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THE LINK

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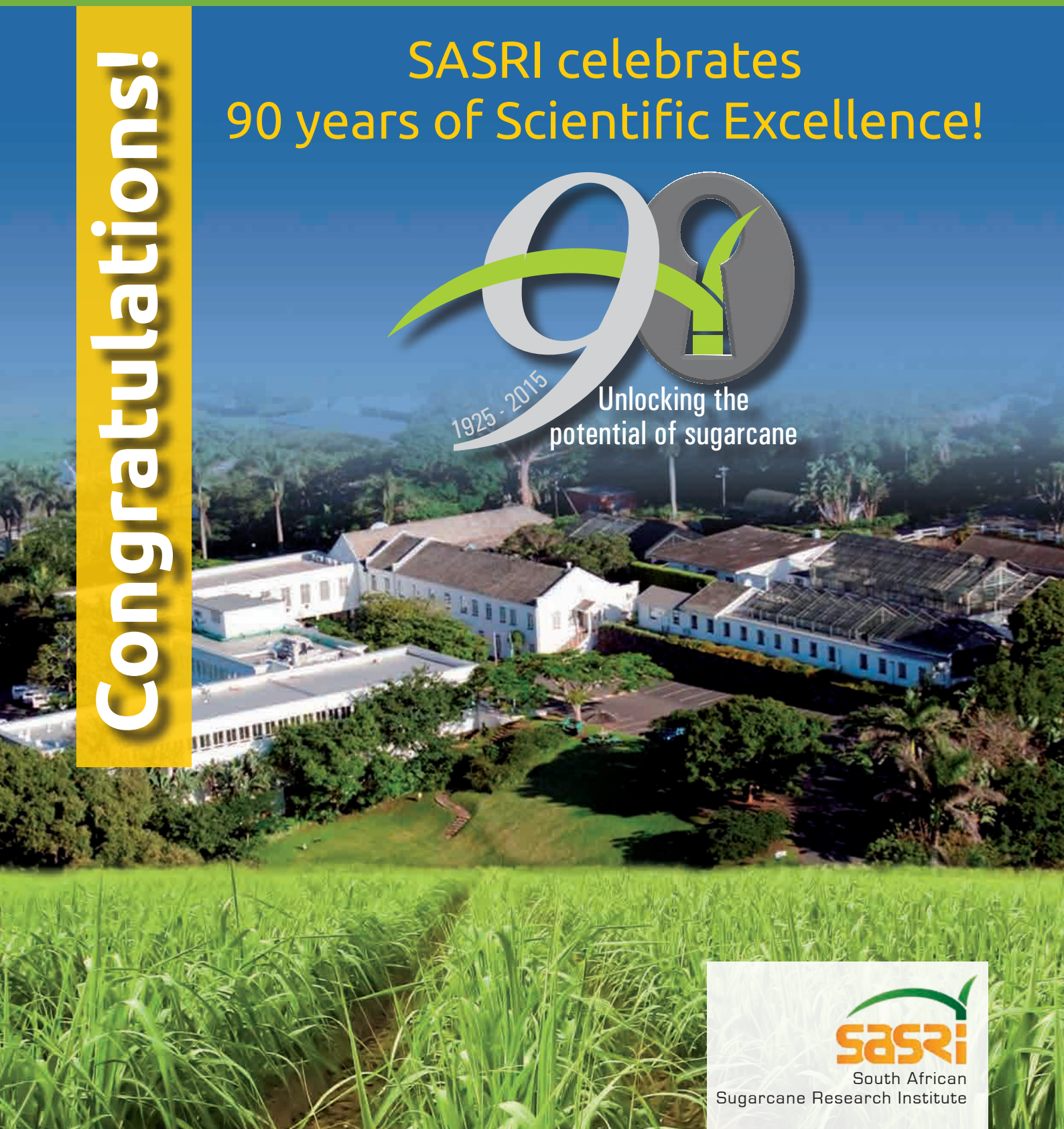
Congratulations!

SASRI celebrates 90 years of Scientific Excellence!

1925 - 2015

Unlocking the potential of sugarcane



SASRI
South African
Sugarcane Research Institute

1925 - 2015 Unlocking the potential of sugarcane

This year, SASRI celebrates 90 years of service delivery and research excellence in the sugar industry. SASRI is the leading sugarcane research institution in Africa and boasts several international accolades as well as internationally accredited scientists.

Also in this issue...

Variety N41

N41 has been widely adopted in both the rainfed and irrigated areas of the industry. However, indiscriminate planting of this variety has led to poor performance in some cases. It is therefore important to understand the limitations of N41, and the ideal growing conditions for this popular variety *(Page 14).*

Besproeiingstelsels

Wanneer besproeiing stelsels ontwerp word, word meestal net evapotranspirasie in ag geneem wanneer die grootte van die stelsel bepaal word. Beide evapotranspirasie en grondwaterhoudingsvermoë moet egter oorweeg word om in staat te wees om 'n akkurate sisteem te ontwerp (Bladsy 20).

RD&E Committees

As a grower, you can influence the nature of research carried out by SASRI. To facilitate this interaction, SASRI, in conjunction with the various local grower organisations, have established ten RD&E committees in the industry, each affiliated to a specific Extension area *(Page 23).*

Message from the... DIRECTOR

Dr Carolyn Baker

Since SASRI's inception in 1925, its mission has been to accomplish cutting edge and problem-solving research to ensure the agricultural sustainability of the South African sugar industry. Arguably, this has been achieved over the past 90 years only because of the focus and dedication of SASRI's internationally recognised scientists and accomplished technology exchange specialists. This commitment to rigour and service delivery is unabated and so, as we enter our 90th year, there is reason to pause and examine whether or not this institution remains relevant in the changing landscape of the sugar industry.

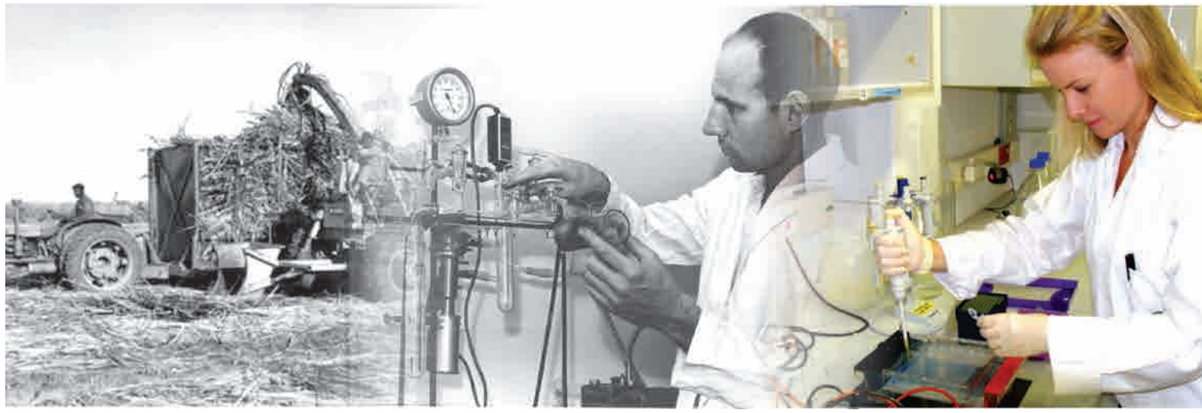
The dominant threats that led to the establishment of the institution in 1925 are unchanged namely, the threat of disease and the need to develop varieties that fit the unique and changing conditions in the South African sugar industry – both of which required dedicated research if indeed the industry was to survive.

In the intervening years however, increasing demands have been placed on the research institute to deliver solutions for a range of agronomic problems. SASRI has been remarkably successful in meeting these needs – indeed so successfully that the expertise, technologies and practices developed here in South Africa have become recognised world-wide and are in significant demand in Africa.

All of this work has been enabled and fostered by the industry, and today the current 'shape and size' of SASRI is a clear reflection of industry requirements. It is undoubted that without the industry's commitment to recognising the value of long-term strategic goals, the need to build a robust research environment and the value of encouraging research excellence, SASRI would not be in its current position today.

Nevertheless, times do change and while the agricultural pressures remain remarkably constant, the industry landscape shifts. From a research perspective, being responsive to these landscape shifts and adjusting accordingly requires careful consideration to ensure continuity in the integrity and value of the research agenda. SASRI's awareness of the challenges facing the industry is acute, and in developing the annual research programme of work, these concerns are paramount with the balance between research and services falling under the spotlight. Regardless of the finer detail in the institute's programme of work, the applied nature of its research programmes will always ensure that the work that it conducts remains relevant and of direct value to the industry.

The importance of demonstrating the value of the research conducted and applicability of the new technologies remains a challenge for SASRI. Being responsive to industry requirements is only one half of the whole; engaging with growers to facilitate adoption is the second half, and requires a deep understanding of their circumstances, and calls for adjustments to meet specific needs. It is an approach to which SASRI remains committed and one that will become increasingly important as production pressures increase.



Topical Tips

Emerging from a very dry winter and with the onset of the spring and early summer rains, added problems are expected in sugarcane production for most rainfed farms. Areas of special attention will be related to pest and disease control, weed control and nutrition.

Pest and disease control

- Keep an eye out for sour rot, which is common after severe dry spells and frosts.

- Ratoon stunt (RSD) can cause severe yield loss on farms. Trials have recorded reductions between 12 and 50% in yields due to RSD. If your fields are infected, it would be wise to fallow these fields until all traces of the previous crop are removed. This is likely to take more than six months. Plan to sample all fields being re-established this year.
- This is the time to inspect and rogue fields and nurseries for diseases and off-types. Diseased stools and off-types must be completely removed with all their roots. In the case of smut, place the diseased material in a bag, remove from the field and burn. Train your staff to identify smut before the whips emerge.
- With the likelihood of increased carry-over cane, especially in the irrigated areas, make sure that you do your own eldana surveys. Alternatively, you may request your Local Pest Disease and Variety Committee to survey carry-over fields. This will ensure that fields with the highest levels of eldana damage are harvested first in the coming season.
- Keep your eyes open for any unusual pest or disease symptoms - remember you are the first line of defence. Notify your local Extension Specialist or P&D Officer if you find something you do not recognise.

Weed control

- Often after a dry spell and the arrival of the spring/summer rains, the dense occurrence of weeds is expected as a result of rapid growth during the off-crop period. Maintaining your weed control programme is vital.
- Watch out for *Panicum* (Ubabe) and *Sorghum* (Uqhangabothi). Follow-up with hand weeding and conduct under canopy spraying of creeping grasses, especially cynodon.
- Don't forget to mow verges and breaks.

Nutrition

- Carry out leaf sampling in young ratoon or plant fields (avoid selecting severely thrips-damaged leaves). Leaf samples should be taken to assess the effectiveness of your fertiliser programme. The period for leaf sampling ends in March for the coastal and midlands areas and in April for the northern irrigated areas.
- With poor canopy development due to the dry winter, there is a good chance that rains during spring and early summer may have caused leaching of fertiliser. Keep an eye on your N levels - you may need a top-up before going into winter.
- Consider planting green manure crops such as winter oats in your replant fields after February.
- Carry out soil sampling (top and subsoil) in your plough-out fields after harvest.

Chemical ripening

- Plan and finalise your chemical ripener programme. Monitor your ripener programme.
- In the northern irrigated areas, this is the opportune time to exploit the use of chemical ripeners as well as schedule planting of varieties. This will ensure harvesting is conducted during the appropriate 'window', warranting the maximum possible income from every field.

Planting

- Seedcane will be at a premium due to the extreme dry conditions during the 2014 winter and sourcing good material may be a problem. There is no substitute for good seedcane. Always ensure you use the best seed available.
- There are additional risks when planting in late summer and autumn, especially if the expected rains have not materialised. High soil temperatures as well as the possibility of the soil drying out as winter approaches is a real possibility. This could lead to the increased risk of pineapple sett rot affecting germination. To avoid this, apply a registered fungicide to protect the setts, and adequately cover and compact the soil over the setts.
- For the Midlands, now is the time to plant seedcane nurseries so that the cane is at the optimum age in spring next year for planting.

Topical Tips

Continued...

The SASRI Extension Team

Harvesting

- Plan your harvesting programme for the coming season.
- Access the latest SASRI crop forecast for the coming season on the SASRI website: http://www.sugar.org.za/sasri. There is also a yield benchmarking facility available on the site. Your SASRI Extension Specialist also has a simple tool to estimate yields.
- Estimate the crop for the coming season and ensure that you submit your estimate timeously.

Irrigation

- Plan a drying-off programme for irrigated fields.
- Schedule irrigation, but do not over irrigate.

Land use planning

- Review the field layout in all your plough-out fields, including contour banks and waterways, for the implementation of structures as the coming winter period is the ideal time.
- Speak to your local SASRI Extension Specialist about the possibility of having your current land use plan updated or a new land use plan drafted if you do not have one. A land use plan is a basic requirement of SUSFARMS®.
- Maintain and repair farm roads.

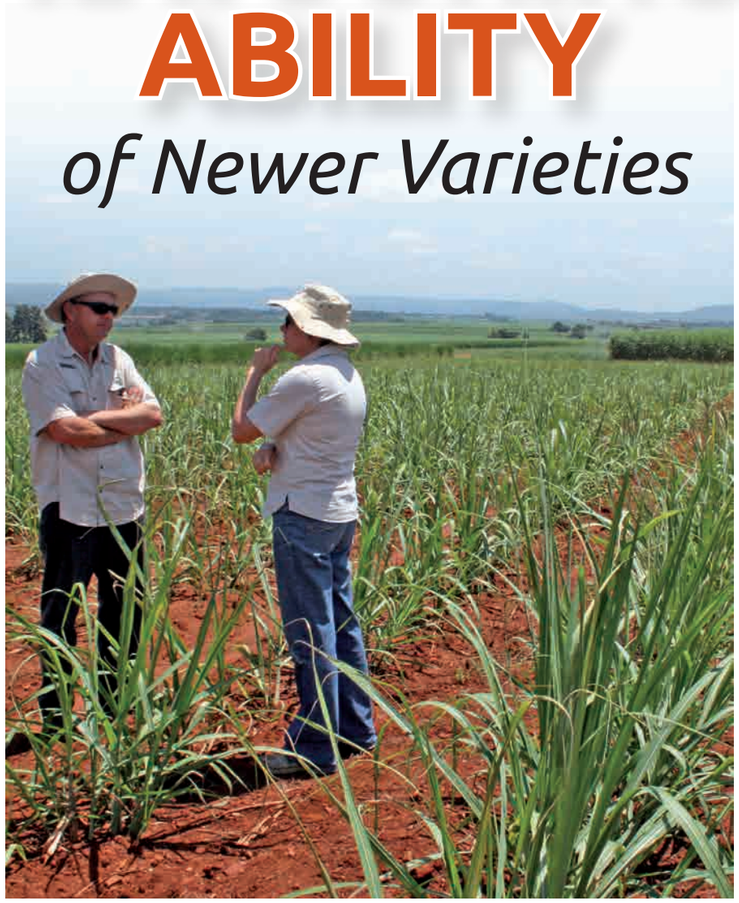
Management

- **Have you completed your annual SUSFARMS® Progress Tracker?** This tool is essential in helping you with your management programme. Some mill groups now require the submission of the Progress Tracker with the first estimate.
- Plan all field operations for the coming season to help with determining income and expenditure estimates (budget) as well as identifying the times at which resources such as labour, fertiliser, herbicide and seedcane should be acquired. SASRI has programme planning sheets available on request.
- Analyse individual field performance to assist in replant decisions such as variety selection, seedcane requirement and appropriate green manure crops.
- Plan and order seedcane requirements for next year.
- You can only manage effectively if you have good accurate information at your disposal. If you are not using a field record system, think seriously about buying a suitable package. There are many available for use with a personal computer; however even basic manual records are good enough provided the correct information is recorded.
- The period during the off-season provides an opportunity to train staff for important operations without much disruption. Courses that should be considered are: disease, pest and variety identification; planting; Junior or Senior Supervisor training; tractor care; basic workshop skills and welding. Contact the Shukela Training Centre on 031 – 508 7706 (www.sasa.org.za/divisions/shukelatrainingcentre) or your local extension office.

Contact your local SASRI Extension Specialist should you require help with any of the above.

RATOONING ABILITY

of Newer Varieties



Ratooning ability is defined as the ability of a variety to sustain sucrose production with each successive crop. This must not be confused with ratoon germination or **ratoon re-establishment**.

Some varieties may not re-establish themselves very quickly after harvest but may still achieve good yields when the next crop is harvested.

At a recent RD&E meeting, growers raised concerns about the ratooning potential of new varieties. There sometimes appears to be a perception that newer varieties have poor ratooning ability compared to the older varieties such as NCo376. There is absolutely no scientific evidence to support this belief.

It is the experience of SASRI specialists that the early N variety releases which have maintained performance over several ratoons are most often planted on the best fields on a farm. Frequently, the poorer fields that have one or more agronomic limitations (water table, salinity etc.) require regular re-planting. New varieties are often planted on such fields and, when productivity drops, a perception may develop that the variety does not ratoon well or is sensitive to the effects of mechanisation. This issue is largely based on grower perception, brought about by anecdotal observations.

Trial results increasingly show that newer varieties tend to ratoon as well as older varieties. Additionally, it has been shown that ratooning ability is more dependent on environmental conditions and management than on variety choice. Many growers in the industry have come to appreciate these realities, and there are many examples of commercial plantings of new varieties performing well beyond the fifth ratoon.

Infield Traffic

No trial data exist to support the contention that new varieties are more prone to effects of infield traffic than the older varieties. The likelihood exists that growers have, over the years, adopted infield loading practices that may be more deleterious to their cane rootstocks, while simultaneously changing variety dispositions. Under these situations, the newer varieties are subject to harsher conditions, which may be prejudicing their performance in the eyes of growers. There has also been an increase in the use of contractors for cane extraction. Decreased regard for infield soil moisture conditions and stool protection during extraction are known to be associated with such a change.

While varieties do differ in their ratooning ability, these differences are minor; **environmental conditions** and **management practices** have a far greater impact on ratooning patterns. Growers can therefore make more progress in sustaining yields by improving management practices rather than trying to select varieties based on their perceived ratooning ability.

Sanesh Ramburan
(Crop Scientist: Variety Evaluation)

STUDY GROUPS

Driving a community toward sustainability

A study group, led by local grower Andrew Brown, met recently in Kearsney. The focus of the afternoon was on mechanisation productivity and included a presentation by John Deere on mechanisation options and upgrades. Costing of mechanical equipment and money-saving tips were also explored. Growers from the community were then given the opportunity to showcase equipment which improves fertiliser application and planting on their farms. Local issues were also discussed and the growers interacted with each other to resolve these. The afternoon ended with a family braai which further allowed all attendees to socialise and network with each other to strengthen the community bond.

There is no knowledge without unity

As the saying above suggests, a cohesive community structure is key in creating a social environment which makes it easy to share knowledge. One way of building this bond is through study groups. Study groups are grower initiatives which bring together neighbouring growers with a common goal: to improve agronomic practices on their farms. It also allows growers to tackle local issues shared by the community whether it's pest and disease infestations, climatic problems, economical methods of farming, labour issues or security. Local sales agents and SASRI Extension Specialists are also invited to share information and participate in uplifting the farming community.

Coming together is a beginning; keeping together is progress; working together is success

The close interface that study groups permit is beneficial to all attendees in several ways. Study groups held on farms allow fellow growers to see operations on the ground and assist with practical solutions. It also gives small-scale growers the opportunity to share their current practices and set-backs with the aim of receiving valuable advice from their large-scale mentors. Study groups allow for the rapid adoption of new technologies as growers may share useful tools and new-found farming methods. This in turn, further promotes productivity on their farms as growers may discuss optimal ways of adopting these technologies to improve farming.

Study groups create a platform for the building of relationships between growers, sales agents in the area, and SASRI Extension Specialists. These participants share experiences, expert advice and services which can be adopted by growers in the community, depending on their current operations. These small groups create a sense of ease and comfort among the growers and allow them to interact on a personal level.

Initiatives such as study groups strengthen both sugarcane agriculture and the community. These vehicles of knowledge exchange unite neighbouring growers and assists in resolving area-specific issues. SASRI encourages these community-driven strategies and strongly supports its contribution to the success of the sugar industry.

> Study groups allow us to get together and help each other as a community to become more profitable, more efficient, more sustainable and to stay in business. We are farmers, we have a goal. Losing sight of productivity by blinkering yourself will cause you to get left behind. **– Andrew Brown** (Grower, North Coast)

Kerisha Raghunandan *(Publications Officer)*
and Adrean Naudé *(Extension Specialist)*

Grower, Andrew Brown (far right), discusses mechanisation equipment with the Kearsney study group. The group started in June 2014 and has brought together a total of 27 growers in the area to date.

SUSFARMS®

Supporting sustainable farming into 2015

The sugar industry's Sustainable Sugarcane Farm Management System, SUSFARMS®, is a management system that has continued to evolve over time and has developed into a useful tool for facilitating the production of sugarcane in a profitable, sustainable and environmentally responsible manner. While the journey of its development began in the 1990s amongst the Noodsberg cane growers, the system has received substantial inputs over the years from a number of other stakeholders, namely environmental bodies, technology providers and sugar customers.

The system is divided into three main chapters that promote best practice within the **economic**, **social** and **environmental** facets of farming. These best practices are either articulated in South African law (i.e. they are required by law), or best practices that are supported by scientific studies. Since much of what SASRI has been promoting over the years is encapsulated within the system, these practices should not be entirely new to growers.

What's in it for me?

There are many benefits that can be derived from implementing sustainable and lawful practices. These include, compliance with legislation, economic viability, social acceptability and environmental responsibility. Without a clear articulated system highlighting both the law and best practice, growers may be unaware of the requirements of the law or they may not have explicit knowledge of where improvements can be made. Growers who have embraced SUSFARMS® have said that the system has assisted them with government audits, encouraged better record keeping and have raised their awareness of environmental and social issues.

What are better management practices (BMPs)?

These are practices that are introduced to reduce environmental impacts, provide economic benefits as well as address the needs of labour and local communities, while ensuring the long-term sustainability of the sugarcane farm. BMPs are based on knowledge derived from scientific studies, or in the absence of such data, best available knowledge.

How is performance assessed?

The SUSFARMS® system includes an assessment tool known as a Progress Tracker. This allows a grower to determine his/her current performance against a set of measures and offers advice on how to improve the situation. The results of a completed assessment allow the grower to highlight his/her strengths and weaknesses and to develop a plan to correct any obvious deficiencies. Implementation of the system by the grower should result in improved performance in the environmental, social and economic spheres.

During the 2013/14 season, both Noodsberg and Eston Canegrowers issued a request for each and every grower to complete and submit a Progress Tracker assessment. These assessments, now collated by SASRI Extension in conjunction with Noodsberg and Eston Canegrowers, provide very useful information that will guide the development of a focussed programme of work, direct new technology development and promote adoption of better practices. It is the experience of these two mill groups that the formal request was a catalyst that encouraged the collection of this valuable information.

What about our customers?

One of the most pressing reasons for the compulsory request to furnish Progress Trackers in these two mill areas has been a need to demonstrate sustainable production to our sugar customers who have in turn made bold commitments to sustainability. There is a growing trend internationally for customers to question the methods used to produce raw materials and the assessment mechanisms developed to verify the sustainability of production of the raw material. SUSFARMS® is therefore an imperative within these regions of our industry and is being used to provide end-users with a high level of assurance of the sustainable practices being implemented on farms. It must be noted too, that while many different standards and certification schemes exist, SUSFARMS® has been recognised as a local system that does not conflict with or contradict other standards.

Why not take a look?

SUSFARMS® is here to assist and protect our sugarcane growers by enabling them to be legally compliant, protecting the environment and ensuring sustainable business. Since SUSFARMS® includes many of the environmental, social and financial best management practices that growers have already been implementing on their farms, it is not new. SUSFARMS® simply packages these BMPs in a fashion that helps the sugarcane farmer to implement them, monitor progress and provide evidence of compliance to legal and recommended standards. The system and the associated assessment are neither a criticism of management-style, nor a competition between growers. It is a journey of continual self-improvement while assisting in demonstrating to our major consumers our commitment to sustainable sugar production.

N41: ’n Wyd aanvaarde variëteit, met beperkings

Suikerriet variëteit N41 is een van die mees gewilde variëteite wat onder besproeiing en droëland toestande aangeplant word.

N41 is in 2002 in die suidelike droëland areas van die industrie vrygestel. Variëteit toetse in die noordelike besproeiings gebied het getoon dat N41 ook daar goeie resultate behaal en dit het gelei tot die vrystelling van die variëteit onder besproeiings toestande gedurende 2006. N41 het oor die laaste dekade getoon dat die variëteit geskik is vir ’n verskeidenheid grond tipes, oes tye en oes ouderdomme, met goeie ratoen vermoë. Ongelukkig is onverantwoordelike aanplanting van hierdie variëteit algemeen en dit lei tot swak prestasie.

Die doel van hierdie skrywe is om die beperkings van N41 uit te lig en aan te dui onder watter omstandighede N41 goed presteer. Hopelik stel hierdie inligting die verbruiker in staat om die verkeerdelike aanplanting van N41 te beperk en die korrekte keuses te maak ten opsigte van variëteite wat meer geskik is as N41 onder sekere omstandighede.

Kus en agterland omstandighede

Die RV opbrengs van algemene kus- en agterland variëteite as ’n persentasie van N41 word in figuur 1 aangedui. Wanneer N41 op ’n ouderdom van 12 – 15 maande geoes word, word beter RV opbrengste ten opsigte van N12, N27 en N39 behaal. Wanneer die oes 15 – 18 maande oud is (agterland toestande), begin die RV opbrengs van N41 egter daal. Onder hierdie agterland toestande is die RV opbrengs van N41 steeds hoër as N12 en N27, maar gewoonlik laer as dié van N39. Ander proef resultate wys dat onder agterland toestande die RV opbrengs oor die algemeen laer is as dié van N48 en N51.

Hoë vlakke van eldana in N41 is onlangs in die kusgebied op verouderde riet aangemeld. Daar word dus voorgestel dat N41 op ’n jaarlikse kapsiklus gesny word vir maksimum RV opbrengs om sodoende eldana skade te voorkom.

Middellande toestande

RV opbrengs van die mees algemene middelland variëteite uitgedruk as n persentasie van N41 word in figuur 2 aangedui. In ryp areas is die RV opbrengs van N41 hoër as dié van N35, maar laer as dié van N36 en N48. In ’n 18 – 24 maande siklus is die RV opbrengs van N41 oor die algemeen swak in vergelyking met N12, N31 en N48. Ander proef resultate wys dat N41 oor die algemeen onder presteer teenoor die nuwer middelland variëteite soos N50 en N52 op die langer kapsiklus.

Daar word aanbeveel dat N41 onder middelland toestande in ryp- en besproeiingsareas op ’n jaarlikse kapsiklus aangeplant word.

Besproeiings toestande

Die RV opbrengs van mees algemene besproeiings variëteite as ‘n persentasie van N41 word in figuur 3 aangedui. Wanneer N41 vroeg seisoen onder besproeiings toestande geoes word, is die RV opbrengs hoër as dié van N25 en N36. Wanneer dit egter middel to laat seisoen geoes word, is die oes RV voordeel laer as dié van N25 en N36. Proef resultate dui daarop dat N41 goed presteer in die middel seisoen in vergelyking met die nuwer variëteite N43 en N46.

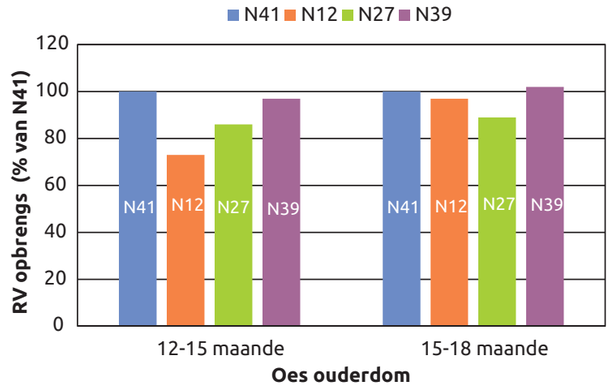
Hoër vlakke van smut is onlangs in N41 lande onder besproeiing in die noorde waargeneem en daar word aanbeveel dat inspeksies en uitkappings gereeld uitgevoer word om die siekte te bekamp. Onder besproeiings toestande word daar aanbeveel dat N41 vroeg- tot middel seisoen geoes moet word met goeie smut bestuurspraktyke.

Die onverantwoordelike aanplanting van gewilde variëteite ly gereeld tot die afbreek van die variteit as gevolg van peste en siektes en swak variëteit/saadriet bestuur. Om N41 as ‘n onderhoubare variëteit in die industrie te behou word boere aanbeveel om die onverantwoordelike aanplant van die variëteit en die bestuur van peste en plae in die variëteit verantwoordelik te bestuur. Verdere inligting rakende die ideale aanplant toestande vir die variëteit word vervat in die variëteit inligtingsblad of kan van die plaaslike voorligtingsbeampte verkry word.

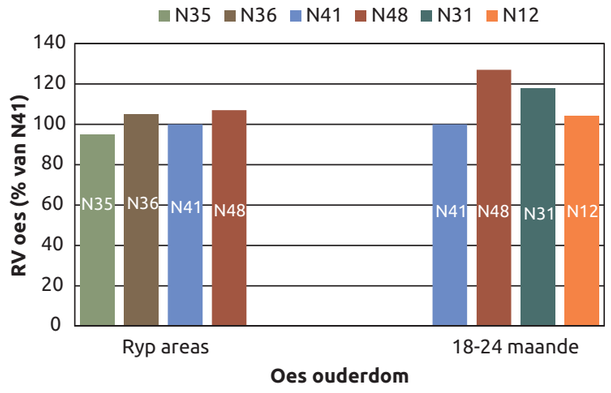
Sanesh Ramburan
Gewas wetenskaplike (Variëteit evaluering)

N41 Suikerriet brand (Smut) waarskuwing

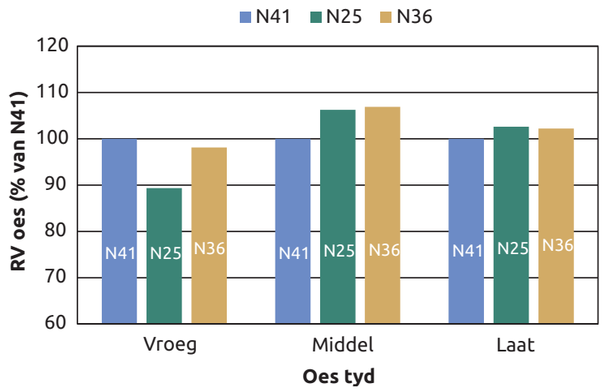
Variëteit N41 is een van die mees populêre variëteite onder suikerriet boere oor die hele suiker industrie en is ook een van die nuwer variëteite wat die meeste onder besproeiings toestande aangeplant word. Alhoewel N41 geklassifiseer word as ‘n variëteit met ‘n gemiddelde (intermediêre) weerstand teen brand (smut), kan infeksies dramaties toeneem wanneer dit in areas soos Pongola, Swaziland en Mpumalanga se Laeveld (waar brand (smut) ‘n groot probleem is en die brand (smut) spoorlading baie hoog is), geplant word. Aanduidings dat dit alreeds gebeur het behoort boere aan te spoor om pro-aktief op te tree om brand (smut) op hul plase te beheer. Roetine verwydering van brand (smut)-besmette plante moet uitgevoer word in kommersiële lande en alle saadriet van die variëteit moet geinspekteer en goedgekeur word deur die plaaslike pes en variëteit kontrole komitee. Geen moeite moet ontsien word om te voorkom dat hierdie hoë opbrengs variëteit verlore kan raak vir die suikerindustrie nie.



Figuur 1. RV opbrengs van gewilde droëland variëteite as ’n persentasie van N41 op verskillende oes ouderdomme.



Figuur 2. RV opbrengs van gewilde middelland variëteite as ’n persentasie van N41 wanneer geoes word onder verskillende middelland toestande.



Figuur 3. RV opbrengs van gewilde besproeiings variëteite as ‘n persentasie van N41 wanneer vroeg, middel en laat seisoen geoes word.

N41: A widely adapted variety, with limitations

Variety N41 is amongst the most popular varieties being planted in the irrigated and rainfed regions of the industry.

N41 was released in 2002 to the southern rainfed regions of the industry. Variety testing in the northern region showed that N41 was also adapted to irrigated conditions, leading to its release to these areas in 2006. Over the last decade or so, N41 has proven to be a widely adapted variety suited to a range of soil types, harvest times, and harvest ages across the industry, with a good ratooning ability. Unfortunately, indiscriminate planting of this variety is common, and this sometimes leads to poor performance.

The purpose of this article is to highlight the limitations of N41 and outline the exact conditions under which the variety does thrive. It is hoped that this information would limit the expansion of this variety into conditions that it is not suited to, and will hopefully inform growers of alternative varieties that are superior to N41 under certain conditions.

Coastal and hinterland conditions

Figure 1 shows the RV yields of common coastal and hinterland varieties expressed as a percentage of N41. When harvested at 12-15 months of age, N41 produces superior RV yields to N12, N27 and N39. When harvested at 15-18 months of age (hinterland conditions), the RV yield advantage of N41 declines. Under these hinterland conditions, N41 is still superior to N12 and N27, however, its RV yield is generally lower than N39. Other trial results also show that under hinterland conditions, the RV yields of N41 are generally lower than varieties such as N48 and N51.

High eldana levels have also been recently reported in N41 that has been aged along the coast. It is therefore recommended that N41 be harvested on an annual cutting cycle along the coast for maximum RV yield benefits and reduced eldana damage.

Midlands conditions

Figure 2 shows the RV yields of common midlands varieties expressed as a percentage of N41. When grown in frost pockets in the midlands the RV yields of N41 are generally superior to N35, but lower than N36 and N48. When grown on an 18-24 month cycle in the midlands, the RV yields of N41 are generally poor in comparison to other midlands varieties like N12, N31, and N48. Other trial results also show that N41 is generally outperformed by newer midlands varieties such as N50 and N52 on the longer cutting cycle.

It is therefore recommended that under midlands conditions, N41 should be planted in frost pockets, or under irrigation on an annual cutting cycle.

Irrigated conditions

Figure 3 shows the RV yields of popular irrigated varieties expressed as a percentage of N41. When harvested in the early season in the irrigated north, the RV yields of N41 are superior to N25 and N36. However, when harvested mid to late season, the RV yield advantage of N41 is reduced relative to N25 and N36. Trial results have shown that N41 also performs well in the mid-season compared to other newer varieties such as N43 and N46.

Higher levels of smut have been observed recently in fields of N41 in the irrigated north, and it is recommended that regular inspection and roguing be practiced in order to manage the disease. It is therefore recommended that under irrigated conditions, N41 be harvested early to mid-season, with good smut management practices.

The indiscriminate planting of popular varieties have often led to their demise due to spread of pests and diseases and poor variety/seedcane management. In order to retain N41 as a sustainable contributor to the industry, growers are encouraged to limit its inappropriate expansion and manage pest and disease issues accordingly. Further information on ideal conditions for planting N41 are contained in the variety information sheet or available from local Extension Specialists.

Sanesh Ramburan
(Crop Scientist: Variety Evaluation)

N41 Smut Alert

The variety N41 has proved very popular amongst growers across our industry and is now one of the most widely planted of the newer SASRI varieties, particularly in the irrigated area. Although N41 is currently regarded as intermediate in its reaction to smut, when the variety is planted in areas such as Pongola, Swaziland and the Mpumalanga Lowveld (where smut is a problem and the spore load is high) the chances of the variety becoming infected with this disease increases dramatically. There have been some indications that this is beginning to happen and growers are strongly urged to be proactive. Routine roguing must be carried out in commercial fields and all seedcane of the variety must be inspected and approved for use by the Local Pest Disease and Variety Control Committee. Please make every effort to ensure that we do not lose this highly productive variety.

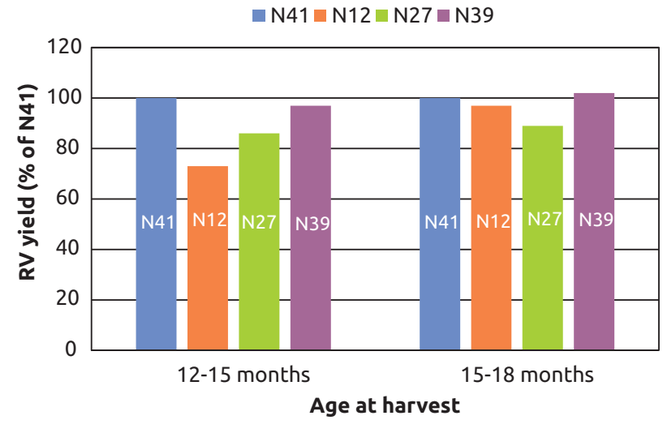


Figure 1. RV yields of popular rainfed varieties expressed as a percentage of N41 at different harvest ages on the coast and hinterland.

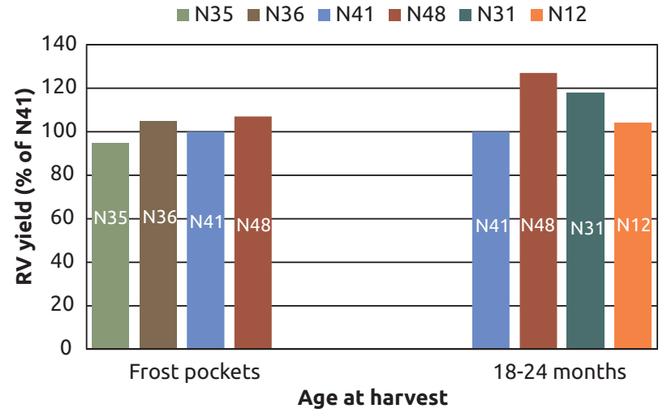


Figure 2. RV yields of popular midlands varieties expressed as a percentage of N41 when harvested under different conditions in the midlands.

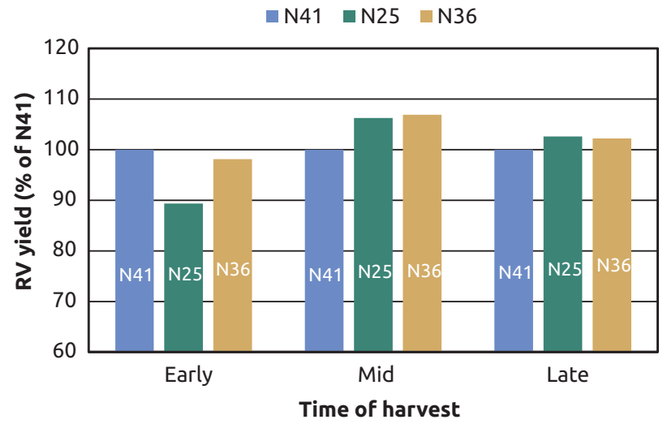


Figure 3. RV yields of popular irrigated varieties expressed as a percentage of N41 when harvested early, mid, or late in the season in the irrigated north.

Soil Health

Neil Miles
(Senior Soil Scientist)

Unpacking Soil Organic Matter

In a lecture delivered at Cedara some years ago, Dr Fred Magdoff, a leading United States soil scientist, asked the question, "Why are soils, which in our father's hands were productive, now relatively impoverished? " He followed this with a fascinating outline of the crucial role of organic matter in maintaining soil productivity.

Organic matter consists of carbon-based compounds derived from plant and animal residues. It comprises about 50% carbon, 40% oxygen, 4% nitrogen, 1% sulphur and varying amounts of a range of other nutrients. Organic matter typically constitutes only about 5% of the soil on a volume basis (Figure 1).

To better understand how organic matter functions in soils, it is useful to recognize the three components of which it is comprised:

1. The living organic matter. This includes living organisms such as fungi, bacteria and earthworms, as well as plant roots.

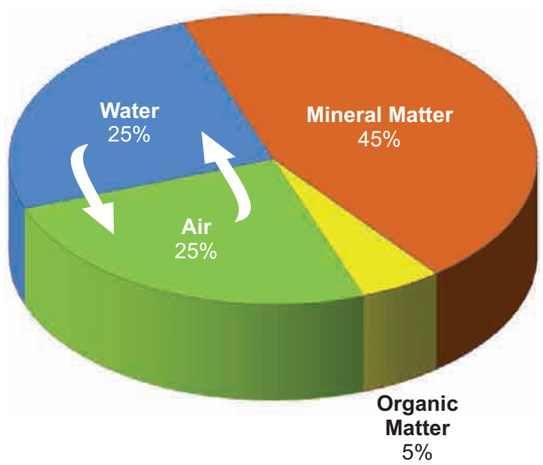


Figure 1: Composition (by volume) of a healthy soil.

2. The 'recently dead' organic matter. This comprises recently deceased plant roots, crop residue and litter, dead micro-organisms, insects and earthworms, as well as recently applied organic products such as manures and sugar mill by-products (e.g. filtercake and flyash). Recently dead organic matter is of massive importance from a soil health perspective. It is the main food source for soil organisms (including earthworms), it releases nutrients for crop uptake, and the compounds produced as it is decomposed help build healthy soil structure.

3. Humus. This is well-decomposed residue that is stable and resistant to breakdown by soil organisms. Humus usually comprises about 60 to 80% of the total organic matter in the soil. The dark colour of many topsoils is due largely to humus.

How much organic matter in soils?

The question farmers regularly ask is: "What *should* the organic matter level be in my soils?" This is not easily answered because soils naturally vary widely in their organic matter contents. Reasons for this include the following:

1. Sandy soils generally have considerably less organic matter than loam and clay soils. This is because organic matter is decomposed more rapidly in sands.

2. Climate affects the amounts of organic matter stored in the soil: levels are higher in cooler, higher rainfall areas than in hotter and drier areas. Thus, for example, soils at Eshowe, Wartburg or Richmond tend to have very much higher organic matter contents than those at Malelane or Pongola.

3. Management practices such as the types of crops grown, the application of manures and composts, and tillage operations have a major impact on the storage of organic matter in soils. Data for organic matter and nitrogen accumulation in soils under sugarcane and kikuyu in the Midlands (Figure 2) provide striking evidence of the build-up of organic matter under pasture systems, and the associated benefit of increased nitrogen reserves.

Managing active organic matter

Long-term research trials have repeatedly shown that it takes many years to substantially change the *total* organic matter content of soils. However, this is not cause for despair: research has also shown that *the fractions of the organic matter that hugely impact soil health are the 'recently dead' and 'living' components*, and there are plenty of ways of rapidly increasing these components in soils. These include the application of chicken and animal manures, compost or sugar mill by-products and the use of green manure crops and pasture rotations. Keeping soils covered through green cane harvesting or spreading of tops also favours an accumulation of active organic matter. Wise farmers will implement these practices wherever possible – they inevitably reflect in the bottom line!

> **"Maintaining active organic matter is the key to keeping almost everything else healthy in the soil".**
> *(Prof Marianne Sarrantonio, University of Maine, USA)*

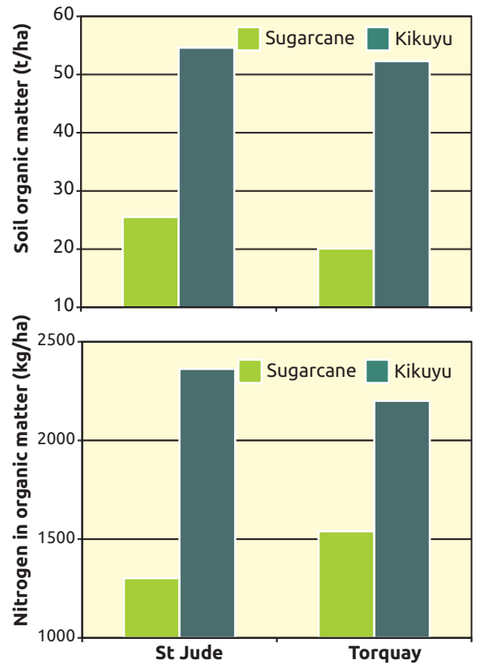


Figure 2: Total organic matter (above) and nitrogen in the organic matter (below) in the top 10 cm soil layers of adjoining sugarcane and kikuyu fields on two farms in the Mid-Illovo area.

Organic Matter, Organic Carbon or Humus?

It is important to distinguish between *organic matter* and *organic carbon*. Analytical laboratories measure the organic carbon (C) content of soils. This measurement is then reported either as the ***soil organic carbon %*** or, following conversion, as ***soil organic matter %***. The approximate conversion from C to organic matter is as follows:

Organic matter = organic C x 1.72

It is important to note that, humus and organic matter are not the same thing! Humus refers only to the well-decomposed component of organic matter (typically 60 to 80% of the total organic matter).

Mechanical Sugarcane Harvesting

The increase in minimum labour wage as well as the lack of labour availability or inclination to cut cane has resulted in growers investigating on-farm mechanical equipment. In order for the equipment to be economically viable to the farm, growers must consider factors such as the cost in relation to the operation and utilisation of equipment, the limitations and suitability of the equipment, slope of the land, field access and other factors such as soil compaction and crop damage and harvesting losses. SASRI Information sheet 6.6: Mechanical sugarcane harvesting systems highlights a wide range of mechanisation options and provides details of the pros and cons of particular models. Some of the locally available options are presented here.

Semi mechanical harvesting

Where fully mechanised systems are unsuitable, semi-mechanical harvesting aids and equipment may then be an option. One example is the Cane Thumper.

This is a walk behind, self-propelled semi-mechanical implement. It has a double-knife sickle bar principle with oscillating blades for base cutting of the cane. It is rated as being capable of harvesting 0.8 to 1 ha per day using 7 to 8 labourers under average conditions.

Source: ESM website: www.canethumper.co.za (Further technical specifications and reports are available on the website)

Front mounted cutters (various designs): (±30t/h to base cut and top)

The economical mechanical front mounted cane cutter typically for use in burnt cane operations. A single line of cane is cut and topped per pass and left in a linear 'sausage' windrow. Labour is required to merge multiple sausage windrows into transverse windrows suitable for mechanical loading operations. An ISSCT paper (Boast, 1989), describes the development of the cutter and provides details on labour requirements for the harvesting and loading operations associated with the system. For a copy of the paper, visit the SASRI Mechanisation webpage - see details at end of article.

Orbach: (±20 to ±40t/h to base cut and top)

This cane harvester is designed to base cut, top and bundle cane in the field. The tractor power requirement is about 50 kW. The harvester is mounted onto the 3-point tractor linkage and is rated at ±50 t/h depending on field and operating conditions. A speed of ±5 km/h is referenced. A tractor of ±70 kW is required and 4wd is preferable especially on slopes.

Vicro harvester: (±25 t/h)

The Vicro harvester is mounted on the 3-point tractor linkage and cuts cane rows adjacent to the tractor. The harvester is designed to base cut, top and bundle cane in the field. A tractor of >60 kW is required and 4wd is preferable.

Mechanised harvesters

Chopper harvesters have met most of the requirements of harvesting under a larger range of conditions, slopes, lodged cane, green cane, and topping requirements. Due to their high costs, mechanical harvesters require a large throughput to make them cost effective.

There are a few smaller sized harvesters that have been developed for sharper turning on small fields and improved infield manoeuvrability. These include the Austoft 4000 harvester (middle) and the John Deere CH330 (3520W) harvester (below) developed primarily for the Indian sugarcane industry but could potentially be introduced into the South African industry. There is also a John Deere CH330 harvester being tested in the KZN midlands.

The extraction vehicles that support the harvester also need to be taken into consideration. Mechanical harvesting systems also require infield management to minimise field and stool damage due to the high level of infield traffic. The adoption of a fully-mechanised system thus requires careful planning from row spacing through to field extraction roads and routes. With high levels of infield traffic, growers are encouraged to implement better infield vehicle management practices such as controlled traffic. A SASRI information sheet detailing the aspects that must be considered before implementing mechanised systems is available *(Information sheet 6.7: Factors to consider when implementing mechanised cane harvesting).*

SASRI is also able to provide plans for some equipment such as cane cutter mechanisms, quick hitches, crane, Hot Water Treatment tanks etc. There are also a series of videos on local and international equipment options. In addition, growers may request an advisory economic analysis tailored to their farming operational needs to find out whether a mechanical aid is comparable or more cost effective than manual labour costs. For more information on these resources, please contact SASRI's Agricultural Research Engineer, Peter Tweddle (peter.tweddle@sugar.org.za) or your local Extension Specialist.

For more information on mechanisation products as well as up-to-date SASRI Mechanisation Reports, please visit the SASRI Mechanisation webpage at www.sugar.org.za/sasri (or use the QR code on the right).

Peter Tweddle *(Agricultural Engineer)*

Kies oorhoofse besproeiingstelsels wat pas by die waterhou-vermoë van die grond

Die omvang van besproeiing in die Suid Afrikaanse suikerbedryf wat plaasvind sonder voldoende inagneming van grondeienskappe soos waterhouvermoë (algemeen bekend as totale beskikbare water – TBW), is kommerwekkend.

In die hedendaagse gejaagde wêreld is dit baie maklik vir boere en/of ontwerpers om in die slaggat te trap om besproeiingstelsels te ontwerp wat slegs aan die maksimum gewaswateraanvraag (Evapotranspirasie – ET) gedurende spitsperiode voldoen. Aangesien ET hoofsaaklik deur klimaatsfaktore bepaal word, kan grondeienskappe baie maklik geïgnoreer word in oorhaastige ontwerp en installering van 'n besproeiingstelsel. Maksimum ET gedurende spitstyd is dus nie die enigste faktor wat in ag geneem moet word wanneer 'n besproeiingstelsel ontwerp word nie. Dit is baie belangrik om ook grondeienskappe soos kleipersentasie, effektiewe wortel diepte en infiltrasie tempo in ag te neem. Hierdie artikel fokus slegs op die waterhouvermoë van die grond.

Die volgende voorbeeld illustreer die nadelige gevolge van besproeiingstelselontwerp sonder om grondwaterhouvermoë in ag te neem. Die getalle wat hier gebruik word is bloot om belangrike beginsels te demonstreer. Veronderstel 'n uitgediende besproeiingstelsel word met 'n nuwe stelsel vervang. As die gemiddelde spitstyd ET vir volwasse suikerriet 5 mm/dag is, sal daar vir die voorbeeld, 'n stelsel ontwerp moet word om die ekwivalent van 6 mm water per dag toe te dien. Vir oorhoofse besproeiing word begroot vir 10% verlies as gevolg van wind en verdamping. Die nuwe stelsel moet dus

'n bruto toediening van ongeveer 6 mm/dag kan maak.

Twee stelsels, wat beide aan die besproeiing vereistes voldoen, word vervolgens beskryf. Stelsel A maak gebruik van 'n 4 mm/uur spuitpakket om 48 mm oor 'n 12 uur staantyd toe te dien. 'n Sewe-dag siklus stel stelsel A se bruto maksimum besproeiingkapasiteit op 6.86 mm/dag. Stelsel B daarenteen gebruik 'n 6 mm/uur spuitpakket. Die staantyd word beperk tot 6 uur en derhalwe is die toedieningsdiepte 36 mm. 'n Ses-dag sikluslengte stel stelsel B se maksimum besproeiingkapasiteit vas op 6 mm/dag. Sien berekeninge.

Beide stelsels A en B blyk geskik te wees, aangesien beide aan die spitstyd gewaswateraanvraag van 6 mm/dag voldoen. As mens egter die toedieningsdiepte van stelsel A met die grondeienskappe vergelyk, verander die prentjie. Die grond het 'n TBW van 80 mm. Volgens besproeiingsontwerpnorme moet die toedieningsdiepte gelyk of minder as 50% van die TBW (40 mm) wees. Dit is duidelik dat stelsel A teen 48 mm per benatting, 8 mm meer as die voorgeskrewe standaard toedien. Gevolglik sal stelsel A aansienlike en deurlopende oorbesproeiing oor tyd tot gevolg hê, wat tot afloop, gronderosie, diepdreinering en loging van duur voedingstowwe/kunsmis aanleiding kan gee.

'n Groot deel van die hoë koste van watertoediening sal vermors word met stelsel A, want 'n beduidende deel van die water sal verlore gaan en is nie beskikbaar vir die gewas nie. In teenstelling hiermee is stelsel B meer koste doeltreffend.

Besproeiingstelsel Aansoek Diepte (mm)	=	Besproeiingstelsel aansoek (mm/uur)	X	Staantyd (uur)

Stelsel A = 4 mm/uur X 12 ure = 48 mm

Stelsel B = 6 mm/uur X 6 ure = 36 mm

Piek Aansoek Kapasiteit (mm/dag)	=	Besproeiingstelsel Aansoek Diepte (mm)	÷	Siklus Lengte (dae)

Stelsel A = 48 mm X 7 dae = 6.86 mm/dag

Stelsel B = 36 mm ÷ 6 dae = 6 mm/dag

Tabel 1. Beraamde Totaal Beskikbare Water (TBW) inhoud waardes gebaseer op gronddiepte en klei inhoud.

Effektiewe worteldiepte (Soil depth)	*Klei-inhoud (Clay content)*						
	10%	20%	30%	40%	50%	60%	70%
50 cm	34	46	53	58	62	65	70
70 cm	48	64	74	81	86	92	96
90 cm	62	82	95	104	111	118	124
110 cm	76	100	116	127	136	144	151
130 cm	90	119	137	150	161	170	179
150 cm	103	137	158	173	185	196	207

Dit is derhalwe duidelik dat die TAW van die grond baie belangrik is en in berekening gebring moet word in die ontwerp van 'n nuwe besproeiingstelsel of strategie, veral in vlak gronde met lae TBWs.

'n SASRI voorligtingspesialis kan met behulp van die onderstaande tabel baie maklik die TAW skat, indien die worteldiepte en klei-inhoud van die grond bekend is (Tabel 1). Die klei-inhoud word aangetoon in grond-ontledingsverslae van FAS. Die gronddiepte kan bepaal word deur grondprofielgate te grawe of om 'n grondboor te gebruik.

Ashiel Jumman
Landbou-ingenieur

Matching sprinkler irrigation application to soil water holding capacity

It is alarming to think of the extent of land that is irrigated in the South African sugarcane industry with limited knowledge of the soil water holding capacity (Total available water – TAW).

In today's rushed world, farmers and designers can easily fall into the trap of sizing an irrigation system to meet the peak crop water demand (Evapotranspiration - ET) only. Since ET is predominately based on climatic factors, soils can easily go unconsidered in the hurried design and installation of an irrigation system. ET is not the only factor to consider. Soil properties such as clay percentage, infiltration rate and effective rooting depth also have to be considered. This article will only focus on the soil water holding capacity aspect.

The detrimental impacts of not considering the TAW are explained by way of an example below. The intention is to convey important principles. The numbers in the example are therefore used merely for illustrative purposes. Let's say an old irrigation system is to be replaced with a new irrigation system. The average peak ET for a fully grown sugarcane crop was determined to be, say, 5 mm per day. For sprinkler irrigation, an allowance of 10% losses from wind drift and evaporative spray implies that the system must be designed to apply the gross equivalent of 6 mm per day, for this particular example.

Two alternatives, which both meet the irrigation requirements, are described. System A makes use of a 4 mm/hr sprinkler package to apply 48 mm over a 12 hour stand time. A 7 day cycle length fixes system A's gross peak irrigation capacity at 6.86 mm/day. System B, however makes use of a 6 mm/hr sprinkler package. The stand time is limited to 6 hours and the resultant application depth is 36 mm. A 6 day cycle length fixes system B's gross peak irrigation capacity to 6 mm per day.

Both systems, A and B appear to be suitable because they meet the peak crop water requirement of 6 mm/day. Reflecting the irrigation application depth of system A against the soil, however, reveals a different picture. The soil has a TAW of 80 mm. In line with irrigation design norms, the irrigation application depth should typically be equal to, or less than, 50 % of the TAW (40 mm, in this example). It is easy to see now, that system A applies 48 mm of water per event, 8 mm more than the recommended standard. The result is that system A has the innate potential for ongoing over-irrigation which will lead to runoff, soil erosion, deep drainage and leaching of expensive crop nutrients/fertiliser over time.

If system A was installed, one would bear the electricity cost of applying the water to the field but, not all the expensive water will be stored in the soil or be available to the crop. System B, in contrast, is well matched.

The TAW of the soil is important and must be factored into the development of any new irrigation system/strategy. The process of matching irrigation application to a soil TAW is especially important when soils are shallow with lower TAWs.

An Extension Specialist can easily use the table on page 21 to estimate the TAW if the soil depth and clay percentage of the soil are known. Clay percentages are usually reported in FAS reports. The soil depth can be determined by digging soil pits or auguring.

Sprinkler Application Depth (mm)	=	Sprinkler Application (mm/hr)	X	Stand time (hr)
System A = 4 mm/hr X 12 hrs = 48 mm				**System B** = 6 mm/hr X 6 hrs = 36 mm

Peak Application Capacity (mm/day)	=	Sprinkler Application Depth (mm)	÷	Cycle Length (days)
System A = 48 mm ÷ 7 days = 6.86 mm/day				**System B** = 36 mm ÷ 6 days = 6 mm/day

Ashiel Jumman
(Agricultural Engineer)

The SASRI Research, Development and Extension Committees

As a grower, you can influence the nature of research carried out by SASRI. To facilitate this interaction, SASRI, in conjunction with the various local grower organisations, have established ten RD&E committees in the industry, each affiliated to a specific Extension area.

RD&E committees act as the channel for the following activities:

- Communication regarding SASRI Extension service.
- Gathering, collating and prioritising local research issues.
- Facilitating interaction between grower representatives, Extension Specialists and SASRI research.
- Reporting back to the industry on research, development and Extension issues.

The primary aim of the committee is to ensure that research is directed towards meeting the needs of the industry by facilitating open and active communication among Mount Edgecombe-based researchers, Extension Specialists working in the field and the growers. In this manner, the committee aims to encourage the adoption of SASRI-developed better management practices (BMPs) by all growers.

Annual workshops

An annual RD&E workshop is held every year. At this workshop, RD&E committees submit lists of the most pressing issues in each of the ten regions. These issues are discussed, clarified and prioritised before being tabled in a document to be reviewed by the SASRI research committee. Feedback on these issues is then made available via the *'Feedback to RD&E Committees'* document which you can obtain from your committee, and which is also made available on the SASRI Info Pack CD distributed annually.

RD&E Obligations

The RD&E committee assists the local Extension Specialist by defining the objectives, needs and problems of the particular area and by establishing priorities when formulating the Extension Specialist's programme of work (POW). To achieve this, the RD&E Committee will meet regularly with the Extension Specialist, and must meet at least three times a year.

The format of the SASRI Extension Specialist's POW has been developed to ensure that the Research-Extension-Grower linkage is considered and enhanced. The POW includes a section called 'issue extension' to ensure that local area issues are tackled timeously. The issues are brought to the local RD&E committee, where they are discussed and prioritised. Some of these issues may be brought to the RD&E workshop, should the Extension Specialist believe SASRI research involvement is required.

Get to know your RD&E chairmen

Lowveld: Pieter Cronjé
Midlands North: Bruno Eggers
Umfolozi: Andrew Russell
Amatikulu: Guy Emberton
Midlands South: Ryan Dohne
Pongola: Helgaard Muller
Zululand North (Felixton): David McIlrath
North Coast: Kevin Drew
Umzimkulu: Mike Neethling
Sezela: Vacant

Your involvement

SASRI encourages active participation in this industry structure that has been established to ensure that we better serve your needs. As a first step, establish which growers from your area serve on the RD&E Committee. In this way, you will know who to contact if there are issues in your area that you feel are not being addressed by SASRI. Better still – offer to serve on the committee yourself.

It would also be beneficial to consult the *'Feedback to RD&E Committees'* document prepared by SASRI each year. This document provides feedback to regional RD&E Committees on the way in which the issues brought to the attention of SASRI are been progressed. It also contains helpful information from SASRI specialists on the issues raised.

Geoff Maher
(Extension Manager)

Weather

Phillemon Sithole
(Agrometeorologist)
& **Abraham Singels**
(Principal Agronomist)

Review

Conditions remained extremely dry throughout the industry, brought about by very low rainfall from April to September (Table 1). In most regions relief only occurred in October with rainfall close to the long term mean (Figure 1), but November was well below average.

The long and severe dry spell (see example in Figure 2) had a negative impact on yields of late season rainfed crops, while cane quality mostly remained high due to favourable maturation and harvesting conditions. The 2014 drought will undoubtedly impact negatively on 2015 rainfed crops. Conditions in irrigated regions with adequate irrigation water were ideal for high yielding, high quality cane.

Outlook

The consensus outlook for the ENSO (El Niño-Southern Oscillation) system is that weak El Niño conditions will exist for the rest of the 2014/15 summer. This is sometimes associated with below normal summer rainfall over the sugar growing areas of South Africa. The South African Weather Service (SAWS) and the European Centre for Medium-Range Weather Forecasts both expect below normal rainfall for the remainder of summer over the eastern parts of SA. However, SAWS forecasts predict above-normal rainfall in the catchments feeding the main rivers in the Mpumalanga sugarcane areas, which could enhance irrigation water supply in that region.

Please visit the SASRI weather web http://portal.sasa.org.za/weatherweb/ for links to up-to- date seasonal climate forecasts and also for the latest rainfall and other weather data.

Region	% LTM Rain
South Coast	47
North Coast	37
Midlands	36
Zululand	43
Mpumalanga	47

Table 1. Regional rainfall received from April to September, 2014, expressed as a percentage of the long term mean (LTM).

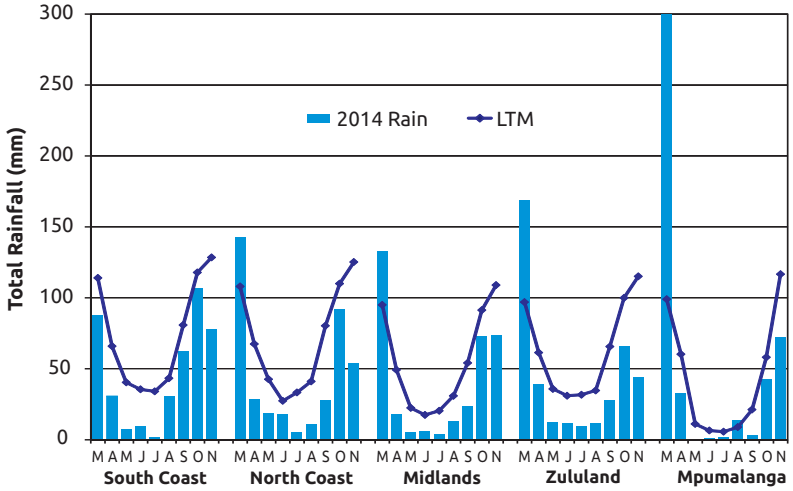


Figure 1: Regional average monthly total rainfall and the monthly long term means (LTM) for March to October, 2014.

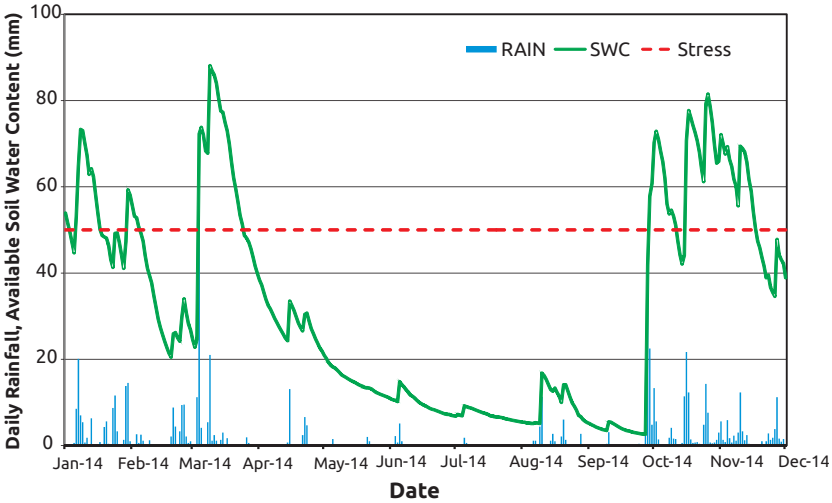


Figure 2: Umzimkulu mill supply area average daily rainfall and calculated daily available soil water content (SWC) for a hypothetical soil with total available water capacity of 100 mm. SWC levels below 50% of capacity (broken horizontal line) indicate periods of crop water stress.

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