REFEREED PAPER

REVIEW OF SOUTH AFRICAN SUGARCANE PRODUCTION IN THE 2016/2017 SEASON: LIGHT AT THE END OF THE TUNNEL?

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Abstract

The objectives of this paper are to characterise South African sugarcane production for the 2016/17 milling season from an agricultural perspective. This is done to provide insight into successes and failures of recent production strategies, and identify priorities for improved efficiency in producing high quality sugarcane in South Africa.

The season saw rainfed yields increasing from that in 2015, as the effects of the prolonged drought are gradually receding. Cane quality, though, was extremely poor due to lingering drought effects and difficult harvesting conditions brought about by winter and spring rain. Yields in irrigated areas were severely depressed by restricted water supplies.

Eldana infestation levels and damage were lower than expected in coastal areas, presumably due to increased adoption of control measures to manage the pest.

Smut levels remained high in northern irrigated areas, while rust infections tended to be less common and severe than previous seasons. Ratoon stunt levels, however, increased markedly in coastal areas following the drought. Routine field monitoring remains essential to identify fields that require appropriate interventions for effective disease management.

Growers could not fully exploit the relatively high RV price, because of very poor cane quality in rainfed areas and very low yields in irrigated areas. The long term sustainability of sugarcane enterprises therefore remained under threat. The outlook for the 2017 season, however, is positive after good summer rainfall in 2016/17 and partial restoration of irrigation water supplies.

Keywords: cane quality, cane yield, diseases, profitability, pests, production

Introduction

The South African (SA) sugar industry produced 15.07 million tons (Mt) of cane in the 2016/17 season, harvested from an estimated 252 010 hectares. Corresponding amounts of cane for the 2014/15 and 2015/16 seasons were 17.75 and 14.86 Mt harvested from 272 928 and 250 641 ha, respectively. These data translate to an estimated industry average cane yield of 59.1 t/ha, compared to 65.1 and 59.3 t/ha for the 2014/15 and 2015/16 seasons, respectively. Sugar production declined to 1.55 Mt in 2016/17, compared to values of 2.12 and 1.63 Mt for the 2014/15 and 2015/16 seasons, respectively. The cane to sugar ratio was 9.12 in 2016/17, compared to values of 8.39 for 2014/15 and 9.12 for 2015/16.

Long term trends in industry total cane production and area under cane are shown in Figure 1.

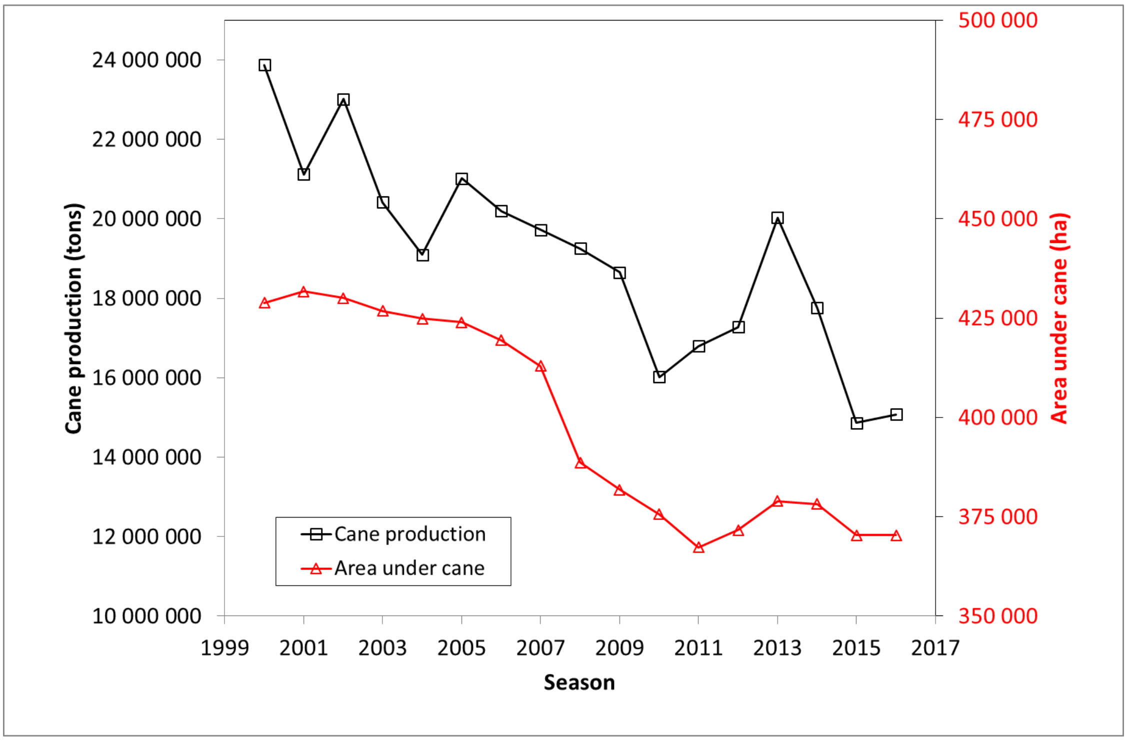

Figure 1. Cane production, area under cane (a) and industry average cane yield (b) in the South African sugar industry since 2000.

This paper analyses production for the 2016/17 season, and relates the key performance indicators of cane yield and cane quality to the main production factors of climate, pests and diseases, agronomic and economic conditions. The information, and lessons learnt from this exercise, should be used in the future to strive for more efficient production of high quality sugarcane in South Africa.

Methodology

A similar methodology was followed to that used in previous reviews (van den Berg *et al.*, 2008; Singels *et al.*, 2010). Production data were mostly analysed at the level of mill supply areas (MSAs), while in some cases pest and disease data were grouped or subdivided into areas as defined by Local Pest, Disease and Variety Control Committees (LPD&VCCs) of the South African Sugar Association (SASA). Some results are also discussed in the context of broad agroclimatic regions (Figure 2).

The sugarcane produced in the 2016/17 milling season grew mostly from between April 2014 (long cycle cane) and December 2015 (annual cane), to between April 2016 and December 2016, when it was harvested. For simplicity, both the growing and milling seasons are referred to as the 2016 season.

Production data

Production (cane deliveries and cane quality) data were obtained from the SASA Cane Testing Service (CTS) database, while the estimated area harvested was gleaned from survey data from the SASA Industry Affairs or from data provided by Mill Group Boards (MGBs).

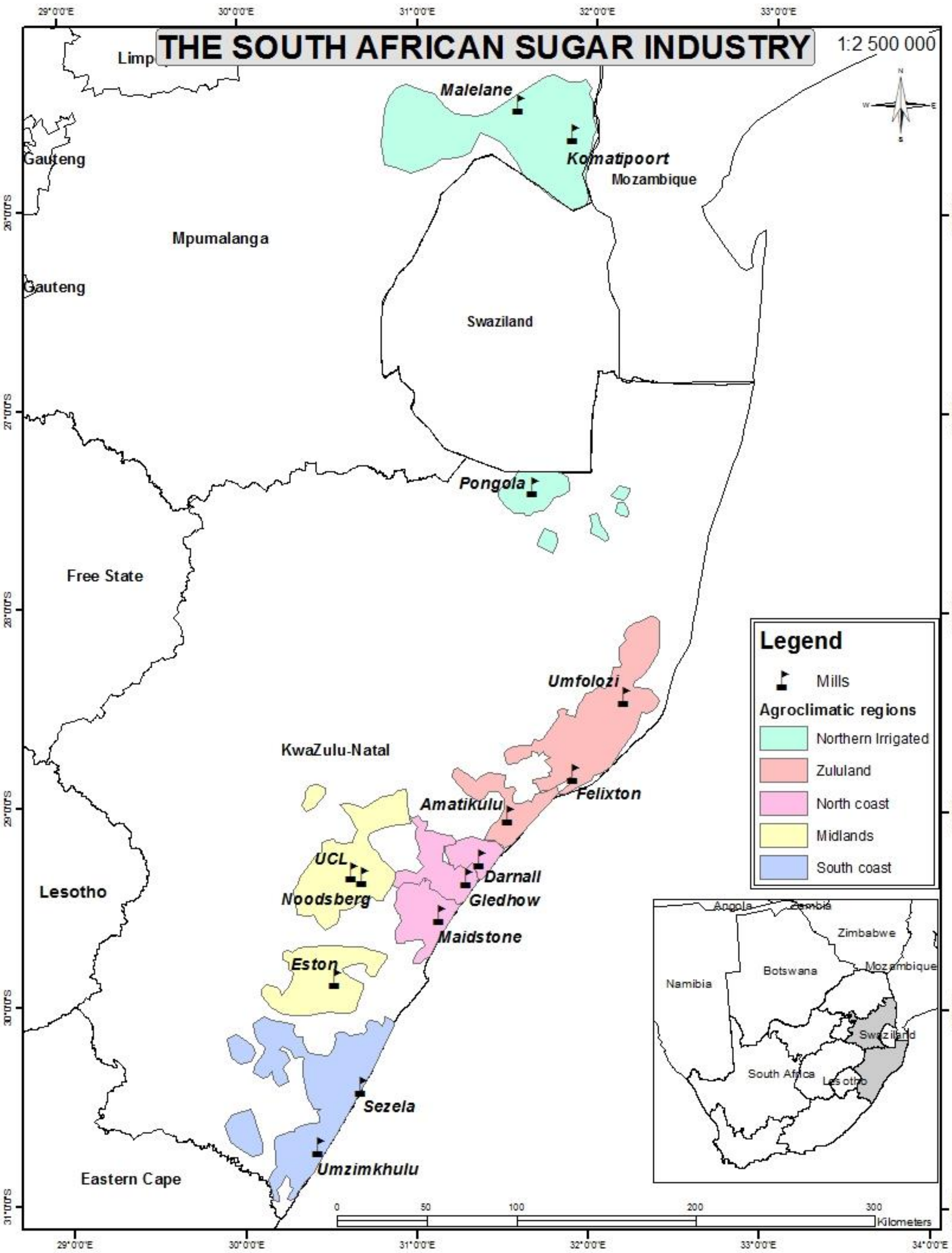

Figure 2. Map showing the 14 South African sugar mills and their location within broad agro-climatic production regions (source: South African Sugarcane Research Institute, Geographic Information System office).

Yield data (computed by dividing home mill production with estimated area harvested) were compared to yields estimated by the Canesim Crop Forecasting System (Bezuidenhout and Singels, 2007) using observed weather data. Model estimates provided a benchmark of the agro-climatic potential for sugarcane production, taking into account soil properties, radiation, temperature and effective rainfall as well as irrigation water supply.

Rainfall

Rainfall records from various weather stations, averaged per MSA, were obtained from the South African Sugarcane Research Institute (SASRI) weather database. Twelve-month totals or average values leading up to each month of the 2016 milling season (e.g. 1 April 2015 to 31 March 2016, 1 May 2015 to 31 April 2016, and so forth) were compared to the corresponding long term mean (LTM) values. The deviations from the LTM (anomalies) were in turn compared to the corresponding anomalies for the 2014 and 2015 seasons.

Pests

Many insect pests attack sugarcane in South Africa; however, *Eldana saccharina* Walker (Lepidoptera: Pyralidae) (eldana), is historically the most widespread and serious ongoing constraint on production. SASRI Biosecurity teams conduct industry-wide annual surveys for the pest. Infestations are quantified as the number of larvae per 100 stalks (e/100) and damage as a percentage of stalks with eldana borings (%SD). Larval numbers and damage were averaged for different regions over the 12-month period from June 2014 to May 2015. For analysis, seasonal average infestation levels for different regions and for the industry as a whole for the past 16 season were investigated to study long term trends, in particular in relation to the current infestations.

Another sugarcane pest, sugarcane thrips (*Fulmekiola serrata*, Thysanoptera: Thripidae), is considered a threat and has thus been monitored for eight seasons in selected fields in the Umfolozi MSA (Way *et al*., 2011).

Diseases

SASRI Biosecurity teams inspected 7 451 commercial fields and 3 214 intended seedcane sources for smut and mosaic during the June 2015 to May 2016 period. Inspections covered over 46 300 ha representing approximately 12% of the area under cane.

The same data collection and processing procedures were followed as described by Singels *et al*. (2014). The selection of fields for inspection varied between MSAs. In most areas fields were randomly selected for survey, while in some areas, fields planted to varieties known to be susceptible to smut or mosaic were targeted. Generally, survey teams aim to visit each farm to conduct a pest and/or disease survey at least once a year, but this depends largely on the number of teams operating in the area and the size of the MSA to be covered. For these reasons, it was not possible to make comparisons between MSAs, but trends over the years within mill areas could be analysed. The presence and severity of brown and tawny rust was also noted during the inspections.

Commercial and seedcane fields are routinely sampled by the biosecurity teams to identify fields infected by ratoon stunt (RSD). Since RSD does not have any obvious external symptoms, routine diagnosis is based on the serological analysis of xylem sap extracted from stalk samples (McFarlane *et al*., 1999). A total of 6 116 samples were received from commercial fields for RSD testing.

Economic information

Farm economics were analysed using survey data from SA Cane Growers' Association (SACGA, 2016b). Only actual data for the 2014 season were available, and the data for the 2014 season were estimated using indices from the Crops and Markets Reports released by the Department of Agriculture, Forestry and Fisheries (DAFF, 2016). The projection for the 2016 season is based on the average Consumer Price Index (CPI) for the year 2016 (Statistics South Africa, 2017). Estimates for the 2015 season are as accurate as possible due to the indices being updated for that season, and therefore take actual changes in prices and costs into account. The estimated change from the 2015 season to the 2016 season was based on the average inflationary increase, which is a standard estimation practice. The survey elicited cost and income data from a sample of large scale growers from the 14 MSAs in SA. Average cost and income statistics reported in this study were determined by weighting MSA values by the deliveries of large scale growers in each MSA.

Results and discussion

Firstly, cane production data are summarized at MSA level, by comparing data for the 2016 season with that of previous seasons. Production conditions during the 2016 growing season are then reviewed, focusing on rainfall, pests and diseases. The impacts of these factors on cane productivity (cane yield and quality) are then discussed, followed by a brief review of economic conditions and its impacts on grower profitability.

Production information

Production increased from 2015 for all rainfed MSAs, but remained at or below the five season mean. Production in irrigated MSAs declined from 2015 and was well below the five season mean in all cases (Figure 3).

The estimated area harvested (Figure 4) in 2016 was lower than in 2015 for Malelane and Komati due to low yielding crops being carried over to 2017 or abandoned due to a lack of water. Area harvested also declined for the Felixton, Sezela and Umzimkulu MSAs. Significant increases in area harvested were noted for Amatikulu, North Coast and Midlands North MSAs, as very low yielding crops in 2015 were carried over into 2016.

The industry total area harvested in 2016 is estimated at about 250 000 ha, a small increase from the 245 000 ha harvested in 2015.

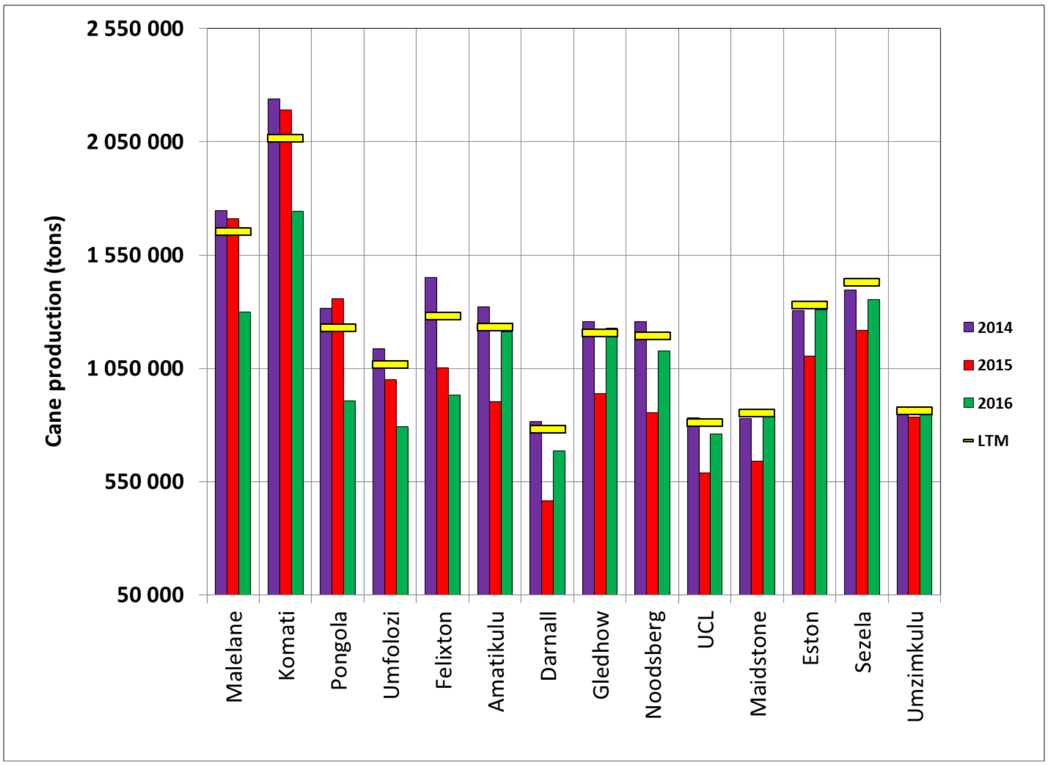

Figure 3. Cane production for different mill supply areas for the 2016 season compared to the 2014 and 2015 seasons and the five-season mean (long term mean (LTM), shown as yellow horizontal bars).

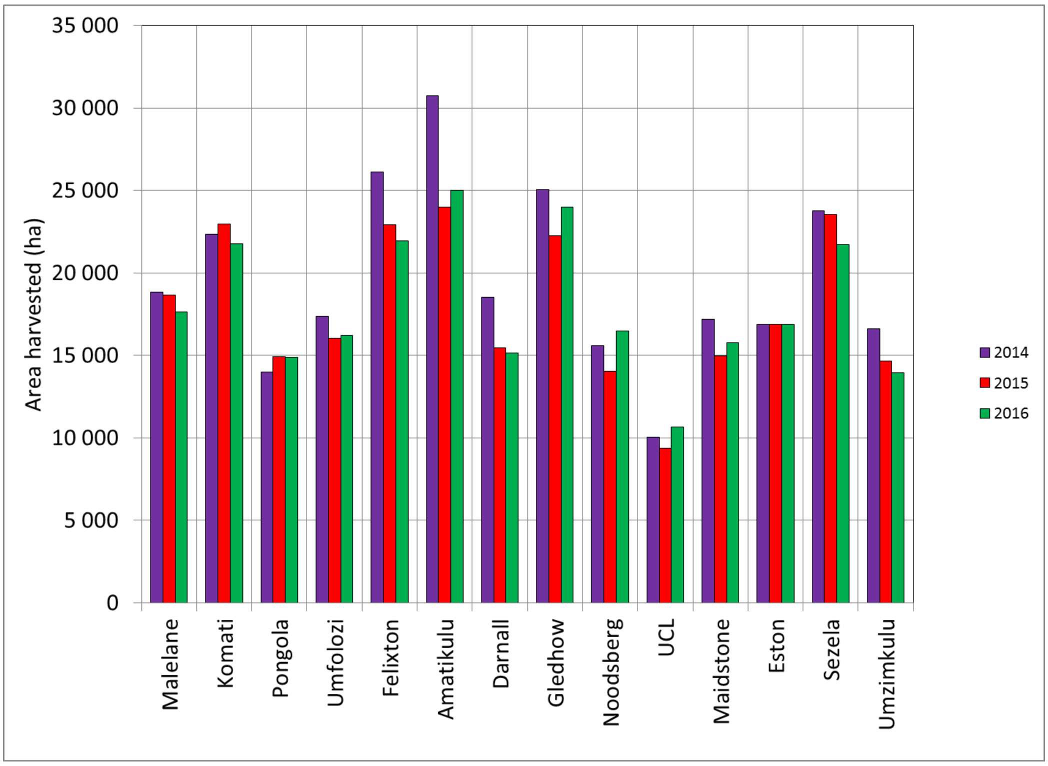

Figure 4. Estimated area harvested in the 2016 season for different mill supply areas, compared to the 2014 and 2015 seasons.

Production conditions

In this section, some of the main factors that determine production conditions and drive cane growth and productivity, namely rainfall, plant health (pests and diseases) and economics, are described for different MSAs for the 2016 growing season. Although soil health and crop nutrition are important factors, lack of appropriate data prevented any meaningful investigation.

Rainfall and irrigation

The entire sugarcane production area received below normal rainfall for the 2016 growing season, with the northern areas the worst affected (Figure 5). For most rainfed MSAs this was the third successive season with below normal rainfall. Industry average growing season rainfall was 20% below the long term (Figure 5).

Conditions in rainfed areas remained severely dry through most of 2014 and 2015, with 23 out of 24 months between April 2014 and April 2016 recording below normal rainfall for KwaZulu-Natal (Figure 6). In July 2015, and May and July 2016, good rainfalls were recorded, very unusual for this time of the year and well above the long term. Rainfall since August 2016 has been close to the long term mean, except for December 2016, which was well below the long term mean (Figure 6).

This protracted period of low rainfall caused soils to dry out, with very low estimated soil water content throughout the summer of 2014/15 up to June 2015 (Figure 7). A brief spike in soil water in early spring was quickly depleted by the crops, resulting in drier than normal soil water status returning towards the end of the 2015 season, and lasting until June 2016. Thereafter soil water status improved, indicating a recovery from the prolonged drought in rainfed areas.

Furthermore, persistently low rainfall in the catchments of major dams that supply irrigation water to sugarcane areas, led to the imposition of water restrictions during the course of 2015 in all the major irrigated areas (Figure 8). Restrictions intensified gradually toward the end of 2015 and were severe in 2016, with allocation as low as 10% of the normal allocation.

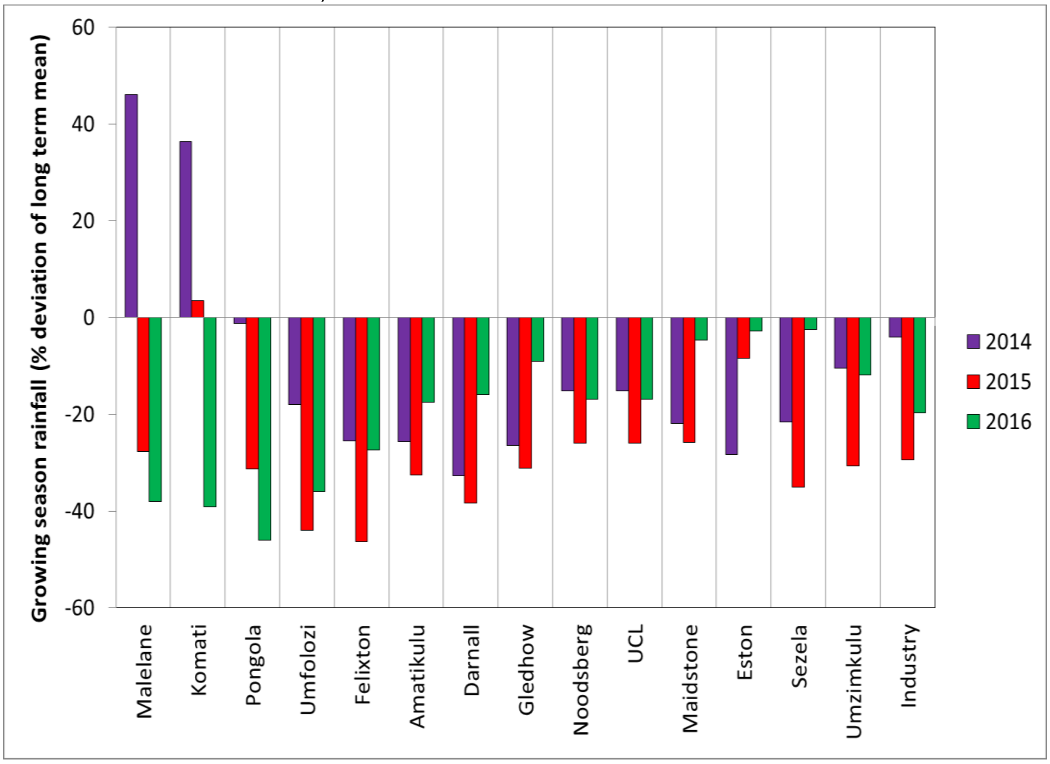

Figure 5. Total 12-month rainfall expressed as a percentage deviation from the long term mean, averaged over each month of the harvest season for different mill supply areas and the industry as a whole for the 2016 season compared to the 2014 and 2015 seasons.

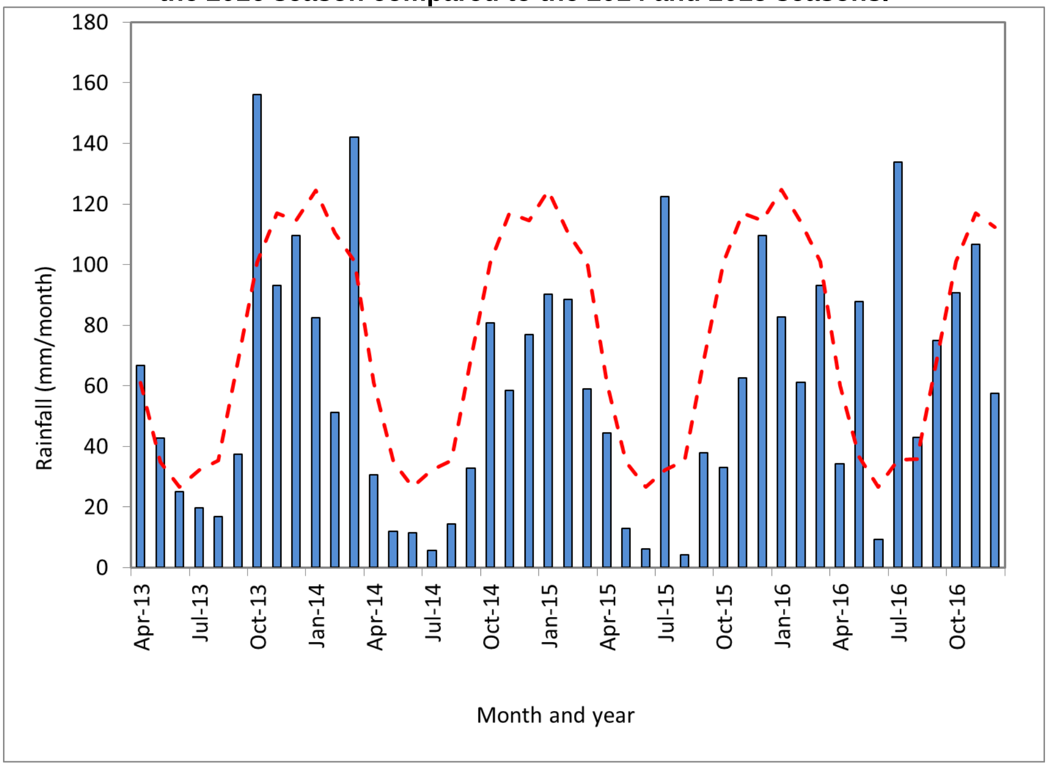

Figure 6. Monthly rainfall averaged for KwaZulu-Natal from April 2013 to December 2016 (bars) compared to the long term mean monthly values (line).

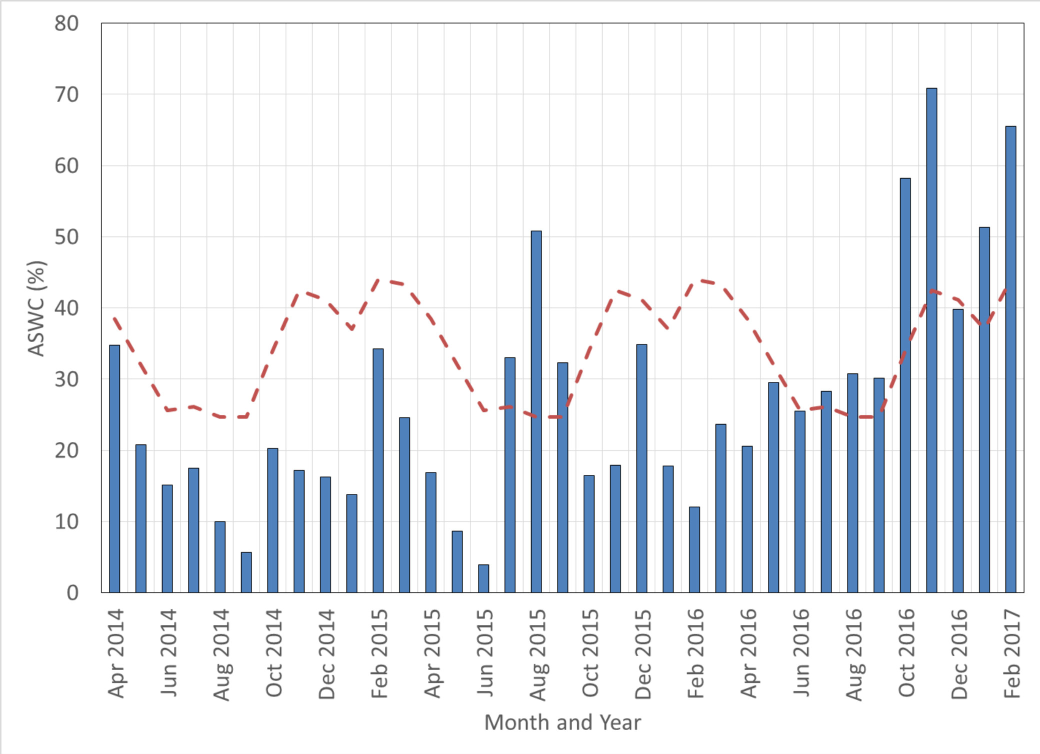

Figure 7. Monthly average plant available soil water content (ASWC), expressed as a percentage of the full capacity, for a hypothetical sugarcane crop growing in the Amatikulu mill supply area during the period April 2014 to February 2017 (bars), compared to the long term monthly mean values (line). Values below 50% can be considered dry.

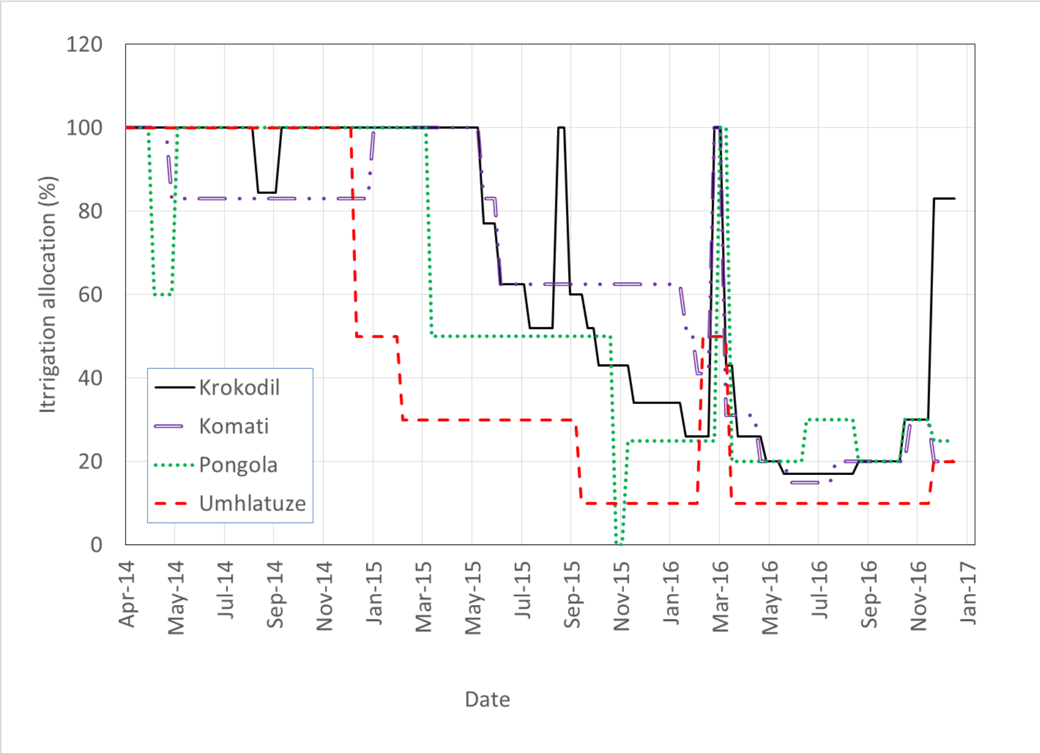

Figure 8. Irrigation allocations (as a percentage of the normal allocation) for the period April 2014 to December 2016 for four different water sources supplying irrigation water to the Malelane, Komati (Krokodil and Komati), Pongola and Felixton (Umhlatuze) mill supply areas.

Pests

Eldana

Despite the prolonged drought, regional average eldana infestation has not reached the excessively high levels recorded in previous drought periods (Figure 8). Moreover, infestation levels in 2016 were lower than in 2015 for the North Coast and Zululand regions and both regions show a declining trend. Levels in the North Coast region are currently at 4.2 e/100, which is well below the long term mean of 6.9 e/100. It is believed that a potential eldana outbreak has been avoided, mainly because growers have implemented the cultural and chemical control recommendations developed by SASRI to assist with eldana suppression (Rutherford, 2015). Survey data from the North Coast region clearly show the impact of chemical control, with average incidence and damage levels in 2016 of 1.5e/100 and 18% respectively for fields with control (3315 samples), compared to 6.9e/100 and 31% for fields with no control (1993 samples) (data provided by A. Naude, SASRI extension).

Eldana incidence in the South Coast has also not increased as markedly as expected, given the upward trend during previous drought seasons. Although eldana infestation levels are low in the Midlands when compared to other regions, the levels in 2015 and 2016 are more than double that of 2014 – a cause for concern.

It is recommended that control measures and eldana vigilance are maintained. In this regard, it must be noted that there were still some fields in which excessive eldana numbers were recovered, especially in the South Coast region.

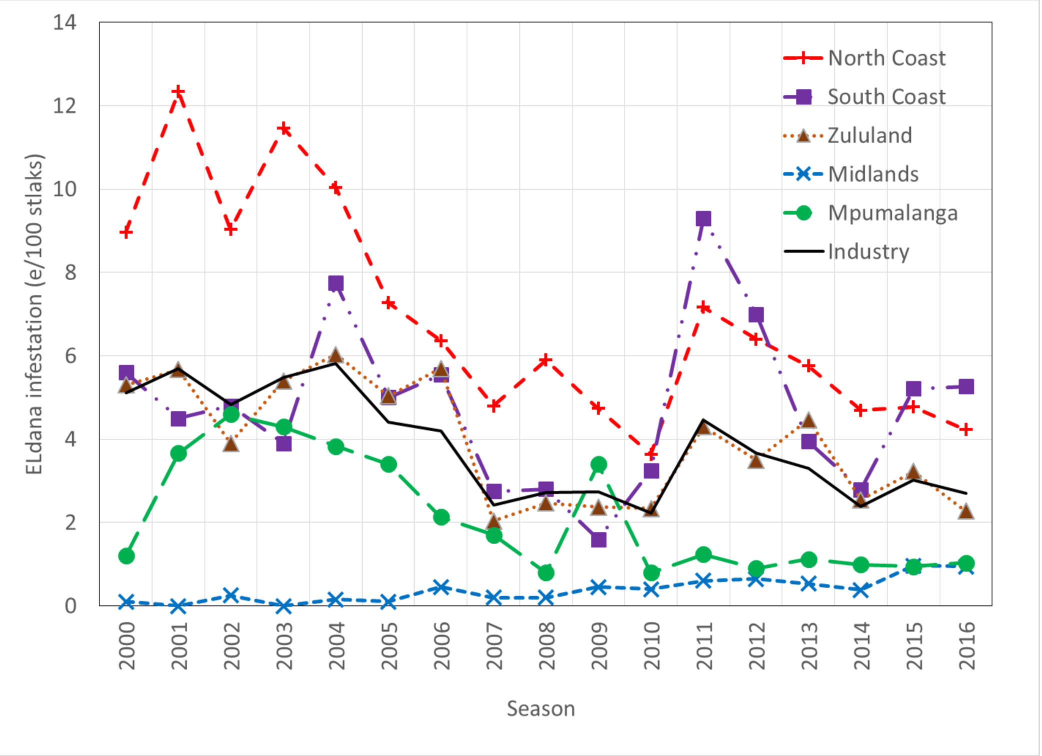

Figure 8. Seasonal average *Eldana saccharina* Walker (Lepidoptera: Pyralidae) infestation levels for different regions and for the industry as a whole for the past 16 seasons.

Sugarcane thrips

Mid-summer thrips infestation levels show a steady decline from 2012/13 and levels were very low in 2015/16 (Figure 9). It is believed that this decline could be partially attributed to increasing control measures that have been implemented.

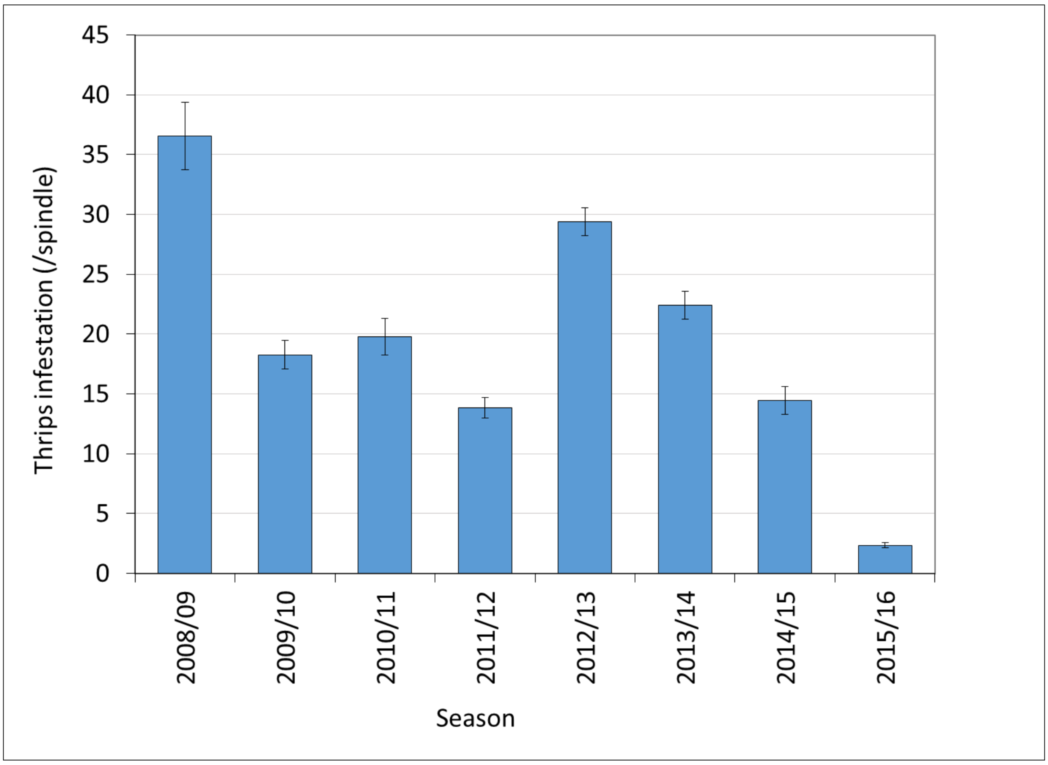

Figure 9. Mean mid-summer sugarcane thrips infestation levels in the Umfolozi MSA over the past eight seasons. Error bar indicate the standard deviation of the mean.

Longhorn beetle

The presence of an indigenous longhorn beetle species, *Cacosceles newmani* Thomson (Coleoptera: Cerambycida), was detected unexpectedly in some sugarcane fields in the Entumeni area during a routine eldana survey (Way *et al*., 2017). The larvae enter the stalks from underground and bore upwards, leaving feeding tunnels in the stool and the stalk, which are filled with frass and excavated debris. In one field up to 50% of the sugarcane stools were infested by the pest and major yield reductions have already been recorded. The pest poses a major threat to sugarcane production in the area and is regarded as a serious biosecurity threat to the entire sugar industry, should it spread to other areas. The industry responded swiftly by placing the affected farms under quarantine, investigating ways to suppress (or eradicate) pest populations in infested fields, and initiating research to understand the biology of the pest and develop effective measures to control it.

Diseases

Smut

There was a slight increase in smut incidence (per cent stools infected) in the South African sugar industry in the 2016 season compared to the previous two seasons (Figure 10). The hot, dry conditions experienced during the previous season would have favoured the spread and increase of the disease. Incidence remained high in the northern irrigated region and the disease was widespread, with more than 35% fields infected in all three MSAs (data not shown). With the current variety disposition in this region, where more than 70% of the area is planted to intermediate or intermediate-susceptible varieties, routine roguing and the eradication of fields exceeding accepted thresholds are essential in managing smut levels. In order to improve the disease situation in these MSAs, only smut resistant varieties are now being considered for release. This has, however, impacted on the availability of suitable varieties for the region since the release of N57 in 2013.

The marked increase in smut incidence in Gledhow was largely due to extremely high levels on one farm. Only 2% of the fields inspected in the MSA were infected and the incidence on other farms was low (data not shown), and would have had a limited impact on yield and posed little risk to neighbouring farms.

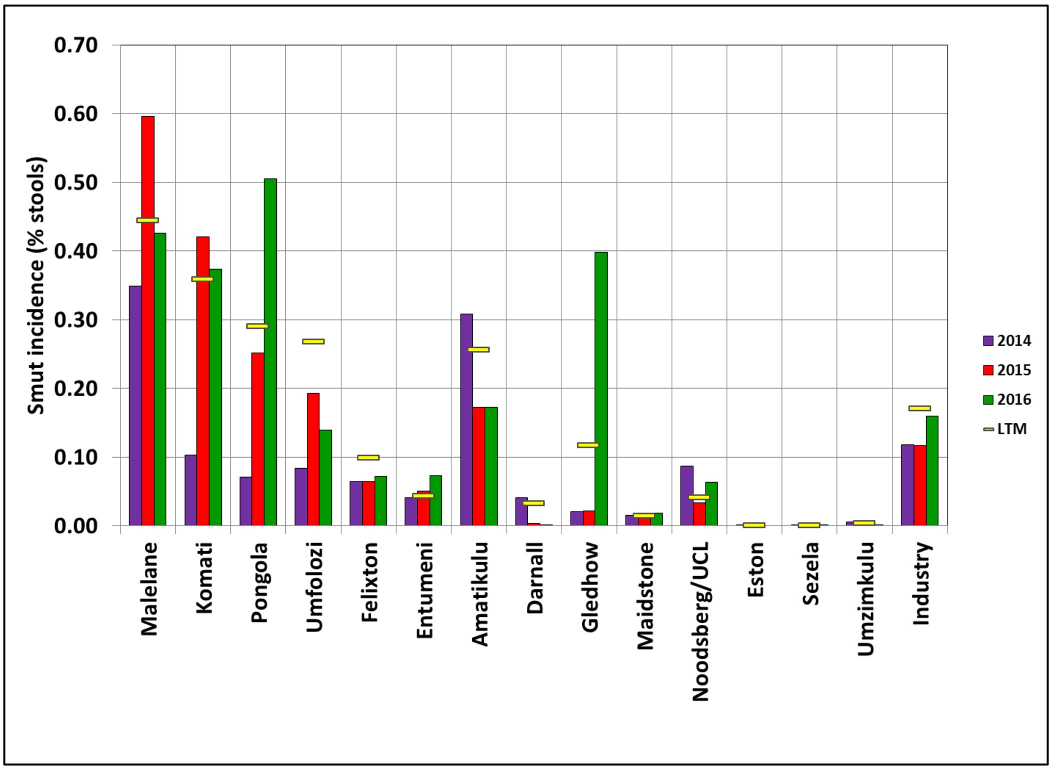

Figure 10. Smut incidence for the 2016 season compared to that of the 2014 and 2015 seasons and to the five-season mean (LTM), shown as yellow horizontal bars. Please note that surveys in the Amatikulu MSA were biased towards fields with susceptible varieties.

Mosaic

Mosaic incidence was below the five year mean in most areas in the 2016 season (Figure 11). An increase in mosaic incidence was only evident in Umzimkulu, where a number of fields of variety N12 were found to be severely infected on one farm. The disease was not widespread in the MSA, however, and would have had limited impact on overall cane yields, with only 5% of the fields inspected being infected, equalling the five season mean and with a mean incidence of 0.03% stools infected on other farms (data not shown).

Mosaic was observed in the newly released variety N57 in the Malelane and Komati MSAs in January 2016. All infected seedcane fields were condemned and N57 fields will be prioritized for inspection in the coming season.

The adoption of varieties with adequate resistance to mosaic in regions prone to this diseases is key to reducing its incidence.

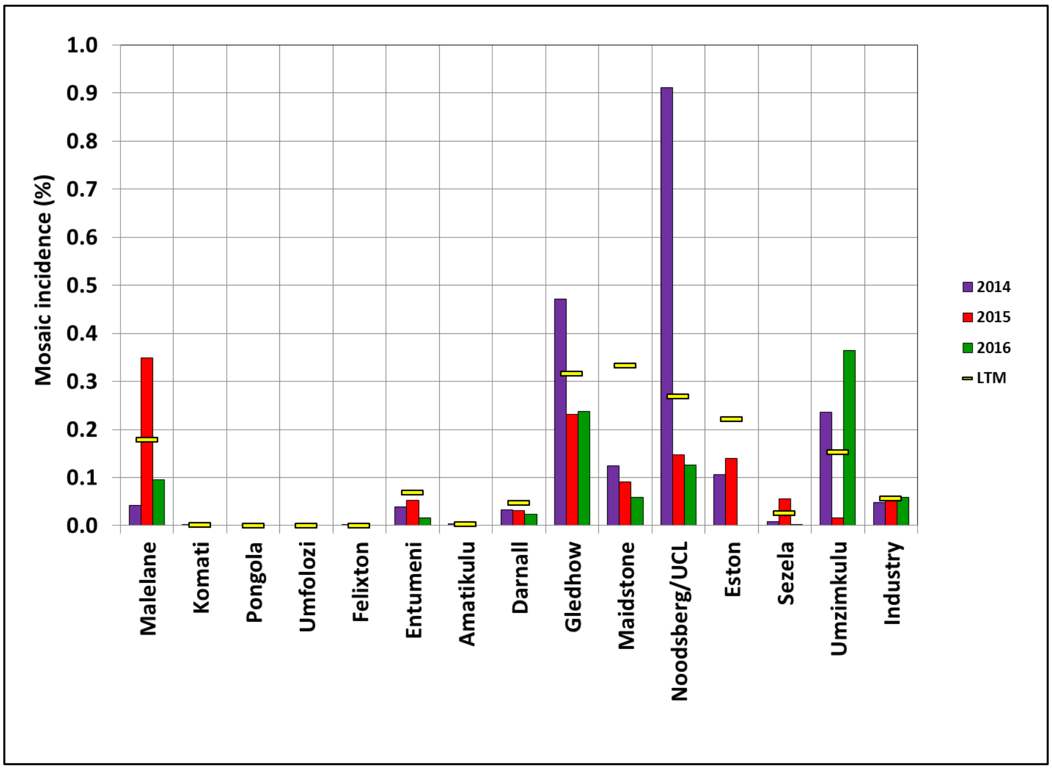

Figure 11. Mosaic incidence for different areas for the 2016 season compared to that of the 2015 and 2014 seasons and to the five-season mean (LTM), shown as yellow horizontal bars (Note: No surveys were conducted in commercial fields in Eston, where mosaic is usually common).

Rust

Brown and tawny rust infections tended to be less common and severe than previous seasons, due to the dry condition in 2015/16. Orange rust spores were detected on spore traps on the SASRI Mpumalanga Research Station at Komati in 2016 but symptoms have not as yet, been observed on cane. Producing varieties with adequate resistance to rust is the most effective and economical management option. This becomes more challenging with the presence of different rust species in the industry as resistance to one rust species does not confer resistance to the others. Three fungicides are registered for the management of rust, and are particularly effective in reducing infection levels and improving yield when applied to young cane where good canopy coverage can be achieved.

Ratoon stunt (RSD)

Of the 6 116 samples received from commercial fields for RSD testing in 2015/16, 413 (6.8%) tested positive for the disease (Figure 12). This was lower than the five season mean of 9.3%. No RSD was detected in 180 samples received from commercial fields in Felixton where a mandatory seedcane scheme has been in operation since 1986 (Mathew *et al*. 1990). There was however, a marked year-on-year increase in Umfolozi since 2012 and RSD levels in the Darnall, Gledhow, Sezela and Umzimkulu MSAs exceeded the five season mean. Increases in RSD can be expected after a drought when seedcane supplies are limited and planting material is more likely to be sourced from commercial fields. In addition, the recommendation to leave commercial fields totally free of sugarcane for a minimum of three months before replanting remains unpopular amongst many growers, increasing the risk of re-infection in newly planted fields.

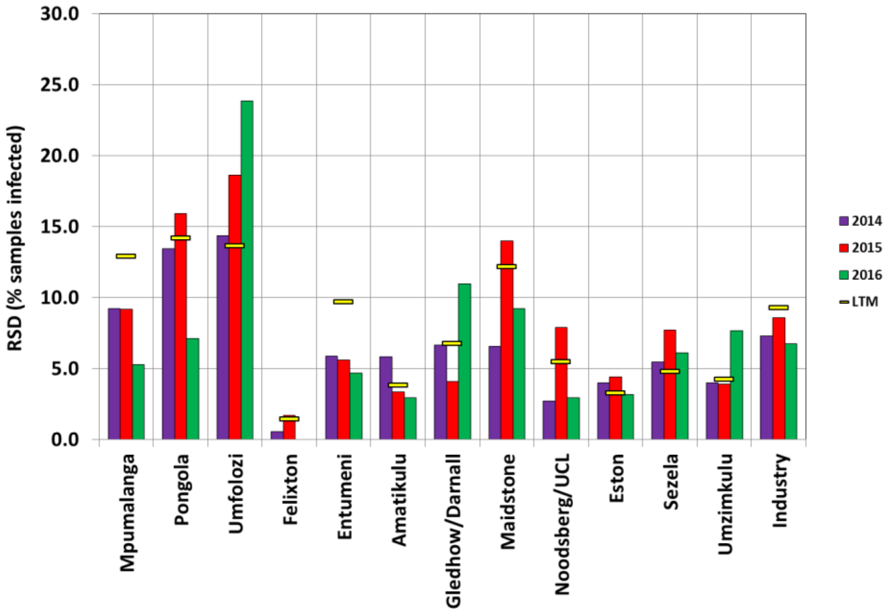

Figure 12. Ratoon stunt (RSD) incidence for different areas for the 2016 season compared to that of the 2015 and 2014 seasons and to the five-season mean (LTM), shown as yellow horizontal bars.

Cane yield and quality

Estimated MSA average cane yields declined sharply from 2015 in irrigated and mixed MSAs (Figure 13), due to a dramatic decline in irrigation water availability (Figure 8). Yields in most rainfed MSAs increased (by between 10 and 25%) from 2015, due to improved rainfall and better water status during the growing period (Figure 6 and 7). Industry average yield, however, remained very low at 59 t/ha, similar to that of 2015.

Cane quality, as quantified by estimated recoverable crystal (ERC) content of cane (fresh mass basis), declined further from 2014 and 2015 for all rainfed MSAs (Figure 14). Cane quality was extremely poor in Zululand and North Coast MSAs. For many of these MSAs, the average ERC content was the lowest since the inception of the RV cane payment scheme in 2000 (Umfolozi, Felixton, Amatikulu, Darnall and Gledhow and Eston). The poor cane quality could be attributed firstly to the impact of the prolonged drought, combined with good rainfall in March just before mills opened. This led to a sharp drop in sucrose content and an increase in fibre content of cane delivered to the mill early in the season. Secondly, significant winter (May and July) and frequent spring rainfall (Figure 6) depressed sucrose contents of cane delivered to the mill for the second half of the season and also interfered with harvesting operations. Cane deteriorated in numerous cases where the delivery of harvested cane to the mill was delayed. North Coast and Zululand mills in particular were badly affected, showing large declines in the number of harvestable days in 2016 (Figure 15) compared to the previous two seasons.

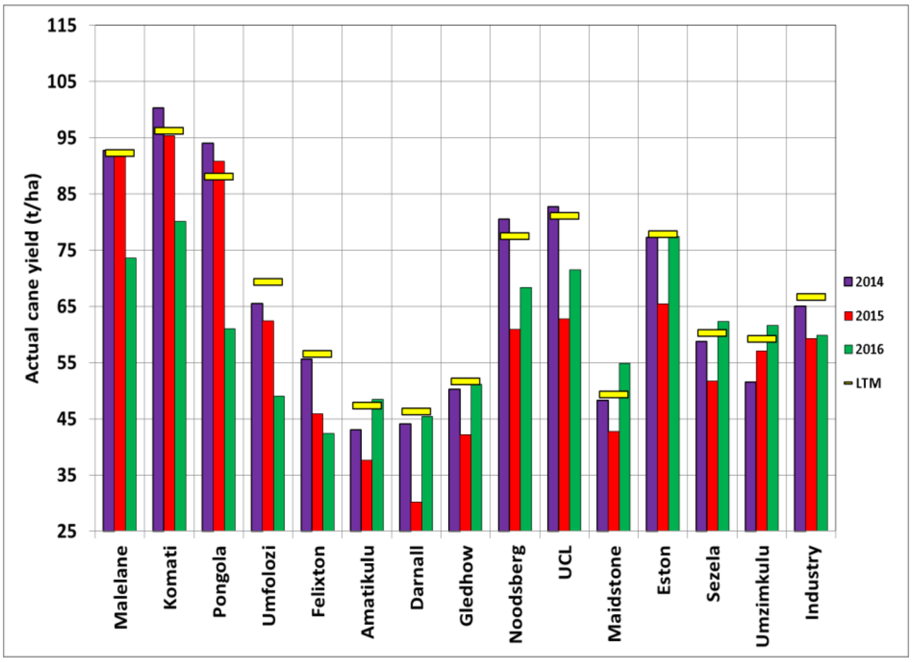

Figure 13. Average cane yields in the 2016 season for different mill supply areas and the industry compared to the 2014 and 2015 seasons and the five-season mean yield (LTM), shown as yellow horizontal bars.

Cane quality was good in the northern irrigated MSAs with ERC contents exceeding, or close to, the five season mean (Figure 14) due to dry weather and-under irrigation. This could not prevent the industry average ERC content dropping to 10.6%, the lowest level since 2000.

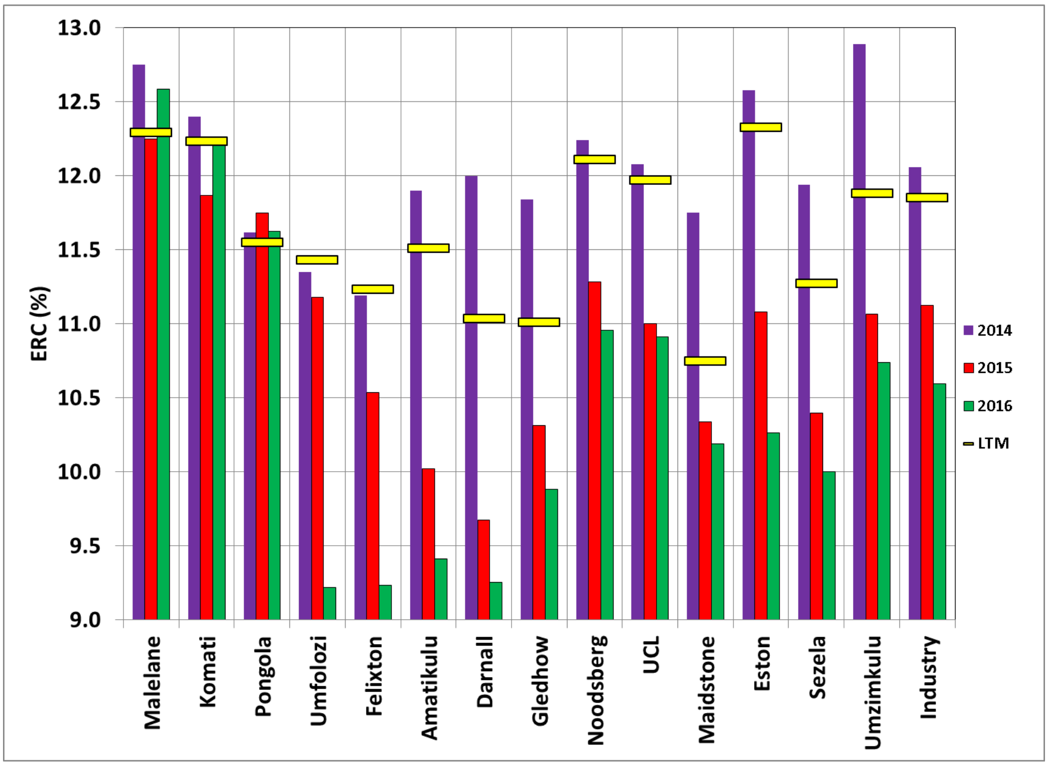

Figure 14. Estimated recoverable crystal content of cane (ERC%) on a fresh mass basis for different mill supply areas and for the whole industry for the 2016 season, compared to the 2014 and 2015 seasons and the five-season mean (LTM), shown as yellow horizontal bars).

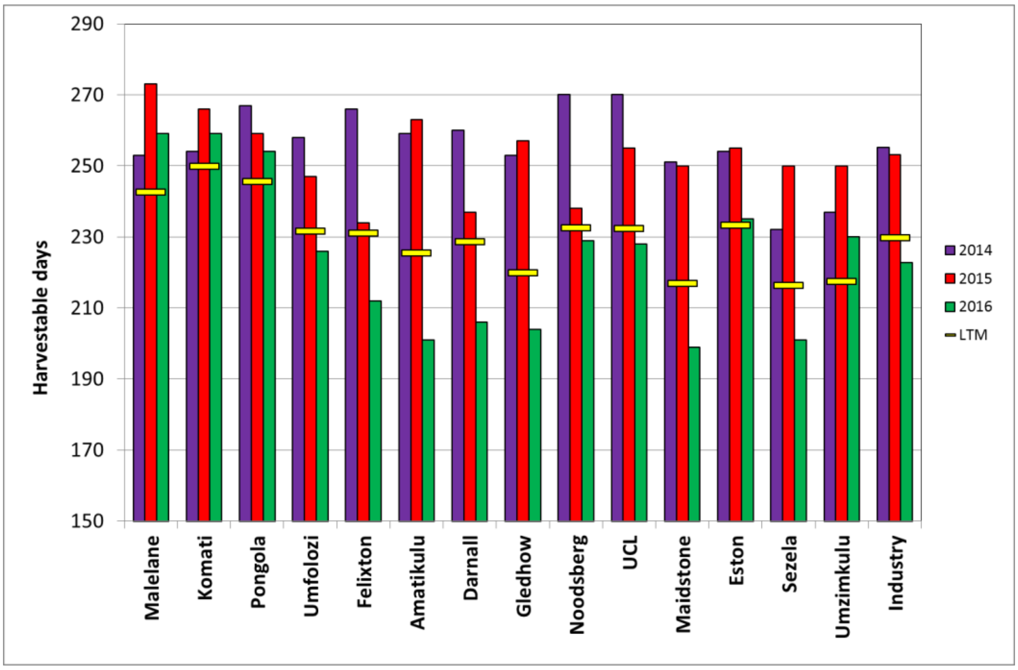

Figure 15. Number of harvestable days from April to December for the 2014, 2015 and 2016 seasons, for the different mill supply areas and for the whole industry. The five-season mean (LTM) is shown as yellow horizontal bars.

Further investigation into the causes of poor quality rainfed cane revealed the extent to which potential value is lost from harvesting to crushing cane at the mill. For example, many commercial fields in the North Coast region had high RV contents in the standing crop, as estimated with the Pur*Est*™ application (Mfeka *et al*., 2015) from brix determinations in standing cane stalks, older than 11 months and free from Eldana damage (Figure 16, data provided by R van Heerden, SASRI). This was not reflected in cane delivered at the mills, where very low RV levels were recorded, especially at the beginning and towards the end of the season (Figure 16).

This implied loss of value from the cane supply chain is alarming and needs further attention. The likely culprits are Eldana damage in the early season and cane deterioration due to excessively long harvest to crush periods at the end of the season. For example, SASA CTS data show that only 27% of the cane delivered to the Maidstone mill from October to December was delivered within 48 hours after harvest, compared to 39% for the period from April to September (data provided by A Harris, Tongaat Hulett Ltd.).

Industry and farm economics

South African sugar production declined further in 2016 and was consumed almost entirely locally, with almost no sugar available for export (Table 1). This, combined with a more favourable world price led to a 24% increase in the price of sugarcane RV (Recoverable Value is a measure of sugarcane productivity for which growers get paid in South Africa (see Groom, 1999).

The strengthening R/$ exchange rate and the recent increase in local market pricing has eroded protection of the domestic market and has seriously exposed the market to imported sugar, which rose to 283 000 tons in 2016 (Table 1).

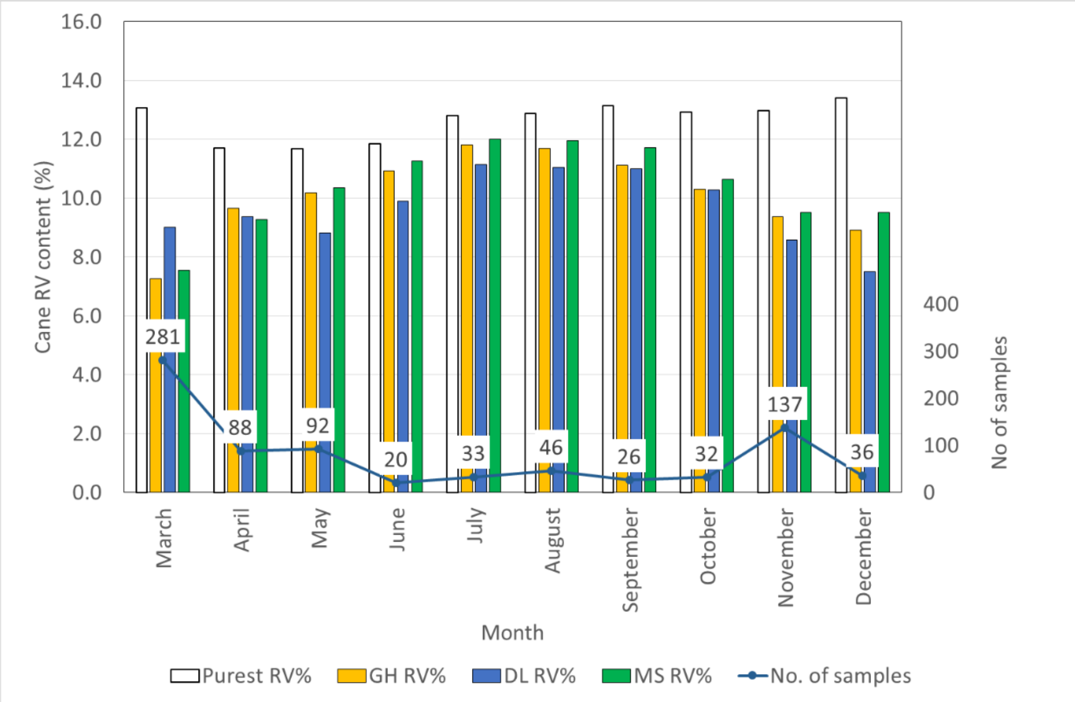

Figure 16. Relative value (RV) content of cane as estimated with Pur*Est*™ from brix readings of live cane stalks older than 11 months and free of Eldana, growing in the North Coast region (data source: R van Heerden, SASRI), compared to RV content of cane delivered to the three North Coast mills (GH - Gledhow, DL - Darnall, MS - Maidstone) for different months of the 2016 season. The number of brix samples that were averaged is also shown.

Table 1. Key economic indicators for the South African sugar industry (SACGA, 2016a).

Season	2015	2016
Gross sugar production (tons)	1 627 395	1 553 229
Local market demand (tons)	1 573 504	1 534 741
Sugar imports (tons)	51 562	283 582
Sugar exports (tons)	46 826	4 998
#11 World price (wt avg USc/lb)	14.14	19.54
R/US$ exchange rate (wt avg)	15.01	13.10
World price (wt avg R/ton)	4 061	5 612
RV price (R/ton)	3979.22	4931.91

Table 2 summarizes recent trends in profitability for typical large-scale sugarcane enterprises. Although 2016 rainfed yields increased from the previous two seasons, these remained below the LTM in most cases (Figure 5). This, together with very poor cane quality, prevented growers from fully capitalizing on the high RV price. Hence, gross income per ton of cane increased by only 11% (Table 2).

Operating costs for rainfed enterprises in 2016 were only slightly higher (less than 2%) than in 2015, with expenditure remaining relatively stable for most cost items. This contributed to a recovery in net farm income in 2016 from the very low levels of 2015. However, the relatively low yields caused low returns that are unsustainable over the long term if manager salaries, depreciation, interest, leases and tax are considered.

Although cane yields in irrigated areas were much lower in 2016 due to severe water restrictions, cane quality was good, which resulted in a 27% increase in gross income per ton of cane (Table 2). However, low cane yields caused unit production costs to increase by 31% in 2016. As a result, net farm income per ton of cane, although slightly (6%) higher in 2016 compared to 2015, remained relatively low. This, combined with low production levels, made irrigated production not economically viable in 2016, and is threatening the long-term sustainability of irrigated sugarcane production.

Table 2. Gross income, operating costs and net farm income (defined as the difference between gross income and total operational cost, and excluding managerial costs, interest, rent and leases, depreciation, and tax) per ton of cane harvested (derived from SACGA, 2016b).

Season	Rainfed			Irrigated		
	2014	**2015**	**2016**	**2014**	**2015**	**2016**
Gross Income (R/ton)	469.80	475.91	530.37	467.20	507.75	642.75
Expenses (R/ton)						
Farm Staff	112.80	140.74	141.24	60.27	73.88	98.86
Chemicals	21.71	27.54	27.37	20.74	25.82	35.76
Fertiliser	58.14	66.68	66.97	50.04	56.49	75.41
Fuels and Lubricants	35.90	42.72	43.25	24.55	28.83	37.34
Mechanical Maintenance	31.35	40.41	41.17	19.30	25.16	33.97
Fixture Maintenance	7.61	9.01	9.11	8.34	9.74	12.69
Services	13.23	18.59	20.11	8.53	11.67	16.93
Administration	21.08	25.92	26.43	25.42	29.11	35.03
Insurance	7.40	9.44	9.47	4.01	4.99	6.42
Licenses	0.83	1.08	1.08	0.30	0.38	0.51
Irrigation Costs	0.51	0.71	0.78	58.46	79.83	115.54
Sundry	33.75	38.79	40.40	39.84	44.53	49.73
Cane Transport	33.57	33.48	35.49	31.63	31.55	33.76
Total Operating Costs	**377.88**	**455.09**	**462.88**	**351.43**	**421.98**	**551.96**
Net Farm Income (R/ton)	**91.92**	**20.83**	**67.49**	**115.77**	**85.77**	**90.80**

Conclusion

The season saw some recovery in rainfed areas from the effects of the prolonged drought, with yields increasing markedly from those of 2015. Cane quality was, however, extremely poor due to lasting effects of the drought and challenging harvesting conditions brought about by winter and spring rain. Brix readings from standing cane in the North Coast region suggest that substantial value can be gained by further reducing the long harvest to crush periods sometimes observed in this region. Yields in irrigated areas were severely depressed by restricted water supplies, but cane quality remained very good.

Eldana infestation levels and damage were lower than expected in coastal areas, presumably due to increased adoption of control measures to manage the pest. Thrips infestations also seemed to have been suppressed by better control measures. It is recommended that vigilance in monitoring and control be maintained to keep pest damage in check. A new pest, an indigenous long horn beetle species, was discovered in the Entumeni area and poses a serious threat to the industry. It will require immediate and extensive efforts to limit its spread and damage to crops.

Smut levels remained high in the northern irrigated areas. Roguing remains an important method of control, with increased levels expected in the coming season due to climatic conditions. Although mean RSD levels in the industry were below the long-term mean, levels were high in some areas and are likely to increase further due to limited seedcane supplies. Routine field monitoring remains essential to identify fields that require appropriate interventions for effective disease management. The release and adoption of varieties with adequate disease resistance remains an integral part of disease management in the industry.

Growers could not fully exploit the relatively high RV price due to very poor cane quality in rainfed areas and very low yields in irrigated areas. The long term sustainability of sugarcane enterprises therefore remain under threat.

The outlook for the 2017 season is positive after good summer rainfall in 2016/17 and partial restoration of irrigation water supplies. Yields in rainfed areas are expected to increase further, while yields in the northern irrigated areas are also expected to increase from the low 2016 base. Growers in both rainfed and irrigated areas will need to implement post drought recovery plans, such as replanting affected fields, to ensure they can recuperate losses incurred over the past two seasons as quickly as possible. Farm consolidation is occurring in especially the rainfed areas to achieve economies of scale as well as diversification which mitigates farm cash flow risks.

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