

**Oudtshoorn Research Farm:
Celebrating
50 years
of the world's first Ostrich Research Farm
(1964 - 2014)**



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50 years
of the world's first Ostrich Research Farm
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Foreword

The foremost challenge in South Africa is to boost economic growth, increase employment and alleviate poverty by providing adequate and safe food resources for our people. The sustainability and global competitiveness of our agricultural sector is pivotal in this regard, and is based on the innovative low-input and high-output farming practices of our commercial and smallholder farmers.

Science and technology are the basis of the knowledge economy and continue to provide the impetus for new production methods and products. This is especially pronounced in the Klein Karoo region, where several challenges – like climate change and avian influenza – are changing the “business as usual” to “business and knowledge unusual”.

In supporting the food needs towards 2030, the smallholder and commercial sectors should be supported by innovative and problem-solving research and development initiatives. In order for agricultural producers (commercial and smallholder) to increase their production, two critical factors must be kept in mind: lower input technology (lower input cost) and higher output (production) technology. The role of research and development is critical in this respect. The world-renowned Oudtshoorn Research Farm has distinguished itself as the only ostrich research facility of its kind in the world, and has

supported farmers in the Klein Karoo for the past 50 years – and will continue to do so in years to come. Our scientific expertise in ostrich feeding, breeding and management has received national and international recognition from peers, and has encouraged us to further excel in these fields.

Comprehensive and problem-focused research programmes and projects by the Oudtshoorn research team will continue to generate cutting-edge solutions. This will ensure that our producers are sustainable and competitive with limited natural resources and the changing environment – and that this will secure the base to increase agricultural production by 10% over the next ten years.

The Department of Agriculture Western Cape is committed to continuing its research support to its farmers and will expand its research farms so that they continue to be the best centres of excellence and on-farm laboratories. We value the role of our partners – especially our farmers – in our determination to increase agricultural production. As our new slogan clearly states, as partners we are better together and we thank you for collaborating with and supporting the Oudtshoorn Research Farm and its team of experts.

Dr Ilse Trautmann

Chief Director: Research and
Technology Development Services





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Introduction

The origins of the ostrich industry in Oudtshoorn (1800s to 1964)

At around 1863, ostrich farming became a viable agricultural undertaking after the introduction of wire fencing and lucerne farming in South Africa. The then magistrate of Oudtshoorn, Scholtz, introduced lucerne when he imported seeds which he planted on a small plot to feed his ostriches.

By 1870, ostrich farming had become an extremely profitable industry, aided by the invention in 1869 of an ostrich egg incubator by Arthur Douglass, the self-described pioneer ostrich farmer of Grahamstown. Douglass also identified the ostrich wireworm and wrote the first book on ostrich farming, published in 1881 entitled *Ostrich Farming in South Africa*.

Many a time at first we were told we were mad, and should leave it alone; that it would never pay; that the birds were naturally of so timid a nature, they would never breed in confinement...

Extract from *Ostrich Farming in South Africa*, 1881.

The period between 1875 and 1880 is often described as the **first ostrich boom**. During this period, ostrich feathers were the 4th



Source: http://upload.wikimedia.org/wikipedia/commons/d/d9/Marie_Antonette_Adu19.jpg

most valuable agricultural product after tobacco, viticulture and wheat.

The **second ostrich feather boom** started in 1897. It was a time of unparalleled wealth – land prices increased significantly and luxurious ostrich feather palaces were built. The newfound wealth also meant that farmers could afford to build steel fences and irrigate their farms, which aided the development of the lucerne industry. With large-scale cultivation of lucerne, sufficient feed was readily available and it became feasible to fence off camps. The cultivation of lucerne also caused considerable modernisation of irrigation methods.

By 1913, ostrich feathers were the 4th largest export product from the Union of South Africa after gold, diamonds and wool. However, the advent of World War I had an enormous effect on the global socio-economic situation, which had favoured ostrich plumes for half a century. The Great War marked the collapse of the ostrich feather industry and the beginning of the decline of the feather trade. Logisti-

cal difficulties with sea freight during the war made export difficult. The invention and manufacture of the automobile further contributed to ostrich feathers going out of fashion as ornate hats became impractical. Fashion, a fickle business, had changed and ostrich feathers were passé. An estimated 80% of ostrich farmers lost their livelihoods in this period. Almost all farmers eventually sold their ostriches, with the exception of farmers of the Klein Karoo. They kept only the best birds from their flocks in hope of a revival in the industry. However, it was a long and difficult road before a revival in the industry eventually came about.

In the 1940s, the high quality of ostrich skins for leather products was discovered, which led to a resurgence of interest in ostriches as a commercial farming enterprise. The Klein Karoo Agricultural Co-operative (KKAC) was established in Oudtshoorn in 1945 to regulate the industry and set the quality standards for ostrich products. The feathers were once again the main source of income up until approximately 1974, after which the focus shifted towards the production of leather and meat.

Early ostrich research initiatives

In 1905, Prof James Edwin Duerden was appointed Professor of Zoology at Rhodes University, Grahamstown. He was tasked to investigate the cause of ostrich feather defects. During his tenure at Rhodes (1905 to 1932), he published *Experiments with Ostriches*, a series of articles that resulted from his research, along with several other key papers. Even today, scientists reference his pioneering work on feather degeneration and cross-breeding ostrich strains.

The Grootfontein School for Agriculture was established in 1911 with a novel ostrich research section. The priority of the ostrich research section was to investigate ways to speed up the improvement of quality of South African ostrich feathers. This instigated the ostrich expedition to northern Africa, undertaken in 1912 by Russell W Thornton, newly appointed principal of Grootfontein, Frank C Smith, in charge of the ostrich flock, and Jack Bowker, an ostrich farmer from Middelburg.

The trio's expedition into Africa, wrought with adventure and tribulations, may unfortunately have been to no avail. They brought back 132 birds, 18 adults and 114 young birds

between the ages of three and 12 months of age.

The adult northern ostriches had no natural immunity against local internal parasites and all succumbed to these infestations. Moreover, the northern birds took two years longer than local ostriches to reach sexual maturity. This meant that the first cross-breeding results only became available in 1917 – three years after the slump in the feather market.



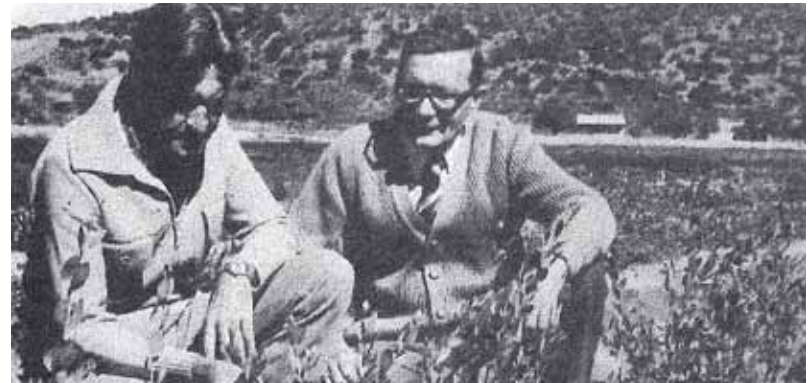
Russell W Thornton

Unfortunately, just as the research started yielding interesting results, the trials had to be terminated owing to the collapse of the feather market. Following this, bird numbers dwindled because of a severe drought (1928) and other factors and by 1944 none were left.

The establishment of the Oudtshoorn Research Farm

Owing to changing farming conditions after the collapse of the feather market, the original research had lost relevance and the need for new research emerged. In 1964, the Department of Agriculture bought a farm of 843 ha at Roode Heuvel (now Rooiheuvel), near Oudtshoorn, to establish the first dedicated ostrich research farm. The farm was bought from SG Schoeman jr after being identified as ideally situated for this purpose. The objective was to establish a facility where research relevant to the ostrich industry and the Oudtshoorn district was the priority. At that stage, ostriches were the main source of income for many farmers in the Klein Karoo.

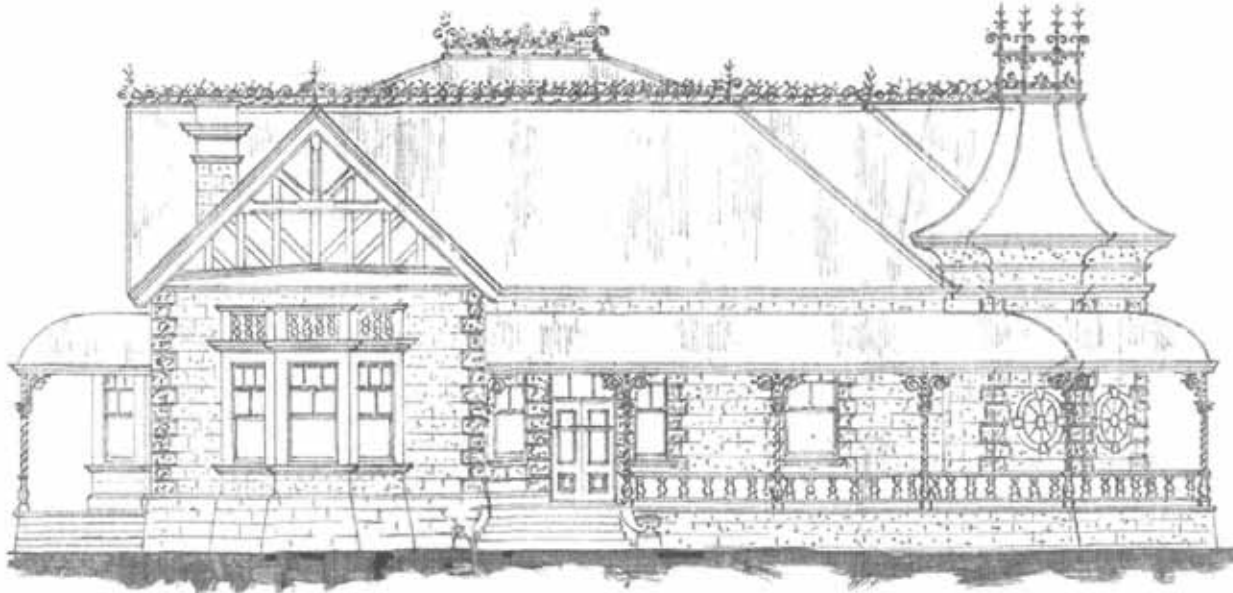
Christo van Zyl was the first farm manager appointed at the Oudtshoorn Research Farm. He immediately started preparing the grounds and developing the farm, but he left after being promoted to the Bien Donn  Research Farm. Abraham Koen replaced him in February 1965 and remained in this position until 1983. He was the control research technician and officer in charge of the Oudtshoorn Research Farm.



The controlling research technician as well as officer in charge of the Oudtshoorn experimental farm, A.P. (Abraham) Koen (left), and the chief extension officer for the Klein Karoo Sub Region, Louw Nolte, surrounded by Jojoba-plants at the experimental farm.

Dr J Serfontein, the then director of the winter rainfall region of the Department of Agriculture instructed Koen to prepare the fields for flood irrigation. Koen was responsible for the installation of drainage pipes, building cement supply canals as well as a 30 000 m³ cement dam for irrigation. He also supervised the building of houses, offices and stores.

The ostrich feather palace on the Oudtshoorn Research Farm



The original architect's drawing of the ostrich feather palace.

Schoeman-huis te Roode Heuvel

The beginning of the 20th century was an era of great wealth in Oudtshoorn thanks to lucrative ostrich feather exports. Affluent farmers, merchants and attorneys built ever grander manor houses, known as feather palaces. Charles Bullock, an eminent sandstone architect in Oudtshoorn, was responsible for the design of about 16 public buildings, including schools, manor houses and hotels. Bullock was also commissioned by Fanie Schoeman sr to design a manor house with a similar plan to the one designed for his neighbour, Ockert Fourie, but with an octahedral tower, above an octahedral room with porthole windows. The sandstone building was erected on the farm in 1908 by a contractor, A Rogers, in the Edwardian art nouveau style.



Photo of manor house from the side showing the octahedral tower.

Piet Roux was farm manager of the Oudtshoorn Research Farm from October 1983 until his retirement in October

2012. He soon realised that there was not sufficient irrigation water and set out building a concrete canal in the Serfontein Canal, which supplies water from the Kamanassie Dam.

The personnel of the farm cemented 3,3 km over five years during the winter months, resulting in the trebling of the quantity of irrigation water. A geologist was also consulted to search for additional irrigation water, but to no avail – only one borehole yielded sufficient seeping underground water, but it was of poor quality and not suitable for irrigation. Roux and his team also built an underground dam to make better use of the water from the Serfontein Canal by pumping it from there to a big irrigation dam. A direct result of the improved irrigation system was the establishment of various alternative crops at the Oudtshoorn Research Farm.

An agreement for ostrich research collaboration was established between the Western Cape Department of Agriculture and the Klein Karoo Agricultural Co-operative (KKAC) in 1989, which came into effect in 1990. The objective of the collaboration was to advance ostrich research through financial and personnel support. According to the collaboration agreement, income generated from the ostriches was to be used to support further ostrich research. The KKAC made R500 000 available and financed the appointment of eight staff members to assist with research. These new staff appointments were Dr Willem Burger (veterinary researcher), Fanus Cilliers (agricultural researcher), Leonie Boshoff (veterinary technician), Zanell Brand (agricultural technician), Basie Pfister (research assistant) and Rose Malgas, Eva Isaacs and Leentjie van Rooyen (general assistants).



Oudtshoorn Research Farm: **50 years**



The Ostrich Liaison Committee was founded to manage, coordinate and prioritise research projects. The committee consisted of members from the Western Cape Department of Agriculture and the KKAC. Kobus Nel, extension officer at the Oudtshoorn Research Farm, was the secretary of this committee, a position he held until his retirement in 2011.

Mike Walters, the then deputy director of research at the Western Cape Department of Agriculture subsequently acquired agricultural land in town from the teacher's college to serve as a diagnostic veterinary centre for ostrich research. The centre, which had two research laboratories, was constructed in 1990 by farmworkers under the supervision of M Landman, the then principle farm manager acting across all research farms. The KKAC provided capital for equipment, which was bought on auction from Roodeplaas Research Laboratories and installed in Oudtshoorn's first diagnostic laboratory.

Funding from the KKAC was also used to build a chick-rearing facility in 1990, and to erect 100 extra breeding camps. Chris Venter and Tielman de Villiers designed a modern chick-rearing facility, which was constructed by farmworkers. In addition, a fully functional feed processing unit, with a pelleting machine, was assembled to produce pelleted experimental diets for the ostriches. Feed crates were built and a store was converted to a metabolic building for nutrition experiments. One of the stores was also converted into an environmentally controlled chick-rearing facility for ostrich chick research.

Other structures built on the farm were the office buildings for the ag-

ricultural development centre and a community centre. Landman did the woodwork of the offices and conference room himself. The buildings were completed and inaugurated in 1992. Today, the community centre is used to give ABET classes for adults and for church services and other community events. It also houses a crèche for children of farmworkers.

Roux and his team also tarred the farmyard in front of the office buildings themselves, with assistance from the Regional Services Council, who tarred the road from the Kamanassie junction to the farm.



Building a loading area for the ostriches.

The establishment of the Klein Karoo Agricultural Development Centre

In the early 1990s, the then head of the department, Dr Johan Burger, and his two deputies, Mike Walters (research) and Alex Kriel (extension), wanted multidisciplinary teams on the research farms, with all the personnel under one roof. In order to house the extension services and other components, additional office space was created. In 1992, the Klein Karoo Agricultural Development Centre was opened on the experimental farm with offices for all the programmes serving agriculture. The centre was the regional office of departmental services to the Karoo and Great Karoo agricultural regions. As such, the centre supported three agricultural extension offices in Ladismith, Laingsburg and Beaufort West.

Louw Nolte was assistant director (extension) at that stage and fulfilled administration and management duties as district manager until his retirement in 1997. The team was quite formidable consisting of all essential expertise required in the area, including agricultural researchers, economists, extension officers, as well as animal health technicians and soil

LOS gaan Klein Karoo bedien met omvattende voorligting

MET die totstandkoming van die Klein Karoo Landbou-ontwikkelingsentrum (KKLOS) op Oudtshoorn-proefplaas word gepoog om 'n volwaardige voorligtingsdiens aan boere van die Klein Karoo-substreek te lewer.

Volgens mr. Louw Nolte, assistent-direkteur: voorligting in die Klein Karoo-substreek, het die gewelddige kennisontplofing oor die afgelope jare tot gevolg gehad dat die wykvoorligter alreeds nie sy hoëvlak-kundigheid oor 'n wye spektrum van terreine kon byhou nie. Dit het dus nodig geword om 'n ondersteunende diens in die vorm van bykomende vakspesialiste daar te stel. Hierdie kundiges sal hoofsaaklik binne spanverband funksioneer en behoort gespesialiseerde inligting binne bereik van elke produsent te bring.

As kenner van sy boeregemeenskap en die plaaslike hulpbronsituasie sal die wykvoorligter steeds as skakelpersoon optree. Die spesifieke probleem of bedryfsbehoefte sal bepaal welke kundiges aanvullend benodig word.

Alle vorm van inligtingverspreiding, hetsy ad hoc adviesgewing of bekendstelling van nuwe tegnologie, sowel as doelgerigte oordragingsprogramme, is die primêre taak van die LOS.

Aanvullend hierdie word die ewerbuing of demonstrasie van nuwe sowel as bewese tegnologie onder plaaslike toestande ewe noodsaaklik gegag. Dit bied die geleentheid aan die voorligter om

kontak met die praktyk te behou, aanpassings vir plaaslike omstandighede te maak en dien terselidertyd as voorbeeld van die tegniek of boerderystelsel wat bekend gestel moet word. Waar die ontwikkelingsentrum nie sulke aksies kan aanbied nie sal gepoog word om deur middel van koöperatiewe demonstrasies by boere wel die belangrikste tegnieke bekend te stel. Verskeie voorbeelde bestaan reeds soos met somer-anoëtegnieke, besproeiingskudering in boerde en wingerde asook die verbouing van droogtevoergewasse.

Die huidige personeel maak reeds 'n aansienlike mate van gespesialiseerde dienslewering moontlik. Ten opsigte van die volstruifbedryf is die navorsingspan plaaslike gesetel en reeds op dreef met verskeie projekte. 'n Ervare spesialisvoorligter is ook beskikbaar om advies te gee.

In die voorligtingswyke van Montagu, Ladismith en Oudtshoorn is die bediening van die kleinveebedryf, aanplanting en natuurlike weidinge die verantwoordelikhede van die voorligtingsgenici, terwyl vakkundige ondersteuning vanaf die LOS voorsien word.

Wykvoorligters beskik meestal oor voldoende ervaring en kennis om met gereelde ondersteuning van die spesialisvoorligter te Eisenburg, asook sporadiese besoeke van instituu-navorsers die vrugtebedrywe van die substreek te bedien. Die diens van 'n grondkundige word met die Suid-geskus LOS op Outeniqua gebied. Be-

sproeiingsvoorligting gesked tans met die hulp van die spesialisvoorligter te Eisenburg, maar sal voortaan ook gestrek word deur die betrokkeheid van die plaaslike landbou ingenieur.

Spesifieke landbou-ingenieursdiensle met betrekking tot meganiesebeplanning, veehouing, bewaringsstrukture, ensovoorts sal ook aangebied word.

Die behoefte aan ekonomiese voorligting oor boerderybestuur, insluitend finansiële beplanning, arbeidsbestuur en meganiese sal grootliks bevredig word deur die onlangse toevoeging van 'n landbou-ekonomiese. Evaluering van die ekonomiese voordele van nuwe tegnologie kan veral 'n bydrae lewer tot beter besluitneming en goeie aanvaarding van voordelige praktyke.

Op bewaringssterrein sal die grondbewaringsgenici steeds beplanning- en ontwerpdienste lewer vir die oprigting van meganiese beskermingswerke, maar daar sal ook 'n groter klemverskuiving wees om biologiese maatreëls te bevorder.

Die bestaande organisatoriese strukture binne die substreek word voldoende gegag om vertrou te bly met klientbehoefte. Gereelde skakeling vind met die georganiseerde landbou plaas.

Navorsings- en voorligtingsprioriteite is reeds grootliks uitgespel in die substreek se landbou-ontwikkelingsprogram. Deur sover moontlik hierdie knoepunte op te los, sal die LOS bydra om die volle landboupotensiaal van die streek te verwesenlik.

conservationists. Jan Theron was centre coordinator from 1998 until 2005, when the regional head office was moved to the Eden district (Outeniqua Research Farm).

After the deregulation of the ostrich industry in 1995, a new provincial collaboration agreement was entered into with the Klein Karoo Co-operative. Research projects were to be driven and industry priorities, which were to be decided by the liaison committee, consisting of five members from each of the entities. This collaboration between the department and the Klein Karoo Agricultural Co-operative was terminated in 2002. The technical staff appointed during the collaboration period were declared redundant. Fortunately, the department secured new posts for all staff to prevent disruption of the ongoing ostrich research projects. In 2004, seven staff members were permanently incorporated into departmental employment in the Institute for Animal Production.

The collaboration agreement was replaced in 2004 with an agreement between the department and the South African Ostrich Business Chamber as national representative of the ostrich industry, which is still in place. As part of this agreement, industry representatives and departmental researchers meet biannually to discuss research priorities and progress.

More recently, under the leadership of the current chief director of the programme: Research and Technology Develop-

ment Services, Dr Ilse Trautmann, the research infrastructure has been improved and biosecurity measures implemented.

The research team, in collaboration with other experts, compiled a manual with practical information for farmers. The first edition of this manual (Afrikaans edition) was launched in 2006.



The first *Volstruishandleiding* presented to the Ostrich industry. Dr Trautmann hands over the booklet to Viljee Keller, ostrich farmer and chair of the South African Ostrich Producers Organisation in 2006.

Ostrich research on the Oudtshoorn Research Farm up to the 90s

The Western Cape Department of Agriculture, in collaboration with the agricultural organisations of the Klein Karoo, took steps to facilitate research soon after the farm was acquired in 1964. A research committee was established to oversee ostrich research projects. To start research, 76 ostriches were obtained from farmers in the region and donated to government. The committee also funded the building of basic facilities.

Chick mortalities and internal parasites were identified as the greatest concerns and research on these topics was prioritised. Feeding, breeding, feather degeneration, body conformation and ectoparasites were also identified as areas for further investigation.

In those early years, Dr DBV Barrow, state veterinarian from Mossel Bay, was involved with trials on the farm relating to internal parasites. In the first-ever progress report for research done on the farm for the period 1 July 1964 to

30 June 1965, Dr Barrow, as responsible officer, reported on how ostriches donated by ostrich farmers were put in different camps on the research farm. This was done in collaboration with the Ostrich Research Committee, whose financial contributions were used to build handling facilities and small paddocks. Various anthelmintics were tested in this first experiment done on the farm. The department also erected holding crates where experimental animals could be kept for short periods after dosing to make the collection of faecal samples easier.

DJ Smit, author of the book *Volstruisboerdery in die Klein-Karoo* published in 1964, was the chief extension officer at the Department of Agricultural Technical Services in Oudtshoorn when the department bought the farm outside Oudtshoorn for research purposes. At that stage, their extension offices were located in town.

In 1966, letters were exchanged between DJ Smit and Dr JH



Smit published plans for an improved plucking box design for Ostriches in *Boerdery SA* in 1969. In the article, Smit discussed the injuries to ostriches and farmworkers owing to poorly designed plucking boxes. His suggested design was adapted from an experimental crate that was used in a physiology study at the research farm in 1968, and he acknowledged Hekkie Coetzee, a technician at the Oudtshoorn Research Farm, for his suggestions to the improved design. Coetzee was the first technician appointed at the ostrich section. He helped build up the research section during the early years. Smit eventually retired as deputy director of the Karoo region in January 1984.

Louw, Department of Genetics at the University of Stellenbosch, discussing the problem of the disappearance of wing plumes of ostriches. Smit subsequently started research for the selection of increased wing plumes on ostriches as well as several other management-related issues.

By 1970, the ostrich section had expanded to include an incubator, dissection room, chick housing, 18 breeder camps, 10 chick paddocks and eight feed crates in which to feed individual ostriches. The chick houses allowed groups of chicks to be raised under controlled conditions from hatching to approximately two months of age.

In March 1972, a report by the secretary of Agricultural Technical Services, who visited Oudtshoorn, stated that farmers were gradually becoming more aware of the Ostrich

Research Section at the Oudtshoorn Research Farm thanks to Coetzee's talks at various farmers' meetings.

The most important contributions the Ostrich Research Section made in the early years included its role in registering an effective product to treat wireworm, and finding that ostriches can prosper on dry rations alone, only requiring clean drinking water. At the time, the belief was that ostriches should not receive any drinking water! Water in the veld contained bacteria detrimental to ostrich health, which led to this belief, especially ostriches on lucerne pastures. Farmers subsequently had to change their practices after dry rations became more widely used.

In 1972, the director of the winter rainfall region, Dr JE Erasmus, confirmed in writing that ostrich research was a priority for the department. The newly appointed Kobus Nel was given the task of supervising the research projects on the farm and developing the ostrich section with Coetzee.



Nel was appointed in 1971 to take over from Smit as ostrich expert and extension officer. Their offices were still in town at that stage, but Nel was instructed to become involved on the Oudtshoorn Research Farm.

The first investigation on the research farm after Nel's appointment was a project to find suitable anthelmintics for wireworms and tapeworms in ostriches. Results led to the development of a dosage programme for ostriches, which Nel communicated to ostrich farmers between 1974 and 1979 through an extension programme.

Nel, AP Koen and Koos Schutte also conducted a comprehensive study on

Dosing Programme For Ostriches

The introduction of a planned dosing programme for ostriches has been successfully launched by extension staff of the Winter Rainfall Region.

At present 94% of farmers dose their stock and use only registered remedies for this purpose. Ostrich chicks, which are especially vulnerable to internal parasite infestation, are currently dosed an average of six times compared with the two doses previously administered.

Whereas only 15% of farmers dosed plucking birds in 1976, today 45% do so as an accepted practice.

A new concept of administering two remedies at a single dosing, as a means of reducing handling, has gained rapid acceptance and is being practiced by 78% of farmers.

Trials carried out in the Region have shown that even under conditions of light infestation, where no direct losses occurred, regular dosing was still economically justified.

LANDBOUNUUS, 9 NOVEMBER 1979

the effect of grazing ostriches on lucerne pastures. Ostriches' trampling effect was shown to be damaging to lucerne fields and it was recommended that lucerne should rather be fed as green cut lucerne or dried milled lucerne.

From 1973, the production of ostriches for slaughter (meat and leather) became more important than feather production. Periodic droughts in the Klein Karoo regularly resulted in situations where lucerne had to be obtained from elsewhere.



Kobus Nel at work in his office at the Oudtshoorn Research Farm.

Investigation of alternative feeding sources was therefore essential. In response, Nel investigated supplementary feed sources. His knowledge of the benefits of drought-resistant crops, such as saltbush and agave leaves, motivated him to study the possible value of these crops as ostrich feed. The plants were cultivated on the farm. The results showed that cut agave leaves (*Agave americana*) and saltbush (*Atriplex* spp.) could make valuable contributions as energy and protein sources for ostriches from 40 to 90 kg. Significant savings on feed costs were also possible.

Kobus Nel worked as an ostrich expert in the early years and remained a specialist extension officer: Ostriches until his retirement in 2011.

In 1974, Derick Swart was appointed the first ostrich research scientist at the Oudtshoorn Research Farm. Between 1976 and 1981, Swart and Dr JH Louw collaborated on ostrich feather research, following on from the work started by Van Zyl Smit. This was the first attempt to study the inheritance of ostrich traits - this time with the aid of modern methods of quantitative genetics. The quality traits of ostrich feathers were also quantified for the first time and their relative economic value was determined, culminating in an MSc thesis for Swart under the guidance of Dr Daan Poggenpoel from the Department of Poultry Science, University of Stellenbosch, as well as two scientific papers on this topic.



Dr Derick Swart

Swart published numerous technical reports, popular articles and scientific papers on all aspects of ostrich production between 1974 and 1989, and was awarded a doctorate for his thesis entitled *Studies on the hatching, growth and energy metabolism of ostrich chicks* *Struthio camelus var. domesticus* in 1988. The microclimate and incubation physiology of ostrich eggs in natural nests was also covered in this study. Information acquired in this way contributed to improved

artificial incubation and hatchery practices for ostrich eggs in automatic electronic forced-draft incubators. Dr Swart was also the first scientist to suggest that the ostrich was able to use products from hindgut fermentation as part of its energy requirements.

In 1986, Dr Swart made the first recommendations to the Registrar of Animal Feeds pertaining to guidelines for formulation of ostrich diets, based on research done

on the farm. At that stage, no standards for formulating ostrich diets existed and feed manufacturers were limited to the guidelines used for poultry. Feeding values and standards for ostriches were specified under the Animal Feed Act 36 of 1947, which enabled the animal feed manufacturing industry to formulate and manufacture ostrich diets and feeds for the first time. Unique research on the energy metabolism and hindgut fermentation in ostriches led to the knowledge that ostriches could not only digest plant fibre and even cellulose, but could also use these as energy sources. This led to better quantification of nutritional values of ostrich feedstuffs and initiated the development of the feedlot industry for slaughter ostriches, which in turn led to a significant increase of economic production of ostriches.

Numerous recommendations based on the experiences and research on the farm was made during these years. The *Winter Rain Newsletter* of 1978 contained information on a wide range of topics, including breeding principles, production of first-grade skins, feather defects, rearing chicks, pasture use and the causes of chick mortalities. Ostrich seminars were also held at the research farm from 1987 to 1991. The aim of these seminars were to give ostrich researchers at universities and other institutions in South Africa the opportunity to share and exchange knowledge. Local research findings were continuously disseminated at farmers' days.



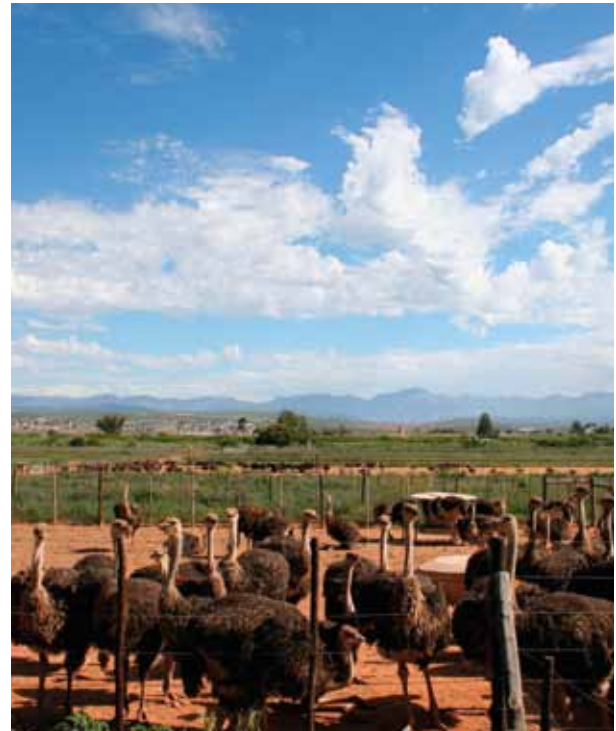


The ostrich breeder flock

The breeding resource flock of the Oudtshoorn Research Farm was developed from the donation of commercial breeding birds from 18 different farms. In 1982, the farm boasted a core flock of 40 breeding pairs. More ostriches were introduced to the flock in 1991, which gave rise to two predominant strains of founder parents in the resource flock. These were designated as commercial or feather strains according to the selection history of the flocks of origin. The flock was gradually expanded from here onwards. In 1992, the flock was increased to 67 pairs and in 1995 to 102 breeding pairs. Young breeder birds were mostly obtained from within the flock. In 1997, different selection lines were introduced and the flock was expanded to consist of 132 pairs. A small number of young Zimbabwean blues (*S.c. australis*) were introduced into the flock in 1998, expanding the flock to 136 pairs by 1999.

In 2002, the Klein Karoo Co-operative introduced more Zimbabwean blues to the flock, expanding the flock to 188 pairs. When Klein Karoo sold these birds in 2003, the department, through the Western Cape Agricultural Research Trust, obtained Zimbabwean blues from a farmer, Hendrik Pienaar from Mossel Bay, to continue with evaluation of the different genotypes.

In 2007, Kenyan rednecks were obtained from Pieter Coetzee and more blues were obtained in 2008 from AJ Schoeman. In 2012, with the registration of a separate breeder farm, the flock were reduced to consist of 150 breeding pairs, used for research on genetic selection, cross-breeding and nutrition.







Ostrich research after 1990

In 1990, SJ (Koot) van Schalkwyk was appointed ostrich researcher, taking over from Dr Derick Swart. At that stage, Kokkie de Kock was the technician tasked with the management of the breeder flock and the hatchery. Van Schalkwyk focused on storage, disinfection, and setting regimes of ostrich eggs. His research was submitted to Rhodes University in an MSc dissertation titled *Increased hatchability of ostrich eggs in the Little Karoo region*. He was involved in fine-tuning wooden incubators, while playing an important role in the design and development of the Prohatch electronic incubator, working closely with Somchem, a division of Denell. Many farmers started using these technologically advanced electronic incubators, which increased hatchability by nearly 20%.

A development chart of the ostrich embryo was also compiled as a result of this incubation research. The chart gave farmers an indication of the stage at which embryos died. This could be linked to specific problems regarding incubation malfunctioning or external problems, such as setting position, diet, storage or disinfection. Van Schalkwyk's involvement in research eventually shifted towards leather

and meat. He worked very closely with the Klein Karoo Abattoir and Tannery in evaluating aspects of meat and leather quality. The effect of slaughter age and mass on leather quality was investigated to determine the optimal stage for slaughter. This research continued until his resignation in 2003 and he was awarded a PhD from the Stellenbosch University in 2008 for his thesis entitled *Factors affecting ostrich leather traits*.

In 1998, Van Schalkwyk and his team hosted a very successful second international ratite congress in Oudtshoorn by. Since then, the team of departmental ostrich researchers have made regular contributions to international ratite symposiums.

In the late 1990s, the late Dr Paul King, head of animal production at the time, introduced students into the Ostrich Research Programme. The students involved were Helet Lambrechts, Lieven de Brabander from Belgium and Mohammed Salih from Sudan. Lambrechts investigated methods to identify unproductive females and improve the reproductive efficiency of ostriches.



Speakers at an ostrich information day held in 2001: Back from left to right, Pieter van Zyl (economist), Helet Lambrechts (student), Koot van Schalkwyk (researcher), Schalk Cloete (specialist researcher at Elsenburg), Kobus Nel (extension officer), Tertius Brand (specialist researcher at Elsenburg), Zanell Brand (technician). Front, Dr Boto Ganzevoort (veterinarian at Klein Karoo Co-operation), Tielman de Villiers, Deputy Director: Research (Elsenburg), Johan Blomerus, Director (Elsenburg) and Dr Francois Hanekom (South African Ostrich Business Chamber).

With Van Schalkwyk's resignation in 2003, research in the hatchery initially came to a halt. In 2006, Zanell Brand, technician at the hatchery, rekindled the research and signed up for a PhD at the University of Stellenbosch in *Studies on embryonic development and hatchability of ostrich eggs*, which she completed in 2011 under supervision of Prof SWP Cloete. Dr Brand was appointed full-time researcher in 2013.

Anel Engelbrecht was appointed researcher in 2004, after completing her MSc studies on the farm. These included in-



vestigations into the origins of skin damage. She was the first person to remove the toenails of ostrich chicks permanently to determine their putative role in causing skin damage. After being involved in developing an approved and standardised practice for clipping ostrich chicks' toenails, she now gives training in the correct methodology and provides certifica-

tion to trained farmers in collaboration with the South African Ostrich Business Chamber. Her work focuses on improving leather quality and various aspects thereof. Dr Engelbrecht obtained her doctorate in 2013 for her thesis on environmental and genetic parameters for ostrich growth and slaughter traits, supervised by Prof SWP Cloete and Dr K Bunter.



Dr Anel Engelbrecht in the field.



Staff of the Ostrich Research Section in 2005.

Ostrich nutrition research

Fanus Cilliers and a technical team appointed by the KKAC were responsible for the Nutritional Research Programme, as well as running the chick-rearing facility. The nutritional requirements of ostriches were determined in special metabolic crates where experiments on different age categories were carried out. Various feedstuffs were evaluated and Cilliers formulated the first balanced diets for ostriches. This included pre-starter, starter, grower, finisher, maintenance and breeder diets. In 1995, he received his doctorate for this work. After his resignation in 1996, Prof Tertius Brand, specialist scientist: Nutrition at Elsenburg, took over the nutritional research for ostriches.

Prof Brand is an associate professor extraordinaire at the Universities of Stellenbosch and Pretoria. He has developed a computerised feed formulation model and a model for determining optimal slaughter age. Under his guidance, the programme was extended to a multidisciplinary approach.





Prof Tertius Brand

In the process, several academic partners from universities across the country became involved.

Several students were also involved in the Ostrich Nutrition

Research Programme in the next 10 to 15 years supervised by Prof Brand. These studies and completed theses include:

- *The evaluation of canola in the diets for ostriches* (Lieven de Brabander, Hogeschool Gent, Belgium, 1998)
- *The effects of high-fibre diets on the digestion, growth performance and production of black ostriches* (Dr Mohamed Salih, University of Ankara, Turkey, 2000)
- *The manipulation of ostrich meat quality, composition and shelf life* (Marissa Joubert, University of Stellenbosch, 2003)
- *The effect of energy and protein nutritional levels on pro-*

duction of breeding ostriches (Dr Zanell Brand, Rhodes University, 2002)

- *The effect of different management practices on the feed intake and growth of ostrich chicks* (Annelie Kruger, Nelson Mandela Metropolitan University, 2007)
- *Factors that will increase the survival rate of ostrich chicks* (Maryke Janse van Vuuren, Nelson Mandela Metropolitan University, 2008)
- *The effect of different slaughter age regimes on the primary and secondary production parameters of ostrich and economic consequences of different slaughter ages* (Clovis Bhiya, Nelson Mandela Metropolitan University, 2007)
- *Determining the nutrient requirements of breeding ostriches* (Theo Olivier, University of Stellenbosch, 2010)
- *The allometric description of ostrich growth and development* (Werné Kritzing, University of Stellenbosch, 2011)



- *The effect of different levels of supplementary feed on the production of finisher ostriches grazing irrigated lucerne pastures* (Marline Strydom, University of Stellenbosch, 2010)
 - *The effect of transport on live weight loss, meat quality and blood haematology in slaughter ostriches* (Wilhelm Wolmerans, University of Stellenbosch, 2011)
 - *The effect of various factors in the quality of ostrich meat* (Dr Coleen Leygoni, University of Stellenbosch, 2011)
 - *The evaluation of probiotics as feed supplement for ostrich chicks* (Natasha Greenhill, University of Cape Town, 2011)
 - *The effect of the inclusion of cottonseed oilcake in diets on the production of growing ostriches* (Denis Squizzato, Padova University, Italy, 2011)
 - *The effect of dietary energy and protein interaction on the physiological plasticity of the small intestine of the young ostrich* (Dr Mariaan Viljoen, University of Pretoria, 2012)
 - *The effect of cottonseed oilcake meal on ostrich growth performance, meat chemical composition and sensory attributes* (Katryn Schoon, University of Stellenbosch, 2012)
 - *The effect of lairage time and transport density on the live weight losses and meat quality in slaughter ostriches* (George Lorenzon, University of Stellenbosch, 2012)
 - *Studies to develop a mathematical optimisation model to describe the effect of nutrition on the growth of ostriches* (Danie Carstens, 2013).
- Other studies by Dr Brand and his team include:
- The evaluation of raw materials for ostriches
 - The use of near infrared spectroscopy to determine the chemical composition and feeding value of ostrich feed
 - The effect of feather clipping on feed-use efficiency and production and feather quality
 - Temperature control of ostriches
 - Determining the true ileal amino acid digestibility values for ostriches by ileum-rectum anastomosed birds
 - *In ovo* nutrition of ostriches and the effect of high protein diets on the mortality rates and production of ostriches were presented at scientific conferences and published in the scientific and popular press.



From left to right: Resia Swart, Stefan Terblanche, Prof Zahava Uni (from Israel), Ger-Mari Tesselaar, Prof Ters Brand, Dr Zanell Brand and Danie Carstens at the Oudtshoorn Research farm during a course on *in ovo* nutrition of ostriches.

Three chapters on this research were published in internationally published and recognised books. This nutrition-related work and work done on ostriches over the last 10 to 15 years are currently being built into a mathematical simulation model for slaughter and breeding ostriches by Prof Rob Gous from the University of KwaZulu-Natal and Prof Ters Brand from the Directorate: Animal Sciences at Elsenburg.



Ostrich breeding – from mystic art to well-developed science

Mass selection for quantitative and qualitative feather traits was evidently successful in the early years, as indicated in early reports. However, with the slump in the feather industry, genetic improvement of ostriches came to a temporary halt, as it became very difficult to assess reproduction and skin traits on replacement animals. In addition, there were a number of beliefs in industry that made it difficult to start a comprehensive ostrich-breeding programme based on objective production traits recorded in ostrich flocks. These included that a pair of ostriches should be continuously paired off in the same paddock, and that ostriches only reach acceptable reproductive performance later in life.



Prof Schalk Cloete with Dr Arthur Gilmour (Department of Primary Industries, NSW, Australia) and Dr Mike Fair (University of the Free State).

It was already shown early on that ostriches reach quite formidable ages compared to other farm animals. Deurden (1910; *Agricultural Journal of the Cape of Good Hope* 36, 19-32) reported that ostriches may produce quality feathers at up to 35 to 40 years of age. However, genetic progress in a flock containing many animals with such an advanced age would be curtailed because of a very high generation interval. Therefore, after the effect of female age on reproduction has been clarified, the number of age groups in the Oudtshoorn breeding flock were severely restricted.

male, female and paddock effects were not confounded.

Reviews to reflect on these developments and report on progress were published in 1998, 2002, 2008 and 2012. In essence, all major traits of economic importance in ostriches – reproduction, chick survival, growth, qualitative and quantitative slaughter traits, mature live weight as well as feather dimensions and weight – were all variable and heritable. Genetic gains should therefore be achievable in any of these

The extensive collaboration between Dr Kim Bunter of the Animal Genetics and Breeding Unit, Armidale, Australia, and Schalk Cloete, specialist scientist: Breeding at Elsenburg, refuted or adapted these beliefs to reflect scientific principles based on research. The restructuring of the Oudtshoorn ostrich breeding flock to apply scientific principles involved the restriction of male and female age groups to 10 or fewer. Males and females were allocated to new mates, and pairs were switched between breeding paddocks to ensure that



Zimbabwean blue



SA Black



Kenyan redneck

traits. Realised genetic gains after directed selection have indeed been demonstrated for reproduction, confirming the derived parameters. Genetic correlations among traits were mostly favourable and sometimes negligible for some trait combinations. The combination of traits in an economic selection index should thus be achievable.

The study of cross-breeding parameters further suggested that Zimbabwean blue and Kenyan redneck ostriches were heavier than South African blacks at slaughter and maturity. However, the former strains exhibited poorer reproduction and adult feather traits. There was also some evidence of poorer chick survival particularly in the Zimbabwean blue strain. It may be feasible to combine the favourable live weight of the Zimbabwean blue and Kenyan redneck strains with the improved reproduction and feather traits of the South African black in a structured cross-breeding system for commercial production. These arguments are supported by the fact that reciprocal crosses between the South African black and Zimbabwean blue exhibited hybrid vigour for chick survival, slaughter weight and reproduction. A commercial cross-bred system may therefore benefit aspects such as sexual dimorphism and breed complementarity in combination with hybrid vigour.

Studies on the molecular genetics of ostriches are underway in collaboration with prof Charlie Cornwallis (Lund University,

Sweden) to assist with the determination of pedigree information of replacement birds. These studies will be expanded to determine the possible relationships of specific genetic markers with quantitative traits of economic importance. It is foreseen that the combination of marker information with breeding values derived from pedigrees will allow marker-assisted selection in hard-to-measure traits in the future. Such selection will allow for the earlier selection of individual replacement animals on traits that are difficult to measure, or that are measured late in life.

Apart from resident scientists at Oudtshoorn whose studies are described elsewhere, several students were accommodated in the ostrich-breeding programme (year of graduation in brackets). These were:

- Fatima Essa (2005)
- Merenza Brand (2005)
- Annelin Davids (2010)
- Magretha Wang (2012) and
- Dr Mike Fair (2012).

These students were jointly supervised by Prof Schalk Cloete, Associate Professor Extraordinaire University of Stellenbosch, and collaborators at the Universities of Stellenbosch, Prof Louw Hoffman and Prof Kennedy Dzama, the Free State, Prof Japie van Wyk, and KwaZulu-Natal, Prof Annabel Fossey.



Mate compatibility, immunology and sexual selection

One of the problems of the pair-mating system to accumulate data is that it does not consider the preferences of animals for specific mates. To this end, Dr Maud Bonato was contracted to study mate preferences in two ostrich-breeding colonies on the Oudtshoorn Research Farm under the supervision of Prof Mike Cherry from the Department of Zoology, University of Stellenbosch, and Prof Schalk Cloete. She established that most males and females had multiple sexual partners. However, she also found that the colouration of the black feathers, white feathers and necks of males (all traits involved in the typical ostrich courtship display) were related to egg weight, and that females laid heavier eggs when mating with males with brighter-coloured feathers.

Male ostriches with brighter feathers, bills, necks and legs also had an improved immune resistance relative to duller males. The immune responses of chicks were influenced by the father's white feather colouration. Moreover, chick immune responses depended on the immune responses of both parents, suggesting that immune response might be heritable.

Chick growth rates, however, were related to the colouration of the father's white feathers and bill. These results could arguably partially explain size variation in cohorts of chicks as well as high chick mortality rates in industry flocks, as chicks with a prime immune system could invest more energy into survival and growing faster. The crucial role of feathers in the ostrich mating system is also highlighted, as females mating with males with brighter white feathers are likely to have offspring with a stronger immune system.

These results led to follow-up studies by Prof Charlie Cornwallis of Lund University, Sweden, on allowing for mate choice of males and females in ostrich-mating systems. These studies are conducted with the help of Dr Bonato as resident scientist. The high levels of chick mortalities in the ostrich industry also attracted interest from the group headed by Dr Cornwallis. It was foreseen that a metagenomics approach might be used to help unravel the complexities of chick adaptation to the production environment. This research is currently underway.

Artificial insemination in ostriches – attempting the impossible

Several problems in the ostrich industry, such as the very narrow male to female ratio, confounding of the random effects of male, female and breeding paddock as well as mate compatibility could be alleviated by a viable protocol for artificial insemination. Scientific research on this topic was made feasible by the research of Dr Paulina Rybnik-Trzaskowska enabling the stress-free collection of high-quality ejaculates from trained ostrich males using a dummy female. Dr Bonato acted as the resident scientist on a project at Oudtshoorn to study the artificial insemination of ostriches based on animal- and human-friendly practices since she completed her PhD in 2009.

Her research is supervised by Prof Irek Malecki from the University of Western Australia and Prof Schalk Cloete from Elsenburg. Technical support came from Marna Smith, a current PhD student, and Naomi Serfontein, technical assistant. Most milestones set out to achieve were reached in the past few years. The insemination of females with cryopreserved semen to study the usage of cryopreserved semen *in vivo*

is scheduled for the winter of 2014, while the entire semen storage and artificial insemination processes are being fine-tuned. Variation in response between animals selected for the artificial insemination process presents some of the most important challenges to iron out.



Dr Maud Bonato with an AI ostrich and in her lab.



Ostrich veterinary research

The unique collaboration agreement between the department and the industry made it possible to extend the research programme significantly to include a nutritionist, Fanus Cilliers, and veterinarian, Dr Willem Burger. Dr Burger, with the help of Leonie Boshoff, ran the diagnostic centre in Van der Riet Street. These were the pioneering years in terms of veterinary research to determine causes of diseases and mortalities in ostriches. The laboratory functioned in close association with the Stellenbosch Veterinary Laboratory. Within the first year, the first influenza virus in ostriches was isolated, identified and typified. International referencing laboratories in Europe also made important inputs to confirm final diagnostics. Various other pathogens have since been diagnosed and isolated, specifically with regard to causative agents for classic enteritis or *rooiderm* in Afrikaans. Hereafter, tailored enteritis vaccines were developed to help manage the problem.

The next challenge was to unravel the so-called air sac disease in collaboration with the University of Stellenbosch.

Early in the project, mycoplasma organisms were isolated in the airways of ostriches. These organisms were typified at great cost as ostrich-specific mycoplasmas. To develop a possible vaccine against these organisms, efforts were made to identify the DNA markers associated with the disease. This project was terminated owing to disintegration within the industry and excessive costs.

Dr Burger was later appointed assistant manager at the Klein Karoo Co-operative overseeing research. His successor was Dr Ashley Morley, followed by Dr Adriaan Olivier, the current specialist ostrich veterinarian.

New developments during this period included the donation of an environmentally controlled chick room for research on housing conditions for ostrich chicks, and the start of research on artificial insemination. The hatchery was also equipped with a chick room from where day-old chicks are sold to ostrich farmers.

Ostrich auctions

The Oudtshoorn Research Farm has been hosting ostrich auctions since the 1980s. In 1995, the first ever catalogue auction of young ostrich breeders was held and the highest prices ever for ostriches were recorded – R17 500 and R20 750 for male and female ostriches, respectively. In 1996, registered ostriches were offered for sale for the first time ever in the history of the ostrich industry. These birds fetched significantly higher prices than unregistered ostriches.

Since 2004, annual auctions take place so that farmers can obtain genetic material from the research farm and benefit from the genetic improvement made with the research flock. Birds for these auctions are selected on breeding values for reproduction and weight, which promotes regular replacement of breeding birds to ensure optimal production.





Plant sciences and alternative crops

While the research at the Oudtshoorn Research Farm is primarily focused on ostriches, several crops have been cultivated and investigated on the farm.

Experiments with wheat began in 1966. Pieter Maree investigated the suitability of several crops for the winter rainfall region including wheat, cotton, carrot seed and cauliflower seed. In 1972, Maree and Bernie Lötter published a list of early and late wheat cultivars that were more disease resistant under irrigation. Maize and sunflower cultivars were also evaluated and investigations were done on the adaptability and production of various clover and grass cultivars. Steve Barnard, who worked on the farm from 1971 to 1977, also did pasture research and investigated drought-resistant crops.

Degradation of the natural veld was also investigated in the early years. Nolte and Koen investigated the possibilities of veld enhancement by sowing natural components. Five natural crops were sown on 5 ha of natural veld to evaluate the grazing potential.

In 1978, the American jojoba (*Simmondsia chinensis*) was planted to test its adaptability. The seeds of this drought-resistant crop contain a valuable pure liquid wax, which is chemically similar to sperm whale oil, a vital industrial material which was in short supply. DJ le Roux, assisted by Koen, initiated the project in collaboration with the Cooperative Scientific Programmes Unit at the CSIR at the request of farmers. PB Roux and JN Diener took over the technical aspects of the project in 1983. Cultivation practices, such as fertilisation, spacing, timing of irrigation, weed and insect control as well as seed treatment and rooting experiments were carried out to promote jojoba cultivation.

The Colombar Vineyard on the Oudtshoorn Research Farm was used to study the effect of cover crop management on soil conditions and weed control. Dr L van Huysteen was assisted by farm managers Koen and Roux from 1983 onwards. In 1985, trials with wine cultivars were started with Danie van Schalkwyk from Nietvoorbij as part of an extensive project for the evaluation of wine cultivars in different climatic re-

gions. Dr van Huysteen and Dr J van Zyl were the first soil and irrigation scientists to work on the research farm.

In the early 90s, farmers in the district raised concerns about the profitability of traditionally cultivated crops. The Department of Agriculture introduced initiatives involving research and demonstrations to encourage farmers to improve existing practices and investigate the production of alternative crops that would supplement or replace crops that were no longer profitable. Bennie Visser, who worked as a technician at Oudtshoorn Research Farm at the time was instrumental in the development of alternative crops. Visser, along with Roux, helped conserve the genetic material of several alternative crop cultivars.

Lucerne was, and today still is, produced on the Oudtshoorn Research Farm to provide all the farm's seed and hay requirements. In 1982, the first of the cultivar trials of the national lucerne evaluation programme was established, with 29 new cultivars and SA Standard as control. Evaluations of new cultivars were conducted by Koos Langenhoven, an expert on lucerne cultivars at Elsenburg in collaboration with the staff from the research farm.

The lucerne industry, with Derick Engelbrecht as manager of the Lucerne Seed Organisation, supported lucerne research and worked closely with PB Roux, B Visser and K Nel

during the lucerne cultivar evaluation trials (LUCEK). The Oudtshoorn Research Farm was one of 27 places in South Africa where LUCEK trials were done. The Lucerne Seed Organisation also bought a motorised lucerne-cutting machine and sponsored a portrait of the ostrich feather palace on the farm for the opening of the new office building of the KKADC in 1992. The portrait can still be viewed in the foyer.

Prickly pears were traditionally cultivated as pasturage, especially during drought. In addition, the fruit was part of the local diet. Roux took an interest in prickly pear cultivation and established a cultivar block with Bennie Visser. Plant material



Prickly pear evaluations.



Prickly pears on the farm.



Bennie Visser and Piet Roux talking in the olive orchard.

from an experiment in Polokwane was used and 14 cultivars were evaluated at the Oudtshoorn Research Farm. This block is still maintained and is the Department of Agriculture's gene bank for cultivars of the Burbank prickly pear. Prickly pear cultivation introduced the need for a machine to remove thorns and with its invention, it was possible to package and market a product acceptable to consumers.

The decision to encourage olive production stemmed from the observation that the Klein Karoo is the habitat of the wild olive, which is closely related to the domestic olive. An olive

orchard grove with 558 trees and five different cultivars was planted in 1998. It served as a demonstration, but was also used to research the effect of fertilisation and irrigation on the phenomenon of biennial bearing. The experiment resulted in the planting of thousands of olive trees in the Klein Karoo.

Visser decided to focus on herbs and essential oils in 1998 and 1999 owing to the Klein Karoo having the perfect climate to produce high-quality aromatic herbs. Plant material was sourced from the Klein Karoo, Franschhoek and Bainskloof to establish the viability of plants for producing essential oils.





Elzanne Kruger, administrative officer at the KKADC, with *Lesquerella* in 2002.

With this in mind, buchu, peppermint, lemon balm, rosemary, chamomile, lavender and spearmint were planted in 1999. Plant material was collected and oil distilled at the research farm. Herbs such as oregano, marjoram, basil, rosemary, parsley and yarrow were also planted. Herb plant material was dried in the attic of the office building and evaluated by experts from Robertson's.

Traditionally, fig and pomegranate trees were planted in the Klein Karoo to reinforce the wire fencing around pastures. During an upswing in the ostrich industry, demand for lucerne increased and the trees were removed along with wire fences to make way for big hay implements. In 2000, plant material

for fig experiments was collected in the winter rainfall region. Visser also rescued plant material from a neglected fig experiment near Citrusdal, which formed part of the fig experiment on the farm. The experiment captured the imagination of many researchers and farmers across South Africa. In his book, *Die vy in Suid-Afrika*, J de V Lötter refers to this fig experiment as a unique venture in the country. It is the only official and most comprehensive fig cultivar block in SA and the department is conserving the material in a genebank at SAPO (South African Plant Improvement Organisation) as the only fig experiment in the country.

Aloes occur naturally in the Klein Karoo veld, but aloe harvesting sometimes leads to overuse. Consequently, the idea arose to cultivate aloes on agricultural land no longer used for grain production. Seeds were collected and seedlings were cultivated in plant bags at the Worcester Veld Reserve. These plants were successfully planted on the research farm in 2001 in an unirrigated field to mirror the conditions found in natural veld.

According to Bennie Visser, who presented the work on alternative crops at farmers days and through publications, farmers in the Klein Karoo and much further afield have been persuaded to change their practices – evidence that the trials on alternative crops done at the farm made a positive contribution to agricultural development in South Africa.



Aloes at Oudtshoorn Research Farm.



Veterinary Services

Through the eyes of an animal health technician

... (Louw) Nolte came storming into my office. He immediately calmed down, asking politely: “Attie, have you got transport here; I would appreciate it if you could lend a hand to the section where some ostriches have gone off on stampede.”

That was the day I realised that I am now part of a completely different type of farming industry. I jumped into my bakkie and caught up with the fleeing slaughter birds, about 2 km from the office building. I was at the point of asking one of the exhausted workers why they seemed to struggle so much to bring the birds under control, when I noticed, with speechless astonishment, how one of the ostriches wheeled around from the flock and came charging at Oom Kokkie’s bakkie at full speed.

The ostrich lifted himself up effortlessly and ran right over the bakkie, jumped off at the back and continued to charge right at my bakkie, which was next in queue.

The ostrich took one jump and landed the bonnet, a few fast paced steps onto the windscreen and roof of the bakkie, then a few quick paces over the body and off at the back without losing any noticeable speed and with unbelievable agility.

I had to learn how to handle these strange creatures, but fortunately, I had good teachers. During tea breaks I could, without embarrassment, ask for advice from agricultural extension officers and managers with many years of experience. I often think back with nostalgia to retired people such as Nolte, Bennie Visser, Kobus Nel and Roux. – Attie Erasmus describing his first ostrich encounter.



Attie Erasmus in the field.

Erasmus started working at the Oudtshoorn Research Farm in 1994 as an animal health technician.

While a state veterinarian has not been stationed at the research farm until quite recently, state veterinarians from Mossel Bay and Outeniqua (George) have supported the farm since 1964. Dr Dempsey de Lange has been supervising animal health technicians based at Oudtshoorn since the 1980s.

According to Erasmus, the main activity of animal health technicians since the first Newcastle disease virus was detected in 1995/96 was collecting blood samples to deter-

mine the spread of the disease. Research on vaccines to protect the resource flock was carried out at the farm. One of the challenges of working with ostriches is that taking a blood sample is no simple task. To this end, technicians have devised optimal procedures to carry out the task effectively without stressing the birds and avoiding injury.

In 1996, a worker at the Klein Karoo abattoir died from stringent Crimean-Congo haemorrhagic fever or Congo fever. This had an immediate effect on the export of fresh ostrich meat. Meetings between technicians involved in animal husbandry, veterinary surgeons and international authorities were held at the Oudtshoorn Research Farm to discuss the situation. It was decided that isolation camps would be erected 14 days before slaughtering. Farmers now refer to these as their “box in a box” camps.

The next major catastrophe occurred in 2004, when avian influenza broke out. Ostriches were slaughtered as a precautionary measure to prevent the spread of disease and mutation of the virus and subsequently infecting humans. Since the outbreaks in 2004 and 2011, extremely strict control regulations and biosecurity measures have been implemented to prevent and mitigate the effects of future outbreaks. At the time, research staff at the research farm worked closely with the veterinary staff to safeguard the valuable breeding resource flock against disease outbreaks.

Veterinary Services

Biosecurity and registration as ostrich farm

The research flock of the Oudtshoorn Research Farm is a closed unit – chicks for research purposes are produced on farm by the breeder flock. To further protect the breeding stock, strict biosecurity measures were implemented in 2013 with the help of Dr Ansie Scholtz from the Directorate: Animal Science. The farm was divided into a breeder and an export farm, which was registered as two separate units and is managed as such. Extra handling facilities, loading areas and fencing were erected to ensure compliance to registration requirements. Strict access control is exercised on the parts of the farm housing the ostriches.



Farmer Support and Development

The Farmer Support and Development (FSD) Programme was formed after Farmer Settlement and Extension Services were combined. Extension officers were involved on the Oudtshoorn Research Farm since its establishment despite being stationed in town. When the Klein Karoo Agricultural Development Centre (KKADC) was established in 1992, the extension offices were relocated to the research farm. At the time, Louw Nolte was chief extension officer for the Klein Karoo sub-region and worked closely with the staff on the farm. In 1998, when Jan Theron was appointed assistant director for the KKADC, one of the objectives was to improve collaboration between different divisions at the centre.

This eventually led to the formation of a regional coordination committee in 2000. The focus areas in the Klein Karoo region were:

- regional economic services
- efficient use of irrigation water

- optimal ostrich production
- evaluation and establishment of new or alternative enterprises
- revitalisation of marginal dryland production areas
- sustainable production systems for emerging farmers
- optimal fruit production
- optimal small stock production
- improvement of optimal veld use
- and control of weeds and invader plants.

Jan Theron, programme leader for alternative crops, visited Mexico and Arizona in 2001. A poster and article entitled *A Framework for the Development of New Crops Industries in South Africa* was delivered at the conference of the Association for the Advancement of Industrial Crops. Following this visit, the cultivation of prickly pear and propagation of jojoba were investigated and refined further on the research farm. Kobus Nel, Bennie Visser, Pieter van Zyl and William Christians did important work at this time.



Back from left to right: Stefan Pieterse, Bennie Visser, Jan Smit, Elzanne Kruger, William Christians, Stefan Theron (Beaufort West), John Bakkes (Ladismith) and Charl du Plessis (Lainsburg)

Front from left to right: Julia van Tonder (Ladismith), Aletta Janse van Rensburg (Lainsburg), Jan Theron, Kobus Nel at a strategic session of LandCare and FSD in 2004.

The Klein Karoo Agricultural Development Centre was instrumental in setting up a platform for efficient coordination among various stakeholders. Regular meetings of the regional coordination committee informed all relevant divisions of the department regarding development opportunities and concerns and contributed to more cohesion between divisions, which led to more efficient outcomes at project level.

Since restructuring the agricultural regions according to municipal boundaries, the Eden directorate of FSD has been divided in two sub-directorates: Garden Route and Klein Karoo. Klein Karoo FSD includes Oudtshoorn, Ladismith and Uniondale. The programme is responsible for farmer settlement and focuses on support to land and agrarian reform, extension and advisory services, improving food security on regional and household level. The aim



Angora goats at the Oude Muragie Mohair Project.

is to improve quality of life in rural areas and to have a direct and indirect effect on regional economies.

The Oudtshoorn FSD office renders services in and around Oudtshoorn, focusing on upliftment and training of new farmers. The cultivation of vegetable gardens for individual households to become self-sufficient is also high on the agenda. This area is serviced mainly by Ernst Guder, while Dr Koot van Schalkwyk deals with ostrich production.

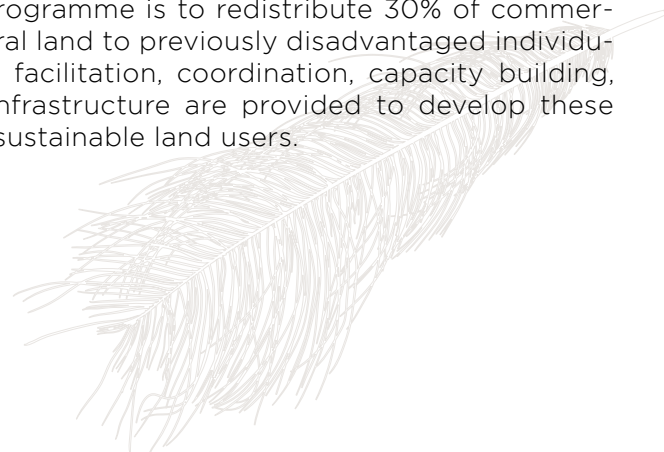
Cultivating tobacco as a cash crop is on the increase, mainly in the Matjiesrivier area. New farmers are trained in correct planting methods, varieties, drying methods to maximise yield as well as disease control. Farmers in Dysseldorp are also trained in vegetable and seed production. New farmers get training in good animal production practices and disease management.

The Oudtshoorn Research Farm regularly hosts farmer's days. In 2011, the FSD office hosted an olive information day on business decision-making, during which information on scheduling, pruning techniques and olive harvesting were given to established and potential farmers. In 2013, the research farm presented a farmer's day on guidelines for bee-keeping and pollination. Later they presented a farmer's day on mohair production in collaboration with the Mohair Empowerment Trust.

As part of the 2010 World Food Day deliverable, the Western Cape Department of Agriculture supported 40 households in Dysseldorp with household food production packs to enable them produce their own food.

In 2012, a food garden competition was held in the same town to encourage home and community food gardens. Participants received water tanks, seedlings, shade cloths and tools through the programme. Community gardens were established at the school, clinic, hospital and churches in the Dysseldorp area. These vegetables are handed out or sold to the community.

Special emphasis is on support services to the Land Redistribution for Agricultural Development Programme. The aim of this programme is to redistribute 30% of commercial agricultural land to previously disadvantaged individuals. Planning, facilitation, coordination, capacity building, advice and infrastructure are provided to develop these farmers into sustainable land users.



Sustainable Resource Management

The programme, Sustainable Resource Management, moved to the Oudtshoorn Research Farm in 1992 when the Klein Karoo Agricultural Development Centre was opened. The sub-programme, LandCare, focuses on the sustainable use of all natural resources to support sustainable production of healthy food. The aim is to reclaim, improve and maintain natural resources by promoting efficient conservation practices among all land users.

In 1992, the team that came to the research farm was Dave Palmer, control technician, two technicians Percy van der Westhuizen and Norman Josling, and the auxiliary services officer, Hendrik April. In 1997, Hennis Germishuys took over as control technician and he was succeeded by Jan Smit when he left Oudtshoorn in 1999.

Important community projects during the last two decades



The team of soil conservation technicians in 2001 were Phyllis Pienaar, Stefan Pieterse, Stefan Theron (Beaufort West office), Jan Smit (control technician) and Norman Josling.

include Haarlem Meent by Norman Josling, Zoar Meent by Stefan Pieterse, Murraysburg Meent by Phyllis Pienaar and the Matjiesriver water supply project by the sub-programme Engineering Services.



The function of LandCare is to provide technical advice, farm and regional planning and water runoff control plans. This includes staking out contour bank systems and designing constructed waterways, erosion structures and livestock watering and reclamation. LandCare also deals with replanting and rehabilitating degraded areas. More recently, LandCare in the Eden district has focused on river and wetland stabilisation. Raising awareness of environmental issues is also an important function, and the junior

LandCare initiative has proven very successful in conveying this message.

In 2005, the area was divided into the Central Karoo and Klein Karoo, which resorts under the Eden district to be aligned with the District Municipality boundaries. Since then, the control technicians are stationed in Beaufort West and George. The Oudtshoorn team consequently now functions under Hannes Muller as control technician in George.

Further Education and Training

The further education and training (FET) centre at the Oudtshoorn Research Farm is one of four decentralised centres throughout the Western Cape. The centre was opened on 24 February 2006 and offers formal and informal agricultural training to commercial, subsistence and smallholder farmers as well as those working on food security and rural development projects. The FET centre provides training service within the Klein Karoo and the Central Karoo District Municipality. Klaas Eland was the first centre coordinator. He was followed by McGrandle Makier until 2013.

The learnerships on offer are AGRISETA accredited with pomology, viticulture, vegetable production, and small and large stock in terms of animal production. Short courses include plant and animal production, agricultural engineering, agricultural management and economics and human and social sciences. In its first year, 46 short course beneficiaries were trained. In 2013/14, the number had increased to 692. The centre supports the development of people in the Oudtshoorn agricultural community and further supports sustainable agricultural livelihoods for beneficiaries in the area.



The new FET training facility at the Oudtshoorn Research Farm.



Farm foreman Rodney Gangathele gives training to students.

Rural Development Coordination

While rural development coordination was only established in 2010, the programme has already made significant strides in rural communities across the province, including Oudtshoorn and its surrounding areas such as Dysselsdorp.

The Development Planning sub-programme is involved in the delivery of the Comprehensive Rural Development Programme (CRDP) and works closely with the national Department of Rural Development and Land Reform. The aim is to create opportunities for rural communities to cultivate an enabling environment to promote private and public sector investment, thereby enhancing the socio-economic environment and quality of life of rural people.

The Western Cape Department of Agriculture is following a holistic approach for development planning in the 16 selected rural development nodes across the province. This includes social facilitation, social upliftment, infrastructure development and economic development by prioritising collaborative support across all three spheres of government.

The implementation model facilitates collaboration between the three spheres of government through intergovernmental steering committees (ISC) focusing on expertise, services and funding to catalyse development within each of the rural development nodes. The team also provides support to the relevant communities by building capacity. The community is assisted to establish a non-profit organisation (NPO) called the Council of Stakeholders (CoS) – a community organisation representative of all sectors within the community. Through this structure, the community can engage with the ISC towards driving development projects in the area. Interactive participation of all key participants such as communities, government and the private sector thereby contribute to make sustainable rural development possible. With Dysselsdorp being the first node to be developed, the department has commissioned an evaluation of the process and progress to date to inform review processes.

The Farmworker Development sub-programme is the only such government unit in the country and provides various

forms of support to farmworkers and their family members. Services are rendered through facilitating access to government resources, implementing life skills and development programmes and active participation at various forum meetings to ensure that farmworker issues remain high on regional agendas.

A household survey is also conducted to establish a database of all farmworkers in the province, highlighting their particular needs and challenges as experienced within each region. The department is committed to understanding the needs of farmworkers. For this reason, the information gathered through this survey will be shared with all relevant government departments to facilitate the delivery of appropriate services to farmworkers.

The annual Western Cape Farmworker of the Year Competition, which recognises the valuable contribution of farmworkers in the agricultural sector, has become iconic in the province. The competition builds up from various regional competitions for farmworkers across the province and culminates in a provincial awards event. It is highly regarded by producers and farmworkers alike and drew over 1 000 entries in 2013. Certificates, trophies, training courses, cash prizes and even an overseas visit are some of the incentives for the winners.





The Oudtshoorn community

While the Oudtshoorn Research Farm has a strong focus on research and service delivery, these are not the only areas in which the research farm has excelled. In 2008, the research farm was a bronze winner in the Premier's Service Excellence Awards for their play park. The Oudtshoorn play park

was chosen as the best play park among the seven research farms. In 2012, the farm choir also excelled and was invited to perform in Western Cape Legislation. Both these awards were received as part of the Programme: Research and Technology Development Services Farm Employee Competitions.



Winning the prize for best playground were Rodney Gangathele, Piet Roux and Stefaans Heunis with Joyene Isaacs, head of the department at the Western Cape Department of Agriculture.



The proud and very successful Oudtshoorn Research Farm Choir.

Isak Janse started his service at the Department of Agriculture in September 1967 at the tender age of 15. In 1986, he was transferred from the general farm section to the ostrich section and on 1 November, he was appointed auxiliary officer. In 2007, he reached the milestone of 40 years of service and he is still working! At present, he works full time in the hatchery and is responsible for the incubation of all the ostrich eggs. In his long years of service, he has worked closely with many of the researchers, including Dr Derick Swart, Dr Koot van Schalkwyk and currently Dr Zanell Brand. In the early years, he was also part of the team who helped to build up the farm with hard labour – before fancy machinery was available to do the work.



Oudtshoorn Research Farm: **50 years**

In its 50 years of existence, Oudtshoorn Research Farm, the world's first ostrich research farm has made many remarkable contributions in terms of national and international research and support to the farming community. Oudtshoorn

Research Farm's rich history perfectly exemplifies the Western Cape Department of Agriculture's current motto "Better Together" and the team of experts will still be making history for many years to come.



The 2014 team at the Oudtshoorn Research Farm in front of the ostrich feather palace on the farm.







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