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PULA IMVULA

GROWING FOOD • PEOPLE • PROSPERITY



GRAIN SA MAGAZINE FOR DEVELOPING FARMERS



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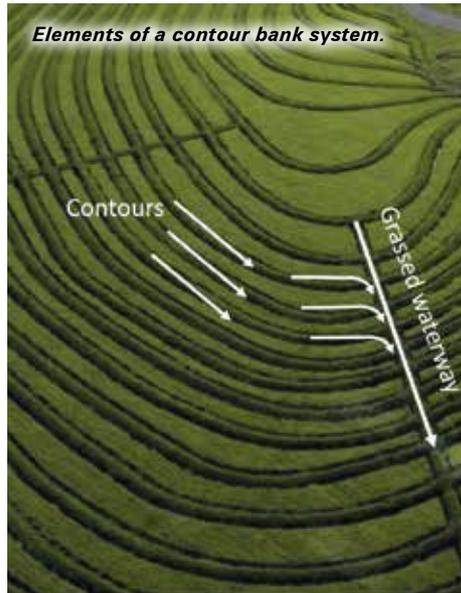
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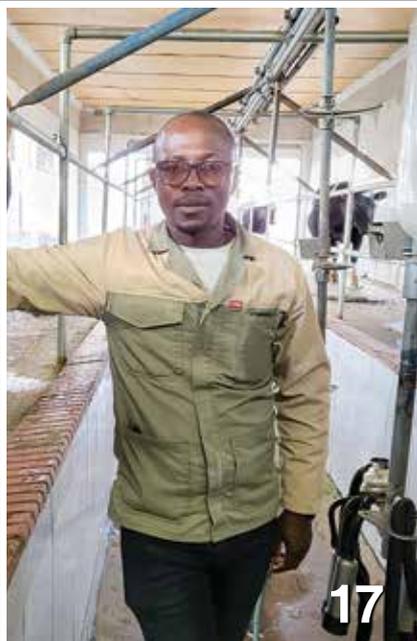
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A WORD FROM...

Jacques Roux (mentor)

THE 2021/2022 PLANTING SEASON WILL BE REMEMBERED AS ONE OF THE MOST DIFFICULT PLANTING SEASONS YET. WITH GOOD RAIN BEING FORECAST, IT INITIALLY LOOKED AS IF THIS WOULD BE ANOTHER RECORD SEASON. EVERYTHING WAS READY FOR PLANTING TO BEGIN, BUT THEN THE BIG RAIN CAME THAT CAUGHT EVERYONE OFF-GUARD.

Tractors would just start the day's work when the rain drops would start falling. Farmers would wait for the fields to dry up, with planters loaded with the most expensive fertiliser in history, and as soon as the work began, the rain would be there too. It carried on like this for almost two months, with water everywhere.

Because farmers have to provide food for the country, they could not give up – they just had to get up and replant. Where lands were inaccessible, farmers had to make a plan and planted using hand planters. The back sprayer was used to go where the tractor and sprayer could not. As the rain washed away the maize's nutrients, fertiliser was applied with a bag on the farmer's back.

In April, the soybeans and maize looked promising, but there were parts where the beans were struggling due to the excess rain. As the sunflower plantings were late, farmers were hoping that the cold would be late too. In general, the crops were growing and it looked as if a good harvest (good tonnage) would be realised.

'The tons and the price are looking good. I will have a good harvest this year,' said one of the farmers. When talking about his money matters, he shared that he wanted to clear his debt at the bank and at SACTA (SA Cultivar & Technology Agency). 'I am looking for help again next year, Nthathe Roux. If I do not pay, you will not help me again. My name is going to be clean. The farmers in the programme all have to pay their debt first – they can. Just tell them: Pay back the money!' he laughed. ■

CONSIDER PLANTING

FARMING CAN NO LONGER BE SEEN AS JUST THE PHYSICAL WORK BEING DONE TO PRODUCE THE CROP. IN MODERN TIMES FARMING MUST BE SEEN AS A BUSINESS AND THEREFORE RUN LIKE A BUSINESS. STRICT RULES NEED TO BE ESTABLISHED AND FOLLOWED TO ENSURE THAT FARMERS CAN PRODUCE PROFITABLY AND ARE ABLE TO PLANT DURING THE NEXT SEASON.

Planting can be a time-sensitive game and choosing the correct planting window can be tricky, but when is it practical not to plant? To answer this question, you have to look at input costs and income.

INPUT COSTS

These costs are defined as the set of costs needed to create a product or service. It includes all costs incurred by a business that are

related to general and administrative activities. To make it more applicable to agriculture, input costs are defined as all costs related to the production and harvesting of crops such as fuel, fertiliser and agricultural chemicals.

Input costs can be divided into two different categories:

Fixed cost does not change with an increase or decrease in the number of goods and services produced or sold. In agricultural terms it can be said that these are costs that a farmer has to pay regardless of whether or not he produces. These are monthly or annual costs such as electricity line hire, rent, salaries and the cost of living – expenses which will remain the same on a monthly or yearly basis.

Variable cost changes in proportion to how much a company produces or sells. In agricultural terms it can be said that this is a cost that increases if production increases. These costs will increase or decrease as production increases or decreases. Examples of these are fuel, seed, agricultural chemicals and fertiliser.

1 Producer price estimate for dry land white maize for the 2022/2023 production season.

Current producer grain price determination*	Maize at a price of R4 000/t			Sunflower at a price of R10 000/t		
	3,5	4,5	5,5	1	1,5	2
Planning yield (t/ha)				10 000	15 000	20 000
Gross value of production (R/ha) @ average price	14 000	18 000	22 000			
Directly allocatable variable costs (R/ha)						
Seed and seedlings	1 093,00	1 229,63	1 912,75	522,67	653,33	653,33
Fertiliser	5 487,04	7 045,76	8 604,49	1 171,80	2 429,70	4 239,90
Lime	236,50	236,50	236,50	236,50	236,50	236,50
Fuel	1 469,73	1 534,08	1 598,43	1 301,19	1 395,42	1 489,64
Repairs	1 539,71	1 587,87	1 636,02	1 363,15	1 442,61	1 522,06
Herbicide	1 345,50	1 345,50	1 345,50	1 186,00	1 186,00	1 186,00
Pesticide	1 016,00	1 016,00	1 016,00	711,21	711,21	711,21
Input insurance	-	-	-			
Price hedging	1 134,57	1 303,23	1 523,17	310,47	386,76	481,52
Contract work	-	-	-	-	-	-
Crop insurance	232,78	299,29	365,80	269,65	404,48	539,31
Aerial spraying	-	-	-	-	-	-
Production credit interest	694,24	797,44	932,02	365,13	454,85	566,30
Total directly allocatable variable costs (R/ha)	14 249,07	16 395,29	19 170,68	7 437,77	9 300,86	11 625,77
Total overhead costs (R/ha)	3 402,63	3 402,63	3 402,63	2 867,90	2 867,90	2 867,90
Total cost/ha before physical marketing (R/ha)	17 651,70	19 797,92	22 573,31	10 305,67	12 168,76	14 493,67
Margin/ha before marketing costs and profit (R/ha)	-3 651,70	-1 797,92	-573,31	-305,67	2 831,24	5 506,33
Total cost/t before physical marketing R/t	5 043,34	4 399,54	4 104,24	10 305,67	8 112,50	7 246,83

* For the best grade at the nearest silo (Rt) (price minus total marketing cost)

if it makes business sense

In short, **total cost = variable cost + fixed cost**. In farming terms, the total cost to produce the crop is equal to the overhead expenses such as rent, upkeep, electricity line hire, levies and taxes, plus the expenses such as the cost of seed, fertiliser, fuel and agricultural chemicals.

INCOME

Income is the amount of money or property received for goods sold or services delivered. It can be divided into two categories:

Gross income, which is an individual's total earnings before taxes and other expenses. For agriculture, gross income is the total amount of money that a farmer receives for the product that he produces and delivers.

Net income can also be referred to as profit. It is the income after all expenses have been subtracted. Expenses include all expenses incurred such as taxes, fuel, levies, fertiliser and subtractions.

$$\text{Net income} = \text{gross income} - \text{expenses}$$

WHEN IS IT NOT VIABLE TO PLANT?

The goal of any farmer should be to produce products in such a way that he can cover the cost of his crop and living expenses; and have enough left to either plant the crop cash, or to serve as an asset which helps him to get a loan.

Farmers should therefore use the following equation to test the viability of planting:

$$\text{Profit/loss} = \text{income} - \text{expenses}$$

In farming terms, this means that net income (profit) is equal to the money a farmer receives from selling his product minus the cost of production.

Criteria to determine if it is viable to plant

- For cash farmers: The profit should be enough to cover your cost of living and to finance the next time you plant.
- For credit farmers: The profit should be enough so that you are able to pay off your debt and cover your cost of living.

In short, to calculate if it is viable to plant:

- 1 Calculate what it will cost to produce the product (the cost).
- 2 Determine what the price of the product is (income).
- 3 Calculate if a profit is made when costs are subtracted from income.
- 4 Determine if you meet the requirements set out above to make it viable to plant.

It is very important for farmers to do their homework properly before they commit to planting a crop. This means that the farmer must be accurate in his prediction of costs and income, as an inaccurate prediction of these concepts can lead to inefficiency and loss.

HOW MUCH IS IT GOING TO COST TO PLANT A HECTARE?

In **Table 1** the production cost for maize, sunflower and soybeans for different yields in North West is shown. Please note that this is only an example as prices of fertiliser, herbicide, pesticide and fuel can still change before planting. Every farmer should compile his own budget before making the decision to plant.

According to Table 1 the price for a 3,5 ton yield should be at least R5 043,34. At a 5,5 ton yield, a farmer can break even as the production cost per ton is close to the price per ton. For sunflower 1 t/ha is close to breaking even, but for 2 t/ha there is some profit. If a farmer is going to plant soybeans using fertiliser (or do fertiliser corrections the year after planting), the profitability of soybean production will be under pressure. ■

Soybeans at a price of R8 683/t		
1	1,5	2
8 683,80	13 025,70	17 367,60
803,57	1 205,36	1 406,25
2 676,00	3 998,25	5 320,50
236,50	236,50	236,50
1 338,85	1 433,07	1 527,30
1 402,60	1 482,05	1 561,51
1 046,50	1 046,50	1 046,50
1 011,65	1 011,65	1 011,65
-	-	-
265,41	330,97	390,76
-	-	-
894,43	1 341,65	1 788,86
-	-	-
497,93	620,94	733,10
10 173,44	12 706,94	15 022,92
3 093,99	3 093,99	3 093,99
13 267,43	15 800,93	18 116,91
-4 583,63	-2 775,23	-749,31
13 267,43	10 533,95	9 058,46



CHRISTIAAN VERCUIEL,
INTERN: APPLIED ECONOMICS, GRAIN SA
AND PIETMAN BOTHA,
INDEPENDENT AGRICULTURAL CONSULTANT





Contours can prevent SOIL LOSS

SOIL CONSERVATION WORK MEANS ANY WORK WHICH IS CONSTRUCTED FOR THE PREVENTION OF SOIL EROSION, AS WELL AS THE IMPROVEMENT OF THE VEGETATION OR SURFACE OF THE SOIL. IT ALSO INCLUDES WORK TO IMPROVE THE DRAINAGE OF SUPERFLUOUS SURFACE OR SUBTERRANEAN WATER, RECLAMATION OF ANY WATER RESOURCE, AND THE PREVENTION OF THE SILTING OF DAMS AND POLLUTION OF ANY WATER RESOURCES.

Some of the most important and precious resources to be managed in the agriculture of a country are its soils and water resources. The responsibilities of landowners are largely covered in the *National Water Act* (No. 36 of 1998) and the *Conservation of Agricultural Resources Act* (No. 43 of 1983), which addresses soil conservation amongst other facets relating to agriculture.

Grain farmers spend much time in tilling and preparing soils in the varying topology and climatic zones of South Africa for grain production. The soils, depending on the tillage practices of each individual, are thus exposed to the differing rainfall patterns in which heavy downpours or light continuous rains effect the soil. Heavy downpours can remove most of the highly productive topsoil if the resource is not protected.

DO AN ASSESSMENT

Most farms in South Africa have had some planning done regarding the building of farm dams, grassed waterways, and the laying out and building of contour banks from tilled lands to either planned constructed or natural waterways.

Unfortunately, the building of contours in the late 1950s and 1960s was based on an incorrect formula in which the starting high-

side point of the contours started with a fall, which then was reduced at varying intervals.

This resulted in silting of the contour at about halfway and enormous damage, as the contours in heavy rains broke halfway and resulted in enormous damage and loss of soil when each lower contour broke in turn. This can be seen throughout South Africa. The only solution is to flatten them and recontour the whole land correctly at great cost; or grass the whole length of the contours into the planned or natural waterway. Larger stormwater contours can be built at intervals to reduce the impact on poorly planned areas. Grassed waterways should be checked and repaired as soon as possible if erosion gullies start developing.

Various scale maps available from the surveyor general for your farming area can assist with the planning, as well as looking at particular lands with Google Earth. Detailed aerial photos of your farm can also be obtained from the surveyor general's office. These show all the faults and help with detailed planning.

WATER RUN-OFF

The function of the contours is to remove any run-off at a constant rate from a whole land into a grassed or natural waterway, so that no damage or soil erosion can occur. Run-off rates depend on soil types and the slope of the land. Sandy soil has a high permeability, with clay having the lowest. Once the soil profile has absorbed enough water, it starts to flow down and across the lower side to the natural waterways.

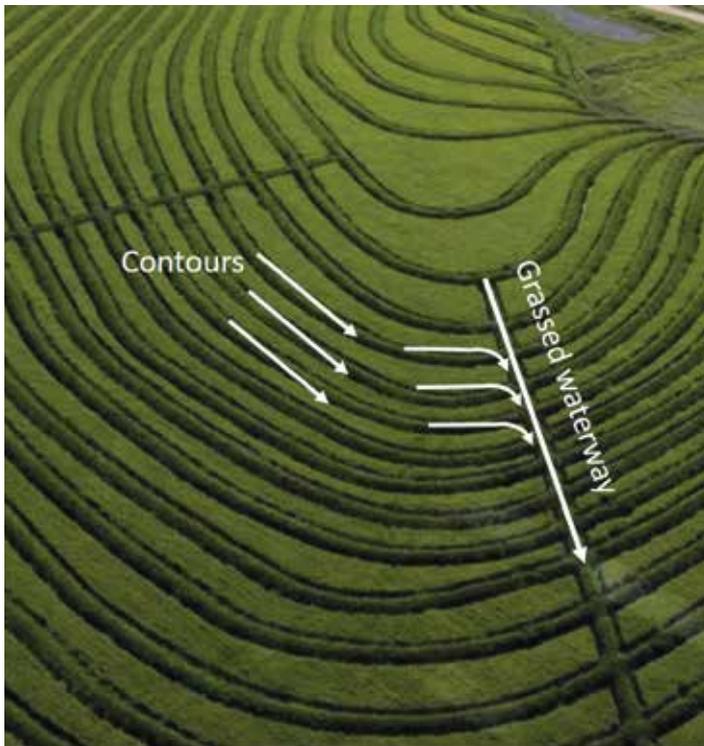
Conservation tillage in crops, together with cover crop rotations, will do much to reduce excess run-off. Planning must include provision for run-off, which will occur from any saturated soil profile that receives more rain.

Any areas not being farmed for crops should be put to an appropriate grass type for your area to reduce any potential erosion.

Guidelines

Working contours are laid out considering the slope of the land topography, soil types and potential water run-off rates. A continuously sloped contour of one in 300 has since the early 1960s been proved to work very effectively in all soil types. This means that for every 300 m of contour, it will drop one metre from the high to the low side.

The key planning for the level between contours is an art as well as a science. The interval between contours in a land of a very high slope can result in so many contours



Elements of a contour bank system.



The design and the spacing between contours are of great importance to safely discharge the runoff and to limit soil erosion.

that it becomes impractical to farm. Intervals of 1,2 m are a useful starting point. Correctly designed contours should be extended into natural waterways.

A dumpy level that can focus on the measuring staff height indicator a kilometre away is useful. Two people, each with a staff and rope of 30 m between them, can identify the points while laying out the contours. The fall between points for a 30 m rope interval would thus be 0,1 m if the contours were to be made at the ideal one-in-300 slope. Once the points are established, closer inspection can indicate a fair line or curve to be followed when contour construction begins. Always write down the level for each point taken.

Contours can be made with graders, mouldboard ploughs, angled discs and properly designed double-gang disc implements.

GOLDEN RULES

Legally you have to provide your neighbours with the run-off water at the lowest point on your farm. You must build waterways at adjoining property lines to enable your run-off to reach the other owner's property at your lowest point, unless it is possible to plan a larger area with several owners co-ordinating the planning works for the catchment area for dams, contour and waterways. These agreements should be covered legally in case new future owners object to the previous planning implemented. ■



RICHARD MCPHERSON,
AGRIBUSINESS AND PROJECT
MANAGEMENT CONSULTANT



You don't concentrate on risks. You concentrate on results. No risk is too great to prevent the necessary job from getting done.

~ BRIGADIER CHUCK YEAGER
United States Air Force officer



We were there for the NAMPO 2022 experience

AFTER TWO YEARS OF ENFORCED SILENCE AND NO PHYSICAL NAMPO HARVEST DAY, VISITORS WERE EAGER TO VISIT NAMPO PARK THIS YEAR. ONCE THE GRAIN SA TEAM WAS GIVEN THE GREEN LIGHT, THEY WERE SPREADING THE INVITATION FOR ALL TO COME AND 'EXPERIENCE IT!', WHICH WAS ALSO THIS YEAR'S THEME. ABOUT 73 000 VISITORS ATTENDED THE EVENT OVER THE FIVE DAYS.

Despite challenges and discouraging moments, the team's enthusiasm and experienced fingerprints were all over the farm as they pulled off yet another successful NAMPO experience. Visitors were not disappointed and enjoyed sufficient parking and entry, and a super warm welcome. Their immediate impression was of a farm buzzing with contagious energy. Bright colourful stands, busy streets and exhibition halls, loud, friendly calls of greeting – so much to see and do!

It was perfectly obvious that the broader farming community was extremely happy to be gathering to do business and fellowship at one of their favourite meeting places. The public seating areas were occupied by groups of farmers with their families, all catching up and sharing insights about their favourite exhibits.

NETWORKING OPPORTUNITIES

Ms Thoko Didiza, the Minister of Agriculture, Land Reform and Rural Development, and her delegation paid NAMPO Park a visit too. She is always very enthusiastic about the show and loves the way it brings her in closer contact with farmers and the broader agricultural sector.

It is important for the grain farmers of South Africa to see their representatives talking with the leaders of the country. This is after all a key role of Grain SA – the lobby that speaks up on critical matters affecting the sector, on behalf of all grain farmers in South Africa.

At NAMPO there was something to pique every interest – a place to gather and see what is new and happening in the agricultural sector. Even more importantly, it's a place for doing business and networking with business leads and experts in their fields. There are not many everyday opportunities for farmers to pick the brains of the top experts in the business, but here a person can really seek out the best advice.

Menfolk usually have a discussion at home about which tractor, planter or implement needs to be given a closer inspection and which expert minds they want to talk to about the product on offer. A person has to keep his finger on the pulse of modern technology to stay in the game – and NAMPO is undoubtedly the space to do just that.

SOMETHING TO INTEREST EVERYONE

The livestock section is always a big drawcard – despite the strong odours that fill the air! People love walking through the stalls, looking at the different breeds of animals on display. The miniature horses were cute and the demonstration in the ring was a delight!

The National Wool Growers Association's interactive demonstrations of traditional sheep shearing always draw interested audiences.



The Harvest Day had no age restriction, and young and older visitors enjoyed the experience.

It is fascinating to inspect different breeds of cattle to find out more about the conditions they thrive in. There is always something interesting to steal a farmer's heart.

Exhibitors must be congratulated on the high standard of their appealing exhibits. The John Deere team even turned things on their head with a stunning array on display, which included an upside-down tractor!

Case celebrated their 180th anniversary in style at NAMPO Park. New Holland Agriculture drew a lot of attention with a wide range of their tractors and machinery on display. Fathers and sons visited the tractor and implement exhibits, including the beautiful collections of toys available for dreamy-eyed farm boys to spend their pocket money on.



Bright colourful stands, busy streets and exhibition halls kept the broader farming community extremely happy at one of their favourite meeting places.



Minister Thoko Didiza enjoyed talking to farmers and networking with the Grain SA team. Here she is with Grain SA chairman, Derek Mathews on a tour of NAMPO Park.



Backsaver Equipment offers back-saving, hand-powered tools that make small-scale farming easier. Michris Janse van Rensburg, owner and designer, demonstrates a feed planter to some farmers.

MEMBERS AND THE TEAM

The farmers who are Grain SA members were treated to many spoils such as free parking, free entry and free access to the Members Facility, where there was a never-ending supply of coffee and treats for the family. The venue was full all day long, with members from all walks of life relaxing and catching up.

There was also an opportunity for farmers to meet the Grain SA team there. Grain SA's chief executive officer, dr Pieter Taljaard, told farmers how excited he is to represent the grain farmers. The Farmer Development team was kept busy with meetings and networking to spread the news about the progress of farmers and highlighting the challenges that farmers face this season. Grain SA economists were also very popular and farmers were eager to pick their brains about the industry.

The NAMPO Harvest Day is big and busy, and visitors just have to accept that they won't see everything in one day. It's a professional show that flies the banner proudly for the progressive agricultural sector and in particular the grain farmers of South Africa. ■



**JENNY MATHEWS,
MANAGEMENT AND DEVELOPMENT
SPECIALIST AND EDUCATOR**

Climate Resilience Consortium

– essential for resilient farming

THE GRAIN SA RESEARCH AND POLICY CENTRE TEAM MANAGES AND COORDINATES RESEARCH EFFORTS IN A CONSORTIUM-BASED APPROACH. THE THREE MAIN RESEARCH CONSORTIA ARE CROP IMPROVEMENT, PLANT HEALTH AND CLIMATE RESILIENCE AND WERE ESTABLISHED TO ADDRESS THE NEEDS OF INDUSTRY AND GOVERNMENT.

Further initiatives the team is involved with include food and nutrition security and farmer development innovation support, cultivar evaluations as well as human capital development. This article provides a short overview of the Climate Resilience Consortium and highlights its key initiatives.

The consortium was established with the aim of investigating the impact of climate change and variability on agricultural production and building resilience to ensure food and nutrition security for the future.

WHAT DOES CLIMATE CHANGE MEAN FOR PRODUCERS?

Global climate predictions suggest that temperatures will increase, rainfall patterns will become more variable, more extreme weather events will occur and atmospheric carbon dioxide (CO₂) levels will continue to rise. These are some of the prominent aspects that will affect both the yield and quality of crop production in the future. Producers are currently facing these challenges and they are predicted to increase in frequency and intensity.

BUILDING A KNOWLEDGE BASE

The uncertain effects of climate change on food security in South Africa means that tackling climate change in agriculture is a high priority shared by government and industry. Grain SA identified key objectives to address certain challenges posed by climate change. The first is focussed on building a knowledge base of the effect of climate change in agriculture. It is well known that climate change will greatly disrupt national food security, but how this will affect production is largely unknown. Through this objective, a greater knowledge base will be developed by investigating specific effects of climate change and variability in a local context and how producers engage with these challenges.

The impact of elevated CO₂ on production

Carbon dioxide is increasing in our atmosphere, and it is unclear how crops will respond to these higher levels. Therefore, the consortium assessed how local maize cultivars would respond to elevated CO₂ (eCO₂) levels. Experiments from preliminary studies led by Rhodes University (RU) showed that when maize is subjected to eCO₂, the increased CO₂ levels can mitigate the effects of drought, with potential differences between cultivars. Physiological mechanisms that underpin the eCO₂ effect are the maintenance of plant water status and how the plant regulates the opening and closing of stomata in leaves.



FUNDING ACKNOWLEDGEMENT

The Climate Resilience Consortium is funded by the Department of Science and Innovation (DSI) in partnership with the Technology Innovation Agency (TIA) through the Agricultural Bio-economy Innovation Partnership Programme (ABIPP) and co-funded by the Maize Trust. This consortium serves as an important base to show the success of effective partnerships between Government, industry, and the research community. The funders are thanked for their continued commitment to building local climate resilience research and capacity.

Research partners

- Rhodes University (RU)
- University of the Free State (UFS)
- University of Pretoria (UP)
- ARC-Grain Crops
- Stellenbosch University (SU)
- University of the Western Cape (UWC)
- Syngenta

Effects of late planting dates on maize development

The consortium is currently investigating the effects of late planting dates (shifting rainfall patterns) on physiological development and yield in maize in South Africa in a project executed by the University of the Free State (UFS), the University of Pretoria (UP) and the Agricultural Research Council (ARC). The project seeks to determine whether the onset of rain in maize production regions in South Africa is in fact shifting later and whether this trend correlates with later planting dates.

Parallel with this, field trials have been set up to investigate the effect of this phenomenon on maize production. Field trials have been set up on three experimental sites in Potchefstroom, Bethlehem and Bloemfontein. Preliminary results provide evidence that late maize planting dates significantly affect plant growth and development. Late planting dates also affected yield for all cultivars tested and the latest planting dates produced a significantly lower yield. This is the third season of the project.

INITIAL STEPS TOWARDS RESILIENCE

The second key objective is to build resilience in agricultural systems. With the objective to develop climate change response plans, a major focus is to investigate production practices that could be used to help build resilient production systems.

Building resilient production systems

The consortium is addressing climate variability by looking at how to build production systems in the long term that are more resilient to climate variability within or between seasons through different crop rotation systems and production practices.

Several long-term agronomic trials have been established to address the importance of assessing production practices on the ground. The UFS is leading an initiative assessing crop rotation and production practices in Bloemfontein and Kroonstad. Grain SA has also partnered with Potato SA on a crop rotation trial in Petrus Steyn (Eastern Free State) with the study being conducted by the UP. Finally, a new initiative has been established in the Eastern Cape and led by Stellenbosch University and in collaboration with the University of Fort Hare to assess crop rotations, adaptability and production practices.

CONCLUDING REMARKS

Ensuring resilient agricultural production systems for future food and nutrition security requires a strong understanding of how climate change will impact farming. It is critical that concrete steps are taken to understand the impact of climate change on agricultural production, particularly as it affects staple food production in South Africa. This knowledge base can be used to determine response plans to make production systems more resilient to expected future climate impacts.

The threat of climate change on national and regional food and nutrition security can only be buffered with strong scientific research into building resilience in agricultural production. ■



RESEARCH & POLICY CENTRE TEAM,
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SA Graan
Grain

INDIGENOUS CROPS

can help with food security

IN SOUTH AFRICA, THE POPULATION IS GROWING AT A RATE THAT EXCEEDS FARMING OUTPUTS. THIS MEANS THAT PRODUCERS CANNOT GROW ENOUGH TO KEEP UP WITH THE INCREASING DEMAND FOR FOOD, WHICH IS ONE OF THE CAUSES OF FOOD INSECURITY. FOOD SECURITY IS THE ACCESS TO ENOUGH FOOD FOR AN ACTIVE, HEALTHY LIFE BY ALL PEOPLE AT ALL TIMES.

Driving forces for food production are human resources, adequate water and availability of sufficient arable land, not forgetting the farm inputs such as fertilisers, pesticides, adequate genetic material in the form of seeds as well as technical know-how.

Indigenous or underutilised crops provide opportunity to increase food production to ensure food security in the country. Crops that are consumed by humans but whose importance has not been exploited very well, can be categorised as indigenous and/or underutilised crops. They are good sources of food, contribute to human health (both nutritional and medicinal value) and are a good means of income generation and environmental services. These crops can be sustained and/or produced with low inputs and can create new markets. Indigenous and/or underutilised crops can be found among oil crops, root crops, ornamental plants, leafy vegetables, fruits, cereals and pulses.

Pulses are a type of leguminous crop harvested solely for the dry seed. Due to the beneficial attributes of pulses, consumption of pulse crops is projected to be increasing in the near future. Hence, there is a need to invest in pulse production to try to close the gap of demand. Pulses as legumes are important for food and nutritional security as well for improving soil fertility. Despite the importance of legumes, there are still constraints in cultivating them.

Chickpeas, groundnuts and pigeon peas as leguminous crops have a narrow genetic base due to bottlenecks associated with the origin and their domestication. On the other hand, the low supply of pulses like pigeon peas (one of the pulses that is underutilised in South Africa) could be due to the limited number of adapted and high-yielding varieties. Locally, pigeon pea production is mainly by smallholder farmers. They use local landraces of which the yields are meagre and most of them are not fully characterised. Despite the potential of pigeon pea as an important leguminous crop, only a few studies have been conducted in South Africa on its adaptability to various climatic conditions as well as agronomic practices such as plant population and planting dates.

PIGEON PEA

Pigeon pea is one of the pulses recognised by the United Nations Food and Agriculture Organisation (FAO). It is a leguminous shrub that can be grown both as an annual or a perennial crop. The nutritional value of pigeon pea includes high starch, protein, calcium, manganese, crude fibre, fat, trace elements and mineral contents,

which makes it an ideal supplement for traditional cereals or tuber-based diets, which are generally protein deficient. In addition to this high nutritional value, pigeon pea is used as source of traditional medicine components in some parts of the world, such as India, China, the Philippines and some other nations. Moreover, pigeon pea can improve the fertility of the soil through atmospheric nitrogen fixation (Adebowale & Maliki, 2011; Choudhary *et al.*, 2013).

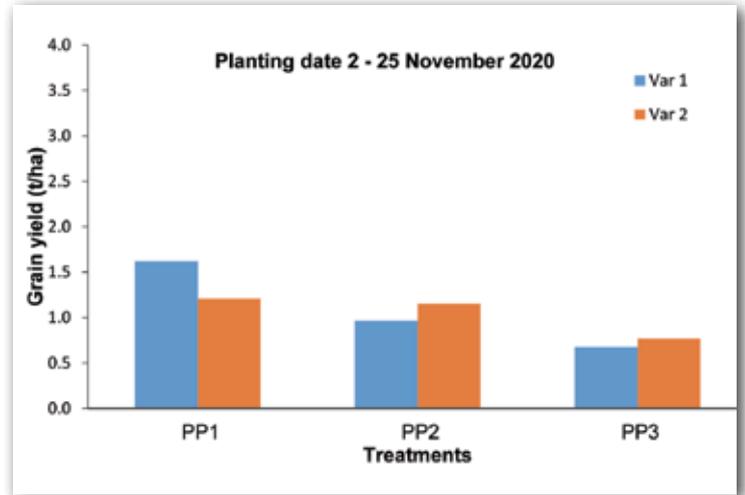
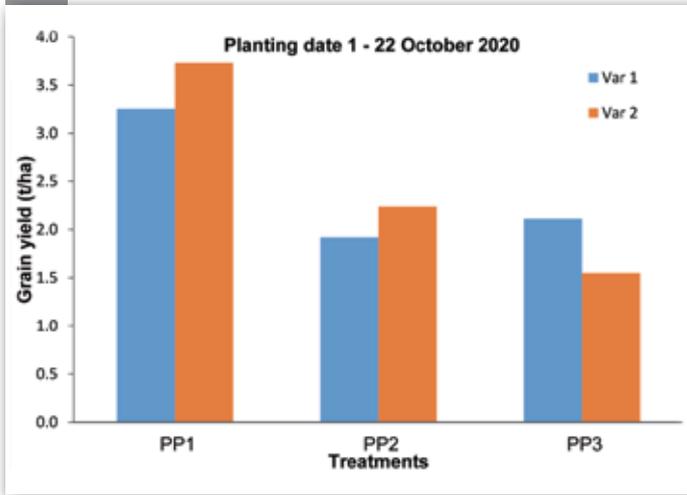


Flowering and podding of pigeon pea (Insert: pigeon pea seeds).



Pigeon pea field trial at the ARC-Grain Crops campus in Potchefstroom.

1 Graph 1 and 2: Effect of planting dates and plant population on grain yields of pigeon pea.



(Variety 1 = ICEAP01258; Variety 2 = ICEAP01284; PP1 = 45 000 plants/ha; PP2 = 30 000 plants/ha; PP3 = 22 500 plants/ha)

In South Africa, pigeon pea is a minor crop in terms of both production and consumption. This presents a great economic opportunity as a niche market for producers. Local pigeon pea production is characterised by lower yields that are often attributed to unfavourable climatic conditions, lack of improved varieties and scarce information on agronomic practices to achieve optimum production in the areas where this crop is cultivated. Pigeon pea is mostly grown in Limpopo, Mpumalanga and KwaZulu-Natal. Varieties can be categorised into determinate and indeterminate growing/flowering types. Determinate types flower within a certain period in their reproductive stage, while indeterminate types flower throughout until a particular environmental condition causes them to stop flowering. The crop can be continuously harvested depending on the duration of the variety as it can be grown as an annual crop or a perennial plant in homesteads.

INTRODUCTION AND AWARENESS

The Agricultural Research Council (ARC) has a mandate of working with partners to provide a sustainable way of producing food for the ever-increasing population and to manage the food security issues of the nation. In order to achieve the goals of reducing hunger, poverty and malnutrition in the region, the ARC works on different crops that have inherent potential to provide food and nutritional attributes – with pigeon pea being one. Recently, the ARC has been trying to introduce pigeon pea to the nation and prescribe optimum production practices for its production. Work on evaluation and identification of the most adapted introduced pigeon pea varieties from various countries and the best agronomic management practices for the production of this crop under South African conditions is a target to contribute to improving food security.

Since not much is known about the cultivation of the crop under South African conditions, lots of work has to be carried out on the crop. This includes identification of the optimum planting dates and plant populations specific to suitable agro-ecological zones in the country. Considering the results from the ongoing study in Potchefstroom in North West, it is advised that the crop should be planted around the

last week of October at the inception of the raining period in a very good season such as this year (2020/2021). This is irrespective of varieties of pigeon pea cultivated during this season.

OBSERVATIONS AND RECOMMENDATION

- One of the attributes of this crop is that it can be cultivated at high population density under dryland conditions.
- At the two planting dates (22 October and 25 November 2020), the highest yield was recorded at the highest plant density (45 000 plants/ha) during the ongoing study at ARC-Grain Crops in Potchefstroom.
- Tentatively, Variety 2 (ICEAP01284) can be recommended to be cultivated as early as the end of October for optimum production at 45 000 plants/ha.

With the help of the Department of Agriculture, Land Reform and Rural Development (DALRRD), a production manual for the crop under South African conditions is expected to be produced. This will cover agronomic practices, which will involve soil management, crop production, crop protection (weed, pest and disease protection) and identification of the most adapted introduced varieties for specific agro-ecological zones in the country. The bigger picture is to understand and find a way to increase pigeon pea varieties in the country. ■

DR ZAID BELLO, DR MALETSEMA
ALINA MOFOKENG AND
DEON DU TOIT, ALL FROM
ARC-GRAIN CROPS,
POTCHEFSTROOM. FIRST
PUBLISHED IN SA GRAAN/
GRAIN OCTOBER 2021



Tool safety is *important*

TOOLS MAKE A BIG CONTRIBUTION TO ANY WORKPLACE OR FARM.

THE EMPLOYER'S RESPONSIBILITIES

Do not use homemade tools in the workplace. Restrict or ban the unauthorised use of tools. Ensure that the right tools are available for the task. Put a system in place that compels an employee to inspect all hand tools before using them.

Tools must be inspected monthly. The inspection list must then be signed off by the employer to ensure that all tools are in a good working condition at all times. If a tool is found to be faulty or poses a danger to an employee, the item must be withdrawn immediately. These tools can be used again after it has been repaired.

RESPONSIBILITIES OF THE EMPLOYEE

All employees must inspect the tools before using them. Employees must ensure that the tools are kept in a good condition and stored

clean and correctly after use. No tools should be left on the ground after use. Tools must be handled correctly at all times. Disciplinary action should be considered if tools are used as toys!

A first-aid kit must be available in the event of an employee getting injured while using the tools. Should an employee or visitor sustain an injury due to a homemade tool, the employer concerned can be prosecuted.

When contractors come to work on the site, the contractor must use his/her own tools. ■



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

Working together



On Wednesday 18 May during the NAMPO Harvest Day week, Grain SA Farmer Development signed a three-year collaboration agreement with the Western Cape Department of Agriculture (DoA) as a lead commodity group partner for grains. Here are representatives from the department with the Grain SA team. Seated: Drs Mogale Sebope (head of department) and Dr Ivan Meyer (provincial minister of agriculture) with Derek Mathews (chairperson of Grain SA) and Grain SA's CEO, Dr Pieter Taljaard. Standing are Darryl Jacobs (deputy director-general: Agricultural Development and Support Services) and Dr Sandile Ngcamphalala, Grain SA Farmer Development Lead.

Taking the lead at ARC



Dr Litha Magingxa, an agricultural economist, was appointed as chief executive officer and president of South Africa's Agricultural Research Council (ARC). He joined the ARC on 1 April 2022.

GROWING agriculture together

A DOCUMENTARY ON THE SUCCESS OF GRAIN SA'S FARMER DEVELOPMENT PROGRAMME WILL TELL THE STORIES OF PASSIONATE FARMERS WHO HAS RISEN ABOVE ALMOST IMPOSSIBLE ODDS. IT WILL SHOW HOW THE PROGRAMME HAS IMPACTED SMALLHOLDER FARMERS AND SHOWCASE THE REAL-LIFE HEROES OF THIS INITIATIVE.

Across Africa, Bayer invests in the support and development of smallholder farmers with the help of industry partners. In South Africa, Bayer partnered with Grain SA (alongside other industry sponsors) to support the organisation's Farmer Development Programme.

Over the past two decades, thousands of subsistence, emerging, and pre-commercial farmers have come through the ranks to improve their own farming businesses by participating in this programme – some already advancing to the level of commercial grain producers. Those who have improved their economic status are part of the success story of this combined industry initiative. It tells the story of the people passionately passing on farming skills and showcase some of the farmers who are embracing this knowledge to reach ever increasing levels of growth, confidently stepping into the commercial arena.

'Bayer places special emphasis on smallholder farmers because it is the right thing to do,' says Dudu Mashile, territory sales manager: Smallholder and New Era Commercial. 'We see smallholder farmers as future commercial farmers and future contributors to the South African economy. Smallholder farmers add to the diversity in our agricultural industry and are important contributors to building rural economies and growing the agricultural sector.'

Bayer has seen life-changing results where maize farmers improved from 2 t/ha to 8 t/ha yield on dry land after adopting new seed technology and improved crop protection methods. This has really brought home the notion that farming is not only a way to survive, but to thrive in a sustainable way. Becoming profitable and more efficient also brings more jobs to rural communities, makes farming easier and enables smallholder farmers to send their children to school and university. 'They are not just farmers, but entrepreneurs in the true sense of the word, Dudu says. 'Together with our farmers we can realise Bayer's vision of health for all and hunger for none.' ■

Scan the QR code to watch a trailer of the soon to be released documentary.



These are some special moments from the documentary.

Meet the partners of the Farmer Development Programme

ANOTHER ONE OF GRAIN SA'S FARMER DEVELOPMENT PROGRAMME PARTNERS IS THE KGODISO DEVELOPMENT FUND, AN INDEPENDENT FUND FOUNDED BY PEPSICO. THE FUND AIMS TO SUPPORT THE BROAD SOCIO-ECONOMIC IMPERATIVES OF EDUCATION; SMALL, MEDIUM AND MICRO ENTERPRISES (SMMES); EMERGING FARMERS AND ENTERPRISE DEVELOPMENT ACROSS PEPSICO'S VALUE CHAIN.

PepsiCo, Inc. is a multinational food, snack, and beverage corporation. The business encompasses all aspects of the food and beverage market and oversees the manufacturing, distribution, and marketing of its products. In Sub-Saharan Africa (SSA), PepsiCo SSA employs more than 13 000 people across the three business divisions: SA Food and Beverages; Essential Foods and West, East and Central Africa (WECA).

When PepsiCo's acquisition of Pioneer Foods was finalised in March 2020, the company agreed to a number of public interest commitments, with the main goal of driving economic growth. One such commitment was the launching of a development fund, with an initial investment of R600 million to enhance effective, market-driven programmes, co-create innovative solutions alongside key partners and scale the impact through catalytic investments.

THE KGODISO DEVELOPMENT FUND

Although founded by PepsiCo the Kgodiso Development Fund operates as an independent entity. This allows it to work across public and private sectors to deliver on its commitments. With strategic partners (like Grain SA) the fund aims to build a more sustainable food system for Sub-Saharan Africa.

The Kgodiso Development Fund is committed to nurturing potential that drives economic growth, promotes social development and leads the way towards a more sustainable food system in South Africa. Its mission is to create shared value solutions along the food and beverage value chain that contribute to the long-term sustainability and resilience of the system.

The fund aims to transform the South African agricultural landscape by developing a new generation of sustainable farming enterprises. It aspires to empower black farmers through funding, business development and increased access to the market.

Under their Agricultural Development pillar, the fund lists the following strategic priorities:

- To support the transformation of the food and beverage value chain by developing and empowering new and current black emerging businesses – for example farmers, suppliers, distributors and women-led enterprises).
- To address knowledge and skills gaps across the South African food system like applied agricultural research and development, climate resilient crop development and nutrition science.



- To tackle local development challenges and strive for tangible impact that affects large-scale change by providing funding to enable sustainable crop production, technical and business support through strategic partnerships and programmes.

JOINING HANDS

As Grain SA has provided agricultural development support to emerging farming enterprises for more than 20 years through the Farmer Development Programme (FDP), the organisation was seen as a perfect match for the goals of the Kgodiso Development Fund.

The Kgodiso Development Fund was approached to provide co-funding of production inputs to this programme to enable farmers to access their full funding requirement at a blended interest rate. Grain farmers in North West and the Free State have benefited from the fund's investment in the programme. Farmers received their inputs on time and the blended interest rate will increase their profitability.

Executive director Diale Tilo knows that patience is required when investing in emerging farmers. It is not uncommon to wait seven to eight years before seeing the full benefits. Therefore, support given has to be for the long haul to allow farmers to grow and become more efficient.

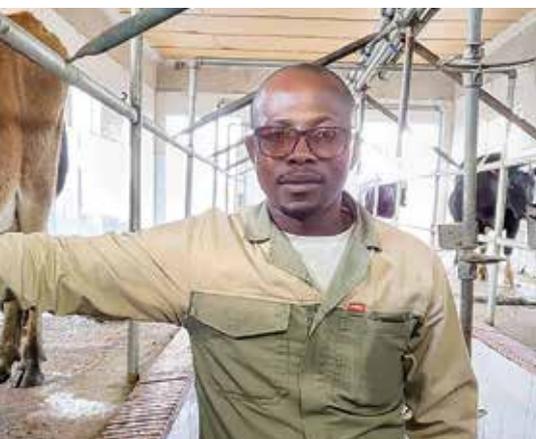
The Kgodiso Development Fund believes that by building on existing models and co-creating new ones it – together with its partners – can maximise the impact of its investment. ■

PULA IMVULA EDITORIAL TEAM

THE CORNER POST

PHUTHEHO TSEPHE

'Work like a slave, live like a king'



'AGRICULTURE MAY NOT BE EASY, BUT IT CERTAINLY IS INTERESTING,' SAYS PHUTHEHO TSEPHE (33) ABOUT HIS JOURNEY AS A FARMER. THIS YOUNG FATHER OF TWO FARMS WITH HIS FATHER, THABANG TSEPHE (61), NEAR MATATIELE IN THE EASTERN CAPE.

FARMING TURNED OUT TO BE THE RIGHT THING

Like many other young people who consider farming as menial and hard work, Phutheho had no desire to farm. After completing his schooling, he studied information technology at PC Training and Business College in Durban. 'Even though I grew up on a farm, I was not interested in farming. When my brothers were no longer on the farm to help my father, I had to go and assist him.' This is where his career path and life changed. He says that after a while he realised that farming was the thing that would lead to a better life for him and his family. 'I had to leave what I loved to get what really needed.'

Phutheho realised that to be a successful farmer he would have to learn continually and improve his knowledge about agriculture. After joining Thabang on the farm in 2013, he completed a course in livestock and vegetable production at Buhle Farmer's Academy in Delmas, Mpumalanga. They form part of Grain SA's new era farmer group and are also members of the 500 Ton Club.

At first father and son focused on dairy and beef production and also had a piggery on their 500-hectare farm, Mariazell Farm. In 2020 they moved to a new 700-hectare farm, Bon-Accord, in the same region where they run a mixed farming operation. They have continued with their dairy operation and livestock farming but have added crops to the menu.

Initially they planted 50 hectares of maize, but have increased it to 75 hectares for this season. Last season they realised 8 t/ha. This season was less favourable with heavy rainfall making the process problematic and waterlogged fields made it difficult to do post emergent weed control. 'Even though this season was not as favourable, we are hoping for the best as far as our maize is concerned,' says Phutheho who is still positive that they will realise a yield of 6 t/ha.

Thabang and Phutheho share the farming responsibilities equally. 'Although we don't really have enough land to accommodate both of us, we are working well together,' Phutheho says about their teamwork. 'The one thing I have learned from my dad is that if you work like a slave, you can live like a king,' Phutheho adds with a smile. As finances allow, they will slowly build their farming enterprise and are hopeful to expand their maize production in the future.

GROWING AND DEVELOPING TOGETHER

Thabang motivated Phutheho to become a Grain SA member in 2018 when he also became part of the Farmer Development Programme.

They are supported by Luke Collier, the regional development manager who is based at the Kokstad regional office, and mentor Eric Wiggille who mentors Phutheho. 'Grain SA plays an important role in our farming operation,' says Phutheho. 'They help us with inputs and mechanisation and thanks to their support we are able to rectify our mistakes in time.'

Thabang and Phutheho have done quite a few of the training courses presented by the Grain SA team like farming for profit, business ethics and business management. Through the courses and mentorship Phutheho has seen a vast improvement in their farming operation, not just as far as crop production is concerned but in the dairy operation as well. With every visit or study group session their knowledge is increased which means better agricultural practices and a better product on the field. 'Training definitely makes farming easier,' he says.

The most important lesson Phutheho has learned over the years is how important timing is when it comes to agriculture. It is a lesson most farmers learn quickly. To be successful, having all the knowledge is not enough. It is the timing of each step that can make the difference between an excellent yield and just having some maize on the field. 'Time is important on the farm, so a farmer has to work purposefully. If you miss a day or plant late it can have serious consequences. Through Grain SA I have learned that failing to plan, is planning to fail'.

AGRICULTURE MAKES A DIFFERENCE

Phutheho hopes that people will start viewing agriculture differently. 'Farming is the only business that will never ever vanish as people need food to survive. I really hope one day our government will see how important it is.' He would like to see agriculture included in the school curriculum. 'They should start teaching the kids at school about the value of farming to make it a more fashionable career choice.'

Although it was not his decision to farm, Phutheho has become passionate about farming. To him it is a humbling profession with no room for pride, only room for learning. 'One season you can make money and the next you will only break even,' he shares, but admits that this 'roller-coaster ride' is very exciting. He has developed so much because a farmer has to be a Jack of all trades. 'You can't always expect other people to do everything for you, so you have to learn to do everything yourself,' he says about this career path that has helped him mature into a man like his father. ■



LOUISE KUNZ,
PULA IMVULA CONTRIBUTOR

A programme that is changing lives



BELIEVING IS SEEING AND SEEING IS BELIEVING

THE GRAIN SA FARMER DEVELOPMENT PROGRAMME FOCUSES ON A RESULTS-ORIENTED COMMUNICATION PROCESS THAT ENCOMPASSES BOTH THEORY AND PRACTICAL KNOWLEDGE, AS WELL AS SKILLS TRANSFER SO THAT THE NEW INFORMATION EQUIPS FARMERS TO USE THE LAND AVAILABLE TO THEM OPTIMALLY.

Over the many years of involvement in farmer development, the Grain SA team has realised that many different tools of communication need to be employed to teach farmers modern technologies and ensure that significant and meaningful knowledge transfer is effected. The team has very strategically put different actions in place to respectfully guide and develop farmers by adopting a 'tell, teach and involve' method for the learning process.

DEMONSTRATION TRIAL PLOTS

One of the most effective communication development strategies that has been employed over the years has been the planting of demonstration trial plots with different study groups. Trial plots are a wonderful way of showing farmers the right thing to do, the right time to do it and the right way to do things – and even sometimes

what not to do, like leaving a portion of the field to grow without any weed control plan or no spray programme while the remainder of the field receives all the correct attention.

Grain SA relies on partners from the agri sector to assist with donations of inputs so the development managers in the various regions make contact with input supply companies and involve them and their agricultural experts in the trials. Every effort is made to plant and manage the trials in a way that is both progressive and technologically advanced, while at the same time within the reasonable reach of the developing farmers. Study group farmers are involved in the planning and preparation of trial plots. Farmers are then able to monitor the progress of the trial plots to see for themselves how successful these strategies are.

Nora Cruz Quebral, often referred to as the 'mother of development communication,' said: 'The purpose of development communication is to advance development'. Development communication in agriculture needs to stand on a platform of diverse communication strategies ensuring knowledge transfer for progress. The Grain SA Farmer Development team is building a stronger, more efficient agricultural sector that will feed and support nuclear farming families, supply healthy food to a growing population and create gainful employment for many more rural dwellers.

AT GRASS ROOTS



After planting the trial plot at Sehlakwane in Limpopo, farmers learned about the mixing of chemicals and spraying using a knapsack sprayer.



At Middelpoos neer Moorreesburg, a canola trial plot was planted with encouraging results.



The sunflowers of the trial plot at Yonaroo Farm near Kokstad had just started drying off at the end of May.



Look and learn

TRIAL plots are planted whenever the opportunity arises and suitable funding can be sourced. The Grain SA Farmer Development team has seen the effective learning that comes from being able to see the different results which come from doing the right thing in the right way.



A sunflower field trial plot on Yonaroo Farm near Kokstad. A farmers' day will be held at the site to discuss the results and lessons learned.

During 2021/2022, four trial plots were planted in four locations:

Limpopo: To benefit the new study groups in Limpopo, a maize trial plot was planted at Sehlakwane under the leadership of Jerry Mthombothi, the regional development manager at the Mbombela office. Grain SA bought the fertiliser and Bayer donated the seed and chemicals. The main purpose was to educate farmers about the no-till planting method. A total of 30 000 plants/ha were sown, using several different seed varieties.

Western Cape: Liana Stroebel, the Western Cape regional development manager, coordinated a trial plot that was planted on Middelpoos near Moorreesburg. It was a collaboration between Grain SA, leading farmer Alfreda Mars, who provided the mechanisation, and Nexus, who supplied the fertiliser and chemicals. This was a first-time planting of canola, done with the aim of determining yield potential. The harvest yielded 1,2 t/ha in a season that presented many challenges, with the rain which made it difficult to enter some areas of the field. The exercise was successful enough to inspire the planting of 50 ha in the 2022 season.

Mpumalanga: Jurie Mentz, the regional development manager at the Louwsburg office, coordinated a 1 ha soybean trial plot at Donkerhoek. The plant population was 300 000 plants/ha, with a row width of 0,91 m.

Eastern Cape: Luke Collier, the Eastern Cape regional development manager, planted a sunflower field trial plot on Yonaroo Farm near Kokstad. There was much collaboration between Grain SA and Andre Chooks, who provided all the mechanisation and the fertiliser. Pannar supplied the seed and the chemicals were provided by Farmers Agri Care. This is a 6-ha trial, using the no-till method of planting. The early season saw a problem with slugs in the crop. This was so bad that a replant was necessary and slugs were then chemically controlled. The result was a steep learning curve for farmers on pest control and a much better plant population. The crop has done well, apart from slight hail damage. The plants were just starting to die off at the end of May. Grain SA hopes to host a farmers' day there with industry partners in the near future.

Developing knowledge at farmers' days

TO offer farmers an opportunity to visit the trial sites, farmers' days are arranged in these areas. Here farmers can exchange information with other farmers, input supply companies, local extension officers and other sector stakeholders, who are strategically invited to these days.

During the 2021/2022 season, the following farmers' days were held:

24 February, Mthatha office: Mr Mhlana addressed the 88 attendees at Ngcobo-Bokleni.

13 April, Mbombela office: The 145 farmers learned from Bayer representatives and Jerry Mthombothi at Syverfontein.

13 April, Louwsburg office: The Oil and Protein Seeds Development Trust (OPDT) funded the event at Driefontein Community Hall, where 87 attendees came to listen to Henry Davies, Timon Filter and Jurie Mentz.

20 April, Kokstad office: The farmers' day at Colana, Mount Frere, where Luke Collier addressed the crowd, was very well attended. Cipla also spoke on livestock care.

21 April, Dundee office: The focus at Milnedale Farm was on plant requirements and fertilisation. Representatives from the Department of Agriculture (DoA) KwaZulu-Natal and Bayer addressed the 37 farmers.

22 April, Mbombela office: At Hereford East, 100 attendees could learn more about agriculture from Grain SA, Bayer, Kynoch and the DoA Mpumalanga.

29 April, Mbombela office: The Limufuye Project hosted the last of April's farmers days. Speakers were Jerry Mthombothi (Grain SA) and representatives from Bayer, the DoA Mpumalanga and Villa Crop.



The Mbombela farmers' days offered attendees the opportunity to visit the trial plot at Sehlakwane. The farmers were excited to be actively involved in soil preparation and planting. ■

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