

Issue Jan/Feb 2017

Harvest SA

Securing South Africa's Food Resources

Winning the war for water

The Water Research Commission sets the standard for leadership and innovation

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





HUMAN-ANIMAL COLLABORATION IN THE WILD

Honeyguides and people cooperate
and communicate with each other

By following honeyguides, people in Africa are able to locate bees' nests to harvest honey. Our research reveals that humans use special calls to solicit the help of honeyguides, allowing honeyguides to recruit appropriate human partners. This relationship is a rare example of cooperative mutualism between humans and free-living animals, which has probably evolved over the course of hundreds of thousands of years.

Humans have trained animals such as dogs, falcons and cormorants to help them find food. However, human-animal collaboration in the wild is rare. But it has long been known that, in many parts of Africa, people and wax-eating Greater Honeyguides work together to find wild bee hives which provide a valuable resource to them both.

Honeyguides give a special call to attract people's attention, then fly from tree to tree to indicate the direction of a bees' nest. We humans are useful collaborators to honeyguides because of our ability to subdue

stinging bees with smoke and chop open their nest, providing wax for the honeyguide and honey for ourselves. In this way, people and wild birds can increase their chances of accessing vital sources of calorie-laden food, with no competition for the prize.

This reciprocal relationship plays out in the wild and occurs without any conventional kind of 'training' or coercion. Thanks to Dr Hussein Isack's research in the 1980s, we know that people in Kenya can greatly increase their rate of finding bees' nests by collaborating with honeyguides,



sometimes following them for over a kilometre.

Keith and Colleen Begg, conservationists working in Mozambique's Niassa National Reserve, first alerted me to the Yao people's traditional practice of using a distinctive call which they believe helps them to recruit honeyguides. With the help of Niassa's honey-hunting community, we tested whether the birds were able to distinguish the call from other human sounds, and so to respond to it appropriately. The 'honey-hunting call' made by honey-hunters, and passed from

generation to generation, is a loud trill followed by a short grunt: 'brrr-hm'.

We wanted to test whether honeyguides associate 'brrr-hm' with a specific purpose, rather than it simply alerting them to the presence of humans. To do so we compared the honeyguides' response to the honey-hunting call to their response to arbitrary human and other animal sounds. When these sounds were played back in the wild during experimental honey-hunting trips, the traditional 'brrr-hm' call increased the probability of being guided by a honeyguide from 33%

to 66%, and the overall probability of being shown a bees' nest from 16% to 54% compared to the arbitrary control sounds.

Intriguingly, people in other parts of Africa use very different sounds for the same purpose. For example, Dr Brian Wood from Yale University has shown that Hadza honey-hunters in Tanzania make a melodious whistling sound to recruit honeyguides. We wondered if honeyguides learnt this language-like variation in human signals across Africa?

As a next step, we want to test whether young honeyguides learn to recognise local human signals, creating a mosaic of honeyguide cultural variation that reflects that of their human partners. Sadly, the mutualism has already vanished from many parts of Africa. The world is a richer place for wildernesses like the where people and animals coexist and this astonishing example of human-animal cooperation still thrives.

This research was recently published as a paper in *Science* titled "Reciprocal signaling in honeyguide-human mutualism" by Claire Spottiswoode and co-authors Keith Begg and Dr Colleen Begg of the Niassa Carnivore Project. The research was funded by the DST-NRF Centre of Excellence at the FitzPatrick Institute, UCT, and by the BBSRC in the UK.

*Claire Spottiswoode
FitzPatrick Institute DST-NRF Centre of Excellence, University of Cape Town and University of Cambridge*



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Subscriptions	Lee-Ann Lawrence (leeann@capemedia.co.za) Local price: R172.00 International price: R469.00
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CONTENTS

- 10 Winning at water**
Setting the standard for leadership, innovation and empowerment
- 14 Phenomenal fertilizer**
The most valuable agricultural input
- 16 Balancing the books**
Commercial agriculture deserves appreciation
- 18 Management first**
The role of an animal health program in livestock farming
- 22 Our living soil**
Soil is at the bottom of the food chain, yet it is the cornerstone of life on Earth
- 28 Taking transformation in South African potato production to a higher level**
Ensuring the development of new Black commercial potato farmers
- 30 Healthy animals, healthy profits**
SA's animal health market is set to double
- 32 Regenerate the land**
Farm workers turn carbon credits into cash
- 34 The market speaks**
2017 has exciting things in store on the JSE
- 36 Tackling disruption**
Smart solutions to agricultural challenges
- 38 Putting water to work**
High yield, high quality, high profit
- 40 Greens in high demand**
Locals are in love with spinach
- 42 Some relief**
Input costs in the agricultural sector likely to ease in 2017
- 44 A royal example**
Thailand's agri-tourism projects have much to offer
- 46 Citrus gets a boost**
The newly unveiled Ikamva Lethu empowerment project
- 48 Onward and upward**
Introducing the Smart Agri climate response framework and implementation plan
- 51 Add it up**
Performance that leads to profits
- 54 Real innovation in crop nutrition**
A new concept in fertilizers
- 56 Use expanded data to your advantage**
A new data collection platform for farmers
- 60 Transformation and food security**
Winds of change in the Western Cape, intensive farming in KZN and Limpopo
- 63 Back to basics**
A better yield requires better insight and planning
- 64 Best lab results**
Top tips: how to get the best out of a laboratory



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FOREWORD

Through good times and bad times



2017 has started as fast as 2016 ended. We literally had to hit the ground running after taking some time off during the festive season. At least, hopefully, most of us had some time to reflect on 2016 and more importantly gained inspiration and motivation to address the challenges and opportunities 2017 will bring.

2016 will most probably be remembered for one of the worst droughts in decades that seriously challenges most of the agricultural sector to remain sustainable. Our agriculturists have become renowned for the sterling job they are doing to ensure food security

in South Africa, and have been able to do so even during this drought in many agricultural sub-sectors. The drought nevertheless had a significant negative impact on many agricultural producers' ability to reinvest and expand their farming operations since reserves had to be redirected to maintain existing farming operations. With the rains that started in late 2016 and which continued into 2017, the outlook is much better. However, one should not forget that price determination in agricultural markets is supply and demand driven. Hence, any significant expansion in supply without a corresponding increase in demand will result in lower prices. Lower prices of food will obviously bring some welcome relief for consumers, but this also means a longer recovery period for agricultural producers to ensure they build up sustainable reserves for their farm businesses to mitigate against any future climate risks. This is essentially the world of agricultural producers, where they must navigate through bad and good times 24/7 a day to ensure the sustainability of their farming operations to the benefit of the whole population. The sustainability of the local agricultural sector is crucial for socio-economic and political stability. This

was clearly demonstrated during the 2008 global financial crisis when South Africa was able to provide food, especially maize, at well below import parity prices at a time when civil unrest as a result of expensive and a shortage of food catapulted many countries into economic and political disarray.

The farming and agribusiness sector can, however, not be successful on its own since it operates in a larger socio-economic and political environment. It must abide by the laws and regulations (of multiple government departments) in the country. One of the biggest challenges in 2017 will be to align the regulatory framework applicable to agriculture to ensure that it unleashes its full potential to create jobs, ensure food security and remain the backbone of our rural economy. In order for this to happen will require leadership that embraces partnerships and stakeholder participation at all levels of our society. This is the challenge we face to ensure a prosperous South Africa for future generations.

I wish you a blessed 2017 and beyond.

*Dr André Jooste
CEO: Potatoes South Africa*

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EDS NOTE



GREG PENFOLD
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Welcome to the first issue of *Harvest SA* for 2017. It seems that the world has changed radically in a short space of time, yet the age-old vocation of producing sustenance from the soil continues.

A key word that recurs throughout this issue is "sustainability". It's one of those tricky words that means different things to different people. However, looking at what different thought leaders in agriculture have to say, it seems obvious that sustainability has a clear and important meaning for the farming community.

There is the basic awareness that a healthy agriculture system is the foundation of any sustainable society. Without agriculture, there can be no food security, and without food security, desperate, hungry people are going to be increasingly inclined to take desperate measures to look after themselves.

Then there is the awareness that the principle of sustainability has its own particular

application to the way farming is practised. In a way, it's a notion as old as agriculture itself. You cannot keep producing from exhausted soil: you have to replenish the fields, rotate the crops, to keep a farm viable for production. You can't overgraze the same pastures all the time. It's odd to reflect that sometimes this basic principle is forgotten by producers fixated on maximising production at the cost of the soil, which becomes less productive the more it becomes addicted to fertilizer. See the Agriculture Research Council's important article on healthy soil in this issue.

Another very important part of sustainability is innovation.

Whether it's about fertilizer, potatoes, or animal health products, backing the right innovations can make all the difference. To stay with the example of soil, although the use of fertilizer has caused problems for the soil, at the same time, the use of newly developed soil-friendly fertilizers can bring new life back to the farm. Stay abreast of recent developments in these and other areas in this issue of *Harvest SA*.

Recent research shows that potatoes are highly nutritious. Cooked with skin, potato is king! See the comparison per 100g serving ...

One hectare potatoes produces two to four times more volume food than grain

Whats in a 10kg Potato Bag?
Cultivar, Class (grade)
Size (small/medium/large)
Name and address of producer
Date of packaging (soon compulsory)

Did you know?
South African consumers prefer white potatoes

There are more than 4000 varieties of potatoes which occur mostly in the Andes. They come in various shapes, sizes and colours

Potatoes have a price advantage over many other staple food such as bread, maize meal and rice

Potatoes are produced all year round in all provinces = fresh potatoes are available all year round

Affordable

Available through out the year

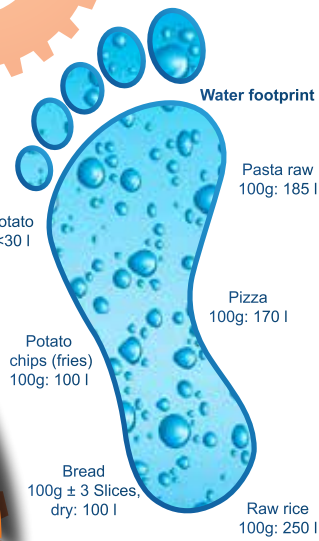
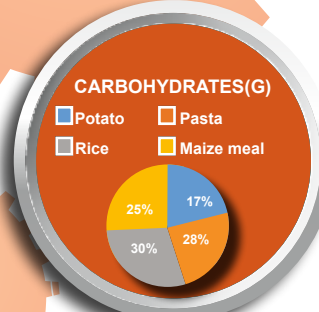
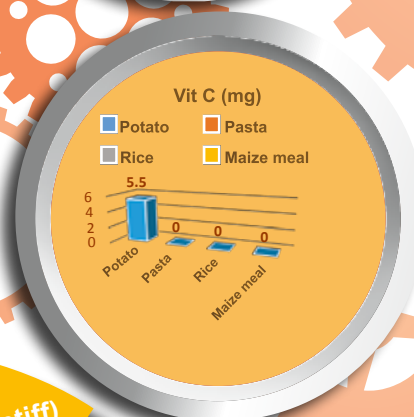
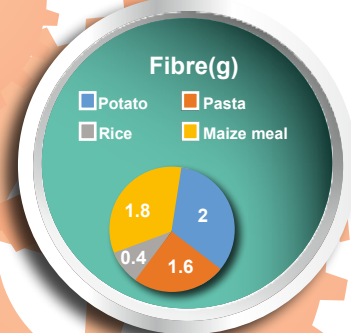
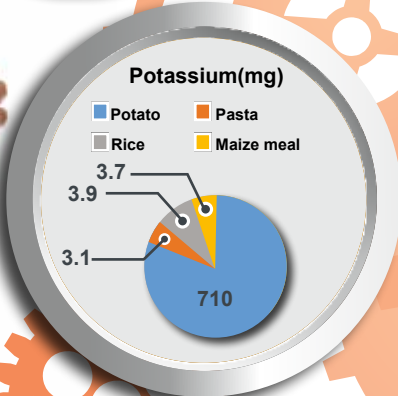
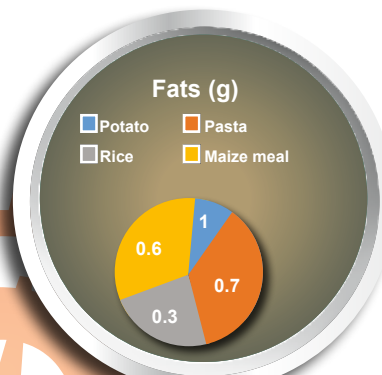
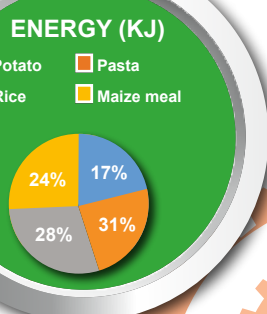
They are good for you

Potato cooked with skin

Pasta (cooked)

Rice (white cooked)

Maize meal (cooked stiff)



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Mr Dhesigen Naidoo, CEO

WINNING AT WATER

The Water Research Commission sets the standard for leadership, innovation and empowerment

Water scarcity compels water institutions to excel in innovative thinking and display cutting-edge leadership that contributes to the African continent's ability to address critical water challenges. Mr Dhesigen Naidoo, CEO of the Water Research Commission (WRC) has a leadership style that reflects precisely this, which is why he was the 2016 recipient of the prestigious Africa Water Leadership Award in an award ceremony held at Le Meridien Hotel, Mauritius, on 7 December 2016.

The Africa Leadership Awards honours achievers, super achievers and future business leaders and attracts the best of the best from Africa. Although the award is a highlight for the Water Research Commission, it is also a highlight for the continent of Africa.

Dhesigen's award recognises him as one of those leaders who can steer their businesses through turbulent times while applying the best of business modules to manage and keep their missions afloat. The water sector in South Africa and Africa are proud of Dhesigen's nomination to receive such a prestigious award.

The criteria for this nomination were the impact Mr Naidoo's leadership has had on the lives of others within the water sector and the quality of the WRC's research outputs as well as their global reach and ability to contribute to social change.

Mr Naidoo receives the award for outstanding leadership, management skills, professionalism and vision in leading his organisation to make a difference and achieve innovative results.

The WRC is one of 13 members of the Global Water Research Coalition (GWRC), which operates on a mandate of information sharing and collaboration to drive the water deficit down, leading to a surplus on a global scale. Naidoo believes strongly in the expansion of cross-border partnerships: "Phenomena like climate change have no respect for national boundaries; in fact, 60% of South African rivers are shared with our neighbouring countries."

This point illustrates the need for global partnerships to eradicate the global water assurance challenges. The World Economic Forum (WEF) has, over the past few years, included water as one of the top risks for business. Naidoo sees this as a positive step in educating nations and their respective industries on their water footprint.

Pour Flush/ Low Flush toilet scoops SAB Foundation Social Innovation Seed Grant Award

The WRC's newly developed innovative toilet Pour/Low Flush Toilet was recognised by the SAB Foundation as one of the recipients of the Social Innovation Seed Grant Award Winners presented on 27 October 2016.

Dr Sudhir Pillay, the Research Manager responsible for sanitation-related projects at the WRC, received the award on behalf of the organisation.

Presenting the award, the Foundation selected the Pour Flush /Low Flush toilet as an innovation combining full flush toilet technology with the logistical advantages of on-site pit toilets, which do not need sewers or copious amounts of water for operation.

While presenting the awards, the SAB Foundation said, "There were over 600 submitted applications and 23 finalists across the Health, Disability, Education, Energy, Water and Sanitation and Livelihoods and Sustainable Agriculture sectors. It was no easy task for our final 12 judges to select the winners. Each and every idea received had the potential to change the lives of so many. But the winners demonstrated their ability to become commercial and scalable."

The Pour Flush /Low Flush toilet is a new technology developed with funding from the WRC and aims to bridge this gap on the sanitation ladder while restoring dignity, privacy and safety to people who have been left behind in the drive towards basic services for all.

A significant step up the sanitation ladder from VIPs, a pour flush toilet is similar to a full flush toilet except that the water is poured in by the user rather than coming from a cistern. The system uses significantly less water—only 1-2 litres rather than the 5-7 litres needed for conventional flush toilets. Some changes had to be made to the pour flush toilets usually used in Asia—for one, South Africans prefer to sit rather than squat, so a pedestal had to be provided. The toilets also had to be able to handle anal cleansing material, such as toilet paper or newspaper.

The WRC's Pour Flush/Low Flush toilet is designed to be as simple as possible to avoid parts which can break or block. While looking very similar to a full flush toilet, there is no water tank, cistern, flusher or liquefier. Since there is no plumbing, no leaks are possible. The toilet is flushed by pouring one or two litres of water into the pan. The pan funnels steeply to a 70 mm-diameter outlet. Greywater can also be used for flushing.

The water seal works just like a regular flush toilet: water is trapped in the bend of the pipe sealing off any smell from the pit coming back up into the toilet. After the water seal, the pipe continues straight to a leach pit. A significant advantage over a VIP toilet is the fact that users cannot use the toilet as a rubbish pit, leaving the resultant sludge essentially free from general household solid waste.

Rather than a conventional sewerage system, the pour flush toilet block is attached to two leach pits. When one leach pit becomes full, then the pit is switched. The full pit is allowed to dry out normally over a period of two years and then emptied, ready to be used again once the operational pit reaches its capacity. The leach pits are fully offset from the structure, making them easier to access for maintenance. Studies indicate that the pits have a lifespan of around five years before they need to be emptied.

Pour Flush /Low Flush trials have been conducted in households and schools in KwaZulu-Natal, Western Cape, and Eastern Cape. After extensive testing, the first two toilets were installed in Pietermaritzburg in 2010. They have been in operation since then without problems or blockages. Consequently, a further 20 household demonstration units were built as well as three toilets at a crèche.

According to Mr Jay Bhagwan, Executive Manager for Water Use and Waste Management at the WRC, all is working well. For the users of the technology it adequately addressed the wish for a flush toilet. Moreover, the technology costs considerably less than installing a full-flush toilet connected to a sewer or a standard septic tank. In addition, it is not dependent on piped

water supply, and can be used even if the water supply is cut off occasionally, as a small amount of water is required and greywater can be used. It is also less complicated than a VIP in terms of installation.

On 12 November 2016 the Department of Science and Technology, under the leadership of Minister Naledi Pandor, visited the Eastern Cape to launch the implementation of the toilets in Amathole District Municipality.

Water empowers women

In October the WRC hosted the launch of the Women Empowerment Programme (WEP) on behalf of the Department of Water and Sanitation. This ministerial flagship program is designed to achieve the empowerment of women through water use security, land use security and knowledge generation for improved household food security and sustainable rural livelihoods in selected areas of Limpopo, Eastern Cape, KwaZulu-Natal and North West provinces.

At the opening, WRC CEO Mr Dhesigen Naidoo explained that gender issues are now mentioned in most provincial, national and regional agricultural and food-security policy plans, but they are usually not taken seriously in some instances. However, women issues should be treated as an integral part of policy and programming. Many agricultural policy and project documents still fail to consider basic questions about the differences in the resources available to men and women, their roles and the constraints they face, and how these differences might be relevant to proposed interventions. As a result, it is often assumed that interventions in areas such as technology, infrastructure and market access have the same impacts on men and women, when in fact they might not.

Women's access to productive resources, such as land, modern inputs, technology, education and financial services, is a critical determinant of agricultural productivity. Agriculture is important to women, but female farmers have less access to the productive resources and services required for agricultural production. Women are less likely than men to own land or livestock,

adopt new technologies, use credit or other financial services, or receive education or agricultural extension advice. Besides the constraints highlighted above women bear the triple burden of reproductive work, productive work and community roles, and have limited time available to expand their agricultural interests. Recently the Water Research Commission completed three projects which focus on empowerment of women. All these three projects were conducted in different provinces across the country.

Results from these projects showed that at least 61% of the households are headed by females, although this varies between the villages in provinces. Culture and tradition still dominate over more contemporary views and the intra-household domain is a variously contested space where male family members strongly influence decision-making in most study sites such as Eastern Cape and Limpopo Provinces. In Limpopo Province, for example, it was found that women in all the study sites were poorly empowered in terms of time, leadership and also ownership of resources. The study conducted in North West Province found that rural women need to be offered opportunities to improve their numeracy and literacy levels since their low levels of education is a major hindrance to the acquisition of new skills.

The water protector

A sterling job in leading research that is protecting South Africa's natural resources has finally paid off. WRC Manager, Mr Bonani Madikizela was recently recognised by South African environmental NGO WESSA, who presented him with an honorary lifetime achievement award at their 90th Anniversary celebration held in Skukuza, Kruger National Park.

The WESSA Award Ceremony on 17 September 2016, celebrated 90 years of the organisation's existence under the WESSA motto 'Caring for the Earth'.

Madikizela was amongst those selected for one of the 90 Lifetime Conservation Achiever Awards, a category which was introduced for the occasion and which provided a unique opportunity to acknowledge 90 living



Mr Bonani Madikizela, Water Research Commission Research (WRC) Manager

individuals who have dedicated their lives to conservation in South Africa.

The prestigious event paid special tribute to a wide range of outstanding environmental achievements. The Lifetime 90 Achievement Award presented to Madikizela was in recognition of his sterling work in fighting against the degradation of South Africa's freshwater ecosystems and for the restoration of biodiversity in natural resources.

Madikizela has spent more than 20 years working with natural resources, focusing in particular on water resource quality and bio-monitoring with respect to inland freshwater ecosystems such as rivers, dams and wetlands. Madikizela is a research manager in the Water Resources unit at the WRC, and has previously worked at the Departments of Water Affairs and Environmental Affairs. As WRC research manager, Madikizela's role includes prioritizing, supporting, and coordinating research done by a variety of organisations and independent consultants across South Africa.

Due to historic lack of attention to wetland health and biophysical integrity, Madikizela's focus is currently biased towards wetlands and also includes river rehabilitation, with the intention to provide methods and guidelines that ensure sustainable utilisation of these resources, but without furthering biodiversity loss. This quest has led to interactions with experts in aquatic ecosystem research and development at national and international levels.

WRC CEO Mr Dhesigen Naidoo said, "We congratulate Madikizela for receiving such a prestigious award, which positions the WRC personnel as leaders in the applicability of research that is managed in a way that encourages exploratory and innovative investigations."

While expressing his gratitude for the award, Madikizela said, "The 90 Lifetime Conservation Achiever Award means a lot in boosting one's self esteem. Even more inspiring is to be recognised at the time when the country is in dire need of water specialists that need to be turning their heads around due to the ongoing water scarcity challenges facing South Africa."

PHENOMENAL FERTILIZER

The most valuable agricultural input



Not only does fertilizer hold the key to profitable agricultural practice, but it is also a significant contributor to food security, water efficiency and environmental wellbeing.

Harvest SA chatted to Eugene Muller and Dr Johan van Biljon from Kynoch Fertilizer to find out more.

Imagine all fertiliser stocks disappeared overnight. What would the effect on farming be?

It would be devastating. Not only food security but also nutritional security would be in danger. This could lead to even more serious price hikes and unrest, which would destabilize the country.

Stated differently: what are advantages of using fertiliser?

The advantages of fertilizer use are numerous and include, amongst others:

- Food security, which refers to the ability to provide enough food, or at least enough staple food (normally high in energy)

- Nutritional security, which not only refers to the energy needs in a diet but also to provide a balanced diet including, e.g. protein, vitamins, minerals, etc.
- Environmental security, which refers to the prevention of mining of the soils which will lead to non-sustainable food production in the future.

What does "plant nutrition requirements" cover?

Plant nutrition requirements consists mainly of the application of macro nutrients (nitrogen, phosphorous and potassium), secondary nutrients (sulphur, calcium and magnesium) and micro nutrients (e.g. zinc, iron, molybdenum, manganese, boron, etc.)

What research goes into producing fertiliser for today's market?

Fertilizer research is a continuous process, not to only stay competitive in the market place but also to provide for the higher demand because of the growing population. South Africa can be seen as a relatively unfriendly agricultural land with higher production risks

(climate), pricing risks (we are price takers seen from a global perspective) and political risk (land-grabbing threats), therefore local conditions must be taken into account to stay relevant and survive.

Does fertiliser also help with water efficiency and drought resilience?

Yes, the water use efficiency of a well and balanced fertilized crop is much higher than a crop that receives an unbalanced "diet" or one deficient in the amount and combination of nutrients. Water use efficiency is extremely important because of our limited and erratic rainfall in South Africa. A well and balanced fertilized crop can also withstand stress conditions much better.

What is the connection between innovation and efficiency?

In the first place, higher efficiency can increase the yield and the quality of the crop to increase the profitability of the food producer. More than that, higher efficiency can also lead to the use of less fertilizer that not only improves the food producer's



financial position but can also benefit the environment. To increase efficiency is not easy and innovative ideas and investment into research are key to reaching these goals.

How should farmers think about fertiliser with regard to planning?

Fertilizer is one of the biggest input costs for a grain producer and could influence the profitability of the farming enterprise directly. Underfertilization can reduce yield and quality, while overfertilization will increase input costs unnecessarily and could also harm the environment. It is therefore not something to play around with and must be put in the hands of a reputable fertilizer company who can add value to the farming enterprise.

What proportion of farming costs does fertiliser typically account for?

There is a big difference for fertilizer as an input cost between e.g. grain producers and fruit producers. Fertilizer cost is one of the highest and can be between 25% and 35% of the input cost. One of the other big

ones is mechanization and soil preparation. For fruit producers fertilizer cost is relatively small compared to packaging, for example.

How does the fertiliser industry strive to be environmentally responsible?

Different technologies can be used to minimize environmental impact. It is recommended that soil samples are taken on a regular basis to determine the nutritional status of the soil. Taking this into account can reduce fertilizer use and will prevent over-fertilization that can harm the environment. Plant samples can also be taken through the growing season to amend the fertilizer program to prevent overfertilization. Safety and the environment is also taken into account in the production of fertilizer products. Care is also taken to use only high-quality raw materials that adhere to minimum standards to produce products that will comply to at least legal specifications. The above mentioned practices emphasize the commitment and responsibility of Kynoch.

Would you say the fertiliser industry is in a healthy, competitive state?

The South African fertilizer industry is a highly competitive business and must be able to compete in the International arena against much bigger players. Barriers to entry are also extremely low and the need to differentiate is a critical component in sustainability of any fertilizer supplier, as food producers are essentially "spoilt for choice" regarding who they procure from. The South African fertilizer industry is amongst other factors challenged by very high harbour and logistical costs compared to first world logistics costs, but through innovation (thorough the

entire value chain) the industry has stood its ground, enabling food producers to compete against the best in the world despite all the challenges.

What are your hopes for 2017?

The previous season was a very tough one where a large number of food producers did not plant, especially in the western parts of the country, which resulted in a big amount of carry-over stock on farms. The season was also extremely short. The 2016/17 growing season looks very promising from a climatic point of view, and although there are always challenges, the industry should have a better time of it during the 2017/18 growing season, enabling them to focus more on making a difference on the farm rather than only getting the inputs delivered.

Fertilizer do's and don'ts

DO

1. Build a long term relationship with a reputable fertilizer company.
2. Buy quality fertilizer that comply to at least minimum standards.
3. Optimize fertilizer use by using benchmark technologies and practices to lower your risk.

DON'T

4. Put your business in the hands of a fertilizer supplier without a long term proven record.
5. Buy cheap, "questionable" fertilizer that can increase your production risk.
6. Guess what type of fertilizer and application rate to be used. Not only can it reduce your profitability, but it can harm the environment too.

BALANCING THE BOOKS



Commercial agriculture
deserves appreciation

From a commercial agriculture point of view, 1994 introduced changes which still affect the sustainability and profitability of primary food production in South Africa. Whilst some of those changes resulted in the abolishment of marketing boards affecting stabilised product prices, the cutting of subsidies also had far-reaching financial consequences. Commercial farmers suddenly found themselves in a position within which they could at best be described as “price takers”. With the knock-on effect on income and profitability came several other consequences as well. Globally they had to compete with producers whose governments did not hesitate to subsidise food production and who did their utmost to protect and sustain the agricultural sector. The exact opposite was happening in South Africa irrespective of the fact that a growing population as well as neighbouring states increasingly became dependent on local commercially produced food.

In a sense, commercial farmers experienced increased distance between themselves and government.

The resultant void created by a lack of governmental interest was, however, replaced by the introduction of several laws which

directly had a bearing on sustainability and profitability. The Restitution of Land Rights Act aimed at repairing loss of land has unfortunately not ensured the retention of productivity of valuable agricultural land. The Extension of Security of Tenure Act (ESTA) is uniquely applicable only to farmers, having had a direct impact on the implications of the scope of private ownership. No other employer in the country is subject to similar legal obligations to provide pensioned employees with access to land. The subsequent introduction of a Sectoral Determination prescribed a minimum wage and currently discussions are under way to consider and introduce a National Minimum Wage. Furthermore, the efforts of government to appoint itself as the custodian of sub-surface minerals and water, as well as current efforts to do the same with “high potential agricultural land”, have created problems and distrust. To top it all, political competition and the side effects thereof, especially in the field of organised labour and the need to win elections, has also contributed to increased tensions.

Meanwhile, farm dwellers are subjected to sustained pressures as a result of continuing violent crimes and stock theft, which pose a direct threat to the country's ability to feed itself as well as those citizens in neighbouring countries where growing populations are

dependent on restricted commercial food production. Ironically, this situation has resulted in an influx of foreign nationals either seeking a better life or employment. The consequent emergence of xenophobia was not expected and contributed to increased pressure on a sector where industrial loss of production levels could not be balanced out by increased employment or overtime arrangements and increased pay. The agricultural production cycle is determined by seasonal factors beyond human influence.

It is within this scenario that commercial farmers are forced to revisit their options. Notwithstanding the need to continue doing what their calling dictates, i.e. to produce food, they have a major role to play by contributing to a stable and sound rural economy. This is itself an uphill battle as rural poverty has been identified as one of the major national challenges. Commercial agriculture is an important creator and provider of job opportunities in rural South Africa. Not only does the local populace depend on income provided by work on farms, but business enterprises in small towns, schools, medical facilities, religious structures and the ability to improve and extend rural infrastructure are equally part of that economic and social reality.

Just as in any other business, farmers need to manage the production process in such

a manner that sustainability and profitability will ensure a viable future. It is this very real fact that distinguishes modern farming practices from the romantic and peaceful existence which in the past was so easily associated with farm life. Even more so, this applies to the need to be able to maintain financial reserves for the droughts, torrents and other natural disasters which may destroy carefully raised crops of livestock without warning. However, the ability to repair or recover losses differs greatly from what managers in other industries experience. The recent drought may well have been broken in most areas, but farmers who lost a season's harvest or who had to drastically reduce a productive herd will need considerable time to recover.

The factors which make the agriculture process possible are restricted not only by the nature of crops or livestock to be raised, but also by access to capital, labour as well as seasonal and biological issues. In a global competitive world, further factors include the increased application of technology, the increasing cost of labour (and the local implications thereof), the need to protect the environment, access to potable water, being able to transport products on a well-maintained infrastructure to urban markets and affordable input costs to ensure sustainability and continued production.

South Africa needs to show and express its appreciation for the decreasing community of farmers and farm workers who are putting food on the table, providing employment and earning valuable foreign exchange to sustain life and the national economy whilst enduring a wide variety of imposed legislation, occupational challenges and serious threat to life and property. The vastly urbanised population with no proper grasp of the current challenges facing farmers owes it to them.

Bennie van Zyl, General Manager of TAU SA





MANAGEMENT FIRST

The role of an animal health program in livestock farming

Livestock farming is the backbone of farming in large parts of South Africa, especially in the more rural areas not suitable for crop production. Even on farms where it is not the main farming enterprise, it plays an important role in utilising land not suitable for crop production. On these farms it can help to improve cash flow, provide that extra little bit of money and be a stabilizing factor.

Whether it is the main or secondary farming enterprise, we need to make the most of it. To get the best out of livestock farming a few important rules need to be followed namely: management, management and again management! It is easier said than done, but something that we cannot escape from if we want to be successful livestock farmers.

Marketing percentage

In sheep (even with woollen breeds), goat and beef cattle breeding production systems, the main driver of economics is the marketing percentage achieved. Marketing percentage is the number of animals annually sold, per 100 females mated. By maximising the number of animals born (reproduction rate) and minimising mortalities (losses) during the year, the more animals will be available to

be sold. Marketing percentage will differ from area to area and to production system to production system due to various variables, but we must always strive to maximise it.

Unfortunately it is not as simple as achieving a good marketing percentage only. The animals and produce sold (in the case of wool/mohair), must also be of such a quality that you will receive the best possible price per kg or animal, to maximise income. Costs should also be kept under control – especially fixed costs.

Many factors contribute in achieving a good marketing percentage. Proper nutrition (probably the most important factor), correct breeding principles (selection for adapted animals), an effective health program and minimising losses due to predators and theft, should get you far.

Role of animal health

The implementation and proper execution of an animal health program can play a major part in achieving a good marketing percentage as well as to ensure a good quality end-product to sell. Animal health has an impact on the following:

Reproduction:

Parasites and diseases could have a negative effect on the development of young growing

animals that lead to delayed puberty and a lower life-time reproduction potential. Body condition score (BCS) has a major influence on reproduction and is directly linked to nutrition. Animals that are kept relative parasite free (internal and external) and are protected from contracting preventable diseases, will utilise nutrients efficiently to grow optimally and achieve the desired BCS to reproduce optimally.

The importance of trace mineral supplementation in supporting optimal reproduction rates is recognised worldwide. Trace minerals have a direct effect in terms of its role on specific reproduction physiology factors like semen quality and quantity, development of ova and the survival of embryo's to name a few. It has also an indirect effect in terms of improved immunity. Improved immunity will increase resistance to disease and general well-being of animals that will have a positive effect on reproduction.

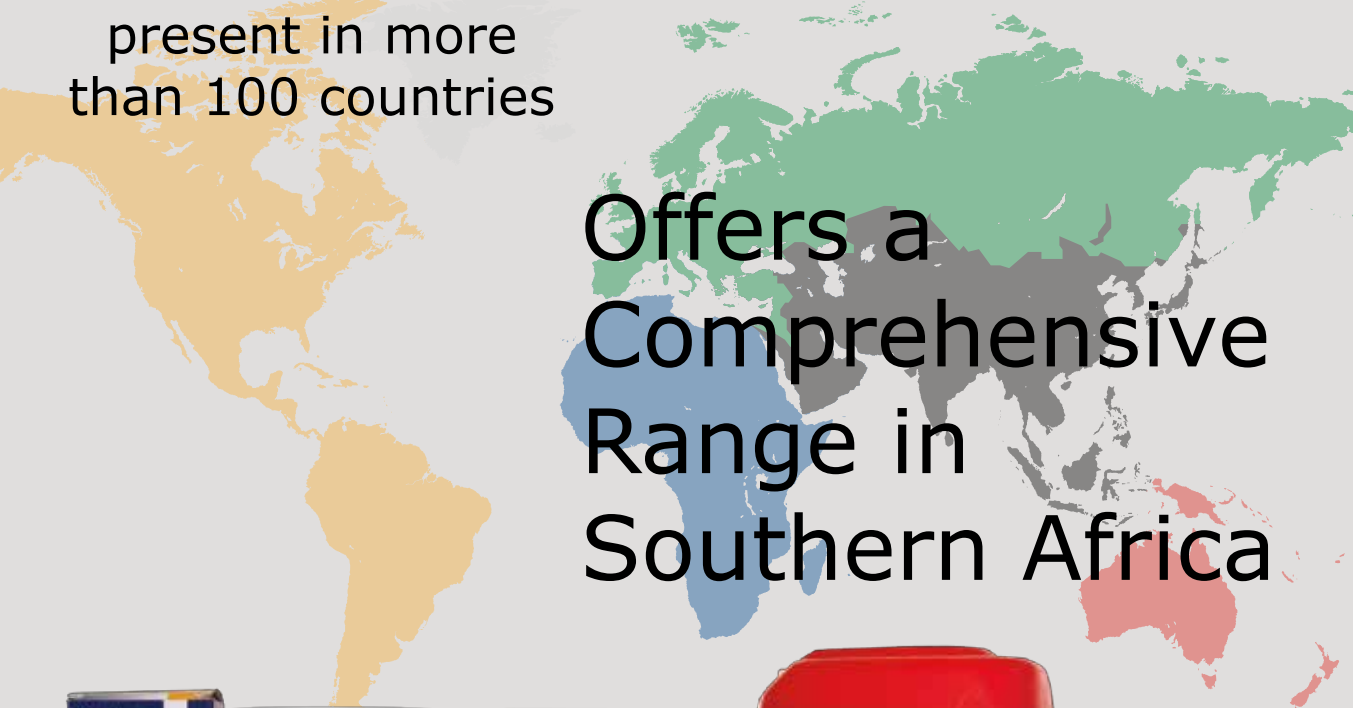
Optimising production and limiting mortalities:

Only animals that are free of parasites, have an optimal trace element status and don't get sick, will be able to stay alive and contribute in achieving a proper marketing percentage. These animals will also grow optimally and produce quality products.



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Elements of a health program

It is all good and well to have a health program, but is even more important to make sure that the 4 C's are implemented. Perform the Correct action, at the Correct time, done in the Correct manner, with the Correct product.

Why the emphasis on a program? With so many aspects to manage on a daily basis, it is sometimes difficult to remember all the actions that need to be implemented, especially those that need to be performed in advance of a certain event. A program is therefore a management tool and a reminder to execute strategic actions that need to be performed on specific time slots during the production cycle ie. before mating, before lambing/calving, before weaning, after shearing etc. If a program is followed, at least 2 of the 4 C's are covered – to perform the correct action at the correct time. To be able to get the most benefit from a program, it is advised that a breeding

program (season/s) being implemented so that specific dates for specific actions can be pinned down. Tactical treatments will be dictated by factors such as the season, change in weather conditions, buy-inn of animals etc.

The following elements should ideally be included in an animal health program:

Vaccinations

Vaccination is like insurance – you either vaccinate and prevent probable losses, or you don't vaccinate and take the brunt in the event of a disease outbreak. Certain vaccines need to be given at a certain stage in the production cycle - especially "live" vaccines. With most "inactivated" vaccines, a booster vaccination should be given within a specified time frame (if given for the first time), to achieve proper immunity. This booster vaccination is often neglected and should be included in the program.

Parasite control

Both internal and external parasite control must be included in a program. Control will help to maximise the utilization of nutrients, minimise the loss of condition during periods of poor nutrition and stress and enhance the general well-being of the animals. Ticks (mortalities due to tick borne diseases), lice (irritation and weight loss) and sheep scab (weight loss and effect on wool/hair quantity and quality), costs

farmers a lot of money each year and need to be managed properly.

Trace mineral supplementation

Trace minerals are generally provided in oral form as part of commercial licks. It provides a baseline supplementation of trace minerals. During critical events in the production cycle like mating, lambing/calving, weaning and other stress situations, the need for trace minerals increases. A "TOP UP" injectable supplementation is advised to optimise trace mineral levels. With increased genetic potential of animals and to optimise reproduction, production and immunity, we are long past the time to only supplement trace minerals when deficiency symptoms are diagnosed! In a country known for sub-optimal trace mineral levels, production losses occur long before deficiency symptoms are diagnosed.

Breeding soundness

This is an aspect that is often neglected! With the increase in the occurrence of sexually transmitted diseases, this should be a non-negotiable part of any program. Fertility (semen quality/quantity), physical soundness of reproductive organs, libido and testing for the presence of sexually transmitted diseases should be part and parcel of this exercise. This should be performed by a suitably qualified operator well in advance of the start of the breeding season, to be able to take corrective measures if needed. No amount of nutrition, trace mineral supplementation, selection, animals free of parasites etc. can replace the fertilisation of properly developed ova by fertile sperm - in the absence of sexually transmitted diseases!

In summary – although animal health generally contributes to less than 10-15% of annual production costs, it can have a major impact on the marketing percentage and quality of produce sold. Therefore a simple, yet efficient animal health program should be drafted and executed! Consult your local vet or contact your local animal health Technical Sales Advisor for assistance in drafting a suitable program for your specific conditions.

*Danie van Niekerk: Technical Support Manager
– Virbac RSA*



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OUR LIVING SOIL

Soil is at the bottom of the food chain, yet it is the cornerstone of life on Earth

Soil is linked to everything around us. It is Earth's only non-renewable resource, and with a natural formation rate of approximately 6-8 cm of fertile soil over a period of 2 000 years, this is not surprising. Traditionally, soil has always been seen or treated as a "dead" medium in which our crops bury their roots only to keep them from falling over.

What very few people realise is that soils also filter out pollutants from water as the water trickles down to underground water tables, and that healthy soils can store up to 9 000 tons of water in a 0.4 hectare piece of land.

In order to feed a global population that increased from 1 billion people in 1800 to 6.5 billion in 2002, agricultural production has doubled four times between 1820 and 1975 across the globe. Consequently, our precious soils have been subjected to annual planting of the same crop on the same piece of land, continuous ploughing in combination with crop residue either being removed by cattle or burned after harvesting. These practices have left valuable topsoil bare and unprotected – vulnerable to being blown away by windstorms and washed away during rainstorms. Keeping in mind that 10 tons of topsoil spread evenly over 1 ha is only 2.35 mm thick, it is astounding to realise how much topsoil is actually lost; consequently, huge crop losses result because of unproductive soils.

The development of synthetic fertilizers, herbicides and pesticides during the 19th century brought about more intensive types of agriculture. This transformation may have rescued billions of people from starvation, but our soils have been reduced to a state of "fertilizer addiction" – being unable to function effectively without the addition of increasing levels of fertilizer. The constant decline in yields (despite increased fertilizer application) due to unproductive and nutrient-depleted soils, along with the subsequent increase in pollution, ecosystem decline, and dietary disorders in humans, make it clear that this type of agriculture has never been sustainable.

The soil's living component

Every producer knows about the importance of the soil's chemical and physical properties which are frequently analysed and adjusted in order to optimise annual crop production. What a lot of producers do not know, however, is that there is also a living component present in soil that plays a crucial role in the functioning of a soil ecosystem. As an unintended consequence, the above-mentioned continued application of chemical fertilizer destroys this living component that is responsible for soil fertility.

Your first contact with the soil's living component was most likely when you enjoyed that "fresh earth" smell when the plough ripped through the earth in preparation for planting season. Have you ever wondered where that "earthy" smell comes from? That is the smell of a harmless chemical called geosmin, synthesised by a specific group of bacteria called actinomycetes – just a very small fraction of microscopic organisms responsible for crucial functions within the soil. This "earthy" smell is also evident after the first spring rains, because as rainwater enters the soil, the air between the soil particles is displaced by the water, thus releasing the air and geosmin.

On the other hand, you would almost certainly also have experienced the less enjoyable aspect of your soil when your crops started wilting or rotting or showing signs of stunted growth and the professionals at the co-op used words like "fungal infection", "bacterial infection" or "nematode infestation" while hurriedly escorting you to the chemical section of the store to kill the "bad bugs"!

Functioning of the soil

An intricate relationship exists between the soil's physical, chemical and biological properties. This relationship is not only exceptionally complicated, it is also extremely sensitive due to the finely tuned balance existing between the triad. Depending on the existing soil conditions, these relationships can be either positive or negative to plant and soil health.



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As soon as this intricate relationship is disturbed through intensive tillage, monocropping, reckless use of agrochemicals, and overgrazing, the functioning of the soil's ecosystem is impacted negatively. In these cases, the beneficial microorganisms are usually suppressed, while the pathogens then dominate the soils, resulting in high levels of plant diseases.

The functioning and health of a soil, which is usually reflected indirectly in the health of a crop, is greatly influenced by the availability of soil organic matter, the activity and biodiversity of soil (micro) organisms, as well as the flow of nutrients within the soil system. It is extremely important to keep in mind that this flow of nutrients is only possible because soil microorganisms do not function in isolation – they are intimately integrated with each other. These microorganisms are found in very high numbers in soil habitats, with bacteria reaching numbers of 100 million to 1 billion bacteria in a teaspoon of healthy soil, meaning that eight teaspoons of healthy soil may contain more bacteria than there are currently people on Earth! Indigenous soil microorganisms are present in unique microenvironments favouring their optimal survival and nutrient cycling.

With an increasing demand to grow more food on soils that have been mismanaged for millennia, it is clear that the responsibility lies with us to look after our soils. Since healthy soils form the foundation of food production in successful agriculture, unproductive soils can be rehabilitated through the adoption and implementation of more environmentally-friendly approaches promoted by the three main interlinked principles of Conservation Agriculture (CA): no or minimum soil disturbance, permanent soil mulch cover, and crop diversification.

The effect of CA practices on soil microorganisms

Soil microorganisms feed not only on decomposing plant material, but also on plant root exudates, i.e. chemicals secreted into the soil by roots. These exudates contain various amounts of different carboxylic acids, carbohydrates, amino acids, etc., depending on the type of plant, growth stage, and even the cultivar. Since soil microorganisms are very energy-efficient, different microorganisms will be attracted to different combinations of root exudate compounds that they are well-adapted to utilise rapidly. By implication, as the composition of the root exudates changes, so will the composition of the microbial community – thus influencing the diversity of the microbial community, and consequently the nutrient cycling process. Therefore, by planting a wider variety of crops as part of a rotation or intercropping system, a more diverse microbial community is stimulated to conduct more vital functions simultaneously in the soil ecosystem.

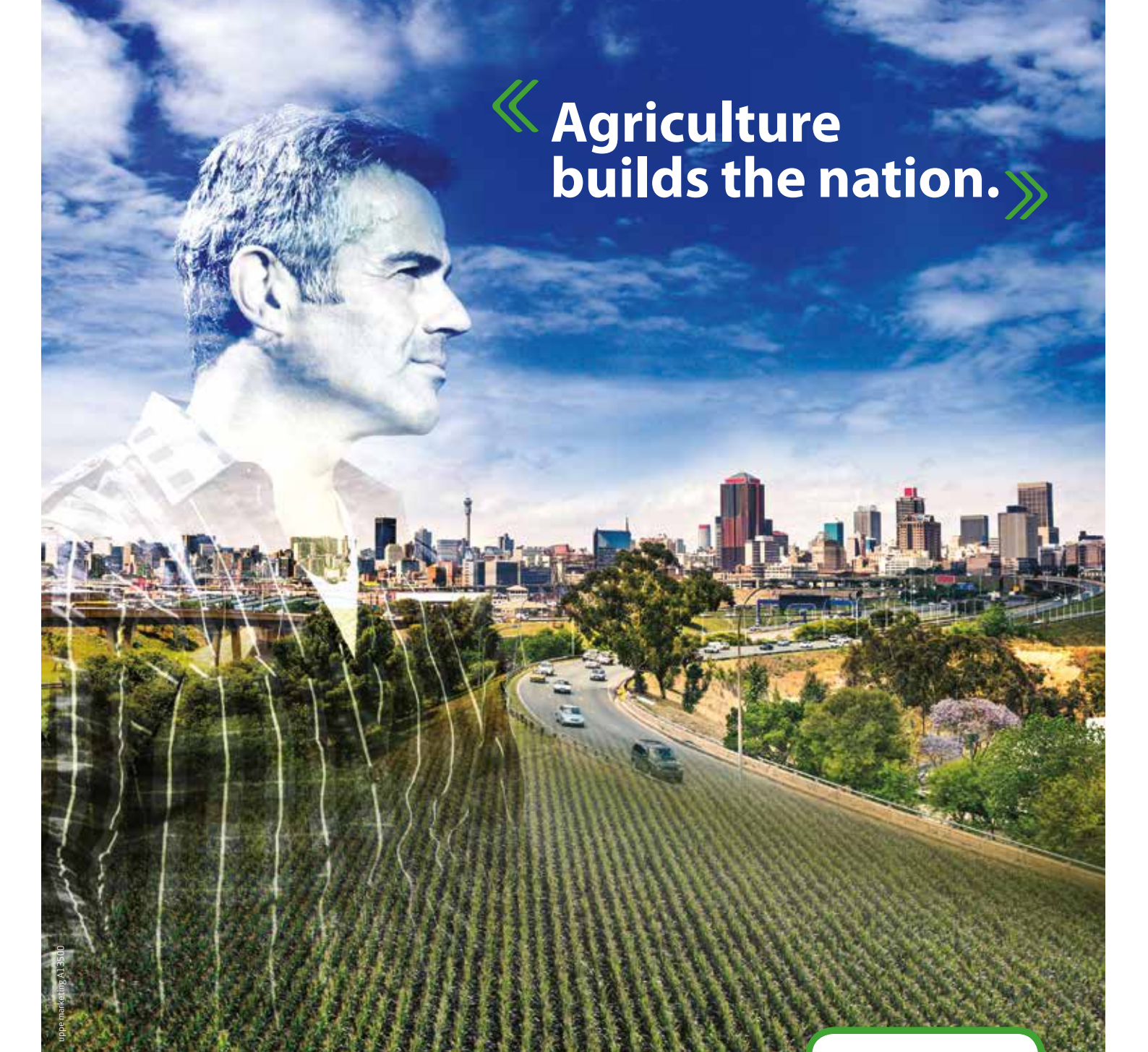
Apart from the decomposition of plant material, various microorganisms have the ability to produce chemical compounds, such as antibiotics and other anti-microbial chemicals, to suppress or decrease the proliferation of pathogens and favouring beneficial microorganisms, while others produce chemical compounds to stimulate plant root growth, solubilise phosphorous and potassium, and fix nitrogen from the atmosphere into the soil. Unfortunately, monocropping (monoculture) has the opposite effect. Since the same crop is planted annually on the same piece of land, the microbial

communities lose their diversity and become highly specialised due to the continuous supply of the same food sources. As a result, some of the microorganisms with the ability to produce the anti-microbial compounds might disappear, creating the perfect environment for pathogens to thrive without having to compete with other microorganisms for the same food supply. Through crop rotation, this disease cycle can be broken, since the food source that the pathogen was used to is suddenly absent and replaced by a totally different food source that the pathogen is not adapted to, and it is suppressed – either by anti-microbial compounds produced by the new set of microorganisms that are encouraged by the new food source, or the pathogens are simply out-competed.

Soil structure can also be improved by planting different crops with different root systems that “break up” the soil structure as they grow through the various soil layers. Root exudates are consequently transferred to the deeper soil layers, thus increasing soil fertility by attracting soil microorganisms to increase nutrient cycling. The topsoil is subsequently kept cool by sustaining a soil surface cover with mulch, thus reducing evaporation to a minimum.

Under these favourable conditions, the growth of fungi (mainly) and bacteria responsible for decomposition, is stimulated. As plant material is shredded into smaller fragments by ants, termites and other insects, the shredded fragments are then carried into the deeper layers of the soil profile by the same insects, as well as by earthworms. Fungi and bacteria are mainly responsible for decomposition of plant material, thus breaking the complex molecules, which are locked inside the plant material, into smaller, simple elements that can be more easily utilised by microorganisms as a food source. In this way, the soil microbial communities are responsible for the mineralisation process in soil ecosystems by unlocking the nutrients in organic matter and releasing them into the soil in plant-accessible forms.

It is thus obvious that the soil ecosystem is finely integrated and working harmoniously to ensure the optimal functioning of this “underground factory”. Unfortunately, by ploughing the soil, this whole “factory” is significantly disrupted. With this physical process of overturning the soil, the microorganisms working optimally in the deeper soil layers under conditions of limited oxygen and sunlight, are suddenly exposed to conditions of abundant oxygen and sunlight. Similarly, microorganisms functioning optimally in the topsoil under conditions of sufficient oxygen and sunlight, suddenly have to survive under conditions of limited oxygen and sunlight. In the human world, it is similar to taking experienced fishermen who are used to spending days on a boat on the wide open waters of the ocean, and forcing them to become farmers who have to work daily with lots of soil and dust and very little water. Fungi, which are responsible for decomposition of plant material after harvesting, are destroyed during tillage, thus slowing the decomposition process. Earthworm tunnels, which allow oxygen and nutrients to flow into the deeper soil layers, are also destroyed, and functioning microbial communities are completely disrupted. Consequently, it is going to take some time for the microorganisms to re-organise themselves to function optimally again.



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How is soil health or fertility determined?

For decades, soil physical-chemical analyses have been used to determine the health or fertility status of soils. Although this practice is not incorrect, it makes sense to also look at more sensitive indicators such as the soil microorganisms, due to their extreme sensitivity to any disruptions or changes in the soil environment.

When we, as humans, feel unwell, is it not true that we would like the doctor to test our most vital signs first to look for something wrong? We don't want them to test our bone density if we have the flu – they should test our temperature and heart rate first, since these are more sensitive indicators of flu infections. When doctors are uncertain of the nature of the illness, they cannot conduct only a single test to determine the nature of the illness; they have to conduct a whole set of tests or analyses.

The same applies to soil microbial tests or analyses: it is impossible to determine the health or fertility status of a soil by conducting a single analysis. It is strongly recommended that soil samples are sent to a microbiology laboratory two or three times a season over a period of at least five years for microbial analyses. Since a healthy soil is characterised by a high diversity of soil microorganisms that are actively busy cycling nutrients, soil microbial analyses will determine the changes in diversity and activity of soil microbial communities over time, providing an indication of improving or declining soil fertility. Frequent analyses of samples collected over an extended period of time will minimise the influence of seasonal fluctuations on microbial data, and enable the soil microbiologist to attain a more complete understanding of the effect that the various agricultural practices might have on soil microorganisms as indicators of soil fertility and health.

The Soil Microbiology Laboratory at the Agricultural Research Council - Plant Protection Research Institute (ARC-PPRI) in Pretoria is adequately equipped with facilities and knowledge to analyse soil microbial communities as indicators of soil health due to their sensitivity to changes in the soil environment. These services are available to anyone concerned about their soils. We have all been appointed as curators of our soils so let us own that responsibility, because without healthy soils, there can be no farmers, no agriculture and no life!

For more information contact:

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Researcher

ARC-PPRI

E-mail: HabigJ@arc.agric.za



Figure 1: Wheat monoculture without soil disturbance. Note the presence of plant material on the soil surface.



Figure 2: Wheat monoculture under conventional soil disturbance. Note the absence of plant material on the soil surface.



Figure 3: Crop diversification: medic-clover mixture rotated with wheat under no soil disturbance. Note the presence of plant material.



Figure 4: Maize-cowpea intercropping under minimum soil disturbance.



Figure 5: A laboratory analysis to determine soil fertility. The darker the colour, the more active the soil microorganisms are.

Taking transformation in South African potato production to a higher level

Ensuring the development of new Black commercial potato farmers

The extent of the Transformation Programme within Potatoes South Africa (PSA) is vast and aims to ensure the development of new Black commercial potato farmers. Farmers are supported for a period of four years, where PSA will supply them with seed potatoes on a sliding scale basis (Y1=100%, Y2=75%, Y3=50%, Y4=25%). The initial engagement with the farmers was that PSA will provide seed for between 3 and 5 ha, training where necessary, technical support and also expose the farmer to the industry through the New Farmer Induction initiative.



Based on the support model described above, there were a number of challenges that farmers experienced, the major one being access to finance and machinery. PSA subsequently adopted a new implementation process which focusses on identifying Black producers who are already farmers (with other commodities) and introduce potatoes to them. Thereafter a pre-feasibility study is conducted as part of a selection process. A business plan is then compiled, partners such as financiers, input suppliers and off takers are identified and the farmer is linked with other partners in the potato industry.

Approval was also granted by all the structures to focus on expanding the hectares of deserving farmers who are already participating in the Enterprise Development Programme to more than 5 ha, i.e. to expand them to become fully fledged commercial potato producers.

The result is that progress is increasingly more visible, as the number of hectares of potatoes planted by Black farmers is on the rise, and there are farmers who have already been identified as having the potential to farm commercially. Currently there are 33 active farmers involved in various provinces.

The Transformation Programme also aims to address food security by engaging with rural communities and assisting them with planting potatoes economically for own consumption. The main aim of the Small Grower Development Programme is to disseminate production and business information through trials, provide farmers with practical training on good potato production practices, and to utilise cultivar or demonstration trials as a way of educating, training and disseminating important production information that is necessary for successful potato production.

A successful example is when PSA paid a visit in 2015 to some small holder farmers near Stutterheim in the Eastern Cape, one of the resource poorest regions in South Africa. What was found was a group of extremely dedicated smallholder farmers who had land available and were prepared to work hard to produce food for their community. However, they lacked the necessary skills as well as inputs and were consequently struggling to successfully produce potatoes.

The project kicked-off in October 2015 using special basic implements and the correct chemicals. The very motivated young smallholder farmers were divided into teams to plant the potatoes themselves. In record time 0.4 hectares of potatoes were planted and correctly sprayed for broad leaf and grass type weeds, as well as for pests. To ensure the success of the project fungicides, a spray program for later use was also supplied and which were strictly followed and applied

by them. As part of the training, the advantages of a proper crop rotation system was also explained, in order to ensure continuous good yields.

The potato crop was harvested during January 2016. Not only was the quality of the potatoes quite good, the dry land yield of eleven kilograms per five meters was also something that brought a smile to the faces of the farmers.

20% of the potato crop was supplied to the local community. The remainder was sold at R50 per 10 kg bag on the farm ensuring a handsome profit after deducting expenses. In view of the success of the projects, it has been decided to expand the project to develop these farmers even further.

The Small Grower Development Programme receives a lot of support from the Department of Agriculture, Forestry and Fisheries (DAFF), particularly KwaZulu-Natal, Eastern Cape and the Western Cape. In 2015/2016 alone, 20 projects were supported with over 700 beneficiaries attending information days.

Furthermore, under the Tertiary Skills Development Pipeline, the Potato Industry Development Trust (PIDT) annually awards bursaries to deserving students studying towards an agricultural related qualification with the emphasis on potato production. The Undergraduate Bursary Programme is primarily aimed at developing the skills of young talented students at existing potato enterprises. Their development is done through tertiary education at universities and agricultural colleges.

The Post Graduate Bursary Programme, on the other hand, is aimed at making a contribution towards ensuring sufficient post graduates to address the relevant research areas affecting the industry, as well as increasing the industry's pool of appropriately qualified scientists. The Research and Development Department of PSA, together with the Transformation Department are jointly responsible for funding and identification of post graduate students.

Since the inception of the Tertiary Skills Development Pipeline in 2008, 67 undergraduate and 36 postgraduate students have been assisted through the scheme.

Student Induction usually takes place early in the academic year with the aim

to introduce new students in the Tertiary Skills Development Pipeline to the broader aspects and role-players in the potato industry. The induction takes place over a two-day period during which informal tours to one of the major fresh produce markets, a packhouse, potato harvesting in the field, the potato gene bank at the ARC and Plantovita laboratories at Roodeplaat. PSA also provides a comprehensive overview of the entire potato industry at Potato House, including the role of the information system within the Potato Industry, Research and Development, Generic Product Promotion and Market Development, Potato Certification Service, the Bursary Committee and Transformation.

The students always consider the induction programme to be of high value. In their evaluation reports the following feedback is often received: the programme sheds light on aspects in the potato industry of which they were previously unaware of, such as how costs provided better insight into production and how markets function; that the practice of rotating potatoes with other crops as a means of disease prevention is quite interesting; the visit to the ARC brings theoretical knowledge into context and that after the farm visit they have a better understanding of the process of potato production, from lifting, grading and packaging as well as the amount of effort that it takes, amongst others.

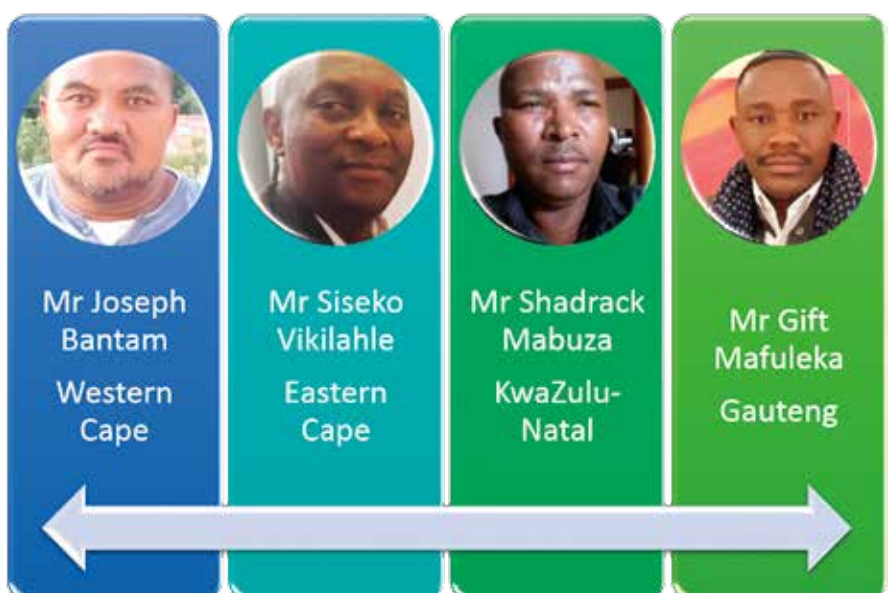
The Internship Programme is primarily aimed at providing experiential training opportunities to PIDT bursary recipients whose study disciplines require practical training and exposure as part of their qualification. The workplace programme is aimed at affording the students with the opportunity to obtain workplace experience to enhance their employment opportunities. Since the inception of the Internship Programme in 2012, 37 students received workplace experience.

Apart from Farm Based Training for the farmers themselves to address skills shortages, training is also provided to their employees. For more information on the Transformation Programme visit <http://www.potatoes.co.za/transformation.aspx>.

As an organisation PSA is also embracing Transformation. During the 2015 PSA Congress, Mr Ernst Yzel was unanimously elected as chairman of PSA for the next two years. He worked tirelessly to put the new constitution of PSA in place which was approved by Congress.

This included provision for more representation by black producers on PSA's Board of Directors/National Council, namely Mr Joseph Bantam (Western Cape), Mr Siseko Vikilahle (Eastern Cape), Mr Shadrack Mabuza (KwaZulu-Natal) and Gift Mafuleka (Gauteng).

This bold move is a clear sign of the potato producers' commitment to the future of this country.





HEALTHY ANIMALS, HEALTHY PROFITS

SA's animal health industry is set to double

Animal health is fast becoming a buzzword among investors, with many promising new startups emerging in the animal health industry over the past few years. A 2016 report by Vetnosis states that the global animal health market is valued at \$24 billion (approximately R36 billion), with continual annual growth rate of 3% expected to continue to 2020. Pharmaceutical firms and venture capitalist and private equity firms are looking at companies developing treatments for pets and industrial animals. *Harvest SA* chatted to ABE Biotech's Dr Johan van Rensburg to find out more about this exciting marker.

What is the animal health industry, in a nutshell?

The animal health industry from our perspective is composed of all pharmaceutical

companies that develop and market animal health products. The total animal health industry is not only restricted to pharmaceutical companies but many other role players contribute to this market i.e. feed companies, farming equipment, breeders, pet toys, etc.

What is the significance of the pharmaceutical animal health industry for South African agriculture?

The global population is currently about 7.3 billion people; it is likely to reach about 9.7 billion by 2050. Some 795 million people are currently undernourished. Given these statistics, it is perhaps no surprise that recent surveys suggests that the global food supply will be the third-biggest challenge facing the animal health sector over the next five years, after antibiotic resistance and infectious diseases. Especially in emerging markets, where animal products typically account for approximately one third of human protein consumption, increasing the productivity

of livestock is critical to feeding the growing population, as is increasing the number of livestock overall. If the quantity of food produced can be increased sufficiently, food prices will fall, enabling a larger share of the population to afford an adequate amount of food. However, in recent years, the rate of growth of the livestock population has struggled to keep up with the rate of human population growth. Increasing the productivity of livestock is critical to feeding the growing global population. The animal health sector supports this by providing treatments for disease prevention and control, and by innovating to improve the nutritional quality of the finished product. The pharmaceutical animal health industry in South Africa has an estimated turnover of more than R 3 billion per year. Not only does this industry ensure safe and wholesome products i.e. meat, wool and milk, but it is the crucial player in sustainable and secure food production. Other segments in this industry

What are some notable recent achievements made in animal health technology?

Excellent progress has been made in various areas. Recently the first ever vaccine against one of the deadliest internal parasites in sheep was launched in Australia and South Africa. Now producers don't have to rely on chemical dewormers to treat sheep since a more natural treatment is available. More environmentally friendly products have also been developed for the control of flies, which is a huge problem in South Africa. An excellent product has recently been developed for the control of ticks and fleas on dogs. With this single oral application in dogs, these nasty parasites are controlled for up to three months. Overall, this means that on the production animal side, more food can be produced in a safer environment at a lower cost. For our companion friends, we can ensure a longer and healthier lifespan.

Which research areas are you focused on?

Our research is mainly focused on vaccine development and finding alternative treatment options to the use of general antibiotics.

Is it true that animal health is a booming growth industry?

For many years the animal health industry was a spillover of the human health

development industry. Many human products at a later stage was developed for use in animals. Today we recognise the need for animal-specific developments as food security becomes more important. Some market segments show excellent growth while others are very slow. The animal health market generated revenues of more than R3 billion in 2016, but the potential is estimated between R5 and R6 billion! Animal health is an unsung contributor to South Africa's economy and wellbeing.

How much of a demand for animal health products is there locally?

The local South African market can be divided in two segments. Currently the commercial segment is the biggest user of animal health products but the growing small scale market is growing fast.

Are you focused more on the domestic or export market?

Over the last few years much of our development went into the local Southern Africa market.

Broadly speaking exporting to other African countries has not been an attractive proposition for the animal health industry due to a perceived lack of value and high risks and barriers to entry. However, the African economy is growing rapidly and we have invested strategically in various market segments.

develop and supply products targeted at the wellbeing of our companion animals. Dogs, cats and horses are the main segments and enjoy considerable development input.

What are the most important current research areas?

Recent surveys confirms that animal health professionals strongly believe that the animal health sector has a bigger role to play in the control of diseases in the human population. One Health initiatives involving networks of stakeholders provide a strong boost to collaboration between animal and human health. On the food producing side, the main focus of many companies is the development of preventative drugs like vaccines. Finding a replacement for antibiotics is also very high on the list.

To ensure healthy pets, the focus is on preventing internal and external parasites and treating ailments such as arthritic pain and kidney, heart and allergic diseases.





REGENERATE THE LAND

Farm workers turn carbon credits into cash

A game-changer in Western Cape agriculture has seen farm workers benefiting from carbon credits earned through a climate change mitigation initiative by an organically certified estate which practices regenerative farming.

27 workers on the Spier estate in Stellenbosch are to share half the R204 000 paid out from carbon credits - derived from practicing regenerative farming on a section of the organically certified wine farm. An average of R4 000 was given to each worker, with those managing the cattle component receiving a larger portion of the credits.

"The farm has acquired the credits for sequestering 6 493 tons of carbon dioxide in its soil, which is cultivated in as natural way as possible by using regenerative farming practices like high density grazing," says Spier Wine Farm's livestock farm manager, Angus McIntosh. "This is a technique that involves frequent stock rotations aimed at using livestock to mimic nature by restoring carbon and nitrogen contained in livestock and poultry urine into the soil profile."

Globally, the conversion of grass- and forest land to crop and grazing lands has resulted in losses of soil carbon, explains

the UN Food and Agriculture Organisation (FAO). Organic carbon accumulates in soils through photosynthesis as plants absorb carbon dioxide from the atmosphere. Carbon escapes into the atmosphere if land loses its cover of natural vegetation and becomes denuded and degraded through practices such as intensive agriculture and monoculture, and use of inorganic pesticides and herbicides.

The credits were bought by a South African bank, brokered by Credible Carbon, a business dedicated for making carbon work for the poor as it facilitates carbon trading through credits earned for reducing greenhouse gas (GHG) emissions and global warming.

Among institutions that have bought credits is the office of the Premier of the Western Cape, Helen Zille.

"We now have a sixth revenue stream from carbon credits in addition to our other five - from sales of beef, chicken, eggs, pork and lamb, says Spier Sustainability Director Heidi Newton-King.

Livestock farming on the Spier Wine Farm practices high-density rotational grazing alongside the vineyards. 74 hectares of pastureland supports about 300 cattle, 4 500 laying hens, 1 200 broiler chickens, pigs and sheep.

Soil samples from the livestock farm were tested over an 18-month period by a leading US laboratory. "They confirm a significant and rapid enhancement of soil organic carbon over this period," shared Credible Carbon.

"The presence of a great many animals in a confined space for a short period of time deposits enormous amounts of manure and urine on the land leading to healthy, vigorous pasture growth without the need of fertilizer," says McIntosh. "No inorganic fertilisers nor grains are used as animal feed, thereby disassociating the farming practice with industrial agriculture."

FAO estimates that carbon released from soil sinks is responsible for about one third of GHG emissions. However, says the FAO, "there is major potential for increasing soil carbon through restoration of degraded soils and widespread adoption of soil conservation practices".

This is the second tranche of carbon credits earned by the farm following a smaller previous payout bringing it to a total of 7 852."

"This initiative adds to the farm's sustainability and underlines that regenerative farming is not only good for the environment but makes good business sense," shares Newton-King.

Irene Bailey



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The market speaks

2017 has exciting things in store on the JSE

The market has always been vital to farmers. In olden times, the market was a tangible space affording the opportunity to exchange material goods for money so that farmers could accumulate wealth rather than merely subsist. Nowadays, the market refers more to the abstract flows of capital bought and sold by traders around the world. However, certain financial products remain rooted in the reality of agriculture, with agricultural commodity derivatives being a case in point. Harvest SA asked Chris Sturgess, Director: Commodities & Key Client Management at the Johannesburg Stock Exchange, to share his insights on the matter.

What JSE commodity derivative products were most active in 2016?

White maize, yellow maize and wheat were certainly most active in terms of the grain products. Then, because we have also diversified and extended into a number of other cash commodities, we saw activity with Brent and WTI. In terms of our activities in 2016, we were 2% down on our previous record of 3.5 million contracts, so in total the division saw just over 3.4 million contracts/trades. We were also able to leverage our diesel contract to use more volumes.

We saw that wheat trading activity has declined significantly in 2016 vs 2015, despite a great harvest – what are your reasons for this?

If you look at the numbers, we were 18% down on wheat volumes, and a lot of that can be attributed to the uncertainty around the future of the import tariffs for wheat. The wheat industry has seen a significant increase in the tariff to just over R1 500 a ton, and so that increase in tariffs did also result in fewer end buyers, fewer millers actively using the contract to hedge because the tariff now was becoming a larger percentage of the overall wheat price. This certainly dampened the volume of trading activities, but also the uncertainty around the tariffs going forward, with an ongoing public consultation process that hasn't yielded any clarity, a number of players have not taken the hedging. National Treasury has indicated that we should see finality on the way forward before the end of quarter one this year, so we're eagerly awaiting that.

Looking at the wheat market and price, from the middle of last year we were trading at R5 100 a ton, but now we're just over R3 000 a ton. This drastic fall is not just attributed to uncertainty around the tariff – clearly it's also a function of the exchange rates strengthening

quite a bit. Then, the global wheat stock has remained high, which has certainly removed pressure from the market because we're sitting with a global surplus at the moment. In fact, the global supply and demand dynamic is very balanced: unless you find another new market where there's a definite increase in demand for wheat, you're probably looking at these levels staying the same. South Africa had one of its better years in terms of local production for wheat, with 1.8 million tons produced, so it's disappointing that even a record crop didn't lead to an increase in trading activity at all.

Does the JSE allow imported grain to be delivered in completion of a futures contract?

Last year in agriculture there was a lot of focus on the impact of the drought. For the first time, we saw South Africa importing white maize on a large scale from Mexico and now some US white maize. Important here is the role of the JSE derivative contract. It's there for price risk management, but price convergence is important: when a contract gets to its spot, to expiry, it needs to reflect what's happening in the market. Probably in the early 2000s, the JSE allowed for foreign product to be delivered, provided it met local grading standards, just to make sure that the local market can't be cornered – in other words, if you are a large supplier, you could buy a large percentage of the market, so sellers would have to deliver on those contracts, and if there wasn't product to deliver, you could basically hold the sellers to ransom.

It's about maintaining the integrity of that market, obviously not as the first port of call, because it's always expensive to do that, but to allow for an exit should the sellers not have local product to deliver. This brings back the reality that ultimately us in soft commodities we're always going to be reliant on the weather. Fortunately, we have seen good summer rains, there's a lot of enthusiasm and excitement for the coming season.

What new products can we expect from the commodity derivatives team in 2017?

Certainly it's going to be an exciting year. We diversified last year by introducing a one-ton beef carcass contract. This year we have planned to introduce a feeder calf contract. These are all cash-settled to allow players who are exposed to young calves to be able to market them and hedge their prices.

We're also working on a lamb carcass, and we have a cash settled wool contract. Both contracts should be up and running soon. Then we're also exploring a deliverable diesel contract, which will enable

not only the logistics players but anyone who is exposed to the volatility of the diesel price to access and take physical delivery of diesel.

The products that we launched this month are a white maize contract and a soya bean crush contract. This is a product that allows the soya bean crushing plants to be able to hedge their margin, so that with one product, you're able to lock in a price for your soya bean as well as your soya meal and oil. This contract has now gone live.

We've always been able to provide products to farmers who are involved in the grain sector, and now for the first time we will also be able to roll out products should appeal to beef, lamb and wool producers. It's the first time that there is a whole new audience out there will be exposed to using futurist instruments to better manage prices. These are products that can only help remove some of the prior anxiety farmers feel within their growing season.

We see that you are advertising the Zambian derivative contracts. Tell us more and what does this mean for regional co-operation?

For South Africa and Zambia, this will be the first initiative where we roll out derivative contracts on Zambian white maize, Zambian wheat and Zambian soya beans. The two countries have been working closely together for a number of years now to introduce these derivative products on the JSE platform, so we're not reinventing or creating another exchange, but rather using the infrastructure that we have in South Africa to enable access for Zambian clients as well as regional clients. Anyone who is interested in trading Zambian white maize into Zimbabwe or soya beans will now be able to hedge the price risk of the Zambian commodity on the same JSE platform. That also comes with the same guarantees

that the JSE clearing house puts in place if you trade in South African product.

We've been working closely with the South African Reserve Bank, as well the Zambian Commodity Exchange based in Lusaka. If we're able to increase Zambian production of grain or maize, hopefully it will also improve food security for the region.

Remind us how we could access the JSE commodity derivative products with the focus on managing price risk?

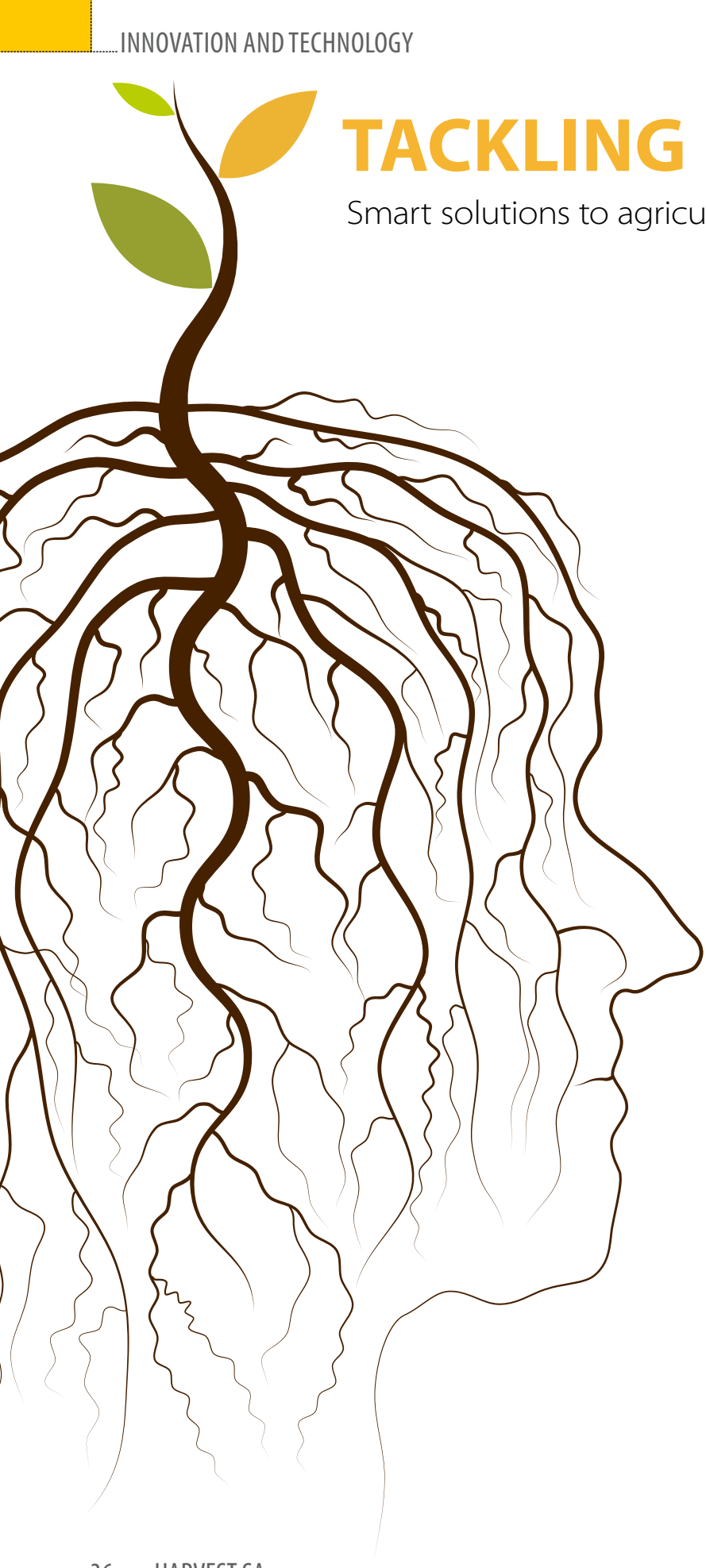
The sole objective of the commodity derivative division of the JSE is around price risk management tools. To access the products, you would need to sign up as a client with a proved JSE commodities member. You can then decide whether to use these instruments for hedging or for speculation.

Obviously speculation has a different risk profile, but as long as you are aware of the different risks, there's nothing preventing you from also speculating in these instruments. At the end of the day, though, the primary focus of a derivative instrument is to remove price risk.

Of course, we should not fool ourselves and say that derivative instruments are there for every investor in the market place – you are advised to take a cautious approach if you've never traded derivatives before. The important point is to decide whether to hedge or to speculate. For example, a maize farmer might hedge to remove price risk exposure. Whatever you're doing, make sure you also understand the cash flow impacts if the market does go against your trade and then also understand how to exit that position.

In other words, if you're going to trade with a contract, make sure there is liquidity – does this contract trade every day? – and look at the underlying activity on that specific product.





TACKLING DISRUPTION

Smart solutions to agricultural challenges

For most of South Africa's growers these are desperate times as harvests written off give them a taste of what a future impacted by climate change may be like. Unpredictable commodity prices and an ever-changing economy further add to the challenges they face.

Considering what they currently face, it appears that for our farming community there are no quick answers or easy fixes. Their most critical challenge is a dilemma intertwined with ours—the nation needs to put food on the table. But, as a well-known agricultural economist (Wandile Sihlobo) recently said, "All is not lost. There still is hope, and that can be found in contemporary best farming practices."

Syngenta, a world leader in agri-business, recently held its Smart Farm Proven Technology Summit for growers, with an emphasis on technology and innovation for smarter farming – a solution for the challenges our growers face and an opportunity for growers to reap a greater yield in a time that may seem bleak.

"The task of farmers is becoming more and more difficult. They know it's time to step up their game—both for their own survival and the survival of the nation. Fortunately, South African growers know exactly where they stand; they also know exactly what is available to them and what can be done with it. This continuous strive toward forward thinking and the willingness to take risks is the power and future of the South African farmer," says Antonie Delpont, Managing Director, Syngenta South Africa.

Every day, our planet wakes up with an extra 200 000 people to feed. To meet this challenge and that of climate change, growers need to make wise decisions and smart choices. Improving crop protection and maximising soil productivity, effectiveness and sustainability, today is a science where SmartFarming is the main buzzword.

According to Delpont, advances in technology represent one of the most powerful resources for increasing yields and mitigating the impact of water scarcity and climate change. The reality however, is that no single agricultural

technology or farming practice will provide sufficient food for the future. Instead, we must advocate for and utilise a range of these technologies in order to maximise yields.

Syngenta's application technology and formulation technology

As much as a third of a product can go to waste due to poor application practices. Fortunately, there is a lot growers can do to prevent their profits from shrinking. According to Ron Wohlhauser, Syngenta's Application Technology Head in Switzerland, application greatly influences the biological effectiveness of a product.

He also states that efficacy is not only determined by the intrinsic activity of the product. How the product is applied, the equipment setup and calibration, and the type of sprayer that is used all play a role. Effective crop protection is only possible when the best product is applied in the best way.

But the product alone cannot do all the work.

Growers are able to control pests, weeds, insects and pathogens using crop protection products—if managed correctly,

you have the ability to increase your yield. Formulation Technology is the science in which an active ingredient is formulated in a manner that increases pesticide effectiveness in the field, improves safety features, and enhances handling qualities. Without this technology, successful farming would be almost impossible.

Syngenta's PotatoPack

Potatoes are an important crop in South Africa and account for approximately 45% of the total vegetable crop and 3% of the total agriculture production. With the global increase in consumption of potatoes, against the off-set of diminishing natural resources, the importance of producing more from less is high on the agenda. With PotatoPack, Syngenta offers a sensible, holistic approach towards increased crop production. Its numerous case studies of growers using PotatoPack have yielded encouraging results that outweigh alternate popular solutions.

When looking at the future of farming in South Africa there are also other innovations that counter the challenges faced by growers. Some of these include drones

which to date, identifying bad crop patches has been a laborious task. The introduction of drones to agriculture changes that task completely giving growers new ways to increase yields and reduce crop damage.

Crop sensors also play a vital role to control irrigation, temperature and relative humidity which can help to optimise plant growth, reduce labour requirements and decrease insect and disease problems.

Automated tractor technologies can also be beneficial especially for growers with large commercial land. Imagine a 20-ton tractor using GPS satellite technology that can steer itself—the multi-tasking growers can focus their attention on other aspects of the farming business.

"The thought of owning or running a Smart Farm is very compelling. It suggests that you will always expect and produce things like a bigger yield because you are the Smart Farmer. Technology and Innovation which is driven by world-class science makes Smart Farming so much more achievable," adds Delpont.

For more information, visit www.syngenta.co.za



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PUTTING WATER TO WORK

High yield, high quality, high profit

The word “hydroponic” comes from Latin and means “working water”. Simply stated, it is the art of growing plants without soil.

The essential differences between hydroponics and field production are that hydroponics offers:

- No soil-borne diseases
- Control of the growing environment
- Better management of plant requirements
- A faster growing cycle (more overall production per season)
- More yield overall
- Better produce quality (fewer unmarketable grades).

The cost effectiveness of hydroponic production depends on the type of plants grown and the target market.

Each hydroponic method is optimised for a specific type of produce. For example, leafy crops such as lettuce are extremely cost effective if grown with the nutrient film technique, as opposed to bag culture. It's about choosing the right horse for the right course. On the other hands, tomatoes will be extremely expensive to grow with nutrient film, but perfectly suit bag culture. Of course, as with agriculture in general, growers earn less than buyers, while consumers pay the highest price. The advantage of hydroponics is in the increased yield.

In fact, hydroponics may eventually be the saving grace of humankind. In the near future, it is expected that 90% of food produce will be produced hydroponically, including fruit. In some instances, this is already the case—figs, grapes and berries, for example. As a rough estimate, I would say that some 60-70% of South Africa's vegetable output is currently produced hydroponically.

In terms of soil, irrigation and nutrition, it must be emphasised that hydroponics is a soil-less cultivating environment. This allows for a more precise and focalised irrigation plan. From a plant nutrition viewpoint, plants receive better nutrients, which manifests in higher nutritional values. However, the difference in nutritional value between hydroponics and soil cultivation varies depending on the types of plant and other conditions.

Hydroponic vegetables are fertilized in the same way as in field production, in that all plants use the same natural elements. There is only one type of calcium atom, for example. However, under soil production, it has to be broken down by bacterial activity in order to become available and recognisable by the plant roots. This means it takes time for the fertilizer to be processed from application to availability. Under hydroponics, on the other hand, nutrient elements are highly soluble and available in the right chemical configuration for recognition and uptake by the plant roots. This means that plants benefit from having the right elements constantly available, which boosts plant development.

When it comes to diseases, there are ups and downs to hydroponics. For example, soil-borne diseases such as bacteria and fungus require a soil environment to sustain themselves: they need a balanced pH, constant moisture and the right temperature. Change one of these parameters and they won't develop. Soil-borne diseases such as nematodes cannot migrate into hydroponic growing medium.

On the other hand, greenhouse disease control is a huge issue as the humidity and temperature of the greenhouse environment are perfectly conducive to promote airborne diseases. Consequently, it is essential to

implement integrated pest management to avoid rapid infestation.

Would-be hydroponics farmers should note that the capital investment requirements are high. Setting up is a one-off cost which is much higher per hectare than open field farming.

However, provided that other factors such as a secure market and appropriate infrastructure are taken care of, a hydroponics business will break even in a very short time. Thanks to the high yield and quality produce that hydroponics enables, the profitability trade-off is mostly 4:1. Basically, more produce grown at higher quality commands better prices.

Although hydroponic production is said to be more capital, management and labour intensive than field production, this really depends on the type of crop. Potatoes are less resource intensive than tomatoes. Overall, though, hydroponics does require more knowledge and expertise than field production.

For hydroponics to succeed, producers need to have a supporting environment including modern quality infrastructure, plant material, fertigation, nutrients, accessories, expertise, and a ready market.

Fortunately, these are all available in South Africa, which makes getting started an easy task. In Nigeria, by comparison, it is practically impossible to get started even on a small scale, as all the necessary elements have to be imported at high cost and expertise is lacking.

If you put water to work with hydroponics and do all your homework, you can have a thriving business in a relatively short period of time.

Ben Safronovitz, hydroponic consultant



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No drift loss	✓
Works on no-till	✓
Made for precision systems	✓
Highest and purest quality	✓
Easy storage and handling	✓

GREENS IN HIGH DEMAND

Locals are in love with spinach

Touched by seeing children going to bed hungry and the people around her lacking sources of good nutrition, Marian Dube started growing and selling vegetables from her backyard.

The 42-year-old widow and mother of three, who grew up in a family of subsistence farmers in Mberengwa, south east of Zimbabwe, says, "I came to South Africa in 2006 and discovered that unlike in Zimbabwe, where most households have backyard gardens, there were very few in Pretoria."

"I was even struggling to get shops that sold fresh vegetables. The shops that sold them were far away and often the price was very high. I could not afford to eat vegetables regularly for these reasons," she says.

In 2008, she relocated to Green Bushes, Port Elizabeth. "The situation was the same as in Pretoria. I saw this niche market and grabbed the opportunity with both hands. I could not wait anymore to start a garden of my own," says Dube.

Dube thanks her Zimbabwe school curriculum for playing a role in her success. "I studied agriculture as part of my high school education. My parents were also small scale farmers. This background helped me greatly."

Her landlord allowed her to use the entire backyard for her garden, but did warn her to use water sparingly.

Dube initially worked in a restaurant and bought her first seedlings with her salary. She currently juggles the gardening project with a job as a cleaner at a nearby air pilot training school.

She concentrates on growing spinach, coriander and rape. "The locals are in love with spinach," she says, and children must be "encouraged to eat vegetables to develop their bodies and to have a healthy mind."

Dube says she can now harvest every fortnight on weekends, earning an average of R1500 per harvest.

"I use this money to pay for the school fees of my three children. I also buy clothing and healthy food for them," she says. Her two sons help her in the garden.

Dube says she can't keep up with demand and she wants to diversify. "I supply a number of shops in Korsten town. I don't have to move around selling my vegetables door to door because my clients are always phoning me for more supplies."

"At the same time, I don't forget my local community. I sell them the vegetables at a highly discounted price because this community is poor. Unemployment and crime are very high here. Also cases of malnutrition have been reported."

With the pressing need to expand, Dube says a local farmer offered her a piece of land in return for 10% of her profits, but she had to clear the land.

She says "everything went well in the early days", but once she had cleared the land and her crops had started to grow, she was kicked off the farm.

"He only wanted me to do the donkey work of clearing his land," she says. "I had heard of such scams in the Port Elizabeth area but I just ignored people who had warned [me] about such unscrupulous farmers. I lost a lot of money buying equipment to clear his land."

This was three years ago. She now plans to approach the municipality for a larger plot. "I discovered that in Eastern Cape there is a high demand of okra, garlic and onions. I would like to grow these crops on a large scale. I also need to buy at least two large water tanks because the Nelson Mandela Bay Municipality often faces a shortage of water."

*Joseph Chirume
groundup.org.za*



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SOME RELIEF

Input costs in the agricultural sector likely to ease in 2017



Fertilizer and fuel are the major inputs in crop production particularly grains and accounts for approximately 35% and 11% of total variable costs

The drought that the country is experiencing has caused a significant drop in planted areas. Finally some relief with the much awaited rains, farmers can at long last commence with planting.

This situation has turned around with the latest Crop Estimates Committee's (CEC) planting intentions report showed a rebound in the expected area for most of the crops. Approximately 3.753 million hectares will come under crop production during the 2016/17 season.

As farmers begin with their seasonal activities, we look at the relative input costs that they face. While input costs remain elevated when compared to historical trends, there has been some decline which bodes well for the season going forward.

Fertilizer and fuel are the major inputs in crop production particularly grains and accounts for approximately 35% and 11% of total variable costs. The prices of these inputs are largely influenced by the international

crude oil market from a transport (freight) perspective as well as the fact that some are derived from oil processing. The benefits of lower crude oil prices were however offset by the increased volatility in the Rand exchange rate that we continue to experience.

Other important inputs for summer grain producers include herbicides and pesticides, electricity and water tariffs and labour.

In all of these, we've experienced increases above inflation over the last couple of years. However it seems that increases might ease off, except maybe for water tariffs.

The strength or weakness of the rand has a huge impact on input prices in the agriculture sector. A weaker rand raises the prices of imported inputs such as fertilizer, pesticides, and herbicides. In addition, the prices of most grain commodities are import parity based and the weaker rand has helped increase the price of maize which is a major ingredient in the manufacturing of livestock feeds. The stronger rand however has an opposite effect.

Currently, yellow maize prices are approximately 11% higher year on year but have since fallen from the 2016 peak of R4021/ton. This trend is likely to continue in the medium to longer term given the improved seasonal outlook with the May and Jul 2017 yellow maize futures already trading below the R 3,000/t level. Profitability margins in the feedlot, poultry, dairy and pork industries are therefore expected to improve in 2017.

The improving domestic grain supply outlook coupled with the huge global production with grains for 2016/17 projected at a record of over 2 billion tons of which 50% is maize augurs well for the livestock sector in the year ahead. A moderation in input costs will help revive the sector which is reeling from a devastating drought during 2015/16 season.

Dawie Maree, Head of Information and Marketing at FNB Business, Agriculture

EXPERTISE WHERE IT COUNTS

Comprehensive fertilizer solutions from Bagtech



Fred Coelho

Managing Director, Bagtech Machine Manufacturing

With over 25 years' experience in agribusiness across the African continent, Bagtech International is based in South Africa, Durban.

Nowadays, Bagtech is focused on offering a supply chain management service and developing custom-made equipment for handling bulk fertilizer.

The service consists in handling the customer's product and generating flow information of bulk fertilizer from receipt at the port, stocking it and blending and/or bagging the fertilizer bulk in Bagtech equipment for distribution until loading up on transport.

To make it happen, the company manages all the production process with its own

software, FERTINA, which can consolidate all the operations daily, showing a detailed product movement report to customers and thereby avoiding extra costs.

Bagtech equipment can be found in the largest fertilizer manufacturers and traders across the African continent, offering advanced technology through an innovative management system in partnership with Festo in order to provide accurate information to the clients. As far as products are concerned, they can design in-house fertilizer blending plants from 45tph, coating plants from 40tph, bagging equipment from 10kg to 1ton, screening equipment and any other compact fertilizer plant as per customer needs.

The company's main goal is to offer the best expertise in the fertilizer industry by providing consultancy, equipment and services from Africa to Africa. They work twenty-four hours a day, seven days a week to bring their clients the best solutions at any given time and when it is needed. Efficiency, reliability and commitment – that is their priority.

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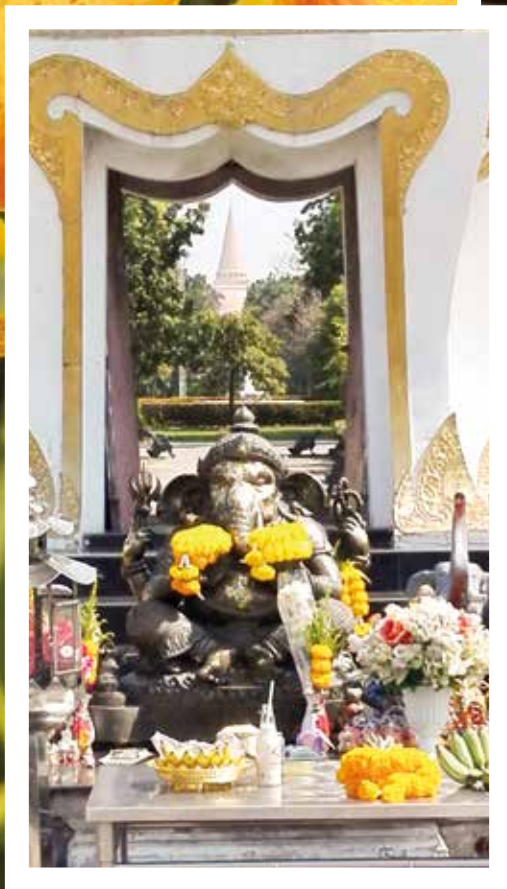
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A ROYAL EXAMPLE

Thailand's agri-tourism projects have much to offer



In December last year, Harvest SA had the privilege of being invited by the Royal Thai Embassy on a tour of Thailand's Samut Songkram Province and Nakhon Pathom Province, rounded off with a sojourn in Bangkok.

The intention was to showcase the attractions of these regions, which are thriving hubs of domestic tourism but seldom feature on the typical international tourist itinerary. Of primary interest was the Royal Thai government's local agri-tourism initiatives.

Thailand is a country like no other. Never having succumbed to colonialism, thanks to the far-reaching vision of monarchs such as Rama VI, who brought Thailand into the modern world, and the popular King Bhumibol Adulyadej (Rama IX), under whose reign, which ended in 2016, thousands of development projects were initiated that have greatly benefited the country and its people, Thailand has succeeded in being progressive without sacrificing its unique culture. This successful balance is evident throughout the country.

Able guided by Kitti-Chanok Phaholyothin of the Royal Thai Embassy in South Africa, we were treated to a series of experiences that should surely feature on the wish-list of any traveler who wishes to augment the standard Thai experience of mountains and beaches. Beginning in Samut Songkram Province, with our base at the Thada Amphawa Resort, a constellation of comfortable lodges like a marina overlooking the water, we rapidly began to appreciate why the riverine town of Amphawa is such a popular destination for Thais keen for a break from the hustle and bustle of Bangkok.

Situated some 50 kilometres southeast of the big city, the town's chief attraction is the Amphawa Floating Market. Traditional boats jostle on a canal of the Mae Khlong River,

offering countless mouthwatering delicacies amidst a uniquely festive atmosphere. Lining the canal are hundreds of stalls with a bewildering variety of goods. Although the market is very busy, there are comparatively few foreign tourists, making this an exciting opportunity to go off the beaten track in search of authentic experience. Towards evening, singing fills the air from a dozen different establishments, and pleasure-seekers pack the long-tailed boats heading out to marvel at the clouds of fireflies along the banks of the Mae Khlong River.

Not far from the floating market is the Chaipattana Foundation, a royal project under the initiative of H.R.H Princess Mahachakri Sirindhorn. Here, an area of land has been turned into a working farm and cultural village dedicated to preserving the traditional Amphawa way of life. We enjoyed an artisanal market, investigated the coconut orchard and were shown the process of making traditional Thai sweets from coconut sugar. The folk of Amphawa are very proud of this project, as it enables them to maintain a link with the living traditions of the past whilst sustaining themselves economically, in line with the principles of King Bhumibol's Sufficiency Economy.

Another must-see attraction in Amphawa is the King Rama II Memorial Park. Situated in spacious, beautifully landscaped grounds, the park includes four exquisitely crafted traditional Thai wooden buildings housing artifacts from the early Rattanakosin era, King Rama II's household furniture, and fascinating displays depicting the daily lives of Thai people during the king's reign.

Waters of life

From Amphawa we departed for Nakhon Pathom, some 56 kilometres to the west of Bangkok. After checking into the Sunlove Resort and Spa, with its beautiful wooden lodges crafted in traditional Thai style, we

embarked on long-tail boats for a sight-seeing tour of the community-based tourism area along Khlong Mahasawat.

This famous canal, one of many that crisscrosses Nakhon Pathom province, was dug from 1860-1862 under the orders of King Rama IV, to connect Khlong Bangkok Noi with the Nakhon Chaisi River. When it opened, the canal made accessible some 32 sq km of fertile farmland. For this reason, Khlong Mahasawat was chosen in August 2015 as a pilot project in the collaboration between the Thai Ministry of Agriculture and Cooperatives and Ministry of Tourism and Sports to promote agro tourism. The other pilot destinations are Pak Phanang in Nakhon Si Thammarat, Ban Khok Muang in Buri Ram, and Khao Kho in Phetchabun.

Observing from the level of the water, passing ornate temples, watching people about their business in their riverside houses on stilts, you have the feeling of blending into a landscape woven together by water. Then you disembark and enter the lives of the Thai farmers working the land and the water. We floated on the surface of a lotus farm, surrounded by thousands of water lilies cultivated to meet the daily needs of the country's Buddhist temples; we drank the juice of the astonishingly potent and delicious gac fruit; we walked through fields of orchids, Thailand's most famous export flower, resplendent with delicate colours; and we thrilled to a breakneck ride through orchards and past rice fields on a Thai tractor.

Everywhere we went, we encountered people who more than lived up to their country's reputation for friendly hospitality. It was clear that the Thai government's support of agri-tourism has benefited these communities by enabling them to be economically self-sufficient while maintaining their traditional lifestyle. Thailand, we salute you!

Greg Penfold

CITRUS GETS A *BOOST*

The newly unveiled Ikamva Lethu empowerment project in the Sundays River Valley could radically transform how future empowerment deals in the agricultural sector are handled

The launch of a R300-million black economic empowerment project in the citrus-rich Sundays River Valley in the Eastern Cape could have significant ramifications for the rollout of similar empowerment deals around the country which until now have experienced very limited success.

The difference between the newly launched Ikamva Lethu empowerment project and other failed agricultural empowerment deals is the collective, long-term buy-in by both land owners and previously disadvantaged members of the community working on farms in the region, say originators of the project.

Initiated by the Sundays River Citrus Company (SRCC) which represents about 10% of South Africa's citrus industry and around 45% of the citrus coming from the Sundays River Valley, the Ikamva Lethu project – Xhosa for “our future” – is earmarked for about 700 hectares of farmland in the area. This is part of a 1,200ha tract of farmland which has been purchased and registered by the SRCC.

The first significant milestone has been the recent allocation of a water licence by the provincial Department of Water and Sanitation, allowing the farm to draw 675ha equivalent of water from the Sundays River Irrigation Scheme for the irrigation of citrus plantations.

An environmental impact assessment (EIA) application for the development of the farmland—which at present is just bush—has now been submitted to the Department of Environmental Affairs, with authorisation for the project expected towards the end of 2017. The EIA will determine the exact amount of land which will be cultivated.



Major empowerment deal

Ken Nieuwenhuizen, SRCC director of transformation and development, explained the magnitude of the Ikamva Lethu project.

“To put it into perspective, the valley is one of the major players in the SA citrus industry and there are about 150 citrus farms here covering around 12,000 hectares in total,” said Nieuwenhuizen.

“So already we are looking at possibly the largest empowerment deal in the citrus industry in the country – and one of the biggest farming enterprises in the valley, when it is fully realised.”

The knock-on effects of the project for the growth of downstream industries—from transport and logistics to storage and packaging—were significant, he said.

Explaining the origins of the deal, Nieuwenhuizen said SRCC was guided by the National Development Plan (NDP).

“Ikamva Lethu is very broad-based; it’s about inclusivity and participation. It will result in about 400 community members becoming shareholders and beneficiaries,

and benefitting from the success of the project,” he said.

A suggested guideline in the NDP pertaining to land reform, empowerment and transformation within the agricultural industry is that 20% of farming enterprises be transferred to farm workers, with the farmer or landowner retaining ownership of half of the shares (10%).

“We wanted to use that as a guiding principle for our project. We want to share the success of the industry with the people who have been living and working on those farms for many years,” said Nieuwenhuizen. “For us as SRCC, it is a way of being proactive within the empowerment and transformation field.”

Shareholding

The premise of the Ikamva Lethu project is that SRCC farmers wanting to empower their farmworkers can purchase shares in the project equivalent to up to 20% of their own farming enterprise. Half of the shares would be held by the farmer, and the other

half would be held by his permanent farm workers within a trust established for this purpose, said Nieuwenhuizen.

"The workers will continue to work for the farmers on their [separate] farming operations, but will own 50% of the investment made in Ikamva Lethu," he said.

Also included in the deal are permanent SRCC packhouse workers. The project was already provisionally fully subscribed, with over 35 farmers indicating intent to buy shares equivalent to 20% of their farming operations, said Nieuwenhuizen, adding that due to the oversubscription, farmers might not each receive a full 20% allocation.

This buy-in would in turn provide capital for the project rollout, as the land needed to be developed with farming infrastructure – from laying irrigation pipes and establishing orchards to erecting buildings and purchasing farming equipment.

Also included in the plan was to mentor and train empowerment shareholders to become board members or directors within the project as it rolled out, he said.

"Provisionally, the plan is that SRCC will have a 5.5% shareholding and will support the Ikamva Lethu farming business, with 60% of the shares belonging to permanently employed previously disadvantaged farm workers living and working on farms in the valley, as well as the future Ikamva Lethu farm workers and SRCC packhouse workers. The remaining 34.5% of shares will be held by participating citrus growers [farmers]," said Nieuwenhuizen, adding that precise details were still being ironed out between stakeholders.

Jobs boost

The project will be a major jobs boost for the Eastern Cape agricultural sector, with up to 80 permanent employees and as many as 700 seasonal workers when fully operational. This was excluding the downstream job creation opportunities, said Nieuwenhuizen. Furthermore, there were on average five dependants for every employed person in the valley who would benefit from the project, he said.

Frikkie Olivier, SRCC operations manager who oversees the various empowerment

projects, said many other empowerment projects failed to impart proper technical and financial support to beneficiaries.

In the case of Ikamva Lethu, beneficiaries would be permanent farm workers in the community who worked off-site on other farms, while a further benefit of the project would be that new jobs would be created through employment opportunities on Ikamva Lethu.

"Support – from financial to technical – has been a major stumbling block in empowerment deals in the agricultural sector which have not succeeded," said Olivier.

Nieuwenhuizen said: "We have a hand in the project. We guide and help along the way."

The project was a long-term one, said Olivier and Nieuwenhuizen.

"We are starting from absolutely nothing. We have bushland and water at this stage. Once we have the authorisation [from the EIA application], then we can start building infrastructure before we plant the trees," said Nieuwenhuizen.

The first phase—the first of four—would include laying infrastructure and building dams, which would take about 18 months. This included cultivating the first 150ha of orchards – planting about 75,000 trees.

"To put the enormity of the scale in perspective, the average size of a farm in the valley is 60ha, so effectively we'll be planting

the equivalent of two farms a year," said Olivier, adding that the earmarked starting date for planting of trees was spring 2019, with completion scheduled for 2023. The first fruits of the project are expected to be borne in 2022. As the project unfolds, citrus varieties to be planted would be determined by market demand, and could also include juice processing opportunities, he added.

Track record

SRCC is no stranger to empowerment projects. Having launched its transformation strategy in 2006, SRCC now has three farming enterprises, excluding Ikamva Lethu, which are owned by workers' trusts – Luthando Farm, Mbuyiselo Farm and Sundays River Farming Trust.

Luthando Farm, which is 75% owned by the workers' trust and 25% owned by SRCC, boasts total export production exceeding 200 000 citrus cartons per year.

Mbuyiselo Farm, which is wholly owned by a workers' trust, boasts total export production exceeding 75,000 citrus cartons per year.

Sundays River Farming Trust, which consists of five consolidated farms – the land of which is still mostly owned by government – has a current total export production of about 450 000 citrus cartons per year, with further growth expected from the development of a farm recently acquired by the trust.



ONWARD AND UPWARD

**Introducing the Smart Agri
climate response framework
and implementation plan**

On 29 November 2016, Alan Winde, Minister of Economic Opportunities, delivered a keynote address at the African Agri Investment Indaba. It is a partnership between the Western Cape Government, Wesgro and the African Agri Council. Over 600 investors, agribusinesses, senior government officials and industry experts are attending the Indaba to discuss how to further strengthen Africa's agriculture sector. It took place at the Cape Town International Convention Centre between 28 November 2016 and 30 November 2016.

Please see comments from Minister Winde's address below.

In 2015, the value of exports from Africa's agricultural produce reached R700 billion, which translates into an annual growth rate of 17% over the past decade.

Approximately 65% of the continent's working population is employed in the agricultural sector.

This continent has the world's largest share of underutilised arable land. And Africa, along with Latin America, is seeing the fastest growth in the share of global farmland under cultivation. Between 2000 and 2008, African countries have cut their foreign debt by a

quarter and trimmed their budget deficits by two thirds.

Investment flows into Africa reached more than US\$200 million in 2014 and projections show the upward trend is set to continue.

We are also making it easier to do business in Africa. Here in the Western Cape, we have a dedicated Red Tape Reduction Unit to clear the way for economic growth. Across the continent, there is an undertaking to make the regulatory environment easier for businesses.

According to the World Bank's Distance to the Frontier scores, the majority of



African countries have put measures in place to create enabling environments for entrepreneurs.

The Enabling the Business of Agriculture index shows countries such as Mozambique and Uganda are making significant progress in streamlining the imports of farming equipment.

Africa Rising also presents increased pressure on our resources.

Over sixty percent of Africa's population is under twenty-five years old, and it is expected that seventeen million young people will enter the labour force each year for the next ten years.

Research shows that while employment opportunities on nonfarm sectors will increase, agriculture will remain the main source of employment in many African countries for the next several decades.

Here in the Western Cape we have selected agriculture and agri-processing as focus sectors. Our Project Khulisa growth strategy has the goal of adding up to a further 100 000 jobs to the economy, and increasing the Gross Value Add of the agri-processing sector to R26 billion.

We are driving a suite of initiatives to grow agri-processing to reach these goals. These include efforts to boost halal and wine

exports, and to create an enabling environment for all agri-processed products to flourish. We have made headway, together with our partners, in our drive to increase water storage in the Brandvlei Dam, and we have commissioned the equipment we require for our residue testing facility.

All of the initiatives under Project Khulisa are designed to open international markets for our produce, and I am pleased with the progress we have achieved thus far.

Wesgro, the Western Cape's tourism, trade and investment promotion agency, also has a dedicated agri-business unit which has played a significant role in facilitating investment in this sector into our region.

To ensure that agriculture can continue to deliver on its potential, we have developed an urgent and co-ordinated response to climate change.

Last year, Ethiopia recorded its lowest annual rainfall in thirty years. In South Africa, annual rainfall dropped to the lowest level since 1904.

We have partnered with the private sector and African Climate and Development Initiative of the University of Cape Town to launch the Smart Agri climate response framework and implementation plan.

Smart Agri identified four focus areas and six priority projects which are being driven by the private sector and government.

Briefly, these include:

Priority #1: Conservation agriculture

This approach includes minimum tillage, year-round soil cover and crop rotation.

Priority #2: Restoring degraded landscapes

The benefits of this action include improved soil conservation. It is suggested to pilot a restoration plan in three regions, and there are significant employment opportunities under this priority project.

Priority #3: Improved catchment management for water security and job creation

One strategy here is the removal of invasive alien plants, which reduces the flow of water and impacts water purification.

Priority #4: Energy efficiency

This step was prioritised across the province and particularly for regions with substantial irrigation farming and processing and cooling of fresh produce. It is also relevant to export-orientated, fruit and wine industries and intensive life-stock industries, such as dairy. Under this step, clean forms of energy are promoted through the use of case studies as success stories.

Priority #5: "Climate-proofing" the Western Cape's agri-processing sector

This priority project includes prioritising climate-resilient crops and livestock.

Priority #6: Integrated knowledge system for climate smart practices

Through this priority project, we are seeking to ensure our extension officers become the first port of call for farmers requiring information on smart agriculture practices.

We are already seeing the success these principles can have. Due, in part, to conservation agriculture farmers in the Swartland have seen good yields in the wheat crop, despite a challenging year.

With the introduction of no-till seeding methods, combined with crop rotation practices that were pioneered through the Long Term Crop Rotation Trial at Langgewens Research Farm in the Swartland, we are currently producing nearly double the amount of wheat on less than half of the area previously planted to this crop.

The results of the Langgewens long-term crop rotation trial speak directly to the increase of wheat production within crop rotation systems. A recent study on the impact of this research project has shown that 98.8% of farmers in the middle Swartland are implementing crop rotation.

We also recognise that to support agriculture to grow, we must embrace innovation.

Farmers here are using smart technologies and artificial intelligence. In the Western Cape Department of Agriculture, we are pioneering several smart agricultural instruments. One example is Cape Farm Mapper which is a combination of geospatial tools.

With the Cape Farm Mapper, which you can download to your phone, you can search for a farm, view climatic parameters, determine broad agricultural potential or even draw and measure features for farm planning.

With this African Agriculture Investment Indaba, we're coming together to provide a platform to connect the most innovative agriculture projects to funders.

These projects illustrate how this sector is delivering inclusive growth and real job creation.

We have been delighted to partner with these businesses on key milestones.

I'd like share with you some of the successes these agri-business ventures have already achieved.

Marketplace Energy (MPE) is a Biotechnology Start-up specializing in the development of biotechnology process platforms. Based in Cape Town, MPE is spearheading the development of a bioprocess technology to sustainably produce biomass feedstock; specifically, algae biomass.

This will convert biomass feedstock into bio-based raw materials for food supplements

and they have set their sights on producing for Africa.

Following the award of a grant by the National Department of Trade and Industry's Employment Creation Fund, the company is set to construct a pre-commercial scale Algae Bio-Refinery in Philadelphia, Cape Town. This refinery, with a footprint of two thousand square meters will be constructed on a one hundred and four hectare farm. This facility is the first step towards an Algae Biotech Innovation and Business Centre which is set to create 600 direct permanent jobs in the first five years in the Western Cape.

Another one of the projects being featured is AGRi-Life Fruit, a black-owned company focussing on agro-processing and based in the rural town of Wolseley. It provides fruit packing and logistical services to fruit farmers and fruit export companies in the Witzenberg region.

Because we recognise the potential this company had to add jobs in our rural areas, this project received initial grant funding from the Western Cape Government.

The company's shareholders include sixty-six farm workers who jointly own four farms.

The final project I'd like to highlight is Buffalo Ridge. It is unique in that it is the first and only water buffalo dairy and buffalo mozzarella producer in Southern Africa.

The Buffalo Ridge buffaloes are milked naturally, with no routine medication permitted. The milk yield of the buffalo is not artificially enhanced and certified biodegradable products are used in the cleaning of the dairy and all milking equipment and all water used is recycled for irrigation of the pastures.

Buffalo Ridge intends raising finance for capital expenditure to cater for the large increase in capacity.

These projects make plain how agriculture is bringing hope to communities. I am confident that the African Agri Investment Indaba will facilitate valuable partnerships which will contribute to Africa's sustained success in this sector.

Add it up

Performance that leads to profits

Pharmaceutical technologies significantly reduce the cost of producing beef by improving the growth and efficiency of cattle.¹ For commercial beef farmers, weaning the weight of their calves is one of the most important factors leading to success and profitability.

Many other factors play a role but the farmer has very little or no control over this. As vets, we have the knowledge and expertise to advise our clients on the best possible ways to achieve improved growth by combining pharmaceutical technologies. Lawrence et al (2007) estimated that the effect of deworming and growth implants in combination produced better results. He estimated an increase of 40.2 % in break-even selling price would occur due to removing them from a programme.¹ Of these two technologies, deworming has been shown to have the greater impact. It is, therefore, crucial to use only the best, tried and trusted dewormers/endectocides on the market.

Growth-enhancing technology has been used for over 40 years in beef production systems and has proven to provide one of the best returns on investment to producers worldwide. Slow release implants provide a

sustained payout period of around 90-120 days, perfect to get the two- to three-month-old calf to weaning in a heavier, stronger condition.

Their use in suckling calves can provide the farmer with a return on investment of up to 18:1. The product with the above-mentioned return on investment is SYNOVEX® C (Reg. No:G1402 (Act 36/1947), Zoetis' new growth implant designed specifically for the suckling calf. Studies performed in 42 different locations in the US, with over 7000 animals, showed an average increase of 8.6 kg's above non-implanted control calves². Implanting is easy to fit into your schedule when placing ear tags or de-budding, with worthwhile returns.

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SYNOVEX® C can also be used in replacement heifers. If you know which animals you are going to keep, don't implant them as you

won't benefit from their gains. Numerous studies have demonstrated the safety of these products in these animals, with very minor decreases in fertility seen, although these decreases have not clearly shown to be due to the effects of the implants. If replacement heifers are to be implanted, it is important to only implant them once as calves between two to three months of age and keep them on a high plane of nutrition.

Combining these two technologies produces a complementary, synergistic effect, as healthy animals are better able to use feed resources more efficiently.¹ This results in more money in your client's pocket and a better bottom line.

Dr BB. Van Houten

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2. Data on File.

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Today, after nearly 60 years, Dow AgroSciences is a wholly owned subsidiary of The Dow Chemical Company. Dow AgroSciences today is one of the world's leading agricultural companies with more than 8,000 employees worldwide. We have R&D and manufacturing facilities in more than 40 countries and our products are being sold in more than 130 countries. Dow AgroSciences is working hard to support the food production needs of the world's growing population. We are committed to develop agricultural solutions to make farming more profitable, productive and sustainable. The only way we will achieve these aims will be through innovations in crop production technology.

The foundation on which this crop production technology is being built is our people, innovation, growth and sustainability. Our people are empowered to create solutions that positively impact lives and continue to reshape the agricultural world around us. Dow AgroSciences collaborates with scientist around the globe to address the world's need for food, feed, fuel, and fibre. We are working hard to discover, develop, and bring sustainable solutions to market. Innovation drives our progress as one of the fastest growing agricultural businesses in the world. This innovation has given rise to the strongest product pipeline in the Dow AgroSciences history. Through financial discipline and technology-driven innovation Dow AgroSciences is delivering sales growth that is outperforming the competition. We are, however, committed to achieve this growth by minimizing our environmental impact through manufacturing, packaging and shipping. Dow AgroSciences is driven to develop solutions that balance human needs with the preservation of our environment. We will support industry efforts to enhance and maintain sustainable agricultural practices.

Because of these solid foundations, Dow AgroSciences has received numerous awards through the years, including four U.S. Presidential Green Chemistry Challenge Awards, eleven Agrow Awards, as well as the first prize in the Good Agricultural Practices category of the XIV Andef Awards. Recently Dow AgroSciences also received the R&D 100 award from R&D Magazine for work done in developing our novel technology, Isoclast™ active.

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Haifa Group, a world leader in the field of specialty plant nutrients, started developing a line of polymer-coated controlled-release fertilizers (CRF's) in the early 90's.

The vision in developing Multicote CRFs was to build on Haifa's efficient plant nutrition strategies by further optimizing fertilizer use and minimizing environmental impacts.

In the beginning Multicote was used mainly for professional production of ornamental plants.

In recent years further improvement in the production process and reductions in production cost have led to an increased use of Multicote fertilizers for agricultural applications paving the way towards developing the Multicote Agri Concept.

Vegetable production is a target area, but Multicote Agri products have proven beneficial for other crops such as citrus, vine and apple orchards. Even field-crops like corn and wheat respond very well.

Multicote benefits

Multicote controlled release fertilizers offer the benefits of labour saving, environmental protection and thrifty use of fertilizer materials. Decreased fertilization application rates and fewer application operations, combined with improved yields resulting from optimal nutrition, have made the application of Multicote an economically justifiable option.

Multicote products

Haifa has developed some unique controlled-release products:

- Coated granules with various NPK ratios are available
- Coated potassium nitrate—a favorable source of potassium for plants

Multicote products are available with release periods of 2-16 months at soil temperature of 21°C. Multicote products perform just as well in cold and hot climates.

The polymer coating of Multicote

In recent years the coating or spraying or any other addition to improve the properties of fertilizer granules has been very popular among many other producers.

These usually come with certain claims of product improvements which in most cases are valid.

It is however very important to understand the difference between technologies available in the market. It is important to understand the technical differences between Slow-release technologies and Controlled release technologies.

Multicote is a specific, CRF (Controlled Release Fertilizer). In the production process of Multicote, thin layers of polymer are formed on fertilizer granules, encapsulating them. This polymeric coating is a semi-permeable barrier that allows measured diffusion of nutrients when the fertilizer granules are applied to the soil. The layered structure of the coating gives it excellent physical properties, ensuring that the granules remain intact during shipping and handling and over time. It also prevents rupture of the coating and destruction of the release features when the granules are exposed to humid conditions (the "Popcorn" phenomenon)

After the release of nutrients is complete all that remain are empty shells, which decompose over time.

Multicote Agri Concept:

The technical teams of Haifa South Africa were instrumental in further developing the Multicote Agri Concept.

The concept entails the mixing of coated Multicote CRF products with different longevities with uncoated granular fertilizers called "starter". This gave rise to the first penetration of CRF technology into open field crop production and can be viewed as a real groundbreaking development in commercial crop nutrition.

All over South Africa forward-thinking farmers are moving to this technology with excellent results.

The future

Haifa has made a decision to position Multicote as a leading controlled-release fertilizer brand. Activities to reach this goal include:

- Development of new products to meet the needs of existing and new markets
- Implementation of new technologies, to extend potential applications of CRF's
- Introduction of Multicote products into new market niches
- Cooperation with local partners to support professional applications

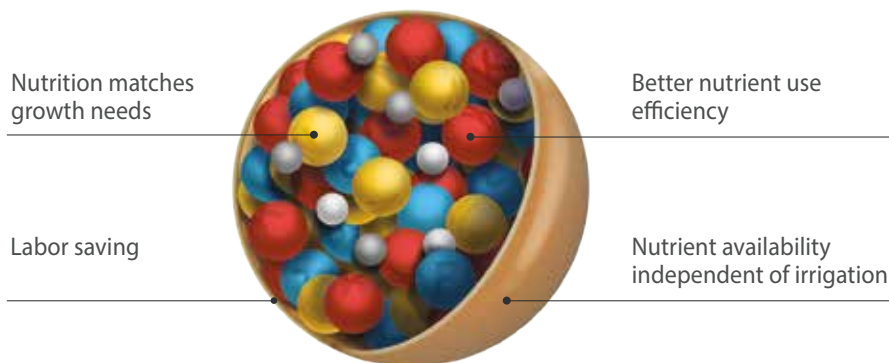
For more information please visit the Haifa website:

(http://www.haifa-group.com/products/plant_nutrition/controlled_release_fertilizers/) or contact Dawie Fourie mobile +2782 335 7760



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USE EXPANDED DATA TO YOUR ADVANTAGE

Farmers don't need to move in all directions anymore to collect or keep data about their farms. New technology from Laeveld Agrochem now offers an all-in-one platform.

South African farmers use new technology faster than their European counterparts. South African farmers usually embrace new agricultural technology very fast. A farmer can switch any data easily into profit if he is equipped with the right technology and utilises it effectively.

MYFARMWEB™

Laeveld Agrochem joined forces with Agri Technovation as part of its Decision Farming™ services to develop a unique information platform for farmers. The system operates through the Internet.

Lately most farmers have geographic information about their farms in the form of maps or analysis that are done from a certain area (coordinate). This information includes soil nutrition maps, harvester maps (yield maps), leaf analysis, soil physical maps, plague maps and NDVI images (Normalised Difference Vegetation Index). Sometimes the data is also electronically available, but often the format is not uniform.

Usually the data is also coming from different sources, such as individual harvester monitors, laboratories or several service providers. After a while it is difficult to manage the information as it is complicated and time-consuming to get hold of the information quickly and to compare the maps or data with each other.

MyFarmWeb™ has a simple goal: To keep all the different information on one easy electronic system and to make it accessible for users.



WHAT YOU NEED TO KNOW

What is MyFarmWeb™?

It is an online platform where a variety of geographic information/data can be stored and used easily.

It is accessible from any web browser. Therefore the point data supplies all the information that is collected at a specific geographic point.

How does MyFarmWeb™ work?

The user gets a unique username and password, signs in from any web browser. It takes the user to a platform where information is

showed about the farms to which the user has access.

Why is MyFarmWeb™ a unique system?

Electronic data that is usually kept in different formats, is now available in one format and at one place. The system offers permanent storage through an Internet cloud. The platform also offers overlapping levels of information. It can be converted easily in practical action steps.

What information is available?

Information about a specific farm is showed against a background that is chosen from one

of the following levels: Aerial photographs, road maps, title deeds (map and transport) and the borders of all farms in South Africa.

On a farm level the following kind of information can be loaded onto the platform:

- Data from soil samples.
- Topographic maps.
- A total of 34 different soil nutrient status cards (chemical maps), for example pH, phosphate (P), calcium (Ca), magnesium to potassium relationship, exchangeable acidity and organic carbon.
- A total of 27 different soil physical cards (soil classification), such as clay content, soil type, soil potential and plant-available water capacity.
- Any images that were acquired through remote sensing, for example NDVI images per satellite, drone or aeroplane and thermal images.
- Yield maps, such as harvester monitor maps with grain crops, as well as yield and unpacking percentage maps per orchard for permanent crops.
- Data about leaf and water analysis.

- Consultation reports.
- MyUploads™: Photographs, reports and notes that can be loaded onto the platform.

What is the source of a specific farm's information shown?

All precision farming information obtained in the past by Agri Technovation, will appear automatically on the platform.

Information farmers obtained from other service providers or created by appliances on the farm, can be sent electronically to Laeveld Agrochem in order to get it loaded. Users can also load photographs, reports, maps and other data themselves.

How does MyFarmWeb™ keep the information?

The information is kept with the help of the latest cloud technology and protected according to the best international practices. The data is not only kept on a person's own computer. Therefore the data is still safe in the cloud if your computer breaks or is stolen.

MyFarmWeb™ keeps all the farming data on one electronic platform with access for all authorised users.

How is access to information on MyFarmWeb™ controlled?

Users only have access to information about farms for which they are responsible or have subscription rights to. In the case of big farming operations, the owner can choose to see all the available information for all his farms or to give his orchard managers only access to the orchard that each one of them manages.

Does a person need training?

No, if you can work with Google Earth on the Internet, you will be able to use MyFarmWeb™ within minutes. Technical help and support is available telephonically.

How to sign-up for MyFarmWeb™

The MyFarmWeb™ service and website is available exclusively through Laeveld Agrochem.



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- ✓ Strategic planning
- ✓ Modern technology
- ✓ Crop protection
- ✓ Soil solutions
- ✓ Plant nutrition
- ✓ Animal health

Farming together for success

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biological products, fungicides, herbicides and insecticides. A wide selection of soil enrichment and plant nutrition products, as well as a top range of animal health products.



NUWATER CHANGES THE BLEAK WATER OUTLOOK IN AFRICA

There is something that resonates within us whenever we hear a good story. Great stories can inspire people and they often serve as a catalyst for change. And this is exactly what NuWater is doing within the water sector.

The SA water sector is in desperate need of a good story. The current picture is bleak as the water sector faces immense challenges, both on the supply and demand side. The long-term supply challenges are enormous and with no improvement in the efficiency of agricultural, industrial and residential water use, water demand is projected to overshoot supply by 40% in the next 20 years.

Stories of poor service delivery and mismanagement at municipal level flood news platforms week after week, while we are increasingly made aware of the drought's devastating effects that are crippling our

food resources and eating away at our economy.

If the water sector is to stand a chance against the growing challenges it faces, it needs to adopt both innovative technical and commercial solutions. It will be riskier to continue the 'business as usual' path than to innovate and implement new technology and forward-thinking business models.

NuWater understands that to truly change the current story of water on our continent, they had to disrupt the business as usual path and think outside of the box to meet the changing needs of their customers.

NuWater knows that innovation is not just about technology but probably even more importantly it is about the business model and truly understanding their clients' financial needs. Therefore, they have disrupted the accepted model of other players in the industry with both their advanced technology and innovative commercial models.

NuWater is at the forefront of innovation in the water sector. It is a technology-led company that designs, builds, finances and operates advanced plants for the treatment of water and wastewater, and the provision of high-quality drinking and industrial process water from sea, river, ground and wastewater sources.

NuWater developed an advanced and robust modular water treatment technology, which allows for the rapid deployment and, where relevant, re-deployment of water treatment plants that can be scaled to address a wide range of challenging applications.

The modular and mobile nature of the plants allows NuWater to offer customers a very different commercial model. NuWater can lease treatment plants on short-term contracts and provide the required operational and maintenance services. This full-service model has proven to be very



attractive to their customers as they can shape the offering to their customers' circumstances.

In the municipal sector, the innovative commercial model allows municipalities to finance the plant through operational budgets. The plant generates additional income to the municipality through having more product to sell to consumers. This, in turn, provides the income stream that can be used to pay for the facility. Also, the "Modular & Mobile" nature of the solution has meant that municipal water treatment works can be run at design capacity, while the NuWater plants deliver the balance of the total volumes required by the municipality, thereby ensuring volumes and quality standards are met.

NuWater can thus tailor commercial offers to suit the cash-flow restrictions experienced by various clients, especially municipalities, and operate on the Build-Own-Operate,

Build-Own-Operate-Transfer or Rental business model.

The biggest user of water globally is the agricultural industry. As farming becomes more professionalized and scientific, NuWater has increasingly noted that farmers want to improve the quality of water used on crops and for livestock to their outputs. Gone are the days when a farmer simply sinks a borehole and accepts whatever quality of water comes out. As the agriculture trends toward consolidation and corporatization continue, NuWater foresees a higher demand for reliable treatment solutions coming from the sector, which can truly meet the needs of this industry. Therefore, NuWater engages with their clients in the agricultural sector to ensure they get the water specifications they need for optimal success.

Just as important as their clients, NuWater invests in their people and empowers them

to take part in the innovation process to ensure that their solutions and services keep improving. "We believe we are playing an important role, not just in helping address South Africa's water challenges but also as an exporter of products, services and expertise in this massive global sector."

Through NuWater's narrative, there is no other company in SA that can match their track record of successful innovation in the water sector. With its innovative, rapidly deployable and re-deployable modular and mobile technology, coupled with a 'can-do' attitude, NuWater is making a real and immediate contribution towards turning water challenges into success stories in SA and other parts of the world.

With a passion for what they do and the benefits of each successful project they deliver, NuWater together with its customers, is improving people's lives and the environment around us.

A photograph of a single, ripe red apple with a small stem, held gently in the palms of several hands of different skin tones. The hands are cupped around the apple, symbolizing care, support, and shared responsibility. The background is a soft-focus green, suggesting an outdoor setting like a garden or farm.

TRANSFORMATION AND FOOD SECURITY

**Winds of change in the Western
Cape, intensive farming
in KZN and Limpopo**



“Dit is lekker op die plaas” is what Solms-Delta Wine Estate co-owner Professor Mark Solms said when Rural Development and Land Reform Minister Gugile Nkwinti launched the Strengthening the Relative Rights of People Working the Land policy (50/50) at the farm late last year.

“Dit is lekker op die plaas” is an Afrikaans phrase that means “it is nice on the farm”. Solms was describing how life has been on the farm after the farm owners decided to give half of their business to the farm workers. He said the model can be easily duplicated on all South African farms.

The Solms-Delta Wine Estate, established in 1690, sold a stake of its equity to farm workers under the Wijn De Caab Trust—effectively turning workers into their business partners.

“...I am very proud to say that they can look at our example and see that it’s not [a bad thing]. This [farm] is a wonderful place... It is a very good community,” said Solms.

The Solms-Delta Wine Estate operates a wine production business in the Franschhoek area outside Cape Town on a property measuring 54 hectares.

Minister Nkwinti commended the established wine farmers—Professor Solms and Richard Astor (for Lubeck-Delta Ltd)—for pioneering the 50/50 policy before it was implemented.

“I think Professor Solms is one the most unselfish South Africans because we did not know about [his farm]. He heard about the programme that we developed.” ...People are celebrating 20 years of the Constitution. We are here celebrating exactly the same

thing but substantively. I am very happy,” he said.

Solms said after taking over the wine estate in 2001, he started conceptualising a model through which farm workers could own a stake in the entire farm operation and the land.

“Prior to the Minister announcing the [50/50] policy, we had already made the decision that we wanted to share in the ownership with Solms-Delta.

“So when the Minister announced this partnership, at that point we already had a three-way ownership partnership between myself and the neighbouring farm and the farm workers who lived on both of our farms. Roughly around 180 people formed a trust and we share equally on the farm,” Solms said.

Through the policy framework on Strengthening the Relative Rights of People Working the Land, commonly known as the 50/50 policy, government seeks to assist beneficiaries - mainly farm workers and farm dwellers - to secure permanent tenure on the properties where they work or live, as well as acquire economic interests in agricultural land and businesses on which they are working or living.

Professor Solms said it was important to address South Africa’s painful past of land dispossessions and forced removals through this policy.

“... We have to find some sort of compromise between everybody’s interests. There has to be something in it for everyone. I think the 50/50 policy is the obvious way to go. We share in the land and we work together in partnership in order to transform the agricultural landscape in South Africa.”

Sussana Malgas, one of the beneficiaries and board trustees of the Wijn De Caab Trust, said as a result of the transaction, life on the farm has greatly improved, as workers now have a say in the affairs of the farm.

After working as a domestic worker for Professor Solms, she has now been empowered and is a qualified wine and heritage guide.

She said the trust does a lot of community development work, including teaching music to farm workers, who have gone on to win music competitions and get local singing gigs.

Malgas said the trust now pays for the education of the children of farm workers.

"The first and most important thing for us is education because back in the day, we as beneficiaries did not have enough money to send our kids to university after they finished school.

"...For us, it is very important because we don't want our kids to be like us when we were growing up," she said.

KZN works to build food security

KwaZulu-Natal MEC for Agriculture and Rural Development Themba Mthembu says the department will work towards ensuring that no household goes hungry.

"We are challenged on this front by rising food prices. We know from health experts that as a result of not getting adequate proteins and vitamins, one in five children suffers from malnutrition and learning disabilities," MEC Mthembu said.

He was speaking at a media briefing at Moses Mabhida Stadium in December, where he outlined the department's strategic plans for 2017/18.

MEC Mthembu said food insecurity will become the overarching focus of the department. He stressed the need to see food as a health and social justice issue, before it is seen as business.

"This is not just a matter of planting more crops and raising more livestock, but dealing with issues of making nutritious food affordable to the poor. The well-being of our nation will be compromised if we do not find ways to provide nutritious food for the poor.

"We need to look at how we can measure our success according to the healthy foods

we produce. Research, especially collaborative research with other institutions, will form an important part of this programme," said MEC Mthembu.

The department's plans will also incorporate the extensive growing of a diversity of food crops, including indigenous crops and fruit trees.

MEC Mthembu said that while the department will work directly with subsistence farmers, the plan is to develop an agency that will largely be concerned with commercial farming.

He said there is a plan to collapse all the department's entities such as Agribusiness Development Agency (ADA) and Mjindi Farming into one entity. Commercial farming will become the domain of this new single entity.

The department's strategy will also involve the development of an intensive urban farming programme, which is aimed at reviving the township economy and aggressively addressing poverty and unemployment.

Vhembe district to remain food security hub

The Vhembe District will remain a food security hub in Limpopo, says the provincial leader of the African Farmers' Association of South Africa (AFASA), Tshiane Mathidi.

"In order to ensure that our district remains the food security hub in the province, we are encouraging farmers to involve their children in farming from an early age. In our district, most of the children of farmers are passionate and deeply involved in farming.

"Despite the severe drought that affected all of us as farmers, we have fertile land in the district, so we want young people to be involved in farming so that they can cross over and become commercial farmers," he said.

Mathidi was speaking at the Limpopo farmers' year-end function held at Madzivhandila Agricultural College near Thohoyandou.

Commercial cattle farmer, Ndwamato Mudau (86), said: "We need more young people in farming to fight food security. Young people need to understand that farming is not for the elderly".

Asked how the drought has affected him, Mudau, who owns a farm comprising 309 hectares in Soekmekaar, said: "I've already lost three cows due to this drought and I am left with 75 Bonsmara cattle".

Speaking on behalf of Communications Minister Faith Muthambi, Prof Lucky Nedambale said: "As African Farmers' Association of South Africa (AFASA) and National Emergent Red Meat Producers Organization (NERPO), you are crossing over from emerging farmers to commercial entrepreneurs.

"Emerging farmers in South Africa face many obstacles and it is not easy to cross over into the sphere of commercial agriculture.

"You were previously disadvantaged. You were given land by government through the land reform process. Some of you have operating knowledge of farming or may have even been previously working as employees on some farms, sometimes lacking the technical know-how, farm and risk management skills and could not access formal markets".

Nedambale is the Advisory Board deputy chairperson of Madzivhandila Agricultural College which is chaired by Minister Muthambi.

Nedambale further said that the majority of African farmers in the country are smallholders who farm on less than two hectares of land.

"For many, the financial risks are high and the returns are low. Our population statistics points to more than 50 million people in South Africa. We all depend on agricultural produce for livelihoods. It is therefore crucial that government help farming communities to prosper and to have access to land and landownership.

"Let us create the emergence of African success stories so that they become pillars on which emerging farmers can lean on. If not, emerging farmers will reach nowhere because their hands will be tied not by ropes but by the greed of the intermediaries that the system would have generated, who eats up the farmer's income while it is on its way into their hands," he said.

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BACK TO BASICS

A better yield requires better insight and planning

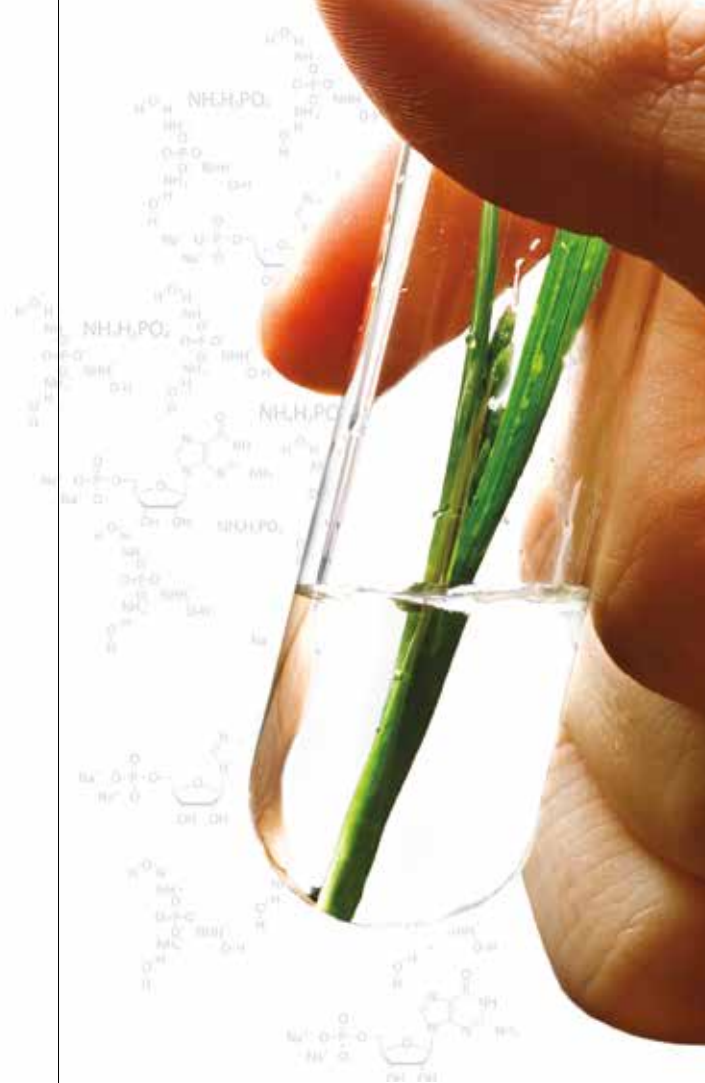
Frequently during a conversation one neighbour would compare his crop yield and associated fertilizer use with that of the other neighbour. Thus one "recipe" would be compared to the other. Neighbour one would like to understand why neighbour two's recipe worked better than his? In this way, for instance, a recipe for liming would be discussed and very easily adapted over an area and accepted as the "only" recipe. Something already proved is that the "basics" should always be kept in mind, and applied. All other "fancy" stuff added should be added to the "basics". Where the "basics" are forgotten and progress has taken place by implementing "fancy" stuff, it will just be a matter of time before shortfalls show.

In our search for the "best recipe" for a plant or crop, eventually we need to adhere to the "Wooden Barrel" principle, i.e. the law of the minimum. This principle describes that all inputs and some other factors will determine yield, but in order to obtain "maximum" yield, the factors should be in balance to one another. Now, this balance does not refer to the cation balance according to some overseas doctrines, but to the fact that the crop or plant will need all inputs in balance to one another. As soon as one input, for instance potassium (fertilizer as well as soil status), is deficient, then it will impact negatively on yield. In this way any input can be a limitation. Examples of this could be too much soil acidity, too little phosphorus or nitrogen, too shallow or too deep planting depth, too little or improper herbicides, soil compaction, poor seed quality, etc. Plant or crop needs for sufficient sunshine and the correct climate should not be forgotten. Without this no harvest would be possible. Thus, climate will always play a crucial role in crop performance and any deviation will be reflected in the yield.

Sidi Parani's point of view is that the application of "only fertilizer" is a commodity, but the application of "plant nutrition" should be regarded as a science. Yield will always be important, and for this reason each and every fertilizer proposal ("recommendation") is like a puzzle (the pieces are to investigate, evaluate and assemble). No fertilizer proposal should just be a "recipe" and most definitely not a duplicate from one neighbour to another, nor a copy of an overseas recipe. It should also not be determined by surplus stock piled-up in one or another store somewhere. At all times sufficient information should be available to do a proper evaluation, i.e. the relevant crop should be known, a complete analysis (top- and sub-soil for acidification, if applicable), row width, positions of banded fertilizer (planting mixture, as well as side-dressing, including pre-plant if applicable), ammonium nitrate based blend versus urea based blends, trace elements, etc.

Too many producers apply recipes (sometimes the neighbour's) and have a less thorough, thought-through approach or plan for his own soil and implement conditions. FARM with success, be blessed and be SAFE!

Dr Chris Schmidt is an agronomist at Sidi Parani and can be contacted at 0828858134 (chris@sidip.co.za).



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BEST LAB RESULTS

Top tips: how to get the best out of a laboratory

A commercial laboratory is a facility that tests materials (solids, sludge's, liquids, gas etc) for many reasons, including to assure product integrity, quality, safety and efficacy.

There are many occasions when it may be necessary to have recourse to a laboratory. Wastewater testing and especially soil testing would be two examples.

Mr. David Long is the Co-Founder of Sci-Ba, a South African company specialising in testing and consulting services, operating across the continent.

Mr. Long offers five tips for how to use a commercial laboratory effectively.

1. You can use local laboratories: Contrary to common belief, South Africa has some excellent laboratories. Many South African laboratories boast qualified scientific experts, equipment and experience to rival peers abroad, e.g. as a leading mining economy, South Africa has pioneered some of the methods used worldwide for the exploration and operation of mining interests.
2. Laboratories can offer advice before testing: If you outline your objectives, labs with professionally registered scientists

can help you determine the most appropriate scientific analysis that must be performed to solve your problem, saving you money and time in analytical service fees.

3. Know that some laboratories specialize: For many reasons, some labs may not be able to perform the specific analysis you require and may opt to use a sub-contractor for your test. If you plan to send your sample to more than one lab to compare results, as many commercial entities prefer to, you need to know if your work will be subcontracted, to avoid sending your work to multiple labs, who use the same sub-contractor. It's also worth confirming whether a standard or non-standard method will be used for your analysis.
4. Manage samples carefully: It is useful to know what type of sample is required for the analysis. Discuss the transportation of the sample with the receiving laboratory to preserve its integrity as far as possible e.g. water samples are perishable and may need special handling on route to the laboratory. Laboratories will retain left over samples for a certain period of time, in case re-testing or other analytical testing is required after initial testing has been performed; and so that there is a record of the sample later. Enquire how long samples are retained for, as this depends on the laboratory standard protocols.
5. You can expect quality results: If you get results from a lab and you have doubts, speak to the laboratory manager and the quality manager if one is available. Be sure to confirm whether any follow up tests carry costs.





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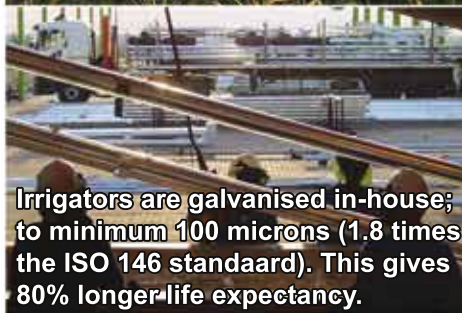
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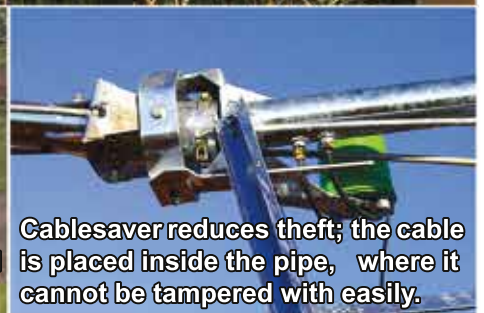
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