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Harvest SA

Securing South Africa's Food Resources

Farming with science

Adapting to the harsh realities of today

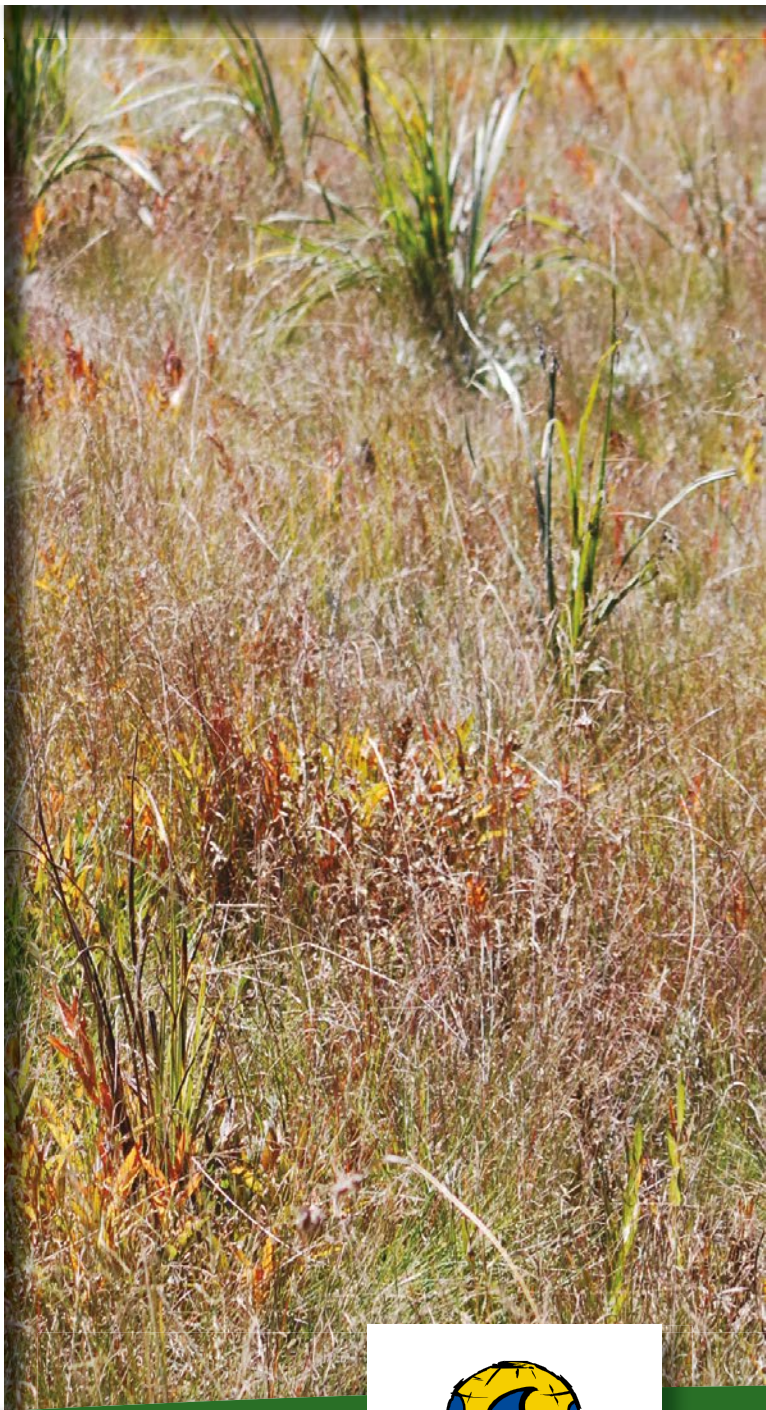
ISSN 2305-0551 ***Harvest SA*** **wins gold at the international Tabbie Awards 2013 in the Best Single Edition Category**

TABBIES 2013 Award Winner

TABBIES 2014 Award Winner

Tough times to come

WATER IS A NECESSITY FOR ALL LIFE ON EARTH. A LACK OF WATER CAN DEVASTATE CROPS AND LIVESTOCK. WHAT CAN YOU DO TO PREVENT YOUR FARM AND LIVELIHOOD FROM SUFFERING AS A RESULT?



Any farmer worth their salt will know that droughts are inevitable, and savvy South African farmers plan around the next drought cycle to ensure good business practice.

With a forecast predicting rain to fall as late as Autumn 2016, the country is being urged to use water sparingly wherever possible.

As every drop counts consider the following:

- Convert irrigation system to be more water efficient.
- Flood & furrow irrigation are the lease efficient.
- Check your piping system, each simple leak dripping one drop per second can waste up to 11000L per year.
- Seal storage dams. Leaks in cement dams can be considerably reduced using salt. (Ask your co-op for advise)
- Check for leaks in the houses on the property.
- Water early morning or late afternoon only.
- Connect rain tanks to every building.

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EDS NOTE

GREG PENFOLD
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If the prolonged drought that South Africa has been suffering was cause for concern at the beginning of 2015, now, as the year draws to a close, it can be seen for what it is: an unmitigated disaster that has devastated agriculture and is now beginning to erode the economic base of the country as a whole.

South African Water Minister, Nomvula Mokonyane, was recently quoted as saying that South Africa is currently experiencing its worst recorded drought since 1992, and as a result two of the nine provinces - Mpumalanga and Limpopo – have been declared disaster areas for agriculture.

As food production capacity becomes compromised as a result of drought-related crop failures, so hefty increases in the price of staples such as bread, mealie meal and maize can be expected. These increases, in turn, are likely to have a catastrophic impact on society, especially those for whom the price of a loaf of bread is already a burden.

While it can be seen as positive that meat is likely to become cheaper in the run-up to Christmas, as farmers slaughter animals in need of feed and fodder, this cannot be seen as a sustainable outcome.

It should not be forgotten that millions of South Africans already have to borrow money before month end in order to put the most basic food on the table.

What is the answer? Faith offers a solution to many. Indeed, Grain SA has organised a mass prayer meeting to take place at Nampo Park near Bothaville in the Free State on 27 November.

Perhaps another answer lies with innovation and technology. Climate change is something that everybody will be forced to adapt to one way or another; South Africa is having to adapt sooner rather than later.

South Africa is no stranger to scientific adaptation in the agricultural field. Indeed, it has been a forerunner in the cultivation of genetically modified maize, and is now a leading contributor to research in fields ranging from soil to cattle breeding and pest control. Much of these efforts are coordinated by the Agricultural Research Council (ARC), among whose latest findings are reflected in this issue of Harvest SA.

EXPAND YOUR OPERATION

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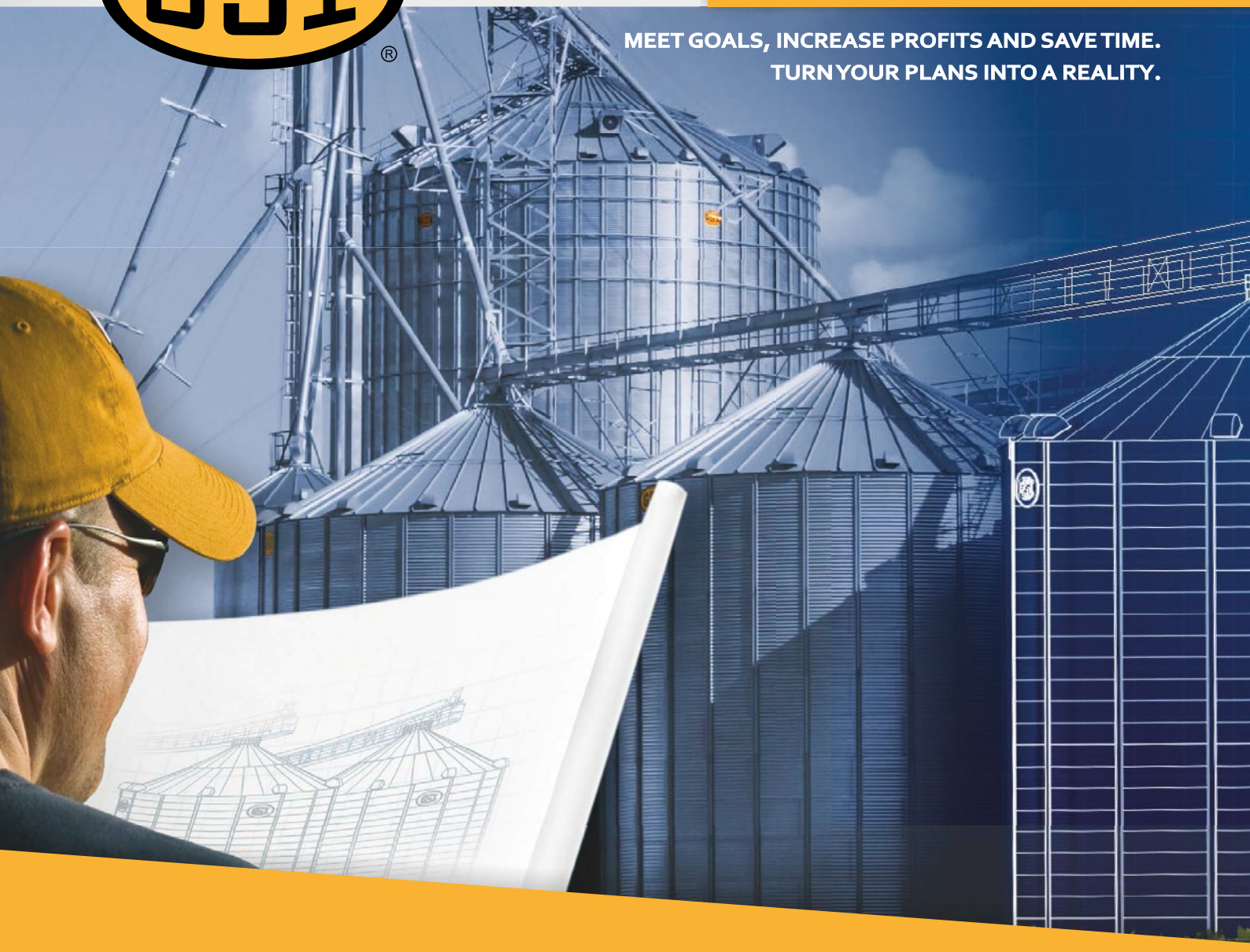

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Partnership takes South Africa one step closer to manufacturing life-saving vaccines locally

The Minister of Science and Technology, Naledi Pandor, said the Pfizer-Biovac partnership paved the way for South Africa to become a local manufacturer of life-saving vaccines.

On 3 November 2015 , Minister Pandor officially launched a significant public-private partnership between global pharmaceutical giant, Pfizer, and the Biovac Institute (Biovac), which aims to enable local manufacture of a vaccine against the pneumonia-causing bacteria.

Prevenar 13, which has proven to be effective in preventing pneumococcal infection in children from six weeks to five years, and in adults of 50 years and older, will be manufactured at Biovac's new commercial-scale facility in Cape Town.

Minister Pandor said that the partnership demonstrated South Africa's ability to do successful technology transfer in the bioeconomy space. "This demonstration of successful technology transfer with Pfizer is one of the prerequisites for unlocking future technology transfers that will see Biovac becoming the major vaccine manufacturer in Africa."

The Minister said this strategy would alleviate South Africa's continued dependence on imports and the consequent threat to security of supply of essential vaccines.

Jennifer Power, the South African Country Manager for Pfizer Inc., said, "Preventing pneumococcal disease is a priority for Pfizer in South Africa. We have already seen great results since vaccination was introduced, and we are pleased to partner with Biovac, sharing best practices, knowledge and skills to continue to make a real difference for patients. We are confident that this partnership will help ensure the sustainable supply of our pneumococcal conjugate vaccine for patients in South Africa."

Dr Morena Makhoana, the Biovac CEO, said, "Biovac is committed to developing and establishing a strong and locally relevant vaccine capability, and, more specifically, vaccine process and product development in South Africa. We believe that this partnership with Pfizer will strengthen our ability to deliver a potentially life-saving vaccine for South African children, as well as accelerate our technological knowledge in vaccine development."

The Minister of Health, Dr Aaron Motsoaledi, said that he believed that the vaccine partnership should be celebrated, as it would benefit not only South Africa but the region. He explained: "The launch of the local manufacture of pneumococcal conjugate vaccine is a stepping stone to the ultimate dream of developing our own vaccines on the continent, for the continent. "

The partnership facilitates technology transfer from Pfizer to Biovac, in compliance with international Good Manufacturing Practice standards. The process involves the formulation (combining 13 different strains or serotypes of bacteria called Streptococcus pneumoniae) and filling a syringe with this combination vaccine (Prevenar 13), resulting in a prefilled syringe, a new technology for Biovac.

Pfizer will also implement a skills-transfer process that will result in Biovac employees being able to continue with manufacturing the vaccines after the transfer period.

Biovac was established in 2003 as a public-private partnership with the aim of restructuring state vaccine assets to ensure domestic capacity in vaccine production, as well as a local skills base.

The Department of Health introduced Prevenar 13 to South Africa in 2011. Results from a laboratory-based survey, published in the New England Journal of Medicine in November 2014, showed that the introduction of the vaccine in South Africa substantially reduced invasive pneumococcal infections in children one of the top five killers of children under the age of five.

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SCIENCE FORUM

South Africa

Scientists, students, public and private sector representatives and civil society constituents, from South Africa and abroad, will be attending the Department of Science and Technology's first annual Science Forum at the CSIR Convention Centre, Pretoria, on 8 and 9 December 2015.

Under the theme "Igniting Conversations About Science", the Forum aims to enrich the national discourse on the importance and the role of science and technology, and to provide an informal platform for the Department to consult with a broad range of stakeholders, as well as to foster international partnerships.

The Forum comprises a rich and diverse programme with leading thought leaders addressing themes such as science's response to societal challenges, skills for the knowledge economy, the agenda for Africa, and the conversation between science and society.

CSIR International Convention Centre

8-9 December 2015

www.sfsa.co.za

INDIGENOUS KNOWLEDGE SYSTEMS

Exploring indigenous knowledge at IKS expo

Did you know that cowpeas are indigenous to Africa and are a good source of protein, calories and minerals, and a good replacement for meat in one's diet?

Commonly known as dinawa in Sesotho or imbumba in isiZulu, cowpeas are a member of the legume family. They are a drought-tolerant, warm-weather crop, so well adapted to dryer regions.

These and many other items were on display at the 5th Indigenous Knowledge Systems (IKS) Expo, organised by the Department in Bloemfontein last month.

Cowpeas and other nutritional and affordable indigenous products were used by communities in days gone by, and these people managed to survive without meat or the processed food products found on shop shelves today.

One of the exhibitors, Mr Ramarumo Moalosi of Hoër-Op Farm in Bultfontein, said: "Cowpeas are an important complement to the predominantly cereal diet in many countries." He believes that if people made cowpeas a regular part of their diet, they would have one less thing to worry about health-wise.

Moalosi explained that a cowpea can consist of up to 25% protein and is low in anti-nutritional factors. (Anti-nutritional factors are substances that reduce the absorption of one or more nutrients.) The beans are very easy to prepare and retain all their nutrients when boiled.

They can grow well even in poor soil with more than 85% sand, less than 0,2% organic matter, and low levels of phosphorus. Cowpeas are also shade tolerant, so are compatible as an intercrop variety with maize, millet, sorghum, sugarcane and cotton. This makes them an important component of traditional intercropping systems, especially in complex and elegant subsistence farming systems.

Also at the IKS expo was Mandla Tshabalala, who uses indigenous knowledge to provide health solutions. He believes that nature holds the treatment for many illnesses. He processes raw fruit using a special juicer (that produces juice without pulp) to assist in treating diseases.

He is also a permaculturist (horticulturalist who uses renewable resources and a self-sustaining ecosystem). He supports sustainable practices using natural remedies and alternative technologies that do not harm the planet.

A variety of herbs were showcased at the exhibition. Some of them are found in

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supermarkets, like rosemary and mint. Other herbs on display included St John's Wort and Gingko biloba which, when mixed together, may improve one's mood. However, little was said about the possible side-effects of these natural remedies.

In 2010 House of Hemp became the first private company in South Africa to be awarded a six-year exclusive permit from the Department of Health and of Agriculture, Forestry and Fisheries to legally cultivate and process hemp in South Africa.

Hemp is from the same plant species (Cannabis) as dagga (marijuana). Although similar in appearance, the dagga plant may develop more side branches and has a more bushy appearance than hemp. Hemp is mainly cultivated for fibre and oil and, because the delta-9-tetrahydrocannabinol (THC) content is very low, it cannot be used as a drug. Dagga, on the other hand, has a low-fibre content and is therefore not suitable for fibre production.

Today, House of Hemp, based in Meyerton on the Vaal, is gradually expanding into a new industrial market supplying hemp fibres and oils, as well as related by-products like tow and biomass for more sustainable industrial practices.

Headed by Dr Thandeka Kunene, the company has developed hemp farms in Gauteng, the Eastern Cape, Western Cape and KwaZulu-Natal.

Ms Fikile Ngema, who was at the House of Hemp exhibition, says work that is done at the company shows that hemp production can contribute to poverty alleviation.

"Cultivating and processing hemp offer a lot of opportunities. For example, hemp oil has omega-3 fatty acids that help to reduce the chances of heart attacks in humans," says Ms Ngema, adding that paper money is made of hemp.

The Expo was used as a platform to deliberate on indigenous knowledge within the science and technology landscape to benefit communities where indigenous knowledge is largely practiced.

With over 30 participating exhibitors, the IKS Expo brought IKS experts, holders of indigenous knowledge and government together to engage in talks on indigenous knowledge and sustainable development.

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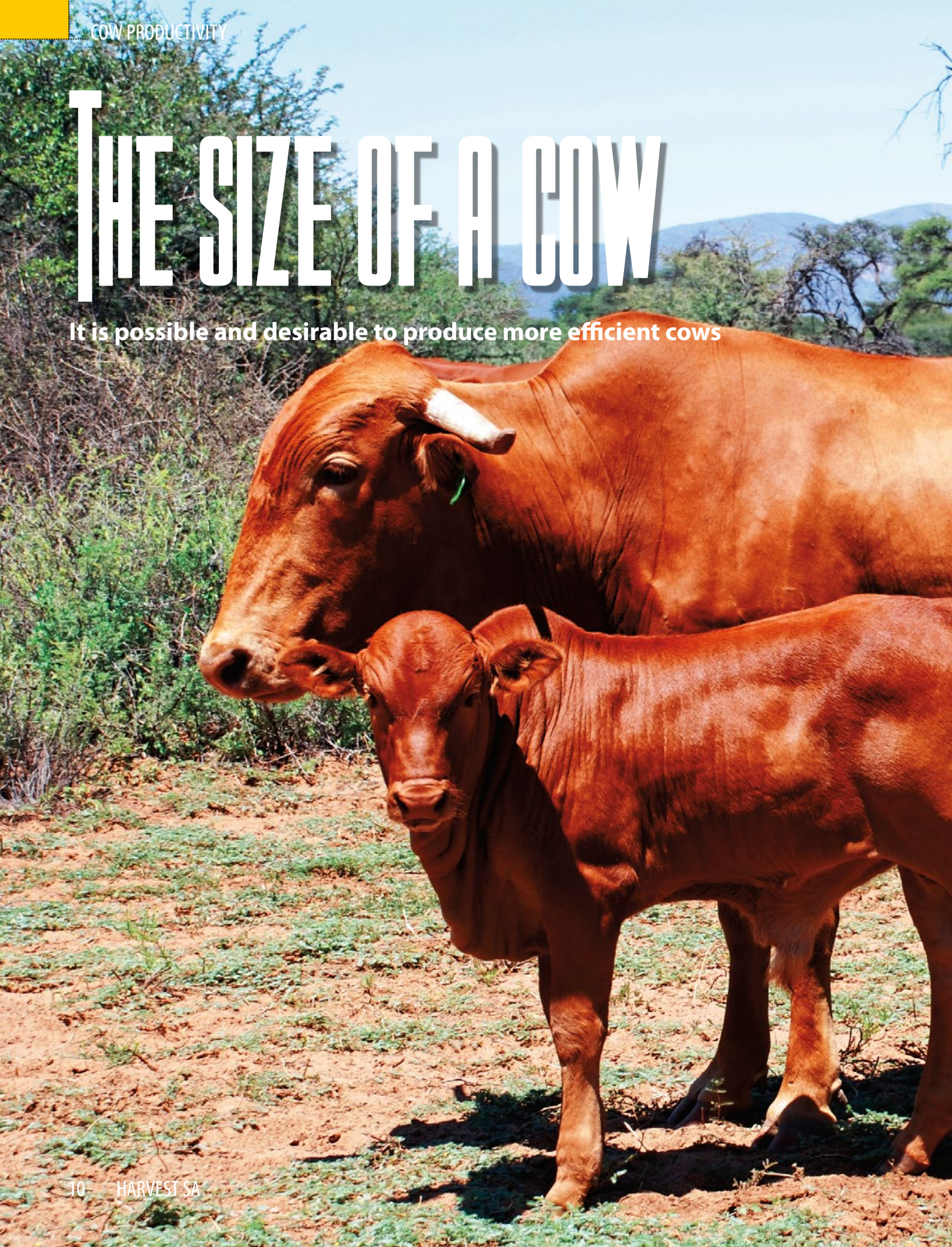
THE SIZE OF A COW

It is possible and desirable to produce more efficient cows



Cow productivity is usually associated with the frame size of a cow. Bigger cows tend to produce bigger calves at birth as well as a heavier calf at wean which is related to a higher or better price per kilogram paid by feedlots. But is bigger always the more profitable option in a wean calf production system? Surely other factors which can play an important role should also be considered. The input costs versus output should form the basis when considering a calf production system aimed at the feedlot market.

Heavier animals are usually associated with a bigger frame, as mentioned, which results in an increase in maintenance requirements because of a higher milk production, high visceral organ weight and an increased need for feed supply to sustain high production. These animals are usually higher in body lean weight and lower in body fat when compared with smaller frame animals which are associated with lower maintenance requirements and lower milk production. Small frame animals have a lower visceral organ weight, low body lean weight and higher in body fat weight. These animals require a lower feed supply than their bigger frame counterparts. Smaller frame animals will typically be those which reach maturity at an earlier stage in life than big frame breeds.

This is typical of the two extreme frame sizes which are usually breed specific, but animals within the same breed can also differs quite significantly in frame size which implies a need for balance and a need to identify an adapted, optimum animal based on the production environment and market requirements.

Breeding objectives to improve the efficiency of beef production

It is important to maintain or increase production per unit; either growth or milk production, to enable the commercial beef producer to ensure sustainability of his enterprise or increase profitability. Due to the important role of the cow-calf phase in the production of beef it makes sense

to concentrate on this phase in order to increase the efficiency of production. Sixty to seventy percent of the cost in producing beef is due to feeding costs and the solution should be to look more closely at the bull and cow for feed efficiency.

According to literature, the genetic variation for maintenance linked to energy requirements is moderate to high and this highlights the value of genetic selection to improve feed efficiency. Relevant research is currently applied by all the role players in South Africa. Young bulls are tested in centralized testing centres of the Agricultural Research Council to identify the most effective young bulls at converting feed into meat. Feed conversion ratio has always been seen as an indication of feed efficiency and is a ratio that indicates the amount of kilogram feed needed by the animal to convert into one kilogram of live weight. This ratio unfortunately does not serve as an ideal trait for selection purposes; because of the combination of two combined traits, e.g. feed intake as well as growth. If used as a selection criteria the outcome will always be selection for growth as well as an increase in body weight and/or frame size.

When testing animals for residual feed intake these two traits can be scientifically separated and the most efficient animals in relation to feed intake can be identified independently from growth. It makes sense to select on male animals due to the big genetic influence in which the bull has on a cow herd. Also keep in mind if the female progeny of these bulls are kept as replacement heifers, genetic improvement can then be established within the herd by improving the feed efficiency of the cow herd, and therefore the efficiency of beef production for a specific environment.

Cow weight as an indication of cow size and the tempo of calf growth are essential factors to be considered by the commercial breeder to ensure efficiency of his production system.

Methods to evaluate cow efficiency

According to literature numerous methods have been investigated in the past to evaluate cow efficiency. Kilogram of calf weaned per cow exposed is a combination of production and fertility of the cow to produce. Another option is kilogram of calf weaned per cow exposed per kilogram of cow weight which is the well-known cow-calf ration used by farmers to evaluate their cows. The norm is usually a cow able to wean at least 50% of her own weight, but this will only benefit the smaller cows. Keep in mind that 50% of a 300 kilogram cow will produce a 150 kilogram calf which may not be in demand by feedlots. In general, feedlot agents will measure calf wean weight as an indicator for potential growth in the feedlot.

The option of kilogram of calf weaned per cow exposed per unit of feed requirements (large stock unit) makes provision for feed efficiency as well as the production ability and fertility of the cow.

Cow efficiency of four landrace breeds of South Africa

Research in the efficiency of production for the four landrace breeds has recently been undertaken by researchers of the Agricultural Research Council. Production, maintenance and fertility formed the three important components of efficiency. Traits such as the phenotypic weaning weight, feed requirements of the dam linked to large stock unit, frequency of calving (inter calving period) and calving percentage formed the basis of these three components.

Large stock unit was defined as the equivalent of an ox of 450 kilogram, with an average daily gain of 0.5 kilogram on grass pasture

with an average digestible energy content of 55% and 75 MJ metabolizable energy. This is an equivalent of 9 kilogram dry material intake per day. Large stock units based on this equation was calculated for the two small frame breeds (Afrikaner and Nguni) and for the two medium frame breeds. (Bonsmara and Drakensberger)

A predicted calving percentage was calculated from the average inter calving period per year for each breed. Cow efficiency was calculated as kilogram calf weaned per large stock unit.

The two medium frame breeds produced the heavier calves at weaning over time with an increase in three of the breeds except the Nguni which showed a decrease in kilogram of weaning weight.

Summary of cow efficiency of the four landrace breeds over 30 years

The Afrikaner breed improved on weaning weight and decreased in mature weight with an improvement in inter calving period with an overall improvement of 18.3 % in cow efficiency. Although the Bonsmara also showed an increase in weaning weight and improvement in inter calving period the simultaneous increase in mature weight prevents a bigger overall improvement in cow efficiency. Because of the drastic decrease in inter calving period for the Drakensberger they managed an improvement in cow efficiency. With the absence of a common breeding strategy the Nguni breed could not manage an improvement in wean calf production but still managed an improvement in cow efficiency through the decline in inter calving period.

What can be done to improve cow efficiency in the national herd?

Improvement in fertility, which is indicated by the calving percentage, needs to be increased from the current 62% of the commercial sector. The common objective should be an increased wean calf production without an increase in mature cow weight. This can be accomplished by either making use of cross breeding or an increase in the milk production of the dam. The ideal is to produce more from less resources to improve on the efficiency of beef production.

According to a prominent and successful Bonsmara breeder the goal of producing calves at birth between 35 and 37 kilogram with an average growth of 1 kilogram per day up to weaning will ensure a 240 kilogram wean calf, which is in demand by feedlots. This can be a benchmark for beef farmers farming with medium frame animals.

He also calculates profitability as the number of calves weaned from the number of cows mated during the mating season.

For the commercial producer, a goal to produce the desired weaner for the feedlot and to satisfy his market by succeeding in that. According to Dave Ford of the SA Feedlot Association, an average wean calf of 235 kilograms would allow the feedlot to add an additional 200 kilograms of meat over a three month period to ensure a profitable calf for the feedlot production system. This implies that the most profitable calf is not always the heaviest calf at wean , but rather an optimum wean calf weight which is acceptable to market requirements.

Management

Management is an environmental factor which has a big influence on the efficiency of cow-calf production. The need is for replacement heifers of good quality genetics to maintain production of the cowherd and also to improve production of the herd. Older cows become less efficient with a decline in milk production and have to be replaced with heifers of good quality.

Manage the condition of cows before mating as well as before calving to ensure higher percentage of pregnancy and a stronger calf at birth. Over-feeding will also increase the birth weights of calves and this should be be prevented. The production environment will determine the optimum cow size and not the other way round. If the breeder tries to create an environment for the optimum cow by supplement feeding it is not a sustainable environment for the cow herd and can influence the sustainability of his production system. Always keep in mind that the easier the cow gives birth the quicker and shorter her recovery will be after birth, and as a result it will be easier to get her pregnant again with the following mating season.

Genetic improvement.

The logical way to ensure genetic improvement is to always improve on the current herd sire by utilizing BLUP breeding values and the purchase of registered bulls. Never buy bulls without performance data and BLUP breeding values.

The use of a terminal bull is another option to increase growth in the herd but the progeny of these bulls should be slaughtered and the females should not be kept as breeding material or replacement heifers. Always consider specific traits of importance when selecting bulls. These important traits need to be in balance for the breeding of replacement heifers. Traits to be considered will always be fertility, growth, frame size and efficiency traits.

Get hold of the auction catalogue as early as possible prior to the auction date and do a "genetic selection" of bulls that fit into the breeding objectives specified for the herd.

Birth direct breeding values should always be on breed average or below average. Wean direct breeding values should be above breed average as well at the maternal breeding value at wean. Average daily gain for improvement on growth ability should also be above breed average. Scrotum circumference as an indication of fertility should also be higher or better than breed average.

Mature weight should be on breed average or below. Other efficiency traits such as feed conversion ratio and residual feed intake should be below breed average.

Conclusion

Dr Gordon Dickerson used to say "On a farm, an efficient cow herd exhibits early sexual maturity, a high rate of reproduction, low rates of dystocia, longevity, minimum maintenance requirement, and the ability to convert available energy into the greatest possible kilograms of weaned calves".

Maximum profitability is usually achieved before maximum productivity.

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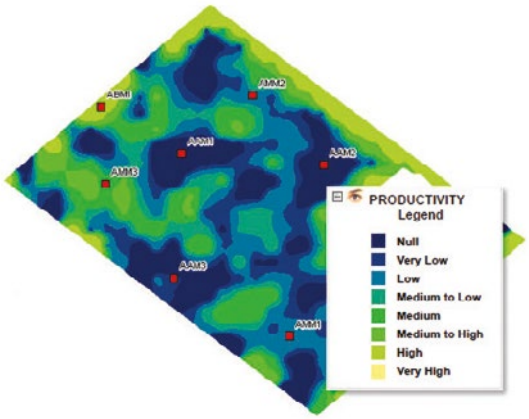
A new way of farming

How information technologies will change the way we work

Precision farming - challenges & opportunities

The challenges in food production during the next decades are well known and have been thoroughly documented - by 2050, the projected world population will reach 9 billion people, which combined with increasing levels of consumption, will require to duplicate the current levels of production. To meet this daunting challenge, it's critical to make a more efficient use of resources, increase productivity, without substantially modifying the agricultural footprint.

In line with this goal, the use of a Site Specific Management approach and Precision Farming technologies, enabling producers to make a more efficient use of seeds, fertilizers and agrochemicals, while optimizing crops yields. Basically, it requires to identify the productive potential of each management zone within the field. Decisions are made based on productivity information and analysis of the causes for limitations. As a result, specific recommendations are developed, inputs optimized, costs reduced, and each zone is managed according to its potential.



GeoAgro Africa's technologies allow to determine a field productivity by analyzing imagery of past seasons, and use it as the starting point for variable seed or fertilizer recommendations

The results can be remarkable. By regularly testing crop season results after applying GeoAgro Africa's Precision Farming Cycle, farmers have verified returns that range from R300 up to R2500 per hectare, due to optimization of a variety of factors, such as phosphorus fertilization, variable rate seeding, or simply adjusting crop rotations and matching zone potential with the right crop or variety.

For instance, site specific management combined with the right choice of fertilizer, shows the potential to improve the bottom line, as illustrated by the following picture of a farm, showing a field with optimized recommendations on the left, and the other without.

In this case, productivity maps were used to determine where to take the most representative samples and to determine where problem areas are, how big they are and how field can be divided into zones for corrections. Soil samples were then taken and recommendations were made for soil corrections as well as plant nutrition.

Get started by asking the right questions

Today, more and more technologies are within reach, to move forward along this path. Remote sensing and the crop history can be used to Identify management zones and limiting factors, GPS and mobile data collectors help us keep track of what's happening in the field, imagery supports monitoring the crops through the season, field computers can help us monitor seed, fertilizer, agrochemical applications, yield mapping can help us to accurately analyse what happened and where. These are just some of the technologies that the farmer will see gradually added to the traditional tools and equipment, and more is coming up!

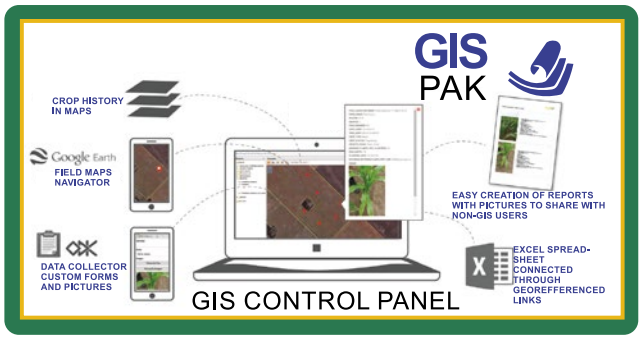
However, there is a risk in incorporating these promising technologies in a non-effective way, adding costs to the operation without visible results. One of the most common mistakes when incorporating precision farming technology, is not defining the business and agronomic goals, as well as a plan to incorporate them as part of the operations. As a consequence, we often see that a producer invests on a new yield monitor, or a drone, or purchasing satellite imagery, but the team is not interested or trained to process or analyse the resulting maps.

So the first and most important question is - why incorporate technology? This key starting question will drive the entire process, and will depend on the context and business goals that different farmers might have. Typical answers can be diverse, some of the critical goals that are set by GeoAgro Africa's farmer clients include…

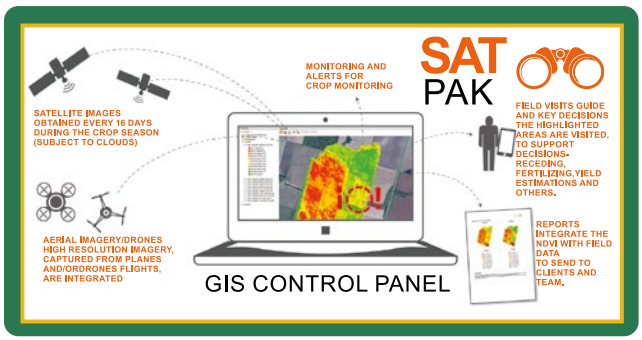
- Organize your farm information in a map and systematic records, for improved traceability, and measuring the impact of each decision.
- Optimize plant density, and support reseeding decisions
- Optimize pest & disease control, and agrochemical applications.
- Support fertilization decisions
- Site specific management by macro-zones: optimize inputs (seed and fertilizers), by managing zone variability in large areas that do not require Variable Rate Technology (VRT)
- Site specific management with VRT equipment, for further optimization of inputs
- Harvest Control
- Post-season analysis - profits by zone

A Flexible framework to assure success

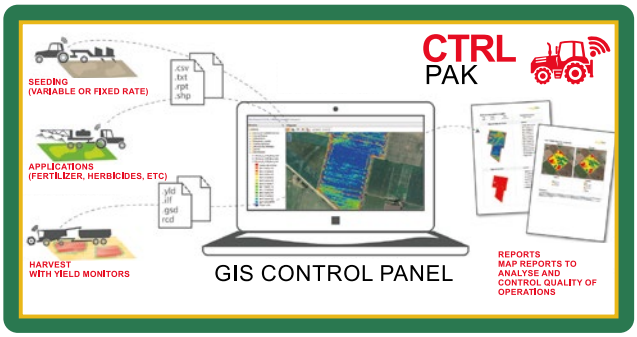
Having set the right questions, the next step is to define clear goals, and a plan to incorporate technologies as part of the operations. GeoAgro Africa's solutions are designed to help farmers assure success by incorporating the technologies that fit their goals, supporting different levels of farm production needs, and a gradual adoption of technology.



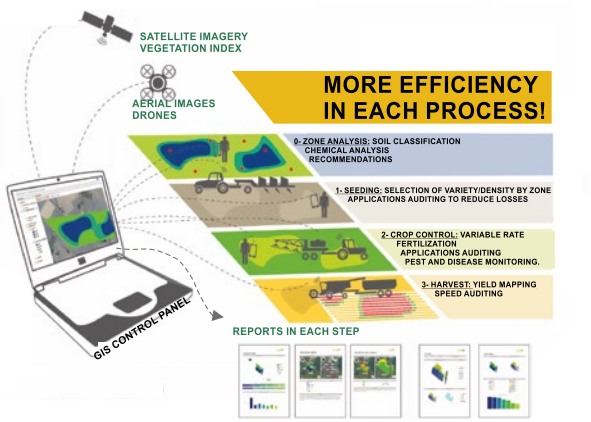
The GIS PAK helps farmers organize the crop season information in Maps, as well as keep Records with GPS and pictures of field visits. Everything is then integrated, easier to see, share and analyse.



The SAT PAK enables farmers to use satellite or aerial imagery to monitor the crops evolution. This information is used to support scouting and field visits, and making decisions at key moments of the season, such as evaluating plant population, fertilization, or yield estimations. In general, it helps to detect issues to make timely decisions, or plan for the next season



The CTRL PAK (Control Pack) helps to audit operations and improve efficiency of applications. By automating the mapping of seeding, fertilizing operations, and yields, it enables to assess the quality of operations, controlling rates and speed. This reduces negative impacts, and allows to make corrections to avoid future losses.



The PF Cycle is the most comprehensive Solution, which allows to recognize the productive potential of each zone in your fields, and manage each zone more efficiently. This enables to make variable rate applications of seeds or fertilizers to improve efficiency, yields and profits of the farm business.

About GeoAgro Africa

GeoAgro Africa's mission is to support farming enterprises in the effective implementation of technology, integrating them within their productive processes. GeoAgro Africa provides a unique combination of software tools, farm data geoprocessing, and implementation support, to assure the effective and profitable use of technologies.

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Damming up erosion

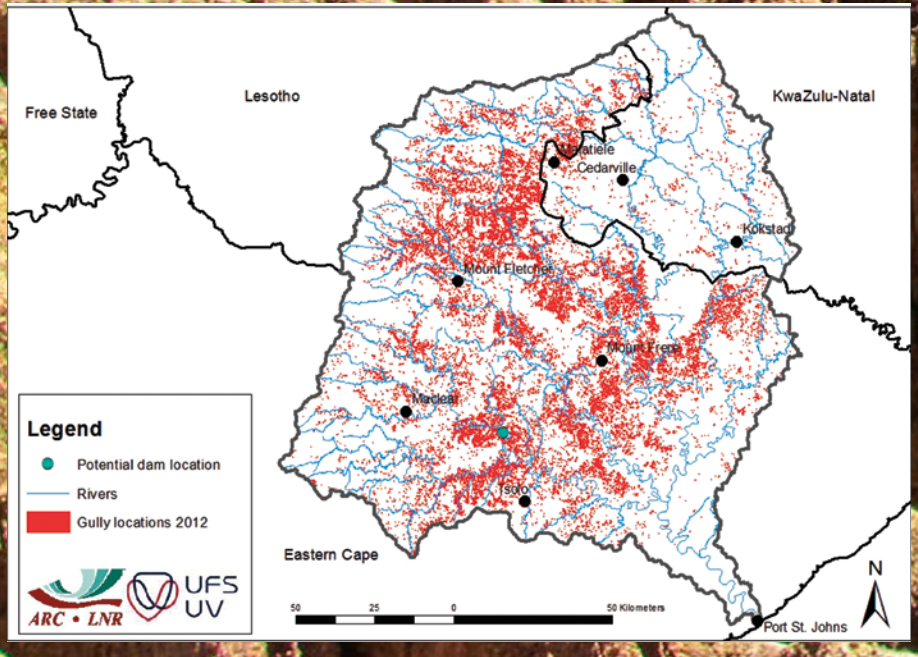
Sediment yield modelling in the Mzimvubu River Catchment

According to researchers from the Agricultural Research Council and University of the Free State, soil erosion control may have an impact on the lifespan of a dam. In a recent project funded by the Water Research Commission entitled "Sediment yield modelling in the Mzimvubu River Catchment" they modelled the flow and sediment yield in the catchment, making it possible to estimate dam life expectancies for different potential dam sites.

The Department of Water and Sanitation is planning water resource development in the Mzimvubu River Catchment, which is on record as the only large river network in South Africa without a dam. The Mzimvubu Water Project will involve the building of two multi-purpose dams on the Tsitsa River, namely Ntabelanga (for irrigation) and Laleni (to generate hydroelectric power). Recent soil erosion mapping and modelling studies, however, indicate that large parts of the catchment consist of highly erodible soils with widespread soil erosion evident. These studies, nonetheless, provide no information about where material moves to or on the sediment yield because a significant part of the eroded soil will deposit again before reaching a river channel or catchment outlet. Furthermore, most regional studies across the world emphasize the sheet and rill aspects of the erosion cycle, but few map and/or model gully erosion at large spatial scales. Modelling the sediment yield contribution from gully erosion at a large catchment scale has not been performed before in South Africa.

In order to provide a comprehensive overview of sediment yield in the Mzimvubu River Catchment, two approaches were implemented: (1) sediment yield modelling using the Soil and Water Assessment Tool and (2) modelling the sediment yield contribution from gully erosion using remotely sensed data and geographical information system (GIS) techniques.

Integration of the sheet-rill and gully results produced a total sediment yield map of the Mzimvubu River Catchment, with an average of 50 t/ha/yr. In the Ntabelanga



Dam Catchment, the sediment yield ranged between 10 t/ha/yr upstream to 225 t/ha/yr at the future dam outlet. The annual average sediment output in the Ntabelanga Dam Catchment ranged between 0.25 million t/yr upstream to nearly 10 million t/yr at the future dam outlet. Gully erosion feeds massive amounts of sediment into the river network, contributing approximately 20 times more to the sediment output than sheet-rill erosion. Based on sediment yield results and digital elevation data in a GIS, the life expectancy of the dam could be between 34 and 49 years without proper siltation prevention or design measures. The future dam at Ntabelanga could therefore experience a similar fate as the Welbedacht Dam near Dewetsdorp in the Free State where the storage capacity decreased by more than 80% just 20 years after completion.

The researchers stress that the results should not be interpreted as absolute values since soil erosion is naturally highly variable and the sediment yield and dam life expectancy are based on a 5-year time frame between 2007 and 2012 (for which the most recent multi-temporal and high resolution imagery are available). Nevertheless, modelling the flow and sediment yield in the Mzimvubu River Catchment has made it possible to identify major soil erosion processes and sediment generating areas. Understanding these processes and factors will enable area-specific management intervention and erosion control measures, and could aid in dam design. Results will also aid in area-specific rehabilitation of gullies and the allocation of scarce conservation resources.

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Resistance is useless

DNA tools have been developed to fight target-site herbicide resistance

Misuse, overuse and underuse of post-(crop) emergence herbicides to control ryegrass in crop production systems has resulted in the development of herbicide resistant ryegrass biotypes. There are several kinds of resistance mechanisms. One of these is called target-site herbicide resistance. It works in such a way that herbicides are unable to bind to the target-site and are unable to inhibit that specific enzymatic/biochemical pathway and the plant survives. Herbicide resistant weeds are a common occurrence in South Africa, especially in the Western Cape. A particularly troublesome weed is ryegrass (Lolium spp.), with billions of Rands already spent towards its control. This input cost is further amplified by the development of herbicide resistant ryegrass biotypes through natural mutation. Often two or three applications of different herbicides at various dosages are applied in an attempt to eradicate the resistant weeds. This leads to resistance to herbicides from several different mode of action groups in one population, leading to limited future chemical control options.

A number of target-site mutations for the different enzymatic pathways have been genetically identified and several DNA markers have been developed since 2007 by research groups in Australia and France. These markers can be used to genotype each specific resistant biotype for every specific mutations. The DNA markers are able to distinguish between plants that are heterozygous (Aa)

(1 copy- resistant allele) or homozygous (AA) (2 copies – resistant allele) resistant for each specific target-site mutation. What is important

for the producer is, if a single ryegrass mother plant is heterozygous (Aa) for a mutation then 75% of the seed/offspring of that plant will be resistant (Aa & AA) and only 25% susceptible (aa). But, in a homozygous (AA) ryegrass mother plant, all (100%) of the seed/offspring will be resistant. Depending on which mutation, the heterozygous or homozygous state of resistance can exponentially increase the needed dosage of herbicide to achieve 50% mortality. What is most important is that resistant biotypes on average require 10-30 times higher herbicide dosages than susceptible types. Results on ryegrass biotypes collected during an extensive South African survey in 2006-2007, indicate that the resistant biotypes have multiple target site mutations, suggesting a broader resistance problem among ryegrass populations in the Western Cape. Some mutations recently identified in South Africa are rare in other parts of the world, but fairly common locally, a phenomenon which needs to be documented. The question also arises as to what the extent of the problem is, several years down the line.

These DNA markers are now used to render a weed resistance allele profiling (WRAP) service to farmers by ARC-SGI. Significant time is saved with this molecular approach; traditionally herbicide resistance is validated in a glasshouse trial through the application of various classes of herbicides, a process taking up to 8-10 weeks. If fresh ryegrass material is sent to ARC-SGI, molecular data for each specific resistance mutation can be obtained in only 3-7 days. A full report with a recommendation on herbicide choice or other alternatives is sent to the producer concerned. Another significant advantage of this service is the increased accuracy. Apart from the ryegrass samples, Bromus diandrus (brome grass) and Avena fatua (wild oats) have also been received.

Results

Herbicides that inhibit Acetolactate Synthase (ALS) prevent the normal production of amino acids. Amino acids are the "building blocks" of proteins needed for optimal plant growth and development. In the Herbicide Resistance Action Committee Chart, Acetolactate Synthase (ALS) or AHAS inhibitors are classified as Group B herbicides. This group includes the Imidazolinones (IMI's), Sulfonylureas (SU's) and Trialzolopyrimidine (TP's) herbicides. Currently five different target-site markers, namely 122, 197, 205, 574 and 653 are optimised to identify mutations towards the ALS herbicides. The target site mutation that was most commonly found in the received samples was ALS marker 197 (Figure 1). This marker indicates the following target-site resistance; Imidazolinone (IMI's), Sulfonylureas (SU's) and Triazolopyrimidine (TP's). In some samples, target-site mutations 205 (target-site resistance to IMI's, SU's and TP's), 574 (target-site resistance to IMI's, SU's and TP's) and 653 (target-site resistance to IMI's) were also observed (Table 1). Target-site mutation 122 which confers high levels of resistance to IMI's was not detected..

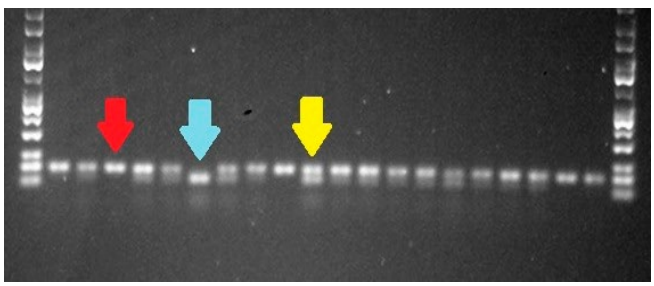

Figure 1: Agarose gel photo of ALS Marker 197 (red – homozygous resistant, yellow – heterozygous resistant and blue – homozygous sensitive wild type)

A summary of the results of all tested samples to date can be seen in Table 1.

Table 1. Presence of ALS target site mutations 122, 197, 205, 574 and 653 in all samples tested

Mutation Marker	Sensitive	Heterozygous Resistant	Homozygous Resistant	Total Samples Tested
ALS122	63	0	0	63
ALS197	20	4	39	63
ALS205	51	12	0	63
ALS574	56	7	0	63
ALS653	60	1	2	63
Total	250	24	41	315

Results

Herbicides that inhibit lipidsynthesis are known as ACCase inhibitors. In the Herbicide Resistance Action Committee chart, ACCase inhibitor herbicides are classified as Group A herbicides. This group includes Aryloxyphenoxypropionates ('Fops'), Cyclohexanediones ('Dims') and Pinoxaden ('Den'). Currently, three markers are utilised to identify mutations linked to the ACCase herbicides. The markers also indicate heterozygous/homozygous resistance in the identified samples. Heterozygous means that only one of the alleles is carrying the resistance mutations, whereas homozygous indicates that both alleles are carrying the resistance mutations. The mutation which occurred most frequently in the samples received is for Marker 2078 (Figure 2). This marker confers resistance to many 'Fops' and all 'Dims', including clethodim. In some samples, marker 1999 and marker 2027 were also observed. Marker 1999 confers resistance to Fenoxaprop and Marker 2027 (Figure 3) confers resistance to all 'Fops'. When heterozygous/homozygous genotypes to ACCase herbicides are detected, most ACCase herbicides, including clethodim, clodinafop, diclofop, fluazifop, haloxyfop, butroxydim, sethoxydim, tralkoxydim and pinoxaden, should be avoided. When results were analysed per sample it was evident that cross-resistance does occur within some biotypes, but most biotypes are still sensitive to some of the herbicides registered for post-(crop)emergence weed control.

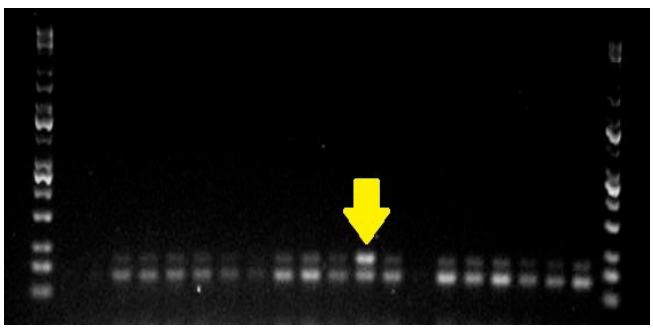

Figure 2: Marker 2078 (red – homozygous resistant, yellow – heterozygous resistant and blue – sensitive)

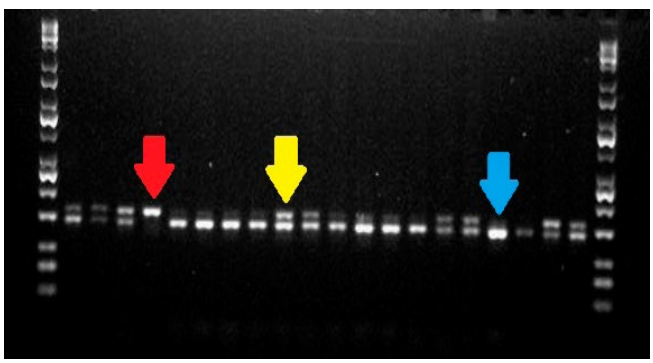

Figure 3: Marker 2027 (yellow – heterozygous resistant)

A summary of the results of all tested samples to date can be seen in Table 2.

To date, target-site resistance has been identified on farmers' fields from the Western Cape, Eastern Cape and Northern Cape.

Table 2. Indicating the levels of resistance of all samples tested to Group A herbicides

Mutation Marker	Sensitive	Heterozygous Resistant	Homozygous Resistant	Total Samples Tested
1999	36	5	0	41
2027	40	1	0	41
2078	36	19	6	61
Total	112	25	6	

Resistance to which herbicides can the ryegrass be screened for?

Currently, ryegrass biotypes can be sent in to get screened for resistance to herbicides from the ACCase inhibitor (Group A) herbicides, ALS inhibitor (Group B) herbicides and the Group D (bipyridyliums) as well as Group G (glycine) herbicides. All grass species can be screened.

How to get your ryegrass tested for resistance?

Producers are welcome to send ryegrass seedlings or seeds to ARC-SGI, Bethlehem. Please make sure that the sample was taken from plants distributed over the entire field, so as to constitute a representative sample of the field. Seedlings must be kept moist and preferably couriered, as this will assure that fresh seedlings arrive in Bethlehem. Please indicate the GPS-coordinate of the field where the sample was taken. Seeds must be stored in brown paper bags to prevent microbial contamination. GPS-coordinates must again be indicated. Note: an adequate number of seeds/seedlings must be submitted for the screening process to be conducted successfully.

Hestia Nienaber and Scott Sydenham
Small Grain Institute, An Institute of the Field Crops Division, ARC

For further information regarding this topic or how to sample your weeds, please contact Hestia Nienaber at (058) 307 3420 or e-mail: deweth@arc.agric.za / sydenhams@arc.agric.za

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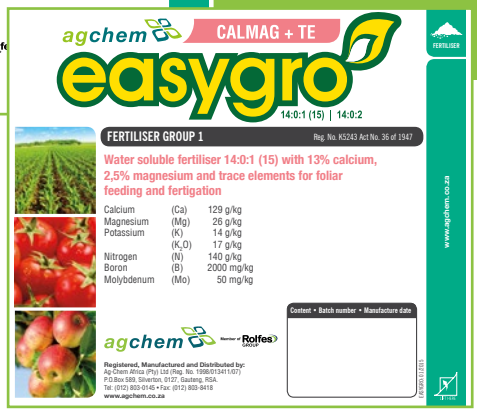

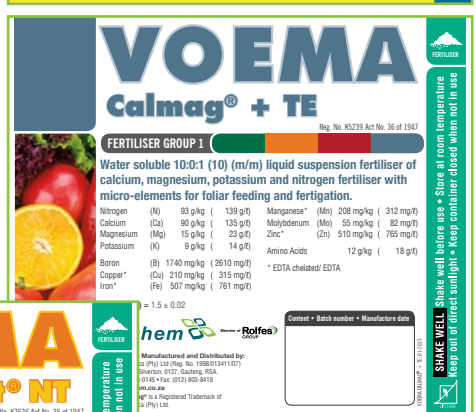

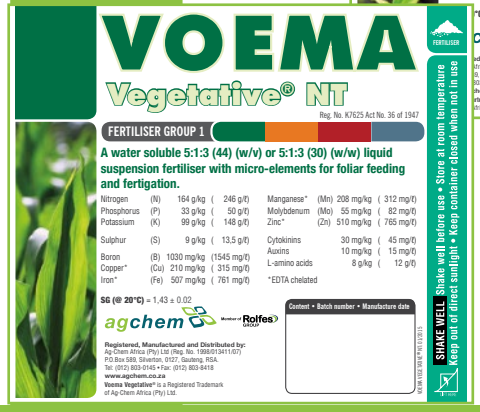

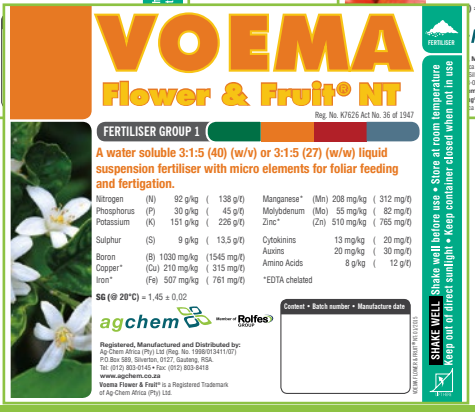

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Prioritising partnership

Partnerships are key in growing agribusiness in Africa

On 16 October 2015, Alan Winde, Western Cape Minister of Economic Opportunities delivered an address at the Farmbiz Power Debate on Agribusiness in Africa. The event was hosted in conjunction with Agri-Expo and took place in Sandringham, Stellenbosch. Minister Winde outlined the Western Cape's plans to partner with African countries to drive economic growth in key sectors.

The world's focus is shifting to Africa.
By 2030, the continent's population is set to double and 50% of this expanding population will be living in cities.

Six of the world's fastest-growing economies are on this continent.

Developed nations are increasing investment into Africa.

It is evident that Africa is emerging as a powerful economic force.

And that is why we have prioritised partnerships with African countries.

In 2014, South Africa's exports of agricultural products were worth R104 billion. Over the past 13 years, the country's exports to Africa have grown by 14%, compared to the EU which saw an 8% increase.

Here in the Western Cape, we boosted exports to Africa by 34% between 2011 and 2013. Our key trading partners include Mozambique, Angola, Kenya, Nigeria and Zambia.

In a recent address, Kofi Annan pointed to the fact that Africa is importing USD34 billion worth of food. We can produce the majority of this food ourselves.

We know that Africa has the most arable land and we need to make sure that Africans lead the way forward.

To do so, we must identify opportunities for mutual exchanges on our continent.

Alan Winde, Western Cape Minister of Economic Opportunities

Our growth strategy for the next five years, Project Khulisa, outlines our detailed action plans to partner with African countries in strategic sectors, namely tourism, oil and gas and agri-processing.

Earlier this year, the Premier and I conducted an official trade promotion visit to Angola.

Angola is a key trading partner for the Western Cape. The value of the Western Cape's exports to Angola was valued at over R2 billion in 2013.

This visit paved the way for increased partnerships between Angolan and South African businesses.

One of focus sectors, agri-processing, holds particular potential for this region.

Under a high-growth scenario, it is estimated that this sector can add up to a further 100 000 jobs to the Western Cape economy.

South African retailers which have a presence in Angola have to source local produce in that country. We're looking at ways we can work with Angola's agricultural sector to develop partnerships around production.

There are some types of produce which will thrive in the Angolan climate and we will be exploring partnership agreements between agri-businesses in the two regions. Africa's continued progress and prosperity depends on this kind of collaboration.

Our continued progress also depends on working together to tackle our challenges and developing shared solutions.

Recent research conducted by the University of Copenhagen in partnership with the University of Stellenbosch has explored the barriers to intra-African agricultural trade.

Project Khulisa has also identified trade and non-trade barriers as challenges to growing the size of our agri-processing sector.

Among the findings was that the reduction of non-tariff barriers and the improvement of land transport would have a significant impact on increasing internal trade in Africa.

Specific weaknesses cited included costs linked to transit time delays at customs, terminals and land transportation.

The research found that if we reduce the costs of these delays by only 20%, the welfare gains would be double than those from removing all tariffs.

It is also important to note that Africa is a diverse and dynamic continent.

We cannot rely on generic partnership strategies for every country.

Considering this, the Western Cape Department of Agriculture has conducted a comprehensive analysis on the macroeconomic environment in Africa.

Researchers from the department's Macro and Resource Economic Services unit have developed a Market Attractiveness Index to assess the opportunities in each African country to aid in our approach.

We will draw on these findings as we deepen our relationships with countries on the continent.

Through commitment and a shared vision, we can build a vibrant and integrated African agricultural sector.

Alien and Invasive Species Regulations How much do you know?

Alien invasive species are any organisms (plants, animals, pathogens) that are exotic, non-indigenous or non-native to the ecosystem under consideration and whose introduction does or is likely to cause economic or environmental harm or harm to human health. They grow quickly and aggressively, spreading and displacing other native species thus posing a threat to indigenous ecosystem functioning and biodiversity. In South Africa, alien invasive species are regulated through the National Environmental Management Biodiversity Act, 2004 (Act No. 10 of 2004) (NEMBA) and its associated Alien and Invasive Species (AIS) Regulations, which were gazetted on 1 August 2014 and became law on 1 October 2014.

What is in the Regulations?

The AIS Regulations list 559 alien species as invasive, under 4 different categories of alien invasive species, that must be managed, controlled or eradicated from areas where they may cause harm to the environment as well as those that are prohibited to be brought into South Africa and these can be found at http://www.invasives.org.za/legislation.html.

4 categories of invasive species:

- **Category 1a:** Alien invasive species that must be combatted or eradicated. Any form of trade or planting is strictly prohibited.
- **Category 1b:** Alien invasive species that must be controlled and where possible, removed and destroyed. Any form or trade or planting is strictly prohibited.
- **Category 2:** Alien invasive species, or species deemed to be potentially invasive, for which a permit is required to carry out a restricted activity.
- **Category 3:** Alien invasive species which may remain in prescribed areas or Provinces. Further planting, propagation or trade is, however, prohibited.

Permits information: Category 2 alien invasive species

Permits are required to carry out restricted activities with Category 2 listed alien invasive species.

Download permit applications from:

https://www.environment.gov.za – Search AIS Permit Application form
http://www.invasives.org.za – Search AIS Permit Application form

Cost to be paid when applying for a permit:

- Importing into the country - R200
- All restricted activities - R100
- Renewal of permit - R50
- Appeals - R50

Permit applications can be submitted through the following methods:

By Hand Delivery

Biosecurity Directorate; Department of Environmental Affairs;
14 Loop Street (4th Floor); Cape Town; 8000.

By Post

Biosecurity Directorate; Department of Environmental Affairs;
Private Bag X 4390; Cape Town; 8000

By Email

AISpermits@environment.gov.za

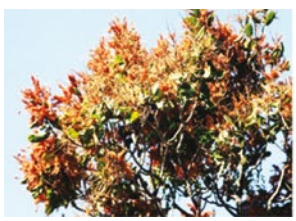
By Fax

086 604 4080

Contact details

021 441 27488

Category 1a: Ant tree



Category 1b: Silver carp

Category 2: Iguana iguana

Category 3: Morning glory

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INTRUDERS OUT

Alien invasive species should be controlled to conserve biodiversity

The Department of Environmental Affairs (DEA) has published for implementation the National Environmental Management: Biodiversity Act, 2004 and its associated Alien and Invasive Species (AIS) Regulations. This legislation regulates the importation of and all activities involving invasive alien species through the issuance of relevant permits. The Act provides the legal framework for stakeholders in Biosecurity to help keep harmful organisms out of the country and respond effectively should any such organisms nevertheless make it in.

The impacts of alien invasive species at the ecosystem level include changes in the availability of resources such as water and nutrients, and changes in the disturbance regimes. Invasive alien plants and trees have decreased water supplies for nearby communities and increased fire hazards in South Africa .

The full costs of invasions also include the social and health impacts of alien invasive species on humans, in particular to rural communities depending on forests. As a result of the negative impacts of alien invasive species on native forest biodiversity, a loss of food sources and traditional medicines may be experienced thereby compromising not only the health of local people but also the livelihoods of those dependent on the collection and sale of such items for income.

South Africa has a rich biodiversity which is of global importance. This biodiversity needs to be protected from the threat of species introduced from elsewhere in the world. South Africa has a thriving fruit, meat and honey export industry which needs to be protected from introduced species. In order to protect South Africa's rich biodiversity and the production sectors of agriculture, forestry and fisheries and human livelihoods, the department has:

- Put regulatory measures in place at the Ports of Entry to control the importation of potentially damaging species into the country and further control the spread of such species if they happen to be introduced. The control measures are in accordance with the Republic's relevant legislation, which is aimed at preventing the introduction and spread of species into South Africa.
- Invested in activities to raise awareness of biosecurity amongst international travellers and traders. Advocacy activities such as multi-stakeholder forums, radio awareness campaigns, and information days etc. are used to create awareness on alien invasive species regulations and to promote compliance with such regulations.

One of the alien invasive species that pose a threat to our water resources is the water hyacinth. The *Eichhornia crassipes* is an aquatic invader species causing increasing concern. A perennial plant that can multiply rapidly during the warmer summer months and has a fast growth rate, completely covering waterways. In common with other aquatic invaders, water hyacinth came into South Africa through the ornamental garden and aquarium trade where they were used to decorate and plant garden ponds, fish ponds and aquariums. Originally from South America, it is a continuous problem in many major dams and river courses throughout Mpumalanga, KwaZulu-Natal, Eastern and Western Cape and Free State. Serious invasions can destroy water quality and aquatic organisms. By far the greatest wetland invader is water hyacinth. Integrated management of the species seems to yield positive results, with biological control proving to be the best and most economical control method.

Bongi Zikalala
Department of Environmental Affairs

Working on Fire can implement fire management on your land

The National Veld and Forest Fire Act 101 of 1998 (NVFFA) has changed the face and market for fire management in South Africa. The Act requires all land owners to conform to the NVFFA which requires land owners to have trained and equipped personnel to implement fire management practices on their owned or leased properties.

The vast majority of landowners in South Africa have limited capacity and experience in the implementation of firebreaks; fuel load reduction using prescribed fire and the suppression of wildfires.

Failure to comply in the event of fire spreading from their properties and causing damage to a neighboring property would result in the landowner being prosecuted.

Weather is the single biggest risk and therefore accurate weather forecasting is required to enable the prescribed burning operations to be carried out safely. This would require that a suitably qualified person be employed to allow for weather forecasting to be supplied to the various crews engaged in burning.

"Working on Fire (WoF) addresses the prevention and control of veld and forest fires, to enhance the sustainability and protection of life, property and the environment through the implementation of Integrated Fire Management (IFM)," says Llewellyn Pillay, Managing Director of WoF SA.

WoF Services and the WoF Academy have developed capacity and products to assist landowners with developing their own potential, as well as the supply of integrated fire management services to rural landowners within South Africa.

They have also developed a pool of qualified and experienced Fire Managers, who are based across all the fire-prone regions of South Africa and are responsible for supervising any prescribed fire and suppression operations performed by the WoF Services fire crews.

Risk of Spread of Fire

- WoF Services burning operations are covered by Risk of Spread Insurance.
- All burning operations are carried out within very specific weather parameters.
- All our project managers and crew leaders are trained to adhere to these requirements.

All project managers and crew leaders are to adhere to the burning Best Operations Procedures.

Health and Safety

In terms of the Occupational Health and Safety Act, both management and employees have clearly outlined duties and as a measure to ensure streamlining of processes and operations it is imperative that WoF Services has a SHE Policy that will be an internal commitment and guideline.

The Kishugu group has implemented a standard Health and Safety Programme, which is managed by a National Health and Safety Manger. Selected personnel are trained and appointed under the occupational Health and Safety Act.

Dispatch and Coordination:

There is a dedicated network of dispatch centers that manage the day-to-day movement of all company resources. The dispatch Centers are all coordinated by Provincial Coordination Centers, which are overseen by a National Coordinator.

This dispatch and coordination system allows for resources to be effectively deployed for immediate reaction in the case of emergency.

Training

WoF Services and the WoF Academy in Nelspruit have developed products to assist landowners in South Africa. All personnel are trained to international standards in: Basic Firefighting, Advanced Firefighting, Annual Safety Representatives Training, Selected First Aider Training, Selected Crew Leader Type 2 and Type 1 Training, Selected Drivers Training, Brushcutter and Chainsaw Training and Selected Teams for Herbicide Applicators Training. Additional specific training courses can be handled as well.

Products and Services:

WoF Services has developed a range of unique fire management products and services that include:

- Transmission power line fire fault reduction and servitude management with prescribed burning and invasive vegetation management.
- Fire prevention suppression in commercial forestry, commercial farming and conservation areas – all types of prescribed burns as well as wildfire suppression activities.

Supply a permanent team to the client, with people employed from the immediate area. This team is then totally dedicated to the client and may be used for working as per training on all properties belonging to the client. The period

of contract will be 3 years. Transport and Project Manager is optional.

- Invasive vegetation management in the forms of manual and mechanical bush clearing of invasive vegetation;
- Aquatic weed clearing and management thereof,
- Carrying out veld and bush assessments.
- Supply of permanent teams to client – team dedicated to client only for three years, included vehicles, tools, equipment and management.
- Supply of firefighting tools and equipment.

Working on Fire's Services manages Integrated Fire Management Services (IFMS) to landowners and government as well as forestry companies.

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Amazing innovation scoops award

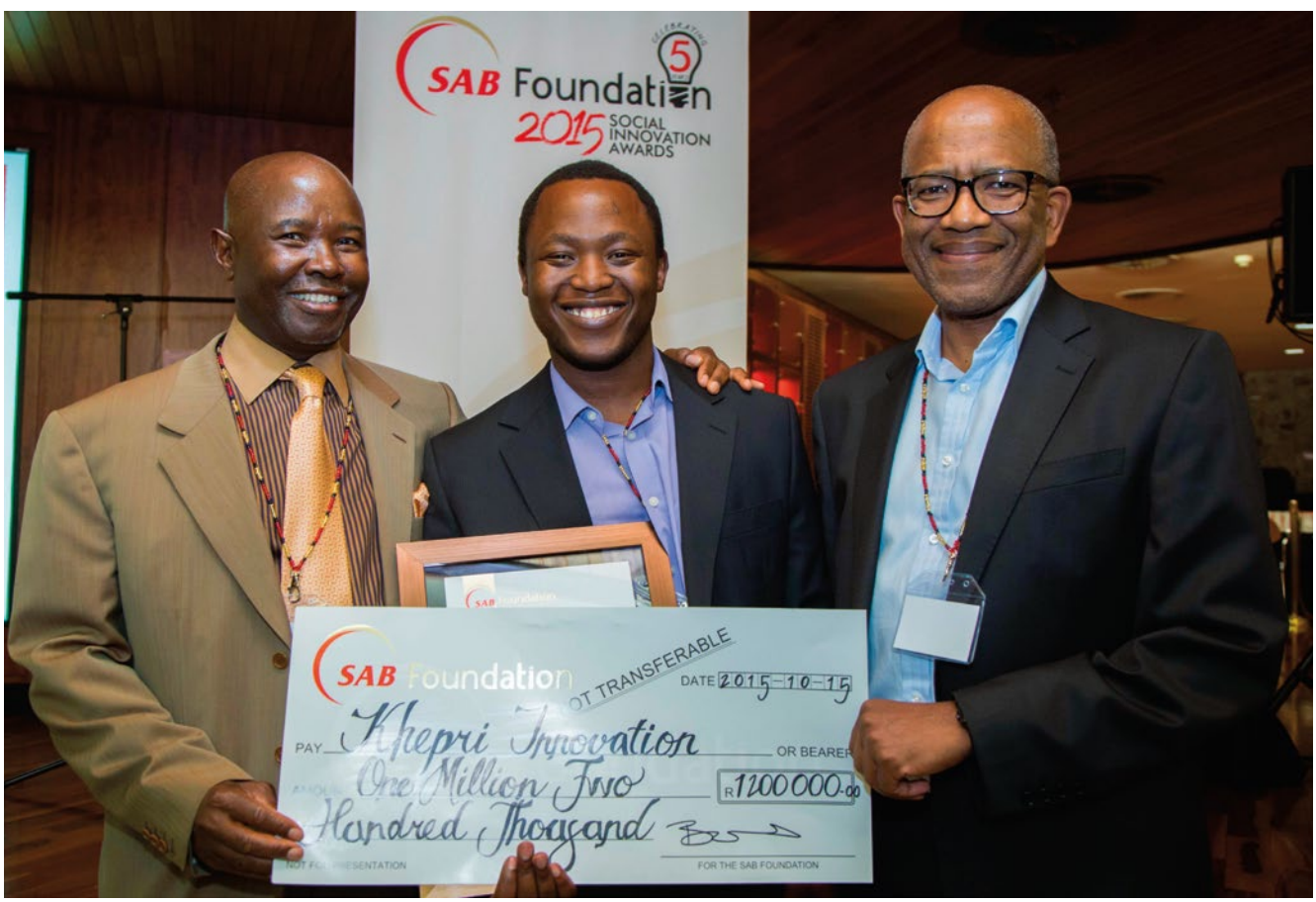
Waste management unit for emerging farmers wins R1.2-Million in 5th annual SAB Foundation Social Innovation Awards

The winner of the 5th annual Social Innovation Awards is a Low-cost insect production unit for animal feed by Khepri Biosciences. Owner of Khepri Biosciences, Bandile Dlabantu from the Eastern Cape, was last week awarded a prize of R1.2-million for the commercialisation of the invention, a cost-effective waste management method for food producers and abattoirs.

The container unit is able to process organic waste onsite using fly larvae, with a 40% reduction of the waste products. The larvae are converted into low cost animal feed protein.

Judges said the insect production unit would assist local emerging famers, particularly chicken farmers, reduce their feed bills. "It offers a replacement which is equally as nutritious as fish meal and is more sustainable," says Bridgit Evans, SAB Foundation Manager. The winning innovation was cost effective, sustainable and replicable, and would have a significant impact on social problems, particularly for people in rural areas, the judging panel said.

"While all of this year's entrants were of such an extremely high standard that for the first time ever, all 14 finalists were given some kind of seed funding, what made Bandile's project stand out was his out-grower scheme which allows for increased job opportunities



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through partnerships with rural communities in running small scale fly farms," says Evans.

"The prize from the SAB Foundation allows us to commission the first six mobile fly farms for our pilot facility a Chamdor abattoir that will process 100% of the waste produced by the abattoir daily," said Dlabantu. "This site would employ 10 people permanently and three part-time allowing us the opportunity to raise the funding that will build a plant with a capacity to take 60% of the organic waste in Gauteng and produce 100 000 tons of animal feed protein in five years' time."

Gradesmatch, an innovative system designed to enhance the way in which high school learners interact with higher learning institution and bursars in South Africa, was awarded the second place grant of R600 000. The innovation matches learners' high school marks with the institution entrance requirements.

Gradesmatch breaks down the student's results by subject, showing them how to improve or alternative paths to follow best suited to their strengths, whilst also providing career information.

Third place winner Lakheni, which gives low income families access to discounted food items, won a R400 000 grant. Lakheni provides poorly resourced crèches with a stable income stream that will enable them to deliver better services and be better equipped to nourish young children.

Developmental grants of R250 000 each were awarded to:

- *Subz Washable Sanitary Pads* – A sustainable, washable, eco-friendly, reusable sanitary pad and panty that is easy to use and wash that allows girls freedom to go to school with dignity to get the education they deserve.
- *Manufacturing of external maxillofacial prostheses* - A new way to make external maxillofacial prosthesis using Additive Manufacturing technology to benefit people suffering from facial deformities caused by accidents or cancer. There is a backlog of patients requiring prosthesis and very few skilled technologists using traditional methods of prosthesis fabrication.
- *Mobile career planning platform* - The TshedzaApp uses technology to positively impact on education in South Africa. It mimics the conversation that young people have with a career counsellor, from finding careers that are suitable for them to knowing which subjects to select in high school, courses to study and which universities, and cuts out the classical expensive and time consuming face to face and brick and mortar counsellor-led career planning.

Seed grants of R100 000 were awarded to eight more projects, namely: SnappBox, Genie Lamp, The Lumkani early warning fire detection system, briGado. Abomakgereza (Recycling Hustlers), Specialised Deliveries, Lady Liberty and Eggmobile Social Project.

All winners receive their grant funding in tranches determined by their growth plan to commercialise and upscale the service and product. "The prize money for all categories was increased this year because we want the award to have an impact and inflation has taken its toll over the years. SAB believes that investing in the country's entrepreneurs will help to grow SA's economy. Each year we look for innovations which address social challenges and assist our intended beneficiaries – women, youth, people with disabilities and people living in rural areas," said Evans.

The SAB Social Innovation Awards has to date invested R20 million in 63 innovations which are geared at benefiting the SAB Foundation's core beneficiaries.

Azure Janneker, SAB Media and Communications

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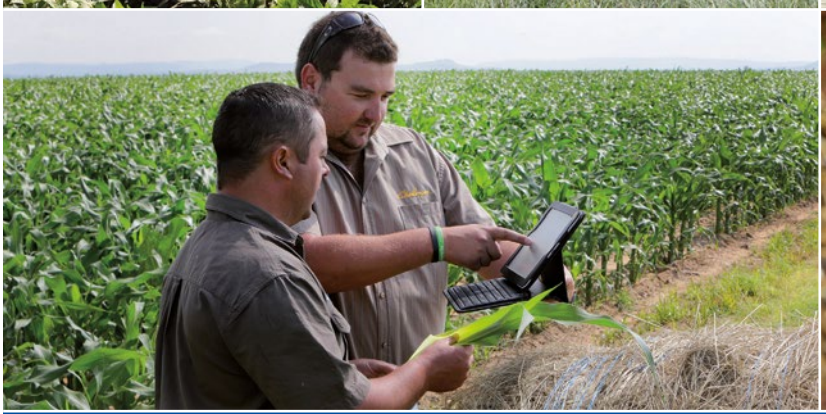
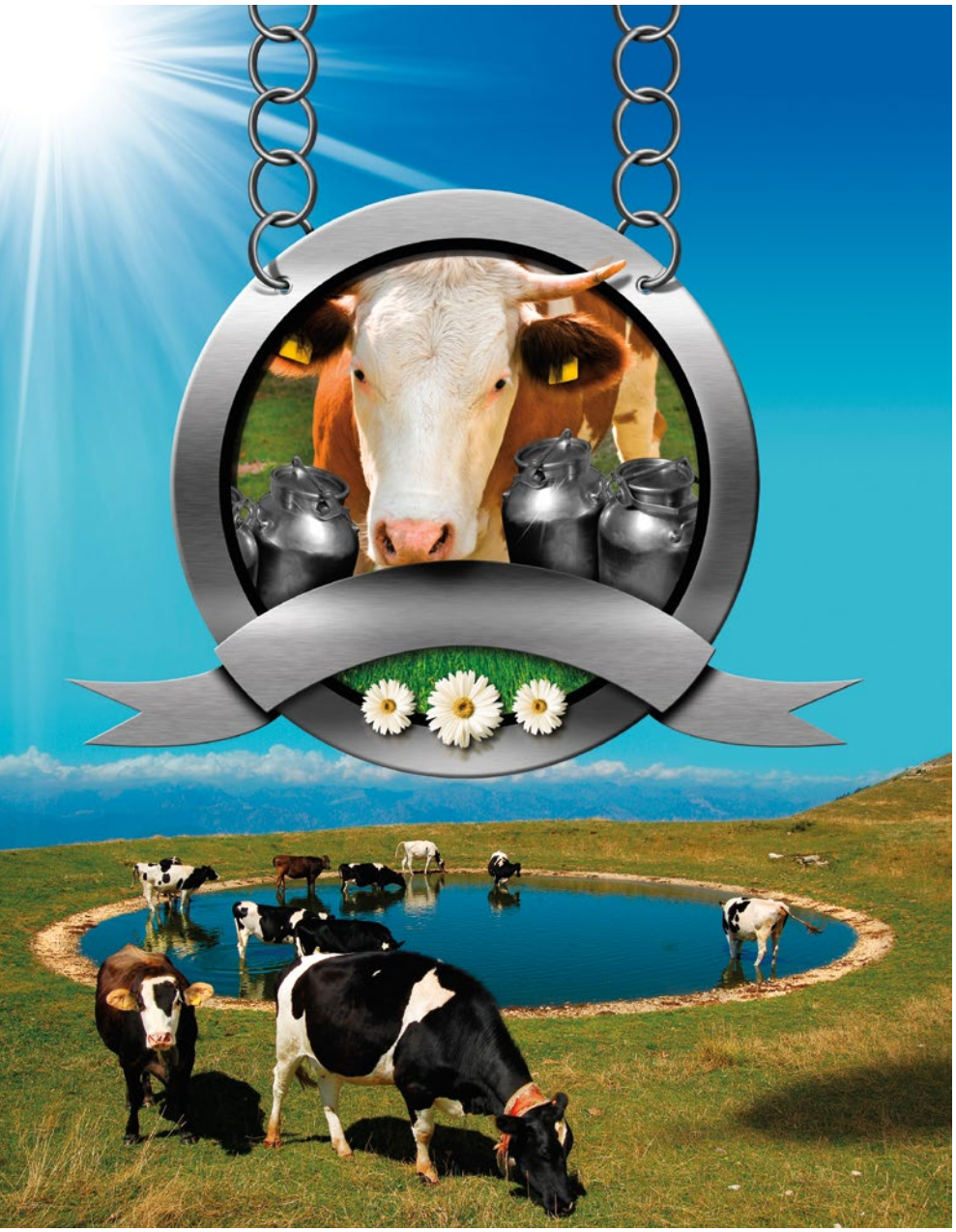


Agriculture value chain a powerful sustainability tool

Farmers, government, and banks should be using the industry's value chains to better manage risk for players and increase food security for everyone



Globally farmers, agri businesses, governments, and financial institutions are beginning to see that the value chain holds vast untapped opportunities for strengthening agricultural development and, therefore, for increasing food security.

The way in which people and organisations interact with the food chain is undergoing a profound shift. It's essential, therefore, that farmers understand that they are a link in a much larger series of activities than simply beneficiating the basic product that leaves the farm. The ultimate pay off of the value chain should be agriculture-for-development. It's a natural but so far unexploited cycle that starts with the farmer, through primary production, and that, ultimately, benefits the farmer again – along with everyone else in the country.

The World Bank stated in 2008 that agriculture continues to be a fundamental instrument for sustainable development and poverty reduction. Since that time, other aspects of agriculture have evolved in the direction of sustainable development but the potential within the agricultural value chain has yet to be fully explored.

This is beginning to change and, to participate in the benefits, farmers need to take the trouble to understand how the chain works now as well as the ways in which it will evolve.

One area to keep an eye on is value chain finance. Banks have always taken a risk averse approach to the range of variables involved in agricultural operations, the unpredictability of the impact of weather on primary

production, and the equally difficult to predict fluctuations in prices.

As a result, the need for industry players to access finance, secure sales, procure products, reduce risk, and increase efficiency has been met via conservative means that are either internal or external to the value chain. Internal mechanisms involve players offering one another finance, usually in the form of an input provider offering a farmer terms or a lead firm advancing funds to a market intermediary. External mechanisms take the form of loans and insurance products from banks.

Both the internal and external options address value chain needs in a fragmented and sporadic way and tend to be exclusive of smaller or inexperienced operators. Certainly, they don't meet the needs of the modern agricultural value chain.

In response to changes in consumer expectations and environmental and human rights concerns, the agro-food sector is moving to models of production and marketing based on demand rather than on producer-defined agricultural goods. The sector is also adapting to a global, liberalised, and compartmentalised marketplace with little seasonality and high product diversity. Food safety and traceability requirements and higher quality standards coupled with the enforcement of basic environmental regulations are driving new operational approaches. In addition, there is an accelerating concentration of control in the sector - with globalisation, economies of scale, and ever increasing vertical and horizontal

integration enabling multinational and other interconnected agribusinesses to dominate.

As usual, opportunity is built into change. The fact that value chains are becoming more coherent and interdependent gives banks the confidence to expand financing options, proactively aim for improvements in financing efficiency and repayments, and help consolidate value chain linkages among participants in the chain.

If a bank approaches value chain financing with a deep, accurate understanding of who the players and where the linkages are, then it can create finance products and services that will strengthen the chain. Finance can be tailored to fit the needs of participants – and structured so as to support new entrants and reduce the risk for smaller players of getting into their value chains. Financial transaction costs can be reduced through direct discount repayments and delivery of financial services. Also, value chain linkages and knowledge of the chain can be used to mitigate risks within the chain, including those arising from participants themselves.

Ideally, however, farmers should not be dependent on other players in the value chain, including the banks, to help them exploit the opportunities that are inherent in the chain's evolution.

When one considers that, out of the average shelf price of R30 for a bottle of reasonably good wine, the grape farmer gets only 52 cents, it becomes very clear that the primary producer, on whom everyone in the chain depends, is in the least favourable position.

By understanding their chain up and downstream, farmers can find ways of getting a share of the value add processes. Or, at least, of supplying more than one value chain.

This doesn't mean that farmers need to become economic or finance specialists. It does mean staying aware of opportunities – and requiring your industry body to keep you up to date on the implications of shifts in the chain. What you should aim for is to use the value chain for your own development, knowing that if you develop, so will the value chain. All of which will make you more sustainable and turn agriculture into a vehicle for real transformation.

Nico Groenewald, Head of Agribusiness at Standard Bank

Top in their field

Grain SA celebrates South Africa's distinguished grain producers with the announcement of the 2015 Grain Producer of the Year

Grain SA celebrated the successes of their grain producers during a prestigious gala event, held at The Theatre on the Track in Midrand on Friday, 16 October 2015. This year's awards ceremony commemorated the 16th year of the gala awards, since replacing the previous Maize Man of the Year in 2000, and was attended by Members of Parliament, representatives of the various Agricultural Trusts, organised agriculture and government, as well as academia, fellow industry leaders and guests of honour – grain producers from around the country.

The event, which coincided with World Food Day, awarded Grain SA the opportunity to give recognition to grain producers who form the basis of food security in South Africa. In addition, the finalists serve as excellent role models to the younger generation of producers whilst the image of the grain producer is enhanced. The judges were once again faced with a difficult task as all the finalists proved to be exceptional producers with diverse management styles. This category gives recognition to successful grain producers who manage their businesses with such passion and dedication, so as to set an example and serve as inspiration to other producers.

The 2015 Grain SA/Syngenta Grain Producer of the Year was awarded to Genade Boerdery, from the Douglas district in the Northern Cape. On the banks of the Orange River, Vickie Bruwer and his sons, Gerhard, Hannes en Klein Vickie run a growing, modern and highly diversified farming operation. The Bruwer's grow mainly maize, wheat, alfalfa and cotton, as well as peanuts, seed sunflower and potatoes

on high potential land and constantly strive to maintain and manage the balance between soil, crops and nature effectively. Maize and wheat are harvested twice a year and a basic, but flexible, crop rotation system is followed with attention given to product price and sustainability. Diversification plays an important role in the economic sustainability and risk management of this successful farming operation. The other finalists in this category were Henk Michau from Modimolle and Niel Neethling from Potteberg.

The 2015 Grain SA/ABSA/John Deere Financial New Era Commercial Farmer of the Year was awarded to Solomon Masango from Carolina in Mpumalanga. And, for the first time in the history of the competition, Masango won a John Deere 5403 MFWD tractor sponsored by John Deere Financial in partnership with ABSA. Joining the Grain SA Farmer Development Programme in 2012 and the Carolina study group in 2014, Masango increased his average yield on maize from 3.5 tons/ha to 6 tons/ha. Overjoyed with his award, Masango thanked the Lord and his wife for the support and encouragement. "All the other jobs that I have done before becoming a farmer, was just the start of my career, and where I am now, lies my passion", Masango said. The other finalists in this category were Vuyani and Lungelwa Kama from Maclear and Maseli Letuka from Kestell.

The 2015 Grain SA/Syngenta Smallholder Farmer of the Year was awarded to Daliwonga Nombewu from Mthatha. Following a career as a taxi driver, Nombewu developed an interest in farming and joined a Grain SA study group and attended various training courses. Nomwebu planted 13 ha of maize and is expecting an average yield of 4.5 tons/ha. The other finalists in this category were Salphanius Motswenyane from Lichtenburg and Lawrence Mtsweni from Nigel.

The 2015 Grain SA/ABSA Subsistence Farmer of the Year was awarded to Ngubengcuka Christian Moyo from Maclear. Realising he can make a living through farming, Moyo left his job at the Department of Agriculture, Forestry and Fisheries and started farming in 2008 on communal land. Ngubengcuka planted 2.5 ha of maize on dryland. Implementing no-till practices from the 2013/2014 planting season, he believes that tractor implements destroy his lands and plants by hand. The other finalists in this category were Jabulani Abednego Mbele from Winterton and Musawenkosi David Ntombela from Bergville.

In addition to these awards, Grain SA also used the opportunity to honour Dr Julian Jaftha with the 2015 Grain SA Inspiration Award, in appreciation of his continuous contributions to the grain industry, excelling to achieve extraordinary results and inspiring the industry to be more competitive in its commitment to excellence. Dr Jaftha, Chief Director: Plant Production and Health in the Department of Agriculture, Forestry and Fisheries has assisted Grain SA with various issues regarding production, inputs and regulatory aspects, such as reviewing the pre-breeding wheat platform, as well as ensuring the farmers' privileges remain in the Plant Breeders Act. "When working with Julian, we don't refer to Grain SA and DAFF, but rather to "us" as partners in the grain- and oilseed industry" Jannie de Villiers, CEO of Grain SA said.

Alzena Gomes
Grain SA

MUTABILITY BLUES

Unpredictable weather is putting more pressure on smallholder farmers, calling for improved farm management

Smallholder farmers should place an emphasis on improving efficiency, financial and farm management skills to overcome the significant challenges facing the agricultural sector.

As the industry faces its most severe drought in 23 years, amongst other economic challenges, it has now become 'survival of the fittest'.

Smallholder farmers must not sit back, wait and rely on support from state programmes and agribusinesses, but should rather proactively look for ways to develop profitable farm operations through improved farm management.

They have an important role to play in ensuring household food security and the overall growth of the agricultural sector in South Africa and the continent as a whole.

According to a report by the International Fund for Agricultural Development (IFAD), there are about 500 million smallholder farms worldwide and more than 2 billion people depend on them for their livelihoods. These small farms produce about 80 percent of the food consumed in Asia and sub-Saharan Africa.

While there is still a lot of work to be done by the Government and private sector to develop these businesses from a funding and support perspective, smallholder farmers should 'take the bull by the horns' and adopt more efficient and sustainable farming techniques in order to survive.

Many smallholder farmers that have access to funding are still not taking advantage of the vast knowledge and technology available to increase crop yield and productivity. For example, adopting techniques such as selecting the right seeds and crop rotation to increase yield and generate more income.

Unfortunately, the reality is that input costs will continue to increase and economic conditions will not improve anytime soon. Therefore, smallholder farmers will have to use all the resources available to them to increase their potential in order to survive.

Change doesn't happen overnight. Developing long term strategies to introduce and implement changes will go a long way to ensuring the sustainability of smallholder farmers.

Furthermore, smallholder farmers that aspire to break into the commercial market must remember that farming is a business. Optimal management of the farm's resources, finance operations and production processes is essential for growth.

For instance, smallholder farmers that have been financially impacted by droughts and are concerned about meeting their debt obligations should know when to approach their bank for assistance. Similarly, the farmer should know and understand the importance of insuring crops during planting season. These form part of the important aspects of farm management.

The agricultural sector in South Africa is already dealing with a multitude of issues ranging from policy uncertainty, power and water shortages, rising input costs and unpredictable weather conditions. On the other hand smallholder farmers continue to grapple with issues such as access to markets and finance, transport and infrastructure costs.

It has never been more important for smallholder farmers to focus on improving farm management and exploring high yield farming methods in order to survive these tough economic conditions.

Dawie Maree, Head of Information and Marketing at FNB Agriculture

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