

Issue 29 • July/August 2017

Harvest SA

**Securing South
Africa's Food
Resources**



A balanced approach

Integrating natural pest control

Farmers of the future

It's in the hands of the youth



War on the armyworm

The armyworm poses a huge threat on grain crop production if not controlled effectively

The 2016/17 summer crop production season started on a promising note for southern Africa's agricultural sector, after emerging from a devastating drought in the 2015/16 season. For South Africa, there are already promising indications that the country could retain its status as a net exporter of maize.

In the second week of 2017, the United States Department of Agriculture (USDA) reiterated their view on South Africa's 2016/17 maize production, leaving their estimate unchanged at 13 million tonnes, which is a 65% year-on-year increase. So far, the lowest market estimate is 11.7-million tonnes. If South Africa manages to achieve a crop within this range, the country will regain its status as a net exporter of maize, as domestic maize consumption is around 10.5-million tonnes a year.

Unfortunately, the prospects of agricultural recovery are slim for other southern African countries. Although the season started on a sound footing across the region, Zimbabwe

and Zambia are currently battling with armyworms—pests of grass pastures and cereal crops.

This outbreak is believed to be the result of an invasion of fall armyworm, an exotic and quarantine pest for Southern Africa. The outbreak of this pest started in Zambia towards the end of 2016 and continues to spread across the country's maize-producing areas. At the time of writing, reports from Zambia's Agricultural Ministry estimated that 124 000 hectares of maize had been affected (out of a total of 1.4-million hectares planted this season).

The armyworm infestation has now spread to Zimbabwe, with the country's Commercial Farmers Union suggesting that seven of the eight maize-producing provinces of Zimbabwe have already been affected. There are also reports that this pest is spreading to some regions of Malawi. So far, the extent of damage is unclear as governments and farmers in the aforementioned countries are actively applying control measures such as spraying, amongst other methods.

These regional developments are alarm bells for South Africa and we need to turn the spotlight on our preparedness to contain such outbreaks. Seven of the nine provinces have been affected, namely, parts of Limpopo, Free State, North West, Mpumalanga, Gauteng, KwaZulu-Natal and the Northern Cape. The Department of Agriculture, Forestry, and Fisheries (DAFF) needs to maintain scouting efforts and encourage farmers to report any cases of this notifiable pest.

A working group consisting of commodity organisations, researchers and policymakers has devised an action plan consisting of tasking taxonomists with providing a positive identification of the pest, an emergency management programme compiled by DAFF, emergency registration of pesticides is underway and awareness programmes and development of long-term integrated pest management plans/protocols for SA.

A national surveillance programme will be rolled out in collaboration with the grain industry (Grain SA and South African National Seed Organization).



Moreover, this outbreak of the fall armyworm poses a huge threat to Southern African Development Community's (SADC) grain crop production. The countries where crop losses have been reported, so far, have yet to confirm these outbreaks with their National Plant Protection Organization portals as members of the International Plant Protection Convention. This poses a further challenge for effective cooperation regionally. This lack of transparency within the region holds a biosecurity risk.

It further prevents scientists from cooperating proactively in confirming whether current outbreaks are due to the endemic African armyworm or the recently introduced and quarantined fall armyworm. Overall, this adds to the food insecurity threat in the region.

With Southern African countries having emerged from drought; crop damage by the armyworm will make grain imports from South Africa critical. According to data from the United Nations Food and Agriculture Organization (FAO), the average annual maize production of the SADC is around 30 million tonnes. Over 80% of this is produced by just four countries, namely, South Africa with a 42% share, followed by Tanzania with an 18% share, Malawi with a 12% share and Zambia with a 9% share.

This means two of the key regional maize producers are at risk—Zambia and Malawi. Ideally, Tanzania and South Africa would have to supply the region with maize this season. However, Tanzania is typically a



net importer of maize. In fact, the largest volume of maize exported by Tanzania in the past 15-years was 274 428 tonnes in 2014. About 81% of this went to Kenya. Therefore, South Africa could be the key supplier of maize to the region in the coming months.

Overall, the region's agricultural sector is not completely out of the woods. After a devastating drought season, the armyworm could prove to be another disaster if not controlled effectively. Currently, the extent of the damage is unclear, but agricultural policymakers within SADC need to react quicker in order to prevent these disasters as smallholder farmers will always

be more vulnerable to outbreaks of pests and diseases.

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FOREWORD



Having worked in many countries in the world including my native Israel and Turkey, I can say that the South African agriculture industry is a very dynamic one. Despite constant change in legislation, volatile markets and unpredictable weather patterns, South African farmers are incredibly positive and adaptable.

As a leading vegetable seedling nursery, Hishtil South Africa is fortunate enough to have been in the country for 10 years now and the business is growing from strength to strength. This to me is a reflection of the people and especially the farmers in the country. We have seen farming evolve during this time from family-run operations to professional and successful businesses. With this has come the demand for professional and quality input products.

Professionalism in every industry is important, but in agriculture and with the difficulties faced by farmers, this is so much

more imperative. Farmers are under constant pressure due to cost increases, pressure to supply higher quality produce and economic difficulties faced by the South African consumer.

Adapting to change in an ever-changing environment is what keeps businesses ahead in whatever industry they may find themselves. This is one thing that we have done well in our two nurseries in South Africa. Adapting our product to our customer's needs, going above and beyond what they expect is what sets us apart from our competition and what I believe has made us successful. Having not just a relationship with your customer, but a partnership is what really counts in today's business environment.

Invest yourself in your customers' business and they will in turn invest in your business, making for longer term sustainable business relationships.

*Shlomo Zuker
General Manager, Hishtil South Africa*



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The Masisizane Fund (NPC) is an initiative of Old Mutual South Africa, established in 2007 following the closure of the Unclaimed Shares Trust. This was done in consultation with the National Treasury of South Africa. The mandate of the Fund at inception was and remains to contribute meaningfully to employment creation, poverty eradication and reduction of inequality, economic growth and the attraction of investment. This is done mainly through the promotion of entrepreneurship, enterprise finance and support to small, micro and medium enterprises (SMMEs).

The target market is made up of enterprises in which previously disadvantaged individual(s) have majority ownership, giving priority to rural and peri-urban/township areas. Masisizane funding is targeted toward businesses in which women, the youth and people with disabilities have 51% (or more) ownership. The Fund targets productive and labour absorbing sectors and works in partnership with others, such as government, to achieve maximum results and benefits for its clients.

The Fund's success is driven by a focused approach to high impact industry sectors, coupled with a comprehensive SMME finance solution that includes business support.

The Fund provides loan finance in the following sectors:

- ▶ Agri-business;
- ▶ Supply Chain;
- ▶ Franchising.

Non-financial value adding services include capacity development, business management and technical support, financial education, market development, and product/service quality standards and compliance. A Business Acceleration Program has been established where potential clients receive training and support to grow into a business eligible to receive financial support.

For more information and where to find us visit:
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EDS NOTE



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DDT is among the more controversial chemicals out there. Developed during World War 2 to combat malaria, typhus and bubonic plague, it was also widely used as an insecticide.

Unfortunately, it came with a lot of now notorious side-effects. The SABC notes that "people exposed to DDT while working with the chemical or by accidental exposure report a prickling sensation of the mouth, nausea, dizziness, confusion, headache, lethargy, incoordination, vomiting, fatigue, and tremors". Animals are also affected. In the USA, the bald eagle only started to return in numbers after DDT was banned. DDT is not used for agricultural pest control in South Africa but is used in Limpopo against malaria. Nowadays, farmers increasingly recognise the value of

natural forms of pest control. Benign predators, ranging from your childhood friend the ladybird to bats, wasps and other creatures, are extremely effective against insect pests. Then there are the biorationals: naturally derived microbials, organic acids, plant extracts, pheromones, minerals, barriers and other active ingredients. As demand for pesticide-free fruit and vegetables rises around the world, so too does the importance of natural pest control increase.

Of course, as always in agriculture, it's necessary to take a balanced, level-headed approach. It's not simply about throwing out the chemicals and turning back to nature: it requires an integrated pest control plan that carefully assesses the needs of a particular farming set-up. This issue of Harvest SA features a number of expert contributions on the topic, which are sure to be a rewarding read.

CONTRIBUTORS



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The NCPC-SA is a programme of the Department of Trade and Industry (the dti) hosted by the CSIR.

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Farmers of the future

Land Bank is looking to challenge youth perception of the agricultural sector to encourage greater participation, writes Londiwe Thabethe

With the fanfare of Youth month now behind us, what remains and cannot be forgotten is the collective work necessary to address the systemic challenges facing South Africa's youth everyday. A lack of access to education, unemployment, and a technical recession must be addressed by creating appropriate opportunities to help youths participate in the economy.

Having recently reversed eight consecutive periods of negative growth due to persistent drought, and with a 22% GDP growth to show for it, the agricultural sector is demonstrating its ability to become a cornerstone of the country's economy, even in depressed economic times. While sector players and policymakers alike have long recognised this potential, its translation into significant benefits for previously marginalised groups, like the youth, has been slow.

The National Development Plan (NDP) provides a clear and overarching policy approach to agriculture that is being implemented across government and within the agricultural sector. As the primary economic activity in rural areas, agriculture has the potential to create close to 1-million jobs by 2030. However, the implementation of activities that will encourage and support more youth entering the agricultural sector hinges on the ability of sector players to fully understand the challenges and how best to respond to them.

To this end, Land Bank recently concluded surveys to understand the perceptions and attitudes of the youth regarding the



agricultural sector as well as the challenges faced by young people participating in the sector. With a mandate to promote social inclusivity within the agricultural sector, these insights are playing a critical role in allowing the Bank to customise its programmes to best support young people in agriculture.

Key findings included[1]:

- Data collected during the surveys suggested that young people's perception of, and attitude towards the agricultural sector is largely influenced by a lack of information and exposure to the industry. Several of the respondents noted that they did not know what agriculture was or what it entailed;
- Others only associated agriculture with subsistence farming, hard work, and being poor;

- Respondents also had little knowledge of opportunities in the sector, and the variety of careers across the agricultural value chain;
- A majority of the respondents preferred a career in one of the tertiary sectors, over a career in agriculture; and
- Some of the main challenges associated with the agricultural sector include a shortage of arable land, a lack of funding as well as industry information and statistics, climate change, and a lack of interest in the industry.

To confirm these perceptions, the study interviewed key role players in agriculture and/or youth training and development, finding that the majority share the sentiments expressed by the youth in the primary survey. According to several role players interviewed, there is a general view

amongst young people that agriculture is an industry for uneducated individuals who do not require proper training. As a result, educated youth tend to view agriculture as their last option, and instead focus their energy on finding employment in the corporate space.

These findings confirm that there is much work to be done in re-positioning the agricultural sector to become more attractive to young people.

The agricultural value chain has become far more integrated, accommodating a diverse array of transferable skills, knowledge and expertise. Technology continues to revolutionise the sector, with many farmers already implementing cutting-edge precision farming methods to enhance their yields and better manage farming processes.

Farmers of the future will be using apps, drone technology and will require other innovative solutions to overcome age-old challenges. With the youth already pre-disposed to technology through the high

penetration of smartphones in this country and increasing access to the internet, they are truly best placed to take advantage of these exciting opportunities within the industry.

While these are not typically traditional 'on the farm' opportunities, we can still show the youth how traditional farming methods are becoming integrated with our digitised lives throughout the agricultural value chain to meet demand and supply. As such, our expanded strategic focus must incorporate secondary agriculture to align with current trends influencing the industry.

South Africa has some of the most successful commercial farmers and, at Land Bank, we are working to bridge the skills gap by bringing these farmers together with emerging farmers, and providing appropriate financing to ensure that they "graduate" to the commercial level. Our focus is to provide support to young individuals already involved in agriculture, since their success

is likely to inspire other young people to get involved. Our collective interventions must dispel negative perceptions about the industry, and ensure that skills being attracted to the sector can be appropriately applied. This translates to ensuring that there is sufficient capacity to train young people wanting to participate in the sector, in both theory and in practice. At Land Bank, we are in the process of finalising a youth strategy, taking these key findings into consideration. We remain confident that, beyond the brief but important awareness Youth Month brings around the challenges facing our country's youth, we will be able to work with role players in the agricultural sector to achieve real sustainable development impact amongst this group.

Londiwe Thabethe is a Sector and Market Analyst within the Land Bank's Strategy Division.

[1] Perception Survey on the Agricultural Sector Among the Rural and Urban Youth, June 2017

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Shoulders to the wheel

Only we can prevent save agriculture from being the black sheep of the economy

It was recently reported in the media that SA can expect a bumper maize harvest. No doubt domestic consumers as well hunger-ridden citizens in neighbouring countries will benefit from this windfall. Whether the lower maize price is good news for commercial farmers, however, is a topic for serious contemplation. Many of those farmers have just emerged from a devastating drought; the financial consequences are still hanging over their heads like the proverbial Sword of Damocles: financial ruin and bankruptcy have not disappeared. The current maize price is well below the average input cost.

In the meantime the land question remains a hot topic, not to mention the proposed National Minimum Wage which should come into effect by May 2018. Whilst indications are that agriculture might be exempt by paying only 90% of the proposed minimum wage for the first year, the real bite will probably be felt a year later when the full Minimum Wage plus the annual increase is to be paid by 1 May 2019.

The anticipated pressure on the land issue, the debt caused by the drought, and the cost of and accessibility to potable water for irrigation purposes and rising input costs in general, are all cause for concern within the ranks of commercial farmers.

In the meantime crime in rural areas is rampant. Not only are farm dwellers subjected to the most horrific treatment at the hands of violent criminals, but theft of property, especially livestock, is at levels never experienced before in our country. To add insult to injury, farmers are increasingly becoming the victims of service delivery protests in outlying areas. The recent uninhibited expression of dissatisfaction with a local authority in Lichtenburg and Coligny has set the scene for similar actions in Biesiesvlei and other rural centres. Crops raised under difficult and challenging natural pressures are stolen under circumstances where effective policing cannot be relied upon. The burning of farm houses, the destruction of crops and the blocking of roads have become the norm in several areas.

To top it all, racial tensions and biased treatment of law abiding and tax-paying citizens have become the flavour of our times.

With the exception of declared wars, South Africa has probably not seen the same levels of widespread violence and criminality in its history.

It is within this environment and the current state of affairs that farmers are continuing to answer to their calling; they are indeed feeding the population, including those who detest them to such an extent that violent crime (including deliberate torture and dehumanisation) knows no boundaries;

and to top it all they are being labelled as land thieves and brutal employers. They are despised by the very people who enjoy the literal fruits of their labour.

Not only are they feeding the population, they are keeping rural economies alive, earning valuable foreign exchange and contributing to the national economy.

What a dilemma! Under such circumstances and challenges, South Africa has been able to produce commercial farmers second to none. They have survived wars, depressions, droughts and criminal onslaughts second to none. This should reflect something of their moral fibre which should make it possible to regard their dedication and determination with special interest and appreciation. It might seem as though a growing portion of society lives under the impression that their daily bread is the product of the local supermarket.

The real and perceived distance between primary producer and consumer seems to be ever increasing.

Current reality indicates that the same applies to government and it's many institutions.

Are farmers, their families and the employees really the out-of-sight Black Sheep most politicians, officials and consumers regard them to be?

The question which law-abiding citizens should ask themselves is what should be

done about the status quo? Of course we can carry on voting like we have been doing, but that is unfortunately no guarantee that meaningful change would be forthcoming. As a matter of fact, our national set of values is under threat. Unfortunately information currently available indicates that the rot has settled in at the highest level of government. Should sound principles not become the norm in both politics and business, as well as our interaction with each other, the decadence will only gather more momentum, thus creating a nightmarish pitfall which will truly be too ghastly to contemplate.

The current policy environment will not foster a growing and thriving economy. Such an economic and business environment is to be regarded as a primary requisite for the creation of opportunities for all to benefit from. While disciplined socialistic practices can aid the aged, the frail and the physically impaired, sound economic practice is the tried and trusted method to create equal opportunities for those who are either good entrepreneurs or those willing to earn a proper income.

Unfortunately, up till now, society has had very few options other than bearing the brunt of failure at monumental cost (not to mention the gigantic losses due to mismanagement and corruption) to the ever-declining tax base. Can we really afford to blindly carry on in the current economic cul-de-sac? When last did we see evidence of cost-effective and meaningful projects benefitting society? TAU SA has adopted the stance that we need to change that which needs to be changed, thus creating a future which promises growth, viability and a truly better future for those who are willing and able to commit themselves.

The various areas of economic activity should therefore start by providing input which will contribute to the de facto creation of a positive policy environment and, with the financial capacity which exists, open new avenues by practical evidence of better business practices, thus creating positive pressure. If the total agricultural value chain could cooperate by working together and thus create a policy which is rooted in private ownership and free market principles which could promote and build trust, it will at least be a starting point. Let us all therefore



accept joint responsibility for our future and speak up and start building a workable policy environment which will produce only one outcome: growth. With that we can address the unacceptably high levels of unemployment and the poverty that goes with that.

In this regard, TAU SA recently hosted an conference to which all the different role-players in the agricultural sector were invited. The organizations which were represented indicated their interest to collectively seek and identify opportunities which will serve the wellbeing of society at large, but in particular the interests of the agricultural sector. We are all positive that we should do something by ourselves. Our challenge now is to inform and convince enough role players so that we can muster critical mass to influence the policy environment in such a manner to replace the present uncertainty with investor confidence and internal stability

and sustainability so that agriculture will be regarded as a strategic asset of national prominence.

The political will to redirect South Africa to a positive future unfortunately doesn't exist. As long as the focus is on saving the ANC and not on the wellbeing of the population and what could be done to create a better sustainable life in reality for them all, the responsible citizens in society do have an almost impossible task to redirect the country to develop to its achievable optimum performance.

The question which every citizen in South Africa should ask themselves is whether they are content with going downhill as a result of government policy. If not what is to be done about it? It will be our own choice if we stay the Black Sheep!

Not on your life!

Bennie Van Zyl, General Manager, TAU SA



Getting Closer™ to control

A commitment to creating sustainable solutions for the agricultural sector has pushed Dow AgroSciences to develop class-leading products

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agricultural potential, staving off insecticide-resistant strains of insects and offering control within 2-3 hours of application. Because South Africa is one of the world's largest exporters of fresh citrus—and in the top 20 for citrus production—demand for agro-chemical products acceptable to the export market is high. Closer™ fits neatly into this space as all major crops have import tolerances set in all of our biggest markets.

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Good perishables

Creating confidence in South Africa
as an import destination



Lucien Jansen, CEO

Established in 1926, the Perishable Products Export Control Board (PPECB) has delivered valuable services to the perishable products industry for over 90 years by enhancing the credibility of the South African export certificate and supporting the export competitiveness of South Africa's perishable product industries. We chatted to CEO Lucien Jansen to find out more about this vitally important service.

What is the extent of your coverage?

The PPECB currently performs inspections on 194 listed agricultural products and has 1752 producers registered on its system who provide produce destined for export to 87 countries. These inspections take place at 952 pack houses registered with the PPECB.

In addition, the PPECB also provides a cold chain management service whereby it monitors the temperature during the export process of 121 product types and for roughly 2.5 million pallets per year.

To carry out these services, we have 885 staff of which 420 are temporary and 465 are permanent. Due to the seasonal nature of the PPECB's business, there is a high reliance on temporary staff in order for the PPECB to achieve its objectives. Of the 885 staff, 347 are inspectors and 231 are cold chain assessors.

How does this enhance the credibility of the South African export certificate?

The PPECB's product inspections ensure that the quality, phytosanitary (excluding special markets) and marking requirements of produce intended for export are met. This is done by making use of suitably qualified and extensively trained inspectors, who conduct inspections against the minimum export quality standards and the requirements of the importing country. In addition the PPECB ensures that all produce intended for export, as well as all stages of handling, storing and transporting thereof, meets relevant food safety standards. All these processes provide assurance to importing countries that produce imported from South Africa meets their requirements as well as minimum food safety standards, thereby enhancing the credibility of the South African perishable product exports.

This in turn creates confidence in South Africa as an import destination, which assists South African exporters to position themselves as the preferred suppliers of perishable produce with international buyers, thereby supporting their competitiveness in the international market.

The PPECB is furthermore an ISO 9001:2015 accredited organization, which lends further credibility to our internal procedures and processes.

ISO 9001: 2015, developed and published by ISO (International Organisation of Standardisation), is recognised by organisations worldwide as a quality management standard which provides principles for organisations aimed at ensuring customers receive

consistently high quality products and services. The standard is also used by external parties to assess the organisation's ability to meet statutory and regulatory requirements applicable to the organisation's mandate. This accreditation indicates that our processes have been independently verified and underlines our commitment to deliver a quality service. This lends credibility to the manner in which we conduct our business and provides assurance to our clients, as well as international stakeholders, that the PPECB is committed to quality and outstanding customer service.

What important quality-control trends has the PPECB been monitoring?

The PPECB continuously scans the environment in order to keep up to date with the latest global trends in the perishable export sector and thus, with the blessing of the Department of Agriculture, Forestry and Fisheries, attends international meetings where continuous discussions are held on quality requirements for agricultural products such as the meetings of the Organisation for Economic Co-operation and Development (OECD). Currently the PPECB is cognisant of the changing weather patterns and the tremendous impact this is having on the agricultural industry.

There are certain quality defects that are associated with specific products which are often exacerbated and impacted by external factors. Although we are aware of these it is often difficult to predict

what will happen as no two seasons are the same. As an example, the recent drought put the trees under tremendous strain which in turn had an impact on the internal quality, yield and sizing of several products.

Where does the CEO fit in?

PPECB's position within the industry requires it to communicate with a diverse pool of stakeholders. I thus see the role of the CEO as placing a priority on stakeholder management, collaboration and integration to ensure that the industry as a whole achieves its objectives and South Africa remains competitive on international markets. I further believe it is essential for the PPECB to keep abreast with latest trends and requirements, as to ensure that the South African export industry remains compliant.

PPECB recently received a certificate of recognition from the South African Institute of Chartered Accountants (SAICA) for its record of clean audits for five consecutive years. What does this mean to you?

The award is a tremendous source of pride for us as we believe it highlights our commitment to sound financial management practices. Furthermore, it is testament to the commitment of both management and staff to compliance with relevant legislation, policies and procedures.

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grow and sustain
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Our passion for excellence helps you grow your business and establish yourself as a preferred supplier of perishable products.



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Waters of life

Irrigation farming: a lifeline for budding 'agripreneurs'

In South Africa, unemployment and poverty are closely associated. Rural areas are nodes of both unemployment and chronic poverty. A study conducted in two districts of Limpopo Province indicates that irrigation farming is strongly associated with significantly better livelihoods. Irrigators were revealed to be clearly better off in terms of food availability and household income than other groups. While caution is needed in celebrating causal linkages, the strong association provides a robust case for irrigation as a core rural development strategy, as set out in the National Development Plan (NDP) of 2011. Article by Kim Trollip.

Rural poverty is the most severe, with rural people more than twice as likely to be poor; and the severity of rural poverty is nearly three times that of urban dwellers. Women and youth suffer the most. The challenges in tackling poverty are compounded by high unemployment, most visibly reflected in youth unemployment, which in 2015 was estimated at 45.3%. This is a crisis indeed.

In rural areas, agriculture makes an important contribution to food security at a household level, particularly for the poorest households. Agriculture is also seen as one of the key strategic opportunities for employment and rural development, but smallholder farmers face formidable challenges.

The general aim of the study, funded by the Water Research Commission, was 'to review

and evaluate appropriate development paths for expansion from homestead food gardening to smallholder irrigation farming, increased water use productivity of crop production and improved livelihoods on selected smallholder irrigation schemes in South Africa'. Enhancement of entrepreneurship is seen as key to growth in a free-market economic system including in the agricultural sector.

The study findings show that irrigation is strongly associated with improved livelihood outcomes and a strengthened human, physical and financial capital base. The incomes of irrigator households were significantly higher, with all irrigator households above the upper-bound poverty line, while home gardeners were on or below this line. Irrigator households were also more food secure with greater food diversity. Entrepreneurial farmers with varied characteristics, but sharing a business outlook, were identified in similar numbers to classical peasant-farming categories, with true capitalist farmers a rarity.

The research effort in this study pivoted on three dominant themes: irrigated agriculture, rural livelihoods and entrepreneurship. The project identified three main populations of irrigators that were the focus of the study. The first population was home-food gardeners comprising individuals engaged in agricultural production within their homestead. The second population comprised farmers active on smallholder irrigation schemes, where a scheme is defined as the hydraulic system which is shared by a group of farmers. The

third population comprised independent irrigators who are solely responsible for their own irrigation system and typically pump from adjacent rivers or boreholes.

The research was conducted using a multiple-case study approach, conducted at two research sites aiming for symmetrical analysis, covering the three populations. Thulamela Local Municipality, located in Vhembe District, was the first site and Greater Tzaneen Local Municipality, located in Mopani District, was the second. Both are located in Limpopo Province.

The key proposition in the project was that increased local, regional and national benefits from smallholder irrigated crop production will be driven by entrepreneurs who identify opportunities, develop strategies to exploit these and turn these into viable and profitable irrigated crop production (and perhaps processing) enterprises.

Comparison of the livelihoods of three groups provided compelling evidence that irrigated smallholder agriculture and improved livelihoods were closely associated. Smallholder irrigation is considered to be a successful poverty alleviation tool when it paved the way for increased consumption, asset accumulation, nutritional improvements and reduced persistent poverty among users. Over time these gains lead to institutional feedbacks that support sustained economic development and the evidence collected at the two study sites indicates that most if not all these criteria had been met.



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Following on the success of the the first Water Research Commission (WRC) Symposium in 2013 and 2015, WRC, South Africa's national funding agency for water research and development, will host the next WRC Research, Development and Innovation Symposium from 18 – 20 September at the Birchwood Hotel in Gauteng. In the past the conference has attracted over 400 delegates from around the wold , including leading figures in water, sanitation and innovation.

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The study found that people arrive at irrigation farming via many experiential routes; from starting points as diverse as desperation and hunger, to planned early retirement with savings and a business outlook. It was found that regardless of their historical experiences (pathway), it was the physical location of farming—in the home garden, on a scheme, or as an independent irrigator—that defined the current farming challenges that they faced. This was because the institutional uncertainties were a dominant challenge limiting their growth and land and water issues were quite different in the different physical locations. This is said noting that wider agricultural production challenges such as finance, knowledge and marketing were shared by all groups.

“Another important finding was more a confirmation of our own and other published work,” explains project leader Jonathan Dennison of Umhlaba Consulting Group, “Smallholder irrigators are not homogenous and different types of smallholder farmers need different kinds of support interventions to meet their priority needs. Modelling responses for smallholders only on successful approaches from the large-scale highly commercialised agricultural sector will serve some, but not most smallholder farmers. A suite of interventions which can be tailored to be responsive to smallholder diversity is essential if the opportunities for smallholder agricultural entrepreneurial development are to be more fully exploited.”

Key messages for policy-makers

Obstacles to successful farming are severe and dominated by institutional disincentives in the acquisition of secure land and in obtaining secure water supply. The wholly inadequate communal land-tenure arrangements, combined with high risks related to inadequate irrigation water supply turn development pathways into somewhat treacherous endeavours. Relocation of promising farmers onto well-established (previously white-owned) schemes, fundamental reforms in communal land-tenure systems on smallholder schemes, investment in water management institutions, marketing support, and water management interventions are all strategies that would have to be pursued in parallel to achieve

results. Irrigation can, it seems, provide the much sought after development outcomes, but this requires a new political will to re-set the development direction, drive profitability initiatives and re-institutionalise the smallholder irrigation sector from a land and water perspective.

“We found that smallholder irrigators are heavily constrained by a reality of institutional ‘chaos’ on the ground due to widespread uncertainties in regard to land-leasing arrangements and water-use rights, says Dennison. “Land-tenure arrangements are quasi-legal in most situations and practices on the ground show diverse interpretation of the law, with high transaction and financial costs for farmers. While smallholder irrigators face serious hurdles in regard to production knowledge, financing and marketing in particular, bringing institutional order to tenure, both land and water, would greatly reduce farming risks and increase smallholders’ resilience to other livelihoods shocks.

“If decision-makers want to achieve ‘bang-for-buck’, local-level institutional and organisational interventions should be pursued as a priority. The methods to address these institutional issues are well-established and the costs are relatively small compared with capital investment in bulk-water supply and in-field irrigation infrastructure. A triple thrust in organisational development comprising secondary cooperatives with an emphasis on knowledge and market linkages, water management organisations (WUAs) with support for registrations/licensing, and skilled support interventions in local land-leasing, would initiate a significant reduction in risk exposure and our evidence shows this would trigger a quantum leap in local investment and profitability. Entrepreneurs, particularly those on the margins in this high risk agricultural production context, will respond to the increased certainty. In the present, seriously-constrained fiscal context, these relatively-low-cost facilitative interventions will lead to marked growth for existing irrigators who are currently surviving and remain active despite the odds which are stacked against them.”

In summary, Dennison’s message to policy-makers is, “We know what to do and how to do it—just do it!”

The so-called ‘good life’ can be enjoyed in rural areas too

Smallholder farming in South Africa was historically geared for food provisioning, which is fundamentally different from farming as a business. The typical 1.5 ha scheme plot size is evidence of this, resulting from the early apartheid Tomlinson Commission recommendations for maize self-sufficiency of a typical ‘Bantu’ family. It is understandable that the image of old or so-called ‘uneducated’ people farming maize and pumpkins does not resonate with trendy western-dominated ideals of the youth, but there is a change in perceptions that comes from the reality of the ever failing ‘urban dream’.

Some of the successful younger agri-business entrepreneurs, or ‘agripreneurs’, who were documented in the study had tried their hand in cities and returned disillusioned and desperate, and took up farming, because there was nothing else left to try. Their vision of agriculture is now very different from that of a parochial agrarian existence. It is one where irrigation means business and production; where crops are planted with money and markets in mind; and where farming is seen as the means to achieve success—in their eyes and in the eyes of others. It is the view of the research team that the reality is one where perceptions of irrigated farming are in transition. While some of course stick to an aged view of agriculture, the new entrepreneurs are fully aware that agriculture is a way out of poverty and a pathway to a better life. But these post-millennial young farmers need more than market forces to get established. Much like the successful mid-century approaches to settle and establish unemployed workers and soldiers, a medium term view and state support is unavoidable.

Agricultural transformation demands a ten-year plan as a minimum. If nothing else, the youth have time on their hands, smartphones at their ears and their eyes on possibilities—pathways to a better life. The challenge is not to change perceptions, but to support those already keen and that will change the wider perspective of irrigation farming: from a dominant picture of gumboots-and-mud to one about making money.

The three Ps

A sustainable solution to pests and plant diseases

Pest and disease control: BioControl makes sustainable agriculture possible. Sustainable practices with reduced ecological impact are becoming increasingly important as we move to provide for an ever-growing world population while simultaneously reducing our impact on our planet. Biological farming methods make this possible by utilizing what Nature provides to increase yields and decrease negative environmental impact.

Biological control deploys the “Three P’s” to protect crops and control pests and diseases: Predators, Parasitoids, and Pathogens. These refer to the natural enemies of the pests and diseases that affect most crops in agriculture. Predators include beneficial insects such as ladybugs and lacewings. Parasitoids and Pathogens are used to either attack pest insects or produce antibiotic substances to prevent and treat bacterial and fungal diseases.

Biological farming focuses on the prevention of pest outbreaks through the purposeful manipulation of these natural enemies. This targeted approach ensures

that there is no ill effect on the environment, including humans and other animals. It is compatible with many other Integrated Pest Management (IPM) practices including cultural, physical, and mechanical controls.

Apart from disease and pest protection, biological farming also focuses on increasing the inherent strength of crops. Stronger plants with better root growth and leaf formation are better protected against pests and disease. There is also the added benefit of better root formation and therefore improved water and nutrient absorption, providing vital protection in our drought-prone country.

BioControl provides a comprehensive range of biological farming products, expertise to back it up, and laboratory soil analysis to tailor-make your sustainable solution.

BioControl’s range of pest control products protects against aphids, fruit fly, grasshoppers, bugs, beetles, and nematodes.

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Plant health and growth can be boosted with BioControl’s soil enhancements. These

include products to rehabilitate and rejuvenate soil, compost-activators, improve organic nitrogen binding to roots, and a range of organic bio fertilizers.

In conjunction with IPM methods, BioControl aims to pave the way to easier agriculture with less upkeep, by offering you a long-term solution to sustainable farming:

- Specific solutions for our harsh climate that breaks the life-cycle of pests and diseases.
- Up to 60% less costly than other methods, but with improved yield.
- No residue, soil depletion, or resistance build-up, and no withholding period after harvest.
- Targeted against specific pests and diseases, making it safe for humans and animals.

Pests and diseases can be controlled in an eco-friendly, sustainable manner with biological farming methods.

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Eddie Honeyball is a microbiologist at the head of BioControl.

His passion is creating tailor made solutions to pest and plant diseases, increasing yield and decreasing production costs.



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Stormy times

When agricultural weather patterns typify
the turbulence of the modern era

It is often said that uncertainty, volatility or even heightened level of risks represent the new normal in the modern era. Since the turn of the new century, the global world has entered this era characterized by elevated levels of risks, uncertainty or instability. It all started with the global food price crises of 2007 when the global food prices got to record levels largely on the back of high oil price shocks. The food price crisis precipitated food price related riots in many countries including South Africa. Before the global economy could get the sense of the new reality, the global food price crisis gave way to the global financial crisis the following year, which in turn led to global recession. Since then, business land scale is changing at an alarming rate turbo-charged by the technological developments.

Thanks to global warming and climate change, the agricultural weather partners are also becoming increasingly unstable. For instance, South Africa moved from severe drought during the summer 2016 season to the wet season the following year. From one season to the next, weather patterns move to the opposite extremes. With these changes, the country moved from the drought-induced maize shortage, producing 7 million tons to a record maize production of over 15 million tons in this year. In 2016, efforts were directed at assisting drought impacted farmers cope with the disaster and finding sufficient volumes of imports to balance domestic supply and demand for maize, among other food products. In 2017, efforts must now be directed at finding export markets for surplus maize productions. This

volatile environment has an impact on planning and investment decisions. Will farmers reinvest the windfall forming higher than normal production? Only time will tell!

Those with long memories will remember the summer of 2004/05 season when the country produced a surplus of 11,7 million tons. Such levels of production led to the collapsing of maize prices to levels of approximately R600/tons. Back then, commercial banks had to reduce the level of production financing in an effort to enable price recovery and improved profitability for the farmers. Fast forward to the present, things have changed: Population has increased, the economy has grown and in the process producing a carnivorous middle class with their insatiable demand for all things animal protein. This in turn led to increasing demand for yellow maize. Although the country is projected to produce record harvest, prices haven't hit the floor and are unlikely to do to. However, maize prices have declined from the record level of approximately R4000/ton early in 2016 to the current level of less than R2000/ton. These movements happened within a short space of time. All these again point to the unstable and unpredictable business environment of the modern era. While the risks associated with new levels of uncertainty can be mitigated through third party products, emerging farmers are at a disadvantage in that many are still at a basic level of production and unable to afford sophisticated risk transferring products. Many are still dealing with issues of market access, access to finance, skills deficiencies and many other hurdles to overcome. This heightened level of risk is however good business for those in the risk management

business. Despite the above elevated risks levels, the record harvests call for a moment of pause and celebration. Masisizane Fund has a flagship project that spans Matatiele and uMzimkhulu in the Eastern Cape and KwaZulu Natal respectively. These Masisizane sponsored black farmers in the programme planted over 2000 hectares of maize and soy beans. As an organization, we are happy and joining in on the celebratory mood as the farmers managed to harvest over 1200 tons of soy beans and are on course to harvest close to 3000 tons of maize. To some, this may be a small harvest relative to country production but given the environment and resources employed the above is significant and worthy of celebration.

However, the celebrations should not distract us from the business of managing risks. In fact, it is through successful risk management that success can be achieved and celebrations occasioned. With this heightened level of volatility in the business environment including agricultural environment, government should work on promoting equitable and yet business friendly policies. The current volatile environment places further pressure on small businesses. This current and fast changing environment places a premium on risk mitigation measures. South Africa has a sizable number of emerging farmers and thus a significant market for risks products is up for the taking. Developers of these kinds of products should balance the need for risk protection against the resource-poor nature of emerging farmers.

*Robert Matsila
Investment Head: Agribusiness, Masisizane Fund*



BALANCED APPROACH

Is biological control of weeds a better option than herbicides for safe and effective weed management?

Biological control (biocontrol for short) terminology, when applied in the broadest sense, is the use of animals, insects, fungi, or other microbes to feed upon, parasitize or otherwise interfere with a targeted pest species. 'Classical' biocontrol targets a non-native pest (e.g. alien invasive weeds) for control with one or more species of biocontrol agents (e.g. insects, pathogens) from the pest's native range. Classical biocontrol remains the most popular and successful approach for controlling alien invasive weed species the world over. Fundamental to the success of biocontrol as a practice is the 100% host-specificity required of biocontrol agents – an attribute that is supposed to protect against harmful effects on non-target species and ecosystems.

Following several decades of intensive use of synthetic chemicals (herbicides, insecticides, fungicides, bactericides) for crop protection and other purposes, Harris (1991) points to public demands for a shift from chemical to biological control. However, several dilemmas are associated with a change in emphasis from chemical control to biocontrol; obstacles in the way of greater adoption of biocontrol range from scientific, legal, political to practical issues. Thus, biocontrol is basically subjected to the same scrutiny as synthetic chemicals, except for the fact that the public, in particular consumers of farm products in developed countries, tend to accept more readily the employment of biocontrol practices for food production than they do chemical control practices. Regulatory authorities responsible for the registration of agrochemical products, specifically pesticides, often are perceived by the agrochemical industry to be guided more by public perceptions (politics) than by the real risks (exposure, toxicity) associated with the use of agrochemicals.



Dr Charlie Reinhardt

Literature abounds with comparisons of the pros and cons of biocontrol with those of chemical control. When the authors are proponents of biocontrol their approach often is to promote biocontrol as an adversarial or alternative measure in relation to the use of synthetic chemicals. No doubt, some supporters of the use of pesticides make the same mistake, but fortunately, the proponents of Integrated Pest Management (IPM), in which all control practices are supposed to be considered on an equal footing, still hold sway. In order to avoid the quagmire of divergent and conflicting opinions, the present discussion will focus only on salient facts as they apply in practice, with reference to examples of weed biocontrol in South Africa.

The benefits of successful control of an alien invasive weed in, for example, the Kruger National Park through the release of this species' natural enemies should be manifestly apparent. Safeguards against non-target harmful effects are vested in the standard procedure that candidate biocontrol agents that are imported from their natural habitats undergo exhaustive screening for efficacy and 100% host specificity under quarantine conditions. The rationale for achieving success with biocontrol in natural environments is that non-target plant species, which dominate the plant community, i.e. indigenous

vegetation, will literally take the invader(s) place. Similar logic applies to the control of aquatic alien invasive weeds (e.g. water lettuce, water hyacinth, Kariba weed), except that in this case the 'taking over' by indigenous aquatic plants does not apply, due to the dearth of free-floating aquatic plants in South Africa.

In contrast, in crop production systems, the 'crop' or desirable species is usually a single species that occurs at fixed density, whereas the weed spectrum on a particular area can be diverse in terms of weed types and levels of infestation. In such a setting, selective biocontrol of one, or even two, weed species will hardly make a difference, since individuals of other species already present will simply take their place. In annual crop production systems, in particular, the control of weeds must be done promptly and weeds must be eliminated in a short space of time in order to avoid unacceptable levels of interference with crop development. Such rapid effects are not possible in the case of biological control. However, in cases where a particularly noxious (herbicide-resistant, poisonous, extremely competitive, etc) weed occurs in crop production, it might be practical to employ biocontrol. The basic problem with this kind of biocontrol is that 'economies of scale' will dictate whether the 'product' will have a big enough and sustainable market in order to warrant research and development (R&D) and registration costs.

One bioherbicide product that was discontinued in South Africa for reason of too small a market is the product Hakattack®, which was a formulation containing spores of the fungus *Colletotrichum gloeosporioides*, used for controlling the alien invader tree of Australian origin, 'silky' or 'needle' hakea (*Hakea sericea*) (Morris, 1982; 1983). Highly interesting is that the same fungus is registered in the USA under the tradename LockDown® (Delta Farm Press, 2009) for the control of a rare legume weed species, *Aeschynomene virginica* (common names: curly indigo; northern jointvetch), which is particularly hard to control in rice with synthetic herbicides. Other fungus-based bioherbicide products registered in the USA (year 2000) were the products Smolder® and DeVine® for the control of the parasitic weed dodder (*Cuscuta* sp.). I am not aware of any

bioherbicide product currently registered in South Africa for weed control.

In South Africa, there are several success stories on biocontrol of alien invader weeds occurring in natural (e.g. conservation areas) or semi-natural (e.g. game farms) habitats. According to Moran et al (2011), some target weeds that have been satisfactorily controlled biologically, include the following species: several cactus species (e.g. the prickly pear, *Opuntia ficus-indica*), St John's wort (*Hypericum perforatum*), sesbania (*Sesbania punicea*), and the aquatic weeds *Azolla filiculoides* (water fern), *Salvinia molesta* (Kariba weed; water fern), *Pistia stratiotes* (water lettuce). It should be borne in mind that eradication of these weeds has not been achieved, nor was it the aim; consequently, they can be problematic from time to time in certain locations. Research by the Agricultural Research Council's Plant Protection Research Institute (ARC, PPRI) on these and many other targets for classical biocontrol is continuing.

'Cover' crop or so-called 'smother' crop practices provide a type of non-classical biocontrol of weeds. Through this practice, certain attributes of the crop are employed for weed suppression, and cover cropping is a key component of Conservation Agriculture. Live crops and/or residual (dead) plant material are used to withhold light from weeds seeds, thereby preventing or reducing germination, and biochemical compounds called 'allelochemicals', which are released from live and dead crop plants in the phenomenon of 'allelopathy', inhibit the germination, growth and development of weeds.

Although accepted generally that the use of synthetic herbicides will remain the mainstay of weed control programs long into the future, it is imperative that we consider the alternative weed management options. An integrated approach to weed management is crucial for sustainable crop production – in all instances all the available weed control options deserve consideration in designing a weed management strategy that has the best chance of contributing to maximizing farmer profits and the achievement of optimal yields of safe and sufficient food.

Dr Charlie Reinhardt, Dean: Villa Academy



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Natural order

The rationale behind biorationals

With the world's population expected to reach nine billion by the year 2050, sustainable means of agriculture are more important than ever. In order to feed the growing population without causing harm to the environment, a tremendous opportunity exists for biorational products.

The term "Biorationals" is used to characterize a broad range of low environmental impact substances or products typically biologically-derived or, if synthetic, structurally similar and functionally identical to biologically occurring materials. The term includes microbials, organic acids, plant extracts, pheromones, minerals, barriers and other active ingredients derived from natural or biological sources.

A global leader in the field of the development and commercialization of microbial biopesticides, plant growth regulators and other products, Valent BioSciences has expanded its biorational business to over 90 countries around the world. While demand for biological products is currently dominated by North America, constituting 40% of world-wide demand, Europe is the fastest growing market due to increased regulation and consumer demand. Even the most conservative estimates predict a compound annual growth rate for biological products in the range of 14% to 17%.

Demand for safe and effective biorational products will continue to rise with increasing demand for organic foods in developed countries and the expanding need for high-quality fruits and vegetables around the world.

By producing cutting-edge biorationals to combine with conventional products, companies like Valent BioSciences are helping to meet the growing, global demand for a sustainable and reliable supply of safe food.

Southern African Agriculture is also driven by the above-mentioned forces. Biorational products have been widely adopted in conventional pest and disease management programs and general farming practices. The result of this habit is a smaller impact on the agroecosystem and a more sustainable future for commercial crop production in South Africa.

Growers realize that Biorational Products bring unique value including features which aid in resistance management, residue management and environmental and worker safety benefits. All of these attributes ensure that growers can meet the needs of today's value chain. This is of crucial importance due to South Africa's big focus on exporting some of our fresh fruit commodities to countries such as Europe.

Some of the success stories in local agriculture include the use of biorational insecticides—such as DiPel® (*Bacillus thuringiensis* – Bt) which is currently either being investigated or in most cases applied for the management of several moth and butterfly species including Bollworm, False Army Worm, Tomato Leafminer, Trimen's False Tiger Moth, Grape Berry Moth and Orange Dog.

DiTera® (*Myrothecium verrucaria*) is a heat-killed microbial product and also widely used for the management of Plant Parasitic Nematodes. Current research is ongoing to investigate the use of DiTera® in combination with MycoApply®, a biological mycorrhizal inoculant which contains viable propagules of four arbuscular mycorrhizal fungi species, to improve overall soil health status.

These above-mentioned beneficial symbiotic organisms colonize plant roots, and increase their effective absorption and rooting area. This symbiosis expands well beyond the nutrient depletion zone of the roots, and allows plants to access and utilize more of the nutrients and water available in their growing environment, while improving soil structure and aggregation, and maximizing plant health, stress resilience, and ultimately optimizing yields. MycoApply® will therefore form part of a grower's drive to create suppressive soils.

Plant Growth Regulators are widely used in South Africa to add value by increasing yields and pack-out. Some of these products include ProGibb® (GA3) on citrus to enhance fruit set and to improve rind quality. It is also used in table grapes for stretching, bunch thinning and berry enlargement. Whereas in apples and pears, MaxCel® (6-BA) has proved to be an exceptional thinning and sizing product that also improves return bloom. Harvest management tools, such as ReTain (AVG) is used on apples to delay the harvest, allowing more time to pick the fruit at optimum maturity. On table grapes, ProTone™ (ABA) is used to improve red coloration, resulting in higher pack-out and less picks.

With a strong focus on innovation, Valent BioSciences will continue to bring creative and applicable solutions similar to some of the examples listed above as the global leaders in Biorational Technology. These solutions can be integrated into crop production processes to ensure the sustainable and successful production of fresh produce to feed a growing nation and population.

De Waal, Jeanne (Philagro) and Lyczko, Remy (Valent BioSciences)

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enhance
mean to you?

... to see **a world** in
a **grain of sand.** »

We at **Kynoch** would like to thank you, the nation builders, the dreamers, the visionaries, those who stand in the face of adversity and see the potential of a harsh landscape, by planting a seed for tomorrow's generations. We salute you, the food producer.

Kynoch pledges to support our food producers at the forefront of sustainability, through enhanced efficiency, through innovation. Ensuring tomorrow's yield is today's victory.

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Kynoch

*Inspired by a William Blake poem

Farmisco (Pty) Ltd. t/a Kynoch Fertilizer
Reg. No: 2009/0092541/07

Nutrient Stewardship:

Increasing fertilizer efficiency, protecting the environment

Fertilizers are key to sustainable crop production and like many inputs, there are best management practices that greatly increase their effectiveness. It was along this line of thought that Kynoch Fertilizers decided to concentrate on “Enhanced Efficiency through Innovation”.

The manner in which food producers use fertilizers to improve or maintain their soil fertility is crucial to the sustainability of their business. Fertilizers need to be applied in such a way as to achieve profitable yields, adhere to assurance programmes and minimise the impact on the environment whilst protecting the long-term productivity of the soils. The 4R Nutrient Stewardship programme, which was developed by the International Plant Nutrition Institute, The Fertilizer Institute, Fertilizer Canada and the International Fertilizer Industry Association, helps farmers meet these challenges by guiding them to choose the Right Nutrient Source, to apply it at the Right Rate in the Right Place and at the Right Time (Table 1). Simply put, it aims to match nutrient supply with crop demand and minimise losses from the field. These principles are implemented on farm by Kynoch by following a crop specific, growth stage specific and site specific approach in the development of products and making of fertilizer proposals.

Table 1. Components of the 4R Nutrient Stewardship Programme.

Component	Goal
Right source	Provide plant-available forms, and a balanced supply of all essential nutrients. Take advantage of various formulations that offer improved efficiency and reduce environmental consequences.
Right rate	Provide a balanced supply of essential nutrients in a plant-available form.
Right time	Manage nutrient applications to match the interactions of crop uptake, soil supply, environmental risks, and field operation logistics.
Right place	Consider root-soil dynamics and nutrient movement, and manage spatial variability within the field to meet site-specific crop needs and minimize potential losses from the field.

Choose the Right Nutrient Source

The choice of fertilizer is important to ensure that the crop receives a balanced supply of all essential nutrients in forms that crops can absorb and utilise for growth. Knowing which nutrients are in short supply or needed in greater quantities, and understanding the food producer's approach to applying the fertilizer, determines which fertilizers to recommend. The right source can vary with the choice of crop, the soil properties of the field and nutrient interactions or compatibility issues. An understanding of these aspects will highlight the risk of potential losses and identify where they are most likely to occur. Nitrogen is a particularly difficult nutrient to manage. Single applications of nitrogen can be risky, as it can be lost from the field through volatilisation, leaching or denitrification leading to poor utilisation of an expensive input. There are nitrogen fertilizers with stabilisers to curb volatilisation and leaching losses thereby increasing their efficiency and the return the farmer receives on each kilogram applied. Such a product is KynoPlus®, which is treated with Agrotain®, an urease inhibitor that reduces nitrogen losses through volatilization to negligible levels. There is an added cost to using such fertilizers but they significantly add to the farmer's ability to manage the timing of nutrient release, improving the nutrient availability to the crop and reducing losses to the environment.

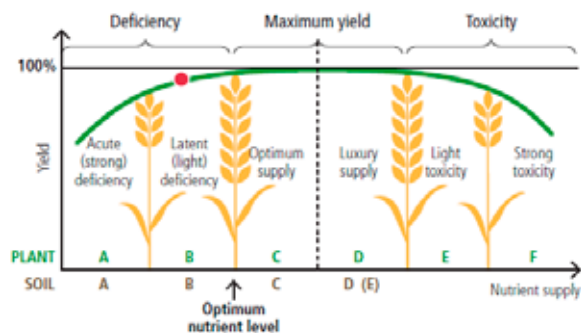
Apply the right rate

Ensuring that the correct rate of fertilizer is applied is essential if the crop is to fulfil its yield potential. To get the best return on fertilizer inputs, one needs to take into consideration the potential yield, the nutrients required to support that yield and the supplying power of the soil. Over application of fertilizers is expensive, inefficient and harmful to the environment and can even reduce yields (see Figure 1). Understanding the dynamics of crop growth and the critical stages that determine the yield potential are key to applying the right rate. Ideally, rates should be adjusted to help balance nutrient supply with crop removal at all times because plants require different rates of different nutrients at different stages of the growing season. When supply matches demand, deficiency stress and economic losses are avoided. On-farm trials give farmers the opportunity to optimise rates for their situation. With the increasing adoption of precision farming technologies, on-farm trials are easily implemented and



their results can guide site-specific, variable-rate fertilizer applications which improve fertilizer efficiency and profitability within an individual field. Kynoch offers a soil and leaf analysis service to determine the right application rate.

Figure 1. Effects of rate on wheat, showing potential deficiency and toxicity effects of not applying the right rate of nutrients. (International Fertilizer Industry Association. Fertilizers and their Efficient Use. Harold F. Reetz, Jr. 2016)



Apply at the right time

As the crop develops, the demand for nutrients changes with some like nitrogen, being required in large amounts early on and others like potassium, at a later stage. An example of timing the fertilizer application to meet the nutrient needs of the crop growth stage is the split-application of nitrogen. This strategy allows farmers to make informed decisions on the total application rate, reduces the potential losses to the environment and allows for the use of precision technologies for making the final application. As an example, maize has a very high nitrogen requirement when the stalk starts to elongate (at approximately the V8 stage). After pollination the effectiveness with which the roots can absorb nitrogen starts to decline so it's important the nitrogen needs of the crop are met by this time. Understanding these dynamics assists in deciding when to apply fertilizers for increased nutrient use efficiency.

It should be kept in mind that crop height, the logistics of applying the fertilizer and weather conditions often force applications to be made at other less-than-ideal times.

Apply in the right place

Soils can be incredibly diverse and identifying the most productive areas of the orchard or field is important when guiding fertilizer applications. Farmers who have invested in Precision Agriculture are making increasing use of nutrient management zones where areas with similar profiles receive the nutrients in the ratios and quantities that reflect the level of soil fertility and the crop potential within that zone. Kynoch offers a precision farming service to enhance the efficiency of plant nutrition which supports a site specific approach.

For field crops there are several options to ensuring that the plant roots can access nutrients at all times. These are:

- Surface broadcast or band applications
- Starter fertilizer applications close to the seed
- Deeper banding (usually 15 – 25 cm below the surface, providing a concentrated nutrient source deeper within the root zone).

Strip-till systems are also becoming popular as only a narrow strip (approximately one third of the surface) is tilled and the nutrients are concentrated in a band below the surface. The benefit of this approach is that the majority of the surface is left untilled and the remaining crop residues help to reduce erosion and conserve soil moisture. When used in conjunction with Real Time Kinematic (RTK) guidance systems, strip-till systems result in a band that tends to expand in size over time, but stays relatively in the same place. The RTK guidance system also enables the farmer to accurately place the seed relative to the fertilizer band improving access to nutrients during the establishment phase.

Summary

Using the 4R Nutrient Stewardship framework to meet the challenges of farming in the 21st century results in sustainable farming that minimises the impact of fertilizers on the environment and guides the efficient use of fertilizers according to each farm's soils, choice of crops, the climate and the management capabilities of the farmer.

All of these culminates in the Kynoch slogan: "Enhanced efficiency through innovation".

Megan Lourens and Dr. Johan van Biljon, Kynoch Fertilizer

A genius for poultry

Bringing the chickens home to roost

On the outskirts of Simon's Town, Einstein Sibanda has established a two-hectare free-range poultry project. Sibanda, who is originally from Zimbabwe, started farming in December 2016 on the lower slopes of Rocklands Farm. He found out about the land—which is home to a Christian campsite and a guest house—through church friends.

One of the two owners of the farm, Paul Rowe, says, "It's an old farm; about 200 years old, which used to supply dairy and vegetables to the Simon's Town community."

"I am excited the farm is able to produce again. Since 1975, it never produced anything, because there was nobody to work on the land. I am happy we found Einstein," he says.

Rowe says Sibanda is not being charged for using the land until his business is established. Rowe's family invested in the infrastructure and is helping with establishing a market for Sibanda.

Sibanda says that there is not yet a formal contract signed between him and the farm owners.

He says, "I am grateful the Rowes believed in my potential. I have had a passion for farming, since secondary school. I did agriculture as one of my practical subjects at Neshaya Secondary School near Hwange National Park. In 2013, I joined an organisation called Living Hope that runs agricultural business courses, where I trained for four years."

Sibanda keeps 1,700 chickens, which he bought for R85 each. He collects about 1,600 eggs daily. He sells a tray of 30 eggs for R66; a live chicken (one which is no longer laying eggs) for R60. He says the cost of running his business works out to about R1.80 per egg. Sibanda says he is making about 25% profit at present.

The chickens are not kept in cages but roam outside. Sibanda says "an eagle" on the mountain is constantly targeting his chickens. He says they also fall prey to mongoose and snakes.

Within the two-hectare fenced site, there is a chicken shed, 20 by eight metres, made from cement blocks with a roof of iron sheeting and clear sheets to let in light. When it's windy or raining the chickens move inside. Wood chips are used for bedding.

Sibanda believes there is a growing market for free range produce. But it is more expensive. The feed costs more.

Sibanda says he works extremely long hours, seven days a week. He employs two people; one to manage the compost and its worms, which the chickens also eat; the other, to clean the grounds, feed the chickens, and collect eggs. He has also started to incubate eggs to raise free range chickens for sale.

His future plan is to train others in poultry farming.

Tariro Washinyira

First published on groundup.org.za





Wheels oiled for Agri Mega Week

The wheels are oiled and rolling for the presentation later this year of Agri Mega Week, highlight on the South African agricultural calendar and flagship of Mega Events' annual projects.

The forthcoming expo will be staged from Wednesday, 13 September 2017, until Saturday, 16 September 2017, at Mega Park, Bredasdorp. Since 2003, when it was presented in the current format for the first time, the event has grown into one of the major agri expos in Southern Africa and a leading agri business platform for Africa.

With its programme for this year's event Mega Events will stick to its winning formula, as was developed and refined through the years. The focus remains on the producers, suppliers and consumers of agricultural products, supplemented by a strong expo-focus on tourism and the outdoors. This year the expo will serve as a forum for the introduction of new agricultural products, the imparting of useful information about recent developments in the agricultural environment, the discussion of topical issues closely affecting agriculture, the consideration of women's role in agriculture, and the celebration of farm workers' contribution to the industry. The programme also focusses on entertainment for visitors of all ages.

The themes, specifically also aimed at commercial farmers, that will be addressed by experts during the discussion and information sessions include the responsible use and management of scarce resources such as water, and a counter-strategy for farm murders. An interactive programme for farm workers is planned, while the tractor driving competition should be a popular event.

In addition to an Interbreed Beefer Championship, with a focus on younger animals, a variety of small and large stock will be on show at the expo. A boerboel show will be presented under the auspices of the South African Boerboel Breeders' Society. Reptile demonstrations and the Mega PetEx interactive pet show should again be popular drawing cards among families.

Another theme of the expo is the tourism potential, opportunities, destinations and infrastructure of our country and the Overberg. Outdoor life – including products such as off-road vehicles, trailers, gear, clothing and photographic equipment – will also be showcased.

Find us on  &  as **Mega Events** or **Agri Mega Week**



Cracking the profit barrier

Challenge set for macadamia nut industry to maintain profitability for farmers

Commercial farming of macadamia nuts is not cheap. With ongoing plantings and continued increase in supply, the onus is on the industry to ensure that key players collaborate and market responsibly to maintain profitability and sustainability for farmers.

South Africa, reputed for top quality, is the second largest producer of macadamias in the world, after Australia. Domestic plantings continue to expand by 1 500 hectares a year and a bumper crop expected in 2018. Primary growing regions include Mpumalanga, Limpopo, coastal regions of Kwazulu Natal, as well as Zimbabwe and Mozambique where many South African farmers have decided to diversify their land portfolio and set up operations.

It's no secret that macadamia farmers have been on a lucrative wicket for some years now: the popularity of the nut is on the up and currently demand outstrips supply; and therein lies the opportunity for the industry to grow. However, getting into the game requires sizable capital investment, tight cash flow management and waiting approximately seven years before breaking even. For a cash crop farmer, this may seem an eon.

Trees take four to five years to bear their first crop and will set you back around R45 to R50 a tree. And the cost of bare land (as does the cost of macadamia farms) varies extensively from around R45 000 per hectare to R90 000, depending. Other costs to consider are land preparation, soil correction, spraying and infrastructure like boreholes and dams. De-husking and drying bins to store product before transporting to be processed is also needed.

The International Nut Council (INC) at their annual conference hosted in Chennai, India



last month announced an 8.4% increase of in-shell crop up by 14 956 mt from 17 506 mt in 2016 to 193 462 mt for 2017. China is set to become a major producer and claims to have planted 185 000 hectares with 330 000 planned by 2030.

Because of this, the time is now for the industry to act responsibly to ensure that huge macadamia volumes in coming years are absorbed into the market, and current profitable prices maintained. Investment into processing facilities, new market and product development are paramount. Currently accounting for only 1% of tree nut volume there is no doubt plenty of room to grow in the future if the marketing is handled professionally.

South Africa's crop is exposed with more than 50% going to China and a more balanced marketing approach to spread risk is imperative. The 200 000 Euro jointly funded research project undertaken at this year's INC

by a number of macadamia industry bodies is laudable to developing a unique health stand-point for the nut.

Macadamias are 80% consumed as a snack and 20% used as an ingredient. With other nuts, like almonds, it's the opposite—80% are used as an ingredient and 20% consumed as a snack. Symptomatic of an immature industry, flipping this ratio is needed to provide security for the industry into the future, while adhering to increasingly stringent food safety standards.

We have everything to play for: a head start in the game, one of the most suitable climates in the world, and businesses, with invaluable insight, through the value chain that have been in the industry for years: to make sure this remains one of South Africa's leading agri-exports.

Alex Whyte, general manager, Green Farms Nut Company

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Forewarned is forearmed

Effective self-defence requires knowledge and planning

Farmers are the biggest traditional category of firearm owners. Traditionally they have owned firearms for self-defence, hunting and general farm use. Many farmers have found it convenient to accredit with the South African Police Services and then licence firearms for game farming or ranching in support of traditional farming activities and, most importantly, for the purposes of self-defence.

Physical isolation combined with difficult access to traditional farming areas has made farmers the highest risk category for violent crime. Farmers are easy targets. Deteriorating infrastructure, theft of telephone cables and patchy cellular telephone reception in rural areas have made farmer's communication with the outside world difficult and has reduced access to the police and other emergency services. This isolation gives criminals the luxury of time to plan and carry out criminal activities. To some extent, this is being offset by the slow but steady development of the private security industry in rural areas, but the costs of setting up a private security to cover large areas with low infrastructure is very large.

You cannot rely on the South African Police Services, even if they intend to come and help you. The Police have experienced a state of decay due to a lack of political leadership and simply do not have the resources or the will to assist farmers.

The disbanding of the commando system due to reasons which are not relevant here has served to make farmers vulnerable. There is only one way to avoid becoming a victim:

self-protection and through the ownership of a firearm for self-defence.

Unless you are prepared to own and use firearms legally to protect yourself, there is a substantial chance that you will become a victim of violent crime.

In this context, many, if not the majority of farmers have opted to own firearms.

This is what you need to do to protect yourself.

Practical considerations

Always have your firearm on you or near you so that you can access it in an emergency.

All firearm owners should know what their rights and obligations are in terms of the Firearms Control Act and other applicable laws. Remember it is an offence to point a firearm without justification. Our law has developed to the extent where you don't have to physically point the firearm, even brandishing or threatening to draw a firearm could be an offence.

It is against this background that if the following principles are present, you can use your firearm lawfully to protect yourself.

First, there must be an attack on you or someone that you have a legal obligation to protect such as a spouse or a child. The attack must have commenced or must be about to commence and you must reasonably believe in your circumstances that serious injury or death will result unless you respond to that attack, only to stop the attack and no more.

Second, your response must be immediate and proportional to the attack. For example, if you are confronted by a group of people and you believe that they are armed with sharp objects such as knives, machetes or firearms and you believe that your life is in danger,

you can probably use your firearm to protect yourself, particularly if they are on your land without permission.

You cannot take pre-emptive action i.e. injure, kill or threaten someone in case they attack you. You must stop your defence as soon as the attack ceases. The best way to illustrate this is to simply state that you cannot shoot somebody in the back, because quite clearly they would be running away and there can be no attack on you.

Safety first

Along with the use of a firearm you need to bear in mind the basic principles of safety.

The Firearms Control Act does not regulate safety other than through the training that is necessary for the granting of a competency certificate.

Always treat every firearm as loaded and never point at anyone or anything unless you are prepared to kill or destroy it. Only put your finger on the trigger when you are prepared to discharge the firearm, and if you do so, know where your bullet is going to go and ensure it will land safely and not injure other persons or property unless you intended to do so.

You are compelled by law to lock your firearm in an approved safe when it is not under your direct control or on your person.

Gun critics often argue that there is more risk to owning a firearm than benefit. Unfortunately, there is no credible research that supports this and we must never forget that it is not the firearm that it is misused, but a person that misuses a firearm.

I am completely convinced based upon my legal experience that it is better to have a firearm than not to have one. This is

particularly apt in the rural area where there is little chance of the police responding to a 10111 call.

The law requires that you must take reasonable steps to safeguard your firearms by placing them in a safe when not in use. All modern safes have an SABS mark on them. If it does, the chances are that the probabilities are that it comply with the Regulations. You are allowed to rely on that mark. If you have an older safe ask the South African Police Services to come and inspect your safe and confirm that it complies.

You are allowed to let somebody else use your firearm. The first is clearly provided for in the Act where you can use somebody else's firearm under their direction supervision and control. The second way is to get a dual licence for a firearm if you and the other person live in the same house.

Most important is the question whether firearms are an effective deterrent. I say unequivocally yes, but a firearm must be combined with an overall sense of security. This means a familiarity with your firearm and

your environment and a mental state of mind that prepares you to use the firearm. You must be prepared to shoot and kill someone to protect you and your family.

Farm security

Securing your farm requires multiple layers of security.

The first is an early warning system such as an alarm or any other device that will wake you up in the event of an activation by someone coming into your secured area.

Dogs outside and inside a house are an effective deterrent and so are geese, because they are very vocal when disturbed.

You should have dogs inside your house because they cannot be poisoned or become familiar with someone that wants to break into your house. A criminal wanting to get into your house might hear a dog, but not know where it is, and this is a major advantage to you.

Physical security is an absolute must. You should have a safe area in your house such as a room that is inaccessible unless

a person has keys to the doors of security gates leading into that area. You should bar the windows as well. I find that cottage pane out windows made of steel are the best.

Finally, you must always allow criminals to come to you unless you have to leave your safe area to protect someone. Try not to confront criminals outside of your safe area, because you are walking into an environment where they have the advantage. If they come to you, you will have the advantage.

Finally, I am also often asked the question, if a dog attacks me can I shoot it? The simple answer yes if you believe that your life is in danger. The law says that you can shoot an animal if it attacks you, particularly in a public place. Animals are regarded as property so you can also euthanize an animal if it is hurt in car accident and you believe that it is better to put it out of its misery than to try and save it.

Martin Hood

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STING THE PESTS

Using wasps to manage flies

What can be more irritating to man and his animals than ongoing pestering by flies? The nuisance value of flies is, however, only half the story. Flies cause tremendous financial losses through decreased animal production and the spread of disease. Dairy farmers know that milk production easily drops by one to two litres per cow per day as a result of pestering flies. Diseases transmitted by flies include cholera, gastric fever, tuberculosis, polio, salmonella, typhus fever, Newcastle disease, pink-eye and amoebic dysentery.

It is clear that fly control should be a priority not only to farmers, but also for health authorities responsible for the general health of affected communities.

The fly life-cycle

Flies breed in areas with sufficient nutrition for developing fly larvae. In human terms, this would generally be described as filthy areas like dung heaps, uncovered drains, areas with spilled feedstuff, manure dams, drainage areas, decomposing compost heaps, etc.

The female fly lays up to 900 eggs in her productive life of three weeks. These eggs will develop through a few larval phases into fly pupae within seven days under favourable conditions. After two or three days adult flies will start hatching depending on climatic conditions.

The fly life-cycle is therefore as short as 10 days, explaining the explosive potential for increase in fly numbers under favourable conditions.

Fly control

Everyone is familiar with at least some fly control methods such as mechanical methods, fly catching methods and chemical control. Recently biological fly control has also become a reality in South Africa, with the regular release of parasitic wasps to prevent flies from hatching from fly pupae.

Effective long term fly control should consist of an integrated approach, making use of various control measures, such as:

- Reduce fly breeding sites.
- Wise use of chemicals or adult fly catching techniques.
- Introduction of biological fly control agents.

To reduce fly breeding sites, special attention should be given to manure management, reducing feed spillage, reducing spilling from silage pits and prevention of water leaks.

Chemicals should be used wisely to reduce the inevitable build-up of fly resistance to chemicals. Rotate chemical groups and target the hot spots. Apply at adult fly resting places such as under roofs, against feed bunks, fences and vegetation. Do not

use insecticides for adult flies on manure heaps, or other fly breeding sites where parasitic wasps live. Be careful to not contaminate feed or water with insecticides.

Control of adult flies has a major shortcoming in that once you see flies, they already are a nuisance, probably already have caused production losses, and might have already laid eggs, providing for an endless fly nuisance cycle.

Larvicides can be applied to fly breeding sites and provide control of fly emergence to a degree.

If larvicides are used, then use trade names with the active ingredient cyromazine which does not effect beneficial parasitic wasps.

BIOLOGICAL CONTROL AGENTS play an important role in fly control and specific care should be taken not to destroy them by irresponsible use of chemicals. By keeping breeding substrates dry, fly breeding is impeded while parasitic wasp breeding is promoted. Parasitic wasps are now bred in South Africa for release on fly-breeding hot spots on farms. Wasps are ordered from an insectary for regular release on the farm. The wasps are tiny, prey-specific and harmless to anything but fly pupae. Many South African farmers are already enthusiastic participants in the biological fly control programme, which has already been successful in the USA for more than 30 years.

Summary

There can be no doubt that an effective fly-control programme is vital for successful animal production systems. Erratic, short term efforts to control adult flies is likely to fail and waste money. It is recommended that livestock producers develop an integrated fly-control programme for their specific conditions. This will enable producers, the livestock industry and the wider community to reap significant production, animal & human welfare, and environmental benefits. Parasitic wasps for biological fly control are now commercially available in South Africa. It should be included in an integrated approach towards fly control for cost-effective long term control of flies, while minimising insecticide usage.



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A decade of delivery

Hishtil SA celebrates 10 successful years in South Africa



On 14 June 2007 the first Hishtil Nursery in South Africa opened its green house doors to farmers across the country. The first houses were soon filled and expansion was necessary. Hishtil South Africa now produces over 100 million seedlings, not just for the South African market, but all over Africa. We proudly work with established and emerging farmers.

Hishtil SA was the first nursery in South Africa to start grafting vegetable seedlings on a commercial basis. Our specialised root engineering ensures fast establishment in the field. Hishtil SA recently introduced the Early Start plug into the market which is not just new in South Africa but ground breaking technology in the international market.

Seedlings are grown in high tech green houses, custom designed for the harsh South African growing climate. This ensures not just a good quality plant, but a strong

plant that is ready to survive the outside conditions wherever they are planted in the country. All the houses are fully covered and protected by Insect Proof netting to ensure no disease causing vectors can enter the houses. This offers the ultimate peace of mind to the farmers in terms of the quality of seedlings they receive. It is not just disease free, quality that is important. Consistency is one of the most important aspects of growing and supplying seedlings. Having one batch look identical to the next, as well all the plants within the batch being uniform, leads to uniform field development and ultimately ease of harvest and possibly higher yields. This can all be accredited to hands on management, sterile homogeneous medium and the highest quality raw materials.

A need in the market in the Western Cape was identified and in October 2014 the Riebeeck West nursery was opened and operation was started. Offering the same quality, expertise and consistency as the Mooketsi

nursery, word soon spread of the quality available in the market.

Both facilities offer not just un-grafted seedlings, but a wide range of high quality grafted seedlings, done under the strictest of hygiene conditions. Hishtil South Africa is the first nursery in the country to obtain and maintain Global GAP status. This not only speaks to the dedication of the facility but it greatly reduces the workload for audit of farmers also being audited for Global GAP.

Ten years on and Hishtil South Africa is as dedicated to quality and consistency as ever. Seedlings are delivered country wide using our unique logistic method which leaves the seedlings in the trays and minimises handling. All our products are supported by a team of professional, experience field support staff.

For more information visit our website on www.hishtil.co.za

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Mapping the land's decline

Degradation and desertification in South Africa



Land degradation is the decline in the capacity of the land to carry out ecosystem functions and services, which support society and development. Desertification is land degradation in arid, semi-arid and dry sub-humid environments caused by a number of issues such as climate variations, human activities etc. The United Nations first put the issue of desertification on the international agenda at a UN Conference on Desertification in 1977 as a global socio-economic and environmental problem. The Republic of South Africa ratified the United Nations Convention to Combat Desertification (UNCCD) in 1997, with the Department of Environmental Affairs (DEA) as her focal point. Members of the UNCCD are required to report on the state of desertification in their country.

Project funder, objectives and the role the ARC played

In order to address the challenges of land degradation and desertification in South Africa, the DEA commissioned the Agricultural Research Council (ARC) to undertake a research on desertification and land degradation. The research project is titled "Research in Phase 1 of Desertification, Land Degrading, Drought (DLDD) and land cover mapping impact indicator of the United Nations Convention to Combat Desertification (UNCCD) in order to determine the current status of land degradation and the rate of change from 2009 to 2013 as part of the Drylands Research Programme in South Africa". The overall objective of the project was to determine the status of land degradation over five-year period from 2009-2013 in South Africa. To realize the overall objective, the following specific objectives were set: (1) to identify and quantify drought affected

land, degraded land and desertified land, and (2) to assess whether progress is being made to combat land degradation in South Africa. The ARC was responsible for project management and research. In order to achieve the objectives of the study, the ARC researchers assessed the land degradation indicators that include land cover change, soil & vegetation degradation (prosopis & woody vegetation), desertification and drought.

The outcome of research

The Prosopis invader vegetation mapping indicated that there was a small decrease in the total affected area from 1.64 million hectares to 1.5 million hectares in 2014. Although the Northern Cape show a marked decrease in Prosopis cover, North West, Western Cape and Eastern Cape experienced an increase in Prosopis cover. For water and wind erosion, assessments showed that locations of erosion hotspots did not change between 2009

and 2013. However, the intensity of both water and wind erosion increased in those hotspots. Secondly, expansion of invasion by alien invasive plants as shown by bush encroachment in some provinces also led to improvements with regard to water erosion via less runoff because of vegetation cover (i.e. invasion of alien plant species in some areas reduced the severity of erosion because of high organic content on the ground). The 2009-2013 assessment period consisted of dry and wet periods, which affected the changes in net primary productivity (NPP) and potential evapotranspiration (PET). The land cover change assessment indicates that at a national level there has been a total increase in transformed land specifically associated with Urban/Mining, Cultivation and Plantation. Drought over the peripheries of the country (southern to eastern coastal areas and Lowveld in the northeast) during the early part of the period (2009-2010) was replaced by drought conditions over the central parts of the country by 2012 and

2013 whilst the eastern and southern parts received above-normal rainfall at that stage.

The negative impacts to the agricultural sector primarily arises as a result of deficient water in the soil profile, affecting crops and grazing negatively. The drought assessment by Standard Precipitation Index (SPI) shows gradual shift in dry areas observed on 36-month time scale SPI up to June 2010 and up to June 2014.

Water and wind erosion assessments

- Locations of erosion hotspots did not change between 2009 and 2013. However, the intensity of both water and wind erosion increased in those hotspots.
- Expansion of invasion by alien invasive plants as shown by bush encroachment also led to improvements with regard to water erosion via less runoff because of vegetation cover.
- Wind erosion became prominent particularly in the Northern Cape, North West and greater parts of the Eastern Cape.

Soil acidity assessments

- Acidic soils were prevalent in the KwaZulu-Natal, Eastern Cape, Western Cape, Mpumalanga, Limpopo, Free State, Gauteng and North West provinces.

Prosopis and woody vegetation assessment

- Prosopis invader vegetation mapping indicated that there is a small decrease in the total affected area from 1.64 million hectares in 2007 to 1.5 million ha in 2014.
- Woody cover density showed an increase in area having sparse woody vegetation from 2009 to 2013.

Net primary productivity and aridity

- The 2009-2013 assessment period consisted of dry and wet periods, which affected the changes in net primary productivity (NPP) and potential evapotranspiration (PET).
- It is evident that the Free State has lost its dry sub-humid areas in the east and there was a small amount of desertification in



Promoting Healthy, Safe and Sustainable Workplaces



The National Institute for Occupational Health (NIOH) is a division of the National Health Laboratory Service (NHLS). It provides Occupational and Environmental Health and Safety (OEHS) services across the public and private sectors of the economy including the informal economy. This is primarily to improve and promote workers' health and safety but very importantly to be a consistent catalyst for a mind-set change towards greater prevention in OEHS. The institute achieves this through:

KNOWLEDGE GENERATION AND INNOVATION

As a centre of excellence and a referral institute, NIOH engages in activities that generate and improve local, regional and international knowledge through research in the fields of OEHS. The research is in line with the priorities of the Republic of South Africa and the African region. NIOH collaborates with local and international institutions of higher learning to redress the legacy OEHS issues in South Africa and the African region in particular.

TEACHING AND TRAINING

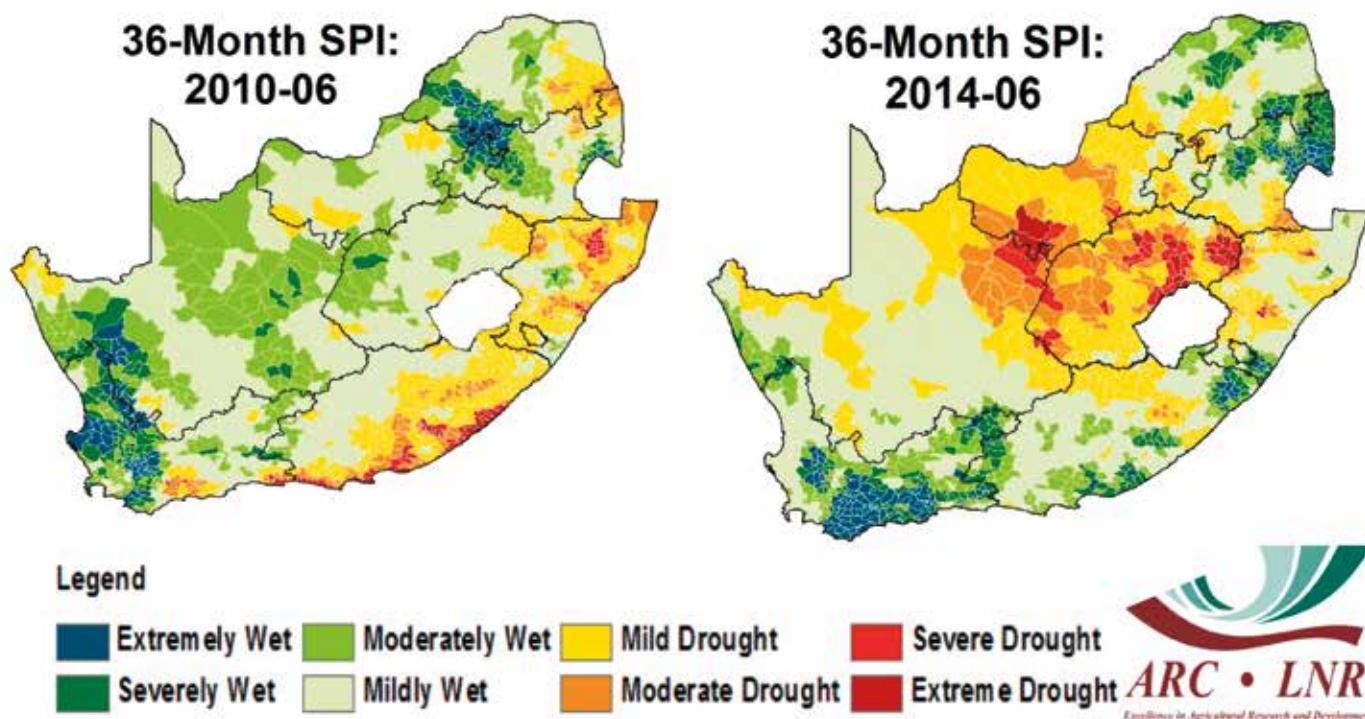
Teaching and training in many OEHS disciplines for professionals, practitioners and others are part of the key deliverables of the NIOH.

SERVICE DELIVERY

The NIOH provides OEHS services to its target population. These include advisory services on OEHS policy development, medical surveillance, HIV and TB workplace programmes, biological monitoring, prevention and hazard control, research protocol development and other areas. The advisory services are particularly useful for small and medium enterprises, but are available to large enterprises and government agencies as well. The NIOH conducts autopsies for deceased current and former mineworkers in terms of the Occupational Disease in Mines and Works Act (ODMWA), which provides compensation for occupational lung diseases. The NIOH houses the national occupational health library and provides information on request.

For more information email us at: info@nioh.nhls.ac.za or call: Tel: 011 7126400.

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North West where arid land has replaced semi-arid land.

Land cover assessments

- The land cover change assessment indicates that at a national level there has been a total increase of 3.27% in transformed land specifically associated with urban/mining, cultivation and plantation.
- Drought over the peripheries of the country (southern to eastern coastal areas and Lowveld in the northeast) during the early part of the period (2009-2010) was replaced by drought conditions over the central parts of the country by 2012 and 2013 whilst the eastern and southern parts received above-normal rainfall at that stage.

Land degradation index

- The 2009 land degradation index map shows that most parts of the country experienced low to moderate degradation, whereas large parts of the Northern

Cape, Western Cape, Eastern Cape and North West provinces experienced high degradation levels.

- Some parts of the Northern Cape experienced very high degradation of which the drivers are wind erosion and soil pH.
- The 2013 land degradation index results indicated that the Northern Cape experienced large pockets of very high degradation in the north, west and south. The northwest portion of KwaZulu-Natal also experienced high degradation impact. This is attributed to high wind erosion, salinity and soil pH level.

Figure 1. Figure 1: Standardized Precipitation Index (SPI) classes at 36-month time scale up to June 2010 and up to June 2014.

The importance of this research

Desertification, Land Degradation and Drought (DLDD) is a complex process, which encompasses both environmental and social issues. Land use and land cover are dynamic, and thus, an important component in understanding the interactions

of humans with the environment. The most direct human contribution to land degradation is land use practice. Therefore, land cover/use change mapping and assessment is central for monitoring all these dynamic processes and requires a coordinated and coherent approach at national and international levels. The outcome of this research will inform decision makers about the extent of and the impact of drought, degraded land, areas affected by invader and woody species and changes in the aridity index. Information about land cover is important for planning purposes and will intensify the government's effort to combat land degradation, desertification as well as developing strategies for adapting to reoccurrences of drought.

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A new deal for Africa

Fertilizer industry welcomes a new partnership

Sackett-Waconia, USA and Bagtech International, South Africa have reached a partnership agreement to offer a wide range of products and services for the fertilizer industry on the African continent.

Sackett was founded as "The A.J. Sackett & Sons Company" in 1897 on the east coast of the United States. During this formative time in the fertilizer industry, Sackett led in the creation of new and more efficient technology, amassing over 100 patents for both new technology and processes, and making improvements to existing ones. By the 2000s, Sackett's reach had expanded globally to 60 countries, with products and equipment in every aspect of the industry, from granulation and compaction to blending and loadout. In late 2016, the company began to merge with Waconia Manufacturing Inc, in Waconia, MN. The companies had been under the same ownership since 1994 and now have a combined five manufacturing floors, with four in the United States and one in Araxá, Brasil. The combined companies of Sackett-Waconia and Sackett Do Brasil offer expertise in engineering and design for all aspects of the Industry.

Bagtech is proud to be an African company which started its activities in the 1980s, when the coffee market was booming. Initially,

the company offered services for only the coffee market, but after some years began to develop its own equipment for the fertilizer industry. Bagtech has been developing a partnership with Festo for more than 15 years. Together, they have developed equipment and controls that offer advanced technology which can be controlled by online system from anywhere via laptop or cell phone. Also, Bagtech has equipment across Africa and offers services for more than 30% of the continent's main ports.

The company has delivered more than 90 fertilizer projects for Africa to date, and has built a reputation for quality and support. Based in Durban, South Africa, Bagtech is positioned well to serve Africa for many years to come.

The new partnership between Sackett-Waconia and Bagtech International brings to bear a mutual philosophy in which reliable, easy-to-use equipment and trust-based customer partnerships are key to success. Though Sackett-Waconia has had a presence on the African continent for many years, partnering with Bagtech "will allow for a better understanding of the emerging needs of African agronomy and will give us the chance to help advance agriculture there," according to Jeff Coon, sales and marketing representative for Sackett Waconia.

"We're already dedicated to making the best equipment we can to support good nutrient use efficiency, and having Bagtech's support will only broaden our ability to support African agriculture."

Bagtech International has a history of not only supplying reliable and efficient systems, but also partnering with and deeply supporting their customers. Both they and Sackett-Waconia share this philosophy. For both companies, it's a way of thinking and the only way to do business. They see customers not as opportunities, but as teammates. The two companies both believe in thoroughly assessing customers' needs and designing a system that will meet them and be flexible enough to adapt to changes over its life-cycle. According to Fred Coelho, CEO of Bagtech, "We are a partner for our customers, not only a supplier. Our goal is to bring them solutions every day."

Larry Taylor, CEO of Sackett-Waconia and Fred Coelho, CEO of Bagtech, both say they are excited by this relationship and are confident it is a very positive development for the supply of high quality, reliable fertilizer equipment systems and support to build agribusiness throughout Africa. This is particularly relevant as the African fertilizer industry continues its role in balanced, sustainable nutrient use to increase food production.

SW+B

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Reaching out to Africa's farmers

Solutions for Zambia's unique market



KSB Zambia staff manning the stand Agritech Expo Zambia 2017 are (front) Fanus Terblans, Basil Hillier, Alf Jacobsen, David Jones and Sven Baumgarten. Back: Andreas Gremels, Clinton Knott and Moses Shebele

The **Zambian agricultural industry was left in no doubt of KSB's commitment following the successful Agritech Expo Zambia 2017, in which KSB featured prominently with an array of innovative solutions presented by a high-level technical team from throughout southern Africa.**

The prominent KSB stand also attracted the attention of Zambian President, Edgar Lungu, who visited the stand and confided his desire to take up farming after his retirement. He

also assured KSB Zambia managing director, Alf Jacobsen, that when he did take up farming that he had earmarked KSB as a preferred supplier.

In addition to the President, the stand proved to be a major drawcard for commercial and smaller scale farmers from across the region who specially visited the stand to discuss their own unique requirements. Existing and interested dealers were also keen to discuss the market's requirements and expressed their eagerness to work hand-in-hand with KSB Zambia.

Mission accomplished

According to Alf, this was the first show of its type that KSB Zambia exhibited at and it met all the company's objectives. "Our internal team of Fanus Terblans, Basil Hillier and Moses Shebele were able to share ideas with farmers and were delighted to see that many of the irrigation companies displayed KSB solutions as well.

Locals were equally impressed by the high-level delegation manning the stand, which included KSB Pumps and Valves managing director, Sven Baumgarten, regional sales

manager, Dave Jones, southern Africa sales manager, Andreas Gremels and country manager for Zambia and Botswana, Clinton Knott. This clearly displayed the level of support that they can expect in future.

"There was a lot of excitement and it was heartening that the community came to us and expressed their happiness that KSB has a permanent presence. We also had the opportunity to meet with other types of farmers for solutions to deal with things like pig manure, feathers and a host of other challenging requirements that we are eager to get involved with."

Growing stronger

The show also gave the visiting KSB delegates the chance to reaffirm relationships with dealers and customers and allowed Sven to experience a show in the heart of Africa including some more rural areas.

"We even got lost on the way back to the airport and as a result Sven got to drive on some lesser used roads that are not usually travelled by tourists and visitors.



Zambian President, Edgar Lungu, meet KSB Zambia's Alf Jacobsen on the KSB stand

We also got to stay in some pretty rural accommodation with some of the team staying in small wooden chalets while others made themselves at home in tents," says Dave.

He concludes that the show revealed that there is a lot of potential in the market with great potential for growth. In

addition, it raised the challenge for us to tailor more solutions for Zambia's unique market including solar powered pump solutions and other customized solutions.

"We are happy to rise to the challenge and establish ourselves as the defacto pump and valve solution providers in Zambia."



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Save your stock

Treating bloat in cattle

The basic definition of bloat is an accumulation of gas in the rumen which exceeds the animals' ability to expel the gas. Gas production in the rumen is a natural consequence of digestion via rumen microorganisms. Under normal circumstances, in excess of 50 L of gas is produced every hour in an average sized bovine and eructated throughout the day via a complex mechanism in the rumen. The gas produced in the rumen separates from the liquid and solid contents and accumulates at the top of the rumen. (Fig 1.) The cardia (oesophageal opening into the rumen) and dorsal sac of the rumen both have receptors to detect free gas; these receptors are stimulated when they are surrounded by gas. A complex process of rumen contractions occurs to move any fluid or rumen fill away from the cardia, which subsequently opens and releases the gas. This protective mechanism prevents fluid being aspirated into the lungs. The process of eructation usually occurs about once every minute and up to 3-4 times per minute at its peak, 2-4 hours after feeding.¹

A few different types of bloat include: Pasture or Frothy Bloat occurs when large amounts of fresh bloat-causing leguminous pastures are freely available to animals.²

The release of the cellular contents of these plants results in the formation of a thick froth/foam, where the gas gets trapped. The result is the gas being in the form of bubbles in the froth instead of free gas, which is subsequently unable to stimulate the receptors in the rumen and activate the eructation

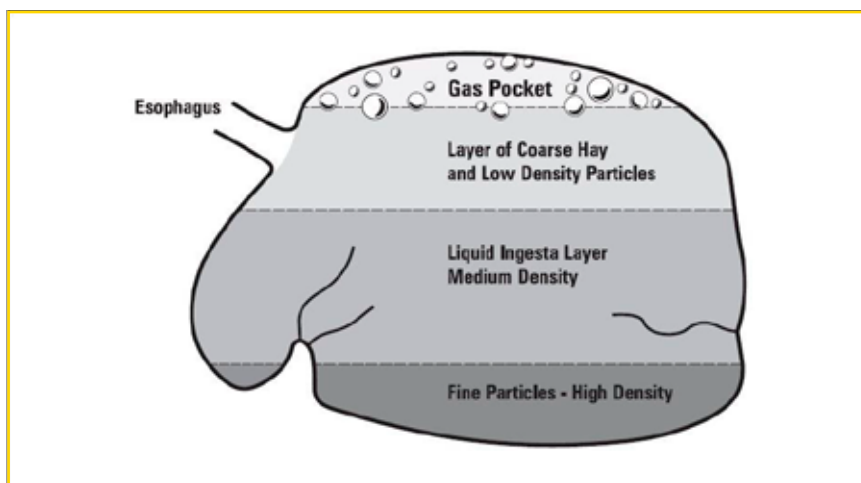


Figure 1: Gas pocket above the various layers of rumen contents¹

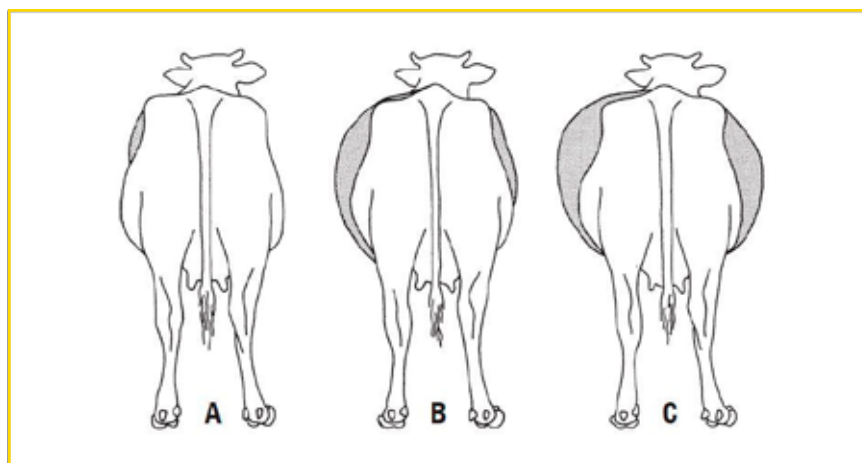


Figure 2: Three degrees of bloat: A - mild, B - moderate, C - severe¹

mechanism, resulting in bloat.² Legumes are divided into bloat-causing, and bloat-safe plants. Some of the major bloat causing legumes are lucerne, red clover, white clover, sweet clover, ladino clover and alsike clover.² Sainfoins and lepedeza (bush clovers) are two of many bloat-safe legumes available.

The reasons for there being safe and bloat-causing legumes is the difference in their cell wall thickness, and levels of tannins in the forage. Safe legumes have a thicker cell wall and thus do not get broken down that readily by mechanical chewing and thus their contents, such as chloroplasts, are less readily

available for bacteria.² It is hypothesised that the heightened concentration of small particles of chloroplasts in the rumen, providing for bacterial blooms producing large amounts gas and slime, is the main cause of legume associated bloat.¹ With regards to tannins, safe legumes contain a higher level tannins, these tannins bind to the soluble proteins responsible for foam production and have also been shown to reduce microbial digestive activity.² Growth stage of the plants also plays an extremely important role in the occurrence of bloat, with the early, pre-bud growth stage having a much higher risk than the more mature stage. Other factors such as weather conditions, moisture, and animal susceptibility also play a role.¹

Feedlot Bloat, as the name indicates, occurs in feedlots (usually in the finishing period) where animals are on a high grain/low roughage diet.¹ The most important factor in these cases seems to be the particle size of the grains, with coarse rolled grains having a much lower incidence. Finer grinding exposes more of the surface area to the rumen bacteria, accelerating digestion and creating a rumen environment that results in excessive rupture of bacterial cells.¹ The release of polysaccharides increase the viscosity of the rumen, leading to frothy contents and bloat.¹

Free Gas Bloat occurs more sporadically than frothy bloat and affects individual animals more than large numbers in a herd. This type of bloat usually occurs quite rapidly due to; irregular feed intake, inhibition of nerves controlling rumen wall contractions (vagal

nerve damage) and physical obstruction of the oesophagus.¹

Clinical signs

The first clinical sign is a swelling in the left flank of the animal with a typical pear shaped appearance, if you observe the animal from behind. This is followed by distension of both sides of the rumen with discomfort. (See Fig 2.) As the condition progresses they will start extending their head and neck, and have difficulty breathing due to the pressure exerted by the gas-filled rumen on the diaphragm. In severe cases, if pressure is not released, animals can die within minutes.¹

Prevention1

Prevention is the easiest way to control frothy bloat, with various methods available. Some of these include; monitoring the stage of growth of the legumes, sowing a mixed pasture with a 50 to 50 ratio of grass and legumes, feeding course hay before being given access to pasture and using bloat-safe legumes. Uniform and regular intake is also key to managing animals on legume pastures. In feedlot bloat, feeding more coarsely rolled grain has been shown to help. Ionophores such as lasalocid sodium have also been seen to be effective in controlling feedlot bloat (grain bloat)¹. Ionophores alter the permeability of microbial membranes as well as change the microbial population. This results in a change in the volatile fatty acid profile in the rumen (more propionic acid) thereby reducing methane and CO² gas production.²

Treatment1

Treatment may still be necessary in certain cases and the handling of these is dependent on the case's severity. Mild early cases can be treated with a non-invasive procedure, like placing a stomach tube and dosing with an anti-foaming agent like Bloat Guard® Drench. (Reg. no.: 1026 (Act 36/1947). However, in more severe cases, a veterinarian is required for the more complex procedures. A trochar and canula can be inserted into the rumen on the left flank at the paralumbar fossa to release gas from the rumen. In cases where the amount of froth is too great and the canula becomes blocked, a rumenotomy can be performed to remove some of the material. Anti-foaming agents can then be dosed straight into the rumen through this opening. In terms of free gas bloat due to a blockage, removing the obstruction quickly is essential in saving the animal.

Dr. B van Houten, Zoetis South Africa, Technical Manager: Ruminants

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Figure 1: Gas pocket above the various layers of rumen contents¹

Figure 2: Three degrees of bloat: A - mild, B - moderate, C - severe¹

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Underpinning the value chain

How Western Cape agriculture impacts SA GDP

The Western Cape (WC) is a province that houses an important part of the agri-economy in South Africa. It has seen the worst of the drought on record, dam levels remain low and the province has gone as far as implementing restrictions on water usage throughout the region.

Here are four reasons why the Western Cape Agricultural sector is important to the South African economy.

The WC is probably SA's most important export province in terms of agricultural products. The deciduous fruit industry, wine industry and increasingly the citrus industry are also setting base in the WC. These are all key export produce that contribute significantly to the overall agri-economy in South Africa. Should any of these industries suffer, it would be detrimental to the agricultural industry as a whole in South Africa and by extension, the local economy.

The WC contributes 24% to total GDP in South Africa. Agriculture has a total

contribution to the GDP of the WC of roughly 4%. But what is significant to note is that agriculture and agro-processing is responsible for 18% of employment opportunities in the province.

The drought will have the biggest impact on seasonal employment in the fruit industry. Due to possible lower production, less seasonal workers might be employed, with the obvious socio-economic consequences related to a decreased number of those employed. For Q1 there were 215 000 employees in the agric sector in the WC. That is 14.2% less than in Q4 of 2016. A large percentage of these are due to seasonality. It is however 5.9% less than the same period in 2016 (228 000) – clearly a consequence of the drought. The WC has the biggest agricultural workforce in South Africa at 24.5%.

The WC is a central agricultural exports province and the drought, if not broken soon, will definitely impact negatively on the long term economic growth for both the province and the country's economy.

The WC has recently had some rains; however, the drought has not been broken. A major contributing factor of the drought has had a negative impact on the wheat industry, seriously hampering supply, with the knock-on effect on wheat prices and possibly the bread price. Although SA is a net importer of wheat, this might mean that we will have to import even more wheat than we normally do. Some of the losses in wheat production might be offset by increasing production in the Free State and Northern Cape.

We must keep in mind that although agriculture only makes up around 4% of the sector when compared to other industries, the majority of agricultural production, in excess of 70%, gets used by the manufacturing industry and the Western Cape is an key contributor to this.

Should agriculture suffer; the whole value-chain will suffer.

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

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