

Issue March/April 2017

# Harvest SA

Securing South Africa's Food Resources

**Out of  
control**

The fall army-worm  
is on the loose

**Water  
of life**

Successful  
management  
strategies

**Growing  
knowledge**

Protect your crops  
the smart way





# DISCOVERING THE VALUE OF OLD KNOWLEDGE THROUGH MODERN TECHNOLOGY

Harnessing old knowledge pertaining to plants can lead to the development of new products for topical application

**A** number of plants have been proven to have positive effects on skin problems such as melasma, spots, pigmentation and acne, and effective cosmeceutical prototype products have been prepared from them.

Prof. Namrita Lall, who chairs the Department of Science and Technology (DST)—National Research Foundation (NRF) Research Chair for Plant Health Products from Indigenous Knowledge Systems (IKS) at the University of Pretoria—is doing outstanding work in this field.

Prof. Lall is quick to point out that seeing these products on a supermarket shelf is still a long way off, but the wait will be worthwhile.

"We are now working on scaling up the processes for extracting valuable compounds from the plants, so that they can be used on a commercial scale," she says.

The DST's Indigenous Knowledge-Based Bioinnovation Programme uses an Ubuntu-based model, which is inclusive of indigenous knowledge holders and community-based structures.

It comprises six platforms in African medicines, cosmeceuticals, nutraceuticals, health beverages, incubation (technology transfer) and commercialisation.

The DST annually invests R10 million in its IKS programme to promote and support research into IKS and its role in science, innovation and community life.

Prof. Lall is looking at harnessing IKS for the use of cosmeceuticals while securing benefits for the communities growing these plants.

Together with one of her PhD students, Richa Sharma, Prof. Lall is exploring the use of the *Leucosidea sericea* shrub (also known as oldwood) and has found that chemical compounds in its silky grey leaves reduce the inflammation caused by a particular acne-causing bacterium. The plant is traditionally used as an astringent and, during scientific investigation, has been a proven treatment for acne.

The work on oldwood is close to commercialisation and a bioprospecting permit has been obtained from the government for this indigenous plant.

*Helichrysum* has been proven in clinical studies to boost sun protection.





The DST supports local communities involved in IKS initiatives by providing financial and technological resources.

Not all laboratory work yields results. On average, only 2% of research reaches a stage where it can subject a product to clinical studies.

"As with any research field, results don't come easily," says Lall. "It takes hard work, whether you are a man or a woman, to be successful in a particular field. Of course, it helps a great deal if you are passionate about what you do; it helps you to handle the pressures and disappointments a lot better."

Prof. Lall is equally passionate about a future where products from indigenous plants will not only benefit companies and consumers, but also the local communities from which the plants and indigenous knowledge come. "I dream of seeing small factories in local communities where they can process the plants and produce the products themselves," she says.

In this context, she has also demonstrated her commitment to various communities around the country by engaging them to obtain a better understanding of their indigenous knowledge and by working to develop cosmeceuticals from local flora. The professor is working with communities in Mamelodi (Gauteng), Edakeni (KwaZulu-Natal) and Ndabakazi (Eastern Cape) where the plants are harvested.

Greenhouses have been established in Mothong in Mamelodi and there are plans to erect an additional warehouse and a drying facility at the site to enable the community to benefit from the plants themselves by drying and packaging.

The new cultivation technologies developed have been transferred to the farmers to capacitate them further. Farmers are also receiving the relevant formal training by enrolling for degree courses through universities.

It is hoped these communities will manage the commercialisation of the final product once it reaches that stage. It is hoped that community-branded cosmeceuticals and pharmaceutical products will be sold through the farmers.

Prof. Lall hopes that this kind of research project will bridge the gap between farmers, researchers and customers.

"By adding value to the local indigenous plants, we might interest pharmaceutical companies to help with the development of novel cosmetic products," she says.

South Africa does not benefit enough from local resources, often choosing to export them in a raw state, which leaves third parties to derive benefits from the value added by turning resources into products. The result is that some of the local cosmetic companies import final products and we lose local beneficiation opportunities and jobs.

Prof. Lall says, "We hope our project may lead to the beneficiation of common local plant materials, infrastructure and upliftment in the community, thus helping to create a local market for raw materials to benefit community farmers, to create local production and future export opportunities and to assist with student training and university technology transfers."



**science  
& technology**

Department:  
Science and Technology  
**REPUBLIC OF SOUTH AFRICA**

# CREDITS

|                               |                                                                                                |
|-------------------------------|------------------------------------------------------------------------------------------------|
| <b>Editor</b>                 | Greg Penfold                                                                                   |
| <b>Art Director</b>           | Brent Meder                                                                                    |
| <b>Layout &amp; Design</b>    | Rugshaana Abrahams                                                                             |
| <b>Project Manager</b>        | Terrence Damster                                                                               |
| <b>Advertising Executives</b> | Wendy Bresler, Theunis Van Zyl                                                                 |
| <b>Distribution Manager</b>   | Edward MacDonald                                                                               |
| <b>Circulation</b>            | Lee-Ann Lawrence                                                                               |
| <b>Subscriptions</b>          | Lee-Ann Lawrence (leeann@capemedia.co.za)<br>Local price: R172.00 International price: R469.00 |
| <b>Client Liaison</b>         | Natasha Keyster                                                                                |
| <b>Office Manager</b>         | Tracy Mills                                                                                    |
| <b>Human Resources</b>        | Allison van der Sandt (Manager)                                                                |
| <b>Accountant</b>             | Chevonne Ismail                                                                                |
| <b>Accounts Department</b>    | Brigitte Eberbach                                                                              |
| <b>Debtors Department</b>     | Nadeema Abdullah                                                                               |
| <b>Managing Director</b>      | Robert Arendse, robert@capemedia.co.za                                                         |
| <b>Financial Director</b>     | Andrew Brading, andrewb@capemedia.co.za                                                        |
| <b>Sales Director</b>         | David Itzkin, david.itzkin@capemedia.co.za                                                     |
| <b>Printers</b>               | FA Print                                                                                       |



[www.harvestsa.co.za](http://www.harvestsa.co.za)



## On the cover

### CAPE MEDIA HOUSE

28 Main Road Rondebosch 7700 • Tel: 021 681 7000 • Fax: 021 685 4448

E-mail: [info@capemedia.co.za](mailto:info@capemedia.co.za)  
[www.capemedia.co.za](http://www.capemedia.co.za)

CAPE MEDIA is wholly owned by KAOALA MEDIA (Pty) Ltd

All rights reserved. No portion of this book may be reproduced without written consent of the copyright owner.  
The opinions expressed are not to be considered those either of HARVEST SA or the publisher, neither of whom accept liability of any nature arising out of, or in connection with, the contents of this magazine.





**DEKALB®**  
**AND YOU ...**

## CULTIVARS

### Yellow maize

**DKC73-72**

**SNK2778**

**DKC71-42**

**DKC71-44B**

**DKC80-30R**

**DKC73-76R**

**DKC68-56R**

**DKC73-74BR GEN**

**DKC80-40BR GEN**

### White maize

**CG4141**

**CRN3505**

**DK8031**

**DKC90-89**

**DKC2147**

**DKC78-17B**

**DKC78-87B**

**DKC78-35R**

**DKC78-83R**

**DKC78-45BR GEN**

*... can make a resounding success of your farming.*

In **DEKALB®** you have a partner who will walk with you all the way to success. With **DEKALB®** from Monsanto, you have a range of high-quality white and yellow maize hybrids for exceptional yields suited to your specific needs.

*Call Monsanto today to find out more.*



Contact us on: **011 790-8200** or  
**customercare.sa@monsanto.com**

Monsanto and **DEKALB®** are registered trademarks of Monsanto Technology LLC.  
Monsanto South Africa (Pty) Ltd, PO Box 69933, Bryanston, 2021.



MONSANTO



# CONTENTS

- 10 Hot winds of change**  
Productivity, stability, sustainability and equitability are the goal
- 12 Growing knowledge**  
Answers and solutions to common problems
- 14 Let the cash flow**  
A helping hand for cash-strapped small farmers
- 15 Lending a hand**  
Volvo Trucks helps Boere In Nood
- 16 Marvellous microbes**  
Forming a bridge between soil and plant
- 18 Green fingers**  
Create the best possible conditions for plants to thrive
- 20 A stark choice**  
Political transformation or economic transformation?
- 22 Water of life**  
Irrigation farming: a lifeline for budding 'agripreneurs'
- 28 On the wing**  
Introducing the air-force of agriculture
- 30 Be water smart**  
Effective irrigation
- 32 Early birds, attack!**  
Why early detection catches this worm
- 34 Bats save millions**  
Two-season research project proves that natural pest control pays
- 36 Cry havoc**  
Vigilance is key in battling the Fall Army Worm
- 38 Waging war on the Armyworm**  
Demystifying the menace
- 39 The silent profit eater**  
Sub-clinical coccidiosis: the silent profit eater
- 40 Safeguarding skills development**  
Agricultural stakeholders need to up their game
- 43 Connectivity is key**  
Reliable always-on Internet for under-served areas



No article or any part of any article may be reproduced without the prior written permission of the publishers. The information provided and opinions expressed in this publication are provided in good faith but do not necessarily represent the opinions of this publication, the publisher or the editor. Neither this magazine, the publisher or the editor can be held legally liable in any way for damages of any kind whatsoever arising directly or indirectly from any facts or information provided or omitted in these pages or from any statements made or withheld by this publication.

[www.harvestsa.co.za](http://www.harvestsa.co.za)



## MAKE EVERY DROP COUNT

1

### WE'RE CULTIVATING WATER SAVINGS

As part of our Farming for the Future programme, our produce, wine and flower farmers are saving water by only irrigating when necessary. We're also committed to using less water in our own business.



2

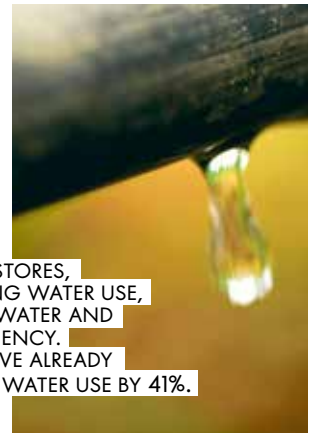
### KEEPING OUR WATER CLEAN AND CLEAR

Farming for the Future means reducing the amount of chemical fertilisers and other chemicals that go back into our water sources. We also partner with fabric and clothing suppliers who are committed to putting clean water back into the environment.

3

### A PARTNERSHIP FOR PRESERVATION

Water stewardship is all about Government, NGOs and the community working together to save and protect the precious water resources we all share. Together with the WWF, the Alliance for Water Stewardship and Marks & Spencer, we're helping our Ceres fruit farmers to manage the water on their farms better.



IN MOST OF OUR STORES, WE'RE MONITORING WATER USE, HARVESTING RAINWATER AND INCREASING EFFICIENCY. SINCE 2011, WE HAVE ALREADY REDUCED RELATIVE WATER USE BY 41%.

4

### CLEAN WATER AND CLEAN CLOTHES

We've introduced phosphate-free laundry detergents that help preserve water quality without compromising on cleaning efficiency.

5

### TEACHING TOMORROW'S GENERATION

With the future in mind, our Making the Difference programme educates learners about the importance of using water wisely.



# FOREWORD

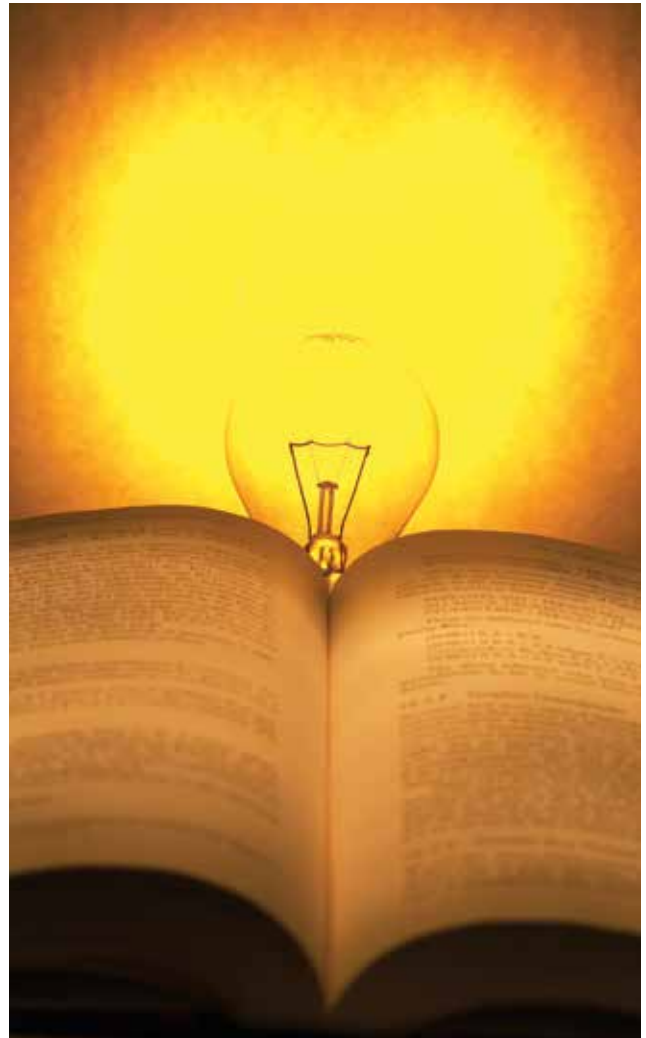
## KNOWLEDGE IS THE FOUNDATION OF SUCCESS



**// If you don't know where you come from, then you don't know where you are, and if you don't know where you are, then you don't know where you're going. And if you don't know where you're going, you're probably going wrong."**  
**Sage words from best-selling author Terry Pratchett.**

Most farmers will be planning their next season, turning last year's insights into next season's plans. After severe drought conditions during the 2015 season, we have seen the last season normalizing with good rainfall over most of the summer rainfall regions. Every season, good or bad, provides us with an opportunity to learn and adjust. The most successful farmers are not the ones who do well during good seasons, but rather those who adjust and deal with difficult seasons. By using proven products, innovative tools and industry leading expertise, these farmers prepare highly effective, individualized plans for every hectare. Knowledge about tools and expertise becomes the foundation for successful farmers. However, insights are gained through practical in-field trial and error experience and demonstrations of new and existing tools.

*Marius Boshoff, National Marketing Manager, Villa*





# Data-driven crop research, education and training.

Herbicides  
Insecticides  
Fungicides  
Adjuvants  
Plant growth regulators  
Micronutrients



Make the smartest decisions in your fields with insights gained at Villa Answer Plot® events. Hosted by agricultural experts, Answer Plot® events will expose you to cutting-edge technologies, agricultural trends and the relevant insights that can make all the difference on your farm.

Villa is now in proud partnership with Land O'Lakes, Inc – a Fortune 250 company from the USA. Land O'Lakes' crop input business, WinField United, will enable us to introduce new expertise, insights and products to the local market.

**Yielding a better tomorrow.**

Villa Crop Protection (Pty) Ltd | Reg no 1992/002474/07  
65 Botes Avenue, Glen Marais, Kempton Park, South Africa Tel: +27 11 396 2233 Tel: +27 87 740 3490 Fax: +27 86 677 3175  
KEMPTON PARK DEPOT: 69 Fried Avenue, Glen Marais, 1619 Tel: +27 11 396 2233 Tel: +27 87 740 3490 Fax: +27 11 396 1943  
CAPE TOWN DEPOT: 3 Marchand Street, Wellington, 7655 Tel: +27 21 873 6892 Fax: +27 21 873 6173  
[villacrop.co.za](http://villacrop.co.za)





# EDS NOTE



GREG PENFOLD  
greg@capemedia.co.za

**L**ife is full of surprises, not all of them pleasant. The biggest shock to the system came recently with the announcement that the dreaded Fall Armyworm had been discovered wreaking havoc on proudly South African crops. A creature of nightmare with the potential to reduce the hard work of years to nothing overnight, this is one crawling creature that cannot be underestimated. Fortunately, our agricultural sector is teeming with experts in pest control, and we are sure you'll appreciate their expert opinion in this edition of Harvest SA.

Indeed, it seems that knowledge has become the key to success in just about every agricultural endeavour. A hit-and-miss approach is bound to fail; nowadays it takes precise

knowledge of production techniques as well as marketing methods to make the grade. Whether it is a question of large, complicated topics like climate change, which affects everyone in ways that are sometimes hard to understand, the best ways to raise crops, the most effective water management techniques, or practical advice on cash-flow (to name a few topics), you'll be enlightened by the expert opinion contained in this issue.

You'll also find out things you might not have suspected previously. Did you ever imagine that bats could be an effective form of natural pest control? Have you ever wondered what it takes to be a crop-sprayer pilot? Did you know that cow dung can be used to generate energy and fertiliser at once? The world of agriculture is filled with marvels – if only we had enough pages to cover them all!

# CONTROL BOTORS



Rene Zwinkels, Horticultural Consultant and Sales Manager at Crop Supplies SA  
Rene has years of experience as a grower and technical advisor in substrates, with a wide knowledge in professional horticulture for the cultivation of flowers, vegetables and soft-fruit, as well as forestry.



Kobus Pienaar has extensive on-farm and commercial experience and was responsible for the development of Woolworths Farming for the Future programme. He holds a B.Agric in Soil Science and a PGDip in Sustainable Development.



Robert Dawson, moved back to South Africa to join his brother Michael at Meridian Agritech in Jan 2014. Rob studied Electrical Engineering and has an MBA from Wits Business School



Marius Boshoff, Marketing Manager, Villa Crop Protection.  
Marius is a trained Plant Pathologist, holding a Master of Science degree in Agriculture from the University of Pretoria.



Robert Matsila, Investment Head:  
Agribusiness, Masisizane Fund





# MASISIZANE FUND

Partnerships for a brighter tomorrow

## BUILDING SUSTAINABLE BUSINESSES THROUGH SUCCESSFUL PARTNERSHIPS

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

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

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

The Fund provides loan finance in the following sectors:

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

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

**For more information and where to find us visit:**  
**[www.masisizane.co.za](http://www.masisizane.co.za)**

An initiative of the



**OLDMUTUAL** Group



# HOT WINDS OF CHANGE

Productivity, stability, sustainability and equitability are the goal



**C**limate change is a recognised fact, which has definite implications for farming—but what, exactly? Kobus Pienaar, Good Business Journey Manager for Woolworths Foods, talks us through this complicated subject.

## What is the impact of the COP 21 Paris Agreement?

From an agricultural perspective, the most significant aspect of the COP 21 Paris agreement was the launch of the 4PT declaration by the French Minister of Agriculture. The declaration highlights the climate change mitigation potential of healthy soils. The 4PT declaration intends to take aggressive steps to move carbon out of the atmosphere and into soils that will simultaneously help the agricultural sector feed a growing population, buffer against climate change impacts, and contribute to greenhouse gas mitigation. The capturing of carbon in soils will improve infiltration and soil water holding capacity as precipitation events become more erratic. The French 4PT declaration strives to address global climate change through the aspirational goal of enhancing

the carbon stock on a large portion of the world's managed soils by an average annual increase of 0.4%, hence the "4 per Thousand" moniker. The Woolworths Farming for the Future program was six years ahead of the 4PT declaration by encouraging farmers to adopt sustainable agriculture methods to build soil structure and contribute to carbon sequestration. During the current drought, the evidence has been clear that where farmers have increased the carbon in their soils, the crops delivered better results in comparison to depleted soils.

## How would you rate South Africa's current food system?

Access to food for all South Africans is a problem. South Africa produces millions of tons of food but not all the citizens have access to food. We need to look at ways to redress this. Hikes in food prices are a major concern because food inflation on basic food commodities is often higher than increases in income.

The results of inadequate access to nutrition are particularly worrisome in early childhood development. Stunting (a subject that does not get the attention it deserves) refers to a

reduced growth size in human development and is a chronic form of under-nutrition. This issue has several significant public health implications due to increased morbidity and mortality. With 25% of all 0 to 3 year olds in South Africa suffering from stunting, it remains a significant concern.

At the other end of the scale, another aspect that warrants consideration is the increasing demand for protein-based diets. This trend puts enormous pressure on the natural resources that are needed to produce the food. In addition, as the diets of South Africans change, the problem of obesity and the wasting of food become more pertinent.

South Africa is undergoing a 'nutrition transition' where stunting, wasting and under nutrition in young children is occurring alongside increasing levels of obesity and overweight in older children and adults.

## What has your recent consultative assessment of farms revealed?

The aspects that have stood out far above all others are the drive that exists amongst our farmers to farm sustainably but the unfortunate lack of support to assist them in making the change without putting them



under financial pressure. They are fully aware of the challenges around climate change, water scarcity and growing demand from consumers – and that is where the Farming for the Future program can assist during the transition to sustainable farming. The assessments encourage:

1. The protection of soil – The soil serves to hold the reservoir of water that a plant needs to thrive. It is crucial that the soil we plant crops in is able to hold water and is protected from the elements. FFF measures the carbon content of soils so that farmers prioritise practices such as cover cropping and composting which increase their soil's capacity to retain water and reduce its vulnerability to the harsh sun and wind.
2. The conservation of water – FFF farmers choose irrigation systems that suit the type of crop that they are growing so that they only water around the root stock areas of a plant and ensure that water is not wasted by watering beyond the roots.
3. The protection of the plant – Valuable water is used to grow a plant. It is vital to ensure that the plant thrives and produces the expected fruit or vegetable. A tree or plant that dies before, or while it can still produce fruit, is a simply a waste of water and a failure to achieve a return on a critical investment.
4. Reusing, recycling, water-harvesting and storing – FFF farmers use a variety of techniques that work for them to harvest and store as much rainwater as possible, such as channelling it into dams and collecting it from roofs. Hydroponic farming also presents opportunities to recycle water and reuse it on either the same or other crops.

### **When it comes to production practices, why is it necessary for South African farmers to change?**

Sustainable farming methods are vital to the health and welfare of our planet. While modern industrial agriculture is highly productive and can produce a massive amount of food within a harvest season, it also introduces many damaging and long-term problems that can only be solved through sustainable practices. With the decline of the farming environments around the world

today, it is important to ensure practices on our farms do not contribute to the demise of our ecosystems but to enhance them.

### **How, specifically, do they need to adapt in terms of water, energy, land and ecosystems?**

There is one simple answer and that is that we need to measure how much we use in relation with how much we produce. If a farmer can determine how much water per kg produced, kWh per kilogram produced, kg per square meter produced and what it means in terms of the ecosystem services, he can set goals for continual improvement. At the end, the farmer will reduce the negative impact on people and planet until the production of food has a positive effect on our planet. We still have a long way to go, but the sooner we all start the better.

### **What should farmers be thinking about with regard to wages?**

The challenge in the near future is not the gazetted minimum wage but the whole concept of a living wage. The definition of a living wage and what it means for agriculture is still in its infancy. At the end of the day, the farmer needs to work out what a fair wage for his employees, given the cost of living today.

### **What is your recommended approach to building and maintaining soil?**

Measure the soil chemical and micro-biological levels as often as possible, add organic humus as often as possible, turn the soil as little as possible, always protect the soil with an organic mulch or cover crop, measure the irrigation requirements, reduce chemical intervention and do not plant crops on marginal soils.

### **What should an integrated pest management system entail?**

1. Write your policy on pest and disease management to state your intent
2. Proper identification of damage and responsible "pest"
3. Learn your pest and host lifecycle and biology
4. Monitor or sample the environment for pest population

5. Establish action thresholds
6. Choose an appropriate combination of management tactics
7. Evaluate results on an on-going basis.

### **What are the most promising forms of agriculture in line with the change to responsible agriculture?**

Agroecology refers to a variety of agroecosystems, and it is not associated with any one particular method of farming, whether it be organic, conventional, intensive or extensive. Furthermore, it is not defined by certain management practices, such as the use of natural enemies in place of insecticides, or polyculture in place of monoculture. Agroecology does not oppose technology or inputs in agriculture but instead assesses how, when, and if technology can be used in conjunction with natural, social and human assets.

Agroecology also proposes a context- or site-specific manner of studying agroecosystems, and as such, it recognizes that there is no universal formula or recipe for the success and maximum wellbeing of an agroecosystem.

Agroecology is related to four system properties: productivity, stability, sustainability and equitability. As opposed to disciplines that are concerned with only one or some of these properties, agroecology sees all four properties as interconnected and integral to the success of an agroecosystem.

Recognising that these properties are found on varying spatial scales, agroecology does not limit the study of agroecosystems at any one scale: farm, community, or global.

Agroecology studies these four properties through an interdisciplinary lens, using natural sciences to understand elements of agroecosystems such as soil properties and plant-insect interactions, as well as using social sciences to understand the effects of farming practices on rural communities, economic constraints to developing new production methods, or cultural factors determining farming practices.

*Kobus Pienaar, Good Business Journey Manager for Woolworths Foods.*

# GROWING KNOWLEDGE

## Answers and solutions to common problems

**T**he optimal performance of agricultural inputs relies as much on precision decision making as on quality products. The average grain farmer makes around 40 key decisions during any crop-growing season. These would typically include decisions around crop rotation, seed variety selections, crop nutrient requirements, equipment use or maintenance, financial modelling and budgets, cost benefit analysis, labour relations, application of crop protection products, which crop chemicals to use and many more. Wrong and uninformed decisions can be disastrous. A successful farmer typically surrounds themselves with partners that assist in making these decisions

Crop protection is a vital part of growing quality and ensuring good yields in any crop. At Villa we aim to provide farmers with products, experience and insights into solving the challenges faced in crop protection and plant health management. These insights would typically include the "right product or program" applied with the "right equipment" at the "right timing" considering the cost to benefit ratio at all times.

Villa agronomists have embarked on a program called "Answer Plots™", a collection of trial sites across the country where we aim to demonstrate our solutions to local weed, pests or disease problems. In collaboration with our USA partner, Winfield United, we aim to bring up-to-date innovation and technology, training and education to our customers using these Answer Plots™.

More than 500 farmers, agronomists, consultants and partners participated in the programme during the past summer season. One session was held in Napier in the Cape on Barley and two more followed in the Eastern Highveld (Delmas) and North

West (Lichtenburg) on maize and soybeans. Farmers had the opportunity to interact with skilled agronomists, other farmers and specialists.

An Answer Plot™ event is designed around technology and innovation themes. For example, the Barley Answer Plot™ in the Cape presented three main subjects: barley disease control through a programme approach, spray deposition and application technology and the use of decision support tools.

Concerning the control of diseases, numerous pathogens can cause havoc. Most notable diseases include rusts, powdery mildew, net blotch, tan spot and more recently Rumalaria leaf spot. During the Napier Answer Plot™ event, the different diseases, groups of fungicides available in South Africa and the key timing for applications were discussed. Further in-field programme events formed the basis for discussion Villa solutions to the diseases.

Another demonstration looked at adjuvants and how Villa will focus on adjuvants in future, namely adjuvants that address problems in the tank, in the air and on the crop plant or weed. Emphasis was placed on deposition, with special reference to the amount of active ingredient that is lost through the incorrect droplet size. It was emphasised that deposition-aids not only reduce drift, but also increase both deposition and canopy penetration. This facilitates improved disease, insect and weed control, simply by ensuring that more droplets reach the intended target. Water-sensitive paper was used indicating the effect of Interlock versus the application without a deposition-aid.

After good rains and several new emerging pests and diseases in the Northern regional crops, the themes of the Northern Answer Plot™ days focussed on weed identification, resistance management of weeds, timing and type of fungicide applications,

formulation technology and advances in adjuvants and application technology.

Proper weed identification, timely application of herbicides and the economic impact of weeds on the crop in detail formed the topic of the first station.

Weeds are broadly classified as broadleaf weed or a grass weed. A knowledge of their life cycle, propagation, time of emergence and their distribution in the soil profile is important for effective weed management. The proper identification of the weed population as well as the field's weed history is a vital part of an effective herbicide program.

The time of application of herbicides has an influence on effective weed control. Some weeds such as grasses are best-controlled pre emergence, while others can be controlled both pre and post emergence. For post emergence application, one needs to consider the following factors:

- Size, growth stage and age of the weed
- Physiology of the weed
- Environment of the weed

These factors will affect the type of application and chemical to be used in a herbicide program.

Weeds have a significant impact on the yield of the crop being cultivated. They compete for the same resources as the crop. Therefore, the crop does not have exclusive access to the limited resources to yield optimally. The early presence of weeds in corn is more significant than in broadleaf crops such as soybeans. Studies have shown that an early weed presence in corn, especially at V3-V4 stage, has an up to 200kg/ha/day influence on yield.

At the disease control station, we went into detail discussing the importance of understanding the life cycles of different diseases in maize and soybeans. The emergence of certain diseases such as *Phaeosphaeria* leaf



spot in maize, *Sclerotinia* in sunflowers and soybeans and *Botrytis* in peanuts under abnormally wet seasons were of particular importance. Understanding the host plant physiology and phenology forms the basis of understanding health in plants. Additionally, the different fungicides available in South Africa, how they work and when to use them optimally were discussed.

A thorough review of the newest application technologies available followed. Application technology is a vitally important aspect in pest and weed control, but has received little attention in South Africa in the past. Todd Cardwell, Senior Agronomist from Winfield United in the USA, did a general presentation on application technology at Villa, starting with a discussion of nozzles and nozzle types but more importantly focusing on what types of droplets and droplet sizes, they produce. We discussed what a driftable particle is and we show what they look like. We then discussed how to maximise the efficacy of the products sprayed by minimising driftable particles, maximising deposition onto target and last getting depth of penetration into the canopy. Using the proper nozzle at the proper pressure with appropriate water volume and the use of new Spray Droplet Modification Technology enables an applicator to be much more precise, leading to better control and less off site movement of the products sprayed.

Villa is proud to bring these events to our customers. The Answer Plot™ events create opportunities for farmers and consultants (agents) to discuss relevant issues facing farming. During the last few months, we have seen the emergence of a devastating pest in the Fall Army Worm, an outbreak of several fungal diseases in row crops and the arrival of the *Tuta absoluta lepidopteran* pest in potatoes and tomatoes. The Villa Answer Plot™ program provided the platform to gain, share and GROW KNOWLEDGE. Follow us on Facebook for information around the next ANSWER PLOT™ events.

Marius Boshoff, Marketing Manager, Villa



# Let the cash flow

A helping hand for cash-strapped small farmers

**C**ash-flow, or the lack of it, has killed many a small business, and for farmers it's even harder, as the working capital cost can be so high. We spoke to Nkhangweni Matsila, Sector Head (Agri-Business) at Old Mutual, about a fund specifically designed with these problems in mind.

## What is the idea behind the Masisizane Fund?

The Masisizane Fund exists to promote entrepreneurial development, particularly in rural communities of South Africa. This in turn creates rural jobs and all the social benefits that come with them. The Masisizane agribusiness portfolio is diverse with investments in many agricultural sectors, particularly primary sectors from field crops such as maize, citrus, and table grapes to sheep, dairy, cash crops and a few others.

## What are the requirements for a small business to get funding?

The requirements are normally the same as with most funders out there, the starting point of which is the business plan that speaks to an identified market opportunity to be exploited, the financial requirements to exploit such an opportunity and the financial projections detailing the ability of the business to assume a loan. The market served by Masisizane faces many deficiencies and market failures and it is important that aspiring entrepreneurs demonstrate that a thought process has been applied in terms of addressing this challenges. Back to the question of requirements, normal regulatory requirements such FICA compliance is standard. Further it is also important that small business owners demonstrate knowledge of the rules and regulations applicable to their environment and demonstrate compliance or intention to comply.

## How does the revolving production facility for agribusiness work?

Masisizane Fund offers different financial products which include term loans, production loans, structured financial products and revolving credit facilities, among others. A revolving facility in Masisizane is considered for short-term funding needs of the business and works much like a normal bank overdraft wherein a capped facility is provided for utilization on, say, the working capital needs of the business. As the business repays the facility, the repaid funds become available for utilization by the business within the stipulated period. Small farmers normally face tight cash-flow problems and this facility provides small farmers with the ability to cover the working capital needs of the farm other than production inputs.

## Is it possible for a co-op to receive funding?

Masisizane has within its agribusiness portfolio cooperatives that have been funded. We know as Masisizane Fund that government promotes the cooperative model as it has the potential to broaden the social benefits to the members and their respective families. While we do know and have experience of the challenges associated of dealing with

cooperatives, we do support them provided all associated risks are mitigated.

## Can you point to any success stories?

We have both success stories and sad stories as can be found in the books of any funding institution. As is often said in the lending space, the best way to have no sad story is not to lend in the first place. Having said that, it should be noted that Masisizane has checks and balances in place to ensure that the limited Masisizane balance is not unduly exposed to risky businesses/farms on the back of reckless lending. We have funded clients whose farms have gone through significant economic transformation, clients that in the beginning were un-bankable but are now bankable by normal commercial banking norms and standards.

## What further developments can we expect?

Masisizane Fund is going through evolution along with developments in the market place to ensure that we remain relevant and current.

Therefore, customers and potential customers should always be on the lookout for new developments coming from Masisizane Fund.





# Lending a hand

Volvo Trucks helps Boere In Nood



**T**he recent drought in South Africa has taken its toll on everyone in South Africa, but the people that face the reality of the drought first-hand are the farmers of our country. Volvo Trucks could not simply sit back knowing the direct effects that the devastating drought would have for farmers throughout South Africa.

Through Boere In Nood, a non-profit organisation that aims to assist farmers now more than ever, Volvo Trucks pioneered the delivery of feed to 1232 farmers throughout South

Africa. The journey of 'Die Lady, Boertjie and Boertjie', spanned over 443, 557 kilometres and saw over 12,000 bales of hay weighing 3456 tonnes delivered to farmers that were affected by the drought.

The facilitation of the deliveries to the farmers was done through Boere In Nood, a non-profit organisation established in 2015 to deal with the crisis faced by farmers. "Volvo Trucks realised that while the drought is taking its toll on a lot of communities the people that feel the harshest impact of the drought is very often one of our customers—farmers. To this end we investigated various

manners in which Volvo Trucks Southern Africa would not only be able to assist the drought stricken farmers but also see first-hand the impact of the assistance given to the farmers," says Valentia Hobbs, General Manager, Marketing and Communication.

Volvo Trucks not only offered the three trucks but also provided drivers and diesel to the vehicles that would travel around South Africa.

The truck drivers were often the unspoken heroes of the day as they faced some harsh words while going about their duties to deliver the much needed feed to farmers in the country.

"We are proud of our association and the impact that we have been able to make through this collaboration with Boere In Nood. The work may be far from over, however, it is a privilege to have been able to make a real difference to the people affected, as well as the animals whose lives were saved from the deliveries of the feed" concludes Valentia.

FACTS about the Volvo Trucks Boere In Nood project:

- The project cost Volvo Trucks over R3million
- Total farmers helped: 1232
- Total amount of feed transported: 3465 tonnes

Total amount of kilometres travelled per truck:

- Boertjie (name of Volvo Truck): 116 037km
- Boertjie (name of Volvo Truck): 160 457km
- Lady (name of Volvo Truck): 167 063km



# Marvellous microbes

Forming a bridge between soil and plant



**A**s the well-known saying of Justus von Liebig's "Law of the Minimum" goes: "If one growth factor or nutrient is deficient, plant growth is limited, even if all other vital factors or nutrients are adequate... plant growth is improved by increasing the supply of the deficient factor or nutrient."

We should then ask ourselves what the limiting factors in our soils are. Is it the pH, water retention ability, nutrient imbalance or microbial activity?

Average maize yields increased from one ton per hectare in 1983 to almost five tons per hectare in 2014. All this being attributable to the maize hybrids that have improved. If one had to create a comparative scenario, it would be like comparing the one ton per hectare maize to a 1983 Ford Mustang and the five ton per hectare maize to a 2014 Ford Mustang. You cannot give both vehicles the same grade of fuel. The 2014 model will not perform if the same fuel is used as for the 1983 model—yet we continue to do this to our maize crops. We gave the one ton maize N P K, now we want to give the five ton maize on the same soil the same N P K as well.

This brings me to the point of relevance regarding microbes. Microbes are regarded as the bridge between the soil and the plant. The higher the concentration and diversity of micro-organisms around the root area of the plant, the more effectively the plant utilises the minerals from the soil. High microbial activity in one healthy hectare of soil can deliver the same value of energy as 10 000 workers with hoes.

The primary function of micro-organisms is the chelation of minerals. Bacteria produce a sticky biofilm that acts like water crystals to retain moisture. This bacterial layer always has a pH of above 6(KCl), and as we know most of your essential elements are optimally available at this pH level. They then produce water soluble pigments that serve as chelation agents, namely siderophores. Siderophores (Greek: "iron carrier") are small, high-affinity iron-chelating compounds secreted by micro-organisms.

Another main function of micro-organisms is the solubilisation of phosphates. Common knowledge tells us that phosphates are inclined to settle in layers of soil with a high or low pH level. Micro-organisms are the only source that can revive these phosphates.



The standard practice among South African farmers is to "pre-plant" the phosphates for grain crops. One of the major drawbacks of this practice is that the phosphates in the soil can settle within six weeks. Phosphates are critical to the germination, flowering and seed-forming stages of the plant development. If the phosphates are settled into the soil during these critical periods when needed by the plant, the plant cannot exploit them which then leads to stress periods and diseases and provides the optimal environment for insects to descend.

The mismanagement of phosphates can have drastic implications, and therefore it is critical to ensure that the microbes in the soil are of a high standard and quality which will also ensure that they can survive harsh chemicals.

*Kristiaan Vermaak*

**lifeforce®** 

**YOUR SOIL PHOSPHATE RECYCLER**

The only product that addresses all aspects of bio-fertilizing.  
For use on all crops, all soil types, under all climatic conditions.  
(016) 065 0008 | 078 662 2327 | [sales@microbial.co.za](mailto:sales@microbial.co.za)

**microbial**  
solutions 

# Green fingers

Create the best possible conditions for plants to thrive

**H**orticulture in South Africa has many faces, from rather conservative nurseries to very modern ones. What we see is that growers who are looking forward and want to invest in modern techniques and sustainable growth are doing better and have the advantage of the attention of the better customers like supermarkets.

Nowadays the supermarkets want to have healthy, attractive products on the shelf, so that means beautiful fruit, veggies, flowers or pot-plants, almost no chemicals used and a good quality product the year around.

The way the grower can give the best guarantee to deliver a product with these specs is to grow in tunnels and probably on hydroponics or at least with the maximum possibility of crop control.

The more that can be regulated, the less the luck factor for a good result.

Soil/substrate is a very important item in growing plants.

For instance, a substrate or soil with no weeds, fungus or insects will give the grower a much better start, less work and a good opportunity to grow as he wants without the limits of too dry or too wet material.

At this moment many crops are still in a soil that is not 100% controlled, or even a waste product from another industry. This isn't necessarily, but the possibility of a loss of a crop is much bigger. Since EC and pH are not controlled, every batch can be different.

Crop Supplies SA imports white peat and coir according to the specs of RHP, a worldwide accepted organisation with the speciality of soil and substrate control from the beginning till the end.

This means that the product will be consistent, every delivery the same and exactly according to the specs as agreed.

A sterile substrate will give a huge benefit for a grower who doesn't have to worry about the quality of the soil that will be received. Every time the same material will be delivered, and if necessary you can ask a consultant to discuss the best options for the circumstances at your nursery.

Growers need to think about the future, so that means asking the following questions: What product? How to get the labour done? To what market can the product be delivered? When will the money come in?

There are many things to think about, but if it is possible to reduce mistakes, it makes life a bit easier.

When a crop can grow in a tunnel, pests and diseases will be more manageable, the weather conditions will not have such a big effect on the yield and the yield per m<sup>2</sup> will be better.

The result of starting to grow in tunnels will give many benefits, for instance less labour per kg or pieces of product.

This more intensive way of growing will also help to control water and fertilizer usage, nowadays an important issue.

Vegetables like cucumbers, tomatoes and peppers grow many times in a bag or a pot with a substrates such as saw-dust or coir. Also the rose growers are working with this system.

The good thing about these media is that they drain very well: if the grower needs to change his fertilizer schedule, there is not too much water left in the substrate. What means is that the effect of a change is almost direct.

Coir lasts much longer than saw-dust and can be used for several crops. The coir has to be treated before usage, but that is not that difficult because the coir has to expand in water and then the buffering of the coir can be done at the same time. If the coir is not treated, there will be a problem with availability of, for instance, calcium and magnesium. Plants will show yellow after ± 6 weeks and growth will not be as quick as



suspected. A company that sells coir must know how to treat it. Important for the right buffering is to know what the EC is at the moment before expanding.

More and more growers are starting to use Grow-Bags with coir. Depending on the crop and the irrigation system, they can choose between several fractions of coir, all with their own physical specs and drainage.

Crop Supplies SA delivers these bags with plant-holes and drain-slits. The bags are 1.00 or 1.20 meter long and depend on the number of plants per bag, 15 or 20 cm wide. The height is also various, from 7 till 15 cm.

Changing crops is much easier and can be done in less time.

Blueberries are an up-coming market, but there are some aspects that have to be considered before planting.

These berries like an acid substrate (pH 4,5) and the roots don't like a wet environment, so the substrate must drain very



well. Most of the time the substrate mix is a combination of coarse perlite, coarse white peat and coir. This mix drains well, is easy to re-wet and has a high AFP.

These mixes cannot be made in South Africa, so it is all imported material, delivered in compressed bales with  $\pm 5 \text{ m}^3$  per pallet.

The pot used for Blueberries must be UV resistant so it will not break when it has to be moved, and the pot must have a good draining bottom.

If the substrate drains well but the pot doesn't have good drain-holes, the water will stay in the pot and the pot temperature will get to high.

The combination of water and a high temperature in the pot will give problems with fungus and less growth.

Pot-plants for indoors and outdoors are grown in plastic bags or pots.

The benefit of a bag is the price but the drainage and life time of a (UV resistant) pot are much better.

Pots are now available in standard colours (black and terracotta) but for a while the pots have also been available in many trendy colours. Important to remember about a pot is that there no light will come through the pot to the roots.

That is why a good coloured pot is black or grey on the inside and coloured on the outside. There are only a few plants that need light on the roots, like some orchids. For these plants there are transparent pots available.

Also for these plants there are good soils available, either just one component or mixtures of peat, coir and/or bark. Every plant has its own demands, so knowledge of the plant and the variety is a must to get the best results.

For cut-flowers, but also for vegetables such as lettuce and cabbage, it is necessary to get the best result with sowing or cuttings.

Many times this is done in trays and if the soil mix is not optimal, there can be big differences in results because of a leak of fertilizer, or big differences in wet and dry trays.

If possible, use a ready to use mix to avoid these problems.

If the young-plants are different in size and length, they will only become less equal during the growth later on. As a result, harvesting will be less easy and takes much longer as necessary.

For all crops it is important to create the best possible conditions for the plant, so get the best possible advice as well.

*René Zwinkels, Crop Supplies SA (Pty) Ltd.*



We can supply you from: Krugersdorp and Stellenbosch with for instance:

- White Peat
- Sleeves
- Perlite and vermiculite
- Pots and trays
- Bamboo canes & trellis
- Cucumber wrapping film
- Coir/Cocos, Grow Bags, Propagation Cubes, Paperpots
- Groundcover
- JAVO potting machines



**What else do you need to make your crop a success.**

We have extended knowledge about modern Horticulture and Supplies, so if you need advice or anything else, please contact us:

Cell: +27 (0) 72 2237505 E-mail: [info@crop-supplies.com](mailto:info@crop-supplies.com)

[www.cropsupplies.co.za](http://www.cropsupplies.co.za)

# A stark choice

## Political transformation or economic transformation?

**Every day, South Africa is bombarded with the concept of radical economic transformation and the need to actualise equal rights for all. Of course, it goes without saying that South Africa is staring down a critical problem of poverty and unemployment. Consequently, it is necessary to determine whether the so-called radical economic transformation preached by President Zuma can possibly bring about empowerment for all – because that is something that we desperately need.**

Economic empowerment has to be sustainable. To take the fruits of one person's success and give them to another is not sustainable in the least. At present, the ANC government is attempting to take the prosperity created by entrepreneurs and share it among other

people. This climate is stoked by speeches, public appearances and even singing provocative songs in favour of the redistribution of wealth.

The danger generated by this approach is twofold in nature. On the one hand, it creates unrealistic expectations of wealth creation – wealth that simply has to be picked up and shared out.

Everybody is entitled to their slice of the pie regardless of what individual energy and effort has gone into creating it. It is a socialist model through and through which is continually reinforced by speeches made in this regard. There is a complete lack of understanding that wealth is generated by hard work in which a competent entrepreneur manages the factors of production in order to make a profit.

It is a continuous process, and unless it is maintained, all the reserves built up over time

could very well be used up. The great danger of this approach is when the prosperity of the others starts to run out and can no longer be shared out as a result. Nobody can reasonably be expected to simply hand over their hard-earned money. At the same time, it scares off the investors we sorely need for the sake of economic growth. Today's world has become so small that entrepreneurs will apply their energy and resources in the safest environment. Never before has so much money left the country, and the main reason would appear to be uncertainty over how assets are going to be treated.

Responsible transformation should take place only in such a way that it will foster economic growth. There is no other way to tackle poverty and unemployment positively and sustainably.

The difference between radical "political" transformation, served with an economic





sugar-pill, and genuine economic transformation, which in point of fact should simply be called economic growth, can be judged by the end results.

A responsible government would realise that every speech and piece of legislation should be tested in advance to assess its impact on economic growth.

If it fails to meet the test, it has to be reconsidered. What are the inevitable consequences of the radical (political) economic transformation that is being promoted? The result will quite possibly be a snowball effect.

- Uncertainty over policy, especially with regard to property rights, will cause fixed investments to dry up.
- This in turn will result in fewer projects being taken on, so that ever fewer employment opportunities will be created.
- The economy will not have the growth it so urgently needs, which will increase negative sentiment towards fixed investments.
- The state will receive ever lower amounts of tax and will have no option but to raise taxes even higher in order to keep the state coffers full.
- Entrepreneurs will leave for greener, safer pastures where they can do business with confidence without being taxed to death. The brain-drain will intensify.
- Poverty and unemployment will keep shooting up.
- Agricultural production will start falling behind as a result of the way land transfers are being dealt with. The department itself acknowledges that such transfers largely come out of production.
- Food will become ever scarcer and more expensive: the masses will not be able to afford or even access it.
- Crime will become even more widespread.
- Corruption and self-enrichment on the part of cadres with the "right" connections will only serve to accelerate the decline.
- As one thing leads to the next, South Africa will enter a downward spiral in which there will be even bigger problems to manage than junk status.



On the other hand, if economic transformation is applied correctly and the government fulfils its two most important responsibilities, South Africa can only attain greater heights. The first requirement is creating the conditions for private initiatives to be pursued with confidence. The second is to ensure the security of all who live in South Africa. Unfortunately, government is falling short in both regards. Should the government manage to focus on applying the correct economic principles by safeguarding private property rights and taking steps to stabilise insecurity, the following results can be expected.

- Politicians must make a public undertaking to stamp out crime and use all the legal means at their disposal to deal with criminals.
- Stable conditions in which proper economic principles are applied will attract greater levels of investment.
- Entrepreneurs will be able to do business with confidence, which will immediately begin creating jobs.
- This will lead to economic growth, which will contribute to increasing the country's capacity, in turn creating the means to address the critical questions of poverty and unemployment
- Establishing private property rights with respect to RDP housing as well as state-owned agricultural land will help bring about stability. Properties will then serve as live assets for their owners, instead of dead assets that at present serve no purpose other than

for the government to manipulate the masses.

- Corruption must be rooted out vigorously as a prerequisite for any economic stability and growth.

South Africa is faced with a decision between the economically motivated choice of private property and the free market and the politically motivated choice of socialism and communism. The results of this decision will determine whether society will flourish or fall into poverty. It would appear that the current platform of radical "economic" (political) transformation that is gradually and subtly being engineered is setting South Africa on an unsustainable economic path.

If the government is serious about empowering the people of South Africa and intends to act responsibly, they will realise that the economic choice represents the only sustainable way forward. It might take a while longer, but at least it holds a chance of success.

It goes without saying that government will have to act more responsibly with regard to their emotive speeches and incitement.

The impression is being created that they would prefer the masses to be poor and unemployed, the easier to manipulate and exploited as voting fodder.

One can only hope that the people of South Africa will have the insight to make the right decision.

*Bennie van Zyl, General Manager, TAU SA*

# Water of life

Irrigation farming: a lifeline for budding 'agripreneurs'

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

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

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

The general aim of the study, funded by the Water Research Commission, was 'to review and evaluate appropriate development paths for expansion from homestead food gardening to smallholder irrigation farming,



# THE WATER RESEARCH COMMISSION – SOUTH AFRICA'S PREMIER WATER KNOWLEDGE HUB

## ABOUT US

The Water Research Commission (WRC) has over the years evolved into South Africa's premier knowledge hub and solutions partner. Ensuring that excellence in research translates into appropriate and relevant policy, impactful industry and environmental management technologies and services, that build capacity and drive social change. Our expertise and multi-disciplinary approach cuts across integrated water resource management, natural ecosystems and climate change, water use and waste management such as in industry and sanitation, as well as important links to agriculture and food security. Central to the WRC's approach is supporting the development of current and future capacity through RDI investments.

One of the primary objectives of the WRC is to provide solutions to overcome South Africa's many water-related challenges and at the same time find useful mechanisms to support sustainable development, social and economic growth through research development and innovation.

WRC drives South Africa's water knowledge base by funding over 60% of applied water research (and 70% of water research in agriculture), growing scientific capacity and disseminating knowledge to a wide range of stakeholders from policy-makers to the public. The complexity of South Africa's 'wicked' water problems, such as addressing water infrastructure in rural communities that were previously excluded during the apartheid era, climate variability and development consequences like the effects of untreated mine water, provide a plethora of opportunity. Equally, the outputs of research need to be accelerated from laboratory bench to impact on the ground.

The WRC has four Key Strategic Areas called KSAs (Water Resource Management, Aquatic Ecosystems, Water Use and Waste Management, Use of Water in Agriculture) which relate to water-centred knowledge, each providing an integrating framework for addressing a portfolio of key water-related needs. These KSAs allow for multidisciplinary studies and are focused on solving problems related to national needs, supporting society and the water sector. While each of the KSAs is unique and mutually exclusive (minimal overlap), they collectively attempt to cover the complete spectrum of water-related topics of strategic importance.

The WRC seeks to leverage funds and resources through donor and foundation funding mechanisms, competing for international funds and seeking co-funding arrangements with various partners. The WRC invests actively in building capacity by making this a core deliverable in every WRC project, either through researcher and student development or, in some cases, community and entrepreneur development. The complexity of South Africa's 'wicked' water problems, like acid mine water, when reframed as an opportunity is pushing us to new partnerships and models. It is also providing an impetus to accelerate the movement of solutions from laboratory bench to active involvement in the field.

## National Water Week

National Water Week celebrated in March every year is an awareness campaign by the Department of Water and Sanitation which serves as a powerful campaign mechanism re-iterating the value of water, the need for sustainable management of this scarce resource and the role water plays in eradicating poverty and under-development in South Africa.

This week creates the opportunity for the WRC to highlight the importance of research and innovation within the water sector and the role it plays in society. Access to safe water is a basic human right, and therefore making it important for us to ensure that there is enough for all, forever. National Water Week will take place from 13 to 19 March 2017 and World Water Day on 22 March 2017.

FOR MORE INFORMATION: about the WRC  
or for free downloads of our water research publications,  
visit [www.wrc.org.za](http://www.wrc.org.za) or Tel: (012) 761-9300 ;  
or email: [info@wrc.org.za](mailto:info@wrc.org.za).

Amandla Olwazi Kubantu –  
**The Power of Knowledge to the People**





increased water use productivity of crop production and improved livelihoods on selected smallholder irrigation schemes in South Africa'. Enhancement of entrepreneurship is seen as key to growth in a free-market economic system including in the agricultural sector.

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

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

scheme is defined as the hydraulic system which is shared by a group of farmers. The third population comprised independent irrigators who are solely responsible for their own irrigation system and typically pump from adjacent rivers or boreholes.

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

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

Comparison of the livelihoods of three groups provided compelling evidence that irrigated smallholder agriculture and improved livelihoods were closely associated. Smallholder irrigation is considered to be a successful poverty alleviation tool when it paved the way for increased consumption, asset accumulation, nutritional

improvements and reduced persistent poverty among users. Over time these gains lead to institutional feedbacks that support sustained economic development and the evidence collected at the two study sites indicates that most if not all these criteria had been met.

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

"Another important finding was more a confirmation of our own and other published work," explains project leader Jonathan Dennison of Umhlaba Consulting Group. "Smallholder irrigators are not homogenous and different types of smallholder farmers





# Perfect Solutions for irrigation management



Enquire about Agriplas products at your nearest irrigation dealer

[www.agriplas.co.za](http://www.agriplas.co.za)



CAPE TOWN – Head Office  
PO Box 696, Brackenfell 7561  
Tel: +27 21 917 7177  
Fax: +27 21 917 7200

GAUTENG  
PO Box 11052, Randhart 1457  
Tel: +27 11 908 2204  
Fax: +27 11 908 5312

MPUMALANGA  
Suite 63, Postnet X 11326, Nelspruit 1200  
Tel: +27 13 755 3510  
Fax: +27 13 755 3505

need different kinds of support interventions to meet their priority needs. Modelling responses for smallholders only on successful approaches from the large-scale highly commercialised agricultural sector will serve some, but not most smallholder farmers. A suite of interventions which can be tailored to be responsive to smallholder diversity is essential if the opportunities for smallholder agricultural entrepreneurial development are to be more fully exploited.”

### Key messages for policy-makers

Obstacles to successful farming are severe and dominated by institutional disincentives in the acquisition of secure land and in obtaining secure water supply. The wholly inadequate communal land-tenure arrangements, combined with high risks related to inadequate irrigation water supply turn development pathways into somewhat treacherous endeavours. Relocation of promising farmers onto well-established (previously white-owned) schemes, fundamental reforms in communal land-tenure systems on smallholder schemes, investment in water management institutions, marketing support, and water management interventions are all strategies that would have to be pursued in parallel to achieve results. Irrigation can, it seems, provide the much sought after development outcomes, but this requires a new political will to re-set the development direction, drive profitability initiatives and re-institutionalise the smallholder irrigation sector from a land and water perspective.

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

in particular, bringing institutional order to tenure, both land and water, would greatly reduce farming risks and increase smallholders’ resilience to other livelihoods shocks.

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

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

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

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

but there is a change in perceptions that comes from the reality of the ever failing ‘urban dream’.

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

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

*Kim Trollip*

### Strategies to overcome the many identified challenges:

- Land tenure interventions
- Market and knowledge interventions
- Water infrastructure investment
- Water regulations and irrigation management



# To fly is heavenly and to hover is divine!!

## Do you aspire to become a helicopter pilot?

We offer Private, Commercial and ATP Pilot Licensing. In addition we also provide conversions, Crop Spraying, Game Work and Designated flight instructor ratings, as well as ab initio military training.



## Safomar Aviation Operations, your “one stop shop”

For all your “rotary” wing requirements across a variety of helicopters.



### Crop Spraying Services

- Crop Seeding
- Crop Spraying
- Crop Management
- Fire Control / Prevention



### Security and Patrolling

- Surveillance
- Crowd Control
- Perimeter Check
- Valuable Goods Transport



### Chartering Services

- VIP Transport
- Leisure Transport
- Pick up and Drop off
- Passenger Transport
- Accommodation arrangements

### Contact Us

Tel: +27 (0)11 805 0640

Web: [www.saosa.co.za](http://www.saosa.co.za)

Email: [andrew.widdall@safomaraviation.co.za](mailto:andrew.widdall@safomaraviation.co.za) / [colleen.winter@safomaraviation.co.za](mailto:colleen.winter@safomaraviation.co.za)

Address: First floor, Grand Central Airport, New Road, Midrand

SAFOMAR AVIATION OPERATIONS (PTY) LTD  
  
a member of the Safomar Group



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

**C**rop 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*

# Be water smart

Effective irrigation means getting to know your equipment and your soil



**Water management and irrigation scheduling is specific to the particular region and depends on the production level you have in mind. That being said, the following basic principles can be applied universally whenever dam or groundwater levels are low.**

It is widely accepted that increasing water supply under certain conditions will increase overall yield. However, oversupply might cause the production of certain crops to plateau or even decline. If you irrigate at high frequency, reducing the water supply slightly will not incur great losses.

The quality of crops is often improved when they are irrigated under drier soil conditions. Obviously, this is also more water efficient. As a result, it's better not to irrigate too frequently when the soil is quite moist.

There can be a negative impact on quality when plants undergo water stress during the flowering and fruiting period. If you want to limit excessive growth, you can use moderate water stress to achieve this.

Using a good mulch is a great ally in the war to save water, because it reduces the amount of surface run-off and cuts down on losses due to evaporation. You will also have more evaporation losses if you irrigate in small, frequent amounts, or if you drip water straight onto plastic strips that have been warmed in the sun.

Are there any other plants competing for water in your fields? It's best to get rid of all those thirsty weeds and cover crops. Spray early in the season and be vigilant not to let the weeds return when you are rotating crops. To get the benefit of light rains, it's better to control weeds on the surface with chemicals than with mechanical solutions, because these destroy roots that are near the surface.

Fertiliser and water are linked. If you use too much nitrogen fertilizer, it can have a negative impact on water levels.

In summer, start irrigating before sunrise or after sunset. This will help you to avoid water loss from evaporation during the hot summer days. You can optimise plant growth by watering in the morning and in the evening, as this will split your total watering time.

In winter, in areas which are prone to frost, it's best to start irrigating after sunrise. That way you will not damage the landscape by putting in water that is going to freeze when it makes contact with your vegetation. In fact, if you irrigate after sunrise, it will wash frost off unprotected areas. Because of low evaporation rates during winter, you can even water late in the morning. It's best not to split your watering in time during winter.

Naturally, you should treat your irrigation system as your best friend. Make sure that the system is working as effectively as it should. Check that you are using the right pressure for which the system has been designed. Check your filters and make sure there are no broken microjets. Check the position of your microjets. Get rid of any weeds or low-hanging shoots that might be interfering with the wetting pattern.

Look at where the roots are clustered. This is where each irrigation application has to be focused.

Above anything else, the most important thing to do is to measure the status of your soil and plant water. You cannot implement an irrigation strategy effectively unless you have enough information that you can trust.

The depth of your soil and how you prepare it make a big difference, too. Deep soil preparation can enlarge the buffer capacity of your field, which is a big help during years of drought. At the same time, you should not irrigate below the root zone of your crops, as this will lead to unnecessary water loss.

# LEREBA EXPORT SOLUTIONS

## PROCUREMENT AND LOGISTICS

Lereba Export Solutions is based in Johannesburg, South Africa. We have been experts in Procurement and Logistics for over 13 years.



### Procurement:

**Whatever you want**, we will source for you from South Africa or anywhere in the World.

### Logistics:

**Wherever you are** – we will get your order to you – by Air, Road or Sea.



### We specialize in:

**Agricultural** – Livestock & Poultry; Seeds; Fertilizer; Agrichemicals and Equipment.

### Fresh Produce

**Hotel, Home & Office** – Décor; Furniture; Linen and Catering Equipment.



Tel: +27- 11- 447-6011

Fax: 27- 11- 447-6641

les@lereba.co.za; yetta@lereba.co.za

*In South Africa found –  
Worldwide Bound*

# Early detection catches **the worm**

Protecting South Africa's crops from the Fall Armyworm



**T**he Fall Armyworm (FAW), *Spodoptera frugiperda*, (or Herfs Kommandowurm, in Afrikaans) can move thousands of kilometres a week. It can migrate through host plants. It is resistant to pyrethroid insecticides and it has one purpose: To move en masse, in an army-like fashion, and consume all susceptible crops in its path.

At the beginning of 2016, the first reports of the advancing Fall Armyworm surfaced in West and Central Africa. Over the past 12 months, this pest has steadily made its way to South Africa. To everyone's dismay, the Fall Armyworm's suspected presence was confirmed on 3 of February 2017 by the Department of Agriculture, Forestry and Fisheries, who stated that outbreaks were occurring in the Limpopo and North West areas of the country. Potentially, this invasion could have a devastating effect on South Africa's food security if the proper precautions aren't taken and immediate action implemented.

Its preferred crop is maize, which is an important South African staple crop and a major animal feed input for the livestock industry.

## Worming its way into crops

It is the larvae stage of the Fall Armyworm that causes the most feeding damage, before the larvae change into moths. The larvae/worms can devour entire plants and decimate field crops within days of infestation. Because the life cycle of the fall armyworm from egg to adult (moth) is only 24 – 40 days, there is a small window period to identify the infiltration and take appropriate action.

Eggs are laid on the crowns of seedlings or on older plants' leaves in clusters of 50 to 150. Within 5 to 10 days, tiny caterpillars hatch and they feed for several weeks. The worms or caterpillars undergo a moulting process through 4 larval stages, after which they pupate before emerging as adult moths. Aggressive feeding takes place during all 4 larval stages. Within one season, three or more generations of these creatures can be produced. Fortunately, the Fall Armyworm

can be combatted effectively while the larvae are still small. This is why early detection is critical.

## Symptoms of the Fall Armyworm

Very early symptoms of this pest resemble the symptoms of the European corn borer. Small holes will be visible on the leaves, as well as 'window pane' feeding patterns in the leaves emerging from the whorl.

When these symptoms are noticed, it is imperative to take immediate action by contacting your Laeveld Agrochem agent, who will be able to analyse the situation professionally and advice on the next steps.

Should the pest not be detected during the early phases of its life cycle, it will continue to skeletonize the leaves of maize by consuming large amounts of the leaf tissue (leaving a ragged appearance similar to grasshopper damage), then feed on the leaf whorls, and burrow into the ears. Most commonly, the damage will be done to late pre-tassel maize.

Due to these feeding patterns, large larvae can usually be located in the whorl – in this location, they have some protection against insecticide applications. The larvae will also move to the cobs when it begins to tassel and young ears/cobs appear.

## The FAW's different uniforms

In order to detect this pest, it is important to know what it looks like throughout its life cycle.

However, a professional agronomist should be contacted if one is uncertain. Taking the right steps and applying the correct pesticides could mean the difference between saving or losing the crop.

The eggs of the Fall Armyworm are greyish white in colour. Moths will lay the eggs in large groups, usually on the underside of the foliage.

Once hatched, the young Fall Armyworm larvae resemble Africa bollworm larvae, as well as the more commonly found



Armyworm species. In terms of colouring, larvae can vary from light tan to green to almost black, with a dark and wavy yellowish stripe down both sides of their abdomen. The Fall Armyworm larvae has four pairs of fleshy abdominal prolegs, in addition to the pair at the end of its body. The distinct marking of the worm is the white inverted "Y" on the front of its dark brownish coloured head.

The adult moths are greyish-brown with a small white dot in the centre of each forewing and dark margins on the hind wings and may be confused with other lepidopteran pests.

### Use the right ammunition against this Fall Armyworm

According to Chris Thompson from Laevel Agrochem, the Fall Armyworm is a real threat to South African maize farmers and should be treated as a very serious situation. "Recently, pesticides from multinational and local suppliers were registered in South Africa to specifically combat this pest. The recommended application will depend on the severity and stage of detection," he advises.

### Registered products against FAW

Feedback has been received that successful applications have been mainly with pesticides with good stomach action (due to FAW's aggressive feeding patterns).

After urgent application by the respective companies, emergency registrations for products against the Fall Armyworm were granted and are listed below.

The products registered are inter-alia:

#### SYNGENTA

- Ampligo: (Active 50g/L *Lambda-cyhalothrin* and 100g/L *chlorantraniliprole*). For early infection, apply direct contact on exposed worm.
- Proclaim: (Active *Emamectin benzoate* 50g/kg). For a high level of infestation, use with Sorba.

- Sorba: (Active *Lufenuron* 50g/L). Sorba en Proclaim should be used together.
- Denim Fit: (Actives *Emamectin benzoate* and *Lufenuron*).

#### VILLA CROP PROTECTION

- Addition 150 SC: (Active *Indoxacarb* 150g/L). The usage of this product is recommended in a tank mixture.

#### BAYER CROP SCIENCE

- Belt: (Active *Flubendiamide* (*Phthalic Acid Diamide*) 480 g/L).

#### DOW AGROSCIENCES

- Delegate 250 WG: (Active *Spinetoram* 250g/kg).
- Uphold 360 SC: (Active *Spinetoram* / *Methoxyfenozide* 360g/L).
- Oncol Super 220 EC: (Active *Benfuracarb* 200g/L, *Fenvalerate* 20g/L).

#### ADAMA

- Warlock Pro: (Active *Emamectin benzoate* 19.2g/kg).
- Plemax: (Actives *Novaluron*/*Indoxacarb*).

A Laevel Agrochem agronomist should be contacted for an analysis and a pesticide recommendation, as each situation is unique and an incorrect recommendation could be more harmful than helpful. The biggest mistake that South Africa's agricultural industry could make is to manage this pest incorrectly, which may lead to resistance against pesticides. Once recommendations have been made, pesticides should be applied through the pivot if possible. Attention should also be paid to the application intervals, which should be determined by regular scouting and not be longer than a maximum of 10 days.

On 27 Feb 2017 the FAW, for the first time, was spotted on potatoes, in the Loskop area.

*If you detect the FAW contact your nearest Laevel Agrochem agent or call the emergency number: Tel 060 458 8483*



## Tailored, informed decisions.

## At the right time and right place.



The development of technology and the resulting application enables us to determine variation better to manage and farm more efficiently and more cost effectively.

Farming is about decisions, so taking the right decision at the right time and the right place is important. The right decisions can only be taken with the right information.

Laevel Agrochem takes the lead by assisting you with making informed decisions. We call it Decision Farming™.

**Nationwide 012 940 4398**  
**www.laevel.co.za**

# Bats save millions

Two-season research project proves that natural pest control pays



**A collaborative research project between Green Farms Nut Company (GFNC), South Africa's largest privately owned processor and marketer of macadamia nuts, four of their suppliers, the macadamia industry body, SAMAC, and the University of Venda is proving the commercial value to the industry of using bats and birds to control insects that damage the crop.**

The project has been designed and is being managed by the university's South African Research Chair's Initiative (SARChI) Chair on Biodiversity Value & Change and results from the first year of the project, which covers the 2016 and 2017 macadamia growing seasons, already provide clear evidence that crop damage is increased when bats and birds are excluded from orchards. The damage is caused by stinkbugs, moths, and nut borers.

Professor Peter Taylor, SARChI chair and supervisor of the project says that "Stinkbug

damage to macadamia orchards in South Africa is estimated to be between R50-100 million per annum. Economic models of the "avoided costs" of bat predation on stinkbugs due to predation by bats on and around macadamia nut trees suggest that the current level of stinkbug damage would be doubled if bat populations in orchards were to become extinct. Any efforts to retain bat populations, through use of safe pesticides, retaining natural vegetation corridors and bat houses, should be strongly encouraged."

Graeme Whyte, GFNC Development and Client Manager, says "Damage to kernels that are supplied to processing factories impacts the farmer in a number of ways. The first is that 60 to 80% of the damage to kernels delivered for processing in the northern regions of Limpopo and Mpumalanga, is due to stinkbug infestation. Areas like Natal are less affected by stinkbug but the increasing percentage of unsound kernel being delivered, shows that their stinkbug population is growing too.

"The unsound kernels can be converted into macadamia oil, but the margin for farmers is far lower. Either way, there is no sensible reason to incur preventable damage.

"There is also a cost to the farmer related to the need to sort and eliminate unsound kernels in the factory. If stinkbugs attack the kernels early in the season, the nut carries a dark brown mark that optical sorters can pick up automatically. Later in the season, however, the mark on the kernel is very pale. Sorting then has to be done manually, which adds cost to the production process.

"In addition, the higher the percentage of sound nuts delivered to a factory, the faster they can be cracked. In one of our factories, for instance, we can crack up to 70 tons of sound kernels a day. When we have to sort high unsound kernel, production can drop to 20 tons a day. This means that the cracking costs we are obliged to charge our suppliers increases.

"And, when factories are less productive, they're able to take on new supply at a slower





rate. So, farmers can't bring their product in as quickly as they would like. The ultimate flow of product to market is slowed down, impacting sales and, therefore, farmers' profits.

"When you consider that pest control via bats and birds is free—all you have to do is put up bat boxes in bat friendly areas and grow indigenous bush next to your orchards—then there really is no downside to doing the environmentally responsible thing." GFNC has made available to the research project orchards on two of its own farms owned by Green Farms Director, Alan Whyte, in the Levubu area.

Three of its suppliers, Fritz Ahrens, Jaco Roux, Alistair Stewart and his farm manager Branden Jardim, all in the Levubu, Thoyandou, and Louis Trichardt areas, are also participating in the project. Researchers Valerie Linden and Sina Weier have put up 48 cages around trees on the six farms.

One set of cages keeps birds and bats from feeding off the insects on and around the

trees. A second set enables both bats and birds to access the insects day and night. The third set of cages is closed in the evenings, to exclude bats and nocturnal birds. And the fourth set is closed in the day time, to exclude birds that are active in the day.

The nuts from the caged trees are then sampled to establish the percentage of damage caused by insects under these controlled conditions.

Linden and Weier have been trained at the GFNC sampling facility at its Levubu factory to identify the specific types of damage caused by the various insects.

Weier is also focusing on the feeding patterns of the bats and birds, using their droppings to establish which insects they are feeding on in the orchards that are part of the study. This information will enable farmers to provide the right environment for encouraging specific bird and bat species to develop colonies around their orchards.

"Before we started the study, we knew that the bats were feeding on false codling moths

and stinkbugs," says Linden, whose focus is the caged trees. "We've since established that certain species will also feed off the stinkbugs and that the bats will catch the insects in the air and take them off the leaves of the trees. Various species of birds have the same habits.

"Based on this behavior, and the kernel damage patterns we've seen this season, it's clear that the bats and birds make a definitive contribution to reducing crop damage. Where bats and birds were excluded from the trees, kernel quality dropped.

"We expect that biological control through the use of bats and birds will reduce the need for farmers to spray their trees. In turn, this will cut their production costs. And, because they will have less kernel damage, a higher percentage of their crop is able to be processed for export. Taken together, the savings on costs and the ability to market more of their crop will make their operations significantly more sustainable.

*Annelle Botha*

# Cry havoc

Vigilance is key in battling the Fall Army Worm

**What is it, where did it come from, and why didn't we see the Fall Army Worm (FAW) coming sooner? As the saying goes, hindsight is a perfect science, so is it important that we didn't see the FAW coming sooner, or is it more about the way in which the problem was dealt with? The biggest question of all is: can we deal with it effectively to avoid a major threat to our food security?**

The year has certainly started off in a very interesting way, from excessive rain (compared with a drought last year), to the Cape region still receiving insufficient rain and now an infestation of a pest with an insatiable appetite, for which it would seem very few people were prepared.

What is the Fall Army Worm? It is described by a number of trusted and noteworthy organisations as a pest that forms part of the Lepidoptera family, and one that can wreak havoc on crops if left to multiply. It is generally a tropical Army Worm, with about 30 different species, 6 of which we already have in Southern Africa... the FAW is, however, new to the region. Its lifecycle is only about 30 days in summer and extends to double that when things cool down a little towards

autumn, and a further 20-30 days in winter. It has no dormant phase, and the scientists are, to date, unsure what effect the various regions of South Africa will have on this pest. So don't think we're out of the woods just yet because it is still going to cool down as winter hits us!

Then where did it come from? The answer is more difficult as it really is speculative at best. Many people believe it could only have arrived in egg form within imported maize or small grains. It originates in the Americas (North and South) and returns on an annual basis to a greater or lesser degree depending on the weather conditions.

Why didn't we see the problem coming earlier? The pest was identified in Nigeria as early as October 2016 with a report allegedly being sent by the International Association for the Plant Protection Sciences (IAPPS) confirming an outbreak. The infestation arrived in Zambia during December 2016, and South Africa only took action in mid-end Jan 2016. So why didn't we take action sooner? Well, perhaps nobody thought it would hit South Africa so soon (four months). In fact the Department of Agriculture Forestry and Fisheries (DAFF) in South Africa needs to be commended on their swift action and dedication to ensure remedies are registered for the relevant crops for the FAW.

This is where the agrochemical companies come in. The systemic remedies such as **Vitex 50** (Emamectin Benzoate) seem to be the most widely recommended and used, to great effect. Some larger multinational seed producers are recommending the use of both systemic and contact pesticides simultaneously, **Vitex 50** plus **Doxstar Flo** (Indoxacarb). This does, however, make such a spray program quite expensive. Then again, one needs to calculate the cost of losing an entire crop, or a large portion of it that has been infested.

Food security! The main host plants are usually corn, sorghum and other similar grass families.

The worm has, however, been known to feast on other crops including, but not limited to, bean, peanut, potato, sweet potato, turnip, spinach, tomato, cabbage, cucurbits, and tobacco.

We certainly believe that the FAW will be contained and that it will not pose a significant threat to food security in South Africa. This, of course, assumes that farmers are exceptionally diligent in identifying these pests and take action immediately with the relevant product(s) according to the degree of infestation.

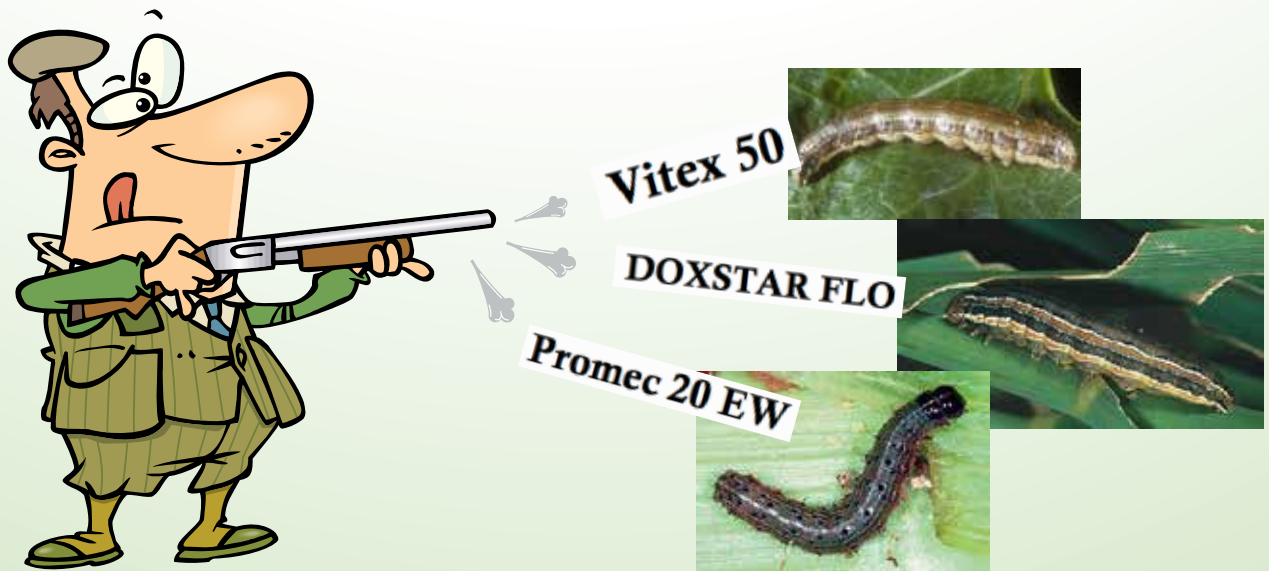
*Robert Dawson, Meridian Agritech*





*helping you grow - naturally!*

### Armyworm infestation ??



#### The preferred solutions to an army of problems:-

- Vitex 50 (Emamectin Benzoate 50g/kg)
- Doxstar Flo (Indoxacarb 300g/L)
- Promec 20 EW (Emamectin Benzoate 20g/L)

For the label and MSDS, go to [www.agritech.co.za](http://www.agritech.co.za)

Or call us on 011 822 8509

Meridian Agrochemical (Pty) Ltd t/a Meridian Agritech are the registered license holder of  
Vitex 50 (L9525), Doxstar Flo (L9884), Promec 20 EW (L9729).



# Waging war on the Armyworm

Fall Armyworm concerns demystified

**A**fter confirmation by the Department of Agriculture, Forestry and Fisheries (DAFF) that the recent pest infestation is in-fact the Fall Armyworm, concerns have been raised around what the impact could be on the South African economy.

## In which provinces is the armyworm present?

At the moment it is in Limpopo and the North West provinces.

## What crops have been affected?

Presently it is in maize, potentially in tomatoes and potatoes. The pest infestation may not be limited to these crops only.

## Does it have an impact on what we export, could South Africa face import restrictions?

The pest is airborne, it does not need to be carried in harvested products to enter the country and therefore restrictions of exports will be ineffective. It is a pest that has travelled from the Americas through North Africa and has found its way in Southern Africa.

## What is being done to contain the spread of the fall armyworm?

DAFF has implemented the South African Emergency Plant Pest Response Plan and is fast tracking certification of pesticides.

## How will this affect maize reserves?

The outbreak, if not contained, has potential to reduce production. However, almost 80% of the country's maize is Bt maize and susceptibility is minimal. The large maize producing areas of SA are still relatively pest free.

## Will this have any impact on the pricing of maize?

Although we should monitor the situation, it is still way too early to conclude what the overall impact could be on price and broader market factors.

This can however quickly change as it is a pest that is airborne and can spread easily.

## What should farmers do to ensure minimal impact?

Be alert: Scout for the pest and notify the authorities for technical information and assistance.

## What are the knock-on effects given South Africa is starting to edge out of a drought?

1. There is an immediate cost to the affected farmers due to the need to source registered and effective pesticides.
2. Farmers who experience another lost crop (from the drought) and income could find themselves in the red; it may take them years to fully recover.

It is still early: a measured approach is needed, as the pest is new to South Africa.

There are no proven remedies available for maize in the country.

However, there are other chemicals that can be recommended, DAFF has already set in motion that new remedies be registered and certified for use.

We just have to minimise the infestation to ensure that the Fall Armyworm does not have extensive impact on a recovering sector.

*Paul Makube, Senior Agricultural Economist at FNB Business*



# The silent profit eater

## Combating sub-clinical coccidiosis

**W**e are all familiar with the devastating economic effects a clinical coccidiosis outbreak can cause in a herd. We're also quite familiar with the clinical signs and pathogenesis of coccidiosis. But how familiar are we with the consequences of a subclinical coccidiosis infection? How often do we consider that the silent inappetence of such an infection can lead to hundreds, or rather more than likely thousands of profit loss due to poor weight gain?<sup>(1)</sup> Are we aware of the fact that such an infection, can upset the animal's homeostasis to such an extent, that it might lead to the animal never reaching its full production potential?<sup>(2)</sup>

Coccidia oocysts are tenacious and ubiquitous, resulting in a high prevalence of coccidiosis (caused by *Eimeria* spp.) in cattle, reaching up to a 100 % in calves.<sup>(2)</sup> Due to the consequences of the infection, it can lead to substantial losses in the cattle industry.<sup>(2)</sup> As far as the sheep industry is concerned, there is a general move towards intensive farming, inevitably coupled with high animal density and production, which could also lead to significant economic consequences in the case of an outbreak of coccidiosis.<sup>(1)</sup>

It is important to know that most *Eimeria* spp. as well as a low infection pressure of the pathogenic species induce subclinical coccidiosis.<sup>(2)</sup> The pathogen not only causes destruction of the epithelial cells of the

intestines, but also strongly interacts with the animal's digestive microflora. The balance of the digestive microflora is disturbed leading to a harmful rise in the percentage of Gram negative bacteria in the intestine.<sup>(1)</sup> Even in the absence of clinical disease, severe damage is inflicted on the intestinal tissue and the animal's overall homeostasis is affected. This in turn, adversely affects the animal's welfare and performance.<sup>(2)</sup>

Interestingly, there seems to be a strong genetic component to oocyst output with a high repeatability. Individual animals show variations in excretion and oocyst excretion may be quite high, without any clinical signs. In small stock, there also seems to be a strong correlation between the excretion of oocysts and nematode eggs, possibly due to the similar environmental contamination by both pathogens.<sup>(1)</sup>

Impairment of growth is the main sign of subclinical coccidiosis. Under certain conditions, sudden death of small stock around the time of weaning, without any preceding signs, has also been ascribed to coccidiosis. Numerous studies have shown, that the use of anticoccidials in small ruminants are important around the time of weaning and afterwards.<sup>(1)</sup>

The consequences of impaired performance, mortality and treatment costs as a result of a coccidiosis outbreak certainly makes this a disease of economic importance.<sup>(2)</sup> Assumedly, subclinical coccidiosis can lead to even more significant economic losses since it is surprisingly more

prevalent and as mentioned previously, can also adversely affect the animal's intestinal physiology, feed conversion and leads to impaired growth.<sup>(2)</sup> Therapy is definitely indicated in acute outbreaks, however, by this time the parasite's life cycle has almost been completed and most of the damage to the intestine has been done.<sup>(2)</sup> As always, prevention is better than cure and adequate prevention involves ensuring hygienic conditions, reducing stressors as much as possible and using anticoccidial drugs.<sup>(1)</sup> Exposed calves should be treated pro-/metaphylactically, rather than therapeutically.<sup>(2)</sup> DECCOX® 6 % is a premix containing micronized decoquinate and is a non-antibiotic anticoccidial developed specifically to aid in treatment and prevention of coccidiosis in cattle and sheep.<sup>(3)</sup> It is also registered for the prevention of toxoplasmosis in sheep.<sup>(3)</sup>

Dr. Chantelle Erwee, Zoetis South Africa (Pty) Ltd, Technical Manager: Ruminants

### References:

1. Chartier C, Paraud C. Coccidiosis due to *Eimeria* in sheep and goats, a review. *Small Ruminant Research*. 2012 Mar 31;103(1):84-92.
2. Dauschies A, Najdrowski M. Eimeriosis in cattle: current understanding. *Journal of Veterinary Medicine, Series B*. 2005 Dec 1;52(10):417-27.
3. Deccox® 6 % South African Package Insert.



## Deccox

# WHAT'S IN THE FEED, COUNTS!

For animal use only. Deccox® 6%. Reg. no.: G3282. Each gram contains 60 mg micronized decoquinate. For full prescribing information refer to the package insert approved by the medicines regulatory authority. Full product information available from Zoetis South Africa (Pty) Ltd., Co. Reg. No.: 2012/001825/07, 6th Floor, North Wing, 90 Rivonia Road, Sandton, 2196. PO Box 783720, Sandton, 2146, South Africa. Tel.: +27 11 245 3300 or 0860 ZOETIS (0860 963847). [www.zoetis.co.za](http://www.zoetis.co.za)

**zoetis**™

# Safeguarding skills development

Agricultural stakeholders need to up their game



**In the same way that farmers have to plan ahead for the next growing cycle, the agricultural sector as a whole should strive to ensure a sustainable skills development pipeline for the future. This applies to stakeholders at all levels, from the government right down to the aspiring agricultural entrepreneur. Gizelle McIntyre, Director of The Institute of People Development (IPD), takes a look at both sides of the scale.**

### **Upskilling the Department of Agriculture, and why it's necessary**

Having grown up on a farm, surrounded by farmers who, as a rule, didn't have any formal qualifications in farming, there is a deep understanding for the need to deal with the practical nature of the occupation. There are great qualifications in all sectors of agriculture, but a lot of people who have moved into the world of agriculture have done so purposefully, for the love of the land and the sense of meaning this occupation gives to the individual. While these farmers didn't have the qualifications, they knew the intricacies of the land—they could tell you more scientific details about the effects certain bugs had on crops than most fully-fledged scientists – they just didn't have a degree behind their name.

One would, however, be remiss to presume every person working in the Department of Agriculture is a farmer, horticulturist, or botanist. In fact, the operational workforce within the Department is more likely to be made up of Human Resources staff, accountants, managers, and administrative employees.

While conducting training at Limpopo's Department of Agriculture in 2016, it became clear that although many of the staff members had the experience to maintain their positions or be promoted, their "paperwork" didn't always reflect this. As a result, The Institute of People Development (IPD) embarked on a Recognition of Prior Learning (RPL) advisory campaign. The end goal was to enable the Department itself to build a RPL Policy, allowing it to RPL people into positions even if they did not have the formal qualifications required, rather focussing on their skills set and experience.

Retaining good people in government positions is not easy – and not acknowledging skills is often the catalyst to staff turnover. There are "sexier" places to work, so this begs the question, how do you keep and engage good people in the civil service? Research shows it's not the salary or perks that make people find other career paths. So, what is it that is making exceptional people move into the private sector? Experience shows that it certainly is not a lack of skills. There are a lot of skills there—but they are either not acknowledged, or the employees are not engaged, so they leave seeking greener pastures. People need a sense of meaning and purpose, acknowledgement, autonomy and a sense of belonging to stay.

While identifying the skills that are needed is indeed the first step, this in itself isn't enough. Experience shows that there is a deeper, underlying problem. Even if the correct skills are recruited, how can they be kept in the employ of the Department? If people do not have their own sense of autonomy in their environment, they will not be

satisfied. Bureaucracy takes any bright person and turns them dull; from a floodlight to a candle. Just identifying the skills needed is not enough; and this is indicative of any governmental department, not just the Department of Agriculture.

How can this be avoided? One solution is to create a career ladder or career path for the Department. When a plethora of skills sets and experience is available, recruitment structures need to shift from qualifications only, to considering experience and skills sets. If this is not done, all succession planning is completely out of sync.

In Limpopo, the skills that were most in demand were that of management. Putting a BSc Engineer into a management position, and assuming that because he has the degree he'll be able to manage a team is a mistake. In addition, the training departments themselves run through the Department of Public Service Training, and don't outsource. This raises concerns regarding degrees of separation.

Agricultural college lecturers are in the same position as any other college lecturer; they're either training from experience, but don't know how to impart knowledge, or they are academics who cannot apply their knowledge practically. For this reason, skills development in training practices is also required.

The only way to identify gaps effectively is to employ proper skills development facilitator functions. These must be at EXCO level. This function must place a focus on auditing the skills that are available, while planning for gaps; without a plan, it doesn't work. Once the gaps are identified, and the plan has been established, the gaps can be filled – through both training and skills-based recruitment.

To fill the coffers, the sexiness of agriculture must be sold. When new graduates or candidates come into the world of work, the Department of Agriculture shouldn't be a last resort job. It should be where people want to go. Then the Department will have the freedom of recruitment, rather than scraping the bottom of the barrel. The key here is to sell the Department of Agriculture more on career awareness and the broad scope of occupations available. There are limitless options, most of those employees working at the Department aren't actually farmers—but candidates aren't aware of the vast opportunities that exist within it.

### **Skills development for entrepreneurs in agriculture**

Within the agricultural industry, entrepreneurs need to come to grips with the fact that, regardless of whether they are farming, selling fertiliser, building dams, or cultivating crops, grasping how a business works is essential to success.

Entrepreneurs are often exceptional at devising excellent business ideas, but a lack of real business management knowledge results in a lack of funding. Without a sound business plan, the business fails before it has made it past infancy. Business leaders must understand the differences between a business account and a personal account, a loan and an overdraft, the principles of Human Resources, salaries, or the value of maintaining a good reputation as an employer. Every company requires structure, even

if it comprises only one employee – and creating structure requires skill and knowledge.

As visionaries, entrepreneurs occasionally struggle to see the gap in their own skillset, gaps that go deeper and wider than agricultural knowledge. These entrepreneurs require training, mentoring and coaching from a business point of view. This ensures that their businesses can continue in a sustainable fashion and flourish. Sustainability is key.

Part of an entrepreneur's power is their personality, so rather than trying to change them, training should focus on adding on to their skills—or learning how to partner with the right people that already have the needed skills. Entrepreneurs have a unique purpose. Training is absolutely necessary, but the focus of training is not to turn them into something else. This is rather to empower them to bring in the right experts in the right fields, without losing control of the business operations.

In instances where entrepreneurs are able to acquire funding, without the skills to manage these funds effectively, the business will still fail – and lose a lot of money in the process. An agricultural entrepreneur may know how to make organic compost, but can they market and sell it? Can they manage the staff required to manufacture the compost, and do they know how to deal with the bank? These crucial business concepts must be understood; often failure is not an indication of a bad business concept.

However, simply teaching them the skills is not enough. It may not be in their nature to utilise these skills, even once they have them. As such, it's essential to help them to apply these concepts, so that when they have someone providing the service in these

areas (an employee, a consultant, or a mentor) the wool cannot be pulled over their eyes. Grasping financial management principles, for example, won't make a business owner an accountant, but it will help them to oversee their accountant's work and make better decisions.

The Institute of People Development (IPD), for example, has worked with many entrepreneurs as they strive to start training companies, and assisting entrepreneurs across the agricultural sector in honing their skills. This learning journey must be considered as a holistic process.

Often, a farmhand that has worked on farms for his/her entire life will think s/he knows everything about the industry, and can easily start their own farming business. Yet, while they will have excellent skillsets in certain areas, they will not have in-depth knowledge of the entire sphere of work.

The key is to do some reconnaissance, to observe other businesses and look at what makes an agricultural business successful. Businesses fall flat because their founders don't know how to sell their skills and produce. From sales to financial management, every business management skill is critical to growing a fruitful business. The business can manufacture the best organic compost on the planet, but if no one is selling it, who's going to know?

Entrepreneurs must put time and effort into creating a business plan before launching their enterprise. This process allows them to identify skills gaps, and areas where expert assistance will be required. It gives the entrepreneur a core understanding of what they need – grasping that they may not need to do everything themselves, but they must always understand the bigger picture.





# Connectivity is key

## Reliable always-on Internet for under-served areas

**R**eliable internet connectivity has become a necessity in today's high-tech world. It is crucial not only for day-to-day personal and business communications, but for other critical requirements like security.

Paratus Telecom SA managing director Kallie Carlsen says access to reliable always-on Internet is becoming more of a necessity than a basic requirement. "There are many low-cost local terrestrial alternatives available, but they cannot always provide the required reliability.

"Two major mobile operators recently released a report on the impact that theft and vandalism has on their rural high sites. These are the sites that everyone relies on for connectivity.

The same issues affect the terrestrial wireless operators, if their sites are down for extended periods then consumers are left vulnerable, with no access to the Internet," he explains.

Previously, the cost of being connected to reliable Internet connection was a barrier to entry for many people, especially those living in rural or remote areas with limited or no conventional internet or telecommunication services.

Carlsen says the good news is that with the arrival of new alternative Internet offerings, these costs have reduced drastically and he foresees a continued reduction of costs.

"The real question is, what is the real cost of not having access to reliable connectivity? The answer is simple: you cannot manage your business, follow commodity markets, place orders, make timeous payments or communicate with those who are connected globally," he adds.

Connectivity is also becoming key in the new IOT (Internet of things) technology that is soon to be a reality. IOT will provide the intelligence and insight into businesses, or the farm, and allow you to manage the key components or processes of the operation. It will enable the farmer to optimally manage their machines, infrastructure and assets. IOT

will also be a key part of farm security going forward.

Since the launch of consumer broadband satellite Internet in 2011, South Africans living in unserved and under-served areas have been offered connectivity literally anywhere in South Africa.

Paratus Telecom SA, formerly Maxwell Technology, has established itself as a leading satellite-based Internet and data solutions provider offering a range of affordable and reliable high-speed broadband Internet solutions to its clients.

Paratus Telecom is the largest privately owned Pan African telecoms operator with its head office in Windhoek, Namibia. It also has fully licensed offices in Angola, Botswana, Zambia and South Africa and delivers products and services to 22 African countries

*For more information contact Paratus Telecom SA on (012) 940-0660 or visit [www.paratustelco.com](http://www.paratustelco.com) to find out how to benefit from being reliably connected.*

## Satellite broadband internet

High speed Internet, no matter where you live!

Reliable, fast and guaranteed connectivity anywhere in South Africa.  
Fast Internet for browsing the Internet, Skype and e-mails.  
Uncapped data packages available at speeds of up to 10 Mbps.  
No limits on daily data consumption.  
No need for phone lines.  
Always-on Internet!

**FREE**

hardware on  
24 month  
rental options.

Subject to credit approval.  
Terms & conditions apply.  
Solution specific.

# Africa's potential

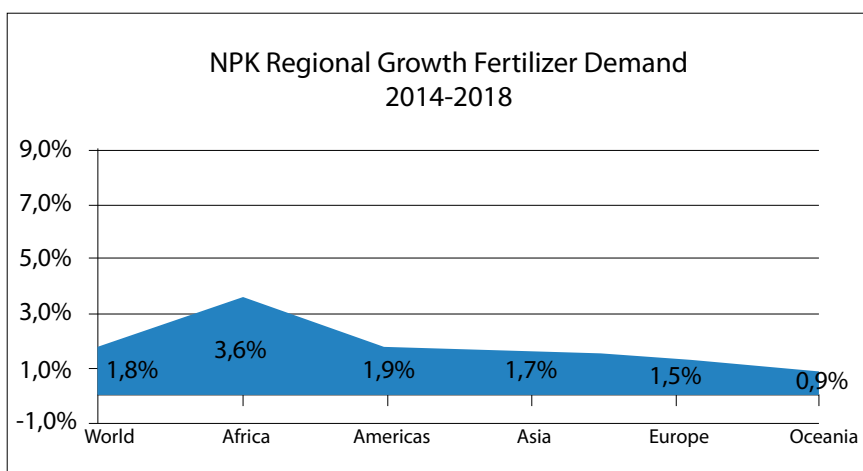
Considering Africa's size and exploding population, it's little wonder that industry experts see enormous business potential for the fertilizer industry on the continent.

**A**nalysing some facts of Africa, it's the second largest continent in the world with more than 30 900 000 km<sup>2</sup> 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. They manage 7 fertilizer plants in South Africa and have capacity to manufacture about 10 custom made equipment per year. The company can design in-house fertilizer blending plants from very small capacities to over 100 tons per hour, coating plants, bagging equipment from 10kg to 1ton, screening equipment and any other compact plant as per customer needs.

Africa is showing its potential on fertilizer market, is showing that has professional people and technology to offer to Africa and to the world. Bagtech has equipment across Africa and offer services for more than 30% of main ports in Africa. We have delivered more than 90 fertilizer equipment for Africa till now.

For more info: [www.bagtechint.com](http://www.bagtechint.com)

**BAGTECH**  
FERTILIZER MANAGEMENT  
AND HANDLING SOLUTIONS

FROM **AFRICA**  
TO **AFRICA**

VISIT OUR WEBSITE  
[WWW.BAGTECHINT.COM](http://WWW.BAGTECHINT.COM)



## BAGTECH, YOUR PARTNER

IN SUPPLYING AND DEVELOPING MACHINERY FOR BLENDING, COATING AND BAGGING FOR FERTILIZER. OUR MACHINES ARE DESIGNED AROUND YOUR NEEDS. WE DELIVER AND COMMISSION ON SITE AT YOUR FACILITY AND OFFER TECHNICAL SUPPORT.

- COATING EQUIPMENT
- BLENDING EQUIPMENT
- BAGGING EQUIPMENT
- SCREENING EQUIPMENT
- CONTAINER BLENDING PLANT
- COMPACT PLANTS



**CONTACT US**  
+27 (0) 31 2010607

**EMAIL US**  
[BAGTECH@BAGTECHINT.COM](mailto:BAGTECH@BAGTECHINT.COM)

FOLLOW US



# UP LIFTING ENERGY

## Biogas for rural communities in South Africa

**R**ising energy costs, increasing energy demand, dwindling fossil fuel reserves, security of supply and environmental concerns are some of the challenges that South African society is faced with when trying to energize rural communities. Renewable energy is increasingly gaining support as an alternative and sustainable way of providing much needed energy in rural areas, and thereby combating climate change. There is an array of renewable energy projects that are in operation in South Africa, including solar power, wind power, hydro-power and biofuels (biodiesel, biogas, bioethanol, biochips and biochar). All of these have the potential to energize rural communities and to solve South Africa's energy challenges.

The Agricultural Research Council (ARC) and the Department of Agriculture, Forestry and Fisheries (DAFF), in collaboration with the Norway Research Co-operation, have initiated a project to install biodigesters in rural communities to produce biogas. The project aims to introduce biogas as an alternative source of energy in a crop-livestock-bioenergy system for rural cattle farmers in the Maluti-a-Phofung Municipality (Free State), Tulamelo and Great Giyani Municipalities

(Limpopo), Ramotshere Moiloa and Moses Kotane Municipalities (North West), and the Great Kei and Mquma Municipalities (Eastern Cape). The project sites were chosen based on the climatic conditions and the agricultural practices in these areas. The criteria used to identify suitable households and beneficiaries for the project were based on the following requirements: a reliable water supply; more than 15 cattle kraaled throughout the year; availability of labourers to feed the biodigester; and minimum temperatures above 10°C throughout the year.

The biogas, as well as a nutrient-rich digestate, are produced by anaerobic digestion of cow dung in airtight digesters. The biogas is used for cooking while the digestate is used as an organic fertilizer to enhance crop production and reduce reliance on expensive chemical fertilizers. The results of a survey showed that the energy requirement priorities of rural communities are for cooking, lighting and water heating, in that order. They rely mainly on firewood as a source of energy, followed by paraffin and electricity, a choice that is influenced by the cost and logistics involved in sourcing them. Hence, the ARC and DAFF saw the need to intervene in improving the livelihoods of rural farming communities in South Africa.

Based on general observations, workshops for training the local farmers on biogas

technology were very successful as farmers from all municipalities in each province showed great interest in the technology and installation of the biodigesters (which was underway at some project sites). The workshops served the purpose of transferring knowledge to the farmers as well as general biogas awareness. Local farmers and community members expressed an understanding and support for the use of clean (renewable) energy.

The impact of this project extends beyond the direct beneficiaries with a number of youth being trained in the installation of biodigesters and maintenance of the biogas system. With almost 90% of the youth in rural areas being unemployed, the temporary job opportunities created are highly appreciated by the community members, and the project has become the main income generator for most youth in the selected areas. To date the project has created 177 temporary jobs in all four provinces during the installation and commission of the biodigesters.

Activities during the course of the biogas project

*Mr Vuyo Mliswa  
Agrometeorology Programme  
ARC-Institute for Soil, Climate and Water  
Tel: 012 310 2657  
E-mail: MliswaV@arc.agric.za*







# SLURRY IN A HURRY

Utilizing organic waste to improve soil nutrient content and mitigate greenhouse gas emissions

**C**limate change driven by anthropogenic activities and its consequence of low soil productivity in the agricultural sector is an alarming concern. Sustainable and environmentally friendly approaches that aid in mitigating the contribution of agricultural activities towards climate change help improve crop performance, growth and yields. These include the use of waste for the production of bioenergy as a waste management strategy, as well as practising organic farming. During the production of bioenergy, organic wastes are produced as by-products. One such by-product is the biogas slurry that remains after anaerobic digestion of organic material such as cattle manure, chicken litter, household organic and slaughterhouse wastes and plant residues. Biogas slurry (BGS) can be used as an organic fertilizer to improve crop production and to reduce greenhouse gas (GHG) emissions from agricultural soils. It is also an alternative resource to mineral fertilizers, which are expensive for smallholder farmers.

The value of BGS is attributed to its nutrient composition which includes significant amounts of nitrogen (N), phosphorus (P), potassium (K), zinc (Zn), iron (Fe), manganese (Mn) and copper (Cu), as shown

in Table 1. Many of these nutrients are depleted from soils as a result of intensive agricultural practices. Biogas slurry contains approximately 93% water and 7% dry matter, of which 4.5% is organic

matter and the remaining 2.5% is inorganic matter. Application of organic amendments improves soil organic matter status and provides a substrate for microbial communities. This then becomes beneficial to



Figure 1: Application of BGS in a vegetable garden in QwaQwa, Free State province the soil by



facilitating the process of nutrient cycling, availability and storage capacity, biological activity, soil aggregation, drainage and resistance to erosion.

In the agricultural sector it is necessary to reduce GHG emissions in order to develop a more sustainable food production system. One of the recommended mitigation strategies for GHG emissions is the use of nitrogen fertilizers together with organic fertilizers such as BGS at optimum rates for crop production due to their huge direct effect on nitrous oxide (N<sub>2</sub>O) fluxes. The effect of synthetic fertilizers on soil respiration has shown that there is a substantial stimulation of soil respiration (16%) and an enhancement in soil carbon mineralization (6%) within the agricultural ecosystem.

However, the specific effects of different organic and in-organic sources on soil N<sub>2</sub>O and carbon dioxide (CO<sub>2</sub>) emissions have not been extensively studied in Africa.

In South Africa, very little research has been done on the use of biogas slurry as a soil amendment and mitigation measure for GHG emissions at both commercial and communal scales. As part of a study on the adoption of bio-digester technology for generation of biogas in small-scale farming communities in four provinces (Free State, Limpopo, Eastern Cape and North West), the Agricultural Research Council (ARC), in partnership with the Department of Agriculture, Forestry and Fisheries (DAFF) and Norwegian Institute of Bioeconomy Research is currently assessing the potential of utilizing BGS as a

soil amendment. One of the goals of the project is information dissemination regarding the application of BGS as an organic fertilizer. Improved understanding of nutrient dynamics of BGS and its influence on GHG emission will help researchers to develop guidelines and regulations on the optimal utilization of BGS for soil improvement, increasing crop production and to sustain a healthy environment.

*Mr Lunga Grootboom and Mr Thandile Mdlambuzi*

*Agrometeorology Programme*

*ARC-Institute for Soil, Climate and Water*

*Tel: 012 310 2500*

*E-mail: GrootboomL@arc.agric.za /*

*MdlambuziT@arc.agric.za*

*village in Limpopo (A) and three different farms in QwaQwa in the Free State province (B, C and D)*

| Parameter   | Biogas Slurry |      |      |      |
|-------------|---------------|------|------|------|
|             | A             | B    | C    | D    |
| pH          | 8.91          | 9.10 | 7.90 | ND   |
| EC (mS/m)   | 300           | 375  | 122  | ND   |
| Ash (%)     | 30.3          | 29.5 | 27.4 | 31.2 |
| OM (%)      | 69.7          | 70.5 | 72.6 | 68.8 |
| Total N (%) | 2.82          | 2.55 | 1.73 | 2.59 |
| Total C (%) | 31.1          | 35.0 | 36.6 | 31.9 |
| C/N ratio   | 11.0          | 13.7 | 21.1 | 12.3 |
| P (g/kg)    | 4.78          | 5.73 | 2.46 | 9.97 |
| K (g/kg)    | 17.6          | 17.7 | 6.41 | 21.0 |
| Ca (g/kg)   | 36.9          | 19.1 | 10.3 | 42.4 |
| Mg (g/kg)   | 32.8          | 9.12 | 3.46 | 19.9 |
| Na (g/kg)   | 32.1          | 4.58 | 1.51 | 20.1 |
| Al (g/kg)   | 6.13          | 8.66 | 8.36 | 4.82 |
| Fe (g/kg)   | 5.98          | 5.18 | 5.22 | 5.50 |
| B (mg/kg)   | 59.46         | 27.7 | 16.6 | 34.2 |
| Cu (mg/kg)  | 36.4          | 40.3 | 23.0 | 36.6 |
| Mn (mg/kg)  | 428           | 788  | 437  | 1129 |
| Zn (mg/kg)  | 634           | 799  | 317  | 1142 |

*EC = Electrical conductivity, OM = Organic matter, ND = Not determined*

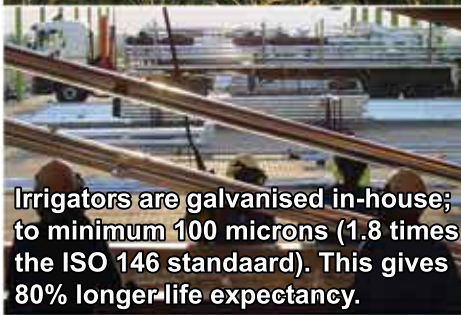
*Table 1: Chemical and physical characteristics of four biogas slurries obtained from Malonga village in Limpopo (A) and three different farms in QwaQwa in the Free State province (B, C and D)*

# AGRICO Centre Pivots & Linear Irrigators



With outstanding standard specifications and many options:

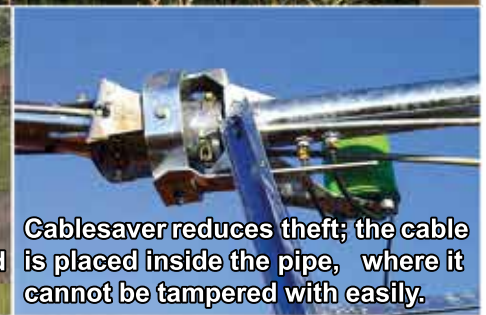
NEW: Internet Control



Irrigators are galvanised in-house; to minimum 100 microns (1.8 times the ISO 146 standard). This gives 80% longer-life expectancy.



Windsaver machines are stable and guaranteed for 4 years.



Cablesaver reduces theft; the cable is placed inside the pipe, where it cannot be tampered with easily.



Autoflush flushes the machine every time the pump starts.



The AGRICO 3-legged center is exceptionally strong.



AGRICO one stop service: Survey, design, manufacture, delivery, installation and after sales service.

ENQUIRIES: Alfred Andrag ☎ 082 824 1214 📠 021 950 4111 📠 950 4208 ✉ [alfred.andrag@agrico.co.za](mailto:alfred.andrag@agrico.co.za)

SALES & SERVICE WITH BRANCHES ACROSSTHE COUNTRY:

- Aliwal North • Bellville • Bethlehem • Bloemfontein • Bothaville • Caledon • Ceres • Cradock • Estcourt • George • Hartswater • Humansdorp • Kakamas • Kimberley • Kroonstad • Lichtenburg • Malmesbury • Moorreesburg • Nelspruit • Nigel • Nylstroom • Pietermaritzburg • Piketberg • Rawsonville • Tzaneen • Upington • Vredendal •

## AGRICO

*Meer as 100 jaar van diens!  
More than 100 years' service!*