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A glance at achievements of SASAS and animal scientists in southern Africa over more than 50 years

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Abstract

With the congress theme of 'Golden Innovations for Sustainable Animal Agriculture', it would be opportune to look not only at innovations with present and future potential, but at those 'golden innovations' that have been achieved and established over more than five decades. Many of these innovations still form the basis of many aspects of present-day sustainable animal agriculture in southern Africa. This brief review covers three areas, namely the history of the South African Society for Animal Science (SASAS), achievements of animal scientists, mainly in the earlier years of the Society, and the coming of age of professionalism in the animal science profession. The South African Society of Animal Production (SASAP) was founded on 28 April 1961 in Pretoria. The name was later changed to the South African Society for Animal Science. The theme of the first congress of SASAP was 'Efficiency in Production', a theme that is still relevant. In 1971 the South African Journal of Animal Science (SAJAS) was initiated, and by 2017 the 47th volume has been published. A large amount of knowledge that is applicable to local conditions has accumulated and should be drawn upon to avoid 'reinventing the wheel'. In the 1950s to 1970s, Professor Jan Bonsma developed the concept of functional efficiency of cattle and principles that focused on adaptability and sustainability. Extensive research was conducted on the feeding of urea and phosphorus to grazing livestock, leading to the practice of urea-containing rumen-stimulating winter supplementation of ruminants. South Africa was considered a world leader in the field of supplementary feeding practices. South Africa has a proud history in the discipline of animal genetics and the practical application of breeding principles to enhance livestock productivity, and is in the forefront with studies on the genomics of livestock in southern Africa. SASAS was instrumental in establishing the professional status of animal scientists in South Africa. The vision is that an animal scientist should be identified as the expert in his/her field and the best qualified person to advise on matters such as animal breeding, nutrition and general management of livestock. SASAS council also acts as a mouthpiece for and custodian of animal scientists. The society protects the interests of animal scientists, is pro-active in promoting animal science, and acts as a watchdog over the professional activities of members.

Keywords: Animal production, history, professional animal scientist

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History and developments in the Society

The South African Society of Animal Production (SASAP) was founded on 28 April 1961 and 120 founder members attended the occasion in Pretoria. The first congress with the theme, 'Efficiency in Production', was held on 16 and 17 April 1962 at the University of Pretoria. Since then, annual congresses have been held until 2000, whereafter biennial congresses were held for a few years. Two joint congresses (in 2002 and 2004) were held with the Grassland Society of Southern Africa, and in 2008 SASAS hosted the 10th World Conference on Animal Production in Cape Town. Consequently, in 2017 the 50th anniversary of

SASAS congresses was celebrated with a superb event in Port Elizabeth, organized by the Eastern Cape branch of SASAS.

In a series of short notes, Dr Frans van der Merwe presented 'SASAP Personalities of the Past', in which tribute was paid to the stalwarts of the early years of the society. (Posted on the SASAS website (www.sasas.co.za) under 'About SASAS'.) Also listed on the SASAS website under 'About SASAS' are the names of the former honorary presidents, past chairpersons/presidents and past editors of SASAS publications. Mr Hannes Booysen managed the society's affairs as secretary from 1978 to 1998, and was succeeded by Professor Jannes van Ryssen. Dr Francis Gilchrist was the first, and so far the only woman honorary president (1987 and 1988) of the society and Professor L.R. Ndlovu the first and so far the only black honorary president (2008-2010) of SASAS. The current president of SASAS, Professor Esté van Marle-Köster, is the first woman president, following in the footsteps of her father, Dr Koos van Marle, who was the then chairman of SASAP from 1976 to 1978.

From Dr Frans van der Merwe's notes on the SASAS website:

'The conception and birth of the SA Society for Animal Production came about in the following manner. While Danie Joubert and George Hunter (our embryo transfer pioneer at the University of Natal) were postgraduates at Cambridge University in the 1950s, working under the world-famous livestock physiologist Sir John Hammond, Wim Verbeek was on a similar mission in the USA at Cornell University doing postgraduate work in livestock nutrition under J.K. Loosli. On his way back to South Africa via London, he visited his South African colleagues in Cambridge and there, in a little tearoom, the three of them conceived the idea of a South African society for livestock scientists or *veetelers* as they were more commonly known in those days. The designation *veekundige* (livestock scientist) was coined in South Africa in 1960 at a symposium in Pretoria. The three young scientists were then members of the British Society for Animal Production and the American Society for Animal Science, respectively, and they were particularly impressed with the roles of these societies and their corresponding scientific journals in the research, teaching and extension fields. Our motto *Experientia docet*, which literally means 'we teach from experience' was probably also born out of their convictions in this regard.'

On 16 April 1992, the name 'South African Society of Animal Production' was changed to the South African Society of Animal Science (SASAS). Although a number of members objected to the use of 'Animal' in the society's name because of the problem of confusion with other disciplines involved in research on animals, the American influence of using animal science prevailed. Following the recommendation of a professor in English, the name was changed in 1999 to South African Society **for** Animal Science.

Branches of the society were established and formed the crux of the society's activities with the aim of taking science to the farmer. The first branch to be established was the Rhodesian one, and two congresses, in 1966 and 1970, were held in the then Rhodesia. In the 1970s SASAP branches were established, namely Transvaal (changed to Northern in 2002), Free State, Natal (later changed to KwaZulu-Natal), Western Cape and Highveld branches, the latter with Ermelo as centre. An Eastern Cape branch was founded in 1987, and organized one congress in 1991 in Port Elizabeth, but became dysfunctional in approximately 1995. This branch was re-convened in 2012. A Northern Provinces branch was formed in 1998, but no further records of its existence could be found. In the early 1980s an 'interest group' was formed, namely the Developing Animal Agriculture Interest Group (DAAIG). It held regular symposia and workshops up to 2006. Two interest groups existed briefly: the Animal Breeding, Conservation & Genetics Interest Group (ABCGIG) and the Milk Production Specialist Group (MSG), both initiated in 1997.

Congress proceedings were published every year for the first nine years, and all presentations were included in an issue. In 1971, the South African Journal of Animal Science (SAJAS) was initiated as a peer-reviewed journal, and for the first 10 years it also contained the keynote addresses of SASAP congresses. This supplies an excellent record of topical issues in those years. In 1982, an existing South African journal, *Agroanimalia*, was incorporated into SAJAS. Since 2000 SAJAS has been published online on the SASAS website. By 2010 all articles published in SAJAS since 1971 had been placed online on the SASAS website. Since 1991, SAJAS has published articles in English only.

Apart from the regular SASAS congresses, several international conferences have been organized under the auspices of SASAS. Recent meetings included The Second All Africa Conference on Animal Agriculture (1996), Ninth International Symposium on Ruminant Physiology (1999), 8th International Conference on Goats (2004) and the World Conference on Animal Production (2008).

Finances

To support the society financially a trust fund was started with the objective of using the interest of the fund to run the society and finance activities such as supporting overseas study trips for members,

presenting bursaries, supporting prominent overseas animal scientists to attend SASAP congresses and further the interests of the society. From 1969 to 1975, members contributed a total of R25 000.00 to the fund. For example, many members were solicited to contribute R3.00 per month for five years. However, the main contributor to the fund at that stage was the private sector (Hofmeyr, 1982). Currently, this fund is more than one million rand strong.

Achievements of animal scientists

Looking back at the research on livestock and livestock production that has been conducted in southern Africa for more than five decades, it is evident that a large amount of knowledge has accumulated. For obvious reasons, much of the research focused on local circumstances, and often had to demonstrate that foreign research was not necessarily always better. Unfortunately, information of earlier research is not always readily available or accessible. Some excellent articles were published between 1962 and 1970 in the SASAP Proceedings, though only a few copies of these journals exist, probably in private book shelves and in library storerooms or archives.

Since it is not possible to cover all achievements over the last 50 to 60 years in all disciplines of animal science in this presentation, only selected earlier and probably forgotten achievements are referred to in this presentation. A review by Naudé (1965) on research on breeds and crossbreeding, feeding and nutrition and growth phenomena and carcass characteristics of pigs, sheep and cattle that had been conducted in southern Africa between 1890 and 1965, was presented at the Fourth SASAP congress. This excellent article was published in the 1965 proceedings of SASAP.

At the first SASAP congress, Dr George Hunter presented an overview of his research on embryo transfer, which was mentioned in the 1968 classic *The biological time bomb* (Rattray Taylor, 1968). In Cambridge, England, Border Leicester embryos were placed in the oviduct of a surrogate rabbit. The rabbit was flown over to Pietermaritzburg, South Africa, where the embryos were transferred to the oviducts of two Dorper ewes at the same stage of pregnancy as the Border Leicester ewes, and two Border Leicester lambs, Romulus and Remus, were born on the experimental farm of the University of Natal.

At the Third Congress of SASAP in 1964, Professor Jan Bonsma presented his philosophy of functional efficiency in livestock (Bonsma, 1964), which has also been published in two books. Among others, he campaigned against the show standards of certain cattle breeds in which head and horns were the main criteria of breed excellence. He demonstrated, for instance with the horn growth of Afrikaner bulls castrated at different ages, that the horns of the earliest castrated bull grew out much longer and thinner than those of the intact bull. In recent master's studies at the University of Pretoria various measurements were taken of the horns, scrotums and other features of oryx gazelle and sable antelope bulls. In the mature bulls of both species, it was found that larger than average horns (used as weapons) were negatively correlated with fertility and masculinity – a largely forgotten concept that Prof Bonsma demonstrated in the 1950s and 1960s. However, it should be emphasized that these bulls were free-roaming and had not been subjected to intensive breeding protocols for trophy horns (Webb, 2018).

It was obvious that many situations and conditions in southern Africa differ markedly from those in Europe and the USA, and solutions have to be found locally. Climatic conditions would obviously be different. In those early days, Prof Bonsma demonstrated that cattle breeds from Europe were not necessarily adapted to the subtropical and tropical climatic conditions in southern Africa. For instance, Bonsma demonstrated what he called 'tropical degeneration' in woolly coated cattle at Mara Research Station. Recently their adaptation to harsh environmental conditions and natural resistance to internal and external parasites have renewed the focus in research on indigenous cattle and sheep breeds of southern Africa.

By the 1960s, it was well established that the natural grazing in large regions of South Africa was seriously deficient in protein and phosphorus (P), and a main constraint in livestock production on natural grazing. This was completely opposite to the situation in Europe and the USA, where excess nitrogen and P often caused major pollution problems. In the earlier days, research and presentations at congresses were dominated by nutrition. Consequently, the investigations on the supplementation of protein and P were major fields of research in cattle and sheep nutrition in the 1960s and before. As early as 1932 Theiler phrased the slogan 'Bonemeal for Beef'. In a review article at the SASAP Congress of 1974, Van der Merwe (1974) pointed out the differences in the P metabolism between sheep and cattle under grazing conditions. Van der Merwe also noted that although P levels in the grass in winter are low, cattle do not respond to P supplementation in winter, that is, during periods of neutral or negative liveweight gains. He speculated that this was associated with a simultaneous protein deficiency and indirectly an energy deficiency in the natural grazing. This described the concept of priority of nutrients where a response to P supplementation could be expected only when the requirements for nutrients with a higher priority in the body, energy and protein, had been met.

In the first nine issues of the Proceedings of SASAP (1962 to 1970), 25 contributions were published on the feeding of urea/biuret to livestock. This formed the basis for the practised winter supplementation in Sourveld regions of South Africa, with well-recognized names such as the 'Potch lick', (25% urea, 25% salt, 25% maize meal and 25% dicalcium phosphate or bone meal) (Lesch *et al.*, 1969). In the 1970s commercial feed companies took over and developed urea, P and molasses free-choice mineral mixtures in molasses block form, the so-called urea-containing rumen-stimulating supplements. Louw (1979) presented the article 'An evaluation of the application of stock licks in South Africa' at the 18th SASAP congress. Louw (1979) substantiated the Van der Merwe hypothesis that no response to P supplementation could be expected if the energy and protein needs of the animal had not first been met. In fact, Louw (1979) demonstrated that the supplementation of P alone to cattle grazing poor-quality grassland in winter had a negative effect on the weight and condition of cattle. At this stage, South Africa was considered a world leader in the field of supplementary feeding practices (Engels, 1983). In the 1960s and 1970s, basic investigations on the metabolism of urea in the rumen were conducted in the Digestion and Metabolism Research (DMR) Unit at Onderstepoort. A review of this research was published in SAJAS (Gilchrist & Schwartz, 1972).

South Africa has a proud history in the field of animal genetics and practical application of breeding principles to enhance livestock productivity. The formation of composite breeds such as Bonsmara, Dohne Merino, Dormer and Dorper, as well as breeding plans for breeds that originated in Europe and elsewhere, bear witness to the influence of South African animal scientists at the forefront of applying genetic and breeding knowledge to the benefit of efficient production. The very early establishment of the proper recording of pedigree and production traits for dairy, beef, small stock and pigs in the previous century also bear witness to the vision of animal scientists. Milk recording in South Africa started as early as 1917, and could be counted one of the first in the world. The global influences in animal breeding by people such as Professor Jan Bonsma, Dr Jan Hofmeyr, Professor Carl Roux and Professor Almero de Lange bear testimony to the sound foundation that had been laid for local animal scientists to build and develop new frontiers of animal breeding and genetics. This has led to South Africa being part of the global community for animal recording and genetic improvement. Membership of the International Committee for Animal Recording (ICAR) resulted to participation in global genetic evaluation for dairy cattle at the Interbull Centre from 1996. SASAS is currently the platform for animal scientists to innovate, learn, express and report on developments and practical application of animal breeding and genetics.

One of the very successful initiatives of SASAS has been the publishing of an issue of SAJAS (issue 3 of volume 43, 2013) on the topic, 'A balanced perspective on animal production, from environment to human health', in which many misconceptions about greenhouse gas production and livestock production were highlighted. Authorities contributed to various aspects of that topic and made special reference to the situation in southern Africa. By May 2017, the 13 articles in this issue had been cited 166 times and some of the authors had been invited to join international study groups, such as FAO teams.

A strong contingent of animal scientists has always focused on meat characteristics as required by the South African consumer and factors affecting quality. Dr Raymund Naudé played a prominent role in the development of carcass classification systems in the country. A variety of aspects were investigated, such as consumer preference, breed and species differences, factors affecting meat and fat quality, age, animal handling and animal welfare. In 2015 the special issue 'Relevance of the South African Carcass Classification System' was published in SAJAS.

In recent years, rapid expansions have taken place in game farming in southern Africa, though the utilization of wildlife has always received keen attention from animal scientists. During the 1970 congress, a symposium was held on production from wild ungulates. It included topics such as 'Physiological adaptations as a criterion in planning production from wild ungulates' (Louw, 1970), 'Research on the reproduction of wild ungulates' (Fairall, 1970) and 'Meat production from wild ungulates' (Von la Chevallerie, 1970). In 1983, an international symposium on herbivore nutrition in the subtropics and tropics was held, with the SASAP Trust Fund as one of the sponsors (Hofmeyr, 1982). This symposium led to the publication of the book *Herbivore nutrition in the subtropics and tropics* (edited by Gilchrist & Mackie, 1984), and the short presentations were published in two issues of SAJAS, volume 13 (1983). The utilization of wildlife has been a regular topic in congress proceedings, for example 'Strategic review of the wildlife ranching industry' by Dry (2014). Opposition to the utilization of game is often encountered, mainly from animal rights activists who do not seem to grasp the concept, 'Use it or lose it', as presented by Van Hoven (2014) at the 47th SASAS congress.

Status of knowledge in South Africa

It is crucial for South African animal scientists to have access to the latest developments in their fields of interest. Collaboration with researchers at foreign institutions and attendance of international conferences and workshops enables them to be exposed to all the latest developments. With the introduction of the

Internet, South African animal scientists had direct contact with experts internationally, access to online publications and could participate in webinars. Many commercial companies that operate in RSA are affiliated to or have been taken over by international companies, ensuring a continued exchange of knowledge.

To demonstrate, The Dairy Mail of June 2016 reported that three dairy herds in South Africa were among the top 12 highest producing large dairy herds in the world (Table 1). This establishes that these herds had each reached a level of excellence according to international standards in all aspects of dairy cattle production. The genetic potential of these cattle must be at a high level, meaning that they acquired the top genetic material available in the world, technology that has been built on the foundation laid by Dr George Hunter and collaborators, who transferred sheep embryos in a rabbit between continents. Furthermore, it would have required high precision in nutrition and all management aspects of dairy farming such as health management, dairying practices and technology and environmental control. This reiterates that the know-how is present in the country or can be acquired from where it is available. However, economic considerations would probably dictate whether such intensive systems would be feasible in the long term.

Table 1 South African dairy herds in top 12 large herds with highest milk production in the world

Position	Herd name	No of cows	kg milk/305 days
7	C.J. Stark	886	13840
10	J.K. Basson	442	13281
11	Inovula	470	13028

Source: The Dairy Mail, 2016

It would create an incorrect impression and would be an injustice to many researchers not to mention that many South African animal scientists have made significant scientific contributions that are not necessarily relevant only to the southern African agricultural scene. To mention just one, a frequent keynote speaker at SASAS congresses is Professor Rob Gous of the University of KwaZulu-Natal. He is the first and thus far the only animal scientist in South Africa with an A rating as researcher with the National Research Foundation (NRF). His research on a variety of topics related to poultry and pigs is internationally recognized and acknowledged.

Professional status for animal scientists

At the 1970 annual general meeting, SASAP Council was instructed to investigate the possibility of registering animal scientists professionally. In 1971, an interim council for the registration of animal scientists was formed with Dr Harry Luitingh as convener, and on 1 February 1974, the first South African Board for Professional Animal Scientists was elected. Their vision was that an animal scientist should be identified as the expert in his/her field and the best qualified person to advise on matters such as animal breeding, nutrition and general management of livestock. The acronym Pr. Anim. Sci. was decided upon. After wide consultation and consideration, it was realized that the status of professional animal scientists would be recognized only if approved by Parliament and that this could be achieved if the Board for Professional Animal Scientists formed part of the South African Council for Natural Scientists. The Natural Scientists Act 1982 (Act 55 of 1982) received statutory status in 1983 and professional animal scientists were officially recognized with the acronym Pr. Sc. Nat. (Anim. Sci.). This act was revised in 2003 and animal scientists can now register with the South African Council for Natural Scientific Professions (SACNASP) in terms of the Natural Scientific Professions (NSP) Act (Act No 27 of 2003).

SASAS is the voluntary association that is recognized by SACNASP as being representative of the animal science profession. It is accepted that SASAS through its council and committees acts as the mouth-piece for animal scientists. Protecting the professional status of the animal scientist is a major objective of SASAS and requires close liaising with related professions such as veterinarians. In a 2016 initiative, SASAS put forward the document 'Alignment of the Animal Science and Veterinary Science Professions of South Africa' (Casey, 2016), in which the close association between animal scientists and veterinarians was analysed. It has been submitted to SACNASP for consultation with the Veterinary Council and ultimately acceptance by Parliament.

Although congresses are often the main direct contact that members have with the society and are perceived by many as the only reason (or benefit) for being a member of the society, organising congresses is but one of its activities. Most of SASAS activities on behalf of animal scientists are performed behind the scenes. They are summarized in the objectives of the society's constitution:

1.3 'Objectives

The objectives are

- 1.3.1 To encourage high standards of service to the animal industry by upholding professional integrity and ethical codes
- 1.3.2 To serve as mouthpiece of the profession on all matters relating to animal science, production and animal products in compliance with public welfare and general interest
- 1.3.3 To encourage the services of professional animal scientists whilst protecting their professional interests
- 1.3.4 To advise on high standards of education, research, technology and science-based policy pertaining to animal science, production and products
- 1.3.5 To ensure the scientific and professional status of members by insisting on continuous training of members active in the profession
- 1.3.6 To liaise with local and international organisations and institutions with similar or related interests'

SASAS Council acts as mouthpiece of and custodian for animal scientists. It protects the interest of the animal scientist, is proactive in promoting animal science and acts as a watchdog over the professional activities of members. A recent major development is the programme of Continuing Professional Development (CPD) for professional animal scientists, which was launched by SACNASP on 1 April 2017. Animal scientists now have the opportunity to earn CPD credits when advancing their knowledge in their own fields. SASAS administers this programme and arranges opportunities for members to obtain CPD credits.

Standardized training of animal scientists at South African universities is an ideal, though this should not impede on the sovereignty of universities. During SASAS congresses discussion sessions are held at which the curricula of undergraduate studies are discussed with the objective that the training of animal science students should be of a similar standard at all South African universities.

SASAS recognises excellence among its members and students. A number of awards are made annually to deserving members in various categories. Undergraduate and postgraduate students of excellence are rewarded by the main SASAS body, by branches or by industry partners. Awards are important in fostering cohesion and pride in being part of the animal science world.

SASAS is actively involved in protecting the fields of practice of animal scientists by taking disciplinary measures against non-registered advisors in animal agriculture and unprofessional conduct of registered animal scientists. This is done with the legal assistance of SACNASP. A problem in implementing disciplinary actions is that action can be taken only when proven evidence is obtained. SASAS has conducted a successful disciplinary hearing against the unprofessional conduct of a 'professional' animal scientist through SACNASP.

Conclusion

By being a member of SASAS, an animal scientist should be contributing to the promotion, protection, and defence of his/her profession. For the society and the professional animal scientist to be successful and prominent, it is crucial that all professional animal scientists should promote their profession themselves, such as when making public appearances on podiums and in the media.

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