REFEREED PAPER

EIGHTY-SEVENTH ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA (2011-2012)

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Abstract

Performance, throughput and other relevant aspects of the sugar industries in southern Africa for the 2011/12 milling season are presented and discussed. Data from sugar mills in South Africa, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe are included. In South Africa, Umzimkulu mill was closed for the entire 2011/12 crushing season, with the cane being diverted to Sezela mill. The 2011/12 season in South Africa was better than the poor 2010/11 season in terms of tons of cane harvested after the worst drought for a number of years. Cane quality was down from the previous season, with the exception of mixed juice purity, which was similar. Time efficiencies were again down despite slight improvements in Scheduled and Other Stops, with No-cane Stops increasing markedly despite the larger crop. Extraction was lower than in 2010/11, but this was mainly due to cane quality as the Corrected Reduced Extraction increased slightly from the previous season. Higher losses to bagasse, filter cake and molasses, as well as an increased Undetermined Loss resulted in a lower Boiling House Recovery (BHR) and Overall Recovery (OR).

Regarding the SMRI Affiliate member mills in neighbouring countries, most factories saw an increase in BHR and OR in the 2011/12 season, and most had improved time efficiencies.

Keywords: sugarcane, sugar factories, cane quality, crop size, performance, recovery

Introduction

This paper reviews the 2011/12 milling season in southern Africa, and includes data from mills in South Africa, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe, that are Full (South African) or Affiliate (non-South African) Members of the Sugar Milling Research Institute NPC (SMRI)[1]. Note that in this review all Swaziland data refers to Ubombo mill only and Mozambique data is for Maragra mill only[2]. Detailed information on factory performance in 2011/12 and recent seasons, details of cane varieties crushed and a summary of cane transport used in South Africa are presented in Tables A to H in the Appendix.

[1]South African sugar factories: AK = Amatikulu, DL = Darnall, ES = Eston, FX = Felixton, GH = Gledhow, KM = Komati, ML = Malelane, MS = Maidstone, NB = Noodsberg, PG = Pongola, SZ = Sezela, UC = UCL, UF = Umfolozi, UK = Umzimkulu
Malawi sugar factories: DW = Dwangwa, NH = Nchalo
Mozambique sugar factory: MA = Maragra
Swaziland sugar factory: UB = Ubombo
Tanzania sugar factories: MW = Msolwa (Kilombero), RU = Ruembe (Kilombero)
Zambia sugar factory: NK = Nakambala
Zimbabwe sugar factories: HV = Hippo Valley, TR = Triangle

[2]Note that, although Xinavane (XN) and Mafambisse (MB) in Mozambique are Affiliate Members of the SMRI, data for the 2011/12 season were not available at the time of compilation of this review.

Operations

The 2011/12 season in South Africa saw only 13 of the 14 mills operating due to the drought in the preceding year and subsequent low crop estimate on the KwaZulu-Natal south coast. UK crushed no cane during the season, and this had a ripple effect on the industry performance for the season. Although it is difficult to quantify this effect, it is worth noting that UK is one of the better performing of the 14 factories in the South African industry. Table 1 indicates the position UK filled in a number of performance parameters during the 2010/11 season.

Table 1. Position of Umzimkulu mill in the South African sugar industry: 2010/11 season.

Parameter	Position
Recoverable value % cane	3
Mixed juice sucrose purity	4
Overall time efficiency	7
Lost time % available	3
No-cane stops	11
Extraction	1
Boiling house recovery	3
Sucrose loss to molasses	6
Undetermined loss	3
Value recovery	2
Cane to sugar ratio	2

It is clear that UK was among the top four factories in the 2010/11 season, and was better than the industry average for the majority of parameters. It was therefore expected that the industry average performance would decrease due to the closure of the mill. The effect on industry average cane quality was minimal, as the available cane was diverted to other mills. This diversion, however, affected cane quality at the mills that received diverted cane.

Another value that would be affected is the rainfall for the season, as this is calculated as the total rainfall during each operating mill's crushing season.

Cane crop

Cane varieties

The varietal distribution at southern African mills for the 2011/12 season is shown in Appendix Table F. There were only small varietal changes in South Africa since the 2010/11 season, with the main change being the percentage of N12 at SZ due to that mill picking up cane diverted from UK. In the Affiliated mills the 2011/12 season saw less N19 at the mills, while the percentage of NCo376 increased markedly at the two mills in Tanzania. The latter was, however, at the expense of 'mixed deliveries' and indicates better identification of cane rather than a changing distribution. There are still fairly high percentages of unknown and mixed varieties delivered, so the trends should be viewed with some caution.

Burning

The overall percentage of cane burnt in South Africa remained relatively unchanged from the previous season, at 91.2% against 91.3% in 2010/11 (Appendix Table F). The SZ region had seen a steady decline in burning over the past few seasons, mainly due to residential developments in the area. This was reversed during the season under review due to the cane being diverted from UK, which had a 94.1% burn in the 2010/11 season.

Rainfall

The industry experienced unseasonal heavy rainfall in July 2011 and heavy falls again in November 2011 (Figure 1). October rainfall was lower than in previous seasons, although the annual rainfall was similar to the 2009/10 season (7970 mm in 2009/10 and 7910 mm in 2011/12). The total rainfall recorded at mills during the crushing season ranged from 219 mm at ML to 964 mm at SZ (Appendix Table F). Six mills recorded higher than 700 mm rainfall in 2011/12. It bears remembering that UK was not included in the rainfall statistics for the season under review as the mill did not operate during the year.

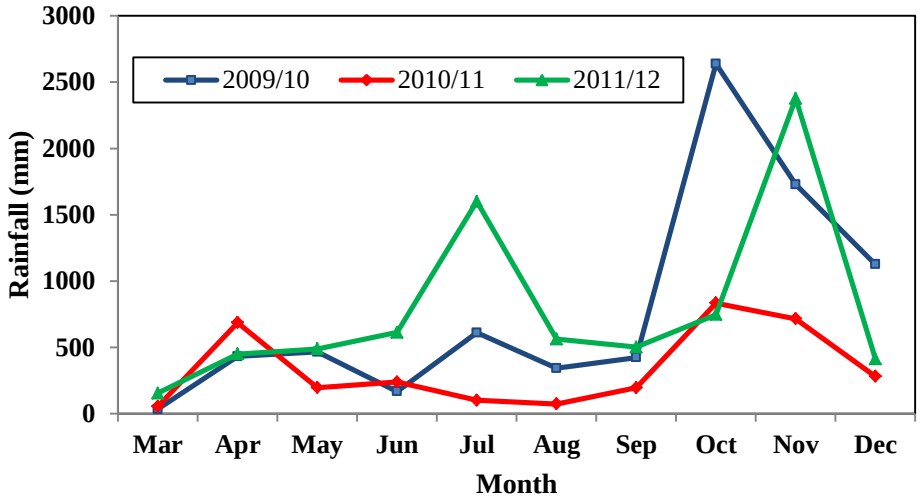

Figure 1. Monthly total rainfall at crushing South African mills for the 2009/10 to 2011/12 seasons (values are the monthly rainfalls summed over all mills crushing during the month).

Cane quality

The trends in the cane quality indicators of Recoverable Value (RV) % cane and Estimated Recoverable Crystal (ERC) % cane over the past ten seasons in South Africa are shown in Figure 2. Both parameters showed a marked decrease over the past year, to the lowest values since the introduction of RV in 2000/01. The levels recorded in 2011/12 are similar to those recorded in the 2006/07 season, which also followed a year of below average rainfall.

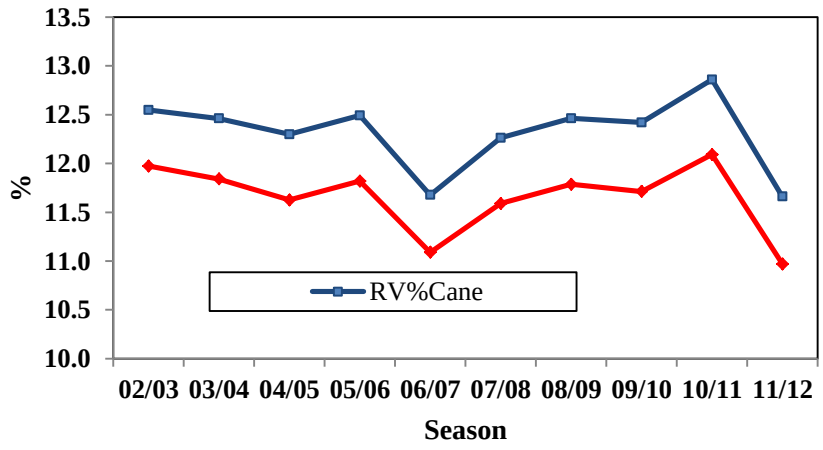

Figure 2. Recoverable Value (RV) % cane and Estimated Recoverable Crystal (ERC) % cane in South Africa for the past ten seasons.

Figure 3 shows the change in RV % cane at the mills for the past three seasons and clearly indicates the effect of climatic conditions on cane quality, as the irrigated areas (ML, KM, PG and UF) show little variation over the period. There was a difference between 2010/11 and 2011/12 of slightly over one unit on the North Coast of KZN (FX, AK, DL, MS and GH), while the difference was over two units at the Midlands (NB, UC and ES) and South Coast (SZ) mills.

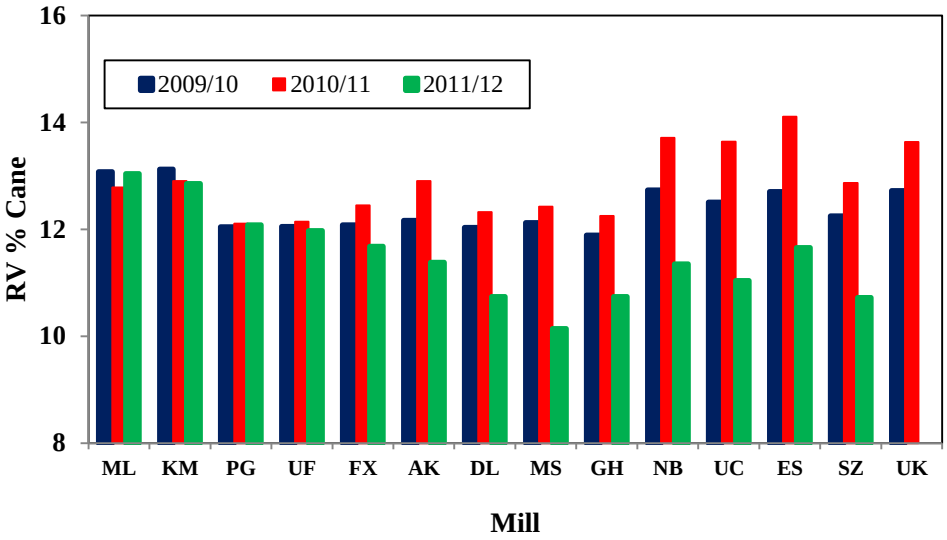

Figure 3. Recoverable Value (RV) % cane at South African mills from 2009/10 to 2011/12.

The monthly RV % cane for the past three seasons in South Africa (Figure 4) indicates that the cane quality during the 2011/12 season was generally far below the previous two seasons, with only the first month and last three months being somewhat similar to previous years.

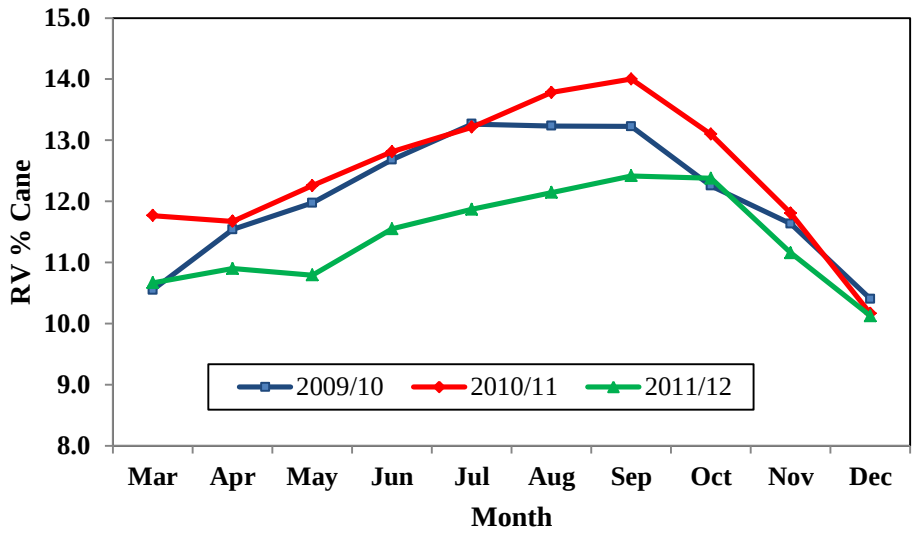

Figure 4. Monthly Recoverable Value (RV) % cane in South Africa for the 2009/10, 2010/11 and 2011/12 seasons.

Looking at the factors that affect RV % cane (Table 2), it is clear that sucrose had the major impact, while increased fibre played a lesser role. Non-sucrose in the cane decreased from the 2010/11 season.

Table 2. Parameters affecting Recoverable Value (RV) % cane: 2010/11 and 2011/12 seasons.

Parameter	2010/11	2011/12
Sucrose % cane	14.14	12.94
Fibre % cane	14.71	15.27
Non-sucrose % cane	2.55	2.34

Considering the whole region, cane quality in terms of ERC % cane (Figure 5) dropped fairly markedly from 2010/11 to 2011/12 in all countries under review. South Africa and Tanzania saw decreases of around one unit from the previous season.

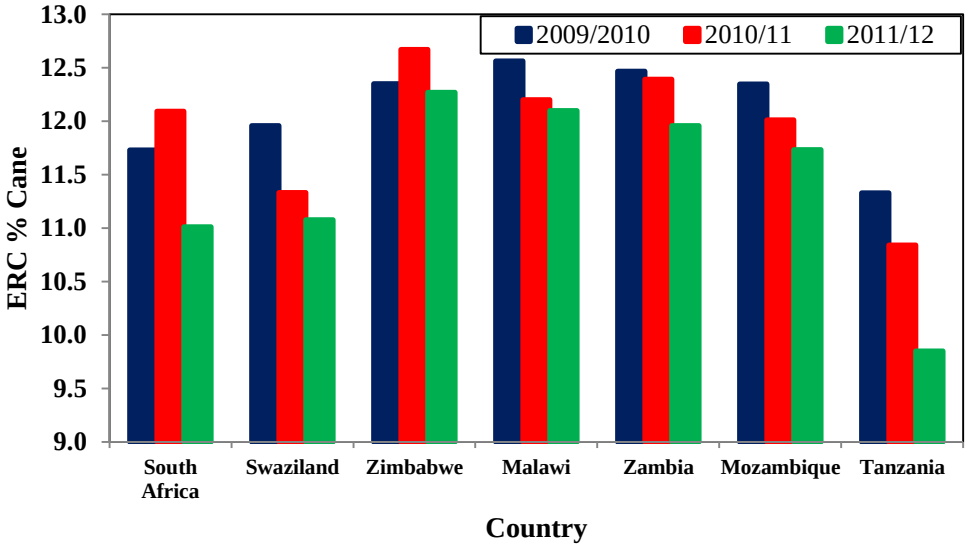

Figure 5. Estimated Recoverable Crystal (ERC) % cane in southern Africa from 2009/10 to 2011/12.

Looking at other parameters included in cane quality, it can be seen that the Ash % cane increased to 2.19% for the South African industry (Figure 6), well above the ten year average of 1.77%, and the highest since 1992/93, when ash was first recorded. It is also the first time that the Ash % cane has been recorded at over 2%. This followed a year when the Ash % cane was the second lowest since 1992/93 (1.49%), also the first year of recorded ash.

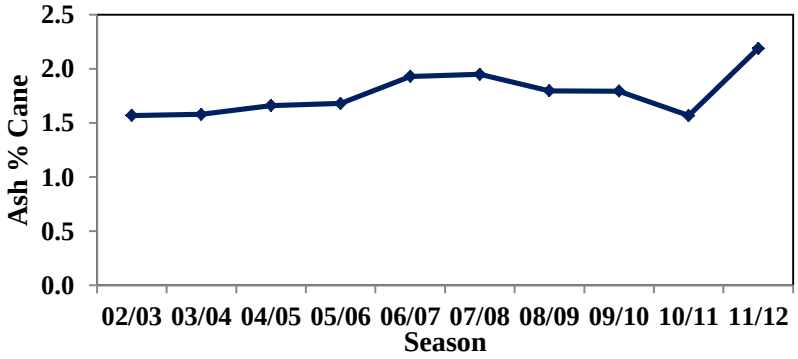

Figure 6. Ash % cane in South Africa for the past ten seasons.

The mixed juice sucrose purity was similar to the previous season at 85.91%, but was well below the ten year average of 86.11% (Figure 7).

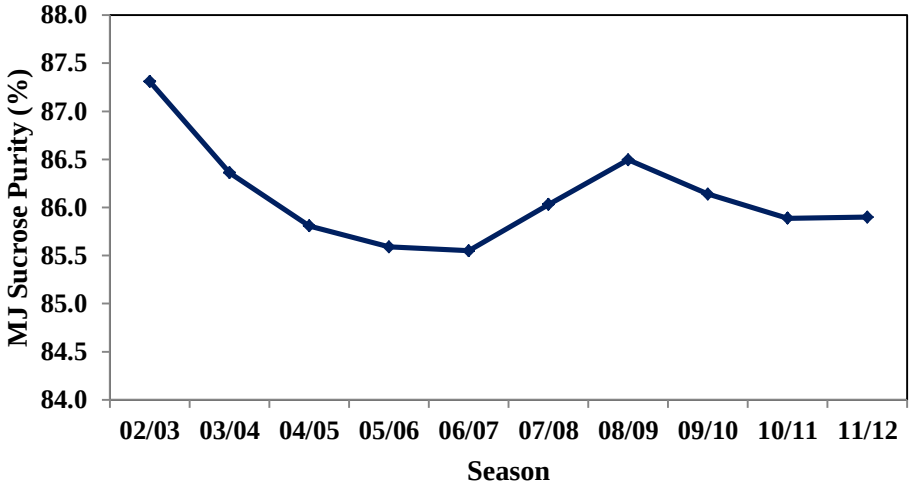

Figure 7. Mixed juice sucrose purity in South Africa for the past ten seasons.

Cane tonnage

Initial predictions in November 2010 for the 2011/12 season in South Africa by the South African Sugarcane Research Institute (SASRI) Canesim crop model forecast were for a 10% increase over the crop that was crushed in 2010/11. The estimate was based on above-normal summer rainfall and on reasonable irrigation water supplies. The estimate increased to 114% of the previous season potential in February 2011 following exceptional summer rains, but decreased to below 110% following low rainfall in February, and remained around 110% for the season. The final tonnage of cane crushed during 2011/12 was 16.80 million tons, which was 784 690 tons (4.9%) more than the previous season, but was still lower by 10% than the 2009/10 value (Figure 8). The tonnage is 7.08 million tons (27%) less than the high of 2002/03. The reasons for the changing sugarcane supply are dealt with in detail in the agricultural Annual Review by Singels *et al.* (2012).

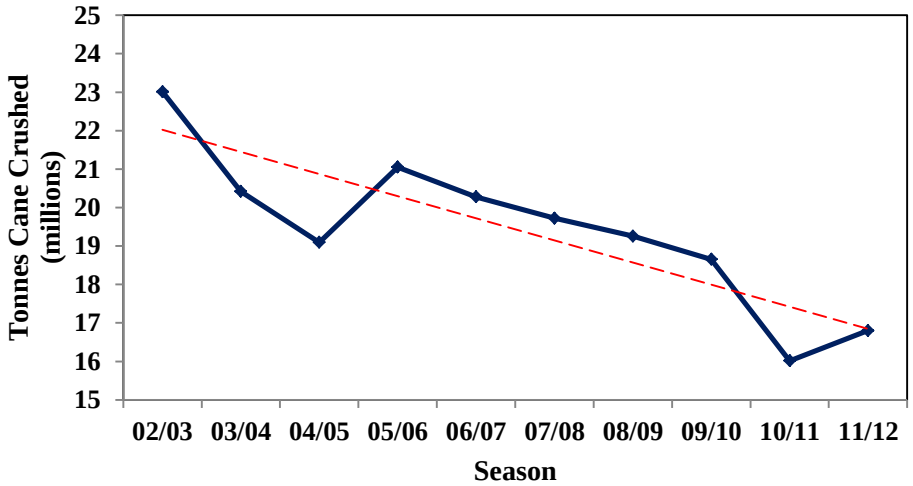

Figure 8. Tons cane crushed in South Africa for the past ten seasons (with linear trendline).

Factory performance

Length of milling season

The 2011/12 season in South Africa ran from 16 March 2011 (ES) until 21 December 2011 (UF). The average length of the season was 242 days, an increase of 15 days from the previous season. Despite the increase, this is still the second shortest season (after 2010/11) since 2004/05. PG had the longest season of 275 days, with SZ having the shortest of 203 days. After 2010/11, when seven mills had a season length of less than 200 days, it was encouraging to see all South African mills exceeding this value. The lengths of the milling seasons in other southern African countries ranged from 197 days at NK in Zambia to 278 days at RU in Tanzania.

Time efficiencies

The time efficiencies for South Africa for the past five seasons are shown in Figure 9. Overall Time Efficiency (OTE) dropped to below 75% for the first time since 2000 and, at 74.05%, was the lowest since 1991/92. The drop was mainly due to a marked increase of 3.76% in No-cane Stops, as well as a slight increase in Lost Time % Available (LTA) and Foreign Matter Stops. Hours for Force Majeure increased from 172 hours in 2010/11 to 569 hours in 2011/12, mainly as a result of industrial action in the Mpumalanga region.

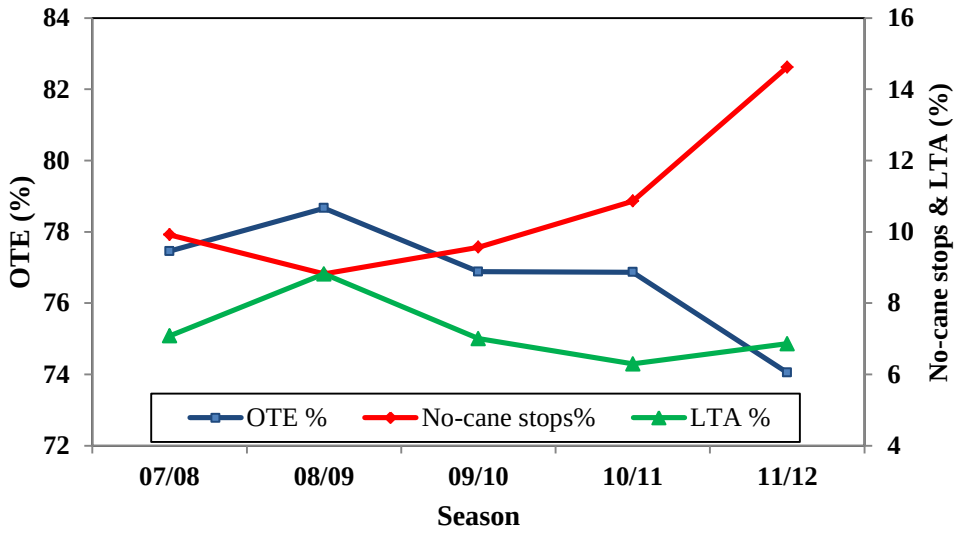

Figure 9. Overall Time Efficiency (OTE), Lost Time % Available (LTA) and No-cane stops in South Africa from 2007/08 to 2011/12.

Ten mills showed an increase in No-cane stops over the previous season (Figure 10). The greatest improvement was at KM, where the No-cane stops were less than half of the previous season's value. MS once again operated one tandem for a lengthy period and, despite an increase in the cane supply, the No-cane stops increased to 42.98%. The value for MS I extraction line in 2011/12 was 78.89%, with the line having an OTE of below 20% for the season. Monthly values of No-cane stops for the South African industry exceeded 10% for every month of the season except May.

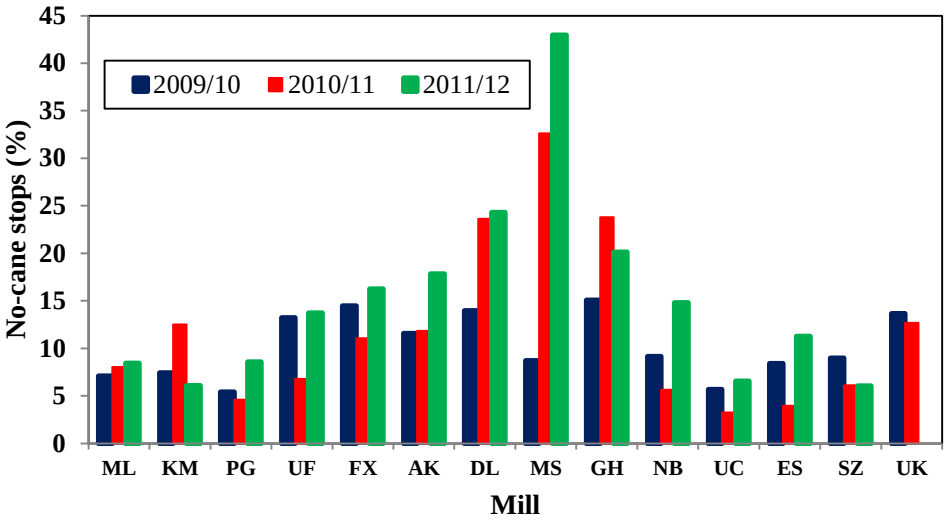

Figure 10. No-cane stops at South African mills from 2009/10 to 2011/12.

OTEs for the mills in Malawi, Swaziland, Mozambique, Zambia and Tanzania were again better than the South African industrial average. Zimbabwe suffered from high LTA at both mills and high No-cane stops at HV. Both mills had OTEs of 70%.

Extraction

Extraction in the South African industry (Figure 11) continued its declining trend from the record value of 98.03% in the 2005/06 season to a value of 97.14% in 2011/12, down from 97.28% in the previous season. Extraction was at its lowest value since the 1983/84 season when a value of 97.02% was recorded. Imbibition % fibre in bagasse was the lowest in the past ten years (331%), although a large contributor to this was the non-operation of UK where the value was 488% in 2010/11.

Figure 11 shows that the Corrected Reduced Extraction (CRE) value, which takes variations in cane quality into account, increased from 96.91 to 97.05% in 2011/12, indicating that the drop in extraction was largely due to cane quality. This is, however, the second lowest CRE value in the last ten years. Despite the drop in extraction, the pol % bagasse value decreased from 1.26% in 2010/11 to 1.17% in 2011/12.

It was noted by Smith *et al.* (2011) that, with the introduction of near-infrared polarimetry (NIRP) to the industry in 2010/11, an increase in recorded pol in bagasse of around 0.1% was recorded. If this is taken into account, the value recorded in 2011/12 would still be above the values recorded in the seasons from 2001/02 to 2007/08, where the values ranged between 0.90 and 0.97. However, as explained in the previous Annual Review (Smith *et al.*, 2011), it is not possible to compare values directly, due to the fact that the exact influence of adopting the NIRP analysis is not yet known.

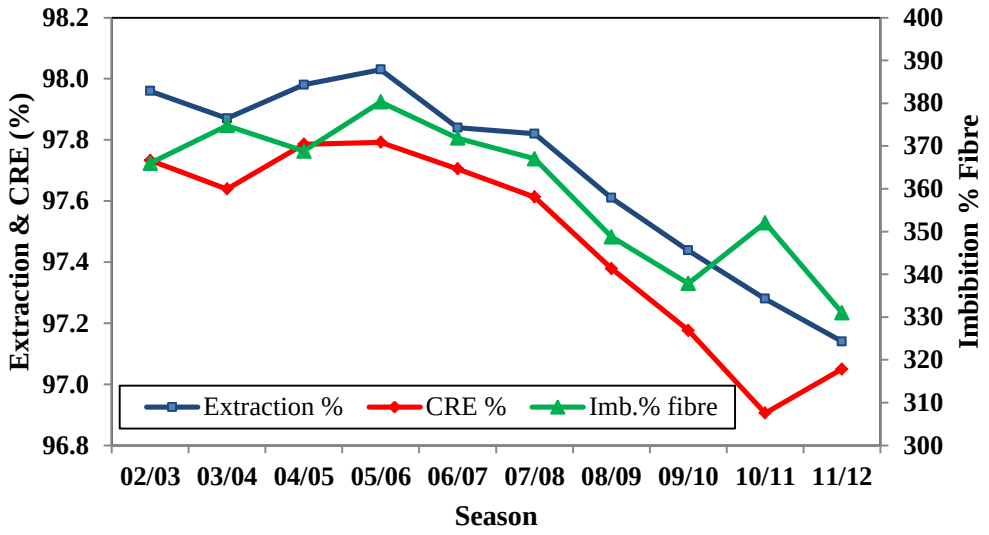

Figure 11. Extraction, Corrected Reduced Extraction (CRE) and Imbibition % Fibre in South Africa for the past ten seasons.

The extraction values for individual South African factories for the 2010/11 and 2011/12 seasons are shown in Figure 12. It can be seen that, despite the industry decline in extraction, four factories still managed to improve their extraction values from 2010/11 to 2011/12. These four factories were all in the Zululand region. While the other factories showed a decrease in extraction performance, only four showed a drop in CRE from the previous season.

In the 2011/12 season, five factories (AK, FX, KM, ML and MS) routed clarifier mud back to the diffusers throughout the entire season, while PG operated with partial recycling. This is the same as for the 2010/11 season, with the exception of UK which did not operate.

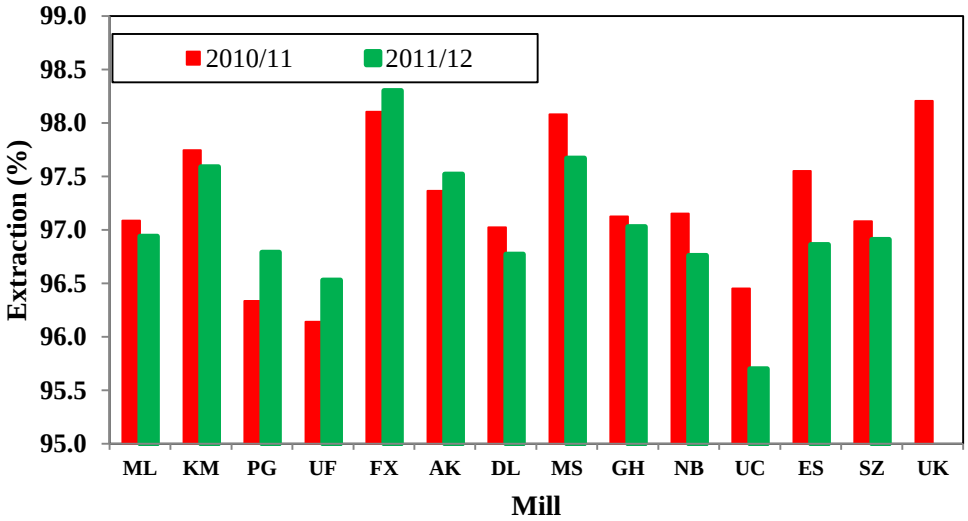

Figure 12. Extraction at South African mills for the 2010/11 and 2011/12 seasons.

Among the Affiliated mills in 2011/12, pol-based extraction increased at five factories from the 2010/11 season (Figure 13), with the increase at MW and HV being the most pleasing.

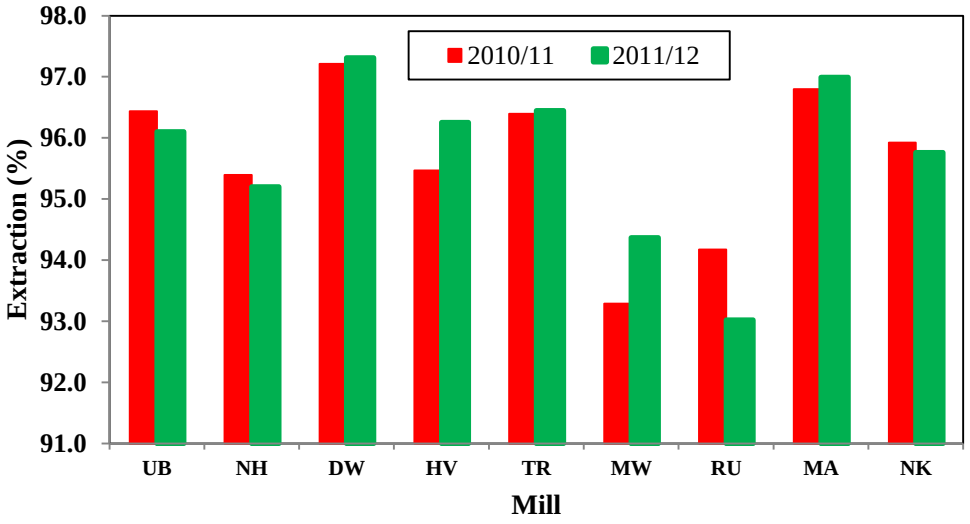

Figure 13. Pol-based extraction at southern African mills for the 2010/11 and 2011/12 seasons.

Boiling house performance

Boiling House Recovery (BHR) for the South African industry continues to decline and, at 86.64% in the 2011/12 season, it was the lowest that it has been for the past ten years (Figure 14). Concurrently, there has been a slight increase in the Corrected Reduced BHR (CRB) from the previous season, 85.63% in 2010/11 to 85.83% in 2011/12, which was largely as a result of the mixed juice based Target Purity Difference (TPD) decreasing from 7.2 to 6.6 units, as there was relatively no change in sucrose mixed juice purity from the previous season.

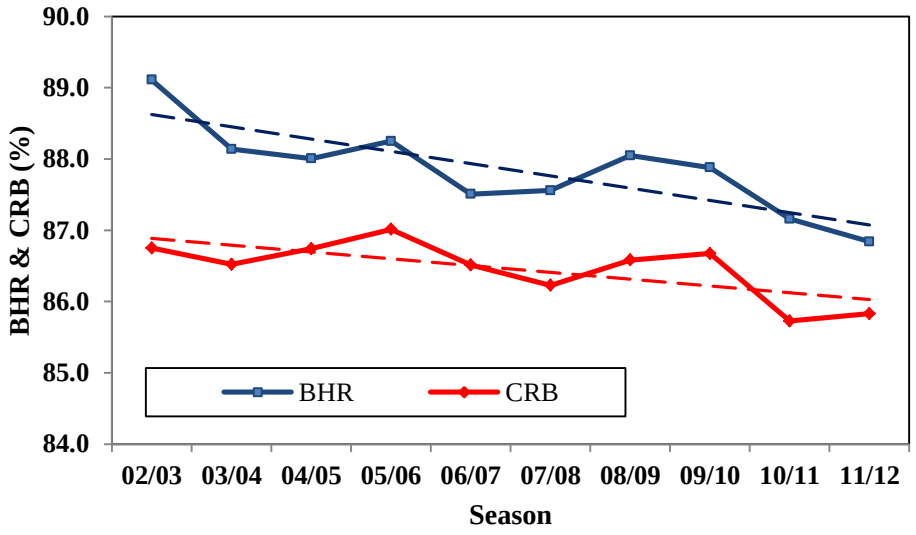

Figure 14. Boiling House Recovery (BHR) and Corrected Reduced BHR (CRB) in South Africa for the past ten seasons (with linear trendlines).

Despite the lower TPD, the overall loss of sucrose to molasses as a percentage of sucrose in cane (Figure 15) increased to 10.19%, the highest that is has been in the past ten years. The trend of Molasses Factors (the ratio of tons sucrose in final molasses to tons non-sucrose in

mixed juice) is shown in Figure 16, and reveals an alarming upward trend, to the highest value since it was first calculated for the 1986/87 season (then a value of 0.5714). It is surmised that the main reasons for the high values in the last two seasons may be the creation of non-sucrose in the factory as a result of inversion, and microbiological losses arising from start/stop operations and non-ideal operational control, as well as the potential impact of poor quality cane by means of gums, for example. In addition, the A-exhaustion dropped to 61.42% from 62.87% the previous season, meaning that there was more opportunity for inversion losses to take place and the low purity operations had to face higher loadings.

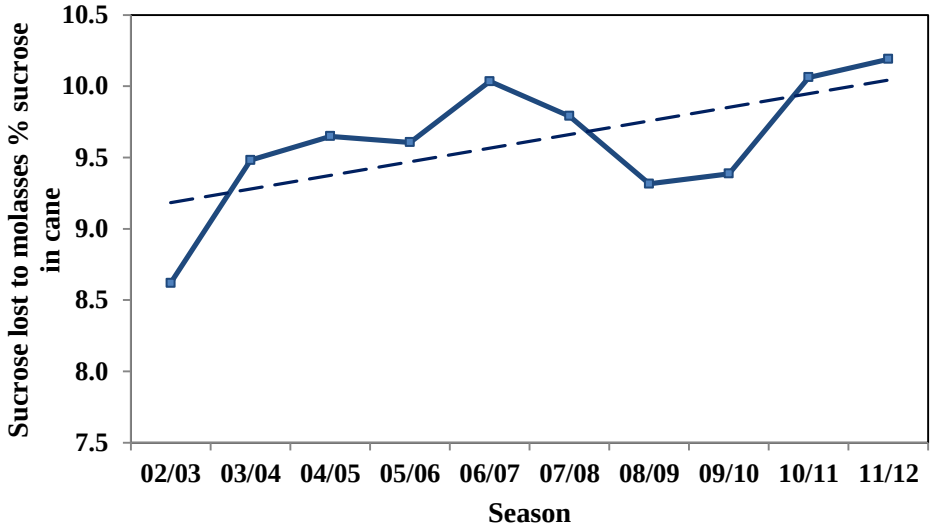

Figure 15. Sucrose loss to molasses in South Africa for the past ten seasons (with linear trendline).

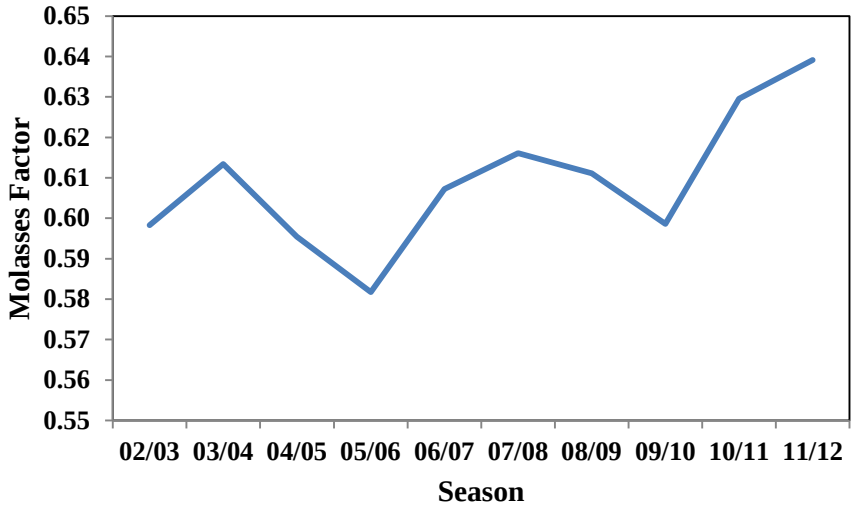

Figure 16. Molasses factor in South Africa for the past ten seasons.

Following the trend of losses in molasses, the Undetermined Loss % sucrose in cane (UDL) also rose to the highest value (2.35%) for the past decade (Figure 17). Figure 18, which compares UDLs at individual South African mills for the past two seasons, shows that, whilst the majority of the mills have made small improvements to their UDL, the losses are still much higher than desirable. Only the UC mill still obtains an UDL under 1%, despite an

increase from the 2010/2011 season. Figure 18 also shows that the UDLs at ML, GH and ES have increased substantially, whilst DL has managed to drop its UDL considerably, although not enough to reach the desirable level. The high UDL experienced in the South African industry can possibly be linked to the lower Overall Time Efficiency (OTE) %, particularly as a result of start/stop operations, often as a result of poor cane supply. Under-utilisation of plant capacity can also sometimes increase exposure to low pH, high temperatures and microbial activity which lead to increased UDL.

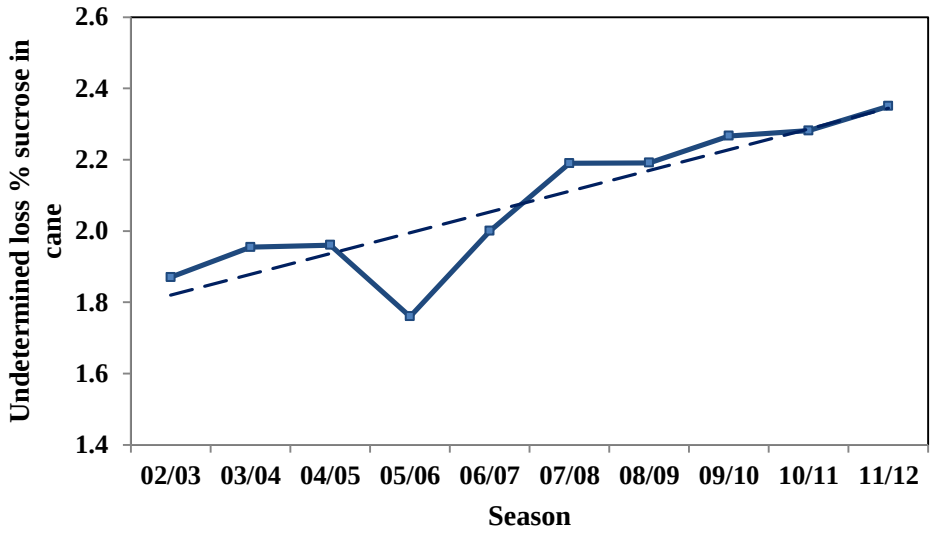

Figure 17. Undetermined Loss (UDL) % sucrose in cane in South Africa for the past ten seasons (with linear trendline).

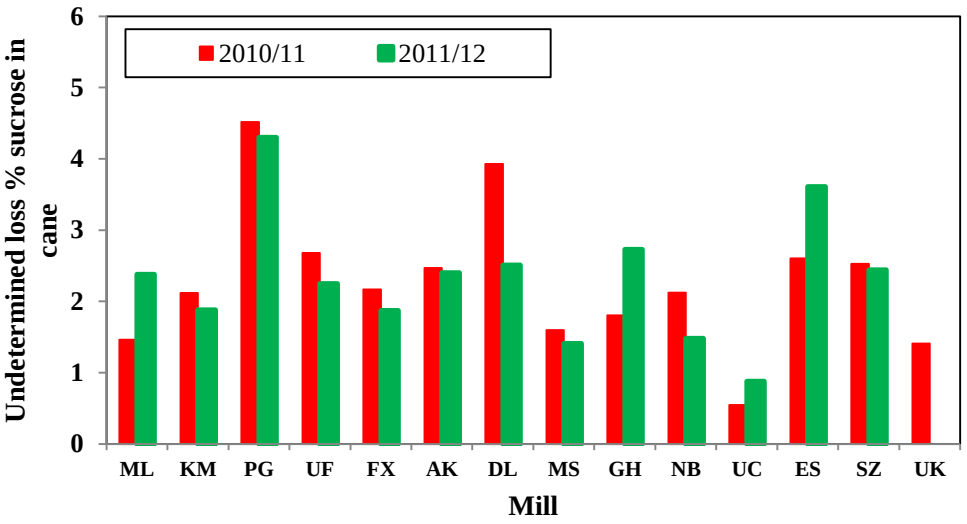

Figure 18. Undetermined Loss (UDL) % sucrose in cane at South African mills for the 2010/11 and 2011/12 seasons.

Among the Affiliate mills, only UB showed a substantial drop in pol-based BHR, whilst the NH, MA and NK mills showed substantial gains (Figure 19). The NK and DW mills posted

pol-based BHRs of 90.15 and 89.95%, respectively, both of which are higher than the pol-based BHRs of the top South African mill in terms of boiling house performance (89.71%).

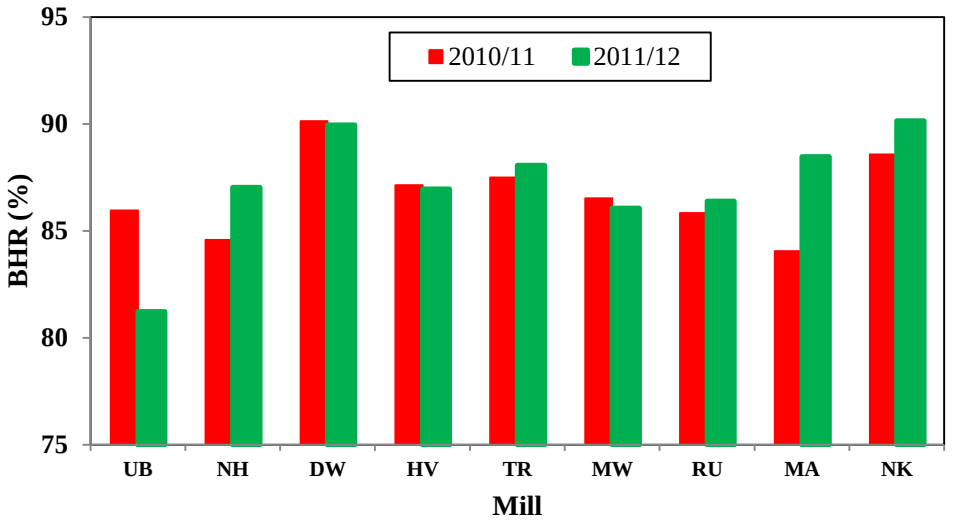

Figure 19. Pol-based Boiling House Recovery (BHR) at southern African mills for 2010/11 and 2011/12 seasons.

Overall recovery parameters

The Overall Recovery (OR) and Value Recovery (VR) of the South African industry for the past ten seasons are shown in Figure 20. As expected from the continuing decline in both extraction and BHR, the OR has also continued to decline. The VR is, however, relatively unchanged since 2010/11, and this is likely due to reduced 'expected' recoveries because of the three-year averaging of the RV factors.

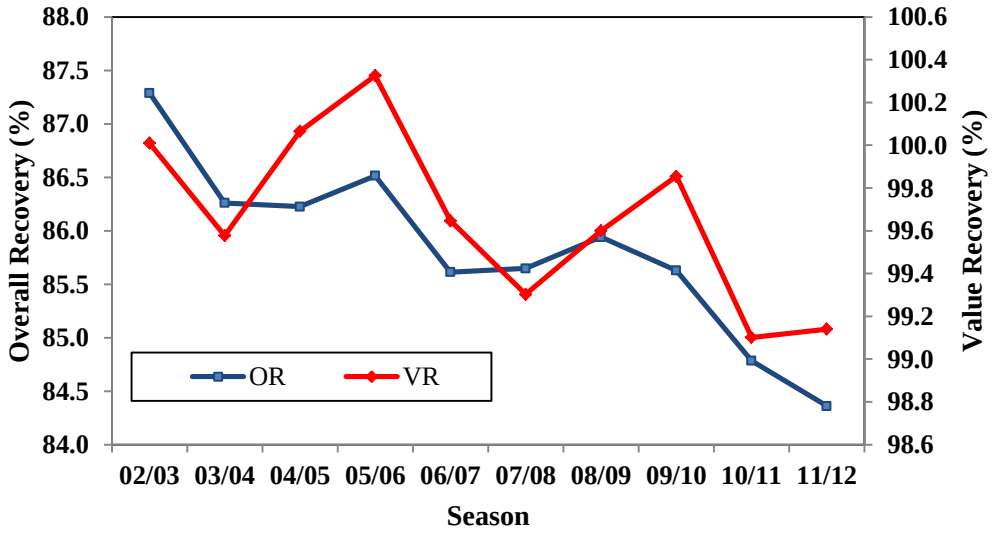

Figure 20. Overall Recovery (OR) and Value Recovery (VR) in South Africa for the past ten seasons.

The Affiliated mills returned fairly consistent pol-based overall recoveries; however, MA improved its OR from 81.37% to 85.81%, while UB decreased its OR from 82.89% to 78.06% due to the respective slight changes in extraction but substantial changes in BHRs.

Cane to sugar ratio

In South Africa, despite more cane being crushed in 2011/12 than during the previous season, less sugar was produced, with 1 842 143 tons made and estimated in 2011/12, and 1 928 881 tons in 2010/11. The cane to sugar ratio thus increased from 8.30 to 9.12. The cane to sugar ratios of the South African industry and the Affiliate mills are shown in Figure 21. From the figure it is evident that South Africa, Swaziland and Tanzania had poor seasons relative to their capabilities. Of the other countries, only Mozambique showed a noticeable improvement to the ratio; however, still not enough to reach that achieved in 2009/10.

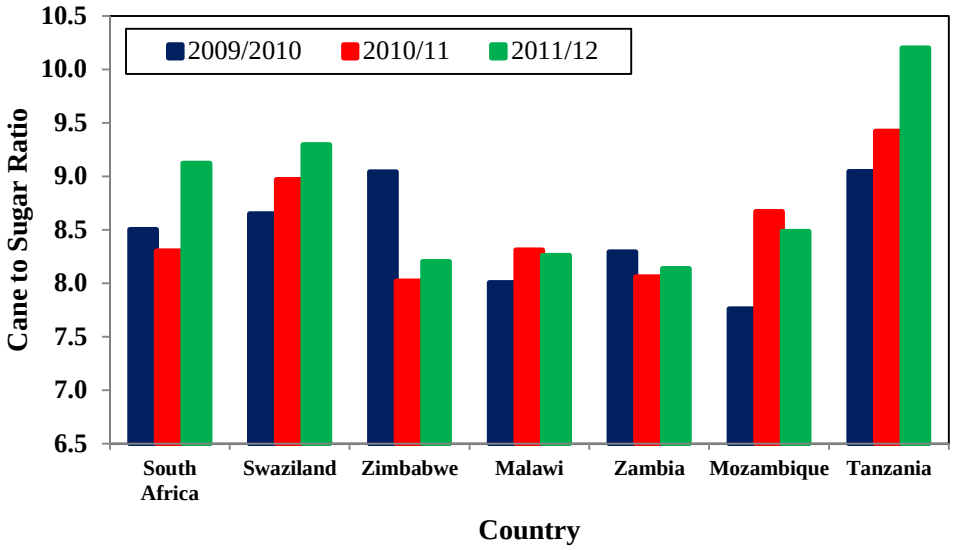

Figure 21. Cane to sugar ratio in southern Africa from 2009/10 to 2011/12.

Sugar quality

The trends in the Very High Pol (VHP) sugar quality with respect to colour are shown in Figure 22. This relates to sugar received by the South African Sugar Terminal (SAST). In the 2011/12 season, the affinated sugar colour of 618 ICUMSA units was similar to the ten-year low (614 ICUMSA units) obtained the previous season. The average VHP sugar colour was below the 1500 ICUMSA target level for the third time in ten years, recording a low for the period of 1410 ICUMSA units.

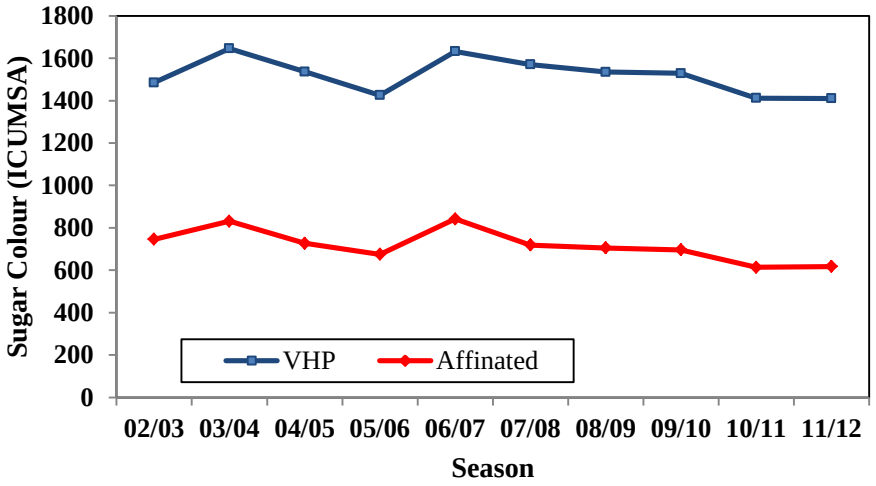

Figure 22. Very High Pol (VHP) and affinated sugar colour in South Africa for the past ten seasons.

There was some concern during 2010/11 over the percentage of sugar fines, or sugar that passes through a 600 µm screen. The trend for the past ten years can be seen in Figure 23. In the 2011/12 season the percentage of fine sugar has dropped to meet the Inter-Miller Penalty Redistribution Scheme standard of less than or equal to 35%, but fines remain a concern and still need to be monitored.

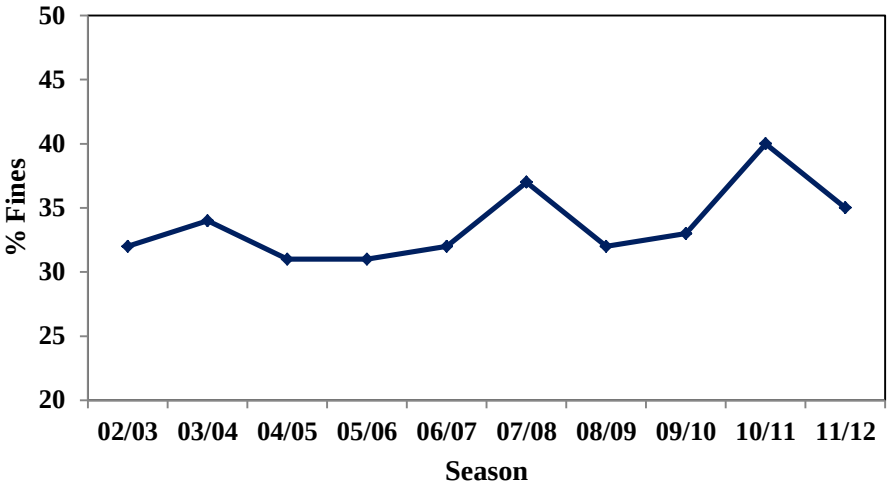

Figure 23. Very High Pol (VHP) fines in South Africa for the past ten seasons.

Concluding remarks

The 2011/12 milling season in South Africa was another difficult season, with poorer cane quality entering the factories. Performance was down on the 2010/11 season in terms of recoveries, but the tonnage of cane harvested saw a welcome increase over the previous year, although it was still lower than the amount harvested in 2009/10. OTE was down as a result of higher No-cane stops and LTA. Extraction performance continued the substantial decline of the previous seasons, although some of this was cane quality related, as evidenced by the slight increase in CRE. Increased losses to molasses and UDL resulted in lower BHR, OR and VR.

Regarding the Affiliate mills in neighbouring countries, most reported poorer cane quality in terms of ERC % cane. The Affiliated factories recorded improved recoveries at most mills, with UB mill being the only one showing a significant drop in BHR.

Acknowledgements

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APPENDIX: DATA TABLES

Table A1: Cane crushed and sugar made, cane composition and time accounts, performances and losses – South African factories (Season 2011/12)

Table A2: Cane crushed and sugar made, cane composition and time accounts, performances and losses – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2011/12)

Table B1: Analysis of bagasse, juices, filter cake, syrup and final molasses – South African factories (Season 2011/12)

Table B2: Analysis of bagasse, juices, filter cake, syrup and final molasses – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2011/12)

Table C1: Massecuites, exhaustions, clarifying agents and additional fuels – South African factories (Season 2011/12)

Table C2: Massecuites, exhaustions, clarifying agents and additional fuels – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2011/12)

Table D: Comparative manufacturing data of recent years (South African factories)

Table E: Average manufacturing results by monthly periods for South African factories (Season 2011/12)

Table F: Cane varieties and rainfall (Season 2011/12)

Table G: Transport summary – South African factories (Season 2011/12)

Table H: Comparative data of reporting South African factories from 1925 onward

TABLE A1
CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS,PERFORMANCES AND LOSSES
SOUTH AFRICAN FACTORIES (SEASON 2011/12)

SYMBOLS OF FACTORIES	ML *	KM-A *	KM-B *	KM-AVE	PG *	UF *	FX-A *	FX-B *	FX-AVE	AK *	DL	MS-A *	MS-B *	MS-AVE
TONS SUGAR MADE AND ESTIMATED	199638	-	-	290812	128426	127139	-	-	193440	124732	89408	-	-	79048
Refined % total sugar	52.16	-	-	-	84.06	-	-	-	-	-	-	-	-	-
Moisture all sugar	0.03	-	-	0.09	0.10	0.09	-	-	0.07	0.20	0.09	-	-	0.07
Pol all sugar	99.97	-	-	99.36	99.85	99.42	-	-	99.44	99.35	99.37	-	-	99.42
Tons cane crushed total	1658943			2358719	1176157	1130078			1705538	1142650	876867			808565
Tons cane crushed per tandem		1190942	1167777				788601	916937				68310	740255	
Season started on	28-Mar-2011	-	-	30-Mar-2011	18-Mar-2011	5-Apr-2011	-	-	4-May-2011	11-Apr-2011	4-May-2011	-	-	11-May-2011
Season completed on	15-Dec-2011	-	-	16-Dec-2011	18-Dec-2011	21-Dec-2011	-	-	7-Dec-2011	18-Dec-2011	18-Dec-2011	-	-	17-Dec-2011
Length of season (days)	262	-	-	261	275	260	-	-	217	251	228	-	-	220
TIME ACCOUNT														
Overall time efficiency %	85.92	83.28	84.22	83.75	77.77	75.01	66.61	69.74	68.18	69.19	59.63	19.30	69.85	45.69
Scheduled stops% gross available time	0.90	1.89	2.05	1.97	4.42	4.43	8.83	8.59	8.71	8.04	7.82	0.04	14.35	7.51
Lack of cane % gross available time	8.46	7.60	4.59	6.10	8.57	13.72	18.24	14.31	16.26	17.83	24.30	78.89	10.10	42.98
Other stops % gross available time	4.54	6.67	8.45	7.56	8.24	5.87	5.55	6.35	5.95	4.65	6.87	1.18	5.26	3.31
Foreign matter % gross available time	0.19	0.56	0.68	0.62	1.00	0.97	0.77	1.02	0.89	0.29	1.38	0.58	0.44	0.51
Lost time % available crush.time	5.02	7.41	9.12	8.28	9.58	7.26	7.69	8.35	8.03	6.30	10.33	5.78	7.01	6.76
Force majeure stops (hours)	207	201	113	157	1	6	36	43	39	68	69	0	0	0
THROUGHPUTS PER CRUSHING HOUR #														
Tons cane	326.30	243.83	237.62	479.96	232.35	242.11	233.82	256.76	477.59	304.54	273.91	73.02	200.06	217.79
Tons fibre in bagasse	44.90	32.57	31.84	64.21	31.13	32.82	36.46	40.07	74.51	50.05	44.32	12.07	35.74	38.67
Tons brix in mixed juice(adj.)	52.31	38.71	37.98	76.45	35.20	35.66	35.19	38.72	71.96	43.56	37.38	9.99	26.86	29.29
Tons sucrose in mixed juice(adj.)	45.27	33.44	32.86	66.09	30.09	30.83	29.98	32.96	61.28	37.49	32.00	8.40	22.47	24.51
Tons non-suc. in mixed juice(adj.)	7.04	5.27	5.12	10.36	5.10	4.84	5.21	5.75	10.68	6.08	5.38	1.59	4.39	4.78
Tons of sugar produced	39.27	-	-	59.18	25.37	27.24	-	-	54.17	33.24	27.93	-	-	21.29
COMPOSITION OF CANE CRUSHED														
Sucrose % cane	14.31	14.07	14.15	14.11	13.38	13.19	13.05	13.05	13.05	12.62	12.07	11.77	11.50	11.52
Pol % cane	14.19	13.95	14.04	13.99	13.26	13.08	12.96	12.96	12.96	12.54	11.94	11.68	11.42	11.45
Fibre % cane	13.76	13.32	13.43	13.38	13.56	14.11	15.60	15.60	15.60	16.43	17.39	16.77	17.84	17.75
Brix % cane	16.72	16.48	16.54	16.51	15.87	15.44	15.61	15.61	15.61	14.78	14.41	14.17	13.94	13.96
Ash % cane	1.53	1.51	1.51	1.51	1.75	1.94	-	-	-	2.29	2.58	-	-	-
ERC % cane	12.30	12.07	12.16	12.12	11.35	11.28	10.94	10.95	10.94	10.72	10.07	9.74	9.44	9.46
ERC % sucrose in cane	85.94	85.80	85.93	85.87	84.82	85.56	83.81	83.85	83.83	84.95	83.38	82.80	82.08	82.14
RV % cane	13.04	12.81	12.90	12.85	12.08	11.97	11.68	11.68	11.68	11.38	10.74	10.42	10.12	10.14
Merc % cane	12.31	12.02	12.12	12.07	11.31	11.27	10.76	10.77	10.77	10.63	9.98	9.55	9.23	9.26
EXTRACTION														
Extraction (sucrose based)	96.94	97.48	97.70	97.59	96.79	96.53	98.24	98.34	98.30	97.52	96.77	97.77	97.66	97.67
Corrected reduced extraction	96.27	96.86	97.13	96.99	96.14	95.94	98.25	98.35	98.31	97.73	97.11	98.06	98.17	98.16
Imbibition % fibre	330	303	297	300	315	338	373	382	378	388	291	382	340	343
Diffusion Rate Index	9	-	-	-	9	8	-	-	-	-	-	-	-	-
Preparation index	-	92	93	92	-	-	91	91	91	92	90	90	90	90
Pol factor	99.63	99.71	99.74	99.73	99.11	98.80	99.54	99.50	99.52	99.81	99.84	97.48	99.67	99.48
Brix factor	101.24	101.18	101.20	101.19	100.05	100.91	101.58	101.46	101.52	101.00	101.44	99.59	101.42	101.26
RECOVERIES														
Boiling house recovery (sucrose)	86.72	-	-	88.97	84.18	87.85	-	-	87.90	88.11	86.73	-	-	86.37
C R B	84.89	-	-	87.16	83.66	85.74	-	-	87.88	87.05	85.75	-	-	88.35
Overall recovery (sucrose)	84.06	-	-	86.82	81.48	84.80	-	-	86.40	85.93	83.93	-	-	84.36
Ton cane per ton sugar	8.31	-	-	8.11	9.16	8.89	-	-	8.82	9.16	9.81	-	-	10.23
Ton cane per ton 96° pol sugar	7.98	-	-	7.84	8.81	8.58	-	-	8.51	8.85	9.47	-	-	9.88
Value Recovery %	97.79	-	-	100.26	96.57	98.43	-	-	101.95	100.42	99.45	-	-	101.94
Crystal Recovery Efficiency (XRE)	100.45	-	-	104.03	99.78	101.76	-	-	107.50	104.71	104.12	-	-	107.79
BALANCES														
Sucrose lost % sucrose in cane														
- lost in bagasse	3.06	-	-	2.41	3.21	3.47	-	-	1.70	2.48	3.23	-	-	2.33
- lost in filter cake	-	-	-	-	0.13	0.32	-	-	-	-	1.63	-	-	-
- lost in final molasses	10.50	-	-	8.88	10.89	9.16	-	-	10.02	9.20	8.70	-	-	11.90
- undetermined losses	2.38	-	-	1.88	4.30	2.25	-	-	1.87	2.40	2.51	-	-	1.41
Non sucrose ratio	1.08	-	-	1.03	1.05	1.02	-	-	1.00	1.01	0.99	-	-	1.06
Fructose ratio FM/MJ	0.97	-	-	0.84	0.89	0.82	-	-	0.79	0.75	0.69	-	-	0.89
Glucose ratio FM/MJ	0.87	-	-	0.61	0.74	0.59	-	-	0.62	0.61	0.53	-	-	0.64

*** Cane diffuser**

 # 2011/12 season's throughputs, for factories with double tandems, were calculated using concurrent crushing hours.

TABLE A1 (continued)
CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS,PERFORMANCES AND LOSSES
SOUTH AFRICAN FACTORIES (SEASON 2011/12)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
TONS SUGAR MADE AND ESTIMATED	-	-	107791	113138	67506	122165	-	-	198899	-	1842143
Refined % total sugar	-	-	100.00	100.00	-	-	-	-	-	-	23.51
Moisture all sugar	-	-	0.02	0.02	0.06	0.06	-	-	0.11	-	0.08
Pol all sugar	-	-	99.93	99.93	99.47	99.55	-	-	99.44	-	99.57
Tons cane crushed total			1078925	1088697	643533	1141931			1989673	-	16800277
Tons cane crushed per tandem	308473	770452					975695	1013978			
Season started on	-	-	4-May-2011	7-Apr-2011	24-Mar-2011	16-Mar-2011	-	-	4-May-2011	-	16-Mar-2011
Season completed on	-	-	11-Dec-2011	27-Nov-2011	17-Dec-2011	23-Nov-2011	-	-	23-Nov-2011	-	21-Dec-2011
Length of season (days)	-	-	221	234	268	252	-	-	203	-	242
TIME ACCOUNT											
Overall time efficiency %	62.41	80.19	71.34	75.40	77.40	80.82	83.95	87.27	85.61	-	74.05
Scheduled stops% gross available time	3.76	4.34	4.05	5.34	7.21	4.15	4.17	4.17	4.17	-	5.21
Lack of cane % gross available time	30.10	10.25	20.13	14.80	6.54	11.29	8.00	4.07	6.03	-	14.62
Other stops % gross available time	3.67	5.13	4.40	4.35	7.44	3.36	2.96	4.01	3.49	-	5.45
Foreign matter % gross available time	0.06	0.09	0.08	0.10	1.41	0.38	0.92	0.48	0.70	-	0.67
Lost time % available crush.time	5.55	6.02	5.81	5.46	8.76	3.99	3.41	4.39	3.91	-	6.86
Force majeure stops (hours)	30	0	15	0	3	0	8	0	4	-	569
THROUGHPUTS PER CRUSHING HOUR #											
Tons cane	94.43	182.10	244.79	264.99	128.99	233.22	208.60	208.05	394.19	-	292.62
Tons fibre in bagasse	15.59	28.97	39.37	37.00	18.11	34.97	35.58	35.78	67.52	-	43.92
Tons brix in mixed juice(adj.)	13.16	24.85	33.61	37.25	17.70	33.34	28.33	28.39	53.66	-	42.82
Tons sucrose in mixed juice(adj.)	11.19	21.21	28.65	32.25	15.15	28.98	24.21	24.31	45.92	-	36.79
Tons non-suc. in mixed juice(adj.)	1.98	3.64	4.96	5.00	2.55	4.36	4.12	4.07	7.75	-	6.04
Tons of sugar produced	-	-	24.46	27.54	13.53	24.95	-	-	39.41	-	32.09
COMPOSITION OF CANE CRUSHED											
Sucrose % cane	12.14	12.03	12.06	12.58	12.27	12.83	11.98	12.06	12.02	-	12.94
Pol % cane	12.06	11.94	11.97	12.45	12.15	12.71	11.88	11.96	11.92	-	12.83
Fibre % cane	16.80	16.77	16.78	15.04	14.20	15.13	17.21	17.36	17.29	-	15.27
Brix % cane	14.50	14.38	14.41	14.80	14.56	14.90	14.24	14.31	14.28	-	15.28
Ash % cane	5.33	4.04	4.41	2.21	1.49	2.56	-	-	-	-	2.19
ERC % cane	10.13	10.04	10.06	10.68	10.37	11.00	10.02	10.10	10.06	-	10.97
ERC % sucrose in cane	83.46	83.41	83.42	84.91	84.49	85.78	83.64	83.75	83.70	-	84.73
RV % cane	10.81	10.71	10.74	11.35	11.04	11.65	10.68	10.76	10.72	-	11.66
Merc % cane	10.06	9.96	9.99	10.64	10.31	10.98	9.89	9.98	9.93	-	10.89
EXTRACTION											
Extraction (sucrose based)	97.57	96.81	97.03	96.76	95.70	96.86	96.91	96.90	96.91	-	97.14
Corrected reduced extraction	97.84	97.07	97.30	96.46	95.35	96.77	97.38	97.39	97.39	-	97.05
Imbibition % fibre	322	315	317	284	321	367	315	323	319	-	331
Diffusion Rate Index	12	12	12	8	9	8	10	10	10	-	9
Preparation index	-	-	-	-	93	-	-	-	-	-	91
Pol factor	100.07	99.40	99.59	99.30	97.28	99.29	99.85	100.82	100.35	-	99.50
Brix factor	101.16	100.82	100.92	100.99	98.84	100.93	101.11	102.02	101.57	-	101.04
RECOVERIES											
Boiling house recovery (sucrose)	-	-	85.30	85.32	88.82	85.72	-	-	85.34	-	86.84
C R B	-	-	85.14	83.96	87.45	83.28	-	-	85.03	-	85.83
Overall recovery (sucrose)	-	-	82.76	82.56	85.01	83.02	-	-	82.70	-	84.36
Ton cane per ton sugar	-	-	10.01	9.62	9.53	9.35	-	-	10.00	-	9.12
Ton cane per ton 96^{o} pol sugar	-	-	9.62	9.24	9.20	9.01	-	-	9.66	-	8.79
Value Recovery %	-	-	99.43	97.89	99.62	96.67	-	-	98.43	-	99.14
Crystal Recovery Efficiency (XRE)	-	-	103.60	101.10	103.81	99.55	-	-	102.72	-	103.04
BALANCES											
Sucrose lost % sucrose in cane											
- lost in bagasse	-	-	2.97	3.24	4.30	3.14	-	-	3.09	-	2.86
- lost in filter cake	-	-	0.35	1.32	0.16	0.08	-	-	0.18	-	0.24
- lost in final molasses	-	-	11.19	11.40	9.65	10.14	-	-	11.59	-	10.19
- undetermined losses	-	-	2.73	1.48	0.88	3.61	-	-	2.44	-	2.35
Non sucrose ratio	-	-	0.99	1.08	0.96	1.12	-	-	1.08	-	1.04
Fructose ratio FM/MJ	-	-	0.68	0.90	0.72	0.84	-	-	0.93	-	0.84
Glucose ratio FM/MJ	-	-	0.44	0.74	0.40	0.52	-	-	0.64	-	0.64

*** Cane diffuser**
 # 2011/12 season's throughputs, for factories with double tandems, were calculated using concurrent crushing hours.

TABLE A2
CANE CRUSHED AND SUGAR MADE,CANE COMPOSITION,THROUGHPUTS AND TIME ACCOUNTS,PERFORMANCES AND LOSSES
SWAZILAND, MALAWI , ZIMBABWE ,ZAMBIA ,TANZANIA AND MOZAMBIQUE FACTORIES
(SEASON 2011/12)

SYMBOLS OF FACTORIES	UB-A *	UB-B	UB-AVE	NH *	DW *	HV-A *	HV-B *	HV-AVE	TR-A *	TR-B	TR-AVE	NK-A *	NK-B	NK-AVE	MW *	RU *	MA
TONS SUGAR MADE AND ESTIMATED	-	-	224089	166840	119636	-	-	170065	-	-	202525	-	-	376085	45591	67509	9074
Refined % total sugar	-	-	34.40	22.24	16.17	-	-	-	-	-	1.97	-	-	9.75	-	-	-
Moisture % all sugar	-	-	0.08	0.02	0.07	-	-	0.07	-	-	-	-	-	0.09	0.12	0.10	0.11
Pol % all sugar	-	-	99.37	99.44	99.22	-	-	99.30	-	-	99.34	-	-	99.45	99.19	99.12	99.21
Tons cane crushed total			2083116	1497432	902709			1382386			1676120			3059577	453603	705497	769911
Tons cane crushed per tandem	839104	1244012				650910	731476		1289549	386571		1617947	1441630				
Season started on	-	-	16-Apr-2011	25-Mar-2011	18-Apr-2011	-	-	17-May-2011	-	-	5-Apr-2011	-	-	28-Apr-2011	16-Jun-2011	7-Jun-2011	26-Apr-2011
Season completed on	-	-	4-Jan-2012	19-Nov-2011	22-Dec-2011	-	-	15-Dec-2011	-	-	9-Dec-2011	-	-	11-Nov-2011	3-Mar-2012	11-Mar-2012	18-Nov-2011
Length of season (days)	-	-	263	239	248	-	-	212	-	-	248	-	-	197	261	278	206
TIME ACCOUNT																	
Overall time efficiency %	87.79	88.76	88.27	82.25	83.29	65.33	75.46	70.28	85.17	51.26	69.94	90.87	85.51	88.22	72.51	78.82	75.05
Scheduled stops% gross available time	3.32	5.27	4.29	4.72	4.88	2.92	3.54	3.23	3.88	24.26	13.03	4.02	4.07	4.04	2.41	3.54	3.12
Lack of cane % gross available time	5.82	3.30	4.57	8.74	6.34	13.04	9.38	11.25	1.03	9.03	4.62	1.48	3.54	2.50	16.23	9.16	18.25
Other stops % gross available time	2.25	2.54	2.39	3.40	4.71	18.56	11.28	15.00	9.92	15.33	12.35	3.45	6.81	5.12	8.69	8.32	0.00
Foreign matter % gross available time	0.82	0.13	0.47	0.88	0.78	0.14	0.35	0.24	0.00	0.12	0.06	0.17	0.07	0.12	0.16	0.16	3.58
Lost time % available crush.time	2.50	2.78	2.64	3.97	5.35	22.13	13.00	17.59	10.43	23.02	15.01	3.66	7.37	5.48	10.70	9.55	0.00
Force majeure stops (hours)	20	0	10	1	0	0	0	0	0	0	0	11	14	12	4	0	33
THROUGHPUTS PER CRUSHING HOUR #																	
Tons cane	155.42	229.68	384.60	316.94	182.55	196.01	199.25	376.55	253.95	155.05	330.07	328.95	316.57	622.06	102.81	141.26	207.53
Tons fibre in bagasse	19.07	30.34	49.35	43.33	25.21	29.15	29.74	56.11	34.74	20.95	45.03	47.94	44.19	88.85	14.53	20.25	25.14
Tons brix in mixed juice	23.06	36.73	59.71	46.89	30.70	31.23	32.52	60.77	40.17	23.81	51.86	51.81	49.24	97.40	14.14	18.60	31.50
Tons pol in mixed juice	19.54	31.13	50.62	40.35	26.69	27.23	28.27	52.90	34.83	20.70	44.99	44.83	42.69	84.35	11.91	15.51	27.43
Tons non-pol. in mixed juice	3.51	5.59	9.09	6.54	4.01	4.01	4.25	7.87	5.34	3.11	6.87	6.98	6.56	13.05	2.23	3.09	4.07
Tons of sugar produced	-	-	41.37	35.31	24.19	-	-	46.32	-	-	39.88	-	-	76.46	10.33	13.52	24.46
COMPOSITION OF CANE CRUSHED																	
Pol % cane	13.31	13.95	13.69	13.37	15.02	14.45	14.73	14.60	14.18	13.98	14.13	14.15	14.17	14.16	12.28	11.80	13.63
Fibre % cane	13.41	14.26	13.92	13.94	13.91	15.08	15.15	15.12	13.93	13.83	13.91	14.44	14.84	14.62	15.26	16.94	12.87
Brix % cane	15.97	18.06	17.22	15.86	17.67	16.84	17.21	17.04	16.79	16.60	16.75	17.08	16.66	16.88	15.05	14.48	15.90
Ash % cane	-	-	-	3.54	-	-	-	-	0.87	0.87	0.87	-	-	-	3.39	4.10	1.43
ERC % cane	11.19	11.00	11.08	11.34	12.86	12.41	12.63	12.53	12.05	11.85	12.01	11.84	12.08	11.96	10.07	9.63	11.73
ERC % pol in cane	84.08	78.83	80.88	84.78	85.59	85.88	85.76	85.82	85.01	84.81	84.97	83.66	85.30	84.43	82.05	81.55	86.08
EXTRACTION																	
Extraction (pol based)	94.48	97.14	96.10	95.20	97.31	96.14	96.35	96.25	96.72	95.52	96.45	96.29	95.18	95.76	94.37	93.02	96.99
Corrected reduced extraction	92.76	96.45	95.05	94.36	96.65	95.70	95.90	95.80	96.01	94.53	95.67	95.79	94.32	95.11	94.02	93.00	95.92
Imbibition % fibre	279	345	319	263	330	353	368	361	345	323	340	365	291	331	183	219	256
Diffusion Rate Index	11	11	11	7	8	-	-	-	-	-	-	-	-	-	-	-	-
Preparation index	-	-	-	-	-	92	92	92	92	92	92	88	88	88	81	79	89
Pol factor	95.14	102.12	99.27	96.30	100.08	96.48	98.53	97.57	99.91	96.55	99.13	99.25	98.78	99.03	90.38	94.17	100.0
Brix factor	96.83	111.79	105.69	98.43	102.02	97.76	99.80	98.84	101.25	98.52	100.61	102.77	99.79	101.36	92.57	95.84	100.0
RECOVERIES																	
Boiling house recovery (pol)	-	-	81.23	87.02	89.95	-	-	86.95	-	-	88.06	-	-	90.15	86.06	86.38	88.4
Overall recovery (pol)	-	-	78.06	82.85	87.53	-	-	83.69	-	-	84.93	-	-	86.33	81.21	80.35	85.8
Ton cane per ton sugar	-	-	9.30	8.98	7.55	-	-	8.13	-	-	8.28	-	-	8.14	9.95	10.45	8.4
Ton cane per ton 96° pol sugar	-	-	8.98	8.66	7.30	-	-	7.86	-	-	8.00	-	-	7.85	9.63	10.12	8.2
BALANCES																	
Pol lost % pol in cane																	
- lost in bagasse	-	-	3.90	4.80	2.69	-	-	3.75	-	-	3.55	-	-	4.24	5.63	6.98	3.0
- lost in filter cake	-	-	0.17	0.18	0.05	-	-	-	-	-	0.46	-	-	0.50	0.36	0.40	0.4
- lost in final molasses	-	-	11.31	9.60	7.83	-	-	7.97	-	-	7.56	-	-	7.80	10.13	10.84	7.6
- undetermined losses	-	-	6.56	2.57	1.90	-	-	4.59	-	-	3.49	-	-	1.13	2.66	1.43	3.1
Non pol ratio	-	-	1.15	0.98	0.93	-	-	0.97	-	-	0.96	-	-	1.00	0.98	1.03	0.9

*** Cane diffuser**
 # 2011/12 season's throughputs, for factories with double tandems, were calculated using concurrent crushing hours.

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TABLE B1
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2011/12)

SYMBOLS OF FACTORIES	ML *	KM-A *	KM-B *	KM-AVE	PG *	UF *	FX-A *	FX-B *	FX-AVE	AK *	DL	MS-A *	MS-B *	MS-AVE
FINAL BAGASSE														
Pol % bagasse	1.48	1.32	1.21	1.27	1.43	1.54	0.68	0.65	0.66	0.93	1.12	0.74	0.71	0.71
Moisture % bagasse	51.17	47.95	48.03	47.99	52.83	51.88	51.78	51.75	51.76	49.58	51.20	51.81	51.73	51.74
Fibre % bagasse	46.51	49.80	49.89	49.84	44.74	45.74	46.55	46.67	46.61	49.00	46.61	46.80	46.93	46.92
Ash % bagasse	3.13	-	-	3.39	4.15	3.75	-	-	-	5.02	-	-	-	-
LCV (kJ per kg bagasse) #	7024	-	-	7640	6489	6762	-	-	-	7035	-	-	-	-
MIXED JUICE														
Mixed juice(adj.) % cane	115.81	113.63	112.93	113.28	112.22	116.25	124.92	126.49	125.76	130.57	112.45	127.87	122.98	123.39
Brix % mixed juice(adj.)	13.84	13.97	14.15	14.06	13.50	12.67	12.05	11.92	11.98	10.96	12.14	10.70	10.92	10.90
Sucrose purity (MJ adj.)	86.54	86.39	86.51	86.45	85.50	86.43	85.19	85.14	85.16	86.05	85.61	84.08	83.64	83.68
Apparent purity(MJ adj.)	85.70	85.66	85.80	85.68	84.60	85.62	84.55	84.50	84.34	85.37	84.48	83.47	83.08	82.35
Purity difference(MJ adj. - DAC)	-0.47	-0.25	-0.30	-0.28	0.37	-0.86	-0.13	-0.15	-0.14	-0.38	0.43	-0.76	-0.34	-0.37
(Glucose + fructose) % sucrose(MJ unadj)	4.94	-	-	4.72	5.05	4.71	-	-	4.18	4.05	4.96	-	-	4.77
Suspended solids % MJ(unadj.)	0.13	0.14	0.14	0.14	0.15	0.48	0.23	0.20	0.21	0.22	1.07	0.19	0.24	0.24
Pol/sucrose ratio (MJ unadj.)	0.9913	0.9916	0.9918	0.9917	0.9907	0.9914	0.9924	0.9925	0.9925	0.9933	0.9888	0.9928	0.9933	0.9933
CLARIFIED JUICE														
Brix % clarified juice	14.06	-	-	13.81	13.11	12.40	-	-	12.12	11.15	11.23	-	-	10.91
Apparent purity (%)	85.13	-	-	85.70	84.55	84.43	-	-	83.41	84.41	83.72	-	-	80.18
Purity difference(CJ - MJ)	-0.57	-	-	0.02	-0.05	-1.19	-	-	-0.93	-0.96	-0.76	-	-	-2.17
Average pH	7.1	-	-	7.0	7.2	7.2	-	-	7.2	7.0	7.1	-	-	7.0
CLARIFIER MUD														
Tons clarifier mud	67740	84892	52310	137202	309	-	78464	84227	162691	79758	-	339	40628	40967
Pol % clarifier mud	12.18	12.13	12.33	12.21	8.38	-	9.95	10.01	9.98	9.81	-	8.01	9.98	9.97
Brix % clarifier mud	14.48	14.57	14.79	14.65	9.87	-	12.23	12.31	12.27	11.82	-	10.48	12.37	12.35
Insoluble solids % clarifier mud	3.93	2.81	2.84	2.82	6.82	-	2.99	3.05	3.02	4.37	-	3.20	6.08	6.06
FILTER CAKE														
Pol % filter cake	-	-	-	-	1.56	1.24	-	-	-	-	3.03	-	-	-
Moisture % filter cake	-	-	-	-	59.45	70.00	-	-	-	-	-	-	-	-
Filter cake % cane	-	-	-	-	1.08	3.38	-	-	-	-	6.49	-	-	-
Filter wash index	-	-	-	-	102.9	102.2	-	-	-	-	108.1	-	-	-
Purity difference(CJ - filtrate)	-	-	-	-	-	7.57	-	-	-	-	1.43	-	-	-
SYRUP														
Brix % syrup	68.36	-	-	65.00	67.93	53.80	-	-	63.44	66.81	66.87	-	-	69.78
Apparent purity (%)	84.25	-	-	85.11	84.88	84.34	-	-	83.79	84.49	84.15	-	-	81.63
Purity difference(Syrup - MJ)	-1.45	-	-	-0.57	0.28	-1.28	-	-	-0.55	-0.88	-0.33	-	-	-0.72
Average pH	5.8	-	-	6.0	6.1	6.0	-	-	6.1	6.1	6.6	-	-	6.2
FINAL MOLASSES														
Refractometer brix	82.12	-	-	84.38	84.86	83.38	-	-	86.20	85.15	83.96	-	-	85.70
Pol/refractometer brix purity (%)	35.91	-	-	32.57	36.11	34.10	-	-	35.21	35.85	33.36	-	-	34.91
Sucrose/refractometer brix purity (%)	38.97	-	-	36.70	38.46	37.73	-	-	37.16	36.94	35.35	-	-	36.32
Conductivity ash %	11.95	-	-	15.29	13.12	13.23	-	-	15.21	14.72	15.28	-	-	14.50
(Glucose + fructose)/ash ratio	1.17	-	-	0.80	0.92	0.86	-	-	0.66	0.66	0.65	-	-	0.68
Fructose %	7.51	-	-	7.11	6.67	6.82	-	-	5.80	5.55	5.91	-	-	5.81
Glucose %	6.52	-	-	5.14	5.34	4.59	-	-	4.27	4.20	4.08	-	-	3.98
TPD based on molasses (made)	8.0	-	-	3.7	7.0	5.9	-	-	4.1	3.7	1.2	-	-	2.9
TPD based on mixed juice	7.9	-	-	5.0	8.2	7.2	-	-	5.4	5.3	3.7	-	-	3.8
Final molasses @ 85° brix % cane	4.54	-	-	4.02	4.46	3.77	-	-	4.14	3.70	3.50	-	-	4.44
Pol/sucrose ratio	0.9215	-	-	0.8874	0.9391	0.9036	-	-	0.9476	0.9705	0.9438	-	-	0.9612

*** Cane diffuser**

 # Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.60 ash % bagasse

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TABLE B1 (continued)
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2011/12)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
FINAL BAGASSE											
Pol % bagasse	0.85	1.14	1.05	1.29	1.65	1.29	1.08	1.08	1.08	-	1.17
Moisture % bagasse	50.99	50.63	50.73	53.41	53.40	49.92	48.17	48.36	48.27	-	50.67
Fibre % bagasse	47.40	47.21	47.26	44.24	44.00	48.14	49.90	49.72	49.81	-	47.30
Ash % bagasse	-	-	3.24	5.52	3.41	6.44	-	-	3.61	-	3.16
LCV (kJ per kg bagasse) #	-	-	7103	6122	6503	6690	-	-	7549	-	7017
MIXED JUICE											
Mixed juice(adj.) % cane	118.41	116.39	116.97	108.07	113.21	123.94	119.49	120.93	120.22	-	117.98
Brix % mixed juice(adj.)	11.77	11.72	11.74	13.01	12.12	11.53	11.37	11.28	11.32	-	12.40
Sucrose purity (MJ adj.)	84.98	85.35	85.25	86.58	85.58	86.92	85.47	85.65	85.56	-	85.90
Apparent purity(MJ adj.)	84.40	84.65	84.56	85.49	84.69	86.09	84.73	84.90	84.40	-	85.00
Purity difference(MJ adj. - DAC)	0.33	0.43	0.40	0.10	-0.14	-0.62	0.27	0.34	0.31	-	-0.14
(Glucose + fructose) % sucrose(MJ unadj)	-	-	4.95	4.46	4.51	4.16	-	-	4.13	-	4.57
Suspended solids % MJ(unadj.)	0.24	0.74	0.60	0.99	0.15	0.11	0.13	0.13	0.13	-	0.30
Pol/sucrose ratio (MJ unadj.)	0.9931	0.9917	0.9921	0.9892	0.9896	0.9907	0.9913	0.9912	0.9913	-	0.9914
CLARIFIED JUICE											
Brix % clarified juice	-	-	11.45	12.77	12.62	11.66	-	-	11.10	-	12.33
Apparent purity (%)	-	-	86.16	86.19	84.14	85.92	-	-	84.36	-	84.80
Purity difference(CJ - MJ)	-	-	1.60	0.71	-0.55	-0.17	-	-	-0.05	-	-0.36
Average pH	-	-	7.2	7.1	7.0	7.1	-	-	6.9	-	7.1
CLARIFIER MUD											
Tons clarifier mud	-	-	-	-	-	-	-	-	-	-	488667
Pol % clarifier mud	-	-	-	-	-	-	-	-	-	-	10.88
Brix % clarifier mud	-	-	-	-	-	-	-	-	-	-	13.18
Insoluble solids % clarifier mud	-	-	-	-	-	-	-	-	-	-	3.57
FILTER CAKE											
Pol % filter cake	-	-	1.03	2.25	2.53	1.53	-	-	1.78	-	1.98
Moisture % filter cake	-	-	70.00	75.00	71.36	72.67	-	-	65.07	-	70.84
Filter cake % cane	-	-	4.04	7.37	0.77	0.70	-	-	1.20	-	1.60
Filter wash index	-	-	102.5	101.9	96.1	98.9	-	-	102.0	-	100.6
Purity difference(CJ - filtrate)	-	-	1.81	0.73	5.37	1.49	-	-	1.90	-	2.84
SYRUP											
Brix % syrup	-	-	65.12	68.49	66.31	64.52	-	-	64.78	-	65.28
Apparent purity (%)	-	-	86.26	86.05	85.04	85.86	-	-	84.79	-	84.69
Purity difference(Syrup - MJ)	-	-	1.70	0.57	0.35	-0.23	-	-	0.39	-	-0.31
Average pH	-	-	6.1	6.1	6.4	6.2	-	-	5.9	-	6.1
FINAL MOLASSES											
Refractometer brix	-	-	83.44	80.62	80.47	82.00	-	-	82.60	-	83.55
Pol/refractometer brix purity (%)	-	-	37.92	38.37	35.94	36.19	-	-	37.55	-	35.61
Sucrose/refractometer brix purity (%)	-	-	40.15	40.94	38.94	38.84	-	-	39.30	-	38.16
Conductivity ash %	-	-	13.86	11.63	12.61	12.54	-	-	13.17	-	13.66
(Glucose + fructose)/ash ratio	-	-	0.59	0.89	0.64	0.70	-	-	0.68	-	0.78
Fructose %	-	-	5.16	6.18	5.42	5.57	-	-	5.38	-	6.20
Glucose %	-	-	3.00	4.18	2.69	3.18	-	-	3.52	-	4.41
TPD based on molasses (made)	-	-	4.5	8.0	5.0	5.7	-	-	5.6	-	5.2
TPD based on mixed juice	-	-	7.8	9.1	7.8	7.7	-	-	7.0	-	6.6
Final molasses @ 85^{o} brix % cane	-	-	3.96	4.12	3.58	3.94	-	-	4.17	-	4.07
Pol/sucrose ratio	-	-	0.9445	0.9372	0.9230	0.9319	-	-	0.9556	-	0.9333

*** Cane diffuser**

 # Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.60 ash % bagasse

TABLE B2
ANALYSIS OF BAGASSE,JUICES,FILTER CAKE,SYRUP AND FINAL MOLASSES
SWAZILAND, MALAWI , ZIMBABWE ,ZAMBIA ,TANZANIA AND MOZAMBIQUE FACTORIES
(SEASON 2011/12)

SYMBOLS OF FACTORIES	UB-A *	UB-B	UB-AVE	NH *	DW *	HV-A *	HV-B *	HV-AVE	TR-A *	TR-B	TR-AVE	NK-A *	NK-B	NK-AVE	MW	RU	MA
FINAL BAGASSE																	
Pol % bagasse	2.69	1.30	1.82	2.12	1.45	1.65	1.69	1.67	1.54	2.04	1.66	1.64	2.22	1.91	2.27	2.70	1.67
Moisture % bagasse	50.86	50.32	50.52	51.43	47.26	53.40	50.19	51.75	51.41	52.05	51.56	50.29	51.05	50.64	49.26	48.79	47.85
Fibre % bagasse	44.98	42.95	43.71	45.06	49.67	43.93	47.01	45.51	45.36	43.92	45.03	45.55	45.35	45.46	46.46	46.91	49.24
Ash % bagasse	-	-	4.71	-	-	-	-	-	-	-	-	-	-	-	5.98	6.63	2.57
LCV (kJ per kg bagasse) #	-	-	6762	-	-	-	-	-	-	-	-	-	-	-	6837	6815	7795
MIXED JUICE																	
Mixed juice % cane	106.94	116.20	112.47	105.60	117.73	118.63	123.20	121.05	117.00	112.81	116.04	121.55	109.82	116.02	95.49	100.79	106.37
Brix % mixed juice	13.87	13.76	13.80	14.01	14.28	13.43	13.25	13.33	13.52	13.61	13.54	12.96	14.16	13.50	14.40	13.06	14.27
Apparent purity (%)	84.77	84.77	84.77	86.06	86.93	87.17	86.94	87.05	86.70	86.93	86.75	86.53	86.69	86.60	84.25	83.39	87.08
Purity difference(MJ - DAC)	-0.05	0.20	0.10	-0.14	0.26	0.24	0.26	0.25	1.13	1.00	1.09	0.74	0.79	0.76	0.72	0.42	1.35
Suspended solids % mixed juice	1.07	1.03	1.04	0.25	0.08	0.18	0.18	0.18	0.21	0.29	0.23	0.22	0.80	0.47	1.18	2.59	0.71
CLARIFIED JUICE																	
Brix % clarified juice	-	-	14.18	14.57	14.13	-	-	13.11	-	-	13.49	-	-	13.26	14.53	12.91	14.03
Apparent purity (%)	-	-	83.76	87.42	86.73	-	-	86.27	-	-	86.31	-	-	87.47	85.56	84.66	86.98
Purity difference(CJ - MJ)	-	-	-1.01	1.37	-0.20	-	-	-0.78	-	-	-0.44	-	-	0.87	1.30	1.26	-0.09
Average pH	-	-	7.0	7.0	7.1	-	-	7.1	-	-	7.0	-	-	6.8	7.0	7.0	7.0
CLARIFIER MUD																	
Tons clarifier mud	-	17703	17703	-	-	32425	37526	69951	122	-	122	103286	-	103286	-	-	-
Pol % clarifier mud	-	11.08	11.08	-	-	11.69	11.82	11.76	9.29	-	9.29	9.31	-	9.31	-	-	-
Brix % clarifier mud	-	13.52	13.52	-	-	14.21	14.37	14.30	11.31	-	11.31	10.95	-	10.95	-	-	-
Insoluble solids % clarifier mud	-	10.56	10.56	-	-	4.44	4.52	4.48	9.92	-	9.92	6.53	-	6.53	-	-	-
FILTER CAKE																	
Pol % filter cake	-	-	2.27	1.47	0.82	-	-	-	-	-	2.59	-	-	3.22	1.06	1.17	1.42
Moisture % filter cake	-	-	-	-	71.92	-	-	-	-	-	-	-	-	77.74	-	-	69.41
Filter cake % cane	-	-	1.02	1.64	1.00	-	-	-	-	-	2.50	-	-	2.18	4.17	4.01	3.83
Filter wash index	-	-	97.3	96.1	101.1	-	-	-	-	-	100.4	-	-	101.8	99.1	101.2	101.7
Purity difference(CJ - filtrate)	-	-	1.52	4.57	3.06	-	-	-	-	-	2.65	-	-	1.20	2.53	2.64	0.71
SYRUP																	
Brix % syrup	-	-	64.38	62.07	66.57	-	-	59.73	-	-	64.82	-	-	64.05	66.80	66.41	64.51
Apparent purity (%)	-	-	82.94	87.12	87.30	-	-	86.56	-	-	86.30	-	-	87.46	84.71	82.23	86.49
Purity difference(Syrup - MJ)	-	-	-1.83	1.06	0.37	-	-	-0.49	-	-	-0.45	-	-	0.86	0.46	-1.16	-0.59
Average pH	-	-	5.8	6.2	6.1	-	-	6.7	-	-	6.2	-	-	6.2	6.9	6.4	5.9
FINAL MOLASSES																	
Refractometer brix	-	-	83.89	83.18	85.79	-	-	85.96	-	-	86.69	-	-	85.59	81.62	83.24	82.47
Pol/refractometer brix purity	-	-	36.85	39.47	37.70	-	-	37.24	-	-	35.72	-	-	35.06	37.66	37.07	36.14
Purity difference(true-target)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing sugars % $	-	-	-	-	-	-	-	14.87	-	-	-	-	-	-	-	-	-
Sulphated ash %	-	-	-	-	-	-	-	14.27	-	-	-	-	-	-	-	-	-
Reducing sugars/ash ratio	-	-	-	-	-	-	-	1.04	-	-	-	-	-	-	-	-	-
Final molasses at 85° brix % cane	-	-	4.95	3.83	3.67	-	-	3.68	-	-	3.52	-	-	3.71	3.89	4.06	3.40

*** Cane diffuser**

 # Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.60 ash % bagasse

$ Lane & Eynon

TABLE C1
MASSECUITES,EXHAUSTIONS,CLARIFYING AGENTS AND ADDITIONAL FUELS.
SOUTH AFRICAN FACTORIES (SEASON 2011/12)

SYMBOLS OF FACTORIES	ML	KM	PG	UF	FX	AK	DL	MS	GH	NB	UC	ES	SZ	UK	INDUSTRY
A - MASSECUITE															
m^3 per ton brix in mixed juice(adj.)	1.14	-	1.23	0.98	1.16	1.05	0.97	1.16	1.11	1.24	1.04	1.05	1.13	-	0.94
Refractometer brix of massecuite	92.35	92.06	92.95	91.92	92.92	92.65	93.00	93.11	92.74	92.28	92.68	92.83	92.62	-	92.65
Purity of massecuite (%)	86.19	85.25	86.14	85.16	85.23	84.62	84.54	82.16	87.16	86.13	86.32	85.41	85.41	-	85.48
Purity of A - molasses (%)	72.41	66.54	72.64	71.01	67.98	65.24	65.52	64.90	70.96	69.51	69.08	70.05	69.38	-	69.43
Purity drop (%)	13.78	18.70	13.50	14.15	17.25	19.38	19.02	17.26	16.20	16.62	17.24	15.36	16.03	-	16.05
Exhaustion (%)	57.95	65.58	57.28	57.32	63.21	65.89	65.25	59.85	64.00	63.29	64.59	60.05	61.30	-	61.42
Pty of A-massecuite - purity syrup (%)	1.94	0.13	1.26	0.82	1.44	0.13	0.39	0.53	0.90	0.08	1.28	-0.45	0.62	-	0.79
Pty of remelt (%)	87.09	82.90	85.67	85.95	87.52	83.75	83.20	84.95	85.42	85.14	84.93	86.25	86.26	-	85.35
B - MASSECUITE															
m^3 per ton brix in mixed juice(adj.)	0.59	-	0.56	0.35	0.32	0.39	0.31	0.33	0.45	0.47	0.39	0.39	0.42	-	0.36
Refractometer brix of massecuite	94.20	94.50	94.71	94.52	94.96	93.88	94.09	93.68	94.82	94.44	94.60	95.48	94.95	-	94.57
Purity of massecuite (%)	71.82	68.04	71.76	69.50	68.92	66.98	67.11	65.92	71.14	69.65	68.74	70.16	70.24	-	69.94
Purity of B - molasses (%)	51.16	45.26	52.15	46.48	45.35	48.07	45.95	47.51	47.29	47.04	47.01	46.89	48.60	-	48.41
Purity drop (%)	20.66	22.78	19.62	23.02	23.57	18.91	21.16	18.41	23.85	22.61	21.73	23.27	21.64	-	21.53
Exhaustion (%)	58.90	61.16	57.13	61.89	62.58	54.37	58.34	53.21	63.60	61.30	59.66	62.45	59.94	-	59.66
C - MASSECUITE															
m^3 per ton brix in mixed juice(adj.)	0.10	-	0.42	0.24	0.27	0.29	0.28	0.32	0.29	0.31	0.24	0.25	0.29	-	0.23
Refractometer brix of massecuite	96.05	97.04	98.14	97.14	96.57	96.30	96.24	96.29	96.98	96.82	97.96	97.60	96.44	-	96.90
Purity of massecuite (%)	55.17	53.54	54.95	53.95	54.29	55.53	53.52	54.39	53.32	55.86	51.43	53.88	56.37	-	54.68
Purity of C - molasses (%)	35.91	32.57	36.11	34.10	35.21	35.85	33.36	34.91	37.92	38.37	35.94	36.19	37.55	-	35.61
Crystal content (%)	28.86	30.18	28.94	29.26	28.44	29.54	29.11	28.82	24.06	27.47	23.69	27.05	29.07	-	28.69
Exhaustion (%)	54.47	58.09	53.66	55.84	54.25	55.24	56.52	55.02	46.52	50.80	47.02	51.44	53.46	-	54.15
TOTAL VOLUME ALL RAW MASSECUITES															
m^3 per ton brix in mixed juice(adj.)	1.83	-	2.21	1.57	1.75	1.73	1.56	1.81	1.84	2.02	1.67	1.69	1.84	-	1.53
WHITE SUGAR MASSECUITES															
Massecuite (kg sugar per m^3)	181	-	463	-	-	-	-	-	472	245	-	-	-	-	359
Tons limestone per 1000 tons white sugar	-	-	66.06	-	-	-	-	-	43.85	-	-	-	-	-	24.03
Tons coke per 1000 tons white sugar	-	-	8.85	-	-	-	-	-	4.50	-	-	-	-	-	2.68
Tons phosphoric acid per 1000 tons white sugar	-	-	-	-	-	-	-	-	0.00	2.72	-	-	-	-	0.57
Tons sulphur per 1000 tons white sugar	-	-	0.45	-	-	-	-	-	0.32	0.21	-	-	-	-	0.20
Phosphoric acid ppm mixed juice(unadj.)	-	-	-	-	-	-	-	-	-	-	42.17	27.79	3.78	-	3.90
Flocculant ppm mixed juice(unadj.)	3.78	2.34	4.50	10.77	2.96	3.59	1.59	3.72	3.16	6.91	5.06	6.00	5.24	-	4.47
Tons lime per 1000 tons cane	-	0.75	-	0.46	0.63	0.47	0.61	1.01	-	0.96	0.43	0.60	0.51	-	0.49
Enzyme (ppm sugar)	-	-	-	-	-	-	57.71	7.08	5.02	-	-	0.98	25.24	-	6.19
ADDITIONAL FUELS PER 1000 TONS CANE															
Tons of coal	18.00	1.39	19.60	7.08	18.57	11.55	1.21	33.57	9.63	26.67	6.92	0.34	12.78	-	12.32
Tons of wood	-	0.02	0.03	-	-	-	0.25	0.05	-	-	0.22	0.58	-	-	0.07
Converted into bagasse *	72.00	5.59	78.44	28.30	74.26	46.20	5.15	134.35	38.52	106.69	27.93	2.08	51.10	-	49.36

*** 1 ton coal is equivalent to 4 tons of bagasse**
1 ton firewood is equivalent to 1.2 tons of bagasse
1 ton sulphur dioxide is equivalent to 0.5 tons of sulphur

TABLE C2
MASSECUITES,EXHAUSTIONS,CLARIFYING AGENTS AND ADDITIONAL FUELS
SWAZILAND, MALAWI , ZIMBABWE ,ZAMBIA ,TANZANIA AND MOZAMBIQUE FACTORIES (SEASON 2011/12)

SYMBOLS OF FACTORIES	UB	NH	DW	HV	TR	NK	MW	RU	MA
A - MASSECUITE									
m^3 per ton brix in mixed juice (adj)	1.04	1.28	1.39	0.95	-	0.99	1.17	1.00	1.01
Refractometer brix of massecuite	93.02	94.23	92.13	92.20	92.40	92.89	92.50	93.26	92.19
Purity of massecuite (%)	83.62	89.45	87.90	87.37	85.79	87.88	85.56	83.41	86.34
Purity of A - molasses (%)	68.83	73.85	74.74	71.33	68.70	71.35	70.28	68.68	69.23
Purity drop (%)	14.79	15.60	13.15	16.04	17.09	16.52	15.27	14.73	17.11
Exhaustion (%)	56.74	66.69	59.25	64.03	63.64	65.64	60.07	56.38	64.39
Purity of A-massecuite - pty syrup (%)	0.68	2.34	0.60	0.81	-0.51	0.42	0.84	1.18	-0.15
Purity of remelt (%)	86.45	85.40	88.07	87.03	83.59	86.47	83.45	83.98	88.01
B - MASSECUITE									
m^3 per ton brix in mixed juice (adj)	0.49	0.30	0.48	0.41	-	0.42	0.50	0.47	0.35
Refractometer brix of massecuite	94.44	94.32	94.03	92.66	93.94	94.94	94.71	95.30	93.75
Purity of massecuite (%)	69.39	71.69	73.04	72.34	68.82	71.55	71.96	69.25	71.28
Purity of B - molasses (%)	50.58	54.51	52.04	53.65	48.40	50.14	50.08	47.59	45.74
Purity drop (%)	18.81	17.18	21.00	18.69	20.42	21.41	21.87	21.66	25.55
Exhaustion (%)	54.85	52.67	59.94	55.74	57.50	60.01	60.90	59.68	66.05
C - MASSECUITE									
$m^3$3 per ton brix in mixed juice (adj)	0.29	0.22	0.23	-	-	0.26	0.28	0.29	0.21
Refractometer brix of massecuite	97.14	96.80	96.20	95.88	96.26	96.52	96.96	97.75	96.82
Purity of massecuite (%)	53.93	59.62	55.78	55.77	55.63	55.75	52.86	54.02	54.03
Purity of C - molasses (%)	36.85	39.47	37.70	37.24	35.72	35.06	37.66	37.07	36.14
Crystal content (%)	26.28	32.22	27.91	28.31	29.81	30.75	23.65	26.33	27.13
Exhaustion (%)	50.16	55.83	52.01	52.94	55.67	57.15	46.14	49.87	51.85
TOTAL VOLUME ALL RAW MASSECUITES									
m^3 per ton brix in mixed juice	1.83	1.80	2.10	-	-	1.67	1.95	1.76	1.56
WHITE SUGAR MASSECUITES									
Massecuite (kg sugar per m^3)	-	454	491	-	-	771	-	-	-
Tons phosphoric acid per 1000 tons white sugar	-	1.61	-	-	-	0.78	-	-	-
Tons sulphur per 1000 tons white sugar	-	-	0.14		-	-	-	-	-
Phosphoric acid ppm mixed juice(unadj.)	-	-	-	-	-	-	-	-	-
Flocculant ppm mixed juice(unadj.)	-	-	2.7	3.7	3.2	2.4	3.3	3.1	-
Tons lime per 1000 tons cane	0.8	0.7	0.7	-	0.5	0.4	0.8	9.3	3.2
Enzyme (ppm sugar)	-	-	-	-	-	-	-	-	-
ADDITIONAL FUELS PER 1000 TONS CANE									
Tons of coal	12.07	-	-	4.66	9.28	-	-	-	0.12
Tons of wood	-	0.52	0.32	0.06	-	0.07	1.33	0.08	0.01
Converted into bagasse *	48.30	0.63	0.39	18.71	37.13	0.08	1.60	0.09	0.51

*** 1 ton coal is equivalent to 4 tons of bagasse**
1 ton firewood is equivalent to 1.2 tons of bagasse
1 ton sulphur dioxide is equivalent to 0.5 tons of sulphur

TABLE D
COMPARATIVE MANUFACTURING DATA OF RECENT YEARS
(SOUTH AFRICAN FACTORIES)

	2011/12	2010/11	2009/10	2008/09	2007/08
Throughput and time efficiency #					
Tons cane per hour	292.62	276.22	293.55	298.30	298.26
Tons fibre in bagasse per hour	43.92	40.02	42.88	43.83	43.48
Overall time efficiency	74.05	76.87	76.88	78.66	77.46
Cane					
Sucrose % cane	12.94	14.14	13.68	13.69	13.47
Fibre % cane	15.27	14.71	14.87	14.95	14.86
Mixed juice					
Sucrose purity(MJ adj.)	85.90	85.89	86.14	86.49	86.03
(Glucose + Fructose)/ash in M.J.(unadj.)	0.95	1.08	0.95	0.93	0.97
Milling					
Imbibition % fibre	331	352	338	349	367
Extraction (sucrose based)	97.14	97.28	97.44	97.61	97.82
Pol % bagasse	1.17	1.26	1.14	1.06	0.97
Moisture % bagasse	50.67	50.45	50.24	50.26	49.77
Bagasse % cane	31.73	30.57	30.71	30.80	30.19
LCV bagasse kJ/kg	7017	7227	7263	7218	7308
Available kJ in bag/kg brix in MJ (adj)	15215	13789	14415	14387	14408
Recoveries					
Boiling house recovery (sucrose based)	86.84	87.16	87.88	88.05	87.56
Overall recovery (sucrose based)	84.36	84.78	85.63	85.94	85.65
Tons cane per ton sugar	9.12	8.30	8.50	8.46	8.63
Filter cake					
Pol % filter cake	1.98	1.55	1.66	1.64	1.69
Filter cake % cane	1.60	1.36	1.29	1.33	1.53
Final molasses					
Brix % final molasses	83.55	84.12	84.45	84.67	84.84
Sucrose/refractometer brix purity	38.16	37.99	37.49	37.46	37.68
Final molasses @ 85^{o} brix % cane	4.07	4.41	4.03	4.01	4.12
Average sugar polarisation	99.57	99.57	99.58	99.54	99.53
Sucrose lost % sucrose in cane					
Lost in bagasse	2.86	2.72	2.56	2.39	2.18
Lost in filter cake	0.24	0.15	0.16	0.16	0.19
Lost in final molasses	10.19	10.06	9.39	9.32	9.79
Undetermined losses	2.35	2.28	2.27	2.19	2.19
Lost in boiling house	12.78	12.49	11.81	11.67	12.17
Total losses	15.64	15.22	14.37	14.06	14.35
M^3 massecuite per ton Bx in M.J.					
A - massecuite	0.94	0.93	0.93	0.92	0.92
B - massecuite	0.36	0.35	0.35	0.34	0.36
C - massecuite	0.23	0.23	0.22	0.22	0.23
Total	1.53	1.50	1.51	1.48	1.51
Exhaustion of massecuites					
A - massecuite	61.42	62.87	63.39	63.12	62.41
B - massecuite	59.66	59.65	60.24	59.79	59.72
C - massecuite	54.15	54.81	55.26	54.92	55.74
Brix of syrup	65.28	65.48	65.45	65.14	65.89

 # 2011/12 season's throughputs, for factories with double tandems, were calculated using concurrent crushing hours.

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TABLE E
AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS
FOR SOUTH AFRICAN FACTORIES (SEASON 2011/12)

End of month period		02 APR 2011	30 APR 2011	28 MAY 2011	02 JUL 2011	30 JUL 2011	27 AUG 2011	01 OCT 2011	29 OCT 2011	03 DEC 2011	31 DEC 2011	28 JAN 2012
Tons of sugar made and estimated	**Month**	15049	79645	187988	279239	227004	246369	320367	224265	211975	50240	0
	To-date	15049	94694	282682	561921	788925	1035295	1355662	1579928	1791903	1842143	1842143
Tons cane crushed	**Month**	159375	814378	1850254	2553416	2021121	2149181	2729265	1924102	2042658	556526	0
	To-date	159375	973753	2824007	5377422	7398544	9547724	12276989	14201092	16243750	16800277	16800277
Tons cane crushed per hour (actual crushing)	**Month**	190.10	261.70	282.15	299.52	313.57	311.68	287.59	295.65	274.84	254.95	0.00
	To-date	190.10	246.51	268.97	283.36	290.20	295.90	294.03	295.00	293.45	292.62	292.62
Sucrose % cane	**Month**	12.00	12.15	12.04	12.79	13.09	13.34	13.66	13.64	12.52	11.60	0.00
	To-date	12.00	12.13	12.07	12.41	12.60	12.76	12.96	13.06	12.99	12.94	12.94
Fibre % cane	**Month**	14.59	13.98	14.75	14.62	14.53	15.18	15.14	15.87	16.81	18.04	0.00
	To-date	14.59	14.08	14.52	14.56	14.55	14.69	14.79	14.94	15.18	15.27	15.27
RV % cane	**Month**	10.67	10.90	10.79	11.55	11.87	12.14	12.42	12.38	11.16	10.12	0.00
	To-date	10.67	10.86	10.82	11.16	11.36	11.53	11.72	11.81	11.71	11.66	11.67
Tons cane per ton sugar	**Month**	10.59	10.23	9.84	9.14	8.90	8.72	8.52	8.58	9.64	11.08	0.00
	To-date	10.59	10.28	9.99	9.57	9.38	9.22	9.06	8.99	9.07	9.12	9.12
Extraction (sucrose based)	**Month**	96.59	96.81	97.08	97.25	97.34	97.21	97.35	97.20	96.83	96.17	0.00
	To-date	96.59	96.78	96.98	97.11	97.17	97.18	97.22	97.22	97.17	97.14	97.14
Imbibition % fibre	**Month**	354	331	334	333	335	330	336	331	325	293	0
	To-date	354	335	334	334	334	333	334	333	332	331	331
Pol % bagasse	**Month**	1.27	1.32	1.13	1.15	1.16	1.18	1.16	1.17	1.14	1.18	0.00
	To-date	1.27	1.31	1.19	1.17	1.17	1.17	1.17	1.17	1.17	1.17	1.17
Moisture % bagasse	**Month**	53.26	51.17	51.26	51.00	50.66	50.70	50.17	50.26	50.49	50.54	0.00
	To-date	53.26	51.54	51.36	51.19	51.04	50.97	50.79	50.71	50.68	50.67	50.67
Boiling house recovery (sucrose based)	**Month**	81.08	82.81	86.55	87.55	87.79	88.02	87.88	87.47	85.28	80.60	0.00
	To-date	81.08	82.53	85.16	86.33	86.75	87.04	87.24	87.27	87.03	86.84	86.84
Overall recovery (sucrose based)	**Month**	78.32	80.17	84.02	85.14	85.45	85.56	85.55	85.02	82.57	77.52	0.00
	To-date	78.32	79.87	82.58	83.84	84.29	84.59	84.82	84.85	84.57	84.36	84.36
Mixed juice sucrose purity	**Month**	83.14	84.33	84.67	85.65	86.25	86.78	86.86	86.80	85.33	82.78	0.00
	To-date	83.14	84.13	84.48	85.05	85.39	85.71	85.98	86.09	86.00	85.90	85.90
Pol/sucrose ratio in mixed juice	**Month**	0.9904	0.9839	0.9870	0.9871	0.9904	0.9944	0.9956	0.9944	0.9929	0.9869	0.0000
	To-date	0.9904	0.9849	0.9863	0.9867	0.9877	0.9893	0.9908	0.9913	0.9915	0.9914	0.9914
Sucrose/refractometer brix purity in final molasses	**Month**	38.61	39.63	37.08	36.30	37.10	38.31	38.25	38.60	39.72	42.23	0.00
	To-date	38.61	39.45	37.97	37.20	37.18	37.42	37.60	37.74	38.00	38.16	38.16
Sucrose lost in final molasses % sucrose in cane	**Month**	13.14	12.71	10.57	9.66	9.42	9.41	9.47	9.73	11.64	13.74	0.00
	To-date	13.14	12.78	11.33	10.51	10.20	10.02	9.89	9.87	10.08	10.19	10.19
Undetermined lost sucrose % sucrose in cane	**Month**	4.95	3.73	2.26	2.24	2.25	1.99	2.09	2.19	2.33	4.47	0.00
	To-date	4.95	3.93	2.84	2.54	2.46	2.35	2.29	2.28	2.28	2.35	2.35
Pol/sucrose ratio FM	**Month**	0.9300	0.9181	0.8934	0.9044	0.9123	0.9363	0.9475	0.9593	0.9633	0.9824	0.0000
	To-date	0.9300	0.9201	0.9038	0.9041	0.9063	0.9129	0.9206	0.9260	0.9313	0.9333	0.9333

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TABLE F
CANE VARIETIES AND RAINFALL
(SEASON 2011/12)
PERCENTAGE BY MASS

Factories	N 12	N 14	N 16	N 17	N 19	N 21	N 22	N 23	N 25	N 26	N 27	N 29	N 30	N 31	N 32	N 35	N 36	N 39	N 41	N 43	N 46	N 47	N 48	NCo 376	MIXED VARIETY	UNKNOWN AND OTHER	BURNT %	* RAINFALL mm
ML	-	10.9	-	-	19.5	-	1.1	7.5	35.5	0.8	-	-	0.6	-	6.4	-	11.3	-	0.5	-	2.7	-	-	-	2.5	0.7	99.6	219
KM	-	18.4	-	-	25.4	-	1.1	8.1	21.7	0.1	-	-	0.6	-	7.4	-	8.6	-	1.0	0.1	2.5	-	-	-	4.8	-	99.6	427
PG	-	11.2	-	-	4.8	-	0.3	8.1	17.5	5.0	-	-	0.2	-	0.5	-	19.5	-	10.7	3.1	2.5	-	-	-	8.0	8.6	98.6	318
UF	0.2	0.6	-	2.3	23.6	0.2	0.6	5.1	4.2	0.5	7.9	2.1	-	-	-	0.3	2.5	1.0	4.6	-	-	-	-	3.5	3.7	37.1	98.6	488
FX	2.0	0.9	0.1	2.3	3.3	0.3	0.1	0.8	4.4	0.3	22.1	1.4	-	-	-	2.7	8.5	0.9	4.2	0.3	0.2	-	-	4.2	3.7	37.5	84.0	784
AK	11.6	0.1	3.4	1.5	2.9	1.4	-	-	0.6	-	18.4	3.0	-	2.4	-	1.5	1.7	11.4	2.2	-	-	0.1	-	2.6	5.9	29.4	94.4	767
DL	10.9	-	3.5	1.0	2.5	0.6	-	-	-	-	25.0	3.4	-	7.3	-	0.2	0.2	8.2	0.5	-	-	0.1	-	2.8	0.2	33.5	88.6	839
MS	9.8	-	2.6	3.0	0.8	0.8	-	-	0.2	-	12.9	3.2	-	12.3	-	0.6	0.1	7.0	0.5	-	-	0.1	-	12.8	6.3	27.1	79.0	808
GH	11.1	-	9.2	1.5	2.0	0.3	-	-	0.0	0.6	11.0	2.6	-	4.7	-	1.7	0.2	4.4	0.7	-	-	0.1	-	7.7	7.6	34.6	85.0	846
NB	60.2	-	8.5	-	-	0.6	-	-	0.3	-	0.3	0.1	-	9.6	-	3.6	3.2	3.1	1.1	-	-	-	0.3	-	0.4	8.7	97.6	469
UC	46.4	-	11.8	-	-	0.1	-	0.1	0.3	-	0.1	0.1	-	10.7	0.1	1.3	3.7	4.0	0.6	-	-	-	0.4	-	-	20.2	99.6	707
ES	62.6	-	5.7	0.1	-	-	-	-	-	0.1	0.3	0.1	0.2	14.0	-	3.1	0.8	1.2	0.3	-	-	-	-	-	0.9	10.7	91.5	489
SZ	17.8	0.1	2.1	-	-	0.3	-	-	-	-	3.2	1.0	-	0.3	-	0.1	0.1	7.9	0.3	-	-	-	-	1.3	5.7	60.0	73.4	1266
UK	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Average SA Factories	14.8	4.6	2.8	0.8	8.3	0.3	0.3	2.9	8.6	0.6	7.1	1.1	0.2	3.5	1.7	1.0	5.3	3.4	2.1	0.3	0.8	-	-	2.3	4.1	23.3	91.2	
UB	-	1.5	-	-	12.0	-	-	29.3	32.5	0.2	-	-	-	-	-	-	0.7	-	-	-	0.3	-	-	11.2	12.4	-	-	316
NH	-	5.8	-	-	-	-	-	-	12.0	-	-	-	-	-	24.1	-	1.4	-	-	-	-	-	-	-	6.8	49.9	-	159
DW	-	9.0	-	-	7.3	-	-	2.8	8.0	-	-	-	-	-	0.7	0.1	1.4	-	-	-	-	-	-	0.8	4.1	65.9	-	285
HV	-	78.7	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.2	0.4	16.6	-	215
TR	-	86.9	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	9.4	1.4	2.3	-	170
NK	-	0.2	-	-	13.5	-	0.1	15.1	56.4	-	-	-	-	-	-	-	-	-	8.5	-	-	-	-	0.1	5.6	0.7	-	42
MW	0.2	-	-	-	8.7	-	-	0.3	14.0	-	0.2	-	0.2	-	0.1	-	0.7	-	7.7	-	-	-	-	52.8	12.8	2.3	-	1125
RU	0.7	-	-	-	6.2	-	-	0.3	15.2	-	0.1	-	0.3	-	0.1	-	0.3	0.2	4.2	-	-	-	-	56.7	6.1	9.7	-	1125
MA	-	-	-	-	24.8	-	-	50.1	3.7	-	-	-	-	-	-	-	-	-	0.2	-	-	-	-	6.4	9.4	5.4	-	244

*** Rainfall during the crushing season**

TABLE G
TRANSPORT SUMMARY - SOUTH AFRICAN FACTORIES
(SEASON 2011/12)
PERCENT OF CANE TRANSPORTED

FACTORIES	ML	KM	PG	UF	FX	AK	DL	MS	GH	NB	UC	ES	SZ	UK	AVERAGE
SOUTH AFRICAN RAILWAYS	-	-	-	-	16.0	-	-	-	-	-	-	-	-	-	1.6
TRAMS	-	-	-	72.7	-	-	0.5	-	-	-	-	-	-	-	4.9
TANKERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARTICULATED TRUCK DRIVEN VEHICLES															
- Interlink	0.7	-	14.2	21.9	67.5	33.7	42.3	87.9	54.1	27.3	24.7	40.4	94.7	-	38.3
- Tri-Axle	-	-	14.4	-	0.8	-	6.0	0.3	10.1	3.1	-	6.5	-	-	2.7
- Hilo	2.9	-	6.6	4.4	1.0	-	6.0	-	0.2	2.7	-	-	2.3	-	1.9
RIGID CHASSIS VEHICLES															
- Truck	91.8	73.0	4.2	-	4.1	27.4	4.8	-	24.7	39.4	32.4	34.4	3.0	-	30.2
- Lorry	3.3	-	2.2	-	-	-	0.3	-	-	2.4	13.2	-	0.1	-	1.2
TRACTOR DRIVEN VEHICLES															
- Hilo	-	-	11.1	0.4	5.7	10.3	8.1	1.0	2.8	20.9	5.7	17.2	-	-	5.5
- Rig	1.3	24.8	-	-	4.0	15.4	15.2	1.2	8.0	1.6	4.8	-	-	-	6.7
- Interlink	-	2.2	47.3	0.6	1.0	13.2	16.8	9.7	-	2.7	19.2	1.5	-	-	7.0

COMPARATIVE DATA OF REPORTING S.A. FACTORIES FROM 1925 ONWARDS
TABLE H

PERIOD (SEASON)	Percent Cane		Cane / sugar Ratio		Extraction	Pol % fibre in Bagasse	Percent Bagasse		Imbibition Percent		Mixed Juice		Final Molasses Suc/brix Purity Chem.suc.	Boiling House Recovery	Overall Recovery
	Pol	Fibre	Tel Quel	96° Pol Sugar	Pol based		Pol	Moisture	Cane	Fibre	Purity Pol based	Reducing Sugar/ Pol ratio		Pol based	Pol based
Average 1925 - 1934	**13.19**	**15.78**	**9.86**	**9.64**	**89.83**	**8.86**	**3.88**	**50.57**	**27.6**	**175**	**85.09**	**3.65**	**45.3**	**83.67**	**75.12**
Average 1935 - 1944	**13.53**	**15.30**	**8.96**	**8.73**	**92.05**	**7.05**	**3.11**	**51.60**	**32.6**	**213**	**86.01**	**3.22**	**43.3**	**88.36**	**81.34**
Average 1945 - 1954	**13.79**	**16.06**	**8.60**	**8.36**	**93.04**	**5.95**	**2.69**	**51.32**	**33.8**	**210**	**85.95**	**3.29**	**40.7**	**89.46**	**83.23**
Average 1955 - 1964	**13.53**	**15.49**	**8.75**	**8.49**	**93.43**	**5.73**	**2.51**	**52.78**	**36.3**	**235**	**85.24**	**3.67**	**39.6**	**89.58**	**83.69**
Average 1965 - 1974	**13.16**	**15.22**	**8.95**	**8.68**	**95.00**	**4.35**	**1.91**	**53.15**	**41.7**	**274**	**84.80**	**4.15**	**39.3**	**88.49**	**84.06**
Average 1975 - 1980	**12.80**	**15.61**	**9.09**	**8.77**	**96.20**	**3.26**	**1.45**	**52.50**	**46.3**	**309**	**84.85**	**5.37**	**38.4**	**88.92**	**85.54**
From 1981 onwards data are sucrose based	***Sucrose based***				***Sucrose based***						***Sucrose based***	***(F + G) / suc.ratio***	***Sucrose based***	***Sucrose based***	***Sucrose based***
Average 1981 - 1984	**12.44**	**15.88**	**9.44**	**9.12**	**97.12**	**2.36**	**1.09**	**51.74**	**52.6**	**347**	**85.17**	**5.88**	**37.2**	**87.25**	**84.74**
Average 1985 - 1994	**12.86**	**15.36**	**9.07**	**8.74**	**97.72**	**1.95**	**0.92**	**51.01**	**54.8**	**368**	**85.04**	**5.58**	**37.0**	**87.50**	**85.50**
1995	11.73	15.84	9.99	9.64	97.69	1.78	0.83	51.70	54.9	356	83.60	6.09	37.3	85.93	83.94
1996	12.60	15.36	9.20	8.88	97.72	1.92	0.90	51.40	50.4	337	85.38	5.23	37.3	87.82	85.82
1997	12.62	15.38	9.15	8.83	97.74	1.91	0.90	51.12	49.9	334	86.15	4.72	37.5	88.09	86.10
1998	13.36	14.66	8.65	8.35	97.73	2.11	1.00	51.00	49.1	343	86.17	5.31	37.2	88.08	86.09
1999	13.77	14.76	8.36	8.06	97.93	1.97	0.94	50.81	52.3	362	86.51	4.73	37.7	88.33	86.50
2000	13.08	14.98	8.74	8.44	97.79	1.97	0.95	49.95	51.3	348	86.46	4.82	37.2	88.97	86.99
2001	13.11	14.97	8.81	8.50	97.74	2.02	0.95	50.81	54.3	369	85.92	4.94	37.1	88.18	86.19
2002	13.71	14.80	8.32	8.02	97.96	1.93	0.92	50.08	53.3	366	87.31	4.16	37.2	89.11	87.29
2003	13.70	14.81	8.42	8.12	97.87	2.01	0.96	50.34	54.5	375	86.36	4.59	37.9	88.14	86.26
2004	13.52	14.84	8.53	8.23	97.98	1.87	0.90	49.93	53.9	369	85.81	4.92	36.9	88.00	86.23
Average 1995 - 2004	**13.12**	**15.04**	**8.82**	**8.51**	**97.82**	**1.95**	**0.93**	**50.71**	**52.4**	**356**	**85.97**	**4.95**	**37.4**	**88.07**	**86.14**
2005	13.74	14.66	8.37	8.08	98.03	1.87	0.91	49.57	54.8	380	85.59	5.12	36.7	88.25	86.52
2006	12.85	14.95	8.99	8.68	97.84	1.91	0.92	49.76	54.5	372	85.55	4.98	37.4	87.51	85.61
2007	13.47	14.86	8.63	8.32	97.82	2.02	0.97	49.77	53.5	367	86.03	4.62	37.7	87.56	85.65
2008	13.69	14.95	8.46	8.16	97.61	2.23	1.06	50.26	51.3	349	86.49	4.41	37.5	88.05	85.94
2009	13.68	14.87	8.50	8.20	97.44	2.40	1.14	50.24	49.4	338	86.14	4.51	37.5	87.88	85.63
2010	14.14	14.71	8.30	8.01	97.28	2.66	1.26	50.45	51.0	352	85.89	5.17	38.0	87.16	84.78
2011	12.94	15.27	9.12	8.79	97.14	2.46	1.17	50.67	49.7	331	85.90	4.57	38.2	86.84	84.36
Average 2005 - 2011	**13.50**	**15.17**	**8.62**	**8.32**	**97.59**	**2.22**	**1.06**	**50.10**	**52.0**	**356**	**85.94**	**4.77**	**37.6**	**87.61**	**85.50**