PULA IMVULA

>> GROWING FOOD >> GROWING PEOPLE >> GROWING PROSPERITY >>

GRAIN SA
GRAAN SA

JANUARY
2019

PANNAR®

PULA
IMVULA

Editorial team

GRAIN SA: BLOEMFONTEIN
46 Louw Wepener Street
1st Floor
Dan Pienaar
Bloemfontein
9301
▸ 08600 47246 ◂
▸ Fax: 051 430 7574 ◂ www.grainsa.co.za

EDITOR IN CHIEF
Jane McPherson
▸ 082 854 7171 ◂ jane@grainsa.co.za

EDITOR AND DISTRIBUTION
Liana Stroebel
▸ 084 264 1422 ◂ liana@grainsa.co.za

DESIGN, LAYOUT AND PRINTING
Infoworks
▸ 018 468 2716 ◂ www.infoworks.biz

infoworks
your ideas can fly

PULA IMVULA IS AVAILABLE IN THE FOLLOWING LANGUAGES:
English,
Afrikaans, Tswana, Sesotho,
Sesotho sa Leboa, Zulu and Xhosa.

Grain SA Farmer Development Programme

DEVELOPMENT CO-ORDINATORS
Johan Kriel
Free State (Ladybrand)
▸ 079 497 4294 ◂ johank@grainsa.co.za
▸ Office: 051 924 1099 ◂ Dimakatso Nyambose

Jerry Mthombothi
Mpumalanga (Nelspruit)
▸ 084 604 0549 ◂ jerry@grainsa.co.za
▸ Office: 013 755 4575 ◂ Smangaliso Zimbili

Jurie Mentz
Mpumalanga/KwaZulu-Natal (Louwsburg)
▸ 082 354 5749 ◂ jurie@grainsa.co.za
▸ Office: 034 907 5040 ◂ Sydwell Nkosi

Graeme Engelbrecht
KwaZulu-Natal (Dundee)
▸ 082 650 9315 ◂ dundee@grainsa.co.za
▸ Office: 012 816 8069 ◂ Nkosinathi Mazibuko

Luke Collier
Eastern Cape (Kokstad)
▸ 083 730 9408 ◂ goshenfarming@gmail.com
▸ Office: 039 727 5749 ◂ Luthando Diko

Liana Stroebel
Western Cape (Paarl)
▸ 084 264 1422 ◂ liana@grainsa.co.za
▸ Office: 012 816 8057 ◂ Hailey Ehrenreich

Du Toit van der Westhuizen
North West (Lichtenburg)
▸ 082 877 6749 ◂ dutoit@grainsa.co.za
▸ Office: 012 816 8038 ◂ Lebo Mogatlanyane

Sinelizwi Fakade
Mthatha
▸ 071 519 4192 ◂ sinelizwifakade@grainsa.co.za
▸ Office: 012 816 8077 ◂ Cwayita Mpotyi

THIS PUBLICATION IS MADE POSSIBLE BY THE CONTRIBUTION OF THE MAIZE TRUST

IN THIS ISSUE...

I was about to start writing you a message for January when I thought about all the clever people who have gone before us. Please will you read the quotations below – they are so pertinent to our endeavours…May you be Blessed in this New Year.

Infuse your life with action. Don't wait for it to happen. Make it happen. Make your own future. Make your own hope. Make your own love. And whatever your beliefs, honour your creator, not by passively waiting for grace to come down from upon high, but by doing what you can to make grace happen...yourself, right now, right down here on Earth.
– Bradley Whitford

Our greatest weakness lies in giving up. The most certain way to succeed is always to try just one more time.
– Thomas A. Edison

Do not wait; the time will never be "just right. Start where you stand, and work with whatever tools you may have at your command, and better tools will be found as you go along.
– George Herbert

Start where you are. Use what you have. Do what you can.
– Arthur Ashe

Knowing is not enough; we must apply. Willing is not enough; we must do.
– Johann Wolfgang von Goethe

Is weather-watching worthwhile?

Ask any farmer in the game for a long time and he will tell you that weather predictions are often unreliable! So, what then is the point of learning more about weather?

Surely everyone knows that farmers gamble annually? All they can do is their best – and then pray the season is a good one! And yet:

- Climatologists are watching the weather more closely than ever before with more tools than previously available; and
- Producers are increasingly collecting many different kinds of weather data to inform their production and marketing decisions.

Climate is what you expect, and weather is what you get! (NASA)

There is a significant difference between the terms 'climate' and 'weather'. The difference is in the measure of time.

Climate – describes how the atmosphere behaves in a region over a relatively long period of time. **Weather** – describes local conditions over a short period of time.

Weather can change from hour-to-hour and day-to-day, but climate is the average of the weather as measured over a longer period of time. Climate is therefore what can reasonably be expected, whilst weather is more dynamic and changeable. Annette Venter, eNCA weather announcer, recently said it is important to remember that weather is a chaotic system easily influenced by small daily changes which is why it is notoriously difficult to predict!

> *"Farmers can't go on doing the same things in the same way and expect to achieve the same results in the same game.*

Climate change

Understanding weather patterns and long-term climate trends is especially relevant since the phenomenon of climate change has reared its ugly head and scientists are trying to identify changes to normal patterns.

Only by looking at a forecast you will know if these clouds mean rain, or if it will pass.

So, what is 'climate change'? It is a high-profile environmental concern that is likely to have a profound impact on natural and human systems. Agri SA's Kosie van Zyl, conducted a disaster risk management review of the South African agricultural sector in 2006 and concluded that significant changes are predicted for South Africa over the next 50 years.

A warming of the African continent of between 1°C and 3°C, with maximum increases in arid regions and the minimum increased at the coast, is anticipated. Rainfall levels, anticipated to be between 5% and 10% less than current rainfall levels, will significantly reduce. Daily maximum temperatures in summer and autumn in the western half of the country will rise and there will be extended summer seasons, with some areas prone to increases in the occurrence of droughts and floods.

The adverse effects of climate change were also addressed at the 2008 AgriSA Congress by Professor Colleen Vogel: The risk to Africa's small-scale farmers, usually the most vulnerable stakeholders in the sector, with low adaptive capacity and coping with multiple other stresses, was also emphasised. Vogel called for focus on identifying best practice agriculture for climate risk reduction which should be taught to farmers to ensure sustainable livelihoods.

What does it all mean? The variability in climate necessitates a change in the way we do things. Farmers can't go on doing the same things in the same way and expect to achieve the same results in the same game.

A good farmer is informed about the weather

Instead of freaking out about these constraints, embrace them, let them guide you.

Being better informed equals a better chance of success and survival. This is important in a challenging environment where farmers face pressures from uncertain politics, elusive economic success and the changing environment.

South African farmers are well known for their proactive approach to new technologies. For example, some farmers in the Western Cape have converted apple orchards into vineyards because grapes require less water and are more tolerant of high temperatures.

In the Southern Cape other farmers have abandoned cropping and are planting pastures

> *Being better informed equals a better chance of success and survival.*

to enhance water storage capacity. Many farmers have already adapted and are using new cultivars which they select according to the weather information they have received. For example, if a growing season is shorter due to late rains, a specific quick-growing cultivar is selected; or they might make the decision to plant an alternative, quick-growing crop like sunflowers.

New technologies and new cultivars can make the difference between food security and famine. New drought-tolerant maize has been bred to give significant yield increases under drought stress and 'more crop per drop'. Minimum till and no-till soil preparation are increasingly important – as is the focus on soil rehabilitation. Farmers in Lesotho have increased yields by adopting CSA, known locally as '*likoti*', by maintaining good mulch covering on the soil. This has increased soil fertility and reduced soil erosion.

An example of the AccuWeather portal.

An example of the YR website.

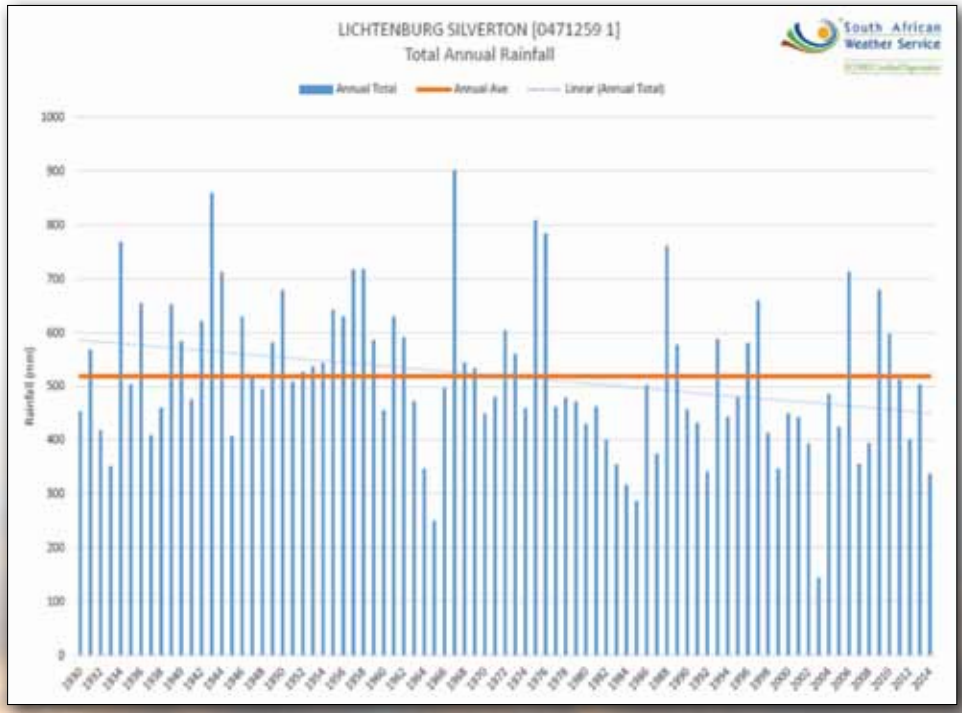
Be an informed farmer

For people who live off the land it is quite normal to keep detailed records or notes from month to month and year to year. Rainfall records have been kept on our farm since 1929. This has been converted into an interesting graph (**Graph 1**). There are many interesting comments in the family record book which note the weather, the season or the yields in a particular year.

Discuss seasonal weather predictions with experts. You can listen to regular broadcast reports on radio or television. You can also contact your local agribusiness to find where to get region-appropriate information. There are many useful apps which can be downloaded to give you minute-by-minute reports collected from satellite images like: YR, Weather & Radar SA and AccuWeather.

Good risk management decision-making requires accurate information and reliable data. While never fully neutralising the element of farming risk, good information will always help one to anticipate potential problems and then make rational management decisions. Simply reacting to unfavourable conditions as they develop is not good management.

Graph 1: Analysis of official SAWS rainfall records for rainfall recording station: Lichtenburg Silverton [0471259 1], 1930 - 2014.



(Source: SA Weather Services, 2016)

Article submitted by Jenny Mathews, Pula Imvula contributor. For more information, send an email to jenjonmat@gmail.com.

THUMA MINA in 2019

Jannie de Villiers

The advantage of the big land debate in 2018, highlighted the numerous problems that our new grain farmers are facing in this country. It came up in all presentations whether it was in public hearings or Parliament. The non-agricultural media also came about to know what exactly the problems are.

The Conference at Bela-Bela made a substantial contribution to indicate how agriculture can resolve our own problems, but the whole issue of finance was singled out as the biggest hurdle to overcome. Private property rights are needed to unlock finance and where farmers do not have the necessary funding to commence with a farming operation, the Government needs to step in and assist. But, this was the old paradigm. One of the other benefits of this intense land debate was the notion that partnerships between Government and the private sector is needed to resolve the financing issue.

Many groupings have met towards the end of 2018 to plan how to address the needs of new farmers when it comes to finance. My hope is that 2019 will be the year that we dreamt of for many years: A new practical solution to crop finance. The 'Thuma mina' call from our President is applicable to all. We can no longer just keep on blaming the Government or the banks or whoever, that there is no finance.

'Thuma mina' means exactly that: We all need to jump in and start solving this problem. As a commodity organisation, we can no longer hide behind our non-profit status or the fact that we are not a bank. Grain SA has an obligation to find a solution to the issue of finance. Our leaders have to scratch their heads and as a typical grain farmer make a plan. You will hear more about it in 2019.

I am thus looking forward to what this new energy will deliver in 2019 to make this new year one to remember. Not just because of the weather or good yields, but one where we overcome a huge hurdle to finance our future crops. My call for you as farmers is to please keep on talking to us about your problems. Help us to find solutions and we will direct the goodwill between all concerned to bring about the dream that we all hope and prayed for. The clean-up process to expose and resolve the corruption evil in this country, is giving us hope for a better future for all. Corruption is benefitting just a few and is detrimental to the majority of our people. Be sure that you remain on the right side of the law. God cannot bless those that hide in the darkness and live in the shadows.

My prayer for you is that your endurance and resourcefulness will take your farming operation to the next level. Keep your eyes focused on the One who can really help and do not rely on princes so much. Happy New Year!

Article submitted by Jannie de Villiers, CEO of Grain SA. For more information, send an email to jannie@grainsa.co.za.

DON'T QUIT!

When things go wrong, as they sometimes will, when the road you're trudging seems all uphill,
When the funds are low and the debts are high, and you want to smile, but you have to sigh,
When care is pressing you down a bit, rest, if you must, but don't you quit.

Life is queer with its twists and turns, as every one of us sometimes learns,
And many a failure turns about, when he might have won had he stuck it out;
Don't give up though the pace seems slow – you may succeed with another blow.

Often the goal is nearer than, it seems to a faint and faltering man,
Often the struggler has given up, when he might have captured the victor's cup,
And he learned too late when the night slipped down, how close he was to the golden crown.

Success is failure turned inside out – the silver tint of the clouds of doubt,
And you never can tell how close you are, it may be near when it seems so far,
So stick to the fight when you're hardest hit – it's when things seem worst that you must not quit.

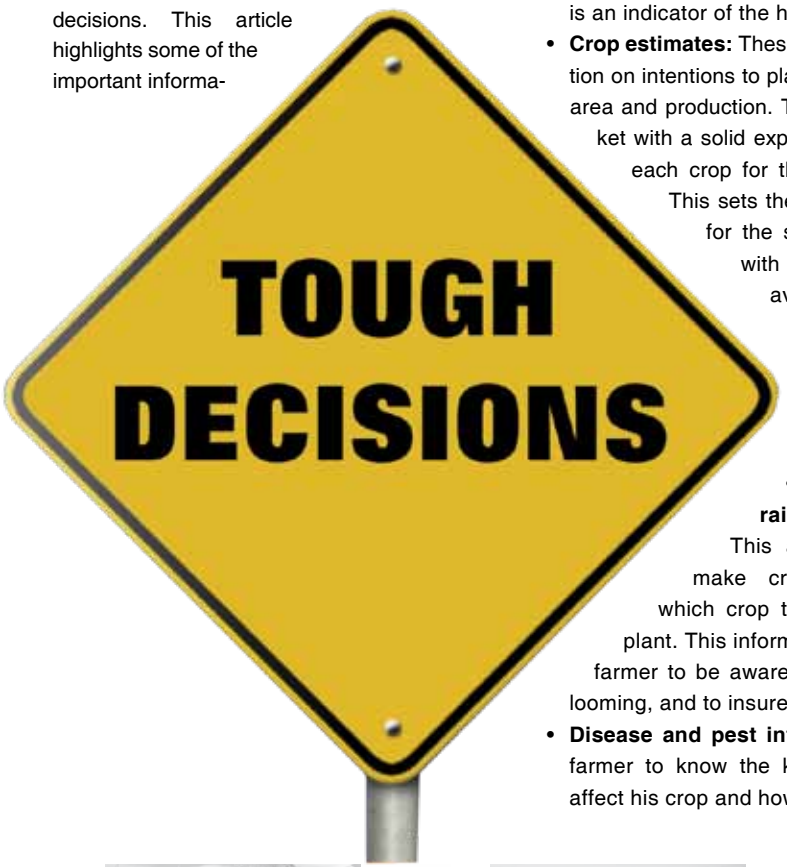
by Anonymous

Make GOOD, INFORMED decisions

Farming comes with many uncertainties and therefore the availability of information at the farmer's disposal reduces some of that uncertainty. The agricultural sector in developing countries is increasingly becoming knowledge intensive.

> *"Farmers need access to reliable, timely and relevant information in order to remain competitive.*

Farmers need access to reliable, timely and relevant information in order to remain competitive. A grain farmer requires different kinds of information according to different stages of the season in order to make informed decisions. This article highlights some of the important information farmers need to keep up with, in order to make good informed decisions.



- **Budgeting:** Usually guided by available farm data; aids the farmer in making financial decisions based on a set plan and this is an indicator of the health of the business.
- **Crop estimates:** These reports give information on intentions to plant, then later, planted area and production. This provides the market with a solid expectation of the size of each crop for the coming crop year. This sets the tone for grain prices for the season. This together with the actual SAGIS available stocks report will give a very good indication of the price expectations based on fundamental information.
- **Weather and rainfall information:** This allows the farmer to make critical decisions like which crop to plant and when to plant. This information also assists the farmer to be aware if there is a drought looming, and to insure their crop.
- **Disease and pest information:** Helps the farmer to know the kind of diseases that affect his crop and how to deal with them.
- **Inputs:** Monitored input prices assists to keep the playing field level for everyone.
- **Daily Safex price information and parity calculations:** This will assist the farmer to make marketing decisions and ensure more market transparency.
- **Supply and demand information:** This report gives an overview of the expected ending stocks at the end of the marketing season, which contributes to the fundamental factors in the price forming of the local market.

In order to remain relevant and up to date, farmers need to embrace new technology, through production techniques and accessing information. All this information is available on different platforms like:

- **Study groups and mentors:** First hand sharing of knowledge and experiences.
- **Grain SA website:** Parity price calculations, daily Safex prices, input prices etc.
- **SAGIS website:** Crop estimates, producer deliveries, imports and export data etc.
- **ARC website:** Pests, diseases, new cultivars, training etc.

This information is needed at different stages of production and therefore aids the farmer to make decisions that are more informed.

Article submitted by Ikageng Maluleke, Junior Economist, Grain SA. For more information, send an email to Ikageng@grainsa.co.za.

Pula Imvula's Quote of the Month

With patience, persistence, and partnership, we can create economic opportunity for every person willing to work hard for it.

~ Thomas E. Perez

Grow your FARMING BUSINESS

It is possibly true to state that all our farmers, whether large or small or have just commenced farming or have been at it for several years, are dreaming and aiming to be successful and to grow their farming businesses.

For this to be achieved your business must be sustainable, in other words, make a profit every year over a long period of time. However, to be sustainable you can never stop changing, adapting, improving and growing. Growing not only in the sense of physical size but it can also be growing in productivity to produce more from the same size. Easy to say, but the difficult part is make it a reality.

Bear in mind that this article is presented from the point of view that you must help yourself. Do not depend on for instance, the government to assist you in growing your business. Should our farmers eventually receive more assistance from government that will only be a bonus. In the meantime, help yourself, implicating you yourself must put in an effort to gather information.

To grow your business, you basically have two choices – expand or diversify.

Expanding is seen as acquiring more land, whether by buying or leasing. However, you can also consider to perhaps open up more land on your existing farm to increase the area under production. Perhaps you could add more infrastructure or equipment.

Diversify is to add more enterprises to your farming operations. Such as perhaps including a livestock enterprise, or add a fruit enterprise, which is a long-term investment. To diversify is of course also a tool to manage the risks of your business.

Should you expand or diversify or combine the two strategies? Each farmer must consider his/her situation and decide what is best for his/her circumstances. When considering the two strategies or a combination keep the following in mind.

Be patient. Remember the expression 'Rome was not built in a day.' Success takes time. Plan to take your time but be persistent – keep on doing it.

Make your choice. Farm with what you are fond of. Some farmers like to farm with livestock, whilst others may prefer crops. If you are fond of what you are doing you will be prepared to put in extra effort to produce the best products possible.

Start small. All our mega farmers or their fathers or even granddads have started small and grew their businesses over time. Make sure you have enough funds, equipment, people, seedlings, fertiliser, feed, or whatever input is needed to produce and market your product/products. Match your expansion plans with available income and resources.

It takes long hours and hard work to succeed. *Photo: Johan Kriel*

Learn as much as you can. Apply yourself to learn as much as possible about your enterprises. Become a professional producer even if you only plant 1 hectare of maize or farm with ten dairy cows.

Stay focussed. Focus on your crops or the breed of cattle you are farming with and grow them to the best of your ability. Do not allow yourself to be distracted by stories of high prices for other crops or other breeds. When you stay focussed you will be able to manage the production of your products better and attend to potential problems before they get out of hand.

Quality. If you want to make money, you must produce and market the best. Quality always sells, even in times of surpluses. Quality should always be supported by continuous delivery. Buyers will become to trust you because you deliver.

Funding. To expand or diversify your business you will need money. Set about this by generating your own funds from the profits you make. If possible stay away from borrowing money, this is another reason to be patient.

Focus on your marketing. First, remember before you start producing a particular product, be sure of your marketing arrangements. Other than a few exceptions, all our agricultural products are fresh produce and have a short window for marketing. Once your product is ready to be marketed, you will not have the time to run around to find a market. Be very careful to chop and change your marketing strategy. Be the dependable supplier, supply on time as arranged and supply quality products, properly packed and presented should that be the case.

Branding. Decide on a brand name and build your brand among buyers by consistently supplying excellent quality products. You all should know ZZ2 tomatoes as an example.

Expanding and/or diversifying is but two strategies that you will have to apply to keep your farming sustainable in the long term. The so-called cost-prize squeeze will force you to apply these two strategies to maintain a sustainable profit. But remember, to apply these two strategies you need information and get as much information as you can. Information is available from many sources, but you must put in an effort to obtain the information. You must help yourself.

Article submitted by Marius Greyling, Pula Imvula contributor. For more information, send an email to mariusg@mcgacc.co.za.

STEPS TO CLEAN AND MAINTAIN YOUR BOOMSPRAYER

1 READ

Before you begin cleaning your sprayer, be sure to review the label of the pesticides you've applied. The label will:

- Tell you how to properly dispose of residual products.
- Provide any special cleaning instructions that might be necessary.
- Recommend decontaminating products.
- Outline the Personal Protective Equipment (PPE) you need to safely clean your sprayer.

2 RINSE

The goal of rinsing is to remove any concentrated or large areas of the product that might still be in or on the sprayer. Cleaning spray equipment involves circulating water through the whole system and then applying it to a site that is listed on the label of the pesticides you have used (in other words, spraying the water/diluted chemical mix, now called the rinsate, onto a safe area).

In order to ensure that you are cleaning the tank as well as the pipes and nozzles, half fill the tank with clean water and then take the tractor for a short drive on one of the farm roads – the bumping on the road will agitate the water and ensure that it splashes the entire inside of the tank. Several rinses using a small volume (up to 10% of the spray tank capacity) is better than merely filling the spray tank once with clean water. It is advisable to repeat the rinsing process at least three times.

Select a location where the rinsate will not contaminate water supplies, streams, crops or other plants and where large puddles won't accumulate, creating a hazard to humans, animals and the environment. You could spray it out along the edge of the land, or along a farm road.

Make sure that you drain the spray tank in a manner consistent with the pesticide label. Don't just open the valves and let it pour on the ground. Add larger volume nozzle tips for a faster and legal method to dispose of sprayer rinsate. The outside of the sprayer should also be washed. Again, when rinsing the sprayer, do not create standing puddles that might be accessible to children, pets, livestock or wildlife.

3 DRAIN

To dispose of pesticide rinsate in accordance with label directions, apply the rinsate to a site where the products are to be used originally (again, along the edge of the land where the chemical has been sprayed is often a suitable place). Repeat the draining process after decontaminating and re-rinsing the sprayer. Make sure that you also drain any clean water rinse tanks prior to storage to avoid damage caused by water freezing inside.

4 INSPECT

After the final rinse you can inspect your sprayer and make the necessary repairs and modifications. Even though the sprayer has been cleaned, always wear personal protective equipment. Some residue may remain on and in the sprayer.

DURING AND AFTER CLEANING

Lookout for the following both during and after cleaning:

- Mismatched and worn nozzles.
- Damaged nozzle screens.
- Damaged strainer screens.
- Cracks, leaks and overall performance in the pump.
- Hose condition, especially brittleness or cracks.
- Valve condition, identifying any possible leaks or areas where seals may have loosened.
- Boom structure, identifying any cracks that must be fixed.

Article compiled from the Grain SA Calibration Course.

Know the value of DRY BEANS

The dry seeds of the eleven types of edible bean types grown worldwide, from within the whole legume family of plants, produced commercially or for own and family use are known as pulses.

The word 'pulse' specifically refers to the dry seeds produced which can be harvested by hand or machine and packaged and cooked in various ways or stored for long periods as dry seeds and the plants which produce such seeds. Storage can be in bulk facilities, bags, and small packets as well as processed into canned beans in brine or tomato sauces and many other ways. We are all familiar with these products on supermarket shelves or found at Spaza's and street corner traders.

Fresh beans, peas, soybeans and peanuts are not considered to be pulses. Soybeans and peanuts will thus not be considered in this article. Soybeans and peanut seeds are much higher in fat content whereas pulses contain virtually no fat.

Types of pulses

The more well-known pulses include the following bean types: Red speckled, brown haricot, large and small whites. Other major pulse crops include dry peas, lentils, chickpeas, carioca beans, alubia beans, pigeon peas, faba beans, dried split peas, mung beans, black eyed peas, lupines, bambara beans and cowpeas.

Nutritional information

Dry beans are a very healthy food source containing no cholesterol, are rich in amino acids such as niacin and thiamine, iron and other nutrients for normal growth and body tissue growth. Pulses have a very high protein and fibre content and are low in fat and are a very good addition to infant and younger people's diets.

The fibre slows down the absorption of carbohydrates and so provides slow burning energy over a longer period which helps people with diabetes suffering from insulin resistance to reduce the high fluctuations in blood sugar levels which are a problem.

Red speckled sugar beans contain about 74% of carbohydrates, 3% fat and 23% protein

Nice and clean dry beans. *Photo: Johan Kriel*

on analysis. One cup of cooked beans or two-thirds of a can provides nearly half the recommended intake of fibre of 21 g to 25 g per day for adult woman. Adult men need 30 g to 38 g of fibre to function effectively. Meat contains no fibre.

> *Dry beans are a very healthy food source containing no cholesterol, are rich in amino acids such as niacin and thiamine, iron and other nutrients for normal growth and body tissue growth.*

The value chain from production to harvesting

As a small producer, you could start with growing from a 0,5 ha of red speckled dry beans through 1, 2 ha or 5 ha, up to 10 ha's. From the discussion one can see that there are many advantages in producing dry beans from a basic level to ensure food security to building production over time to exceed self sufficiency needs.

With experience and enough financial inputs one can become a fully-fledged commercial producer supplying wholesalers in the market or ultimately packaging beans and selling them directly to consumers. South Africa imports about 85,000 tons of beans per year in addition to the national crop ranging from 44,100 to 82,000 tons a year. There is still a huge local market to be supplied.

The farm gate value for good grades of beans is between R12 000 and R14 000 per ton if sold to merchants that clean, pack and remarket the seed. Farmers can usually average between 1,8 tons/ha and 2,2 tons/ha of saleable seed with good dryland production practices. This implies a gross income of about R26 000 per hectare which compares very well with the income from other dryland crop production options.

Most recommendations for a desired viable plant population require about 75 kilograms of seed per hectare. The cost per 25 kg of quality bean seed for planting is in the range R1 200 to R1 450 per bag from recognised seed supply companies. Your seed cost/ha could be from R3 600/ha to R4 350/ha. All the other direct input costs should be added to this. The finances and other production resources available will determine which sized area from 0,5 ha to 10 ha would be most suitable to plant.

Various types of beans.

At the consumer end of the chain 1 kg of packaged beans retails for about R22,00 per kg for 500 g packets to various sized packets making up 5 kg packs. This gives an implied value of R22 000/ton at his point. There is therefore quite a leeway for adding value at various stages of trade in the chain from farm to consumer.

Production parameters and crop rotations

Experience from growers and seed suppliers indicates that beans should be planted on a well-prepared clean seed bed when soil temperatures are over 13° and with a prevailing seasonal temperature of between 18° and 20°. A sandy loam, sandy clay loam or clay loam soil with a clay content of between 15% and 35% are all suitable.

Farmers using conservation tilage methods should be careful that there is not too much plant residue present on the soil from the previous crop. The seed needs to be planted in moist conditions for maximum emergence and a good final plant population. This factor is critical as the seed costs to plant are a high proportion of the total direct costs.

Although beans are a legume and fix nitrogen farmers should fertilise the crop with nitrogen, assuming that the crop will not provide any nitrogen itself. Use a soil analysis to optimise the nutrients required.

Beans can play an important role and is a high value option to be brought into a crop rotation plan. Experience shows that it seems best to follow maize in a rotation and should only be planted on the same land every three years. Sorghum could also be used with maize within the rotation but due to the possible build-up of Sclerotinia it is recommended that sunflowers not be included in the rotation with dry beans. Where the production of wheat is viable, or the planting of green feed is required for your livestock these can also be used to an advantage in the crop rotation plan.

Conclusion

The growing of dry beans should be strongly considered as an option for both small and large growers, given the high value of the crop compared with other dryland and irrigated crop options at the current prevailing Safex futures prices. It can be used as a useful crop within a planned rotation system.

Article submitted by a retired farmer.

CANOLA – planning for the new season

The most successful farmers are those that do the best planning. Leave as little as possible to chance and make sure you have the best information possible to assist you in making the best decisions possible. Consider the following factors when planning canola for the new season.

What lands to plant to canola

There are many factors that must be considered when deciding what lands are to be planted to canola in the coming season. The recommendation is that canola should only be planted every third or fourth year on the same land, especially if either black leg or Sclerotinia occurred in the current season. Furthermore, canola should preferably not be planted within 500 meters of a field in which the diseases occurred in the current season.

Many farmers still use canola as a tool to manage herbicide resistance, especially of grass weeds, in lands that have been planted to cereals for a number of seasons. Canola enables farmers to use herbicides with a different mode of action (moa) to control weeds that have developed resistance to the herbicides normally used in cereals. Rotating chemicals with different moa's is a good anti-resistance strategy, making the incorporation of canola in a crop rotation system an important management tool.

The second important consideration is to determine whether the herbicide used the previous season will not have residual problems that could damage the canola seedlings. Make sure that the withholding period indicated on the product label indicates that it is safe for planting canola. Canola is particularly sensitive to the sulphonylmethyl (SU) group of herbicides and the withholding period for different SU's ranges from nine months to two years.

Problems with diflufenican residues have also been noted over the previous few seasons. After seasons of below average rainfall the threat of product residue carry-over is increased because less leaching of product from the top layer of soil will have occurred and soil microbial activity, which is responsible for breaking down many products, will be reduced in drier soils.

The third aspect to be considered is the amount of plant residue which remains on the soil surface after harvest. Good agricultural practise encourages the retention of as much mulch on the surface as possible, but too much material, especially in big clumps which often occurs when straw is not cut into shorter lengths, can cause problems for germinating canola seedlings. Heavy straw loads over the planting row results in retarded germination due to cooler soil temperature under the straw which makes the seedling more prone to disease or insect damage. A further problem is, because the seedling must grow through the straw layer before reaching sunlight, it results in long, spindly plants which have less chance of survival.

Consider baling excessive straw after harvest. Should a farmer prefer to maintain residue on the surface until just prior to planting canola, then other techniques must be employed to prevent clumps of straw remaining on the land. By cutting the straw into shorter lengths at harvest it can be more easily spread evenly over the land. Dragging tyres or other implements over the surface before planting also helps to break up clumps and spread the residue.

Finally, canola should not follow lupines in a rotation system as both are hosts to Sclerotinia and this greatly enhances the risk of infection in the canola.

Decide what canola cultivars you intend planting in the next season

Excellent information is available from the cultivar evaluation trials conducted by the Department of Agriculture Western Cape every year. Select cultivars that have performed consistently in your production area over a number of seasons. Order the seed as early as possible to avoid the disappointment of not being able to plant the cultivars of choice.

Remember to select Clearfield (CL) or triazine tolerant (TT) cultivars should you intend to use either imazamox or a triazine herbicide on the canola.

Plant a basket of cultivars which differ in their physiological development tempo. This enables the farmer to spread the optimum time to conduct different strategic activities, such as topdressing, spraying diseases or optimum time to harvest for the different cultivars, making management decisions easier. By not putting all your eggs in one basket also reduces risk.

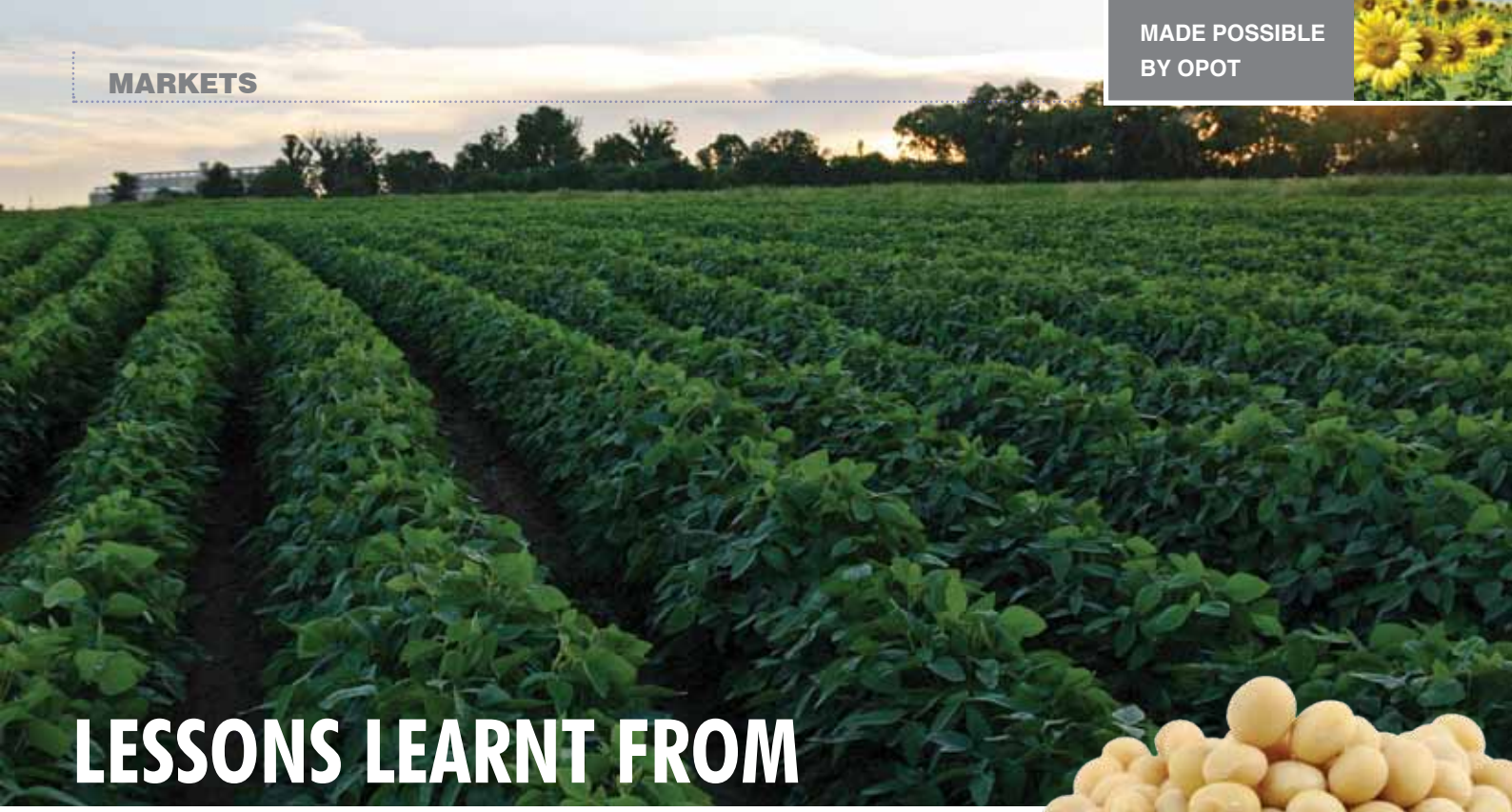
Should you determine your fertiliser programme on soil analysis, get soil samples taken timeously to ensure recommendations can be made in good time.

Keep lands intended for canola planting in the new season weed free, especially from volunteer canola plants and other weeds, like ramenas and wild mustard, that are hosts to pests and diseases that also occur in canola.

A young canola land. *Photo: Liana Stroebel*

The recommendation is that canola should only be planted every third or fourth year on the same land because it is sensitive to disease.
Photo: Chris Cumming

Article submitted by Chris Cumming, consultant for the PRF (Protein Research Foundation). For more information, send an email to cummingza1946@gmail.com.



LESSONS LEARNT FROM BRAZIL'S SOYBEAN INDUSTRY

This article reflects on lessons that South Africa can learn from Brazil's successful agricultural growth model, also looking at how far South Africa is in terms of investing in the soybean industry and growing it further.

By 2050, Africa's population will grow from 1,86 billion to 2,4 billion. With vast growth in population, food producers need to keep up by producing more efficiently, bearing other factors in mind like climate change and increasing input costs.

Brazil is the largest economy in South America and the seventh biggest economy in the world. Brazil has a high amount of tropical zones, which are a challenge to agriculture; high numbers of pests, drought, soil acidity, low nutrients etc. all of which will be intensified with global climate changes.

> *It is important to empower research institutions financially, in order for research to be aligned to the country's specific needs.*

In the 1970s, Brazil was not food secure, they had low agricultural production with low yields, constant food supply crisis and rural poverty, they lacked adequate agricultural development policies. Today Brazil owes its agricultural success to strong government investment in research and development.

In the 1970s, Brazil established a research council named the Brazilian Agricultural Research Corporation (EMPRPAPA), which is a world leader in tropical research. One of the contributions of this research institute is that they developed new varieties of soybeans that were better suited to tropical climates like Brazil, with a much shorter growing period. This revolution made Brazil a big competitor for the US and Europe regarding soybean exports, also giving rise to big soybean producers and traders.

In the past 20 years, average annual soybean yields in Brazil increased by 1,33%, Argentina by 0,64% and America by 1,46%, whereas in South Africa yields on average were 40% lower than the average achieved in the above-mentioned countries.

Reflecting on South Africa's situation, we have made great strides in growing the soybean industry, with more hectares dedicated to the crop yearly and farmers adapting production techniques to get more stable and improved yields, we even have a high crushing capacity which we do not fully utilise.

Market information shows that companies are not willing to introduce the latest technology in South Africa without a breeding and technology levy. A breeding and technology levy is a statutory levy paid by producers on each ton of soybean delivered, to invest back into the industry to fund activities such as research and development. The breeding and technology levy is approved in South Africa for the next two years and it will be implemented from March 2019 at R65/ton for the first year and R80/ton for the second year.

Brazil's story clearly highlights the importance of research and development given the economic and commercial benefits seen in Brazil. It is important to empower research institutions financially, in order for research to be aligned to the country's specific needs.

> *A breeding and technology levy is a statutory levy paid by producers on each ton of soybean delivered, to invest back into the industry to fund activities such as research and development.*

As South Africa, there is clearly a lot that we can learn from the model used by Brazil to grow their soybean industry and agriculture as a whole. However, we are moving in the right direction in terms of the breeding and technology levy, but more still needs to be done for the country to become competitive in the international soybean industry.

Article submitted by Ikageng Maluleke, Junior Economist, Grain SA. For more information, send an email to Ikageng@grainsa.co.za.

Stay on top of your game – DO TOPDRESSING

If you are going to plant maize, then it stands to reason that you intend to get the best yield possible off the plants growing in that field. This means you will have carefully considered all your seed, fertilisation and weed control requirements.

One of the most important factors to consider is plant nutrition. It is important to use the right fertiliser to ensure the plant roots can take up all the nutrients available in the soil and convert this into grain. It is therefore necessary to take regular soil samples, so you know how much fertiliser to apply. There is still more to the science of fertilisation though, because **it is equally important to apply the necessary nutrients at the right time**, so the plant can use it as efficiently as possible.

Top dressing

Top dressing refers to a process by which any material from either natural or synthetic origin is added to the soil to supply nutrients to a plant or crop. The most basic definition of top dressing says it is an application of manure or fertilizer to the surface layer of soil. Top dressing is thus a way to ensure the fertiliser that the farmer puts down is used optimally towards the benefit of the maize plant and ultimately the yield.

> *"Topdressing should preferably be done when the soil is moist.*

What does it mean when we say the amount and type of fertiliser is used optimally?

The effective use of fertiliser applied at the correct time means you are more likely to extract the maximum amount of grain possible. It is also most likely to result in improved water efficiency so that none of the water available to the plant is wasted. This means the plant will produce more grain per millimetre of water available – in other words secure 'more crop per drop'!

Some important factors to bear in mind when topdressing

- Ensure that the fertiliser does not come into direct contact with any part of the plant to avoid burning or scorching.

After topdressing the nitrogen burned the leaves. *Photo: Johan Kriel*

Ready to spread the topdressing.

> *The effective use of fertiliser applied at the correct time means you are more likely to extract the maximum amount of grain possible.*

- The best method to top-dress is band placement as it is much more economical.
- The earlier you can do your topdressing the better e.g. once before it reaches knee height and then again when the plant is waist height and still in its pre-tasselling stage.
- It may be necessary to top-dress at least twice in areas where soils are less fertile.
- It is a good idea to split the dressing so that your fertiliser concentration is decreased and less likely to cause sub-soil acidification which will scorch the roots and harm the plant's potential to uptake nutrients anyway.
- Topdressing should preferably be done when the soil is moist.
- Avoid topdressing during heavy rains as the fertiliser will be leached from the soil or washed away.
- Weed control should be done prior to top-dressing. This simply means the weeds will not get a chance to take up any of the nutrients intended for the crop.
- Weeding should always be done to avoid competition for both nutrients and sunlight.
- Do not be tempted to apply all the fertilisation prescribes in one application process. The negative effects are too serious to take this risk as not only scorching of the roots but also fertiliser will fall outside of the optimum band area and nutrients will be wasted.
- Remember the maize plant's nutrient requirements increase steadily and the final yield potential is determined in the V12 stage. This is the stage when maize is rapidly growing, and a new leaf appears every two days as well as significant root development.
- It is important to do accurate calibration of the fertiliser spreader before you start your application. It is crucial to apply the prescribed amount of fertiliser in order to achieve optimum results.

These factors are important to keep in mind when applying your topdressing fertiliser. But the most valuable factor is to be **pro-active** and to get it done! Often, we don't apply at the correct time or we don't apply the correct amounts which result in poorer yields. As mentioned before; in order to achieve the best possible yields, we need to consider all the growing factors of a plant. Don't neglect the topdressing factor.

Article submitted by Gavin Mathews, Bachelor's in environmental management. For more information, send an email to gavmat@gmail.com.

BENEFITS OF WINTER COVER CROPS in a mixed farming system

With a total of only 14% land suitable for arable cropping, South Africa is not well endowed with resources for dryland (rainfed) farming. Soil degradation often occurs due to monoculture cereal production, intensive tillage and limited crop rotation.

In conservation agriculture (CA) systems, crop rotation that includes soybean and sunflower produces limited amount of crop residues with associated problems. These crops are mostly grown on sandy soils and erosion is a common phenomenon, especially when crop residues leave insufficient soil cover during winter. Without sufficient cover these sandy soils often develop crusts after rain events.

The impermeability of these crusts leads to runoff, soil erosion and eutrophication of water resources. When these conditions prevail during and after a winter fallow period, arable soil is vulnerable to degradation, water loss and weed infestation. Winter or cool season cover crops are seen as an ideal CA practice to combat these problems.

Cool season cover crops

The most commonly used cover crops fall into one of three broad groups or families. General information on key aspects of these three groups is mentioned here.

Small grains (grasses)

This functional group includes grasses like rye, triticale, oats and black oats (see **Photo 1a** and **Photo 1b**). Winter cereals are the most widely used winter cover crops as part of the crop rotation system.

These crops have a fibrous root system that will benefit the formation of soil organic matter deep in the soil profile. Oats is preferred for grazing. Biological production varies between 3 t/ha/year to 5 t/ha/year for the different crops. All crops in this particular functional group will form associations with arbuscular mycorrhiza fungi (AMF).

Rye, when left to mature, has a high C:N ratio and will form a better mulch that will cover the soil for long periods. Planting into rye after termination might lead to the immobilisation of N by microbes in the process of breaking down the mulch.

Winter cereals are typically planted in late summer through early fall (February to March). Planting winter cereals as part of a mixture, after early rain in September in the North-Eastern Free State, was also successful and supplied valuable grazing during November.

Grasses respond well to N fertiliser and increased biomass production and root development is common after application. It is suggested that 40 kg - 60 kg N is applied at planting.

Brassicas

Brassica cover crops have grown in popularity recently due to their ability to provide many of the same benefits as grasses, but with residues that break down more rapidly after termination. Radish is by far the most productive cool season crop with between 8 t/ha to 10 t/ha dry matter (DM).

In the water table sandy soils of the North-West Free State, it raised the soil carbon at a depth of 80 cm by the value of 0,3% during a single season. Brassicas often used in mixtures include turnips, radish (fodder and tillage) and kale (see **Photo 2**).

Certain brassicas are also becoming well known for their ability to produce a large taproot that is effective in breaking soil compaction. As brassicas decompose, they produce chemical substances that can fumigate the soil and kill plant parasitic nematodes.

Brassicas is a non-mycorrhizal plant family and evolved on disturbed sites with ample available P. When livestock graze on brassica pastures, bloat might occur, but on a mixture, this does not seem to happen. In a pure stand, infestation of bagrada bugs is a common occurrence and can destroy the crop.

Legumes

Legumes in association with nitrogen-fixing bacteria have the ability to 'fix' nitrogen from the atmosphere. Inoculation is thus essential. Some of that 'fixed' nitrogen will be available to provide low-cost nitrogen for the following summer crop, a very important feature that makes planting of

Table 1: Potential benefits of cool season cover crops.

POTENTIAL BENEFIT	DESCRIPTION
Sustainable intensification	Cool season cover crops expand and intensify summer cropping systems and keep production at a high level over a long period. It allows us to use resources (sunlight, residual moisture and nutrients) optimally. Spatial and temporal intensification making use of intercropping systems is made possible.
CA	Starting with CA can be a daunting experience for first timers. Cool season cover crops allow ample time to correct soil nutrients, uplift compaction, get rid of problem weeds (e.g. kweek) and build a soil mulch. CA without diversity and soil mulch is doomed to be a failure.
Integration of livestock	Cool season cover crops' nutritional content is high and productive animals (lactating cows, weaners and growing sheep) can benefit from utilising them.
General	Cover crops scavenge soil nutrients as they grow and ultimately release them for following crops to use. This reduces the potential of nutrient losses, especially N. Cover crops reduce crusting, runoff, and protect soil against wind and water erosion. Cover crops biomass contributes to soil organic matter, which helps to improve soil structure, water infiltration, and water-holding and nutrient-supply capacity. Cover crop roots can act as 'living ploughs' breaking up compacted soil layers. Cover crop residues increase water infiltration and limit evaporation. This helps to reduce moisture stress during drought conditions. Leguminous cover crops fix N as they grow. This N mineralises after the cover crop is terminated and becomes available for use by future crops. Cover crops shade the soil, which can reduce high surface temperatures, weed germination and growth. Some cover crops also have an allelopathic effect on weeds.

1a: Winter small grains (grasses) sole stand.
1b: Winter small grains (grasses) delayed intercropping in maize stand.

Winter legumes (grazing vetch), sole stand.

Winter legume (vetch) delayed intercropping in maize.

legume cover crops practical and economical. Legumes are valued as cover crops in integrated systems for their high feeding value.

Common legumes used as winter cover crops in cropping systems include vetch (hairy and grazing vetch), sweet clover and crimson clover. To survive the winter, legumes should be planted at such a time that it is well developed before first frost.

In a North West Province trial (Ottosdal) vetch was planted as pure and mixed stands and with a C:N ratio of 15 it contributed to N mineralisation (see **Photo 3a** and **Photo 3b**). The amount of N added by legumes varies among species, but it is directly proportional to the amount of biomass produced.

The residues of cool season legumes break down fast after termination. Legume plants also have the ability to form associations with mycorrhizas.

Crop mixtures: Why?

Single species leave resources partially unexploited, leaving room for other species to continue or complete the resource exploitation. More diverse systems are hence more productive due to increased niche complementarity or resource use efficiency.

Grass-legume mixtures can be particularly advantageous because they combine the benefits of both and quickly lead to a good canopy cover (see **Photo 4**). The presence of N-rich legume residues can also help break down grass residues more quickly. Disadvantages of mixtures can include increased seed cost and more complicated management.

Potential benefits of cool season cover crops

The potential benefits of cool season cover crops are explained in **Table 1**.

Practical suggestions implementing cool season cover crops

Planting of cool season cover crops

Depending on the producer's objectives, three opportunities exist where cool season cover crops can be established:

Brassicas (radish).

Winter cover crop mixture with grasses, brassicas and legumes.

- Intercropping into standing maize can be an effective establishment method for certain cover crops in short-season environments. In general, legumes and brassicas with extended seedling growth are candidates for in-season seeding (typically from December to January in the summer rainfall area) (see **Photo 5** on page 18). Planting cereals (grasses) during this period is not recommended, as these species have a higher initial light requirement. Spreading seed with fertiliser spreader or using tailor made drills can be used when maize is in four to eight leave stage.

Benefits of winter cover crops in a mixed farming system

Intercropping winter and summer cover crop mixture with maize.

Delayed intercropping with winter cover crops in soybeans.

- Seeding at physiological maturity of grain crops (i.e. during February or March in maize or soybeans) can provide additional time for establishing grasses and grass-legume mixtures as relay or delayed intercropping (see **Photo 6**). As the grain crop dries down, sunlight breaks through the canopy and improves conditions for germination and early cover crop growth.

Winter cover crops planted after soybean, Vrede area.

Seeding cover crops into mature maize requires high-clearance or aerial seeding equipment.

- Seeding cool season cover crops after soybeans are harvested can simplify the planting process. In the Vrede area, a mixture of cool season cover crops was planted after soybeans were harvested, followed with 40 mm of rain. Livestock was introduced later in winter (see **Photo 7**).

Putting seed mixtures together

This outcome will depend largely on the producer's objective. In the drier North West Province, for example, creating water saving mulches should be a priority. Rye and black oats can produce residues that decompose slowly. During the first two months after planting cash crops, evaporation from the soil surface should be curbed with soil cover. In areas where rainfall is more reliable, legumes can reduce input cost by adding N.

A typical mixture for the Vrede and Reitz areas as proposed by Barenbrug, is as follows:

10 kg/ha black oats, 5 kg/ha stooling rye, 3 kg/ha vetch, 5 kg/ha fodder peas, 0,5 kg/ha fodder radish, 0,5 kg/ha tiller radish, and 0,5 kg/ha rape. Total seeding density of 24,5 kg/ha.

Terminating the cover crop

The use of a roller-crimper is a handy tool to terminate cover crops. Small grains are very sensitive during the soft dough stage and will terminate through crimping. If left too late viable seed can create problems as weeds during planting of cash crops. Often producers will use glyphosate after rolling small grain to get rid of other weeds.

Brassicas and legumes are not killed successfully by using a roller crimper. A good herbicide programme to terminate legumes and brassicas is a mix of glyphosate and 2,4-D or dicamba. Glyphosate alone is not a recommended programme to kill a legume such as hairy vetch since its performance is variable.

Plant growth regulators such as 2,4-D and dicamba are effective, but also require some delay

Mob grazing on winter cover crops.

(one to two weeks) between application and maize planting to avoid herbicide injury. Faster desiccation by using paraquat and 2,4-D or paraquat and atrazine is also a possibility.

Grazing of cover crops

Cool season cover crops are preferably utilised or managed by livestock through mob grazing, also called short duration grazing and ultra-high-density grazing. The main purpose of this grazing practice is to increase competition among livestock, concentrate urine and manure and trampling more plant material onto the soil surface. The amount of biomass utilised and trampled by grazers should be managed, for example through different camp sizes (using electrical fences) (see **Photo 8**).

Mob grazing (e.g. grazing intervals) still needs more research in South Africa. A temporary recommendation is to move livestock daily if shorter intervals are impractical. Creating an inclusion zone where livestock can be 'parked' during periods of bad weather, or when you have to work with the animals, will make implementation more manageable.

Conclusion

Cool season cover crops use substantial volumes of water and it is imperative that response farming principles are adhered to. The recharge of the soil profile with soil moisture before planting grain crops is necessary and grain crops should only be planted after sufficient rain (20 mm in 24 hours). As organic matter in the soil increases, more water will infiltrate and more plant available water will be stored in the soil. Pest problems might occur due to the availability of more food.

Article submitted by Gerrie Trytsman, ARC-Animal Production, for SA Graan/Grain April 2018. For more information, send an email to gtrytsman@arc.agric.za.

PASSPORT SYSTEM ADDS VALUE

Southern Oil (Soill) has been gathering relevant data from canola producers for the past six years. The canola passport system, as it is known, contains among other things the producers' spraying records, which cultivar and how many hectares of the relevant cultivars have been planted.

Because Soill is Hazard Analysis and Critical Control Points (HACCP) certified and this food security system requires it, proof must be provided that pesticide residue on the incoming seed is negligible to absent.

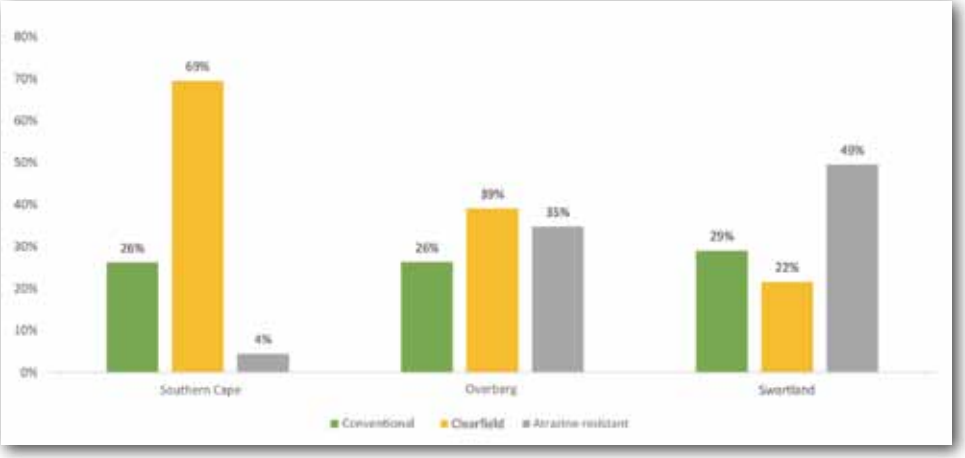
In addition, the second phase of the Consumer Protection Act, Act 68 of 2008, came into effect on 31 March 2011 and obliges all parties in the food manufacturing chain – from the farm to the consumer's plate – to comply with all legally prescribed requirements in order to control and limit the risk of prosecution due to deviations.

This is why it is vital for producers to record this information fully and completely before canola can be delivered at any depot. Spraying records should be kept and monitored conscientiously and continuously.

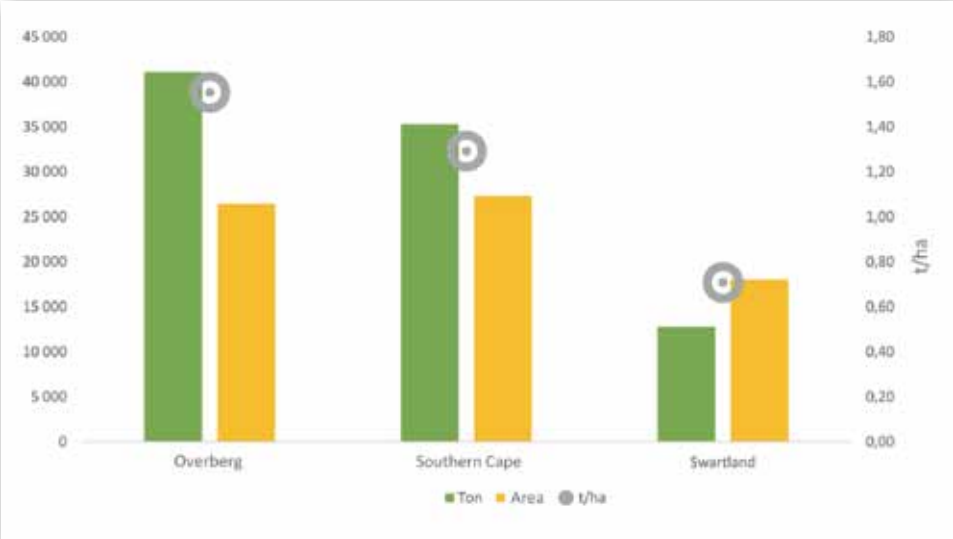
Producers are given a list of registered products and they must try to stick to this list of products. This ensures that only South African-registered sprays for canola are used by the producers, at the prescribed dosage, and are followed by recommended withholding periods.

Canola is still classified as a less important crop, and in cases where there is a need for certain products that are not registered, the industry can pass this on to the registrar in collaboration with Grain SA.

Graph 1: Distribution of different cultivar groups per area for 2017.



Graph 2: Area linked to delivery per producer for each area for 2017.



Valuable information

Valuable information is also obtained from the forms submitted by the producers. This can then be taken to the industry to add value. For example, it can be determined exactly how much of which cultivar was planted in a certain area. The data can also be used to compile standard spraying programmes for budgeting purposes.

This passport system plays a vital role in the company's compliance with HACCP's and the Consumer Protection Act's inflexible requirements, and in protecting everyone who forms part of the canola oil and canola oilcake chain from legal prosecution for unacceptable levels of chemical residue.

The system does require additional administrative work from everyone – from the producer to the silos to which he delivers – but the system is invaluable and should in future be a requirement for all other crops in order to ensure sustainable production of food. Malt barley has a similar system in place.

Article submitted by Zander Spammer, junior agricultural scientist, Southern Oil, for SA Graan/Grain February 2018. For more information, send an email to zander@soill.co.za.

A look at the seven wonders of grain production

Prof Fred Below is Professor of Plant Physiology in the Department Crop Sciences at the University of Illinois. Illinois is right in the centre of the lush maize belt and it is here that Prof Below specialises in examining factors which limit crop productivity, particularly in maize and soybeans.

He has developed a teaching approach which he calls 'intelligence intensification', which highlights the most important factors that contribute to increased yield.

The world record maize yield was achieved this past season in the USA at 34,1 t/ha. The average yield record was also achieved this past season at 11,1 t/ha. The yield gap is the difference between what the average grower gets and what the record yield is. This is what Prof Below calls 'the opportunity to increase maize yield with better crop management'.

A review of yield contest winners has shown that all 18 winners exceeded 20 t/ha in 2017, while five growers exceeded 25 t/ha and three others, 30 t/ha. Prof Below says it all starts with two key factors, namely better plant nutrition and making sure the plant is never stressed. Other crucial prerequisites for yield improvement, but not part of the seven yield wonders, are:

- Drainage.
- Pest and weed control.
- Proper soil pH and adequate levels of P and K, based on soil tests.

> *"The elements always dictate when you can or can't plant your crop and weather also dictates the success after planting.*

The seven wonders of the maize yield world

The Weather

The elements always dictate when you can or can't plant your crop and weather also dictates the success after planting.

Nitrogen

We can control N but we don't have complete control over it. Every single thing about N is influenced by the weather. There are many examples of weather-induced N loss. In the USA there are even climate programmes which predict the availability of N. Too much rain and you will lose N. N moves downwards in the soil, which explains the N deficiency after heavy rain.

He then asked if N moves downwards and not sideways and where the best place to put the N would be. Their trials have shown that placing the N along the row has been worth about 0,6 ton yield advantage.

Hybrid/variety selection

All hybrids are not equal. In a trial between 44 commercial hybrids grown at three different sites in Illinois, there was a 3,8 ton range in yield at the Harrisburg site; a 5,9 ton difference between yields at Champaign and at Yorkville there was a range of 7,6 tons between the highest and lowest performing hybrids.

Prof Below says he is often asked which is the best hybrid:

- The best hybrid is the fullest maturity for the region build.
- The best hybrid is most often the newest and most expensive one.

He says farmers can't afford to use the same hybrid four years in a row and miss out on the benefits of improved genetics.

Prof Fred Below.

Previous crop

The previous crop grown in a field significantly impacts the new crop. In this region crop rotation is predominantly between soybeans and maize. Trials have proved that if soybean was the previous crop, it will boost the next maize crop by +1,6 ton; whereas if the previous crop was maize, it would negatively impact yield by -1,6 tons.

He calls it 'the continuous maize yield penalty' saying 'it always gets worse with time'. Prof Below credits this to crop residue build-up over

Table 1: The seven wonders of maize yield.

RANK	FACTOR	VALUE (T/HA)
1	Weather	4,4+
2	Nitrogen	4,4
3	Hybrid/variety	3,1
4	Previous crop	1,6
5	Plant density	1,3
6	Tillage/no-tillage	0,9
7	Growth regulators	0,6
Total		**16,3**

time (**Photo 1**). Residue acts like a sponge to prevent rain from infiltrating. It ties up nutrients and also releases chemicals, which interfere with the growth of the crop.

Plant density

Prof Below believes that farmers don't plant enough seed. He says this has to change in order to obtain higher yields. He believes this may be the South African farmers' problem, whilst acknowledging the high cost of seed and the risks we face with poor weather conditions.

Nonetheless he insists this factor has changed the most in the USA over the last 55 years. The USA yield increases by 1 ton every eight years. In 1965 the average yield was 4 t/ha (45 000 plants/ha in 91 cm rows). Today the norm is 79 000 plants per ha in 76 cm rows…'and guess what, it's only going to go up. It has to go up.'

Essentially grain yield is a product function of yield components: Yield = plants/ha (planting and emergence) x kernels/plant (flowering) x weight/kernel (grain filling). The function a farmer has the most control over is plants/ha. In the USA plant density increases at a rate of 900 plants/ha/year despite high seed costs.

There is another factor to consider, i.e. maximum plant density. Beyond 94 000 plants/ha in 76 cm rows plant competition decreases yield. Prof Below says this will be reached within 15 years in the USA then rows will have to become narrower, e.g. 51 cm. The future of maize in South Africa has to be 76 cm rows. Narrower rows hold two advantages: They can better manage the higher density of plants and they intercept more early light.

A further benefit of narrow rows is higher moisture retention because the leaves shade the ground and prevent evaporation.

Tillage or no tillage

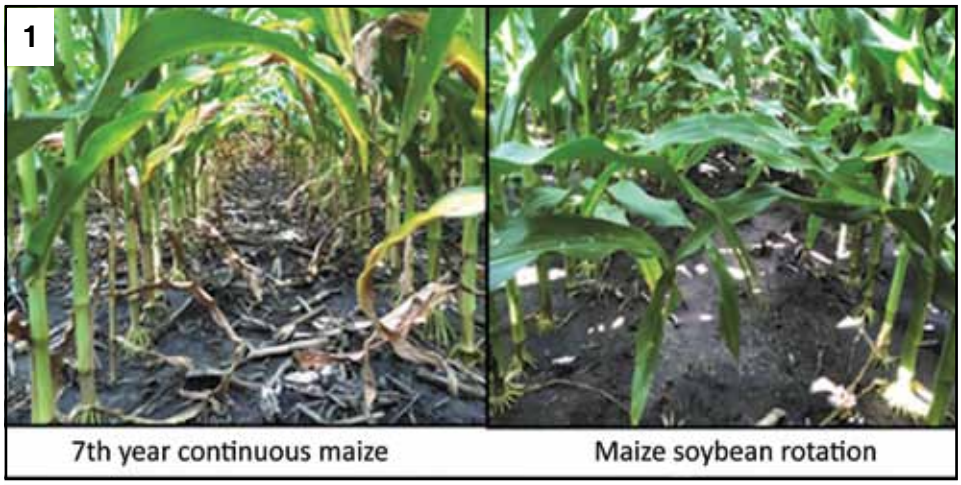
This is designed to control one of the preceding 'wonders' and can influence yields by up to 0,9 t/ha.

Growth regulators

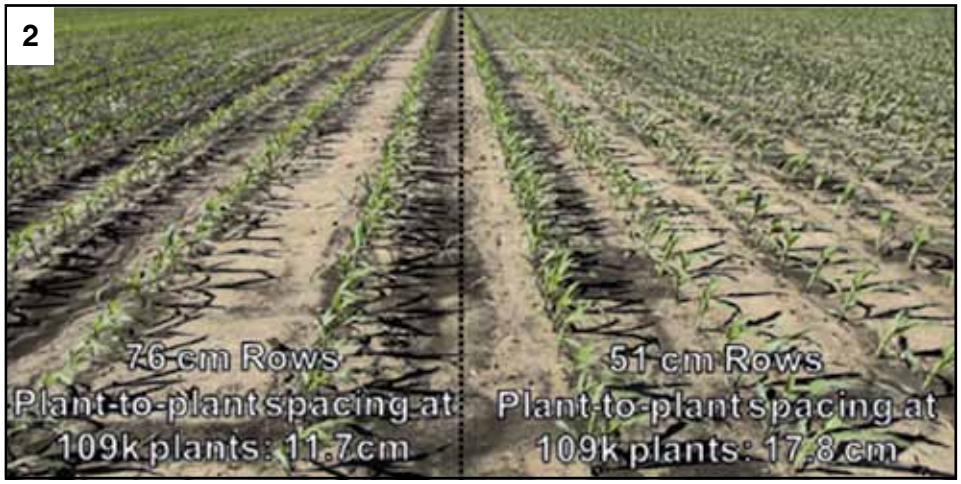
'This is the next big thing in agriculture.' This is all about leaf health and leaf performance. Leaf greening is promoted through the application of strobilurin fungicides which are applied even in the absence of leaf disease. The greener leaves can give up to 0,6 t/ha increase in yield. There are risks which could decrease yields if the wrong growth regulators are used in wrong conditions, i.e. be very careful.

Table 1 sums up the seven wonders and their influence on yield potential.

> *"Understanding the factors that have the biggest impact on yield gives growers the opportunity to increase yield.*



Yield penalty due to residue.



Is the future of maize higher populations in narrow rows?

No maize plant left behind

Higher maize yields are achieved where a farmer optimises each of the seven wonders and their positive interactions and provides better prerequisites, season long weed control (modern hybrids don't interact well with weeds) and balanced fertility.

Prof Below emphasised that in future both application and fertiliser technologies will be used to supply the required crop nutrition. Nutrients have a high harvest index value and farmers must feed the plant, not the soil.

He summarised with his four most important nutrients for high grain yield namely, nitrogen, phosphorus, sulphur and zinc.

He advocates for fertilisation to be applied in bands – 'where the roots will be' – as this results in an incredible improvement in the early growth of the crop. A plant missing out on fertiliser is a plant left behind and that plant will never catch up.

Understanding the factors that have the biggest impact on yield gives growers the opportunity to increase yield.

Article submitted by Jenny Mathews, SA Grain contributor, for SA Graan/Grain April 2018. For more information, send an email to jenjonmat@gmail.com.

WHY DOES MAIZE LODGE?

Lodging happens when the stalk breaks below the ear. This means yield losses, increased time to harvest and may also influence the grain quality. Lodging usually occurs in the second half of the season as the maize plant starts to mature.

There are several causes of lodging in maize, and it is often a combination of these factors that result in lodging. The main causes are the following:

- Severe weather;
- Stalk borer damage;
- Nutrient deficiency; and
- Stem and root rot.

Hard rainstorms accompanied by strong winds and/or hail late in the season can cause severe lodging even on a healthy crop of maize. There is little that can be done to prevent this type of lodging. Unlike severe weather, the other factors influencing lodging can, to some extent, be mitigated by improved management.

> *"Nutrient deficiency, particularly potassium and nitrogen, can increase lodging.*

Stalk borer infestation, where the worms eat tunnels into the stalks or ears and cause weakened stalks, often results in significant lodging and cob drop. Improved stalk borer control and the use of stalk borer tolerant hybrids can help reduce this type of lodging.

Nutrient deficiency, particularly potassium and nitrogen, can increase lodging. A plant that is deficient in these nutrients will relocate nutrients from the roots, stalk and leaves into the developing ear during grain-fill. This weakens the stalk and roots, making the plant more prone to lodge.

The fourth major cause of lodging is stalk rot. Stalk rot is caused by infection by a complex of different fungi. This infection decreases the maize plant's ability to resist external stress by weakening the stalk tissue and results in a plant that is more susceptible to stalk breakage. Stalk rot symptoms usually appear after flowering. Stalks become spongy and are easily crushed. The internal pith disintegrates, leaving only the vascular bundles and the outer layers of the stalk. This weakens the stalk, predisposing plants to lodging during strong winds and rain.

The occurrence and severity of stalk rot in any given field depends on the susceptibility of the maize hybrid, the presence of the stalk rot organisms and an environment conducive to formation of the disease. These three conditions, the host, the pathogen and the environment, must be present simultaneously in order for stalk rot to develop. All three can be partially controlled by management. For example, you can choose hybrids with good disease resistance, or you can partially control the growing conditions with management decisions.

> *"Managing lodging in maize is critical to a successful crop and effective harvest.*

Managing lodging in maize is critical to a successful crop and effective harvest. Farmers are encouraged to take careful consideration of the factors discussed above and implement relevant management practices to help reduce the risks of lodging as far as practically possible. There is little more demoralising than being faced by a field of severely lodged maize plants!

Article submitted by Grant Pringle, Product Agronomist, Pannar. For more information, send an email to grant.pringle@pannar.co.za.

Stem and root rot.

The Corner Post

FRANCOIS FIVAZ
Be inspired and then become an inspiration

'Rather than reinventing the wheel, entrepreneurs need to find the wheel-maker and leverage the wheel-maker's expertise and experience.' This advice was shared in a blog by Mike Rowlands in the *Huffington Post*, an American internet newspaper.

The 2018 winner of the Grain SA/Bayer Potential Commercial Farmer of the Year, Paulus Mosia, used this method when he approached Francois Fivaz in 2015 and asked him to become his mentor. Instead of trying to figure out farming methods, he decided to use the experience and expertise of the 'wheel-maker' next to him, who was also a seasoned commercial producer.

Neighbour becomes mentor and financial advisor

In 2007 Paulus, who had a farming dream from a very young age, joined the Grain SA Farmer Development Programme and in 2008, he was given the farm Sterkwater by the DRDLR through the PLAS Programme. Little did he know that one of his neighbours would in later years play a vital role in his success.

Francois has a mixed farming operation in the Edenville district in the Free State. He farms with Bonsmaras cattle and also plants maize, sorghum and sunflower. His added expertise on agricultural inputs stems from his second job where he also sells inputs such seed, fertiliser and chemicals. His extensive knowledge in this field is also one of the reasons why Paulus wants to do business with Francois. He knows that the advice is not just sales talk, but honest and sometimes firm help from a neighbour and fellow agriculturalist who has proven that he does not mind walking the extra mile.

Although Francois only mentored Paulus during 2015, he remained involved in the Mosia farming enterprise. 'I was Paulus's mentor for a year and now play a much smaller role – more of an advisory role – in his farming operation mainly to help him draw up his budget,' Francois explains. 'Whenever we get together to work on the budget, I realise that Paulus is a farmer at heart who wants to farm for years to come – he is not in it for the money. He sometimes pays himself less than the minimum wage!'

Budget planning is done systematically by first looking at how much money was made from the harvest. 'The first thing Paulus does, is pay his tax. With the money that is left other farming decisions can be made,' Francois explains. The financial planning done for the year ahead includes the decision about what should be planted in the next season and salaries that have to be paid. Then a list is drawn up of inputs needed monthly – seed, fertiliser, pesticide and herbicide according to the season's requirements.

As mentor Francois paid a lot of attention to the mechanisation aspects of planting as Paulus already had a very clear concept about what planting entailed as well as the basic agricultural practices. 'We focused on how to calibrate the planters. I would demonstrate practically what had to be done and then Paulus would have to do it. He had to work out how to set the planter for the different crops, how much fertiliser was needed per row to achieve the correct amount per hectare.' These practical sessions obviously helped Paulus develop and to become even more independent.

Their method worked – Paulus would see what Francois was doing and then copy it on his own farm. Francois says he would love to help his own farm workers develop into farmers in the same manner. 'These are people that already know how tough it is to be a farmer. There are too many people who want to farm but know nothing about what it entails.'

A successful partnership

Although Paulus was the winner of the Farmer of the Year competition, Francois has shared in the success with people phoning to also congratulate and thank him for the role he played in mentoring a winner. 'It is wonderful to witness how successful this process is and great to know that someone paid attention to the advice I shared and put it into practice.'

There are many producers in the area who have become more aware of the mentorship programme and are showing an interest in joining this worthy programme. 'I think there are more producers who are willing to get involved than is realised.'

For Paulus the award has meant a lot and according to Francois he is now seen as 'one of us' in the farming world (i.e. as a commercial grain producer). Francois is excited about the doors that are opening after Paulus won the award. There is a huge opportunity to expand his hectares. Unfortunately, this also causes a problem as more hectares needs more finances and more equipment.

For the hardworking developing farmer getting finance is a huge issue. 'You cannot expand your farming operation if you only plant 50 ha to 100 ha, no matter what yield you achieve', Francois says, so he really hopes that that problem will be solved, and that Paulus can realise his dream of becoming a commercial producer.

At this stage Francois is involved in his community mentoring farmers in the area who are not yet part of the Grain SA Development Programme. He says the developing farmers say that he is too strict and rather try to find someone less stern. Luckily Paulus did not make that mistake!

'Paulus was ready to learn from the word go; he is open to guidance and I really admire him as he has not ever taken offense. He is willing to learn, very humble and always invests in the farm before he buys something for himself. He even walked to the farm before he decided the time was right to purchase a bakkie.'

When asked what the mentor had learned from the mentee, Francois is quick to answer: 'If I could stick to my budget like Paulus does, my financial statements would look quite different! I also admire his drive to become a successful farmer and he is truly an example of humility.'

It seems that there is always something that the wheel-maker can learn from the apprentice!

This month's edition of The Corner Post was written by Louise Kunz, Pula Imvula contributor. For more information, send an email to louise@infoworks.biz.

LOCAL UNDERSTANDING IS THE KEY TO UNLOCKING YIELD POTENTIAL.

(033) 413 9500

infoserve@pannar.co.za

www.pannar.com

www.facebook/pannarseed

www.twitter@Pannar_Seed

www.instagram.com/pannarseed

PANNAR®

Together we farm for the future™