



**GRAIN SA MAGAZINE FOR DEVELOPING FARMERS** 



# PULA IMVULA

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This issue's cover photo was taken by Jenny Mathews.



### A WORD FROM... Dirk Strydom

F YOU ARE PART OF AGRICULTURE THERE IS NOTHING LIKE THE SMELL OF WET SOIL. WE HAD A FEW VERY DIFFICULT SEASONS WITH DROUGHT AND LATE RAINS. THIS YEAR IT IS A DIFFERENT SCENARIO, THE RAIN IS ON TIME AND THERE IS GREAT OPPOR-TUNITIES TO PRODUCE A SUCCESSFUL CROP.

However, in a developing world there are a lot of challenges before these wet soils can be planted. Finance as we know is a large stumbling block and a producer will gladly take up any bit of support. Sometimes there is an opportunity to utilise some finance or some support through grant programmes. The challenge is that these funds are normally received very late in the season putting pressure on producers to utilise the small window of opportunity of these wet soils.

Support is very little these days, thus if you receive some support make sure that you can utilise the opportunity to obtain maximum output. If support is late, compare the advantages and disadvantages of planting at a late stage. Do not plant out of the optimal planting window unless it is absolutely needed.

Why am I saying this? The wet soil and the need and urge to plant forces any person with agriculture in his or her blood to want to plant. But the best thing for any developing producer is to have a great start/kick-off and by utilising funds not at full potential means that only half of the kickstart can be achieved. For developing producers it is all about sustainability and making sure there is at least something left at the end of the year, to secure a new year of production. The next step in agricultural development is to make sure that you farm sustainably.

Thank you for staying positive through difficult times and for your love of agriculture.

## RECORD KEEPING - is your finger on the pulse?

HIS SUMMER SEASON IS CRITICAL TO THE SUS-TAINABILITY OF MANY MAIZE FARMING ENTER-PRISES. IN MANY AREAS SUCH AS THE NORTH WEST AND THE FREE STATE, WE ARE STARTING OUT WITH GOOD SOIL MOISTURE LEVELS, BUT MANY FARMING OPERATIONS STILL HAVE TO COPE WITH RESTRICTED BUDGETS FOR NEW INPUTS DUE TO THE RECOVERY TIME REQUIRED FOLLOWING THE SERIES OF DROUGHTS EXPERIENCED.

Maize production is a high-risk venture. If you are lucky enough to be one of those who had a good maize crop last season, then you can get started with a joyful heart.

#### **ROUTINES AND RECORD KEEPING**

There are a few key issues which need to be addressed on an annual basis in order to improve our chances at attaining high yields and also reduce our risks. This checklist should be reviewed every season; and an astute farmer and businessman will make sure that he or she is accurately recording the activities that take place on the farm every week.

Record keeping is critically important as often one needs to look back and see the history of a particular field, for example:

- · What crop was planted in the field two years before?
- What spray programme was used on the crop and how successful was it – were you satisfied with the performance of the chemicals you used? Will you follow the same programme again?
- Do you know the service history of each implement, machine or tractor, for example when were the filters of a particular tractor last replaced? When were tyres replaced?



#### **RAINFALL RECORDS**

By keeping an eye on the weather records we are able to plan our farming operations much more efficiently. We can set planting dates that according to our records will most likely be a good time to plant with sufficient moisture. Obviously, the weather is never and will never be totally predictable. But we will always be able to have some kind of rough idea as to what will happen. This ability is an advantage that we as farmers need to grab a hold of – so start your own logbook now!

#### **REQUIRED ROUTINES**

- Take soil samples in good time so that fertiliser can be ordered.
- Get advice from experts and representatives of the seed companies

Jenny Mathews, Pula Imvula contributor. Send an email to jennymathews@grainsa.co.za





Every farmer should keep his finger on the pulse by enquiring and reading as much as possible all the time.

who know your area and discuss which varieties of maize seed you could plant.

- · Get to know the character and growing times of the different varieties of maize seeds, they are all different with different advantages for different growing conditions.
- Make sure all your other inputs are ordered and ready for you to be able to use your window of opportunity to plant optimally.
- Don't plant too early where soil moisture content is still very low.
- · Make sure you have at least loosened your topsoil to promote the penetration of the rain when it does come i.e. through either disking or vibroflexing.
- Make sure early weeds are controlled either chemically or with a tined implement to conserve the available moisture. Your weed control programme is critical and will affect the growth of your maize plant as well as the number of pips which develop on the cob so your entire harvest can be negatively affected by poor weed control through the season.
- Do your maintenance on planters and other primary tillage implements i.e. replace tines on vibroflexes and shears on the ploughs as you do not need down time to fix implements especially if it only

happens these days.

rains late as it sometimes

- Take a long-term view of the maize growing season and even before you have put your first seed pips into the ground consider your marketing options. Decide what you need for on farm use such as for household use and as livestock fodder and then consider how and where you will sell the rest of your crop.
- It is very important to become familiar with the way the South African grain trading market works even if you have an agent who assists you. Take the time to get help so you understand the futures exchange on the JSE and how it works. Make sure you understand the location differential and what its purpose is so that you can negotiate the best possible prices for your maize crop.
- Crop insurance is costly but could be helpful in a particularly risky season. It is advisable to contact your agribusiness or credit supplier and discuss your options and whether you could qualify for crop insurance for this coming season. You cannot take it for granted that you will qualify as insurance companies are not guaranteed to automatically offer you cover.



Record keeping is critically important as often one needs to look back and see the history of a particular field.



#### MAINTAIN, MONITOR AND MANAGE

Be disciplined throughout the maize growing season. It is not wise to spend a lot of money putting a crop of maize in and then not monitoring it and managing it in the long term.

- This means being present in your fields almost daily.
- · It means maintaining your tractors and implements in good working order.
- It means keeping all your stocks neatly stored in your shed until required and chemicals and poisons safely under lock and key.
- It means good, consistent record keeping keeping your accounts and office administration neat and up to date.
- · It means picking the brains of local experts and other more advanced farmers in your area.
- It means joining your organisation, Grain SA, and attending meetings, study groups and training courses on an on-going basis - and reading our informative Pula Imvula monthly from cover to cover too of course!

No farmer can ever say he has learnt all there is to know. The maize growing environment is dynamic, progressive and ever changing as seed companies strive to improve their seeds and chemical companies offer new, more efficient products. It is up to every maize farmer to enquire and read as much as possible all the time and in this way equip him or herself to become a better farmer by keeping a finger on the pulse of the dynamic maize industry in our country.

Effects of C VID-19 on consumers

E FIND OURSELVES AMIDST THE COVID-19 PANDEMIC AND THE RESULTANT LOCK-DOWN AND WE CAN ASSUME WITH A GREAT AMOUNT OF CERTAINTY THAT THE LOCK-DOWN WILL STILL BE WITH US FOR QUITE SOME TIME. THE LOCKDOWN, WHICH IS AN ABNORMAL SITU-ATION, HAS INFLUENCED OUR PEOPLE IN DIFFERENT WAYS. AS CONSUMERS, PEOPLE WHO BUY THEIR FOOD, THEIR PREFERENCES AND BUYING PATTERNS HAVE CHANGED.

Briefly, according to reports the characteristics of the consumers in South Africa can be summarised that the size of the average household is decreasing in terms of members per household, our population are becoming more literate, more urbanised and younger, and debt levels are increasing. Added to this the lockdown has already caused major job losses. It is predicted that 2 to 3 million people will lose their jobs or end up with a lower income. In other words, the population are becoming poorer, especially those already in a lower income bracket. All these characteristics influences the choice of food.

Being poorer on average has caused a move to the buying of the cheaper and more basic foodstuff such as maize, rice, and cheaper vegetables. Consumers are also buying more chicken and pork and meat from the forequarter of beef carcasses. The more expensive food such as mutton will form the smaller part of the food basket.

#### PURCHASING CHOICES

The choice consumers will make when buying food is influenced by several factors, such as purpose, religion, quantity, health, and wellness factors but price remains the main driver. Simply put – the cheaper, the better. Reports indicate that the majority of South Africans, particularly low-and mid-income consumers base their purchasing decisions



Consumers are buying more chicken and pork to save costs.

almost exclusively on price. Among affluent consumers demand is supported by health and wellness trends. Interesting, consumers now also prefer smaller sized products which are more affordable and practical with less waste.

Price poses an additional challenge to our producers because of the costprice squeeze. Many consumers can just not afford higher food prices. To counter higher prices farmers are forced to increase their productivity.

The pandemic has also influenced people to be healthier minded Marius Greyling, Pula Imvula contributor. Send an email to mariusg@mcgacc.co.za



regarding their food. There is a greater demand for food that improves immunity and general strength. Add to this an increased consideration of the quality of the product, and a higher emphasis on traceability – from the primary producer to the final consumer.

The practical buying patterns by consumers were forced to change. Consumers reacted to the lockdown rules and regulations by buying closer to home and even using digital methods. On-line buying, advertising on Facebook and WhatsApp are used. And this is on the increase and here to stay. On-line purchasing is on the increase because of convenience, personal safety, and time-saving reasons.

Even deliveries to consumers have become important. Apart from comfort reasons, personal safety also plays a role. There is also a shift to cheaper alternatives and buying a smaller variety. The medicinal value of products has favoured the buying of more fruit and vegetables. Consumer expenditure on fruit and vegetables are increasing steadily as consumers focus more and more on health and wellness. The demand for fruit and vegetables have grown in richer countries such as America and Europe, which opens more export opportunities for our farmers.

At the beginning of the lockdown period when there were major disruptions of the formal marketing channels the importance of the informal channels (street vendors) became known. They provided food in difficult times, thus countering food insecurity. Consistent marketing, that is to provide or deliver your product to your market regularly as agreed upon will assist in achieving higher prices. This applies even if you deliver products to a street vendor. Remain consistent, and pay attention to quality, packaging and presentation and you will find buyers keen to buy your product.

#### HOW DOES ALL THIS AFFECT OUR FARMERS?

Regarding the production of your products not much has changed. The COVID-19 pandemic together with the drought many have experienced, and the dire economic position of our country have all served to emphasise certain aspects of farming if your vision is to be a successful farmer making a sustainable profit. Produce quality, healthy, and safe products. Apply eco-friendly conservation farming methods and improve your production continuously and give attention to traceability. And do not forget about precision farming and ethical farming methods.

Re-consider your crop mix and diversify to reduce production risks, but do not chop and change. Rather be the champion producer of a few products and the reliable consistent producer.

Regarding the marketing of your products you must adapt. Take note of the aspects mentioned in the article, such as the use of digital platforms, consistent deliveries, delivering directly to clients. Diversify your market – deliver a product to more than one market if possible. This will reduce your market risks being less dependant on your income from only one market.

### Together we are GROWING FOOD PEOPLE and PROSPERITY

HE GRAIN SA FARMER DEVELOPMENT PRO-GRAMME FOCUSES AS MUCH ON MEANINGFUL HUMAN DEVELOPMENT AS ON AGRICULTURAL PRODUCTION PRACTICES. THROUGH THE WORK DONE IN THIS PROGRAMME, FOOD SECURITY AND THE PRODUCTIVITY OF THE GRAIN PRODUCING SEC-TOR HAVE BEEN STRENGTHENED.

Many South African farmers have renewed confidence and hope and thousands of developing farmers in South Africa are reaping the reward of doing the right thing at the right time in the right way. The Grain SA Farmer Development team engages with farmers, goes the extra mile and gets involved.

We believe development is about the individual and is not only about land, machines, markets, money, skills development and training – development is about all of the above and is a process and not a leap.

#### WHAT HAVE WE BEEN UP TO LATELY?

#### Study groups

We were very pleased that we could start up our study group meetings in time for the new summer growing season after the lockdown period.

The establishment of a study group sets the Grain SA footprint in key grain growing regions – even in very remote areas. It is the point of entry for a new farmer. This is where we get to know the farmers – and they learn to trust us. It is also the place where we get the opportunity to identify unique challenges and opportunities in a specific region as well as to transfer important knowledge and skills. Our teams of managers and mentors can be instrumental in updating farming systems and changing the lives of hard-working farming folk.

From 1 October to 17 November 2020 we held 352 study group meetings in the regions, particularly focussing on new season production, launching new season projects and even organising inputs to be purchased and delivered to the participating farmers.

#### Have you heard about our Beyond Abundance (BA) project?

Grain SA's five-year initiative rolled out in collaboration with the Jobs Fund of National Treasury and other key donors and contributors – 'From Subsistence to Abundance' has been an encouraging model of farmer development. Year on year it became evident that farmers were embracing new ideas, using new technologies and adapting to new farming practices – and feeling rewarded for their efforts. Most significantly, there was a ripple effect as neighbouring farmers saw the fruits of the changes and joined in the project too.

With no further funding beyond the planned five year project forthcoming from the Jobs Fund, the project could have ended, but the farmers had so much drive to build on what they had learned and their requests for more training and knowledge and mentorship gave impetus to a new project – Beyond Abundance. Jenny Mathews, Pula Imvula contributor. Send an email to jennymathews@grainsa.co.za



#### Our inspiration

- Farmers have seen results in spite of challenging conditions like droughts and pests.
- Farmers are inspired by what they have learned and the results they have seen.
- Farmers are excited by the new possibilities their farming livelihoods offer them.
- Farmers have already put their hard-earned money 'in the bank' for the new season.

#### Company support

During 2019/2020 a number of companies continued with their support to the farmers in the new Beyond Abundance programme and each participating farmer received:

- Bayer supplied 10 kg seed which is adequate for 1 ha.
- SA Lime and Gypsum supplied lime in a 50 kg bag.
- Kynoch bagged fertiliser in 50 kg bags.
- Villa Crop packaged the pre- and post-emergence chemicals in a 1 kg pack.

5 043 farmers eventually deposited their R3 500/ha in their TPFA accounts. The Beyond Abundance farmers' maize crop yields were fantastic. The yields averaged 4,3 t/ha while the countrywide average was 5,9 t/ha. We couldn't be more delighted with this – the fruits of our labours being harvested by so many farmers.

This year 3 160 ha have been planted in the Beyond Abundance project – 95% of the participants are growing maize on 1 ha and are contributing towards improved household food security and nutrition levels. We are trusting the season ahead will bear even more fruit as we walk beside the developing farmers.

#### Farm visits to support individual farmers

'Who will catch them if they fall?' A need was identified to support advanced developing farmers who have grown beyond study groups and are almost ready to farm independently, but will likely benefit from a year's intensive one-to-one mentoring. Our team of managers have already made 136 farm visits to offer support to individual farmers during October and November.

### The stem borer complex of South Africa

AIZE IN AFRICA IS ATTACKED BY MANY LEPIDOPTERAN PESTS. IN SOUTH AFRICA, THERE ARE THREE ECONOMICALLY IMPOR-TANT STEM BORER SPECIES THAT ATTACK MAIZE, NAMELY THE AFRICAN MAIZE STEM BORER (BUSSEOLA FUSCA), CHILO BORER (CHILO PARTEL-LUS) AND THE PINK STEM BORER (SESAMIA CALAMISTIS). THESE SPECIES CAUSE SEVERE DAMAGE TO MAIZE AND CROP LOSS VARIES DEPENDING ON THE TIME AND LEVEL OF STEM BORER INFESTATION.

#### **AFRICAN MAIZE STEM BORER**

The African maize stem borer (Photo 1) has three distinctive moth flights per season (Figure 1). Plants are infested by either the first or second stem borer generation, depending on the planting date of the maize. Female moths lay their egg packets behind the leaf sheaths of the plants. Newly hatched larvae are dark brown in colour and become lighter as they mature.

After hatching, the larvae migrate upwards to the whorl leaves where they begin to feed and remain for a long period before burrowing into the stem. Larger larvae feed through the rolled whorl leaves resulting in visible rows of holes as leaves grow out. Damage symptoms of this stem borer therefore manifests as 'windows' and 'shot holes' on whorl leaves (Photo 2). If the stem borer damages the growth point of the plant, it leads to 'dead heart' symptoms. The duration of the larval stage is about six weeks after which larvae become pupae. Larvae that did not pupate will overwinter in stubble residues, which is the main source of infestation in the following season.

> It is verv important to make use of the high dose/refuge strategy in order to prevent resistance development.



#### **CHILO BORER**

The Chilo borer (Photo 3) has a much shorter life cycle compared to that of African stem borer, which leads to a large-scale overlap of generations and a continuous increase in larval numbers. Chilo borers can have up to five generations per season. Moths lay overlapping egg batches on both the upper and underside of leaves that appears as yellow spots on the leaves.

Larvae are creamy white in colour with dark spots, which is why Chilo borer is also referred to as the spotted stem borer. Larvae

Elrine Strvdom, Junior Researcher, ARC-Grain Crops, Potchefstroom and Pietman Botha, Pula Imvula contributor. Send an email to StrydomE@arc.agric.za or pietmanbotha@gmail.com



migrate to the whorl and feed for about 10 to 14 days before entering the stem. Damage symptoms are similar to that of the African stem borer. As the winter season approaches, the larvae become inactive and overwinter in stems or behind leaf sheaths.

#### **PINK STEM BORER**

The pink stem borer (Photo 4) mainly occurs in coastal regions where it is an important pest but inland infestations has been on the increase. The moths of this species lay eggs behind the leaf sheaths of the maize plants and neonate larvae that hatch here, penetrate the stem directly while others that hatch from the husks will enter the maize ears (Photo 5). This behaviour differs from the other borer species, whose larvae move to the whorl and do not penetrate the stem directly.

African maize stem borer (Busseola fusca),

1



<image><text>

Seasonal moth flights of the African maize stem borer captured in light traps (Based on data obtained from Van Rensburg et al., 1985).



'Dead heart' symptoms are, therefore, the first visible damage symptoms because larvae enter the stem directly and do not damage the whorl leaves. Generations overlap to such an extent that individual generations cannot be distinguished. Larvae develop throughout the year and do not enter a dormant winter state.

#### CONTROL

Bt maize was introduced into South Africa to control all three stem borer species. The Chilo borer and pink stem borer are successfully controlled by both Bt genes commercially available in South Africa. The African maize stem borer, on the other hand, is well controlled by the latest Bt gene commercially available but showed resistance to the first Bt gene released in South Africa. It is therefore very important to make use of the high dose/refuge strategy in order to prevent resistance development.



The pink stem borer (Sesamia calamistis).



Neonate larvae of the pink stem borer hatching behind the leave sheath of a maize plant, directly penetrating the stem.

### Chemical weed control principles every farmer should know

EED MANAGEMENT IS PERHAPS THE GREATEST CHALLENGE FACED BY SMALL-HOLDER FARMERS, CAUSING EXCESSIVE TIME SPENT ON MANUAL WEEDING AND REDUCED YIELDS. CORRECT INCORPORA-TION OF CHEMICAL WEED CONTROL IN WEED MANAGE-MENT STRATEGIES, WILL, HOWEVER, NOT ONLY RESULT IN GREATER YIELDS, BUT WILL CREATE THE OPPORTUNITY FOR THE FARMER TO EXPAND ON ACTIVITIES.

It is imperative that the farmer familiarise him or herself with the basic principles associated with herbicides as inaccurate use of herbicides will not only result in ineffective weed control but also crop damage. The correct application of the herbicide remains the responsibility of the farmer, and it is imperative that farmers familiarise themselves with the instructions for use as stipulated on the label which accompanies the product.

It is firstly important to understand that each herbicide is unique regarding the crop on which it can be applied, the weeds that it controls as well as the time at which it is applied. Herbicides are generally divided into two main groups i.e. pre- or post-emergence.

With pre-emergence application, weeds are controlled before they emerge (appear above the soil surface) and are aimed at controlling annual grass weeds. Generally speaking, pre-emergence application is done at the same time as the planting of the crop. As no, or herbicides with limited grass species control, are available for the control of grasses once crops such as maize or sorghum have emerged, pre-emergence herbicide play a crucial role in grass control.

Post-emergence herbicides control weeds when they have already emerged above the soil surface. Both the crop and the weed are accordingly actively growing when post-emergence herbicides are applied, and the growth stage of both the crop and the weed must be taken into consideration with application. Dr Maryke Craven, Senior Researcher, ARC-Grain Crops, Potchefstroom and Pietman Botha, Pula Imvula contributor. Send an email to CravenM@arc.agric.za or pietmanbotha@gmail.com



Knowledge of the basic principles associated with herbicides and their application requirements, will assist the farmer with the correct choice of herbicide and subsequent effective weed control.

#### **IMPLEMENTING CHEMICAL WEED CONTROL**

Note must be taken of the following basic aspects when planning to implement chemical weed control as part of a weed management strategy.

#### Identify problematic weeds correctly

Herbicides differ regarding the weed spectrum they control. Regular field scouting is important to identify problematic weed species which will allow the farmer to make an informed decision as to which herbicide to select. Correct identification of weeds accordingly forms the foundation of effective weed control. The weed identification handbook *Common weeds in the crop and gardens in Southern Africa* written by C Botha are available from ARC-Grain Crops, Potchefstroom (018 299 6100).

#### Ensure that the herbicide is registered for the crop to be planted

Some herbicides (such as glyphosate) kill all plants irrespective of the crop or weed, whilst others are more selective in the plants they kill. Herbicides are accordingly registered to be used on certain crops. Some can be applied on crops such maize and sorghum, while others are registered for use only on e.g. sunflower. Applying an herbicide



The weed spectrum indicated in A is at the correct growth stage for post-emergence application. Weeds indicated in B is too big, and ineffective weed control will be achieved.

not registered for the crop planted, will result in severe or total yield loss. Chemical weed control with intercropping practices are accordingly a challenge and require careful planning.

#### Herbicides with a residual effect, impact on crop rotation

Certain herbicides have a residual effect. 'Residues' refers to the amount of herbicide which is still present in its original or closely related form in the soil, long after it has served its purpose. Such residues can cause severe damage to follow up crops not registered for the herbicide. Where crop rotation is accordingly practiced, take note of the label instructions with regard to the waiting periods for follow up crops. Atrazine is an example of herbicide which has a residual action which offers a broad spectrum of weed controlled. If beans, pumpkin and other vegetables are rotated (or intercropped) with maize or sorghum, atrazine should accordingly not be considered.

#### Seedbed preparation

The efficacy of a pre-emergence herbicide requires a fine and even seedbed.

#### The importance of water

Water requirements differ for pre- and post-emergence herbicides.

- In order to reach the germinating weeds under the soil surface, pre-emergence herbicides require water. Once applied, 10 mm to 20 mm of water (irrigation or rain) is required within four days of herbicide application in order to activate the herbicides and ensure that it works properly. Excessive rain will result in the herbicide being washed from the soil profile and subsequent poor weed control.
- Post-emergence herbicides, on the other hand, require a rain free period once applied. Rain that occurs within 6 to 8 hours will wash the herbicide from the leaves and will accordingly result in insufficient control. Herbicides are, however, available with shorter rain fast periods. Please refer to the product label.
- Do not apply post-emergence herbicides on weeds that are under drought or moisture stress. Such weeds are not capable to effectively take up the herbicide, and this will result in insufficient control. Increasing the dose will also not result in effective control under drought conditions. Post-emergence herbicides must be applied on actively growing weeds.

#### Apply at the correct time

The most common mistake that farmers make with the application of postemergence herbicides is to apply herbicides when weeds are already too big (**Photo 1**). Consult the label to establish at what growth stage weeds will be most effectively controlled. Generally, the ideal growth stage would be between 2 to 4 leaf stage of the weed. Pre-emergence control, however, remains more effective than post-emergence control.

#### Apply the correct dosage

Herbicide application must be done in such a manner that weeds are effectively controlled without harming the crop. Crop damage can occur if too high dosages are applied. Consult the label regarding the dose required. With pre-emergence herbicides, the clay percentage of the soil plays an important role in the dose to be applied.

#### Importance of temperature

Aside from having an effect on the evaporation of the herbicide, temperature can also have an influence on how quickly the herbicide is taken up and transported within the plant. Generally speaking, higher temperatures are more favourable for uptake and transport than lower temperatures – provided that stress conditions resulting in wilted weeds are not prevailing. Optimal uptake of post-emergence herbicides take place under warm humid conditions, but under drought conditions the humidity is too low and the temperature too high.

#### **Tank mixtures**

Weeds that are usually difficult to control can be effectively controlled with the use of tank mixtures i.e. where two or more herbicides are added to the same tank and applied simultaneously. Label instructions must however be carefully followed in this regard as to ensure that the products added to the tank mixture are compatible and that they are registered to be used as such.



#### Adjuvants

Adjuvants are substances that improve herbicidal activity. Adjuvants enhance penetration, adsorption and spread of herbicides and have to be added to most post-emergence herbicides. Only apply recommended adjuvant as per label instruction, as not all adjuvants have the same function or purpose. The pH of tank water has to be checked and where necessary a buffer and/or ammonium sulphate has to be added to enhance the efficacy of post-emergence herbicides.

#### Follow up applications

For effective weed control during the whole season a minimum of two herbicide applications are recommended. Refrain however from using herbicides from the same chemical group more than once per season on the same field. This could lead to herbicide resistance in the weeds that will negatively impact their control.

#### Calibration of herbicide applicators

It is imperative that whatever method used to apply the herbicide, that regular calibration is conducted. Make sure that nozzles are clean and not clogged, as this can lead to inefficient spread/overlap of the herbicide at application.

Lastly it is important to wear appropriate protective clothing when using herbicides, which may include a long-sleeved shirt and long pants, waterproof gloves, heavy duty shoes, eye protection and a respirator.

# **SOYBEAN PROSPECTS** for the 2020/2021 season

LOBAL SOYBEAN PRICES HAVE BEEN ON THE RISE DUE TO UNCERTAINTIES RELATED TO WEATHER CONDITIONS, THE US SOYBEAN MARKET TRENDED ABOUT 9% HIGHER SINCE THE END OF SEPTEMBER TO OCTOBER 2020. PRODUCTION UNCERTAINTIES PERSIST FOR SOUTH AMER-ICA AS LESS THAN OPTIMAL WEATHER CONDITIONS PRE-VAIL, SLOWING DOWN PLANTING IN SOME AREAS.

Although weather conditions have improved in some parts of Brazil, the planting is significantly later than normal, they will probably have to import to cater to local demand. China's demand for soybeans remains high for 2020/2021 as they work towards growing their hog herd after the African swine fever wiped out about 40% of their herd in 2019. The focus will be on the South American market until early 2021. The upward movement of prices internationally have had an impact on the South African market, where prices are trending higher, but demand remains good.

#### LOCAL MARKET TRENDS

According to the latest SAGIS figures, producer deliveries for Soybean as of 1 September totalled 1 202 982 tons, which is about 97% of the estimates by the Crop Estimates Committee (CEC) (**Table 1**). The forecast for the new season in terms of production planning is looking favourable.

The CEC reported that the intention to plant for 2020 will possibly increase by 80 800 ha to 785 800 ha, which is an 11,46% increase compared to the previous year's 705 000 ha. Projections for closing stock levels at the end of the season (28 February 2021) is estimated at 121 105 tons, this would represent available stocks for a month, with average processing of 115 417 tons per month, this is tight considering that we require stocks for at least one and a half months to cater for the local market's new season deliveries to come in or imports can be arranged.

#### Local supply and demend of soybeans.

	2019/2020	2020/2021*
Production (CEC)	1 170 345	1 261 250
Opening stocks (1 March)	502 241	138 455
Imports	9 098	150 000
Surplus	0	2 600
Total supply	1 646 518	1 519 305
Total demand	1 508 063	1 398 200
Ending stocks	138 455	121 105

*Source: Grain SA, NAMC* \*Data as at October 2020



Ikageng Maluleke, Agricultural Economist, Grain SA. Send an email to Ikageng@grainsa.co.za



Source: Grain SA, 2020

The local soybean market demand remains good. According to the latest SAGIS figures, the year to date overall processing of soybeans is 882 506 tons, approximately 2,6% more than the previous season's year to date pace. This is mainly due to the processing of oil and oilcake which is ahead of last year's pace by 7%.

Over the past few months, domestic soybean prices continued to increase due to the support from increasing international pric-

> es, depreciation of the rand and strong domestic demand (**Figure 1**). Since around April/May, local prices moved closer to import parity levels, following international price movements pushed by higher demand for US soybeans as well as uncertainties in weather conditions in South America.

> In addition, local demand for crushing has increased. The December futures price increased by 22,7% since June 2020, while July 2021 futures price is trading at around R7 200, at the time of writing this article. Prices are likely to remain relatively stable at current levels in the short term. Most of the actual plantings still need to take place; hence, there is still a lot of production risk that can affect prices.

# Coaxing sunflower seedlings through the emergence phase

FARMER MAY HAVE DONE EVERYTHING PER-FECTLY RIGHT FROM SEED BED PREPARATION TO PLANTING DEPTH AND PLANT POPULA-TION, BUT IT IS CRITICALLY IMPORTANT TO ALWAYS REMEMBER THAT SUNFLOWER SEED-LINGS HAVE A PARTICULAR REPUTATION FOR BEING VERY VULNERABLE AT THE POINT OF EMERGENCE.

Seedling emergence is one of the most important factors in the establishment of optimum plant density for a maximum yield. a common cause of poor emergence is surface crusting.

#### THE CHALLENGE

The surface of the soil in which the sunflower seed is planted can often form a thick, impenetrable crust which will result in uneven emergence and gaps in the stand. Since sunflowers are normally planted in mid-summer, we have hot, dry weather with intermittent thunderstorms. Water is attracted to soil particles and is then held or absorbed by the soil particles.

When heavy rains fall, followed by more days of extreme heat, the effect is a bit like an oven which bakes the soil and causes a thick crust to develop on the surface. We know sunflowers to be vigorous growers but the tender young seedlings cannot penetrate through this crust easily – if at all. The result will either be delayed emergence or significant gaps in the rows and a poor, uneven stand.

#### **KNOW YOUR SOILS**

Different soil types react differently and some are more prone to compaction and crusting than others. More friable, clay soils do not crust as easily as the more sandy and sandy-loam soils. Another factor which influences crusting is the amount of organic matter in the soil, the higher the level of organic matter, the lower the likelihood of severe crusting is – which is a benefit to those farmers practicing no-till farming.

The typical field which is most likely to be prone to surface soil crusting is the field which has been worked two or three times for seedbed preparation and has a fairly fine texture.

When I asked a North West farmer who has grown sunflowers for the past 20 years in sandy soils, what he does to deal with the problem of crusting, his very firm response was: 'Duisendpoot, duisendpoot, duisendpoot!'

The term 'duisendpoot' is commonly used throughout South Africa but is correctly termed a rotary hoe. It is very important that this action is performed at the correct time since little emerging sunflower seedlings Jenny Mathews, Pula Imvula contributor. Send an email to jennymathews@grainsa.co.za



are very delicate and can easily be broken if 'duisendpooting' occurs while they are emerging.

#### **TIMING IS EVERYTHING**

As is the case in so many farming operations, timing is everything! The sunflower farmer only has a small window of opportunity to get into the field with the rotary hoe because there is a risk of damage to the seedlings.

Every sunflower grower should conduct at least one pass over the field on the third to fourth day after planting. No sunflowers would have emerged as yet so this will ensure that the surface is loosened. Conveniently, this action will also damage the weeds which will be germinating closer to the surface than where the sunflower seed will be lying.

The next process will be the really risky one. If there is no rain again, the one pass across the fields should be sufficient for good germination, but if it does rain again before the field of seeds has fully emerged, then the farmer will have to consider another pass to ensure that all the seedlings emerge well.

There is a risk to the second process because some seedlings would have germinated while others won't necessarily be germinated yet and there is a crust which urgently needs to be broken!

Although the rotary hoe's effectiveness is greater at faster speeds, the best practise at this point is to drive the tractor much more slowly to ensure that the speed of the pass does not either dig out the little seedlings or break off the ones which have emerged.

Another helpful bit of advice is to conduct any post emergence rotary hoe operations on warm, sunny afternoons – and while the surface of the soil is quite dry. Then the sunflower plants will be more flexible and even slightly wilted which will result in less crop injury. There will probably be some damage but this can be reduced with careful monitoring of the process. In fact, some farmers even anticipate this potential loss and increase their planting population accordingly. The rule of thumb is a 5% stand loss with each hoeing.

No farmer should just send a driver to his field and let him get on with the job – this is one of those moments when it is essential that the farmer watches the process with the eyes of a hawk.

# A win-win approach to CONFLICT MANAGEMENT

AN YOU REMEMBER THE LAST PERSON YOU HAD A FIGHT WITH? WAS IT AT WORK OR AT HOME? CAN YOU REMEMBER WHAT IT WAS ABOUT? HAVE YOU MANAGED TO MAKE PEACE WITH THEM? ARE YOU STILL ANGRY? TRY AS WE MAY TO ERADICATE IT, CONFLICT REMAINS AN INEVITA-BLE PART OF OUR PERSONAL AND WORKING LIVES.

#### WHAT IS CONFLICT?

Conflict may escalate quickly at times or it may be suppressed or simply forgotten. Conflict often spreads as we share our perspective, our side of the truth, with our families, friends, colleagues and even complete strangers. Conflict can even be carried from one generation to the next.

It is all around us. But this is not necessarily a negative thing. Conflict can be productive and can even bring about much needed adaptation or innovation. It all depends on how it is perceived and how it is dealt with. This is as true when it comes to businesses or organisations as it is when it concerns individuals. One can only deal with conflict, however, if it is recognised as such. It might surprise you to learn that sometimes people do not even realise that they are living or working in a state of conflict.

There are many forms of conflict in addition to what we might experience in terms of personal relationships. At a social level in South Africa there is conflict emanating from land reform, conflict between different cultures, races and genders. There are also forms of conflict peculiar to businesses or organisations.

Business or organisation conflict can be said to occur when co-workers or departments fail to make progress with a task because of disagreement over what they should be doing or their goals (task conflict). It can also occur when colleagues disagree over which policies or procedures to follow to accomplish the task at hand (process conflict).

Conflict exists at multiple levels in many different contexts and can be defined in many ways. However, it is always primarily a disagreement with another person or group and it largely arises when we feel that a person or group threatens or obstructs our interests.

#### **IS CONFLICT ALWAYS BAD?**

As implied above, not all conflict is unhealthy or dysfunctional. In organisations constructive or functional conflict is sometimes necessary and even, at times, vital to performance and success.

Indeed, Bruce Tuckman (a famous educational psychologist) saw conflict as an essential part of the formation of groups capable of learning, working together and achieving goals. In his *Stages of Group Development*, he theorises that any group will only reach the final stage of performing if they have moved through a 'storming' stage. This is a stage where they openly engage in conflict that helps them to establish agreed-upon values and rules or norms for the group (the 'norming' stage). A similar view is shared by Daniel Coyle, the author of *The Culture Code: The Secrets of Highly Successful Groups*. In this best-selling book, Coyle states that the success of any group can be measured by two key moments. One of these is how the group responds to its first conflict.

From research and theory, it appears that the effective and productive performance of any group requires exploring, harnessing and resolving conflict. But it is a balancing act. Too little conflict in an organisation can Dr Leon Bezuidenhoud: University of the Free State and Dr Eugene de Klerk: University of Mpumalanga. First published in SA Graan/Grain January 2020. Send an email to bezuidenhoudl@ufs.ac.za



result in employee complacency and sluggishness, while too much can lead to stress and burnout and negatively affect collaboration. Conflict within organisations can be thought of like an irrigation pipe: Too little pressure in the system and no water will come out; too much pressure and the pipe will most probably burst. Too far, in either direction, and productivity is put at risk. Just the right amount of conflict is needed in order to make the organisation function effectively.

#### IS THERE ONLY ONE WAY TO HANDLE CONFLICT?

It is important to acknowledge that conflict will be a part of your life. Better yet, it is important to acknowledge that constructive conflict *should be* part of your life. The question is: How can we work with conflict to ensure that both we and the people we manage are productive and collaborative?







Five conflict management styles based on two dimensions:

Perhaps the most important parts of successful conflict management are to effectively manage emotions and to develop our emotional intelligence or EQ. EQ refers to the ability to identify and manage one's own emotions and those of others. An important part of managing our emotions is to understand that different people handle conflict differently.

The different ways people handle conflict can be related to how much they are concerned with meeting their own needs or those of others. Those who are concerned mostly with their own needs (those who are self-assertive) will tend to be forceful in a conflict, while those who are more concerned with the needs of others (those who are cooperative) will tend to be accommodating. Those who find it difficult to assert themselves in a situation and who do not wish to co-operate, will simply avoid participation. Perhaps the most successful way to handle conflict is to show both confidence and a concern for others; this is when we collaborate and compromise.

However, even the same person will not use the same style in all situations. A lot can depend on the situation as well as those we find ourselves in conflict with. For example, if you are involved in a conflict that is not important to you (like your children fighting over who gets to choose the TV channel), you might choose the avoiding style and just ignore the problem or person. When negotiating your salary, you may choose the compromising style and when faced with a rude or even a drunk person, you might choose the forcing or avoiding style.

#### **AIMING FOR A SOLUTION**

While we all have different and context-dependent styles of handling conflict, when it comes to resolving it, we need to control our emotions. In the bestseller, Anatomy of Peace, the Arbinger Institute suggests that we should reject any impulse to focus exclusively on the

conflict, as this may often escalate it. When we focus on conflict, we usually only see two alternatives, namely the two sides - yours and mine. Stephen Covey, in his well-known book the 8th Habit of Highly Effective People, refers to this as the 'scarce mentality'. It would seem we are limited to these two options. Covey implies that we should shift our focus to finding a third alternative. This alternative should be to try to find a way so that there are no losers in the conflict: a win/ win situation. A win/win approach (collaborating approach) is when both parties walk away from the conflict feeling as if they have won.

In my experience, effective conflict resolution means listening to the other party. Acknowledging the emotions of the other party may also help. But effective listening does not suggest listening to respond, but truly listening to understand. This means we are not constantly thinking of how we are going to reply to, counter or contradict what they are saying. Although difficult, it is also important to remain calm in a conflict situation. A shouting match will only result in a scarcity mindset, with a definite winner and a definite loser.

#### **STEPS IN HANDING CONFLICT**

Listening will allow you to clarify what the disagreement is about. This is the first step to resolving conflict. Effective listening will also allow you to establish a common goal for both parties and to find ways to meet the common goal and explore the barriers that prevent the achievement of that common goal. Once this has been explored, you can agree on the roles and responsibilities of both parties. But listening remains the key ingredient. You may need to check your understanding of what the other person is saying and the other person's understanding of what you are saying. This will avoid miscommunication owing to misinterpretation.

#### CONCLUSION

The skill of listening remains one of the most important aspects to effective conflict handling. Only through proper listening, will you deal effectively with conflict. Another key aspect is understanding yourself, knowing your trigger points and which behaviours or attitudes cause you to become angry or emotional. Sometimes the best approach to a non-important conflict is to walk away. But if the relationship or goal is important to you, then stay focused on listening. Also remember that unacknowledged conflict can never be resolved and that conflict, when productively worked through, can only strengthen groups and relationships.

To conclude, while we cannot resolve each and every conflict we are involved in, with understanding and self-awareness, we can prevent conflicts from becoming worse.



We do not inherit the earth from our ancestors; we borrow it from our children.

~ SOURCE UNKNOWN





### THE BATTLE AGAINST FLEABANE – a long-term strategy

HIS WEED IS NOT CALLED 'ARMOEDSKRUID' IN AFRIKAANS WITHOUT REASON, BECAUSE WHERE FLEABANE ABOUNDS, YIELDS ARE OF-TEN POOR. PARTICULARLY IN FIELDS WHERE MINIMUM OR NO-TILL IS APPLIED, THIS LIGNE-OUS WEED IS OFTEN ONE OF THE MAIN NEGATIVE FAC-TORS AFFECTING THE PROFITABILITY OF A CROP.

Jaco de la Rey, who farms on the farm Springbokdraai just outside Leandra, says the economic impact of fleabane is underestimated across the country. He only realised the severity of the problem when his soybean crop produced just less than half the long-term average yield this year. He attributes this largely to the pressure on the crop because of the presence of fleabane in his soybean and maize fields.

It was tall fleabane (*Conyza sumatrensis*) in particular that took over in Jaco's soybean fields and maize residue this year, more so than in other years. 'The pressure on the soybean crop was much higher than on the other crops because there are fewer weed control options for soybean fields,' Jaco explains. He feels that the particularly dry summer of 2018 contributed to the sudden population growth of the weed.

'Initially I thought the mistake had been mine and joined a technical working group to learn more about combating the weed.' That is where Jaco was approached by BASF to become part of a project that established trial plots at Belfast, Koster, Hennenman, Reitz, Bloemfontein and now also Leandra. This is an attempt to determine the best strategy and application schedule for combating fleabane. Valerie Cilliers, SA Graan/Grain editor. First published in SA Graan/ Grain December 2019. Send an email to valerie@infoworks.biz



On Springbokdraai applications (Roundup and 2,4D as well as Eragon [saflufenacil] and Roundup) were made on four plots – see **Photos 2** to **5**.

Sean Stiles (row crop manager, BASF) explains that the timely application of pesticide is extremely important. 'This weed is classified as "difficult to control". It is therefore essential to apply the herbicide just after the plant has germinated. The period just before and just after a harvest is critical. If fleabane has survived the winter, it is very difficult to get rid of.' He says you also have to make sure that there is no fleabane in the fields when you start planting. 'It becomes very difficult to control fleabane among crops,' he explains.

According to Sean, Jaco is a very good candidate and partner in the battle against fleabane. 'Jaco has done a lot of research and has experimented with drop sizes, for example.' He explains that the fine hairs on the fleabane leaves make it difficult for the toxins to penetrate. The type of nozzle, water volume and water pressure during spraying are therefore very important.

'This is an entire science on its own,' Jaco explains. 'You want to make sure that the herbicide drop remains on the plant for as long as



Jaco de la Rey shows how the fleabane emerged after his maize harvest.



On plot 1 the first application was made on 21 June, and then again on 6 August and 13 September. As can be clearly seen from the photo, on 30 October 2019 there was no sign of any fleabane.





The first application on plot 2 was on 6 August 2019, and then again on 13 September – also with reasonable success.

The Double Tap method was used on plot 4, with two applications in quick succession on 18 and 24 October 2019. By this time the fleabane was already quite big and although the applications had an effect on the plants, regrowth can be seen.

5

On plot 3 the first application was on 13 September 2019, with less success.

4



## **COVER CROPS** as a tool towards regenerative farming

ITHOUT SOIL WE WOULD GO HUNGRY. DO WE EVER SPARE A THOUGHT FOR OUR SOIL? TO US, SOIL IS MERELY SOIL AND THAT IS IT. MOST PEOPLE TAKE SOIL FOR GRANTED, YET SOIL IS JUST AS NECESSARY TO SUSTAIN LIFE ON EARTH AS AIR AND WATER,' SAYS MS MARINA MÖLLER-EILERS IN HER EDUCA-TIONAL BOOKLET CALLED *SOIL BLANKET*, DEDICATED TO THE LEGACY OF JACK HUMAN (1950 - 2015).

She confirms that soil is the source of subsistence – the basis of most fundamental nutrients. Plants grow in soil, animals eat plants and humans eat plants and animal products – directly or indirectly derived from the wonder of soil.

Nitrogen, phosphorus and potassium are as important to a plant as 'meat, bread and vegetables are to humans', according to Möller-Eilers. These nutrients are absorbed via the roots of the plant. Nitrogen aids plants with photosynthesis, phosphorus is important for flowers and consequently seed and fruit production, while potassium nourishes roots. For these to be produced naturally, the best possible soil health needs to be sustained.

#### **EXPERIENCE FROM THE USA**

With an imperative focus on regenerative agriculture and sustainability through farming in harmony with nature, Prof Buzz Kloot from the University of South Carolina in the United States of America (USA), introduced Mr Jason Carter to South African producers at the Regenerative Agriculture Conference presented by *Landbouweekblad* in conjunction with the Riemland Study Group, Ottosdal No-till Club, Grain SA and the Soil Health Support Centre at respectively Reitz, Ottosdal and Joostenbergylakte.

Jason farms in the centre of South Carolina, a state on the southern east coast of the USA. He shares what he has experienced on his farm over the past years – on the way towards a more sustainable grain and specifically maize production system.

> There is no one out there spraying the forests and fertilising them, yet the trees grow well and produce fruits for the wildlife. It is the same with our soils. If we have healthy soils teamed with biology, they can support the plants.

#### CONSERVATION FARMING VERSUS REGENERATIVE FARMING

According to Jason some landowners consider no-till as conservation farming. 'Just minimum tillage or straight no-till really do not address that. It is a step towards regeneration, but you need to take a couple of steps further to really regenerate the soil. Regenerative farming has more to it. We focus on the carbon in the organic matter in the soil. We introduce cover crops and often bring in livestock to bring the soil biology back to life.'

Jason farms with maize, cotton and soybeans on about 8 030 acres (3 252 ha). He also does some work for a neighbour – taking it to 4 000 ha in total.





He confirms that they implemented solid regenerative principles about seven years ago. It has been 20 years since he quit any type of tillage on the farm and 'went to just strip-till'.

'We noticed our organic matter was not changing. Seven years ago, we decided to start with cover crops. There was not much information and I started working with Prof Kloot. After planting our first cover crops, we started to track the organic matter changes in the soil. Since then we have been seeing about two tenths of a percent increase every year. We increased the organic matter in our soils from about 0,6% to about 1,8%,' says Jason.

He adds that they have cut back on the phosphorus, potassium and on all synthetic fertilisers and pesticides. 'That is the biggest step to get the biology back in the soil,' he says.

Jason emphasises that it is necessary to reduce the use of synthetic fertilisers and pesticides, since they are detrimental to soil microbiology. Regenerative agriculture is a much more sustainable system.

#### **COVER CROPPING**

He explains that they plant the multi-species cover crop at the end of the summer. It grows throughout autumn, winter and the first part of spring. They plant maize directly into the green cover crop and then spray herbicide directly after planting. With the cotton and soybeans they terminate the cover crop about 30 days earlier, because they need to have enough moisture later in the hot growing environment for germination.

Preferred cover crop mix selections on Jason's farm currently include about four to five, but he plans to expand to more cover crops soon. 'We need to be at around eight. I think that is one of the mistakes we have been making. Almost all the mixes have rye in it, clover, vegetables, radish and we are experimenting with some lupine this year, but we need to bring in some more species. Since we do have rye as a grass species, bringing in oats or anything else in the grass family will do.'

Jason Carter, a maize producer from South Carolina in the USA, says that he has cut back on phosphorus, potassium and synthetic fertilisers and pesticides to get 'the biology back in the soil'.



#### **BENEFITS**

Jason says they have cut their insecticides by at least three quarters of a percent. 'When we first started with the cut-back of inputs, we expected a yield decrease. However, we have found that our yields are staying the same. Every year we try to trim our inputs and our yields are staying the same. That just goes to show the benefit of diverse soil rotation with crops and cover crops when you regenerate and bring the biology back to the soil.'

He compares his commitment to regenerative farming to the reality of forests as the prime example of how nature is functioning optimally. 'There is no one out there spraying the forests and fertilising them, yet the trees grow well and produce fruits for the wildlife. It is the same with our soils. If we have healthy soils teamed with biology, they can support the plants.'



Nitrogen aids plants with photosynthesis, phosphorus is important for flowers and consequently seed and fruit production, while potassium nourishes roots.



#### **A DEFINITE 'YES'**

He says that he would most definitely recommend regenerative maize production for South African conditions. During his visit here he saw that a lot of the problems South African producers have, are similar to what they experience. However, compared to the Southeast, South Africa has a drier environment and moisture is probably a bigger concern here than in his area. In other areas in the USA they have the same moisture concerns. He still thinks that bringing the cover crop into the mix is a definite 'yes'. There might be some challenges with the dry environment, but there should be benefits as well – even in a drier location.

'Some producers in our area do have the advantage of having irrigation. They can plant maize, cotton or soybeans later into the season because of that. A lot of producers do not have this advantage. So, I would say that the moisture concerns from what the cover crop can take in a dry environment when it is time to plant, could be a problem.'

#### **QUANTIFIABLE RESULTS**

Jason states that the proof of the pudding lies in results, which can be converted into monetary savings and potential yield increases. These need to be calculated in relation to direct costs.

On his farm he has seen, in relation to the surface planted, that an investment of \$25 (R370,00 at a R14,80 exchange rate) in cover crops, was realising savings of about \$100 (R1 480,00) per acre in synthetic nutrient inputs, insecticides and pesticides.

'It is a huge saving and we are maintaining the same yield. I think we have pushed our crops to the limit of the yield. From now on our savings are going to be from what we can cut back while maintaining the same or increased yields,' says Jason.



#### The battle against fleabane...

#### A FEW INTERESTING FACTS ON FLEABANE

- Fleabane germinates in autumn (April to July).
- One fleabane plant can produce 230 000 seeds.
- The seed are distributed by the wind and can be blown hundreds of kilometres away from the mother plant.
- Initially there is little growth above the ground while the tap root is established. The plant can then grow to a height of up to two metres.
- Fleabane needs light to germinate and therefore germinates in shallow soil. A cover crop that forms a canopy works well to combat the weed – precisely because it keeps the light away.
- Fleabane likes untilled soil and germinates within seven days, but can germinate up to three years later.
- Grazing leads to there being fewer leaves and therefore less chance for herbicide to penetrate the plant.

#### A SUMMARY OF CURRENT FINDINGS FOR THE LONG-TERM CONTROL STRATEGY OF FLEABANE

- The extraordinary application window: Herbicide must be applied just after the fleabane has germinated (the main part of the germination occurs just after a harvest).
- For the best results the prescribed application instructions must be followed.
- Regular monitoring of fields for germinating fleabane is vital.
- Producers must alternate several herbicides and methods of action to avoid fleabane resistance.
- Each season brings its own challenges and the control strategy must be adjusted accordingly.

possible. That is why, for example, we used water-sensitive paper for the first time to determine the optimum size of the water drop. We also realised that you should not try and save a few rands here by using less than the prescribed dosage. The economic impact of the weed is much bigger than the money you will save,' he says.

Yet, the biggest factor remains the timing and sufficient monitoring of the fields. 'Fleabane's growth schedule falls outside the traditional application period for herbicides. It is very important for producers to remain on the lookout for the small plants that often hide below the crop residue,' says Sean. He mentions that glyphosate resistance is currently a major concern. 'Producers have sprayed only with glyphosate over the years, largely because it is a broad-spectrum herbicide. And yet it is necessary to alternate and combine the products to prevent the weed from becoming resistant. To get fleabane under control, producers must follow a programme covering a number of years. There is no instant solution,' Sean warns.

Jaco is satisfied with the results of the trials. 'We have already been able to draw good conclusions and after a lot of head scratching and lying awake I see a light at the end of the tunnel.'



## THE ROLE OF COVER CROPS IN SOIL HEALTH

HE TERM 'COVER CROPS' IS INEXTRICABLY LINKED TO OTHER TERMINOLOGY SUCH AS SOIL BUILD-UP, SOIL HEALTH, SUSTAINABLE AGRICUL-TURE AS WELL AS CONSERVATION FARMING. COVER CROPS ARE THE AXIS OF OR THE MOST IMPORTANT ASPECT OF ANY OF THESE IDEOLOGICAL AP-PROACHES.

However, many farmers are still struggling to get to grips with the establishment of cover crops on traditional crop farms. It demands a different way of thinking and specific practices are required to get the process of soil build-up going, such as altering red fallow soils into cover crop grazing.

This problem can be overcome by understanding how nature works and what the basic rules of soil health entail.

#### **RULES OF SOIL HEALTH**

Soil health depends on carbon – the more efficient the carbon cycle in the soil, the better the results and benefits for the producer.

The greatest improvement in soil health occurs when the following rules are followed and maintained:

- Permanent organic cover.
- · Constant actively growing roots.
- Crop diversification.
- Minimal soil disturbance.
- Implementing a livestock factor.

#### Permanent organic cover

This aspect gives rise to a drop-in ground temperature, a decrease in the evaporation of soil moisture, less wind erosion, decelerated water run-off, and an increase in the soil's water uptake. High soil temperatures cause soil microbes to die off, which is why nature sends her own ground cover (weeds and undesirable species) as soon as the soil becomes exposed.

However, this cover is usually toxic, unpalatable or covered in thorns, thus preventing animals from grazing it. The ground is covered in this way to create conditions under which more desirable species can establish themselves.

#### **Constant actively growing roots**

Plants are the conduits of free carbon found in the air. The carbon is bound in the leaves by way of photosynthesis and then converted into sugar. The sugar, in turn, is discharged by the roots in exchange for minerals and other nutrients. These sugars consist of a large portion of carbon ( $C_6H_{12}O_6$ ) and serves as a source of nutrients for soil microbes. Plants and microbes therefore live in symbiosis with one another.

#### **Crop diversification**

Different plants attract different microbes with the help of the sugars that they excrete, for example legumes as opposed to grassy types. In order to stimulate soil microbe activity as much as possible, it is important that the roots are established at different depths in the soil. This is achieved by planting crops with different root types for an effective distribution across different soil depths.



Dawie du Plessis, Agricol cover crop specialist. First published in SA Graan/Grain November 2019. Send an email to JSwanepoel@agricol.co.za



In this regard one can consider crops with tap roots and others with adventitious roots, and even plants with finely branched roots or thicker lateral roots. The different roots in the soil will attract and increase different types of soil microbes. This creates an environment characterised by a better balance of different types of soil life. The result is a situation in which desirable microbes will inhibit undesirable microbes. This can also assist in addressing problems such as nematodes.

#### Minimal soil disturbance

Air ducts are formed in the soil when roots or parts of roots die off after grazing or at the end of a growing season. These ducts or canals



Agrilife Grazer 2, Agricol's winter cover crop.

cause aeration and lead to a substantial increase in the soil's water infiltration ability.

It is a known fact that soil contains aerobic and anaerobic microbes. As soon as a plough takes to the soil, for example, the different microbes will be subjected to unfavourable oxygen levels and die. The air ducts and soil structures are broken by the ploughing action and soil compaction will once again occur.

The greatest drawback of this process, however, is the dying off of the soil microbes. Because soil microbes comprise mainly of carbon, oxygen then binds to the dead microbe's carbon, forming volatile CO<sub>2</sub> which disappears into the air. This process of evaporation represents the greatest form of loss of soil carbon in South African agriculture.

#### Implementing a livestock factor

There is a balance between surface plant mass and the amount of plant roots below the soil surface. As soon as animals start feeding on the surface leaves and stems, the factory that must produce the sugars will diminish and some of the finer and weaker roots below



the surface will die, as too little energy will be available to them. Once new leaves are formed, new roots will also grow, and the process will repeat itself. The roots that die off in this way also consist of carbon and become part of the soil carbon build-up process.

Animals that graze cover crop pastures will therefore accelerate the entire soil carbon process below the surface but will also use their digestive tracts to help break down plant residues above the surface. Plant residues are therefore broken down to a medium that is easily degradable for the soil microbes.

#### SENSIBLE COMPOSITION OF MIXTURES

Cover crop mixtures must be composed sensibly with the emphasis on soil health, but also for use as high-quality grazing. Producers can utilise this aspect of cover crops to generate an income from their animals, while at the same time improving and building up the soil.

Agricol has developed its AgriLife Grazer cover crop mixtures to meet the following criteria:

- AgriLife Grazer 12 is a summer mixture consisting of a base of different annual forage sorghums, Pearl millet (Babala), cowpeas as well as certain legumes. This mixture can be planted from October to February.
- **AgriLife Grazer 2** is a winter mixture consisting of different growth lengths of oats, stooling rye, radishes as well as vetch. The planting time for this mixture is from February to the end of May.
- AgriLife Grazer 21+ is an advanced multi-species soil build-up mixture with 21 and more different annual crops that include both summer and winter crops. The best time to plant AgriLife Grazer 21+ is in January. It can offer grazing or cover until the end of October. This mixture is ideal for use on fallow land.

Soil health improves much faster when planting a combination of the three main groups of plant species: grassy types, tuberous plants and legumes. The combination also offers high quality grazing for livestock.

Mixtures can easily become ineffective if composed non-judiciously by disregarding the various crop characteristics. This includes planting density, plant height, growth habit, growth rate, competition, light requirements, synergism, allelopathy, duplication, et cetera.

Non-judicious composition and disregard of crop characteristics can yield undesirable results, making it seem as though the mixture is ineffective. It is also important that the product remains affordable.

#### SOIL MOISTURE CHALLENGES

The greatest challenge in the cultivation of cover crop mixtures, is the availability of ideal soil moisture and the fact that soil moisture must be conserved for the next grain crop. The rate at which a cover crop uses water, can be decreased by controlling its height through grazing.

However, this must be done in a way that will not over-expose the soil surface and increase evaporation. Soil will double its water retention ability with every 0,5% increase in carbon – this means that soil which has been managed based on the rules of soil health, will conserve more water than fields that lie fallow.

Soil build-up is a long and patient process for which there is no quick fix. Implementing cover crops is a step in the right direction and offers a solution for underperforming fields.

Contact your nearest Agricol-agent or visit the website at www.agricol.co.za for a recommendation in your area.



# Part 1 How does the maize market function?

HIS ARTICLE IS THE FIRST OF A FOUR-PART SERIES THAT ATTEMPTS TO EXPLORE THE FUN-DAMENTAL FACTORS THAT HAVE AN IMPACT ON THE MARKET. THE FIRST THING WE WILL DIS-CUSS IS THE SAFEX PRICE FORMATION MECHA-NISM FOR MAIZE.

#### SAFEX

The South African market started to function as a free market in 1996, when the Marketing of Agricultural Products Act was enacted, and the market was deregulated. This means that market participants; namely, producers, traders and processors respond to forces of supply and demand in setting prices. In practice, all of these participants use the Agricultural Markets Division of the South African Futures Exchange (Safex) as the benchmark for the prices they will ask or offer on the 'spot' market of daily trading in maize. The spot price refers to the Safex price paid for a commodity at Randfontein, less transportation costs price to determine the spot price at all registered silos.

Upon the formation of Safex, the trading of derivatives (futures and options) was introduced for white, yellow maize and other grains. The price of futures and options are generated on the exchange market through 'bids' and 'offers', this reflects the views of market participants on the prices of specific commodities at different dates in the future (for example when there is reference to the June price, or the December price).

The same instruments are used to hedge (safeguard) against price risk. The effective use of Safex, allows market participants to manage their price risk, which can improve their financial position.

The futures market provides a platform where buyers and sellers can meet and trade freely, in a transparent way. Therefore, effectively discovering the price of the commodity. It is therefore completely up to the farmer how much risk he/she is willing or able to take.

#### **FUTURES PRICE**

All buyers and sellers of futures contracts on Safex, contribute to the process of price determination. The prices that we see on the futures market represents all supply and demand pressures that determine prices. The large number of volumes traded on the exchange, ensures that there is a good representation and individuals cannot tamper with or influence prices. Therefore, the price is determined by the collective action of thousands of buyers and sellers, including producers, processors, handlers, exporters, importers, and speculators. The market price will rise, fall, or remain steady because of a collective action from participants to either buy or sell.

The futures price reflects the price that buyers and sellers are prepared to pay or accept for a commodity at a future date. The futures price therefore reflects a

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collective market opinion. For example, the price for maize could be determined by the following:

- The opinion of a producer in the North West, expecting a smaller crop due to drought conditions.
- The opinion of a producer in Mpumalanga who expects a good crop.
- A feed manufacturer who expects demand for maize to be higher as a result of herd expansion after good rains.
- As well as the opinion of a grain trader who expects a good crop in the US and a stronger rand against the dollar can cause a decrease in the Safex price.

The futures price is therefore a forecast of what the cash price of the commodity will be for a given future month, based on currently available information. Meaning supply and demand factors (locally, regionally, and internationally), weather conditions, consumer preferences and changes in living standards, government policy, political uncertainty, trade agreements and technology affect the prices of products in the future. In the long-term price trends are normally a reflection of supply and demand factors, while breaking news, the exchange rate and emotions influence the market on a daily basis.





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# THE CORNER POST

### SAM RUITERS Saying goodbye is never easy

HE BLOEMFONTEIN OFFICE IS MOVING TO PRETORIA IN DECEMBER AND ACTIVITIES FOR THE TRAINING COURSES AND SCHOOLS PROGRAMME WILL BE ARRANGED FROM THE HEAD OFFICE IN PRETORIA IN FUTURE. HOW-EVER, IF YOU ATTENDED ONE OF GRAIN SA'S TRAINING SESSIONS DURING 2013 TO 2020, YOU UN-KNOWINGLY MET WITH THE ORGANISATIONAL SKILLS OF SAM RUITERS (39), THE TRAINING ADMINISTRATOR AT GRAIN SA'S BLOEMFONTEIN OFFICE.

Sam ensured that these classes went off without a hitch and she loved every minute of her job. Unfortunately this mother of three was not able to relocate to the head office and had to hand over her duties to someone else.

#### **HELPING DREAMS COME TRUE**

For Sam coordinating the schools programme and training courses across the country has been wonderful. The courses are arranged through the study groups with Sam as the facilitators' right-hand woman. Her behind the scenes undoubtedly influenced the sessions and her administrative and organisational skills contributed to its success.

Grain SA initiates these courses to equip developing farmers with the necessary knowledge to become better farmers. As Oprah Winfrey said: 'If you know better, you do better'. Courses include information regarding basic maize production, irrigation, calibration, workshop tools, basic engine repair and even a tractor's driver course to name just a few.

Sam says she has always been hardworking and precise in whatever she does. According to her planning and time management were the key factors to ensure that the training courses and schools programme could run smoothly. 'If the material is not ready and on time, the trainer can't continue with the sessions – especially with so many of the remote rural areas being without the luxury of electricity.'

The highlight of her time at Grain SA is that her work contributes to the advancement of agricultural knowledge amongst school children and the skills development of developing farmers. The fact that she played a part in increasing the number of courses over the years from 150 to more than 500 delights her.

'I realise now that if I could successfully organise more than 500 courses, I can do anything I set my mind to.' This is why she has made the decision to study next year and take on an 18-month online diploma in human resources. 'Although it is daunting, I am sure that I will persevere.'

She wants to thank everyone who enriched her life while she was part of the Grain SA Farmer Development team. 'I have to say a

Louise Kunz, Pula Imvula contributor. Send an email to louise@infoworks.biz



special thank you to Willie Kotzé (the former operations manager of the Farmer Development Programme) who really made me believe in myself and encouraged me whenever I needed support.'.

#### THE BEGINNING OF A NEW CHAPTER

Bloemfontein has been Sam's home from a young age and she matriculated in 1999 at Heatherdale Comprehensive Secondary School. After school she filled a few temporary positions before joining Absa where she worked for five years.

To gain more experience she decided to apply for another position at Services Seta, an organisation whose primary function is to facilitate skills development through learning programmes. 'I gained a lot of experience and really developed my skills here as I was exposed to several industries from hairdressing to funeral services!'

Problems at the company had Sam looking for a new challenge. She was fortunate to be employed at Grain SA where she could once again be involved in facilitating skills development through learning programmes. 'Leaving Grain SA wasn't part of my plan. I intended to stay here until I retired, but unfortunately our plans do not always work out the way we want them to,' Sam shares.

If she looks back at her years as training administrator, she feels proud of the systems she put into place to make the work of the trainers and facilitators simpler. 'I worked hard to get a system that works well so that I could help the facilitators and trainers.'

Although she feels sad about the end of this chapter, she is excited about the one ahead and believes in staying positive. 'I felt very emotional when I received the news in August about the office moving, but I have realised that God can only work if I have peace about my circumstances. I am depending on Him for a new door to open.'

To Sam, her time at Grain SA developed her human knowledge immensely over the years. She also realised that she is an organiser at heart with good communication skills. With these skills and a willingness to develop and learn more, Sam believes that her next job will be just as wonderful as the one she is now leaving behind.

Kalpana Chawla, the first woman of Indian origin to go to space said: 'The path from dream to reality does exist. May you have the vision to find it, the courage to get on to it, and the perseverance to follow it.' May your dreams come true, Sam!



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