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MAY
2014

S.O.S
– save our soils

2014 CONGRESS

Combine maintenance

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Member of the PLENNEGY GROUP

PULA IMVULA

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NKGONO JANE SAYS...

IN THIS ISSUE...

COVER ARTICLES

INSIDE

We have recently been on the judging tour for the Farmer of the Year competition for both the Smallholder and Subsistence categories. What a wonderful experience! We were able to see that there is appropriate technology for farmers at all levels – from ¼ ha to thousands of hectares.

In this development programme, we believe that we can make a real contribution to household and national food security and we assist farmers to make use of the most modern and productive farming practices. There are some farmers who are able to ensure household food security by planting ¼ ha of maize whereas before they knew of modern production practices, they had to plant 3 ha and then not even produce sufficient for own use. This is indeed a step forward towards ensuring food security for our country. These subsistence farmers require one ton of maize per year – this ensures their staple food and then they can plant other crops for additional nutrition. Some of these farmers used to have too little to eat, and now they are able to supply the staple food to other members of the community. There are thousands of people in South Africa who have access to land (particularly in the rural areas) and yet they are food insecure – this is because they do not know what to do, and they do not have access to modern production inputs. If we could get all this land into production, we could change lives.

At the other end of the scale, there are 'developing' farmers who are no longer 'developing' – they are the New Era Commercial Farmers. These farmers are producing fantastic crops on their lands – they are fully fledged commercial farmers who are making a difference to national food security.

We are proud to be associated with these farmers who are making optimal use of the natural resources available to them and producing food for South Africa.

S.O.S – save our soils

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At the most recent meeting of the Grain SA Farmer Development committee, a visiting professor from Australia commented on the problem of soil erosion he has observed on his travels to meet emerging farmers in the rural areas of South Africa and especially in KwaZulu-Natal. This is a massive problem which has been identified as the silent cancer in South African agriculture and it is given little attention.

The annual soil loss in South Africa is estimated at 300 - 400 million tonnes which is almost three tonnes of topsoil for every hectare of land. To replace the soil nutrients which are washed away with fertiliser would cost about R1 000 million. South Africa's arable soil resources are under threat of being exhausted which threatens food security and developmental goals.

So what is soil erosion?

Soil erosion is caused by the movement of wind and water which removes the soil from where it is situated. It becomes a problem when human activities speed up the process. Wind and water are assisted by two factors namely: speed – the faster it moves the more soil is eroded and vegetation – plants protect the soil but where they have been removed wind and water can do more damage and remove more top soil. When a raindrop hits the unprotected soil it has the same impact as a bullet. It loosens the nutrient-rich top soil and the soil particles are washed away usually ending up at the bottom of a slope or in streams and rivers and washed out to sea. This leaves behind poor quality soil where plants struggle to grow causing the area to become like a desert wasteland.

Soil takes millions of years to form and is a non-renewable natural resource so once it is gone it is lost forever. Because soil is essential for farmers to produce their crops, it goes without saying that soil must be managed carefully and responsibly. Soil is a living thing comprised of many different elements and home to many micro-organisms, insects and animals. Every farmer must understand the characteristics of the soil he is working with as well as monitor the health of the soil and the threats of erosion unique to each region.

What causes soil erosion?

Farming practices which are not environmentally friendly cause soils to be exposed and disrupted so they are more easily washed or blown away. Some examples are:

- Overstocking and overgrazing contribute to bare soils making them vulnerable to

Photo 1 - 4: Soil erosion is the silent cancer in South African agriculture – every farmer needs to work together to prevent it!

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erosion which is a common problem particularly on communal grazing areas which may not be as well managed.
- The hooves of many animals also destroy the soil structure and expose it to erosion particularly along their footpaths and around watering points.
- Farming techniques which plough deeply to produce annual crops can be problematic especially where there is no vegetative matter protecting the surface of the soil. This is common in South Africa since livestock are often free to roam over croplands and eat every last piece of plant matter remaining after the crops have been harvested.
- Over-cultivation and compaction causes the soil to lose its structure and cohesion (holding together) so it is more easily eroded.
- A mono-cropping system which doesn't incorporate any form of crop rotation.
- Where no contours are designed along the slope of a hill or planting is done down slopes instead of along a contour.
- The steeper the slope, the greater the erosion is likely to be because the water will flow faster.

The importance of plants and grassland

Organic material is like the glue which holds the soils together.

- Plants slow down water as it runs off the land and instead enables the rain to soak into the land where crops will be grown.
- The roots of plants secure the soil so that it is not easily washed away.
- The plants protect the soil so that raindrops do not hit the soil so hard and the reduced impact means less soil is disturbed and likely to erode.
- Plants in wetlands and on riverbanks also bind the soil and prevent the water from flowing fast and eroding the water courses.

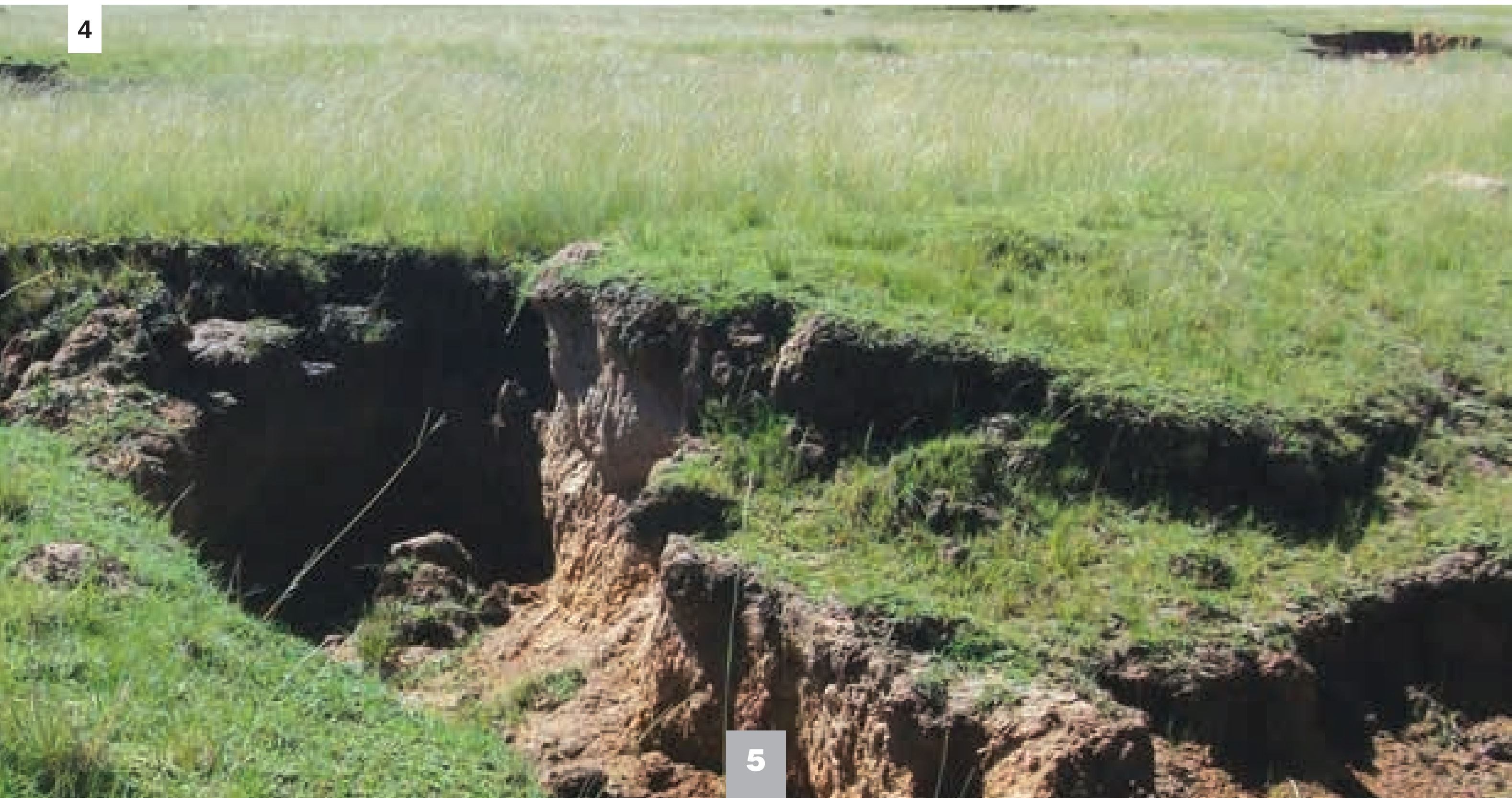
The loss of plants through overgrazing, deforestation, ploughing and fires makes soil more exposed and vulnerable to being carried away by wind and water. Once the nutrient rich top soils are gone plant life cannot thrive and the result is a process of desertification. It is difficult if not impossible to reverse this situation and restore desertified land.

How do we prevent soil erosion?

While there are some problems which need to be addressed by politicians such as land ownership and commonage management, there are definitely management approaches which can be influenced by wise farmers who are farming with the future in mind.

- Use contour ploughing techniques.
- Investigate the possibility of minimum or no-tillage farming.
- Practice crop rotation.
- Plant wind breaks – using indigenous trees and bushes.
- Leave unploughed grass strips between ploughed lands.
- Make sure there are always "good guy" plants growing on the soils not weeds.
- Make sure the soil is rich with decaying material. Micro-organisms in the soil cause plants and leaves to decompose and provide life giving nutrients into the soil which saves on a farmers expenses by lowering fertilising costs.
- Avoid over-grazing and over-stocking.
- Grow indigenous plants along water courses and encourage biodiversity by encouraging the growth of different types of plants and bushes.
- Help to conserve the natural wetlands.
- Break the flow of water where it has already established pathways by placing logs, packed stones or old tyres in the path.
- Do whatever possible to work together with other farmers in your area to repair erosion gullies and rehabilitate them.

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



2014 CONGRESS:

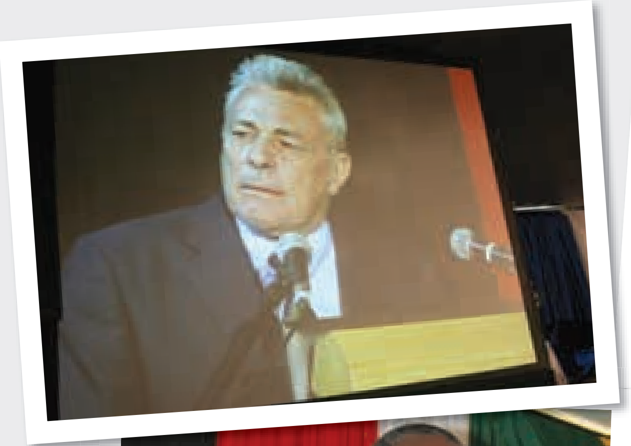
The next generation

We arrived in the rain: from the north, the east, the south and the west. Whether you are a winter or a summer grain farmer – rain is always welcome!

The attitude was positive, and this brought a lot of energy to the table. I was also impressed by the seriousness with which the topical matters were approached. In spite of good farming conditions, the men and women were focused on resolving the issues of the day. The theme, The Next Generation, was relevant for everybody. If you are not part of Generation Y, you have to know how their minds work so that you can guide them to become adults who can, in turn, produce food for their generation and their successors. This was a very refreshing approach.

What was remarkable to me was the degree of responsibility with which input providers approached the future. Naturally you can also make money if you accept these challenges, but setting objectives like yields that must be doubled by 2030 and inputs that must be reduced by 33% takes some doing. I heard leaders in the input industry express the same concern as farmers about a world faced by a gigantic food security crisis. Some days I dream of a government that shows the same urgency in its actions. Talking and planning will fill nobody's plate with food. I was also excited to learn that there are a number of plans in place already to help us with this enormous task, but except for the predictions about climate change, I did not have the same warm feeling about what we will have to do when the weather starts playing up. This so something that still needs some work.

The presentation on Generation Y (people born between 1981 and 2000) was something everybody needed to understand this group of people better. It was also nice to show the world what some of our farm workers look like who not only fill their overalls, but make a substantial contribution to food security. Farm workers with diplomas and degrees in agriculture were probably a threat to some people in organised agriculture!



Congress also gave birth to some new terminology. In his welcome speech our vice chairperson, Victor Mongoato, referred in passing to the developing commercial farmers. This group of farmers has been called so many names just to avoid the race issue, but this name stuck in my mind. It says something about the process they are involved in, but also about their final objective. The other term I picked up in one of the conversations with our international guests was Eastern Hemisphere. This refers to Africa, Asia and the Middle East. Perhaps not in such a straight line as we are used to with the Northern and Southern Hemisphere, but very significant when it comes to grain consumption. This Eastern Hemisphere will be very big and will grow a lot with regard to grain consumption in the next 5 to 10 years. The last new term I learnt was data science. I realised that all the scientific data that is dumped on our producers requires a serious amount of processing and interpretation before it can be converted to management information that helps the farmer to make decisions. Grain SA will definitely have to expand our capacity in this field to help our farmers to convert all the data to a digestible format to facilitate decision-making.

It was also encouraging and a vote of confidence that the grain producers decided themselves to fund their organisation properly by increasing the voluntary levy. This is an example of brave leadership that is converted to deeds by bequeathing us and the following generation something we can be proud of. We look forward to an outstanding season and strong growth in the grain market. Thank you to everybody who contributed to our new direction and the fact that we can enter the future with confidence.

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

Have you assessed this season's crop estimates?

The climatic conditions experienced throughout the main maize producing areas for the current production season of 2013/2014 have ranged from extreme drought before or during planting, late summer rains, a very hot and very dry period after planting with good rains received from the middle of January 2014.

Rainfall in many districts was sporadic in that some farms received enough rain to plant while neighbours received very little. Some areas have received excessive rainfall and the effects of crop drowning could reduce potentially good crops in these areas.

Some crops that were within a week of major damage from the drought have fortunately recovered enough to give possible record yields.

National maize crop estimates

The Crop Estimates Committee (CEC) sits from time to time to be able to make a national crop production estimate from satellite imagery, aerial photos, and on the spot maize yield estimations from planted lands.

The estimates with crop conditions at the end of February show that an area of about 1,531 million hectares of white maize was planted. At an average yield of 4,28 tons the expected crop will be 6,548 million tons. This is an 18% rise over last year's production.

The yellow maize crop is estimated to be 5,854 million tons from the 1,137 million hectares planted at an average yield of 4,65 tons per hectare.

It is generally felt that a possible reduction of high potential yields in the very wet conditions of the eastern production areas will be balanced by the boost from good rains that the later planted maize crops received in the western production areas.

Safex futures prices

The Safex futures exchange is a very useful trading mechanism that assists all farmers and users of white and yellow maize to discover a market related price for current and future values for the crop.

The high prices for maize experienced in the January to April 2014 period of about R3,300/ton reflected the shortage of stocks and uncertainty of supply in the light of the prolonged early season drought in many production areas. Fortunately, for the added value industries such as feed suppliers for animal consumption and millers of white maize for human consumption, as well as the consumers of these products, the futures price reduced to about R2,400/ton for May 2014.

The futures price for white maize for July 2014 deliveries is around R2,130/ton and R2,220 for yellow maize. The almost 280,000 contracts traded for June 2014 reflects a high activity level by farmers and traders that have taken the prevailing generally improved climatic and supply conditions into account. All the factors combined have determined a market value, using all current supply and demand parameters, for this very important strategic product. It seems that the price should stabilise at around R2,200 for most of 2014 and into 2015.

Maize yields for each farmer

After looking at the broad national picture each farmer has to make an assessment of how this season will turn out. Planting disruptions due to the drought, hard rains on just planted maize, and general climatic conditions experienced will be different for each farmer.

The lower maize future prices will influence the projected income in your business plan. An accurate assessment of the probable yields in your maize crop lands will be helpful to plan harvesting operations including drying, storage and effective marketing of what could be a record crop.

Estimating maize yields on your farm

The ultimate yield that will be realised on your farm can be estimated by various methods but all calculations are influenced by final plant

Your yield assessment will be more accurate once your crop reaches maturity.

population per hectare, ears per plant and thus per hectare, kernels per ear and average weight per kernel.

Each farmer will have an idea from previous experience what mass of maize he has practically realised from small to large cobs. Grain from cob mass can range from 100 grams for small second cobs on the maize plants to 300 grams for plants bearing large single cobs.

The more the crop reaches maturity the more accurate will the assessment be for your yield.

Remember that kernel depth and density continue increase until the black layer has formed in the seed kernels.

Quick calculation and estimation for maize yield

There are so many variables that will influence the final yield determination. The cobs can be weighed more accurately towards and at maturity.

The assumptions for estimated cob weights used as an example could be as follows:

- Large cobs – 210 grams;
- Medium cobs –180 grams; and
- Small cobs – 150 grams.

(This assumption is based on the fact that kernels can vary from ,25 of a gram to ,35 of a gram. An average of ,30 of a gram has been assumed).

1. Measure row width – the row widths used could generally be 1, 5, 0,90 or 0,70 meters.
2. Pick points in rows at random in at least ten representative spots in the land.
3. Measure the following length of row for the various row spaces above and count the number of cobs. The appropriate length of rows represent 1/1 000 of a hectare.
    - 1,5 metre rows – measure 6,7 metres with a tape measure.
    - 0,90 metre rows – measure 11,1 metres with a tape measure.
    - 0.70 metre rows – measure 14,3 metres with a tape measure.
4. Count the number of cobs in this distance from all the plants present in the measured row. Total the number of cobs found from ten sites and then divide by ten to get the average for cobs in the measured row areas.
5. Estimate the average size of the cobs on the plants. In a good year the first cobs and second cobs will be large to medium. In average years the second cobs will be small.
6. Multiply the number of cobs found in the measured row by the average estimated weight. Divide the answer by 1 000 to get an amount for yield per hectare.
7. Subtract 10% for harvesting losses to give you the estimated yield per hectare.

For example, given a row width of 0,90 metres, a measured distance of 11 metres, a cob count of 22 and a medium cob average estimate of 180 grams the calculation will be as follows:

(22 cobs x 180 grams x ,90%) / 1 000 = 3,56 tons/ha final yield.

- At a cob average weight of 210 grams the yield would be 4,15 tons/ha.
- At 33 cobs per 11 metres at 210 grams per cob the yield will be 6,20 tons/ha.

If cobs can be weighed accurately the yield determination will be practically more useful.

Summary

Use the Safex prices less your silo differential and a well calculated crop estimate to determine how much maize you will have to harvest, store and sell and the potential total income that might be realised from your maize crop.

Article submitted by a retired farmer.

Monsanto dedicates Fouriesberg COE Farmers' Day to emerging farmers and youth

Monsanto recently dedicated a farmers' day especially to cater for the needs of emerging farmers and young people.

On March 13, Monsanto hosted a farmers' day at their Centre of Excellence site near Fouriesberg on the farm of commercial farmer, Jaco Breytenbach, to address the technical needs of emerging farmers.

Plant populations, row widths, planting depths, refuge areas, herbicide applications, as well as information on DEKALB hybrids such as DKC73-74BR GEN, DKC78-79BR, DKC78-45BR, were addressed during the day. This type of demonstration allowed farmers to see the effects of a variety of applications under a variety of conditions.

The proud seed prize recipients of a random draw at the farmers' day were:

- **First prize** – 10 bags of any DEKALB seed hybrid – Frans Mphafi, from Tweetspruit in the Free State who plants 80 ha of both white and yellow maize.

From left to right: Albert Parsons, Monsanto sales representative; Thabo Nacholo, second prize winner; Frans Mphafi, first prize winner; Tumelo Nkisi, third prize winner and Kobus Steenkamp, Monsanto Country Lead.

The heart of Fouriesberg COE Farmers' Day: Francois de Villiers; Albert Parsons; Kevin Nel and Jaco Breytenbach.

- **Second prize** – 5 bags of any DEKALB seed hybrid – Thabo Macholo, from Qwa-Qwa. A local farmer who plants both white and yellow maize on 135 ha.
- **Third prize** – 1 bag of any DEKALB seed hybrid – Tumelo Nkisi from Rosendal who plants yellow maize on 64 ha land.

Commercial farmers like Sister Priscilla Katase from Ladybrand who attends the Monsanto Fouriesberg COE year on year, encourages other farmers in her community to attend these days and make use of such platforms to gather knowledge and empower themselves to improve their farming efficiencies.

Article submitted by Clara Mohashoa, Marketing Communications Assistant, Monsanto. For more information, send an email to clara.mohashoa@monsanto.com.

Nitrogen deficiency in maize

A healthy maize cob compared to two cobs affected by nitrogen deficiency.

Healthy leaves compared to nitrogen deficient leaves.

Note the front tip of the cob had been "weaned off"; this will result in lower yields.

One of the many important roles of a farmer is to continuously assess his crops for potential problems. These may arise at any stage of the maize growing period; the most vulnerable stage however is from germination to about waist height. This is also the period at which something can still be done to combat the problem.

One of the problems which farmers should always be on the lookout for is nutrient deficiencies in their crops. Nutrient deficiencies usually occur due to low nutrient levels in the soil, but this is however not the only cause of these issues. In this article we will take a look at nitrogen deficiency in maize. This is one of the most common nutrient deficiencies which we see in maize lands and also one of the most damaging if left untended.

Identifying nitrogen deficiency

There are numerous symptoms to look out for when you suspect a nitrogen deficiency. It is important to keep in mind that nitrogen is a mobile nutrient in a plant and thus the symptoms will always begin on the older leaves which are lower down close to the ground. The first sign that you will notice is a yellowing V-shaped pattern, this pattern progresses from the end of the leaf to the collar of the leaf. As it progresses the starting points will turn a brown colour and will eventually dry off.

What causes nitrogen deficiency?

The main cause is nutrient shortage in the soils. This should be improved by correct fertiliser application. If however there was incorrect or insufficient fertiliser application then the problem may arise. Another common cause of nitrogen deficiency is compaction. This is especially common where animals are placed on the lands to graze the stover after harvest time. Due to the compaction there is increased run-off and decreased penetration of water into the sub-soil level, thus there will be significant leaching taking place which removes nutrients from your top soil. Variable growing conditions may also cause nitrogen deficiency. If weather conditions are cold and the soil is saturated then these will be favourable conditions for nitrogen deficiency to occur. Often you will notice the problem in maize that was planted very early on in the season.

How can we prevent nitrogen deficiency?

The best way to prevent this problem is to kerb it from the beginning stages of your planting season. Get accurate soil samples taken from all of your lands and have them tested at a reliable laboratory. Once you receive your sample result it is important to fertilise accurately according to them. This includes making sure your PH levels are correct. Soil acidity can affect the availability of nutrients to plants.

To make it easier you may ask the assistance of a local fertiliser representative. The next step is to make sure that the weather conditions are ideal for planting. The sub soil needs to be nice and moist for the seed to germinate and for the fertiliser to dissolve and be ready to be drawn up by the roots as they develop. When you apply your top dressing fertiliser later in the season it is important to keep an eye on the weather channel as you don't want any big thunderstorms just after you applied it, this may result in leaching if the run-off is too strong.

How to treat nitrogen deficiency?

The best way to treat the problem is to correct the deficiency in the soil. The best time to treat the problem is as soon as you start to notice the tips of the lower plants turning yellow. Immediately apply a good dose of high nitrogen concentrate fertiliser such as LAN or MAP. If this occurs before the tasselling period then there is a good chance that the crop will recover. However, if it is left too late then there will be significant consequences at harvest time.

Consequences

If this problem is left un-treated there will be

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The tip of the nitrogen deficient leaf starts to dry off and this results in less photosynthesis taking place in the plant.

The yellow V-shaped wedge on the deficient leaf.

numerous problems that occur as time progresses. The maize stalks will thin out and become weaker. This will be a problem when the crop experiences windy conditions. It will also cause the cob to "wean off" the maize kernels at the tip of the cob, thus resulting in a lower grain yield. There will be significantly less dry matter which will reduce the amount of stover available for the animals in the winter. The overall plant will have a decreased photosynthetic capacity which will generally result in a poor overall plant.

Nitrogen supply has a significant effect on a plants growth and development therefore it is essential to make sure that the nitrogen levels are correct before planting a crop. If you notice the first signs of nitrogen deficiency it is important to act fast and try and correct the soil before it is too late to get into the lands.

Article submitted by Gavin Mathews, Bachelor in Environmental Management. For more information, send an email to gavmat@gmail.com.

Grain SA interviews...
Michael Ramoholi

This month Johan Kriel, our Ladybrand Development Co-ordinator interviewed Michael Ramoholi who farms between Bloemfontein and Welkom in the Theunissen district. This hands-on farmer believes that knowledge is the key to his success and that young aspiring farmers must realise that farming is the future.

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

I farm in the Theunissen district in the Masilonyana Local Municipality, the Lejweleputswa District Municipality in the Free State Province. My farm is 214 hectares of which 115 hectares are arable land and 99 hectares natural grazing. Because the farm is so small I also lease 277 hectares of high potential arable land from the Welkom municipality. I plant maize and sunflower and have beef cattle.

What motivates/inspires you?

The love of the land inspires me. To plant seeds in the earth and then watch the crop grow as well as to bring the harvest in, motivates and inspires me.

Describe your strengths and weaknesses

I am determined to make a success of whatever I tackle in life. I am hard working, I am a businessman and I have staying power. I also finish what I start. When I fall down, I will get up stronger. Unfortunately, incompetence, slow processes and people not keeping their promises will make me blow my fuse.

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

When I started planting crops my yields were so poor I used to put the beef cattle into the lands. I am a member of the Grain SA 500 Ton club now and have harvested over 4 tons/ha with maize and 1,8 tons/ha with sunflower.

What do you think was the main contributor to your progress and success?

The gaining of knowledge contributed to most of my success. The Grain SA Study Group meetings, Farmers Days and on-farm support visits have helped me limit my mistakes. You also need to be a hands-on manager on your farm.

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

I have completed the Introduction to Maize and Sunflower, Advanced Maize, Tractor and Implement Maintenance, Contractors Course and Farm Resource and Planning courses. I have also sent my farm workers on training courses to give them the knowledge they need to add value to our farming operation. Training can never stop, I will keep on learning.

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

In five years time I want to be an independent, successful, fully fledged commercial farmer. I would like for my family and fellow farmers to look at me and be proud of the example that I have set.

What advice do you have for young aspiring farmers?

Come visit me on my farm and join the Grain SA Farmer Development Programme to see and realise that farming is the future.

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.

Entry to conservation agriculture is a step in the right direction

Frik van Sittert had to do something to allow him to farm economically on relatively little arable land, and consequently started on 200 ha, which has now expanded to 500 ha. An adviser from Omnia, Johannes Smith, advised them at the time that conservation agriculture would be the only way in which they could farm sustainably and profitably.

At the time, Smith had just returned from a visit to Australia, where he had been exposed to their agricultural industry (to date conservation agriculture has been accepted by 90% of Australian farmers).

Van Sittert also acquired background on soil science at the University of the Free State, and he immediately understood the benefits of conservation agriculture with respect to basic soil science principles. Eleven years ago he decided to switch from conventional to conservation agriculture and immediately purchased a no-till planter. Despite considerable disbelief, he quickly produced good crops and profits.

Van Sittert pointed out that it is now possible for him to buy the right implements without having to buy new ones regularly (the implements just last so much longer with conservation agriculture). He also feels that it is better for the farming community to have smaller farms, but more that are fully utilised – and this can be achieved only with conservation agriculture. At present his direct input costs for maize are R2 500 per hectare (with a 4 ton/ha fertiliser target), his average yield is 4,2 ton/ha, with a profit of about R5 900 ton/ha.

Soil information

Van Sittert has a detailed soil map and regularly does soil analyses. **Table 1** indicates the dominant and subdominant soil forms in his region and on his farm.

Crop cultivation systems

Van Sittert's crop cultivation system is described in **Table 2.**

Table 1: Soil types on the Van Sitterts' farm, Paardeplaats.

	Soil form	Effective depth (m)	% of clay in topsoil	% area
Dominant	Hutton	0,8 - 2	12 - 15	80
Sub-dominant	Clovelly Westleigh Oakleaf	0,3 - 0,6	12 - 15	20

Table 2: Crop cultivation system on the farm Paardeplaats, Hartbeesfontein.

Year 1	Year 2	Year 3	Benefits	Shortcomings
Crop: Maize **Plant date:** 20 November - 15 December **Harvest date:** July to August **Plant population:** 16 000 **Row width:** 0,9 m *** Harvest yield:** 4,2	**Crop:** Maize **Plant date:** 20 November - 15 December **Harvest date:** July - August **Plant population:** 16 000 **Row width:** 0,9 m *** Harvest yield:** 4,2	**Crop:** Sunflower **Plant date:** 1 November - 15 November **Harvest date:** April - May **Plant population:** 35 000 **Row width:** 0,9 m *** Harvest yield:** 1,6	Low plant establishment helps to avoid risks	Ground cover because of wind and sun that destroy crop residue; lack of suitable cover crop

* Average long-term crop yield (ton/ha).

Table 3: Van Sittert's fertiliser application levels.

Crop	N (kg/ha)	P (kg/ha)	K (kg/ha)	Comments
Maize	80	15	0	P and K levels were increased by applying fertiliser on top of the soil. Nitrogen application is done pre-plant with spray in the form of ammonium nitrate (21%). Lime is also applied on top of the soil in Ca:Mg ratio of 70:20
Sunflower	60	9	0	

Fertiliser mixture (liquid) during plant: Liquigrow (only N and P) with pH 6,8.

Table 4: Weed management programme.

Spraying session: dates/time	Type of substance	Quantity	Comments
Two weeks after first rain	Glyphosate (540)	1,3 litre/ha	Generic substances are not used
With or after plant	Glyphosate (540)	1,3 litre/ha	
After pollination (for winter)	Glyphosate (540)	1,3 litre/ha	
Four weeks after plant	With grass herbicide (Harness)	1 litre/ha	
If a lot of rain (for winter)	Glyphosate (540)	1,3 litre/ha	

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Conservation tillage system

Name of farmer:
Frik van Sittert
Name of farm:
Paardeplaats
District:
Hartbeesfontein

Description of production area

Description of soils

This area is covered in red soils with a medium to high base status, mainly of the Hutton soil form. These are moderately weathered, well drained soils with a poor structure and gradual transition between the horizons. The morphology is uniform because of the absence of clear horizon sequencing. The consistency is usually friable in the moist condition. Clay mineralogy is characterised by the accumulation of non-intumescent primary and secondary minerals, dominated by low-activity clay (mainly kaolinite), but they contain mainly small quantities of smectite and/or mica. The structure is massive or poor.

Properties of soils

These soils have a high porosity, good water-retention ability, and good internal drainage. They have an acceptable chemical fertility and active soil fauna. Organic material content is usually low to moderate. However, most of the surface horizons are very thin with low levels of organic matter, particularly in areas with a characteristic dry season. Soil acidity is neutral to a little alkaline. The ability to capture phosphate is low to moderate. Potassium reserves and zinc availability is moderate to high. Aluminium toxicity is absent. Soil depth varies from shallow to deep. These soils develop from a wide variety of deposits and rocks.

Management of soils

Such soils are good agricultural soil and are usually cultivated where soil depth, slope and climate allow this. Care must be taken to protect and maintain the top soil where soil organic matter has accumulated, mainly to prevent the structure from being destroyed. Conservation agriculture will play a significant role in preserving the soil organic matter.

Climate

The mean annual rainfall (MAR) is between 500 mm and 550 mm, with a regular mid-summer drought from January to February. Maximum day temperatures in summer vary between 32°C and 34°C, with regular frost in winter.

Young sunflowers on no-till fields.

The John Deere 4730 high-clearance sprayer that is used.

Mature sunflower under no-till.

The long-term maize yields vary between 3 ton/ha and 5 ton/ha, with a maximum of 6,5 ton/ha. He believes that the greatest impact on crop yield is obtained with a good fertiliser programme, but also through improved soil health (the soil contains considerably more earthworms, for example).

Van Sittert uses no cover crops at present. He feels that this is not beneficial to ground water conservation and is also uneconomical, particularly on small farms or little soil. Soil surface cover (with crop residue) is a problem and is removed or destroyed by the wind and sun in particular. Cattle are also allowed to graze on the crop residue, but the utilisation of crop residue is still managed well.

The following quality/intensity of rotations (number of crops in rotation) exists in the region:

- One crop (monoculture): 10% of all farmers.
- Two crops in rotation: 90% of all farmers.
- Three crops: 0% farmers.
- Cover crops: 0% farmers.

Weed management

Van Sittert maintains that it is very important to develop a thorough knowledge of weed management, including the availability and action of herbicides. One of the potential problems that can develop is that too much herbicide is used, which leads to a lot of unnecessary costs.

Weeds have to be monitored regularly to be managed correctly. Van Sittert uses a self-propelled high-clearance sprayer (John Deere 4730) and gains considerable (economic) benefit from it, particularly in the timeous controlling of weeds in Roundup Ready maize. His weed management programme is discussed in **Table 4**.

Pest and disease management

Pest and disease management are combined with all three (or four) sprayings for weed control. An application of 66 ml/ha supermethrin is all that is applied; treated seed is also used.

Mechanisation and information

Van Sittert's mechanisation plan works as follows: He uses two Jumil 2980 eight-row planters, which consist of a vacuum planter with a cutting disc and tine of 15 cm - 20 cm deep. During planting the tine must be kept clear (of soil); fertiliser is placed directly below the seed. A self-propelled high-clearance sprayer (John Deere 4730) is also used.

As far as knowledge and information are concerned, the internet is the main source of information, particularly from the USA and Australia. Van Sittert has also visited Brazil, which has further expanded his field of reference. The closest active conservation agriculture group is the Ottosdal no-till club, where he is involved now and then.

The acceptance of conservation agriculture in this region (or at least on his farm) is greatly promoted by lower costs, soil conservation and improvement and groundwater conservation, which all play a role in enhancing the sustainability of the system.

According to Van Sittert the acceptance of conservation agriculture in the region developed as follows: In 2005 they were the only ones to implement it, in 2009 about 10% of the farmers were involved, and by 2013 about 20% of farmers had become involved.

The region's main technical need for the promotion of conservation agriculture is the shortage of a suitable cover crop that can fit in with their system in a meaningful way.

Institutionally the greatest need (which hampers promotion and acceptance) is the lack of small study groups in specific agro-ecological zones or areas. The main recommendation that Van Sittert and his father have with respect to conservation agriculture is that these study groups should be formed and should meet regularly. The basic idea is to meet as a group of farmers and to talk about their experiences involving conservation agriculture.

Article submitted by Dr Hendrik Smith, Conservation Tilling Facilitator, Grain SA, for SA Graan/Grain May 2013.
For more information, send an email to hendrik.smith@grainsa.co.za

KNOW YOUR HERBICIDE – Sulphonyl urea group

The sulphonyl urea group consists of several herbicides that are registered for different crops for controlling a wide range of weeds. By far the most types of sulphonyl ureas are registered for use on wheat, namely: *chlorsulfuron, halosulfuron, iodosulfuron, metsulfuron-methyl, mesosulfuron, prosulfuron, sulfosulfuron, thifensulfuron-methyl*, and *tribenuron-methyl*. However, for maize only two sulphonyl ureas are registered: *halosulfuron* and *nicosulfuron*.

Only one of the above, *halosulfuron*, is registered for both maize and wheat, for controlling uintjies in particular. The great diversity in this group is reflected by the registration of *rimsulfuron* for tomatoes and potatoes in South Africa. In the USA and Europe *rimsulfuron* is registered for use for both maize and potatoes.

All the sulphonyl ureas have a zone in their molecular structure that corresponds exactly, but it is surrounded by considerable differences between members of the group. They all have an atomic construction (**Figure 1**) that is located between two ring structures (R1 and R2).

This structure is the so-called 'sulphonyl urea bridge' that is broken down through the process of hydrolysis (reaction with water) under low pH conditions and inactivates the molecule. Under acid soil conditions there are a surplus of protons (H+) that are attracted by the partially negatively charged oxygen atoms (O-) and thus break up the 'bridge'.

History

Sulphonyl ureas were one result of long-running research that focused on targeting enzymes without which plants cannot survive. Members of this group all inhibit the enzyme acetolactate synthase (ALS), also known as acetohydroxyacid synthase (AHAS).

An important reason for the focus on enzyme inhibitors was that only plants and microbes can manufacture their own amino acids – humans and animals procure theirs through plant material in their diet. For this reason the particularly low toxicity of the sulphonyl ureas and other enzyme inhibitors like glyphosate (inhibits EPSP synthase), glyphosinate (inhibits glutamine synthase), the imidazolinone group (also inhibits acetolactate synthase) and the triketone group that inhibits HPPD synthase.

The introduction of the sulphonyl ureas since the 1970s was fortunate, as this heralded the use of low quantities of active ingredients (grams per hectare) at a stage when the use of herbicides in kilograms per hectare contributed to their occurrence in water sources.

These new-generation substances heralded an era with high biological activity (strong weed-killing action) being accompanied by the application of quantities of active ingredients measured in grams per hectare, for example: *chlorsulfuron* in small grains (4 gram/ha to 26 gram/ha); *metsulfuron-methyl* in small grains (2 gram/ha to 8 gram/ha); *chlorimuron-ethyl* in soybeans (8 gram/ha to 13 gram/ha).

Action

The inhibition of a single essential enzyme, ALS, by sulphonyl ureas means that relatively little of the active ingredient is required to have a harmful effect on sensitive plants. Another benefit is that this enzyme is present only in chloroplasts that occur in leaves and other green plant parts, hence the recommendation for postemergence application, which ensures that the herbicide comes into direct contact with green plant parts so that it takes a shortcut to the location of the action in chloroplasts.

Roots as well as leaves absorb the sulphonyl ureas, but the South African registrations are all for postemergence application on weeds, which probably indicates leaves as the main route for absorption.

The recommendation for the use of additives that promote the absorption of herbicide by the green parts of plants is of the utmost

1

Typical symptoms of damage by chlorosis at the growing point (in calyx) and an excess of anthocyanin production in wild sorghum that was treated with nicosulfuron.

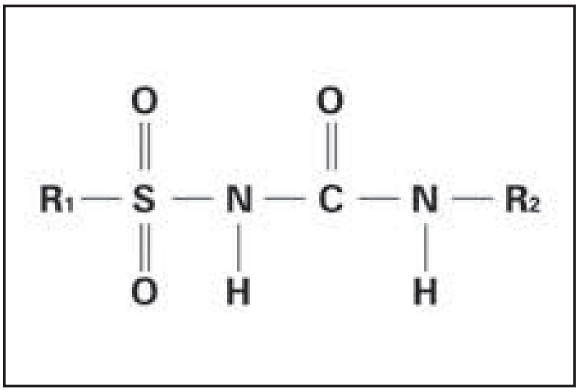

Figure 1: The atomic construction of sulphonyl ureas.

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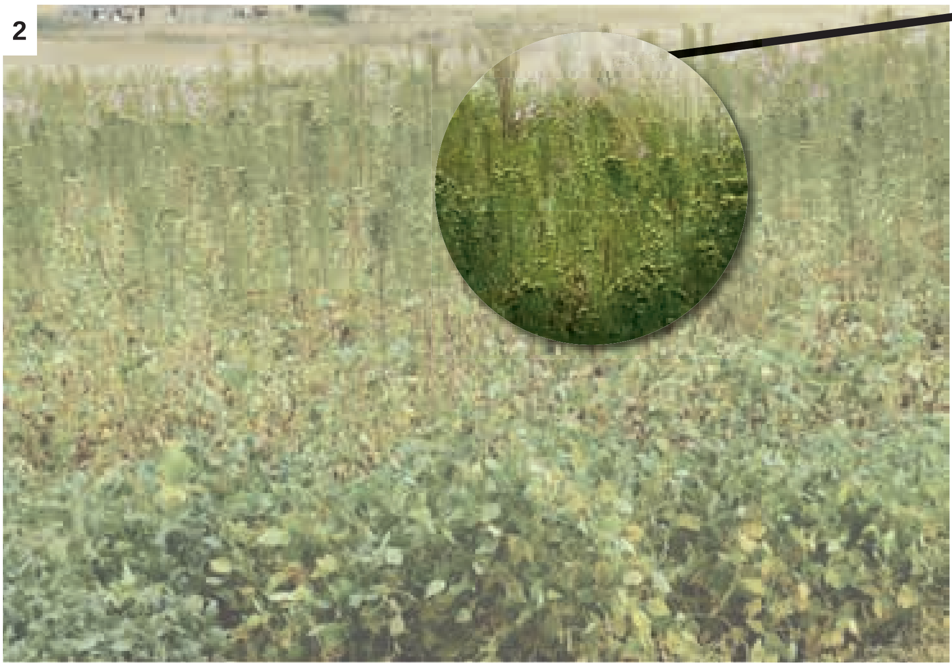
2



Soybeans severely infested with tall khaki weed – thanks to its relatively long aftereffect in soil, sulphonyl urea like chlorimuron-ethyl would be able to control weeds still emerging later in the season.

importance in this case, as so little is applied in the first place, and less than half (even less than a quarter in many cases) of active ingredients applied is absorbed by plants.

Because of the inhibition of the ALS enzyme the production of three essential amino acids (valine, leucine and isoleucine) is inhibited. Exactly how sensitive plants die has not yet been fully determined, because although the ALS enzyme is inhibited within a few minutes in a laboratory, it can take weeds in the fields four to six weeks to die. Nevertheless, the growth of sensitive plants in field conditions is affected within a few hours after application – to the extent that competition with the crop quickly deteriorates or stops, even if the weeds are not dead yet.

Why do certain crops tolerate sulphonyl ureas and certain weeds do not? In other words, what causes the difference in sensitivity of crops to sulphonyl ureas? The answer is that the crops for which these herbicides are registered inactivate them shortly after absorption, while sensitive weeds do not have this ability, or that the rate at which inactivation occurs is slower than in the crop itself.

Symptoms of damage in sensitive plants are characterised by chlorosis (yellowing) that develops at growing points within days and turns into necrosis. Another obvious symptom of damage is the leaf veins turning purple because of anthocyanin production (**Photo 1**). A general effect accompanying this is stunted growth, which becomes obvious shortly after exposure.

Behaviour in soil

Sulphonyl ureas are rendered harmless by microbes, but under conditions of very wet or dry soil, low temperatures and high soil pH (7 to 9), microbe activity is low or even absent, so that the aftereffect can be so long that sensitive follow-up crops can be damaged several months or, in extreme cases, years later.

Because of their ability to have a long aftereffect in soil under certain conditions, waiting periods according to which the planting of sensitive crops can be scheduled are indicated on the labels of sulphonyl ureas. Soil pH is so important in determining the aftereffect that waiting periods are doubled if the soil pH is higher than 7. Free lime in soil is exacerbating as far as the aftereffect is concerned.

Lower than pH 7 – the more acid the soil, the greater is the role of the hydrolytic breakdown of the sulphonyl ureas. Basically hydrolysis involves the chemical reaction of water with the herbicide, with subsequent structural loss and inactivation.

Because of the negative charge on the molecules under alkaline conditions and a neutral (no charge) status under acid conditions, the fixation of sulphonyl ureas on clay particles is considerably weaker than it is on the humus fraction ('composted' organic matter) of soil.

Clay is mainly negatively charged and repels molecules with the same charge, but the humus fraction retains molecules, regardless of whether they have a charge or not. Nevertheless, sulphonyl ureas generally remain in the root zone for a long time, with a relatively long aftereffect that becomes particularly long in alkaline soils.

Photo 2 illustrates the benefit that a long aftereffect of a herbicide can have on weed control late in the season – naturally if it can be limited to the season of application so that the safety of sensitive follow-up crops is not affected.

Resistance to herbicides

Resistance to sulphonyl ureas in South Africa was proven for the first time in 1993 for *Lolium rigidum*, and in 1998 for other annual *Lolium* types. Resistant populations of *Bromus diandrus* were identified in 2004. All these grasses were resistant to the ACCase inhibitors at the same time. The first sulphonyl urea-resistant broad-leaved weed, *Rhaphanus raphanistrum*, was reported in 2001.

An urgent search for solutions to resistant weeds, specifically in the winter rainfall area in the case of wheat, where the problem with sulphonyl ureas is the worst, is underway. The urgency is caused by the fact that the choice of alternative grass herbicides is extremely limited because the same grass types are also resistant to the ACCase herbicides.

For more information, contact Prof. Reinhardt at 083 442 3427.

Sources and further reading

Heap, I. 2013. The international survey of herbicide resistant weeds. http//www.weedscience.com (accessed 28 March 2013).

Peterson, DE et al. 2010. Herbicide mode of action. Kansas State Univ Agric Exp Station and Cooperative Extension Service. www.ksre.ksu.edu.

Weed Science Society of America. 2007. Herbicide Handbook, 9th ed. Lawrence, KS, VSA. Zimdahl RL. 2007. Fundamentals of Weed Science. Academic Press, London.

Article submitted by Prof Charlie Reinhardt, Extraordinary Professor: Weed Science, Department of Plant Production and Soil Science, University of Pretoria, and Dean: Villa Academy, for SA Graan/Grain May 2013. For more information, send an email to dr.charlie.reinhardt@gmail.com.

The effect of crop rotation on crop production

During the past few seasons the area under wheat in the Eastern Free State decreased, while the area under soybeans increased. The expected profit and the risk of the crops concerned probably played a decisive role in this shift.

The economic performance of a crop is usually assessed in isolation, without taking into account the synergistic effect that crops that are being rotated have on one another. On the basis of this premise a crop may not achieve the desired results and the decision would then be made not to cultivate it further. If the crop were to be assessed not in isolation, but as part of a crop rotation system, and the synergistic effect of the crops on one another is also taken into account, the crop can in fact be acceptable for production.

A synergy or crop rotation effect often occurs between certain crops if they are alternated. This simply means that the yield of a crop and the quality of the grain can benefit from its cultivation in a crop succession pattern. Not only the profitability of a crop is affected by crop rotation, but the production risk is also influenced.

Results of crop rotation

Various experiments have been done that clearly illustrate the crop rotation effect. Measured over several years and localities, the yield of maize increases by an average of 12% if it is cultivated after a legume. After sunflower the yield of maize is usually the same as in the case of monoculture maize. After wheat and a fallow period of about ten months the yield of maize at the ARC-Small Grain Institute (ARC-SGI) is 33% higher than with monoculture.

If we look at individual seasons, there is a great variation in the extent of the crop rotation effect. Cases have been identified where crop rotation with legumes have suppressed the yield of the subsequent maize, probably because the moisture content of the soil profile was exhausted by the legume and nothing was transferred to the next season.

Sunflower in particular can utilise more moisture in the soil than maize, and the subsequent maize is then harmed. This occurs particularly when the legume or sunflower grows until late in the season and insufficient rain falls to replenish the shortfall for the next season. In some years sunflower increases the yield of the subsequent maize as if it were a legume.

Table 1 contains the yield results of a crop rotation experiment carried out at the ARC-SGI close to Bethlehem over a period of nine years. Compared to maize, wheat reacted strongly to crop rotation. The yield of wheat in an 18-month fallow system exceeded that of wheat in monoculture by 40%. Wheat was also cultivated directly after dry beans in a maize-dry beans-wheat system, where the wheat yield was also 31% higher than that of monoculture wheat. Because of the rainfall it was possible to plant wheat after dry beans in only six of the nine years.

Table 1: The average yields of crops obtained in a crop rotation of nine years at the ARC-SGI, Bethlehem.

Crop system	Yield (ton/ha)				
	Maize	Wheat	Soybeans	Dry beans	Sunflower
Monoculture	4,2	1,92			
Maize – soybeans	5,13		2,01		
Maize – dry beans – wheat	6,06	2,43*		1,33	
Sunflower – wheat		2,95			1,80
Wheat – fallow		2,69			

* Average of only six years

Table 2: Crop budgets for the Eastern Free State.

Crop	Yield	Price	Directly apportionable variable costs	Gross margin overheads
	(kg/ha)	(R/ton)	(R/ha)	(R/ha)
Maize monoculture	4,2	2 200	6 102	3 138
Maize after fallow	6,06	2 200	7 300	6 032
Maize after soybeans	5,13	2 200	6 702	4 584
Soybeans after maize	2,01	4 480	6 033	2 972
Soybeans after rest after wheat	3,0	4 480	6 033	7 407
Sunflower after maize	1,80	4 670	3 314	5 092
Dry beans after maize	1,33	10 000	8 500	4 800
Dry beans directly after wheat	1,00	10 000	8 000	2 000
Wheat after fallow	2,69	3 500	5 700	3 708

Then the surprise. The yield of wheat after sunflower and a 13-month fallow period was 54% higher than that of the monoculture wheat system. Even the protein content of the wheat was higher than that of the other systems.

Unfortunately, the crop rotation effect was not present everywhere and it seems to occur less often in clay soil than in sandy soil. In parts and years in which the rainfall tends to be lower, specific crop rotation systems can have a yield-suppressing effect, probably because of differences in the soil moisture transferred from one season to the next.

Impact on the economy and risk

Crop rotation requires greater management input and technical knowledge of the farmer and therefore it should increase the profitability of a farm and/or reduce the chance of failure (risk) to make sense. The impact of mechanisation should also be taken into account. With crop rotation, where the same implements are used in different periods, fewer tractors per hectare are required.

To test the meaningfulness of crop rotation, the yield results obtained with the ARC-SGI experiment were used to compare the net margin of systems with wheat and maize in monoculture. The crop budget for the 2012/2013 season published by Grain SA was used and is shown in **Table 2**.

The directly apportionable cost and grain prices applicable when the budgets were drafted were used to calculate the margin for the different crops and crop rotation systems with the yields that were achieved. Where a fallow period occurred in a system, it was accepted that it cost R700/ha to keep it free of weeds.

In order to compare the profitability of the system, an imaginary farm of 400 ha was used and different systems were planted on the farm. It was assumed that maize monoculture would be the measure against which the other systems were compared. In order to reflect the change in the area, maize and soybeans were planted in rotation, as was a system comprising maize, soybeans, wheat and then fallow until maize was planted again. To minimise the effect of fallow, a system was also tested where maize, dry beans, wheat, and the dry beans again were planted.

The profitability of all these systems was determined by the profitability of the individual crops. The profitability of the fallow system was negatively affected by the fallow period and its cost. If a catch crop can be planted, the profitability of the system as well as the income is dramatically increased.

According to **Table 3** it is clear that the profitability of the different crops plays a major role. If farmers can also manage not to allow the soil to lay over, the profitability is also better.

Diversification is a means of combating risk. The production risk, i.e. the chance of failure, is also always lower for a crop rotation system than for a monoculture system. The risks of crop systems also differ and the risks and margins should be taken into account when a system is planned.

Every farmer has to design his own system for his farm and see if it will work.

Article submitted by by Pietman Botha, Pula/Imvula contributor, André Nel, ARC-Grain Crops Institute, Potchefstroom, and Willem Kilian, ARC-Small Grain Institute, Bethlehem, for SA Graan/Grain May 2013. For more information, send an email to pietmanbotha@gmail.com or contact him at 082 759 2991.

Table 3: Profitability of different systems.

Crop	Hectares planted	Gross margin for crop (R/ha)	Total gross margin for farm (R)	Total gross margin for farm per hectare (R)
Maize monoculture				
Maize monoculture	400	3 138	R1 255 200	R3 138
Maize and soybeans crop rotation				
Maize after soybeans	200	4 584	R1 511 160	R3 778
Soybeans after maize	200	2 972		
Maize, soybeans, wheat crop rotation				
Maize after wheat	100	6 032	R1 201 180	R3 003
Soybeans after maize	100	2 972		
Wheat after fallow after soy	100	3 708		
Fallow after wheat	100	-700		
Maize, sunflower, wheat crop rotation				
Maize after wheat	100	6 032	R1 351 700	R3 379
Sunflower after maize	100	5 092		
Wheat after fallow after sunflower	100	4 625		
Fallow after wheat	100	-700		
Maize, dry beans, wheat crop rotation				
Maize after wheat	100	6 032	R1 475 700	R3 689
Dry beans after maize	100	4 800		
Wheat after fallow after dry beans	100	4 625		
Fallow after wheat	100	-700		
Maize, dry beans, wheat crop rotation				
Maize after dry beans	100	4 584	R1 488 900	R3 722
Dry beans after maize	100	4 800		
Wheat after fallow after dry beans	100	3 505		
Dry beans directly after wheat	100	2 000		

Maintenance of combines prior to harvesting

The harvesting season for the 2013 - 2014 crops of sunflowers, soybeans and sorghum will soon start for the early planted varieties.

Most of the production areas experienced a mixture of extreme drought at the start and midway through the optimum planting periods. Fortunately, enough rain has been received during late January and February to be able to ensure above average crops in many production districts.

A high yielding crop is always a test for any of the older combine harvesters. If you do not have your own combine or harvesting equipment make sure that you have contacted a combine contractor. It is important to outline to the contractor exactly what the areas of each crop will be on your farm and the probable time that he should be ready to combine each crop. Keep in mind that some contractors specialise on one or two crops. In this case you need to plan to use specific contractors for specific crops. Bulk trailers or trucks also need to be on hand to receive the harvested grain in bulk from the combines and transported to your own storage or commercial silo.

If you do use your own harvesting equipment the machines must be thoroughly maintained far ahead of the day that it will be needed when the crops are physiologically ripe.

Maintenance

Proper maintenance and service adjustments of all aspects of the combine from the engine, header unit or units for the different crops, and threshing mechanisms must be completed by an intensive inspection and testing of all components. As there are many moving parts and hidden bearings in a combine harvester this can be a challenging task that cannot be done correctly at the last minute.

Costly repairs, premature wear, and loss of precious combining time in the field can be reduced if the combine is not properly maintained and adjusted.

Always consult the operator's manual for the machine to be inspected and maintained for reference to the specific maintenance intervals for various parts of the machine. The manuals usually include a total check list of components. It is wise to keep a detailed logbook of maintenance carried out, hours worked, the parts used for replacement and the cost thereof. One can then refer back to see when a component was replaced and if it for some reason has failed prematurely. If you don't have a manual ask the manufacturer to order one for you. Manuals can also be downloaded from the internet.

A well maintained combine will ensure the timely and efficient harvesting of your crop.

General maintenance

Some pointers for proper and regular maintenance to consider are outlined:

1. Always keep the machine clean. Before starting a machine always clean plant material, mud and excess grease and oil from the machine. Moisture build-up on any parts should also be avoided.
2. Make sure that nuts, cap screws, shields and all sheet metal is still tightly in place. Loose shields can vibrate loose and create further damage to moving parts and the operator.
3. Inspect the combine before starting every day.
4. Keep maintenance records.
5. Don't abuse the machine by overloading, rough operation, or harvesting at speeds that are too fast for the terrain or crop yield.

Other components

A detailed inspection and adjustments or repairs should be done in a systematic manner. If you cannot do the detailed mechanical repairs yourself make timely arrangements with the supplier or competent mechanics to go through the machine. Modern combines have many electronics and linked electronic hydraulic oil valve controllers which require the attention of trained persons for proper adjustment and maintenance.

The following components should be checked in detail:

1. Engine and power train.
2. Header or different headers for maize or sunflowers and specific adjustments when installed on the combine.
3. Main platform adjustment.
4. Threshing unit maintenance to ensure maximum extraction of grain from the crop material.
5. Separating unit.
6. Cleaning unit – all belts and pulleys and lubrication.
7. Grain handling unit.
8. Wheel and track maintenance.
9. Belt and chain maintenance.

A well maintained and repaired combine will be a pleasure to put into a high yield crop and ensure the timely and efficient harvesting of your high value crop.

Article submitted by a retired farmer.

The Corner Post

ARC encourages collaboration for a competitive grain industry

Studies and predictions by various United Nations bodies, including the Food and Agriculture Organisation (FAO) suggest that the global food system will experience an unprecedented confluence of pressures over the next 20 to 40 years. On the demand side, the global population size will increase, including South Africa, from nearly seven billion today to 9 billion by 2030, and probably to over 9,5 billion by 2050. Overall a greater number of people are likely to be wealthier, creating demand for a more varied, high quality diet that will also require additional resources to produce. South Africa, as part of the middle income countries with greater prospects for higher economic growth, will be among the nations with increased population wealth.

Further, agriculture will experience increased pressure to fulfil the needs of increased population and demand. On the production side, competition for natural resources, particularly land, water and energy will intensify, while effects of climate change will become increasingly apparent. The need to reduce greenhouse gas emissions and adapt to a changing climate will become imperative. Conservation and sustainable use of natural resources will become critical to the success of agriculture to meet population demands. Over this period globalisation will continue, exposing the food system to novel economic and political pressures. Innovation and increased focus on science and technology for a knowledge based economic system will become vital to the success of agriculture to meet future demands.

Agriculture production is critical for ensuring food security for all, because it contributes to poverty alleviation by reducing food prices, creating employment, improving farm income and increasing wages. It's therefore imperative that we ensure sustainable and continuous improvement in our ability to produce high quality grains, particularly as they constitute more than 50% of our staple diets. Increased agricultural productivity from innovations in agricultural research and development have been demonstrated to enable producers to increase yields, lower food prices and thereby facilitate greater access to affordable and nutritious food; which ensures food security. Grains contribute significantly to food security and South Africa's total gross agricultural production. As the main ingredient of our staple foods it's vital that we intensify research and development initiatives on grains.

To ensure a sustainable, competitive grain sector will require targeted investments in research and development for increased productivity, yields and reduced input costs. This may require a reprioritisation and alignment of research and development priorities by all stakeholders, research organisations such as the Agricultural Research Council (ARC), Universities, private sector agro-processors, producers and consumers.

Although significant progress has been made towards defining the research agenda in the grain sector; further improvements could be achieved. There's a need for greater alignment of various research and development priorities by all the stakeholders, particularly focusing on increased investments in training, next generation science and technologies, especially accelerating breeding programmes, production practices and adaptation to climate change. South Africa's continued and consistent investments in agricultural research, particularly from public funds such as the parliamentary grant to the ARC and private sector contributions are critical for a sustainable, competitive and growing grain industry. These investments enable the ARC and other research institutions to generate solutions and technologies to reduce any adverse impacts on yields and productivity. Examples include drought tolerant maize cultivars, pest and disease resistance, to name a few. Nutritional qualities of grain cultivars are critical to a healthy society; hence bio fortification needs to continue as one of priorities for research and development.

Success in research and development is often accelerated through collaborations such as the Borlaug Global Rust Initiative, which includes the ARC. Through this collaboration researchers at ARC have made important scientific breakthroughs that could potentially lead to the development of wheat cultivars that are resistant to multiple plant pests and diseases. The researchers have identified several breeding lines with quality characteristics that are important for agro-processing and consumer needs. These achievements will enable the ARC to develop new cultivars incorporating new genes for pest and disease resistance while enhancing quality characteristics, which would results in increased yields.

The application of existing knowledge and technology as well as investments in research and development in the ARC have demonstrated substantial potential to increase crop yields and sustainable use of natural resources. For example, focused research and development on conservation agriculture has enabled many farmers to reduce adverse impacts on natural resources such as soil erosion, biodiversity and micro-nutrient loss; which in turn has reduced input costs for production contributing to enterprise sustainability. Research on soil and soil types using multi-spectral satellite imagery has provided vital information for land use mapping that is required by producers and planning authorities. Use of these scientific tools is vital to enable agriculture's resilience to adverse impacts of climate change.

To achieve sustainable economic growth in a developmental society requires a competitive agricultural sector capable of creating employment, particularly among the rural poor communities. The ARC continues to contribute towards enhancing the competitiveness of the agricultural sector through innovation and technology transfer initiatives. We believe the grain industry is poised to sustainable growth and competitiveness that will ensure food security.

About the Agricultural Research Council

The Agricultural Research Council, a schedule 3A public entity, established in 1990 through the Agricultural Research Act 86 of 1990 (as amended by Act 27 of 2001) is a premier science institution that conducts research with partners, develops human capital and foster innovation in support of the agricultural sector. Its core mandate as defined in the Act is to act as the principal agricultural research institution in South Africa so as to conduct research, drive research and development, drive technology development and the transfer (dissemination) of information in order to: Promote agriculture and related industries; Contribute to a better quality of life; facilitate/ensure natural resource conservation; and alleviate poverty. It provides diagnostic, laboratory, analytical, agricultural engineering services, post-harvest technology development, agrochemical evaluation, consultation and advisory services, food processing technology services as well as various surveys and training interventions. For more information visit the ARC website at *www.arc.agric.za.*

This month's edition of The Corner Post was authored by Dr Shadrack Moephuli, CEO of the Agricultural Research Council. For more information, send an email to ceosec@arc.agric.za.

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DKC62-84R	DKC78-45BR
DKC73-74BR GEN	
DKC73-70B GEN	
DKC73-72	
DKC66-32B	
DKC66-36R	
DKC80-10	
DKC81-90	
New	*New*
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	DKC78-87B
	DKC78-83R
	DKC78-79BR
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