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PULA IMVULA

GROWING FOOD • PEOPLE • PROSPERITY

GRAIN SA MAGAZINE FOR DEVELOPING FARMERS



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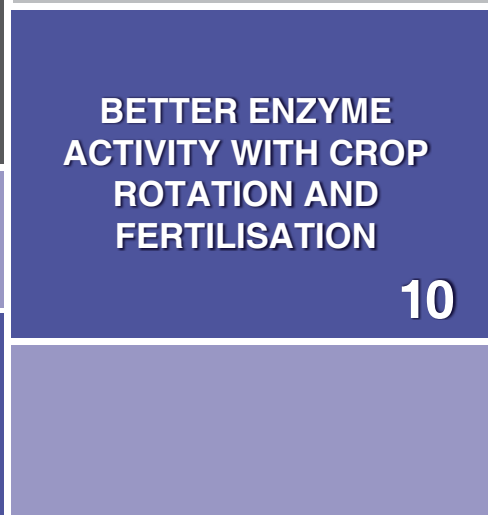
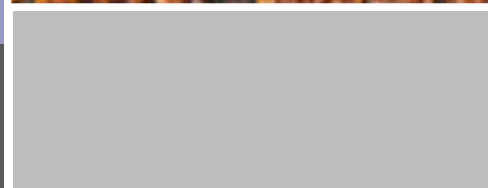
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A WORD FROM... *Jeremia Mathebula*

FARMING HAS MANY CHALLENGES, BUT THE EXCITEMENT OF SEEING YOUR MAIZE GROW WILL KEEP YOU FARMING – YOU WOULDN'T WANT TO CHANGE YOUR CAREER FOR ANYTHING ELSE.

At the time of writing this message, I, like other farmers, have finished harvesting and am now busy preparing for the new season. For many farmers the past season was a difficult one due to the high rainfall we received. In Mpumalanga we got stuck in the waterlogged fields all the time.

In my area, the agricultural buzz is still the high input cost for the new season. Smaller and new-entry farmers are also concerned, as this will lead to a very small profit. This is why planning is key. Failing to plan, means planning to fail!

For me the most important agricultural practices to get into place to ensure a successful season ahead are the following:

- You cannot plant in unprepared fields, so early soil preparation is important.
 - Servicing your tractors regularly will ensure that you don't have to fix something when you actually want to start working. Although most of the maintenance can be done in the quieter months, you have to check the diesel, lubrication, water-cooling system and tyres before using your tractor.
 - Order inputs in time to counter possible price increases.
- Farming is difficult, but don't give up. We all work towards the same unique objectives to produce food for our country and secure food security.

Let's keep working together with all our stakeholders, even during this difficult period, when the high input cost makes farming even more challenging. We need to keep our faith that this situation will normalise in the near future. What goes up, must come down!

– **Jeremia is chairperson of the Farmer Development Working Group and also vice-chairperson of Grain SA.** ■

*To most people, it's dirt.
To the farmer, it's potential.*

~ DOE ZANTAMATA
American author

Hedging helps to manage risks



WITH INPUT COSTS AT RECORD HIGH LEVELS AND MUCH UNCERTAINTY IN THE MARKET, PRODUCERS FIND THEMSELVES IN AN IMPOSSIBLE SITUATION: THERE IS ALWAYS THE POSSIBILITY THAT PRICES MAY FALL BACK TO LOWER LEVELS, BUT WITH THE CURRENT INTERNATIONAL SUPPLY AND DEMAND OUTLOOK, IT SEEMS THAT COMMODITY PRICES WILL BE SUPPORTED FOR THE NEAR FUTURE.

The following factors are supporting commodity prices:

- Low international carry-over stock from the previous season.
- Declining production estimates in the United States of America (USA) due to unfavourable weather forecasts.
- Weak production estimates in Europe due to heatwaves.
- Uncertainty about exports from Ukraine.
- Weak farmer sales of soybeans in Argentina.
- Lower than expected palm oil production.

With prices at their current levels and the planting season rapidly approaching, it is the perfect time to start doing calculations with the current input and commodity prices to ensure profitability and sustainability.

Examples

A farmer calculates with the current prices that his input cost to produce maize amounts to approximately R15 500 per hectare. The farmer then needs to ensure that he sells his product in the future at a price that will cover this cost. If the farmer produces 4 tons per hectare, he needs to sell his maize at a minimum of R3 875 per ton to cover his costs.

Input cost = R15 500/ha

Income = 4 tons/ha x R3 875/ton = R15 500

Profit equals income minus costs:

Profit = R0 (R15 500 income - R15 500 costs)

A profit will be made if there is an increase in tons per hectare produced or an increase in price per ton.

• If tons produced increases to 5 tons per hectare:

- Input cost = R15 500 per hectare
- Income = 5 tons per hectare x R3 875 per ton = R19 375 per hectare
- Profit = R3 875 per hectare (R19 375 income - R15 500 cost)

• If the price increases to R4 000 per ton:

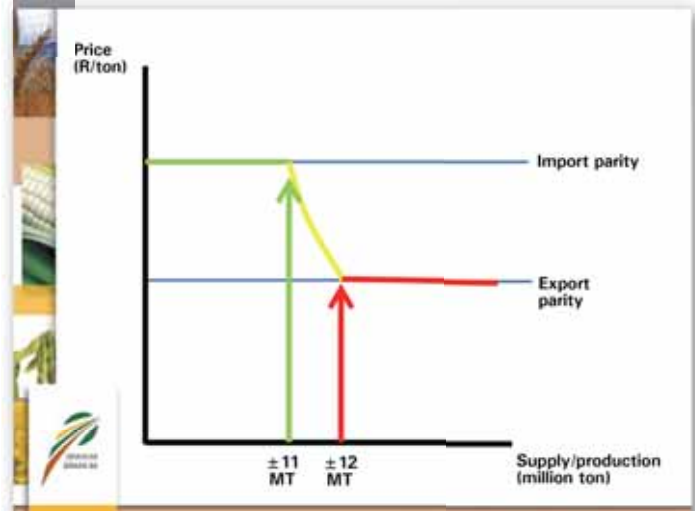
- Input cost = R15 500 per hectare
- Income = 4 tons per hectare x R4 000 per ton = R16 000 per ton
- Profit = R500 per hectare (R16 000 income - R15 500 costs)

FACTORS AFFECTING PROFIT

Looking at the examples above, it is clear that the two main factors influencing the profit are **production and price**. A producer has no

1

Maize demand curve.



control over production but he has control over the price that he is paid for his crop.

Hedging

A simple tool to ensure profit is hedging. Hedging is when a producer sells his product in a forward contract, when he plants at a specific price in the future that is higher than his input costs. The producer then buys a future contract that shifts the risk to another entity. This ensures that a producer gets a specific amount per ton for the product he produces.

The ideal for a producer is to hedge the amount that inputs will cost to ensure that he is able to cover his cost. Depending on market conditions, the producer can choose to hedge a larger portion of the crop or keep the crop for cash sales when harvesting commences.

In essence, hedging helps the producer manage the price risk by ensuring that he is able to pay off the input costs. Everything over and above the input costs are profit. Therefore, hedging is an important strategy in sustainable farming.

CONCLUSION

Prices are affected by production. If surpluses are produced, prices will move to export parity and in times of shortages prices will move to import parity. These parities are affected by international prices, and therefore there exists a lot of volatility and factors affecting the market. This is why hedging must be used to manage risks. ■



**CHRISTIAAN VERCUIEL,
JUNIOR AGRICULTURAL
ECONOMIST, GRAIN SA**

Know your pests:

Chilo borer

IT IS IMPORTANT TO BE ABLE TO IDENTIFY ANYTHING THAT CAN DAMAGE YOUR CROPS. LEPIDOPTERAN PESTS SUCH AS THE CHILO BORER CAN CAUSE HUGE DAMAGE IN MAIZE FIELDS, WHICH WILL CAUSE SUBSTANTIAL YIELD LOSSES. EARLY IDENTIFICATION CAN PREVENT OR MINIMISE THIS.

This chilo borer occurs mainly in the maize triangle and low-lying warmer areas of Mpumalanga, Limpopo, Springbuck flats, Makatini flats and areas in KwaZulu-Natal. The primary host of this pest is sorghum, with maize being secondary.

The life cycle of the Chilo borer is much shorter and is completed within three to four weeks. Moths emerge in September, with females laying egg batches (up to 500 eggs) on the upper and underside of young seedling leaves. Egg batches are white, oval, flat and overlapping, similar to roof tiles, and hatch after five to seven days.

Larvae are creamy white in colour with characteristic dark spots along the back, which is why Chilo borer is also known as the spotted stemborer. Emerging larvae crawl towards the whorl and spread



Chilo eggs.



Chilo larvae feeding in whorl and tunnelling in midrib.



Characteristic spots on Chilo larvae.



Larvae pupate in maize stems.

to nearby plants on thin silk threads. Larval feeding lasts three to four weeks in the whorl where they feed on young rolled up leaves, before leaving this area to penetrate the stem for pupation.

Larvae overwinter in plant stubbles and as temperatures increase after winter, moths emerge after a short five to seven day pupal period.

Due to the shorter duration of the larval stage, less feeding and shorter life cycle of Chilo borer, it is regarded as a less serious pest for maize when compared to African stalk borer.

DAMAGE

The damage caused by the chilo borer includes small holes or 'windows' in the leaves as they grow out due to larval feeding in the whorl as well as extensive tunnelling in stems and maize cobs by older larvae. Damage by the Chilo borer is very similar to that of the African stalk borer. ■

Reap the rewards of VAT registration

DO YOU HAVE A VAT NUMBER? ARE YOU REGISTERED FOR VAT? THESE MAY BE QUESTIONS THAT YOU HEAR FREQUENTLY AS A FARMER, BUT WHAT IS 'VAT'? A LARGE NUMBER OF COUNTRIES, INCLUDING SOUTH AFRICA, USE THE VALUE-ADDED TAX ('VAT') SYSTEM TO COLLECT TAX FROM CONSUMERS, WHILE OTHERS USE SALES TAX OR CONSUMPTION TAX SYSTEMS.

VAT is levied whenever a product or service is sold and the tax is then collected from the buyer – not by the government, but by the seller of the products or the person delivering the service (the 'vendor').

The vendor then has to pay the tax over to the South African Revenue Service (SARS) at the end of a fixed period. The VAT that the vendor has paid on goods and services used in its business may be recovered from SARS by reducing the amount paid over to them. Therefore, the government effectively only receives the VAT on the value that the vendor had added through its process.

Only businesses that are registered as vendors may collect VAT on behalf of the government.

TO REGISTER OR NOT TO REGISTER

Registration and the administration of the process of collecting VAT from the vendors are done by SARS, and they have some basic rules that you need to be aware of:

- Only persons or businesses that supply goods or services are al-

lowed to register for and collect VAT from their customers.

- Smaller businesses will have lots of administration for very little benefit to themselves or the government; and therefore only vendors that have a turnover of more than R1 million a year are obliged to register for VAT.

You may feel that you will benefit from registering, even if your turnover is not yet that high. You would be allowed to register voluntarily if you can prove that your turnover will be more than R50 000 in a year.

How to register

To register, you need to visit a SARS office or alternatively you may make use of a registered tax practitioner. Most reputable accounting firms are registered as tax practitioners and will be able to assist and guide you through the process.

If you are farming, include this information in the registration in order to get the benefit of having VAT levied at 0% by your suppliers on selected goods, such as feed, seed and fertiliser. This is a special benefit only available to farmers.

After registration

Once you have registered, you should:

- Make sure all your suppliers have your correct VAT number on their documents and are aware that you are registered as a farmer. This is to ensure that you can claim back the VAT that you pay to your suppliers. This is referred to as **input VAT** – being the VAT you paid on the goods and services that went into your business.



- Update your sales invoices to comply with all the requirements for a valid tax invoice, according to the VAT rules.
- Start to add VAT to the selling price of livestock and crops that you sell from this date onward. This is referred to as **output VAT** – being the VAT charged on what goes out of your business.

Output VAT is usually charged at 15% of the price of the items you sell. Wheat, soy beans, sunflower and livestock are examples of items where VAT is charged at 15%. However, in certain cases VAT is charged at 0%. Some of the most relevant items that are taxed at 0% include maize, fresh fruit and vegetables, milk, eggs and rice.

SCHEDULED VAT RETURNS

Depending on the period defined in your registration from SARS, you then have to submit a VAT return to SARS every two or six months. The returns are due on the 25th of the month after the end of the VAT period. For example, if the VAT period is March and April, the return is due on 25 May.

The process of completing the scheduled VAT returns basically involves the summarising of your accounts and then reporting to SARS the total of:

Output VAT

- Sales made at 15%.
- Sales made at 0%.

If the output VAT is more, you have to pay the difference to SARS with the submission of the return. Late payment is penalised.

Input VAT

- Goods and services bought or paid for where VAT was charged at 15% by the supplier.
- Assets bought where VAT was charged at 15% by the supplier.



If the input VAT is more, you will be refunded the difference by SARS into your business bank account.

SARS may from time to time request certain further details in order for them to make sure you are declaring these amounts correctly.

The VAT returns are completed and submitted on the SARS e-filing platform. You can register to do this yourself but, unless you have some experience in these matters, it is highly recommended that you obtain professional assistance.

Late or incorrect submissions as well as failing to reply or giving incorrect replies to SARS on any further information requested from time to time, could result in expensive additional taxes or penalties charged to your business.

For more details, refer to <https://www.sars.gov.za/lapd-vat-g02-vat-404-guide-for-vendors/>. ■

EBEN BAKKER, CHARTERED ACCOUNTANT

HEALTH AND SAFETY

Part 5

Attach implements *with care*

BEFORE ATTACHING IMPLEMENTS, AN EMPLOYEE MUST FIRST INSPECT THEM TO MAKE SURE EVERYTHING IS IN WORKING CONDITION. THE VEHICLE/TRACTOR USED MUST ALSO BE CHECKED AND ALL MOVING PARTS SHOULD BE COVERED WHEN IN OPERATION.

Operators must have the necessary knowledge to attach and detach implements. Employees attaching and detaching implements for the first time, should do so under supervision to familiarise themselves with the process.

Ensure that the implement is in line with the tractor/vehicle before attaching it otherwise the implement or vehicle can be damaged in the process. No employee should stand between the implement and vehicle/tractor when it is being attached.

Once the implement is attached, all moving parts must be tested to ensure they are in good working order. Other employees should not be present for the testing. If there is something that needs attention, such as blades that need to be replaced, the implement must be switched off. The implement should also be detached. When the repairs are done, everything should be reconnected and tested before

the task can be done. While working, the operator should stop and investigate if something doesn't sound right. Report any problems to the supervisor.

When the implement is detached, the vehicle/tractor must be taken out of gear and the handbrake applied before starting the detaching process. When the task has been completed, the implement must be stored properly – the resting position of implements should not pose a danger to anyone. Make sure the resting blocks on which certain implements are stored are in place. ■

**CHARL SAAYMAN, HEALTH AND SAFETY CONSULTANT
AT MEGA HEALTH AND SAFETY**

AGRI-PESTS:

Tackle it effectively

IT IS VITAL THAT FARMERS CAN IDENTIFY PESTS TO ENSURE EARLY MANAGEMENT, USING THE RIGHT SET OF TOOLS. QUELEAS AND LOCUSTS ARE MAJOR AGRICULTURAL PESTS, AND ARE DECLARED PESTS ACCORDING TO THE AGRICULTURAL PESTS ACT (ACT NO. 36 OF 1983). THESE PESTS CAN CAUSE SUBSTANTIAL DAMAGE TO PASTURES AND CROPS.

AGRICULTURAL PESTS

The Department of Agriculture, Land Reform and Rural Development (DALRRD) is responsible for the control of these pests.

Queleas

Before an official of the department can do a physical inspection when queleas have been reported, the following procedures/steps must be followed by the complainant:

- The sleeping or breeding area of the flock of queleas causing the damage must be correctly identified. The area can only be identified early in the evening, as the queleas will not be at their respec-

Locusts

The United Nations office in Geneva, Switzerland, calculated that even a tiny swarm of locusts can eat as much food as can feed 35 000 people in a single day. This is why it is so important to control locusts.

According to Dr Gerhard Verdoorn from CropLife SA, who has 40 years' experience in dealing with locust outbreaks, grasshoppers can be controlled without commercial pesticides. He believes locusts should be controlled in the pedestrian phase of their development – the period in which they 'walk' for seven to ten days before they begin to fly.

Once the locusts start flying, it is more difficult to control them. Swarms are usually sprayed early in the morning, before they start flying, or at night, when they rest. Spraying them while they are in the air not only wastes pesticide, but also poisons the environment. Therefore, Dr Verdoorn suggests that a herd of animals is chased over the pedestrians, or that branches are tied to a vehicle and dragged over them. This injures the pedestrians to such an extent that they do not begin to fly.



Grain SA photo competition – Luca Geertsema, December 2016

It is very important to control locusts before they start flying.

tive nests during the day. Breeding flocks will have nests and they can be used during the day to identify the breeding area.

- If the identified area is not the complainant's property, the complainant must obtain permission for access and possible control actions from the landowner.

The complainant may then contact one of the resource conservation inspectors (see contact list) with the information and report the queleas. An appointment will be made to inspect the sleeping or breeding area in the company of the complainant.

Fall armyworm

Fall armyworm (*Spodoptera frugiperda*) are active during dusk and dawn, and mostly hide in plant whorls or between leaf sheets during the day. Although the initial infestation often goes unnoticed, as small larvae cause little plant damage, large larvae consume 80% of their total food intake in the last few days of development. When they move into the cob, poor germination follows and severe damage up to hard-seed stage can occur.

According to CropLife SA, the best control for armyworms is early



Because of the damage it can cause to crops, the quelea is described as Africa's most hated bird or the dreaded 'feathered locust'.

treatment. Scouting for moths and monitoring with pheromone traps can determine early moth flights, indicating infestations and the size thereof. Field inspections every three to four days are crucial to identify egg parcels, small larvae or 'window' damage. When these are identified, a producer should act fast because mature larvae are more difficult to control, especially once they have moved into the cob.

INTEGRATED PEST MANAGEMENT

Integrated pest management (IPM) is an effective and environmentally sensitive approach to pest management. This method emphasises the growth of a healthy crop with the least possible disruption to agro-ecosystems. It encourages natural pest control mechanisms and uses all suitable techniques or strategies to keep pests below levels that cause unacceptable crop losses. The first requirement of IPM is to grow a healthy crop, which is more able to withstand the effects of pests than a weak crop or one under stress.

Pest management protects the crop against yield losses – it does not increase the potential of a crop to produce a high yield. It is also a combination of all appropriate practices into a single plan for crop and pest management that optimises the use of inputs to reduce pests and crop damage to an acceptable level and to maximise crop yields.

Advantages

With IPM, the use of inputs is optimised:

- Unnecessary pesticide use is avoided, resulting in reduced costs.

- Crop losses are reduced.
- The development of pests resistant to pesticides is avoided.
- Crop production is sustainable and biodiversity is maintained.
- The risk of human, animal, food, wildlife and environmental contamination is reduced.

Remember that IPM is only one aspect of overall crop production that needs to be considered by a grower. Overall management of the crop by the grower affects pest management, and vice versa.

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<https://sagrainmag.co.za/wp-content/uploads/2020/12/Grain-Guide-2021-ENG-web.pdf> ■



LOUISE KUNZ,
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Report pest problems here

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MULALO MUKOBE (Upington)

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Better ENZYME ACTIVITY with crop rotation and fertilisation

MAIZE PRODUCTION IN SOUTHERN AFRICA OCCURS COMMERCIALY ON LARGE FARMS AS WELL AS ON MORE THAN 12 000 SMALLER FARMS, PRIMARILY IN NORTH-WEST, MPUMALANGA, THE FREE STATE AND KWAZULU-NATAL.

The relatively higher and stable returns obtained from maize when compared to that of alternative crops, the relative ease with which it can be produced and the high efficacy of pesticides and herbicides to control pests and weeds on maize, all contributed to a maize monocropping practice.

The production of maize, however, can be influenced by various abiotic and biotic factors. Monocropping often goes hand in hand with poor soil fertility in combination with nutrient imbalances. To complicate matters further, most of the soils in Southern Africa have a low amount of phosphorus (P) available to the plant. Producers therefore depend heavily on chemical P fertiliser to supplement low soil P.

Elevated levels of chemical P application can lead to poor plant growth because it reduces the plant's ability to take up essential micronutrients, mainly iron and zinc, even when adequately available. On the other hand, excessive chemical nitrogen (N) can increase a plant's susceptibility to pests and fungal diseases and promote vegetative growth at the expense of yield. Leached N, particularly on sandy soils, can pollute rivers and streams, posing a significant risk to marine animals and livestock dependent on it as a water source.

The inclusion of legumes in a maize-based crop rotation system generally improves maize production. In addition, the improvement and nourishment of enzyme activity through judicious cropping (**Photo 1**) and tillage systems, have the potential to reduce the use of chemical fertiliser and provide plants with a more readily available nutrient basis in more balanced proportions. Soil enzymes are involved in many important soil processes, such as the breakdown of soil organic matter (SOM) that is then released into the soil during plant growth as well as the release of mineral nutrients and aid in its supply to plants.

Enzymes such as β -glucosidase are involved with carbon cycling, which is important because carbon is the main component of SOM and it helps give soil its water-retention capacity, structure, and fertility. Urease enzymes help to degrade urea to promote N availability to the plant. Phosphatase enzymes change unavailable forms of organic P into phosphate that can be absorbed by plants. Enzyme activity is, therefore, affected by soil environmental changes, cropping or farming systems and fertilisation. Urease is influenced by the cropping system, SOM, tillage, as well as pH. Monitoring soil enzyme activity is important in order to understand the farming systems that regulate it.

Legumes such as cowpea and soybean included in such a maize-based crop rotation system can either be used for human consumption or for animal feed. The contributions of grain legumes to N availability have been well documented, but the non-N effects of cowpea and soybean, including the impacts on soil enzyme activities

because of the quality and quantity of the organic compounds released by their roots (root exudates) into the rhizosphere of the plant roots, needed to be studied.

METHOD

The study was conducted over two consecutive growing seasons at Lichtenburg to investigate the impact of cowpea-maize and soybean-maize rotation on soil enzyme activity compared to that in continuous maize under high (to achieve a 4 t/ha maize grain yield) and low (half of the fertiliser used in the high level) fertilisation levels, respectively. Crop cultivars used in this study included BG 5685R (maize), Bechua-na white (cowpea) and PHB 96T06R (soybean). The trial site consisted of an Avalon soil form with sandy loam texture and had an average annual rainfall of about 580 mm. The soil enzymes monitored included β -glucosidase, alkaline phosphatase and urease. Soil sampling of the trials for enzyme analysis was done at flowering stage, because this is when roots are actively growing and thus fuelling enzyme activity via derived organic materials (**Photo 2**).

RESULTS AND DISCUSSION

During the first growing season, β -glucosidase activity was higher in soil planted to either soybean or cowpea and followed up with maize than that in soil from only maize. Alkaline phosphatase activity was better improved when maize was planted after cowpea compared to maize planted after soybean and only maize. Urease activity was not affected by rotation during this season. Low fertilisation improved β -glucosidase activity better than high fertilisation. Alkaline phosphate and urease activities were not affected by fertilisation.

During the second growing season, urease activity was higher in soil planted to either soybean or cowpea and followed up with maize than that in soil from only maize. Both β -glucosidase and alkaline



Maize plant roots with the surrounding soil where roots, microbes and enzymes interact (rhizosphere).



2

Soil sampling for enzymes on different cropping systems was done at flowering stage.



3

Soybeans planted early have an opportunity to form many branches.

phosphatase were not affected by rotation during this season. The low fertilisation improved β -glucosidase, urease and alkaline phosphatase activity more than the high fertilisation.

Generally, rotation of maize with legumes improved enzyme activity better than that in systems that contained only maize. Cowpea and soybean have a low C:N ratio, which can increase enzyme activity. The residual N of the soybean was very low because this crop has a high nitrogen harvest index. However, the yield obtained from the maize that was planted after soybean was higher than that obtained from maize that was preceded by maize.

These observations indicate that legumes benefit a subsequent cereal crop not only with residual N, but also with other non-N effects such as improved microbial and enzyme activities. In addition, the variety of plant families such as legumes and cereals, promote diversification of plant root systems that favour enzyme activity. A system that contains only maize could always be linked to lower enzyme activities, which confirms the negative impact of monocropping on soil enzymes and other microbial activity. A legume-maize rotation implemented with a low fertiliser level showed more effective nutrient usage and soil microbial functions. This is a good system to improve nutrient uptake by crops to achieve higher yields.

CONCLUSION

Producers can improve their soil enzyme activity by including legumes in their maize cropping systems. The inclusion of legumes promotes soil processes that make nutrients available to crops even at low fertiliser levels. It is also vital for producers to monitor the pH levels of their soils, because it has a direct impact on enzyme activity. Seasonal climatic fluctuations can play a key role in the effect of rota-

tion and fertilisation on enzyme activities. However, observations obtained from this study should be investigated further.

For further information, contact Edzisani Nemadodzi at nemadodzie@arc.agric.za.

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**EDZISANI NEMADODZI AND
OWEN RHODE, ARC-GRAIN CROPS.
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BAYER**

Fertilisation and planting date **IMPACT YIELDS**

THE AVERAGE AREA UNDER SUNFLOWER CULTIVATION IN SOUTH AFRICA SINCE 2009 (UP TO 2021) IS 552 000 HECTARES, WITH AN AVERAGE ANNUAL PRODUCTION OF 715 000 TONS OVER THIS PERIOD. THE SOUTH AFRICAN SUNFLOWER PRODUCTION AREA REMAINS CONCENTRATED IN THE FREE STATE AND NORTH WEST, WHICH TOGETHER ACCOUNT FOR 80% OF THE NATIONAL AREA PLANTED (ON AVERAGE) OVER THE PAST TEN YEARS.

Sunflower (*Helianthus annuus* L.) is an annual oilseed crop globally cultivated on a production area of approximately 26 million Hectares that results in \pm 47,4 million metric tons of seed annually – an 8% share of the world oilseed market. Sunflower oil is one of the world's major vegetable oils, often used in the food industry for the production of various related commercial products due to its high quality, high protein content and edibility.

SUNFLOWER AND NITROGEN

In sunflower production a nitrogen (N) fertiliser is often applied during seed sowing in dry areas. This is followed by another N fertiliser application, or topdressing, when precipitation is expected before

anthesis, or until ten-leaf stage to twelve-leaf stage in an attempt to better match the plant's N requirements over its growth period. Fertiliser application, depending on the expected yields and the residual soil N, varies in practice from none in nitrogen-rich soil to 140 kg N/ha. An N excess or over fertilisation can cause excessive water consumption, fungal diseases, lodging and a drop in grain oil content.

Several international studies reported that 100 kg N/ha was suitable for sunflower production, but that a higher rate (150 kg N/ha) resulted in a negative effect on the oil content and seed yield. However, other studies reported that 80 kg N/ha was sufficient for sunflower fertilisation or that increasing N levels resulted in steady increases in yield, protein contents and linoleic acid, with the oil content and oleic acid percentage responding negatively. Unfortunately, little or no research has been conducted in South Africa to quantify the optimum N application for local sunflower production conditions.

SUNFLOWER PLANTING DATES

In South Africa, sunflower is often used as a catch crop, meaning it is planted as an alternative in growth seasons where the rainfall onset is too late for maize or soybean establishment. Therefore, the stable yields under these late planting conditions are well below the crop's yield potential. Late sunflower plantings are more likely to encounter adverse conditions during their development, including seed or seedling exposure to high December or January temperatures, and pollination or seed development occurring under rapidly decreasing temperatures.

The optimum planting time of a crop allows maximising the use of all the natural resources in line with the crop optimal environmental conditions and physiological growth stages, thereby ensuring good seed germination, seedling establishment, optimum root system development, growth and yield. This also enables plants to establish themselves better, thereby allowing the absorption of essential nutrients from a large volume of soil. Sunflower grain and oil yields are greatly reduced when normal planting dates are delayed.

TRIAL DESCRIPTION

This study aimed to address the effect of N fertilisation on sunflower yield under different planting dates. Two field experiments were established at ARC-Grain Crops' Potchefstroom research farm with two different planting dates: The first planting was considered the optimum planting date (15 December 2020), followed by a second late planting date (26 January 2021). Five sunflower hybrids (two conventional [PAN 7080 and AGSUN 8251], two Clearfield [AGSUN 5106 CLP and PAN 7160 CLP] and one high oleic hybrid [PAN 7158 HO]) were planted.

Five different levels of N fertiliser were applied, consisting of 0 (control) or 45 kg/ha N as a basal application at planting or as a treatment one month prior to planting. This was followed with a topdressing one month from planting applied as 0 kg/ha, 45 kg/ha or 75 kg/ha (**Table 1**). According to soil analysis and sunflower production requirements, additional phosphate (P) and potassium (K) fertilisers were not required.

1 Nitrogen treatments and their applications.

Treatments	Amount of basic N fertilisers (kg/ha)	Amount of topdressing N fertilisers (kg/ha)
Control	0	0
T1*	45*	0
T2	45	0
T3	45	45
T4	45	75

* One month prior to planting.

2 Agronomic nitrogen efficiencies (kg/ha) for the different N treatments under optimal and later planting conditions.

Agronomic efficiency (kg/kg)		
N levels (kg/ha)	Optimum planting	Late planting
120	8,45	6,59
90	8,08	8,02
45	12,23	6,56
45*	8,56	8,58
0	0	0

Agronomic efficiency (AE) = (grain yield of fertilised crop - grain yield of unfertilised control)/fertiliser applied.

The AE equation indicates the yield gain (in kg) per kg fertiliser applied (Mengel et al., 2006).

Responses were studied in a randomised complete block design with a split-plot arrangement and four replications. Each plot (36 m x 5 m) comprised 40 rows at 0,9 m as row spacing and with sub-plot sizes of 7,2 m x 5 m, with N applications in the main plots and sunflower hybrids in the sub-plots.

Effect of N on sunflower yield

The different N applications showed a highly significant effect on sunflower yield at both planting dates, with 120 kg N/ha – applied as 45 kg/ha at planting and 75 kg/ha as topdressing – producing the highest yields: 2,85 t/ha for the optimum and 2,14 t/ha for the late planting dates (**Graph 1**). This was followed by 90 kg N/ha applied as 45 kg/ha at planting and 45 kg/ha as topdressing. There were no significant differences between 45 kg/ha applied one month before planting and the 45 kg/ha applied at planting. Zero N application yielded the lowest yield of 1,85 t/ha and 1,35 t/ha for optimum and late planting respectively (Graph 1).

The graph shows the combined average of the different cultivars, thus removing possible cultivar biases, with the bar indicating the standard error over the four replicates (N= 4).

Figure 1 shows the effect of different N levels and time of application on the sunflower growth and development. At 120 kg and 90 kg N/ha the plants have bigger leaves, a darker green colour, thick-

er stems, a bigger head and are taller compared to other treatments. At 0 kg N/ha the plants show less vegetative growth, smaller leave size, shorter plant height and smaller head size than at other N levels. Results indicated that these vegetative characteristics have a direct positive effect on the sunflower seed yield.

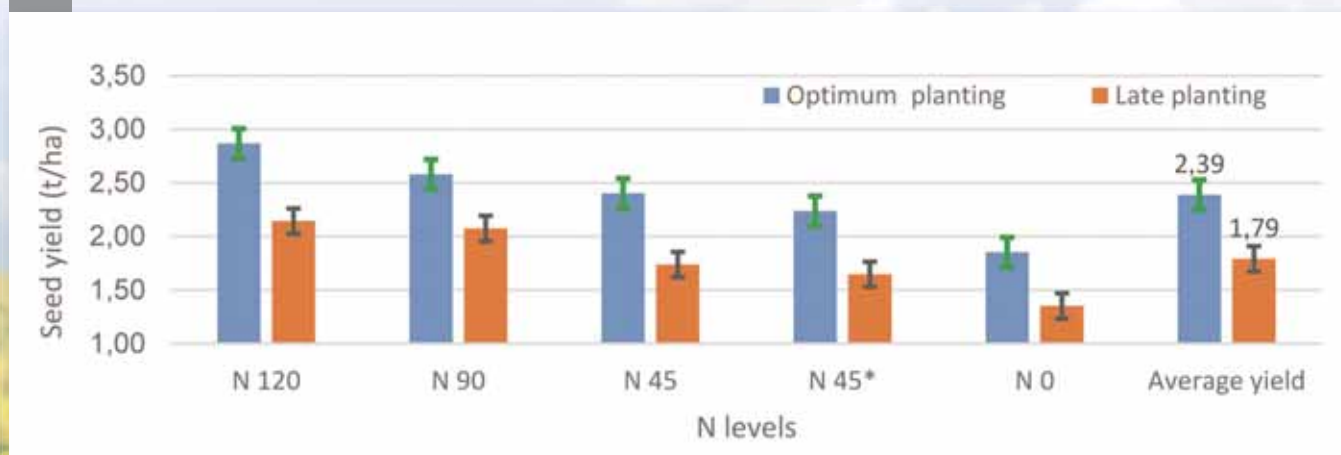
Indexes of N use efficiency

Agronomic efficiency (AE) represents the ability of a plant/cultivar to increase yield in response to the nutrient applied. This parameter is used as a short-term indicator of the impact of applied nutrients on crop productivity. Here, the AE is calculated in units of yield increase per unit of nutrient (N) applied. It more closely reflects the direct production impact of an applied fertiliser and relates directly to economic return. The calculation of AE requires knowledge of yield without nutrient input, so it is only known when research plots with zero nutrient input have been implemented.

Under the optimum planting date, the highest AE value (12,23 kg/kg) was obtained with the 45 kg N/ha treatment, while under late planting conditions the highest AE (8,58 kg/kg) was observed at 45 kg/ha applied one month before planting (**Table 2**).

In other words, under the optimum planting date, for each kilogram N fertiliser applied, an increase of 12,23 kg in yield was observed.

1 Effect of different N treatments on sunflower yield at different planting dates.



Fertilisation and planting...

3 Profitability study for effect of different N levels and time of application on sunflower yield at two planting dates.

N applied (kg N/ha)	Fertiliser used (kg urea/ha)	Seed yield (t/ha)	Cost (R/ha)	Income (R)	Profit (R)	Return on investment (profit/cost) in %
Optimum planting						
120	261	2,87	2 087	24 395	22 308	10,69
90	196	2,58	1 565	21 930	20 365	13,01
45	98	2,4	783	20 400	19 617	25,07
45*	98	2,24	783	19 040	18 257	23,33
0	0	1,85	0	15 725	15 725	
Late planting						
120	261	2,14	2087	18 190	16 103	7,72
90	196	2,07	1565	17 595	16 030	10,24
45	98	1,74	783	14 790	14 007	17,90
45*	98	1,65	783	14 025	13 242	16,92
0	0	1,35	0	11 475	11 475	

Values used in the calculations:

Urea price: R8 000/ton

Sunflower seed price: R8 500/ton



1



2



3



4

Best return on investment (ROI)

Correct use of fertilisers can yield huge returns on investment. During the 2021 growing season a one-year result at Potchefstroom research farm showed that the best ROI was obtained by using 45 kg N/ha, which is equal to 98 kg of urea compared to other N levels (Table 3).

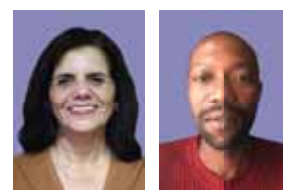
CONCLUDING REMARKS

Highly significant seed yield differences were observed between the optimum planting dates and the late plantings, with a 25% reduction in yield recorded for sunflower planted in the last week of January compared to the optimum planting date of mid-December. At both planting dates, high levels of N application (120 kg N/ha) recorded the highest yield with the zero N application control producing the least. However, nitrogen AE and best ROI indicated that an application of 45 kg N/ha at planting under optimum planting dates and one month before planting for late planting dates, showed the best yield increase per kilogram N fertiliser applied – the largest return for the least money spent. ■



5

Plant growth under different N levels, with Photo 1 to Photo 3 showing 45 kg/ha treatments at planting and Photo 4 the one month prior to planting treatments. Photo 1 represents the 120 kg/ha, Photo 2 the 90 kg/ha, Photo 3 the 45 kg/ha and Photo 4 the 45 kg/ha total N treatments. Photo 5 is the control with no additional fertiliser.



DR SAFIAH MA'ALI AND WILLIAM MAKGOGA,
ARC-GRAIN CROPS FIRST PUBLISHED IN
SA GRAAN/GRAIN, NOVEMBER 2021.

BAN lifted on movement of cattle

ON 8 SEPTEMBER THE MINISTER OF AGRICULTURE, LAND REFORM AND RURAL DEVELOPMENT (DALRRD), MS THOKO DIDIZA, DECIDED TO LIFT THE COUNTRY WIDE BAN ON THE MOVEMENT OF CATTLE AFTER THE 21-DAY BAN.

The decision to lift the ban was based on the work done by the state veterinary services, private vets and animal health technicians over the 21-day period. The cooperation of traditional leaders, communities and the police assisted in limiting the spread of the disease.

PROVINCIAL UPDATES

- The Eastern, Western and Northern Cape provinces did not report a single case of foot and mouth disease before or during the 21-day ban.
- In Gauteng and North West there were suspect cases around quarantined farms.
- In Mpumalanga no new cases were reported in the first week of September.
- The disease management area in the protected zone and area surrounding it in Limpopo will be retained.
- In the Free State the disease management area will cover those areas where no improvement has been observed, such as Marquard, Viljoenskroon and Harrismith.
- The disease management area will be retained in KwaNongoma, Ulundi, KwaHlabisa, eHluhluwe and eMtubatuba in KwaZulu-Natal.

CONTROL MEASURES

In an effort to limit the negative effects of the disease as much as possible, the minister has taken the decision to repeal the control measures relating to foot and mouth disease as prescribed in the Government Notice No. 2075 of 10 May 2022 and Government Notice No. 2391 of 18 August 2022, and allow movements under certain conditions as outlined below, in the rest of the country except the new Disease Management Areas in Limpopo, KwaZulu-Natal and Free State.

ALL MOVEMENTS MUST BE ACCOMPANIED BY:

1. Owner declaration.
2. Recipient undertaking to isolate the animals for at least 28 days before introducing them into the main herd.
3. All stock theft documents (Section 6 and section 8 documents).

The department will continue with surveillance and vaccination in these areas that still have active infections and call upon farmers and communities to observe the health protocols that have been put in place and refrain from illegal movement of cattle/animals.

"Once again I call for improvement in the primary animal health care and the strengthening of biosecurity measures by all farmers, feedlots and auctioneers," said Minister Didiza. ■

Photo: Tiani Claassen



MEDIA STATEMENT ISSUED BY DALRRD,
8 SEPTEMBER 2022

WORDS OF
WISDOM



'Soil is a living ecosystem, and it is a farmer's most precious asset. A farmer's productive capacity is directly related to the health of his or her soil.'

~ WARREN BUFFET
American business magnate



MADE POSSIBLE BY
BAYER

Success is best when shared



THE GRAIN SA/PHAHAMA GRAIN PHAKAMA (PGP) FARMER DEVELOPMENT PROGRAMME RECEIVES SPONSORSHIPS FROM VARIOUS PARTNERS, SUCH AS THE KGODISO DEVELOPMENT FUND AND STANDARD BANK, TO FINANCE DEVELOPING FARMERS. THE KGODISO DEVELOPMENT FUND, WHICH WAS FOUNDED BY PEPSICO, AIMS TO SUPPORT THE BROAD SOCIO-ECONOMIC IMPERATIVES OF DEVELOPING FARMERS, ENTERPRISE DEVELOPMENT, EDUCATION AND SMALL, MEDIUM AND MICRO ENTERPRISES (SMMES) ACROSS PEPSICO'S VALUE CHAIN.

Lethiwe Mthethwa, a farmer from the Dannhauser area in KwaZulu-Natal, is a beneficiary of the programme. Tshego Selepe, agribusiness manager at the Kgodiso Development Fund, says the fund and Standard Bank have each contributed 50% of the loan given to Lethiwe, via the Grain SA Farmer Development Programme.

LETHIWE'S STORY

On a 612-hectare farm between Dundee and Newcastle, the Mthethwa family had for many years produced maize and soya beans crops on their farm, Milnerdale. Following the tragic death of the family patriarch in 2018, the 33-year-old Lethiwe Mthethwa and her brothers found themselves at the helm of the family business.

"Stepping into my father's shoes was not easy. We were faced with many challenges – a fear of failure, low self-confidence, a lack of respect from workers and the potential for all of this to negatively impact our family dynamics. Despite this, we managed to embrace our challenges for the success of the farm. We learnt to trust each other as siblings, which strengthened our bond and helped in decision making and idea generation," she says.

With limited experience and resources, Lethiwe is breaking barriers and pioneering a new generation of sustainable farmers in the country.

In a heart-warming success story, Lethiwe has successfully settled her loan after the season's good harvest. She hopes all small-scale farmers can be uplifted and supported with working capital, machinery and the efficient utilisation of funds, as well as mentoring and commercial guidance to grow and participate in mainstream farming.

MAKING A DIFFERENCE

Tshego explains that the fund, which was launched in March this year, is part of the public interest commitment made to the government during PepsiCo's acquisition of Pioneer Foods and is aimed at transforming South Africa's food systems through supporting black emerging farmers.

"PepsiCo has committed to invest a total of R600 million over a five-year period in the fund – R200 million is for education and training, R100 million will go towards small to medium-sized enterprise (SME) development and R300 million has been set aside to support black emerging farmers," he says.

"The fund has helped us a lot. The funding allows us to buy input materials and tractors. When we get a profit, we will use it to buy more inputs to grow the business and employ more people to expand the farm," says Lethiwe.

With a mission of developing capacitated sustainable grain farmers, the Grain SA/PGP Farmer Development Programme contributes to household and national food security through the optimal use of the land available to each farmer. "Our goal is to ensure that each one of the farming enterprises supported through our programme is profitable, grows and is sustainable," says Dr Sandile Ngcamphalala, Grain SA/PGP Farmer Development Programme lead.

Sandile acknowledged the growing partnership with the Kgodiso Development Fund, saying: "We need more strategic collaboration with like-minded partners to help achieve these goals. On behalf of many of the farmers participating in our programme, we remain extremely grateful for the vital role that Standard Bank and the Kgodiso Development Fund are playing in supporting the development of grain farmers in South Africa through direct financial and technical contributions."

WOMEN CAN FARM

The farming sector is arguably one of the most important economic sectors for South Africa's development, as it is directly linked to food security and poverty reduction. The majority of South Africa's small-holder female farmers, in particular those in rural areas, are under-represented in this sector and they rely predominately on the land to feed their families, with the hope of a small surplus to sell for some additional income.

As someone who has been described as incredibly hardworking, Lethiwe says it's important for women to get involved in farming. "I'm so happy to be in this field of farming, which seems like it's male dominated, but I can drive a tractor and do what males do in this industry. So, I want to encourage all women out there: You can do whatever you want to do if you put your mind to it.

"Making women active participants of the agricultural economy has benefits that extend way beyond their own livelihoods – helping to improve the lives of their families and communities too," she concluded. ■



The hard work of farmers across South Africa was recently celebrated at Grain SA's Day of Celebration. Lethiwe and her brothers received an inspiration award at the event. Read more about this celebration of farmers in the December issue of Pula Imvula.

KGODISO DEVELOPMENT FUND MEDIA STATEMENT,
8 SEPTEMBER 2022

Corner Post

BY LOUISE KUNZ, ASSISTANT EDITOR

ON 21 SEPTEMBER AT GRAIN SA'S DAY OF CELEBRATION WHERE FARMERS ARE CELEBRATED FOR THEIR CONTRIBUTION TO FOOD SECURITY, PHILLIP (FLIP) MANOTO (46) WAS ANNOUNCED AS THE GRAIN SA/ABSA/JOHN DEERE FINANCIAL NEW ERA COMMERCIAL FARMER OF THE YEAR.

Flip joined his father Labius on the farm in 2001. Their successful partnership on communal land prompted them to buy a farm together in 2005 with a loan from the Land Bank. They have already paid off the farm and are proud owners of the title deed. As Labius is getting older, Flip is taking over the duties on the farm, but his father remains a mentor and role model to him.

After completing his school education, Flip enrolled at a Klerksdorp technical college to obtain his N1 to N4 in electrical engineering. He was however never employed as an electrician as his desire to farm was just too big. 'Farming has been part of my life since I was a small boy. There is nothing else in my blood but agriculture.' He hopes to inspire the youth to develop an interest in agriculture as well. As a member of the community of Lombaardslaagte he serves on the board at the local school where his responsibility is to help the personnel and learners expand their agricultural knowledge.

Flip is also part of the Schoeman Group's Zamukele dry bean project – a project aimed at establishing developing dry bean farmers as commercial farmers.

FLIP'S STORY

WHERE DID YOUR PASSION FOR AGRICULTURE ORIGINATE?

As a young boy I had to attend to my father's cattle after school and during vacations. When I was a bit older my father taught me to drive a tractor so that I could help him in the lands when it was time to plough and plant.

3 TIPS FROM A WINNER

1. Work hard because hard work is rewarded.
2. Learn from those who know more than you and don't be afraid to ask when you need advice.
3. Be honest and pay your debt. If you pay, your financiers will help you again.



WHAT IS YOUR DREAM FOR THE FUTURE?

To grow my farming operation especially the livestock component. I want to convert some lands to plant pastures for the cattle. One day, I would also like to own a feedlot.

HAVE YOUR FARMING PRACTICES DEVELOPED OVER THE YEARS?

When I started farming I was in survival mode just making enough to survive until the next season. By looking at what commercial farmers are doing and following their example when I started farming on my own land, I have become a successful farmer in my own right.

WHAT IS A BIG CHALLENGE YOU HAVE HAD TO FACE?

The drought in North West had a huge impact on our production and the farm's profitability, but since the 2019/2020 season things started going better. ■



Flip Manoto

FARM FACTS

Farm: Lusthof

Nearest town: Lichtenburg

Region: North West

Size: 550 ha. He is also leasing 36 ha of communal land from people in the Lombaardslaagte village where crops are planted.

Type: Mixed – crops (maize, sunflower and drybeans) and livestock (150 cattle) project – a project aimed at establishing developing dry bean farmers as commercial farmers.

GRAIN SA'S CONTRIBUTION

- He is a member of the Brooks study group at Mooifontein.
- In 2017, the father and son team became members of the 1 500 Ton Club.
- He became member of Grain SA in 2016.

Training courses completed:

- Basic engine repair.
- Farming for profit.
- High application tractor maintenance.
- Tractor and farm implement maintenance.

A mentor's view:

Du Toit van der Westhuizen, regional development coordinator at the Lichtenburg office, has seen Flip develop from a struggling farmer to a successful commercial producer. 'What has made Flip so successful is that he can function independently without someone peeping over his shoulder. He is also a very good decision-maker and one of the best managers on a farm that I have ever seen and his crops are on a par to his commercial neighbours' crops,' says Du Toit.

A programme that is changing lives



GREAT MENTORSHIP means everything

SINCE THE START OF THE 2021/2022 SEASON ON 1 OCTOBER 2021, THE FARMER DEVELOPMENT TEAM HAS HAD OVER 1 500 CONTACT MEETINGS WITH THE ADVANCED FARMERS IN THE PROGRAMME. THOSE ARE ALL INDIVIDUALS ALREADY WELL ON THE WAY TO FULL COMMERCIAL PRODUCTION.

Farmers are visited by their dedicated mentors, who spend time coaching them about business skills, crop production and mechanisation planning and management. They regularly tour the farmers' fields to monitor soil health, crop progress and conduct inspections for pests and diseases in the plants. A timeous reaction to problems saves the yield returned from these fields.

WHEN THE MENTEE BECOMES THE MENTOR

There is nothing quite as rewarding as when the farmer, who was once in the developing programme, becomes a mentor to other farmers. One such farmer is Solomon Masango, a successful maize, soybean and livestock farmer in the Carolina district.

He says the Farmer Development Programme has played an important role in his growth as a farmer, because by being willing to learn from others he has fast-tracked his depth of agricultural knowledge.

Solomon's hard work and dedication saw him win the Grain SA/ Absa/John Deere Financial New Era Farmer of the Year award in 2015. After winning this prestigious competition, he received many phone calls from other emerging farmers who desperately wanted his advice about advancing their own farming businesses through better practices.

He was happy to share what he has learned and has subsequently become a valued mentor and advisor to other developing farmers. Together with Jurie Mentz, regional development manager, Solomon has walked the road with a number of other farmers in his region.

His top tips are:

- Know what to do and if you don't know, be willing to ask someone who does.

- Plan ahead and set goals for each season and each division of the farming enterprise.
- Timing is crucial – do the right thing at the right time to get a good crop.
- Practise excellent weed control.
- Be diligent about your administration and office work.

PASSING ON THE BATON

Solomon's young daughter, Happiness, has followed in her father's footsteps and thrown herself into her own farming business. Not only has she become a great support in overseeing farming operations with her dad, but she is also well on the way to become a fully-fledged grain farmer herself.

During the 2021/2022 summer grain season, Happiness planted her own fields and participated in the Grain SA AB InBev project. The heavy rains had a negative impact on her crops this season and she also had the misfortune of a runaway fire through some of her maize fields.

Nonetheless, Happiness successfully harvested her fields with a 3,9 t/ha average and a R4 400/t return on her crop. She proudly told *Pula* that she has fully repaid her loans to AB InBev and in spite of the minor setbacks, she will definitely be going full-steam ahead in the next season. Happiness says she absolutely loves working with her dad, as he is generous with his knowledge and support.



Happiness Masango fully envisions her future in farming and dreams of buying her own land one day. She plans to plant a hectare especially for her baby daughter this season, so she too can benefit from a bright future.

AT GRASS ROOTS



Mentor Martin Botha with two of his mentees, New Era Commercial farmer Badge Skosana and his son, Andile, who farm on Kleinwater in Mpumalanga.



Jacques Roux visits his mentee Samuel Molo's farm near Fouriesburg in the Free State regularly. Samuel is a New Era Commercial farmer and a member of the 1000 Ton Club.



Farmer Tshabalala Paulos meets with his mentor Johan Roux on his farm Vaalkop to discuss the new season.



Mentoring changes lives

THE Grain SA Farmer Development team considers mentorship a vital form of knowledge transfer and a significant disaster management strategy for successful farmer development.

The organisation has been in the business of training new farmers for over 22 years giving individual attention with specialised mentoring and support in the different grain growing regions. Grain SA believes that with intensive one-on-one support these farmers have the potential to develop their farming enterprises further along the road to full commercial production.

Where new landowners and young farmers have listened and learned from those in the know about best practise farming methods, wonderful results have been seen.

Newcomers to the business of agriculture should be prepared to learn from a more experienced farmer. Once the new farmer learns the 'secrets', he becomes better equipped to be a better farmer.



Mentor Chris de Jager and farmer Harry Khumalo discuss the soil quality of newly acquired lands.

Regional development managers are also mentors – Graeme Engelbrecht looking at the Mngadi brothers' planning.



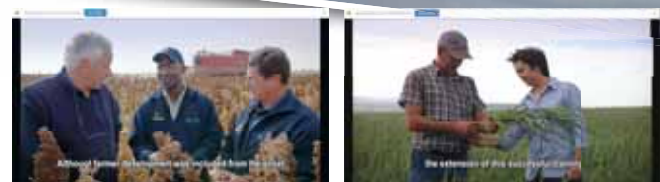
Farmer Joseph Mohlomi discusses land preparation with his mentor, Jacques Roux.



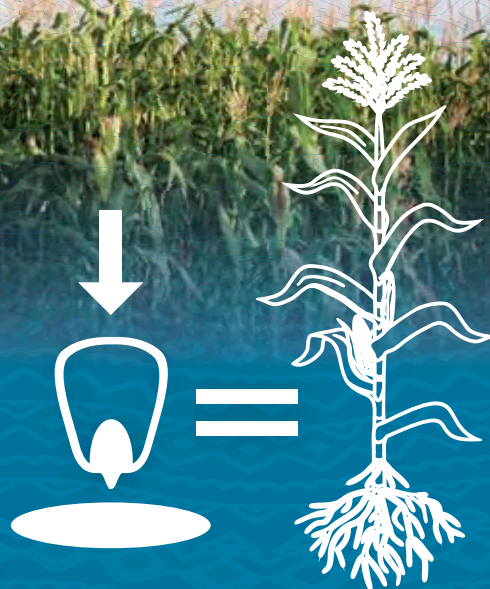
Solomon Masango, who mentors farmer Dorcas Ntombizethu, helps his mentee with her records.

More than 20 years of BLESSINGS

IN coordination with Grain SA, Bayer South Africa, one of the partners and sponsors of the Farmer Development Programme, recently premiered a new documentary called *Blessings*. It illustrates the real impact that smallholder farmer development has across the country and shows the power of partnerships and the resilience of smallholder grain farmers in South Africa. To watch the full documentary, scan the QR code:



Screenshots taken from the video.



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