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# PULA

# INVULA

**GROWING** FOOD • PEOPLE • PROSPERITY

GRAIN SA MAGAZINE FOR DEVELOPING FARMERS



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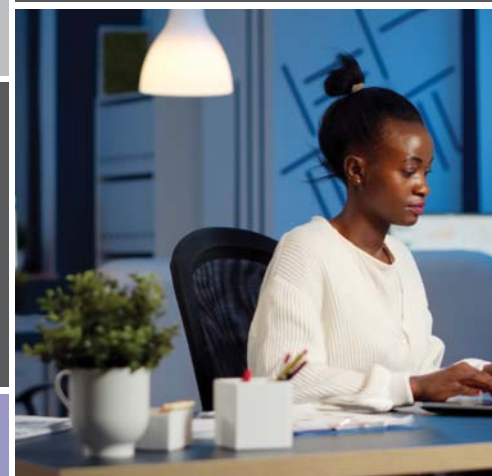
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## A WORD FROM... *Phumzile Ngcobo*

**A**S FARMERS LOOK FORWARD TO THE UPCOMING PLANTING SEASON, THEY CANNOT HELP BUT LOOK BACK AT THE PREVIOUS ONE AND THE LESSONS IT PRESENTED.

Most important to farmers is obtaining good average yields. However, the shift towards the use of sound and good agricultural practices is increasingly becoming an important factor.

Recent history has illustrated how the agricultural industry is largely affected by additional factors, including the climate, input supply and marketing. Farmers' ability to adapt to prevailing climatic conditions influences their productivity and the sustainability of agricultural production systems.



Soil testing is one of the most basic and important tools for the management of crop production operations.



The variable nature of factors affecting farmer productivity (climate, input supply and markets) requires farmers to be more intentional regarding their production practices. While the productivity objectives are met, the environmental and regenerative aspects of production need to be largely considered.

Soil testing is one of the most basic and important tools for the management of crop production operations – allowing the correction of imbalances and the application of recommended fertilisation programmes to obtain the best possible yields. Seed variety selection should consider climatic conditions prevailing in the region.

As the saying goes, never put all your eggs in one basket! Diversification of enterprises is key where complementary and supplementary enterprises can be managed to operate to the optimum benefit of farmers and their livelihoods. Grain crop production should, where possible, be supplemented by live-stock production and vice versa. This is to create a symbiotic relationship between enterprises and the ultimate resilience and sustainability of farmer and farming operations.

The management of the crop throughout the growing season in relation to weed, pest and disease management is one of the determining factors of a successful harvest.

*– Phumzile Ngcobo is the assistant regional manager at the Dundee office. ■*

# Chemical labels contain new requirements

**F**ARMERS AND FARMWORKERS SHOULD BE AWARE THAT THEIR CROP PROTECTION PRODUCT LABELS ARE CHANGING AND WILL CONTINUE TO DO SO FOR A WHILE. THE REASON FOR THIS IS BECAUSE OF THE *GLOBALLY HARMONISED SYSTEM OF CLASSIFICATION AND LABELLING OF CHEMICALS* (GHS), WHICH AFFECTS CHEMICAL AGENTS IN VARIOUS INDUSTRIES.

## 1 GHS label requirements.



**Product trade name** Note regarding use

**BEFORE USING THIS PRODUCT, READ THE LABEL CAREFULLY**

**FUNGICIDE** Product group

**A-WONDER REMEDY**

Reg. No Lxxxx, Act/Wet No./Nr. 36 of van 1947

An emulsifiable concentrate, systemic fungicide for the control of powdery mildew on crops as listed.

'n Emulgeerbare konsentraat, sistemiese swamdoder vir die beheer van poeieragtige meeldou op gewasse soos aangedui

Declaration regarding formulation and use

FRAC FUNGICIDE GROUP CODE 5 FRAC SWAMDODERGOEPCODE

Resistance group code

**ACTIVE INGREDIENT / AKTIEWE BESTANDDEEL**

Spiroxamine (spiroketalamine) 500 g/l Spiroksamien (spiroketalamien)

Active ingredient and quantity

**Hazard statement**

Fatal if swallowed

**Precautionary statements**

Wash hands thoroughly after handling  
Do not eat, drink or smoke when using this product  
IF SWALLOWED: Get emergency medical help immediately  
Specific treatment (refer to safety data sheet)  
Rinse mouth  
Store locked up  
Dispose of contents / container in accordance with local regulations

Hazard statements (must have heading and be on the right of the pictogram)

**Precautionary statements**

(must have heading and be linked to the specific hazard statement)

**DANGER**

Signal word (must be below pictogram)

Registration holder / Registrasiehouer  
A-Chemicals (Pty) Ltd (Reg No. 67/07147/07)  
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Emergency Number: 082-446-8966  
Client Service Number: (011) 555-0000

Company trademark and name

**A-CHEMICALS**

Registration number

Batch no., date of manufacture, expiry date

Pictogram

Net volume/mass UN number (transport information)

The need for GHS arose because of the global trade of chemicals, which often cross boundaries into areas with different languages and varying levels of literacy – thereby creating challenges when communicating safe and responsible usage instructions of the products.

In South Africa, GHS became a legal requirement since September 2022 and is stipulated in *The Regulations for Hazardous Chemical Agents (No. R280 of 29 March 2021)*. Since then, the labels and safety data sheets of crop protection products must follow a standardised approach in communicating the hazards of the chemical products. Bear in mind that there is a transition period for chemicals that were already imported or manufactured prior to this date.

In this article the focus will be on products used in the crop protection industry. It is very important for farmers and farmworkers to understand the new layout, because the hazards associated with a particular chemical, its nature and its severity are communicated through several elements, such as hazards statements, pictograms and signal words on both the label and the safety data sheet of the product.










## CLASSIFICATION CRITERIA OF HAZARDS

According to the GHS, the nature of a hazard is assigned according to a hazard class, of which there are currently 29. A total of 17 of these are physical hazard classes, such as oxidizing liquids, ten are health hazard classes, such as skin corrosion/irritation, and two are environmental hazard classes, namely hazardous to the aquatic environment or hazardous to the ozone layer. These classes belong to a hazard group or type, depicted by a pictogram that can be used for several different hazards.

Within these classes, the severity of the hazard is then allocated in terms of a hazard category expressed as a number – for instance, category 1 would be the most severe. Some of these categories are further subdivided into divisions, which are expressed as a letter, i.e., A, B, C and so forth.

One of the biggest changes on the labels is the fact that there will no longer be a colour band illustrating the toxicity of the product. This may be concerning to some, but one should note that with the GHS classification the hazard of the product is determined using acute and chronic toxicity, whereas the colour bands only considered acute toxicity – meaning that the new classifications are more comprehensive.

The GHS also uses hazard statements, pictograms and signal words to communicate the hazard of the chemical, as well as precautionary statements to mitigate any potential risks.

GHS HAZARD GROUPS AND PICTOGRAMS					GHS STATEMENT EXAMPLES								
	Explosive		Chemicals under pressure		Exclamation mark	<b>Acute Toxicity Category 1 (oral exposure)</b> <b>Hazard statement</b> • H300 – fatal if swallowed							
	Flammable		Corrosive		Health (chronic toxicity)	<b>Precautionary statements</b> • Prevention P264: Wash hands thoroughly after handling P270: Do not eat, drink or smoke when using this product • Response P301+P316: IF SWALLOWED: Get emergency medical help immediately P321: Specific treatment (refer to safety data sheet) P330: Rinse mouth • Storage P405: Store locked up • Disposal P501: Dispose of contents / container in accordance with local regulations							
	Oxidising		Acute toxicity		Environment	<i>Note that the codes (Hxxx/Pxxx) must appear on the safety data sheet, but may be omitted from the label.</i>							
<div>SIGNAL WORDS: WARNING   DANGER</div>					The chemical identity of all ingredients contributing to the final GHS classification of the remedy needs to be disclosed on the product label								
info@croplife.co.za					• www.croplife.co.za								





Hazard statements are phrases that describe the hazard/s as determined by the hazard classification. They start with the letter 'H', followed by three numbers.

For physical hazards, the statement will start with H2 (followed by two additional numbers), health hazards start with H3 and environmental hazards with H4, for example, *H300: Fatal if swallowed*. These hazard statements appear both on the label and the safety data sheet – however, the code (i.e., Hxxx) only needs to appear on the safety data sheet and not on the label.

Precautionary statements are used to explain how to handle these substances, as well as which precautions to take to ensure any risk associated with handling the product is mitigated. The precautionary statements are preceded by the letter 'P' and three numbers that are also categorised according to type, similar to the hazard statements.

For instance, general statements will start with P1 followed by two numbers, prevention statements with P2, response statements with P3, storage statements with P4 and disposal statements with P5, e.g., *P264: Wash hands thoroughly after handling*.

One of the biggest changes on the labels is the fact that there will no longer be a colour band illustrating the toxicity of the product.

These statements appear on the product label and the safety data sheet, and they are linked to a specific hazard statement and pictogram. As with the hazard statements, the codes (i.e., Pxxx) are only required on the safety data sheet and not on the actual label. Both the hazard statements and precautionary statements must have headings indicating which type of statements they are, and they must be placed to the right of the associated pictogram.

As mentioned, pictograms are used to depict nine different chemical hazard types, illustrated at the bottom left corner of **Figure 1**.

A signal word should appear on the label, of which there are only two:

- **Danger**, which indicates the more severe hazard, or
  - **Warning**, indicating a less severe hazard.
- Only one signal word should appear on the label.

## SUMMARY

These are just a few elements of the GHS, mostly pertaining to the product label, because the entirety of the GHS is beyond the scope of this article, but it is critical that farmers and farmworkers familiarise themselves with these important elements.

The GHS's aim is to communicate the inherent hazard of the chemical. Because of this hazard, there are certain risks involved with working with the product, but these are mitigated if the label instructions are followed. Just because a product is hazardous, does not mean it cannot be applied safely.

A vehicle, for instance, can also be a hazard if you consider the number of accidents on the road, but vehicles are not banned altogether because of this. Instead, the risk is mitigated by wearing a safety belt, adhering to the speed limit and following other road safety regulations.

The same logic applies when working with hazardous chemicals, which is why understanding the product label is so important. And remember, any application of a crop protection product in any manner other than the label instructions is a contravention of the law – so do the right thing and make sure you, and any person working with you, know exactly how to use these products safely and responsibly. ■

ELRIZA THERON,  
CROPLIFE SA



# 14

# TOP TIPS on planter maintenance

**S**UBOPTIMAL PLANTER PERFORMANCE RESULTS IN IRREGULAR SEED DEPTH, SEEDS AT THE SOIL SURFACE, OPEN SEED SLOTS, COMPACTED SOIL ON TOP OF THE SEEDS, HAIR PINNING AND SIDEWALL COMPACTION. OTHER PROBLEMS INCLUDE SKIPS, DOUBLES AND TRIPLES – AND AT THE END OF THIS, THE YIELD WILL BE LOWER AND THE INCOME WILL BE LESS.

You may be able to get away with a poorly maintained planter in conventionally tilled soil, but not in tough no-till conditions. No-till and conventional planters must be able to plant through heavy crop residue, penetrate firm soil, open a perfect 'V' slot, place singulated seeds at equal distances and at uniform depth, close the seed slot so seeds have proper seed-to-soil contact, not cause sidewall compaction and not excessively compact soil on top of the seed. All these things must be done while driving 6 km/h to 10 km/h, dropping ten to 20 seeds per second.

To avoid planting problems, first check that your equipment is working properly, and then regularly check the planter performance in the field and change the settings at planting time.

The following 14 points need to be evaluated:

## 1 Meters

Dysfunctional seed metering units result in skips, doubles and triples, with a loss in yield. To guarantee optimal performance, take metering units apart, remove dirt and clean the hood with soapy water. Replace cracked plastic covers. Replace broken fingers in a finger-pickup meter. Reset the tension on the fingers and tighten them correctly. Check backplate and seed brushes for wear and replace as needed. Also check the belt in finger-pickup meters. It should be flexible, not have cracks in it and should be clean. You can lubricate the meter with graphite.

It makes sense to take your finger-pickup metering unit to a dealer to have it calibrated. If you have a vacuum or air meter, check that the vacuum or air pressure is correct, check for leaks and wear on knock-off brushes and repair/replace as needed.

## 2 Planter unit

Accurate depth placement can be compromised if planter units are loose or wobbly. You should not be able to easily lift a planter unit or move it sideways. Look across your planter units from the side. Are they all at the same height? If one unit is either up or down compared to the others, it needs attention. A common problem is that some bolts are loose or that additional bushings are needed. You also need to replace cracked or broken seed hoppers.

## 3 Seed-opener disks

Seed-opener disks need to have a minimum diameter (check operator manual), or they will not place the seed at the appropriate depth. On the majority of planter brands a system of two seed discs touching each other is used to open the furrow in the soil, where you will

then place your seed. The relation between these two discs is extremely important to ensure that you get a clean, uniform 'V'-shaped furrow to place your seed into.

When the seed disc spacing is not correct and dirt is able to move between the seed discs, it causes issues such as:

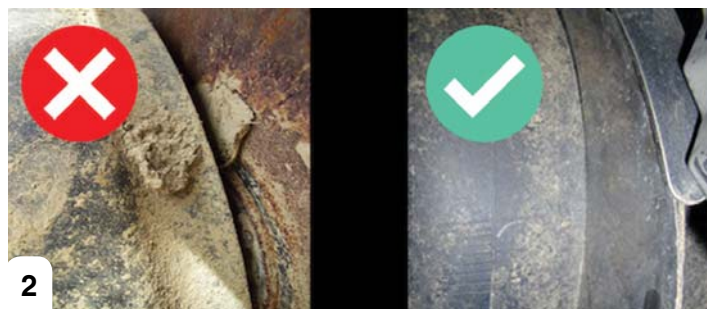
- A 'W' is created instead of a 'V', which means the seed lands at an uneven height and because it's not situated in the centre of a clean uniform furrow, it also makes closing the furrow and ensuring good seed-to-soil contact difficult, which causes problems during germination.
- By having a gap between the seed discs, you also allow for dry surface dirt to fall into the furrow and get in contact with the seed.
- This dirt moving between the seed discs can often also be the cause of seed discs jamming when the moisture level picks up a bit.

Put two business cards between the openers and move them as close together as possible to check this (**Photo 1.**) If the opener disks are worn too much, you will get a 'W'-shaped seed slot instead of the desired 'V' slot. Insert one card at the top of where the two discs make



**Make sure the opener discs are not worn too much.**

Source: <https://www.striptillfarmer.com/articles/4186-how-to-check-your-disc-openers>



**A gap between the depth gauge wheel and the seed disc can cause problems.**

Source: <https://www.striptillfarmer.com/articles/4186-how-to-check-your-disc-openers>



contact and one at the bottom, just enough for the contact point to hold the cards. Measure the distance between the two cards. The ideal is to achieve 6 cm contact between the cards. If the gap between the cards is too small, remove the shims. If it is too big, add shims to ensure you get 6 cm of contact.

#### 4 Seed tubes

The end of seed tubes may wear to the extent that it curls inwards, catching seeds. There is often a hook halfway up that can easily break off. Seed tube guards need to have a minimum width and be fastened correctly, or damage to the seed tubes is likely. Clean seed sensors if your planter was fitted with it.

#### 5 Seed firmers

These help to press the seed down in the furrow, guaranteeing more accurate depth placement of the seeds. The tension can be adjusted with a bolt. If the seed firmers are worn too much, they need to be replaced.

#### 6 Depth wheels

This is often a much-debated topic regarding what type of depth gauge wheel is best – close to the seed disc or far away from it. The most common is a depth gauge wheel that makes light contact with the seed disc. When there is a gap between the gauge wheels, it allows for dry dirt to make its way between the disc and gauge wheel, causing a ‘rooster tail’ effect of dry dirt in the rim or lip of the gauge wheels. This dirt then flicks up from the gauge wheels and lands in the furrow contacting the seed, causing germination problems. See **Photo 2**.

As your planter wears, or even on a new planter, the spacing between gauge wheels and seed discs can change.

- On a new planter, the gauge wheel arm mouldings/fabrication can be slightly out.
- The rubber tyres can be worn.
- The gauge wheel arms can be bent.
- The bearing/shaft can be poorly worn.

To ensure the correct gauge wheel spacing, check that the arms aren’t bent, the tyres aren’t worn past their respective wear marks and the bearings are still in good condition. Lift the planter, place blocks under the gauge wheels and lower the planter back down onto the gauge wheel blocks. Then use the respective planter’s type of adjustment to adjust the gauge wheels to where the gauge wheel is making light contact with the seed disc at a ground-engaging height but is still able to rotate.

#### 7 Coulters

Check the diameter of the coulters and replace it if necessary. You should adjust the depth setting of worn coulters that are still usable.

#### 8 Row cleaners

Check for wear. Adjust to compensate for wear or replace if worn too much.

#### 9 Closing wheels

Closing wheels need to have an intact spring and need to be checked for damage or wear. Bearings cannot be wobbly or too tight. The bottoms of rubber or cast-iron closing wheels need to be 37 mm to 50 mm apart. The closing wheel arm cannot have too much play. If so, bushings or the entire arm may need to be replaced.

#### 10 Alignment of coulters, opener disks and closing wheels

Take a rope and pull it straight from the front coulter to the closing wheels. The firming wheels, seed openers and coulters should all be in line. Closing wheels should not run on top of the seed furrow.

#### 11 Insecticide boxes

The insecticide boxes should have no holes or cracks. Tubes should be blown out with air as well as the slot on the bottom of the meter.

#### 12 Fertiliser unit

Fertiliser opener disks should have a minimum diameter (check manual). The bearings should not be wobbly or too tight. Hang a bucket below the tube of the unit and do a test run. Compare the fertiliser weight to the expected weight and recalibrate the planter to make sure the desired fertiliser is applied.

#### 13 Chains and sprockets

Check all chains and sprockets. If it is worn or chain links are stiff, it needs to be replaced. Chains need to have the appropriate tension and should be lubricated properly.

#### 14 Tyre pressure

Inflate tyres to correct the pressure – remember this wheel is driving nearly everything on the planter.

For more information, contact your local dealer to help setting up your planter. ■



**PIETMAN BOTHA,**  
INDEPENDENT AGRI-  
CULTURAL CONSULTANT





# EFFECTIVE NITROGEN MANAGEMENT IN SOYBEANS IS CRUCIAL


**I**N SOUTH AFRICA THE SOYBEAN PRODUCTION AREA HAS GROWN CONSIDERABLY, WITH NEW AREAS BEING PLANTED THROUGHOUT THE COUNTRY. THE GROWING CONDITIONS ARE VERY DIFFERENT FROM THE EAST TO THE WEST OF THE COUNTRY. FARMERS HAVE TO CONSIDER EACH SITUATION THAT COULD INFLUENCE THE TREATMENTS OF THE NITROGEN-FIXING BACTERIA.

Every farmer should decide which product to use on his soybean crop and how to manage the treatment. In this article, the basic guidelines of how to make this decision are explained.


## BIOLOGICAL NITROGEN FIXATION

Nitrogen-fixing bacteria fall under the pesticide registration process at the Department of Agriculture in South Africa and all products must be registered under this act to be sold.

All soybean varieties rely on *Bradyrhizobium japonicum* for biological nitrogen fixation. The Agricultural Research Council (ARC) isolated *B. japonicum* WB74 many years ago, but there are various strains around the world which can and will fix high volumes of nitrogen. All the strains registered in South Africa are effective, but they will have different application guidelines to be truly effective. Speak to your representative to find the best way.



When treating biological products to your seed via seed treatment or through infurrow application, you need to take the temperature and sunlight into account.



Multi-strain products may sound great to the ear, as you could get a dual or triple mode of action, but in biological products the active ingredient concentration is extremely critical to the performance of the product. Once there is a saturated solution, you need to reduce the numbers of the one *B. japonicum* strain to add another strain to the formulation.

Now there are two or more strains of *B. japonicum* in the product, of which one will be more dominant to perform the targeted action – in this case, nitrogen fixation on soybean. So, in essence now there is a reduced volume of the dominant strain of bacteria, which is performing the task.

The quality of the product is a very important aspect of *B. japonicum* and will influence its ability to be effective in the field. Due to the slow growth rate of these microorganisms, the final product must be free of contaminants and must contain a high amount of the microorganism.

Looking back, ten years ago most of the products in the market were manufactured with a one-to-six-month shelf life, with 24 hours to treat and plant the product. However, with new technologies, products can be produced with an 18-month shelf life and 60 days between treatment and planting. This shows that the products are now more stable and higher quality, with added technology to protect the bacteria on the seed.

## THE PLACEMENT OF NODULES

The placement of nodules is also very important, as the quantity of plant-available nitrogen it can produce is ten times more on the primary root than on the secondary root structure.

Be careful not to look at the number of nodules only, but rather at the positioning on the root zone. This is very important, as the same amount of nitrogen can be fixed by one nodule of the same size in dry weight on the primary root as ten nodules on the secondary root.

## PLANTING CONDITIONS

Planting conditions are extremely important, as bacteria and seed require moisture to germinate and grow. This is often easier said than done with the growing season in South Africa. Farmers are constantly pushing this boundary to plant or not due to dry soil and very hot top 5 cm of soil at 40°C to 50°C. When soybeans are planted, the best conditions are essential for good nodulation and germination of the plants.

When treating biological products to your seed via seed treatment or through infurrow application, you need to take the temperature and sunlight into account. Store *B. japonicum* at a maximum of 25°C ambient temperature and out of direct sunlight.

The operation needs to be managed more strictly. For instance, if you did a seed treatment, take only the seed that you will use for the morning planting. It is advisable to rather collect fresh treated seed more frequently from your shed, where it should be stored carefully and responsibly. Management of the treatment and treated seed on the farm is extremely important in order to get good results.

The physical treatment of seed is vital to a good start. Ensure that every seed is treated with the same amount of *B. japonicum*. The treatment machine should also be clean and free of any chemicals that can influence the bacterial treatment.

Daily calibration of the seed treatment machines is very important, especially when changing from one variety to the next because of the different seed sizes. If this is not done, you could see varied results in the product. Make sure you follow the rules with the treatment method.

## MOLYBDENUM AND COBALT

The role of molybdenum (Mo) and cobalt (Co) is vital to the functioning of the nitrogenase enzyme, which acts as a catalyst to nitrogen



fixation in soybean and legume plants. Without Mo and Co, the nitrogen fixation process will be limited.

Certified seed farmers would apply three to four applications of Mo in the production cycle of the seed to increase the molybdenum in the seed. Molybdenum and cobalt can be applied as a seed treatment or foliar application in the growing season, as it will help the nitrogenase activity.

There are some warnings, as both Mo and Co products are salts which will dry out bacteria on the seed when treating them together with a rhizobium. So make sure that if you apply Mo and Co to the seed treatment, planting is done within four to six hours after the seed treatment. Make sure you have a very high-quality rhizobium inoculant with osmoprotection technology to increase the survival of the bacteria, as this will be essential to your nodulation.

The same amount of nitrogen can be fixed by one nodule of the same size in dry weight on the primary root as ten nodules on the secondary root.

## FERTILISERS

Fertilisers are important for the soybean yield, but management of the type and placement is very important.

- Too much nitrogen is very problematic, as about 10 kg/ha is more than sufficient for planting. Any more than this will hamper nodulation and delay the process.
- Secondly the placement needs to be a minimum of 50 mm below and 50 mm on both sides of the seed to ensure that moisture and salt burn will not happen.

Use phosphorus (P), potassium (K), sulphur (S), calcium (Ca), magnesium (Mg) and micro-elements to increase the soybean yield. However, it needs to be especially created for your soybean crop.

## NODULATION

As growers and agronomists in the field, R1 would be a stage at which you need to evaluate the nodulation process and assess if this has happened successfully. If not, you need to act and apply high volumes of nitrogen fertiliser of 100 kg to 200 kg. Talk to your local agronomist for final details of this application.

## IS INFURROW OR SEED TREATMENT MORE EFFECTIVE?

By analysing many trials statistically and commercially in side-by-side trials, both methods of rhizobium application are effective and it really depends on the grower's management of the farming operation.

If you feel comfortable with both methods, choose the best one for your situation. Infurrow treatment results in slightly but not significantly more secondary nodulation and can look more effective in some cases. But once harvested, you generally do not see any significant yield advantage due to the placement and efficacy of the nodules on the secondary root structure. Many farmers treat the seed and apply product infurrow to cover any mistakes in the treatment, which works well to ensure effective results.



*Too much nitrogen will hamper nodulation.*

As more and more planting is done in sandy soils in the western region, nematode pressure and control are vital for good soybean production. This also influences the rhizobium nodulation, nitrogen fixation and ability to have space on the root structure. Please contact your chemical agent for registered options available.

Soybean inoculants are very important for your farming operation, providing high amounts of nitrogen for your soybean crop. The impact can range from 200 kg to 1 500 kg of yield per hectare. Depending on the soil, the region and yield of your planted crop, it could equate to as much as 40% of your crop's yield. It is therefore critical to get the treatment correct via seed treatment or infurrow applications. ■

**JONATHAN ETHERINGTON, DIRECTOR OF MBFI (PTY) LTD**

# Control weeds to optimise SUNFLOWER YIELD

**W** EED CONTROL IN SUNFLOWER MUST BE DONE EFFECTIVELY AND WITH PRECISE TIMING BECAUSE YOUNG SUNFLOWERS ARE VERY SENSITIVE TO WEED COMPETITION. TO KEEP SUNFLOWER FIELDS CLEAN, AN INTEGRATED WEED CONTROL PROGRAMME NEEDS TO BE IMPLEMENTED. THIS MEANS A TOTAL ALL-INCLUSIVE HERBICIDE CONTROL PLAN, WHERE THE EFFECT OF VARIOUS AGRONOMIC, MECHANICAL AND CHEMICAL COMPONENTS IS INCLUDED TO CONTROL WEED.

Farmers should focus on weed control, especially from germination up to the V8 stage (about six weeks after planting). In the following stages of the plant, the effect of weeds is not such a big problem because leaves and the leave canopy effect should be sufficiently shaped to suppress the weeds naturally.

However, unlike with crops such as corn and soybeans, the options are limited for herbicides that can control post-emergence broadleaf weeds in sunflower. Weed control, especially broadleaf weeds in non-Clearfield sunflower, remains difficult and needs proper planning before the crop is planted.

In the planning for sunflower weed control, farmers should start with the selection of the fields where sunflower can be planted. Begin with the implementation of a crop rotation system, where crops like maize are planted a year before the sunflowers are planted.

Make sure that this maize is managed in such a way that the broadleaf weeds are properly controlled and that the crop rotation with sunflower is kept in mind with the selection of herbicides. If crop rotation is not applied, firstly choose fields where broadleaf weeds are not such a big problem and plant them with sunflowers.

## **BROADLEAF AND GRASS CONTROL**

Before planting, get yourself a very good broadleaf and grass control plan where pre- and post-emergence herbicides are used to control the weeds. In the case where the weed pressure is very high, the use of implements is needed. The rolling of sunflower seeds before germination helps a lot to control weeds in the rows.

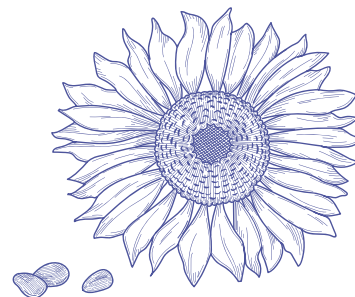
If non-Clearfield sunflowers or Clearfield sunflowers are planted, a weed cultivator that works shallow between the rows can be used to control the weeds before the Clearfield herbicide is applied.

Grass control in sunflower must preferably be done before germination. This can be done before planting or by spraying of the sunflowers before it germinates. Read the different herbicide labels for the best advice and to calculate the different application rates.

The Clearfield® and Clearfield® Plus cultivars provide the farmer with the option to control broadleaf weeds post-emergence in sunflower. Product labels should be read and studied to understand







# 1 Herbicides registered for weed control in sunflower and the optimal application time.

Active ingredient	HRAC group	Application before or after emergence of weeds	Waiting period (crop-dependent)	Weeds on which herbicide is registered <sup>1</sup>		
				Grass	Broadleaf	Sedge
Clethodim	A/1	Post-emergence	7 - 30 days	X	-	-
Cycloxydim	A/1	Post-emergence	3 months	X	-	-
Haloxypop-R-methyl ester	A/1	Post-emergence	3 months	X	-	-
Propaquizafop	A/1	Post-emergence	10 - 40 days	X	-	-
Quizalofop-P-tefury	A/1	Post-emergence	1 - 6 weeks	X	-	-
Imazamox/imazapyr <sup>2</sup>	B/2	Post-emergence	4 - 20 months	X	X	-
Flurochloridone	F1/12	Pre-emergence	6 - 18 months	X	X	-
Pendimethalin	K1/3	Pre-emergence	12 months	X	X	-
Trifluralin	K1/3	Pre-plant	12 - 18 months	X	X	-
Alachlor	K3/15	Pre-emergence	None	X	X	X
Metolachlor + Benoxacor (safener)	K3/15	Pre-emergence	None	X	X	-
S-Metolachlor + Benoxacor (safener)	K3/15	Pre-emergence	None	X	X	X
EPTC + Dichlormid (safener)	K3/15	Pre-emergence	None	X	X	-
Metolachlor + Dichlormid (safener)	K3/15	Pre-emergence	None	X	X	-
Metolachlor	K3/15	Pre-emergence	None	X	X	X
Metolachlor + (safener)	K3/15	Pre-emergence	None	X	X	X
Flufenacet	K3/15	Pre-plant	4 - 6 months	X	X	-
dDimethenamid-P	K3/15	Pre-emergence	None	X	X	X
S-Metolachlor	K3/15	Pre-emergence	None	X	X	X
EPTC	K3/15	Pre-plant	None	X	X	X
EPTC + safener	K3/15	Pre-plant	None	X	X	X

<sup>1</sup>Weed species controlled by the product will vary between products. Product labels should be read and studied.

<sup>2</sup>Only for use with Clearfield® or Clearfield® Plus sunflower – read labels for more information.

when and how much herbicide to apply to manage the weeds. Just make sure that there is sufficient time available before the follow-up crop is planted.

Some pre-plant and pre-emergence herbicides mainly control grass weeds, but some of these herbicides can also control certain broadleaf weeds – although this is sometimes variable with some of the weed species. These types of herbicides require that they must be worked into the soil (as with pre-plant herbicides) or that between 10 mm and 15 mm of rain must fall within seven days of application so that the herbicide can be washed into the soil. Remember to incorporate these requirements into the selection of herbicides.

In contrast, post-emergence herbicides are applied after the weed has already germinated. Active ingredients registered for post-emergence control of broadleaf weeds are currently limited to Imazamox/ Imazapyr. However, these types of herbicides can only be applied to Clearfield® and Clearfield® Plus sunflower varieties. Don't try it on other cultivars as it will kill the sunflowers, as some farmers have already experienced.

To prevent herbicide resistance populations from arising on your farm, herbicides with different mechanisms of action (or HRAC groups) must be varied in production systems. The implementation of a crop rotation system where sunflower is rotated with example maize will also help to prevent herbicide resistance.

The active ingredients that are currently registered for weed control in sunflower, as well as the type of weeds (broadleaf, grass or sedges) that they can control, are shown in **Table 1**. However, it is important to take note of any waiting periods that may be linked to a specific product because this can affect crop rotation systems. ■

**PIETMAN BOTHA, INDEPENDENT AGRICULTURAL CONSULTANT AND DR MARYKE CRAVEN, SENIOR RESEARCHER, ARC-SMALL GRAIN**



# Overseas trends influence crop prices

EACH YEAR WHEN THE UNITED STATES OF AMERICA (USA) BEGINS ITS PLANTING SEASON, THE INTERNATIONAL MARKET MOVES INTO A WEATHER MARKET. THIS MEANS THAT WHAT HAPPENS TO THE USA CROP HAS A BIG IMPACT ON THE MOVEMENT IN THE MARKET.

In the current season, soybean crop conditions have seen a downward trend from the beginning of the year and was at the lowest point between June and July, when conditions reached a low of 50% good to excellent condition. Currently the crop is in 54% good to excellent condition, compared to 59% the previous season. This caused prices to increase in the international market.

This reaction is called a crop-scare rally. When weather conditions improved, this rally ended and prices again came under pressure. On 30 June, the United States Department of Agriculture (USDA) released a report indicating that the soybean area planted was 5% higher than initially expected and that the maize area planted was 5% lower. Thus, improving weather and higher hectareage put maize under pressure, but the report was able to minimise the downward price movements for soybeans.

Prices again found support after Russia announced on 17 July that it will not extend the Black Sea shipping deal between Russian and Ukraine. This deal entailed that cargo vessels can sail the Black Sea region freely, without the threat of military action by either side.

Russia claimed that the deal was not in the country's best interest anymore and therefore chose not to extend it. This led to supported

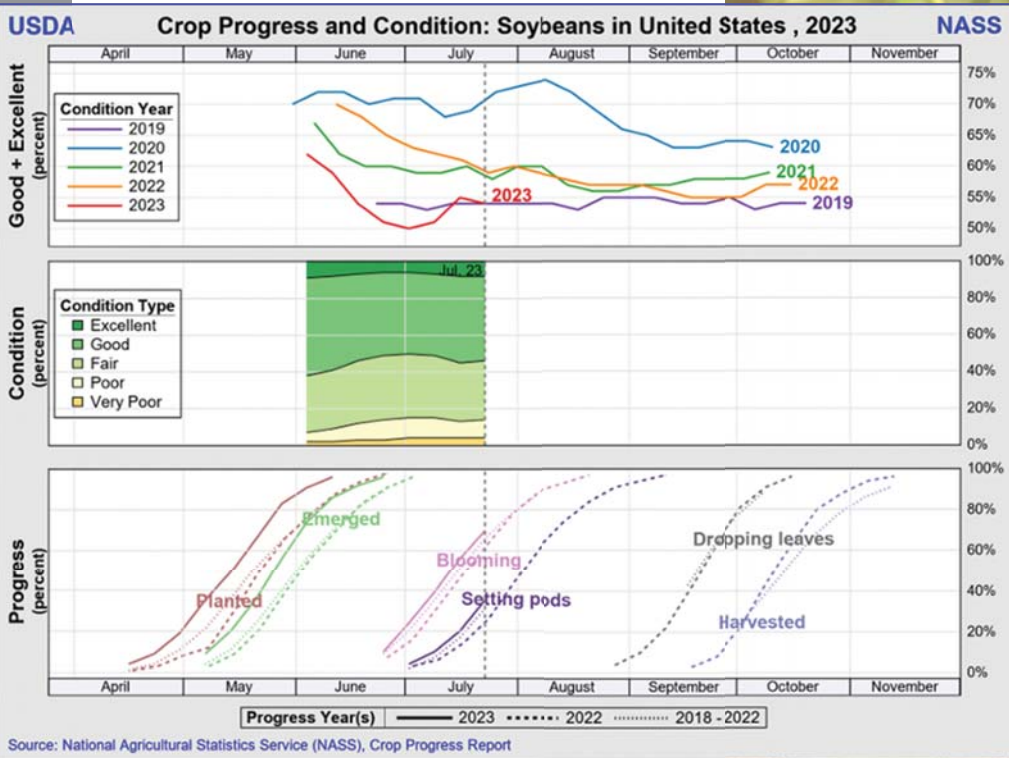
prices, as the market was unsure of how this decision would affect the flow and availability of grain and oilseed.

This type of trading can be referred to as sentimental or emotional trading. When you look at the bigger picture, the story looks a little different. Expectations of a larger crop this season can lead to higher closing stock at the end of the coming season. Therefore, expectations are that the grain prices can come under pressure in the long run when taking fundamental factors into account. ■

CHRISTIAAN VERCUIEL,  
AGRICULTURAL  
ECONOMIST, GRAIN SA



1 Crop progress and condition: Soybeans in the USA, 2023.





# Why a **BOOKKEEPER** comes in handy

**F**ARM ADMINISTRATION MAY TAKE HOURS. HIRING A BOOKKEEPER GIVES YOU MORE TIME TO FOCUS ON YOUR BUSINESS. WHEN YOU DON'T HAVE TO WORRY ABOUT ORGANISING YOUR OWN BOOKS, YOU CAN SPEND MORE TIME AND EFFORT ON THE CORE ACTIVITIES OF YOUR BUSINESS.

As a farmer, entrepreneur or small business owner, your greatest concern when making the decision to hire a bookkeeper or accountant is probably the cost. You are trying to save money and may think that you cannot afford an accountant. Ask yourself this: Can I risk making a mistake? How valuable is my time? Is my time as a business owner best spent trying to figure out a VAT return, and can I be sure it's accurate?

The advantages of hiring a bookkeeper may benefit your farming operation, as they are more experienced in handling business processes such as tracking all transactions and recordkeeping. This

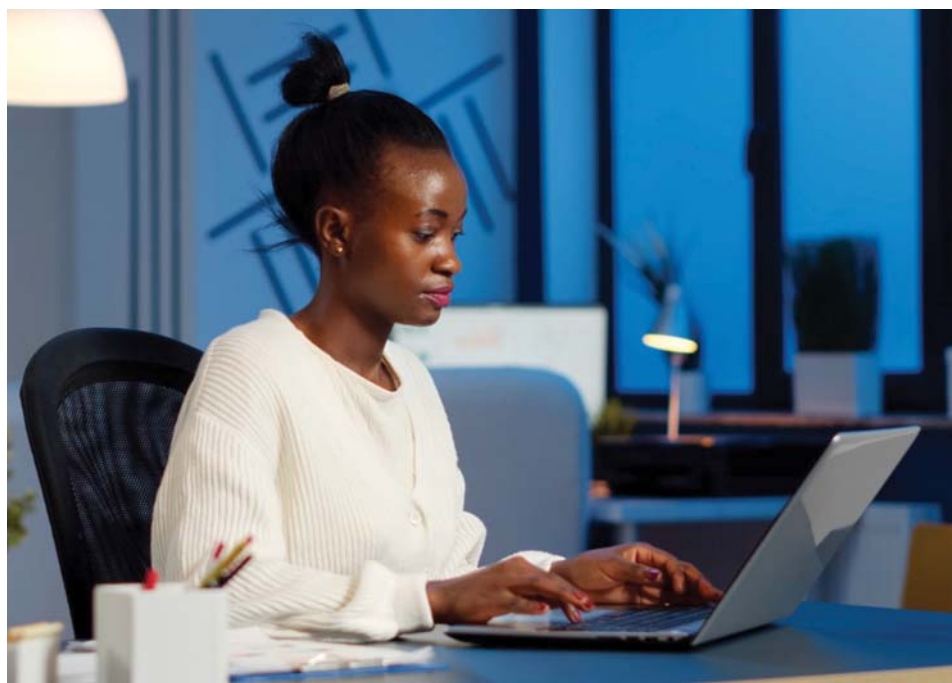
prevents errors that can result in penalties for filing documents in the future.

A bookkeeper can give you an outside perspective on how to manage your budget and run your business more efficiently. He can teach you ways to cut costs, provide insight into your spending and more.

Here are some factors to consider when choosing a bookkeeper:

- Your bookkeeper should be able to show a track record of successes, especially among clients in your industry. Ask around and learn more about the bookkeeper's reputation and service delivery.
- A trustworthy bookkeeper should have some certification, although legal requirements for bookkeepers are not as strict as for accountants. Ask your potential bookkeeper for references who can testify about the quality of his services.
- It is very helpful to be able to have occasional in-person meetings with your bookkeeper, so you may want to limit your search to bookkeepers in your area.

- Find out what the person's fee structures look like. You need to tell him what services you will need. Compare fees between bookkeepers. The right bookkeeper should know your business inside and out – including how you operate, who you bill and what your main expenses are. They will indicate a willingness to ensure your business is fully compliant and information is available in good time. If your bookkeeping systems are in place and working well for you, your business will look more professional, and that will be money well spent. ■



**JENNY MATHEWS,**  
MANAGEMENT AND DEVELOPMENT  
SPECIALIST AND EDUCATOR

WORDS OF  
WISDOM



*There are no secrets to success. It is the result of preparation, hard work, and learning from failure.*

~ COLIN POWELL  
Former United States secretary of state



# Mycotoxin research can help curb negative effects

**T**HE WORD MYCOTOXIN IS DERIVED FROM THE GREEK WORD *MYKES* OR *MUKOS*, WHICH MEANS 'FUNGUS', AND THE LATIN WORD *TOXICUM* WHICH MEANS 'POISON' – A TOXIC SUBSTANCE PRODUCED BY A FUNGUS. MYCOTOXINS ARE SECONDARY FUNGAL METABOLITES THAT NATURALLY CONTAMINATE THE HUMAN OR ANIMAL FOOD CHAIN.

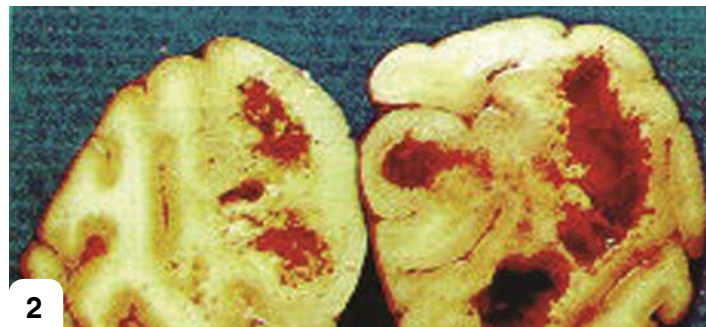
Mycotoxins are structurally diverse, naturally occurring, chemical metabolites produced by a wide range of fungi. The growth of fungi and subsequent mycotoxin production can occur at several levels of the food chain:

- (1) on crops in the field;
- (2) during grain storage;
- (3) during transportation of feeds or crop grains; and
- (4) during food processing.

Mycotoxins are recorded in history as far back as 5 000 years ago in China and may be fatal or cause severe illness at very small concentrations. Following the discovery of carcinogenic aflatoxins, further searches resulted in the identification of more than 100 toxigenic fungi, although only around 30 have true toxic properties of concern. Most common mycotoxins that have been linked to toxic syndromes in livestock and/or humans in South Africa, include aflatoxins, trichothecenes, fumonisins, zearalenone, alternariol and the *Stenocarpella maydis* associated mycotoxins, which have been implicated in lethal (acute and/or chronic) outbreaks of mycotoxicosis in exposed animals and/or humans.

Exposure to mycotoxins in adequate quantities may cause mycotoxicosis, which affects various processes in exposed animals and/or humans depending on the target organs of the specific mycotoxin. The term mycotoxicosis was used for diseases resulting from the growth of specific fungi in foods and feeds. Mycotoxicosis is generally more frequent in areas where higher levels of humidity and temperature occur, which favour growth of mycotoxin-producing fungi and subsequent mycotoxin production. Exposure to very high amounts of mycotoxins over a short period result in acute toxicity.

Historically, acute mycotoxicosis caused epidemics that intoxicated people or animals in entire areas at the same time. Chronic



**Brain lesions (leukoencephalomalacia) on the brain of a horse caused by fumonisins.**

mycotoxicosis occurs due to the long-term exposure to lower amounts of mycotoxins and affects humans and animals over a long period.

Symptoms caused by this exposure are often not noted until it is too late. Locally, mycotoxicosis such as diplodiosis in bovines (caused by *Stenocarpella maydis*) and pulmonary oedema (caused by fumonisins produced by *Fusarium verticillioides*) in pigs are the most common acute diseases noted. Various mycotoxicoses may occur in humans and are discussed more specifically under each mycotoxin. However, a host of other mycotoxins which occur at low levels may be responsible for long-term chronic diseases in both livestock and humans.

## FUMONISINS

Fumonisin is a commonly occurring mycotoxin in maize grain (**Photo 1**) and are primarily caused by the fungus *Fusarium verticillioides*. Fumonisin is most common in warm and dry production areas, particularly in the north-western maize growing areas. High levels of fumonisins have a negative effect on consumers of maize grain since they can be carcinogenic to humans and animals.

Increased levels of fumonisins in mouldy maize kernels have been statistically linked to human oesophageal cancer and neural tube defects in humans in the former Transkei region in South Africa. It causes brain lesions in horses (**Photo 2**), pulmonary oedema in pigs (**Photo 3**) and liver cancer in rats.

In South Africa, fumonisin levels of more than 2 mg/kg were recorded in commercial maize cultivars in the North West and Free State, while only trace amounts were measured in those grown in Gauteng, Mpumalanga and KwaZulu-Natal. An amount of 2 mg/kg is the maximum tolerable daily intake recommended by the Joint FAO/WHO Expert Committee on Food Additives (World Health Organisation, 2002).

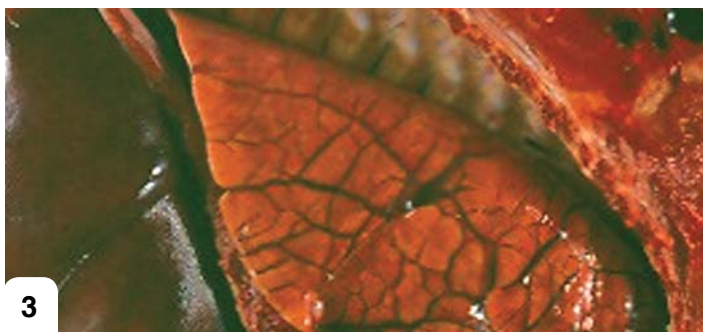
In September 2016, the South African Ministry of Health has implemented new regulations that allow 2 mg/kg and 4 mg/kg fumonisin for maize flour/meal for human consumption and raw maize, respectively. In rural maize production areas of South Africa, however, much higher fumonisin levels are recorded.

Local researchers have reported fumonisin levels of up to 21,8mg/kg in Mokopane and Venda (Limpopo), Lusikisiki (Eastern Cape), Mbazwane, Jozini, Pongola and Manguzi (northern KwaZulu-Natal),



***Fusarium verticillioides* infection on a maize ear.**





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**Pulmonary oedema (bleeding on lungs) in a pig lung.**

whereas FB1 levels of up to 117 mg/kg were found in the Centane and Butterworth districts in the former Transkei (Eastern Cape). In Centane, fumonisin levels recorded in home-grown maize were also much higher (1,14 mg/kg) than those found in commercial maize (0,22 mg/kg), although both were still below the allowable legal limits.

The difference in fumonisin levels found in maize grown under commercial and resource-poor production systems, might be the result of resource-poor farmers planting home-grown seed from the previous season. Harvested grains used by these farmers are not graded in the same manner as commercially produced maize and recommended production practices are not applied. Alternatively, *F. verticillioides* isolates found in different fields might contribute to the variation in fumonisin levels.

### **FUSARIUM GRAMINEARUM SPECIES COMPLEX**

The two primary trichothecenes are deoxynivalenol (DON) and nivalenol (NIV), which are produced by a range of species within the *Fusarium graminearum* species complex (FGSC) (**Photo 4**). Until recently, *F. graminearum* s.l. was thought to represent a single cosmopolitan species based on morphological species recognition.

According to recent research, *F. graminearum* s.l. now comprises at least 15 species that are biogeographically and phylogenetically distinct to form what is currently referred to as the FGSC. Identification is difficult because these require very specialised techniques to separate and each produces specific mycotoxins. For the purposes of this article, FGSC will be referred to as a group.

Members of the FGSC are known to infect a wide range of plant hosts in both temperate and subtropical regions. They were originally found either as pathogens or secondary invaders of crops, including maize, sorghum, wheat, barley, rice, rye and oats. Over the years, the host range of the FGSC has expanded from cereal to non-cereal crops such as dry beans, canola, potato and soybeans. Studies have shown FGSC to be on the increase – particularly in South African maize production areas. Infected grains can be contaminated with mycotoxins such as DON, NIV and zearalenone (ZEA).

### **TRICHOTHECENES – DON AND NIV**

Trichothecenes include DON and NIV. Studies show that NIV is the



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**Maize ears infected by *Fusarium graminearum*.**

final product of the trichothecene biosynthesis pathway, while DON is seen as a pathway intermediate. Currently, strain-specific trichothecenes have been identified in the FGSC, namely DON, 3-acetyl deoxynivalenol (3ADON), 15-acetyl deoxynivalenol (15ADON) chemotype and NIV.

No single 'subspecies' of the FGSC isolates has been found to produce both these trichothecenes, even though 'subspecies' are predominant farmers of DON or NIV. DON is the most widespread of the trichothecenes and is frequently detected worldwide. Although restricted, NIV has been reported in Africa, Asia and Europe, but not in North America.

These mycotoxins can alter the functioning of the immune system, mitochondria and cell division and affect cell membranes. The crops in which trichothecenes can play a role in animal and human health, are maize, wheat, oats and barley, which influence swine, cattle, horses, rats and humans.

The effect of trichothecenes on these animals and humans results in digestive disorders (emesis, diarrhoea, refusal to eat), haemorrhage (stomach, heart, intestines, lungs, bladder, kidney), oedema, oral lesions, dermatitis and blood disorders. The presence of DON in maize-based feeds such as silage increases the risk of health problems in livestock and is associated with poor performance in animal growth and production.

### **ZEA**

In addition to the production of trichothecene mycotoxins, FGSC species are also considered as the primary farmers of ZEA. This mycotoxin has been detected in a wide variety of cereal crops, including sorghum, barley, oats, wheat and maize. The co-occurrence of ZEA, DON and NIV are common in cereal crops infected by FGSC.

Although the biological potency of ZEA and its metabolites is high, the actual toxicity associated with consumption of food and feed sources contaminated with these compounds is low. Pigs are highly sensitive to this mycotoxin, with as little as 1 µg/kg (ppb) known to cause detectable uterogenic responses in sows.

Concentrations between 50 mg/kg and 100 mg/kg can interfere with conception, ovulation, implantation, foetal development and the viability of new-born animals. ZEA results in estrogenic effects (oedema of vulva, prolapse of vagina, enlargement of uterus), atrophy of testicles, atrophy of ovaries, enlargement of mammary glands and abortions. Livestock that are fed contaminated cereals transmit this mycotoxin into their meat. ZEA is the potential causal agent for precocious pubertal changes in young children in Puerto Rico.

### **CONCLUSION**

Mycotoxins result in a number of toxic effects in different animals and in humans. It can be reduced by various means during plant growth and grain storage. Several mycotoxins have been well researched and well understood whereas others have not. Fortunately, the *Fusarium* spp. mycotoxins have been extensively researched. However, new information is being generated continuously, assisting in improving understanding of these mycotoxins and the role they play in human and animal health.

Anyone interested in finding out more detail on mycotoxins and how to control the diseases that cause these mycotoxins may contact the authors at 018 299 6100. ■

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# PLANT DISEASE

## – identification can limit damage

**A**GRICULTURAL LOSSES BROUGHT ON BY PLANT DISEASES CAUSED BY FUNGI, BACTERIA AND VIRUSES, REMAIN A CONTINUING PROBLEM IN AGRICULTURE. THEREFORE, EARLY AND ACCURATE DISEASE DETECTION OR DIAGNOSIS ARE CRITICAL TO DISEASE PREVENTION IN ORDER TO LIMIT DAMAGE IN AGRICULTURAL CROPS DURING GROWTH, HARVEST, AND POST-HARVEST PROCESSING, AS WELL AS TO MAXIMISE PRODUCTIVITY AND ASSURE AGRICULTURAL SUSTAINABILITY.

Farmers frequently deal with various diseases on crops, as well as new pathogenic strains that may develop which may be fungicide-resistant or be able to overcome host resistance in the same crop or field.

### WHY ACCURATE PLANT DISEASE IDENTIFICATION IS IMPORTANT

Plant diseases brought on by endemic, re-emerging and emerging epidemics of pathogens result in significant economic loss for plant systems, low productivity and a threat to food security. The world is concerned about food safety and security as well as nutritional security since the significant rise in human population necessitates an improvement in agricultural production.

Therefore, accurate diagnosis of plant diseases is crucial in the current era of reducing crop losses. Without proper identification,

disease control efforts can be a waste of time and money if an incorrect approach is taken. If plant diseases are correctly diagnosed and discovered early enough, appropriate control measures can be implemented to control pathogens that cause disease.

### DIAGNOSTIC METHODS FOR PLANT DISEASES

Accurate, sensitive and precise diagnosis is required for the management of plant diseases to be effective and affordable.

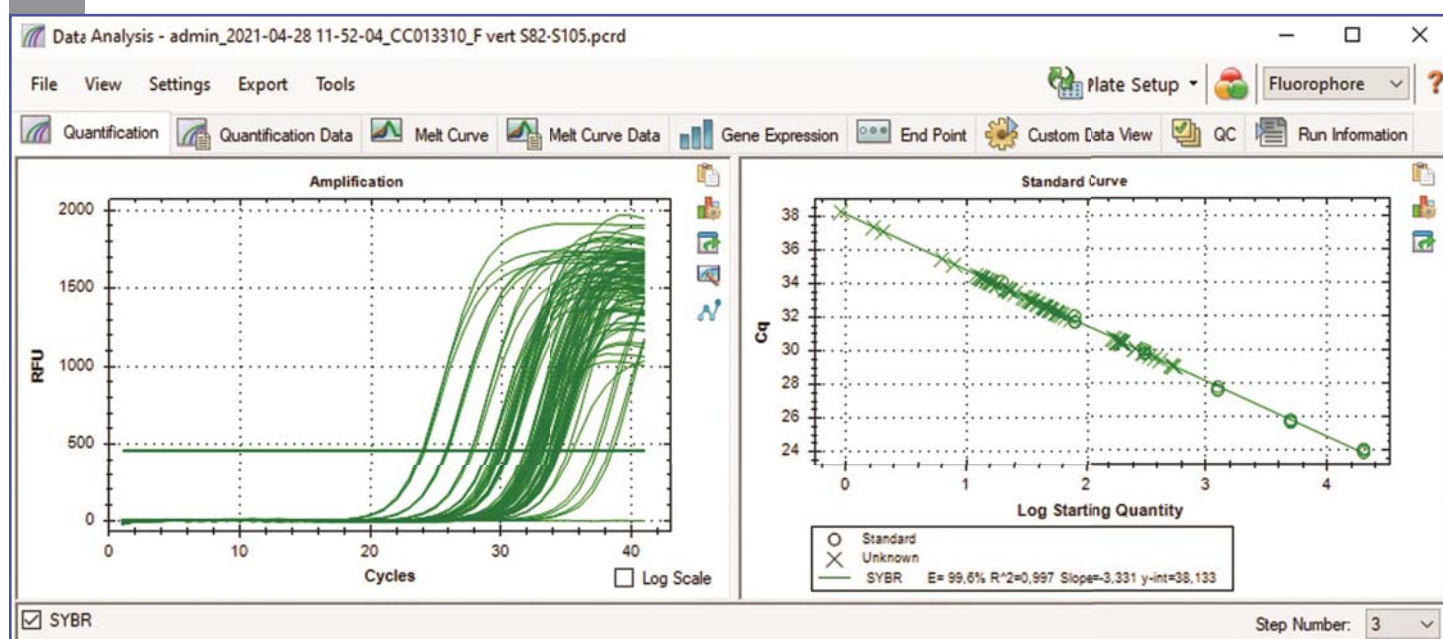
Visual identification alone has issues: Some disease symptoms are similar and are frequently confused with one another, which can result in misdiagnosis and have a negative impact on control measures. An example of this is bacterial leaf streak, which to the untrained eye may look like grey leaf spot (a fungal disease) and/or sunburn damage. In this case a bactericide will have no effect on a fungal disease and a fungicide will have no effect on a bacterial disease. Neither a fungicide nor bactericide will have an effect on sunburn (abiotic) and the producer will spend money on a product that is not pathogen-specific while the misdiagnosed disease continues to spread.

Traditional plating out techniques (**Photo 1**) and microscopic identification of plant diseases have given way to high-throughput serological techniques like enzyme-linked immunosorbent assay (ELISA) and molecular techniques such as polymerase chain reaction (PCR) (**Figure 1**) in the field of plant disease diagnostics.

Plating-out techniques are time-consuming, produce a lot of environmental waste and require microscopical expertise. Even then, some species cannot be distinguished from each other. Molecular

1

*Modern method of plant disease identification and quantification.*



Typical amplification plot of qPCR to determine mean threshold cycle (C<sub>t</sub>) values of *Fusarium verticillioides* done at the Grain Crops laboratory.





**The old method of plating out infected plant material on a selective growth medium to isolate pathogens.**

techniques are faster and more accurate. Specific and sensitive detection of phytopathogens is required for efficient and effective plant disease management.

#### Culture-based methods

In the past, most methods for diagnosing bacteria and fungi have relied on morphological methods based on culture. This entails plating out the sample on a particular growth medium and waiting for the potential pathogens to grow under controlled conditions; this process can take days or even weeks and can be considerably more challenging in the case of biotrophic pathogens.

In addition, when identifying a disease pathogen morphologically, taxonomy skills or knowledge are also required.

#### Molecular methods

A number of molecular approaches have been employed to identify pathogens in a more accurate, focussed and quick manner in an effort to speed up and reduce the time-consuming culture-based technique. They include conventional polymerase chain reaction (PCR), real-time PCR, reverse transcription (RT)-PCR, PCR-ELISA, nested PCR, multiplex PCR and isothermal PCR, which are all PCR-based techniques.

PCR is an in vitro, primer-directed (identifying specific sequences within a pathogen genome, all of which differ according to species or race), enzymatic reaction capable of exponential amplification of DNA. PCR-based assays are specific, sensitive, efficient, rapid, versatile and relatively economical.

These methods are ideal for detection of pathogens de novo because they do not require isolation of the pathogen in pure culture, thus saving time and resources. PCR has the added advantage in that the pathogens can be identified and quantified and the results can be compared with the effect of different treatments.

#### Immunological techniques

Serological detection of plant pathogens involves identification of disease based on antibodies supported by colour change in the assay



**A C1000Tm Thermal Cycler (Bio-Rad).**

(this is similar to ELISA testing used to diagnose HIV infection, pregnancy tests and blood typing). Each antibody is specific to a particular antigen and will bind to it.

ELISA – which was earlier developed for detecting viruses, but today can be used to detect and quantify a vast array of plant pathogens – is the most commonly used serological method. The accuracy of ELISA has been greatly improved by commercially available recombinant antibodies which make the diagnosis practically reliable. However, their costs are usually higher than PCR-based technologies and the shelf life of kits based on immunological techniques is limited.

#### HOW TO PROCEED IF UNSURE OF THE DIAGNOSIS

Farmers who are unsure of any disease diagnosis made in their grain field crops can send samples to the authors at the ARC-Grain Crops' plant pathology section in Potchefstroom. Pathogen identification in the field can be quite challenging and requires specialised equipment, protocols and training for an accurate diagnosis.

The ARC-Grain Crops in Potchefstroom has a well-equipped laboratory and experienced plant pathologists to perform these assays. Farmers who are unsure of a disease diagnosis should contact them for support.

Farmers are welcome to contact Dr Henry Njom at [njomh@arc.agric.za](mailto:njomh@arc.agric.za) or 018 299 6225; Dr Belinda Janse van Rensburg at [BelindaJ@arc.agric.za](mailto:BelindaJ@arc.agric.za) or 018 299 6357 or Dr Bradley Flett at [FlettB@arc.agric.za](mailto:FlettB@arc.agric.za) or 018 299 6362 with any disease enquiries. ■

DR HENRY NJOM, ARC-GRAIN CROPS, POTCHEFSTROOM, DR-BELINDA JANSE VAN RENSBURG, ARC-GRAIN CROPS, POTCHEFSTROOM AND DR BRADLEY FLETT, ARC-GRAIN CROPS, POTCHEFSTROOM. FIRST PUBLISHED IN SA GRAAN/GRAIN, SEPTEMBER 2022.

**SA Graan**  
GRAIN

*Make sure the dam on  
your farm meets the legal  
requirements.*

# MAKE SURE YOUR DAM IS LEGAL

**T**HE DEPARTMENT OF WATER AND SANITATION (DWS) HAS REQUESTED THE PUBLIC TO APPROACH ITS DAM SAFETY OFFICE FOR GUIDANCE ON APPLICATION REQUIREMENTS FOR LICENCES TO BUILD NEW DAMS, OR WHEN THEY WANT TO CHANGE OR ENLARGE A DAM.

This request is a result of a judgement delivered by the Water Tribunal of South Africa in 2022. The judgement concerns an application by the Corona Farm Trust for leave to appeal, with a view to obtain a decision to stop the construction of an illegal dam on the farm Bergview in the Winterton district, KwaZulu-Natal, to go ahead. However, the application was rejected.

The events followed an unsuccessful application in 2016 by a farmer and trustee of the Corona Farm Trust, David Gace, for a water use licence to build a new dam at Bergview. According to the department, Gace continued with the construction of the dam on 10 January 2019, despite not having obtained a licence to build the dam.

The DWS's dam safety department undertook a site inspection on 30 January 2019 and then held a further meeting with the farmer on 1 February 2019. This led to the issuing of a notice in terms of section 53 (1) of the *National Water Act* against the farmer.

He was informed that, according to this article of the law, he started using water illegally by storing water in a dam and changing the characteristics of a watercourse.

Following this, the farmer made submissions to the department which were not accepted. However, this did lead to the issuing of a second notice and an instruction on 13 March 2019.

The order required the farmer and the Corona Farm Trust to cease all illegal water use and activities, including the construction of the illegal dam. It also required Gace to submit a plan to the department in which he indicated how he would remove all structures that obstruct the natural waterflow and how rehabilitation would be done. The plan was made subject to departmental approval prior to the demolition of the dam and before rehabilitation could begin.

Consequently, Gace submitted such a plan, but did not implement it. However, he did appeal to the Water Tribunal of South Africa

against the directive issued in terms of section 148 (1) (j) of the *National Water Act*. The defence has been recorded that the guidelines are irrational, unreasonable and unconstitutional. The appeal also alleged that the demolition of the dam amounted to the deprivation of property.

However, according to the findings of the Water Tribunal of South Africa, the dam is an illegal structure and cannot be authorised retroactively. The tribunal also found that the farmer's actions were in conflict with good environmental management and the rule of law, which consequently makes it a criminal offence.

The findings pointed out that the illegal damming and water use pose an ecological threat downstream. The ecosystem's water cycle is dependent on the runoff of rainwater for above-ground as well as underground water sources and any collection of water in the dam will lead to the disturbance of the water balance.

Furthermore, the Water Tribunal made an order that the application for leave to appeal by the Corona Farm Trust should be dismissed and that the order, as issued by the DWS on 13 March 2019, still has to be confirmed and must be complied with within 14 days.

## PLEASE NOTE

According to the DWS's spokesperson, Sputnik Ratau, the Blue Scorpion Unit will continue to enforce compliance with regulations on dam owners who break the law, as it is a criminal offence to build a dam without obtaining the required licence.

There are three legal requirements that must be met before a person can build, change or repair a dam. It must be determined whether:

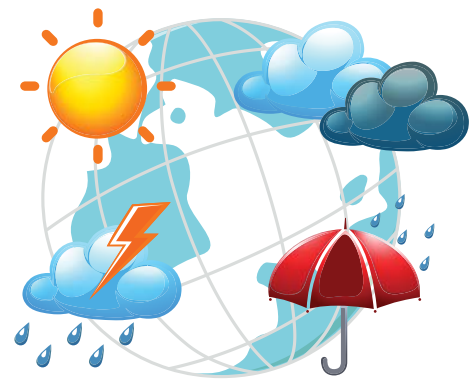
- The dam is safe.
- Whether the right to use the water in such a dam exists.
- What the impact on the environment will be.

More information in this regard can be obtained from [damsafety@dws.gov.za](mailto:damsafety@dws.gov.za). ■

MARIËTTA CRONJÉ, SA GRAAN/GRAIN CONTRIBUTOR. FIRST  
PUBLISHED IN SA GRAAN/GRAIN, OCTOBER 2022.



# Weather patterns influence farming operations



**I**N THE COMING MONTHS AND YEARS, CHANGING GLOBAL WEATHER PATTERNS WILL LIKELY HAVE SIGNIFICANT CONSEQUENCES FOR SOUTH AFRICAN FARMERS, ESPECIALLY THOSE INVOLVED IN LIVESTOCK AND GRAIN PRODUCTION.

This is according to Paul Makube, senior agricultural economist at FNB, who says that, after enjoying three years of abundant rains and favourable conditions due to La Niña, South Africa is now heading into an El Niño phase. This typically translates to drier weather and creates uncertainty for farmers, with the potential to negatively impact yields going forward.

‘The previous La Niña years were a boon for South African farmers, with above-average rains supporting agriculture and leading to higher yields in field crops, fruits, vegetables and even improved grazing pastures for livestock,’ Makube explains. ‘However, the anticipated shift to El Niño conditions presents new challenges for farmers who are already facing multiple other factors that are impacting their activities.’

According to Makube, these challenges include loadshedding, changing consumer patterns and declining consumer confidence due to lower levels of disposable income, and relatively elevated farming input costs. He explains that the changing weather patterns will almost certainly exacerbate these challenges. It will add upward pressure on costs for farmers and food prices for consumers, further fuelling concerns about food insecurity – not so much in terms of availability, but more so due to unaffordability.

‘Adaptation by farmers is crucial in the face of the coming hot and dry conditions caused by El Niño.’

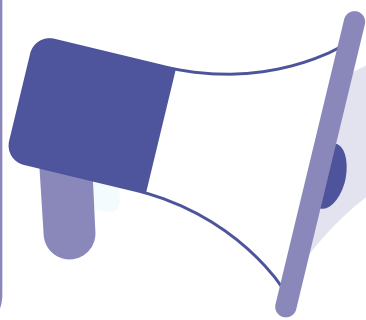
‘Adaptation by farmers is crucial in the face of the coming hot and dry conditions caused by El Niño,’ he emphasises. ‘For livestock farmers this means taking steps now to ensure an appropriate balance between feed availability and stock numbers.’

Makube highlights that, in situations where there is an imbalance in these factors, the common response of liquidating some stock should be done cautiously. He says that careful consideration needs to be given to the liquidation of female livestock, which will be needed for future expansion when conditions become more favourable.

‘Rebuilding a herd takes time, and a lack of breeding stock can compound this challenge,’ he explains. ‘Therefore long-term thinking by farmers regarding herd replenishment and farm viability, profitability and sustainability should guide their short-term decisions about female livestock liquidation to deal with coming climate challenges.’

**Source:** FNB Agribusiness ■

RPO NEWSLETTER, JULY 2023



# HAVE YOU HEARD?

## GRAIN SA NEWS

- At a recent Grain SA function for retired board members, Grain SA also gave recognition to personnel with long service at the organisation. Two Phahama Grain Phakama (PGP) employees received long service awards:
  - Liana Stroebe (operations and training manager) – ten years' service.
  - Luke Collier (regional development manager: Kokstad) – five years' service.
- Dr Pieter Taljaard, Grain SA's chief executive officer, resigned and emigrated to Canada. The process for his successor is currently under way.



*Liana Stroebe, Luke Collier and his wife, Lee.*



*Dr Pieter Taljaard*

## RESEARCH TEAM AT FARMERS' DAY

Grain SA's research team attended a farmers' day in Brooksby (North West), where Dr Godfrey Kgatle (intern research coordinator at Grain SA) did a presentation on Grain SA's research portfolio. Lawrence Mataha from the University of Pretoria (FABI) also shared information on the university's diagnostic clinic and how to access the service.



*Dr Godfrey Kgatle highlighting some of the activities within the research team at the Brooksby farmers' day.*

## APPOINTMENTS IN AGRICULTURE

- Debra Mallowah** has been appointed as Bayer's new cluster division head and cluster lead CS Africa. She will be based in Nairobi, Kenya.
- Dr Peter Evans** has been appointed as the new chief executive officer of the South African Pork Producers' Organisation (SAPPO).
- Liesl Breytenbach** is the new executive director of the Animal Feed Manufacturers Association (AFMA).



1.



2.



3.

## WHO IS YOUR HERO?

Not all heroes wear capes! The *My Hero* series, a competition by Grain SA and John Deere, is your chance to acknowledge the heroes who fuelled your passion for the agricultural industry. It can be devoted parents, grandparents or farm workers. Maybe your spouse, a helpful neighbour or a wonderful mentor inspired you.

Your story is a tribute to their lasting legacy, so why not enter the competition? You may win a cash prize of R2 500 and provide your hero with an exciting gift from John Deere. Scan the QR code to fill in the entry form. ■





# Corner Post

BY LOUISE KUNZ, ASSISTANT EDITOR

**T**HE FACT THAT JOHANNES SETSHEGO (50) HAS COMPLETED NEARLY ALL THE GRAIN SA TRAINING COURSES, SHOWS THAT HE IS TRULY COMMITTED TO DEVELOPING INTO A BIGGER AND BETTER FARMER. HE GREW UP ON A FARM IN THE WINBURG AREA, WHERE HIS FATHER WAS A FARM WORKER FOR A COMMERCIAL PRODUCER.

Johannes always loved being on the farm but had to attend school in Welkom, where he stayed with his uncle who was trading with sheep. This made him realise that there is more to farming than just working on the lands.

After he had completed his schooling, he bought his first cow and slowly began developing a keen interest in cattle trading. In 1999 he read about the Land Redistribution Programme and decided to apply for land. 'I knew if I had my own land, my dream to become a farmer would be realised.' In 2001 Johannes stepped onto the farm Cradocksia and began his career as a cattle farmer.

Although he had no knowledge of crop production, he decided to try his hand at it and planted wheat. 'Because of my lack of knowledge, this was a complete failure and I did not even harvest the crop.' A neighbouring commercial farmer saw his attempt and just had to intervene. He also introduced Johannes to the right team, who could teach him the correct agricultural practices to develop as a crop farmer.

This team was the Farmer Development team of Grain SA, and they changed his life. 'I attended my first study group meeting in 2006 and gained so much knowledge there that I tried not to miss a get-together since then.'

Johannes is extremely grateful towards Grain SA, who began a programme to develop farmers with little or no knowledge into grain farmers who can contribute to food security in the country. 'I met Ntate Johan (Kriel) at one of my first meetings and he has played an enormous part in my development from a beginner farmer to where I am today – a graduate of the 1 500 Ton Club of Grain SA.' Last season Johannes realised the following yields: Maize – 6,8 t/ha, sunflower – 1,8 t/ha, and soybeans – 1,4 t/ha.

## JOHANNES'S STORY

### WHAT HAS HELPED YOU TO BECOME A SUCCESSFUL FARMER?

Apart from hard work, I have never been afraid to ask for advice. I listen to people with

knowledge and try to learn as much as I can from them. I have really fought hard to get everything right. It has taken me two years to get the green beans on standard, but I didn't give up. I like a challenge!

### HOW CAN THE YOUTH BE MOTIVATED TO FARM?

There are not many jobs available, but there is soil. I believe that young people have the wrong impression about farming. They think it is a hard job where you get dirty. They don't realise that because people must eat, growing food and selling your products will ensure you have an income. I often get young people to help on the farm. I try to teach them that it isn't difficult to grow vegetables – it is hard work, but anyone can do it.

### ARE ANY OF YOUR CHILDREN INTERESTED IN FARMING?

Yes, my younger daughter has shown a keen interest in following in her father's footsteps. She is attending Glen Agricultural College to learn more about grain production in preparation of her farming career.

### JOHANNES'S THREE TOP TIPS

1. Work hard.
2. Know your soil because farming success is all about soil health.
3. Be a hands-on farmer.



## FARM FACTS

**Farm:** Olivine (210 ha) and Cradocksia (285 ha). He also rents additional land for planting.

**Nearest town:** Virginia

**Region:** Free State

**Type of farming operation:** Mixed farming with crops – he plants maize, sunflower and soybeans in a crop rotation system, and he also grows green beans. Livestock – cattle and sheep.

## GRAIN SA'S CONTRIBUTION

- Joined Grain SA in 2004
- Welkom Study Group
- Became a 1 500 Ton Club graduate in 2022

### Training courses completed:

Johannes has completed 20 of the 27 courses, which include:

- Introduction and advanced courses to maize, sunflower, wheat and soybean production and marketing
- Business ethics and farm management

### A mentor's view:

Johan Kriel, regional development manager in the Western Free State, says Johannes is a farmer at heart. 'Farming is all he wants to do. He is keen to learn and not deterred by stumbling blocks. He does things right and pays his debt on time. After about 50 visits to his farm, he has perhaps become more of a family member than a mentee!' ■



Johan Kriel

# A programme that is changing lives



## Investing in the farmers of the future

**ACCORDING TO THE WORLD BANK (31 MARCH 2023), NO ECONOMY CAN AFFORD TO UNDERESTIMATE THE ROLE OF AGRICULTURE AND IN PARTICULAR AGRICULTURAL DEVELOPMENT. HEALTHY, SUSTAINABLE AND INCLUSIVE FOOD SYSTEMS ARE ESSENTIAL TO ACHIEVE THE WORLD'S DEVELOPMENT GOALS.**

Agricultural development is one of the most powerful tools to end extreme poverty, boost shared prosperity and feed a projected 9,7 billion people by 2050. Growth in the agriculture sector is two to four times more effective in raising incomes among the poorest compared to other sectors.

Agriculture is essential for economic growth, accounting for 4% of the global gross domestic product (GDP) and in some developing countries more than 25% of the GDP, but agriculture-driven growth, poverty reduction and food security are at risk as a result of multiple shocks. These include extreme weather events, pests and conflicts between countries, which are all negatively impacting food systems, resulting in higher prices and growing hunger.

- Russia's invasion of Ukraine has accelerated a global food crisis that is driving millions more into extreme poverty. About 205 million people across 45 countries have so little food that their lives are at risk.
- The impact of climate change could further cut crop yields, especially in the world's most food-insecure regions.

- South Africa's food systems are responsible for about 30% of greenhouse gas emissions.
- Current food systems also threaten the health of people and the planet.
- One third of food produced globally is wasted. Addressing this is critical to improving food and nutrition security.
- Poor diets: Millions of people are not eating enough or are eating the wrong foods, resulting in malnutrition leading to illness and health crises.
- Food insecurity increases the risk of malnutrition, leading to undernutrition or being obese and unhealthy. An estimated 3 billion people in the world cannot afford a healthy diet.

Grain SA, through *Phahama Grain Phakama* and its Farmer Development Programme, is determined to make a difference in the South African agricultural development sector. This vision is supported by an extensive programme employing diverse strategies that seek to interact with developing farmers and impact them with new knowledge, modern practices, mentorship and diverse other support systems, such as these employed by successful commercial farmers.

The goal is to build support networks around each developing farmer who demonstrates a real desire and work ethic to grow his or her farming enterprise, using the natural resources at their disposal optimally.

## AT GRASS ROOTS



*Mentor Chris de Jager visited Lucky Khumalo, who was busy harvesting maize.*



*When mentor Paul Wiggill visited Nhlanhla Mngadi the maize was looking good and was nearly ready to harvest.*



*Musa Thomas Sibiyi was busy harvesting his maize when mentor and trainer Timon Filter paid him a visit.*





## Courses focus on training and skills

**ONE** of the fruitful development strategies employed in Grain SA's Farmer Development Programme is training and skills development. The courses are comprised of both theory and practical sessions and are delivered in a language that the course attendees understand.

These events have impacted the farmer development activities immeasurably over the years. Up-to-date records reflect that close to 3 000 courses have been presented. The demand from farmers for more courses, covering more topics, continues unabated. Grain SA appreciates the partnerships that enable the role-out of a meaningful training programme every year.

Thanks to the sponsorship of the Maize Trust and the Oil and Protein Development Trust (OPDT), the following training opportunities were possible during June:

- Two 'Introduction to maize production' courses were presented to farmers in the Eastern Cape.
- 'Introduction to soybean production' was presented in the Dundee and Louwsburg regions.
- Farmers from the Louwsburg and Dundee areas attended the course 'Introduction to sunflower production'.
- A practical skills course about planter and boom-sprayer calibration was presented in the Dundee area.



*During the course, 'Introduction to sunflower production', trainer Timon Filter showed the Middelburg Study Group how to take soil samples. They also learned more about planter calibration.*

## A big thank you FROM FARMERS

**SOME** of the farmers who attended courses during June, shared their gratitude after the training courses.

- 'I am happy that the training was very successful, and it was nice to be with this lecturer to learn more about farming. I want to come again to learn bigger things. The practical part was very, very good. Everything was in order.'  
– Samuel Ramothibe
- 'Theory was great – it was clear and we understood everything. We contributed our own facts or understanding of farming. We also learned from experienced farmers. We learned how to plant, when to plant and when to harvest the sunflower. We learned how to till soil and the different implements. We learned how to control weeds and pests and how to calibrate our sprayers. I know now how to fertilise my field. We even learned more about tractors.'  
– Doctor Tshoba
- 'Very informative and of great assistance. Well presented by the trainer, who explained everything clearly. He is very knowledgeable. Examples were given to give us more understanding. Thank you! Extensive experience from the trainer assisted the group very much. Good demonstration. Our lives are much better off than before!'  
– Petrus Mtsweni



*Timon made sure farmers from the Pixley Study Group, who attended the 'Introduction to soybean production' course, learned more about the soybean plant and knapsack calibration. The theory session also gave some insightful information – all thanks to the sponsorship of OPDT.*



# YOUNG PEOPLE

SEE THE FUTURE

*Differently*



The way in which **young people see the future** speaks of a positive attitude – and of the choice to be relevant in a new era. AgriSeker shares this excitement about the future of agriculture in South Africa. Our motto is 'A certain future', after all.

AgriSeker is motivated to make a contribution to the future of our country with a dedicated focus on agriculture through knowledge, understanding and participation in this sector. Our focus is on producers and young people, because for agriculture to survive, we need you.

Ask your insurance broker or find us online at [agriseker.co.za](http://agriseker.co.za)