R 10 105.00
Mortality costs						
Yearly cost	R 22 200.00	R 16 800.00	R 34 000.00	R 15 450.00	R 1 225.00	R 10 105.00
Total cost	R 22 200.00	R 16 800.00	R 85 500.00	R 17 450.00	R 12 225.00	R 87 105.00
Initial cost						
over 3 years	R 0.00	R 0.00	R 17 166.67	R 666.67	R 3 666.67	R 25 666.67
over 5 years	R 0.00	R 0.00	R 10 300.00	R 400.00	R 2 200.00	R 15 400.00
Total cost						
Per sheep / 1 year	R 22.20	R 16.80	R 85.50	R 17.45	R 12.23	R 87.11
Per sheep / 3 year	R 22.20	R 16.80	R 51.17	R 16.12	R 4.89	R 35.77
Per sheep / 5 year	R 22.20	R 16.80	R 44.30	R 15.85	R 3.43	R 25.51
Assumptions	Hunt once/year Fuel @R3500/hour Fly 4 hours Kill 3 DCA/hour R600/DCA R4.00/km 250km/hunt	Use Professional hunter @R500/night +R600/DCA R4.00/km (100km/night) Successful 75% of nights Hunt 4 nights/month Hunt 4 months / year	R7500/dog x 3 R5000/dog x 1 Dog food @R500/month/dog Veterinary @R1000/day/year Facilities @R6000/hunnel Successful on 50% of 15 hunts	R200/soft trap Buy 10 soft traps Set 120 nights/year Service daily Labour 2 hours/day 30 Km's/day AA tariff R4/km	1 collar/flock (lambs/weaning) R1000 maintenance/collar/year R5500/collar Charge battery every 2 months @R610/collar 1 Labourers for 1 day R105/day	1 collar: 10 ewes R770/collar Battery @R100 per collar 1 Labourers for 1 day R105/day

Table 2: Cost of non-lethal methods

	King collar	Dead stop collar	Owners choice collars	Bells	Modern shepherd	Fasma track
Initial cost	R 9 000.00	R 29 000.00	R 17 000.00	R 13 000.00	R 16 000.00	R 40 507.00
Maintenance cost/year	R 210.00	R 210.00	R 210.00	R 210.00	R 1 740.00	R 9 885.00
Monthly costs				R 0.00		
Yearly cost	R 210.00	R 210.00	R 210.00	R 210.00	R 1 740.00	R 9 885.00
Total cost	R 9 210.00	R 29 210.00	R 17 210.00	R 13 210.00	R 17 740.00	R 50 392.00
Initial cost						
over 3 years	R 3 000.00	R 9 666.67	R 5 666.67	R 4 333.33	R 5 333.33	R 13 502.33
over 5 years	R 1 800.00	R 5 800.00	R 3 400.00	R 2 600.00	R 3 200.00	R 8 103.40
Total cost						
Per sheep / 1 year	R 9.21	R 29.21	R 17.21	R 13.21	R 17.74	R 50.39
Per sheep / 3 year	R 3.21	R 9.88	R 5.88	R 4.54	R 7.87	R 23.39
Per sheep / 5 year	R 2.01	R 6.01	R 3.61	R 2.81	R 4.94	R 17.99
Assumptions	1 collar/lamb R9/collar 2 Labourers for 1 day R105/day	1 collar/lamb R29/collar 2 Labourers for 1 day R105/day	1 collar/lamb R17/collar 2 Labourers for 1 day R105/day	Bell/lamb R13/bell 2 Labourers for 1 day R105/day	R8000/device 2 devices/lamb flock Scout/month R40150 Visit monthly 30 Km's/visit AA tariff-R4/km	1 Labourers for 1 day R105/day License fee(RC3000)/year Control station(RC7500)/reduction station(RC1700) RF Tag(RC195 (1:10)) GPS Tag(RC1500 (2/Flock)) RF Tag(RC660/year & GPS Tag(RC100)/year

	Agri-alert	Hotgroup	Electrical fences	FM Radio	Lights
Initial cost	R 66 950.00	R 39 000.00	R 81 450.00	R 2 400.00	R 1 800.00
Maintenance cost/year	R 38 625.00	R 1 888.00	R 5 780.00	R 880.00	R 360.00
Monthly costs				R 0.00	
Yearly cost	R 38 625.00	R 1 888.00	R 5 780.00	R 880.00	R 360.00
Total cost	R 105 575.00	R 40 888.00	R 87 230.00	R 3 280.00	R 2 160.00
Initial cost					
over 3 years	R 22 316.67	R 13 000.00	R 27 150.00	R 800.00	R 600.00
over 5 years	R 13 390.00	R 7 800.00	R 16 290.00	R 480.00	R 360.00
Total cost					
Per sheep / 1 year	R 105.58	R 40.89	R 87.21	R 3.26	R 2.16
Per sheep / 3 year	R 60.94	R 14.89	R 32.91	R 1.66	R 0.96
Per sheep / 5 year	R 52.02	R 9.69	R 22.05	R 1.34	R 0.72
Assumptions	Control station(RC500) Reduction station(RC4500) RF Tag(RC750 (1:10)) GPS Tag(RC2000 (2/Flock)) RF Tag(RC400/month)&GPS Tag(RC60/month) 1 Labourers for 1 day R105/day	R7800/collar 1:200 sheep R1888 airtime/year Guarantee included	R2715/km Visit weekly 30 Km's/visit AA tariff-R4/km	R1200/radio R500 per battery/year Visit once every 4 weeks 30 Km's/visit AA tariff-R4/km Use for 12 months	Lights: 15 Only lamb camps @ 300 oneie R120/night 30 Km's/visit AA tariff-R4/km Use for 12 months Visit once every 4 weeks

	Alpacas	Anatolian dog	Human Guard	Non-Lethal Combo
Initial cost	R 39 000.00	R 15 000.00	R 0.00	R 38 000.00
Maintenance cost/year	R 2 750.00	R 14 880.00	R 73 080.00	R 2 160.00
Monthly costs				
Yearly cost	R 2 750.00	R 14 880.00	R 73 080.00	R 2 160.00
Total cost	R 41 750.00	R 29 880.00	R 73 080.00	R 40 160.00
Initial cost				
over 3 years	R 13 000.00	R 5 000.00	R 0.00	R 12 666.67
over 5 years	R 7 800.00	R 3 000.00	R 0.00	R 7 600.00
Total cost				
Per sheep / 1 year	R 41.75	R 29.88	R 73.08	R 40.16
Per sheep / 3 year	R 15.25	R 19.88	R 73.08	R 14.03
Per sheep / 5 year	R 10.55	R 17.88	R 73.08	R 9.76
Assumptions	RC500/alpaca 2 alpacas/flock 1 alpaca/2.5ha Karoo carrying capacity@ 6ha/ooi 1 lamb(RC200)/ewe/year Rent/ha(RC6)/year	RC500/dog 2 dogs for 2 flocks Dog food/month/dogs(RC500) Cost for training(RC5000/dog/year 1 Visit once every 2 weeks 30 Km's/visit AA tariff-R4/km	Minimum wage: R105/day 30 days/month Visit ones every 3 days 30 Km's/visit AA tariff-R4/km Night guard @ 1.4 overtime factor	4 week / method Bells / King collar / Modern sheepguard / King collar See initial cost in first table 2 Labourers for 2 days per method R105/day Bells and collars for all lambs in the flock

5. THE FARMER'S JACKAL "TOOLBOX"



(By Dr Gerhard H Verdoorn, Griffon Poison Information Centre, neshier@tiscali.co.za, 082 446 8946)

In the good old days all the sheep farms had jackal-proof fencing and every farmer had a small pharmacy bottle containing jackal poison. Mr Jackal had a hard time surviving because if he could make it through the fence, he ran into poisoned bait. This has changed completely since the subsidy to maintain fences is long forgotten and poison bottles are currently empty.

New life for jackal-proof fencing

Swithan Webster, a livestock farmer from Queenstown, convinced BKB to supply sheep farmers with jackal-proof fencing at great discounts. This gave jackal-proof fencing a new lease on life and many farmers started fencing again. The fact is, if jackal and company cannot get access to the farm, they cannot get access to free lamb chops.

A livestock farmer without a proper predator-proof fence is like a man fighting a Karoo drought – you simply won't win the battle. Some farmers are also keen on electric fences, but it may result in major losses of tortoises and pangolins. Small, moveable camps with electric fences work well in areas where the stocking rate is very high and sheep farming is more intensive.

Protective animals

A new fancy with a lot of merit, is protective animals such as the Anatolian mountain dogs, blesbuck rams, donkey stallions and alpacas. These animals are not friendly towards jackal and lynx, and will definitely limit predation by keeping predators out of camps. Such protective animals

are not the alpha and omega, and must be deployed in combination with other management options.

Patents by farmers

Methods and techniques to keep predators away from camps include new inventions by farmers. These include the "Skaapwagter", which releases smells and sounds that unnerve predators and keep them away from camps. Something that works like a charm, especially in smaller camps, is radios that broadcast a radio station loudly at night, in combination with a flashing yellow or orange lights, making the predators extremely sceptical of chasing the mutton. However, this system must be moved and changed every night because jackal and lynx are not stupid and get used to it very quickly.

Protection of the flock itself is something that is well established with protective collars such as the King Collar, Eddie Steenkamp's bell collars, collars with flashing lights, secreting odours or weird colours at night. All these tools are available in the farmer's toolbox, denying predators access



to lamb chops. It is pretty similar to an ordinary toolbox – no farmer uses a shifting spanner for all the nuts. He uses the right tool that fits the nut. A range of protective collars and other resources are used to keep jackal at its wits end.

Forget about poison

If the predators are already mastering all the tools, then the hard decision must be made to get rid of the culprits. Forget about poisons right from the outset – they are illegal, non-selective and destructive. Only poison collars may be used to kill predators. But it isn't the only noose from which guilty predators may be hung.

From an ecological viewpoint, shooting damage-causing predators is one of the most selective control methods. However, this is only effective if the hunter is experienced and knowledgeable. One cannot even try to imagine the damage that a “wild” client with a tripletwo can cause. Experienced problem animal hunters can effectively call predators and shoot only caracal and black-backed jackal. It is truly unforgivable to shoot bat-eared foxes and aardwolves, and senseless to shoot African wild cats. The effort should be directed to those predators that cause actual economic damage – the jackal and caracal.

Sometimes there is also significant damage caused by the Cape fox, but it's not nearly on the same scale as the black-backed jackal and caracal. Use a light with a red filter and fit a silencer onto the gun so that the shot is at least slightly dampened.

Gin traps

The use of gin traps is condemned from all quarters and with good reason. In inexperienced and irresponsible hands gin traps are basically murder weapons that catch and mutilate all moving things. It requires someone with excellent knowledge of predators and years of experience to set a trap so that only the black-backed jackal or lynx will be caught, and then without maiming the animal. It works well by covering the trap's jaw with rubber tube so that the animal can be caught without hurting legs or breaking bones.

If something like an aardwolf is accidentally caught, the animal can be released unharmed.

Jackal and lynx should be shot in the head with a centre-fire calibre so that the animal does not suffer. Only traps with jaws that have a groove and are also equipped with an adjustable tread plate, should be used. This allows smaller predators to step on the tread plate, set at 2kg, and not trigger the trap.

Cage traps

Cage traps are excellent for lynx (caracal), Cape fox and wild cats. Forget about catching black-backed jackals with cage traps because they simply won't enter such cages. With caracal it is a great idea to hang a ball of rolled-up aluminium foil in the cage. It draws the cat's attention and lures him into the cage. If there is a white live chicken as bait, the cat also has no chance.

In terms of small stock one should be careful in trying to advise farmers on how to manage their herds, because they surely know more than us city dwellers.

To catch African wild cats and Cape fox, use the remains of lambs caught as bait. It is amazing how easily these two species are caught with cage traps. A plea from my side is that the African wild cats should not be killed, but rather be kept in a pen and fed until the lambs are three weeks old. The cats can then be released because they only predate on very small lambs. The same can be done with the Cape fox.

In terms of small stock one should be careful in trying to advise farmers on how to manage their herds, because they surely know more than us city dwellers. Farmers agree, however, that it is necessary to keep the lambing season as short as possible so that the predator only has to be

managed for a short period of time. If lambing takes place throughout the year, problem animal control becomes a nightmare for farmers.

Finally, I should point out that our farmers are sometimes their own worst enemies. There have been several warnings about farmers that hang dead jackals on boundary fences along

the roads. Consumers passing these scenes are horrified by the sight of the dead animals and often become the leading campaigners against farmers. If problem animals have to be killed, do it with the necessary respect for the animals and for the norms and values of society. And do not advertise it. Good luck with your battle against problem animals!

6. YOUR ANATOLIAN SHEPHERD



The Anatolian Shepherd, a Turkish dog breed, was bred to protect livestock from wolves and bears. Today these impressive dogs are bred and reared by the Cheetah Conservation Fund to serve the farmers of Namibia. Given to farmers at the age of six weeks, the dogs are raised exclusively with the flock and instinctively protects the flock from a variety of predators, including cheetah. By deterring predators, this important working relationship eliminates the need for farmers to trap and shoot this endangered cat.

As a result of the successful Namibian initiative, the Anatolian has also been introduced to serve the farmers of South Africa. To give this initiative the best possible chance of success, it is important to follow the introduction and monitoring processes advised for your dog.



An unprotected, abundant source of food (your sheep or goats) provides predators with an easily accessible resource which they do not need to hunt. This food source will encourage predators to enter your farm and will assist in increasingly successful breeding habits, with a resultant growth in predator populations. Traditional methods of control such as indiscriminate poisoning, hunting and traps often result in the removal of more beneficial animals such as bat-eared foxes, aardvark and raptors. By using this non-lethal method of predator control, you will restore balance to your farmland and reduce the predator population to a size able to exist by hunting its natural prey.

6.1 Important notes

- Always leave your puppy with some sheep or goats from the herd that he will be protecting, even if only one or two, when the herd leaves for the veld. The remaining individuals and the puppy should be securely kraaled. Do this until the puppy is old enough to travel with your herd to the veld and take up his duties as their protector.
- Handle your dog on a leash every day to allow for a relationship sufficient to enable easy husbandry and veterinary care.
- Do not encourage your dog to come to you. The goats or sheep are the family with whom he must bond.
- Feed your dog a quality dry dog food, especially while growing. Optimum health will help him serve you better. Do not feed your



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dog meat or meat produce; remember he is living with your herd.

- Do not allow your dog to run and play with your herd as he grows. This behaviour should be restricted by putting your dog on a light chain and run-line – do not use a drop-stick on his collar as this has been known to injure and kill Anatolian puppies.
- Check your dog regularly for illness, especially biliary – consult your husbandry manual.
- Follow parasite control protocols – consult your husbandry manual.
- Report any concerns to your local vet immediately.
- Never beat the dog; it will result in the dog losing confidence.
- Do not let family or neighbours feed or play with the puppy.



Photograph:
<http://www.cheetah.co.za>

|| Puppies must start going out with livestock early enough, but must not be made to walk too far initially. ||



Photo: <http://www.cheetah.co.za>



This manual was compiled by CCF Namibia and amended and extended by CCF Cheetah Outreach and De Wildt Cheetah and Wildlife Trust. The complete manual is available from Cyril Stannard of the Cheetah Foundation at 082 927 2729 or email anatolian@vodamail.co.za, or phone Bom Louw of the NWGA at 082 652 2243.



7. STOCK THEFT: WHAT DOES THE LAW STATE?

Stock theft remains one of the biggest headaches faced by livestock farmers in South Africa and every farmer should have a thorough knowledge of the laws that apply, namely the *Stock Theft Act, No 57 of 1959*, the *Animal Identification Act, No 6 of 2002*, and the *Fencing Act, No 31 of 1963*. It is also important to know what information should be included in a statement to the authorities.

7.1 The Stock Theft Act

The *Stock Theft Act* determines that:

- Any person in possession of animals or products found in respect of which there is a reasonable suspicion that it was stolen and was unable to give adequate account of such possession, is guilty of an offence.
- Any person who in any manner, otherwise than at a public sale, acquires or receives into his or her possession from any other person stolen stock or stolen produce without having reasonable cause for believing, at the time of such acquisition or receipt, that such stock or produce is the property of the person from whom he or she acquires or receives it or that such person has been duly authorised by the owner thereof to deal with it or dispose of it, shall be guilty of an offence.
- In the absence of evidence to the contrary which raises a reasonable doubt, proof of possession shall be sufficient evidence of the absence of reasonable cause.
- Any person who in any manner enters any land enclosed on all sides with a sufficient fence or any kraal, shed, stable or other walled place with intent to steal any stock or produce on such land or in such kraal, shed, stable or other walled place, shall be guilty of an offence.
- When someone is charged with a contravention, the onus is on him to prove that he had no intention to steal any such stock or produce unless he was found proceeding along any road or thoroughfare traversing such land.
- Any person (including any auctioneer, agent

or market master who sells, barter, gives or in any other manner disposes of any stock to any other person shall at the time of delivery to such other person of the stock so sold, bartered, given or disposed of, furnish such other person with a document of identification. Somebody obtaining such a certificate must keep this certificate in his possession for a period of at least one year. No person shall drive or transport livestock or products of which he is not the owner, on or along a public road unless he is in possession of a certificate of removal, by the owner of such stock or products or the duly authorised agent of the owner issued to him.

Livestock owners should note that if someone is found guilty of theft, they can claim for damages or loss under Section 300 of the *Criminal Procedure Act, 1977 (Act 51 of 1977)*.

7.2 Animal Identification Act

The *Animal Identification Act (Act 6 of 2002)* is applicable nationally. Benefits of the legitimate branding of animals include the fact that it is a physical deterrent as livestock thieves are more likely to steal unmarked animals. It also serves as identification, positive proof of ownership, effective policing and a high recovery percentage, while enabling the tracking of lost or stolen animals.

The following applies under the *Animal Identification Act*:

- All owners of cattle, sheep, goats and pigs must keep an identification register with the registrar of livestock identification.
- Each owner must mark his / her animals according to the prescribed method.
- All cattle, sheep, goats and pigs whose identification has become obscure or invisible, must be re-identified in accordance with legal prescriptions.
- No person shall, within 14 days after the date on which he or she becomes the owner of an animal with an identification

mark, sell, barter, give away or in any other manner dispose of any animal to another person, unless he or she furnishes a document of identification to the person who acquires that animal; or after 14 days from the date on which he or she becomes the owner of an animal, sell, barter, give away or in any other manner dispose of that animal, unless such animal has been marked in the prescribed manner with the identification of the owner disposing of that animal; and he or she furnishes the person acquiring the animal with a document of identification.



Photograph:
<http://www.wikimedia.org>

must be branded at the age when the first pair of permanent incisors appear. Sheep must be tattooed at the age of one month.

It is regarded as an offence if:

- Someone is a marking operator and fails to keep a register.
- A person has in his or her possession an animal that is not marked in accordance with, or in a manner permitted by law.
- An identification mark on an animal is changed, defaced or removed.
- Any person is sold an animal on which an identification mark has been altered, defaced or cancelled.
- An animal with an ear cut off is sold to any person.

It is illegal to develop an animal identification mark or to allow it to be marked with a brand that is not a registered brand; brand or allow an animal marked with an identification without authorisation of the owner of such identification; marking an animal or allow it to be marked with an identification mark other than in the prescribed manner; marking an animal or allowing it to be marked with an identification mark which is registered in the name of a person who is not the owner of the animal; and mark or allow an animal to be marked with a brand that is not a prescribed identification mark in respect of the group to which the animal belongs.

Registered (stud) animals are marked with identification marks issued by the relevant breeders' society. The society will prescribe the method of identification (branding or tattooing). Registration certificates issued by the breeders' society must accompany registered animals sold at public auctions.

The law has certain requirements regarding the age of marked animals. Livestock must be marked at the age of six months, but can also be tattooed at the age of one month. Cattle

Such a person is guilty of an offence and liable upon conviction for a fine or imprisonment for a period not exceeding six months or to both a fine and imprisonment.

7.3 Fencing Act

Under the *Fencing Act (Act 31 of 1963)* a person is guilty of an offence if:

- Someone opens a gate in a fence or leaves it open; or finds it open when passing through, and does not close it.
- Someone passes through a gate or climbs through a fence without the consent of the owner or lessee of the land on which such fence or gate is located.
- Someone deliberately damages or removes a fence or gate.

Stock owners must ensure that persons who are charged with theft, are also charged with the above offences.

The following aspects should be considered during the completion of a declaration in the case of theft:

- Owner's full details.
- Date and time of incident/awareness of the theft.
- Where the theft occurred.



- What led to suspicion of theft?
- Describe the nature of fencing and state thereof when the livestock were left there the last time.
- How many of the livestock in question were in the camp / pen?
- Describe how the livestock were possibly removed e.g. cut lock or wires.
- What was your immediate action?
- Specify what was stolen / or is missing?
- How much of this property is missing?
- How can this property be identified? Give a complete description of the stolen livestock, e.g. brand marks etc. (Attach a copy of the brand as an annexure to the statement.)
- When was this property last seen and since when has it been missing?
- Have you given anyone permission to take or possess it?
- What is the actual market value of the property that is missing? It is important to first list the value of each head of missing livestock, and then to give the sum total of the value.
- Give a complete description of livestock that were recovered (if applicable).
- Give any additional information that you consider as important and which could be helpful for a successful prosecution e.g. red hat picked up at the scene, three different types of footprints found at the scene, injuries to livestock that were left behind, etc.
- At the end of the statement, the owner should request that the court considers a compensation order (after finding the accused person / persons guilty) in terms of Section 300 of the *Criminal Procedure Act*, No 51 of 1977 for the loss in value of the stolen cattle.

7. PREDATION CONTROL CONTACTS

Veldwagter (cellphone)	Philip Lotter	082 333 0101 CELMAX
E-Shepherd collars	Jaco de Villiers	082 572 9341 / www.eshepherd.biz
Collars	Desmond Schmidt	082 414 3242 FAUNA TRACK http://www.theftstop.co.za/
	Cornay Botma	083 4476148 HOTSURE cornay@btbits.co.za
	AGRI-ALERT	www.agri-alert.co.za
Jakkalsjaer	André Theron	083 338 2025 Sound and lights 02062 – ask for 1604 Merweville asco@mtnloaded.co.za
Skaapwagter	Ernst van Zyl	082 450 6988 info@skaapwagter.com www.skaapwagter.com
Jackal control	Rion Horn Marius Steyl Johan Strydom Lourens Goosen Heinrich Funk John Mohaud Steve Blakey Hilton Saunders Meyburgh Theron	072 124 9626 (Welkom) 083 447 4855 (Bfn) 082 378 4460 (Warden) 082 718 9125 (Bfn) 051 773 7042/082 494 4060 (Philippolis) 083-501 1848 (Dogs, Kokstad) 072 591 1788 (Robertson) 072 372 9065 (Greytown) 083 271 8898 (Winburg) Doornpoort@vodamail.co.za 083 630 9419 (Ladismith, Cape)
	Tewis van Oudtshoorn	

	PJ Schoeman Francois Raubenheimer	082 953 7740 (Mooi River) 073 420 4438 (Rouxville)	
Problem animal control	Niel Viljoen	082 381 8227 (Loxton) Consultant for NGWA	
Free State Hunters' Association Chairperson: Vice-chairperson:	Daan Bodenstein Phoena van der Walt	051 447 8529 (Office) 083 489 9193 083 633 6698	
KwaZulu-Natal Hunting & Conservation Association	031 709 3904 Chris Jennings, CEO, chris@kznhunters.co.za Alan Swart, damage-causing animals control coordinator, alan@solaray.co.za		
Poisonous collars and bells Dead Stop Collar King Collar	Eddie Steenkamp Klaas Louw Nick King	082 778 7775 (Protect-A-Lamb) 072 424 7752 072 379 8067 Protective collars	
Courses	Peter Schneekluth Max van der Merwe Robert Wilken & Lourens Goosen	084 803 2399 (Prins Albert) jackalcontrol@absamail.co.za 073 207 0834 (Ermelo) 084 362 8631 (Bloemfontein) 051 442 7082	
The San	Gert Schoombie	083 306 8289/082 808 9473 (Kimberley)	
Anatolian shepherd dogs	Breeders: Jan v Biljon Ramsem Fouché Jordaan Cyril Stannard Marieta Pieterse Gerrie Scholtz Roux de Waal	056 343 1093 (Viljoenskroon) 051 441 7913 (Bloemfontein) 082 557 5660 (Brandfort) 082 927 2729 (Cheetah Foundation) 083 656 0994 (Carolina) 083 633 6006 (Hopetown) 082 927 9493 (Bothaville)	
Predator experts Vermin experts	Thys de Wet Tim Snow Dr Gerhard Verdoorn	076 129 0889 082 463 4104 082 446 8946 nesher@tiscali.co.za	
Research (ALPRU)	Prof HO de Waal	083 645 8958 Research	
Donkeys / Ostriches / Alpaca	Sally Kingwill Jandré Boshoff	(Eastern Cape) 084 251 0426 082 579 1718 (Fouriesburg)	
Black wildebeest	Blits van Heerden	082 777 0747 (Edenburg)	
Jack Russells	Henk Coetsee	082 772 9114 (Mooi River)	
Electric fencing	Adriaan van Rensburg (Stafix) Maurice Williamson Chris Marais (MEPS)	082 373 2393 082 557 2780 082 459 3743	Bfn KZN Rand
Cape Leopard Trust	Quinton Martins	027 482 2785	



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1. BIOSECURITY FOR SMALL STOCK

(By Dr Chris van Dijk, MMedVet (Bov), Zoetis)

Risk. What do you think of when you hear this word? Bungee jumping at the Bloukrans River? Russian roulette?

Investments on the stock exchange? Or maybe expanding your sheep or goat flock? With the way in which many producers handle expansions and/or the introduction of new animals in existing herds of late, Russian roulette seems like child's play. All that is needed to destroy the flock that you built up for years, is to introduce one or two animals with an infectious invisible (subclinical) disease into your herd.

Veterinary reports suggest that more and more cases of sheep scab, pizzle disease, foot rot and abscesses, to name but a few, occur after new animals are brought into herds. These diseases can lead to huge economic losses and can have a very negative effect on cash flow, particularly where a herd has expanded. To optimise production, the exposure of animals to infectious diseases should be kept to a minimum.

The question is: How can we prevent it? The answer is pretty simple, namely through the establishment and implementation of a biosecurity programme. The question will then be, what is biosecurity and how can I apply it to a small stock production unit?

1.1 What is biosecurity?

Biosecurity is all the management practices applicable to a farm to ensure the health of the current herd, as well as that of purchased animals. These biosecurity measures protect the herd, increase the economic output of the producer and

ensure the quality and safety of the product to the end-consumer.

1.2 Quarantine facilities

The very first step to prevent unnecessary exposure of a herd, is the establishment of isolation and quarantine facilities, as well as a strict rule that all incoming animals should be subjected to a number of tests before they are allowed to mix with the animals of the current herd. The above will also apply to animals that are temporarily leaving the farm, for example to shows or that ram your neighbour quickly borrows. That top male or female you recently purchased at an auction, might well be the proverbial "Trojan sheep". A lot may have been paid for the new addition to the herd, but a number of new diseases could have been introduced on top of that.



Recent surveys show that 94% of new animals in herds were not subjected to quarantine measures or tests before they were exposed to the current herd's animals. It is practices such as these that make bungee jumping and even Russian roulette seem reasonably safe pastimes.

The general lack of understanding of the basic principle of isolation and quarantine is responsible for the rapid spread of various diseases. It is these diseases that ensure that the cheque to you will shrink and eventually disappear completely. Some producers believe that these losses are part of farming, and are willing to accept anything between 1% and 10% "as sacrifice". In the current difficult financial times, these losses are the difference between success and failure.



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1.3 Factors contributing to a biosecurity programme

Biosecurity entails most of the day-to-day management measures on a farm, but can be divided into the following three components:

1.3.1 Animals

- If you want to expand your herd or purchase animals, make sure that you have the complete history of these animals at your disposal.
- Familiarise yourself with the background of all animals that you or your herd may come into contact with. Do not purchase animals from an unknown source.
- It is also possible for certain diseases to be transferred through semen (fresh and frozen), embryos, fresh meat or meat products, as well as other products such as milk, raw hides and wool.
- All new animals should be isolated to prevent contact between new animals and your current flock. This is very important to prevent the spread of disease.
- Any farm should have a quarantine or isolation area where purchased animals can be kept for at least 21 to 28 days before they are put with the rest of the herd. The most economically important diseases have an incubation period of one to four weeks.
- The above isolation period should be sufficient for the new arrivals to be submitted to a thorough testing programme, be vaccinated and dewormed and to become adapted to their new environment. It often happens that animals look healthy, but after several days or even weeks suddenly get sick, because they lost their immunity due to stress associated with a move to a foreign environment.
- The newcomers should be kept at least 20-30 metres from the existing flock, while their conduct, movement and equipment for feed purposes should be completely

separate. Ideally dedicated workers need to care for these animals and they must be trained to handle the animals so that disease transmission is eliminated as far as possible. Access of people, including veterinarians and nutritionists, to the quarantine area should be limited to only the essential.

- Isolation areas should be downwind and downstream of your current herd.
- No feeding and water troughs should be shared between isolated animals and the current herd.
- All animals entering the herd must be tested for various diseases. Work in close relation with your local veterinarian and state veterinarian and the seller's veterinarian about the range of tests, type of tests and interpretation thereof.

1.3.2 Humans

- People play an important role in keeping biosecurity risks to a minimum. Biosecurity measures should also consider the role of employees and visitors to the farm and timely measures should be instituted.
- Training of employees in relation to biosecurity should be a priority to ensure a healthy herd. The correct management of waste (manure), movement of people, hygienic facilities and equipment are critical management measures for which all workers should take responsibility.
- All employees must be made aware of measures to prevent the spread of disease.

Think back ... How many people were in your kraals, how many people have simply stopped next to the crush to chat, where did your neighbour's children play when they came to visit – possibly at the lambing pens? How many of those people really should have been there – many people came to these areas without a specific reason. Limit the areas where people are allowed and reduce the possibility of new diseases entering the herd.



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Although you trust them to keep your herd in optimal production and reproduction, veterinarians, nutritionists, semen distributors or any other representatives, the hide hawker and especially the drivers of trucks are often unintentionally responsible for spreading diseases from farm to farm.

- Although nutritionists should visit your flock, ask them to adhere to your biosecurity measures for outside visitors. Where possible, most of their tasks such as balancing rations should be done away from the farm. Another suggestion is that you meet in the office on the farm, or even better, at a meeting place away from the farm.
- Where visitors have to come to the farm, offer them your own boots to prevent the introduction of pathogens, that can survive in manure and mud, to a minimum. Visiting tour groups are, in my opinion, taboo and should be discouraged at all times.
- Manage the contact of people and equipment with your animals, your facilities and the rest of your farm on a day-to-day basis. Avoid unnecessary contact and ensure a safe environment.

|| **A complete herd health programme in cooperation with your herd veterinarian, if not already in place, should be priority number one.** ||

- The easiest way to monitor traffic is to place a “No access” notice at all areas where visitors and some employees are not allowed. Establish a clear protocol regarding appointments by representatives and others – that will reduce traffic of “undesirable” persons dramatically and make all concerned just more aware of biosecurity.

- By limiting the people who come into contact with animals to the minimum, the outbreak of diseases can also be limited.
- It is equally important to control the movement of vehicles, especially trucks transporting animals and rations. Trucks move from farm to farm, and there is no way to know for certain where a truck has been before it came to your farm or what diseases may be transported with the contents. By limiting vehicle movement, the risk is also limited. It is proposed that trucks may move only in certain designated areas and the truck driver may not be allowed to move from this area.
- All feeds and animal products used as feed could transmit diseases and if the source is unknown, it should be treated as possibly infected and should not be allowed on or near your farm.
- Never use the same equipment that fed animals in the isolation area for your “healthy” flock. Paint the equipment from the isolation area with a colour and use it only in the isolation area. If necessary to work with the animals in the isolation area, it is also proposed that separate handling facilities are used.

1.3.3 Programmes

The final component of the biosecurity programme involves a structured immunisation programme. A complete herd health programme in cooperation with your herd veterinarian, if not already in place, should be priority number one. This programme will not only prevent diseases entering the herd, but also serves as preventative protection against outbreaks of other diseases.

Vaccination of young animals help to establish a well protected flock. It is suggested that you discuss an immunisation programme with your veterinarian. Consult with your veterinarian to ensure maximum protection of your animals with an end goal of optimal production and reproduction. It is certainly one of the better investments you can make regarding your herd.

If you want to protect and maintain your flock, it is critical to keep up the single animal but also the





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Die RPO wil as kollektiewe bedingings-organisasie die ekonomiese welvaart van sy produsente verbeter, bedryfstabiliteit in die hand te werk en die rooivleisprodusent se belange by regerings- en nie-regeringsorganisasies bevorder.



As a collective negotiating organisation, the RPO strives to improve the economic welfare of its producers, establish stability within the industry and promote the red meat producer's interests with governmental and non-governmental organisations.

FOCUSING ON:

- Negotiating for lower input and marketing cost
- Tariff protection
- Import monitoring
- Trade agreements
- Negotiations re. legal frameworks

BIOSECURITY AND BIOSAFETY PROCEDURES



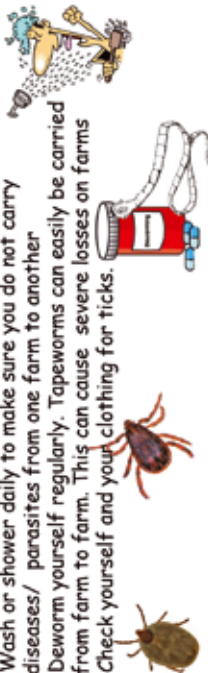
Definition: Biosecurity refers to the implementation of specific measures, procedures and structures which aid in:

- Prevention of disease outbreaks
- Reduce the risk of disease introduction
- Improving or maintaining herd/flock health
- Optimizing financial returns

Caution

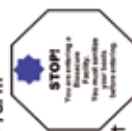
Personal hygiene:

- Ensure that your hands are washed properly after being to the toilet
- Wash or shower daily to make sure you do not carry diseases/ parasites from one farm to another
- Deworm yourself regularly. Tapeworms can easily be carried from farm to farm. This can cause severe losses on farms
- Check yourself and your clothing for ticks.



Procedures when entering a farm:

- Familiarize yourself with the biosecurity measurements on the specific farm. They might have a shower-in system
- Change clothes and/or overalls when moving from farm to farm
- Gumboots should be sterilized daily with a recognized disinfectant like F10, Virkon or Farm Fluid
- Park your vehicle away from animals or kraals in designated areas only
- Sterilize all equipment you use, for example PM equipment
- Wear hats, hairnets or face masks when required to do so
- Do not take in any organic material or live animals
- leave your dog at home



BIOSECURITY AND BIOSAFETY PROCEDURES cont..

Procedures when leaving the farm:

- Do not leave any used gloves or used needles or any other biological waste on the farm.
- It should be placed in a sharps bin and discarded in the approved manner
- Clean and sterilize the equipment you have used. This is especially important when you worked with or touched sick animals
- Wash or shower. Use disinfectant especially when you are planning to visit another farm on the same day
- Change clothes and sterilize your boots to prevent the spread of pathogens between farms
- If there is a footbath use it



Biosecurity procedures in laboratories:

- When working or visiting a laboratory, ensure that you adhere to their biosecurity measurements
- Eating and/or drinking is prohibited in laboratories
- Laboratories should have a written risk management protocol.. Read it before entering the facilities



IT IS YOUR RESPONSIBILITY TO ENSURE THAT YOU ARE FAMILIAR WITH AND ADHERE TO THE BIOSAFETY PROTOCOL OF THE FARM OR LABORATORY YOU ARE VISITING. FAILURE TO DO SO MIGHT RESULT IN YOU BEING HELD ACCOUNTABLE FOR ANY PROBLEMS WHICH MAY ARISE



Caution

journey of evaluation, identification of problem areas, planning, training, monitoring, re-evaluation and implementation. Contact your herd veterinarian for more information and the establishment of a strategic and effective biosecurity programme!



2. FIVE-POINT PARASITE CHECK



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3. AGE DETERMINATION AND TEETH EXAMINATION

3.1 Age determination in sheep and goats

Age determination is done to determine age and flock composition, and to identify dental defects and diseases.

Lifting the lips to expose the teeth should take place in such a way as to prevent unnecessary stress to the animal. The following illustration shows how this should be done: Preferably use the index and middle finger or thumb to open the lips.



It is important not to confuse the temporary teeth in a year-old animal, which has not yet started teething, with those of an adult sheep that is four years of age ("full mouth"). The more mature characteristics of the face will be helpful in this regard.

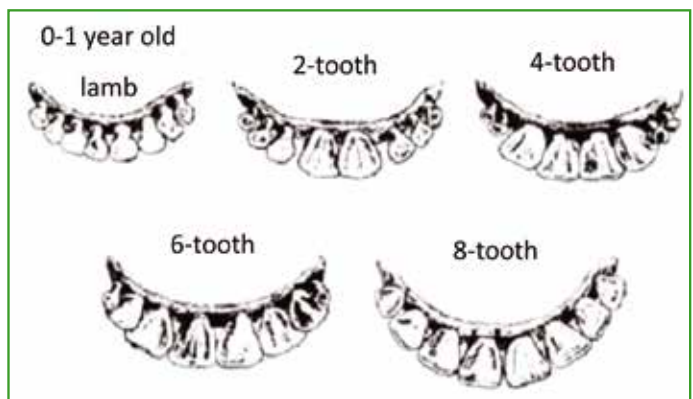
Sheep's (and goats') age are indicated as follows:

15 months (1 year)	± 3 months	=	2-tooth (two permanent teeth)
24 months (2 years)	± 3 months	=	4-tooth
33 months (3 years)	± 3 months	=	6-tooth
42 months (4 years)	± 3 months	=	8-tooth (full-mouth)
Gummer (6-8 years)		=	
Old, stumpy teeth (or very long teeth, if little wear takes place)			

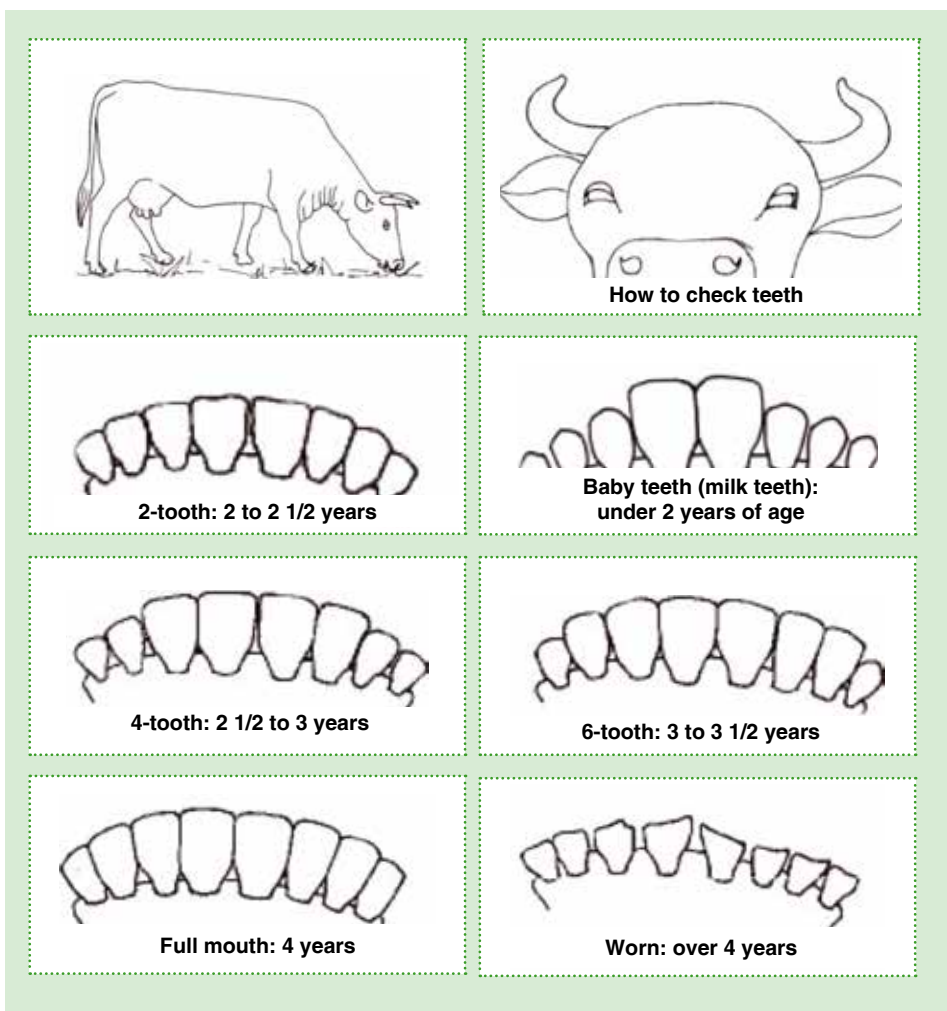
Once animals reach this stage, they will already have lost condition (because of poor intake) and it would be too costly to feed them to regain condition for slaughter purposes. This is why breeding animals should not usually be retained in the flock when older than eight years.

On lush, soft pastures (intensive systems), there is virtually no wear on the teeth. These then grow out long to eventually impair feed intake. In the past teeth such as these were filed down ("teeth grinding"), but this is not an acceptable practice as it is painful and unnecessary.

Figure 1: Age of sheep (and goats)



3.2 Age determination in cattle



Teeth	Breed	Average age (months) at appearance	Variation in age at appearance (months)
2-tooth	British breeds	24	21-27
	Brahman cross	26	23-29
4-tooth	British breeds	31	26-36
	Brahman cross	33	28-38
6-tooth	British breeds	38	32-44
	Brahman cross	41	35-47
8-tooth	British breeds	46	39-54
	Brahman cross	51	43-58

4.CONDITION SCORING AND ITS APPLICATION

Condition is determined by palpation of the loin. The extent to which the spine, eye muscle and fat covering can be felt, determines the condition score.

Figure 1: Condition scoring based on the spine

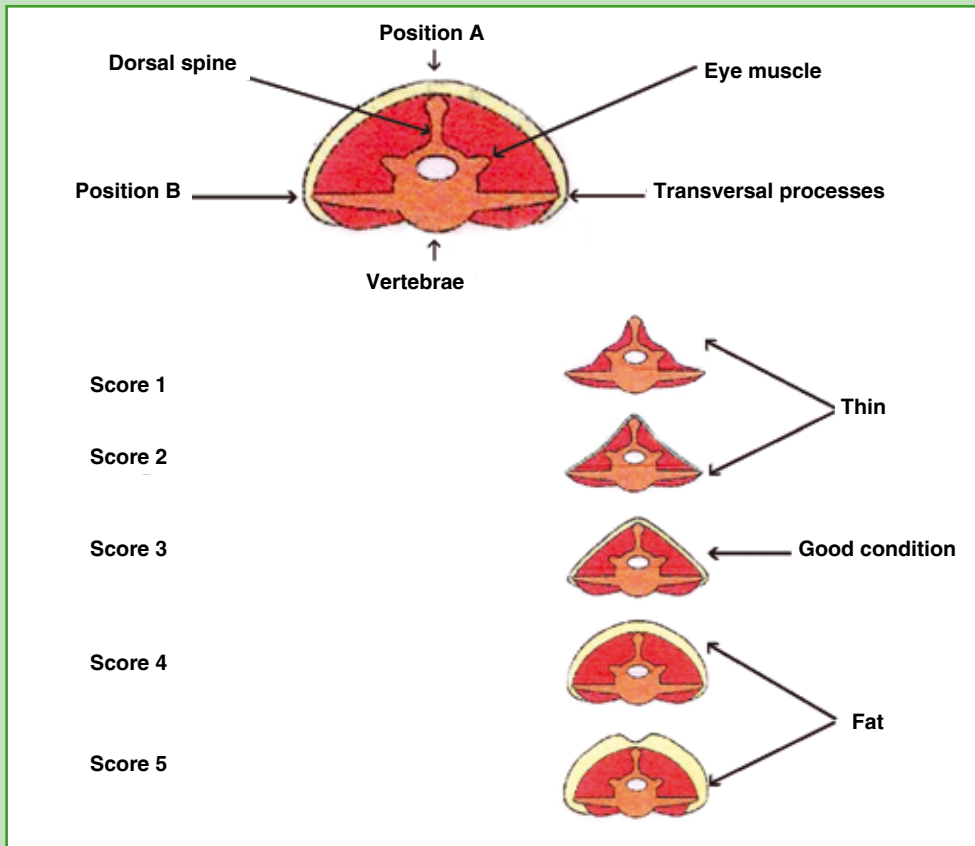


Table 1: Condition scoring in sheep

Score	1 Emaciated	2	3	4	5 Obese
Spine	Can be felt individually, very sharp	Forms a continuous line with deep indentations	Continuous line with shallow indentations	Can only feel indentations by pressing hard	Cannot feel indentations
Transverse processes	Fingers can easily fit in underneath	Round ends	Well covered. Struggle to get fingers underneath	Cannot be felt	Cannot be felt
Muscle	Very small, concave	Concave	Straight from spine to transverse processes	Maximum developed convex	Maximum developed
Fat layer	None	Very thin	Medium	Thick	Very thick, indentation on mid line

Table 2: Guide for reproductive cycle of the ewe.

Stage	Phase	Days	Condition score: Target	Energy requirements MJ /head/day	Management guidelines
1	MATE	0	3.5	8 – 9.5	Ewes' condition should be improving. Do not mate ewes with a condition score below 3.
2	EARLY TO MID-GESTATION	1 – 90	3	9 – 11.0	Maintain condition.
3	LATE GESTATION	90 – 150	3.5	Single: 10 – 14.5 Twin: 11 – 18	Ewes must receive enough quality nutrition for foetal and udder development.
4	LAMBING	150	3.5	Single: 18 – 21 Twin 23 – 27	Maximum supervision with minimum interference – lamb in small groups.
5	LACTATION	150 – 240	3		Extra nutrition for milk production, especially twins – creep feed (monitor intake).
6	WEANING	240	2		Weaners minimum 45% of mature weight.
7	POST-WEANING	240	2		Good quality nutrition for lambs – best converters of feed.
8	PRE-MATING	365	2 - > 3.5		Flush to improve the condition of ewes.

NB: Extra nutrition not necessarily from a bag, but also in the form of rested veld, pastures or stover (with suitable licks).

5. BODY CONDITION SCORING SYSTEM FOR BEEF CATTLE

The following information was obtained from Wagner *et al*, 1988 (*Journal of Animal Science*). The system is based on a 1-9 score with 1 being emaciated and 9 being obese.

1. **Severely emaciated**, no palpable fat detectable over back, hips or ribs. Tail head and individual ribs prominently visible. All skeletal structures are visible and sharp to the touch.
2. **Emaciated**. Little visible muscle tissue. Tail head and ribs less prominent than in 1.
3. **Very thin**. Backbone easily visible. Slight increase in muscling over body.



4. Individual ribs noticeable, but overall fat is lacking. Increased musculature through shoulders and hindquarters. Hips and backbone slightly rounded.



5. Some fat cover over ribs although some ribs still visible. Tail head full but not rounded.



6. Good. Body appears rounded over the back and hindquarters. Tail head slightly rounded and spongy when palpated. Slight fat deposition in brisket.



7. Fat. Animal carries fat over the back, tail head and brisket. Ribs are not visible. Fats deposits around vulva and rectum.



- Information on production systems
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die bedryf en sy pro-
dukte te vestig en
te bevorder.

8. Very fat. Squared appearance due to excess fat over back, tail, head and hindquarters. Fat deposits in brisket, over ribs, around vulva, rectum and udder.



9. Obese. Same as 8, but to greater degree. Mobility may be limited due to excess fat.



6. FOOTROT

(By Jacques Jansen van Vuuren)

Lameness in sheep is a big problem in South African sheep flocks, especially in the higher rainfall areas of the country. It is a cause of discomfort and pain as well as a source of economic loss in the sheep industry. Animals with lameness cannot graze properly and can also not compete for food.

The results of lameness in sheep are:

- Loss of body condition.
- Lower lambing percentages.
- Lower birth mass, which has a detrimental effect on lamb survival.
- Loss in milk production.
- Fertility of rams are lower.
- Poorer wool growth.

The most important to always do first, is to confirm that the problem is footrot, caused by the bacteria *Dichelobacter nodosus*. Other

common causes of lameness are bluetongue, ticks, foot abscesses, strawberry footrot (caused by the germ *Dermatophilus congolensis*), post-dip lameness (caused by the germ *Erysipelas rhusiopathiae*) and selenium deficiencies (especially lambs). In winter the majority are foot abscesses, strawberry footrot, acidosis (sheep on lands) and laminitis (incorrect supplementary feeding).

“ The bacteria
(*Dichelobacter nodosus*)
causing foot rot, live on
the feet of infected animals
showing to be lame or
normal. ”





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The bacteria (*Dichelobacter nodosus*) causing foot rot, live on the feet of infected animals showing to be lame or normal. It is calculated that *D. nodosus* can survive for a maximum of 7-10 days on pastures and up to six weeks on trimmed hooves under optimal conditions. It can even survive up to three years in the hooves of live sheep, which will then be carriers. The organism survives best in warm (>10°C), wet environments (normally more than 50mm rainfall). Infected sheep therefore are the main source of infection for other sheep, although spreading of the bacteria from one sheep to another can also occur via the surface on which they stand or walk (Whittington, 1995). *D. nodosus* is present in anaerobic conditions, e.g. mud.



Table 1: Guidelines to distinguish between footrot and foot abscesses.

Footrot	Heel abscess	Toe abscess
Affects more than one foot.	Normally affects one back foot.	Affects front feet.
No swelling.	Swelling normally divides toes.	No or little swelling.
No pus emerges, but a black-grey slimy liquid may occur.	White creamy excretions.	Liquid can be excreted where feet are trimmed.
Hooves can be warm.	Warm at the touch.	Can be warm.
Cuts and abscesses have a bad odour and may be covered with flies.	Cuts and abscesses may have a subtle odour, but flies are seldom present.	Odour present, but different to foot rot. Flies might be present.
Spread fast under all ages of animals, especially under favourable conditions.	Normally heavier animals, e.g. rams and pregnant ewes.	All animals.
No cuts in the coronary skin, but the sensitive inner horn separates from the hard outer horn.	Abscesses normally present at the coronary skin or the interdigital skin.	Abscesses normally under the horn of front of the toe. Can form a line above the coronary band. In chronic cases the front part of the sole can separate from the rest.



Symptoms

Under favourable conditions the disease spreads fast through the entire flock. A lot of sheep become lame, stand on their knees and lie down. It is noticed very easily as the animal lowers its head when stepping on the sore foot, or does not tread on the foot at all. They have pain, eat less and lose condition. A drop in wool production can also occur. One or all four feet can be infected. At first only the skin between the claws is infected. The skin is red, moist, smells bad and grey-yellow pus is present. Only the claw is affected in contrast to foot abscesses, where the foot joint is also affected.

As footrot progresses, the sole and outer hoof become damaged. The hoof becomes soft, crumbly and loose. Claws are warm and become malformed. As the horny parts are trimmed away, one gets to the bad smelling, grey-yellow pus. This condition can lead to foot abscesses and permanent lameness. Within 7-14 days the swelling between the claws can progress to where the hoof separates from the tissue. Favourable conditions for *D. nodosus* can lead to more than 10% of animals being affected.

Treatment options

- Selective culling.
- Footbath.
- Vaccinations.
- Antibiotics.
- Trimming of hooves.
- Pour-ons and injectable remedies.

In less serious cases:

- Spray claw with antiseptic remedy daily until healed.
- Inject antibiotic (tetracycline) for 3-5 days.



In more serious cases:

- Spray tincture of iodine on abscess areas of claw.
- Apply acriflavine ointment thickly.
- Bind with paraffin gauge and bandages and change every second to third day.
- Inject antibiotics (tetracycline).
- Treatment and healing may take long and it is paramount that infected animals are not returned to the flock before they are not totally healed.
- If the sheep or goat does not react positively to the treatment, it is better to cull it.

Footbath

A footbath is a cheap way of applying chemicals to the feet of a large number of animals. It is important to use a footbath on a dry day to allow the after-dip area to be dry. Let animals walk through clean water prior to treating them in a footbath. A footbath cannot be used to treat all cases, but only as a management tool for the prevention and treatment of less serious cases, to be done in conjunction with antibiotics and anti-inflammatories.

Trimming of hooves will increase the effectiveness of a footbath. Do not trim too deep. After taking animals through the after-dip area back to the veld, it is important to take them to a fresh (clean) camp that has rested for at least seven days to ensure that all bacteria in the camp have died.

The liquid in the footbath should be enough to cover the hooves, i.e. where the skin and the hoof meet at the top. Sheep will each remove approximately 600ml of the solution from the footbath in the process. It is important to adhere to the prescribed dosage and instructions for each product.



Use of a footbath

Divide the sheep into three groups: sheep with no lesions, those with mild lesions (score of less than 2) and those with serious lesions (score of more than 2).

- Identify all factors that enhance susceptibility of animals and try to remove or reduce them
- Start timeously with preventative measures. The best time is as soon as it becomes moist and daily temperatures increase, i.e. in September in the summer rainfall areas.
- Animals with no lesions can be taken through a 1% zinc sulphate solution (100g zinc sulphate on 9 litres water) once a month with a contact time of 5-10 minutes. Second-best is 0,5% formalin (1 part formalin on 190 parts of water) and a contact time of approximately 1 min is then needed. A 7% iodine solution can also be used.
- Animals with mild lesions should go through a 1% zinc sulphate footbath on a weekly basis. A contact time of at least 20 min is needed.
- Animals with serious lesions should go through a 1% zinc sulphate footbath with a contact time of at least 30 min twice per week. Treatment with antibiotics and an anti-inflammatory remedy is normally also necessary. Start with a common antibiotic, e.g. a tetracycline or a sulphate remedy. Expensive antibiotics will, however, not compensate for poor management practices.
- Always start with the no lesion group and treat the most seriously infected group at the end.
- NB! Formalin is poisonous and should be handled with care. Never allow animals with lesions to go through formalin as it will cause permanent skin damage and increase your problem cases.
- After a footbath animals should stay on a dry surface for at least 30 min. Once the most seriously affected group was treated, the drying area should be disinfected before the less serious and healthy animals are allowed there.
- Seriously affected groups of animals should be separated from the healthy and mild cases.
- If seriously affected animals grazed in a camp, that camp should be rested for at least four weeks before other animals are allowed to graze it again.
- Try to avoid marshy camps during times of favourable conditions for footrot.
- Never hesitate to cull problem animals. Identify all treated animals and keep record of all treatments: Remedy, dosage and when they were treated. Good records not only assist with the selection of animals, but also assist with the choice of antibiotics and planning for the next month and season.
- If possible, all animals that have not recuperated within a month or that were treated more than three times a season, should be culled, especially rams. Inherent immunity is hereditary and since rams contribute 50% of the genetic component, they should not be problem animals.
- It is important to grade all animals at least twice a year for footrot lesions if it is a common problem on a farm. It can be done at the same time as the pre-mating and weaning check-up. Strict culling of problem animals will assist to decrease problems faster, as inherent immunity against footrot is hereditary.
- A 10% solution copper sulphate can also be used, although the danger of wool contamination exists. It also loses its effectiveness easily when contaminated with urine or manure. It is therefore is not used that often.

The footbath itself

A cement floor with sides of 15-20cm is normally used for the construction. Assure that the sides are built in such a way that animals cannot stand on the sides to evade the chemicals. Gates can be placed on both ends of the footbath. A drain plug should also be built in. Try to manufacture a footbath of at least 6 metres in length. Wool can be placed at the bottom of the bath to limit wastage through spluttering and to make the surface more acceptable for sheep.



Determining the volume of the footbath

- Multiply length x width x height to obtain cubic metres.
- Take this value and x 1 000 to obtain litres:
1 cubic metre = 1 000 litres.

Example

Length = 8m

Width = 3m

Depth of chemicals = 55mm

Volume = $8 \times 3 \times 0,055$

= 1,32m³ of 1 320 liter

Determining the holding capacity of the footbath

If we accept that a sheep takes up approximately 0,25m², this footbath will hold about 72 sheep.

Area = length x width

= $8 \times 3 = 24\text{m}^2$

Thus $24 / 0,33 = 72$ sheep

Prevention***Prevention is better than cure.***

Here are some options that could prevent footrot:

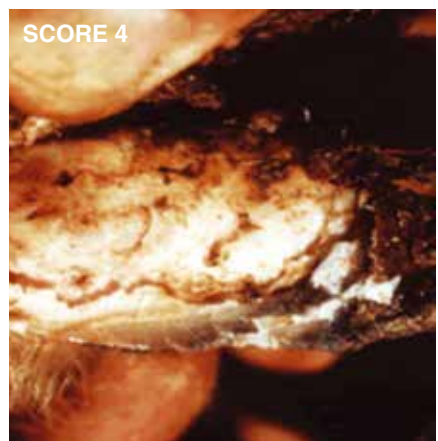
- Correct nutrition.
- Injection of trace minerals.
- Hoof trimming.
- Putting newly purchased sheep through a footbath before they join your flock.
- Avoiding marshy areas in the wet season.

SCORE 2

Score 2: The skin between the claws is inflamed and raw. This condition may involve part, or all, of the soft horn on the inside of the claws. There is no underrunning of the horn.

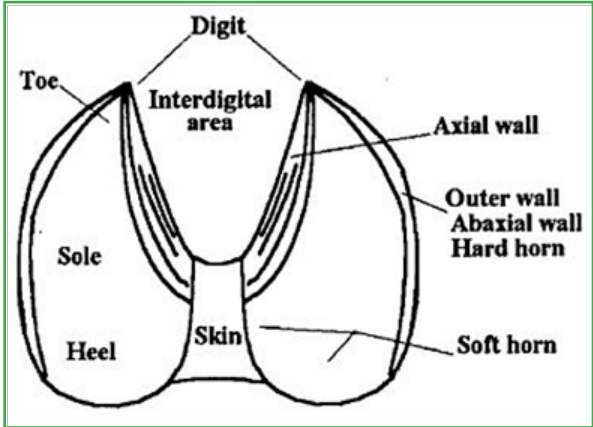
SCORE 3**SCORE 1**

Score 1: Slight to moderate inflammation with some erosion between the claws. There is no underrunning or erosion of the skin or horn.

SCORE 4

Score 4: The underrunning extends to the outside edge of the sole of the claw and involves hard horn.

Lesion grading



Scoring sheet

Sheep no	LF	RF	LH	RH	Total
23	1	0	0	0	1
45	2	1	2	2	7
78	3	0	0	1	4
12	0	0	4	1	5

7. WESSELSBRON DISEASE

(By Prof Leon Prozesky)

Much has been said during the past years about the importance of Rift Valley fever as the cause of abortions and mortalities amongst sheep, cattle and various other stock types. However, not much information is available on Wesselsbron disease, also seen as an important cause of abortions and congenital deviations among especially sheep and goats in South Africa.

The cause

Wesselsbron disease is a viral disease transmitted by insects. It affects sheep, cattle and goats. It causes relatively high mortality rates under newly born lambs and kid goats, while it causes a sub-clinical infection in adult animals. The disease is also associated with abortions in ewes and congenital deviations of the central nervous system, as well as *hydrops amnui* (dropsy of the placenta) in ewes.

Incidence of the disease

The Wesselsbron virus was isolated in 1955 from an aborted sheep foetus in the Wesselsbron district in the Free State on a farm where sheep had been vaccinated against Rift Valley fever. Since then outbreaks of Rift Valley fever and Wesselsbron disease have been occurring simultaneously, although the occurrence of Rift Valley fever is much more common. Serological surveys indicated that the incidence of Wesselsbron disease is widely spread in South Africa and its neighbouring countries, including Mozambique and Zimbabwe.

Clinical effect

The Wesselsbron virus mainly affects the liver and central nerve system. As far as clinical image and pathological lesions are concerned, a fair amount of similarity exists between Wesselsbron disease and Rift Valley fever. Wesselsbron disease is, however, a mild disease with lower mortalities



as well as number of abortions. Jaundice and widespread bleeding are common incidences in affected foetuses. Congenital deviations of the brain are more common in cases of Wesselsbron disease, compared to Rift Valley fever.



- Relatively high mortality rates in newly born lambs or kids.
- Climatic conditions which are beneficial for the presence of a lot of insects.
- The macroscopic and microscopic lesions in affected animals.

Experimental data indicates that mortalities amongst young lambs which have been infected with Wesselsbron disease, can be as high as 27% in lambs aged one to three days. On the other hand, Wesselsbron disease is very mild in calves, adult sheep, cattle and goats, with low mortalities.

If pregnant animals are infected with Wesselsbron disease, the clinical image depends on the stage of pregnancy and includes abortions, the retention of immunised foetuses as well as hydrops amni and extended pregnancy in ewes.

Infected lambs may display various deviations of the brain, including porencephaly and hydrocephaly as well as artrogriposis. Post mortems on lambs with Wesselsbron disease show mild to acute jaundice and widespread bleeding. Microscopic investigations of the liver usually show mild to acute necrosis.

Zoonosis

As in the case of Rift Valley fever, Wesselsbron disease can also affect humans. In the recent past, outbreaks of Wesselsbron disease occurred in the following areas: Beaufort West, Graaff-Reinet and Fauresmith. Suspected cases have also been reported.

Diagnosis

To diagnose Wesselsbron disease, it is imperative to take the following aspects into account:

To confirm the diagnosis, it is imperative to collect appropriate samples for microscopic investigations as well as for the isolation of the virus. Because the disease may also occur in humans, it is important to take the necessary precautions to prevent possible infection. Appropriate samples should preferably be collected by a professional person, preferably a veterinarian. It must also be submitted to a diagnostic laboratory in the correct way.

Other viruses

Bear in mind that other viruses may also be part of the group of flavi-viruses, of which Wesselsbron disease is one, and which can lead to similar abortions and congenital deviations in sheep and cattle. There are at least ten similar viruses in South Africa. Therefore, it is imperative to ascertain as correctly as possible the cause of reproduction problems or mortality.

There are indications that some of the other flavi-viruses may have been responsible for mortalities among other young lambs and kid goats in the recent past. It is unwise to assume without the necessary proof that Rift Valley fever and Wesselsbron disease are responsible for reproduction problems or high mortality rates among young animals.

Prof Prozesky is the section head for pathology at the Department of Paraclinical Sciences at the Onderstepoort Faculty of Veterinary Science of the University of Pretoria.



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8. TRICHOMONAS – THE SILENT THREAT

Trichomonas is a venereal disease in cattle and is caused by a protozoon, *Trichomonas foetus*, which parasitizes the reproductive organs.

Trichomonas occurs in all areas where cattle are farmed with. The disease occurs in the USA, Europe, Australia, Africa, India, South and Central America and Canada. One can therefore regard this disease as endemic (commonly occurring) where extensive cattle farming takes place. The disease is the most common non-viral transmitted venereal disease in the world. It was diagnosed in South Africa for the first time in 1937 and has since been diagnosed in herds across the country.

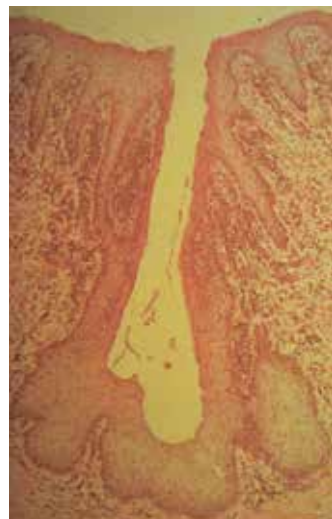
Trichomonas causes substantial losses in profitability without necessarily exhibiting visible signs. In a study conducted by Dr Dietmar Holm in a cow herd consisting of 84 animals over a period of two years (2009-2011), a loss of ±R150 000 was recorded.

Economic losses attributed to trichomonas include:

- Fewer calves are born after infection due to early embryonic death and abortions – this represents approximately 70% of the total losses and the most visible loss is seen shortly after a new infection has been established in a herd.
- Most bulls that test positive for the disease are culled and the farmer only receives slaughter value for his animal. Genetic value is always higher than slaughter value – in some cases up to ten times higher.
- With fewer replacement heifers to maintain the herd's numbers, a farmer will have to buy in pregnant replacement heifers or cows.
- A loss in interest due to late calving, is a loss that is especially significant in chronically infected herds and is often overlooked. It is caused by an increase in the age at first

calving (AFC) of heifers and the inter-calving period (ICP) of cows.

- The veterinary costs involved in combating the disease, can increase the total veterinary expenses relating to the herd.
- Other indirect losses include marketing losses due to an extended calving season, which results in smaller groups of calves having to be marketed at a time and a bigger burden on the management system due to a longer calving season.



*Deep crypts of the mucous membranes of the sheath of an older bull. *Trichostrongylus axei* can easily hide here. (Photograph supplied by Zoetis)*

Specific circumstances also play a role in bulls that test positive for trich:

- Bulls younger than three years are less susceptible to trichostrongylus and older bulls more. However, some young bulls may house the parasite and can play a role in spreading the disease.
- Beef herds.
- Seasonal rest.
- Communal grazing.
- Contact with other herds.
- Large groups within herds.
- Lack of strict pregnancy examinations and culling systems.
- Lack of a proper biosecurity plan designed in conjunction with a veterinarian to address the herd's unique risks.

8.2 Susceptibility and infection

Bulls of all breeds are susceptible to the disease. Cyclical female animals are also highly susceptible. It is important to realise that cows in oestrus can get rid of trichostrongylus as well as vibriosis infection. This is why one of the essential components of prevention is that cows should have completed at least three oestrus cycles before the mating season starts. This will limit the risk of infection transmission by the cows.

8.1 Sources of infection

Trichostrongylus is found in cattle that are mated naturally and therefore especially in beef cattle, as artificial insemination (AI) is mostly done in dairy herds. AI prevents the spread of the parasite.

Permanently infected bulls are the main source of infection in a herd. Test results have found that between 0% and 25% of sheath scraping or washing samples tested positive. There is a misperception that the organism is found in the semen and sexual glands. *T. foetus* is an organism that lives primarily on the surface of the mucous glands of the sheath and establishes itself in the folds of the sheath. There it multiplies by way of binary fusion. The cow may also be a source of infection, but bulls remain the main sources of infection.

In order for cows to be cyclical before the bulls enter the breeding herd, their peri-partum nutritional status should be correct – in other words, the cows must be in an improving condition, which means that the management of grazing and supplementary feed must meet the cows' needs.

Once a bull has become infected, he can remain a carrier for life and will transfer the parasites from mating season to mating season. However, spontaneous recovery can also take place.

Joint herd infection with *Trichostrongylus foetus*- and *Campylobacter* species is quite common. However, there is no proof that infection with one of the agents will improve the chances of infection with another.

8.3 Transmission of trich

- Trichomonas is usually transmitted during the natural mating process. The number of cows that become infected when a *Tritrichomonas*-infected bull is introduced into a herd, varies. In one study 42 of 73 cows mated in the first season, became infected while the rest all became infected during the second mating season. In yet another study 23 out of 26 heifers contracted the infection with a calving percentage of 45%. Young bulls can play a role in the spreading of *T. foetus* through mechanical transmission, even if they haven't tested positive for the disease. The number of cows that become infected when a *Tritrichomonas*-infected bull is introduced, varies.
- Semen can become infected during collection. Trichomonas can therefore also be transmitted via AI, as *T. foetus* can actually survive the semen freezing process.
- It is also possible for bulls to infect each other when they cover one another, although this has not been proven yet.
- The disease can potentially be transmitted among bulls by way of a sheath scrape or wash if aseptic measures are not applied.
- Clean swabs must be used for each bull during penis examinations.
- The same applies to vaginal examinations and treatments.
- Disease transfer between female animals seems unlikely.
- Disease transfer by flies also seems unlikely.

8.4 Recovery and immunity

Spontaneous recovery can take place within seven months in cows and heifers, provided that normal oestrus cycles (which depend on nutritional status) are maintained. However, should a uterine infection develop and normal oestrus cycles are disrupted, the cows will remain infected longer and the organisms will spread.

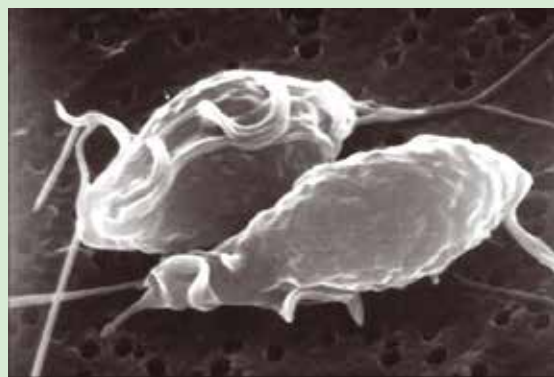
A small percentage of cows can become carriers.

Some of these carriers have uteruses that are filled with pus (also known as *pyometra*). Remember that there are different reasons for the development of pyometra in cows – trichomonas is just one reason. Organisms can also be excreted for long periods following abortion. It has been reported that cows retained the infection throughout a normal gestation period, thus making them a potential source of infection during the next breeding season. *T. foetus* can survive in a herd for long periods at a time amidst unfavourable conditions that lead to poor condition in cows.

The organism exhibits weak immunogenicity, but antibodies are secreted through vaginal mucous (15 months), especially during oestrus when the blood flow to the uterus increases. Cows develop partial immunity that won't prevent re-conception, but animals will heal quicker. Bulls do not develop immunity.



Sporadic abortions can occur due to trich. This uterus was infected following mating. (Photograph supplied by Dr Brand Anema)



Tritrichomonas foetus is a protozoon that inhabits the reproductive organs.

8.5 Consequences of infection

In female animals the organism moves to the uterus following mating. There it establishes itself and multiplies. Fertilisation may still occur, but due to the multiplication of the protozoa and the unfavourable environment that it creates, early embryonic death is usually the result.

The common indicator of infection in a herd is a drastic decrease in pregnancy rate, despite good activity among bulls. Sometimes cows that have already been confirmed as pregnant, will come into heat again. The reason for this is that resorption and abortions take place early on during pregnancy (first five months), but there are also cases where abortions occur after five months of pregnancy.

The following clinical signs are visible in infected herds:

- Poor calving percentages.
- Most calves are born at the end of the calving period.
- Extended inter-calving period (ICP).
- Heifers that won't get pregnant despite repeated mating and increased age at first calving (AFC).
- Abnormal oestrus cycles.
- Sporadic abortions. The uterus in the photograph became infected after mating. *T. foetus* was isolated from six pyometras.

T. foetus can also act as a carrier of mycoplasmas.

8.6 Samples to isolate *T. foetus*

Bulls are the best animals from which to isolate the organism. The best time to test bulls are two weeks after having removed them from the breeding herd or shortly prior to the start of the breeding season. During the breeding season, when bulls regularly serve cows, there are fewer organisms present in the bull's seminal discharges and mucous membranes. The number of organisms in bulls fluctuate and it is therefore recommended that bulls are tested three times with a one-week interval in-between.

Organisms can also be isolated from discharges from the uterus of female animals. However, the chances of cultivating the organisms from samples from female animals not showing these signs, are low.

The veterinarian collects samples through a sheath wash or scraping. These samples must reach the laboratory within three days if it is transported through special means. Otherwise it must reach the lab within 24 hours.

The organisms can be identified through the polymerase chain reaction (PCR) test. Genetic material (DNA) that is specific to the organism is isolated if it is present in the sample, after which it is multiplied in order to determine whether the organism is present in the sample. These tests are conducted in the PCR laboratory at the Onderstepoort Veterinary Institute. Their accuracy is of international quality.

It is also possible to cultivate the parasite from the material and to find it under a microscope. Such visual identification must be performed by a technician with the necessary training and experience, as there are other organisms found in the sheaths of bulls that can look very similar to *T. foetus*. Errors in this process can lead to false positive diagnoses.

As these tests are not 100% accurate, three tests are conducted at intervals of seven days to make sure that animals that are positive, are not missed. This is also the so-called golden standard prescribed by the South African Veterinary Association for the certification of bulls.

8.7 Control and treatment

The treatment of bulls must be done by a veterinarian with experience in the area. In valuable animals the veterinarian will treat the bulls with everything that is available. It is true that there are risks involved. There is the possibility of false negatives if the bull is tested shortly after treatment, as some organisms might have remained behind following treatment.



A bull such as this must be tested again after a long resting period in order to determine whether the treatment was successful. Younger bulls are able to recover, but studies show that the older bulls get, the less the chances are of them reacting favourably to the treatment.

Artificial insemination is the best measure to prevent the disease from being transmitted, but then the semen must also be free of trichomonas.

Seasonal rest may be the answer to lowering the number of infected female animals in the herd substantially. Discuss the nature of the herd with a veterinarian. Please remember that in certain cases clinically healthy animals can remain infected for long periods.

One strategy to build a **“clean” herd** is by using “clean” bulls or AI when mating heifers. Thereafter the management of the herd must be very good so that heifers and bulls won't come into contact with infected animals. Test bulls annually and remove non-pregnant animals during pregnancy examinations.

Older bulls should only be bought from a certified negative herd. Success has also been achieved where older bulls were replaced after four years. Always remember that some carrier cows may appear to be healthy.

8.8 Biosecurity

- The secret of a trichomonas-free herd is managing a closed herd.
- Border fences must be in a good condition.
- Bring in only bulls that have not mated with other female animals.
- Bulls can only be bought with a breeding suitability certificate issued by a veterinarian.
- Bulls must be tested three times, even if they were brought in from a certified negative herd.
- Purchase bulls at least three months prior to using them and have them re-tested at the start of the mating season. If the bulls test positive, there is usually a rush to obtain new bulls for the breeding season and then most auctions are over. It might be better not to test a month prior to the breeding season, but rather three to four months before the breeding season commences.
- Any bull that leaves the farm and returns, must be kept in quarantine until he has been tested and found to be clean.
- Get rid of bulls and cows that jump the fence.
- Unknown bulls and cows found on the farm, must be put under quarantine to determine whether they possibly brought trichomonas into the herd.
- Because trich can be transmitted via semen, it is very important to test donor bulls for trichomonas. The veterinarian is the ideal person to assist in this regard.
- Old cows must have calved normally and completed at least three oestrus cycles before breeding with them. A small percentage of female animals remain positive for a short period following calving.
- It is also proposed that the breeding season should be as short as possible. Animals that don't become pregnant, are probably infected and should be culled.
- Cull animals with uterine infection.
- It is of cardinal importance that cows should come into heat as soon as possible after calving (three cycles before they are mated) in order to recover completely if trich was present in the herd. For this purpose good management and supplements (licks) are necessary during the winter months and drought periods, otherwise they won't come into heat.
- A vaccine by Zoetis called Trichguard (*Reg no G1749, Act 36/1947*), containing inactivated *T. foetus* organisms, and TrichGuard V5L (*Reg no G3018, Act 36/1947*), containing inactivated *T. foetus*, *Campylobacter foetus* and five *Leptospira* species, is available. The vaccine is given only to heifers and cows in infected and



- high-risk herds. Two initial dosages are given with an interval of four weeks. The last injection is given four weeks prior to the breeding season. Thereafter an annual injection is administered prior to the start of the breeding season.
- Some practitioners recommend the vaccination of bulls, although there is no proof of efficiency.
- Cases where too many abortions occur or increase, have to be investigated in order to eliminate trichomonas.

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9. SHEEP SCAB: ALL OR NOTHING

(By Danie Odendaal, Izak Hofmeyr and Susan Botes)

Sheep scab is an all or nothing problem. You either have it on your farm or you don't. If it is present on your farm, you need to get rid of it. In terms of the *Animal Diseases Act*, sheep scab is a notifiable disease. Any possible or confirmed cases should be reported to your nearest state veterinarian, animal health technician, extension officer or police station. Failure to report sheep scab may lead to prosecution.

While the treatment and prevention of sheep scab has been mastered by the veterinary profession, there is grave concern over the fact that it still leads to large production losses. Three principles should apply in the fight against sheep scab. Firstly, it is not a disease that can be managed on your farm. Secondly, if you have sheep scab on your farm, you have to get rid of it. Lastly, if you do not have it on your farm, you should have very strict biosecurity measures in place in order to prevent it.

Causes of sheep scab

Sheep scab is caused by the sheep scab mite. The female mite has a lifespan of approximately 30 days, during which she will lay 40 to 90 eggs. A larva hatches from the egg, grows and moults into a nymph, which develops into an adult mite. Under favourable conditions the lifecycle from the new-laid egg to a mature, egg-producing female can be as short as nine days. An infested sheep can exhibit severe lesions within four to six weeks.

Within the herd the mites are transmitted from sheep to sheep through direct contact between animals. However, individual mites can remain viable and capable of re-infection for as long as 12 days after having been removed from a sheep. They can be spread by means of, amongst other, vehicles, the sheep shearing process, handling equipment, the clothing and bedding of shearers.

Symptoms

Sheep scab mites live and feed on the skin surface of the animal. The mites cause intense skin irritation when feeding. One of the first visible symptoms is wet wads of wool that the sheep will continue to gnaw at. Within days the lesion will become larger and the wool in the centre of the lesion will become detached. This area will be wet and later form a scab. The lesions will slowly become larger until a large area of the sheep is affected.

Usually lesions first appear on the shoulders and flanks of the sheep. Among rams lesions will often first appear around the chest and neck, due to infection which takes place during breeding. During the breeding season rams will, in turn, cause the first lesions to appear on the rumps and hips of ewes.

Stop sheep scab!

In order to eradicate this disease, the farmer should take drastic steps and not skip any of the steps in fighting this disease:

- Consult a veterinarian as soon as any skin condition or itchiness is noticed. This will allow for the guilty organism to be diagnosed timeously and specifically.
- If sheep scab is diagnosed, no animals should be moved to or from the farm. The farm should immediately be placed under quarantine by a veterinarian or animal health technician.
- The sheep should then be dipped twice, with an interval of eight to ten days, using a registered sheep scab dip. Injections are also available, but should be used in consultation with your veterinarian.
- Spot-mark each animal as it is dipped, each time with a different colour. This will make it easy to identify animals that were skipped during treatment and prevent re-infection.
- When the animals are dipped, they should be submerged for at least sixty seconds and their heads should be immersed at least three times. When using injections, calculate the



dose based on the weight of the heaviest animal.

- Ensure that you are very thorough throughout the entire treatment; it only takes one or two mites to re-infect an entire herd.

Identify your farm's risks

A single biosecurity plan cannot be prescribed for all farms as each farm is unique, says Danie. "Each farm's unique circumstances should therefore be considered when creating a biosecurity plan for that farm."

Sheep scab, for example, can be identified as a disease risk if the neighbouring farms' animals have been suffering from the disease for the past two years. This means that the farm in question has a high level of risk when it comes to sheep scab. The next step is to determine the possible effect of the disease.

"Sheep scab will have a potential effect on especially wool production, but sheep used for mainly meat production will also show a drop in production. The farm will be placed under state-controlled quarantine until the herd is declared free from sheep scab. This can have a dramatic effect on the farm as a business," says Danie.

Once the farmer has identified the risk on his farm, it is time to put a biosecurity plan into action. Typical tasks include:

- Repairing all border fences in order to ensure that no stray sheep have access to your farm.
- Preventing direct transmission of the disease by ensuring that shearing teams wear clean overalls and all equipment is disinfected.
- Training farm workers to identify and immediately report the first signs of sheep scab.

Treating sheep scab

Sheep scab is traditionally prevented by means of chemical control where sheep are treated twice, seven to ten days apart. Treatment can be done by dip or injection, says Danie. "To inject all the



sheep on a farm and having to repeat the entire process in seven to ten days, is labour- and cost-intensive, and it is seen as quite a hassle by producers. Long-acting injectable agents that are registered for the treatment of sheep scab mites are therefore regarded as a breakthrough, as it saves farmers 25% on the agent itself and 50% on labour and time.”



with your veterinarian, as young lambs with no fat reserves can easily be poisoned by injectable parasite control agents.

- Administer the injection in the smooth part of the groin (upper inner leg) of the sheep in a sitting position or in the smooth skin behind the elbow joint, when it is pulled forward. The area where the injection is administered should be clearly visible during

the process.

However, the use of these agents as a single treatment means that there is no room for error in the administration of this treatment. Danie says the following steps should therefore be followed with great care:

- Immediately report a case of sheep scab to the state veterinarian to ensure that the source of infestation can be identified and the spread of the disease prevented, as well as to get approval for the use of a single treatment.
- Ensure that the equipment used for the injections is in working order and correctly calibrated.
- The product used for the treatment should be stored in the correct manner as it is extremely heat- and light-sensitive. It should also be used before the expiry date. When the agent is injected under the skin of the animal, ensure that a small bubble forms under the skin. Cover the hole created by the needle for a few seconds after injection to ensure that no liquid escapes.
- All sheep should receive the designated dosage as stipulated on the package insert leaflet. Use the heaviest sheep as benchmark. If there are lambs in the herd, use the heaviest lamb as a benchmark, unless there is a significant difference in the various lambs' weight. The treatment of very young lambs should be done in consultation
- Treated sheep should be clearly marked with an oil-based paint.
- Count the treated sheep in each herd and keep proper records.
- Move the treated sheep to new, clean enclosures as the sheep scab mites can, for example, survive in wool stuck to fences for three weeks.
- Lambs born from treated ewes within ten days of the treatment, should also be treated. Once again, consult your veterinarian on treatment during the lambing season, as this could pose a great risk.
- If you have sheep on more than one farm, workers and their clothing that have been in contact with infected sheep, should be washed and disinfected in order to limit the spread of the disease.
- All vehicles used for the transportation of sheep should also be treated with a dip.
- Animals that are purchased and brought onto the farm should be treated and kept in quarantine for three weeks.

For more information, contact your local veterinarian. Sheep scab control should be very well planned and executed with the support of a veterinarian.

12 (a) VACCINATION PROGRAMME FOR SHEEP (By Dr Ariena Shepherd)

Disease	Vaccination	When	How	Comments	Recommendation
Pulpy kidney	Inactivated vaccine. Single or combinations.	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous		Essential
Black quarter	Inactivated vaccine. Single or combinations.	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous		Essential
Bluetongue	Live, 3 parts.	Lambs: from 3 months Ewes: after lambing Rams: after mating	Subcutaneous, 3 weeks apart	Don't vaccinate pregnant ewes or during mating. Rams infertile 60 days after last vaccination.	Strong recommendation
Tetanus	Inactivated vaccine. Single or combinations.	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous		Essential
Other Clostridium (dikkop, noyvi etc.)	Inactivated vaccine. Single or combinations.	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous		Strong recommendation
Anthrax	Live vaccine. Single or combinations.	Lambs: 4-6 months Ewes: annually after lambing Rams: annually after mating	Subcutaneous	Compulsory.	Essential
Botulism	Inactivated vaccine. Single or combinations.	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous	Don't vaccinate during mating or pregnancy.	Strong recommendation, especially if feeding chicken litter, silage, baled hay
Pneumonia (pasteurellosis)	Inactivated vaccine. Single or combinations.	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous	Routine in feedlots. Use recommended combination for area.	Strong recommendation

Disease	Vaccination	When	How	Comments	Recommendation
Corynebacterium pseudotuberculosis (Abscess)	Different types, single or combinations	Lambs: 6-10 weeks booster 4 weeks later. Ewes: Annually 4-6 weeks before lambing Rams: Annually	Subcutaneous	During outbreaks vaccinate every 3 months until under control.	Only use if disease a problem on farm.
Rift Valley fever	Live vaccine, single.	Before 8 months	Subcutaneous	Once as lambs. Repeat after 3 years if disease still occurs.	Strong recommendation.
Brucella (Rev 1)	Live vaccine, single .	Rams 2-4 months (never vaccinate after 4 months)	Subcutaneous	Only ram lambs. Use with caution. Dangerous to humans.	All future breeding rams.
Contagious abortion (Chlamydia)	Live vaccine, single.	Not before 5 months. Repeat every second year.	Subcutaneous	At least 4 weeks before mating. Don't vaccinate pregnant ewes. Use with caution. Dangerous to humans. No rams.	Only use if disease a problem on farm.
Orf	Live vaccine, single.	Anytime	In skin scraping	Use with caution. Dangerous to humans.	Only use if disease a problem on farm.
Blue udder	Inactivated vaccine, combination.	Ewes: 6-8 weeks before lambing with booster at 2-4 weeks before lambing. Then annually 4-6 weeks before lambing.	Subcutaneous		Only use if disease a problem on farm.
Johne's disease	Inactivated vaccine, single.	According to vet prescription	Subcutaneous	Only in areas allowed by state veterinarian.	Only in areas allowed by state veterinarian.

12 (b) GENERAL VACCINATION PROGRAMME FOR BEEF CATTLE

(By Dr Ariena Shepherd)

Name	Type	How	Animals	Comments
<i>Clostridium</i> group (e.g. black quarter, malignant oedema)	Inactivated vaccine	Injected under the skin, usually in the neck	Calves: twice 4-6 weeks apart around 4-6 months Yearlings: booster at 16-18 months Cows: booster 4-6 weeks before calving Bulls: 4-6 weeks before breeding	It is better to use a combination vaccine rather than (7 or more) single type as there are many clostridia and different ones can only be identified by a laboratory. Usually only used if feeding silage.
Anthrax	Inactivated vaccine	Injected under the skin, usually in the neck	Calves: twice 4-6 weeks apart around 4-6 months Yearlings: booster at 16-18 months Cows: booster 4-6 weeks before calving Bulls: 4-6 weeks before breeding	
Lumpy skin disease	Live spores (Sterne) vaccine	Injected under the skin, usually in the neck	Calves: at 7/8 months Yearlings: 16-18 months before breeding Cows: annual after calving Bulls: annually after breeding	This vaccine is required by law.
Pasteurella	Live freeze dried vaccine	Injected under the skin, usually in the neck	Calves: at 7/8 months Yearlings: 16-18 months	Cows and bulls can be given a booster during outbreak.
<i>Brucella abortus</i>	Different types, mostly leucotoxin	Injected under the skin, usually in the neck	Calves: twice 4-6 weeks apart around 4-6 months Yearlings: booster at 16-18 months Cows: booster 4-6 weeks before calving Bulls: 4-6 weeks before breeding	Can be combined with clostridium. Some newer types only require one vaccination initially.
<i>Brucella abortus</i>	Live freeze dried vaccine	Injected under the skin, usually in the neck	ONLY heifers between 5-8 months	This vaccine is required by law.
IBR (<i>infectious bovine rhinotracheitis</i>)/BVD (<i>bovine viral diarrhoea</i>)	Inactivated vaccine	Injected under the skin, usually in the neck	As recommended by your veterinarian	Do not vaccinate pregnant cows.
IBR (<i>infectious bovine rhinotracheitis</i>) BVD (<i>bovine viral diarrhoea</i>)	Live freeze dried vaccine	Injected into the muscle, usually in the neck	Calves: twice 4-6 weeks apart around 4-6 months Yearlings: booster at 16-18 months	

Name	Type	How	Animals	Comments
IBR (infectious bovine rhinotracheitis)/BVD (bovine viral diarrhoea)	Inactivated vaccine	Injected into the muscle, usually in the neck	Calves: twice 4-6 weeks apart at around 4-6 months.	Usually more expensive than living types.
Anaplasmosis	Live freeze dried vaccine	Injected into the muscle	Calves: 8-10 months	Older animals can be done, but they may need blocking. Do not vaccinate pregnant cattle.
Asiatic redwater	Live freeze dried vaccine	Injected into the muscle	Calves: 8-10 months	Older animals can be done, but they may need blocking. Do not vaccinate pregnant cattle.
African redwater	Live freeze dried vaccine	Injected into the muscle, usually in the bum	Calves: 8-10 months	Older animals can be done, but they may need blocking. Do not do pregnant cattle.
Heartwater	Live freeze dried vaccine	Injected into a vein	Calves: 2-3 weeks old	Older animals can be done, but they will need blocking. Do not vaccinate pregnant cattle.
Rift Valley fever	Different types of vaccines	Injected under the skin, usually in the neck	All animals annually depending on type	Don't use the live vaccine during the first half of pregnancy.
Three-day stiffness	Live vaccine	Injected under the skin, usually in the neck	All animals annually (as routine only bulls after breeding)	Vaccination during an outbreak will be effective.
<i>Actinomyces pyogenes</i>	Inactivated vaccine	Injected under the skin, usually in the neck	Only use in herds which have a problem	Can be used during outbreaks. Must give a booster every 6 months.
Neospora	Inactivated vaccine Withdrawn – not available	Injected under the skin, usually in the neck	Only use in herds which have a problem	Vaccinate during first trimester of pregnancy.
Salmonella	Different types of vaccines	Injected under the skin, usually in the neck	Only use in herds which have a problem	Vaccinate according to veterinarian instructions.

Name	Type	How	Animals	Comments
<i>E. coli</i>	Different types of vaccines	Injected under the skin, usually in the neck	Only use in herds which have a problem	Vaccinate according to veterinarian instructions.
<i>Campylobacter</i>	Inactivated vaccine	Injected under the skin, usually in the neck	Only use in herds which have a problem	Vaccinate according to veterinarian instructions.
Trichomonas	Inactivated vaccine	Injected under the skin, usually in the neck	Only use in herds which have a problem	Vaccinate according to veterinarian instructions.
Pink eye	Inactivated vaccine	Injected under the skin, usually in the neck	Only use in herds which have a problem	Vaccinate according to veterinarian instructions.



13. LAMBING PENS FOR HIGHER PRODUCTIVITY

(By Jacques Jansen van Vuuren)

Problems such as mining, stock theft and predators put a lot of pressure on the financial viability of livestock farming. Reproduction has therefore become all the more important, allowing farmers to sell more animals to compensate for problems encountered elsewhere. It is important to know the causes of these losses, whether it involves predators, stock theft, diseases, weather conditions or management. Sometimes losses are blamed on predators while poor management might in fact be the culprit.

Lamb losses are one of the biggest causes of inefficient sheep farming and have major economic implications. The majority of lamb mortalities occurs during the first three days after birth and can be as high as 20% or even more. Losses amongst multiplets can be 1,5 to 3 times more than amongst singular lambs, which emphasises the special supervision and management required by multiplets. Multiple births play a very important role in the profitability of sheep farming because it increases the reproduction tempo of ewes.

Lambing pens have been used for many years, but in the past it was utilised only for "problem cases" (e.g. ewes abandoning lambs) and for protection against elements (e.g. harsh cold weather, snow, etc.). The major reason for ewes abandoning lambs is because they don't have enough colostrum when the lamb is born, mostly due to a shortage of bypass proteins.

13.1 Types of lambing pens

Lambing pens can be built using different methods and means. It is important to use what is locally available, rather than buying expensive material that will not necessarily be better than the local DIY product. Lambing pens can have different measurements

depending on the breed of sheep, but are normally approximately 1,5m x 1,5m. It can also be 1,5m x 2m. The pens can be 1 to 1,2m high. For multiplets the bigger pen will be better.

The majority of lambing pens are made from steel gates (sheep gates), fencing, plastic sheep gates, wooden gates, etc. The floor of the lambing pen may vary from soil with sawdust, cement with sawdust, slatted floors, outside in the veld, etc. Soil with sawdust tends to be the best, provided it is cleaned thoroughly between every cycle of ewes lambing in them.

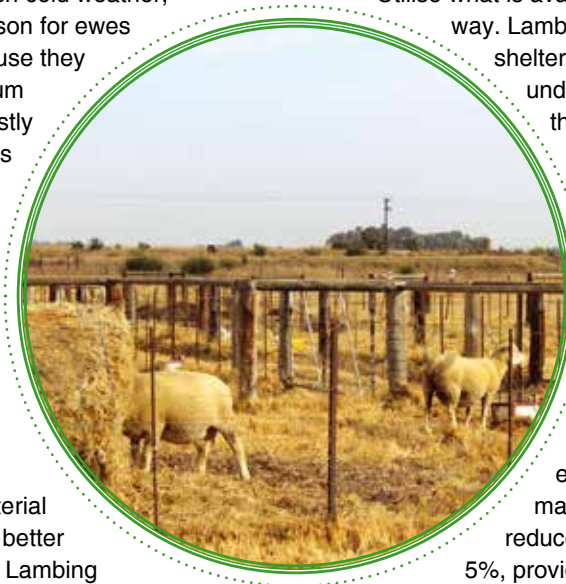
It has also been noted that pine sawdust might be a deterrent for flies, because of its odour. Cement floors are not generally used because they are cold and do not absorb any moisture (the amniotic fluid is more of a culprit than the ewe's urine).

Slatted floors tend to lure more flies, unless they are cleaned regularly. Ewes should be adapted to the diet which they will receive in the pens, especially if they have slatted floors, otherwise they will easily become clogged. Ewes that are not adapted to the more concentrated diet, will develop diarrhoea, which is undesirable in a lambing pen.

Utilise what is available in the best possible way. Lambing pens can also be sheltered (roof) as a unit or under different roofs, even in the veld. The most beautiful and most expensive is not always the most practical. Use what works for you.

13.2 Advantages of using lambing pens

- The fact that lambing pens promote bonding between the ewe and her lamb(s), is the major contributing factor to reduce lamb mortality to below 5%, provided that a correct and well balanced diet is fed. Where ewes



and their lambs are placed in lambing pens shortly after birth, lamb mortality was only 3% compared to 12 to 23% where ewes lambed in camps (Putu *et al.*, 1988a, b).

- Lambing pens simplify management and supervision during lambing and problem cases can receive special attention, thus increasing lamb survival.
- Lambing pens increase lamb survival during adverse weather conditions as well as for ewes with multiples and maiden ewes lambing for the first time. It will be beneficial to scan ewes for pregnancy as well as number of foetuses in a lambing pen system. Lambing pens can be used for all your ewes, or only for ewes needing extra care, as stated above.
- Lambing pens promote accurate record-keeping, which in turn accelerates breeding progress. According to Dr George Anderson of Australia, nearly 9% of singles, 15% of twins and 24% of triplets have inaccurate pedigrees under Australian conditions. The biggest reason for this is the high incidence of lamb theft by other ewes, especially where the concentration of ewes is high in lambing camps. Lambing pens prevent interference with and lamb theft.
- Lambing pens prevent one lamb of a set of twins from straying from the birth place or not walking with its dam and being separated from her. Pre-weaning mortality is very high where lambs are separated from their mothers in this way. Only 32% of such lambs survive in practice (Anderson, 1984). According to Nowak (1996) 40-50% of twins, in the case of Merinos, can be separated from their mothers within the first 48 hours of birth, because they do not follow her when she walks away.
- Lambing pens makes it easier to identify:
 - o Ewes with stillborn lambs.
 - o Ewes that have to be assisted during lambing; that abandon lamb(s).
 - o Ewes with poor or no milk; with udder problems, etc. These ewes and their lambs should be marked and culled and not be used further for breeding purposes.
 - o There is no danger of losing mothering

abilities or artificially making good mothers out of bad mothers. It is easier to identify and cull a bad mother in the lambing pen than ewes lambing in the veld.

- Lambing pens prevent predators from killing newly born lambs.
- Many groups of ewes can lamb at different times throughout the year to allow for facilities to be utilised optimally. It allows for a sound cash flow.

13.3 Disadvantages

- Labour-intensive during lambing.
- In an eight-month system with various groups of ewes lambing the entire year, a vaccination programme can become complicated.
- Initial capital outlay can be high.
- Feeding costs may be high, but higher weaning percentages should compensate for that.

13.4 General guidelines for a lambing pen lambing system

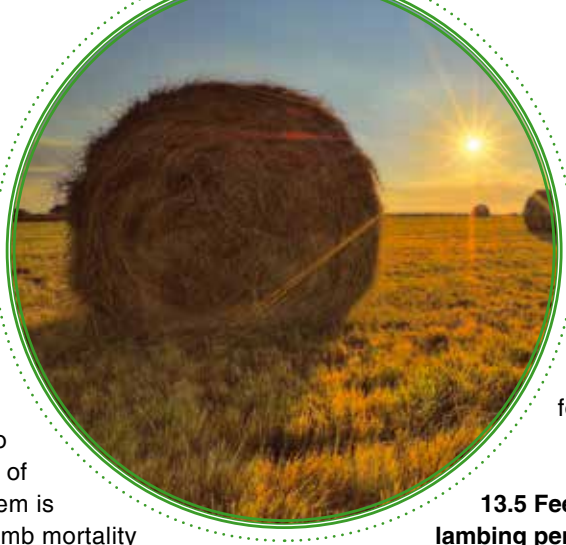
Synchronise ewes that should lamb in lambing pens, to shorten the period in the pen and save on feeding and labour costs. Ewes can be brought closer to the pens just prior to lambing, and as soon as the first ewe lambs, all ewes can be placed in the lambing pens where they can then lamb.

Ewes can also be kept in small camps near the lambing pens and placed in the pens as soon as they have lambed, to keep the pens drier (the majority of fluids in the pens originate from amniotic fluid at birth). Lambing pens protect ewes and lambs against inclement weather (cold, wind, rain and heat), predators and lamb theft by ewes lambing close to each other.

As soon as ewes have lambed, ensure that the ewes' teats are open. Tug gently on the teat to release the plug. The lambing pen system simplifies the supervision and identification of ewes and their lambs. Lambs can be marked to associate them with a specific ewe.



Sometimes a lamb would lie on top of an ewe and when the ewe gets up, the lamb may fall out of the pen. If this happens to a number of lambs, they might get mixed up if not marked. An easy way is to mark your pens and to give the lambs the number of the pen. Although the system is labour-intensive, it limits lamb mortality (norm is less than 5%). Afterbirth should be removed from lambing pens and buried.



Lambing pens should be well ventilated to prevent lung disease and to limit high temperatures in summer. Fly control is important and Agita or wasps can be applied for this purpose.

Depending on the variation of the lambing pen system used (all ewes placed in lambing pens, only ewes with twins or only problem cases), and/or ewes are synchronised using teaser rams or sponges, the number of lambing pens needed is at least 20 to 40% of the number of ewes mated (Henderson, 1990). The percentage can be up to 80% depending on fertility levels and conception percentage. Ewes served by the follow-up rams will only get into the pens once the original group has left the pens.

Lambing pens should be kept clean and dry by regularly replacing the bedding with clean straw or sawdust. It should be disinfected after use. Henderson (1990) recommends straw and slaked lime (CLC building lime or calcium hydroxide) on the floor of the pens before putting in the bedding to limit germ build-up. F-10 can be combined with the lime. The umbilical cord of lambs should be disinfected properly (preferably an iodine-containing remedy) prior to placing them into the lambing pens or immediately after birth when lambing in the pens.

To limit infections such as infection of the spinal cord, docking and castration should not take place in the lambing pens. Docking can be done in the pens by means of a clean cut without using the rubber ring (using a burdizzo in combination with a knife is recommended in the lambing pen).

13.5 Feeding programme for lambing pen system

When using the lambing pen system, ewes bearing twins should be adapted to the same diet that they will receive in the lambing pens six weeks prior to lambing and single-bearing ewes four weeks prior to lambing. Start with 500g/ewe/day and increase it weekly with 250g/ewe/day, until the stage where the ewes in late gestation will enter the lambing pens. Ewes expecting singular lambs should then consume 1 to 1,5kg and twin-bearing ewes 1,5 to 2kg/ewe/day of the diet.

Depending on the condition of ewes, body mass and the number of foetuses, maximum feed intake in lambing pens of late pregnant ewes will be approximately 2,5 to 3% of body mass and that of ewes that have already lambled, will be 3 to 4%. Once the lam ewe ration is given, discontinue all lick supplements. When feeding the wet ewe diet (suckling ewes), ensure that ample feeding space is available (long wool ewes: \pm 450-500mm/ewe; short wool ewes: \pm 400-450mm) to allow all ewes to feed at the same time.

Examples of the wet ewe diet that should be supplied in a milled form, are shown in the table below. Because these diets contain urea, it is important not to exceed the maximum intake of each diet in order to prevent urea poisoning. Clean drinking water should be available *ad lib* at all times. Contact your feed consultant for more available diets. *Table 1* is only a guideline and example. Use your own discretion. The most expensive diet is the one that did not work.

Table 1: Options for lamb ewe rations

Component	Ground complete wet ewe diets*		
	Max. intake 1,5kg/ ewe/day	Max. intake 2,5kg/ ewe/day	Max. intake 3,5 kg/ ewe/day
Ground lucerne (25 mm)	375kg	375kg	375kg
Ground maize	350kg	350kg	350kg
Voermol Maxiwol	200kg	150kg	100kg
Voermol Procon	-	50kg	100kg
Voermol Molasses meal	40kg	40kg	40kg
TOTAL	965kg	965kg	965kg

* Feed ewes with single foetuses $\pm 2,5\%$ and those with twin foetuses $\pm 3\%$ of body mass.

* Feed ewes with single lambs $\pm 3\%$ and those with twin lambs $\pm 4\%$ of body mass.

13.6 Moving ewes and lambs out of pens

Ewes with their lambs should be kept in the lambing pens for at least two days, but preferably three to five days. Ewes with triplets can be kept in the pen for up to eight days. It takes between 48 and 60 hours for a lamb and ewe to bond properly. If the ewes don't accept their lambs, lambs are still weak or there are other problems that can lead to lamb mortality when the lambs are removed, they should be kept in the pens for longer.

The recommended procedure is to release ewes and lambs from the pen as soon as the ewes accept their lambs and the lambs have suckled properly. It is normally about two to three days in

the case of singles and three to five days in the case of twins or triplets. Ewes are kept in small groups after leaving the pens and the groups gradually become bigger. This is done to gradually adapt ewes and lambs to higher concentrations of animals and to prevent separation of ewes and lambs that can lead to lamb mortality.

In the case of single lambs, keep ten ewes in a camp for the first 5 to 7 days, twenty ewes for the next 5 to 7 days, forty ewes for the next 5 to 7 days and after that preferably not more than 100 ewes per camp. In the case of twins the number of ewes per camp is 5, 10, 20 and 35 to 50. In any lambing system there should never be more than 200 to 250 lambs and their dams together in a camp.

In the lambing pen system it is easy to separate ewes with singles and those with multiplets and it is also recommended as such. After having been removed from the pens, ewe lambs must be visited daily to attend to problem cases. If sufficient green feed is available, you can switch to a high bypass protein lick (250kg Voermol Maxiwol concentrate + 200kg ground maize or whole barley + 50kg salt) or Voermol Maxiblock. If poor quality and/or insufficient grazing is available after removing ewes from the pens, you should continue feeding the complete wet ewe diet.

Supplementary feeding should never be stopped abruptly, but must be phased out gradually. The lambs may start consuming creep feed from the age of 10-14 days. Creep feed can be adapted



gradually to the diet that will be used in the finishing pens. These lambs grow out faster, allowing the ewe to recuperate faster after lambing and decreasing weaning shock in the lambs. Young lambs have a much better feed conversion rate than older lambs. Therefore, the sooner you can start with creep feed, the better.

Lambs can be weaned as early as 60 days of age, which may result in lambs being marketed earlier, allowing you to keep more ewes on the farm. Lambs growing out faster can also have a longer productive lifespan. However, be careful not to overdo this as lambs growing too fast can put on fat too quickly, and fat can accumulate on the ovaries, with a resultant detrimental effect on the reproductive performance of ewes later on. With the use of lambing pens and early creep feed the number of ewes kept on the farm can be increased because the lambs can be weaned earlier and placed in finishing pens.

13.7 Selection in lambing pens

Producers often worry that the use of lambing pens will have a negative influence on the mothering abilities of ewes. This can be prevented if the ewes are selected for mothering abilities before they are placed in the lambing pens. Weaker lambs can be ear-notched to be identified for marketing to ensure that your flock remains profitable.

In all lambing systems one must discriminate against ewes that struggle to lamb, that require assistance during lambing, that give birth to still-born lambs, that don't accept their lambs, that have no or very little milk, etc. Mark both these ewes and their lambs so that they are not used further in breeding programmes. Ewes and especially rams which transmit genetic defects, must be identified and culled.

13.8 General

If the lambing pen system is used, lambing time should be as short as possible to save on feed and labour costs. The lambing time can be drastically shortened if ewes are teased for eight days prior to mating and then mated for a

maximum of 28 days. This will ensure that about 90% of the ewes will lamb in the first cycle (the first 17 days) of your lambing season.

It is important to ensure that all feed purchases, ration mixing as well as all other preparations are done before the ewes start lambing. Once lambing commences there is little time for these actions. Ewes can also be synchronised and mated in groups. For this to work you will need 25-30% rams to ensure that the ewes are mated at peak heat. The rams must also be fit and healthy.

In all lambing systems it is important that you work calmly and slowly with ewes that are close to lambing. If possible, maiden ewes must be kept separately from older ewes. Younger ewes tend to be more nervous and therefore will exhibit more lambing problems around lambing time.

Ensure that sufficient clean and cool drinking water is available within walking distance in the lambing camps. Some shade and structure to protect them from rain and wind can also help. When lambing in high summer, shade of $\pm 2\text{m}^2$ per ewe is important. If lambing camps are adjacent to one another, especially where water troughs are shared, it is important to make sure that the fences are in good order so that the lambs cannot crawl through the fence. Chicken wire can be used. Feed troughs should preferably be placed away from the water troughs.

13.9 Colostrum

It is very important that newly born lambs receive adequate colostrum (210ml per kg bodyweight in the first 18 hours). Weak lambs can be given colostrum through a stomach tube ($\pm 100\text{ml}$ at a time, 3 to 4 times per day) if they do not suckle on their own, within the first three to four hours after birth.

Colostrum can be frozen. It is best if thawed at room temperature or a lower temperature (below 35°C) if needed. Above 37°C the anti-

bodies can be destroyed. Thawed colostrum should preferably be heated, but not to above 37°C before administering it.

If colostrum is not available, artificial colostrum can be made from 500ml full cream cow's milk mixed with 125ml cream (or 3 tablespoons fish oil or cooking oil), 1 whole egg and 1 teaspoon lactose. This colostrum must then be heated to $\pm 37^{\circ}\text{C}$ before it is given to lambs. It is important to note that artificial colostrum has no antibodies against current diseases.



requires much better management and commitment and should be thoroughly investigated before making any capital investment. Lambing time is harvest time!

By following the guidelines as closely as possible, producers will limit the occurrence of lamb mortality. Accurate recordkeeping of lamb losses will assist the producer in adjusting his management, lambing pen and feeding practices in order to prevent lamb mortalities in the future. Higher profit margins are possible in your sheep enterprise. It is important to plan your immunisation programme carefully if an eight-month lambing system is followed. Contact your vet or animal health representative to assist in this regard.

13.10 Summary

Lambing pen systems are a huge help if the ewes are synchronised (for instance with AI) to reduce the lambing time (3 to 5 days). It is easy to apply if ewes are to be fed during lambing time anyway. The biggest drawback of this system is increased feed cost and intensive labour. Although the cost of the lambing pens is quite substantial, this cost can be written off over time.

Although some researchers (Brand, Cloete & De Villiers, 1985; Haughey, 1989) are still not sure whether the lambing pen system is economically viable, one has to weigh the cost of the system against extra income due to higher weaning percentages. An increase of approximately 5 to 10% in weaning percentage should compensate for the cost of the pens and the extra labour.

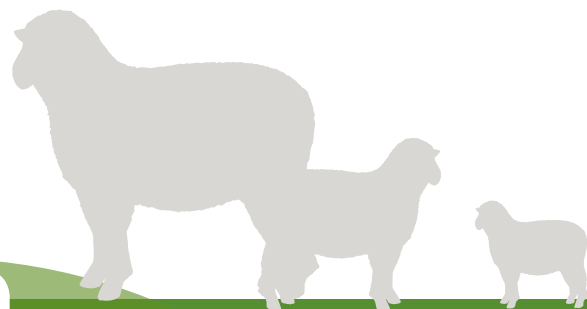
Applying an eight-month lambing system will assist in recovering the initial costs quicker. The use of lambing pens, early weaning of lambs through the use of creep feed and rounding off the lambs in a feedlot, can allow you to keep more ewes on the same piece of land.

Lambing pens are not a quick fix for poor lambing and poor weaning percentages. It

Acknowledgements

Drs Jasper Coetzee and Dave Midgley for their commitment and the time dedicated to the small stock industry. Dolf Bam who, as a producer, assists many farmers who want to start a lambing pen system.

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E-mail: wolskaap@mweb.co.za



14. LAMBING PENS – TYPES AND MANUFACTURERS

Improves weaning percentage (bonding) and facilitates pedigree.

Size: $\pm 1,5\text{m} \times 1,5\text{m} \times 1\text{m}$.

Use material available on the farm.

PD Jacobs – Trompsburg • Cell 082 783 1463

Good nutrition – all sheep receive the same feed as that which ewes will receive afterwards. Lambs remain in the pen 0-4 days before and 2-5 days after lambing.

Vicus Bekker – Edenburg • Cell 082 413 3834

Some pens can be moved and dismantled and stored when not in use.

Giepie Caldo – Trompsburg – CMW • Cell 082 468 3618

Slatted floors under roof – movable.

Leon Bekker – Warden • Cell 082 550 0687

Initially he wanted it as cheap as possible, but when he realised its worth, he upgraded.

**Carlos da Silva – Harrismith
• Cell 082 571 2212**



Open

Ewes are inseminated by laparoscope and then taken to the veld. ± 135 days after AI ewes are placed in camps closer to the homestead. Once the first ewe lambs, they are all taken to the lambing shed. Only one per pen – 252 pens in shed. Single lamb ewes are moved out after four days. Losses below 4% including orphan lambs.

Dolf Bam – Amersfoort • Cell 084 491 0310



Covered



Use system for proper bonding between ewe and lamb. Lambing pens 1,8m x 1,0m – galvanised pipe. 1,8m sides used for other purposes on farm rest of year. One pen for every three ewes that will give twins. As soon as the first ewe in a group lambs, the ewes of that group are placed in lambing pens.

Ben Brynard - Calvinia • Cell 072 110 5694



Use this system to improve lamb survival. Synchronise and then use rams. Covered slatted floors are movable. Ewes come to lambing pens three days prior to lambing. Twins stay 48 hours and singles 24 hours in lambing pen. Three lambing seasons per year.

Gert Loggenberg – Harrismith • Cell 082 770 8338

Use this system for better management. Approximately 60% twins. Lambing only once a year in two groups, but 30% more multiple births. Scan and handle singles, twins and triplets separately.

Johan Rautenbach – Senekal • Cell 082 442 7069

Slatted floors under roof – scraper on rope and pulley cleans.

Deon Maree en Tania Boshoff – Harrismith • Cell 083 255 4722

Ewes in as soon as first ewe lambs. Singles 3 days and twins 12 days in pen. Cost-effective, palettes. Once you have used pens, you will never look back. (Charl Naudé)

Agricultural High School Marlow – Cradock • Tel 048 881 3121

Straw bedding – water pipe system and individual feeding.

Hansie Kruger (Joubert en Verster Boerdery) – Luckhoff • Cell 082 775 2460

Ewes come in to lambing pens two weeks prior to lambing and are adapted on a TMR. They remain in the lambing pens as long as nature requires. Natural mating takes place for 35 days. Two lambing seasons are used per year and scans are conducted to determine conception and twins. Wean on 90 – 120 days of age depending on the availability of pastures.

Gilly Scheepers – Fouriesburg • Cell 058 223 0410 • bloukruin@intekom.co.za



Lamb carrier



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Dr Francois van de Vyver, Voermol Voere, Tel: 032 439 5879
email: francois.vandevyver@tongaat.com



VOERMOL

What nature lacks -
Voermol will provide

The success of any sheep enterprise lies in the sound management of the enterprise. A sheep management program enables the farmer to complete different sheep management activities at the correct times of the year in order to support high reproduction rates, low mortalities, herd health and ultimately also the quality and quantity of marketable product available.

Deciding on an appropriate date for the beginning of the breeding season is the starting point of a sheep management program. Once this date has been fixed, the commencement date of flush feeding can be calculated. Flush feeding should start no less than 21 days prior to the beginning of the breeding season and continue 21 days into the season.

The lambing season will start approximately five months later and supplementary feeds should be made available to the pregnant ewes from four to six weeks prior to the start of the lambing season. The focus should be on "bypass" protein which supports udder development for quality colostrum and milk production. Additionally, it supports the growth and development of the unborn lamb and has a dramatic effect on lamb survival rate. During lactation, the same supplementary feed can be utilized at higher intakes and will support high milk yields, thereby improving lamb growth rates.

When lambs reach the average age of ten days, they can be introduced to creep feeds. A quality creep feed is characterized by sufficient levels of carbohydrates and natural protein to support rumen development. The last important date to record is the planned weaning date.

Recommendations for the critical nutritional phases are as follows:

- For flush feeding, use **Voermol Maxiwol Readymix (V7815)** at 300-400g/ewe/day.
- Use **Voermol Maxiwol Readymix (V7815)** or **Voermol Maxiwol Production Pellets (V15415)** at 250-350g/ewe/day for the last six weeks of pregnancy.
- Ewes will already be adapted to the concentrate fed during gestation and can be continued on this supplement during early lactation at levels of 300-500g/ewe/day.
- Creep feeds can be prepared by mixing 150kg **Voermol SS 200 (V8592)** with 175kg **Voermol Procon 33 (V12701)**, 40kg **Voermol Molasses Meal (V1995)** and 625kg maize meal or whole small grains. The creep feed is fed *ad libitum* to the young lambs.

Over and above the nutritional management built into such a program and developed in collaboration with your animal nutritionist, other important events can also be recorded and planned. These include vaccination dates, endo-and ectoparasite treatment and general events such as dates for mating, weaning, marketing, auctions and so forth.

For further information, contact your nearest Voermol Agent
(visit www.voermol.co.za for contact details) or send an email to info@voermol.co.za

15. CRITICAL DATA FOR SHEEP FARMING

15.1 Fertility

Weaning age:	60 (early weaning) – 120 days
Teasing period:	9 days
Length of oestrus cycle of ewe:	17-18 days
Mating period:	34 days
Gestation period:	5 months

15.2 Feedlots

Floor space (dry sheep and lambs):	1,8m ² per sheep
Shade:	0,27m ² shade per sheep
Feeding space:	10cm per sheep
Drinking space:	1cm per sheep



15.3 Reproduction definitions

- **Conception percentage:** Number of ewes lambing per 100 ewes mated.
- **Fecundity:** Number of lambs born per 100 ewes lambing.
- **Lambing percentage:** Number of lambs born per 100 ewes mated.
- **Weaning percentage:** Number of lambs weaned per 100 ewes mated.
- **Mortality:** Number of lambs dead per 100 lambs born.
- **Survival percentage:** Number of lambs alive at weaning per 100 lambs born.

15.3 Nutritional requirements of a 50kg sheep in various stages of production.

Production phase	Dry matter intake per day	Proteïen/day	Energy Tdn/day
Dry animals	1kg	90g	550g
Late gestation (last 6 weeks)	1,7kg	160g	1 000g
Lactating	2,1kg	220g	1 360g
Young growing	1,4kg	150g	940g

Figure 1: Measurements for slat construction.

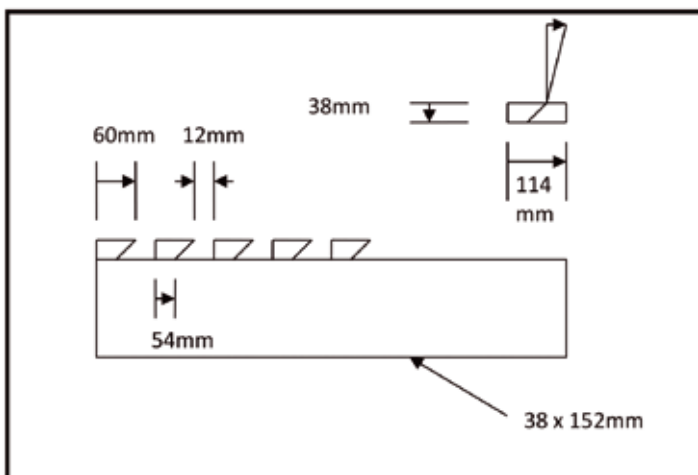


Figure 2: Creep pen measurements.





Cattle trough
1,8 metres



Cattle trough
3 metres



Cattle trough 3
metres super



Cattle feeding
trough 3 metres



Cattle oval trough 2,5 metres



Game oval trough 2,5 metres



Cattle feed-
lot trough 3
metres



Sheep feed
trough 3 metres



Sheep trough 1 metre



Sheep
trough 2
metres



Self-feeder



Sheep trough 3 metres



Float valves



Troughs, feed troughs and self-feeder systems for
cattle, sheep and game. Available at all co-ops.

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4.1 HANDLING SYSTEMS AND DIPPING FACILITIES

(From: *Sheep facilities manual*, by Hentie Breedts Pr Ing, ARC Institute for Agricultural Engineering)

The layout of a handling facility will determine how effective it is in respect of labour requirements and the movement of sheep. The specific layout is, however, mainly dependent on the requirements of the manager and the choice of the site. These two factors vary tremendously and it is therefore almost impossible to obtain the ideal layout.

A general objective in the design of the facility is that various tasks must take place with minimum movement and labour. Tasks which can be done simultaneously must not influence each other adversely. Facilities not used simultaneously, can be used for more than one activity, such as using the reception pen for the dip, loading platform, crush or work walkway.

Elements of the handling facility

The typical handling facility can include the following:

- Loading ramp.
- Adapting pens.
- Holding pens (reception and dispatch pens).
- Crowding pen or reception pen.
- Gathering pen.
- Crush or working alley.
- Sorting pens and sorting gates.
- Weighing scale.
- Dip facilities.
- Dripping pens.
- Shearing pens.

The handling facility can also include the office and hospital complex. Referring to general placing, it can be sensible to place this facility against the wind and on grade of the housing and feed-processing area. This will decrease the detection of odours and limit problems with run-off.

4.1.1 Loading ramp

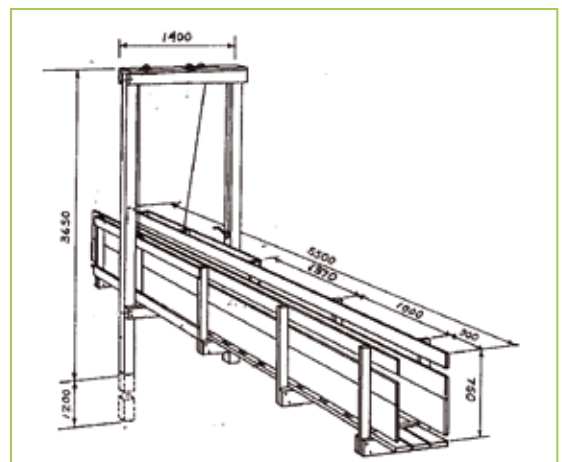
A loading ramp is provided in the system for easier loading of sheep. The loading ramp can be part

of the facility or a mobile unit, if there is more than one loading point. *Figures 1 to 3* illustrate various types of loading ramps.

Important points include:

- Sheep must preferably not be loaded against the sun.
- The loading ramp must be placed in such a way that sufficient access is provided for a vehicle, for both side and hind-loading methods.
- The loading ramp must have a non-slip floor surface to prevent possible injuries.
- The sides of the loading structure must be smooth and without any protrusions to prevent injuries.
- There must not be any opening between the loading ramp and the truck. It will make sheep hesitant to climb onto and from the truck and can cause injuries if the sheep should step into the opening.
- If the loading ramp is wider than the truck, the openings between the loading ramp wall and the truck must be closed with adjustable gates to prevent the sheep from jumping down.

Figure 1: Permanent loading ramp unit.





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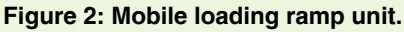
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4.1.2. Adapting pens

After off-loading incoming sheep, they are inoculated against pulpy kidney, dosed for internal parasites and then vitamins A, D and E are administered. The sheep are weighed, dipped and kept in adapting pens for five days. The purpose of the adapting pens is to make the sheep gradually used to the ration provided in the feeding complex.

4.1.3. Holding pens (receiving and dispatch pens)

The area provided in front of the loading ramp is used for keeping the sheep in groups for dispatch. In the case of incoming animals, the sheep are gathered there before any treatment is given. The typical space requirement in the holding pens is 0,5m² per sheep.

4.1.4. Gathering pens and crowding pens

Gathering pens are pens in which sheep are let through in small groups to further activities. Gathering pens usually hold 25 sheep for easy handling and a surface of 0,5m²/ewe or 0,7m²/ewe with lamb is provided. The gathering pen is usually round or funnel-shaped and examples thereof are shown in *Figures 4 to 6*. The sides of the round gathering pens are usually solid and typical building materials include brickwork, concrete, wood, sheet metal or rubber tyres.

4.1.5. Post-gathering pens

Sheep are collected in post-gathering pens after treatment, before they are moved back to the feeding complex in a group. An area of 0,5m²/sheep for the post-gathering pen must be provided, usually to the crush. In layouts where sorting pens are placed after the crush, it is not necessary to make use of post-gathering pens, because the sorting pens can be used for this purpose.

4.1.6. Sorting pens and sorting gates

Sorting pens and sorting gates are used to separate certain sheep from others in the production process. The sorting pen will therefore be used to sort new animals, to separate lambs from ewes or to separate sheep to be sold from the rest.

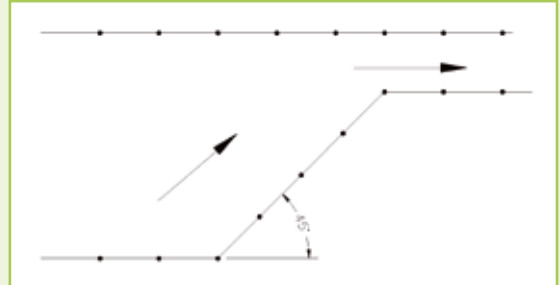


Figure 4: Funnel-shaped gathering pen.

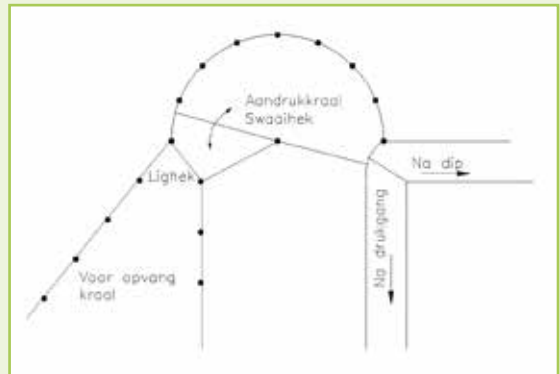


Figure 5: Round crowding pen serving two entrances.

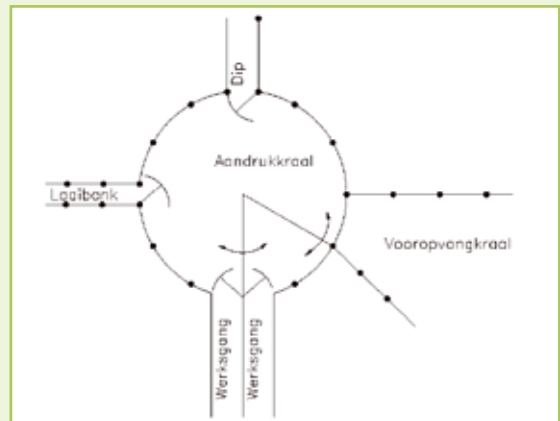


Figure 6: Round crowding pen serving four entrances.



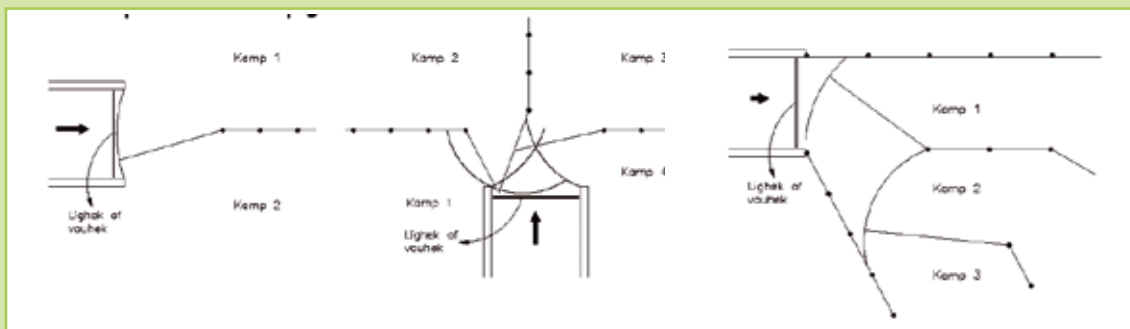


Figure 7: Sorting to different camps by means of gates.

Sorting is done from the crush and usually to the scales with the aid of a number of gates controlling access to specific camps. *Figure 7* shows a typical configuration for the sorting of sheep in two, three or four camps. Sorting pens are used for relatively short periods, after which the sheep move back to the feeding pens. The area must, as is the case with gathering pens, provide 0,5m² per ewe.

4.1.7. Crushes or working alleys

Crushes are used to classify certain types of animals and to work on sheep or for the treatment of diseases. In the handling facility distinction is made between crushes, alleys narrower than 600mm and wider alleys (approximately 1 000mm), also known as working alleys.

(a) Working alleys

Some farmers prefer to work with the sheep between the sheep. It is also necessary to separate treated sheep from untreated sheep during treatments such as castration and docking. For these actions, the wider, shorter working alley as shown in *Figure 8* is preferred. The sides are 1m high to keep sheep inside and also enable the handler to climb in and out of the working alley with ease. The working alley is approximately 1m wide, about 6m long and allows for ±10-15 ewes. In the configuration, the handler can treat the sheep without them passing by him. Treated sheep are let through and in this way are separated from the untreated sheep. Vertical sliding gates allow the handler to lift the gates by means of ropes to let sheep in or out.

Two adjacent working alleys can increase efficiency by filling one with sheep while the handler is

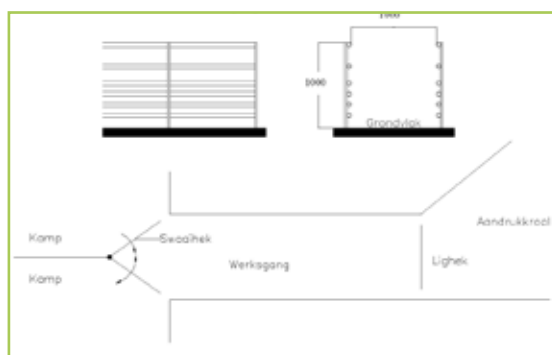


Figure 8: Working alley for handling of sheep.

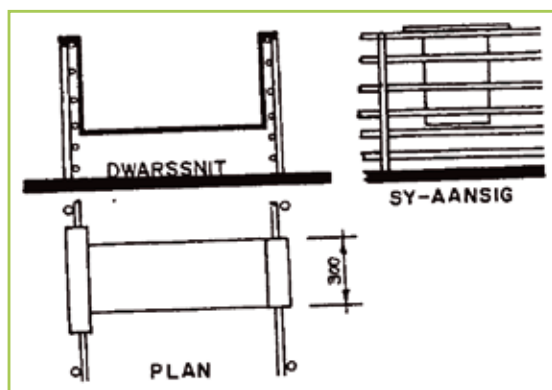


Figure 9: Example of a portable working table.

busy in the other alley. This cuts back on time that the handler must wait for the next group. A portable working table as shown in *Figure 9* can be used for individual treatment.

(b) Crushes

For farmers who prefer to work with the sheep from the side, there is a smaller crush which is perfect for treatments such as dosing and injection. The aim of the crush is to get a single row of sheep with their heads in the same direction. Sheep should not be able to turn in the crush. The crush must have smooth solid sides, so that the sheep can only see the opening and sheep in front of them.

At crushes with vertical sides, a width of 375 to 550mm is recommended, depending on the breed. Arched crushes or crushes in an “S” shape also give good sheep flow, since they cannot see the entrance in front of them and just keep on walking. Where V-shaped crushes are used, a base width of 200 to 300mm and a top width of 450 to 675mm is recommended.

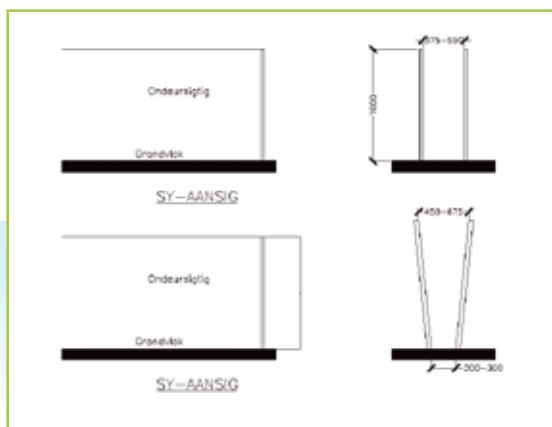


Figure 10: Crush for the handling of sheep.

4.1.8. Dip facilities

A distinction is made between walk-in/walk-out dips and those dips where the handler places the sheep in the dip and it walks out by itself. The first type requires little energy from the handler and will be the automatic choice from a labour point of view. *Figures 11 to 13 show typical dip facilities.*

A further distinction is made between oblong, round or spray-dips. The choice of a type of dip is that of the manager or handler.

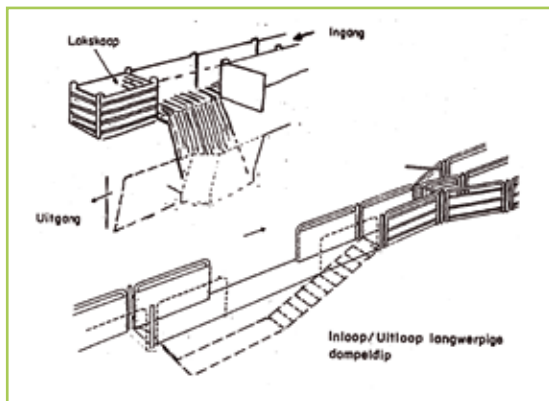


Figure 11: Longitudinal walk-in/walk-out dipping tank and sideways slide-in dipping tank.

Round dips are usually the type where the sheep has to be lowered into the dip. The round dip has the advantage that during dipping for mange – when they have to lie in the dip mixture for one whole minute – they can be forced to swim around in the tank for that specific time. A further advantage of the round dip is that the handler does not have to move over a long distance to control the sheep in the dip.

Longitudinal dipping tanks are usually the walk-in/walk-out type and have the advantage that the dipping process is usually faster as with the round dip and it is less labour-intensive. Note that the top width of the dip is 500 to 600mm. Sheep must not be able to turn around in a dip. For smaller breeds of sheep the measurement is thus 500mm and for bigger breeds 600mm.



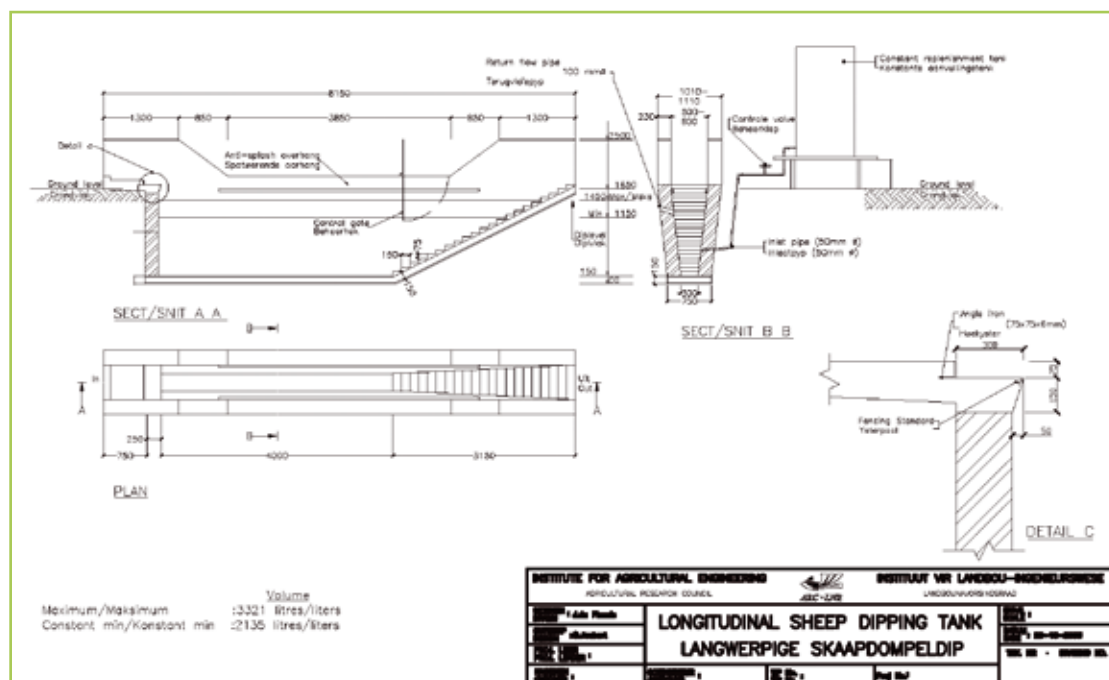


Figure 12: Longitudinal sheep dipping tank.

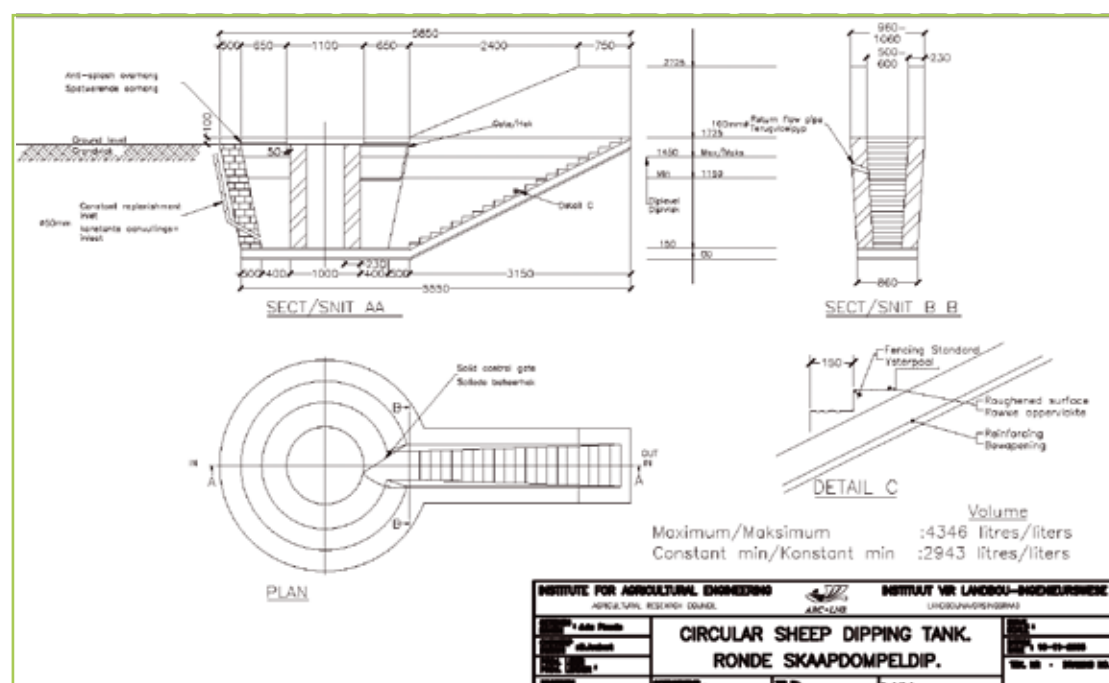


Figure 13: Circular sheep dipping tank.

Spray-dips are not used for sheep on a large scale, because of the poor wetting of sheep, especially those with a long fleece.

A hoof bath can also be incorporated into the facility to treat hoof-related diseases. *Figure 14* shows the dimensions of such a hoof bath.

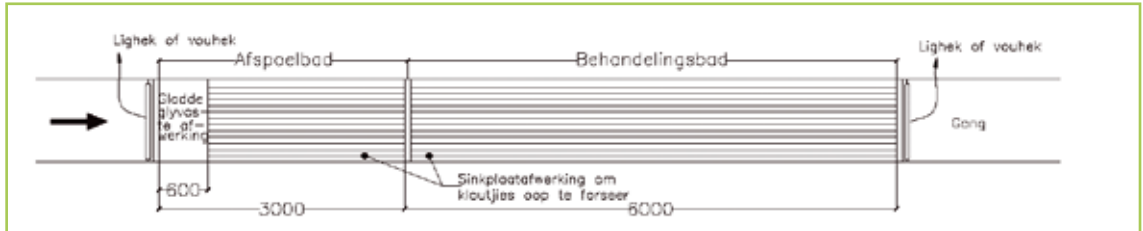


Figure 14: A typical hoof bath.

4.1.9. Dripping pens

At least two dripping pens are placed at the exit of the dip where sheep stand for ± 10 minutes so that excess water can drip off. A surface of $0,5\text{m}^2/\text{sheep}$ must be provided for dripping pens. The floor of the dripping pen is usually of concrete with a coarse finish to prevent sheep from slipping and falling. The floor has a slope of 1:30 in the direction of the dip so that dripping water can be drained back into the dip.

10. Elements of the shearing shed complex

The shearing shed complex can be divided into three clearly identifiable areas on the basis of the activities which take place there. These areas are:

- Holding area.
- Shearing area.
- Wool handling area.

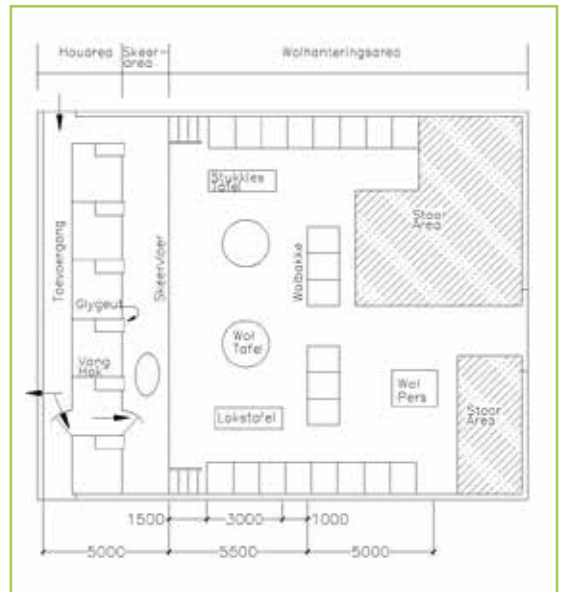


Figure 15: Typical layout and minimum dimensions of a shearing shed.

The shearing shed can also include the following:

- Storeroom for bale bags, shears, parts, etc.
- Office for recordkeeping systems, first aid equipment, medicine, kettle, etc.
- Toilet facilities and showers. If these facilities are placed too far away from the building, unnecessary time is wasted.



Figure 16: Layout of a typical four-room shearing platform (Source: *Shearing manual*, NWGA Shearing and Wool Handling Advice Committee).

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4.2 HANDLING FACILITIES FOR CATTLE

(From: *Beef cattle manual* by HJ Jordaan, ARC Institute for Agricultural Engineering, November 2000)

When planning handling facilities, one must take into account the objective of the facility. A handling facility for commercial cattle will possibly differ from a facility for a stud farm and definitely from that of a feedlot.

In a well-designed handling facility, animals can be gathered safely, sorted and controlled. Depending on the size and type of facility, there are basically five essential components in a well-designed facility:

- Sorting pens.
- Working area.
- Loading platform.
- Crush passage.
- Crush pens.

4.2.1 Sorting pens

Cattle are collected from the field or feeding pens, before being handled. The size of the sorting pens must be as large as the largest group of animals to be handled at a time. Each animal needs approximately 2m² of space in the sorting pen.

The shape of a sorting pen depends on the overall layout of the facility, whether round or square. To save on labour, there should preferably be two sorting pens. In the planning of systems, provision must be made for possible future expansion.

In sorting pens used for commercial purposes, one pen should be in the shade and supplied with water, should sick or injured cattle have to be kept there for recuperation. In feedlots, however, provision must be made for a separate recuperation camp. In large feeding pens a separate sickbay with a crush pen and special facilities may even be necessary.

4.2.2 Crush pens

Crush pens are used to drive the cattle from the sorting pens to the loading platform. It is usually provided with mobile gates, used to lead the cattle into the crush by making the area behind them smaller.

A funnel-type crush is usually used in handling facilities with a rectangular layout. The crush pen must be designed in such a way that the one side joins straight, e.g. continuous with the crush. The other side must join the crush at an angle of approximately 30°. Should both sides join the crush at an angle, like a funnel, it will cause cattle to try and turn around and mill around in front of the entrance.

One of the common handling mistakes that generally occur in funnel-shaped crush pens, is that the pens are overloaded with cattle. The crush pen must never be more than three-quarters full with cattle. Cattle will be able to move into the crush more effectively if handlers wait until the crush is half filled before driving in more cattle. This will create enough space for the cattle to follow a leader into the crush.

Cattle usually walk along a fence and tend to stand in corners. A round crush corral is usually better than a rectangular one, as it assists with the flow of cattle. The construction of such a crush pen is, however, more a 11-sided pen instead of a round one. A partial circle can also be used.

A number of exit gates are provided on the sides and lead to the loading platform, crush or sorting pens. The crush pens are supplied with two crush-gates that hinge around a pole in the centre of the pen. One gate is for directing the cattle towards the correct exit and the other is for moving the cattle. These crush-gates can be 3m to 3,5m long. The pole on which the gates are joined, must be securely concreted and sturdy hinges must be affixed.

For very heavy gates, a bearing on the top end serves as a hinge. A wheel can also be affixed to the bottom end of the gate, to provide sturdiness for heavy gates. Leave a gap of approximately 100mm between the gate and the ground to make provision for uneven surfaces and for the collection of manure. The layout for a standard herding pen is shown in *Figure 1*.



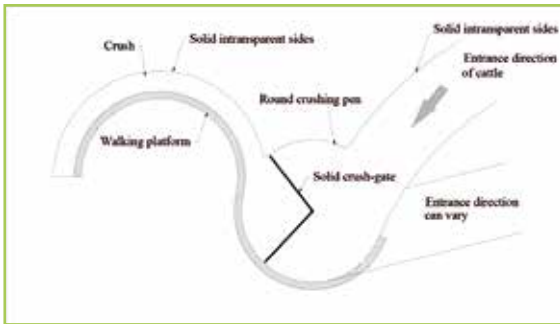


Figure 1: Herding pen.

4.2.3 Crushes

(a) Static crushes

A crush is used to line up cattle in single file to handle them. The end of the crush is considered the working area. A general problem with crushes is that they are usually made too short and too wide. Avoid frustration by following a few directives. The type of crush used will depend on the specific layout of the handling facility.

The length of the crush is determined by the number of cattle that have to stand in the crush at the same time. The rule of thumb is 1,5m per animal. Multiply the number of cattle that have to stand in the crush at one time with 1,5m.

A crush must preferably be at least six metres long, with the length of a straight crush generally 12m to 21m long. A too short crush will lengthen the labour time of large herds of cattle, while a crush that is too long, will cause the cattle to remain crowded

together during a long work session. This could force some cattle to lie down, causing disorder and injury. This is especially relevant for wild cattle.

It is preferable that the crush is built at an upwards incline towards the front, because cattle tend to move uphill in a narrow passage rather than downhill. Cattle tend to stop in their tracks if they are driven downhill in a crush. The slope will also help to allow rainwater to run off and prevent slush from forming.

Crushes can be curved or straight. The overall layout of the handling facility will determine which type to use. The advantage of a curved crush over a straight crush, is that the flow of cattle is generally better in a curved crush.

One of the reasons for this is that the leading animal cannot see the exit in front of him and he/she simply follows the flow of the crush. The rest of the cattle see only the animals in front of them, making following easier. The cattle are unable to see ahead that they are going to be handled. Another advantage of the curved crush, is that the rumps of all the animals face in the same direction. This simplifies gestation examinations.

The radius of such a crush is approximately 13m. The sides of a crush can be straight down, V-formed or boxed, as well as solid or see-through. The various crushes are illustrated in *Figure 2*.

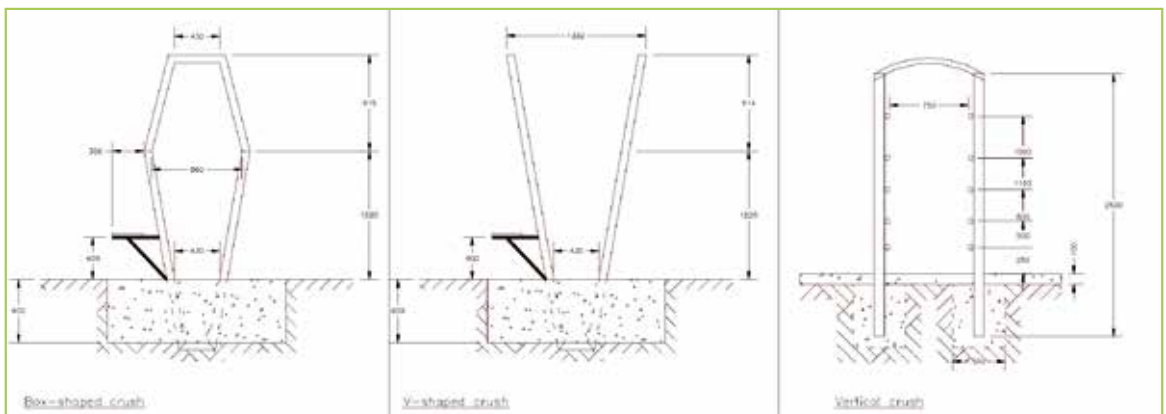


Figure 2: Different crushes.

4.2.4 The work area

The work area is located at the end of the crush. This is the area where the animals are handled and can contain the following items:

- Neck clamp.
- Body clamp.
- Scale.

The working area must preferably be provided with a roof and concrete floor. The floor must be made coarse to prevent animals from slipping. Floors with an imprinted diamond pattern render very good results. After casting the floor, a straight edge is used to imprint the diamond pattern of approximately 200mm wide and 20mm deep into the concrete. This diamond pattern is also easy to clean. If an earth floor is used, it must be able to drain easily and not be trampled into slush. In order to ensure this, the floor must be thoroughly compacted. *Figure 3* shows a typical working area.



Figure 3: Typical work area.

The work area components mentioned above, must be arranged so that the openings and gates are combined, making access to the cattle possible. A convenient gate is one that swings open from the side in the direction of the crush in order to block off the crush for other animals, but gives access to the rump of the animal. A comfortable work area must be provided in front of the animal.

It is convenient to control all the equipment in feedlots hydraulically. It

simplifies the process and saves a lot of time. The hydraulics must, however, be designed in such a way that the animals are not injured. Pressure control valves must be used to prevent injuries.

Figure 4 shows a hydraulically controlled unit.



Figure 4: Hydraulic unit.

4.2.5 Loading platforms

A loading platform must be designed so that the cattle can be loaded quickly and the first animal is not able to walk back. The height of the loading platform is determined by the height of the back of the truck or transportation vehicle. As general directive, a height of 1,1 to 1,2m for trucks is accepted.

A loading platform which is built at a too steep angle causes injuries. Thus the gradient must not exceed 16° . This is equal to a 1m increase over 3,5m horizontal distance or 1,1m increase over 3,85m. Loading platform floors can become very slippery and must therefore be made very coarse. A diamond pattern is recommended.

The width of the loading platform is the same as that of a crush, e.g. approximately 750mm. For the collection of cattle, a wider loading platform can be used.

Figure 5 shows the construction of a loading platform.

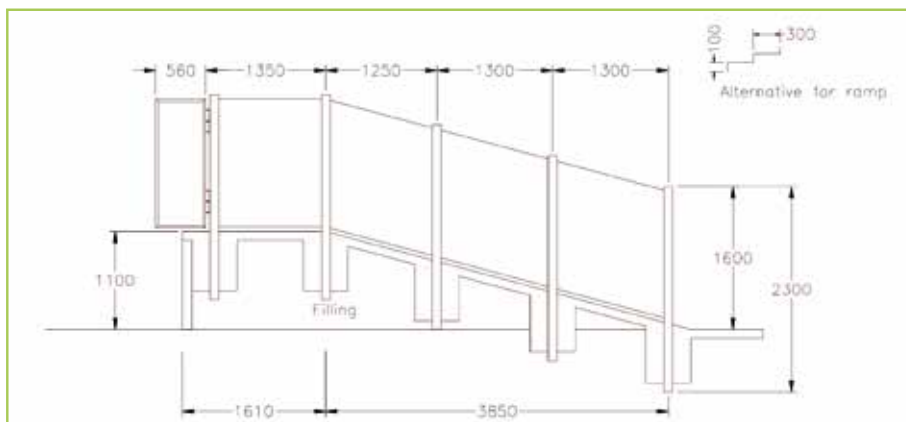


Figure 5: Loading platform.

1. FEED GUIDELINES: CULTIVATED PASTURES

Crop residues

Crop	SGD/ha
Lupines	1 000
Dry beans	500
Soybeans	1 100
Sunflower	1 100
Sorghum	1 000
Maize	1 000

Creep feeder measurements

15-20cm wide 38-46cm high



Creep feeder measurements.

Table 1: Alternative licks for supplementation when grazing maize.

	Acidosis	Natural protein	Non-protein nitrogen (NPN)
Salt	30	20	20
Bicarbonate of soda	10	5	5
Feed lime	60	15	15
Oil cake meal	–	60	–
Urea	–	–	8
Maize meal	–	–	50
Sulphur	–	–	2
Lick cost (R/ton)	341	1 048	704
<u>Intake (g/day)</u>			
Mature	133	319	421
Weaner	25	110	89



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2. TYPE OF GRASS AND CULTIVATION REQUIREMENTS

	Plantyd Planting date	Saaidigtheid Sow density (kg/ha)	PH (KCL)	P (mg P/kg)	K (mg k/ha)	N (kg N/ha)	Grondvereiste Soil require- ments	Potensiële drakrag Potential stocking rate
Smutsvinger/ Smutsfinger	Nov / Jan / Feb	10	> 4.5	> 15		80-120		2 LSU / ha for 8 months
Oulandsgras/ Eragrostis	Oct / Nov Feb / March	6- 8		15-20	100- 120	80-120		2 LSU / ha for 7 months
Tef / Teff	Nov	10-12		> 15	> 100			4-6 tons / ha
Swenkgas / Fescue	March – May	25		> 20	> 120		Wet	Autumn: 20 SSU / ha Spring: 30 SSU / ha
Raaigras/ Ryegrass	Feb	25		> 30	> 140	350		Autumn: 20 ewes & lamb Spring: 30 ewes & lamb
Paspalum	Feb	25		> 20	> 80			
Kikoejoe / Kikuyu	Before Feb	2	> 5	> 15	> 100			Summer: 2-4 ha / LSU
Kanariegras / Canary grass	March – May	8	> 4.5	> 15	> 80		Wet	
Voersorghum / Feed sorghum	Oct – Dec	20	> 4.5	> 15	> 80		Heavy	Summer: 4 tollies / ha
Babala	Oct – Jan	10-15	> 4.5	> 15	> 80		Light texture	Summer: 3 tollies / ha
Geelblom / Lusern	Nov – Dec Feb – March	6-8	> 4.5	> 15	> 120		Loam	
Lusern / Lucerne	Feb – April	5-7	> 5	> 25	> 120		Clay loam	Summer: 9 ewes & lamb
Rooiklawer / Red clover	Feb – March	20-25	> 5	> 30	> 140		Well-drained	
Witklawer / White clover	Feb – March	4-5	> 5	> 30	> 140		Well-drained	
Japanese radysse/Radish	Jan – Feb	2	> 4.5	> 20	> 140	70	Light sand Sandy loam	3 000 – 7 000 SGD / ha
Groenvoer / Winter feed	Jan – March	35-50	> 4.5	> 20	> 100	40	Deep	1 000 – 4 000 SGD / ha
Lespedeza Armmanslusern / Poorman's lucerne	Oct – Nov Turf Feb – March Sand	10-20		> 15	> 80		Any soil type	

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2.1 Annual pastures under irrigation.

MIXTURE

1.	Rye	SSR729	20kg
2.	Ryegrass	(Enhancer)	2kg
3.	Clover	(Assegai)	6kg

PLANTING DATE

15 February

METHOD

- Fine seedbed.
- Sow ryegrass and clover.
- Roll thoroughly.
- Plant rye in 90cm rows on top of the above.

FERTILISER

- Plant with 200kg 434/ha.
- 150kg nitrogen – approximately 3 treatments of 50kg each.

Table 2: Perennial mixture under irrigation.

PERENNIAL MIXTURE		Be aware of the danger of internal parasites, especially with perennial pastures. Supply energy blocks and hay on pastures – it helps.
Tall fescue – Dovey	15kg	
Ryegrass – Agriton	10kg	
Cocksfoot – Cambreta	5kg	
White clover – Duzi or Landina	3kg	
Red clover – Kenland	1kg	



Grazing

3. THE ESTABLISHMENT OF DRYLAND LUCERNE PASTURES

(By Dr Johann van Heerden)

Lucerne is the most productive legume pasture in South Africa. The reason for this is that lucerne has a more steady production than medics throughout the year and this results in high animal production. Lucerne has been successfully cultivated for years in longer rotations with wheat, barley and canola crops, where the period under lucerne lasts five or more seasons. This enables the producer to control especially grass weeds for less money and more effectively during the grazing phase.

Previously only one lucerne cultivar, SA Standard, was available commercially. SA Standard is a so-called “cultivar”, but this is actually a mixture of genotypes which developed as a landrace

over many years from a large number of species, cultivars and lines brought into our country. The plant was first established in Oudtshoorn where it was mainly used as grazing for ostriches. In this harsh environment, a mixture of hardy, widely adapted and adaptable types were developed, and eventually marketed as SA Standard.

In the seventies a change occurred in South Africa’s lucerne industry, when, due to serious aphid infestation, the production and survival of SA Standard was in danger. To address the problem, the seed industry was allowed for the first time to import cultivars from overseas. Most of these cultivars were more winter-active and thus more sensitive to grazing. This led to research in which



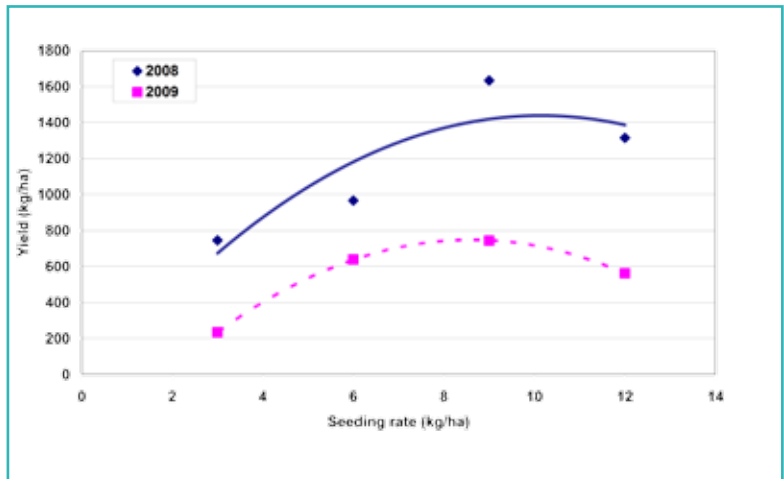
more grazing-resistant types, which were also more resistant to aphids than SA Standard, were evaluated under grazing.

Recent research has identified more productive and perennial lucerne cultivars, which can add considerable value to animal production gained from lucerne pastures. Here we think particularly of varieties such as WL414, WL 357, SA Select, Magna 601 and Venus. The seeds of these varieties are expensive and research is currently being done on sowing density and seed treatment in order to lower sowing density as much possible.

It is traditionally recommended that lucerne is sown at about 12kg/ha. In research conducted in the Overberg, it was found that lucerne can be sown much sparser at about 8 or 9 kg/ha, saving a minimum of 25% on seed cost.



Figure 1: Influence of seeding rate on the yield of dryland lucerne production, Roodebloem.



Should you have any questions, please contact Dr Van Heerden at tel 021 887 7142, fax 021 883 3248 or email jmvh@sun.ac.za.

This research is complemented by research in which different seed treatments are tested to ensure that a greater percentage of the sown lucerne seeds will grow. This allows for an even lower sowing density of lucerne, while a larger number of lucerne plants are established. The control seed was simply inoculated, while the others were treated with fungicide or fungicide and insecticide treatments. The treatment of lucerne seed with fungicides and insecticides yielded an average increase of 40% in the number of seedlings established.

Lower sowing rates of 8 to 9kg lucerne/ha can be used, but it is recommended that the

lucerne should also be treated with a fungicide and insecticide. If this is done, more vigorous lucerne seedlings will establish, resulting in a dense lucerne stand with a long productive life of five or more seasons. At the moment some of the remedies used are not registered for use on lucerne, but the matter is under investigation in co-operation with the seed trade and lucerne producer organisation.

Financial and logistical support for this research was acquired from Cape Wools, the Red Meat Research and Development Fund (RMRDT), ARC (Animal Production and Plant Protection Institute), Overberg Agri, Agricol Seed Company and the NWGA.



3. DRYLAND MEDIC/CLOVER PASTURES IN SMALL GRAIN CROP ROTATION SYSTEMS: A SITUATIONAL ANALYSIS

(by Dr Johann van Heerden)

Rising cost of crop production and the effectively decreasing value of crop products have put more pressure on the production of small grains in the small grains and livestock grazing areas of the Western Cape. In conjunction with changing input prices, there is also the biological pressure of the ever-growing problem of herbicide resistance.

Annual medic and clover pastures are successfully cultivated in short rotations, with one or two years of pasture, followed by one or two years of grain. These pastures fulfil a valuable dual role as productive and nutritious grazing for wool and meat sheep as well as rotation crops for cereals. Rising wool and meat prices have increased the relative value of the legume pasture / wool sheep component in recent years.

4.1 Crops

These crops are usually sown only once and after a year or two re-establish themselves in grains from a reserve source of hard seed. The maintenance of a good source of hard seed is of utmost importance.

Surveys conducted in the Swartland and Rûens since 1998, have shown that the size of the medic and clover seed reserves in soil differ from farm to farm and even from one field to another on the same farm.

Thus, there are many farms and fields on farms where the medic and clover pastures do not have sufficient seed reserves to ensure good pasture establishment. It is a matter that needs attention.

4.2 Regular seed recordings

Just like regular soil analysis, it is also necessary to conduct regular surveys on seed reserves on the farm following the wheat year. If it is found that the grazing seed population is too low, new species and cultivars should be sown in.

4.3 Successful pastures

In surveys conducted across a large number of farms in both the Western and Southern Cape, a negative correlation was found between the number of broadleaf and grass weeds and grazing legume pasture seedlings. Weeds therefore have a suppressive effect on the ability of medic and clover pastures to produce seedlings. Seed production is reduced, mainly because of weed. High levels of weed are probably a symptom of poor management and control of weeds in the system. Factors affecting the success of medic and clover pasture in rotation are:

(a) Weed control

To ensure good pastures, weeds should be controlled in both the pasture and small grain phases. Research also showed a connection between the number of medic and clover seedlings established, and the yield of these pastures. It is therefore important that there are sufficient and viable medic and clover seed before the start of the grazing year.

However, the number of seedlings that are established, is determined by both the total number of seeds and the percentage thereof that is viable. Different clover and medic species and cultivars differ not only in terms of their ability to produce seed, but also in the percentage of viable seed in a particular year.

(b) Viability

The lower the viability of the seeds, the more seeds are needed to produce enough seedlings ($>300/\text{m}^2$). The percentage changes with the aging of the seed source and increases as the seed population declines. In stands with old and low seed populations, it can be as high as 30%. In stands with many seeds, the percentage is usually below 10%. It can be safely assumed that about 15% of the total seed bank in a given year will establish as seedlings.

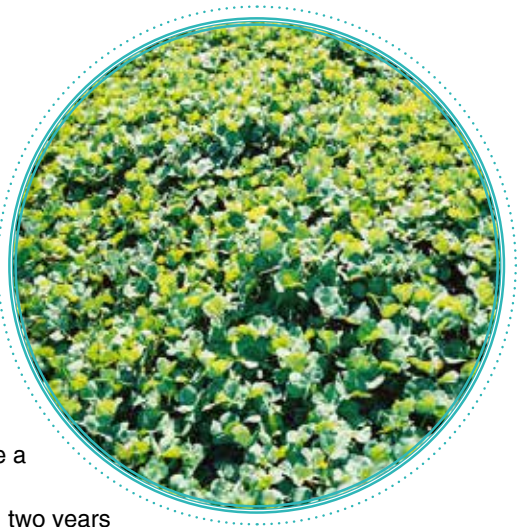
(c) Seedlings

To ensure 300 seedlings/m² a seed reserve of about 2 000 seeds/m² is required. The ability of pastures to produce seedlings therefore varies between farms, fields and over time, depending on the climate, management and species and cultivar composition of the pastures.

It is also necessary to note the following:

- Monitor the potential of your pastures to produce seedlings.
- Use only adapted species and cultivars.
- Sow mixtures of at least two or more cultivars.
- Cultivars differ greatly in terms of their ability to survive a small grain phase.
- Follow a system with one grain year and no more than two years of grazing.
- Don't sow legumes too deep and till them quite shallow in the small grain phase.
- Sow clean legumes and inoculate with the correct inoculants.
- Be careful with herbicides to which legumes are sensitive.
- Control pests.

Financial and logistical support for this research was acquired from Cape Wools, the ARC-Animal Production and NWGA.



4. GRAZING MAIZE – WINTER'S CHAMPION FOR SHEEP

(By Erika van Zyl and Mynhardt Sadie, Department of Agriculture and Environmental Affairs, Dundee Research Station)

Whole maize is an excellent proposition as winter grazing for the sheep farmer. Weaner lambs can be raised on maize, with good economic benefits; either use your own lambs or buy lambs and use grazing maize as a "low-cost feedlot". It can also be utilised successfully to overwinter ewes with lambs.

Maize fills the winter gap effectively in a fodder flow from autumn until the first spring rains and can be used on its own or in combination with other winter pastures or crop residues or even saved for bridging the difficult August-September period. It is a low-risk, high-potential winter pasture produced with summer rain and kept until winter as forage. It is not, as in the case of winter grains, dependent on unreliable autumn rains. Prior to



Sheep in grazing maize.

winter a relative reliable estimate can be made of the amount of fodder available. In the case of high grain yields, some rows can even be reaped for grain production; the crop residues of the reaped areas can also contribute to the feed available on the land.

5.1 Cultivation of maize for grazing

The carrying capacity of maize is determined to a large extent by the grain yield; therefore maize for grazing should be cultivated in the same way as maize as a cash crop, i.e. a suitable cultivar for the area producing a high grain yield. Normally the cultivar suited for grain and silage production in an area will also be good for grazing.

5.2 Grazing period

Maize can be grazed from the first frost up to the first spring rains, roughly taken as ± 100 days. Some farmers prefer to start grazing it earlier, when the maize is still a bit green and sheep will take in more leafy material and less grain, and adapt more easily. As the season proceeds, dry material losses will be unavoidable and maize in the latter part of the grazing season will inevitably be of lower quality than those grazed earlier in the season.

5.3 Adaptation of sheep prior to grazing

Start with a good internal parasite control programme. Also immunise against pulpy kidney at least two weeks prior to adaption. Acidosis due to the high energy content of grazing maize is a real danger, but correct adaptation prior to grazing and buffers in their licks will successfully control the problem. Make provision for sufficient lick trough space, so that each animal can take in sufficient amounts of lick.



Ensure sufficient space for lick troughs.

Some farmers prefer to start grazing maize immediately with restricted grazing periods that increase every following day. Supervision is of utmost importance. Ensure that internal parasites

are under control and immunise against pulpy kidney.

5.4 Grazing of the whole maize plant

Good supervision, especially during the first two to three weeks of grazing and when camps are being changed, is very important to quickly identify and treat sick animals in a bid to prevent diseases.

Lambs should be at least three weeks old when grazing commences, to ensure that they are strong enough and won't become separated from their mothers. Lambs will gradually, as they start grazing, adapt to the high energy diet and should not be susceptible to acidosis. They will also benefit from the good milk production of their dams on the maize. Ewes on grazing maize usually leave the grazing in good condition, which is beneficial during the next breeding season.

One serious shortcoming of grazing maize, is an insufficient protein content for producing sheep. This should be rectified with a protein lick or a protein-rich companion crop such as Japanese radish or small grains. The combination crop is grazed at the same time as the grazing maize. Sheep tend to prefer the combination crops to the maize. This then defeats the goal of including the combination crop. Good management, such as rationing the surface, can solve the problem.

A good alternative is protein supplementation in the lick. It is very effective and eliminates a lot of practical problems. Licks can be mixed yourself, but do consult an expert regarding the correct inclusion of buffers or use the commercial licks developed specially for use on grazing maize and crop residues. Ensure sufficient lick trough space, so that enough lick is ingested. Supply fresh lick regularly.

Graze restricted surfaces one at a time to reduce selective grazing habits and losses due to trampling. If not, sheep will first select a high-quality diet that will become poorer with time, with a subsequent decline in animal performance. Temporary or electric fences may be used to divide grazing into smaller areas. Move to the next camp



when the area is well utilised but $\pm 20\%$ grain is still available. Non-producing animals such as old ewes can be used as scavengers.

5.5 Growth

Pre-weaning growth of lambs should be 180-250g per day, with lactating ewes 50-100g/day and weaner lambs between 180-200g/day and even more.

An accepted norm for the higher rainfall areas is:
 1 ton grain = 1 000 sheep grazing days/ha (sheep mass 45-50kg and 1kg maize/sheep).
 E.g. 3 tons grain = 3 000 sheep grazing days/ha.



Good animal performance is possible with grazing maize.

5.6 Stocking rate norms

Stocking rates are directly linked to grain yield. Sheep/ha as a norm is not important, but stocking rate linked to a grazing period is, because it is a dormant (non-growing) feed source (few animals grazing for a long period = many animals for a short period). The number of sheep kept, will be determined by the period during which the feed is needed.

Table 1: Stocking rate (SSU/ha) vs grain yield (t/ha) and grazing periods (days).

Grain yield t/ha	Stocking rate with different grazing periods (SSU/ha/days)		
	30 days	60 days	90 days
2	66	33	22
3	100	50	33

In the drier western maize production areas, the norm should be adapted to 600-660 sheep grazing days/ha with 1 ton/ha grain potential.

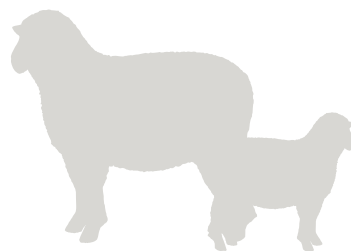
If the value of wool production has to be added, a production of 15g clean wool/day/ewe can be used as a norm. Good winter pastures with sufficient protein will also prevent tender wool. Ewes should be in good condition after weaning, which will contribute to higher re-conception.

5.7 Economics of grazing maize

The economic profitability of a sheep production system when grazing maize is basically dependent on mutton prices, the grain price, animal performance and the input cost of maize. Although breeding ewes also increase in mass, they are not a saleable commodity and only lambs and culled ewes are taken into account. Ewes can, however, contribute to wool income. Weaner lambs deliver better economic results, because all the grazing animals are saleable. During the 2009/2010 season producers did exceptionally well with grazing maize and were able to realise the equivalent of R3 000/t maize grain.

5.8 In conclusion

The economy of this system must be evaluated every year, but when it comes to fodder flow and animal performance, it offers an excellent winter feed option for sheep farmers. Management inputs may be high, but it can deliver good financial results.



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5. SELECT GRASS PASTURES

(By John Fair)

5.1 *Eragrostis curvula* (outlands grass)

The most popular grass pasture in South Africa. Easy to establish, hardy, persistent, provides early spring grazing and makes good quality hay provided it is cut before seed heads emerge. Grows well on sorry soil. Is fast becoming uneconomic due to cost of high N requirements. Feeding back hay on lands greatly reduces fertilisation requirements. Burn and graze without any fertilisation is also a good strategy that results in excellent animal performance and eliminates the need to fertilise.



known to gain mass. Ideal for lands that tend to waterlog and for vleis areas, where it combines well with clovers.



This grass can effectively plug the autumn, winter and spring feed gaps. With good management it can persist for over 30 years. Fescue does not grow well on dry top lands and on soils low in humus (organic carbon). Fescue is not as N-hungry as eragrostis and is a good soil (humus) builder. Amazingly, it also desalinates soil.

TIP

Correct soil minerals and mix with lucerne or *Sericea lespedeza* to cut back on fertiliser and improve pasture and hay quality.

5.2 Smutsfinger (*Smutsi*)

Long lived and drought hardy. More difficult to establish than eragrostis. Also slower in the spring but provides better autumn grazing and early winter forage. Also N-hungry. Not as good for hay making as *Eragrostis*. Combines well with lucerne; fogged Smutsi/lucerne is excellent for over-wintering beef cows.

TIP

Combine with lucerne, *Sericea lespedeza* or Crownvetch.

5.3 Tall fescue

Tall fescue is a most under-valued grass in South Africa. It is a vigorous perennial grass that can provide 365 days of grazing; even in midwinter animals produce well on frosted forage. Results in excellent lamb growth in March to June and lactating ewes have been

5.4 Cocksfoot

Cocksfoot is an excellent perennial pasture for sheep and cattle that has been seriously overlooked in South Africa. In fact many farmers have tried and discarded it because of a lack of its persistence. This was because the early cultivars were very susceptible to rust. Improved cultivars have, however, overcome this problem. Cambria cocksfoot has provided one farmer in the Kokstad district with good pasture now for over 25 years!



Two very important attributes of this grass is that it is well adapted to old lands – just as *Eragrostis* is – and that it provides excellent autumn and early winter grazing for ewes and lambs.



5.5 Select legume pastures

6.5.1 Lucerne

Lucerne and Merinos go together like butter and jam; a wonderful working marriage! Lucerne is the most productive of all perennial pastures legumes and it is hardy and persistent to boot. This explains why more land is planted with lucerne than any other perennial pasture legume in South Africa.

If lucerne did not have a bloat problem, there would be little need to use alternative perennial legumes. Many farmers complain about grass invasion in their lucerne lands. This is actually an indication that the soil is poorly mineralised. Lucerne is particularly dependant upon calcium and phosphorous. Liming to correct pH is most certainly no assurance that calcium levels in the soil will be built to optimum; very often they will fall far short of this all important mineral.



Huge – very costly and wasteful – applications of super phosphate are needed to build soil P to the desired level. For this reason most farmers don't apply sufficient P, consequently lucerne suffers from P hunger. This reduces its vigour, thus giving grass weeds the competitive edge. In the long run, building P with rock phosphate is far more effective and less costly. For top yields and the production of high-quality lucerne, soil minerals should be fully balanced according to the Albrecht model. Finally it must be pointed out that the NWGA, working in conjunction with the Nooitgedacht Research Station (Ermelo) has demonstrated that a rotation between Merino-grazed lucerne and maize, out-yields – financially speaking – any other dryland cropping system in the region.

5.5.2 *Sericea lespedeza*

Sericea, also known as poor man's lucerne, is gaining rapidly in popularity amongst South African farmers who require low-cost legume pastures. Unlike lucerne, Sericea does not require costly soil mineral corrections – this is how it earned the poor man label.

Another very important characteristic, also unlike lucerne, is that animals do not bloat on Sericea. Sericea grows satisfactorily on run-down old lands and will even produce valuable grazing and hay on shallow soils. Liming is rarely required, but P is needed when soil levels are extremely low in this all important energy mineral. The other great advantage of Sericea is that it makes protein-rich and very palatable hay – far superior to the average quality hay farmers make from *Eragrostis*. Moreover the hay can be baled four hours after cutting on a hot and dry day.



Sericea makes ideal sheep pasture but it is good for cattle too, provided it is grazed at a young stage. Sericea's biggest drawback is the fact that most farmers find that it takes at least three years for it to become fully productive. The reason for this is that most farmers plant Sericea late in summer and they do not control weeds. Early summer planting with effective weed control (virtually all problematic weeds can be controlled with herbicides) will most often result in well developed plants that produce some seed by the end of the first season!

5.5.3 Sainfoin (*Onobrachis viciifolia*)

Sainfoin is a perennial legume that has so much to offer Highveld farmers. It is a non-bloating, highly digestible and nutritious pasture. Perhaps the most outstanding feature of Sainfoin is its excellent frost tolerance. Managed correctly, it can provide green pasture in the middle of winter. Moreover, it starts growing very early in the spring, and provided there is sufficient soil moisture, will yield excellent quality grazing in September, which is traditionally the most problematic month in the Highveld in terms of providing grazing. Leaf hold in seasonal dry periods and drought survival are outstanding.

Despite all these wonderful attributes, Sainfoin has for the greater part a poor track-record, despite a limited number of remarkable successes. Fortunately this is easily explainable. Sainfoin requires calcareous soils, i.e. soils high in calcium. Such soils are very rare in South Africa. Experience has shown, however, that soil correction according



to the Albrecht system enables Sainfoin to grow highly satisfactory. In fact, I would go as far as to say that it grows to full potential only when the soil calcium levels have reached the level prescribed by Prof Albrecht.

The name Sainfoin is derived from Saint Foin. It is also known as Holy Grass. These names are directly coupled to the fact that, two hundred years ago, farmers believed that Sainfoin had “miraculous” healing properties, because even sick and weak animals recover on Sainfoin pasture. Sainfoin was planted in healing camps in which sick animals were placed. These facts clearly point to the high nutritional value of Sainfoin.



Sainfoin is a very strong self-seeder. It starts flowering early in the spring, and within 45 days after onset of flowering, hard seeds have already been formed. These seeds drop and germinate readily. Seed production can be as high as 600kg of seed/ha, and the seed can easily be reaped by hand.

This factor ensures lower costs for farmers who wish to increase their area under Sainfoin. Sainfoin has a remarkable ability to extract insoluble phosphate from soil.

5.6 Basic principles of multi-specie pastures

Keeping things simple is not always a good rule; in fact it is a very limiting one when it comes to growing low-cost, high-quality pastures. The truth is that the production of profitable multi-specie pastures (MSP) is far from simple – you require at least a matric in botany, biology, advanced soil science and pasture management!

Actually it is not quite that complex, but I guess I have made my point.

Simple grass-only pastures are doomed. I have just two good reasons for predicting this. Firstly, single specie of grass pastures will be, and in fact are, already being financially strangled by the ever increasing cost of energy. Without high annual fertiliser inputs grass pastures are unprofitably unproductive. Secondly, grass pastures don't produce high-quality forage and consequently animal production is not as good as it could be.

Single specie legume pastures can be much more profitable than single specie grass pastures, but, with one or two exceptions, they are still not the best option. I must also point out that growing single specie legume pastures cannot be regarded a simple solution to the economic woes of fertilised grass pastures. For the greater part – Sericea is a notable exception – complex and expensive soil mineral corrections are required to ensure top production levels of legume pastures.

I can hear a farmer muttering on the other side of this page: “I have been growing good lucerne for many years without spending much money on soil corrections!” My answer to you, is that it is highly probable that you have lost a great deal of money by not putting the soil mineral balance right when you first planted; your forage yields and animal production levels could have been a lot higher, especially in the dry years when you needed it the most.

There is consensus amongst Australian pasture specialists that perennial legumes should not be planted on their own; they prefer to plant grass/legume mixes. One of the reasons for this is that nitrogen levels build up to unhealthy levels in pure legume pastures. (Excessive soil N levels are detrimental to the soil eco-system.)

Once again I can hear mutterings. “My biggest problem with lucerne is that it is invaded and eventually smothered by grass weeds!” The problem, is once again that your soils do



not contain the high levels of calcium and phosphorous, together with a good balance of other minerals, that will ensure that lucerne will be able to compete with invading grasses.

Invade they will, because this is nature's way of dealing with soil N build-up. The answer should be obvious; plant a suitable grass or a combination of grasses with lucerne. And why not add a few non-bloating legumes to lessen the bloat hazard? If the land can be irrigated in the winter, then you could consider adding some perennial winter grasses and some self-regenerating annual legumes. Don't forget to add some herbs, like chicory or sheep's burnet.

The choice of species will, of course, depend on the region in which you farm. I am personally convinced that a MSP for every region can be devised and that it will provide 365 days of grazing per year, provided it is managed properly and that selected camps are stockpiled for mid-winter pasture – even on lands that are not irrigable. These pastures are costly to establish; the two main costs being soil mineral correction and seed. Establishment cost can easily amount to R 5000/ha, but this cost can be discounted over the lifespan of the pasture, which should be anything from 10 to 20 years and even longer under really good management.



5.6.1 Advantages of MSP

- Sustained high forage yields for the greater part of the season.
- High levels of animal production. Every species has its own particular composition of nutrients and minerals, thus ensuring that the grazing animal gets nutrient-dense forage. For example, chicory has about seven times the amount of zinc than ryegrass has. Amongst other things, zinc is vital for male fertility. Similarly all the other micronutrients play vital roles in animal physiology. Balanced nutrition is a core principle of MSP.
- Plants secrete through their roots energy-rich exudates that feed soil micro-organisms. Micro-organisms use this energy to synthesise and solubilize nutrients that contribute towards the biological fertility of the soil and thus the plants get “free” nutrients, including costly nitrogen. The point I want to make is that each pasture species has its own particular “blend” of exudate that stimulates the productivity of a specific segment of the soil eco-system. It stands to reason that the greater the pasture species mix, the greater the biological fertility of the soil. In this way the need for expensive fertiliser can be radically reduced – and even eliminated!

This is a grass/clover MSP which could be improved by the addition of herbs, such as chicory and plantain and non-bloating legumes such as Sainfoin and birdsfoot trefoil.

For more detailed information on the above and other pastures, read *John Fair's Guide to Profitable Pastures*, which is now also available in Afrikaans.

6. ALTERNATIVE VELD MANAGEMENT SYSTEM FOR SWEET GRASS VELD

(By Drs A Moore & A Aucamp, NWGA Port Elizabeth)

Controlled selective grazing (CSG) has for many years been recommended as the most suitable veld management system for the sweet grass veld areas in South Africa. It comprises a rotational grazing system based on the principle of moderate grazing of the desired grass types, after which animals are withdrawn until these grasses are properly revived. It also implies a multi-camp system with at least six, but preferably more, camps per flock.

A small number of farmers have accepted and applied the CSG system with great success. It seems, however, that the majority of farmers do not use or apply this system. As a result veld conditions are under pressure and especially in drier cycles, feed shortages are common. Given the following background, a new approach towards the veld management of sweet grass veld is required:

- Research over a period of 15 years has placed a question mark over the principles on which CSG is based.
- Over-grazing due to too high stocking rates is generally viewed to be the main cause of veld deterioration. However, techniques to determine grazing capacity are sorely lacking, while major seasonal variation renders the application of any known long-term techniques or norms useless.
- Known veld management systems cannot accommodate effective fodder flow planning on a seasonal basis. On the majority of farms short-term feed shortages are therefore rather the rule than the exception. Added to this, short-term shortages often lead to prolonged catastrophic feed shortages.
- Traditionally recommended veld management systems are capital-intensive, while its underlying scientific basis is questionable.
- New knowledge, especially in relation to seasonal resting procedures, indicates the possibility of more effective, simpler veld management systems. Seasonal resting of veld leads to a dramatic increase in production of palatable grasses during the following season.

Current knowledge supports the following principles:

- Separate veld types (preferred areas). Limit additional camps (number and size to minimum needed for good livestock management).
- Rest sufficient veld for the full growing season, so that it will be available as spare veld during the period when veld growth does not take place (fodder flow planning).
- Full growth season resting periods are essential to the maintenance of growth vigour and veld improvement.
- Adapt stocking rates to veld production on a seasonal basis. A flexible animal production system.

6.1 Implementing the system

Assumptions

- Duration of the growing season is practically four months (one third of the year). In these four months (December-March) the veld has to produce enough for 12 months' worth of grazing.
- Veld production varies from growing season to growing season. Varied stocking rates are therefore unavoidable.
- Grazing of veld for one growing season, followed by two periods of prolonged rest in the growing season, will result in veld revival.
- Grazing during the dormant season is not detrimental to veld.

Step 1

- Identify and map the different veld types on the farm.
- Divide each veld type into three parts with equal carrying capacity and use these divisions to divide the farm into thirds, whereby each veld type is represented (blocks 1, 2 and 3).

Step 2

Divide the year into three seasons:

- Growing season: December – April (five months).
- Winter: May – August (four months).



- Spring: September – November (three months).

The division of the year in these seasons provides for fodder flow planning with a sufficient supply of feed throughout the year. The unequal division of 5 months, 4 months and 3 months is to make provision for grazing losses because of game and termites as well as a decrease in the nutritive value of the grasses.

Step 3 – Apply the following grazing procedures:

- The different parts are grazed systematically in alternate seasons:
 - 1: Block 1 – growing season; Block 2 – winter; Block 3 – spring
 - 2: Block 2 – growing season; Block 3 – winter; Block 1 – spring
 - 3: Block 3 – growing season; Block 1 – winter; Block 2 – spring
- The cycle repeats itself after three years and veld grazed in the growing season, is therefore rested in the following two growing seasons.
- All animals are restricted to one third of the farm being grazed in a specific season.
- A camp in a block is grazed at a predetermined intensity and the duration of the grazing period in a camp depends on the available grazing material and the maintenance of acceptable animal performance levels.

During the growing season animals may return to a camp that was grazed earlier in the growing season, if sufficient regrowth took place. By keeping record of the number of animals and the number of days that animals spend in a particular camp, one can ultimately form a good idea of the carrying capacity of the various camps on the farm.

6.2 Aligning animal numbers to production of veld

Due to seasonal variation in rainfall and resultant veld production, three scenarios may develop, namely:

Scenario 1

Animals have enough suitable grazing available in the growing season grazing block. A similar stocking rate will be applied for a further seven months on the remaining two blocks.

Scenario 2

Animals have enough grazing, but do not utilise all camps in the growing season grazing block. Stocking rate may accordingly be increased, or camps will be available for special situations.

Scenario 3

Animals have to be removed from the growing season grazing block before the end of the growing season and moved to the second (winter) grazing block. Production of veld therefore is too low for the relevant stocking rate and feed shortages will definitely occur in the dormant season. The stocking rate has to be decreased accordingly.

The following guidelines will contribute to a successful veld management programme:

- Know the various grass species and their grazing/nutritional value.
- Accept the fact that not all grasses are suitable for grazing. Palatable perennial grasses should be utilised as the main source of feeding.
- Accept that good animal production can only be obtained when animals have access to sufficient palatable (tasty) grass.
- Plan the farm and divide into camps according to differences in veld type and animal preference.
- Apply the correct stocking rate by adapting animal numbers to the current veld and climatic conditions.
- It is essential that veld should be rested during the growing season to build up reserves, to produce seed and to establish seedlings. Remember, rotational grazing does not necessarily imply the resting of veld – for sweet veld a full growing season resting period is recommended.
- Keep record of the number of animals and the number of days a camp is grazed.

Advantages of this system

- Easy fodder flow planning on veld.
- Sound animal performance.
- Veld improvement.
- Easy and timely adaptation of animal numbers to seasonal variation in climatic conditions.

This approach has definite potential for sweet veld regions such as the Southern Free State. This system is currently applied in a demonstrative way on a farm in the Smithfield area. Preliminary results are very promising.

7. VELD MANAGEMENT: GOOD SHORT-TERM DECISIONS LEAD TO LONG-TERM RESULTS

By Alan Short

The veld is the foundation of your enterprise, providing the bulk of the forage and all of the water that supplies springs and boreholes. The veld is constantly changing according to the changing seasons, rainfall, grazing and fire. And the different species of grass respond differently to these constantly changing conditions.

A good grass farmer has to respond to the changing conditions rapidly, taking advantage of good growth and adjusting to poor growth. And the only way you can respond to the constantly fluctuating state of the veld is exactly the same way you respond to the changing condition of your flock – by keeping an eye on it.

Keeping an eye – weekly, monthly and yearly
“Keeping an eye” on the veld means monitoring a few simple indicators in the short and long term. In the short term (weekly to monthly) you and your stockman need to be watching the growth of the grass and monitoring the amount of forage available at any time. Knowing when to burn or when to rest the camp also requires watching the growth of the grass, the patchiness of the veld, the amount of bare soil and litter.

Long-term monitoring is what you do every year to track the state of your veld and plan for the coming season and emergencies. For both long- and short-term monitoring, a digital camera (including the one in your cellphone) is a very useful tool. Taking a photograph of the veld in your camps will allow you to keep track of both the short- and long-term trends in the veld.

Short-term: What to look for

In the short term (daily, weekly or monthly) you are looking at the amount of forage available to graze and adjusting the stocking numbers accordingly. For sheep farmers, short, green grass is important for animal performance. But “hammering” the veld is not good for the veld. So moving the animals requires watching the state of the veld regularly, and especially the amount of forage.

Tall, rank grass (note the height of the grass against the man's legs). The amount of forage is substantial, but the quality is low. This is more suitable for grazing cattle this year.



Short, green grass, ideal for grazing sheep immediately.



Long-term: The main indicators

In the long term, there are four things you need to watch:

- The amount of grass. Is the grass cover increasing or declining? Is the grass productivity increasing, decreasing or remaining stable from year to year?
- The health of the soil. Are there dongas with active head-cuts in your camps? Are the grass tufts standing on pedestals raised above the soil surface, indicating sheet erosion? Can you see large areas of bare, shiny soil in the spring time?
- The proportion of the most important species. What are the top three or four species in each camp? Rank them in order of abundance and estimate the percentage of each. Are important grasses like red-grass increasing or decreasing?
- The amount of alien or encroaching species. There are different problem plants in different parts of the country. In your area, it could be sweet-thorn, *bankrotbos*, pom-pom or bramble. Estimate the cover of any problem species and determine whether they are increasing or decreasing from year to year.

The long-term condition of the veld is the result of many cumulative decisions made in the short term. Adapt your management weekly and monthly and you will see an improvement in your veld over the next few years.

For more information, contact Alan Short at cedara.alan@gmail.com or 072 372 9099.

1. REPRODUCTION AND BREEDING

1.1 Artificial insemination

- Teaser rams in for maximum 9 days.
- Sponges: On for 12-14 days; PMS with removal.
- (300 IU for Merino & Dohne, 480 IU for SAMM) (1 bottle of Ovastim contains 6 000 IU).
- AE 48 and 60 hours later (or once 54 hours later).
- Artificial vagina: 42°C.
- Keep semen at: 30-34°C.

1.2 Important steps

- Have rams and teaser rams tested by a vet before mating (fertility and venereal diseases).
- Test serving ability and libido of rams.
- Use teaser rams 8-10 days before mating.
- Condition of rams should be good prior to mating and they should be fit.
- Rams should have short wool during mating.
- Condition of ewes prior to and during mating should be good and in a growth phase.
- Crutch long wool ewes before mating and lambing.
- Cull ewes with spoilt udders.
- Apply demarcated mating seasons.
- Mating period 34 to 36 days.
- Do sonar testing at 42 days of pregnancy.
- Remove dry ewes by hand and eye appraisal before lambing.
- Cull dry ewes.
- Identify potential multiple births for management purposes.
- Identify ewes losing lambs in first 35 days of the lambing season.
- Market these ewes.
- Market the mothers of the poorest 10% lambs at weaning.
- Market the poorest 10% of lambs.
- Try to obtain the % mortality (not predators) until 35 days after the last ewe lambed down below 10%.
- Record 40-day lamb weight as indication of milk production.

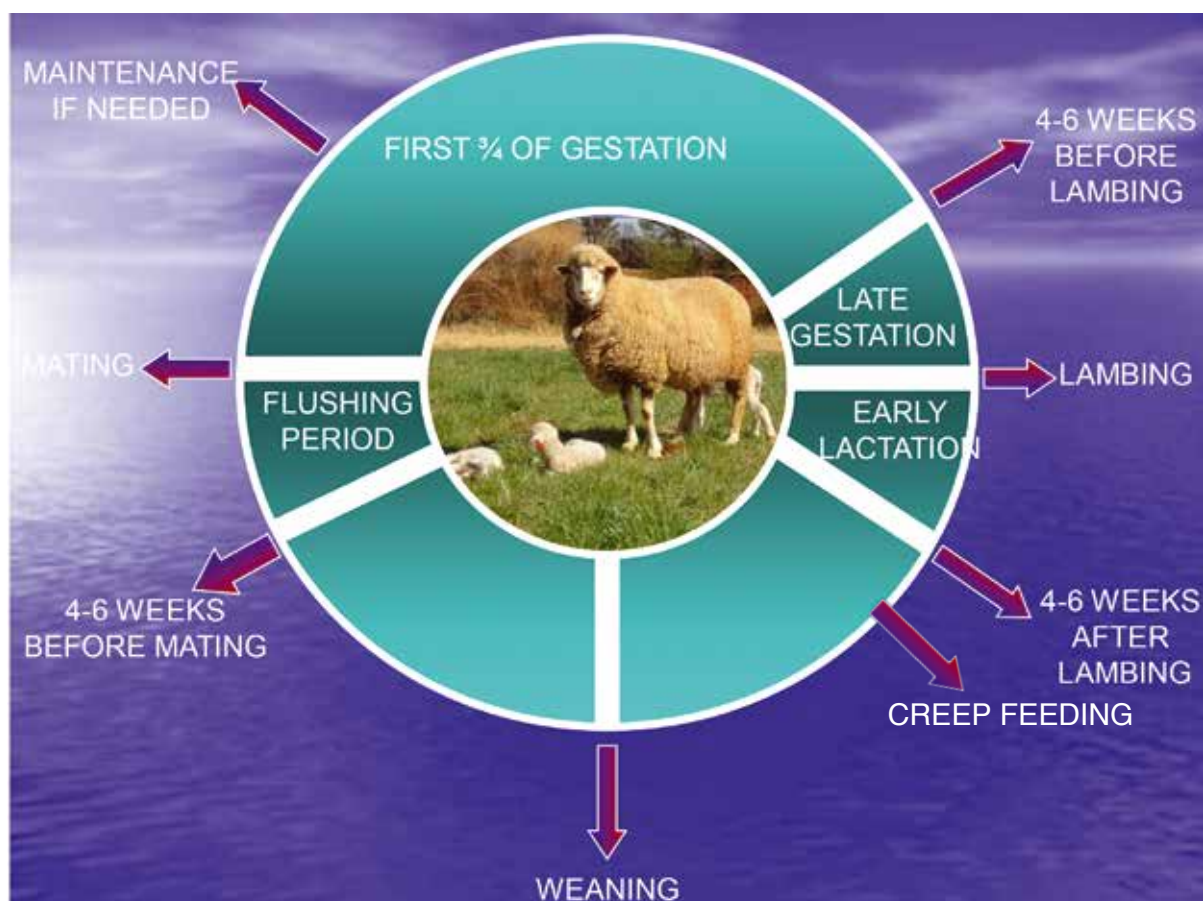
Table1: Date mated and expected date of birth.

DATUM GEPAAR/ DATE MATED		VERWAGTE DATUM VAN GEBOORTE / EXPECTED DATE OF BIRTH									
		OOI / EWE		MERRIE / MARE		KOEI / COW		SOG / SOW		TEEF / BITCH	
Januarie	1	Mei	30	Desember	6	Oktober	7	April	25	Maart	3
January	8	June	6	December	13	October	14	May	2	March	10
Januarie	15	Junie	13	Desember	20	Oktober	21	Mei	9	Maart	17
January	22	June	20	December	27	October	28	May	16	March	24
Januarie	29	Junie	27	Januarie	3	November	4	Mei	23	Maart	31
February	1	June	30	January	6	November	7	May	26	April	3
Februarie	8	Julie	7	Januarie	13	November	14	Junie	2	April	10
February	15	July	14	January	20	November	21	June	9	April	17
Februarie	22	Julie	21	Januarie	27	November	28	Junie	16	April	24
February	28	July	27	February	2	December	3	June	22	April	30

DATUM GEPAAR/ DATE MATED		VERWAGTE DATUM VAN GEBOORTE / EXPECTED DATE OF BIRTH									
		OOI / EWE		MERRIE / MARE		KOEI / COW		SOG / SOW		TEEF / BITCH	
Maart	1	Julie	28	Februarie	3	Desember	5	Junie	23	Mei	1
March	8	August	4	February	10	December	12	June	30	May	8
Maart	15	Augustus	11	Februarie	17	Desember	19	Julie	7	Mei	15
March	22	August	18	February	24	December	26	July	14	May	22
Maart	29	Augustus	25	Maart	3	Januarie	2	Julie	21	Mei	29
April	1	August	28	March	6	January	5	July	24	June	1
April	8	September	4	Maart	13	Januarie	12	Julie	31	Junie	8
April	15	September	11	March	20	January	19	August	7	June	15
April	22	September	18	Maart	27	Januarie	26	Augustus	14	Junie	22
April	29	September	25	April	3	February	2	August	21	June	29
Mei	1	September	27	April	5	Februarie	4	Augustus	23	Julie	1
May	8	October	4	April	12	February	11	August	30	July	8
Mei	15	Oktober	12	April	20	Februarie	19	September	7	Julie	16
May	22	October	18	April	26	February	25	September	13	July	22
Mei	29	Oktober	2	Mei	3	Maart	4	September	20	Julie	31
June	1	October	28	May	6	March	7	September	23	August	1
Junie	8	November	4	Mei	13	Maart	14	September	30	Augustus	8
June	15	November	11	May	20	March	21	October	7	August	15
Junie	22	November	18	Mei	27	Maart	28	Oktober	14	Augustus	22
June	29	November	25	June	3	April	4	October	21	August	29
Julie	1	November	27	Junie	5	April	6	Oktober	23	Augustus	31
July	8	December	4	June	12	April	13	October	30	September	7
Julie	15	Desember	11	Junie	19	April	20	November	6	September	14
July	22	December	18	June	26	April	27	November	13	September	21
Julie	29	Desember	25	Julie	3	Mei	4	November	20	September	28
August	1	December	28	July	6	May	7	November	23	October	1
Augustus	8	Januarie	4	Julie	13	Mei	14	November	30	Oktober	8
August	15	January	11	July	20	May	21	December	7	October	15
Augustus	22	Januarie	18	Julie	27	Mei	28	Desember	14	Oktober	22
August	29	January	25	August	3	June	4	December	21	October	29
September	1	Januarie	28	Augustus	6	Junie	7	Desember	24	November	1
September	8	February	4	August	13	June	14	December	31	November	8
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September	29	Februarie	25	September	3	Julie	5	Januarie	21	November	29
October	1	February	27	September	5	July	7	January	23	December	1
Oktober	8	Maart	6	September	12	Julie	14	Januarie	30	Desember	8
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October	29	March	27	October	3	August	4	February	20	December	29
November	1	Maart	30	Oktober	6	Augustus	7	Februarie	23	Januarie	2
November	8	April	6	October	13	August	14	March	2	January	9
November	15	April	13	Oktober	20	Augustus	21	Maart	9	Januarie	16
November	22	April	20	October	27	August	28	March	16	January	23
November	29	April	27	November	3	September	4	Maart	23	Januarie	30
December	1	April	29	November	5	September	6	March	25	February	1
Desember	8	Mei	6	November	12	September	13	April	1	Februarie	8
December	15	May	13	November	19	September	20	April	8	February	15
Desember	22	Mei	20	November	26	September	27	April	15	Februarie	22
December	29	May	27	December	3	October	4	April	22	March	1

2. MANAGEMENT DURING THE REPRODUCTIVE CYCLE



2.1 BEFORE MATING

• Rams

- Healthy (vaccinate and dose).
- Inject a multi-vitamin and vitamin A & E.
- Shear, clip hooves and horns.
- Good condition (nutrition) and fit (exercise).
- Test semen, serving ability and libido.

Scrotum circumference of 15-month-old rams should be 30-35cm.

Avoid rams with soft testes -> 50% have poor quality semen. Replace at least 25% annually.

• Ewes

- Healthy (vaccinate and dose).
- Inject multi-vitamin and vitamin A & E.
- Good condition (flushing, start earlier with maiden ewes).
- Crutch.
- Examine udders.
- Place 3% teaser rams with ewes for eight days.
- Flush breeding ewes (from \pm three weeks prior to mating for \pm six weeks).
- Flushing of lean ewes can improve lambing percentage with 10 to 20%.
- Lambing percentage of ewes in a good condition was 150% vs 110% of lean ewes (Robertson, 2005, Australia).
- To save on flushing, ewes should be divided in at least two groups at weaning according to condition (lean vs good). Lean ewes should be placed on better grazing to regain condition.
- * Ewes gaining weight during mating, are more inclined to produce twins than those maintaining or losing weight.
- * Conception and ovulation tempo decrease if ewes lose weight prior to the flushing period.

Target condition and weight

- Excellent condition with mating (3,5 CP).
- As soon as ewes reach a certain critical mass, the number of twins increases, lambing % increases with \pm 1,5% for each kg that ewes are heavier during mating.

Flushing (from three weeks prior to mating for six weeks)

- Rested camps and/or production licks (250-400g/ewe/day) (e.g. chocolate grain or licks).

Scan

Scan ewes 42-60 days after rams are removed.

Action on results: Divide into groups and manage multiples for lamb survival and ewes for re-conception. Cull barren ewes.

2.2 BEFORE LAMBING (LAST SIX WEEKS)

• Ewes

- Nutrition – high level (supplement/licks).
- 70% of foetus forms during this period.
- Udder tissue development.
- Primary wool follicle development takes place.
- Milk production is determined during this period.
- Prevent “domsiekte”.
- Health
 - Vaccinate against blue udder.
 - Vaccinate against pulpy kidney.
 - Vitamin A, D, E.
 - Dose.
- Management
 - Crutch.
 - Shear udders.

2.3 LAMBING

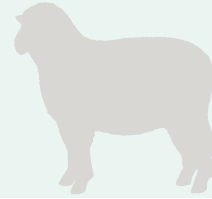
• Ewes

- Nutrition – high level (supplement/licks). (Also influences fertility next mating, as ovary recuperation takes place directly after lambing.)
- Secondary wool follicle development stops here – thus important for maximum wool production over lifetime of animal.
- Breeding
 - Mark dry ewes.
 - Mark ewes with poor milk/faulty udders.
 - Mark ewes with poor mothering abilities.
 - Mark ewes with twins.
 - Udders.
- Health
- Management
 - Group size (younger, smaller groups, as they grow older, combine groups).
 - Shade.
 - Handling and movement.
 - Camps.
 - Supervision



- **Lambs**

- Nutrition - High level (creep feed).
- Breeding - ID twins.
- Health - Vaccinate and dose.
- Management - Handling and movement.
- Marking, docking and castration.
- Wet/dry technique.



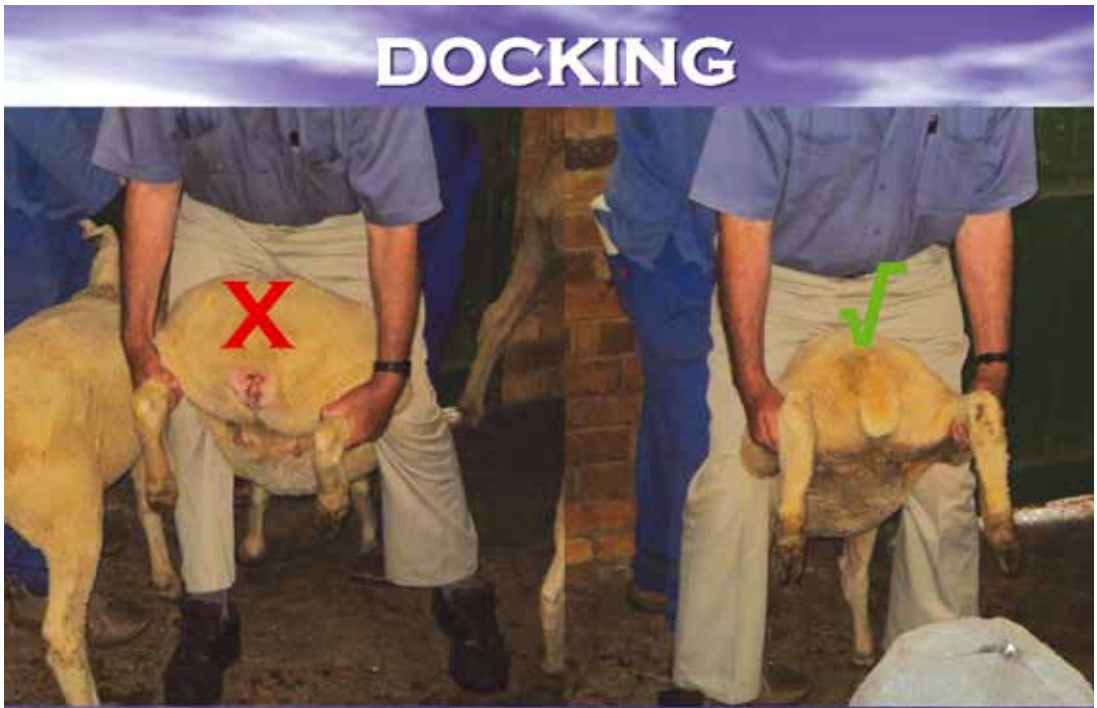
2.4 TAIL DOCKING

Longer tail (see picture):

- Helps prevent cancer – protects from sun.
- Reduces blowfly attacks – tail chases blowflies.
- Reduces incidence of prolapse.
- Reduces wool contamination – ewes urinate away from body.

2.5 WEANING

- At 90 to 120 days of age, depending on system.
- Even at 60 days during intensive lambing systems (then creep feeding compulsory).
- Take the ewes away from lambs so that the lambs can remain in a familiar environment.
- Keep a couple of mature dry ewes with lambs.



3. CHOICE OF A BREEDING BULL

(By Michiel M Scholtz, ARC Animal Production Institute)

One of the most important steps in genetic improvement of a herd is the selection of bulls to be used in the herd. The bull has a very big impact on a herd since 50% of the genetics of the calves will be influenced by him.

Choosing a suitable breeding bull doesn't need to be difficult. If you select a bull in the same way that you would go about appointing a new employee, you are on the right track. An employer will not appoint a worker upon presentation of a birth



certificate only, but if the potential employee has the appropriate qualifications and a good CV, he/she stands a better chance. Buying a bull is very similar.

Are you prepared to use a bull of which you have no information or only a birth certificate? No. You would like to have proof of the bull's performance. Similarly an employer will not appoint a worker on which he has no information, except for a birth certificate. A bull's registration certificate will only tell when and where it was born (breeder) as well as who its parents are.

Whether a bull is required for stud breeding or for commercial purposes, it should be picked on its performance record. Pick a bull that suits the production system and farming environment best. The bulls "job description" should be determined. Determine what the specific herd needs: fertility, a better growth rate, bigger or smaller cows, increased milk production or increased weaning weight. Once this step is complete, a farmer can draw up a "shortlist" of the most suitable bull.

The comparison in *Table 1* below demonstrates the similarities between appointing a new employee and choosing a breeding bull.

3.1 Breeding, production and marketing system

This is the "type of business". Surely this will differ among a stud breeder and a commercial breeder. The stud breeder should identify the needs of his clients and his aim should be to breed animals that satisfy the needs of his clients. The needs of his clients may also be diverse and he should be aware of this.

In turn it is important for the commercial breeder to identify the needs of his clients, which include the feedlot sector, or maybe a niche market, and the consumers. After he has done this, he must also define his breeding system, which can be:

- Pure breeding.
- Rotational crossbreeding.
- Terminal crossbreeding.

Secondly he must understand the role of different breeds in terms of adaptation to the environment and the breeding system, which can be:

- General purpose breeds.
- Maternal line breeds.
- Terminal line breeds.

Table 1: Comparison between appointing a new employee and choosing a breeding bull.

Appointing a new employee	Choosing a breeding bull
Type of business in which the appointment is to be made.	Breeding, production and marketing system of the herd in which the bull is going to be used.
Job description (what the employee will be doing).	Breeding objectives (what is expected from the bull, what you want to achieve?).
Identification document.	Registration certificate (tells of a specific breed and breed standards, also contains information on ancestors).
Qualifications.	Performance recording information.
Curriculum vitae (CV).	Estimated breeding values (EBVs).
Short list the potential employees using the information available above.	Identify bulls that meet your breeding objectives from the information above.
Interview the shortlisted candidates. Do not interview candidates who did not make the short list.	Look at the bulls you have identified. Do not look at bulls that do not meet your requirements.
Make an offer of appointment to the best candidate and if he does not accept, make the offer to the next best candidate, etc.	Attempt to purchase the bull that meets your requirements best, or another bull that will meet your requirements.
Re-advertise when none of the suitable candidates accept the offer of appointment. Never appoint someone who cannot do the job.	Go to another sale / breeder if you cannot buy any of the bulls that meet your requirements. Never buy a bull that does not meet your requirements.

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Thirdly the production environment will also have an influence on the choice of a bull and it is important to consider:

- Environment including temperature, rainfall, diseases and parasites.
- Extensive or intensive farming conditions.

Lastly the marketing system should also be taken into consideration:

- Replacement policy.
- Age at marketing (weaners or grass-fed beef).
- Niche markets (when a branded product is marketed the correct breed must be used).

3.2 Breeding objectives

Breeding objectives is the "job description" of the bull. The breeding objectives:

- Link biological and economic factors.
- Make a statement on traits of economic importance (economically relevant traits).
- Put relative emphasis on each trait to improve profitability (relative economic value).

The following steps are therefore needed for defining a breeding objective:

- Establish the overall goal.
- Specify the breeding, production and marketing system.
- Identify sources of income and expenses.
- Determine the role of phenotypes directly affecting income and expense.

Table 2: Example of breeding objectives versus selection criteria.

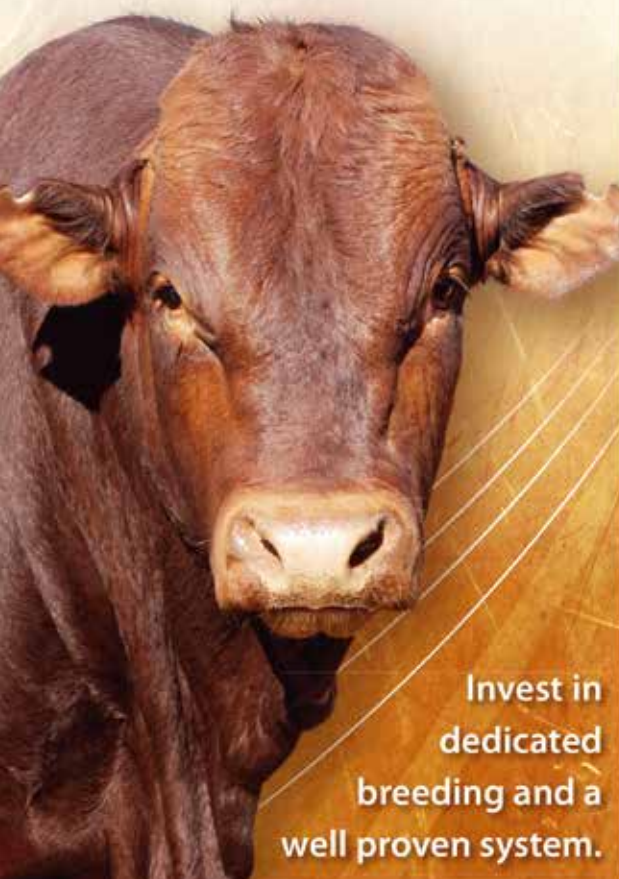
Breeding objective	Selection criteria
Fertility	Scrotal size Calving tempo Calving interval Age at first calving
Weaning weight	Maternal weaning weight (EBV) Direct weaning weight (EBV)
Feedlot performance	Average daily gain (ADG) 12-/18-month weight Feed conversion ratio (FCR)
Veld performance	Kleiber ratio



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- Good mothering ability
- Superior growth under intensive and extensive conditions
- Good carcass that rounds off very well with best grades at a young age.
- Disposition (temperament)

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- Registered by **SA Studbook**
- Performance tested by **SA Studbook**
- Approved by **Bonsmara Selectors**
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3.3 Registration certificate

A valid registration certificate is one issued by a registered registering authority.

3.4 Production recording

The production measurement information is the "qualifications" of the bull. In other words, what level of education does the potential employee have and what were his marks. The performance recording information indicates whether the bull was performance-recorded and in which production stage:

- Pre-weaning.
- Post-weaning.
- Central growth test.
- On-farm growth test.

It also reflects the actual performance of the bull.

3.5 Estimated breeding values (EBVs)

Estimated breeding values (EBVs) is the "CV" of the bull and refers to the value of an animal for a specific trait in a breeding programme.

- It is an estimation of the animal's genetic ability.
- It is represented in the unit in which the trait was measured.
- It predicts how the future progeny of an animal within a breed will perform.
- It is based on the performance and information on relatives available.
- They are relative to each other and expressed relative to a base year.

A person's CV can change over time and should always be updated. Similarly a bull's EBVs can change over time as more information becomes available and the latest breeding values should always be used.

General guidelines on how breeding values can be used in selection are available, but will not be discussed in this article. It is important to note that objectives may be different for different conditions and that breeding values should be utilised as such.

3.6 Identify the bulls that meet you breeding objective

This is the process where you "shortlist" potential bulls using the information available from the registration certificate, production recording and EBVs.

Ask for the sale catalogue up front and look at the production information and EBVs of the bulls on the catalogue. It is also important to look at the performance of relatives (age at first calving and inter-calving period of dam). In the case of a private sale, ask for the information. Identify the bulls that meet your requirements and only look at these bulls.

3.7 Look at the bulls you have identified (visual appraisal)

This is when you conduct an "interview" with the shortlisted bulls. An employer will not interview someone who is not on his shortlist of candidates. So, do not look at bulls that you have not shortlisted, since this will only confuse you.

Concentrate on the following functional efficiency traits when you look at the bull:

- Masculinity (imbalance of testosterone).
- Scrotum.
- Sheath.
- Hooves.
- The rump.
- The legs and pasterns.
- Temperament.

3.8 Purchase the bull

Now you are ready to make "an offer of appointment" for the bull. Remember that you may not necessarily succeed in buying your first choice, but there may be other options if you have shortlisted more than one bull. An employer should never appoint someone who cannot do the job. So never buy a bull that does not meet your requirements.

Table 3 summarises the reasons listed by the various sectors for buying a bull. This was determined through a national survey.

Table 3: Reasons for choosing a bull by the different sectors.

Sector	Communal	Emerging	Commercial
Reason	%	%	%
Performance	18,9	30,3	33,2
Conformation	22,0	19,3	11,1
Temperament	7,2	9,2	9,8
Size	33,1	23,5	8,8
Availability	11,0	11,5	8,4
Colour	3,2	2,5	5,7
Horns	4,6	3,6	0,4

Photograph by Loutjie Campher



3.9 Go to another sale/breeder

An employer will re-advertise a job when none of the suitable candidates accept the offer of appointment. If you are a dedicated stud or commercial beef cattle farmer, you will go to another sale or breeder if you cannot buy any of the bulls that meet your requirements.

4. INTERPRETATION OF BLUP BREEDING VALUES

(By Dr Japie van der Westhuizen, SA Stud Book)

Breeding values indicate the genetic potential of an animal relative to the animals in the base year (average breeding values of animals in a specific previously agreed upon year). The great value of BLUP breeding values is that it provides information about economically important traits that can be used to make important decisions. BLUP is the method used where various information (including pedigree information, own performance and performance of relatives) is used for a specific trait to predict the performance of offspring more accurately.

Please note that only half of an animal's breeding value will be carried over to the next generation since an animal's genetic make-up consists of half of each parent's genetics. The economically important traits for which breeding values are currently available include reproduction (fertility), growth ability (body weight), clean fleece, and quality traits for wool such as fibre diameter and staple length. If a breeder or herd farmer wants to improve these traits in his/her herd, BLUP breeding

values will be a helpful tool to reach goals faster. The interpretation and use of breeding values by only numbers proved to be challenging and did not make much sense. A simplified system using symbols with breeding values was incorporated. A specific symbol appears with an animal's breeding value to indicate its position in the breed. The symbols and their meaning are:

*** Excellent.** Animal is in the top 10% of the breed. This means that there is a very good chance that the animal will improve the trait in the next generation.

+ Above average. The animal is in the top 40% of the breed. This means that there is a chance that the animal will improve the trait in the next generation.

= Average. The animal is in the 20% around the average of the breed. This animal will most likely make no difference in the trait in the next generation.



- Below average. The animal is in the bottom 40% of the breed. There is a chance that the animal will affect this trait negatively in the next generation.

x Very poor. The animal is in the bottom 10% of the breed. There is a very good chance that the animal will affect the trait negatively in the next generation.

4.1 Interpretation of mutton catalogue information

There are a variety of catalogues for different breeds. At first glance the plethora of numbers may seem intimidating and overwhelming. Certain catalogues explain the abbreviations at the bottom of the page. Here are some abbreviations and their meaning:

NLW%: EBV for number of lambs weaned
 ILP: Inter-lambing period
 LS: Lambs weaned
 SI%: Selection index percentage
 TL: Times lambd
 MLI: Mean lamb index
 SD: Scrotum deviation
 1st: Age at first lambing
 LB: Number of lambs born
 EP: Ewe production index
 REV: Relative economic value

A single trait does not generate profit on its own. A variety of traits contribute to total income. The REV takes this into account and combines different economically important traits. If ram 1's REV is R30 and ram 2's is R10, ram 1's offspring should deliver R10 $((30-10)/2)$ more income per small stock unit per year.

These abbreviations also appear in the catalogue:

Ind: Index
An index indicates an animal's performance compared to the group. An index of 100 is the average of the group in which the animal was measured. An index of 110 means that the animal performed 10% better than the average of the group.

Dir: Direct breeding value
Weights such as birth weight, weaning weight and post-wean weight are influenced by both the genetic potential of the animal itself and the effect of its mother. Direct breeding values refer to the genetic potential of the animal.

Mat: Maternal breeding values
This refers to the influence of the genetics of the mother on the weight of her calf.

Acc: Accuracy of breeding value
Breeding values with a high accuracy are more reliable and stable. Accuracy depends on how much information is available, including pedigree information, the animal's performance and the performance of its relatives.

(1)/(2)/(3): The birth status of the animal – single, twin, triplet, etc.

*/+/-/x: Symbols



4.2 Interpretation of wool catalogue information.

Figure 1: Catalogue information as offered at an auction.

LOT 6	RAM : 1923 11 0225	Totalsproegroote	42
Geb Status: Enkel	Vaar: 2012/10/05	Totalsdatum	
Geb Datum: 14/09/2011	801 987114	Logix Verreyningsnommer:	7120717
Eienskap	Teslewaarde	Indeks	MOEDER REPRODUKASIE
Liggaamsmassa	4.04 ¹ ₂₁	109	Moeder: 1923 08 0065 0003227708
Skoonvagnmassa	9.205 ¹ ₂₁	96	Gesl Lamkase: 2
Veseldate	-1.9 ¹ ₂₁	99	Gesl Lamindeks: 128
Stapelengte	-1.34 ¹ ₂₁	99	Lammers Gebore: 2
REW / Sel Indeks %	27.86	106.3	OPI Indeks: 105
Speen Direk	2.5 ¹ ₂₁	112	Lammers Gespeen: 2
Speen Matemaal	0.64 ¹ ₂₁		OPI AFW: 3
			Lam Massa Sp(TWW): 3.18 ¹ ₂₁
			Wolpunt: 0.49 ¹ ₂₁
			KV DEV: 1.59
			Bouwpunt: 0.53 ¹ ₂₁
			Gesl. Faktor: 99.7
Phys:	Nota Mikron: 18.8		
Kleier:			

- RAM ID: 1923-11-0225
 - o Ram: Gender.
 - o 1923: Stud number.
 - o 11: Year in which animal was born.
 - o 0225: Series number.
- Birth status: Born as individual.
- Date of birth/birth date: 2011/09/14.
- Father: 801 08 7114.
- Size of test group: 42.
- Test date: Date on which measurements were taken.
- Logix reference number: 7120717.
- Trait / Breeding value / Index.
 - o Body weight: Breeding value and index for body weight.
 - o Clean fleece weight: Breeding value and index for clean fleece weight.
 - o Fibre thickness: Breeding value and index for fibre thickness.
 - o Staple length: Breeding value and index for staple length.
 - o REV / Sel. index %.
 - ◇ REW: REV: R27,86 per small livestock unit per year. This is a relative economical value that combines the weaning-, after weaning- and reproduction breeding value in an economic index.
 - ◇ Sel. index %: A selection index (expressed as a percentage) combines the first and last weight of the animal in order for the one with the best first and second weight to have the best SI %.
 - o Direct weaning: Breeding value and weaning index for direct growth potential.
 - o Maternal weaning: This is the influence

that the mother has on the lamb's weaning weight. A higher value means that the ram's ewe progeny will wean heavier lambs.

- Mother reproduction
 - Mother
 - Amount of lambing chances: The amount of production years is an indication of the amount of lambing chances that a ewe had.
 - Lambs born: Amount of lambs born (live or dead) for the ewe.
 - Lambs weaned: Amount of lambs with weaning weights.
 - Lamb weight Sp (TWW): Breeding value for total weight of lamb weaned.
 - Conformation point: As awarded by the classifiers.
 - Average lamb index: The average index of all the ewe's lambs.
 - EPI index: Ewe productivity index is discussed later on in the document.
 - EPI deviation: This is the value that should be used to select ewes for reproduction. This value is calculated from the average ewe productivity index (see value in summarised report for the group) for each production year group. For example, a value of six means that the specific ewe's EPI was six points above the average EPI for her age group. All ewes that have a value of -10 or less, are bad producers, and those that have a value of 10 or more, are very good.
 - CV DEV: Coefficient of variation deviation is discussed later on in the document.

4.3 Reproduction information (Ewe productivity index or EPI)

In this section the reproductive information of the animal's dam is provided. This information consists of the ewe's number of productive years, ewe productivity deviation and the average weaning index of her lambs.

The number of productive years is an indication of the number of lambing opportunities the ewe had. The weaning mass of her lambs is used to calculate a total weight weaned at each lambing opportunity. The weight of her lambs at each lambing opportunity is added to get a total weight. This weight is used to determine the ewe productivity index within the production year group. In other words, ewes that had five production years

are treated as one group. The ewe productivity index deviation is also determined within the group to determine whether the ewe performed better or worse than the average. A value of +10 is usually very good and -10 is poor. In some cases the number of lambs weaned per lambing opportunity is provided. This information can be misleading because most ewes should have more lambs than lambing opportunities if the lambing percentage is above 100%. The EPI corrects this data.

The average index of a ewe's lambs is calculated from the weaning index of each lamb weaned by the ewe.

4.4 Genomic selection

The latest development in quantitative genetic analyses worldwide is genomic selection. Genomics refers to the study of genomes and genomic selection refers to the use of molecular information to increase the accuracy of selection. Biological material of animals (blood, hair, semen) gets processed in a laboratory to extract DNA, which is then analysed to determine the genetic composition of the animal.

Particular attention is paid to SNPs (single nucleotide polymorphism), which contributes to a variation of traits. These results are combined with traditional methods of breeding value estimation to estimate more accurate breeding values. This means that young animals of which little or no information is available, will be able to get reliable breeding values.

However, it is of utmost importance to remember that this does not mean that performance recording will no longer be necessary. Traits must still be measured and pedigree information must be available. Genomic information does not replace performance recording – this is simply a powerful tool to enhance the accuracy of breeding values.

Contact your breeders' society for any information regarding your breed. Contact the Merino Breeders' Society on (049) 892 4148, the Dohne Merino Breeders' Society on (043) 683 1330, the SAMM Breeders' Society on 051 522 6827 and SA Stud Book on 051 410 0900.

5. THE DO'S AND DON'TS OF BLUP

(By JL Venter)

It is important to know what to do and what not to do with BLUP to ensure that the data is correctly applied. Here are some important guidelines as set by Johan Swart of Swellendam.

RECORDKEEPING	
DO	DON'T
Use simple identification methods.	Don't put everything on the ear.
Be safe and use a book and a pen to record performance.	A pencil and loose piece of paper are not appropriate and can be lost easily.
Be sustainable and consistent – know what information you are collecting.	Don't frequently change what you measure.
Be accurate!	Guessing and thumb-sucking are inappropriate.
Use records to make decisions.	Records are not used only for marketing or for the sake of interest, but first and foremost to evaluate a herd for selection and herd improvement, especially when it comes to pedigree information.



MANAGEMENT

Keep nutrition as natural as possible.	Avoid over-feeding or feeding for animal survival.
Maintain a short lambing season for comparable groups.	Long lambing seasons make comparisons difficult.
Manage large comparable groups.	Steer clear of small groups such as auction and show groups.
Establish a link between groups, studs and years.	Avoid only one ram per "group".

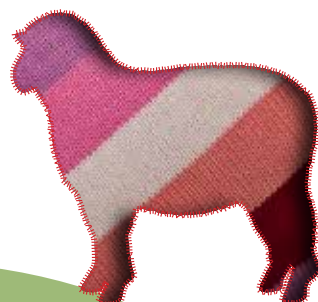
BREEDING OBJECTIVES

Know what you want to achieve and how you have progressed.	Don't try to impress other breeders.
The herd farmer is your primary client.	Don't chase "fashion" in the stud breeding industry.
Maintain a balance between productivity and a functional appearance.	Avoid single "fashionable" traits.
Goals must be reachable within five years.	Don't set unrealistic goals.

He also stressed the changes that occur in traits if one selects for only one trait.

ADVANTAGES	DISADVANTAGES
Selection only for growth	
Muscle mass increases.	Maternal traits deteriorate.
Conformation improves.	Birth weight increases.
Fat remains constant.	
Selection only for maternal traits	
Fat decreases.	Little improvement in growth traits.
Muscle unchanged.	Milk-type animals.
Conformation unchanged.	
Selection only for muscle	
Conformation improves.	Fat increases.
Slight increase in growth.	Negative maternal values.
Selection only for conformation	
Better muscling.	Major decrease in fat.
Slight increase in growth.	Maternal traits remain unchanged.

BLUP is a useful tool to select animals that meet the criteria for breeding objectives. Remember that BLUP values alone don't contribute to performance. Animals need to be in a favourable environment or/and meet their requirements to be able to reach their genetic potential.



6. UNDERSTANDING THE MEANING OF GENOMIC SELECTION AND WHERE BLUP FITS IN

By Dr Japie van der Westhuizen, SA Stud Book

The goal is to predict the genetic merit of each potential breeding animal as accurate as possible.

The quest of each animal breeder is to reach the set breeding goals as efficiently as possible. Breeding goals are usually formulated based on those traits and properties that will ensure long-term profitability. Traits can usually be classified formally or loosely into one or more of the following groups: Fitness traits (reproduction, survival, resistance to adversity), growth (weights or gains to certain age intervals, efficiency of growth rate, expressed as gain per intake or gain per maintenance), maternal ability (maternal breeding values for birth and weaning weights, weaning weight relative to cow maintenance), type (maturity type expressed in different ways, several body measurements and linear scores), functionality (physical description or score, prevalence of absence of specific properties) or other desirabilities (like coat colour, pigmentation).

In this quest it is important to strive for an accurate assessment of each potential breeding animal's ability to produce offspring that will perform as close as possible to these goals. This merit can also be described as the breeding value of each animal (the value as a parent for the traits of importance). There are obviously different means to increase the accuracy of prediction.

Initially these predictions were purely based on visual observation. Simply put: "The biggest calves were more likely to breed the biggest or heaviest progeny." This was refined by simply weighing the calves and picking the heaviest ones as parents. By applying objective assessments breeding values were obviously more descriptive (pounds or kilograms).

This was followed by assessing animals within the same treatment groups and also taking some non-genetic factors such as age at measurement, sex and age (and parity) of dam into account. This

group is commonly referred to as the contemporary group. Basically each animal was rated with its contemporaries and these differences were expressed as a so-called index (or "ratio").

There are, however, some serious limitations to using indices as breeding value predictors. There is no real guarantee that superiority within a specific contemporary group would equal a similar feat in another. Practically expressed, if a young bull born in the spring of 2012 outperforms his peers on my farm in the 2013 weaning season there is no real certainty that he could have done the same in a different herd or in any other peer group.

|| A simple example would be to name the known non-genetic influences, from the calf's perspective, on weaning weight in beef cattle. ||

Other obvious questions could be linked to his mother's ability to look after him. Was his superior weaning weight the result of his merit for growth or because of the extremely good mothering ability of his dam? Similarly, if one averages the progeny performance of a bull, will he not look superior if mated to the top cows (preferential mating) and not because of his own merit?

All these shortcomings have led to the development of more sophisticated methodologies to predict the genetic merit of farm animals.

BLUP breeding values

BLUP breeding values (usually called EBVs or by other names such as EPDs or ETAs) answer all the questions related to mass (population) selection. The principle is to select individuals in a popula-



tion to change the mean production levels of the population they are selected from. BLUP breeding values maximise the correlation between the predicted values and the “true” genetic merit.

These predictions rely on a few very important principles, namely:

Related animals

It is well-known that related animals share identical parts of the genetic codes responsible for differences in genetic merit (and therefore differences in the expression or performance for different traits or properties). For example, a herd sire will share 50% chromosomal genetic material with each of his offspring.

If this sire was widely used over herds and produced progeny over different years of birth, he serves as a “link” between different contemporary (peer) groups as half of him (50%) will be represented by each of his progeny in each group. If this fact is furthermore taken to the extreme, just about all animals in a breed could be somehow related, therefore sharing genetic pieces in the whole population.

Performance superiority

All recording (measurement) differences among animals (even in the same peer group) are the result of two very important influences. The first influence relates to differences among animals due to their differences in genetic merit (the genes and gene interactions on their chromosomes). The second very important influence is the effect of differing environmental influences.

A simple example would be to name the known non-genetic influences, from the calf’s perspective, on weaning weight in beef cattle. They include some or more of the following: Recording age (older calves are usually heavier), sex (males are usually heavier), age and parity of the dam (mature

cows have more milk and are better mothers), season and year of birth, specific farm or location and any treatment different to the rest of the peer group animals.



Taking all this into account, as well as the possibility of a random genetic “superiority” caused by breeding practices associated with heterosis (as a result of crossbreeding) or inbreeding depression, it only expresses the genetic superiority that can be transferred to the progeny (additive genetic value).

This is achieved by making use of the heritability estimates for each trait when breeding values are predicted.

Common parts of the DNA

One could say: “No trait is an island.” In essence all traits we record in farm animals are correlated in one way or the other. This means that selection in a population for one trait will generally affect the genetic merit for other traits. Modern BLUP models consider such genetic correlations.

This has a huge advantage in breeding value prediction accuracy in the following cases: sequential culling (where some animals are culled at different ages), sex-limited traits (like scrotum circumference, female reproduction, maternal ability, milk, etc.) where animals could not be measured yet for some traits (still too young) or where the trait of importance is too difficult or expensive to measure for all animals (like feed intake, marbling, eye muscle, etc.).

All these factors make BLUP breeding values extremely precise and accurate in predicting genetic merit. A multitude of examples exist where genetic change happened, where this methodology has been used effectively in all possible farm animal species and production systems.

The question could therefore rightfully be asked: “Why the introduction of genomic information in farm animal selection?”



Genomic selection

BLUP breeding values basically rely on the concept of “family selection” as relatedness among animals is based on average values. Two collateral half sibs (for example half brothers with the same sire but born from different, unrelated mothers) are assumed to share 25% common genes (DNA). This is of course true as a common statement if it reflects the average relationship over the whole population of all half sibs.

“Methodology has been developed where some parts of the base pairs on the chromosomes serve as “snap shots” of the whole genome of each animal.”

There is, however, one very important fact that needs extra consideration, namely that pieces of DNA separate relatively independent and randomly in the formation of sperm and egg cells. Some half sibs, in our example, can have

a relationship of more than 25% while others are less related.

By using the additional information hidden in the genetic code in each and every animal, the “true” relationship among all animals can be established using genomic information.

The next obvious question could be: “What could be gained by knowing more about the specific relationships among animals in a population?” This question brings one at the real crux of genomic selection, namely the establishment of a so-called “reference population”. Such a population consists of animals (in a breed) where the knowledge of their genetic merit is well-known.

In practical terms, old animals with a large number of recorded progeny (a high BLUP breeding value prediction accuracy) form the core of such a reference. In essence the genomic values are correlated with the breeding values for animals in the reference population. Methodology has been developed where some parts of the base pairs on the chromosomes serve as “snap shots” of the whole genome of each animal.



Current SNP (single nucleotide polymorphism) chips commonly used range between 50 000 and 777 000 base pairs as predictors of the approximately 3 500 000 000 base pairs on the chromosomes of most farm animals. Once these correlations are established, it can be used to enhance the prediction accuracy of BLUP breeding values for young animals.

II Genomic information does not negate the need for recording of the traits and properties included in selection programmes. II

Where BLUP breeding values basically used family information, genomically enhanced BLUP breeding values add a new dimension, namely the specific separation of genes within families of animals in the population. Obviously this is even possible with BLUP alone, once breeding animals have many measured progeny. Genomic selection, however, assists in making this information available at a younger age.

Genomically enhanced breeding value predictions, commonly known as GEBVs, therefore kick off with a higher prediction accuracy, compared to BLUP alone. Knowledge of the genome information of a sire with very accurate EBV values will, however, be of very little use for any breeder as his progeny has already contributed to knowing his value as a parent.

The biggest benefit

The biggest benefit in using genomic selection is obvious. It works best in combination with BLUP breeding values and enhances the accuracy of prediction in specific cases. The biggest advantages for rapid genetic progress currently happen in the dairy industry.

Previously many years passed before BLUP breeding values for potential sires could be known as milk production, its components and daughter fertility could only be recorded on

the female offspring of these bulls. This has lengthen the generation interval and makes the whole process extremely expensive. The combination of genomic information and BLUP breeding values has turned this inside out as the prediction accuracy of young potential AI sires equals that of an older sire with ten measured daughters.

Many new opportunities exist. Selection for traits where recording is limited to one of the two sexes, such as milk, daughter fertility, mastitis resistance, mothering ability (e.g. beef cattle or sheep), litter size and semen quality are some obvious examples. Other trait selection that are to benefit include those only measurable on dead animals (carcase and meat properties), and those that are expensive and difficult to measure (such as feed intake, ovulation rate, disease resistance, parasite resistance, etc.), and can only be measured late in the animal's lifetime (like longevity, lifetime production and productive life).

Perspective

Although the use of genomic information in the breeding of farm animals have taken the world by storm, it is important to keep perspective. Genomic information does not negate the need for recording of the traits and properties included in selection programmes. The opposite is more true. The need for recording is as important as always as known relationships between genomic information and true breeding values change over time and are usually population-specific (within breed and even within country).

A very important issue is also to keep to well defined and logical breeding objectives when using predicted breeding values (genomically enhanced or not). In some cases, bigger or heavier might not always be better. The setting up and carrying out of these objectives is a science on its own and involves knowledge of the genetic correlation among traits, their relative economic contributions and the environmental constraints (physical or due to the limitations of the production system).



7. IMPORTANT LEGISLATION

The Animal Improvement Act

The Animal Improvement Act (Act 62 of 1998) aims in ordering the breeding of stud animals, the control of imports and exports of genetic material (animals, semen and embryos), as well as the acquisition and trade thereof. The act is managed by the registrar of animal improvement.

This act places the South African stud industry at a level that establishes credibility and confirms the integrity of stud animals' origin.

The act provides inter alia that a breed of a particular kind of animal first has to be declared as a breed by the registrar and published in the *Government Gazette* as such, before the animals involved can be identified as a breed. Any group of animals that is therefore linked to a specific breed name prior to the breed being declared by the registrar, is not a breed, but simply a group of animals.

Declared breeds are divided into different categories. Indigenous breeds or breeds developed in South Africa, are declared as landrace breeds.

The act provides that no genetic material may be imported without an import permit, issued by the registrar. These permits are also issued in collaboration with the society of the specific breed.

No genetic material from landrace breeds can be exported without an export permit issued by the registrar.

Regarding animal breeders' societies, the act determines that only breeders of a declared breed can establish a society and that there can only be one breeders' society per breed.

Furthermore, only a registered registering authority such as SA Stud Book can issue registration certificates and official pedigree details. Each society must decide on a registering authority, and the act specifies that a society or group of societies may apply to establish their own registering authority if they do not want to make use of SA Stud Book's

services. There may only be one registering authority per breeders' society.

The Animal Identification Act

The Animal Identification Act (Act 6 of 2002) states that every animal in South Africa must be marked (brand mark or tattoo) with the owner's unique registered identification mark. Application for the registration of an identification mark is done at: The registrar of animal identification, Private Bag X250, Pretoria, 001.

" Indigenous breeds or
breeds developed in South
Africa, are declared as
landrace breeds. "

Cattle can be marked from the age of six months, but calves should be marked before they are weaned from their dams.

Small stock must be tattooed by the age of one month.

This legislation is very important for all livestock producers. Not only is it mandatory to put the approved identification mark on your livestock, but it is the only way in which legal ownership can be determined in the case of theft. Note that stud animals are excluded from certain provisions of this act. The identification of stud animals is determined in terms of the *Animal Improvement Act* (Act 62 of 1998), and the constitutions of the SA Stud Book Society and the respective breeders' societies.

This concession is only valid as long as an animal is registered with a registering authority.

If a stud animal is cancelled after weaning, these animals must also be branded with a registered brand within 14 days, or in the case of small stock, tattooed, as is the case with commercial animals with changing of ownership.



1. CODE OF BEST PRACTICE FOR WOOL SHEEP FARMING IN SOUTH AFRICA

In a world where the modern consumer is paying more and more attention to produce that is produced environmentally friendly and socially responsible, it is becoming more important that we have a good understanding of these concepts.

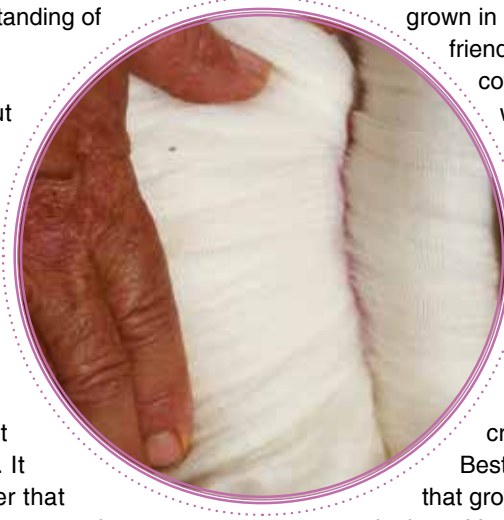
The producer is on the input side of the manufacturing process and it is essential that he has a good understanding of the practical significance of terms such as “organic”, “animal-friendly”, “environmentally friendly” and “social/ethically acceptable” – what is acceptable and what not. It is important to the consumer that there is a responsible and respected organisation setting guidelines for the industry, and also monitoring the application thereof. For those who market this product in its various stadia, it is important that the process underwrites the “image” of the industry, thus basing promotion of the product on new consumer values.

This document is the result of a joint venture between the NWGA and its industry partners, with inputs from various other role-players. The 2008/09 edition will be continuously reviewed and updated in future editions in respect of technical detail such as changing requirements, legislation and other guidelines. This issue is responsible for supplying principles that the wool farmer can utilise to his advantage to plan his enterprise in order to adhere to the fast changing requirements of the consumer millennium.

1.1 Summary of code contents

In practical terms the Code is a manual to assist the producer in focusing on issues relating to best practices on his farm.

Wool is produced largely in a manner that leaves a small environmental footprint. Compared to synthetics and even cotton, wool and especially wool produced under extensive conditions, is grown in a much more environmentally friendly manner. Even organic cotton is still a monoculture while our sheep graze on natural vegetation with all the biodiversity that it supports. In the past we haven't informed the consumer accordingly and we hope that this Code will help to address that. It is vital that wool growers live up to this reputation to ensure our credibility. Through this Code of Best Practice we intend to ensure that growers do just that by the signing a Vendor Declaration, confirming that they have grown wool according to the Code.



The Code is built on **three** pillars, namely:

- **Animal welfare**
Animal welfare is an area in which wool producers have been experiencing pressure from activist groups in recent years. It is an area that will continue to be important to consumers and as a result makes up the largest component of the Code of Best Practice. The welfare of our animals is of paramount importance to us as growers, and this fact needs to be communicated to the consumer. A “mules” operation is not allowed.
- **Care for the environment**
With global warming and other environmental issues receiving so much attention nowadays, it is vital that we as growers demonstrate that we are serious about caring for the environment and that we grow wool in a sustainable manner. This is key to our survival as wool growers.
- **Social responsibility**
Social responsibility has become a key aspect

- in corporate governance and is an important consumer concern. As such it is also a concern for us as wool growers and this aspect of the Code deals with our responsibility to our employees.

If producers study the Code carefully, they will find that they are already adhering to the majority of these requirements. It is important to take a closer look at the above.

(a) Animal welfare

Animal welfare addresses the following issues.

- **Adequate nutrition.**
Adequate nutrition and sufficient water of a good quality are fundamental requirements for animal welfare. These are also fundamental requirements for profitable wool cultivation.
- **Prevention of pain and disease.**
By breeding sheep that are adapted to the environment by implementing the correct management practices, we have an active strategy to prevent disease and accompanying stress to the animal. These management strategies include procedures to follow when introducing new stock to a property to prevent the introduction of contagious diseases.
- **Allow natural behaviour.**
Consumers do not want a product that is grown under artificial conditions and so it is vital that animals are allowed to express their natural behaviour. This implies that there must be minimum interference with the animals. We do this by breeding adapted animals that don't require help from humans for occurrences such as lambing.
- **Prevent fear and distress.**
Whenever we work with animals we attempt to create as little stress as possible for the animals. We also exercise strategies to prevent our sheep from being preyed upon by predators.
- **Protection against adverse weather.**
This is particularly important after shearing and during lambing, especially if the farm is in a cold part of the country. Shearing and lambing periods are also scheduled not to coincide with the coldest times for the year.

To further illustrate what the Code of Best Practice is about, I will look at examples of key aspects that are managed to improve animal welfare.

- **Water and feed quality.**
As mentioned earlier, adequate feed and water are critical to the wellbeing of the animal. As feed and in some cases water is not available in the same quantity and quality all year round, the wool grower has to ensure that the stocking rate matches the available supply of feed and water.
- **Drought strategies.**
In the case of extreme situations such as drought the wool grower must have strategies in place to limit the stress on the animals.
- **Tail docking and castration methods.**
At times we need to do things to animals for their long-term benefit, but which will cause stress at the time. Here we recommend the best age and practices in order to minimise this stress.
- **No mulesing.**
The type of sheep we have in South Africa don't require mulesing.
- **Disease prevention strategies (including fly strike).**
It is important not only to treat problems, but also to have strategies in place to prevent them. These include breeding animals that are less susceptible to the common diseases.
- **Conditions for transportation (on foot and trucking).**
Here the Code specifies maximum distances that sheep can be driven in a day, minimum requirements for vehicles, the driver's responsibilities, etc.
- **Facilities.**
For handling, shearing and shelter.

(b) Care for the environment

- **Soil management.**
By looking after your soil structure and the organisms in it, you require less intervention with chemicals and will have a more sustainable farming practice.
- **Rangeland management.**
This is central to sustainability in extensive areas. The sheep are merely harvesting



methods, but it is the rangeland that is the real resource that is being utilised.

- **Water management.**

The availability of good quality clean water is going to become more and more of a problem and we as wool growers must, through our practices, help to conserve this precious resource. This includes not being wasteful with water and not polluting the water that runs off our properties.

- **Management of invasive plants.**

Invasive plants not only take over natural vegetation, but in the process also destroy functioning ecosystems and need to be combated.

- **Predator control.**

This is a tricky, and at the same time, a very emotional issue. From an animal welfare point of view we must protect our sheep from predators. From an environmental point of view predators are part of the natural environment and therefore they must not be wiped out. The solution lies in trying to find selective methods of problem animal control that target only the animal that attacks the sheep and are as humane as possible. This is easier said than done. Methods such as guard dogs, alpacas and other deterrents are used in an bid to employ a more holistic approach towards predator control.

- **Chemical use.**

The Code requires wool growers to limit usage of chemicals to the minimum as chemicals often have a detrimental effect on other parts of the ecosystem. This is done through alternatives such as biological control, genetic improvement and innovative management. When chemicals are used, it must be done strictly according to the manufacturer's recommendations and withdrawal periods must be adhered to. The use of fossil fuels must also be kept to a minimum.

(c) Social responsibility

This is mainly related to labour, and addresses:

- Conditions of employment.
- Labour relations.
- Skills development.
- Health and safety.

South Africa has labour laws that provide good protection for employees. By adhering to these laws and, in addition, creating a wholesome working environment and empowering employees through ongoing skills development, we are addressing social sustainability in the industry.

The question may now be what the value of this Code of Best Practice is. In the first instance we have to inform our consumers of these practices. All will be in vain if we farm according to these best practices, but our end-consumer is not aware of it. Furthermore it is our expectation that if there still are producers who are not farming according to the Code of Best Practice, they will in time accept it and adhere to it. We are convinced that the application of these practices will make a significant contribution towards the sustainability of wool production.

1.2 Commitment to the code and the declaration of intent (Vendor Declaration)

By signing the document, the producer declares that he/she is committed to the principles contained in the Code. The producer furthermore undertakes to continuously evaluate his/her enterprise according to the principles contained in the Code, to make the necessary adaptations where limitations are identified or where opportunities for improvement occur. A broad network of specialists is available to assist the producer in this process by giving practical advice and rendering extension services.

|| Furthermore it is our
expectation that if there still
are producers who are not
farming according to the
Code of Best Practice, they
will in time accept it and
adhere to it. ||

It is important to note that the Code is not a set of quantifiable specifications against which the producer is tested to determine if his clip adheres to minimum requirements for marketing.

Signing the declaration should therefore be seen in this context. A signed declaration which is on record will enable us to continuously illustrate to the buyer, the user and consumer of South African wool and wool products on a generic basis, which percentage of the South African clip is produced by producers underwriting the Code and who undertake to be pro-active in continuously rectifying limitations.

Getting the Vendor Declaration signed is a task that the brokers decided to take upon themselves. Producers will be notified either by written notice or will be informed during a shearing shed visit by their broker's field official.

During auctions it will also be noted in the catalogue whether the Declaration has already been signed.

The aim is to have almost 80% of producers sign the Vendor Declaration. During auctions it will also be noted in the catalogue whether the Declaration has already been signed. In the process we want to promote the good story of the South African primary wool industry to the consumers of our product.

2. SHEEP HANDLING

A person's skills and knowledge can be determined by his/her behaviour in the kraal. The capability to catch a sheep and to calm it will clearly indicate his/her knowledge.

Most often a sheep is referred to as a stupid thing. The contrary is that sheep are not stupid. Rather, it is the handler who often does not have a clue of the sheep's way of thinking. If the handler does not have a clue, he/she will receive no co-operation from the sheep.

Always bear in mind that sheep in a kraal experience some measure of stress. Your actions will have a great influence on a sheep's behaviour. Sheep tends to remember unpleasant events. Well-designed handling facilities leads to a pleasant experience when handling sheep; for the farmer, the handlers and sheep. The opposite is also true. If facilities are badly designed, everybody gets frustrated and nobody enjoys the process.

To simplify the task in the kraal, to enjoy it and make it more pleasant and save time and labour in the process, one needs to look at the following factors:

- Prevent unnecessary noise - don't use a whip in the kraal.
- Too many untrained workers can complicate the task. One well-trained worker can do the same as ten untrained workers.
- Move slowly and calmly amongst the sheep.
- Sheep tend to move in the direction where they come from or where their grazing is.
- Sheep prefer moving uphill to downhill, they'd rather climb steps than a steep uphill.
- Sheep don't like moving into a dark place, therefore the end of a crush must be open (transparent).
- The above-mentioned sheep psychology must be kept in mind when erecting structures.
- Never force sheep into a space. In the process they can get hurt and pregnant ewes



can hurt their foetuses and abort. Always stand near the gate to prevent crowding through the gate.

- Poor disciplined sheepdogs can cause more damage than good.
- Prevent over-crowded kraals.
- Take care that sheep do not stand in kraals for too long. Keeping them in the kraal overnight should be an exception.
- Should this happen, facilities for feed and water should be present.
- If possible, always use the gate. It is bad kraal manners to climb over fences.
- Ensure that the gate is always securely closed.
- Always open the gate in the direction that sheep are going to move.
- Never use barbed wire in handling facilities.

3. VENDOR DECLARATION OF PRODUCTION PRACTICES

I, as a bona fide woolgrower hereby commits to the principles embodied in the *Best Practice Reference Manual for Wool Sheep Farming in South Africa*, and undertake to implement all procedures to ensure that the product I deliver, meets the required standards. I commit myself to honesty and integrity in all actions related to this undertaking.



In order to consistently produce the quality of wool demanded by the market and to ensure sustainable resource use, animal welfare and social responsibility, I commit myself to the following:

PROMOTION OF ANIMAL HEALTH AND WELL-BEING THROUGH:

- Selection and breeding of animals that are well adapted to the environment, displaying high resistance levels to disease and parasites, and which have the ability to thrive under average conditions of feed availability and quality.
- Total non-use of the mules operation.
- Supply of nutrition and water to maintain a high level of natural immunity against disease and parasites.
- Using products required for disease management and injury treatment strictly according to product specifications.
- Following veterinary recommendations and/or prescribed legal requirements for the use of vaccines or other remedies required for the prevention of outbreaks of endemic and/or state notifiable diseases.
- Ensuring that when sheep need to be housed, handled or transported, this is done in a responsible manner by trained staff to minimise any stress, by using facilities and equipment that are appropriate and which pose no threat to the sheep or staff.

PROTECTION AND MANAGEMENT OF ALL NATURAL RESOURCES IN A SUSTAINABLE MANNER ACCORDING TO LAW AND ACCEPTABLE BEST PRACTICE THROUGH:

- A commitment to environmental protection as part of farm management and the monitoring of the effectiveness of my actions through the implementation of appropriate impact assessment, planning and monitoring procedures.
- Maintenance and enhancement of the fertility and structure of the soil.
- The proper and effective management of all water resources to prevent wastage and pollution.
- Promotion of plant material decay to foster soil organism activities.
- Minimising the use of energy, particularly energy from non-renewable sources, by maximising use of renewable sources such as sunlight, wind and water.
- Pro-active conservation of existing biodiversity and development and implementation of a management plan to build biodiversity.
- Implementation of a waste management plan to reduce, re-use, recycle or compost waste in a manner that is appropriate to the materials in question.
- Implementation of a fire management plan to avoid and/or prevent fires which can adversely affect the environment.
- Ongoing reduction of the volume of agro-chemical product use to the maximum possible extent and strict adherence to product specifications.
- Observation of the required wool withholding periods for external pesticide products for use on sheep and for herbicides for use on available pastures.
- Development and implementation of a holistic and integrated predator management strategy and plan.

DISCHARGING OF SOCIAL RESPONSIBILITIES THROUGH:

- Creating wholesome working conditions for staff by subscribing to all appropriate principles embodied in modern human resource management principles.
- Protection of worker rights and obligations through appropriate contracts which are in line with all legal requirements.
- Empowerment of staff through encouragement of life-long learning and provision of opportunities for skills development and capacity building.
- Respect for and compliance with all core human and labour rights as prescribed by the International Labour Organisation.

IN ADDITION TO THE ABOVE, I ALSO COMMIT MYSELF TO HARVEST AND PREPARE MY CLIP FOR THE MARKET THROUGH THE FOLLOWING:

- Use of trained shearers and wool classers.
- Use of prescribed and industry-regulated woolpacks.
- Preparation of clips according to the appropriate Industry Code of Preparation (Classing Standards).
- Provision of suitable shearing facilities and following of all prescribed procedures to ensure that my clip is free of all forms of contamination.



Signature: Date:

Address:

Producer no:

The way forward

The production advisors of the NWGA, in collaboration with the field personnel of the brokers, are currently in the process of informing producers on the utilisation of the Code. At the same time producers will be assisted in completing a questionnaire to generate data that will enable us to quantify the current status in the wool industry as a whole. The result of this process will also be a guideline to individual producers in respect of their own practices according to the principles contained in the Code. Thank you very much in advance for your support. We trust that this project will take the image of the woolled sheep industry to even greater heights.



4. CLASSING, MARKING AND PACKING STANDARDS FOR WOOL

4.1 General guidelines for classing and marking of wool

- Raw wool must be classed into different classes or lines to ensure uniformity within lines regarding characteristics important to processors, such as mean fibre diameter (micron), staple length and tensile strength, vegetable matter content (VM), quality and appearance.
- Contamination with baling twine or any other loose object must be avoided at all costs.
- Wool stained with tar, urine, dung, blood, paint, branding fluids or discoloured by fungi or chemicals must be removed prior to shearing.
- White wool contaminated with pigmented fibre or kemp must be removed and packed separately.
- When marking ink is used to identify the contents of a bale (either on the farm or after re-handling and packing by brokers or other traders prior to delivery to processors), great

care should be taken to prevent ink from seeping through and staining the wool inside.

4.2 Classing and marking of Merino-type wool

(a) Definition

Merino-type wool is white wool that is free of kemp and has an average fibre diameter of not more than 27 micron (μm).

(b) Fleece wool

The portion of the fleece that is sound in tensile strength (no break), which remains after the lines described in section (b) to (f) have been removed, must be packed separately and marked according to an appropriate combination of symbols denoting the estimated length (AA-EE) and average fibre diameter of the wool (FF, F, M, S, SS). The classification system is based on the matrix in *Table 1*.

Table 1: Fineness classes (microns).

Length groups	Superfine (<19)	Fine (19,1-20)	Medium (20,1-22)	Strong (22,1-24)	Overstrong (24,1-27)
>90mm	A AFF	A AF	A AM	A AS	A ASS
80-90mm	A FF	A F	A M	A S	A SS
70-80mm	B BFF	B BF	B BM	B BS	B BSS
60-70mm	B FF	B F	B M	B S	B SS
50-60mm	C FF	C F	C M	C S	C SS
40-50mm	D DFF	D DF	D DM	D DS	D DSS
30-40mm	D FF	D F	D M	D S	D SS
20-30mm	E EFF	E EF	E EM	E ES	E ESS
<20mm	E FF	E F	E M	E S	E SS

All fleeces deviating noticeably from the average properties of the clip must be prepared and marked according to the following principles:

- Fleece wool exhibiting a clear break in the staple or general overall lack of tensile strength (tenderness) should NOT be divided into classes, but only skirted, packed separately and marked “TDR”.
- Fleece wools with average fibre diameter of more than 27 micron must be packed separately and marked with the appropriate length symbol (see Section E) followed by “XM”.
- “Long wool” lines (B length and longer),

differing by more than 25mm, must not be classed together.

- “Short wool” lines (C length and shorter) differing by more than 20mm, must not be classed together.

(c) Backs

If wool from the back of a sheep does not deviate in appearance, quality and VM (vegetable matter) contamination from the rest of the fleece, it needs not be removed and packed separately. Otherwise, backs must be removed and marked as indicated in *Table 2*.

Table 2: Symbols for the marking of back wool.

Mark	Contents
BKS	Dusty, noticeably weathered.
BKS2	Inferior, very dusty, badly weathered, crow's nest, short or with high VM contamination.
BKS3	Highly contaminated with straw and/or excessive VM (feedlot backs).

(d) Broken fleeces

Neck-fold wool, breech wool or portions of the fleece from an adult sheep containing excessive vegetable matter must be packed separately and marked with a single length symbol according to the guidelines given in Section (B). If the quantity is less than one bale, or if it is too short or unattractive in appearance, it can be blended with the appropriate bellies and skirting lines (see Section E). Good quality neck wool (if sufficient in quantity to qualify

for a separate line – one bale or more) must be marked as “NKS” with the appropriate preceding length symbol (see Section B).

(e) Bellies and pieces

Wool removed from the belly area of an adult sheep and/or portions removed from the fleece that deviate from the overall characteristics of the fleece, must be packed separately and marked as indicated in *Table 3*.



Table 3: Symbols for the marking of belly and piece wool.

Mark	Contents
CBP	Long belly wool (at least 60mm), and fleece pieces, white to cream.
BP	Short belly and fleece pieces (40 – 60mm), deep cream or slightly yellow.
BP2	Short belly and fleece pieces (less than 40mm), deep cream or slightly yellow.
CB	All belly wool, deep creamy or yellow, at least 50mm.

(f) Locks

Manure- and urine-stained wool from the breech area, matted wool, brisket wool, top knots, cheek wool, double cuts and any sweaty wool shorn from an adult sheep must be packed separately and marked as indicated in *Table 4*.

Table 4: Symbols for the marking of locks.

Mark	Contents
LOX	Long sweaty wool, long top knots and cheek wool with an attractive colour – minimum length 40mm.
LOX1	Sweaty locks, matted brisket wool, short belly wool with deep cream or slightly yellow colour, long top knots and cheek wool – minimum length 25mm.
LOX2	Shankings, short top knots and cheek wool, double cuts, hard sweaty pieces, maximum length 40mm.
LOX3	Light urine- and/or manure-stained wool.
LOX4	Very heavy, sweaty locks.
LOX5	Matted, very seedy locks, stained or unstained.

4.3 Packing and marking of bales

- All greasy wool for off-farm delivery to the trade must be packed in nylon packs complying with the appropriate SABS/ Wool Testing Bureau standards and specifications.
- The minimum mass for bales is 100kg and the maximum is 180kg and 220kg for lox.
- A maximum of nine bale hooks must be used to close the bale.
- Not all marking inks are scourable. Prevent seepage through the bale onto the wool and use only approved marking fluids.



5. CONTAMINATION IN THE SOUTH AFRICAN CLIP

(By JL Venter)

Wool buyers have been cautioning South African wool producers on numerous occasions about the drop in standards of wool classing and contamination of the South African wool clip. The seasonally combined clip fault report indicates that there is indeed an increase in the number of clip faults in the SA wool clip (*Table 1*).

Table 1: Clip fault report for the 2010/11 to 2012/13 season.

FAULT	SEASON			
	2010/2011	2011/2012	2012/2013	2013/2014
Mixed lengths (<20mm variation)	205	624	929	993
Mixed quality (poorly skirted)	19	18	69	67
Sweaty pieces in main line	0	1	0	0
Piece and belly lines urine/manure-stained	0	15	1	4
Baling twine, plastic	49	200	859	1287
Black hair	12	2	24	44
Kemp/modulated fibre	6	2	2	26
Paint, marking ink	368	222	297	179
Cigarette butts, etc.	1	2	0	1
Metal wire, clips, etc.	4	1	2	9
Other	303	16	27	48
Total faults	960	1 103	1 834	2658
Lots	937	1 096	1 823	2636
Total producer lots	35 299 305	34 593 351	38 075 409	40 700 725

The most alarming of these trends is the increase in baling twine (26 times higher than in 2010/11). Baling twine breaks down in small fibres that contaminate the wool. This type of contamination is difficult to detect with the naked eye and ends up in the finished cloth, where it is clearly visible. It stands to reason that the wool processor loses a lot of money and he will claim for this loss from the wool buyer. This is damaging the reputation of the SA clip.

It is ultimately the responsibility of every wool producer (farmers, wool trader, feedlots and abattoirs), shearer, classer and advisor to ensure that the highest standards of wool clip preparation are followed to ensure that the South African clip remains a sought-after commodity.

The increase in mixed lengths is also alarming as this indicates that the standard of wool classing and shearing is not up to the required level. It appears that the incidence of mixed lengths did not increase much this season. The practice of shearing shorter wool also contributes to the variation in length and classers must be made aware of this problem, especially where shorter wool is shorn.

No paint and marking ink should be used on the wool of sheep, but rather on their faces (hairy parts). The use of paint causes losses to the wool processor as it damages the carding machines. All paint markings on wool (whether it is washable or not) should be removed prior to shearing and not on the sorting table. The incidence of this form of contamination declined significantly (51%) and is attributed to good preparation prior to shearing.





Examples of contaminants found in wool bales.



It is important that no poly-prop bags are used to divide bales. The use of brown paper is suggested.



6. INTERPRETING THE WOOL SETTLEMENT ACCOUNT

(By Gerrie van der Walt)

The wool settlement account provides valuable management information to the farmer regarding his standard of classing, planning for future shearing, breeding progress as well as wool production of his sheep. It may not be scientifically correct, but it gives the farmer an overview of his clip.

6.1 Planning of shearing

Refer to *Figure 1* for wool settlement account number 150520A.

The following valuable information is provided:

- Main fleece line: Fleece wool line with the highest number of bales. It also gives an indication of the type of wool on your sheep, e.g. fine, medium or strong.
- Other fleece lines.
- Cast fleece lines: If present, e.g. TDR, AM2, and what was the reason for the cast fleece line, e.g. what caused so many sheep to produce tender wool?
- Gives an indication of the number of wool packs to be ordered.



Figure 1: Wool settlement statement for account 150520A.

Producer Lots				Account no. 000000 Reference no: 12333778				Catalog no. / Date : P24/30 Invoice no: 458087				16/03/2011 Page 2 Date: 18/03/2011																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																				
Lot no	Ref No	Bales	Description	Appraised Wool Type	Gross Mass	Tare	Greasy Net Kg	Clean Net Kg	Sale Price	Gross R Amount	Mic	SD Yield	VM	Colour	Staple test information																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																																	
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(a) Which main fleece class will you put out?

CM

(b) Which other fleece lines will you put out?

CS

DL

BM

DS

(c) Which cast fleece line will you put out?

None

6.2 Standard of classing

It provides information about too much variation regarding length, e.g. if the coefficient of variation for length is above 12%, then variation starts to get too big and the farmer can improve his classing regarding length. This will benefit the producer's price at the end.

Refer to the headings on the statement in *Figure 1*.

(a) What does PM stand for?

Plant matter (mainly seeds). If the percentage of seed becomes too high, it will reflect negatively on the wool price because it is expensive to remove seed from wool and it will decrease a clean yield. Is the seed contamination a result of the pastures or are the handling facilities contaminated with weeds?

(b) What does SL stand for?

Staple length.

(c) What does CVL stand for?

Coefficient of variation of length. It shows the variation in length as already indicated. Is variation because of poor classing or poor shearing?

Table 1: Grade of uniformity in length.

Percentage variation	Degree of uniformity
12% and less	Very good uniformity.
13- 20%	Good to average uniformity.
21% +	Increased variation of staple length.

(d) What does SS stand for?

Staple strength or tensile strength. Wool with tensile strength less than 30N/Ktex is sold as tender. What are the causes of tender wool on a farm? It can be nutrition, diseases, parasites or stress conditions.



(e) What does POB stand for?

Position of break. It indicates percentage-wise the position of the break over the length of the staple, in other words 74% of the breaks occur in the tip and 26% occur in the centre of the staple. It is, however, only of importance when the wool is tender and can then give an indication of the period when the break occurred. It can then assist the farmer to identify the cause of the break more accurately.

6.3 Relation of different classes to the total clip

It can give an indication whether I have over- or under-classed my back wool and additional classes.

Table 2: Guideline for classing.

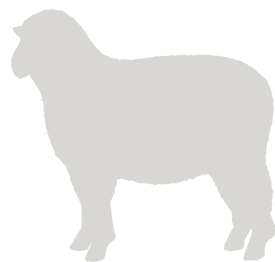
Line	Months' growth		
	12	8	6
Fleece classes	70%	75%	80%
Back	10%	5%	0%
Bellies	10%	10%	10%
Locks	10%	10%	10%

For example, if my back wool line comprises more than 10% of my clip, I might have removed too much back from the fleece.

6.4 Wool production per sheep

It is always useful to know how much wool my sheep produced. This is only an average, but can be used as a good indication. I can also split different age groups and determine their wool production separately, e.g. lamb wool and adult sheep's wool, or wool production per ewe mated etc. It can also indicate tendencies over a number of years – if there is a declining or rising tendency, what is the reason for that?

The following explanation is based on a farming unit of 1 000 sheep.

**(a) What is the average wool production per sheep?**

$$= \frac{\text{Nett greasy mass}}{\text{Number of sheep shorn}} = \frac{3\,498,9 + 191}{1\,000} \quad \boxed{3,69\text{kg/ sheep}}$$

Do not use gross mass, because it includes the weight of the wool packs.

(b) What is the average gross wool income per sheep?

$$= \frac{\text{Gross yield}}{\text{Number of sheep shorn}} = \frac{\text{R}18\,3645,52 + \text{R}2\,490,07}{1\,000} \quad \boxed{\text{R}186,14}$$

(c) Given the following:

(i) Shearing costs	= R1/kg
(ii) Labour	= 50c/kg

$$= \frac{\text{What is the net wool income per sheep?}}{\text{Shearing cost + labour x net greasy mass}} = \text{R}1,50 \times 3\,689,9\text{kg} = \text{R}5\,534,85$$

$$\text{Net wool income per sheep} = \frac{\text{Net yield} - \text{R}5\,534,85}{\text{Number of sheep shorn}}$$

6.5 Other useful information

(a) What is the average fineness of the clip? 20,6µ.

It can give an indication of tendency over years if my clip is getting finer or stronger. It can then assist me with the selection of rams according to their fineness.

(b) What appraisal type is my main line and what does it mean?

MF4S.	M = Breed	=	Merino
	F = Category	=	Fleece
	4 = Style	=	Best
MB5SL.40	M = Breed	=	Merino
	B = Category	=	Bellies
	5 = Style	=	Good
	SL = Vegetable matter type = S = Shive (stick grass seeds) & L = Clumpy		
	(matted with seed) 40 = Length (mm)		

7. CODE OF BEST PRACTICE FOR THE SHEARING INDUSTRY

7.1 WORKING HOURS

- Wool producers should organise farm activities in order for a shearing team to work a minimum of six hours per day for at least five working days per week.
- Provision should be made to keep sheep under sufficient cover/protection from rain for at least one full day of shearing.
- It is recommended that working hours, where possible, should be divided into two-hour shifts.

7.2 SUITABLE FACILITIES

- Sleeping facilities.
- Provision has to be made for separate sleeping facilities away from the shearing shed.
- The producer must supply mattresses that are at least 10cm thick.
- Functional lighting in sleeping quarters is compulsory.

Ablution facilities

- Running water is required.
- Provision has to be made for washing/showering facilities for shearers and washing facilities for their clothing.
- Hot water is not a requirement, but provision should be made for facilities in order for shearers to heat their own water. (Wood and containers to heat water in to be provided.)
- Toilet facilities must be provided for use by the shearing team.

Cooking facilities

- Undercover cooking facilities must be provided.
- The producer must supply cooking utensils.
- The producer must supply enough firewood for cooking.

Shearing/wool handling facilities

- Undercover facilities should be available to house enough sheep for at least one full day's shearing.
- Individual catching and inspection pens for each shearer are recommended. However, where possible, the producer must limit the distance to no further than five metres from the catching pen to the shearing points.
- A wooden shearing board (it can be a sheet of laminated wood) is recommended.
- Adequate lighting and fresh air are important.
- The distance between the shearer and the wool sorting table should not exceed five metres.
- The distance between the sorting tables and the wool bins should not exceed five metres.

Meals

Shearing is physically demanding and the following rations should be provided per team member to ensure productivity for an eight-hour day:

- 300g meat.
- 800g maize meal or 1kg "boermeel".
- 1 litre of milk and tea or coffee and at least one cup of sugar per team member.



SKETCHES FOR PATTERN SHEARING: HAND SHEARING

Figure 1



HOLD BOTH FRONT LEGS UP UNDER THE LEFT ARM
THE SHEARER PULLS HIS LEGS BACK TIGHT AGAINST
THE SHEEP TO STRETCH THE BELLY

Figure 2



RIGHT KNEE IN FRONT OF THE BRISKET

Figure 3



RIGHT FOOT MOVES BACK WHEN CLEANING OVER
THE TAIL. LEFT HAND STRETCH SKIN.
NOTE: (FULL BLOW OVER THE BACKBONE)

Figure 4



REMOVE ALL THE TRIMMINGS INSIDE THE LEG

Figure 5



BLOW 15 ROLL THE HEAD, STARTING ON THE TOP SIDE
OF THE BRISKET. FINISHING SQUARE UNDER THE JAW

Figure 6



CLEAR UP BEHIND THE EARS AND TOP KNOT WITH
THE SHEEP'S HEAD BELOW THE SHEARER'S KNEE

Figure 7



SHEAR INTO THE FIRST SHOULDER, KEEPING
POINTS OF THE SHEARS DOWN ONTO THE SKIN

Figure 8



SHEAR AROUND THE FIRST SIDE, MOVING LEFT FOOT
AWAY FROM THE SHEEP TO LET THE SHEEP LIE DOWN
FOR BLOW 26 TO COMMENCE THE LONG BLOW

Figure 9



PUT BLOW 27 IN AS THE SHEEP DROPS DOWN. STEP
OVER WITH THE RIGHT FOOT AS BLOW FINISHES

Figure 10



COMPLETE A FULL BLOW OVER THE BACK BONE.
AS BLOW 28 FINISHES, STEP FORWARD WITH THE
RIGHT FOOT, TURNING TOE IN. ROLL SHEEP TOWARDS
RIGHT FOOT WITH LEFT FOOT AND LEFT HAND

Figure 11



THE LAST CHEEK IS CLEARED BEFORE
RELEASING SHEEP RIGHT FRONT LEG

Figure 12



STEP OUT WITH THE LEFT FOOT WHEN
BLOW 37 IS COMPLETED

Figure 13



THE SHEEP'S HEAD IS BROUGHT FORWARD OF
SHEARER'S LEGS.

Figure 14



GRIP THE LOOSE SKIN IN THE FLANK AND ROLL
THE FIST ON THE FIRM PART OF THE LEG TO KEEP
IT STRAIGHT



A guide to pattern shearing

1. COURSES AND WEBSITES

The following courses are presented or organised by the NWGA and are mostly free of charge. Contact your production advisor (contact details in first chapter of this book) and he will organise the course for you.

- Sheep handling.
- Animal nutrition.
- Veld management.
- Flock management (2 or 3 days, includes breeding, selection, mating, lambing and weaning).
- Animal health.
- Sheep artificial insemination.
- Wool work (piece picking).
- Blade shearing (producers can organise for us to train the shearers of the shearing contractor he is using on his farm. Groups of farmers who want to start a shearing society and want to train their own shearers to shear the group's sheep, can also contact us – contact Isak Kloppe).
- Machine shearing.
- Predation (problem animal control, information days and courses).
- Fencing.
- Recordkeeping.
- Wool classing (Grootfontein, except when a group of ten is interested and a farmer is willing to offer his clip and facilities for the presentation of the course).

WEBSITES

AGRI SA	www.agrisa.co.za
ANIMAL RIGHTS AFRICA	www.animalrightsafrica.org
BIRDLIFE SOUTH AFRICA	www.birdlife.org.za
BKB	www.bkb.co.za
BREEDERS' SOCIETIES	www.daff.gov.za/daaDev/sideMenu/links/Digest11.htm
CAPE LEOPARD TRUST	www.capeleopard.org.za
CATTLE NETWORK	www.cattlenetwork.com
CHEETAH OUTREACH	www.cheetah.co.za
CMW	www.cmw.co.za
ELSENBURG	www.elsenburg.com
ENDANGERED WILDLIFE TRUST	www.ewt.org.za
FARMER'S WEEKLY	www.farmersweekly.co.za
GROOTFONTEIN	gadi.agric.za
HANDY ADDRESSES	www.daff.gov.za/daaDev/sideMenu/links/Digest18.htm
INTERNASIONALE WEER	www.yr.no
LANDBOUWEEKBLAD	www.landbou.com
LANDMARK FOUNDATION	www.landmarkfoundation.org.za
NATIONAL COUNCIL OF SPCA's	www.nspca.co.za
NWKV	www.nwga.co.za
RPO	www.rpo.co.za
SA FEEDLOT ASSOCIATION	www.safeedlot.co.za
SA STUD BOOK	www.studbook.co.za
THE WILDLIFE TRADE MONITORING NETWORK	www.traffic.org
VEEPLAAS	www.veeplaas.co.za
VOERMOL	www.voermol.co.za
VRA VIR FAFFA	www.landbou.com
WEATHER	www.weathersa.co.za
WILDLIFE AND ENVIRONMENTAL SOCIETY OF SOUTH AFRICA	www.wessa.org.za
WORLD WILDLIFE FUND, SOUTH AFRICA	www.wwf.org.za
ZOETIS	www.zoetis.co.za



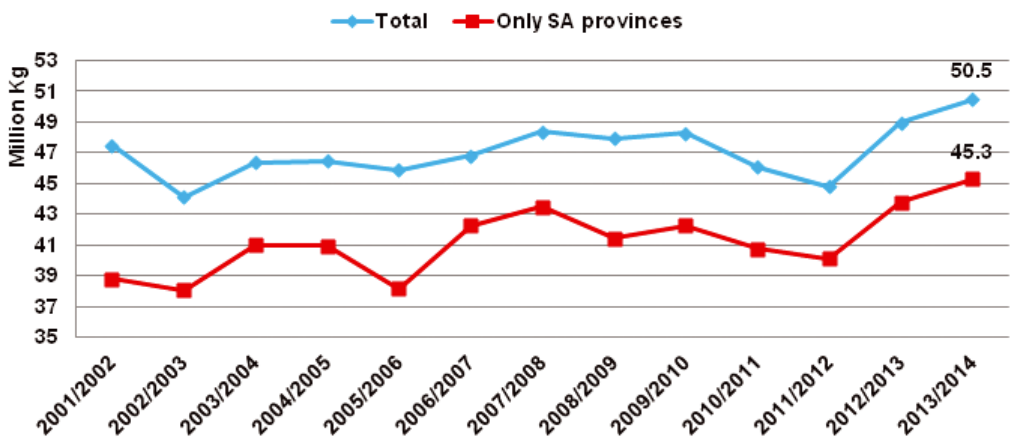
1. RSA WOOL PRODUCTION 2001-2014

South Africa produces only 2% of the world's total production, but South African wool has a reputation as good-quality, well-classed wool. So it is important that South Africa continually focuses on wool production at a competitive level to maintain its place in the world market.

Wool produced in the neighbouring countries of Namibia and Lesotho is considered part of South African production as it has always been

sold in South Africa. *Figure 1* shows the total wool production of South Africa, as well as the production of only the nine South African provinces from 2001 to 2014. The lowest wool production season was during the 2002/2003 season with 44,2 million kilogram. Thereafter the total production increased over the 50 million kilogram mark during 2013/2014. The nine provinces of South Africa produced 81,7% of the total production in 2001/2002. During the 2013/2014 season, the nine provinces produced 89,6% of the total production.

Figure 1: Wool production (kg)

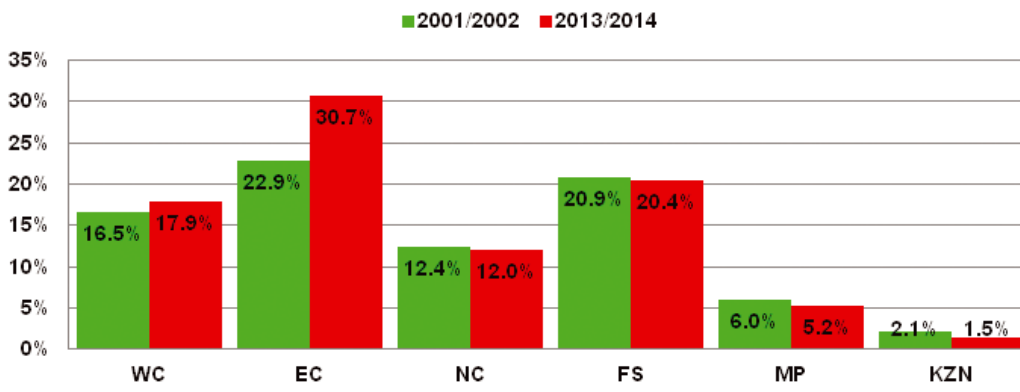


Source: CWSA 2014

Provincial wool production

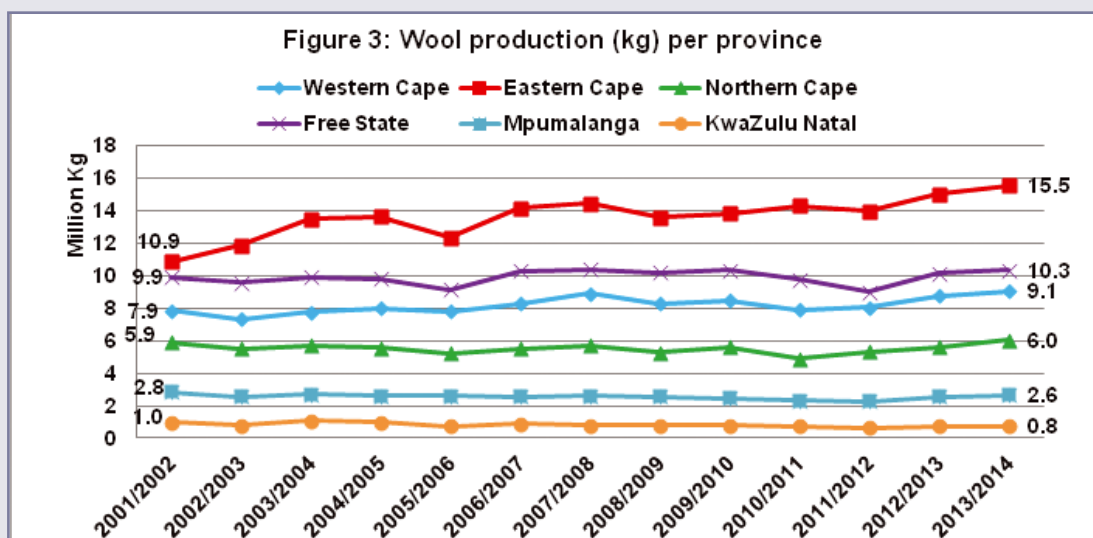
The percentage of wool production in the Western Cape and the Eastern Cape increased from 2001/2002 to 2013/2014 (*Figure 2*), where the other provinces decreased slightly. Each province had its own challenges and opportunities for the past 5 years, and these challenges and opportunities will surely also occur in the future. If we look at the wool production of the Eastern Cape, there has been a big change.

Figure 2: Wool production per province, 2001/2002 & 2013/2014



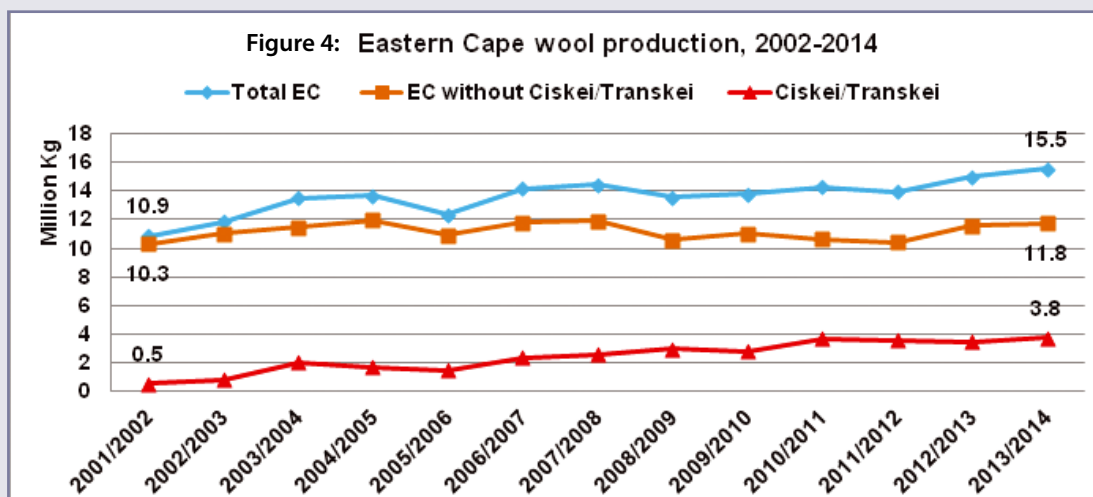
Source: CWSA 2014

Figure 3 illustrates the wool production growth in the Eastern Cape. Most of the provinces experienced a decrease during the dry unfavourable wool production year of 2005/2006. From there on the wool production increased up until the enormous animal losses caused during the 2009/2010 Rift Valley fever outbreak. During 2012/2013 all the provinces showed an increase in wool production.



Source: CWSA 2014

Figure 4 shows the total wool production in the Eastern Cape, as well as the wool production of the Eastern Cape without the Ciskei/Transkei production. The impact of wool production in Ciskei/Transkei is enormous in the Eastern Cape, as well as on the national wool production. The wool production from Ciskei/Transkei was 535 911kg in 2001/2002, increasing to 3 764 606kg in 2013/2014. This increase in wool production from Transkei and Ciskei was largely because of the advice that the National Wool Growers' Association (NWGA) production advisory service provided in the communal areas, specifically regarding the marketing of their wool through the formal auction system.



Source: CWSA 2014



Table 1: Top 25 wool-producing districts in South Africa, 2013/2014. (Source: CWSA, 2014)

No.	District	Province	2013/2014	% of RSA
1	TRANSKEI/CISKEI	EC	3 764 606	8,3%
2	CALEDON	WC	1 357 729	3,0%
3	BREDASDORP	WC	1 342 641	3,0%
4	SWELLENDAM	WC	1 222 608	2,7%
5	BARKLY EAST	EC	936 430	2,1%
6	CRADOCK	EC	868 789	1,9%
7	VICTORIA WEST	NC	860 606	1,9%
8	ERMELO	MP	859 748	1,9%
9	VREDE	FS	767 662	1,7%
10	SOMERSET EAST	EC	743 563	1,6%
11	FRANKFORT	FS	742 523	1,6%
12	HARRISMITH	FS	724 056	1,6%
13	ALBERT (Burgersdorp)	EC	698 435	1,5%
14	CALVINIA	NC	692 358	1,5%
15	WODEHOUSE (Dordrecht)	EC	683 174	1,5%
16	LADYBRAND	FS	682 824	1,5%
17	RICHMOND	NC	667 843	1,5%
18	RIVERSDAL	WC	625 882	1,4%
19	COLESBERG	NC	621 310	1,4%
20	HEIDELBERG (WC)	WC	604 881	1,3%
21	SMITHFIELD	FS	584 799	1,3%
22	MALMESBURY	WC	574 518	1,3%
23	MOORREESBURG	WC	526 293	1,2%
24	MACLEAR	EC	514 096	1,1%
25	DE AAR	NC	511 308	1,1%
TOTAL RSA			45 296 223	49,0%

2. WOOL PRODUCTION ACCORDING TO PROVINCE AND DISTRICT FOR THE LAST 12 YEARS

Production per province						
Greasy wool (kg)						
RSA						
Province	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
WESTERN CAPE	8,493,863	7,897,705	8,029,118	8,772,426	9,051,541	
EASTERN CAPE	13,805,227	14,300,589	13,950,406	15,015,277	15,529,348	
NORTHERN CAPE	5,617,319	4,896,023	5,344,661	5,609,529	6,043,433	
FREE STATE	10,355,595	9,751,911	9,018,453	10,125,792	10,326,986	
MPUMALANGA	2,470,876	2,325,133	2,275,610	2,566,339	2,627,280	
KWAZULU-NATAL	786,649	747,514	658,744	716,036	758,802	
LIMPOPO	7,279	9,740	14,987	9,660	16,569	
GAUTENG	206,572	216,307	241,032	274,285	262,683	
NORTH WEST	511,666	612,047	584,279	703,738	679,581	
NAMIBIA	4,623	3,323	3,060	8,493	6,902	
LESOTHO	3,566,260	4,228,328	4,183,703	4,392,993	4,911,439	
UNALLOCATED	2,519,647	1,280,661	492,447	741,813		
DIRECT PURCHASES	1,615,040	363,479	503,689	750,871	291,566	
TOTAL	48,300,787	46,099,196	44,807,741	48,955,805	50,506,131	

Production per province						
Greasy wool (kg)						
Western Cape						
District	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
BEAUFORT-WEST	278,714	243,448	298,110	325,630	354,963	
BELLVILLE	69,989	55,805	75,566	67,064	79,777	
BREDASDORP	1,316,495	1,243,490	1,200,406	1,316,315	1,342,641	
CALEDON	1,370,567	1,230,634	1,307,264	1,334,782	1,357,729	
CALITZDORP	8,963	4,448	2,607	3,147	3,509	
CERES	154,662	152,793	151,429	155,502	167,422	
CLANWILLIAM	107,432	145,580	116,238	123,704	146,294	
GEORGE	50,758	48,707	47,847	59,838	56,338	
GOODWOOD	2,435	3,739	4,877	3,152	6,054	
HEIDELBERG(C,P)	531,125	483,863	520,896	591,164	604,881	
HERMANUS	22,837	15,133	21,233	23,823	26,077	
HOPEFIELD	67,053	69,012	66,535	65,658	80,360	
KNYSNA	12,518	10,405	8,520	14,445	11,174	
KUILS RIVER	1,344	438	389	1,327	1,512	
LADISMITH	3,466	1,437	2,640	7,351	9,469	
LAINGSBURG	120,122	101,707	102,920	97,722	108,009	
MALMESBURY	593,300	585,371	571,695	606,682	574,518	
MITCHELL'S PLEIN					207	
MONTAGU	19,337	10,255	11,722	10,311	10,128	
MOORREESBURG	474,716	456,239	468,177	486,934	526,293	
MOSSELBAAI	211,454	202,316	200,729	227,654	255,732	
MURRAYSBURG	343,334	328,822	323,627	334,750	371,176	
OUUDTSHOORN	24,488	11,793	29,242	39,049	42,761	
PAARL	110,138	102,222	102,221	99,100	107,300	
PIKETBERG	344,484	360,673	373,551	394,182	428,460	
PRINCE ALBERT	110,102	97,953	98,621	100,193	124,509	
RIVERSDAL	539,177	539,779	549,104	665,768	625,882	
ROBERTSON	15,009	3,638	5,602	8,571	5,240	
SOMERSET-WEST		41	24		5,069	
STELLENBOSCH	16,121	14,877	17,744	26,095	39,233	
SWELLENDAAM	1,283,064	1,042,982	1,045,386	1,202,408	1,222,608	
TULBAGH	11,497	11,007	15,253	14,539	13,985	
UNIONDALE	41,399	48,414	38,983	61,903	47,284	
VAN RHYNSDORP	55,666	51,738	59,483	50,443	59,956	
VREDENBURG	71,707	76,191	64,865	77,654	83,868	
VREDENDAL	22,886	22,797	22,000	20,659	22,619	
WELLINGTON	61,378	95,037	84,149	122,285	93,264	
WORCESTER	16,392	24,377	19,179	31,281	33,931	
UNKNOWN WC	9,734	544	287	1,344	1,309	
Total	8,493,863	7,897,705	8,029,121	8,772,426	9,051,541	

Production per province						
Greasy wool (kg)						
Eastern Cape						
District	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
ABERDEEN	464,081	439,142	456,367	547,959	505,876	
ADELAIDE	380,703	368,927	341,186	385,418	384,573	
ALBANY (Grahamstown)	127,328	105,586	147,021	137,176	145,030	
ALBERT (Burgersdorp)	664,293	686,680	595,797	734,885	698,435	
ALEXANDRIA	15,480	14,436	14,291	18,219	14,714	
ALI WAL-NORTH	268,991	261,030	262,434	239,931	250,233	
BARKLY-EAST	929,176	897,677	876,812	943,978	936,430	
BATHURST	1,183	1,434	1,726	1,956	1,029	
BEDFORD	264,932	270,247	268,799	293,928	300,035	
CATHCART	439,863	399,742	396,014	376,222	413,250	
CRADOCK	814,346	836,294	709,136	867,427	868,789	
ELLIOT	211,292	189,510	176,816	177,197	168,425	
FORT BEAUFORT	87,722	81,977	74,592	67,848	56,757	
GRAAFF-REINET	534,943	399,970	382,285	419,968	428,116	
HANKEY	676	420	1,567	9,255	15,771	
HOFMEYR	258,000	245,053	324,934	281,759	301,492	
HUMANSDORP	204,412	212,729	193,588	247,849	230,275	
INDWE	76,347	70,364	63,144	71,958	76,846	
JANSENVILLE	134,598	133,352	123,469	156,067	153,176	
JOUBERTINA	31,391	16,507	19,623	20,730	20,267	
KING WILLIAMS TOWN	82,882	69,891	53,106	52,852	56,729	
KIRKWOOD	890	562	2,542	664	54	
KOMGA	15,727	18,125	15,214	17,705	14,857	
LADY GREY	209,507	197,727	178,107	178,583	191,218	
MACLEAR	206,900	425,882	322,692	132,740	514,096	
MIDDELBURG	407,974	407,332	386,667	396,126	458,629	
MOLTENO	364,925	346,460	324,793	352,269	362,791	
EAST LONDEN	31,306	3,516	20,330	32,025	28,991	
PEARSTON	119,739	122,377	134,690	130,007	136,305	
PORT ELIZABETH		11,733	180,691	123,263	147,694	
QUEENSTOWN	78,681	90,603	64,925	250,259	239,566	
SOMERSET-EAST	580,896	637,714	609,425	695,584	743,563	
STERKSTROOM	81,785	94,891	84,875	90,272	105,322	
STEYNSBURG	322,519	340,620	311,950	359,400	357,328	
STEYTLERVILLE	130,231	130,043	166,919	169,495	210,850	
STUTTERHEIM	260,666	219,231	238,282	257,195	215,469	
TARKA	463,385	457,249	421,057	440,701	394,570	
TRANSKEI/CISKEI	2,807,141	3,688,393	3,555,077	3,213,163	3,764,606	
UITENHAGE	23,337	18,728	41,163	39,901	170,372	
VENTERSTAD	236,989	181,276	173,671	235,589	174,451	
WILLOWMORE	241,316	168,543	226,135	234,836	249,747	
WODEHOUSE (Dordrecht)	643,524	587,651	630,045	634,044	683,174	
UNKNOWN EC	585,150	450,965	378,452	730,102	339,456	
Total	13,805,227	14,521,296	14,148,478	15,015,277	15,529,348	

Production per province						
Greasy wool (kg)						
Free State						
District	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
BETHLEHEM	125,371	138,462	153,468	147,763	233,814	
BETHULIE	411,454	384,753	404,831	507,604	473,210	
BLOEMFONTEIN	184,335	198,378	194,654	217,952	215,277	
BOSHOF	83,489	90,449	114,921	97,326	122,155	
BOTHAVILLE	81,437	91,607	70,687	94,618	108,256	
BRANDFORT	245,321	230,911	196,702	216,956	242,665	
BULTFONTEIN	157,383	134,892	143,549	151,658	142,626	
CLOCOLAN	86,852	90,538	84,034	83,591	86,659	
DEWETSDORP	410,982	403,816	364,582	391,914	372,213	
EDENBURG	338,545	376,015	277,661	405,634	319,325	
EXCELSIOR	87,528	73,212	65,381	65,322	73,742	
FAURESMITH	225,122	205,408	223,580	295,398	283,337	
FICKSBURG	83,856	85,997	69,563	58,402	70,408	
FOURIESBURG	46,795	46,867	52,306	59,490	69,468	
FRANKFORT	699,031	673,166	650,515	672,625	742,523	
HARRISMITH	637,131	833,235	620,661	673,529	724,056	
HEILBRON	262,126	240,864	240,700	285,945	271,617	
HENNINGMAN	25,187	21,533	13,228	12,069	13,735	
HOOPSTAD	37,704	102,152	64,039	58,159	83,179	
JACOBSDAL	57,969	36,288	59,408	40,194	114,995	
JAGERSFONTEIN	138,079	159,548	128,630	141,514	116,384	
KOFFIEFONTEIN	2,067	7,854	1,778	586	2,161	
KOPPIES	52,780	54,876	49,123	49,598	54,294	
KROONSTAD	187,346	188,141	181,122	168,820	184,605	
LADYBRAND	149,670	445,678	618,965	598,229	682,824	
LINDLEY	195,200	195,226	180,603	202,595	203,521	
MARQUARD	124,039	133,087	121,991	104,366	134,610	
ODENDAALSRUS	14,428	13,669	10,932	17,650	18,203	
PARYS	26,891	12,842	26,542	87,560	138,284	
PETRUSBURG	23,947	22,523	21,104	15,414	21,332	
PHILIPPOLIS	306,752	292,981	296,777	359,688	370,669	
REDDERSBURG	187,076	183,304	135,581	177,060	163,850	
REITZ	179,917	197,146	150,695	174,209	189,878	
ROUXVILLE	218,829	262,670	187,726	303,124	246,699	
SASOLBURG	40,286	27,588	13,672	19,704	15,538	
SENEKAL	339,938	317,408	290,200	365,526	334,477	
SMITHFIELD	533,576	563,758	487,846	617,725	584,799	
THABA NCHU	18,427	15,709	15,564	14,656	12,520	
THEUNISSEN	113,907	92,704	108,057	110,398	135,422	
TROMPSBURG	539,455	456,576	427,161	572,913	455,601	
VENTERSBURG	118,892	116,361	86,262	84,690	75,985	
VILJOENSKROON	55,542	44,422	49,872	50,845	54,348	
VIRGINIA	4,514	4,810	4,303	5,934	6,921	
VREDE	757,705	734,952	698,791	693,088	767,662	
VREDEFORT	45,917	34,498	28,301	22,410	28,454	



WELKOM	2,673	4,828	7,841	11,483	9,003	
WEPENER	164,381	183,392	145,209	131,100	121,593	
WESSELSBRON	97,716	71,490	103,059	91,290	75,271	
WINBURG	109,326	116,998	80,790	96,379	97,314	
WITSIESHOEK (Qwa-Qwa)	6,194	5,989	9,689	7,098	8,513	
ZASTRON	286,081	274,765	232,540	293,991	252,991	
UNKNOWN FS	1,026,426	57,575	53,260			
Total	10,355,595	9,751,911	9,018,456	10,125,792	10,326,986	

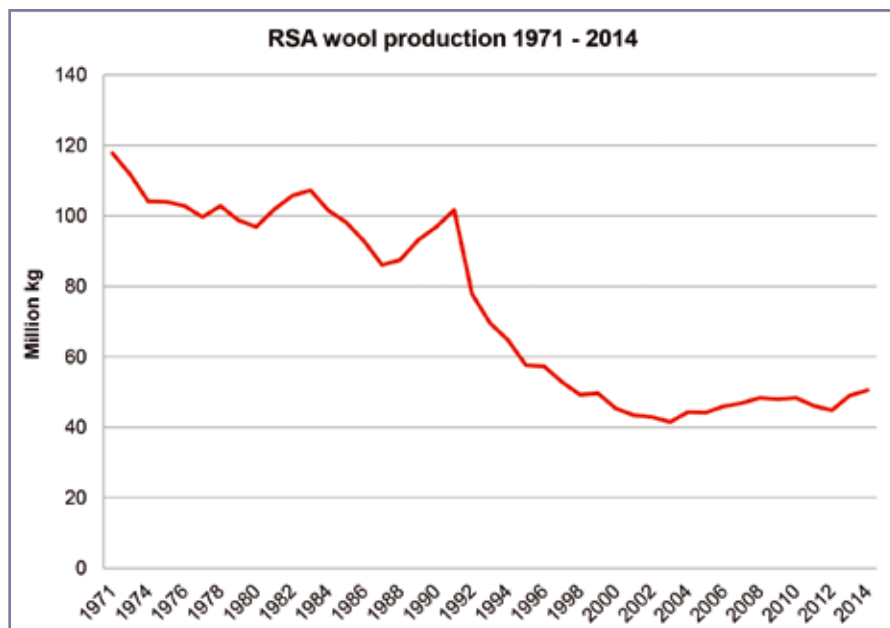
Production per province



































Greasy wool (kg)

Northern Cape

District	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
BARKLY-WEST		1,030	2,107	2,067	2,249	
BRITSTOWN	410,657	338,495	372,177	394,038	435,779	
CALVINIA	656,280	586,225	683,103	670,341	692,358	
CARNARVON	180,456	133,544	131,936	161,241	172,376	
COLESBERG	530,782	425,948	522,840	514,814	621,310	
DE AAR	401,277	382,209	355,653	431,693	511,308	
FRASERBURG	388,260	302,351	311,560	345,823	276,015	
GORDONIA	12,532	7,308	8,417	6,270	8,908	
HANOVER	346,805	386,756	333,539	484,579	372,743	
HARTSWATER	4,782	6,314	6,467	10,409	5,104	
HAY (Griekwastad)	21,632	14,828	21,943	16,404	20,550	
HERBERT (Douglas)	46,167	31,159	15,531	6,924	2,468	
HOPETOWN	228,079	176,906	210,653	202,150	260,606	
KENHARDT	2,817	2,522	7,856	12,290	35,790	
KIMBERLEY	23,624	19,198	19,808	16,073	17,011	
KURUMAN	4,654	7,962	5,531	3,318	8,509	
NAMAKWALAND	2,526	3,790	7,054	5,109	15,670	
NOUPOORT	184,899	174,784	153,442	187,231	204,758	
PHILIPSTOWN	430,372	420,182	426,271	408,784	460,605	
POSTMASBURG	10,952	145	6,419	4,031	10,382	
PRIESKA	124,041	96,248	72,563	78,174	75,370	
RICHMOND	571,525	386,509	534,858	480,679	667,843	
SUTHERLAND	229,072	196,674	226,487	195,699	231,056	
VICTORIA-WEST	727,428	699,050	792,808	897,637	860,606	
WARRENTON	5,333	5,999	6,107	5,232	2,177	
WILLISTON	72,367	59,934	56,184	68,523	71,880	
UNKNOWN NC		29,953	53,347			
Total	5,617,319	4,896,023	5,344,661	5,609,529	6,043,433	

Production per province						
Greasy wool (kg)						
Mpumalanga						
District	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
AMERSFOORT	148,186	138,189	118,468	151,829	136,662	
BALFOUR	36,789	31,262	30,630	32,091	27,295	
BABERTON		130	298	35	453	
BELFAST	109,951	79,129	63,517	54,122	57,587	
BETHAL	205,106	209,221	187,348	197,892	212,823	
CAROLINA	224,487	174,211	164,608	175,525	197,136	
DELMAS	30,614	10,592	9,008	10,557	13,966	
ERMELO	769,410	745,774	706,650	875,530	859,748	
GROBLERSDAL	717	947	1,385	283	1,651	
HIGHVELD RIDGE	2,908	5,400	732	1,357	4,082	
KRIEL	1,204	3,162	4,218	4,100	4,388	
LYDENBURG	22,002	22,182	22,286	26,084	21,969	
MIDDELBURG (MP)	169,947	153,589	134,132	138,988	148,548	
NELSPRUIT	571	137	1,090	1,956	3,070	
PILGRIMSRUS		202	105	99	86	
PIET RETIEF	34,183	23,038	25,328	25,412	24,443	
STANDERTON	181,587	176,489	274,817	312,510	334,082	
VOLKSRUST	185,139	226,545	189,635	189,812	197,740	
WAKKERSTROOM	343,333	319,105	327,253	348,387	366,763	
WATERVAL-BOVEN	2,535	2,481	2,003	1,451	1,210	
WITBANK	2,207	3,172	11,896	17,848	13,131	
WITRIVIER		176	206	473	452	
Total	2,470,876	2,325,133	2,275,613	2,566,339	2,627,280	



Production per province						
Greasy wool (kg)						
KwaZulu-Natal						
District	2009/2010	2010/2011	2011/2012	2012/2013	2013/2014	09/10 - 13/14
ALFRED	299	812	740	367	134	
BABANANGO	366	280	719	240	451	
BERGVILLE	18,047	13,699	17,634	11,346	22,914	
CAMPERDOWN					771	
DANNHAUSER	11,080	15,598	13,280	11,794	10,449	
DUNDEE	39,577	44,064	33,523	30,807	43,993	
DURBAN	1,095	834	3,892	1,570	2,586	
ESTCOURT	27,560	23,026	9,560	22,905	12,979	
GLENCOE	9,584	6,732	6,909	9,729	7,832	
IMPENDLE	4,703	12,850	4,280	8,207	5,183	
INANDA	118	111	127			
IXOPO	3,977	2,054	1,563	892	1,846	
KLIPRIVIER	41,404	30,825	34,557	29,667	27,233	
KRANSKOP	161	78				
LIONS RIVER	3,456	4,552	2,754	5,380	5,541	
LOWER TUGELA			871	2,448	2,045	
MOOI RIVER	13,912	17,334	13,145	15,607	11,481	
MOUNT CURRIE	336,128	308,581	294,892	333,889	349,365	
NEW HANOVER	312	338	489	115	7,243	
NEWCASTLE	51,571	38,320	22,561	18,877	29,413	
NGOTSHE		1,031	1,222	305	185	
PAULPIETERSBURG	30,091	30,139	25,777	27,795	28,243	
PIETERMARITZBURG	4,204	4,733	3,419	3,692	3,429	
PINETOWN	2,671	1,535	2,297	2,623	2,135	
POLELA	5,826	5,180	4,869	5,820	6,567	
PORT SHEPSTONE		410	128	111	115	
RICHMOND	2,269	2,424	2,595	3,917	2,803	
UMLAZI	226	72				
UMVOTI	1,016	422	868	150	125	
UMZINTO		172	260	65	195	
UNDERBERG	39,443	43,167	46,564	49,556	50,090	
UTRECHT	105,884	110,665	90,491	95,549	102,365	
VRVHEID	31,669	27,476	18,761	22,616	21,094	
Total	786,649	747,514	658,747	716,036	758,802	

THE SOUTH AFRICAN *Carcass Classification System*

FOR LAMB, MUTTON, BEEF & GOAT



Sponsored by the Red Meat Industry of South Africa

Red meat carcasses are classified according to the South African carcass classification system indicated by roller-marks on the carcass. These coloured roller-marks which are sometimes visible on raw meat are completely harmless, and illustrate the age of the animal before slaughter as well as the fatness of the carcass.

Why classify carcasses?

During carcass classification each carcass is allocated a class code in a manner that does not imply that a carcass in one class is more or less desirable than a carcass in another class. Carcass grading however, grade carcass characteristics in order of merit and assumes that all buyers have the same preferences and needs. Carcass classification enables the buyer to select a carcass according to his own needs and preferences, according to the characteristics within a specific class. Consumers often prefer to make their own decisions as to what is desirable, and to choose what they want.

Why is some meat stamped?

- These stamps are used as an indicator by meat inspection officials who inspect, grade and approve all meat carcasses after slaughter.
- The stamps indicate the age of the animal, the fatness of the meat and an abattoir identification code to enable the traceability of the carcass.
- The stamps are applied as a roller mark to the whole carcass, and only some cuts will display this mark after processing into retail cuts.
- These coloured stamps on the flesh are completely harmless. They are made with edible vegetable dyes and disappear during cooking.



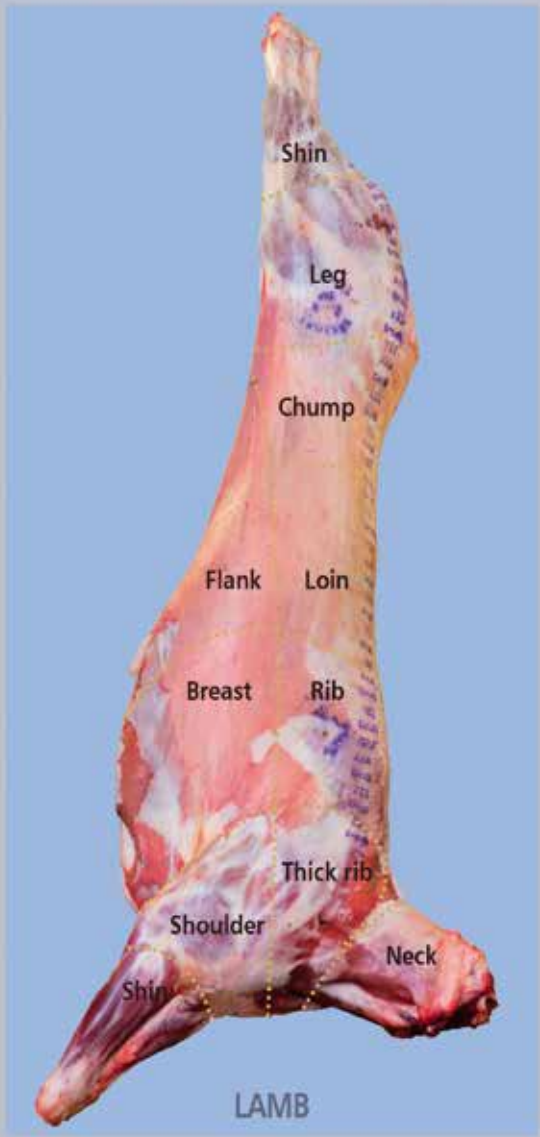
PRIMARY CUT USAGE

	<p>NECK</p> <p>Use slices for potjiekos or a braised dish. Serving a tender whole neck is very fashionable.</p>	
	<p>THICK RIB</p> <p>Lamb thick rib chops are mostly grilled, while mutton thick rib chops are braised. Mutton can also be cut in cubes for stews, and lamb cubes can be used for kebabs.</p>	
	<p>SHOULDER</p> <p>Deboned and rolled, the lamb shoulder can be oven-roasted, and the mutton shoulder pot-roasted. Debone and butterfly this cut for oven-roasting or grilling over the coals. Cubed meat can be used for kebabs.</p>	
	<p>BREAST AND FLANK</p> <p>Deboned and cut into a rectangular shape it can be used for a roll. Roils can be pot-roasted or cooked in aluminium foil. Salted ribs can be prepared from the rib portion, or cubes (25 mm) can be used for casseroles and stews. Deboned lamb breast, cut into 25 mm wide strips, can be used for concertina kebabs.</p>	
	<p>RIB</p> <p>The rib ends of a whole rib of lamb can be Frenched (i.e. remove all cartilage, fat and meat from the first 2.5 cm of the rib ends) and used for oven roasts such as a rack or crown roast. Rib chops can be sawn for grilling.</p>	
	<p>LOIN</p> <p>Oven-roast the loin, or cut chops for grilling. Alternatively, the loin can be deboned, rolled and secured with skewers. Cut through the meat between the skewers to make Saratoga chops for grilling, or remove the eye muscle, tie with a string at 25 mm intervals, and cut through the string to make noisettes.</p>	
	<p>LEG</p> <p>The leg can be kept whole for pot-roasting with or without the bone. Debone the leg to make a roll, or for butterflying. Cubes can be cut for kebabs, and sliced shin is ideal for braises and stews.</p>	
	<p>CHUMP</p> <p>Chump chops can be grilled or roasted.</p>	
	<p>SHANK</p> <p>Cubes can be cut for kebabs, and sliced shin is ideal for braises and stews. Serving whole lamb shanks is also very fashionable.</p>	

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THE SOUTH AFRICAN CARCASS CLASSIFICATION SYSTEM FOR BEEF, LAMB & MUTTON



CARCASS AGE	A	(purple AAA roller mark) Meat from a young animal	<div>Flavour</div> <div>Tenderness</div>
	AB	(green ABAB roller mark) Meat from slightly older animals	
	B	(brown BBB roller mark) Meat from an older animal	
	C	(red CCC roller mark) Meat from an old animal	
CARCASS FATNESS	0	(000 roller mark) - no visible fat	<div>Fatness</div>
	1	(111 roller mark) - very lean	
	2	(222 roller mark) - lean	
	3	(333 roller mark) - medium fat	
	4	(444 roller mark) - fat	
	5	(555 roller mark) - over-fat	
	6	(666 roller mark) - excessively fat	

All goat carcasses are roller-marked in orange according to the age of the animal



The South African Carcass Classification System has been in use since June 1992 (Agricultural Product Standards Act, 1990 (Act No.119 of 1990)) and classifies lamb, mutton, beef and goat carcasses based on a set of predefined characteristics.

Carcass attributes recorded in the carcass classification system

1. Carcass mass
2. Age of the animal
3. Fat content of the carcass
4. Carcass conformation
5. Damage to the carcass
6. In the case of bulls and rams in the AB, B and C grades, the 'gender of the animal is recorded'

Age of the animal

Dentition is used to divide carcasses into four age categories: A (0 teeth), AB (1 to 2 teeth), B (3 to 6 teeth) and C (more than 6 teeth). Ruminants cut their first set of permanent incisors (teeth) between the age of 1 and 2 years and when slaughtered are classified as AB age carcasses. The fourth incisor erupts at the age of between 3 and 4 years, and when slaughtered this will place the carcass in the C age category. Beef carcasses are classified as veal (calf) until the first pre-molar teeth erupt, normally between 5 and 6 months of age, these carcasses are classified as A carcasses.

Fat content

Following a visual assessment of carcass fat content and fat distribution by a trained official, carcasses are assigned to one of 7 fat classes (0 (no fat) to 6 (excessively fat)).



South African production systems

- More than 80% of lamb and mutton are pasture fed, which means they graze naturally on open fields.
- More than 70% of South African beef are produced on natural or cultivated pastures, with the majority finished off for two months in feedlots.
- Most of these animals are slaughtered as age A, fat code 2 carcasses (A2).
- The AB class specifically makes provision for cattle to be raised on veld to a marketable fat cover (fat code 2) because this acceptable fat cover is not achieved on most veld types without concentrate feeding.

REFERENCE

National Department of Agriculture, 1990. Agricultural Product Standards Act, 1990 (Act No. 119 Of 1990) No. R, 342. Regulations Regarding the Classification and Marking of Meat.





Classification of Red Meat*

A key to more effective marketing



Classification provides a sound basis for:

- Meat traders to describe their specific requirements in simple terms when purchasing carcasses.
- Utilisation of variety in the market with a view to optimum consumer satisfaction.
- Utilisation of price differences.
- Determining selling prices.

CLASSIFICATION CHARACTERISTICS OF:

Beef, Lamb, Sheep and Goat Meat

AGE	CLASS	CONFORMATION	CLASS
0 Teeth	A	Very flat	1
1-2 Teeth	AB	Flat	2
3-6 Teeth	B	Medium	3
More than 6 Teeth	C	Round	4
FATNESS	CLASS	Very round	5
No fat	0	DAMAGE	CLASS
Very lean	1	Slight	1
Lean	2	Moderate	2
Medium	3	Severe	3
Fat	4	SEX	
Slightly overfat	5	The carcass of a ram or a bull as well as of a hame, a kapster or an ox showing signs of late castration of the AB, B or C age classes, are identified.	
Excessively overfat	6		

CLASSIFICATION CHARACTERISTICS OF:

Pork

% MEAT*	mm**	CLASS	CONFORMATION	CLASS
≥70	≤12	P	Very flat	1
68-69	13-17	Q	Flat	2
66-67	18-22	R	Medium	3
64-65	23-27	C	Round	4
62-63	28-32	U	Very round	5
≤61	>32	S		
No specifications in respect of % meat apply in the case of flogh, Sucking pig (≤20kg) and Sausage pig (≥100.1kg).			DAMAGE	CLASS
** In case of intrascapular.			Slight	1
			Moderate	2
			Severe	3
FAT THICKNESS**			SEX	
% MEAT*			The carcass of a boar as well as of a barrow showing signs of late castration, are identified.	
Only in case of the Hennessy classification apparatus.				

*Measured between 2nd and 3rd last rib, 45mm from carcass midline.

MARKS FOR CLASSIFICATION CHARACTERISTICS ON:

Beef, Lamb, Sheep and Goat Carcasses

TRAIT	MARK	WHERE ON THE CARCASS
Age (A, AB, B, C)		One mark on each quarter of beef carcass.
Fatness* (0 to 6)	Eg. Class 3	Only one mark on the carcass for lamb, sheep and goat carcasses.
Conformation (1 to 5)	Eg. Class 3	One mark on each side of beef carcasses. No mark for lamb, sheep and goat carcasses.
Damage** (1 to 3)		Taking into account the area of damage, one mark on each side for beef carcasses. Only one mark on the carcass for lamb, sheep and goat carcasses.
Sex		One mark on each side of beef carcasses. Only one mark on the carcass for lamb, sheep and goat carcasses.

* In case of a sheep carcass with a fat tail, a double impression of the mark.

** Damage, if it occurs, is indicated on a scale of one to three for the areas concerned, viz B (buttock), L (loin) and F (forequarter).

EXAMPLES OF THE ROLLER-MARK COMPOSITIONS FOR:

Beef, Lamb, Sheep and Goat Carcasses*

AAA ABAB BBB CCC	- Age class of the animal as an indication of tenderness.
000 000 000 000	
ZWZ ZWZ ZWZ ZWZ	The A age class is roller-marked in purple (most tender), AB carcasses are in green (tender), B in brown (less tender) and C in red (least tender)
AAA ABAB BBB CCC	
000 000 000 000	- Fatness class** of the carcass.
ZWZ ZWZ ZWZ ZWZ	
AAA ABAB BBB CCC	This symbol can be replaced in the roller-mark by 111, 222, 333, 444, 555 or 666.
000 000 000 000	
ZWZ ZWZ ZWZ ZWZ	- Abattoir-identification code.
ZWZ ZWZ ZWZ ZWZ	

* All goat carcasses are roller-marked in orange, taking into account the age of the animal (AAA, ABAB, BBB or CCC).

** The amount of visible fat can be evaluated by the consumer and selected according to preference.

MARKS FOR CLASSIFICATION CHARACTERISTICS ON:

Pork Carcasses

TRAIT	MARK	WHERE ON THE CARCASS
Conformation (1 to 5)	Eg. Class 3	One mark on each side.
Damage* (1 to 3)		Taking into account the area of damage, only one mark on the carcass.
Sex		One mark on each side.

* Damage, if it occurs, is indicated on a scale of 1 to 3 for the areas concerned, viz B (buttock), L (loin) and F (forequarter).

MARKS FOR CLASSES OF PORK:*

CLASS	MARK	WHERE ON THE CARCASS
Sucking pig	S	One mark on forehead.
P, O, R, C, U & S	P, O, R, C, U & S	One mark on each side.
Sausage pig	W	One mark on each buttock.
Rough	RU	One mark on each side.

* The class of a pig carcass is not roller-marked on it. Some pig carcasses may be roller-marked in purple ink with a specific abattoir-identification code/trademark.

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*Meat Classification Regulations No. R. 863 in Government Gazette of The Republic of South Africa, 1 September 2006.



South African Meat Industry Company

SA

Lamb/Lamsvleis

7 Loin
Lende

6 Rib

2 Thick rib
Dikrib

1 Neck
Nek

9 Leg and shank
Boud en skenkel

3 Flank
Lies

8 Chump
Kruis

5 Breast
Bors ("ribbetjie")

4 Shoulder
Blad



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South African Meat Industry Company

SA

Beef/Beesvleis

11 Sirloin
Lende

14 Topside
Binneboud

13 Fillet
Filet

10 Wing rib
Voorrib

5 Chuck
Dikrib

4 Bolo

1 Hump
Skof

2 Neck
Nek

3 Shin
Skenkel

16 Aitchbone
Stertstuk

15 Silverside
Dy

17 Thick flank
Diklies

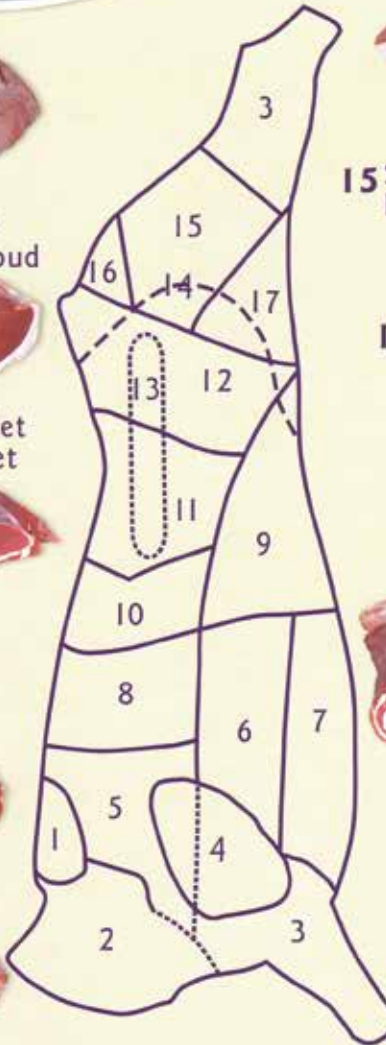
12 Rump
Kruis

9 Thin flank
Dunlies

8 Prime rib
Primarib

6 Flat rib
Platrib

7 Brisket
Borsstuk



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South African Meat Industry Company

SA

Pork / Varkvleis



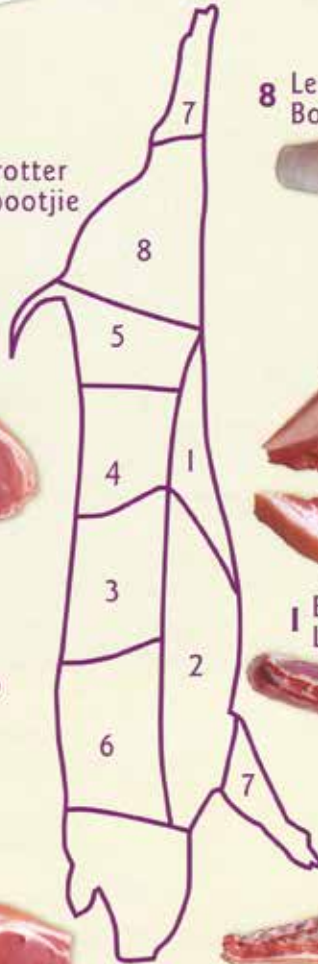
7 Shank and trotter
Skenkel en pootjie

5 Chump
Kruis



3 Rib

6 Thick rib
Dikrib



8 Leg
Boud



4 Loin
Lende



1 Belly
Lies



2 Breast
Bors ("ribbetjie")



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IMPORTANT CONTACTS

Agbiz	012 807 6686	admin@agbiz.co.za
Agri SA	012 643 3400	agrisa@agrisa.co.za
Agricultural Research Council	012 427 9700	enquiries@arc.agric.za
Association of Animal Feed Manufacturers of SA (AFMA)	012 663 9097	admin@afma.co.za
Breedplan SA	012 677 5258	info@agribisa.co.za
Department of Agriculture, Forestry and Fisheries	012 319 6000	www.nda.agric.za
Grasslands Association of South Africa	083 256 7202	admin@grassland.org.za
Milk Producers' Organisation	012 843 5600	info@mpo.co.za
National Association for Agricultural Machinery (NAAMSA)	011 453 7249	jim.rankin@agfacts.co.za
National Livestock Theft Forum	012 348 1933	rpo@lantic.co.za
Red Meat Abattoir Association	012 349 1237	info@rvav.co.za
SA Agricultural Teachers' Association	014 577 1195/6	–
Animal Health and Production Group SA Veterinary Association	012 346 1590	vetlink@mweb.co.za
South African Feedlot Association	012 667 1189	safa@safedlot.co.za
South African Sheep Dog Association	017 735 1844	sasda@telkomsa.net
South African Stud Book and Animal Improvement Association (SA Stud Book)	051 410 0900	info@studbook.co.za
S.A. Society for Animal Science (SASAS)	012 420 6017	jvryssen@up.ac.za
TAUSA	012 804 8031	sekretaresse@tlusa.co.za
Youth Show Association	082 671 9712	henniep9@absamail.co.za

Major shows and events – organisers

Vryburg Show, Vryburg	053 927 3945	April
Bloem Show, Bloemfontein	051 448 9894	April/May
Nampo Harvest Festival, Bothaville	056 515 2145	May
Royal Show, Pietermaritzburg	033 345 6274	May
The Spring Show, Pretoria	012 667 1980	August
Santam Agriculture Boertjie Kontreifees, Bultfontein	083 636 1555	August
Agri Mega Week, Bredasdorp	028 425 3788	September
Stockman's School, Aldam	015 821 1783	October



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