

THE Link

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In this issue...



Increasing fertiliser prices and the need for strategies that will maintain productivity and profits are major issues for sugarcane growers throughout the industry. The article on **page 4** offers tips to optimise fertiliser use during these difficult economic times.



Outbreaks of YSA are likely to occur in summer requiring growers to be on high alert for this pest. Scouting must begin before visible symptoms appear. The article on **page 8** outlines an interim scouting method for early YSA detection.



PurEst® is a mobile application for the sugarcane farming industry offered by SASRI that provides the user with crop ripening recommendations based on Brix readings. Make sure you have the latest version (Version 3.0.2 – March 2022) that has several new features (**Page 12**).



SOUTH AFRICAN SUGARCANE
RESEARCH INSTITUTE

Unlocking the potential of sugarcane

Farm diversification – key to survival!

Crop diversification and inclusion of newer high yielding SASRI varieties can be a significant factor in increasing a grower's profits. Read how two growers have diversified, allowing them to farm sustainably, improve productivity and increase profits (**Page 14**).



DIRECTOR'S MESSAGE

 Dr Terry Stanger

As we leave the 2022 calendar year behind and look forward to the upcoming season, I'm left with the feeling that we have certainly traversed some stormy waters. We have endured (1) the Covid pandemic and have now finally been able to resume some level of normality in our daily lives; (2) extreme weather events in the form of destructive floods and damage to infrastructure; and (3) as the year came to an end the devastating news that Tongoat Hulett had been placed into business rescue.

It certainly puts the phrase "rapid change is the new normal" into context. Throughout these difficult times, I must thank the Industry Principals for the continued support and encouragement that SASRI has enjoyed. I would also like to commend the SASRI staff on their resilience, commitment, and continued delivery, with notable progress being made in many research projects. The Junior and Senior Certificate courses and the Modular Courses resumed with the certificate courses being oversubscribed. In this edition of The Link, I would like to focus on two key areas of SASRI research.

Small-scale grower (SSG) sustainability is key to the sugar industry. Soil information in SSG regions is mostly unknown with the result that no definitive and precise advice can be given, contributing to sub-optimal yields.

A project is under way with the aim of capacitating SSG extension and Agricultural Advisors to be able to estimate yield potential using simple soil data so that they can assist with the decision-making of their growers. The soil survey phase in the Gcumisa and Nkosazane regions has been completed. Development of an Excel database and the creation of soil maps and tables with the MyCanesim model are in the initial phase of development. During interactions with the SSGs, several noteworthy matters were raised by community members: (i) growers in the Nkosazana and Macekane regions appear not to recognise the importance of soil sampling; (ii) growers prioritise herbicide application over fertiliser, and growers who apply fertilisers generally follow the practices of their neighbours; (iii) some growers prefer mechanical (hoe) weeding to using herbicides; (iv) some growers do not know the variety on their fields and rely on their leadership for this knowledge. Many of these apparent knowledge gaps are to be addressed in the SASRI project, "Soil conservation learning resources for small-scale grower extension".



Engagement with SSG communities on the value that may be derived from cane quality management through the application of chemical ripening agents by unmanned aerial vehicles (UAVs) continues to gain traction. Several field days were held at the SSG drone ripening demonstration trial locations at Malelane, Komatipoort, Pongola, Umfolozi, Nonoti and Gcumisa. At the Umfolozi trial location, the Brix gradient concept was used to enable growers to visualise the ripening benefit in which, over the six-week treatment period, the estimated RV% in the control treatment increased by 2.2 RV percentage units due to natural ripening. In contrast, over the same time period, the RV% in the Orca® treatment increased by 4.6 RV percentage units, thereby outperforming natural ripening by a substantial margin, clearly demonstrating the economic benefits.

In the five-year SASRI strategic plan, Smart Agriculture has been identified by the industry as a critical success factor for SASRI. We recently commenced three new projects to investigate the use of hyperspectral and satellite data for developing plant and soil spectral libraries, the modelling

of leaf nutrient concentrations, and sugarcane crop assessments. One of these has the aim of developing a spectral library (database) for the SA sugar industry. The library will include spectra representing varieties, crop phenology, pests, diseases, and nutrition and will form the basis for modelling and image processing in future research. A project to model leaf nutrients in sugarcane using *in situ* hyperspectral data has also commenced with the aim of developing spectral models for sugarcane nutrition management. The models will potentially inform the construction of customised sensors for use *in situ* and/or mounted on an unmanned aerial vehicle (UAV) for near real-time crop nutrition assessments. The methodology provides for non-destructive and cost-effective nutrient management. Additionally, this methodology could alleviate the need for costly laboratory analysis, resulting in savings for both growers and researchers. We look forward to some exciting progress as this technology is deployed in our industry.



Too much of a good thing: When blanket fertilisation strategies cost you money

 **Louis Titshall** (Senior Soil Scientist) and **David Wilkinson** (Extension Specialist: Midlands North)



Blanket fertilisation strategies using a single blend at a standard rate is a common approach to apply fertiliser across a farm. From a management perspective, this is very convenient as it usually means only one type of fertiliser can be purchased (and often in bulk) and in field application can be simplified with very few adjustments to application rate calibration between fields. However, under some conditions, this approach may have hidden costs and risks.

Let us consider a simple scenario for five ratoon fields (based on actual data from some recent sample analyses):

Field	Phosphorus		Potassium		Clay %	N.Cat	N	P	K
	mg/L	kg/ha	mg/L	kg/ha					
1	27.7	56	426	852	37	3	150	0	0
2	5.1	10	67	134	9	1	190	10	240
3	5.4	11	268	536	26	1	190	20	0
4	4.7	10	92	184	27	1	190	20	185
5	15.6	32	90	180	17	1	190	0	195

Despite all these fields being near to one another, their nutrient requirements varied widely. However, for convenience, a blanket approach is used. For example, a decision to use a blanket application of 900 kg ha of 5:1:5 (45) (with approximate cost of R16 700/ha) to closely match the most common nitrogen (N) requirement of 190 kg/ha across all the fields might be taken.

The table on the next page highlights the amount of nutrients over- or under-supplied for each field with this approach. The approximate cost of this extra nutrient (based on equivalent value of a straight nutrient – urea for N, MAP for phosphorus (P) and KCl for potassium (K)) is also given.

5:1:5 (45) @ 900 kg/ha (R16 700/ha)				Approximate cost of extra nutrient applied but not needed	
Field	N	P	K	R/ha	R/ 5 ha
	kg/ha				
1	+34	+37	+184	13 700	68 500
2	-6	+27	-56	2 800	14 000
3	-6	+17	+184	10 400	52 000
4	-6	+17	-1	1 750	8 750
5	-6	+37	-11	3 900	19 500

In this hypothetical example Field 1 receives large amounts of N, P and K that are not required for optimal production, while Field 3 receives excess P and K that are not required.

The cost of the unnecessary nutrient in these two fields is over R10 000 /ha at current fertiliser prices and this would require nearly an extra 1.5 to 2 tRV/ha to offset the additional cost.

Also keep in mind that where excess N is applied, sucrose yield can decline (e.g. Field 1), while excess K leads to luxury uptake, increasing the risk of nutrient imbalance in the crop and also reducing sugar extractability at the mill. Excess P, while not commonly associated with loss of yield can increase risk of pollution of waterbodies (from erosion of P-rich soil) and interfere with uptake of some nutrients. The other fields are more closely matched with only P being applied in excess and the additional cost mainly related to that component, though over many hectares this cost can add up. It is also noteworthy that for Field 2 the K requirement will be nearly 60 kg/ha sub-optimal which could lead to a loss in yield, thus further lowering returns from that field.

In some cases, the blanket fertiliser is applied without any soil samples being taken. The application rate is often based on a crop removal factor based on the previous harvest's yield but does not account for soil supply. In a worst-case scenario, the application rate is based on some historical precedent ("what we've always done" argument) that has no relation to the crop removal or soil supply of nutrients. In either case, there is a risk of over- or under-supply and the risk of creating nutrient imbalances.



Good Practice

To optimise fertiliser use, it is necessary to match fertiliser types and rates to each field. Given the impracticality of too many fertiliser rates and combinations, the following approaches can be used to find suitable compromises between the ideal matches and application practicalities:

Step 1

Ensure that you account for any additional amendments (such as chicken litter, CMS, compost and filter press) you are applying, as this will reduce the amount of commercial fertiliser needed. It is also important to regularly analyse these amendments to know how much nutrient is being applied.

Step 2

Decide on the acceptable upper and lower limits (or ranges) that you are prepared to apply, considering factors such as soil types and risk of losses that may affect both short and long-term nutrient availability. For instance, on sandy soils, it is better to closely match application rates to the requirements as these soils have low nutrient supply potential and high risk of losses, particularly for N and K. On high clay soils, there is greater opportunity to widen the acceptable range due to higher buffer capacity and lower risk of loss of nutrients.

Step 3

Attempt to group fields with similar requirements together so that only 2 or 3 blends are needed to match most requirements and consider balancing any requirements that are outside of your acceptable range (step 2) with additional straights or blends.

Step 4

Factor the additional cost of management and application operations of more fertiliser options over the single blanket application approach.



Topical Tips



Rowan Stranack (Extension and Biorisk Manager)



Managing Smut

Smut continues to be problematic in some areas. In the irrigated areas pay attention to roguing fields of N19, N25, N36, N41 and N43. The variety N41 is under significant immediate threat and there is a moratorium on planting this variety in the Pongola area. However, other less smut susceptible varieties such as N36, but also very popular, could come under threat if smut pressure increases.

In rainfed areas, some varieties are also under threat. N54 and N59 need special monitoring and roguing to make sure smut is controlled. Unfortunately, there have been some very high levels of smut recorded in both varieties (>10% stools infected) and urgent action is required.

These are both excellent varieties which are proving very popular. Do your utmost to help preserve them and take precaution to limit plantings to less than 20% of the area under cane on your farm.

When roguing diseased plants make sure the entire stool is removed, including the roots, to prevent regrowth. Chemical roguing of smut, although requiring some training is probably a preferable option.

Speak to your SASRI Extension Specialist or your Biosecurity Officer. The best counter to any disease or pest is to plant commercial fields with disease-free true-to-type approved or certified seedcane.

A critical time to scout for eldana

The big threat in the southern coastal and midlands rainfed areas this summer will be eldana. In the ever-increasing area of unplanned carryover cane (see *The Link*, January 2022, Page 4) scouting will prove critical over and above the routine Pest and Disease team inspections. It is going to be extremely difficult in some areas to decide whether to even harvest some fields next year given their extreme age and what to do with these fields is a decision best made in consultation with your Extension Specialist.

The current situation of forced ageing of cane in eldana prone areas makes precautionary spraying necessary. Eldana can destroy a crop if cane is left to age untreated, and the cost and trouble to treat cane will be minimal in the face of total loss.

Fields heavily infested with eldana at harvest might retain a significant population of the pest in the stubble. Speak to your SASRI Extension Specialist or Biosecurity Officer for assistance in determining if stool treatment will be required.



Look out for Yellow sugarcane aphid this summer!

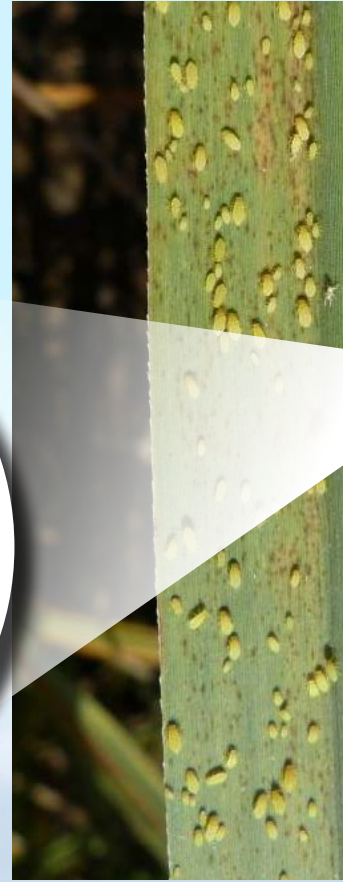
Outbreaks of Yellow sugarcane aphid (*Sipha flava*), more commonly known as YSA are likely to occur in summer and autumn. Regular scouting will provide early warning of an outbreak and trigger treatment if necessary.

Early detection is crucial if infestations are to be treated before they cause significant damage. This is proving to be successful where growers are actively implementing this approach.

Scouting staff need to be aware after working in a YSA infested field to remove aphids from clothing before moving to other fields.

Keep breaks, verges and waterways well mowed. These areas can harbour vectors of diseases such as mosaic, maize streak virus, and sugarcane yellow leaf virus, and pests such as YSA. Consider chemical mowing to save money.

Often the pest reappears in the same spot each year and these areas should be checked carefully. Spraying of insecticide should be carefully considered as the pest can be elusive and natural enemies are also often present to provide a measure of control. Ask your SASRI Extension Specialist or Biosecurity Officer for advice.



Wees op die uitkyk vir Geel Suikerriet Plantluis hierdie somer!



Uitbrake van die geel suikerriet plantluis (*Sipha flava*), meer algemeen bekend as "YSA", sal waarskynlik gedurende somer en herfs voorkom. Gereelde verkenning van lande sal dien as vroegtydige waarskuwing van 'n uitbraak en die beheer daarvan indien nodig bepaal.

Vroeë opsporing is belangrik om infestaties te beheer voor dit ernstige skade aanrig. Hierdie benadering toon suksesvol te wees in gevalle waar boere dit aktief implimenteer.

Verkenningpersoneel moet bewus wees nadat hulle in 'n YSA-besmette veld gewerk het om plantluise van klere te verwyder voordat hulle na ander velde beweeg.

Hou waterbane en randbestuur kort gesny. Hierdie areas kan as oordraers van siektes soos mosaiek, miele strook virus en geel suikerriet virus dien, asook peste soos geel suikerriet plantluis huisves. Chemiese sny kan oorweeg word om kostes te bespaar.

Peste kom gereeld in dieselfde areas voor elke jaar, hierdie areas moet noukeurig verken word. Die gebruik van insekdoders moet versigtig oorweeg word, aangesien die pes ontwykend kan wees en natuurlike predatore kan ook teenwoordig wees wat 'n mate van beheer kan toepas. Vra u SASRI Voorligtingspesialis of Biosekuriteitsbeampte vir advies.

Crop management during the off-season

Although regarded as the so-called 'quiet time' of the season, January, February and March are when maximum growth takes place and maximum income is generated. Growers with irrigation should be on full alert to ensure minimal disruption to water supply. Make sure growth is not lost to unnecessary weed competition and ineffective irrigation scheduling.

Planning your harvesting and replant programme for the coming season should be settled by now. However, if further information is required, visit the SASRI website to access the various yield benchmarking, crop estimating and weather-related decision support tools available (www.sasri.org.za), or speak to your SASRI Extension Specialist.

Under the current conditions prevailing in the southern rainfed regions, there are many opportunities for the rationalisation of area under cane, the implementation of long fallows to improve both soil health, reduce disease and provide opportunity for either diversification or short-term cash-cropping. There is a trend towards reduced replanting in these areas. This should, however, go together with ensuring that what cane is replanted has the best chance of long-term success by being on more productive soils and planted with either certified or approved seedcane following a long fallow.

Decisions around ripening very old cane are tricky and fraught with potential complicating issues. Growers sometimes opt to ripen as routine. Whilst this is good practice in the irrigated regions, not so nowadays in the south. Consult your Advisor or SASRI Extension Specialist for advice. The **PurEst**® app has been put to extensive and good use in the past couple of seasons. Continue using the app to make the best decisions (downloadable from Google Play Store or the i-Store).

Drawing up a programme plan of operations for all fields on the farm is the next step once a harvesting and replant plan has been drawn up. When doing this, a visit to each field, noting all the necessary operations required to ensure the field will produce an optimum yield, is essential. A programme planning chart can be used to visually schedule all the necessary operations for the season ahead. At this stage, once all field inputs and operations have been decided, a budget can be developed.

The quieter times during the off-season are an opportunity to train staff without much disruption to important operations. Some courses that could be appropriate at this time are: disease, pest and variety identification, planting, Junior or Senior Supervisor, tractor care, basic workshop skills and welding. Cane cutter courses could also be scheduled for the start of the season. Contact the Shukela Training Centre on 031 508 7700 or your local SASRI extension office.

Crop nutrition and soil health

– sampling is key to reducing costs!

With the price of fertiliser being where it is and likely to stay high for some time still, reduced applications of nutrients are the norm on many farms. Leaf samples in young ratoon cane can be a good indication of the nutrients available to the plant from the soil.

It is not too late to take leaf samples provided that the crop has not undergone any stress during the last two months and the cane is the correct age for sampling. The results from leaf samples can indicate changes which might be necessary for the coming season's fertiliser programme.

Cutting back on fertiliser application will once again be likely in the coming season. Such cuts can only be

cost-effective if based on a sound knowledge of your soils and their nutrient status.

Plan to sample soils as early as possible so that lime application and the planting of green manure crops can be done timeously. Green manures for winter fallows need also to be planned. Although not a legume, oats are popular, and this crop can be especially useful in fields where creeping grasses are a problem.

High levels of soil acidity in the midlands and coastal hinterland regions, and the build-up of salinity/sodicity in the dry northern regions, can have a significant effect on cane yields if not properly addressed. If either of these problems is suspected the only reliable way to confirm their presence is by taking both top and subsoil samples and sending these to SASRI's Fertiliser Advisory Service or speak to your SASRI Extension Specialist.

Soil conservation and wet land management

The protection of wetlands and watercourses in the industry has recently come under the spotlight nationally. The forestry industry is tightly controlled in terms of water use, and sugarcane, although not as thirsty as trees, also requires significant water reserves to grow and has therefore been under scrutiny for some time. Certain critical catchments in the industry are planted extensively to sugarcane and there is a need to ensure that sufficient water of good quality continues to be available from these areas.

Well-protected watercourses and wetlands are essential to prevent excessive soil loss and to maximise water retention on your farm. Should signs of erosion appear in these areas, ask your SASRI Extension Specialist for advice. Much work has been done in the past on ways to protect the banks of streams and how to encourage the rehabilitation of wetlands, and there is a wealth of

information available. There are opportunities currently, with less pressure on area under cane, to withdraw cane from sensitive areas adjacent to wetlands and watercourses, thereby improving their stability.

The Sustainable Sugarcane Farm Management System (SUSFARMS®) is an excellent practical tool which can be used to gauge the level to which environmental better management practices have been implemented on your farm. Speak to your SASRI Extension Specialist for more details.



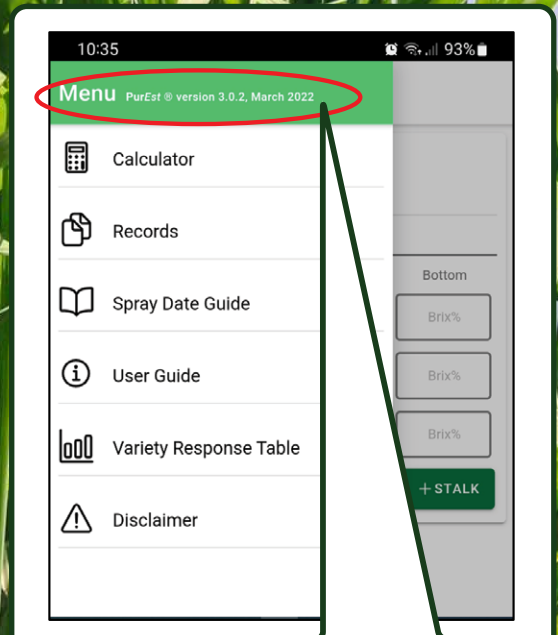
A note about PurEst®

SASRI's PurEst® mobile application has been in use for several years with updates taking place periodically. Make sure you have the latest version (Version 3.0.2 – March 2022) that has a number of new features.

Summer weed control

Work hard at controlling creeping grasses. Repeated under- canopy applications of glyphosate, and verge control with imazypr (Arsenal) are essential to keep these grasses under control. It is a good idea to put flags in problem spots within fields to keep track of these areas as the cane matures. Large areas where grasses have taken over will require re-establishment. It is important to target the source of creeping grass problems. Verges and small patches of grass inside fields MUST be treated with herbicide. Hand hoeing is not recommended as it is not effective and could encourage the spread of these grasses. Loaders can also spread creeping grasses. Make operators aware of this and take extra care in fields where grasses are a problem.

The heavy mulches from the current older crops can go a long way to suppressing creeping and other grasses.



Ensure that the latest version of **PurEst®** is installed on your phone. i.e. *Version 3.0.2 -M arch 2022*

Installation: Update the current version of the application on your phone, or if not yet installed, download it from the application store.

Version verification: After launching the application, click on the menu icon in the top left of the Calculator screen. On the Menu screen, the version number is displayed above the menu options.

Updated feature: Date selection has been streamlined. To change to a different month swipe left or right (↔) across the calendar.

Once the correct month has been selected, tap on the required day of the month (○).

Updated variety response table: The latest variety-specific treatment recommendations, emanating from SASRI research trials, are included.

New feature: Press the green view button (🔍) next to each variety to view the treatment recommendations (see N70 as an example below).

Treatment	Recommendation
Ethephon (and other trade names)	Recommended
Fusilade Forte (and other trade names)	Recommended
Combination Ethephon + Fusilade (and other trade names)	Highly recommended
Moddus (and other trade names)	Recommended
Combination Moddus + Fusilade (and other trade names)	Recommended
Interim recommendation (Only for varieties with no or limited trial data currently)	Not applicable

Updated feature: Enhanced colour-coded (amber, green and red) visual display of stored records with check boxes for selecting records for sharing or deleting.

New feature: Ability to share record(s) in either CSV or PDF formats via e-mail or messaging (e.g. WhatsApp) applications on phone. Access the share option by pressing the 📄 button.

New feature: A4 format PDF report shareable via e-mail or messaging (e.g. WhatsApp) applications on phone.

New feature: Average Brix% gradient (top, middle and bottom) values in tested stalks are displayed (circled in red box) as an indicator of relative maturity.

Farm Diversification



Kalisha Naicker (Publications Officer)

Planting a single crop can be risky, and could lead to significant losses if there are unforeseen circumstances. Two farmers shared their 'farm diversification' journeys at the South African Sugar Industry Agronomists' Association (SASIAA) Annual Symposia held on 1 November 2022 at Mount Edgecombe. Both live by the old adage, 'Nothing ventured, nothing gained' which not only allows them to farm sustainably, but also enables increased productivity and profits.

Sharing his strategic approach to planning operations on his Sutherland farm in the Jolivet region, Barry Cole said that this practice is 'the future'. His diversity farming approach includes macadamias, guava orchards (together with a processing plant), timber and cattle. Barry explained how cover crops are used at every opportunity to maintain soil health.

Cole also described how thrips are controlled in macadamia orchards using an integrated pest management approach and how careful selection of plant species established on his farm ensure that a healthy bee population is maintained to pollinate the macadamias.

His core message on diversification in agriculture is that the re-allocation of some of a farm's productive resources, such as land, capital, farm equipment and labour, enables other income streams.

North Coast sugarcane farmer, Anthony Goble, who first planted macadamias in 2006, took us through his experiences, highlighting the many challenges and rewards from venturing into a new crop. While sugarcane and macadamias are two very different crops, his experience is that they complement each other well in terms of use of labour and other resources. For Goble, crop diversification is key to survival; he has moved from away from growing only sugarcane to now farming sugarcane, bananas and macadamias.

Other speakers at the symposium supported the concept of crop diversification. Richard Nicholson (SA Canegrowers) added that "growers face an uphill battle

to remain profitable with constant input price increases." He said that climate change, and the mitigation thereof through mechanisms such as carbon credits, can provide financially beneficial opportunities for sugarcane growers.

"Diversification of the SA sugar industry is essential, if the industry is to remain a competitive part of the agricultural and agro-processing sectors of the South African economy."

In his presentation, Andy Church (SA Canegrowers) explored various alternative products from sugarcane, with sustainable aviation fuel holding much promise. He stressed that diversification and sustainability will need to go hand in hand.

The common theme being advanced by all speakers at the symposium was that, especially in the current economic climate, farmers need to diversify to remain sustainable.



Speakers at the symposium (from left) Richard Nicholson, Andy Church and Barry Cole.

Agronomists' Association shares views on how to deal with unplanned carry-over cane

At the recent symposium, Kevin Drew from Tongaat-Hulett, Mafambisse, described how growers are having to think outside the box when faced with unplanned carry-over cane. Growers have had to consider factors such as levels of eldana damage, lodged or flowering cane and chemical ripening when deciding on the order in which fields have to be harvested.

His investigations have established that, with the advent of new varieties and with chemical control of eldana, some growers can carry over 30% of the farm, without a drop in tons harvested. Others, however, experience challenges related to declines in cutter performance due to lodged cane, higher haulage costs and a reduction in RV.

Whether planned or unplanned, Kevin reiterated that a shift in thinking is required to address these challenges and ensure that the best quality cane is prioritised for delivery to the mill.




Fine tribute to the out-going Agronomists' Association co-ordinator

SASRI Senior Soil Scientist Dr Rian van Antwerpen has served the SA Sugar Industry Agronomists' Association for 10 years. During that time, he has planned numerous field trips and symposia, often sharing his own knowledge and expertise. He is thanked for his unwavering dedication and enthusiastic leadership of the Association. He hands over the reins to Dr Riekert van Heerden from SASRI.

We are hugely grateful for Rian's commitment and support!



WEATHER

 **Phillemon Sithole** (Agrometeorologist)

Review

Most parts of the industry received below-average rainfall during the winter and spring seasons of 2022, with Mpumalanga the only exception (Figure 1). However, crop status remained generally good due to well-replenished soil water following the heavy rainfall received in autumn 2022 (*The Link, September 2022*).

Irrigation water supply remained adequate throughout the hot and dry late spring and early summer months when irrigation demand peaks. No water restrictions were implemented in any of the irrigated areas in 2022.

Outlook

The El Niño-Southern Oscillation (ENSO) is currently in a La Niña state and is expected to remain in this state for the rest of the 2022/23 summer season. The La Niña state favours normal to above-normal summer rainfall in eastern South Africa.

The *South African Weather Service, International Research Institute for Climate and Society* and the *European Centre for Medium-Range Weather Forecast* all predict normal to above-normal rainfall for the industry for the remainder of this summer season.

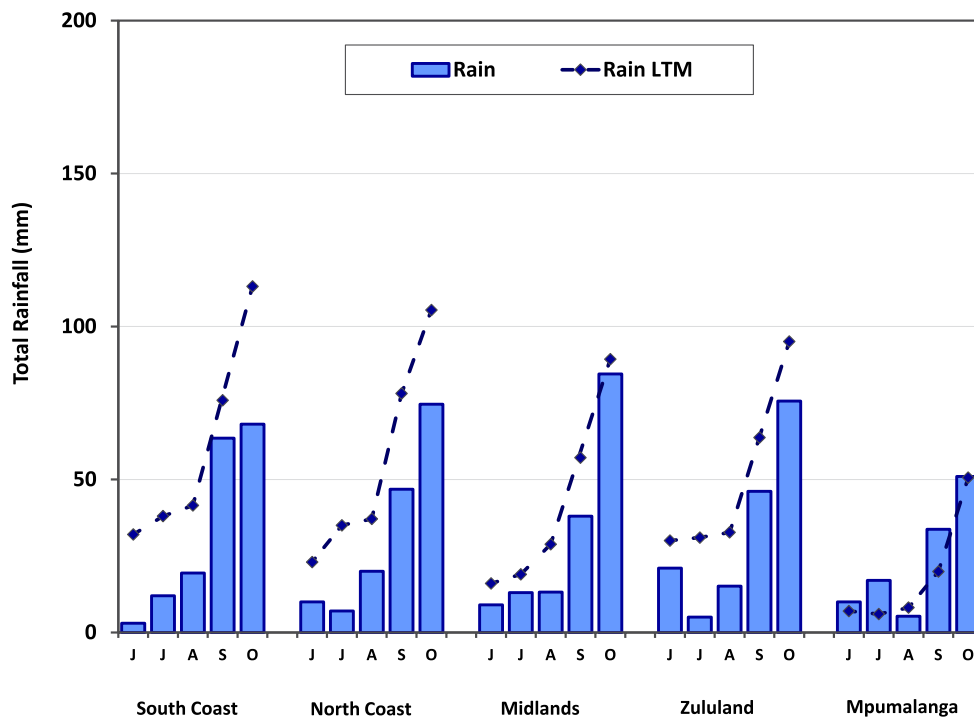


Figure 1: Regional average monthly total rainfall (Rain) for June to October, 2022, compared to the monthly long-term means (Rain LTM).

Please visit the SASRI weatherWeb <https://sasri.sasa.org.za/weatherweb> for the latest industry weather reports and links to up-to-date seasonal climate forecasts.

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