PULA IMVULA

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

GRAIN SA
GRAAN SA

SEPTEMBER
2013

MAURICE BOKI
"Striving to achieve success"

The importance of LIMING

Winter Cereals special feature

Producing wheat under centre pivots

PULA IMVULA

Editorial team

GRAIN SA: BLOEMFONTEIN
Suite 3, Private Bag X11, Brandhof, 9324
7 Collins Street, Arboretum
Bloemfontein
▸ 08600 47246 ◂
▸ Fax: 051 430 7574 ◂ www.grainsa.co.za

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

EDITOR 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

Danie van den Berg
Free State (Bloemfontein)
▸ 071 675 5497 ◂ danie@grainsa.co.za

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

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

Naas Gouws
Mpumalanga (Belfast)
▸ 072 736 7219 ◂ naas@grainsa.co.za

Jurie Mentz
KwaZulu-Natal (Vryheid)
▸ 082 354 5749 ◂ jurie@grainsa.co.za
▸ Office: 034 980 1455 ◂ Sydwell Nkosi

Ian Household
Eastern Cape (Kokstad)
▸ 078 791 1004 ◂ ian@grainsa.co.za
▸ Office: 039 727 5749 ◂ Jenilee Buntting

Lawrence Luthango
Eastern Cape (Mthatha)
▸ 076 674 0915 ◂ lawrence@grainsa.co.za
▸ Office: 047 531 0619 ◂ Cwayita Mpotyi

Toit Wessels
Western Cape (Paarl)
▸ 082 658 6552 ◂ toit@grainsa.co.za

This publication is made possible by the contribution of the Maize Trust, Winter Cereals Trust and Monsanto.

NKGONO JANE SAYS...

IN THIS ISSUE...

COVER ARTICLES

INSIDE

Before embarking on a journey, you must surely have an idea of where you are planning to go? In a way, life is also a journey; however, the journey of life has many destinations, and these destinations change as you grow and develop. When you were in junior school, you were dreaming about high school; in high school you were dreaming about going to college; at college you were thinking about the job you would have; then your marriage, owning a house, having children et cetera.

Many of you are also on another journey – the destination of this journey is the optimal use of the land that is available to you. Your journey as a farmer must also have a destination. What are you trying to do?

There are many people all over the world who do not own a farm – but there are also many people in the world who are growing crops (food) on whatever piece of land is available to them. I have seen pictures of people who grow plants in containers placed on their roofs, seeing as this is the only space they have.

In South Africa, most people have access to a little land (except those living in high-rise buildings). There are also many people who have access to at least 1 ha of communal land. How are you using the land that is available to you?

Agricultural land (all land) has the potential to grow something – the amount you can expect from your land is determined by the soil depth, the rainfall as well as the knowledge, skills and commitment of the person using the land. Are you using your land to full potential?

It is not possible that everyone in the world can have a farm – there simply is not enough earth to allow this. This should not stop you from growing food on the piece of land that you can access.

My wish for this season is that everyone should start producing food on whatever land is available to you – make your farming destination the optimal use of your land. You too can contribute to household and national food security and food sovereignty.

Liming remains important

Lime is an important aspect of nutrient management, because when the soil pH drops, it negatively affects crop production and yield potential. Lime is the element which is applied to neutralise the acidity of the soil and restore it to an ideal balance most suited to optimum production.

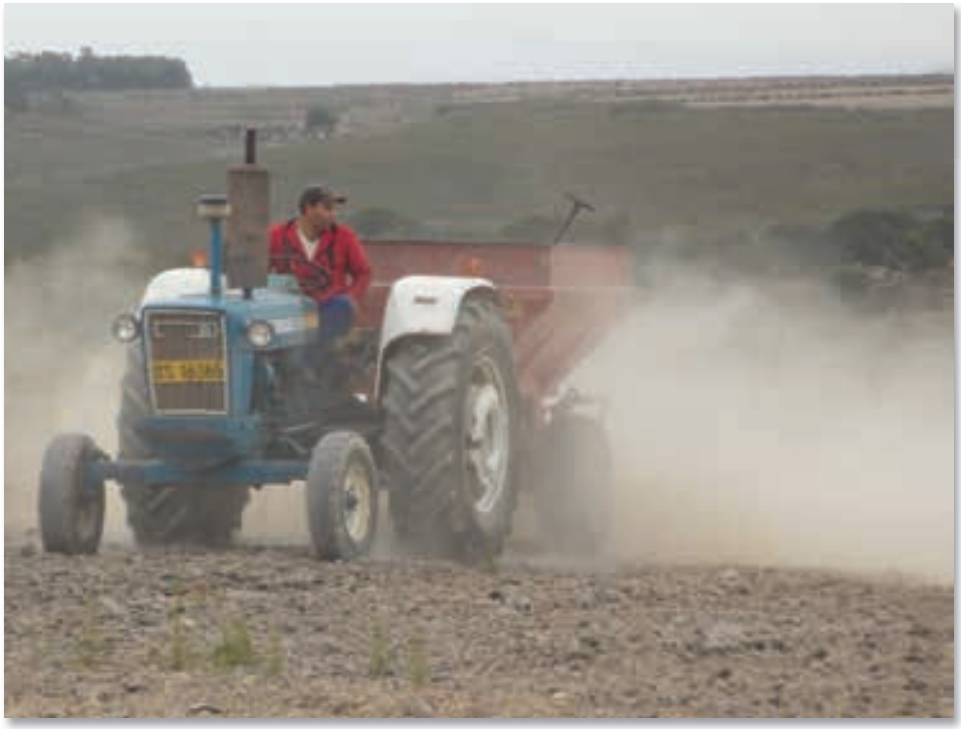
Farmers are sometimes confused when they see that one farmer gets a higher yield than they do, even though the soils seem the same. There could be many reasons, but one of the most likely reasons is the pH levels. The farmers who are getting optimal yields are most likely closely monitoring their soils' pH levels and don't let them fluctuate too much. Yield losses due to acid soils occur gradually and likewise when you add lime to correct the situation, it will also take two to three years to improve the yield levels. Managing your field pH levels is even more important where farmers are growing maize continuously.

Proper soil pH is important, because it:

- Enhances nutrient availability to your plants by helping with the movement and absorption of phosphorous, nitrogen and magnesium. The effect of soil pH is great on the solubility of minerals or nutrients and since many valuable plant nutrients are in the soil, it is essential to ensure that these are available to the plants by being dissolved in the soil solution.
- Aids nitrogen fixation.
- Promotes healthy crop development.
- Is conducive to healthy soil microbial activity, seeing as it benefits bacteria, fungi and other soil life important for nutrient cycling.
- Enhances herbicide activity. A lack of microbial activity means there will more likely be herbicide carry-over problems, so farmers must see to it that pH levels are suitable to keep microbes numerous and active.
- Contributes to a healthy soil structure in which air and water moves easily.

It is necessary to take regular soil samples to

> *"Trying to maximise maize profits without understanding acidity is like building a tall sky-scraper without pouring a solid concrete foundation first – the entire structure will probably come crashing down.*



A Kenyan subsistence farmer's true testimony – maize yield increases eight times

In 2008, 29-year-old Isaac Ochieng Okwangi, a subsistence farmer in Kenya, harvested 0,12 tons/ha of maize from his 1,5 ha maize field. On that same field, today he gets up to 0,960 tons/ha of maize and because he farms in Kenya, the warmer seasons enable him to get this crop twice every year. Ochieng says the reason that his maize crop has increased by eight, is attributed to lime applications he has put down on his farm. The lime has lowered soil acidity levels, making the soils better suited for growing crops. The practice of year-in year-out crop production had slowly increased soil acidity and gave the fields no resting time, which negatively impacted yields. Ochieng reported that after he had spread the lime on his maize fields, the difference was immediately evident as the maize was vibrant and healthy and all the plants were having two or more cobs. Ochieng has since been able to build a new house for his family and his successes have now convinced other local farmers to also dig lime into their fields.

determine the need for lime and to establish exactly how much should be applied to the field. The pH value on your soil analysis will be your guide.

What is pH?

pH actually stands for "the power of hydrogen" and the pH of the soil defines how acid or how alkaline the soil is. The pH is measured according to the pH scale, which ranges from 0 to 14, with 7 being neutral. So levels which are below 7 are acidic and levels above 7 are alkaline.

pH and maize crops

The secret to well-balanced, fertile soil is directly linked to the pH level. The ideal soil pH for maize production is between 6,0 and 7,0. If the soil pH is below 5,5, the maize plants begin to develop problems, especially because aluminium and manganese elements become more readily available in acidic soils and can potentially stunt or even kill your plants.

Toxic elements like aluminium and manganese are a problem in acid soils, because the lower the pH, the more soluble they become. This means that they are easily dissolved in water and made available too easily, which will affect plant growth negatively. There is always a lot of aluminium present in soils, because it is an element present in most clay particles.

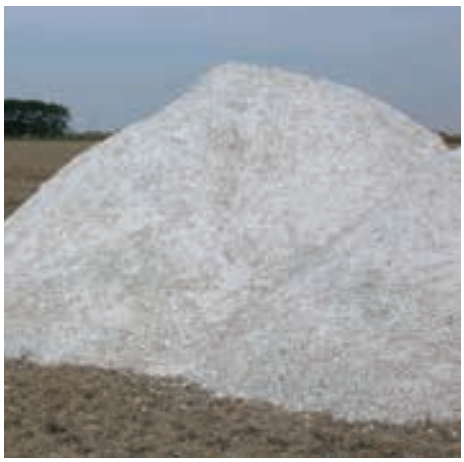
Low pH in the soil also makes phosphorous, nitrogen, potassium, sulphur, magnesium and calcium less available to growing plants. Acidic soils also hamper the root development of the plants as well as the activity of helpful soil microorganisms.

What makes soils acidic?

There are a number of factors which influence the acid levels of soils.

High rainfall

Areas which have high rainfall levels will experience leaching. Rainfall effectively causes soils to become acidic if a lot of water moves through the soil very quickly. Sandy soils are often the most likely to become acidic, because water filters through rapidly due to the lower clay and organic matter content.



Crop production

Fields used for cropping and even grazing animals lose minerals over a period of time as a result of crop removal, since both plants and animals are withdrawing calcium from the soil for their own use. Crops absorb lime-like elements from the soil for their nutrition and when these crops are harvested and the yield is taken off the field, some of the basic material which could have counteracted the acidity is lost and so slowly acidity in the soil increases.

Fertilisation

Modern chemical and fertiliser applications are all major contributors to soil acid levels. The annual applications of nitrogen fertilisers slowly produce acid conditions in our fields over time.

How to rectify the imbalance

Limestone is a natural source of calcium, which raises the pH levels of the soil. The soil correction process may even need to be done over a few years, with multiple applications of agricultural lime. Even though there are regions which do have naturally occurring limestone, like in the North West Province, it is still essential to test the soils to see if soil correction is required to counter the acidifying processes. There are a number of types of lime in the agricultural market. The correct pH depends on the crop that is being grown and it is necessary to get advice from your local fertiliser representatives or agri-business. When lime is added, it will raise the soil pH and also increase the levels of calcium and magnesium in the soil. It takes water to activate the lime reaction, so lime works slowly in dry soil and it can take at least a year or more to measure a change in the soil pH.

It is preferable to apply lime in autumn, so soil acidity can be reduced before crop growth begins, but if this is not possible, then applying it in the spring is still better than not applying it at all.

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

Agricultural chemicals: Remember the following

When agricultural chemicals are purchased and used, the following should be kept in mind:

Even if the substance is registered in accordance with Act 36 of 1947, this is no guarantee that it has been statistically tried and tested.

Make sure that the input provider is a recognised company with a proven record.

The sales agent must provide proof that the company whose product they distribute is a member of CropLife SA.

The distribution company must be a member of ACDASA.

The agent must be able to prove that they are qualified.

Ensure as far as possible that all recommendations are provided in writing and store these copies safely.

Keep good records of what is sprayed where.

Seed treatment should be done by the seed company itself or with certified seed treatment equipment.

Article submitted by Corné Louw, Senior Economist: Inputs, Grain SA, for SA Graan/Grain September 2012. For more information, send an email to corne@grainsa.co.za.

Crop success starts with cultivar choice and weed control

The crop estimates committee forecast during June 2013 shows that a white maize crop of about 5,9 million tons and a yellow maize crop of about 5,5 million tons will be realised.

Safex prices for white maize range from R2 260/ton from July 2013 to R2 130/ton in July 2014. The prices have risen to a peak of R2 330 from December to March 2014. Yellow maize shows a similar but lower value pattern being set at about R2 090/ton for July 2014.

This is the future price scenario that must be taken into account when planning for the coming production season from October 2013 through to December 2013. One will also have to decide what mix of white or yellow maize will suit your farming situation and remember to take the importance of the livestock factor in your operation into account.

Past production year

Maize production on most farms this past season was very variable, depending on the rainfall received as well as the influence of heat waves experienced in the main production areas and even within districts. The heat negatively affected or even stopped pollination in some lands, depending on the planting dates. Farms separated by only a few kilometres either experienced a total loss or much reduced production, whereas others achieved above average yields.

Cultivars and weed control

Two of the most important aspects of production planning for the coming year will be to decide on the choice of suitable white and yellow maize cultivars that will perform under tough as well as good climatic conditions.

It would be to your advantage to discuss in depth, with your seed consultant and fellow farmers in your study groups, the performance and yields achieved on your farm with the cultivars used last year.

Apart from cultivar choices, farmers need to keep abreast of the following: Fast changing technology such as Bt technology, which counters the potential attack of stalk borers on a maize crop; extensive application of plant and environmentally friendly forms of seed treatments; the use of soil enhancers; foliar feeding at various crop stages and all the advances in plant health management.

In parts of the Eastern Free State with medium production potential, the early maturing or fast cultivars planted during the last week of October and early December performed equally well, with a range of 3,2 tons/ha to 3,5 tons/ha. The maize was planted after soybeans the previous season and despite the intermittent rain received and heat waves, produced a reasonable yield where longer season varieties performed poorly.

Hybrid seed selection

In general most seed breeders or seed suppliers supply a package or range of cultivars which consist of ultra-early, early and medium growth patterns for yellow maize cultivars and early, medium early, medium and medium late growth patterns for white maize cultivars. The choice for the farmer becomes quite complex, with a mix of conventional maize, stalk borer resistant or Bt maize cultivars, glyphosate herbicide tolerant cultivars, and stacked gene cultivars that combine both of the previously mentioned characteristics.

There is such a diversity of choices which can be made to suit your farming operation and your existing equipment. Always remember that even if your choice is to mainly plant Bt resistant and glyphosate tolerant recommended bands of conventional maize, it must be strategically planted near the Bt maize cultivars.

Equipment considerations

Your current tractor power, size of planters and crop spraying equipment might be a limiting factor in being able to plant all cultivars in the ideal planting window. Use a variety of cultivars by using short and longer growing season types. Their use will allow an extended planting period and enable you to use your existing equipment over a longer planting season. The various cultivars will thus pollinate at different times and thus reduce the climatic risk of drought periods affecting the whole crop at once.

If you are starting with or are already using conservation tillage techniques, your equipment must be robust and well designed to achieve a good planting job.

The use of several different cultivars with different growth and maturity periods is thus recommended as a standard management practice to reduce production risks.

Growing season classes are placed into various categories and is related to the relative days to 50% tassel, the heat units (HU) required for plant growth to 50% tassel, the relative days to physiological maturity and the approximate days to harvest. The growing periods as indicated are also

influenced by the general prevailing temperatures experienced in a particular area.

Companies involved in plant breeding have classified the various cultivars that are released for commercial planting into growth classes. The data collected for some early maturing or quick cultivars is shown below as an example of quantification of the units described above.

A period of 61 days to 50% tassel will be taken in warm areas and for the same cultivar 78 days will be taken in cooler areas. 710 heat units will be required for the plant to reach physiological maturity. The period required for these number of heat units for the plant to reach physiological maturity will be 109 days in warm areas and 159 days in cooler areas. The estimated days to harvest will be 168 in warm areas and 223 in the cooler areas.

As you can see, the general warm or cool climate has a huge influence on any cultivar chosen. All the above factors will be greater for any cultivars that are classified as medium or long growth cultivars. Make sure that the cultivars supplied from different companies are compared firstly to the seed package offered within a particular company and then in turn also compared to the other suppliers or plant breeders. This comparison will enable the planting of cultivars at the correct planting dates. It is also essential to develop a good relationship with your seed supplier in order to gain a proper understanding of the seed types that are available.

Spraying programmes

On farms where glyphosate tolerant maize crop cultivars and conventional maize cultivars have been selected for planting, there will be a need for different spray programmes. It is very important to inspect your spraying equipment and to calibrate and test the systems well before the planting season.

Glyphosate applications in conservation tillage systems might require more than one spray operation prior to planting. The rainfall received after a first spray operation can result in regrowth of weeds. It is not advisable to save the costs of an additional spray if the weeds have regrown again prior to planting and would immediately compete with the newly planted crop.

In conventional tillage systems which makes use of mechanical cultivation, effective weed control with glyphosate is usually effective with one spray prior to planting. Weed status and possible moisture loss must be constantly monitored.

The active chemical ingredients recommended for glyphosate tolerant maize compared to conventional maize with estimated costs per hectare is shown below. These recommendations can be used as a guideline to help understand the many brand names of various weedicides and weedicide combinations on the market.

Please make sure that the recommendations for mixing the active ingredients and additives with water and the total application per hectare of the active ingredients mixed with water are followed. Applications of the total mixture might range from 150 litres - 250 litres per hectare depending on soil conditions and ability of the farmer to provide enough water for the spraying operation. More mix applied per hectare will imply a better coverage of the area being sprayed, resulting in better control of weeds.

A weed control programme for glyphosate tolerant maize

Glyphosate 450 at 2 litres/ha of active ingredient mixed with water and suitable additives can be sprayed before planting at a cost of about R100/ha. Spray after planting, but before germination with acetochlor and safener at a rate of 0,8 litres/ha active ingredient plus water at a cost of about R70/ha. This can be done together with a product mixture of atrazine and tebutylazine combination at 2 litres/ha of active ingredient at a cost of about R120/ha. Spray the maize crop before the eighth leaf stage with RU powermax at 1,7 litres/ha of active ingredient plus water at a cost of about R90/ha and Acetochlor at 1 litre/ha of active ingredient plus water at a cost of about R60/ha.

A weed control for conventional maize varieties

Weed control in conventional or normal maize is to be done after planting, but before germination using a spray of acetochlor plus safener at 1 litre/ha of active ingredient at a cost of R87,50/ha with a combination of atrazine and tebutylazine at 3 litres/ha at a cost of R180/ha. Spraying could be concluded before the eight leaf stage with Acetochlor at 1 litre/ha. Again use the recommended mix of water, additives and active ingredients.

Clay content of the soil

Always know the clay content of your topsoil, so that the atrazine based weedicides can be applied at the correct rate. A soil with higher clay content requires a higher application of atrazine. On the other hand, an excessive application of atrazine on a sandy soil will result in atrazine run-off and contamination of water resources and streams near the sprayed lands.

Always do a proper scouting to identify the weed types present and talk to your chemical consultant so that the correct chemicals are used and applied effectively.

Conclusion

A detailed analysis of cultivars required and detailed planning for the spraying programmes to be used will ensure that your crop stands a good chance of success and profitable production.

Article submitted by a retired farmer.

Proactive pre-season product planning

"Do you want to make a resounding success of your farming?" A provoking question posed to all farmers by global leading biotech and seed producers, Monsanto.

What you reap depends a great deal on what you sow; it is therefore imperative to make well-informed and carefully guided decisions upon selecting seed for the next planting season. Although spending less may seem appealing, quality comes at a cost. The innovation that is offered by biotech seeds allows farmers to increase their productivity so that any farmer, both commercial and non-commercial farmers can compete in the world's current challenging economical climate and agricultural markets.

Monsanto's mission is to ensure that farmers get access to products and relevant technologies that will allow them to produce more while conserving more; with Monsanto's ground breaking, high yielding seed products, these goals are undoubtedly achievable.

As South Africa is well into its pre-planting season, it has become evidently imperative that farmers begin with preparations for the upcoming season. Field preparation plays a crucial role to seed germination as well as to the survival of

Table 1: Recommended white maize products

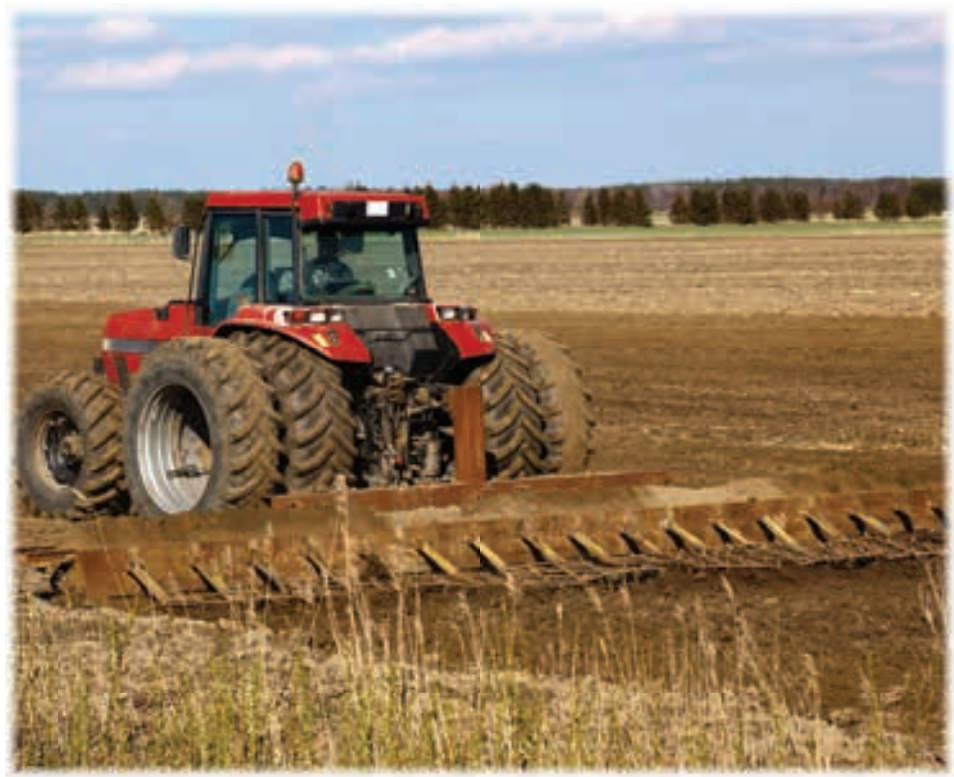
Highly recommended seed									
Characteristics									
White maize	**✓ High yielding**	**✓ Multi-eared**	**✓ Disease tolerance**	**✓ Medium growth period**	**✓ Excellent grain quality**	**✓ Rapid drying**	**✓ Good standability**	**✓ Heat and drought tolerance**	**✓ Eastern and western drylands**
Most popular				**New products**					
CRN3505	Conventional hybrid			**DKC78-27**	Conventional hybrid Strong Seedling Very stable across various yield levels and environments				
DK8031	Late maturing conventional hybrid Suitable for high rainfall areas (North West/Limpopo, Western Free State/ Northern Cape)								
DK8073	Recommended for Swaziland and Limpopo								
DKC78-15B	Leader in white maize cultivar Contains YieldGard® gene that controls stalk borer			**DKC78-87B**	Contains new YieldGard® II gene that controls stalk borer				
DKC78-35R	Tolerant to Roundup PowerMAX® herbicide			**DKC77-77BR**	Tolerant to Roundup PowerMAX® herbicide Contains new YieldGard® II gene that controls stalk borer Strong seedling Few tillers				
DKC78-45BR	Leader in white maize cultivar Stalk borer resistance Herbicide tolerance Not very leafy			**DKC78-79BR**	Tolerant to Roundup PowerMAX® herbicide Contains new YieldGard® II gene that controls stalk borer				

Table 2: Recommended yellow maize products

Highly recommended seed									
Characteristics									
Yellow maize	✓ High yielding	✓ Multi-eared	✓ Disease tolerance	✓ Medium growth period	✓ Excellent grain quality	✓ Rapid drying	✓ Good standability	✓ Heat and drought tolerance	✓ Eastern and western drylands
Most popular				**New products**					
DKC80-10	Conventional hybrid Use as refuge area along with DKC80-12B GEN			**DKC61-94BR**	With Genuity® YieldGard® II protection Tolerant to Roundup PowerMAX® herbicide Suitable for irrigation Ultra-short growth period Plant in high plant populations.				
DKC80-30R	Leader in white maize cultivar Tolerant to Roundup PowerMAX® herbicide Use as refuge area along with DKC80-40BR GEN								
DKC80-40BR GEN	Twice the benefit in top genetics Tolerant to Roundup PowerMAX® herbicide Contains new YieldGard® II gene that controls stalk borer								

seedlings. farmers are urged to apply consistent weed management practices such as the application of herbicides, that is, Roundup Ready®, and minimum tillage practices, to ensure that fields are constantly kept clean and free of weeds; soil moisture contents to be maintained; erosion prevented (minimum tillage has proven very effective in assisting with the above). It is during this time that farmers should seek soil sampling services from relevant agronomic service providers in order to make informed decisions upon hybrid selection; information of such services may be obtained on request from any nearby co-operative.

Year after year, the pre-planting season without fail presents a rat race of seed and herbicide orders that flood in by the numbers; for this reason, it is advisable that farmers place their orders well in advance and get their finances in order as stocks are always limited and planting on time is vital to the success of the season.



Article submitted by Clara Mohashoa, Pula/Imvula contributor. For more information, contact her at 011 790 8200.

After the harvest: Take time to save time

Time spent on general farm maintenance and organising the store and tool shed is easy to neglect. However, if just a little attention is paid to these matters after the harvest season so much time can be saved in the long run. Hold-ups for repairs and time wasted searching for "stuff" will be avoided.

Maintenance is a crucial tool which can drastically reduce machinery costs throughout the season if preventative maintenance is done on machines. All too often we are inclined to glance quickly over the machines and equipment with a general eye, and not give the necessary critical attention to detail with thorough inspection, which could pick up problems of wear and tear before they develop or break, for example fan belts and bearings, which may need replacing.

Post-harvest season

Some farm machinery is used continuously throughout the year, whilst others, like harvest equipment and combines, may sit idle for many months. If these machines are not cleaned properly before they are stored, they can slowly degenerate and develop problems, so it is important to properly care for them and protect this investment.

During harvest time, these machines work hard and become covered in dust, dirt and grime, so they need to be cleaned properly, then inspected to see what things may need repair.

- Change the oil and filters, check the battery, change the air filters.
- Check through the cooling systems for leaks in radiators or perished pipes.
- Check that all lights are in good working order.
- It is also always a good practise to keep the fuel tanks filled to prevent condensation, which causes water in the fuel, which in turn is very bad for the diesel pump.
- All equipment should be properly greased.
- Tyres should be protected during storage. They should either be stored indoors or covered so they are protected from sunlight. It is also a good idea to jack the machinery up to take the weight off the tyres during the standing period.
- Wheel nuts should be checked and kept tightened, because loose wheel nuts cause movement and chaffing, and can even shear the wheel studs off, thereby causing the rims to develop cracks.

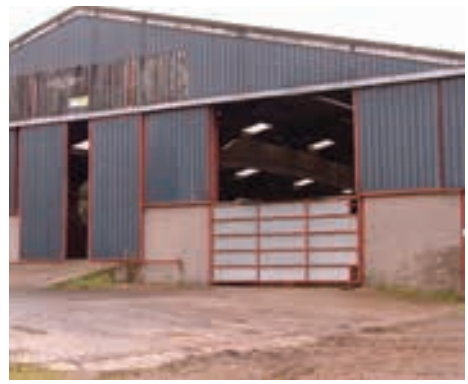
The machines should be prepared so that they are effectively ready for the next usage and time is saved when the next under-pressure harvest season comes around again.

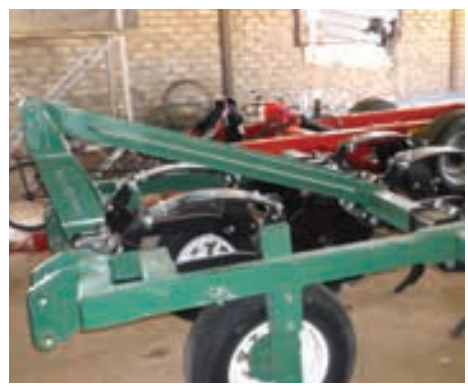
Storage spaces

The store sheds should always be cleaned out thoroughly and organised properly, otherwise they attract rats and mice which mess on the equipment and chew wires on the machines, which can present some nasty surprises when the machines are needed to work.

It only takes a little effort and planning to create order, which enables you to find things easily. Clean standing equipment from time to time and take a stock inventory quickly. Stack old containers together, pile useful bags in neat heaps and hang tools on racks or boards. Try to keep the floor areas clear and clean by using "rainy" days to work in the farm shed and storage areas.

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





Western Cape grain farmers – what to do before year-end

In the Western Cape, the month of September is called "the month of reckoning" in the cash crop production season. If we experience cool moist conditions during September, the growing season is lengthened, which may result in better seed fill, which in turn may result in better yields. The reverse is also true: If the rain ceases and the temperatures rise, the season is shortened and might result in lower yields.

This is something we are not able to control, since we are dependent on rain for our crop production. We can, however, find a middle path through the practice of conservation farming. If enough crop residues from the previous season's crop can remain on top of the soil, we can retain moisture for longer periods, thus enabling the crop to fulfil the function of seed filling.

From July towards September, we must be vigilant and monitor our crops regularly for insect and disease problems. Insects such as bollworms and aphids on wheat, barley and oats, and cabbage aphids, diamondback moth and bollworms on canola, can cause havoc with potential yields. Diseases such as various types of rust and powdery mildew must also be treated. We might have to apply fertiliser top-dressings and micro-element shortages must be corrected through foliar sprays.

From September onwards, the different crops near the time for harvesting, depending on when it was planted and where in the province the farm is located. This might occur from as early as middle September. If the crops are swathed, the swathing process might start from the middle of September, seeing as each different crop reaches the correct development stage. In the case of canola, swathing might actually start even earlier. Make sure you know the correct stage of ripeness and moisture content at which the different crops are harvested and that your harvester is in tip-top condition.

> *"Keep the eyes peeled and the nose in the crop, and may your harvesting season be successful.*

When harvesting canola, it is best to do it in the early morning until 11 am, then again from late afternoon until the dew becomes too heavy. The reason behind this is that the canola pods open very easily if it is harvested too dry and large harvest losses can occur, but if there is some moisture in the air, the pods tend to be more resilient and does not open as easily. If any crop is harvested too wet, it might cause problems at the silo or can even start to rot if it is not dried. The opposite is true for wheat and barley, if too wet, the kernels are not easily separated from the ears and chaff. The percentage impurities in the grain delivered to the silo increases, which results in lower grades and lower income.

Keep the eyes peeled and the nose in the crop, and may your harvesting season be successful.

Article submitted by Dr Johann Strauss, Directorate Plant Science, Western Cape Department of Agriculture. For more information, send an email to johannst@elsenburg.com.

September is the time for the different crops to be harvested. Make sure your harvester is in tip-top condition before harvesting.

Successful production of irrigated wheat

South Africa is a net importer of wheat, with imports rising from nothing in 1988 to nearly 1 900 000 (1,9 million) tons during 2013. The local wheat price on the Safex exchange is constant around R3 400/ton up to March 2014. If the rand continues to weaken, there might be upward pressure on this base price.

Farmers that have the physical resources to produce wheat under centre pivots can consider continuing to keep wheat in their crop rotation system. This local production will assist in reducing the imports required to satisfy the market. Each farmer must do a detailed gross margin analysis to determine if he can produce the crop profitably. Work out your breakeven point for direct and overhead costs in yield per hectare to be sure your production potential can meet this.

Management of irrigated wheat production in all aspects is critical to success.

Irrigated wheat yields in the various irrigation scheme areas on particular farms have steadily risen from an average of about 6,5 tons/ha to up to 10 tons/ha under centre pivot irrigation. 10 tons/ha has been achieved in a cycle following irrigated beans.

Production cycle

Please find below some check points to consider for the next production cycle.

Centre pivot irrigation equipment

The main pumping system together with the main electrical supply should be thoroughly inspected for any faults before planting the crop. Run the pivot system to check for any leaks and blocked or broken nozzles on the pivot. Also check all the tyres, bearings and gearboxes on the wheel systems.

Make sure that your Eskom contract and electricity supply for the coming season is in order.

Put out rain gauge funnels at intermediate spaces in the pivot land to be planted to wheat and measure and calibrate the actual precipitation with the settings in the main control box.

Irrigated wheat production under pivot requires high amounts of water at the flag leaf stage and through flowering. Any interruption in water supply with the resulting moisture stress to the plants can easily result in a loss of two or more tons of the planned production.

Irrigated wheat production under pivot requires high amounts of water at the flag leaf stage and through flowering.

Fertilisation

Adequate fertilisation in general and the supply of nitrogen in the form of dissolved urea is very important. Normally nitrogen is supplied in between three to five applications while irrigating. A yield target of 6,5 tons/ha will require at least 240 kg nitrogen, 40 kg phosphate and 55 kg potassium per hectare. Any fertiliser that is applied at planting should be placed below and to the side of the seed placement, so that any fertiliser damage to the germinating seed is avoided. Avoid applying more than 45 kg of nitrogen per hectare at planting. The other 195 kg of nitrogen required will then be applied through the pivot. Higher yield targets will require an upward adjustment to these basic requirements. Analyse your soils and get a proper recommendation from your fertiliser representative or agronomist.

Land preparation

Every situation depends on the management of stubble from the previous crop. Burning destroys large amounts of potassium. If you are using conservation tillage, set up your planters correctly and ensure that seed is placed correctly.

Wet profile

It is especially important to ensure that the whole profile of the soil is at field capacity prior to planting. The top can be left to dry off slightly to promote optimum soil conditions for planting and then the planted seed can be watered up for maximum germination.

Use the SAPWAT programme or soil probes to be able to monitor soil moisture at all levels during the growing cycle. It is very difficult, if not impossible, to catch up with any moisture deficit that develops.

Cultivars

Due consideration should be given to the correct choice of cultivars to produce the maximum yield under the conditions found on your farm.

Wheat cultivars are classified as true winter, winter and intermediate or spring types. This will be subject to the amount of cold pe-

riod required to initiate the growth habit from a vegetative stage to the production of tillers that will in turn produce seed heads or ears of wheat. The cold requirement process is known as vernalisation. Winter types produce more tillers from the secondary roots (stooling) that develop after the initial seed germination than the spring cultivars. Winter varieties can thus be seeded at a lower rate than the spring varieties.

Spring cultivars that are suitable for irrigation have no cold requirements and can flower from about 100 to 113 days after planting. Choose cultivars that have been well proven in your area. Choose which are suitable depending on whether or not you are producing in the cooler central irrigation areas or the warmer areas in the western regions of the production areas.

Contact the various wheat cultivar breeders and suppliers to keep abreast of what is performing the best in your area.

Planting date

Ideal planting dates for the cooler central areas are between 1 June and 25 July. A common practice in some irrigation areas is to rotate maize and wheat production in the cooler areas using fast maize cultivars. The maize crop is harvested at the latest in the first week of June followed immediately by burning or baling the maize stubble to make way for the seeding of wheat. In conservation tillage or no-till systems, only a robust suitable planter will do the job. Wheat planting after soybeans or a fallow break within the irrigated cropping cycle will be much easier. A large build-up of crop residues on top of the soil from preceding seasons can really hamper the proper emergence of the wheat plants. They can also become susceptible to root and stem diseases.

Plant populations

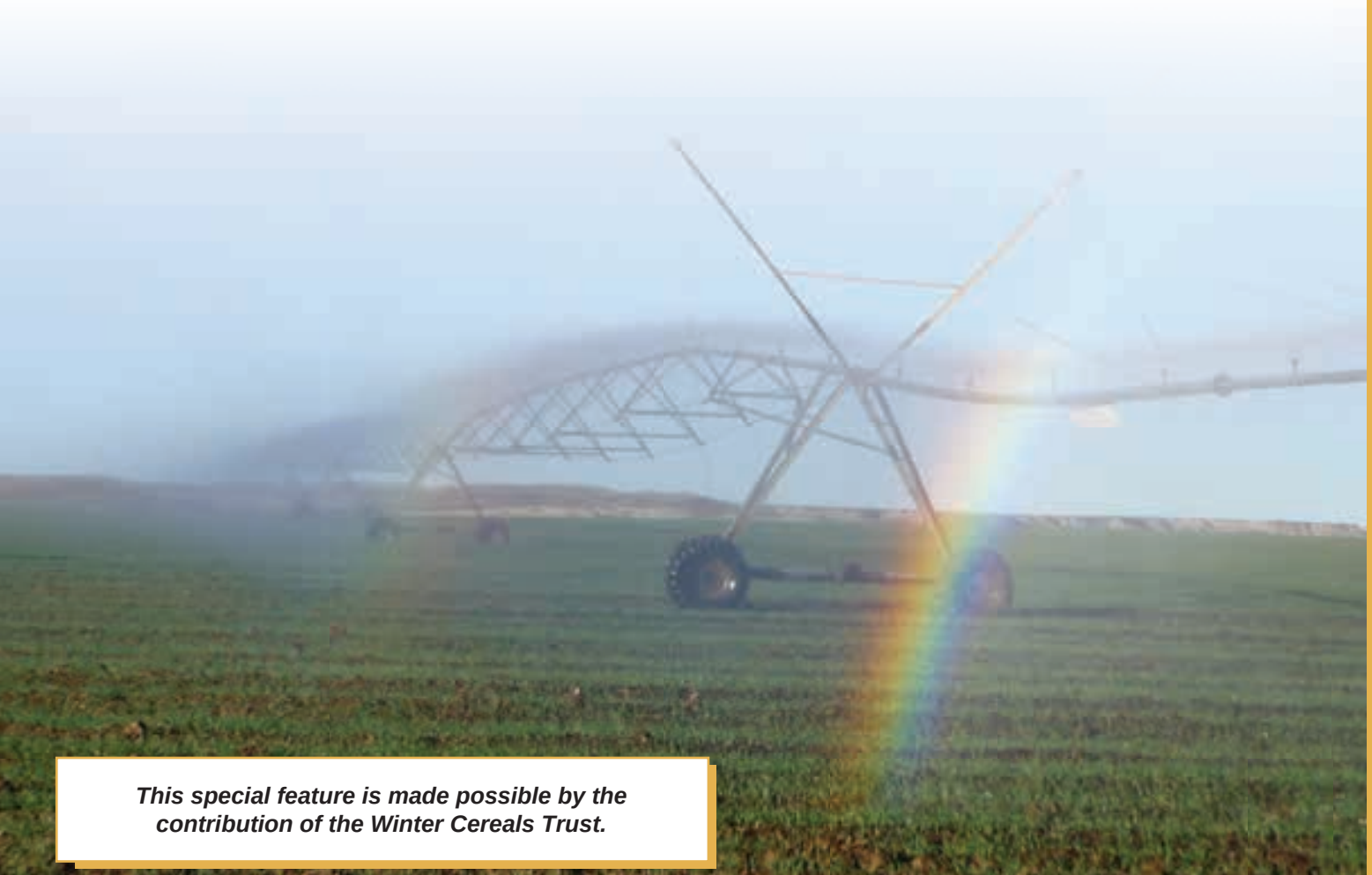
Recommendations for the ideal plant population vary from between 100 kg to 120 kg per hectare, resulting in a stand of between 250 000 and 325 000 plants per hectare. Local and personal experience with particular irrigated wheat varieties at various population densities will influence what the ideal is for your soils and farm. Always weigh 100 seeds to make sure you know how many potential plants you are seeding for every kilogram of seed used.

Make use of integrated weed and pest management programmes to monitor and control the crop from the first day of planting. Some production areas require the use of fungicides at certain growth stages.

Conclusion

Follow all the pointers highlighted above to ensure success. Inspect the growth progress of your crop daily when monitoring the efficiency of the pivot in providing adequate watering for the crop.

Article submitted by a retired farmer.



This special feature is made possible by the contribution of the Winter Cereals Trust.

Nematode control on annual crops

It is not always easy to apply nematode control effectively and timeously. Unfortunately, many farmers also do not really realise how much damage nematodes can cause, because they have no standard against which this can be compared on their farms.

Nematodes occur in the soil around the root system of the plant and are too small to detect with the naked eye. The farmer is therefore unable to see, like with insects, for example, how they inflict damage before it is too late. In addition, damage caused by nematodes is often confused with damage that is typically caused by drought, waterlogging, pesticides and nutrient deficiencies.

These factors, as well as the fact that nematode pesticides are often very expensive, cause the dry-land farmer often to take the chance of not applying nematode control in any form. However, when our unpredictable environmental conditions are beneficial to nematode reproduction in a specific season, the unprepared farmer suffers enormous losses. It is therefore wise to be preventive without necessarily paying a small ransom for the prevention.

A farmer has a few alternatives to consider for preventive measures. The positive and negative elements of each control method should be thoroughly weighed against one another so that the farmer can make an informed decision about the best method to employ in their circumstances.

By combining control methods, the farmer can benefit even more and better manage their nematode problems and spread the risk.

Chemical control (nematode pesticides)

Advantages:

- Most farmers still depend heavily on this option. The reason for this is obvious. Nematode pesticides remain very effective and definitely have a place in the management of plant-parasitic nematodes.
- Nematode pesticides are not specific and are not effective against all the plant-parasitic nematodes.
- Chemical control can be combined without problems with crop rotation and resistant cultivars.

Disadvantages

- The most important disadvantage of chemical control to a farmer is that it can be very expensive, particularly for dry-land farmers.
- Most nematode pesticides are red-band products, which means, that they are extremely toxic. If they are not used carefully and judiciously, the risk of environmental pollution and poisoning of people and animals is always present.
- If nematode pesticides are not applied as prescribed, the risk of residues in the plant material is always present because the majority of these substances are systemic and are absorbed by the plant.
- Our environmental conditions are unpredictable. The effectiveness of nematode pesticides can be negatively affected by unfavourable environmental conditions.
- Biological breakdown where nematode pesticides that fall in the same chemical group are repeatedly used on the same soil can also play a role. The microbial organisms in the soil break down the substance much more quickly so that it does not remain effective for very long.
- Chemical control can be combined with biological control only with careful planning and deliberation.

Biological control

Advantages

- Biological control is applied by using products that contain living organisms that are harmful to the pest that the farmer wants to control. It is environmentally friendly and cannot pollute or poison the environment.
- Biological control combined with crop rotation and resistant cultivars can be employed to control an nematode infestation.

Disadvantages

- Because the products contain living organisms, the product can contain special prescriptions with regard to the storage of the product to keep that organism alive.
- If biological control is applied, the effect is often not visible within the first two to three years, and often longer. The organisms require some time to establish themselves in the soil and then to reproduce on their own.
- If the environmental conditions in a specific area are not conducive to the organisms used in the biological control process, they will not survive to effectively control the nematodes.
- Biological control can be combined with chemical control (including chemical control of all pests) only with careful planning and deliberation because the chemical pesticides can also kill the organism in the biological-control product.

Crop rotation

Advantages

- Not only nematodes, but other pests too can be controlled in this way if the right crop/cultivar is used.
- It can be beneficial to the next crop.
- It is environmentally friendly.
- It can be combined with chemical and biological control as well as with resistant cultivars.

Disadvantages

- The farmers often have a limited choice of rotation crops.
- In terms of nematode control it is not the crop that ensures success, but the cultivar concerned. There should therefore be a cultivar available that is resistant to the particular nematode that the farmer wants to control.
- The farmer should be aware of which type of nematode causes the most problems before he can decide on crop rotation that is applied specifically for nematode control.

Resistant cultivars (if available)

Advantages

- The nematode population is kept under control so that it cannot cause economic harm.
- Yields can be increased in nematode-infested fields without the farmer having to incur additional costs.
- It is environmentally friendly.
- It can be combined with chemical and biological control as well as with crop rotation.

Disadvantages

- Resistant cultivars often display resistance to only a single nematode species and will not be effective against a wide variety of species.

Article submitted by Dr Sonia Steenkamp, ARC-Grain Crops Institute, for SA Graan/Grain September 2012. For more information, contact her at 018 299 6100.

Downy mildew:

A potential threat to sunflower production

Sunflower downy mildew caused by Plasmopara halstedii is known to occur in all sunflower growing countries except for Australia. Plasmopara halstedii is primarily a soil-borne fungal pathogen and is rarely seed-borne. It usually infects sunflower plants through the roots of young plants and is a destructive disease that can result in losses of up to 50% - 95% in cool wet weather. Locally, infections of up to 15% have been observed primarily on heavy clay soils in the Rustenburg and Koedoeskop production areas.

Yield loss from downy mildew depends on factors such as incidence and geographic distribution of the pathogen, percentage of infected plants in the field, and the seasonal weather conditions.

Plants that survive the disease often compensate for those that die prematurely after sporadic infection. However, yield losses may also become more severe in highly infected fields due to plant mortality, poor quality and reduced seed production as well as a reduction in seed oil content.

Signs and symptoms

Signs and symptoms primarily occur as systemic and secondary symptoms in sunflower plants. Systemic symptoms appear in seedlings infected through the developing roots, and include stand reduction, plant death with blank spots in the field (**Photos 1 and 2**).

Infected seedlings can be identified by thickening and yellowing (chlorosis) of leaves that can be noticed on the cotyledons or the first true leaves. Chlorosis widely occurs along the leaf veins and sometimes throughout the entire leaf (**Photo 3**).

Fungal mycelium and spores can be easily identified by their white, cotton-like masses on the underside of the leaves (**Photo 4**). Systemically infected plants are usually severely stunted (**Photos 1, 2 and 5**) with reduced seed production at maturity.

The sunflower head develops, but appears to stare straight up into the air (**Photos 2 and 5**).

Secondary infection occurs when windblown zoospores (asexual spores) land on sunflower leaves. Secondary infections on the upper leaf surface appear as small and angular chlorotic lesions whereas white, cotton-like masses show up on the underside of the leaf. Secondary infections rarely cause systemic symptoms or yield loss.

Disease cycle

Plasmopara halstedii can survive for up to ten years in the soil as sexual, thick-walled fertilised female cells (oospores) that are produced just beneath the epidermis of infected plants and they are more prevalent in roots than in leaves.

Oospores germinate in cool (12°C - 14°C) and water-saturated soils giving rise to asexual, motile zoospores. Zoospores initiate systemic infections by infecting sunflower seedlings before the root reaches about 5 cm in length.

Plants surviving such initial infections later produce white zoosporangia (a structure in which zoospores develop) on the underside of the chlorotic patches of the leaves. Windborne zoosporangia land on sunflower leaves resulting in secondary infections, particularly in sunflower plants exposed to moist conditions for long periods.

Management of downy mildew

Resistance

Planting downy mildew-resistant hybrids is important in the management of the disease. However, due to the development of new pathogenic races, resistance may not sufficiently control the disease in all areas where the disease is endemic.

Evaluating downy mildew resistant lines to the various races collected from different growing regions, can enable researchers to determine and select new resistant hybrids.

Crop rotation

Crop rotation is not effective in the management of downy mildew compared to other sunflower diseases such as Sclerotinia, rust and phomopsis due to the overwintering oospores that can survive in the soil for many years.

Seed treatment

Downy mildew has been effectively managed through the use of fungicide seed dressings in the past. However, some Plasmopara halstedii races have developed resistance to two of the most commonly used fungicides, metalaxyl and mefanoxam, in various countries.

Once fungicide resistance develops, disease control cannot be achieved by increasing the dosage rate of the seed treatment. Nevertheless, other seed treatments, such as azoxystrobin, are still effective.

Foliar fungicide sprays are also ineffective against systemic infections and are not economical for prevention of secondary infections since these do not cause significant yield.

Weed control

Wild sunflower species and volunteer plants are natural hosts of the downy mildew pathogen. The elimination of such wild sunflower species and volunteers can effectively reduce the *Plasmopara halstedii* inoculum as well as the inoculums of other economically important sunflower diseases, such as rust and Sclerotinia.

Disclaimer

Reference to commercial products or trade names in this article is for the information and convenience of the reader. Such use does not constitute an official endorsement or approval by the authors and the ARC-GCI of any product or service to the exclusion of others that may be suitable.

Article submitted by Dr Edson Ncube and Dr Bradley Flett, ARC-Grain Crops Institute, Potchefstroom, for SA Graan/Grain September 2012. For more information, contact them at 018 299 6100.

Photos 1 and 2*: Blank spots and stunted plants in a field with a high incidence of the downy mildew pathogen. Please note that in Photo 2, the white discolouration in non-stunted plants is due to powdery mildew disease. (Photos: Bradley Flett)*
Photo 3*: Typical chlorotic symptoms bordering and covering leaf veins in a systemically infected plant. (Photo: Sam Markell)*
Photo 4*: White, cotton-like growth of pathogen (sporulation) on bottom leaf surface due to extended periods of cool, wet weather. (Photo: Sam Markell)*
Photo 5*: Systemically infected plant. Note severe stunting and movement of head upward. (Photo: Bradley Flett)*

Conservation farming: Manage the biology of your soil

The attitude of farmers towards conservation farming has changed increasingly over the past few years. The realisation is taking hold that sustainable farming requires conventional farming practices to be changed.

The conversion from a conventional to a conservation farming system involves cultivating crops in a different environment. The soil is no longer tilled intensively, crop rotation is applied, and crop residues remain on the soil surface.

In the changed environment one of the almost forgotten aspects of soil science, soil biology, is probably affected the most. The biological processes and properties of the soil combine the physical and chemical properties of the soil. We use this premise to look at the effect of conservation farming practices on the biology of the soil.

Soil inhabitants

Soil houses a diverse community of biological creatures, comprising viruses, bacteria, fungi, algae, protozoa, mites, eelworms, worms, ants and other insects. Each of these organisms plays an important role in breaking down organic matter and regulating the cycle of macro and micro-nutrients that the plant can use.

Fungi and bacteria constitute the most important and biggest percentage of micro-organisms in the soil. Bacteria play a critical role in breaking down residues and recycling carbon, nitrogen, phosphorus and other minerals. The presence of live plant roots in the soil in particular stimulates bacterial activity.

Some species require no oxygen, while others do. Because of the need for oxygen, some bacteria are less active, particularly in wet soil (anaerobic), which contains less oxygen.

In the anaerobic conditions organic matter is not broken down effectively. On the other hand, tillage aerates the soil and bacteria flourish because of the increase in oxygen, the crop residues that are worked into the soil, and respiration that increases.

Populations increase rapidly, which results in the breakdown of organic matter and the release of nutrients. However, this story also has a downside. The rapid respiration rates cause the soil to lose carbon to the atmosphere and also cause a possible loss of valuable nutrients, which can leach out before the plants can absorb them.

This problem is prevented by conservation farming. The soil is not enriched with excessive oxygen and plant residues, and the soil carbon is retained. At the same time, nutrients are released gradually so that they can be utilised by the plants. Well-managed conservation farming fields with a good soil structure and root canals promote moderate aeration without the side effects of tillage.

The role of fungi is clearly illustrated by the symbiotic relationship between roots and mycorrhizae. The fungi benefit certain crops in that they facilitate the absorption of phosphorus and other minerals like calcium, zinc and copper by the plant. Mycorrhizae help to stimulate the process and accomplish a chemical change in the soil.

A simple explanation is that mycorrhizae obtain sugars from the plant roots and release them to other bacteria and organisms. The organisms then help the plants to absorb nutrients in the soil. If the mycorrhizae are inactive, phosphorus can become limited and more fertiliser is required. This is particularly noticeable where conventional practices like ploughing are used on soil with limited phosphorus, and the mycorrhiza fungus is disturbed. With conservation farming the mycorrhiza fungus in particular is present because the soil is not disturbed.

> *Because the soil is not disturbed with conservation farming, it promotes the presence of earthworms in the soil. Earthworms are regarded as soil engineers because of the dramatic changes they accomplish in the soil structure.*

Where mycorrhizae colonise the plant roots, higher photosynthesis levels can occur, and water consumption is higher and better, while different types of carbon products are transported to the roots. Carbon products are excreted continuously from the live roots, which keeps the mycorrhizae alive.

The fungus produces a gum-like sugar that is called glomalin. Glomalin is the product that allows soil to form aggregates. The establishment of a grass ley can also indirectly promote the process of glomalin formation. The symbiotic environment between plant roots and mycorrhizae can then also result in fewer pathogens, as well as more beneficial rhizo bacteria.

Soil engineers

Because the soil is not disturbed with conservation farming, it promotes the presence of earthworms in the soil. Earthworms are regarded as soil engineers because of the dramatic changes they accomplish in the soil structure.

They improve the structure of the soil because they dig tunnels in their search for food. They pull organic matter into the soil, which in turn improves the fertility of the soil. The tunnels also help to drain rainwater from the soil surface, and aerate the soil.

Earthworm casts (soil that has moved through the body of the worm) give the soil a crumbly texture, which is beneficial for plant growth. These casts have been found to have a higher nutrient content than the surrounding soil.

Earthworms also help to curb eelworm numbers and disease-causing fungi because they feed on them. Conservation-farming practices consistently lead to more and larger earthworms. Unfortunately, earthworms are

The contribution of soil microbes and roots to soil structure in conservation farming.

limited to moister, cooler conditions and will therefore not be found in the drier regions of the country.

Establishment of a healthy soil habitat

The populations in the soil depend on the conditions in the soil and the quality of the food sources. The poorer the food source, the more difficult the living conditions.

Soil organisms can survive in poor conditions, but react strongly to favourable conditions. A method of stimulating microbes is not to disturb the soil and cultivate a legume. The less the soil is disturbed, the better for the growth of microbes. However, the opposite also applies, as more disturbance makes it more difficult for microbes to flourish.

Diverse food sources (for instance with crop rotation) can have a moderating effect on soil life if conventional practices like ploughing are applied. Another advantage of the diversification of food sources is that soil life can be helped to recover from certain fertiliser administrations, for example. In general the establishment of cover crops and the rotation of crops are recommended to provide soil organisms with that source of food variety. Only one season of crop rotation can create a robust colony of soil microbes that can improve the soil quality for a period of up to five years.

Mycorrhizae populations can also be enhanced by planting legumes together with rotation crops like maize, sunflower and soybeans, which are extremely dependent on mycorrhizae. Biodiversity therefore promotes soil quality.

Plant diversity also influences soil chemistry. Different plants differ in the way in which they absorb nutrients from the soil. As plants grow and reach maturity, some of their residues start to decompose and nutrients are released to form organic material in the root zone.

The microbes therefore play an intermediary role and serve as temporary storage place for nutrients that are in due course released for the plant's use. Diversification of crops has major benefits for the soil as a result of the root structure and depth of crops.

The root material in the soil profile contains the key to the promotion of soil quality and structure. Cover crops or grass leys are ideal for this and ensure that the profile is filled with long and short roots. The roots will later form organic matter and produce this variety of material that promotes life underground.

The key to sustainable grain production is high-quality soil. The quality is largely ensured by the microbial population in the soil. Conservation farming is the right way of allowing the microbial population of the soil to come into its own.

Article submitted by Owen Rhode and Charné van Coller, ARC-Grain Crops Institute, Potchefstroom, for SA Graan/Grain September 2012. For more information, contact them at 018 299 6100.

Consider conservation agriculture

Since the earliest times, man has tilled the soil to plant seed in order to provide himself with food. Manual tools and animals were used to till the soil so that man can plant.

The breaking open or loosening of the soil had certain benefits, because it was a way of preparing a good seedbed. Weed control was also applied to a certain extent where soil had been turned. The penetration of rainwater also improved after tillage. Soil aeration also improved, which benefited the soil organisms that require oxygen to survive and increase.

Primary tillage involves aggressive cultivation of the soil and some of the implements used cause more damage to the structure of the soil than other methods.

Traditional tillage followed, where ploughs are used to break and turn the soil. Timeous secondary tillage is used just before planting to control weeds from early weed growths and self-sown maize. This ensured a good seedbed in which we could plant successfully. If sufficient moisture was present in the soil, seed germinated well and a good plant population could be easily obtained. The use of herbicides after planting ensured adequate weed control and this worked very well.

This was the norm across the world, and remains the practice globally, but to a lesser extent in modern times.

The first tillage after a season is determined by the quantity and types of plant residues in the fields after a harvest. If there were large quantities of tall residues, we use a disc plough to cut up the residues before ploughing. The farmer has to try and plough when the soil contains sufficient moisture. Too dry soil requires a lot more traction and force, and the soil breaks open in large clods that will require even more tillage to break down. If the soil is too wet during ploughing, it compacts and deep-tooth implements have to be used later to break up the compaction layer. With the aid of a disc plough, fertiliser or lime and in some cases herbicides can be worked in more effectively than with a tooth implement, which may require two or three tillage processes.

These days farmers plough less and employ minimum tillage by using a disc plough, followed by a chisel plough with a roller. This tillage leaves very few surface residues, which could lead to the same erosion damage as conventional tillage.

In South Africa, where erosion and droughts are a major problem, we have to look at the conservation of moisture. Here we employ no ploughing or disc tillage to ensure that the farmer works residues into the soil, but also rather leaves the residues on the surface. This can be done with tooth implements, but tooth implements easily block up with too much residue on the field. To break up the residues, farmers use upright cutting wheels that cut up residues as well as rollers with blades that also cut up residues into smaller pieces.

With minimum tillage, the seed is planted in a narrow band where the soil is disturbed, with no tillage between the rows. The use of herbicides makes it possible to leave the rest of the soil untilled. With minimum tillage, a specialised planter is used, and this is expensive. These planters are heavier and have to be stronger to cut up plant residues and to cut open paths in untilled soil for seed placement. This form of tillage has become very popular across the world. The infiltration of rainwater, less erosion, lower soil temperatures and better moisture conservation are only a few benefits of the system.

Choice of tillage

The degree to which soil compacts must be determined before a farmer can select the type of tillage to use. Compacted soil will delay plant roots or prevent them completely from penetrating the soil any deeper. Groundwater and nutrients below the compacted soil will not be available to the plant roots. Compaction or a crust can also occur in the form of a layer on top of the soil, where it can affect infiltration and the growing of seedlings. The best method of determining compaction is digging profile holes to check the plant roots below the surface. Normal plant roots are well branched, with numerous capillary roots, while affected roots appear thickened and truncated at the level where penetration is a problem.

Sandy soil will compact more quickly with less soil moisture than clay soil. Wind-blown sand will be more sensitive to compaction, even if it is almost completely dry. A ripper is usually used here in winter at a depth of 450 mm, with row widths of 1,5 m. Planter rows are planted directly on the ripped rows so that plant roots have access to the available soil moisture deeper down in the soil. Plant residues must be retained on the wind-blown sand to limit erosion as far as possible. On heavier clay soils (5% - 10%), which have a better ability to retain water, periodic deep tillage will also be required. On heavier clay soils (10% - 20%), where densification occurs and where the field is ploughed, the tractor wheel in the ploughing furrow will cause densification. The use of tooth implements should eliminate the problem on the soil to a reasonable extent. Soil with a clay content of more than 20% seldom has a compaction problem, provided it is not tilled while it is too wet. Where the danger of compaction exists, a chisel plough will provide better results than ploughing as the wheel in the ploughing furrow is eliminated.

For economic reasons unnecessary tillage should be eliminated and conservation farming should be applied. Due to the current cost problems, erosion hazards and moisture conservation farmers should concentrate more on minimum tillage and conservation tillage if their soil allows this.

Article submitted by Jurie Mentz, Development Co-ordinator of the Grain SA Farmer Development Programme. For more information, send an email to jurie@grainsa.co.za.

Financial planning for your next crop

The only place where you will find SUCCESS before WORK is in a dictionary. To be successful in your business, you must put in a lot of effort (work), and to compile a financial planning requires work.

Why must I do a financial planning before planting my next crop?

Many answers to this question could be provided, but the most basic answer is that you are farming to earn yourself a living. To achieve this, your business must be successful – total income must be more than total expenditures – then there is a profit of which you can use for yourself (your salary).

Farming is the most difficult business to run and to make a profit requires top-notch management. Financially wise farmers face the challenge of the so-called cost-price squeeze, whereby the prices of your inputs (expenditures) increase at a higher rate than the prices of your outputs (products). The general consensus is that for the past season the average increase of all agricultural inputs were on average 19%, whilst the increase of the price of commodities were much less.

The challenge for our farmers is to improve production in order to increase income, whilst containing the cost of inputs. This can be done through proper management – planning, organising, implementing and control. Financial planning is thus part of the planning task of proper management. You have no choice – you must plan to be successful.

Table 1: An example of a production budget for conventional white maize 2013/2014 season.

	R/ha 3,5 tons production/ha	Total estimated cost to plant (100 ha)
Income @ R2 145,00/ton	7 508,00	750 800,00
Gross production value	**7 508,00**	**750 800,00**
Less: Direct allocated variable costs		
Seed	457,00	45 700,00
Fertiliser	1 454,00	145 400,00
Lime	330,00	33 000,00
Herbicides	375,00	37 500,00
Pesticides	163,00	16 300,00
Insurance – input	148,00	14 800,00
Fuel	805,00	80 500,00
Repairs	515,00	51 500,00
Crop insurance	285,00	28 500,00
Marketing costs	237,00	23 700,00
Total costs	**4 769,00**	**476 900,00**
Gross margin	**2 739,00**	**273 900,00**
Less: Overhead and fixed costs (if available)	2 350,00	235 000,00
Net enterprise income	**389,00**	**38 900,00**

How do I do a financial planning for my next crop?

Strange as it might sound, but you start with your practical production process. Therefore the first step is to write down, in as much detail as possible, every step you will take to produce your crop – from preparing the seedbed up to harvesting and marketing. This is your production management programme. In this programme you must answer the following questions:

- What am I going to do?
- When am I going to do it?
- How am I going to do it?
- How much do I aim to produce per hectare? When and how am I going to prepare the seedbed? (Plough, rip and minimum tillage.)
- What seed will I be using and how much?
- What insecticides and pesticides will I be using?
- How will I control weeds – mechanical and/or chemical?
- How and when will I harvest?
- How and when will I market my product?

Thus a production management programme is a **written, step by step description of** every step of the production process of a specific enterprise. It addresses the question **"How to produce"** in full.

The unfortunate thing is that you must do a financial planning every year, but the fortunate thing is once you have compiled a production management programme and a financial planning, it is much easier the next year. But, and this is an important but – reconsider and revise your programme and planning every year. It is imperative in order to improve your production every year. New cultivars are developed, new improved chemicals are available, there will be new technology, and so on.

The **next step** is to put financial figures to every action/task and for this you need information on prices, both for income and expenditures. It is advisable to work on a per hectare basis and then to translate it to the number of hectares you will be planting.

Table 2: An example of how to calculate the amounts you will use per hectare times the cost of the input.

Estimated cost of seed					
Expected price/25 kg bag (a)	**Seed per ha (b)**	**Cost per ha (c) (a/25 x b)**	**Hectares to be planted (d)**	**No of bags to purchase (e) (d x 6)/25**	**Total expected cost (c x d)**
R1 904,00	6 kg	R457,00	100	24 bags	R45 696,00
Estimated cost of crop insurance					
-	-	R285,00	100	-	R28 500,00

Occurrence of ear blight in South Africa

Ear blight is one of the major diseases that affect irrigated wheat. It occurs on barley, oats and maize and causes a decline in yield and quality. The fungus also produces mycotoxins that can be harmful to people and animals.

Crop rotation with wheat-maize leads to a build-up of inoculum in the soil, which can cause an outbreak of ear blight in the next season. Currently there are several species of fungus that cause ear blight, and there are also no cultivars that are resistant to it. There are currently also no fungicides registered in South Africa to control this disease.

The downward bend of wheat beard after it has been infected with the ear blight fungus.

Symptoms

Ear blight can be identified by a dark brown lesion that occurs on infected chaff just after flowering. Usually the infected chaff becomes straw-coloured, while the rest of the chaff is still green. The beard of the infected chaff bends downwards (**Photo 1**).

Sometimes a pink to orange discolouration appears on the outside of the chaff. The infected grains are shrivelled and light-coloured, while fungus growth can also sometimes be observed on the grains.

Ear blight symptoms can easily be confused with those of foot rot. Foot-rot infected plants, where the roots of the plants are affected, are easy to pull from the soil, as the roots are brittle and break easily, while this does not happen with ear blight.

Stunting of foot-rot infected plants occurs as a result of the restriction of nutrient absorption, while ear blight occurs only in the chaff on ears and the rest of the plant has a normal appearance.

Infection

Shrivelled grains are easily blown out by the combine harvester and this causes the build-up of inoculum in a field. Because maize is attacked by the same fungus, the maize can also be infected if it is planted immediately after the wheat has been harvested.

In maize the fungus causes ear rot, and crop rotation between maize and wheat is therefore not recommended. Infected seeds can also contain harmful mycotoxins and should preferably not be used for animal feed, as it can lead to a decline in reproduction, depending on the toxin levels.

When infected barley seed is used to produce beer, the mycotoxins can cause the beer to foam uncontrollably – called the gushing of beer. Various species that cause ear blight can be found in different areas.

It is important to remember that although the ARC-Small Grain Institute (ARC-SGI) does not encourage the withholding of seed, small and shrivelled seeds (**Photo 2**) should be removed before storage, and the seed should be stored in a cool, dry place away from sunlight and insects to prevent a decline in germination.

If seed is not stored correctly, the fungus can grow on the seed and higher levels of mycotoxins can occur. When infected seed is planted, the germination of the seed can be affected.

The treatment of wheat seed can increase the viability of the seed, but in most cases the treatment of the seed will have no effect on the ears of the plant, as the seed treatment protects the plant only for a short period. When the ears appear later in the season, the seed treatment has already lost its effectiveness and no longer protects the ears during flowering, when they are susceptible to ear blight infection.

Control

There are no chemical substances registered in South Africa to control ear blight. Even if these substances are administered, the time of administration, the quantity of the fungicide

Fusarium-infected wheat grains (light-coloured, small and lightweight) mixed with healthy grains.

*Table 1: Levels of susceptibility of irrigation cultivars in South Africa to ear blight.**

Cultivar	Level of susceptibility
Baviaans	Moderately susceptible
Buffels	Unknown**
CRN 826	Highly susceptible
Duzi	Moderately susceptible
Kariega	Moderately susceptible
Krokodil	Susceptible
Olifants	Moderately susceptible
PAN 3434	Moderately susceptible
PAN 3471	Susceptible
PAN 3478	Moderately susceptible
SST 806	Moderately susceptible
SST 822	Susceptible
SST 835	Highly susceptible
SST 843	Susceptible
SST 876	Highly susceptible
Steenbras	Susceptible

** Information in the Guidelines for the Production of Small Grains for 2012.*
*** Currently being evaluated*

and a follow-up spraying are not always effective and are very difficult to implement successfully, as all the plants do not flower at the same time – even if only one cultivar has been planted.

The Department of Agriculture, Forestry and Fisheries is currently researching the chemical control of ear blight with the aid of fungicides, and this could lead to the registration of such chemical substances. The best control method at present is to reduce the amount of inoculum present on the field, as the fungus survives on dead plant material. Dead plant material, e.g. stubble, can be ploughed back and/or burnt to reduce the occurrence of the inoculum that causes the disease. Remember that the burning of stubble can lead to erosion, low nitrogen levels and the loss of soil moisture, and it is not always economical either.

At the moment the ARC-SGI is identifying sources of ear blight resistance and resistant strains will then be used in a breeding programme, as most of the South African wheat cultivars are susceptible to ear blight (**Table 1**). The different levels of susceptibility of the cultivars are indicated in Table 1.

If you detect any symptoms of ear blight, contact Cathy de Villiers at 058 307-3452. All enquiries will be dealt with.

Article submitted by Cathy de Villiers, ARC-Grain Crops Institute, Bethlehem, for SA Graan/Grain September 2012. For more information, send an email to devilliersc@arc.agric.za.

Financial planning for your next crop

Where do I get prices?

This takes effort and time. Use your prices from the previous year, if you have them, as a basis. Contact your service providers, contact Grain SA, what about your study group? Consult the different magazines available, consult the internet if available.

To calculate the cost per hectare for each item, you need to calculate the physical amount you will use per hectare times the cost of the input. The difficult costs to calculate are the fuel and repair costs, but should you have historical figures, it can be used as a basis to work from.

What is next?

When you have all the financial information, you must compile a production budget, also known as an enterprise budget, of which the following is an example. The production budget will reflect the production costs for the next year, based on your enterprise production management programme. Remember that a budget is defined as a written plan, expressed in physical and financial quantities, of future actions of your business in order to achieve the objectives set.

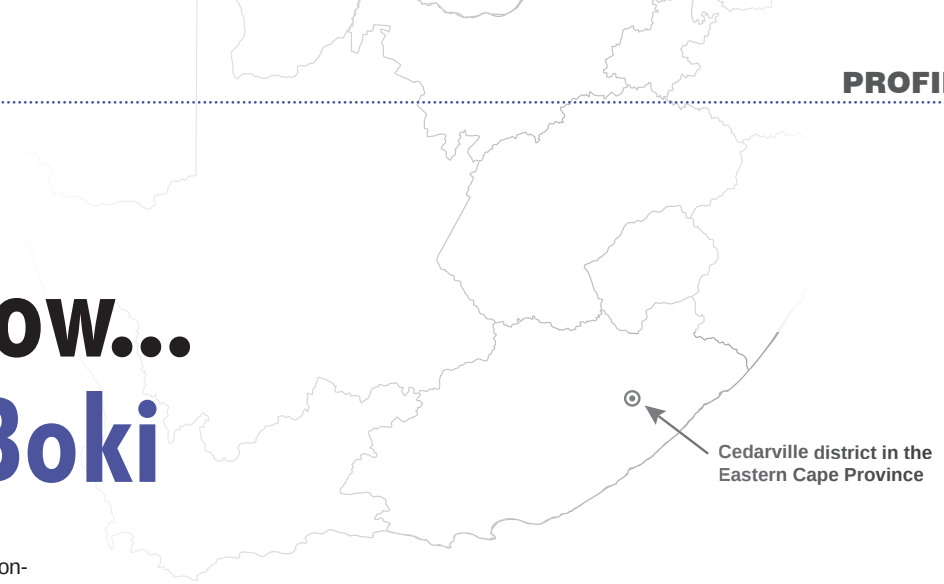
Should you not be able to draw up your own enterprise budgets, remember that assistance is available from various institutions. You can also get someone to do it for you, even if you have to remunerate the person – it will be worthwhile – that is a guarantee; or obtain a budget from, for instance, Grain SA, your input service provider or an agricultural company in your vicinity. Although these budgets may be generalised, it is a good starting point.

Once you have gone to the effort of compiling a budget, it just makes sense that one should use it properly as a management tool. When using your budget to the fullest, it promotes discipline in the management of your business. As you are the owner/manager of your own business, it can at times be difficult to be your own "boss" as well. Being your business and your money, you can do what you like and spend money as you wish. Conduct of this nature is, however, a sure way to disaster. A budget can fulfil this function of becoming your "boss" to the benefit of your business. Using it promotes the discipline to complete all tasks as planned at the cost allowed for the task. A budget will assist you to be in charge of your business in a disciplined manner.

Remember, the only place where you will find SUCCESS before WORK, is in a dictionary, and to do a financial planning requires time and effort (work). Nobody has ever said farming is easy – farm to the best of your ability, it can be rewarding.

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

Get to know...
Maurice Boki



Meet Maurice Mthandeki Boki, a passionate, animal loving, man of the earth, committed to doing his best and always striving to achieve success.

Where and on how many hectares are you farming? What do you farm with?

I am currently farming on a 1 178 ha farm in the Cedarville district of the Eastern Cape.

What do you farm with?

I farm predominantly with cattle and have currently planted 135 ha of maize. I am also running a 200 cow herd on the veld. Farming is an absolute passion which provides me with the inspiration and motivation to want to farm all the time.

What motivates/inspires you?

My passion for agriculture has been my biggest motivation. Ever since I was a child, I have been inspired to be a man of the earth, and have an absolute love for animals. My wife, Kholiswa, and I have four children. My son, Stembile, is in the corporate world in Johannesburg, my eldest daughter, Lindelwa, is a doctor in East London and our second daughter, Zintle, is in marketing in Johannesburg and our youngest daughter is currently at home.

Describe your strengths and weaknesses

Strengths: My biggest strength is the firm commitment in doing your absolute best and striving to achieve success.

Weaknesses: My weakness is the same as everyone else, which is being too hasty and wanting to achieve a lot very quickly. I want everything done yesterday.

What was your crop yield when you started farming? What are your respective yields now?

I started farming commercially in 1995 after the purchase of my first farm. Prior to this I ran a trading store, where I dabbled in farming and speculating with livestock. When I stared farming, I was only able to achieve 2,5 tons of maize per ha. I am now currently achieving yields in excess of 6 tons per ha. I am also running a herd of 200 cows. Weaning weights have also increased from 40 kg to 50 kg.

What would you say is the main contributor to your progress and success?

Pure hard work, commitment to achieve short-term and long-term goals as well as the support from my family are the main contributors to my progress and success.

What training have you received to date and what training would you still like to do?

I have attended numerous courses at Cedara over the last 20 years. One cannot ever have enough knowledge.

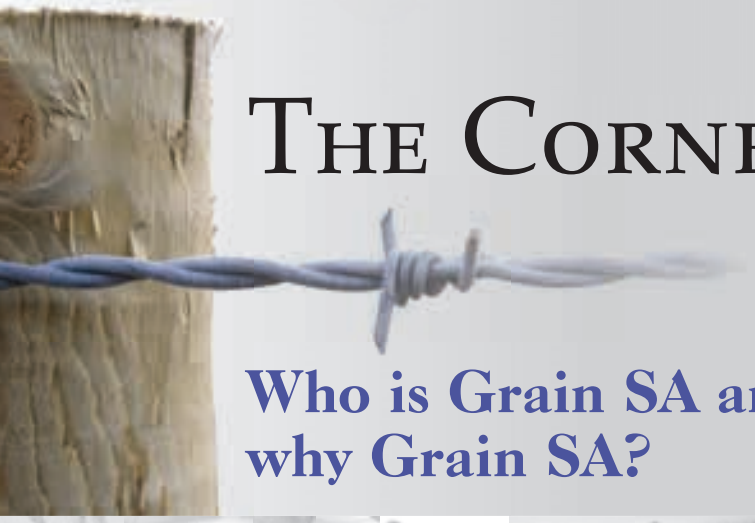
Where do you see yourself in five years' time? What would you like to achieve?

In five years' time I would like to be able to achieve 10 tons of maize per ha on dry land and also expand hectares planted as well as to increase my breeding herd to 400 cows. My biggest limiting factor will be the shortage of land.

What advice do you have for young aspiring farmers?

For all the young farmers out there: Don't think that you will become rich overnight. Farming is a tough, time-consuming process to develop financial stability. It requires a huge amount of dedication, patience and effort to achieve in farming. One should not forget that the main objective of farming is to feed the nation.

Article submitted by Johan Kriel, Development Co-ordinator of the Grain SA Farmer Development Programme. For more information, send an email to johank@grainsa.co.za.



The Corner Post

Who is Grain SA and why Grain SA?

During the 2012/2013 production season for summer crops, Grain SA partnered with the National and various Provincial Departments of Agriculture and Land Reform on a number of projects. This begs the question – "Who is Grain SA and why partner with Grain SA?"

Grain SA is the commodity (producer) organisation for the grain, oil seeds and cereals industry in South Africa. The Grain SA Farmer Development Programme has been running for more than 13 years and has more than 4 000 black farmer members. The focus of the programme is on training and skills development which is done through Study Groups, Farmers' Days, Demonstration Trial Plots, a Farmer of the Year competition, support to individual farmers, a monthly newsletter (published in seven languages) and 24 different training courses. The training programme of Grain SA is accredited by the AgriSETA.

The Head office of Grain SA is in Pretoria, and the Development Programme is housed in Bloemfontein. The farmers in the development programme are serviced by the regional personnel based in Belfast and Nelspruit (Mpumalanga), Vryheid (KwaZulu-Natal), Kokstad and Mthatha (Eastern Cape), Paarl (Western Cape), Ladybrand (Free State) and Lichtenburg (North West).

The members of the Grain SA Development Programme vary – both in terms of the size of their farming operations as well as the systems of land tenure. There are members of the programme, who are on communal land (from 1 ha upwards), commonage land, rented private land, privately purchased land as well as all forms of redistribution (SLAG, LRAD and PLAS). Although the challenges may differ from farmer to farmer, in our experience the farmers lack knowledge and skills, tractors and implements, production inputs and on-farm support during the growing season. Our recent experience in the North West has made us realise that with good support and mentoring, access to arable land coupled to the grant support from government programmes (mechanisation as well as production inputs) we can make a real impact on food security, rural unemployment and income generation in the rural areas.

How does Grain SA manage grant funds?

It is essential that all efforts to support developing farmers should be working towards their sustainability and eventual independence. A problem many developing farmers experience, is that they are not able to borrow money (production finance) because they do not have a banking record. Although for the duration of his project, the farmers will be mentored and supported in all aspects of crop production, we would also like them to become familiar with normal commercial procurements. In order to attain our goal of sustainability and independence, we use the following process for all procurement

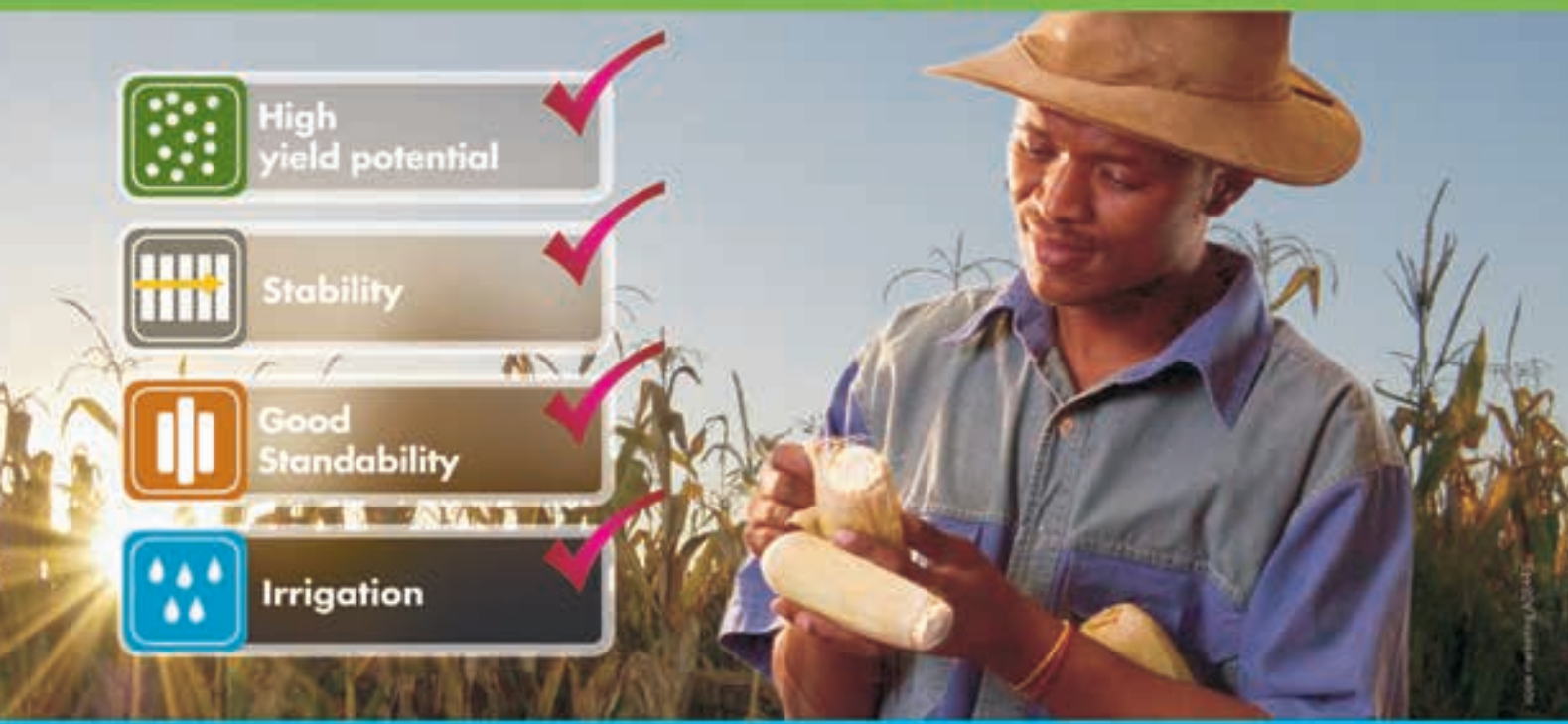
- Grain SA will open a bank account in the name of each farmer in the project. These bank accounts are with Standard Bank and are known as Third Party Fund Administration Accounts (TPFA). Grain SA is registered with the Financial Services Board and is therefore legally permitted to do this.
- Any funds leaving this account can only be done through an EFT managed by Grain SA (the farmer does not have direct access to this account).
- The mentor is issued with an order book for each farmer which has a unique set of numbers.
- The farmer and the mentor are required to get three quotations for any purchase of inputs.
- The inputs should be procured from local suppliers (if at all possible) so that a network of support can be established.
- Once the farmer and mentor have decided which quotation they wish to accept, they get an invoice from that supplier.
- The farmer and the mentor make out an order in the farmer's order book, attach the invoice as well as the quotations and send it to the Bloemfontein office of Grain SA for payment.
- On receipt of this documentation, an order is made out for that farmer from the particular line item budget on the I ACC accounting system (managed by PWC).
- The order, accompanied by the order, invoice, quotes et cetera is then loaded onto the document management system (AX) which is an internet based system. These orders are submitted to the Grain SA management for the necessary approvals.
- Once all the approvals are in place, payment is made by EFT from that farmer's account.
- The supplier and the mentor (and if the farmer has access to email, also the farmer) are sent the remittance advice so that they can see that the payment has been made.

Advantages of the TPFA accounts

- The budget for each farmer is held in his/her accounts.
- The farmer receives statements from the bank each month.
- The farmer cannot access the money directly, so there is no danger of unauthorised expenditure.
- Bank statements can be generated off the system on request.
- All interest generated on the account can be credited to that same account each month.
- The farmers build a banking record.
- Once the project has reached completion and the farmer wishes to continue on his own, the same account with the same number can be migrated to the farmer for management by himself.

This month's edition of The Corner Post was authored by Jane McPherson, Programme Manager of the Grain SA Farmer Development Programme. For more information, send an email to jane@grainsa.co.za.

Grow to your **FULL POTENTIAL** with **DEKALB®** by your side



Do you want to make a resounding success of your farming?

Then you need a partner who is ready to walk with you all the way to success. With **DEKALB®** from Monsanto, you have a comprehensive range of high-quality white and yellow maize for exceptional yields. **DEKALB®** also offers you a choice of hybrids featuring **YieldGard®**, **Genuity® YieldGard® II** and/or **Genuity® Roundup Ready® Corn 2** technology in maize for protection against stalk borers and weeds. Get **DEKALB®** for good quality, excellent standability and the best yields!

Call Monsanto today to find out more.

Yellow Maize	White Maize
DKC80-40BR GEN DKC80-13B GEN DKC80-30R DKC67-80BR GEN DKC64-78BR GEN DKC73-76R DKC65-84R DKC73-74BR GEN DKC73-70R GEN DKC73-72 DKC66-32R DKC66-36R DKC66-60BR DKC80-10 DKC61-90	CRN3505 DKC78-15R DKC78-35R DKC77-61R DKC77-85R GEN DKC78-17R DKC78-45BR GEN DKC78-45BR
New in 2013	**New in 2013**
DKC61-94BR	DKC78-37 DKC78-87R DKC78-83R DKC78-79BR DKC77-77BR

DEKALB® – More than maize!™

Monsanto tel: 011 790-8200 | www.monsanto.co.za

Clients are welcome to contact our client services on 011 790-8200 or customercare.sa@monsanto.com

MONSANTO