

Issue May/June 2017

Harvest SA

**Securing South
Africa's Food
Resources**



Game changer

Land Bank's TP Nchocho weighs in

Herd performance

It's in the genes

Pure goodness

Potatoes can save us

SA's garden innovation has potential to ensure food security while saving water

Improving water sustainability and boosting food security have become critical in the current drought environment facing South Africa and its neighbours. Harnessing these crucial factors in new agricultural methodologies has become important and has proved to be a winning formula for a young South African innovator.



Claire Reid, founder of Reel Gardening (Pty) Ltd, a local start-up business specialising in hand-made vegetable seeds, herbs and planting products earned a top international award developing a simple gardening technique that improves water sustainability, while also boosting food security.

Miss Reid's company received the Global Agripreneurs Award recently in the Future Agro Challenge, beating a total of 50 entrepreneurs from over 30 countries. Reel Gardening was chosen among eight finalists from Colombia, Chad, Peru, Germany, India, Uganda and the Netherlands, and this innovation stands to empower communities to grow their organic vegetables.

The competition was the highlight of the Global Entrepreneurship Congress (GEC), an inter-disciplinary gathering of startup champions from more than 150 countries. Delegates represent distinct components of their entrepreneurial ecosystems and are focused on how best to help entrepreneurs start and scale new companies.



Supported by the Department of Science and Technology, Reel Gardening aims to create sustainable subsistence gardens in the country. It provides consumers with pre-fertilised strips, taking the fuss out of gardening, as the biodegradable paper already anchors the seeds at the correct depth and distance apart. The kit also offers planting instructions in seven languages.

Miss Reid said the benefits of planting the 'reel way' could save up to 80% in water consumption and the product contained top quality natural seed and fertiliser.

Reel Gardening has used this pilot project to supply no-fee-paying schools, homes, community centres and churches to plant and to use yields for feeding schemes and feeding community members who require assistance.

Miss Reid started the project in 2002 when she was only 16, making seed strips with newspaper and encased seeds using a paste made from flour and liquid fertiliser.

This craft-type project was entered into the Eskom Expo for Young Scientists in 2002 to gain her some extra marks in science in Grade 10.

She has also developed a mobile application to support communities throughout their planting journey. The app records exactly which seeds have to be planted and reminds users when to water.

"You will learn everything you need to know about vegetable gardening by watching a series of short animated videos over a four-month growing cycle", she said.

The DST hosted the Agripreneurs Award in partnership with USAID, Sweden through the Swedish International Development Agency and the Ministry of Foreign Affairs of the Kingdom of Netherlands who are partners in the Securing Water for Food (SWFF) grand challenge for development. It is a partnership that seeks to identify and accelerate science and technology innovations and market-driven approaches that improve

water sustainability to boost food security and, ultimately, alleviate poverty.

The goal of the agriculture challenge is to enable the production of more food with less water and/or make more water available for food production, processing, and distribution.

Speaking at the awards ceremony, DST's Deputy Director-General: Socio-economic Innovation Partnerships, Imraan Patel, congratulated the winner, saying that it would encourage more young innovators to develop tools that could assist the country to be competitive in the agricultural field.

By David Mandaha



**science
& technology**

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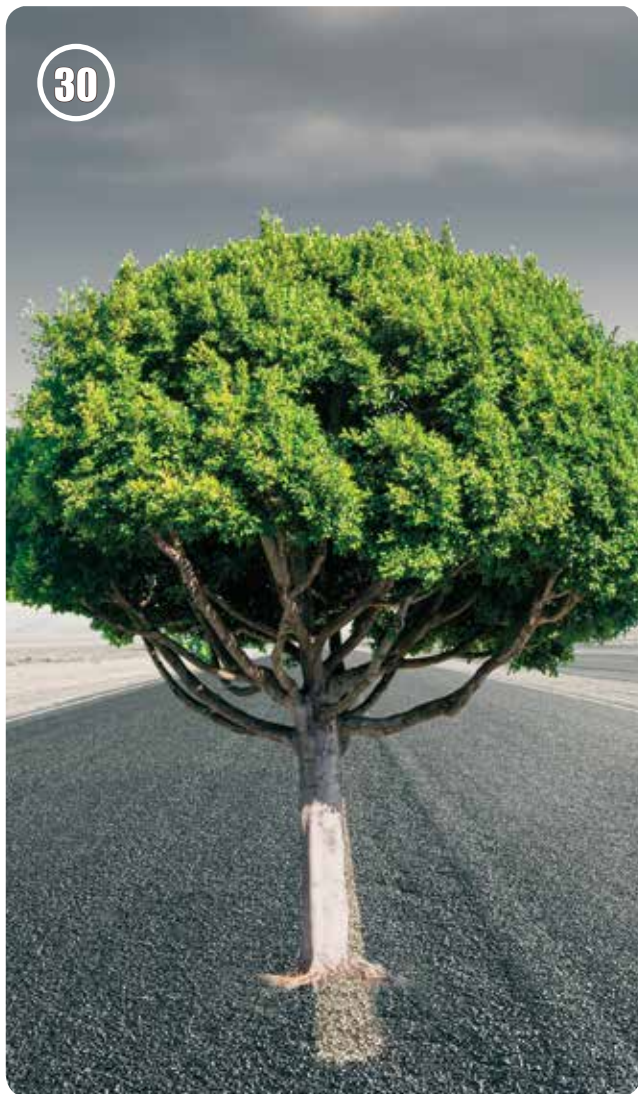
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FOREWORD



During 2014/15 and 2015/16 South Africa had experienced two consecutive seasons of drought. In times such as these a good risk management tool can be of great benefit to farmers who have a vested interest in protecting themselves against adverse price movements in the South African grain market.

South Africa is prone to drought and related extreme weather events and these have severe effects on grain farmers. These events lead to poor grain yields and hence low production, which in turn leads to high commodity prices because of lack of supply. Ironically, the grain farmer would still be worse off amid high commodity prices, since poor yields means the farmer has little or nothing to sell.

The JSE Commodity Derivatives may be the answer to helping the farmer manage fluctuating commodity prices in a time of uncertainty. Commodity derivatives have been trading on the JSE since 1996. Futures and options (collectively known as derivatives) contracts allow market participants such as commercial producers, consumers and millers to “lock” in prices of their white maize, yellow maize, wheat, soya beans and sorghum ahead of time, thereby protecting themselves from the risk of price fluctuations caused by unfavourable weather conditions.

The JSE provides a safe and transparent platform for this price discovery and price risk management where all trades are guaranteed through our derivatives clearing structure. While derivative contracts can be a daunting new risk model, those who make use of them do benefit from the protection of price fluctuations, allowing them

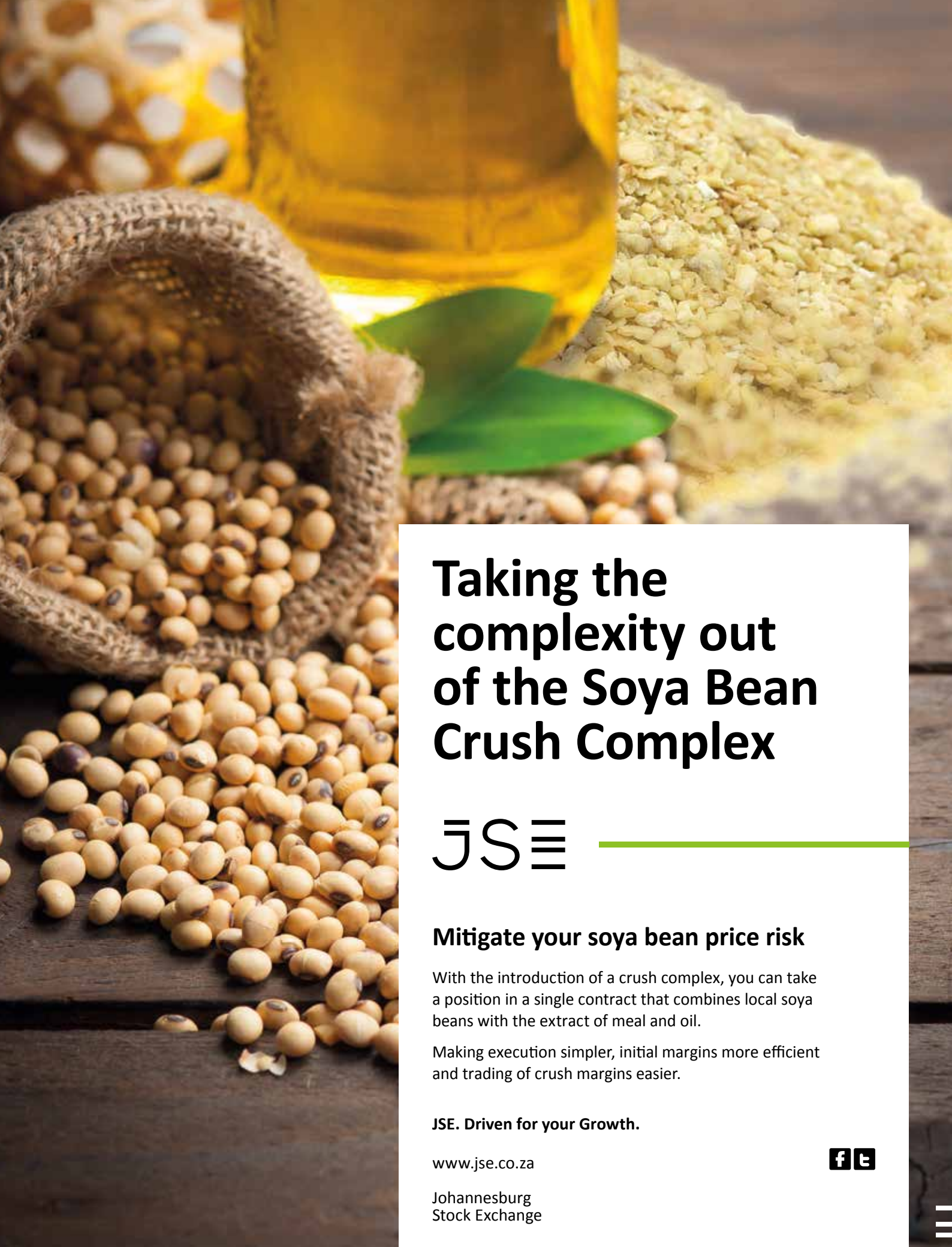
to plan ahead with a sound mind that the price locked in is the price he will get at the end of the season.

Wholesalers making use of derivative contracts are also able to advertise pricing ahead of time, enabling them to stay ahead of competitors and build brand loyalty with customers.

Now that 2016/17 is a bumper crop year thanks to good rains, we see commodity prices in the grain sector dropping significantly from the all-time highs in excess of R5000/ton we saw last season. The beginning of 2017 has seen slower trading activity on the JSE compared to last year due to tight physical stock available in the market. However, we are seeing trading activity picking up since April and now are heading towards the new marketing season with a bountiful harvest estimated at 14.3 million tons for white and yellow maize alone.

Perhaps the South African farmer should take a leaf from those farmers who have protected themselves during the past two seasons by continuing to use price risk management tools such as futures and options when marketing their grain.

*Dr Raphael N. Karuaihe
Manager – Commodity Derivatives
JSE Capital Markets*



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EDS NOTE



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Commercialisation is the word of the moment, with the announcement in April that the Land Bank has set a target of making available "at least" R1-billion in funding over the next year in order to support black agricultural entrepreneurs, with particular emphasis on transforming its R39-billion loan book, the vast majority of which is still accounted for by loans to established commercial farmers.

The announcement comes at a good time. Nobody can deny that land reform has dragged on interminably, with stakeholders seemingly never able to come to agreement between practical commercial considerations and ideological imperatives. Now the Land Bank has a plan that, if it succeeds, won't throw the baby out with the bathwater. That's because it recognises that land redistribution has to be coupled with the necessary ability to farm the land commercially. As

Deputy President Cyril Ramaphosa commented at the time, "Inclusive growth requires that we redistribute agricultural land on a far larger scale and at a far quicker pace; and that we properly equip the new owners of that land to farm it productively and sustainably."

One of the most interesting developments is the reported design of "corporate farming investment structures" for black entrepreneurs to acquire and manage portfolios of agricultural assets. The details are not clear yet, but reportedly the Land Bank has in mind a means to commercialise unused land currently held by the State, mines and farmers, in a manner that may resemble the competitive bidding process for independent power producers.

Given that the Renewable Energy Independent Power Producer Procurement (REIPPP) programme stands out as a South African success story, it is to be hoped that the Land Bank can emulate its success in the agricultural domain.

CONTRIBUTORS



Megan Lourens is Research and Development Manager with Kynoch fertilizers and has a special interest in using biology to enhance the efficiency of fertilizers.



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Author: Yoliswa Nkomo
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Financing entrepreneurs

and Bank weighs in on agricultural sector transformation at NAMPO 2017

Land Bank is working to unlock the massive potential in the country's agricultural sector to ensure greater and more meaningful participation by black farmers, industrialists and intermediaries.

This is the Bank's key commitment going into the NAMPO Harvest Day 2017, South Africa's premiere agricultural showpiece.

The Bank has ramped up financing for empowerment and transformative activities in the sector over the last five years to support emerging black farmers, industrialists and financial intermediaries who on-lend to black farmers. However, it acknowledges that more must be done in order to drive shared and inclusive growth in the sector.

For Land Bank CEO, TP Nchocho, NAMPO represents a timely opportunity for all stakeholders in the agricultural sector to confront these challenges head on and commit to working together to achieve transformation and inclusivity.

"Our mandate is to make sustainable financing available to all those who are keen to participate in the agricultural sector. With every transaction, programme or initiative undertaken at Land Bank, we are concerned with driving real development impact. This involves making the agricultural sector do more – working to ensure that more land is productive and getting more people farming at scale on a sustainable basis," says Nchocho.

To this end, the Bank recently announced that it would be providing R1-billion in financing for black entrepreneurs to invest in high value agricultural economic assets

With every transaction, programme or initiative undertaken at Land Bank, we are concerned with driving real development impact

during the current financial year. This is in addition to undertaking R500-million worth of investments in high-value agribusinesses to support black industrialists in the sector.

It will also be providing emerging farmers with the financial and technical support that allows these farmers to expand their activities to a commercial scale.

Nchocho added that funding alone is not the sole catalyst for growth: "The transfer of skills from large commercial farmers to emerging farmers, including vulnerable groups such as women and youth is vitally important, so collaboration is essential."

During NAMPO 2017, Land Bank is set to further demonstrate its commitment to the transformation of the sector through its various programmes to benefit black emerging farmers, financial intermediaries and industrialists.

Land Bank's action-packed programme at NAMPO 2017 includes a deep dive discussion of its financial modelling initiatives together with some of the beneficiaries of these programmes as well as participation in the 'Nation in Conversation' series panel discussion to mark the launch of a programme called the 'In-Transformation Initiative'. The Bank's insurance division, Land Bank Insurance Company, will also be launching an innovative agricultural asset insurance product to cater for emerging farmers—a first for the sector.

All NAMPO attendees are welcome to visit Land Bank's Stand at the Microbial Solutions Hall (19–22) for more information on the work the Bank is doing as well as on how to access the agricultural finance they may need.



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We believe that collaboration is essential in unlocking South Africa's agricultural sector potential.

That is why we are working with farmers, industrialists, financial intermediaries and a wide range of other stakeholders to drive economic transformation and social inclusivity in the sector.

Every edition of NAMPO is, for us, an opportunity to reflect on the challenges facing the agricultural sector head on and recommit to working together to achieve real development impact in the agricultural sector!







Shattering the myths

Healthy soil is the real key to feeding the world

One of the biggest modern myths about agriculture is that organic farming is inherently sustainable. It can be, but it isn't necessarily. After all, soil erosion from chemical-free tilled fields undermined the Roman Empire and other ancient societies around the world. Other agricultural myths hinder recognizing the potential to restore degraded soils to feed the world using fewer agrochemicals.

When I embarked on a six-month trip to visit farms around the world to research my forthcoming book, "Growing a Revolution: Bringing Our Soil Back to Life," the innovative farmers I met showed me that regenerative farming practices can restore the world's agricultural soils. In both the developed and developing worlds, these farmers rapidly rebuilt the fertility of their degraded soil, which then allowed them to maintain high yields using far less fertilizer and fewer pesticides.

Their experiences, and the results that I saw on their farms in North and South Dakota, Ohio, Pennsylvania, Ghana and Costa Rica, offer compelling evidence that the key to sustaining highly productive agriculture lies in rebuilding healthy, fertile soil. This journey also led me to question three pillars of conventional wisdom about today's industrialized agrochemical agriculture: that it feeds the world, is a more efficient way to produce food and will be necessary to feed the future.

Myth 1: Large-scale agriculture feeds the world today

According to a recent U.N. Food and Agriculture Organization (FAO) report, family farms produce over three-quarters of the world's food. The FAO also estimates that almost three-quarters of all farms worldwide are smaller than one hectare – the size of a typical city block.

Most of the world's farmers work the land to feed themselves and their families. So while conventional industrialized agriculture feeds the developed world, most of the world's farmers work small family farms. A 2016 Environmental Working Group report found that almost 90% of U.S. agricultural exports went to developed countries with few hungry people.

Of course the world needs commercial agriculture, unless we all want to live on and work our own farms. But are large industrial farms really the best, let alone the only, way forward? This question leads us to a second myth.

Myth 2: Large farms are more efficient

Many high-volume industrial processes exhibit efficiencies at large scale that decrease inputs per unit of production. The more widgets you make, the more efficiently you can make each one. But agriculture is different. A 1989 National Research Council study concluded that "well-managed alternative farming systems nearly always use less synthetic chemical pesticides, fertilizers, and antibiotics per unit of production than conventional farms."

And while mechanization can provide cost and labor efficiencies on large farms, bigger farms do not necessarily produce more food. According to a 1992 agricultural census report, small, diversified farms produce more than twice as much food per acre than large farms do.



Even the World Bank endorses small farms as the way to increase agricultural output in developing nations where food security remains a pressing issue. While large farms excel at producing a lot of a particular crop—like corn or wheat—small diversified farms produce more food and more kinds of food per hectare overall.

Myth 3: Conventional farming is necessary to feed the world

We've all heard proponents of conventional agriculture claim that organic farming is a recipe for global starvation because it produces lower yields. The most extensive yield comparison to date, a 2015 meta-analysis of 115 studies, found that organic production averaged almost 20 percent less than conventionally grown crops, a finding similar to those of prior studies.

But the study went a step further, comparing crop yields on conventional farms to those on organic farms where cover crops were planted and crops were rotated to build soil health. These techniques shrank the yield gap to below 10 percent.

The authors concluded that the actual gap may be much smaller, as they found "evidence of bias in the meta-dataset toward studies reporting higher conventional yields." In other words, the basis for claims that organic agriculture can't feed the world depend as much on specific farming methods as on the type of farm.

Consider too that about a quarter of all food produced worldwide is never eaten. Each year the United States alone throws out 133 billion pounds of food, more than enough to feed the nearly 50 million

Americans who regularly face hunger. So even taken at face value, the oft-cited yield gap between conventional and organic farming is smaller than the amount of food we routinely throw away.

Building healthy soil

Conventional farming practices that degrade soil health undermine humanity's ability to continue feeding everyone over the long run. Regenerative practices like those used on the farms and ranches I visited show that we can readily improve soil fertility on both large farms in the U.S. and on small subsistence farms in the tropics.

I no longer see debates about the future of agriculture as simply conventional versus organic. In my view, we've oversimplified the complexity of the land and underutilized the ingenuity of farmers.

I now see adopting farming practices that build soil health as the key to a stable and resilient agriculture. And the farmers I visited had cracked this code, adapting no-till methods, cover cropping and complex rotations to their particular soil, environmental and socioeconomic conditions.

Whether they were organic or still used some fertilizers and pesticides, the farms I visited that adopted this transformational suite of practices all reported harvests that consistently matched or exceeded those from neighboring conventional farms after a short transition period. Another message was as simple as it was clear: Farmers who restored their soil used fewer inputs to produce higher yields, which translated into higher profits.

No matter how one looks at it, we can be certain that agriculture will soon face another revolution. For agriculture today runs on abundant, cheap oil for fuel and to make fertilizer – and our supply of cheap oil will not last forever.

There are already enough people on the planet that we have less than a year's supply of food for the global population on hand at any one time. This simple fact has critical implications for society.

So how do we speed the adoption of a more resilient agriculture? Creating demonstration farms would help, as would carrying out system-scale research to evaluate what works best to adapt specific practices to general principles in different settings.

We also need to reframe our agricultural policies and subsidies.

It makes no sense to continue incentivizing conventional practices that degrade soil fertility. We must begin supporting and rewarding farmers who adopt regenerative practices.

Once we see through myths of modern agriculture, practices that build soil health become the lens through which to assess strategies for feeding us all over the long haul.

Why am I so confident that regenerative farming practices can prove both productive and economical? The farmers I met showed me they already are.

*David R. Montgomery
Professor of Earth and Space Sciences, University of Washington*

This article first appeared on The Conversation.

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enhance
mean to you?

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*Inspired by a William Blake poem

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Improving the quality of life

Fertilizers represent one of the keys for sustainable crop production

Sustainable development as defined by the International Fertilizer Association (IFA) is the practice of managing natural resources and human activities so that present and future generations of humanity have the resources to meet their needs. Sustainable development must therefore conserve land, water, animals and plants, as well as avoiding harm to the environment while remaining technologically and economically viable. There needs to be a human focus too, because sustainable development must improve the quality of life for communities.

Food and nutritional security

Sustainable crop production is essential to improve the quality of life for future generations and can be linked to food security and nutritional security. Food security means there is enough energy in the diet, whilst nutritional security refers to a balanced diet where protein, carbohydrates, vitamins, etc. are provided in sufficient quantities and are in balance. In Africa, food security is a challenge in a number of countries and even more so nutritional security; specifically the quantity of protein, zinc and Vitamin A present in diets. Protein is extremely important for brain and muscle development while zinc is very important for the immune system and also reduces infant mortality rates.

Fertilizer use is an essential component in improving and maintaining soil fertility, so that developing communities can increase the amount of locally produced food. Proper crop nutrition also optimizes the nutrient content of the food that is produced. Commercial fertilizers contribute almost half of the nitrogen taken up by the world's crops.

In turn, these crops provide about three quarters of the nitrogen used to build the protein that is consumed by humans, either directly, or indirectly through the consumption of meat. In other words, about one third of the protein consumed by mankind is the direct result of fertilizer use.

As fertilizers are a key component of food production, the fertilizer industry is dedicated to ensuring that the plant nutrients it provides are produced and used in ways that contribute to sustainable crop production and the global food supply. This responsibility extends throughout the life-cycle of fertilizer products: from mining the raw materials and production to distribution and application.

Fertilizer use is an important step in meeting the objectives of sustainable development. Fertilizers replenish the soil by replacing nutrients taken up during crop growth. This in turn helps to prevent soil degradation, keeping agricultural land productive and economically viable. By enriching soil in developing communities, fertilizer application helps to ensure food security at a local level, contributing to poverty alleviation and furthering economic and social development.

Environmental impact

Sustainable development is not possible without a commitment to preserving the earth's ecosystems. The fertilizer industry has been working for many years to reduce its impact on the environment – through research, education, encouraging best practices and eliminating waste during mining and production.

From the factory to the farm, the industry is environmentally aware and implements best practices at every stage of the production and use cycle. Manufacturers continue

to upgrade factories and install technology that reduces emissions. Distributors and retailers are streamlining the transport and delivery of fertilizers in order to eliminate spills and misuse. Fertilizer companies also educate farmers in the responsible and efficient application of fertilizers.

Over the years, the fertilizer industry has launched many successful initiatives in support of sustainable development, encouraging long-term thinking on the various environmental, social and economic challenges. IFA and other organizations have worked hard to boost local soil fertility, encourage cleaner production, improve fertilizer education and optimize distribution around the world. The results: more fertile fields, higher crop yields and agricultural communities that are increasingly self-sufficient.

Poverty and crop productivity

Eliminating poverty is a cornerstone of sustainable development. Although the global food supply has increased dramatically over the last 20 years, poverty and malnutrition are still widespread. More than 800 million people suffer from malnutrition or hunger. It is generally agreed that consistent agricultural production is a necessary element in fostering economic self-sufficiency.

Fertilizer use is a key component in ensuring sustainable agriculture, especially in countries where soils are poor in nutrients. However, fertilizers are just part of the picture. Rural roads, functioning markets, appropriate credit facilities and other enabling structures must be in place for fertilizer use to have a maximum positive impact within the overall framework of crop management.

Highly productive farming systems require that crop inputs—fertilizers for example



—are used efficiently. Nitrogen is especially targeted for increased efficiency because of the risk of losses to the air and soil water. One of the most effective techniques to prevent volatilization is the use of nitrogen stabilizers (also known as urease inhibitors). These technologies slow the conversion of urea to ammonium that occurs after the fertilizer is applied to the soil.

The leading commercially available urease inhibitor is abbreviated NBPT and contained within the product AGROTAIN®. AGROTAIN® dramatically reduces ammonia losses (keeping nitrogen in the soil) following urea applications. In South Africa, Kynoch Fertilizer sells AGROTAIN® treated urea under the trade name KynoPlus®. An example of the benefit of this approach can be found where Kynoplus® was used in KwaZulu-Natal, South Africa, where the average yield difference between the maize topdressed with Kynoplus® was 500 kg/ha more grain, compared to the halves where normal urea was used.

Soil and habitat

In communities where nutrients have been mined from the soil, fertilizer use will restore nutrient balance and return soil to full

productivity. Well fertilized soil also helps to conserve water and improve assimilation of carbon dioxide by crops. All these benefits feed communities by enabling more efficient farming and larger crop yields.

The prevention of soil erosion is one of the key challenges to sustainable agriculture. Fertilized crops grow faster and stronger, covering the soil and protecting it from the eroding effects of wind and rain. By increasing overall crop yields, the application of fertilizer encourages farmers to stop cultivating fragile or unsuitable soils.

Fertilizers are one of the agricultural technologies that have prevented farmland from infringing on tropical forests and other ecosystems. Because fertilizers increase soil fertility, farmers can increase their yields without expanding the agricultural area.

The yield gap

Farmers may achieve very different yield levels under similar agro-ecological conditions. The “yield gap” represents the difference between farmers’ actual and attainable yields and is often caused by poor access to agricultural inputs and to knowledge. Yield gaps can be substantial,

for example, Sub-Saharan Africa is only yielding one fifth (20%) of the attainable yield (IFA, 2014).

Yield gaps can be narrowed through the adoption of existing best management practices and new technologies which will be discussed in the next edition.

Summary

Sustainable crop production links to food and nutritional security and is essential to improve the quality of life for the future while preserving the earth's ecosystems.

Fertilizer use, especially at high rates of efficiency, is a key component in ensuring an increase in agricultural productivity.

The “yield gap” is often caused by poor access to agricultural inputs and to knowledge.

This gap can be narrowed through adoption of existing best practice fertilizer management.

Dr. Johan J. van Biljon and Megan Lourens, Yield Enhancing System, Kynoch Fertilizer, South Africa

References

International Fertilizer Association (IFA). www.fertilizer.org



A photograph of a brown cow standing in a lush green field. The cow is facing right, and its head is turned slightly towards the camera. The background is filled with green foliage and trees. A semi-transparent green box is overlaid on the right side of the image, containing the title and subtitle.

The gene game

Performance testing for the small-scale commercial livestock farmer to improve profitability



Frans Jordaan

To be commercially profitable, the producer needs to produce the optimum number and weight of wean calves per cow mated at the lowest cost possible. Wean calves need to be marketed as economically as possible directly after wean at the optimum weight. To achieve this efficiently, the fertility of the cow herd is of utmost importance as well as the growth ability of calves from birth to wean and post wean to the benefit of the feedlot industry.

The basis of good reproduction management is excellent record keeping of the cow herd and this enables the breeder to make informed selection decisions to achieve the above-mentioned objectives.

Phases A and B of the National Beef Recording and Improvement Scheme (NBRIS) offer a platform to commercial breeders to measure animals within these phases to support these objectives on a road of financial success.

Certain management practises such as weighing of animals at birth and wean are already being done by farmers, but as an additional

routine, it needs to be sent to the national database, which is the integrated Recording and Genetic Information System (INTERGIS), to be captured and processed into information. The processed information is sent back to breeders in the form of reports containing valuable information regarding the productivity and efficiency of the cow herd. This can be used to make important selection decisions regarding whether to cull animals or not.

Management practises

It is important to perform certain management practises in a structured way to ensure meaningful processing of data into information. Most important is a fixed breeding season with a maximum period of three months. The specific three-month period is dependent on the regional raining season of the year and must be planned in such a way as to utilize natural grazing at its peak period when the nutrient need of the lactating cow is at its peak and also ensure the condition and weight of cows and heifers at the start of the mating season. The lactating cow's nutrient needs are at its peak during the six weeks after the birth of the calf.

Phase A

All calves born need to be notified and identified with an identification system on the farm when every calf will be marked by using an ear tag and the birthdate as well as the birth weight captured on the INTERGIS. Also important is to report still-born calves and to accurately calculate traits such as "age at first calving" and "inter calving period".

Cow weights can be taken at birth or wean of the calf, which is the easiest and most practical time to weigh the cows. The purpose of a weaner production system is the optimum wean weights at the lowest cost per breeding animal, which is the cow in this case. For this reason, it is also important to contain cow weights to minimise input costs and selection and management must concentrate on improving production or output. The ideal is to wean a calf of at least 45% of its mother's body weight.

At the time when the breeder decides to wean his calves, he can request a specific form from the system, the wean weigh list, and will usually do this when the calves are around 7 to 8 months of age. All his calves born in the previous calving season will appear on this weigh list.

The wean weights and also the date of wean needs to be completed on the weigh list and sent back to the INTERGIS to be captured. This enables the system to calculate the standard 205-day weight for each calf in the wean group as well as an index value.

Animals within the same wean group will vary in age from up to three months from the youngest to the oldest because of the three-month period of the breeding season. This complicates the comparison of animals based on performance within the wean group. The older animals always have the advantage above their younger contemporaries as well between the two sexes.

Wean ages get standardized to a 205-day age for this reason and calculated for the whole wean group.

A new wean report, the wean test report, is generated with the wean weight, adjusted 205-day weight and the 205-day weight index and

enables the breeder to fairly compare animals based on their growth performance.

How to calculate the wean index per animal

For example, a bull calf weighs 40 kg at birth and weighs 280 kg at wean with a 200-day age at wean at the end of the weaning season.

Step 1: Total weight gain in kg from birth till wean:

$$280\text{kg} - 40\text{kg} \\ = 240\text{ kg}$$

Step 2: Average gain per day:

$$240\text{ kg}/200\text{ day} \\ = 1.2\text{ kg per day}$$

Step 3: 205-day wean weight

$$205 \times 1.2\text{ kg} \\ = 246\text{ kg} + (40\text{ kg birth weight}) = 286\text{ kg}$$

Step 4: Wean index for this animal;

$$286/250 \times 100 \text{ (For example if the average 205-day weight for the male group calves was 250 kg)} \\ = 114$$

This implies that the animal grew 14% better than the average male animal in the group.

Wean production report

The wean index for each animal is its performance expressed as a percentage of the group average, which is 100 %. All animals with a wean index bigger than 100 are above-average and below 100 are below-average performers.

The wean test report contains the complete wean group with wean weights, 205-day weights and wean indexes for comparison purposes.

This enables the breeder to identify calves with the best growth ability within the group and to identify heifers for replacement of older cows which become less efficient with time. The wean weight of the calf is an indication of its own ability to grow as well as an indication of its mother's milk production.



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Phase B

The general practise is for the commercial farmer to market all his bull calves at wean; his preliminary selection of replacement heifers has been done on wean already. This means mainly heifers will proceed from wean to the next phase, which is phase B1 and B2.

Post-wean production reports

Similar to the wean report, reports also get generated at 12 and 18 months. This serves mainly as a guideline for the selection of replacement heifers.

Phase B is the on-field test for adapted female animals and growth performance can be evaluated without the influence of the mother until the age of 18 months.

Reproduction report

Also known as the breeding herd report, it lists all the active cows and heifers above 24 months of age. The report includes reproduction information such as the number of calves, age at first calving, inter-calving-period and the average wean index for all calves weaned per cow. The average wean index per cow is valuable to determine the efficiency of the cow, which includes milk production and whether she still has the ability to wean an above-average calf in the herd. If she's not efficient enough or does not produce a calf every year, it might be better to replace her with a heifer.

Age at first calving is a fertility trait which enables the breeder to identify cows that calve earlier in the calving season, which enables more time after calving to get ready for the next mating season.

Additional benefits of performance testing

- Performance testing improves management with economic benefits.
- Breeding seasons ensure the optimum utilization of natural pastures especially when the lactating cows nutrient needs are on a high level with saving on additional feeding

- Reproduction records per cow are updated after each event and the cow can be evaluated on a regular basis to ensure efficiency of the cow herd.
- Data are saved on a central database with no risk of theft or damage to a personal computer.
- Subsidised services rendered by the Agricultural Research Council at an affordable prices structure and regional personnel for support in all provinces.
- A unique member number with herd designation mark is allocated to each breeder with user name to enable breeders to log into the national database to generate weigh lists as needed.
- Support from regional ARC personnel in all provinces to purchase registered bulls that support breeding objectives such as improvement of growth and milk production.
- ARC technicians who have completed inspector courses can also assist with selection of breeding material.

Financial benefits with an increase in production

As an example for a 100 cow herd size with a current calving percentage of 65% and an average wean weight of 180 kg.

At R20-00 per kg weaner price the bruto income is R234 000.

By improving calving percentage by 10% and the average wean weight per calf with 10 kg can mean an improved bruto profit of:

R285 000 – R234 000
= R51 000

Summary

It's not always easy to improve production in consecutive years because of environmental fluctuations that are out of the farmer's control, such as differences in rainfall between seasons, but it remains important for the breeder to try and improve his cow herd's genetics from one generation to the next.

Frans Jordaan, ARC-API

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Tshakhuma Barotta UIGC Farm, the food basket of the Tshakhuma community



Tshakhuma Barotta UIGC Farm is known as one of the largest reputable farms in Levhubu, Limpopo Province, South Africa and is one of 25 farms, which were restituted by the government to the Tshakhuma community in 2005.



Chief Executive Officer, Dr John Mudau

Background

Tshakhuma Barotta UIGC Farm was previously named Barotta Farm. The new name was launched in 2016, with 49 full-time employees, through the partnership of Tshakhuma Community Farms and the reputable Univen Innovative Growth Company (UIGC). The farm operated from 2005 under the name Barotta Farm and collapsed in 2015, due to a lack of finance and farm business management skills. The state of the farm resulted in a significant negative impact on the community of Tshakhuma as they mostly relied on the farm for jobs in order to feed their families.

Collaboration

The partnership improved production of the farm and infrastructure. The farm is currently producing high yields of good-quality crops.

Furthermore, the collaboration did not only benefit the farm, it also empowered the community of Tshakhuma through job creation and the provision of farming skills to employees through training. The skills provided enable them to practice agriculture in their gardens in order to ensure food security and alleviate poverty in the community.

The collaboration also benefits the University of Venda through training that is provided to students. The farm offers 6 months of work-integrated learning to the students of Agriculture who are in their final year of study.

Capacity Building

Tshakhuma Barotta UIGC Farm has two Farm Managers and three Technicians (Packhouse, Workshop and Field Technician), and 44 permanent farm workers who are distributed throughout the farm. Most of the operations carried out on the farm, such as harvesting, weeding, fertilising and chemical application are labour intensive. Due to this, the farm goes to the extent of employing about 40 temporary workers from February to April every year, as these are the farms most demanding months, and all produce must be ready for sale. Temporary labourers usually focus on the weeding and harvesting of avocados.

Production

Tshakhuma Barotta UIGC Farm has a total land area of 222 ha. Of the 222 ha, only 152.49 ha are under production, occupied by 64.1

ha of banana crop, 45.49 ha of macadamia nuts, 39.3 ha of macadamia nuts and 3.6 ha of guavas. Currently, bananas are regarded as the main crop, with the annual yield of 430 tonnes, followed by avocados, with an annual yield of 39 tonnes, and macadamia nuts, with an annual yield of 7 tonnes. The 2017 production forecast is expected to increase at a high rate, due to proper field operations, which were carried out in 2016, and also due to the high amount of rainfall received in 2016/2017. Banana yields are expected to increase to 704 tonnes, avocados to 47 tonnes and macadamia nuts to 22 tonnes per year. The remaining hectares of land (69.51) have been allocated for the production of vegetables in order to “make more money”.

Marketing

Tshakhuma Barotta UIGC farm has adopted a collaborative marketing strategy, which has yielded suitable economic benefits for the farm and its partners. Consequently, the farm has partnered with processing companies, retailers and fresh produce markets in the Vhembe District and outside the district to supply, distribute and sell their produce. Currently, bananas are in high demand by their clients. They supply the bananas to the Department of Education as part of the school nutrition programme. Some of the bananas are supplied to the Johannesburg market (city deep). Macadamia nuts are being sold to processing companies that deal with the production of cooking oil. Avocados are sold to fresh produce markets.

Protection right from the start

New product lets cattle farmers breathe easier



Bovine respiratory disease (BRD) is the most costly and second most costly disease in the beef and dairy industries respectively. Animals are experiencing higher challenges year after year from viral and bacterial causes, due to an increase in the intensive nature of production. This was evident 2014, which was a particularly bad year with regards to bovine respiratory disease in the South African feedlot industry.¹

Bovine respiratory disease is an extremely difficult disease to control and various methods are required to reduce the incidence to a level

which is economically viable. When trying to develop a plan of action against BRD you need to look at the predisposing factors, and think of ways to reduce the effect that each of these can have on the animal.

Some of the most important factors include, but are certainly not limited to:

- Stress; stress due to environmental conditions (heat etc.) and management (social stress due to groupings, weaning etc.), has a huge effect on the immune system of animals.
- The type/age and nutritional status of the animal.
- Dust production (which has an effect on the animals ability to prevent infection)

- The challenge faced by various viral and bacterial causes.

The end goal will be to reduce the number of deaths, as well as those requiring an antibiotic treatment.

Although all are important, prevention of the viral and bacterial causes will be discussed in more detail. The goal in any herd needs to be to reduce the challenge to an absolute minimum whilst increasing the herd's immunity to the highest possible level. Management plays a major role in reducing the challenge, but vaccination is needed to improve the herd's immunity to BRD causative agents. "Traditional" parenteral vaccination has been common practice for many years and its effectiveness has proven its value in all production systems. Intra-nasal vaccination doesn't replace parenteral vaccination but rather complements it by providing more rapid protection at a time when the immune system is still developing a response to the parenteral vaccination.

The new product

Intra-nasal vaccination is an old concept in veterinary science but recent developments have resulted in the launch of INFORCE™ 3, the intra nasal vaccination against BRD from Zoetis. The vaccine contains Infectious bovine rhinotracheitis (IBR), Parainfluenza type 3 (PI³) and Bovine respiratory syncytial (BRSV) viruses, 3 of the most important viral causes of BRD.³

Where INFORCE™ 3 (Reg. No. G4044 Act 36/1947) is a game changer is that the protection differs from "traditional" vaccination in that it stimulates an immune response in the upper respiratory tract specifically and helps prevent the establishment of the virus (which needs to happen before disease can occur). It does this by stimulating the production of interferon and Immunoglobulin A (IgA). IgA is the most important and prevalent immunoglobulin (antibody) in the mucosal system of animals, providing protection against these viruses at the initial site of their infection and replication.³

Another game changer is that the time the vaccine takes to develop a protective response is from 24- 48 hours (where traditional vaccines require 10-14 days) making INFORCE™ 3 extremely useful in times where a rapid response is needed.²

Safety is an important aspect when discussing vaccines and INFORCE™ 3 has been proven to be safe in all animals, from pregnant mothers to the day old calf. In fact, the safety study done with INFORCE™ 3 was the largest ever performed in the United States for a vaccine approval study. Challenge studies with the vaccine have also

demonstrated its unprecedented effectivity against BRSV, earning the "prevents infection" label claim from the USDA.³

Maternal antibody interference is always a concern when vaccinating young calves against any disease after receiving colostrum. INFORCE™ 3 is different, and numerous studies have been performed to prove the maternal antibody override that is seen with it.³ Each fraction of the vaccine has been shown to stimulate protective responses in the presence of maternal antibodies, which gives you peace of mind and allows you to give calves protection, right from the start.

Use of INFORCE™ 3 at weaning on dairy/beef farms or arrival at a feedlot will stimulate the production of interferon and Immunoglobulin A, providing a very quick and effective protection against IBR, PI3 and BRSV.

INFORCE™ 3 used, used together with Bovi-Shield™ Gold 5 (Reg. No. G3675 Act 36/1947) and One Shot Ultra 7 (Reg. No. G2818 Act 36/1947) as per package insert, will provide multiple levels of respiratory protection (local viral, systemic viral and bacterial). That is the game changer you need to improve BRD management!³

Dr. BB van Houten

Please direct any further questions regarding INFORCE™ 3 to the author at barry.vanhouten@zoetis.com

*References:

1. Personal communication with feedlot consultants in the RSA feedlot industry.
2. Carell J. Kucera, 1978
3. Data on file

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Inforce™ 3: Reg. No.: G4044 (Act 36/1947). Infectious bovine rhinotracheitis (IBR), bovine respiratory syncytial virus (BRSV), parainfluenza type 3 virus (PI3).

Bovi-Shield® Gold 5: Reg. No.: G3675 (Act 36/1947). BVD Type 1 & 2 (Bovine viral diarrhea virus), IBR (Infectious bovine rhinotracheitis), BRSV (Bovine respiratory syncytial virus), PI3 (Para-influenza 3).

One Shot Ultra™ 7: Reg. No.: G2818 (Act 36/1947). Cl. chauvoei, Cl. septicum, Cl. novyi, Cl. sordellii, Cl. perfringens Type C & D, Mannheimia haemolytica bacterin-toxoid.

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A fruitful legacy

Saving what might be South Africa's oldest apple tree for future generations

South Africa's most elevated apple tree might also be its oldest. After a three-year search, Tru-Cape Fruit Marketing, the largest marketer of South African apples and pears, the successful sale of which is responsible for the livelihoods of 15 200 people, has found an ancient apple tree at the very top of Table Mountain.

The as yet unidentified tree is understood to have been planted by the engineer of Woodbridge Dam, possibly over a century ago, as it was found in the front garden of the engineer's hut, subsequently taken over by the South African Mountain Club.

According to Tru-Cape's New Varietal Expert Buks Nel, the modern-day apple originated in the Tien Shan mountains of Kazakhstan near the modern day Altamy (city of apples). These apples are regarded as the genetic source of all today's apples.

Buks Nel and Tru-Cape's Quality Assurance Manager Henk Griessel teamed together to research ancient apples, the subject of their book *Apples in the Early Days at The Cape*.

The two were also the force behind the planting of the Tru-Cape Heritage Orchard, now in its fourth leaf, at Oak Valley Estate in Grabouw. Griessel explains: "We wanted to preserve the genetic materials of South African apples and pears, no longer in commercial production, and at risk of being forgotten."

"In our continued search for ancient apples and pears, we discovered that there is an apple tree at the very unlikely place, on top of Table Mountain," Griessel says.

Griessel and Nel were accompanied to the top of Table Mountain with a varietal expert from the SA Department of Agriculture, Forestry and Fishing, Hennie Venter. "It was a pleasant experience to go up the mountain and see the vegetation there," Venter says and of the tree they found: "It certainly is a very old tree although we cannot say

exactly how old. It might be younger than it looks as it has lived in very harsh conditions. The tree is almost growing horizontally as a result of the strong winds. It doesn't appear to be a tree that I can identify," he admits, but Griessel says we can look to history for a clue: "In 1723, Francois Valentijn reported seeing three apple trees in the Company's Garden. One of them he named the Aagtenappel of which he said: "De aagtenappel zyn hier doorgans wel klein, doch zeer goed van smaak" (the apples here are all very small but very tasty). We found the Aagten apple in the book of Knoop of 1758, which is also known as the Kroon apple. When we compare historic illustrations of the Aagtenappel we see many similarities to the fruit from the tree on top of Table Mountain.

Separately, Tru-Cape has also secured the Wijnappel, the first apple recorded in the diary of the first Dutch Commander of the Fleet and Settlement on 17 April 1662.

Nel says that Tru-Cape recently received a telephone call from a grower in Carolina, between Pretoria and Swaziland, who said that he'd read about Tru-Cape's attempts to track down the Wijnappel through Dutch connections and wanted to say that he had the 'Wijnappel' in his garden.

According to Nel, the Dutch Wijnappel is currently in quarantine and will be planted in Tru-Cape's Heritage orchard in 2020, while the Carolina apple will be investigated at the earliest opportunity.

In addition to the old apple tree in the front garden of the Mountain Club of South Africa hut, a stone and corrugated iron cottage at an altitude of 760m and 12 minutes walk from Kasteelspoort, close to the Woodhead Reservoir and Waterworks Museum, a



Tru-Cape's Buks Nel and Henk Griessel with the ancient apple tree on Table Mountain

second, younger apple tree was found, most likely a seedling.

According to the Mountain Club, The Table Mountain hut was originally built for the Resident Engineer overseeing construction of the Woodhead and Hely-Hutchinson Reservoirs on the lower table. In 1904 when the dams were completed and the hut due to be demolished, the MCSA approached the Cape Town City Council and negotiated a lease agreement. The nominal rental of one Pound per annum was later dropped because it wasn't cost-effective for the council to continue collecting it.

Roelf Pienaar, Tru-Cape's Managing Director says that Apples in the Early Days at The Cape tracks the history of mostly forgotten varieties. One of the challenges the authors experienced was the paucity of

readily available information about historic plantings.

He explained that when they discovered how few records of apple varieties planted in the Cape existed, they became aware of the overwhelming responsibility to preserve the knowledge and to ensure that when future generations look back to this century, they will have excellent records of the fruit we enjoyed. Their research led Nel and Griessel to interview older growers who might have remembered varieties that are no longer propagated. The discovery of this apple tree on Table Mountain is a natural extension of the work that Griessel and Nel and Tru-Cape as a whole are doing to preserve our fruit history for the future.

Brian Berkman



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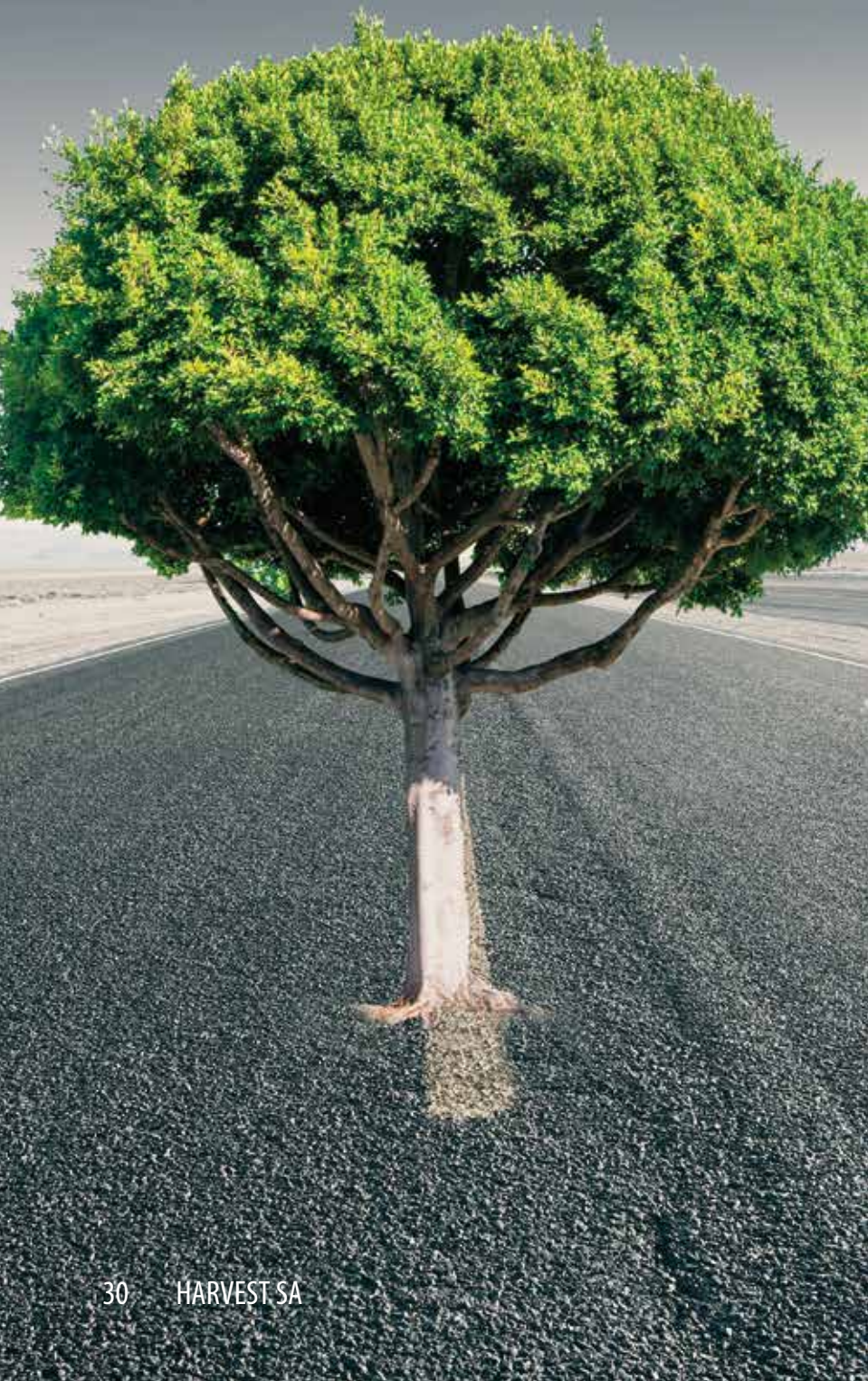
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The high road to success

Knowledge and expertise are pre-requisites for growth



Much has been said about the need to provide previously disadvantaged South Africans with farmland so that they can share in the wealth of the land. This view has to be placed in perspective.

- Farmland on its own does not correspond to wealth unless it is made use of correctly and treated as one of the factors of production in a profitable production process that, correctly applied, creates the conditions for potential wealth creation. It is necessary to persevere with great expertise throughout the process. Wealth is not simply out there for the taking – it has to be created, and created continually.
- Land is only one among many factors of production, including entrepreneurship, labour and finance, which have to be placed in a particular relation to each other in order to achieve successful production. Nowadays, technology is considered as a fifth production factor and should be added to the mix.
- Exceptional expertise is required to manage these different production factors profitably. Not everyone has the necessary interest, dedication, sense of urgency and knowledge (which comprises many things). Few farmers have the means to finance the servicing of production costs themselves. Finance has to be obtained from a financial institution or service provider; the farmer's ability to repay is investigated before any financing is considered.
- A very important aspect that must also be taken into account is the principle of economies of scale. The variables that farmers have to deal with, which are out of their control (eg drought and other disasters, rising input costs, fluctuating prices, political uncertainty, uncertain security conditions), demand in many cases that farmers take their own preventive measures. A farmer with insufficient capacity to overcome these variables will soon come under tremendous pressure. Worldwide, it has been found that farms are becoming increasingly bigger in order to ensure there is sufficient capacity to underwrite sustainability.



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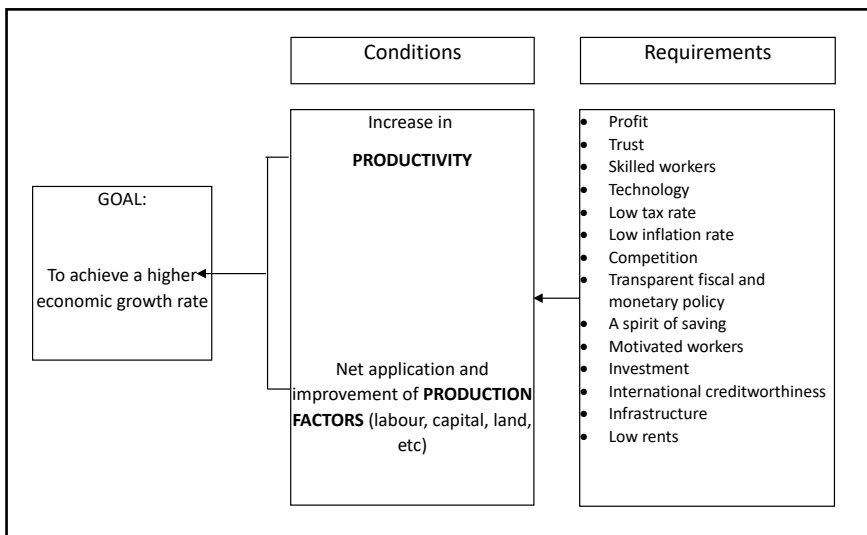
In South Africa, the question of poverty and unemployment is unquestionably a challenge that has to be addressed. It cannot be said too often that it can only be achieved sustainably if the economy grows. There are certain conditions and requirements that have to be met in order to get it right. The following table illustrates the point:

This process cannot be reconciled with people or governments that adopt the wrong approach. It has to be admitted that South Africa has not had a great deal of success in attaining the abovementioned conditions and requirements. It must also be said that before there can be any chance of attaining them, a trustworthy foundation on which to be build must be laid by a healthy policy environment – about which much could also be said.

An important contributing factor to insecurity and the breakdown of trust, of course, is the unacceptably high crime rate afflicting South Africa. The plunder by corrupt parties of the very means the state must use to fulfil its function of stabilising and stimulating the economy is already costing our country too dearly.

This returns us to the view that farmland (even if it is small parcels) must be transferred to black South Africans. What is the expected outcome, how sustainable is this approach, and is there any chance that these lands will be farmed successfully? Assuming the government honestly intends to transfer the land to black farmers, there also has to be an honest agenda. Start by allocating economic units of state land to selected black farmers, give them the title deeds and help them, at the very least, to reach a position where they manage the factors of production meaningfully.

By contrast, it makes no sense to create opportunities that have to be kept on the go by artificial means such as recapitalisation. Our country simply does not have enough farmland and water with which to play political games. A healthy point of departure would be for all farmland to be economic units. In this regard, TLU SA began making constructive representations to government as early as 2005, with a view to setting up a process that would welcome new black entrants to the agricultural sphere,



but in such a manner that they have a good chance of success, unlike the track record of government projects to date. Unfortunately, the government decided not to accept our representations.

Given that more than 66% of South Africans live in cities, the strategic value of commercial farmers in terms of food security cannot be emphasised too strongly. Should the government forge on regardless down the path of unproductivity, it should prepare to deal with food shortages. That is why it is necessary to ensure that the best, most expert farmers are given the opportunity to farm. The only mechanism that can determine who the best farmers are, is the principle of market forces, which apply to black and white farmers alike.

The proposal of 2005 would have made it possible for political targets to be reached according to economically sustainable criteria.

The crucial part of that proposal was that the agricultural domain should be stabilised, that no established farmer should be threatened in any way, that people should gladly invest in it, and that the right mechanisms should be in place in order to maintain optimum production.

It is the farmer's job to farm profitably. It is the state's responsibility is to look after food security. It is a considerable challenge to remain competitive. Every farm is a business entity in its own right, not to be compared with the neighbouring farm; every farm is

expected to operate profitably in its own right, without help from the state. The challenge has only increased with our newly acquired junk status. Bear in mind that a farmer doesn't "go on pension" – the farmer's investment in the land is their security for old age.

At a recent international agricultural congress in Europe, South Africa's commercial farmers were recognised as being among the best in the world. A very senior person in the agricultural domain was asked why this was so, and he said he could quickly think of three reasons: 1) our country is perceived as a marginal farming territory, yet we manage to be a net exporter of food. 2) We compete on international markets against subsidised produce. 3) In any other country, the state is seen as the farmer's best friend, whereas in South Africa it is quite the opposite.

Our farmers' reputation for quality is well founded on years of experience working under difficult circumstances, supported by superb research and extension services who have brought applied knowledge to South African farms.

May all South Africa's farmers continue to follow the path of knowledge and expertise as a foundation to contribute to economic growth – it is the only way to address the serious obstacles facing our country's development.

Bennie van Zyl, General Manager, TLU

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Like migrating antelope, the aircraft follow the seasons ...

Crop spraying in South Africa is seasonal, with the summer season seeing maize as well as beans, potatoes and sunflowers being planted countrywide and in the Eastern Free State. In the winter, aircraft operate mainly out of the Southern and Western Cape where herbicides, fungicides and fertilisers are applied to wheat and barley crops.

In the spring, the aircraft generally move back to the Eastern Free State where they apply herbicides and insecticides to wheat. In the Mpumalanga Province, the aircraft spray tea plantations and in the Northern Province cotton and sugar. Large areas of maize are planted in the western areas of the Northwest and Free State Provinces and are treated with herbicides and insecticides, through the summer months of December, January and February. The majority of the crop dusting aircraft are based in South Africa

In light of the daily increasing demand and expansion we experience in agriculture helicopters' utilization, specifically in crop spraying, together with extensive game work and other agriculture helicopter utilizations, Safomar Aviation in partnership with Arnold Du Plessis have established a company to actively promote and develop the use of helicopters in a divergent number of specialist applications. The company is named Safomar Aviation Enterprises (PTY) LTD. Arnold is a keen aviator (Rotary and Fixed wing pilot), a farmer and an entrepreneur involved in a host of businesses. The synergy between the two parties hosts expertise, product and market knowledge, technical competencies, the most suitable platforms and systems to provide for the growth in the agriculture helicopters utilization.

A difficult niche to fill

It was ascertained that there are very few crop spraying helicopter pilots and a very small cadre of crop spraying instructors in South Africa. The shortage presents a limiting factor in growing this industry and catering for the increasing demand. Suitable and reliable equipment was required to provide for optimization of such operations, including the platforms, approved crop spraying equipment and agriculture GPS, which also had to be economically affordable. Safomar Aviation Enterprises (SAE) was therefore established to provide solutions to these challenges.

Recognizing the features, characteristic, high power and manoeuvrability, low acquisition, low operating cost and high reliability, the company has decided to initially utilize the Enstrom 280FX turbocharged piston

ON THE WING

Crop spraying



engine helicopter. The company exploits the exemplary training potential of the Enstrom 28/280 helicopter crop spraying capabilities of this highly agile and robust platform. Three helicopters are already equipped with Isolair crop spraying systems that have been integrated with the dedicated DynaNav crop-spraying GPS system that are all represented by Safomar Aviation in Southern Africa. The fourth helicopter will be utilized for training and as a spare aircraft whilst the others are undergoing maintenance.

I've been part of this industry since I was three years old. My father bought his first crop spraying aircraft in 1989, a Piper Pawnee (ZS-EVG), and I was inspired by his love for flying to follow in his footsteps.

When people think of an "ag-pilot" they envision some old guy flying a biplane with his leather cap, buzzing the landscape without a care in the world. If you're one of those people, you're certainly in for a big surprise. There is more to aerial application aviation than you have ever imagined. Today there are organizations working to change the stereotype of the ag-pilot. The National Agricultural Aviation Association (NAAA) is one such organization, due to the way they promote research, new technology and new spraying techniques.

Crop spraying has become a sophisticated and professional industry different from the ways of the past, when "flagmen" on the ground were used to indicate the line in the field to be sprayed by the pilot. Two people would stand at each end of the field and once the pilot lined the aircraft up with them and the aircraft passed over the flagmen, they will move twenty paces up. Today's crop-spraying aircraft are fitted with GPS units, flagmen are no longer required. The GPS units help the pilot to do a more accurate job, thereby adding to the professionalism of the crop-spraying industry.

In South Africa, approximately 65 pilots hold an ag-rating, though not all of them are actively spraying. Southern Africa has a good balance between young and old aerial applicators, stretching from ages between the early 20s to 70 years of age. However, in America, the average age of an aerial applicator is 60 years old. This demonstrates that there are ample opportunities opening up all over the world for ag-pilots. A fairly good living can be made from being an aerial applicator, although it is like a roller-coaster ride. Nothing is for certain in this business, due to fluctuating crop prices and unpredictability of weather patterns.

Crops are seasonal; there are certain times of the year that you won't have any spraying work to do. Some pilots spend the summer months spraying crops in the Highveld and in the winter months they'll move

down to the Western Cape for spraying work. This means that they are spending months away from home on a yearly basis.

High risks, incredible skills

One of the drawbacks of this line of work is likely its risk factor. Ray Dyson, an American aerial applicator once said: "Mothers should always caution their sons about making a career choice that requires a crash helmet." Statistics show that crop spraying is one of the most dangerous jobs in the world. The pilot's role is a professional one with tremendous pressures, requiring courage, caution, and common sense, with a mindset on safety. The pilot must be under control at all times and be able to recognize fatigue. Sometimes pilots work for days with only the league time off.

Hazards that aerial applicators have to look out for are wires, structures such as houses, trees, cell phone towers, weather conditions especially mist and also the terrain due to the extremely low level at which agricultural pilots have to operate.

Headlines like: "Crop spraying pilots are a dying breed" or "Crop spraying is a dying art" are very disturbing. The most frequently asked question to aerial applicators is whether there is still a future in the industry. To produce future foods, fiber and bio-fuels, increased production on land already in use will be critical. The use of fungicides, insecticides and herbicides has helped to increase such crop yields. Big ground spraying rigs and genetically generated crops have cut into business, but there will always be a place for a crop-spraying aircraft. Not only the pilots' skills, but also their relationship with the chemical representatives and farmers will determine the success of an aerial applicator. Due to finances and economics, farmers are working under a lot of pressure themselves. A pilot who offers their services to a farmer can literally "save" a crop attacked by insects, fungus or weeds. If you fail, he fails. If you win he wins. Getting up early before sunrise, flying for hours without stepping out of the aircraft, combined with the stress and pressures involved, makes crop spraying challenging, but it all adds to the excitement of being an aerial applicator. Any type of flying has its challenges and dangers. Always remember that taking off is optional, but landing is mandatory.

Safe flying.

Trevor Ormerod – Executive Business Manager – Safomar Aviation
Andrew Widdall – Designated flying Examiner and General Manager of SAO



IN HIGH DEMAND

Partnering to grow the South African maize industry

Tongaat Hulett, the third largest buyer of maize in South Africa, invested some R135 million to upgrade its existing Alidex plant at its Germiston mill. This will result in increased demand for South African maize.

The upgrade has resulted in an increased enzyme glucose output to 300 tons from 130 tons per day, which is supplied to the spray drying sector. At full capacity, this will increase the maize processed by more than 25 000 tons per year.

"We are proud that we are touching the lives of maize farmers as we are procuring more maize," said Stewart Krook, marketing director at Tongaat Hulett Starch. "This was the biggest single undertaking by Tongaat Hulett's Starch operations since the commissioning of the Kliprivier Mill."

Another benefit is that jobs are being sustained in the downstream value chain, for instance transport and logistics operations.

With the spray drying market growing substantially faster than GDP in South Africa, customers invested to increase their output to meet the increased demand for final products. With this growth in the local and export markets, which resulted in the need for more glucose, Tongaat Hulett found itself short of capacity to supply product to the market, on time and in full.

This supply shortfall meant that glucose had to be imported, which had a detrimental effect on all participants in the local value chain.

To pursue the glucose market more determinedly, the company implemented two strategies, namely increasing the capacity of the acid glucose plant and investing in an additional enzyme glucose production plant.

Much needed foreign exchange is now staying in the country and allowing South African producers to pursue export programmes for local products.

Production costs are also optimised as additional maize is processed.

To ensure the sustainability of the project, the investment in the R135 million upgrade was made on the back of a long-term supply agreement.

Tongaat Hulett's Starch operations, with a history dating back to 1919, has a long-term history and vision of supporting the South African maize industry.

The company grinds over 600 000 tons of maize annually across its four operations. This is a combination of non-GMO yellow and white maize as well as waxy maize.

As the only maize wet-miller south of Egypt, the company is a vital contributor to the South African economy supplying essential ingredients to a wide and diverse range of industries such as food, beverage, pharmaceutical, textile, paper converting, paper making, adhesives and spray drying.

Its world class milling facilities are located in Kliprivier, Germiston and Meyerton—in Gauteng, and in Bellville—in the Western Cape, with a dedicated Sorbitol facility located in Chloorkop, also in Gauteng.

What is success?



Tongaat Hulett believes that real, sustainable success can be achieved through partnership.

Our holistic view of success extends beyond wealth created for shareholders, to improvements made in the lives of the communities in which we operate through small scale grower initiatives, the upskilling of employees in a zero-harm work environment, creating successful and sustainable neighbourhoods for communities in the lower socio-economic spectrum and partnerships with government to contribute towards achieving The National Development Plan in the communities surrounding company operations.



 **Tongaat Hulett**
www.tongaat.com

Passion breeds success

Mentoring project brings hope to small-scale farmers

When the maize stands tall and the cobs are full, farmers are equally proud and passionate, whether they planted one or a thousand hectares.

To get to those ultimate yields under South Africa's less than perfect agricultural conditions demands the latest technology and knowledge. These are luxuries the subsistence and small-scale farmers, specifically in the rural areas, previously hardly ever had access to.

In 2014 this changed. Jane McPherson, Manager: Farmer Development at Grain SA, brought public and private sector partners together and formulated an ingenious project to educate, mentor and provide access to markets and the best seeds and fertilizers available. A group of dedicated Grain SA mentors from all over the country passionately share their knowledge and bring new technology to the furthest corners of rural South Africa. With regular study group meetings, farmers' days and farm visits, these mentors educate and support subsistence and resource-poor farmers to get the best yield possible from their land available.

To secure access to good quality input supplies, the project needed to take hands with agricultural input suppliers. Monsanto was an obvious choice.

They share Grain SA's belief that participation in the development of small-holder and emerging farmers will ultimately be the route out of poverty, unemployment and a way to overcome food scarcities for thousands of South Africans.

Through their programmes and partnerships, the company collaborates with farmers, researchers, nonprofit organizations, universities and industry bodies to help tackle



some of the country's biggest agricultural challenges.

Sharing in the vision of Grain SA's Farmer Development project, Monsanto also believes in focusing on the basics such as access to finance, increased investments, providing of high-quality seeds and crop protection products whilst teaching farmers to use water and other valuable resources more efficiently. By investing in programmes to train emerging farmers on best practices to improve productivity Monsanto also aid in the transition of farmers from emerging to commercial, by revolutionising opportunities such as access to new technologies and markets.

Kobus Steenekamp, CEO of Monsanto South Africa, says: "It is for Monsanto a privilege to play our part in this successful transformational project. We have a strong commitment to the successful and sustainable transformation of agriculture in South Africa and across the world."

Other partners in the project are: SA Lime and Gypsum, Department Rural Development

and Land Reform, Sasol Agricultural Trust, Silostrat, Kynoch, Syngenta and The South African Jobs Fund.

During a recent tour to some of the project's participants in Mpumalanga, KZN and the Free State, these comments were heard: "I'm a single parent. My husband passed away long ago. With farming with Grain SA I am able to raise my children. We have enough now to eat and sell the rest" (Mavis Hlatshwayo).

Ntombizonkhe Dlamini of KZN said: "The method we used for planting wasn't good and as a result we didn't get a good yield. This has helped us because we get good seeds, fertilizers and chemicals. There is a huge difference – the yield has increased greatly. We can now donate food to the disadvantaged, sell and feed our families."

Well done, Grain SA Farmer Development and partners – this project stands out to be one of the most beautiful transformation success stories in our country. We are looking forward to the emergence of some Mega Farmers from these ranks.

Celebrating ten years in business Nurseries

Hishtil SA celebrates a decade of business and introduces early-start seedlings



Hishtil South Africa, as part of the world-renowned nursery brand Hishtil International, was founded in 2007 in Mooketsi, Limpopo, South Africa, with a second facility subsequently established in Riebeeck West in the Western Cape.

Extensive trials were done with farmers in the Western Cape to assess the quality and establishment of the seedlings supplied. After successful trials these farmers have now started planting seedlings supplied from Riebeeck West on a commercial basis. Feedback from customers has been exceedingly positive.

Farmers have in general reported back on uniformity of seedlings leading to uniform

field development, fuller field stand and in some cases higher harvesting rates – especially leafy crops.

Early Start Seedling (ES)

After much trailing and development, Hishtil SA is proud to add a new plug design to our current range of high quality trays. The new root system is referred to as ES – or Early Start and has the following features:

- Largest root zone volume available in the Hishtil range
- Early plant development due to larger size
- Early fruits set due to quicker establishment and lower stress
- Early harvesting due to quick establishment after transplant
- High quality custom made medium

- 60 Seedlings per tray
- Semi-stable medium making for easier handling
- Greatly reduced transplant shock
- No J-rooting
- No loss of medium around roots during transplant and handling
- Quicker take off after transplant compared to traditional 128 seedlings
- Greater root development in a shorter time compared to 128 seedlings
- Currently available for Cucurbits only
- Reduces seed usage therefore driving savings for the farmer

For more information contact us on:

015 395 4043

sales@hishtilsa.com

www.hishtilsa.com



Hishtil South Africa's primary production is both grafted and un-grafted vegetable seedlings that are delivered country wide.

Hishtil South Africa was established in 2007 in Mooketsi in Limpopo, as part of the International Hishtil Group.

WHY Hishtil

- ✓ Best possible start
- ✓ Greater uniformity
- ✓ Consistent quality
- ✓ Updated technology
- ✓ Technical back up
- ✓ Professional service
- ✓ Country wide delivery

HISHTIL - SOUTH AFRICA

MOOKETSI: Farmboschhoek 415, Houtbosdorp Road, Mooketsi 0825

RIEBEECK WEST: Plot 2028, Station Street, Riebeeck West, 7306



Hedge to protect

Producers lose up to R1 860 per ton as prices fall sharply from import to export parity

In spite of maize crop estimates indicating that this year's production, at 14.32 million tons, will be the third biggest on record, farmers will gain less benefit than they should. This is mostly due to the fact that some 60% of producers chose not to hedge their prices and lost some R1 860 per ton when grain prices did a U-turn. For white maize, 56% of the crop, the price dropped from above import parity of R4081/t in December 2016 to below export parity of R2220/t currently.

It would have cost farmers R400/t to protect themselves against the fall in prices. The amount they've lost is more than four times the cost of protecting themselves.

While it is true that no-one could have foreseen this particular sharp drop in prices, everyone in agriculture knows that prices can vary at any time. If you're lucky, they go up. If you're sensible, you'll cover yourself for when they go down. Had the prices gone up instead of down in this case, the R400 per ton cost of protection would have been more than offset.

One can't lose using a hedging strategy, especially if, as we always recommend, you hedge only one third of your crop. The ideal scenario is to sell one third of the crop on a pre-season minimum price contract and one third on a pre-season fixed price contract. One can then keep the last third for the end of season premiums, without risking losing good income from the main part of the crop.

In many respects, not hedging your crop in today's extremely volatile market is reckless business practice.



This season's large crop brings a few additional problems with it, including increased pressure on the logistics needed to bring it to market.

The fact that Standard Bank is ranked 20th on the World Bank's Logistics Performance Index gives us the confidence that we can handle today's export volumes of 2.8 million tons with ease. Also, we proved in the 2011/2012 season (2.5 million tons exported) that we could manage high levels of output.

What is going to be more challenging is that we've been out of the market for the past two years because of the drought. Our absence has enabled other countries to take a share of our usual markets. The USA and Argentina, for instance, have made inroads into our traditional international markets and Zambia has moved into our regional markets.

Consequently, marketing this year's export volumes may mean having to quickly develop new markets. That will not be easy.

An additional factor affecting this season's marketing efforts is an increase in carryover stocks, globally – up by 7%. Also, the International Grains Council's Grains & Oilseeds Index for maize has dipped slightly over the past 5 weeks (-1, 8%) on the back of favourable weather for South America supporting crop expectations.

None of these are insurmountable problems. They're simply a reminder that we need to be pro-active on an ongoing basis about developing new markets alongside the skills to compete more effectively, whether in new or established markets.

MC Loock, Primary Agribusiness Senior Manager, Standard Bank

Applied innovation

Steel is strong, safe and smart

Steel is an indispensable material in the agriculture industry. Buildings, farm gates, fencing, solar power systems, water reticulation systems, signage, transport—you name it, steel is everywhere.

Farmers have relied on steel for centuries, but more efficient manufacturing techniques have improved the quality and reduced the cost. Thanks to these technologies—and a wealth of practical experience—Mertech Cable & Wire is able to supply a wide range of steel cable and wire products which offer the agriculture industry a cost-effective alternative, resulting in huge savings.

Mertech Cable & Wire is powered by Mertech Marine. Established in 1998, Mertech Marine was the first company in the world to recycle out-of-service undersea telecommunication cable in an environmentally friendly way.

Mertech Cable & Wire markets and sells its products in South Africa as well as the rest of sub-Saharan Africa. Cattle, game and fruit and vegetable farmers will all find products to suit their needs. The strength and flexibility of steels lends itself to diverse applications.

For example, steel cables are used to make hail nets erected over vineyards, citrus and fruit orchards. Many such enclosures, especially in the provinces of Limpopo and Mpumalanga, are covered with nets supported by Mertech Cable & Wire's cables.

Steel wires are also ideal for fencing and trellising vegetables, citrus, vineyards and fruit orchards. Another new development is the annealing of the wires mentioned above to create binding wire.

Thicker wires are galvanised and applied as offset brackets in electric fences to keep jackals away from the farmer's sheep. Among other uses, these thicker wires can also be incorporated into anchors used at the ends of trellised rows in vegetable field.

The Mertech range also includes straight and peg (also known as turn and peg) wires, which can be employed during the young and growing phase of vineyards, citrus and fruit trees.

Breaking force

Steel cables that are currently available vary in diameter, namely 6 and 7 mm. Results of tests done on the cables show a breaking force on the 6 and 7 mm cables of 52kN (5,2 metric ton) and 79kN (7,9 metric ton) respectively.

Products at a glance

- 6 mm and 7 mm cable—Ideal for building cattle kraals, game fencing and for erecting hail nets over vineyards, citrus and fruit orchards.
- Steel droppers (galvanised and covered with neoprene)—ideal for fencing on farms, available in a various lengths.
- Turn and peck (straight and peck)—employed during the young growing phase of vineyards, citrus and fruit trees.
- Anchors - employed at the ends of trellised rows of vineyards, citrus and fruit orchards.
- Offset brackets—Galvanised offset brackets to protect livestock against i.e. jackal
- Various diameter wires—ideal for trellising of vegetables as well as binding wire



OUR INNOVATION CHANGES INDUSTRIES

Mertech Cable & Wire believes in innovation, and we focus on delivering a product that meets the needs of our clients. Do not hesitate to contact us with your steel cable, wire and offset bracket needs. We endeavour to go out of our way to deliver.



Offset Bracket



6 mm
Steel Cable



7 mm
Steel Cable



Steel Dropper



Turn and Peck

For more information, phone 021 981 8266, 081 549 1109 or 076 784 3205, or send an email to info@mertechmarine.co.za. Visit our website at www.mertechmarine.co.za to learn more.

Tapping tomorrow: innovative clean water solutions

Thinking outside of the box to help solve the water crisis



It's no secret that South Africa's water sector is facing immense pressure. There are steep challenges in matching the waning supply of water with current and long-term demand for this essential resource. We know that our municipalities are under pressure to meet these demands and there are also the effects of climate change and droughts on the agricultural sector and the economy. It's a tough time in the world of water management.

It's often in the most challenging times, though, that innovative solutions come to the fore to turn stressful situations into success stories.

This has proven to be true in the case of South African water resources management company NuWater, which is disrupting the status quo in the water sector by applying technological as well

as commercial innovations to drive outstanding improvements in this industry.

What they do

NuWater offers a wide range of water treatment solutions. These include desalination of large volumes of sea and brackish water and the treatment and reclamation of almost any wastewater. NuWater specialises in the use of the latest membrane technologies, including its proprietary reverse osmosis (RO) technology to clean water.

Some of NuWater's major projects include Anglo American's New Vaal Colliery (treating up to 20 million litres of wastewater per day), the seawater desalination plant for Knysna Municipality at Sedgefield, other local municipal applications as well as mining industry projects in Ghana. NuWater has a strong presence internationally, running large scale sewerage water reclamation and seawater desalination projects.

The nature of its technology allows NuWater to build its plants in a modular, and where necessary, mobile configuration, enabling it to apply its offering to multiple industries needing water treatment. Some of these applications include off-grid treatment and desalination plants and emergency cover when existing infrastructure fails or where surface water is contaminated.

For the agricultural industry, NuWater has increasingly identified that farmers are looking to improve the quality of water used on crops and for livestock. NuWater pro-actively engages with farmers to ensure they get the water specifications that are required for optimal output and success.

Disrupting and decentralising

Traditionally, water management and treatment projects have been made up of large, centralised infrastructures that are expensive, inflexible and take too long to deliver. These projects are typically funded over long periods of time, which results in many of them never getting off the ground due to financing challenges. In addition, these projects are prone to operational difficulties as the source water varies, and often they tend to struggle to maintain the original design efficiencies. Historically, this structure has created a disincentive for innovation in the water sector.

NuWater believes that the future of water treatment lies in distributed rather than centralised water treatment infrastructure. Because of the specific RO technology in use, NuWater is able to deploy its treatment plants in the form of compact modular and mobile units. NuWater is capable of scaling a plant rapidly by adding or removing additional modules to easily increase or decrease capacity according to the



need. Fixed infrastructure is kept to a minimum, enhancing the speed and ease and decreasing the cost of plant deployment. This innovative design is a completely different design philosophy to that of conventional plants, and this technical flexibility has allowed for a fresh commercial model to emerge.

Commercial consciousness

NuWater's leading edge technology allows it to offer unique business solutions to its clients. NuWater can shape its commercial offerings according to its customers' specific needs.

NuWater is able to provide full service, short-term contracts, leasing the treatment plants, and is able to provide all of the required operational and maintenance services as a one-stop provider. This allows its customers to get on with their core activities while NuWater runs the plant and provides water treated to its customers' requirements.

In doing this, Nuwater has changed the risk profile for its clients. A NuWater client's purchasing decision is made easier and their cash flow pressure is dramatically reduced, given that they can regularly reassess their requirements without being locked into long-term commitments or the purchasing of expensive equipment.

It's this combination of flexible financing options, combined with the modular and mobile plants operated by NuWater, that have made this such an attractive proposition for municipalities, mines, water utilities and the energy sector.

"Water shortage in South Africa is here to stay and, if anything, is going to become more acute. Given the unpredictability of our climate and of climate change, water solutions and infrastructure that may be considered suitable today may become redundant in a very short period of time. A multipronged approach is therefore required, including long-, medium- and short-term solutions

as well as both national and local strategies. We believe localised, or what we refer to as decentralised, water reclamation and reuse projects will play an increasingly important role in ensuring water security in South Africa. Innovative financing approaches such as those offered by NuWater are also as important as world-class technology when it comes to supporting the delivery of such projects." ~ NuWater South Africa

It's exciting to hear a story of such trail-blazing change from the water sector. NuWater's growth locally and internationally bodes well for South Africa's water situation and supports the view that NuWater's differentiated mobile and modular approach is making a positive contribution to service delivery and sustainability.

We hope to hear more stories of success as they help to close the challenging gap between water supply and demand on the continent and worldwide.





Training the trainers

Guiding extension advisors in irrigation capacity building

A recently published study by the Water Research Commission (WRC) has sought to improve knowledge dissemination on irrigation management to the country's extension advisors.

South Africa faces particular challenges regarding water supply. Rising temperatures and changing rainfall patterns will have further consequences for food production and water supply. At the same time, the National Development Plan 2030 proposes the advancement and expansion of agricultural development through effective land reform and growth in irrigated agriculture. This goal, however, requires skilled and well trained agricultural advisors to support smallholder farmers with decision-making on opportunities open to them.

For many farmers, but especially smallholder farmers, extension advisors play a

pivotal role in building capacity through programmed learning and access to information. The WRC identified the need for training of extension advisors, in particularly irrigation management, as this would give smallholder farmers a better chance of being successfully integrated into the food value chain.

Motivation for WRC project

In South Africa, extension services play an important role in the investment of human and social capital required for sustainable agriculture development. The policy environment for the agricultural sector in South Africa is dominated by three important policy issues: land reform, black economic empowerment and the strategic vision for agriculture. Agricultural education and training has an indispensable role to play in all of these strategic policy issues.

Despite playing such a critical role in especially smallholder agriculture, studies have

shown that the extension link has deteriorated in recent years and become less effective. A previous WRC project illustrated that many educational programmes and curricula offered by tertiary education and training organisations in South Africa are inappropriate and not aligned to the skills and knowledge required by extension advisors to do their work properly.

In many cases this results in a lack of confidence and self-esteem among extension advisors, decline in credibility and therefore withdrawal from the community which they must serve. An urgent need was therefore identified to restore the self-esteem of these individuals and to improve the service delivery of the extension profession.

A first step in rectifying the situation was to define the 'knowledge profile' for training of extension advisors, or the basic knowledge required to advise farmers effectively on irrigation management. This conceptual



knowledge profile of the irrigation extensionist does not imply that extensionists should become subject matter experts in each of these identified technical learning areas, but rather that adequate technical knowledge and competence in each of these learning areas is a prerequisite for credible extension service delivery to irrigation farmers.

Already in 2006 the WRC, through a project led by the University of Pretoria, developed learning material (93 modules) for the eight learning areas identified to form the knowledge profile of the extension advisor. This training material includes the main elements required to inform irrigation water management on farm level and have been divided into technical and extension related modules. The aim of the learning material is to support tertiary education organisations, commonly demarcated as further and high education.

This latest project involved disseminating the research output to agricultural colleges; universities of technology; AgriSETA accredited training colleges; FET colleges; commodity organisations involved in irrigated agriculture development; provincial Departments of Agriculture; and international irrigator advisors and professionals.

The report emanating from the project reflects activities and discussions held with various stakeholders involved in agriculture education and training to raise awareness of the training material, but also to encourage and catalyse the possible inclusion into existing curricula and use in short courses for practical training of irrigation farmers at irrigation scheme level.

The discussions with stakeholders have resulted in a number of key messages, opportunities and challenges for shifting the discourse within the educational and training sphere to include irrigation water management learning material in existing curricula offered at agricultural colleges and university of technology.

The aim of the WRC project was to make key actors within the various education and training organisations aware of the learning material and to disseminate the knowledge on the training and learner guides developed by the WRC for extension advisors in irrigation water management, and to identify possible constraints in the uptake of the research knowledge.

“Capacity building is not a once-off event but must rather be seen as a ladder where information access, facilitation and empowerment, technological development, mentorship role of consultation/extension advisors and programmed learning and important pillars for increasing of capacity.”

Main messages and recommendations

Extension is a process of capacity building through engagement of individuals, groups and communities so that farmers are more

able to deal with various issues affecting them and opportunities open to them. Extension therefore comprises several activities that may provide: a framework for learning, a specific learning event; a process for developing or modifying specific management practices or technologies; individual mentoring and an on-going access to needed knowledge and information.

Capacity building is not a once-off event but must rather be seen as a ladder where information access, facilitation and empowerment, technological development, mentorship role of consultation/extension advisors and programmed learning and important pillars for increasing of capacity.

The reflections and insight of a strong set of knowledgeable individuals involved in training and extension provide a nuanced image of challenges and shortcomings that are critical to address training and education in irrigation water management. It helped to better understand the underlying challenges at training organisations for the uptake of the learning material.

In summary, there are a number of proposals emanating from the discussions to move forward:

Quality of training in irrigation water management: A positive interest and need exists with all stakeholders to upscale the quality of training to extension advisors, farmers and academic staff/lecturers responsible for training through mainly the offering of accredited short courses. These courses can be offered through private training organisations, universities or agricultural colleges. An important condition will be that, apart from theory being offered, attention should also be given to hands-on skills during these courses. The training product should therefore be designed to address specific competency needs of clients.

Policy enabling environment: The necessary conducive strategies and policies already exist for the role that extension advisors



should play in enhancing sustainable irrigation agricultural development, such as Farmer Support Programmes that are implemented in all the provincial Departments of Agriculture. However, the lack of necessary political will to implement these strategies in a way where extension advisors are released to address the real needs of farmers and do what is required of extension, undermine smallholder farmer advancement.

Strengthening agricultural colleges organisational capacity

An urgent need exists for reviewing of content on current curricula offered at Agricultural Colleges and Universities of Technology to align with industry needs. Instead of developing new curricula at colleges and universities of technology, the general preference by participants were that updating of existing curricula with information from the learning material will be the best option in the short term.

At some agricultural colleges serious staff shortages necessitate the employment of young, inexperienced staff, who require additional mentoring and support. This learning material can be of great support to help these young scientists and lecturers with the updating and revision of existing curricula. Overall, much agricultural education and training focuses on primary production rather than on farming as a business – a crucial need for general economic business skills which are clearly addressed in the learning material content.

Very positive findings from the discussions were the general attitude and understanding expressed by participants that current curricula offered at many colleges and universities of technology are outdated and should be reviewed. The general opinion expressed in the majority of discussion forums and meetings held was that the WRC should play a more important intervening or brokering role in addressing the shortcomings and misalignment of formal education by agricultural colleges and universities.

Explore possibilities of establishment of irrigation water school or Centre for Irrigation Water Management

Participants suggested exploring the establishment of an irrigation water school or Centre for Irrigation Water Management.

The private sector can help with the funding of such a project, and also be involved in the training and research envisaged for such a centre.

Policies and implementation of decisions that support the proper functioning of agricultural education and training

Although the necessary policies and strategies with regard to the repositioning of agricultural education and training have been accepted, no concrete actions to implement these decisions have been taken yet. Unless the current position of agricultural education and training is not clarified soon, the degradation of infrastructure (including irrigation infrastructure) and demoralising of lecturing staff will continue.

Clear and distinctive decisions and implementation of an action plan are required to enable agricultural education and training centres to play its role in providing training and short courses to the agricultural sector.

Professional registration of extension advisors

Professional registration of extension advisors open doors for the offering of credit-bearing courses and training events as part of the continuous professional development required to maintain registration. This will help foster ongoing involvement in learning as well as support the national institutional arrangement for recognition an accreditation of learning.

Extension Suite On-line

Extension Suite On-line is an Internet-based application developed by Manstrat Agricultural Intelligence Solutions and provides an important link and information transfer mechanism between agricultural research and extension services.

The system facilitates and enhances the transfer of information between these parties by collecting, collating, interpreting and transforming scientific agricultural data into useful and user-friendly formats for use by extension practitioners and farmers.

The possibility of including some of the material as part of this service rendered to extension practitioners were discussed with the developer.

Lani van Vuuren



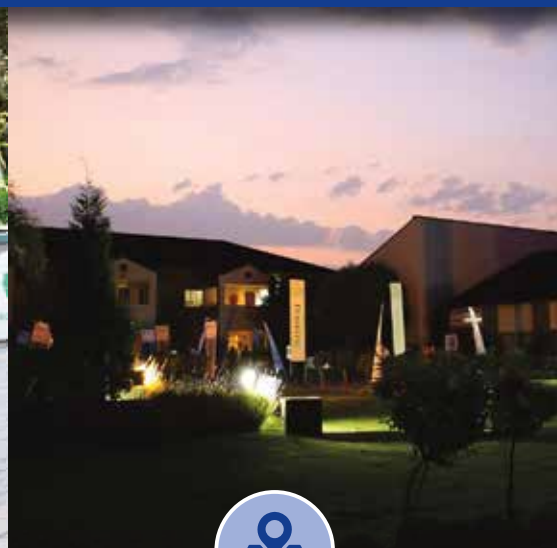
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Following on the success of the the first Water Research Commission (WRC) Symposium in 2013 and 2015, WRC, South Africa's national funding agency for water research and development, will host the next WRC Research, Development and Innovation Symposium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

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What the drought can teach us

It's time to rethink agriculture



The cloud of drought still hangs heavy over Cape Town, while in the rest of South Africa full dams and a good-looking maize harvest have given cause to say, "it's over".

But a report released recently in Johannesburg by Oxfam, titled "A Harvest of Dysfunction: rethinking the approach to drought, its causes and impacts in South Africa", argues that there is little cause to cheer. The rains have come, and officials have praised the heavens. But the deep-rooted problems of how South Africa manages its precarious water resource, and how this led to more suffering than dry skies can be blamed for, are nowhere near being fixed. The long-lasting drought exposed the many social and political faultlines that strip already vulnerable people to naked desperation, and some radical rethinking of what is meant by "drought" is needed for drought not to be synonymous with human disaster.

During the worst drought in 35 years, and in some areas in 100 years, more than half of the population (33,8 million people) had experienced insecure access to drinking water, while rising food prices which headed towards 20% inflation, and income insecurity made hunger a daily reality for a growing number of families.

"A Harvest of Dysfunction" argues that the devastation caused by the drought was not simply a consequence of poor rainfall and the strongest El Niño on record; it arose from a failure to address structural vulnerabilities. Lessons from the drought can develop more effective responses to such a crisis, and put the country on a more equitable and sustainable path.

Food-price escalations – resulting from an unregulated market and compounded by drought-induced supply constraints – had and continue to have a devastating impact on vulnerable people. Women are particularly affected; they are compelled to work ever harder to provide their families with the food and water they need to live healthy, productive and dignified lives. The country's food staple, white maize, is at the mercy of speculative and financial dynamics that extend beyond South Africa, placing the entire region's food security at constant risk.

References by government officials and politicians to drought as a "God-given" event – and their palpable relief that rain has now fallen in parts of the country – create the illusion that South Africa has survived the crisis and can put the problems of drought behind it. This denies the reality of severe drought as a slow-onset disaster that systematically strips away layers of resilience, resulting in poverty, insecurity and hunger for growing numbers of people.

The drought exposed inequalities in income and access to land and water which exacerbated its ongoing impact. To mitigate future combinations of recurrent droughts, stronger El Niño effects and rising temperatures as a result of climate change, urgent changes are necessary.

Government's responses to the drought were slow, sporadic and badly targeted. Despite the range and extent of impacts across society, it refused to declare a national emergency. By defining the drought in the narrowest terms – i.e. as a single event caused by low rainfall – the government response was limited, overlooked those people and groups who most need support, and missed a crucial opportunity to address the structural problems that have been laid bare by the drought. As the effects of climate change unfold, it is an opportunity that South Africa and the wider region can't afford to miss.

While equitable redistribution of water for multiple purposes is a social and political imperative, overall national consumption of water must be reduced in the face of climate change and demographic pressures. The drought also makes clear the need to rethink key agrarian issues – and to balance water use and its conservation with efficient food production, and the availability of sufficient, nutritious, affordable food. These are policy challenges in 'normal' times. As recurrent drought becomes 'the new normal', these challenges will escalate if they are not effectively confronted now.

The key findings of Oxfam's research are:

A narrow definition of drought limits the range of necessary relief.

The official and popular definitions of drought in terms of reduced rainfall are too narrow to describe the spread and severity of its impacts, and perpetuate an understanding of drought as a singular event

rather than as an extended, multi-factor process. Most importantly, it fails to take into account the social and political dimensions of drought. The effect of such narrow definitions is to limit the range of necessary relief-related interventions.

Poor governance of the water resource in key respects created the crisis.

The drought exposed hazardous shortcomings in the planning and management of the country's water resource. South Africa is a water-scarce country, already subject to recurrent droughts, and – unless this is rectified – faces the prospect that water supplies in more and more areas will run out. The challenge is that reduced water consumption and recycling need to happen at the same time as redressive redistribution to extend water services to those who have historically been deprived of them.

Drought combined with unregulated food markets resulted in food inflation that pushes ever-increasing numbers of people into acute hunger, creating a national and regional crisis.

The most extensive, national impact of the drought was and still is on food prices and the capacity of low-income households to purchase sufficient quantities of nutritious food for their families. Food inflation has drawn more families into a crisis of hunger and low-income households were forced to substitute protein-rich foods with flavoured starches.

Rethink agriculture

The drought greatly exacerbated trends in agriculture that favour large-scale producers over smaller farmers and labourers, including the concentration of landholdings and integration of large commercial producers in input and output markets. These dynamics drive social inequality. The combined effects of recurrent droughts, water scarcity and climate change suggest that it is time to rethink agriculture and its role in South Africa's economy and food system.

The Oxfam report therefore recommends that:

Drought be redefined to enable an appropriate response.

The drought is not simply an agricultural disaster; it is, more importantly, a social

disaster in terms of its universal impact of food-price escalations. Therefore:

A national emergency should (have been) declared.

A universal disaster grant should have come into immediate effect in recognition of the impact of the drought on food prices and the costs of securing water. A universal grant would be relatively simple and cost-effective to implement, given that South Africa already has an extensive system of social grant administration.

'Drought' should be redefined to ensure a greater understanding of causes and its ramifications across society, ensuring a long-term, equitable response.

There should be an equitable and sustainable redistribution of water.

State governance of the public and private sectors is critical for a sustainable water system and the fair distribution of water for human and ecological needs. This requires long-term planning, with limits set to growth based on the water resource, and careful monitoring of climate change and relevant adaptive planning. Therefore:

Extended demand and rightful share should be met through recycling, tightened restrictions on the use of potable water, prioritisation and careful management of groundwater to supplement surface water use, domestic harvesting, and soil moisture maintenance practices.

The state roll-out of rainwater tanks should be extended to all low-income households, with reserve back-ups in the form of community reservoirs and community-managed boreholes.

Water management policy implementation should focus on water conservation and water demand management, including in the distribution system, urban and agricultural uses, and catchment management, as well as tighter restrictions on users as the norm.

Maintenance of existing water storage, provisioning and treatment facilities must be reprioritised to address the recent maintenance neglect.

Public investment decisions, for example in the case of mining and nuclear energy, should be based on water allocation

assessments and the real and full costs of water consumption and pollution.

Penalties should be applied for wasteful water use and pollution, and incentives given for the development of domestic, industrial and agricultural recycling practices.

Controlled allocations of water for human life (drinking, cooking and cleaning), household food gardens, and non-profit small livestock farming systems (poultry, goats and sheep) should be free.

Consumption-linked charges should be imposed on higher-use households.

Full costs of water should be charged for profit-making, in for example agriculture and industry.

A 'sin tax' could be extended to certain middle-class consumption goods which use high amounts of water in production (eg. beef, coffee and chocolate).

All South Africans should be able to access affordable, nutritious food.

Strategies to reduce the impact of drought on the cost of food across the country and the region involve both short- and longer-term interventions. Amongst these, food policy should prioritise the price of the white maize staple both for South Africans and the region. Therefore provision should be made for:

An emergency universal grant, pegged at inflation on low-income household nutritional food baskets. Alternatively, together with the declaration of a national emergency, all social grants should be increased by food-inflation rates on low-income households. The availability and requirements for accessing the Social Relief for Emergency Grant should be widely publicised.

Mechanisms for stabilising the price of white maize need to be investigated, including delinking white maize from market dynamics through input subsidies, state-provided crop insurance schemes, milling cooperatives (possibly state-owned enterprises), floor-price ceilings and state purchase guarantees.

Indebted farms growing white maize should be redistributed to small and emerging commercial farmers, and appropriate support provided to enable productivity.

Farming and agricultural relief require a rethink.

The agrarian structure is vulnerable to crises, including drought and political and economic shocks. It is imperative that a new structure comes into being – one that supports a more equal society and can potentially regenerate the rural economy. Therefore:

Immediate drought relief in the form of feed and fodder transfers should be directed at owners of small livestock (chickens and goats) rather than owners of cattle.

That is, direct support should be given to a broader range of livestock owners, and aimed at livestock that require less support to keep alive (per unit) and meet the needs of a greater number of low-income consumers.

Support to small-scale cattle farmers should be directed at restocking breeding cows once the risk of drought is over. If they have guarantees of state support to do this, farmers should be persuaded to reduce herds and focus on keeping a smaller number of breeding stock alive.

Land should be redistributed to small-scale and emerging commercial farmers, with appropriate technological and production support, including access to credit and produce markets, subsidised insurance and climate adaptation strategies.

The extension of irrigation to stimulate the rural economy, as proposed in the National Development Plan, should be subject to ongoing review.

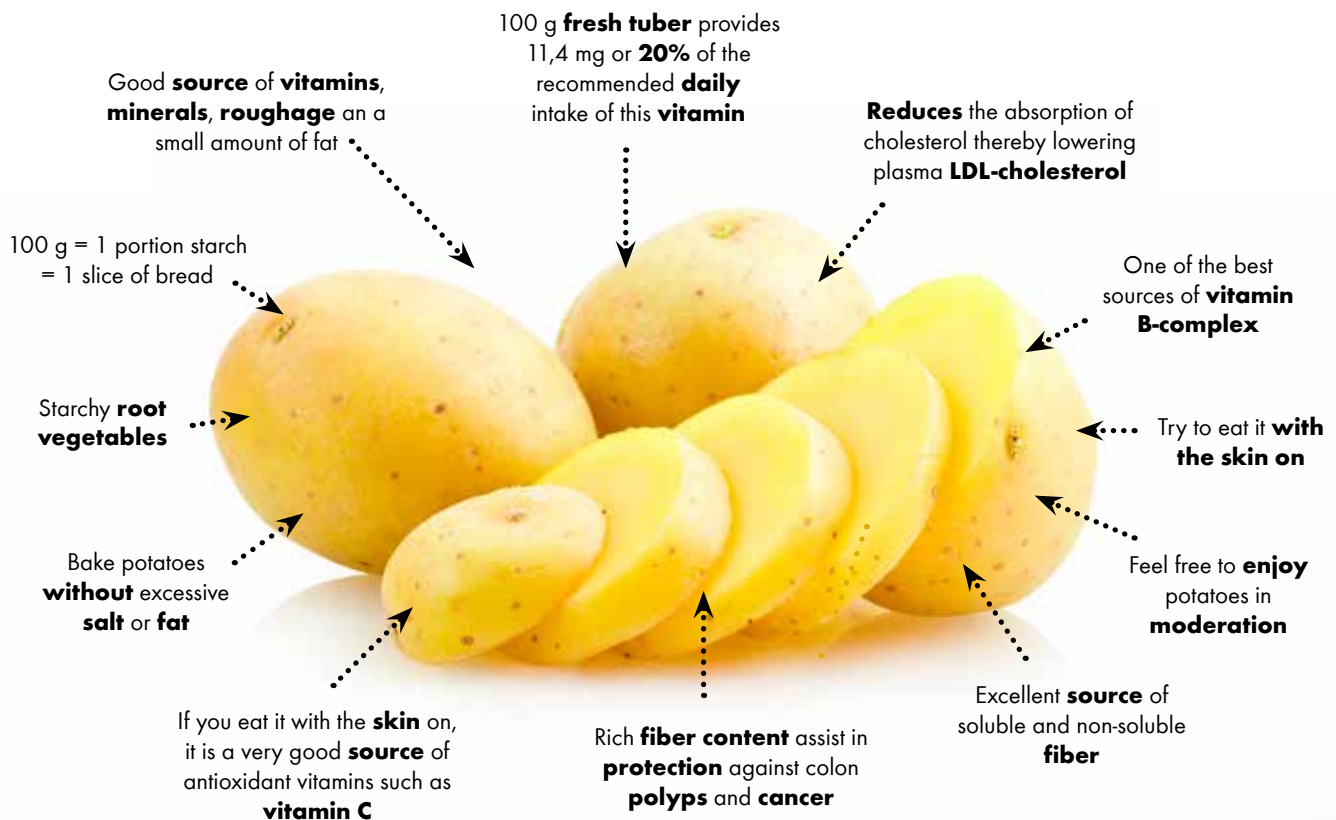
Bigger allocations of public funds should be made to develop and support climate-adapting and agro-ecologically resilient small-farming methods, which are less water-demanding and are geared to meeting multipurpose household farming systems.

Yves Vanderhaeghen.

This is an edited summary of the Oxfam report, "A Harvest of Dysfunction", by Donna Hornby, Yves Vanderhaeghen, Dirk Versveld and Mngqobi Ngubane. The full report is available at www.oxfam.org.za

What you have to know about potatoes

Goodness from the earth



Potato industry in South Africa
R23 billion worth

per capita used
Growth annually between 2% -3%

Contributes
R6,6 billion to SA's economy

Annually creates
Between 45 000 and 50 000 job opportunities

Potatoes contain
0,1% fat per **100g**

Potatoes are produced
in 16 production regions in the country

2,24 billion tonnes produced annually is nearly equal to the **combined** production of tomatoes, onions, sweet corn and green vegetables

Pure goodness, pure profit

Helping emerging farmers to benefit from profitable potatoes

Potatoes are among the most lucrative crops on the market today, and promise to help transform South Africa's agricultural sector. To find out more, Harvest SA spoke to Dr André Jooste (CEO Potatoes SA), Nomvula Xaba (Manager Transformation) and Hanrie Greebe (Manager Communication).

What is the current status of potatoes?

The potato sector is a significant role player in the South African agricultural economy in terms of its contribution to the gross value of agricultural production. Taking the combined value of the field crop and horticultural sectors, potatoes represent the fifth biggest agricultural sub-sector, and this when merely between 50 000 and 54 000 hectares are used for potato production (less than 1% of the available agricultural land). Annually approximately 2.24 million tons are produced in 16 production regions, creating between 45 000 and 50 000 job opportunities. South Africa produces fresh potatoes 12 months of the year. The primary potato industry is valued at R6.6 billion. When the secondary potato industry is included the industry is worth R23 billion.

Potatoes are lucrative, yet the number of potato producers has fallen considerably. What factors account for this?

In the past two decades, the potato industry underwent significant structural changes. The clearest indicators of change can be seen in the number of commercial potato

producers. Just before the turn of the century, there were nearly 2000 commercial producers. This number has shrunk to fewer than 600. This occurrence is similar almost all over the world. Economies of scale are becoming increasingly important in potato production, especially seen from a production cost point of view, due to the tightening cost-price squeeze phenomenon. Since the cost of investing in the potato industry in terms of capital outlay, such as a packhouse, sorting machines and other potato production equipment, amounts to several million Rand, potato producers are forced to sell larger volumes of potatoes to justify the initial investment costs.

Also, at production level, the quality of the product that ends up on the consumer's plate has significantly increased and also changed. Through innovation, the leading potato producers constantly raise the bar and other producers simply have to adapt accordingly to stay in business.

If economies of scale are so important, do emerging farmers have a chance of entering the market?

It is a fact that economies of scale are critically important and hence the reason why Potatoes SA has over the years been revising its enterprise development strategy to ensure that the emerging farmers are benefiting from the support provided. When the Enterprise Development Programme started, the focus was to support six farmers with only five hectares of potatoes per farmer. After realising that it might take a while to have

real commercial farmers from the Enterprise Development Programme, and also realising that the emerging farmers were farming at a very small scale, thus depriving them of the benefits of the economies of scale, Potatoes SA then decided to focus not only on the number of people on the programme but rather on the number of hectares planted. In short, Potatoes SA endeavours to support emerging commercial producers to reach 30 hectares planted with potatoes as soon as possible since this is regarded as a commercial viable unit, provided they have access to enough land.

What can Potatoes SA's enterprise development programme do to help increase the number of black potato farmers?

Potatoes SA's Enterprise Development goal is to assist in setting up viable potato businesses for black farmers and thus increase the number of black people farming with potatoes. To achieve this, Potatoes SA engages with new potential potato farmers by identifying them and conducting pre-feasibility studies, which mainly looks at the availability of land, input costs and other resources. Support in the form of seed is provided to the new farmer on a sliding scale basis for a period of four years. This is to ensure that the farmer can re-invest back into their farm to guarantee sustainability once they exit the programme. Technical support is provided to the farmer to ensure understanding of the technical aspects of potato farming. Potatoes SA makes it compulsory that farmers have access to a mentor to ensure that they

adhere to the correct procedures at the correct times. Due to the challenge of access to finance, Potatoes SA is constantly working on developing partnerships where funding to assist more black farmers can be unlocked. Potatoes SA is also working with other commodity organisations with farmers on their programmes who can easily be introduced to potato farming due to them having access to resources such as machinery and infrastructure.

What has the response been from participants in the programme?

The cost of potato production is high and any support in terms of funding is always welcomed by the farmers, more especially the emerging farmers who are just starting up. Potatoes SA only supports the farmers with seed, training and mentorship. The cost of seed makes up about 30% of the production costs, and the funding provided by Potatoes SA provides significant relief for the beginner potato farmer. Farmers have responded very positively to the Enterprise Development Programme supported by Potatoes SA. A few farmers have left their jobs and are focusing on being full-time potato farmers as they have realised that it can provide a decent living.

What success stories have there been?

As mentioned, the initial aim of the Enterprise Development Programme was to assist a maximum of six farmers per year with up to a maximum of five hectares each. The idea was that after the four years on the

programme, farmers would be self-sustainable. Potatoes SA however realised that only towards the fourth year were farmers starting to be fully engaged in potato production and mastering technical aspects of potato production. A decision was made to refinance some of the farmers who had shown commitment and passion for potato production. An additional four hectares of seed was supplied to these farmers to expand their production. To date many of these farmers have expanded beyond the number of hectares that were funded by Potatoes SA. They have gone the extra mile and used their own funding to plant additional hectares, as they have realised that potato production is a viable business in which to invest. Through learning curves, these farmers have obtained the knack to face challenges and seek solutions within their individual unique farming practices.

In your view, what could the potato sector look like in ten years' time?

Due to the cost-price squeeze effect, potato farmers are constantly forced to become more productive. From a production point of view, new technologies will become more vital over the next decade to support the sustainability of the industry. This will include, amongst others, new and advanced cultivars, increased adoption of precision farming, enhanced chemical applications, increased efficiency in pack houses, etc. Demand for potatoes remains strong and is growing as consumers realise the value proposition that potatoes offer as a healthy and nutritious

product at affordable prices. There is a substantial potential to expand the demand for potatoes. The processing industry has experienced significant growth over the past ten years and this growth is expected to continue as consumers' lifestyles are changing. Export potential to the rest of Africa is considerable and is expected to become an important offset channel for locally produced potatoes. South Africa has a world-renowned potato certification scheme, which will support the sustainable growth of the potato industry, enabling farmers to take advantage of the opportunities that exist on the local and export markets.

How can established farmers become involved in the programme?

Mentorship for emerging commercial potato farmers is regarded as critically important due to the technical skills required to farm with potatoes. Established commercial potato farmers can play an invaluable role to support these farmers, including, but not limited to planning, soil preparation, planting, caring for the crop during the production season, harvesting, sorting as well as packaging. However, such support is not restricted to production processes only. Mentors can also provide guidance and assistance in terms of marketing potatoes. In addition, established commercial potato farmers can become involved in the Small Grower Development Programme that aims to support communities to produce potatoes, which is critically important from a food security point of view.



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Observe, measure, respond

Turn your business around with intelligent farming



Intelligent or smart farming is a farm management concept based on observing, measuring and responding to crop variability in a specific field or between different fields. It can be applied to almost any farming operation, whether it is crop or animal production. Smart farming practices are used to make farm production more efficient so that farmers and soil work better and not harder.

When mentioning smart farming, usually images generated from satellites come to mind. It is true that GPS (Global Positioning System) and GIS (Global Imaging System) can be an integral part of smart farming practices, but they are not the only "smart" tools available. The technology used with drones has brought the cost of operating these machines down and the images generated have much better resolution, for example. GPS, GIS and images from drones

can be used to monitor moisture levels, evapotranspiration, nitrogen levels, biomass, etc. This is an easy tool to access as it is normally internet based, but data needs to be collected over an extended period to make an informed decision.

These imaging technologies are very helpful in creating an overview of what is happening and determining the exact position where it is happening. Working on the ground, however, requires tools that can be used every day to make production more efficient. Examples of these are:

- GPS Equipped Tractors, seeders and harvesters will track their position and be guided automatically. Seeders and sprayers can be guided to prevent overlap, while fertilizing is done according GIS soil map to optimally distribute these resources. Variable rate irrigators can be guided to optimally apply water, and combine harvesters will monitor crop yield as the field is harvested. The circle is completed and

can be adjusted in the next season to be optimised even further.

- A farm weather station can be used to monitor: temperature, humidity, wind speed, wind direction, solar radiation and rain. This data can be used to determine evapotranspiration and for disease models predicting potential crop problems.
- Soil and water analysis is not only used for crop or fertilizing decisions, but also helps manage and understand irrigation scheduling and systems. By knowing the water-holding capability of different soils, informed irrigation scheduling decisions can be made. On the other hand, irrigation water quality can not only influence your crop, but also cause blockages of the irrigation system. If the condition of the water is known, peroxide, chlorine or acid can be injected to keep the system clean.
- Soil moisture probes represent a very useful tool to optimise irrigation water use and improve crop quality and yield.

When changing the amount and frequency of irrigation for different soil types and crops, not only will the crop benefit but pumping time and therefore cost can come down.

- Automation and monitoring systems for irrigation is also a tool that has become a necessity and is not a luxury any more. Irrigation can be applied timeously and labour cost brought down while monitoring dam levels, pumps, filters and valves accurately.
- Crop fertilizing can be done effectively by introducing liquid fertilizer into the irrigation system. Dosing pumps or venturi systems can be used for nutrient injection. Depending on the type of system (open field or hydroponic), different control systems are available to control the injection process either volumetrically or based on EC and / or pH levels.
- Another technology available is farm management software. This is a tool to help

manage: labour, vehicles, fuel, equipment, etc. These resources can be managed and monitored effectively and even help to identify theft.

- The above-mentioned smart farming practices combined with higher value crops can generate huge returns on investment. Producing what has always been produced is simply, in some cases, just not good enough anymore. Thinking out of the box and taking a "smart" risk can lead to totally turning a farm around.

There are a lot of tools available to farmers today and it can be difficult to decide what to use and what not to use. As a starting point, I believe it is good practice to start using tools that will improve the way things are done currently. Take small steps and make small changes, but always grow towards the bigger goal.

Jacques Millen

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Double-edged sword

Land reform favours businesses, not the poor, say researchers

Land reform is favouring agricultural businesses and sidelining the intended beneficiaries, research in the Eastern Cape suggests. In a recent study of land reform in the Sarah Baartman district in the Eastern Cape, researchers Ruth Hall and Thembela Kepe found that none of the 11 beneficiaries investigated had any documented rights to their land.

In two cases, the leases to the land were between the government and “strategic partners”, not the beneficiaries. Strategic partners are agricultural businesses or experienced farmers. “In both cases the people involved as strategic partners are established farmers or representatives of large agribusinesses, and all those we came across were white men,” state the researchers. In both these cases, the farms were handed over by the government to an agricultural business and the farmworkers were then signed up as “beneficiaries”.

In one case the “strategic partner” ran the farm as his own operation. The beneficiaries were treated as employees and paid below minimum wage.

Hall and Kepe say the system continues to favour large agricultural businesses and commercial land use, while the intended “beneficiaries” are side-lined. The authors believe that cases such as these bring into question “whether state funds for ‘redistribution’ are being used to provide agribusinesses with cheap or free access to land in the name of redistributing land to rural people”.

A bleak picture is painted of a land reform programme “in crisis” where beneficiaries receive “little or no tenure security”.

Land reform has changed from a system where the state assisted poor households to purchase land, to one where the state purchases the land and then “leases” it to beneficiaries.

The authors explain that originally beneficiaries were to have ownership transferred to them after a period of renting the land, but due to “widespread non-payment of rent”, a new policy was implemented. This policy stipulates that the beneficiaries sign 30-year leases, which are renewable for 20 more years, and only then will the state consider transferring ownership to the beneficiaries.

For beneficiaries to qualify for support for production and infrastructure on the farm they must have a “strategic partner”.

The study describes how land reform has moved from “prioritising secure tenure as a basis for poor black South Africans to make their own land-use decisions” to one where there is a “highly prescriptive managerial approach” that contributes to the prioritisation of commercial land use, wealthy beneficiaries and agriculture businesses.

The researchers say land reform has been “contorted” with policies on poverty reduction and rural livelihoods appearing to “have foundered in practice”.

The Department of Rural Development and Land Reform did not respond to questions concerning the findings of the research but did elaborate on some of its own processes.

The Department said that before the new lease policy of 2013, beneficiaries were given the option to purchase their land at a future date at market value price.

The new lease policy was implemented following “an outcry” by beneficiaries who took issue with the short-term contracts, which did not give them financial security or the opportunity to get funds from financial institutions to increase production or buy the land.

The Department explained that the new lease policy does not give an option to purchase to households who have “no or very limited access to land even for subsistence production” or to small scale farmers “who have been farming for subsistence purposes and selling part of their produce on local markets”. Only medium scale or large scale commercial farmers whose growth is constrained by the size of their land, will qualify for a lease with an option to purchase.

As to how the beneficiaries are chosen, the Department explained that there is a committee in each district, chaired by an elected farmer, which chooses the beneficiaries. The committee itself is made up of representatives from farmer unions, local and district municipalities. These beneficiaries are chosen by looking at the enterprise or land use of the farm. Applicants themselves indicate what enterprise they are interested in and the allocation is based on that.

“A list is drawn from the database of applicants who meet the set criteria. Each applicant is discussed fully and sometimes the committee might invite the applicants to present their cases where more clarity is needed,” said the Department.

Ashleigh Furlong

This article first appeared on Ground Up.



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Africa's potential

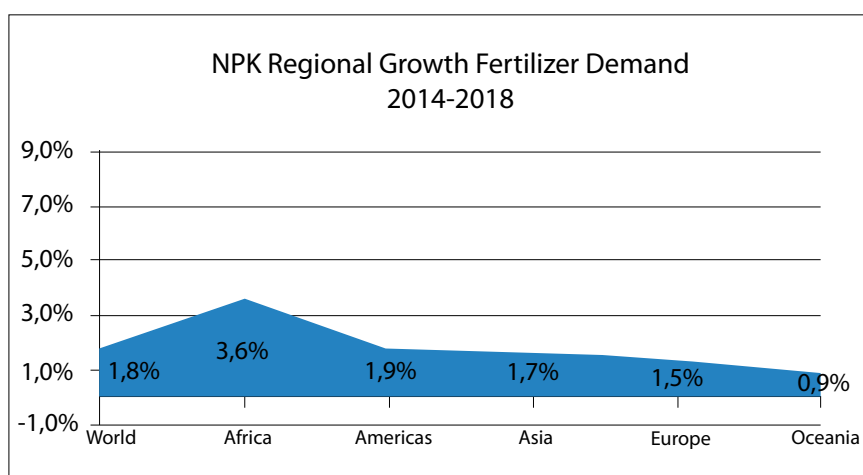
Considering Africa's size and exploding population, it's little wonder that industry experts see enormous business potential for the fertilizer industry on the continent.

Analysing some facts of Africa, it's the second largest continent in the world with more than 30 900 000 km² of total area and also the second largest world population with about 1.2bi of people, it means that we have a huge area to work on. And the key for its development is partnerships.

Africa has receiving more than USD30bi of foreign investments for the fertilizer market since 2012 till now. Huge corporations and others are coming to invest in agribusiness in Africa and creating local opportunities as well. Bagtech has a Japanese company as its partner: Toyota. Bagtech delivered a fertilizer blending plant to them in Kenya in 2016, and the company projects 2017 better than 2016.

With more than 60% of its 1.166 billion people living in rural areas, Africa's economy is inherently dependent on agriculture. More than 32% of the continent's gross domestic product comes from the sector considering that food is the basis for humans.

According to The World Bank and US Department of Agriculture projects that agriculture and agribusiness in Africa will grow to be a US\$1 trillion industry in Africa by 2030. To promote this outcome, the continent must review its incentive structures. Over the next decade, fertilizer use is projected to increase by almost 2 percent annually, which is consistent with overall crop production growth trends.



In the North of Africa is possible to find one of the largest phosphate reserves in the world as well the main exporters of fertilizers in Africa.

The main consumers of fertilizer in World are China, India, USA and Brazil which are considered more developed areas using more fertilizer per hectare than Africa. And the main consumers of fertilizer in Africa are Egypt, Morocco, Nigeria, Kenya, Ethiopia and South Africa respectively. According to FAO, Africa growth fertilizer demand will increase more than others continent with 3.6%. So why not believe in Africa?

Bagtech

They have a long history in Africa. A company that always think and act in a positive vibe.

Bagtech is proud to be an African company which started its activities in 80's when

the coffee market was booming. By that time the company was offering services for coffee market in Africa, and after some years started to develop its own equipment for agri industry. "We had a long and hard way to become who we are today, and nowadays we provide services and equipment from Africa to Africa focus on fertilizer market." Fred Coelho, Managing Director. The company's main goal is to offer their clients all their expertise in the fertiliser and agro-industry by providing consultancy, equipment and services around Africa.

Most of fertilizer equipment found in Africa region has more than 30 years old and most of them are in a bad condition due to lack of maintenance. Maintenance is essential every day since fertilizer product is a very corrosive product. Bagtech team is always present at the customer's facility providing



service and showing how to clean the machine after work. It can impact on customer's production if it is not clean proper, also can rust the machine.

Developed in a partnership with Festo, Bagtech equipment comes with an advanced technology which can be controlled by online system from anywhere with your laptop or cell phone.

"In my view, Africa needs to encourage African companies and give the opportunity to show that we also have technology and knowledge to offer. When you encourage local content, you create local

jobs, companies can invest on technology and on people.

Both can grow together" says Fred Coelho. Bagtech has grown significantly and currently employs 150+ workers having as its clients the main players in fertilizer market such as Toyota Kenya, TWK, ETG, Yara and others.

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Build your herd

Rapid livestock increase for revenue

For many livestock farmers, it is the proverbial case of “getting back up off the floor” after the drought conditions that prevailed over large parts of the country and led to a reduction in herd numbers. The challenge is now to increase numbers as quickly as possible to generate income again.

The most obvious option is the buy-in of replacement breeding stock. The problem with this option is firstly availability and secondly the price premium you will pay! The second option is the optimisation of the reproduction rate of your current herd. How do we achieve this? The answer is simple – “back to basics”. Basics does unfortunately not mean simple or easy. Careful planning and dedication in execution will be required to achieve optimal results.

Reproduction rate is the crux of economical livestock farming and it will be even more important in a herd-building phase. The better the reproduction rate, the more replacement animals can be selected to increase the numbers of breeding stock. During the herd building phase, we can compromise a little bit on “quality”, especially with non-stud animals. Keep and breed as many replacement heifers/ewes as possible and only cull the real runts at weaning.

Condition is the most important factor in achieving maximum reproduction rates. Condition score is mainly determined by the nutritional status of the animal during the reproduction phase. In sheep, where multiple conceptions are possible, it is even more important. All management actions should be focused to achieve optimum condition during mating. To achieve optimal body condition score at mating time, proper fodder flow planning should be done to provide the necessary quantity and quality of feed during each production stage. The correct supplementation should be given to correct for imbalances in nutrients like protein, energy, minerals and vitamins.

Trace mineral and vitamin supplementation: the supplementation of trace minerals is one of the most under-rated aids in optimising reproduction and the survival rate (immunity) of animals. We are long past the general belief that one should start supplementation only when clinical symptoms surface. The immune system of the animal is the first to suffer from sub-optimal trace mineral and vitamin levels

(leading to vulnerability to all sorts of diseases and increased mortalities and poor performance). Next to suffer is maximum, and then only normal growth and fertility, before clinical symptoms appear (see figure).

Although most commercial licks contain trace minerals and vitamins and provide a base supplementation, they have certain short-comings.

The effect of antagonists (Ca, Fe, S and Mo) in the digestive system on the absorption of certain trace minerals, the variation in intake between animals in the herd (trough space and dominance) and the elevated demand of trace minerals during critical times such as breeding, lambing/calving and weaning, justifies the use of a “TOP UP” injectable supplement that is complete, balanced, bio-available and proven to be effective.

Parasite control: the control of internal and external parasites is not only important to optimise growth and condition, but also to minimise mortalities. Sheep are very vulnerable to internal parasites. Liver fluke has a huge negative impact on the performance of animals.

The liver performs or supports so many vital functions in the body that it is crucial for it to be in pristine condition (free of liver fluke). Ticks transfer fatal diseases like hart water, red water and gall sickness. The presence of lice causes immense irritation and loss of condition.

Vaccinations: many diseases and mortalities can be prevented through the implementation of a proper vaccination program. Farmers can't afford a reduced reproduction rate and mortalities through diseases that can be prevented by vaccination.

Determination of breeding fitness: it does not help if farmers spend a lot of time and money to get females in good breeding condition, trace mineral supplementation, treat parasites and vaccinate the herd, and then the breeding bulls/rams are not tested for fertility, ability to mate and libido. The whole herd should also be tested for the presence of sexually transmitted diseases.

These conditions/diseases can undo all the hard work done and result in poor reproduction rates.

Danie van Niekerk – Manager: Technical Support, Virbac RSA

Synergy in the soil

Plants and microbes help each other thrive

Microbes are an essential factor in plant management, and the more there are, the better. The current chemical approach to their control perfectly fits the definition of "unsustainable": more chemicals are used every year and still the disease and insect pressure increases each year. The recent trend is towards more sustainable practices involving the monitoring of soil life, including earthworms, protozoa, cellulose digesters, nitrogen fixers, phosphate solubilisers, nematodes and many other organisms responsible for nutrient delivery.

The higher the number and the diversity of microorganisms living in the root zone, the more efficient the utilisation of minerals from the soil. The lower the number of microorganisms, the more the need for toxic chemicals.

There is a clear link between microorganisms and disease resistance: plants rely on microorganisms to make nutrients available and in exchange give the microbes 30% of their plant sugars.

That's why it is so important to make sure your carbon levels are high, as this is the microbes' habitat. Then reduce toxic chemical sprays and increase microbial application to reward your plants for that 30% of energy that they sacrifice to the soil. The microbes live from these plant sugars and in exchange give the plant nutrients, enzymes, vitamins, hormones, ATP production, disease and nematode suppression.

With this in mind, a complete plant management plan would involve the following elements.

Bio-fertilisation

Bio-fertilisation is the making available of elements in the soil and then moving them and/or fertilisers into the plant's roots – against the laws of physics.

Microbes produce a slime layer around the roots that always has a pH(H+) above 7. At that pH most of the elements are plant available. Microbes that are essential to bio-fertilisation are azotobacter for nitrogen fixation, pseudomonas fluorescens, a phosphate solubiliser, bacillus, for nitrogen fixation, phosphate solubiliser and ATP production, Mycorrhizal Fungi, which penetrate the roots and deliver moisture and nutrients, nitrogen-fixing nematodes, and protozoa, which are involved in mineralising nutrients.

Hormone production

Bacillus bacteria are mainly responsible for the production of plant growth hormones in the soil. Some of these hormones include auxins, which promote cell division. Cytokinins are responsible for plant roots and shoots, cell growth and differentiation. Gibberellins are responsible for stem elongation, germination, flowering, enzyme induction and to regulate fruit and leaf ageing. Kelp is a brilliant product to give plants these hormones, but remember that the plant needs this specific plant growth hormone at specific times. Microbes produce these hormones when the plants need it most.

Disease reduction

Microbes are a brilliant tool in disease reduction, being natural, sustainable and cost effective. The microbe that most will know will be trichoderma, a fungi that is very effective in root disease control. Lately there have been some rumours

that it controls leaf diseases as well especially the harizanum strain. It is always a good practice to use bacteria and fungi in conjunction, especially with your bacillus strains, as bacillus is a very aggressive quick-acting bacteria whereas trichoderma has a longer working action.

These microbes' mode of action are through competition, antagonism, the production of antibiotics, siderophores and SARS (Systemic Acquired Resistance Syndrome).

Soil pest suppression

When the topic of soil pests is raised, nematodes will be the first victim. Some farmers try to do something about it and others deny the fact that this destructive microbe is the reason for bad yields. Nematodes get controlled mainly by chemicals, but the export and food industries have started to ban these toxic chemicals.

Biological control of nematodes holds lots of positive prospects. Microbes that have proved successful are bacillus, nematode-trapping fungi, arthrobotrys, and paecilomyces lilacinus strains.

Legume inoculation

Legume Inoculation is a practice that the industry has used for quite a while now and the inoculants are widely available. These inoculants contain highly sensitive bacteria, which is why it is so important to apply these products correctly and more regularly.

In using these bacterial products, the most important aspect in choosing what company and what product to use, you need to look at the bacteria strengths and durability.

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Forging ahead

Agri-parks and sun farming set to revitalise agriculture

President Jacob Zuma says agriculture is one of the powerful tools that can unearth jobs and realise the goal of radical socio-economic transformation. Addressing dozens of residents in the West Rand at the Westonaria Agri-Parks on Tuesday, President Zuma said government wants to bring approximately 300 000 new smallholder farmers into the agricultural sector and to create 145 000 new agro-processing jobs through the Agri-Parks Programme.

The programme is also aimed at bringing one million hectares of land into production.

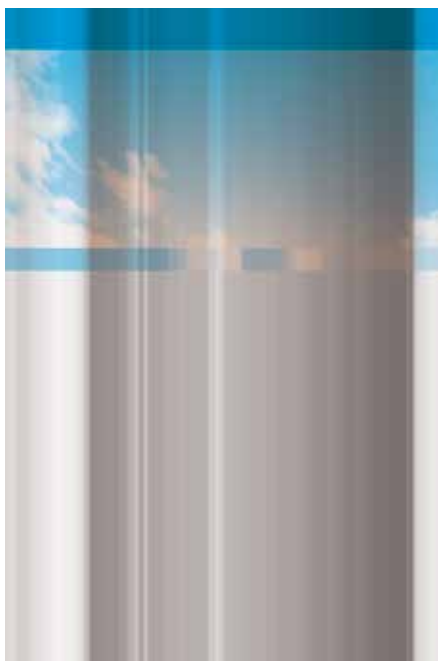
"The intention of the Agri-parks Programme is to ensure that farmers own at least 70% of the wealth creation opportunities created by the programme. We look up to the agricultural sector to create more jobs for our people," said President Zuma.

He said Agri-Parks are part of government's drive to radically transform the South African economy so that millions of African people, including women, youth and people with disabilities, are brought into productive activities and ownership within the mainstream economy.

The key pillars of the programme include supporting producers and helping them to get markets to sell their produce. It is also about fast tracking land reform.

The Department of Rural Development and Land Reform, in partnership with the Department of Agriculture, Forestry and Fisheries and other spheres of government, is rolling out the Agri-Parks Programme to all 44 districts in the country.

"We want to see the Agri-Parks Programme contributing to the growth and development of the economy. We remain resolute



in our commitment to build a better South Africa and create opportunities for all of our people," said the President.

Putting the land to good use

Ahead of his address, President Zuma conducted a site visit to various agri-projects in the area. He spoke to some of the staff members already working on site.

The President said he was impressed that Agri-Parks were creating jobs for people with disabilities.

There were 10 gardens of lettuce, run by a group of 10 young people with disabilities. The young farmers told the President that they have a dream of expanding their gardens so that they can employ more deaf people, and they hope to create jobs for deaf people in other provinces across the country because it is difficult for deaf people to get jobs.

They said they already have a market and they supply their products to companies.

The Director at the Gauteng Department of Agriculture and Rural Development, Motlatjo Makaepa, told SAnews that six of the seven Agri-Parks in the province are almost complete.

Some are partially functioning, while one is still under construction.

"The one in Westonaria is a farmer support production unit. We have infrastructure for primary production, which is the hydroponics tunnels, where we use the old conventional technology. We also have a high-tech hydroponics tunnel.

"We have a pack house, where the produce is packaged after it has been harvested. In the pack house, we have cold rooms.

We also have an office facility that is used by the three co-ops which are operating from inside, and also the farmers. We also have a training room where farmers will receive training," said Makaepa.

He said the Agri-Park has about 60 people currently working on site, including farmers and co-ops, but the department has a target of increasing the number to 150.

Makaepa said there is a possibility that more than 150 jobs will be created at this Agri-Park alone because there are farmers who work at their own sites, who need some of the facilities at the Agri-Park.

Structure of Agri-Parks Programme

- The Agri-Parks Programme is underpinned by 10 guiding principles, namely:
- There will be one Agri-Park per District Municipality.
- Agri-Parks are managed and owned by smallholder farmers.
- Agri-Parks act as the catalyst around which rural industrialisation will take place.

- Agri-parks will be supported by government for 10 years to ensure economic sustainability.
- Agri-Parks will strengthen partnerships between government and private sector by ensuring increased access to services such as water, energy and transport as well as production, while strengthening existing markets and creating new markets to develop and expand value chains.
- Agri-Parks will maximise benefits to existing State land with agricultural potential in the provinces, where possible.
- Agri-Parks will maximise access to markets for all farmers, with a bias to black farmers and rural communities.
- Agri-Parks will catalyse the use of high value agricultural land. Too much of it lies fallow in rural areas.
- Agri-Parks will widen the use of existing agro-processing, bulk and logistics infrastructure, including having availability of water, energy and roads.
- Agri-parks will support the revitalisation of rural towns and promote rural urban linkages.

Sun farming technology spells good news for food security

Agriculture, Forestry and Fisheries Minister Senzeni Zokwana has commended a farming

project, which harnesses the power of the sun to grow vegetables. The Minister recently visited the SUNfarming project, situated at the North West University in Potchefstroom.

The solar powered vegetable growing project was born from a partnership between SUNfarming and the University of Potchefstroom in 2013, establishing the first Solar Training Centre in South Africa. The centre has trained over 450 people since 2013, providing skills on solar photovoltaic (PV) technology.

The project began production in June 2016, producing tomatoes, spinach, cauliflower and other herbs. No soil is required to grow vegetables in the project's tunnels and water productivity is increased through drip irrigation.

The project has three tunnels, with six young women trained per tunnel. Solar tunnel production has much higher yields compared to conventional farming.

"The project provides an opportunity to grow affordable and nutritious food in local municipalities.

This is an opportunity to effectively address household food and nutrition insecurity.

"This is innovative technology for agriculture and we want to see this replicated in other parts of the country, as it effectively

deals with the issue of climate change and the scarcity of water and land," said Minister Zokwana.

Buni Maretlwa, one of the workers at SUNfarming, said she was excited to have been in the first group of people who were trained in this project.

"We are no longer planting our vegetables using the soil, but coco fibre. Our system of farming saves water.

Our vegetable pots are irrigated on time and we produce fresh vegetables," said Maretlwa.

Professor Fika Janse van Rensburg, the University of the North West Potchefstroom Campus Rector, said the North West province is blessed with a lot of sunshine, and all that was needed was creative, innovative minds to come up with great initiatives to make use of the sunlight in order to increase agricultural production.

"Sun farming is good for our future... In Potchefstroom, we have more agriculture land that must be utilised."

Tlokwe Mayor Kgotso Khumalo was pleased with the potential sun farming presents.

"I am excited about the project and the potential it has for our municipality. I want to pledge our full support to this project." –

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Supporting smallholder farmers

Vodacom takes agriculture into the cloud

Vodacom has partnered with the Deutsche Gesellschaft für Internationale Zusammenarbeit (GIZ) on behalf of the German Government and Manstrat Agricultural Intelligence Solutions to launch a mobile technology solution to support South African smallholder farmers into commercial agriculture. With an estimated combined investment amount of €1.5 million (around R21 million) over three years, the 'Connected Farmer' platform, a cloud-based web and mobile software solution, will link thousands of smallholder farmers to the agriculture value chain enabling access to information, services and markets.

The Internet of Things (IoT) has a much wider impact on nation economies and in the case of agriculture, IoT is expected to help improve agriculture productivity, address food security, create jobs and increase incomes in the agriculture sector. The project will support participating agribusinesses to promote sustainable agricultural practices among smallholder farmers.

Vuyani Jarana, Chief Officer for Vodacom Business, says: "Vodacom believes that ICT provides innovative solutions to address Africa's societal and economic challenges. Leveraging the successful implementation of Connected Farmer projects in East Africa, we are laying the foundation for inclusive growth in the agriculture sector through integrated value chains in agriculture. Africa is a net importer of cereal, yet it is endowed with greater proportions of arable land. For Africa to be able to feed itself, the application of ICT based solutions like the Connected Farmer is critical."

Christiane Kalle, GIZ Country Director South Africa and Lesotho, says: "German development cooperation views ICT solutions as having huge potential to support smallholder farmers in the commercial agriculture segment through linking farmers and agribusinesses to potential buyers and services. At the same time, we find that producing agricultural goods sustainably and at high quality, is key to the farmers' success. With this initiative, we address both of these challenges and expect significant employment effects."

Food security in South Africa remains a challenge, with just 30 000 commercial farmers being responsible for most of the country's food production. Over 200 000 smallholder farmers and an estimated 2 million subsistence farmers have an important role to play in food security and poverty reduction, yet their access to markets, information and finance is limited or non-existent. There is also a lack of available data on smallholder farmers and their supply chains, which is a barrier to informed decision-making by agribusinesses and policy makers.

Mobile ICT solutions such as Vodacom's Connected Farmer platform will help to address this by providing farmers with the services they need. This promotes sustainable agricultural practices, enhances productivity and, most importantly, reduces risk. Sourcing from smallholder farmers as a result becomes more realistic and executable for food manufacturers and retail businesses, increasing the number of smallholders and subsistence farmers in commercial agricultural value chains. This has been proven in the deployment of the Connected Farmer platform in East Africa.

Jarana says: "Digitising the agricultural value chain means that smallholder farmers will

benefit from access to information and markets. Vodacom and its partners will enable this while reducing some of the risks carried by agribusinesses. Vodacom's ICT services enable enterprises to have real time visibility of their supply chains, as well as the ability to engage and communicate with smallholders directly."

The Connected Farmer platform is aimed at connecting enterprises, small and commercial agribusinesses, NGOs and farmer associations. Vodacom's partnership with GIZ will provide commercial and operational support to link thousands of farmers to this platform, enhancing the sustainability and longevity of the initial deployment of the service in the South African agriculture sector. The launch of this platform further complements the current Internet of Things platforms which Vodacom has launched into the various markets and segments.

A farmer can use any mobile device on any network to access the Connected Farmer's platform and through SMS receive valuable information including weather forecasts and market prices. Farmers with smartphones can access the same platform with increased capability to access additional content. Through the partnership with Manstrat Agricultural Intelligence Solutions, a local developer of Agricultural Decision Support Systems for the past 25 years, Vodacom will provide farmers and enterprise users with access to a broad and deep reservoir of relevant and expert content.

Agribusinesses pay a monthly service fee per farmer and per mobile enterprise user, who are provided with the requisite hardware, software, training and support as a managed service.

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- Increased access to quality information and more informed decision making
- Less risk in transacting with Smallholder Farmers
- Improved farmer database management and security for authorised users
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