EIGHTY-FOURTH ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA (2008-2009)

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Abstract

Performance, throughput and other relevant aspects of the sugar industries in southern Africa are presented and discussed. Data from sugar mills in South Africa, Malawi, Mozambique, Swaziland, Tanzania, Zambia and Zimbabwe are included. The 2008-2009 milling season in South Africa was slightly better than the 2007-2008 season in terms of cane quality and recoveries, although the tonnage of cane harvested was lower. Time efficiencies showed general improvement, with less No-cane and Other stops. However, extraction performance was not as good as previously, showing a substantial decline in the last two seasons. Losses to molasses were much reduced, although undetermined loss results were mixed. Overall, though, the 2008-2009 season showed improved results in terms of overall recovery and value recovery.

Regarding the Affiliate mills in neighbouring countries, those in Zambia and Zimbabwe experienced poorer recoveries than in the previous season, while the Maragra mill in Mozambique showed the most notable improvement over previous seasons.

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

Introduction

This paper reviews the 2008-2009 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 (SMRI)[1,2]. Note that all Swaziland data for 2008-2009 in this review refers to Ubombo mill only and Mozambique data is for Maragra mill only. Detailed information on factory performance in 2008-2009 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 Co. Ltd., 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 and Mafambisse (Mozambique) are Affiliate Members of the SMRI, data for the 2008-2009 season were not available at the time of compilation of this review.

Cane crop

Cane varieties

The varietal distribution at southern African mills for the 2008-2009 season is shown in Appendix Table F. There were no significant changes in South Africa since the 2007-2008 season. However, at many of the mills there were still large percentages of unknown and mixed varieties delivered, so these trends should be viewed with caution. At many of the Affiliate mills, the percentage of NCo376 continued to decrease, while variety N25 continued to replace N14 at NK.

Burning

The overall percentage of cane burnt in South Africa increased slightly from the levels of the previous three seasons to 91.5% (Appendix Table F), with the largest increases at DL, MS, GH and ES.

Cane quality

Trends in the cane quality indicators of Recoverable Value (RV) % cane, Estimated Recoverable Crystal (ERC) % cane, Ash % cane and Mixed Juice sucrose purity over the past 10 seasons in South Africa are shown in Figures 1a to 1c. Cane quality in terms of ERC continued to increase from the poor value in 2006-2007 to 11.79%, while the Ash level reversed its upward trend of the past five seasons to record a value of 1.80%. The mixed juice purity again increased, with the value of 86.5% being above the 10 year average, and the highest since the 2002-2003 season.

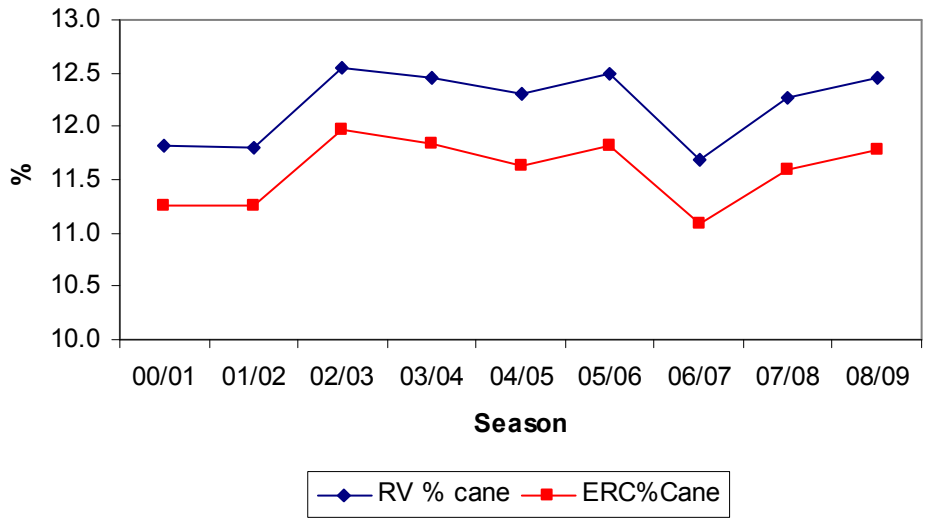

Figure 1a. Recoverable Value (RV) % cane and Estimated Recoverable Crystal (ERC) % cane in South Africa.

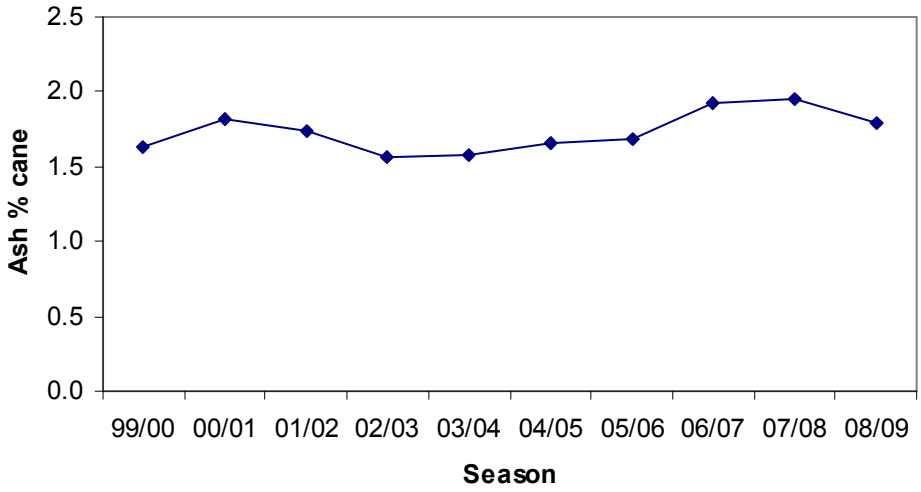

Figure 1b. Ash % cane in South Africa.

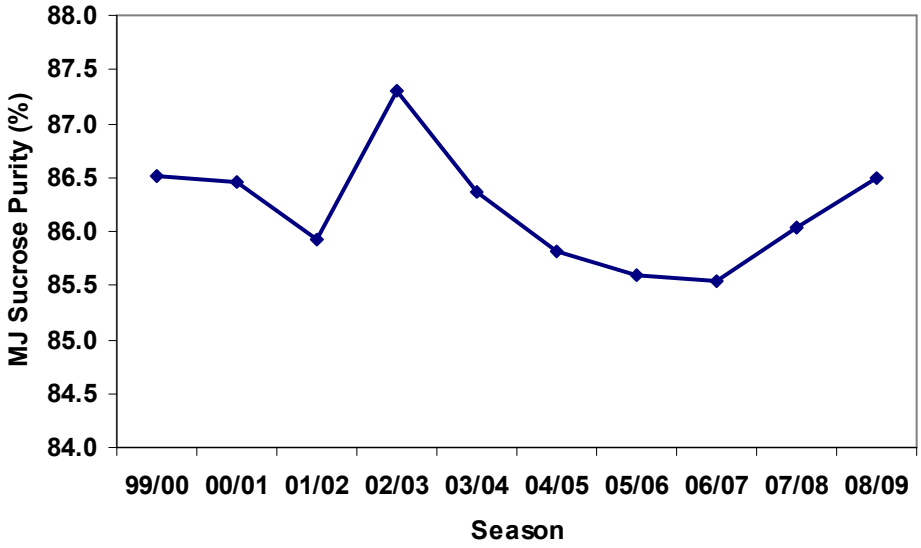

Figure 1c. Mixed juice sucrose purity in South Africa.

The monthly RV % cane for the past three seasons in South Africa (Figure 2) shows that the cane quality during the 2008-2009 season was better than the previous two years for most of the season. A steep drop was, however, again seen from October onwards. The industry average value for the season rose to 12.48% from a low value of 11.68% recorded in 2006-2007 and 12.26% in 2007-2008, and almost reached the level of the 2005-2006 season of 12.49%. This trend was reflected in individual mill values, with the notable exceptions of UCL Co. Ltd., Sezela and Umzimkulu, which declined from the previous season. Amatikulu, Maidstone, Noodsberg and Eston have all improved by over one unit of RV since the 2006/07 season.

The RV trend shows the normal curve with a maximum reached in September, despite there being high rainfall in April, June and September, the first two being unseasonal (Figure 3). The June rain was concentrated over the KwaZulu-Natal south coast and resulted in stops at

Sezela (628 mm) and Umzimkulu (410 mm). The total rainfall recorded at mills during the crushing season ranged from 337 mm at Komati to 992 mm at Sezela (Appendix Table F). This extensive rainfall had serious consequences for factory operations, as will be shown later and also reduced the crop size because of extensive cloud cover associated with the rains.

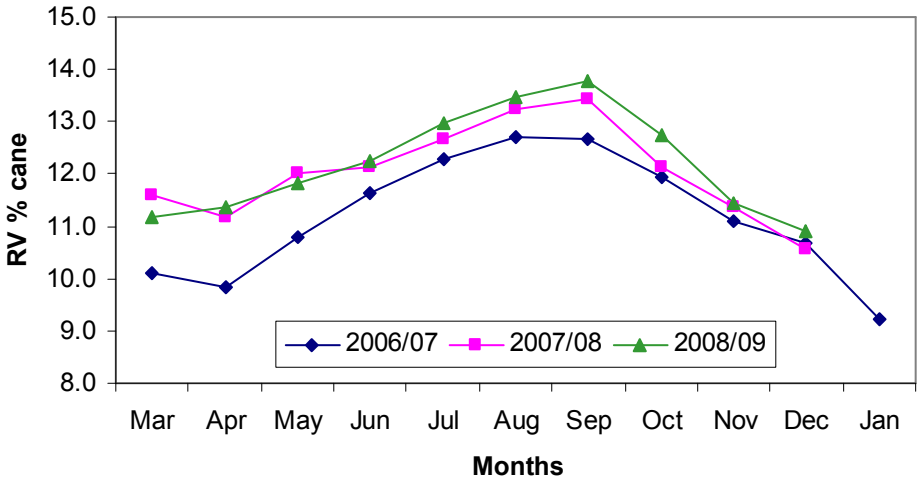

Figure 2. Monthly RV % cane in South Africa for the 2006-2007, 2007-2008 and 2008-2009 seasons.

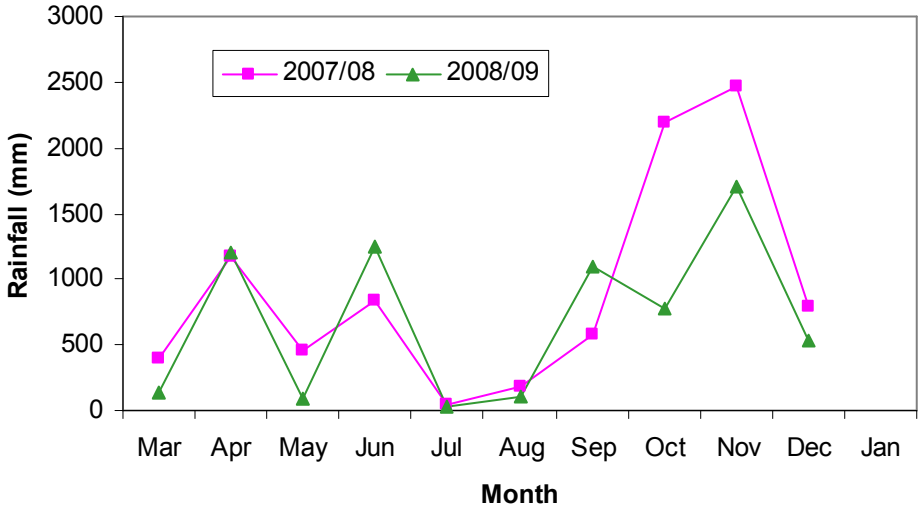

Figure 3. Monthly total rainfall at crushing, South African mills for the 2007-2008 and 2008-2009 seasons (values are the monthly rainfalls summed over all mills crushing during the month).

Considering the whole region, cane quality in terms of ERC % cane improved slightly from 2007-2008 to 2008-2009 in all the countries under review other than Zambia, where it showed little change (Figure 4).

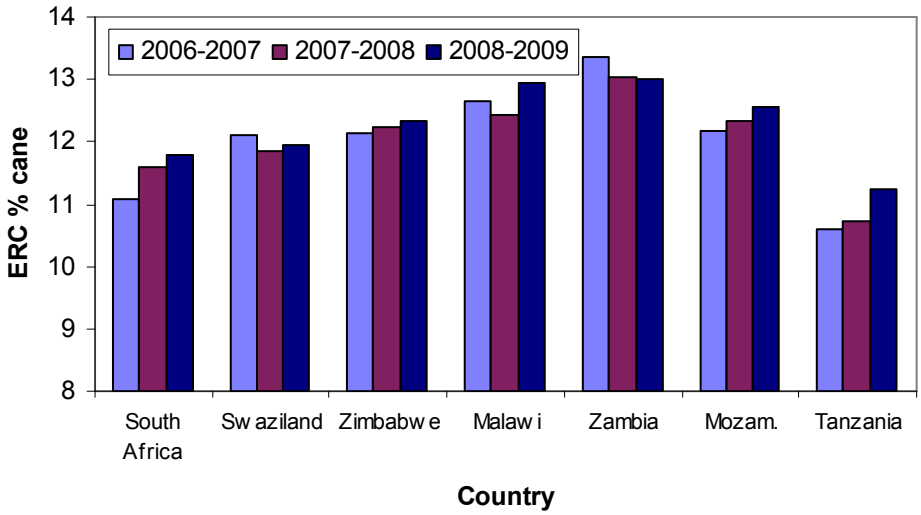

Figure 4. ERC % cane in southern Africa from 2006-2007 to 2008-2009.

Cane tonnage

Initial predictions for the 2008-2009 season in South Africa by the South African Sugarcane Research Institute (SASRI) Canesim crop model forecast (http://sasri.sasa.org.za/cropest/) were for a smaller crop than was crushed in 2007-2008 as a result of below average rainfall in most regions and restricted water supplies in some irrigated areas. Despite later increases in estimates following good rains during April (most areas) and June (South Coast), a reduction of around 5% from the 2007-2008 crop size was predicted by Canesim. The final tonnage of cane crushed during 2008-2009 was 19.26 million tons, which, while better than the initial low estimates, was still the second lowest in the last 10 years, and continued the recent declining trend (Figure 5).

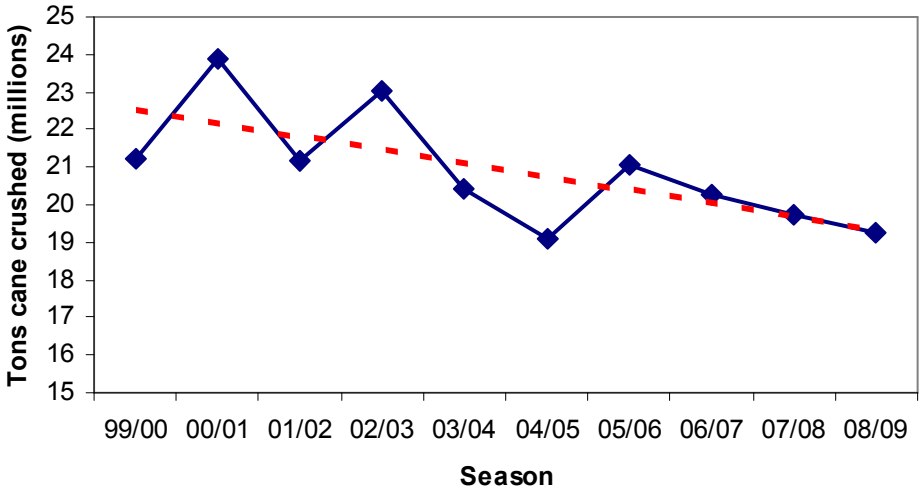

Figure 5. Cane tonnages in South Africa with linear trend line.

Factory Performance

Length of milling season

The 2007-2008 season in South Africa ran from 11 March 2008 (Pongola and Eston) until 31 December 2008 (Komati), with only Komati and Malelane crushing after the Christmas holidays. The average length of the season was 249 days, with Pongola having the longest season of 284 days and Gledhow the shortest of 205 days. The lengths of the milling seasons in other southern African countries ranged from 196 days at Maragra in Mozambique to 304 days at Triangle in Zimbabwe.

Time efficiences

The time efficiencies for South Africa in the 2008-2009 season improved over those of the 2007-2008 season, but remained well below the values of the 2004-2005 and 2005-2006 seasons (Figure 6). While No-cane stops were less in 2008-2009 than in 2007-2008, Other stops decreased slightly, leading to a small decrease in the industry average Lost Time % Available to 6.90 in 2008-2009.

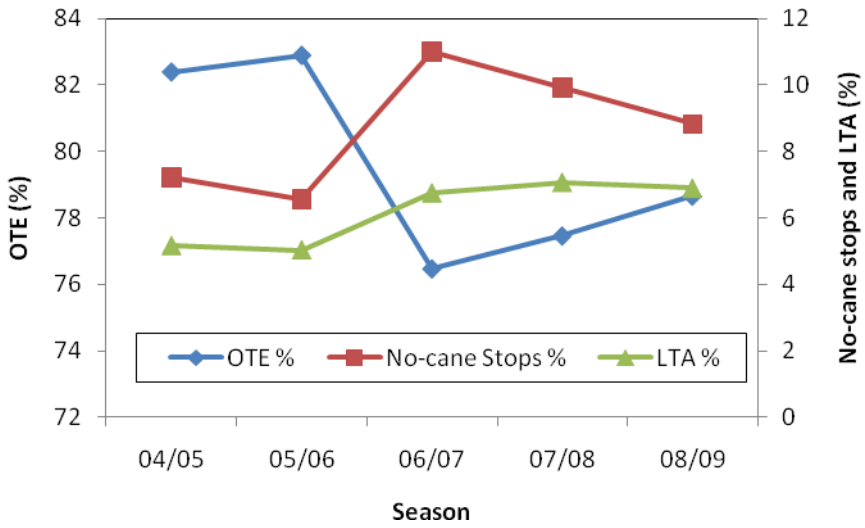

Figure 6. Overall Time Efficiency (OTE), Lost Time % Available (LTA) and No-cane stops in South Africa from 2004-2005 to 2008-2009

The No-cane stops at individual mills in 2007-2008 and 2008-2009 (Figure 7) indicated an improved cane supply at most mills, with the exception of Felixton, Gledhow, Noodsberg and the South Coast mills. The greatest improvement was at Maidstone, as the result of a 4.5% increase in cane supply and a reduction in crush rate from 330 to 320 tons of cane per hour. By contrast, Gledhow suffered from a 23% reduction in cane supply due to a change in delivery patterns by growers, resulting in a large increase in No-cane stops, despite a reduction in crush rate from 283 to 276 tons of cane per hour. Monthly values of No-cane stops exceeded 10% for April, October, November and December, corresponding closely with the rainfall pattern.

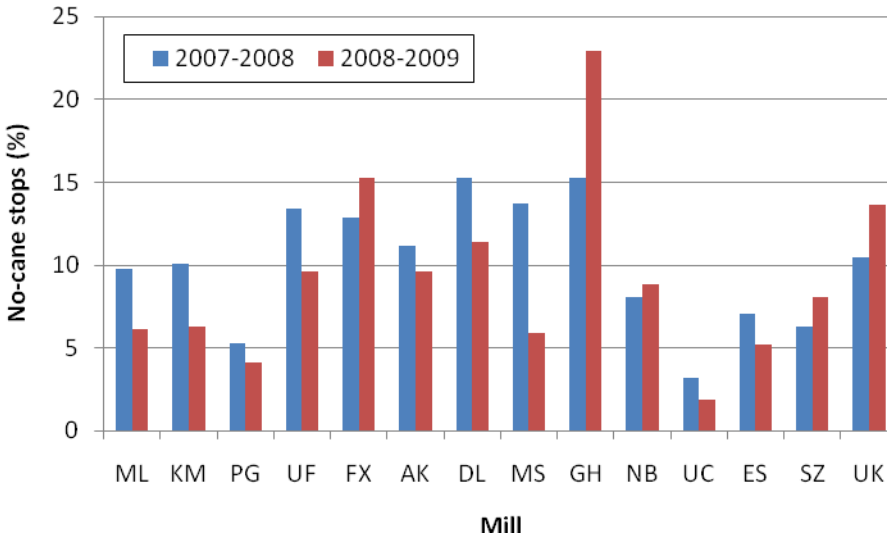

Figure 7. No-cane stops at South African mills for the 2007-2008 and 2008-2009 seasons.

Overall time efficiencies for Malawi, Swaziland (Ubombo) and Tanzania were again better than the South African industrial average, while Mozambique (Maragra), Zambia and Zimbabwe suffered from considerable No-cane stops, and Zambian and Zimbabwean factories recorded high percentages of Other stops, both of which reduced their OTEs to relatively poor values below that of the South African average (Appendix Table A2).

Extraction and clarification

Extraction in the South African industry continued its declining trend from the record value of 98.03% in the 2005-2006 season to a value of 97.61% in 2008-2009, the lowest value since the 1988-1989 season (97.60%). This is a disturbing trend, as consideration of the parameters shown in Appendix Table H reveals that in recent years, better extraction values have been achieved with lower imbibition rates, higher bagasse moistures and poorer cane than in the 2008-2009 season. Figure 8 shows that the Corrected Reduced Extraction (CRE) value, which corrects for variations in cane quality, has also dropped to the lowest value in the last 20 years, yet the imbibition rate, while low, is still well above the low values of the mid-1990s. The pol % bagasse value of 1.06% in 2008-2009 is the highest value recorded for the industry since the 1983-1984 season of 1.08%, and leads one to wonder whether this may be a consequence of the severe skills shortages being experienced in our industry at present.

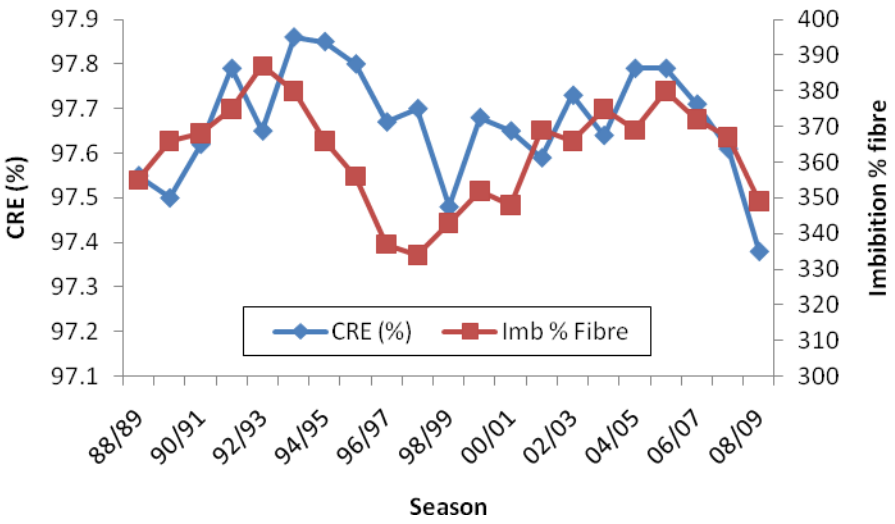

Figure 8. Corrected Reduced Extraction (CRE) and Imbibition % Fibre for the South African industry from 1988-1989 to 2008-2009.

The extraction values for individual South African factories for the 2007-2008 and 2008-2009 seasons are shown in Figure 9. It can be seen that some factories maintained or even improved their extraction values from 2007-2008 to 2008-2009, but most showed a decrease in extraction performance. In the 2008-2009 season, six factories (Amatikulu, Felixton, Komati, Malelane, Maidstone and Umzimkulu) routed clarifier mud back to the diffusers throughout the entire season, while Pongola operated with partial recycling.

Among the Affiliated mills in 2008-2009, pol-based extraction maintained similar values to the 2007-2008 season (Figure 10), apart from Hippo Valley, which showed a substantial drop of 2.18% due to poor cane quality (high fibre), reduced imbibition rates and pol losses arising from frequent operational stops, and Nakambala and Msolwa, where smaller drops were experienced, but from an already low value.

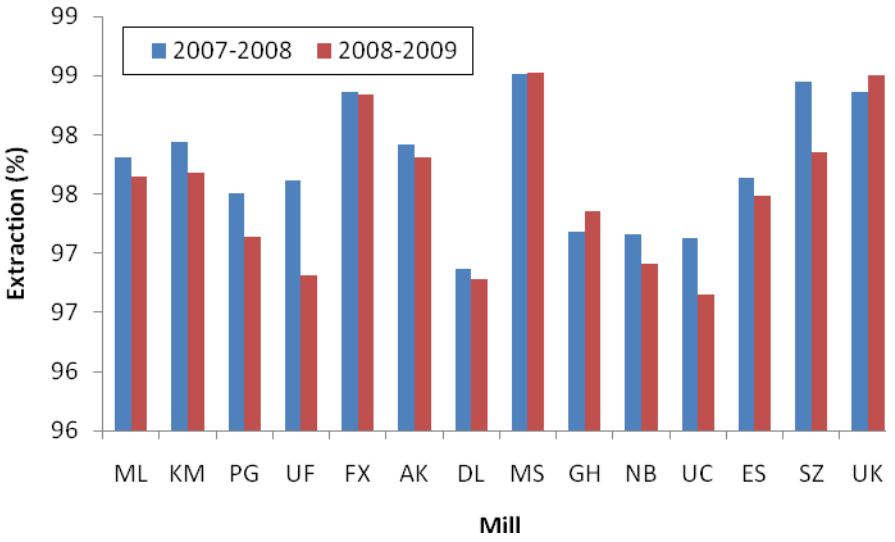

Figure 9. Extraction at South African mills for the 2007-2008 and 2008-2009 seasons.

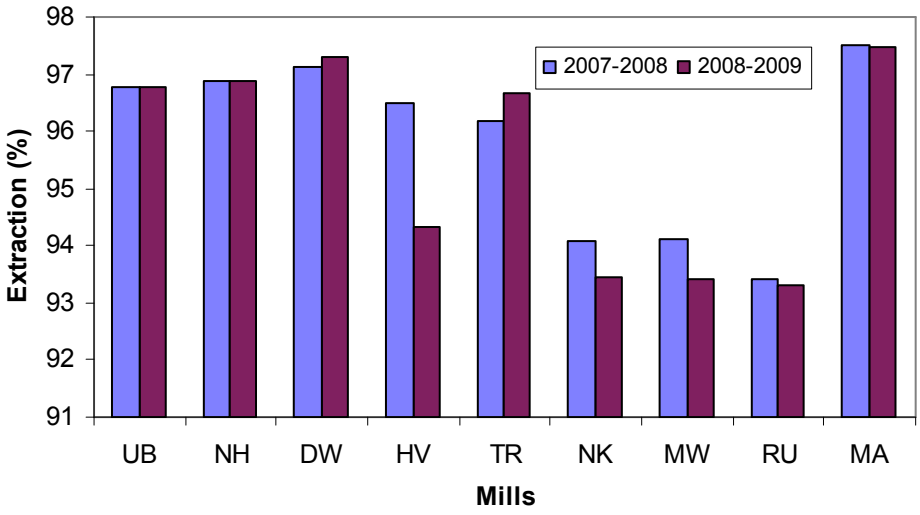

Figure 10. Pol-based extraction at southern African mills for the 2007-2008 and 2008-2009 seasons.

Boiling house performance

Boiling house performance in South Africa in 2008-2009 showed some improvement over the 2007-2008 season, with a season average Boiling House Recovery (BHR) for the industry of 88.05% (Figure 11). The Corrected Reduced BHR (CRB) also improved to a similar degree, indicating better boiling house work. The overall loss of sucrose to molasses as a percentage of sucrose in cane (Figure 12) has shown a welcome drop to the lowest value since the 2002-2003 season at 9.32%.

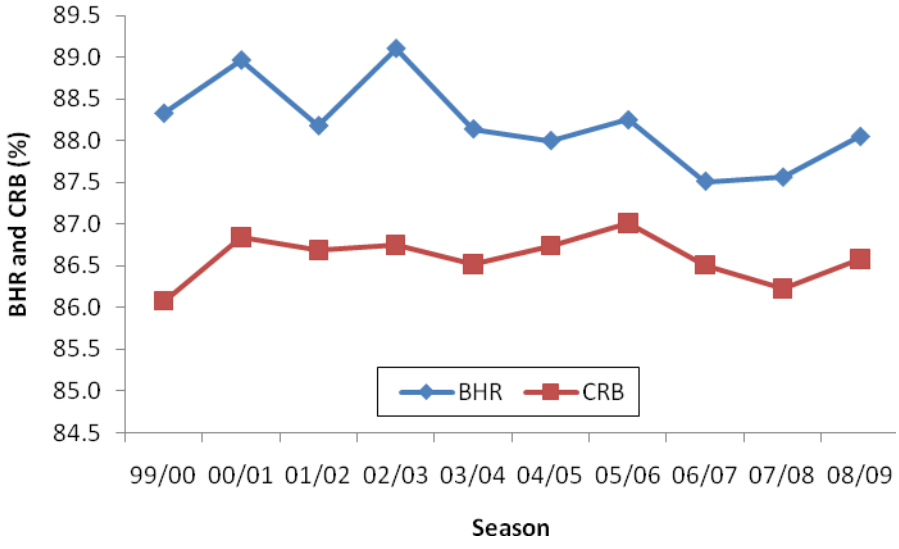

Figure 11. Boiling House Recovery (BHR) and Corrected Reduced BHR (CRB) in South Africa from the 1999-2000 season to 2008-2009.

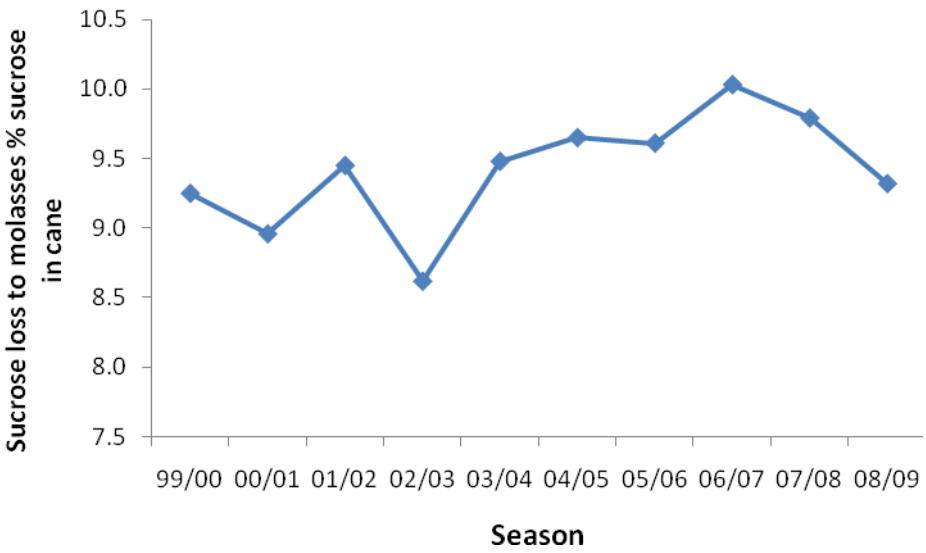

Figure 12. Sucrose loss to molasses in South Africa from the 1999-2000 season to 2008-2009.

Undetermined Loss % sucrose in cane in 2008-2009 was remarkably the same value as in 2007-2008 at 2.19% (Figure 13), maintaining the highest value since 1993-1994. Although several mills (Felixton, Noodsberg, UCL Co. Ltd. and Umfolozi) showed noticeable improvements over their 2007-2008 values (Figure 14), Malelane and particularly Pongola showed substantial increases in undetermined losses, largely due to increased inversion losses.

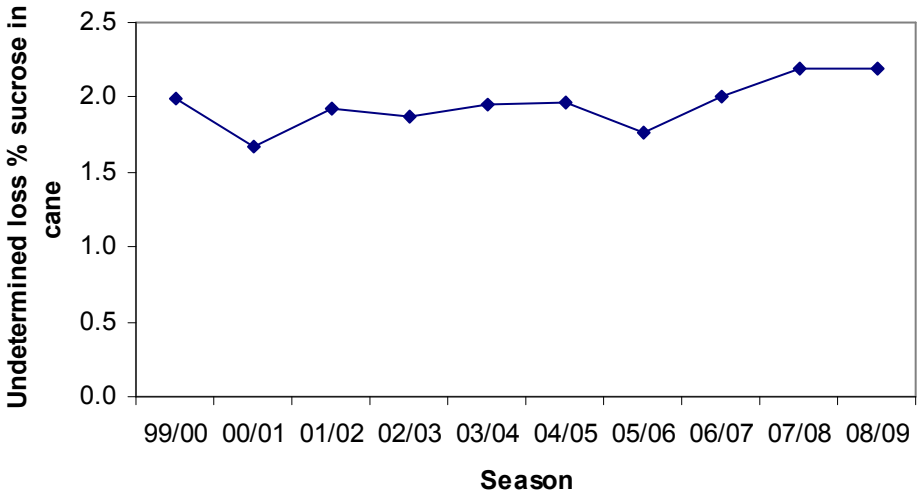

Figure 13. Undetermined loss in South Africa from the 1999-2000 season to 2008-2009.

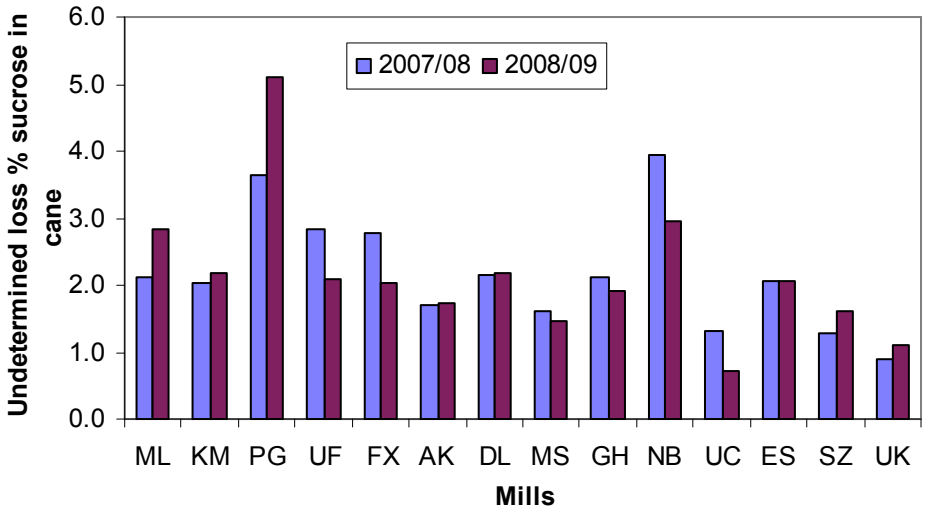

Figure 14. Undetermined loss % sucrose in cane at South African mills for the 2007-2008 and 2008-2009 seasons.

Among the Affiliate mills, those in Tanzania, Zambia and Zimbabwe showed substantial reductions in pol-based BHR values to particularly poor values in 2008-2009 compared to 2007-2008 (Figure 15). The majority of the poor BHR results are the result of high undetermined losses (Appendix Table A2), while the losses to molasses are relatively low. However, Nakambala in Zambia was in the process of undertaking a substantial expansion while crushing, which impacted on crushing operations and increased the losses.

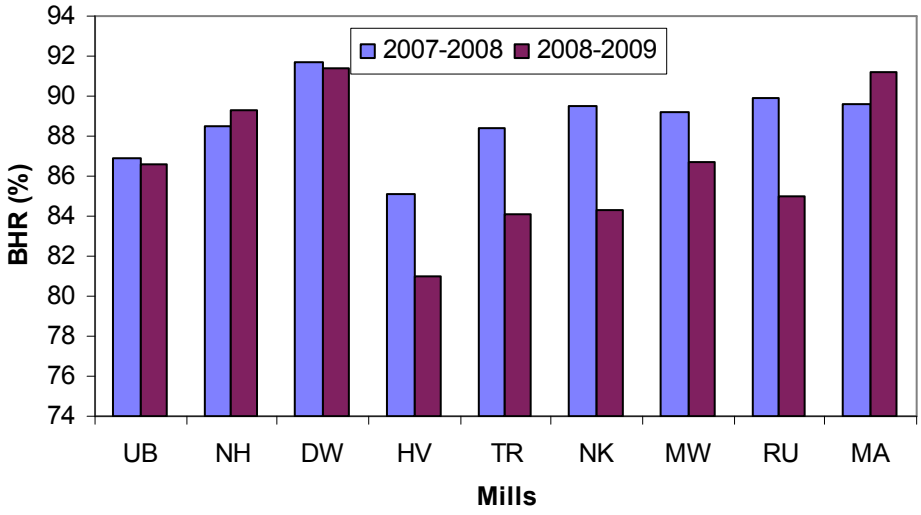

Figure 15. Pol-based Boiling House Recovery at southern African mills for the 2007-2008 and 2008-2009 seasons.

Overall recovery parameters

Overall Recovery (OR) and Value Recovery (VR) for South Africa since the inception of the RV cane payment system are shown in Figure 16. Both OR and VR showed some improvement over the poor values reported for 2007-2008, but both are still below the long-term averages. The VR values at individual mills for the 2007-2008 and 2008-2009 seasons

are shown in Figure 17, in order of increasing VR for the 2008-2009 season. From this it is evident that, while mills such as Noodsberg and Felixton produced better results in 2008-2009, other mills such as Pongola and Malelane fared worse. Many of these changes can be related to changes in undetermined losses, as shown in Figure 14.

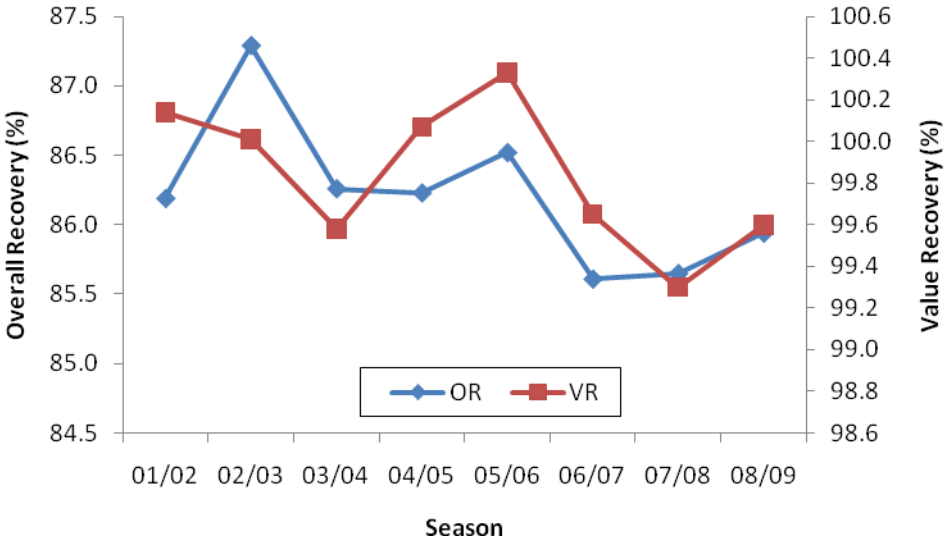

Figure 16. Overall Recovery (OR) and Value Recovery (VR) in South Africa from 2001-2002 to 2008-2009.

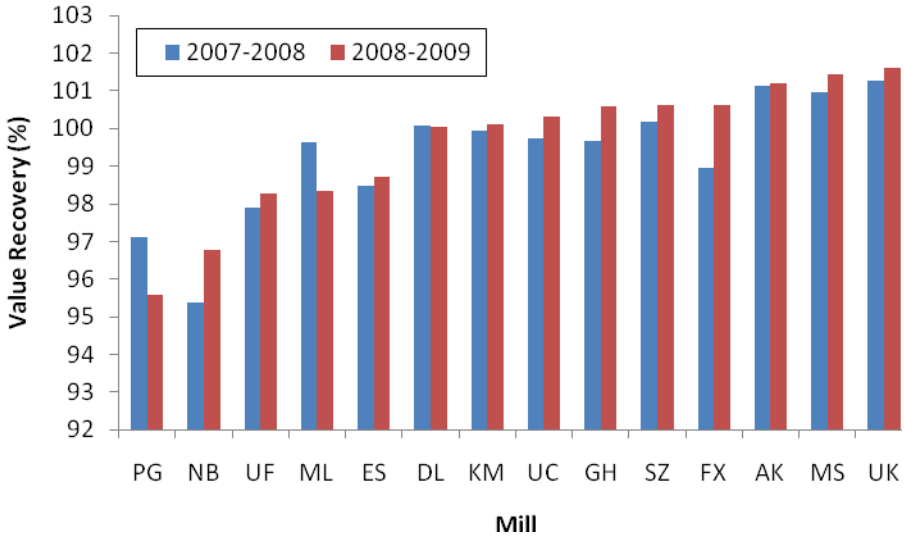

Figure 17. Value Recovery (VR) at South African mills in 2007-2008 and 2008-2009, ranked in increasing VR order for 2008-2009.

An interesting trend is revealed where the annual industry VR is plotted against the annual industry undetermined loss, as shown in Figure 18. There is a clear trend which indicates that low VR will generally be associated with high undetermined losses, as is the case with individual mills. However, the urge to correlate VR with undetermined loss should be resisted: firstly, because factors other than undetermined loss will obviously also influence the results, and secondly, the three-year rolling averaging of the ERC factors used in the RV and VR calculations has a noticeable effect.

This last point can be illustrated by considering two pairs of consecutive seasons, namely 2003-2004 (Davis, 2004) and 2004-2005 (Davis and Achary, 2005), and 2007-2008 (Davis and Achary, 2008) and 2008-2009. In each pair, the industry undetermined loss remained virtually unchanged at 1.95% and 2.19%, respectively. However, in each case, the VR for the second season was noticeably higher than that for the first season of the pair. The reason for this appears to be the performance of the previous seasons, and the averaging of the ERC factors.

For the 2003-2004 season, the average factors included those of two good seasons, 2001-2002 and 2002-2003, so the 'expected' derived value recovery would have been much higher than that achieved as a result of the high losses. However, in the 2004-2005 season, the factors from the good 2001-2002 were dropped, and the factors from the poorer 2004-2005 season were included, lowering the 'expected' derived value recovery, and thus yielding a higher VR for similar losses.

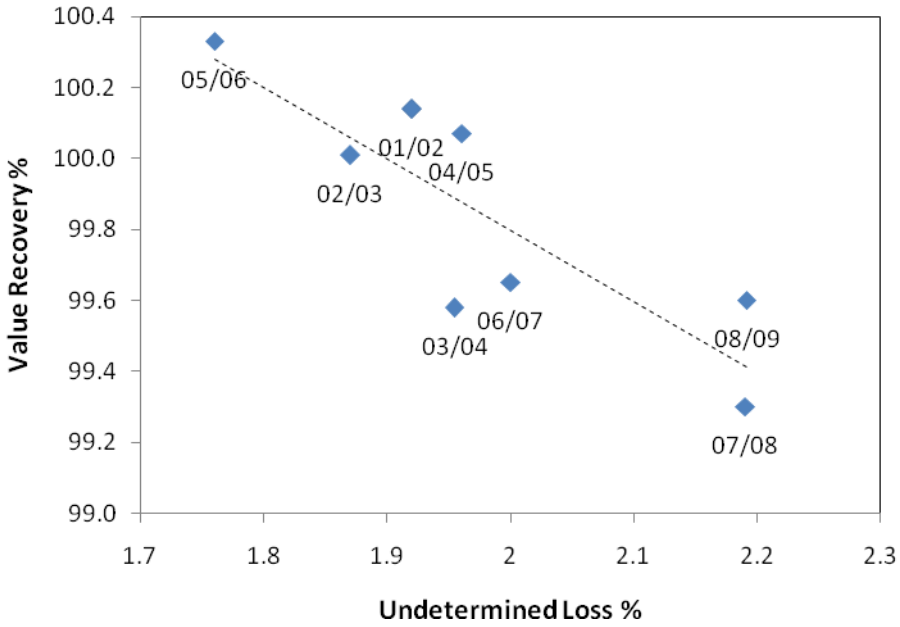

Figure 18. Value Recovery and Undetermined Loss for the South African industry.

Similarly, for the poor 2007-2008 season, the average factors included the excellent 2005-2006 season, therefore the high losses of the 2007-2008 season led to a very poor VR. However, in the season under review, 2008-2009, the factors from the 2005-2006 season were dropped, and the factors of two poor seasons, 2007-2008 and 2008-2009, were included, leading to a higher VR than for 2007-2008 despite the losses being identical. It should thus be clear that minimising undetermined losses is key to maintaining high value recoveries, be it at mill or industry level. Factors that will assist with this are steady operation with few stops, good cane quality (fresh, mature and free of excess tops, trash and soil) and good attention to best factory operating practices.

On a related topic, questions have been raised whether another measure, such as RV to sugar

ratio, would give a better indication of individual mills' performances. There is little value in calculating such a ratio, as this is firstly a mismatch of concepts, as RV includes factors relating to the quantity of saleable molasses produced and the prices obtainable for sugar and molasses and, secondly, the indicators currently calculated are adequate for this purpose. Value Recovery gives a measure of what proportion of the value paid for in the cane has been recovered by the factory, while other parameters such as Overall Recovery and Crystal Recovery Efficiency (XRE) give better indications of technical performance. In fact, the poorly performing mills in terms of VR can generally be shown to have had poor extraction figures, high sucrose losses to molasses and/or high undetermined losses. Hence, the reasons for a low VR figure are usually clearly evident when considering the technical performance parameters and no other derived ratios are necessary.

The Affiliated mills returned pol-based overall recoveries that ranged from a poor 76.36% at Hippo Valley to good values of 88.93% and 88.86% at Dwangwa and Maragra, respectively.

Cane to sugar ratio

The cane to sugar ratios of the South African industry and the Affiliate mills are shown in Figure 19. This illustrates better seasons in South Africa, Swaziland, Malawi and Mozambique, while Zambia and Zimbabwe had poor seasons relative to their capabilities. The Zimbabwe mills continued to struggle with erratic cane supply and general shortages of material and spares, while Nakambala's expansion project adversely impacted on crushing operations.

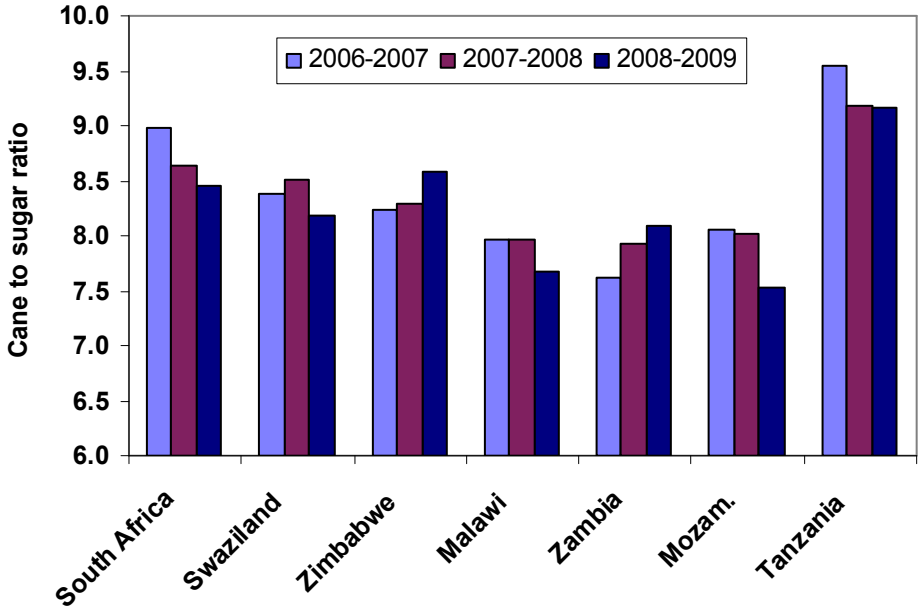

Figure 19. Cane to sugar ratio in southern Africa from 2006-2007 to 2008-2009.

Sugar quality

The trends in the Very High Pol (VHP) sugar quality with respect to colour are shown in Figure 20. Although the 2008-2009 season in South Africa showed some improvement over the previous season in terms of cane quality and factory performance, there was relatively little improvement in VHP sugar colours, with the average colour still marginally above the 1500 ICUMSA target level.

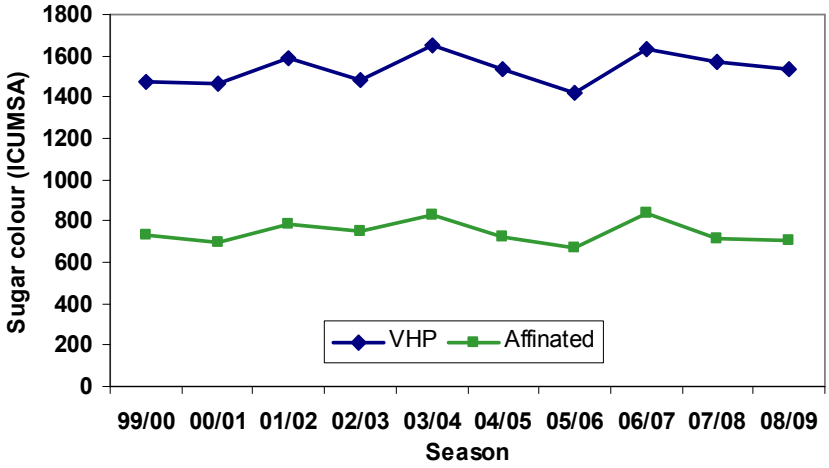

Figure 20. Very high pol (VHP) and affinated sugar colour in South Africa.

Conclusions

The 2008-2009 milling season in South Africa was slightly better than the 2007-2008 season in terms of cane quality and recoveries, although the tonnage of cane harvested was lower. Time efficiencies showed general improvement, with less No-cane and Other stops. However, extraction performance was not as good as previously, showing a substantial decline in the last two seasons. Losses to molasses were much reduced, although undetermined loss results were mixed. In general, the 2008-2009 season showed improved results in terms of overall recovery and value recovery.

Regarding the Affiliate mills in neighbouring countries, those in Zambia and Zimbabwe experienced poorer recoveries than in the previous season, while Maragra in Mozambique showed the most notable improvement over previous seasons.

Acknowledgements

This Annual Review is made possible by the valuable contributions of the following people and organisations, and their assistance is gratefully acknowledged: South African Sugar Millers' Association Ltd, South African Sugar Association Cane Testing Service, South African Sugarcane Research Institute, South African Sugar Terminals, SMRI Member and Affiliate Member mill laboratories, Sugar Milling Research Institute laboratories and staff, and the staff of the various mills and milling groups.

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APPENDIX: DATA TABLES

Table A1: Cane crushed and sugar made, cane composition, throughputs and time accounts, performances and losses – South African factories (Season 2008-2009).

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 2008-2009).

Table B1: Analysis of bagasse, juices, filter cake, syrup and final molasses – South African factories (Season 2008-2009).

Table B2: Analysis of bagasse, juices, filter cake, syrup and final molasses – Swaziland, Malawi, Zimbabwe, Zambia, Tanzania and Mozambique factories (Season 2008-2009).

Table C1: Massecuites, exhaustions, clarifying agents and additional fuels – South African factories (Season 2008-2009).

Table C2: Massecuites, exhaustions, clarifying agents and additional fuels – Swaziland, Malawi, Zimbabwe, Zambia, Tanzania and Mozambique factories (Season 2008-2009).

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

Table E: Average manufacturing results by monthly periods for South African factories (Season 2008-2009).

Table F: Cane varieties and rainfall (Season 2008-2009).

Table G: Transport summary – South African factories (Season 2008-2009).

Table H: Comparative data of reporting South African mills from 1925 onwards.

TABLE A1
CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION, THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES
SOUTH AFRICAN FACTORIES (SEASON 2008 - 2009)

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	211128	-	-	294271	128809	117795	-	-	195882	186582	127413	-	-	143169
Refined % total sugar	64.70	-	-	-	98.23	-	-	-	-	-	-	-	-	-
Moisture all sugar	0.03	-	-	0.09	0.01	0.09	-	-	0.12	0.19	0.09	-	-	0.06
Pol all sugar	99.77	-	-	99.42	99.92	99.37	-	-	99.50	99.26	99.29	-	-	99.51
Tons cane crushed total	1731056			2362732	1186787	1045080			1737101	1527579	1098962			1222829
Tons cane crushed per tandem		1149197	1213535				850890	886211				517155	705674	
Season started on	2-Apr-2008	-	-	31-Mar-2008	11-Mar-2008	16-Apr-2008	-	-	3-May-2008	2-Apr-2008	16-Apr-2008	-	-	24-Apr-2008
Season completed on	28-Dec-2008	-	-	31-Dec-2008	20-Dec-2008	11-Dec-2008	-	-	30-Nov-2008	30-Nov-2008	24-Nov-2008	-	-	7-Dec-2008
Length of season (days)	270	-	-	275	284	239	-	-	211	242	222	-	-	227
TIME ACCOUNT														
Overall time efficiency %	89.28	77.03	82.26	79.65	77.58	75.84	72.97	69.36	71.19	78.31	71.29	67.85	72.22	70.04
Scheduled stops% gross available time	0.00	1.62	2.29	1.96	5.62	3.45	7.77	7.73	7.75	7.67	8.18	19.46	19.78	19.62
Lack of cane % gross available time	6.10	7.13	5.45	6.29	4.16	9.63	13.88	16.65	15.24	9.65	11.41	8.79	2.98	5.88
Other stops % gross available time	4.45	13.07	8.78	10.92	11.26	9.39	4.93	5.89	5.40	3.17	8.27	3.57	4.56	4.07
Foreign matter % gross available time	0.18	1.15	1.21	1.18	1.38	1.70	0.44	0.38	0.41	1.21	0.85	0.32	0.46	0.39
Lost time % available crush.time	4.75	14.50	9.64	12.06	12.68	11.02	6.32	7.83	7.05	3.89	10.40	5.00	5.94	5.49
Force majeure stops (hours)	48.0	72.7	46.6	59.6	21	22.8	1	0	0	2.0	1	0	0.00	0.00
THROUGHPUTS PER CRUSHING HOUR														
Tons cane	298.11	238.90	236.41	475.23	225.17	241.44	219.18	247.62	465.64	334.88	289.11	140.21	178.93	320.44
Tons fibre	40.67	32.70	32.36	65.04	30.88	33.12	32.93	37.21	69.96	51.56	43.22	21.42	28.14	49.79
Tons brix in mixed juice(adj.)	48.43	38.54	38.17	76.70	33.98	35.82	33.25	37.65	70.72	52.16	43.28	21.47	27.44	49.11
Tons sucrose in mixed juice(adj.)	41.87	33.14	32.98	66.12	29.25	30.87	28.22	31.99	60.05	45.18	37.31	18.53	23.50	42.20
Tons non-suc. in mixed juice(adj.)	6.57	5.40	5.19	10.58	4.73	4.95	5.03	5.66	10.67	6.98	5.97	2.94	3.94	6.91
Tons of sugar produced	36.36	-	-	59.19	24.44	27.21	-	-	52.51	40.90	33.52	-	-	37.52
COMPOSITION OF CANE CRUSHED														
Sucrose % cane	14.38	14.23	14.26	14.24	13.37	13.21	13.08	13.14	13.11	13.79	13.34	13.40	13.34	13.37
Pol % cane	14.27	14.13	14.16	14.15	13.29	13.14	13.04	13.11	13.08	13.76	13.26	13.36	13.31	13.33
Fibre % cane	13.64	13.62	13.75	13.69	13.86	14.60	15.02	15.03	15.03	15.40	15.83	15.45	15.60	15.54
Brix % cane	16.87	16.77	16.72	16.74	15.81	15.55	15.72	15.81	15.77	16.18	15.73	15.69	15.79	15.75
Ash % cane	1.60	1.11	1.11	1.11	2.06	2.38	1.94	1.84	1.89	1.46	1.94	-	-	-
ERC % cane	12.43	12.25	12.33	12.29	11.46	11.34	11.05	11.09	11.07	11.87	11.41	11.54	11.40	11.46
ERC % sucrose in cane	86.43	86.09	86.44	86.27	85.72	85.86	84.46	84.39	84.42	86.08	85.58	86.11	85.41	85.71
RV % cane	13.14	12.96	13.03	12.99	12.14	12.00	11.75	11.80	11.78	12.55	12.08	12.19	12.08	12.12
Merc % cane	12.66	12.41	12.50	12.46	11.64	11.49	11.10	11.14	11.12	12.00	11.57	11.66	11.51	11.57
EXTRACTION														
Extraction (sucrose based)	97.65	97.52	97.84	97.68	97.14	96.82	98.41	98.28	98.34	97.81	96.78	98.65	98.43	98.53
Corrected reduced extraction	97.10	96.97	97.36	97.17	96.65	96.34	98.34	98.20	98.27	97.72	96.62	98.61	98.43	98.51
Imbibition % fibre	345	317	315	316	295	333	390	365	377	378	300	357	360	359
Diffusion Rate Index	8	-	-	-	7	-	-	-	-	-	-	-	-	-
Preparation index	-	93	93	93	-	-	91	90	90	92	90	91	91	91
Pol factor	99.16	100.17	99.54	99.85	99.14	98.69	97.83	98.28	98.06	100.01	99.61	99.42	99.67	99.57
Brix factor	100.78	102.23	101.32	101.76	100.92	100.51	100.02	100.52	100.27	101.44	100.96	100.17	101.51	100.94
RECOVERIES														
Boiling house recovery (sucrose)	86.64	-	-	88.99	83.50	87.59	-	-	87.00	89.87	89.20	-	-	88.46
C. R. B.	84.91	-	-	87.64	82.61	86.18	-	-	87.44	88.35	87.87	-	-	87.93
Overall recovery (sucrose)	84.61	-	-	86.93	81.11	84.80	-	-	85.56	87.91	86.33	-	-	87.16
Ton cane per ton sugar	8.20	-	-	8.03	9.21	8.87	-	-	8.87	8.19	8.63	-	-	8.54
Ton cane per ton 96^0 pol sugar	7.89	-	-	7.75	8.85	8.57	-	-	8.56	7.92	8.34	-	-	8.24
Value Recovery %	98.36	-	-	100.10	95.60	98.28	-	-	100.64	101.19	100.03	-	-	101.43
Crystal Recovery Efficiency (XRE)	98.85	-	-	101.59	96.17	99.61	-	-	103.34	103.25	101.62	-	-	102.99
BALANCES														
Sucrose lost % sucrose in cane														
- lost in bagasse	2.35	-	-	2.32	2.86	3.18	-	-	1.66	2.19	3.22	-	-	1.47
- lost in filter cake	-	-	-	-	0.09	0.57	-	-	-	-	0.29	-	-	-
- lost in final molasses	10.20	-	-	8.57	10.84	9.35	-	-	10.74	8.17	7.97	-	-	9.92
- undetermined losses	2.85	-	-	2.19	5.10	2.10	-	-	2.04	1.73	2.19	-	-	1.45
Non sucrose ratio	1.07	-	-	1.00	1.10	1.04	-	-	0.96	0.96	1.05	-	-	1.10
Fructose ratio FM/MJ	0.99	-	-	0.93	1.02	0.89	-	-	0.85	0.82	0.87	-	-	0.99
Glucose ratio FM/MJ	0.87	-	-	0.65	0.92	0.66	-	-	0.66	0.70	0.68	-	-	0.88

*** Cane diffuser**

TABLE A1 (continued)
CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION, THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES
SOUTH AFRICAN FACTORIES (SEASON 2008 - 2009)

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	-	-	107009.173	158295	86640	169375	-	-	232459	117810	2276637
Refined % total sugar	-	-	99.35	100.00	-	-	-	-	-	-	23.18
Moisture all sugar	-	-	0.02	0.02	0.06	0.11	-	-	0.13	0.06	0.08
Pol all sugar	-	-	99.93	99.93	99.58	99.41	-	-	99.37	99.56	99.54
Tons cane crushed total			914089	1321382	715525	1342575			2056164	993553	19255415
Tons cane crushed per tandem	233099	680989					961841	1094323			
Season started on	-	-	23-May-2008	27-Mar-2008	27-Mar-2008	11-Mar-2008	-	-	2-Apr-2008	2-Apr-2008	11-Mar-2008
Season completed on	-	-	14-Dec-2008	3-Dec-2008	14-Dec-2008	23-Nov-2008	-	-	22-Dec-2008	21-Nov-2008	31-Dec-2008
Length of season (days)	-	-	205.00	251	262	257	-	-	264	233	248.6366614
TIME ACCOUNT											
Overall time efficiency %	56.26	80.69	68.48	79.57	84.09	86.59	82.61	87.74	85.21	77.97	78.66
Scheduled stops% gross available time	3.18	4.61	3.90	5.10	5.92	4.68	4.18	4.68	4.43	7.12	5.95
Lack of cane % gross available time	37.02	8.82	22.92	8.85	1.85	5.21	11.15	5.08	8.07	13.65	8.82
Other stops % gross available time	3.49	5.10	4.30	6.30	7.19	3.00	1.78	1.67	1.72	0.97	5.83
Foreign matter % gross available time	0.04	0.78	0.41	0.18	0.95	0.52	0.29	0.84	0.57	0.29	0.74
Lost time % available crush.time	5.84	5.95	5.90	7.34	7.87	3.34	2.11	1.87	1.98	1.23	6.90
Force majeure stops (hours)	1.0	0.0	0.5	2.7	11	24.7	177	29	103	128.4	425
THROUGHPUTS PER CRUSHING HOUR											
Tons cane	85.83	174.77	276.48	275.62	135.60	252.39	190.01	197.77	388.13	232.71	298.30
Tons fibre	14.00	27.38	43.77	36.51	20.41	36.07	31.78	33.00	64.83	35.24	43.83
Tons brix in mixed juice(adj.)	13.44	26.79	42.62	43.27	20.68	40.39	27.93	29.01	56.99	35.35	46.10
Tons sucrose in mixed juice(adj.)	11.55	23.12	36.73	38.12	18.09	35.55	24.17	25.10	49.31	30.70	39.87
Tons non-suc. in mixed juice(adj.)	1.90	3.68	5.89	5.15	2.59	4.84	3.76	3.91	7.67	4.65	6.23
Tons of sugar produced	-	-	32.37	33.02	16.42	31.84	-	-	43.88	27.59	35.27
COMPOSITION OF CANE CRUSHED											
Sucrose % cane	13.78	13.60	13.65	14.27	13.80	14.45	13.00	12.97	12.98	13.39	13.69
Pol % cane	13.73	13.55	13.60	14.19	13.75	14.38	12.93	12.89	12.91	13.34	13.63
Fibre % cane	16.64	16.66	16.66	14.30	15.21	14.51	16.87	16.83	16.85	15.14	14.95
Brix % cane	16.27	16.02	16.08	16.45	16.10	16.60	15.29	15.25	15.27	15.64	16.08
Ash % cane	3.00	2.96	2.97	1.73	1.33	2.31	-	-	-	1.71	1.80
ERC % cane	11.78	11.64	11.68	12.48	11.93	12.66	11.12	11.10	11.11	11.57	11.79
ERC % sucrose in cane	85.50	85.61	85.58	87.45	86.46	87.63	85.55	85.56	85.56	86.35	86.07
RV % cane	12.47	12.32	12.36	13.14	12.60	13.32	11.77	11.74	11.75	12.21	12.46
Merc % cane	11.94	11.81	11.84	12.67	12.15	12.88	11.31	11.28	11.30	11.67	11.95
EXTRACTION											
Extraction (sucrose based)	97.63	97.27	97.36	96.91	96.65	97.49	97.83	97.87	97.85	98.50	97.61
Corrected reduced extraction	97.70	97.26	97.38	96.13	96.42	97.06	98.02	98.05	98.04	98.43	97.38
Imbibition % fibre	401	361	372	284	299	409	328	343	336	485	349
Diffusion Rate Index	9	10.00	9.74	6.00	7	6.68	9.62	9.49	9.55	7.00	7.00
Preparation index	-	-	-	-	93	-	-	-	-	-	92
Pol factor	99.79	99.34	99.45	99.35	97.92	99.62	100.41	99.41	99.88	99.36	99.34
Brix factor	100.40	99.93	100.05	100.52	101.23	100.10	101.98	101.10	101.51	100.36	100.89
RECOVERIES											
Boiling house recovery (sucrose)	-	-	88.06	86.55	90.39	89.04	-	-	88.42	89.48	88.05
C. R. B.	-	-	87.35	83.99	87.11	85.55	-	-	86.47	87.97	86.58
Overall recovery (sucrose)	-	-	85.73	83.88	87.36	86.80	-	-	86.52	88.14	85.94
Ton cane per ton sugar	-	-	8.54	8.35	8.26	7.93	-	-	8.85	8.43	8.46
Ton cane per ton 96^0 pol sugar	-	-	8.21	8.02	7.96	7.65	-	-	8.55	8.13	8.16
Value Recovery %	-	-	100.5842882	96.79	100.30	98.72	-	-	100.63	101.62	99.60
Crystal Recovery Efficiency (XRE)	-	-	102.04	97.51	101.55	99.49	-	-	101.65	103.48	100.94
BALANCES											
Sucrose lost % sucrose in cane											
- lost in bagasse	-	-	2.64	3.09	3.35	2.51	-	-	2.15	1.50	2.39
- lost in filter cake	-	-	0.35	1	0.07	0.10	-	-	0	-	0.16
- lost in final molasses	-	-	9.36	9.16	8.49	8.51	-	-	9.57	9.26	9.32
- undetermined losses	-	-	1.92	2.95	0.73	2.07	-	-	1.61	1.10	2.19
Non sucrose ratio	-	-	1.00	1.08	0.94	1.04	-	-	1.05	1.03	1.03
Fructose ratio FM/MJ	-	-	0.79	1.01	0.73	0.94	-	-	0.91	0.87	0.91
Glucose ratio FM/MJ	-	-	0.57	0.82	0.44	0.68	-	-	0.76	0.66	0.73

*** Cane diffuser**

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 2008 - 2009)

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	-	-	209584	186991	115990	-	-	106104	-	-	180591	-	-	193880	55208	62817	76530
Refined % total sugar	-	-	46.14	32.05	22.38	-	-	-	-	-	18.68	-	-	11.16	-	-	-
Moisture % all sugar	-	-	0.20	0.05	0.05	-	-	0.15	-	-	-	-	-	0.06	0.11	0.06	0.17
Pol % all sugar	-	-	99.55	99.39	99.19	-	-	99.16	-	-	99.05	-	-	99.44	99.12	99.58	99.07
Tons cane crushed total			1777734	1483183	839477			934960			1527503			1625748	480205	600483	594768
Tons cane crushed per tandem	1016465	761269				458882	476078		1250159	277344		564744	1061004				
Season started on	-	-	18-Apr-2008	11-Apr-2008	26-Apr-2008	-	-	2-Apr-2008	-	-	25-Mar-2008	-	-	30-Apr-2008	20-May-2008	13-Jun-2008	24-Apr-2008
Season completed on	-	-	13-Dec-2008	3-Dec-2008	30-Nov-2008	-	-	26-Dec-2008	-	-	23-Jan-2009	-	-	3-Apr-2009	28-Jan-2009	21-Feb-2009	6-Nov-2008
Length of season (days)	-	-	239	236	218	-	-	268	-	-	304	-	-	260	253	253	196
TIME ACCOUNT																	
Overall time efficiency %	84.88	84.75	84.82	89.53	86.40	66.50	68.05	67.29	72.04	34.52	56.02	69.68	73.95	71.78	79.78	78.79	77.83
Scheduled stops% gross available time	4.26	4.20	4.23	4.91	3.24	3.64	1.89	2.75	3.58	6.73	4.92	0.77	1.39	1.07	3.21	4.32	2.10
Lack of cane % gross available time	7.75	8.74	8.25	1.25	1.79	12.94	17.43	15.23	10.60	47.44	26.33	10.72	10.73	10.72	9.53	7.52	17.19
Other stops % gross available time	1.40	1.35	1.37	3.26	8.27	16.87	12.58	14.68	13.73	11.16	12.63	18.71	13.84	16.32	7.33	9.12	2.43
Foreign matter % gross available time	1.71	0.97	1.34	1.05	0.29	0.04	0.06	0.05	0.05	0.15	0.09	0.12	0.09	0.11	0.15	0.24	0.46
Lost time % available crush.time	1.62	1.57	1.59	3.51	8.73	20.24	15.60	17.91	16.01	24.44	18.40	21.16	15.76	18.52	8.42	10.38	3.02
Force majeure stops (hours)	115	119	117	0	3	0	0	0	12	0	6	1890	1921	1905	16	87	0
THROUGHPUTS PER CRUSHING HOUR																	
Tons cane	203.00	152.33	355.37	301.31	187.61	139.31	135.71	274.91	237.82	147.72	428.22	148.59	273.07	423.03	100.56	127.40	171.94
Tons fibre	24.36	19.05	43.42	40.44	27.34	21.76	21.26	43.01	34.89	21.06	62.51	19.73	36.06	55.96	15.51	18.78	21.92
Tons brix in mixed juice	31.47	24.63	56.10	48.27	31.75	21.81	22.68	44.52	38.98	23.25	69.67	24.05	43.91	68.18	14.85	18.26	27.32
Tons pol in mixed juice	27.17	21.01	48.18	42.26	28.13	18.71	19.47	38.21	33.34	19.94	59.63	20.99	38.32	59.50	12.78	15.61	24.05
Tons non-pol in mixed juice+B57	4.30	3.62	7.92	6.01	3.61	3.10	3.20	6.31	5.63	3.30	10.04	3.06	5.60	8.68	2.07	2.65	3.28
Tons of sugar produced	-	-	41.90	37.99	25.92	-	-	31.20	-	-	50.63	-	-	50.45	11.56	13.33	22.12
COMPOSITION OF CANE CRUSHED																	
Pol % cane	13.85	14.22	14.01	14.48	15.41	14.23	15.22	14.74	14.47	14.11	14.40	15.19	14.97	15.05	13.60	13.13	14.35
Fibre % cane	13.67	13.37	13.54	13.62	14.65	15.88	15.93	15.90	14.87	14.56	14.81	14.05	14.12	14.10	16.56	16.24	13.54
Brix % cane	16.43	17.06	16.70	16.76	17.76	16.93	18.07	17.51	17.48	16.91	17.38	17.83	17.57	17.66	16.29	15.81	16.52
Ash % cane	-	-	-	2.12	-	-	-	-	0.98	0.98	0.98	-	-	-	2.80	2.77	1.31
ERC % cane	11.86	12.08	11.96	12.64	13.49	12.13	13.01	12.58	12.21	11.97	12.16	13.13	12.94	13.01	11.50	11.05	12.57
ERC % pol in cane	85.63	84.96	85.34	87.29	87.54	85.20	85.48	85.35	84.36	84.83	84.44	86.41	86.42	86.42	84.55	84.16	87.61
EXTRACTION																	
Extraction (pol based)	96.60	97.01	96.78	96.89	97.31	94.37	94.26	94.31	96.89	95.71	96.68	93.02	93.70	93.46	93.40	93.31	97.49
Corrected reduced extraction	95.34	95.99	95.63	96.08	96.80	94.13	93.79	93.96	96.47	95.05	96.22	90.90	91.82	91.50	93.27	92.99	96.69
Imbibition % fibre	263	312	284	263	356	255	280	268	295	257	289	246	232	237	247	282	284
Diffusion Rate Index	12	12	11	9	8	-	-	-	-	-	-	-	-	-	-	-	-
Preparation index	-	-	-	-	-	92	92	92	90	91	90	-	-	-	77	79	89
Pol factor	99.17	100.05	99.55	98.56	99.96	93.41	99.99	96.76	99.61	97.16	99.17	96.53	95.70	95.99	97.09	92.58	99.72
Brix factor	100.16	102.15	101.02	100.22	101.17	95.77	102.10	98.99	101.90	99.31	101.43	98.48	97.55	97.88	98.29	95.60	100.51
RECOVERIES																	
Boiling house recovery (pol)	-	-	86.56	89.34	91.39	-	-	80.97	-	-	84.09	-	-	84.31	89.69	85.01	91.15
Overall recovery (pol)	-	-	83.77	86.56	88.93	-	-	76.36	-	-	81.30	-	-	78.80	83.76	79.33	88.86
Ton cane per ton sugar	-	-	8.48	7.93	7.24	-	-	8.81	-	-	8.46	-	-	8.39	8.70	9.56	7.77
Ton cane per ton 96^0 pol sugar	-	-	8.18	7.66	7.00	-	-	8.53	-	-	8.20	-	-	8.10	8.42	9.22	7.53
BALANCES																	
Pol lost % pol in cane																	
- lost in bagasse	-	-	3.22	3.11	2.69	-	-	5.69	-	-	3.32	-	-	6.54	6.60	6.69	2.51
- lost in filter cake	-	-	0.24	0.12	0.07	-	-	-	-	-	0.17	-	-	1.25	0.34	0.24	0.38
- lost in final molasses	-	-	9.41	8.59	6.64	-	-	10.36	-	-	10.34	-	-	7.89	7.41	9.92	6.26
- undetermined losses	-	-	3.36	1.62	1.68	-	-	7.59	-	-	4.86	-	-	5.52	1.88	3.82	1.99
Non pol ratio	-	-	1.02	0.99	0.95	-	-	1.09	-	-	0.97	-	-	0.95	0.95	1.09	0.94

*** Cane diffuser**

TABLE B1
ANALYSIS OF BAGASSE, JUICES, FILTER CAKE, SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2008 - 2009)

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	1.14	1.28	1.12	1.20	1.30	1.47	0.63	0.69	0.66	0.94	1.30	0.56	0.64	0.61
Moisture % bagasse	51.95	48.11	48.08	48.09	51.04	49.45	52.78	52.68	52.73	50.32	52.25	51.10	50.48	50.74
Fibre % bagasse	45.96	49.58	49.85	49.72	46.51	48.04	45.54	45.48	45.51	47.80	45.44	47.71	48.12	47.95
Ash % bagasse	4.42	-	-	2.62	4.22	5.76	-	-	-	3.11	-	-	-	-
LCV in kJ per kg bagasse ##	6633	-	-	7758	6848	6893	-	-	-	7217	-	-	-	-
MIXED JUICE														
Mixed juice(adj.) % cane	117.42	115.79	115.71	115.75	111.01	117.09	125.91	122.09	123.96	126.29	111.98	122.56	124.26	123.54
Brix % mixed juice(adj.)	13.84	13.93	13.95	13.94	13.59	12.67	12.05	12.45	12.25	12.33	13.37	12.49	12.34	12.41
Sucrose purity (MJ adj.)	86.44	86.00	86.40	86.21	86.07	86.19	84.88	84.96	84.92	86.61	86.21	86.32	85.65	85.94
Apparent purity(MJ adj.)	85.76	85.43	85.78	85.61	85.51	85.76	84.62	84.75	84.69	86.41	85.71	86.09	85.45	85.72
Purity difference(MJ adj. - DAC)	-0.22	-0.59	-0.44	-0.51	-0.02	-0.31	-0.20	-0.07	-0.13	0.15	0.27	0.30	-0.40	-0.10
(Glucose + fructose) % sucrose(MJ unadj)	5.03	-	-	4.99	5.02	4.61	-	-	4.44	3.93	4.75	-	-	4.26
Suspended solids % MJ(unadj.)	0.11	0.11	0.11	0.11	0.18	0.75	0.19	0.19	0.19	0.27	0.79	0.16	0.19	0.18
Pol/sucrose ratio (mj unadj.)	0.9921	0.9935	0.9928	0.9931	0.9935	0.9951	0.9970	0.9976	0.9973	0.9976	0.9942	0.9973	0.9976	0.9975
CLARIFIED JUICE														
Brix % clarified juice	13.92	-	-	13.64	12.70	12.07	-	-	11.68	12.52	12.67	-	-	11.89
Apparent purity	85.39	-	-	85.75	85.15	84.99	-	-	84.24	85.55	85.45	-	-	83.61
Purity difference(CJ - MJ)	-0.26	-	-	0.25	-0.29	-0.69	-	-	-0.38	-0.73	-0.13	-	-	-1.71
Average pH	7.1	-	-	6.9	7.9	7.2	-	-	7.1	7.1	7.0	-	-	7.1
CLARIFIER MUD														
Tons clarifier mud	63938	84535	28758	113293	9133	-	85798	81792	167590	99076	-	3508	87206	90714
Pol % clarifier mud	11.88	12.05	12.11	12.06	11.14	-	9.11	9.23	9.17	10.75	-	9.57	10.89	10.84
Brix % clarifier mud	14.14	14.31	14.38	14.33	13.42	-	11.11	11.27	11.19	12.71	-	11.48	12.97	12.91
Insoluble solids % clarifier mud	3.63	2.72	2.85	2.75	7.42	-	2.69	2.65	2.67	5.60	-	3.30	3.16	3.16
FILTER CAKE														
Pol % filter cake	-	-	-	-	1.85	1.39	-	-	-	-	0.98	-	-	-
Moisture % filter cake	-	-	-	-	69.95	70.00	-	-	-	-	-	-	-	-
Filter cake % cane	-	-	-	-	0.68	5.38	-	-	-	-	4.00	-	-	-
Filter wash index	-	-	-	-	107.0	105.0	-	-	-	-	105.5	-	-	-
Purity difference(CJ - filtrate)	-	-	-	-	2.91	5.10	-	-	-	-	1.21	-	-	-
SYRUP														
Brix % syrup	66.95	-	-	66.20	61.64	55.57	-	-	62.19	67.64	66.47	-	-	70.14
Apparent purity	84.59	-	-	85.74	84.91	84.40	-	-	83.57	85.81	85.83	-	-	84.67
Purity difference(Syrup - MJ)	-1.06	-	-	0.24	-0.53	-1.28	-	-	-1.05	-0.47	0.25	-	-	-0.66
Average pH	5.9	-	-	5.5	6.0	5.8	-	-	6.2	6.2	6.3	-	-	5.9
FINAL MOLASSES														
Refractometer brix	83.31	-	-	87.13	85.12	86.04	-	-	85.79	85.77	84.88	-	-	88.73
Pol/refractometer brix purity	35.96	-	-	31.67	36.51	34.81	-	-	37.57	35.36	30.88	-	-	33.85
Sucrose/refractometer brix purity	38.38	-	-	35.82	38.34	37.28	-	-	39.41	36.60	33.37	-	-	35.49
Conductivity ash %	13.07	-	-	17.05	13.99	14.73	-	-	16.40	15.75	17.04	-	-	15.93
(Glucose + fructose)/ash ratio	1.13	-	-	0.86	1.03	0.83	-	-	0.68	0.76	0.74	-	-	0.83
Fructose %	7.86	-	-	8.42	7.68	7.18	-	-	6.51	6.86	7.39	-	-	7.41
Glucose %	6.94	-	-	6.17	6.69	4.99	-	-	4.63	5.03	5.27	-	-	5.84
TPD based on molasses (made)	7.6	-	-	2.6	7.1	3.8	-	-	3.4	3.4	0.0	-	-	2.7
TPD based on mixed juice	7.7	-	-	3.3	7.3	4.7	-	-	4.1	4.2	1.6	-	-	2.9
Final molasses @ 85^0 brix % cane	4.50	-	-	4.01	4.45	3.90	-	-	4.21	3.62	3.75	-	-	4.40
Pol/sucrose ratio	0.9371	-	-	0.8841	0.9522	0.9336	-	-	0.9532	0.9662	0.9253	-	-	0.9536

*** Cane diffuser**

Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.6 ash % bagasse

TABLE B1 (continued)
ANALYSIS OF BAGASSE, JUICES, FILTER CAKE, SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2008 - 2009)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
FINAL BAGASSE											
Pol % bagasse	0.96	1.14	1.09	1.52	1.40	1.23	0.86	0.84	0.85	0.66	1.06
Moisture % bagasse	50.34	50.03	50.11	51.85	51.90	49.53	47.17	47.57	47.38	48.45	50.26
Fibre % bagasse	47.89	47.87	47.88	45.58	45.53	48.44	51.02	50.66	50.83	50.07	47.70
Ash % bagasse	-	-	2.78	3.75	2.92	5.93	-	-	2.80	3.71	2.87
LCV in kJ per kg bagasse ##	-	-	7316	6761	6903	6859	-	-	7884.66	7508	7217.66
MIXED JUICE											
Mixed juice(adj.) % cane	131.31	123.85	125.75	108.53	111.91	128.96	122.14	124.26	123.27	143.42	120.53
Brix % mixed juice(adj.)	11.93	12.38	12.26	14.47	13.63	12.41	12.03	11.80	11.91	10.59	12.82
Sucrose purity (MJ adj.)	85.89	86.28	86.18	88.10	87.46	88.02	86.54	86.53	86.53	86.85	86.49
Apparent purity(MJ adj.)	85.56	85.98	85.87	87.58	87.14	87.58	86.04	85.99	86.01	86.47	86.05
Purity difference(MJ adj. - DAC)	0.65	0.85	0.80	0.29	-1.15	0.55	0.18	0.04	0.11	0.35	-0.01
(Glucose + fructose) % sucrose(MJ unadj)	-	-	4.53	3.72	3.98	3.67	-	-	4.45	3.62	4.41
Suspended solids % MJ(unadj.)	0.25	0.80	0.66	0.97	0.15	0.17	0.11	0.12	0.12	0.19	0.30
Pol/sucrose ratio (mj unadj.)	0.9962	0.9965	0.9964	0.9941	0.9964	0.9950	0.9942	0.9938	0.9940	0.9956	0.9949
CLARIFIED JUICE											
Brix % clarified juice	-	-	11.90	14.39	13.98	12.44	-	-	11.48	10.35	12.59
Apparent purity	-	-	85.91	87.99	86.73	87.34	-	-	85.50	85.72	85.93
Purity difference(CJ - MJ)	-	-	0.12	0.52	-0.41	-0.17	-	-	-0.15	-0.64	-0.30
Average pH	-	-	7.11	7.1	7.1	7.0	-	-	6.9	6.9	7.1
CLARIFIER MUD											
Tons clarifier mud	-	-	-	-	-	-	-	-	-	80546	624290
Pol % clarifier mud	-	-	-	-	-	-	-	-	-	6.83	10.19
Brix % clarifier mud	-	-	-	-	-	-	-	-	-	8.19	12.20
Insoluble solids % clarifier mud	-	-	-	-	-	-	-	-	-	3.53	3.50
FILTER CAKE											
Pol % filter cake	-	-	1.20	2.40	1.54	1.75	-	-	1.66	-	1.64
Moisture % filter cake	-	-	70.00	75.00	71.35	73.48	-	-	64.70	-	71.28
Filter cake % cane	-	-	3.99	5.45	0.60	0.82	-	-	1.20	-	1.33
Filter wash index	-	-	103.01	100.56	97.5	99.7	-	-	103.76	-	101.9
Purity difference(CJ - filtrate)	-	-	1.76	0.69	6.44	1.56	-	-	2.50	-	2.68
SYRUP											
Brix % syrup	-	-	66.11	68.83	67.51	63.06	-	-	64.28	64.85	65.14
Apparent purity	-	-	85.93	87.63	87.16	87.30	-	-	85.85	85.41	85.54
Purity difference(Syrup - MJ)	-	-	0.14	0.15	0.02	-0.21	-	-	0.19	-0.95	-0.37
Average pH	-	-	6.08	6.1	6.4	6.3	-	-	6.0	6.0	6.0
FINAL MOLASSES											
Refractometer brix	-	-	83.04	82.54	84.84	82.70	-	-	80.81	85.77	84.67
Pol/refractometer brix purity	-	-	36.02	36.37	37.77	36.18	-	-	35.58	36.78	35.20
Sucrose/refractometer brix purity	-	-	37.43	39.24	39.91	38.80	-	-	37.28	37.91	37.46
Conductivity ash %	-	-	14.94	13.02	13.46	12.77	-	-	12.89	14.73	14.74
(Glucose + fructose)/ash ratio	-	-	0.67	0.91	0.68	0.87	-	-	0.90	0.68	0.84
Fructose %	-	-	6.11	7.15	6.17	6.81	-	-	6.74	6.06	7.16
Glucose %	-	-	3.96	4.67	3.04	4.29	-	-	4.82	4.01	5.24
TPD based on molasses (made)	-	-	3.79	7.0	6.0	6.0	-	-	5.5	4.2	4.6
TPD based on mixed juice	-	-	5.88	7.5	8.8	7.1	-	-	6.6	5.1	5.3
Final molasses @ 85^0 brix % cane	-	-	4.02	3.92	3.45	3.73	-	-	3.92	3.85	4.01
Pol/sucrose ratio	-	-	0.96	0.9268	0.9462	0.9326	-	-	0.9542	0.9703	0.9399

*** Cane diffuser**

Lower Calorific Value (LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.6 ash % bagasse

TABLE B2
ANALYSIS OF BAGASSE, JUICES, FILTER CAKE, SYRUP AND FINAL MOLASSES
SWAZILAND, MALAWI, ZIMBABWE, ZAMBIA, TANZANIA AND MOZAMBIQUE FACTORIES
(SEASON 2008 - 2009)

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	1.86	1.57	1.73	1.63	1.41	2.27	2.51	2.39	1.39	1.91	1.49	3.44	3.21	3.29	2.66	2.76	1.40
Moisture % bagasse	49.02	50.38	49.63	48.88	47.70	52.19	51.03	51.60	51.12	51.21	51.14	51.60	49.95	50.54	49.74	49.07	48.04
Fibre % bagasse	47.31	46.30	46.86	48.47	49.45	44.22	45.07	44.65	45.50	45.07	45.42	43.05	44.98	44.29	45.73	46.30	49.51
Ash % bagasse	-	-	3.93	-	-	-	-	-	-	-	-	-	-	-	5.49	6.12	2.53
LCV in kJ per kg bagasse ##	-	-	7160	-	-	-	-	-	-	-	-	-	-	-	6820	6841	7776
MIXED JUICE																	
Mixed juice % cane	106.16	111.95	108.64	107.54	122.43	104.51	109.11	106.85	110.27	104.99	109.31	101.79	101.24	101.43	104.34	109.72	110.44
Brix % mixed juice	14.60	14.44	14.53	14.90	13.82	14.98	15.32	15.16	14.86	14.99	14.88	15.90	15.88	15.89	14.15	13.07	14.39
Apparent purity	86.33	85.32	85.89	87.54	88.62	85.78	85.87	85.83	85.55	85.79	85.59	87.29	87.26	87.27	86.07	85.48	88.01
Purity difference(MJ - DAC)	1.19	0.24	0.77	-0.31	0.82	-0.42	-0.17	-0.29	0.86	0.54	0.80	0.40	0.38	0.39	1.52	-0.31	0.49
Suspended solids % mixed juice	1.57	0.77	1.22	0.18	0.06	0.24	0.24	0.24	0.18	0.29	0.19	0.76	0.91	0.86	1.09	1.37	0.71
CLARIFIED JUICE																	
Brix % clarified juice	-	-	15.37	15.40	13.42	-	-	17.33	-	-	14.31	-	-	14.19	14.57	14.10	14.06
Apparent purity	-	-	85.79	88.28	88.25	-	-	84.19	-	-	83.88	-	-	86.50	86.76	87.07	87.90
Purity difference(CJ - MJ)	-	-	-0.10	0.74	-0.37	-	-	-1.64	-	-	-1.71	-	-	-0.77	0.70	1.59	-0.11
Average pH	-	-	7.3	7.0	7.0	-	-	6.9	-	-	7.5	-	-	7.1	6.9	7.0	7.0
CLARIFIER MUD																	
Tons clarifier mud	-	-	-	-	-	33490	36926	70416	1067	-	1067	-	-	-	-	-	-
Pol % clarifier mud	-	-	-	-	-	16.66	16.78	16.73	9.00	-	9.00	-	-	-	-	-	-
Brix % clarifier mud	-	-	-	-	-	20.30	20.50	20.40	10.59	-	10.59	-	-	-	-	-	-
Insoluble solids % clarifier mud	-	-	-	-	-	3.71	3.65	3.68	3.37	-	3.37	-	-	-	-	-	-
FILTER CAKE																	
Pol % filter cake	-	-	1.21	0.93	1.08	-	-	-	-	-	0.97	-	-	5.19	1.23	0.92	1.38
Moisture % filter cake	-	-	-	-	70.78	-	-	-	-	-	-	-	-	76.36	55.65	-	71.02
Filter cake % cane	-	-	2.74	1.81	1.00	-	-	-	-	-	2.60	-	-	3.64	3.83	3.49	3.91
Filter wash index	-	-	94.5	96.7	103.0	-	-	-	-	-	104.0	-	-	112.0	97.1	92.7	102.3
Purity difference(CJ - filtrate)	-	-	1.44	2.44	2.45	-	-	-	-	-	2.04	-	-	1.23	1.79	2.81	0.99
SYRUP																	
Brix % syrup	-	-	68.31	66.79	66.61	-	-	54.02	-	-	63.03	-	-	64.89	65.59	66.76	63.83
Apparent purity	-	-	85.87	88.52	88.22	-	-	84.73	-	-	83.50	-	-	86.45	86.47	85.64	88.10
Purity difference(Syrup - MJ)	-	-	-0.02	0.98	-0.40	-	-	-1.10	-	-	-2.09	-	-	-0.81	0.40	0.16	0.09
Average pH	-	-	6.1	6.2	6.2	-	-	6.3	-	-	6.5	-	-	6.3	6.7	6.5	6.2
FINAL MOLASSES																	
Refractometer brix	-	-	88.13	84.32	85.78	-	-	80.93	-	-	85.28	-	-	87.45	82.33	84.61	82.17
Pol/refractometer brix purity	-	-	37.09	39.52	37.35	-	-	38.72	-	-	40.92	-	-	38.66	35.16	36.83	34.72
Purity difference(true-target)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing sugars % #	-	-	19.52	-	-	-	-	16.81	-	-	-	-	-	-	-	-	-
Sulphated ash %	-	-	14.20	-	-	-	-	10.32	-	-	-	-	-	-	-	-	-
Reducing sugars/ash ratio	-	-	1.37	-	-	-	-	1.63	-	-	-	-	-	-	-	-	-
Final molasses at 85^0 brix % cane	-	-	4.18	3.70	3.22	-	-	4.64	-	-	4.28	-	-	3.61	3.37	4.16	3.04

*** Cane diffuser**

 # Reducing sugars determined by Lane & Eynon method

Lower Calorific Value(LCV) = 18260.00 - 31.14 Bx % bagasse - 207.01 moisture % bagasse - 182.6 ash % bagasse

TABLE C1
MASSECUITES, EXHAUSTIONS, CLARIFYING AGENTS AND ADDITIONAL FUELS
SOUTH AFRICAN FACTORIES (SEASON 2008-2009)

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.)	1.06	-	1.29	0.98	0.98	1.05	0.92	1.01	1.07	1.23	1.06	1.05	1.04	1.00	0.92
Refractometer brix of massecuite	92.73	92.60	92.87	92.43	92.68	92.40	93.09	92.89	92.70	92.53	92.22	92.59	93.33	92.81	92.74
Purity of massecuite	86.34	84.08	85.26	84.37	84.71	85.36	86.08	84.21	86.42	87.93	86.97	86.47	86.05	84.85	85.81
Purity of A-molasses	72.22	65.95	72.01	68.73	67.41	67.38	65.71	65.49	69.20	72.20	72.16	70.65	67.52	64.76	69.05
Purity drop	14.12	18.13	13.25	15.64	17.30	17.98	20.37	18.72	17.22	15.72	14.81	15.82	18.53	20.09	16.77
Exhaustion	58.87	63.33	55.51	59.28	62.67	64.57	69.01	64.42	64.69	64.33	61.17	62.34	66.31	67.19	63.12
Pty of A-massecuite - purity syrup	1.75	-1.66	0.35	-0.03	1.14	-0.45	0.25	-0.46	0.49	0.30	-0.19	-0.83	0.20	-0.56	0.27
Pty of remelt	86.38	81.59	85.50	84.20	86.86	84.47	83.94	84.94	84.02	85.63	86.68	86.37	85.55	85.23	84.96
B - MASSECUITE															
m^3 per ton brix in mixed juice (adj.)	0.55	-	0.57	0.33	0.29	0.33	0.22	0.30	0.41	0.61	0.34	0.34	0.31	0.43	0.34
Refractometer brix of massecuite	94.92	95.15	95.01	95.52	94.54	94.52	94.57	93.94	95.00	95.11	94.13	95.59	95.52	94.32	94.90
Purity of massecuite	71.59	67.12	71.77	67.24	68.94	68.40	66.99	66.62	69.35	72.39	71.86	71.04	68.48	68.63	69.96
Purity of B - molasses	52.52	44.33	50.83	43.56	46.68	47.60	44.11	46.29	45.32	50.73	52.08	46.12	44.92	48.82	48.36
Purity drop	19.07	22.79	20.94	23.68	22.26	20.80	22.88	20.33	24.03	21.66	19.78	24.92	23.57	19.82	21.60
Exhaustion	56.10	60.99	59.34	62.40	60.56	58.03	61.11	56.82	63.37	60.72	57.44	65.11	62.47	56.41	59.79
C - MASSECUITE															
m^3 per ton brix in mixed juice (adj.)	0.09	-	0.43	0.25	0.27	0.25	0.26	0.30	0.27	0.26	0.18	0.21	0.25	0.31	0.22
Refractometer brix of massecuite	97.09	97.05	97.19	97.10	96.31	96.70	96.81	96.42	96.76	97.37	97.92	97.35	96.88	97.35	96.95
Purity of massecuite	56.17	52.70	54.24	54.18	55.30	55.65	52.52	54.29	52.70	56.36	53.29	53.00	55.04	56.06	54.65
Purity of C - molasses	35.96	31.67	36.51	34.81	37.57	35.36	30.88	33.85	36.02	36.37	37.77	36.18	35.58	36.78	35.20
Crystal content	30.64	29.87	27.15	28.85	27.35	30.35	30.31	29.79	25.22	30.59	24.43	25.66	29.27	29.69	29.10
Exhaustion	56.18	58.40	51.49	54.84	51.36	56.40	59.61	56.92	49.46	55.75	46.81	49.72	54.89	54.39	54.92
TOTAL VOLUME ALL RAW MASSECUITES															
m^3 per ton brix in mixed juice (adj.)	1.71	-	2.29	1.55	1.55	1.63	1.40	1.61	1.76	2.11	1.59	1.60	1.60	1.74	1.48
WHITE SUGAR MASSECUITES															
kg sugar per m^3 massecuite	286	-	487	-	-	-	-	-	578	396	-	-	-	-	503
Tons limestone per 1000 tons white sugar	-	-	47.91	-	-	-	-	-	43.83	-	-	-	-	-	20.36
Tons coke per 1000 tons white sugar	-	-	5.03	-	-	-	-	-	4.34	-	-	-	-	-	1.65
Tons phosphoric acid per 1000 tons white sugar	-	-	-	-	-	-	-	-	-	1.49	-	-	-	-	0.35
Tons sulphur per 1000 tons white sugar	0.22	-	0.27	-	-	-	-	-	0.14	0.19	-	-	-	-	0.16
Phosphoric acid ppm mixed juice (unadj.)	-	-	-	-	-	-	-	-	0.43	-	37.02	40.71	2.98	5.28	4.88
Flocculant ppm mixed juice (unadj.)	3.84	2.94	4.70	8.63	3.48	4.04	2.12	2.39	3.15	8.55	4.85	5.77	5.43	2.61	4.44
Tons lime per 1000 tons cane	1.60	0.17	0.65	0.47	0.63	-	0.52	0.67	-	0.75	0.46	0.48	0.51	0.56	0.55
Enzyme ppm sugar	-	-	-	-	-	-	35.80	2.93	7.12	-	-	4.25	28.65	12.38	6.40
ADDITIONAL FUELS PER 1000 TONS CANE															
Tons of coal	18.47	-	18.81	3.23	18.91	3.81	1.47	16.39	14.48	20.45	2.78	0.49	-	0.17	8.37
Tons of wood	-	-		-	-	-	0.21	0.03	-	-	0.21	0.29	-	-	0.04
Converted into bagasse **	73.90	-	75.24	12.92	75.64	15.23	6.13	65.59	57.92	81.81	11.36	2.33	-	0.66	33.51

**** 1 TON COAL EQUIVALENT TO 4 TONS OF BAGASSE**
1 TON FIREWOOD EQUIVALENT TO 1.2 TONS OF BAGASSE
 # 1 TON SULPHUR DIOXIDE 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 2008 - 2009)

SYMBOLS OF FACTORIES	UB	NH	DW	HV	TR	NK	MW	RU	MA
A - MASSECUITE									
m^3 per ton brix in mixed juice	1.04	1.38	1.43	1.07	-	0.82	1.13	1.36	1.04
Refractometer brix of massecuite	93.42	94.33	92.18	92.31	92.51	93.03	92.21	93.31	92.58
Purity of massecuite	85.88	90.44	88.64	84.39	84.62	87.53	86.77	87.10	87.55
Purity of A - molasses	71.24	75.76	73.59	64.57	66.53	72.86	72.26	72.31	68.87
Purity drop	14.64	14.68	15.04	19.82	18.09	14.67	14.50	14.79	18.69
Exhaustion	59.27	66.95	64.27	66.29	63.87	61.76	60.27	61.34	68.55
Purity of A-massecuite - pty syrup	0.01	1.91	0.41	-0.34	1.12	1.08	0.30	1.46	-0.55
Purity of remelt	87.05	86.79	87.58	84.16	83.30	82.58	85.87	95.09	86.77
B - MASSECUITE									
m^3 per ton brix in mixed juice	0.41	0.35	0.52	0.39	-	0.05	0.43	0.54	0.37
Refractometer brix of massecuite	95.13	93.94	93.75	93.00	94.17	93.83	94.48	94.07	93.72
Purity of massecuite	70.50	75.21	70.84	67.66	67.38	72.92	72.64	72.56	70.32
Purity of B - molasses	49.90	57.25	51.85	50.26	47.42	55.60	50.32	52.20	48.05
Purity drop	20.60	17.96	18.99	17.40	19.96	17.32	22.32	20.36	22.27
Exhaustion	58.32	55.86	55.67	51.70	56.34	53.50	61.84	58.69	60.96
C - MASSECUITE									
m^3 per ton brix in mixed juice	0.25	0.20	0.28	-	-	0.22	0.24	0.28	0.19
Refractometer brix of massecuite	98.39	97.25	95.77	95.42	97.23	96.72	97.14	96.72	94.41
Purity of massecuite	55.08	59.17	52.67	54.60	55.32	57.72	53.10	55.38	53.26
Purity of C - molasses	37.09	39.52	37.35	38.72	40.92	38.66	35.16	36.83	34.72
Crystal content	28.13	31.61	23.43	24.72	23.69	30.05	26.87	28.40	26.82
Exhaustion	51.91	54.92	46.44	47.45	44.05	53.83	52.09	53.03	53.33
TOTAL VOLUME ALL RAW MASSECUITES									
m^3 per ton brix in mixed juice	1.70	1.93	2.23	-	-	1.09	1.80	2.18	1.59
WHITE SUGAR MASSECUITES									
Kg sugar per m^3 massecuite	479	487	502	-	591	585	-	-	-
Tons phosphoric acid/1000 tons white sugar	-	0.91	-	-	-	1.43	-	-	-
Tons sulphur/1000 tons white sugar	0.24	-	0.14	-	-	0.32	-	-	-
Phos. acid ppm mixed juice	-	-	-	-	-	-	-	-	116.4
Flocculant ppm mixed juice	0.3	0.1	2.7	2.5	2.4	2.6	3.7	0.3	3.2
Tons lime per 1000 tons cane	1.0	0.8	1.1	1.0	-	0.7	0.6	7.3	0.3
Enzyme ppm sugar	-	-	-	-	-	-	-	-	-
ADDITIONAL FUELS PER 1000 TONS CANE									
Tons of coal	6.45	-	-	10.91	7.97	0.09	-	-	0.41
Tons of wood	-	-	0.19	0.03	-	0.15	0.79	0.20	-
Converted into bagasse **	25.81	-	0.22	43.68	31.90	0.55	0.95	0.24	1.64

**** 1 TON COAL EQUIVALENT TO 4 TONS OF BAGASSE**
1 TON FIREWOOD EQUIVALENT TO 1.2 TONS OF BAGASSE
 # 1 TON SULPHUR DIOXIDE EQUIVALENT TO 0.5 TONS OF SULPHUR

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

	2008/2009	2007/2008	2006/2007	2005/2006	2004/2005
Throughput and time efficiency					
Tons cane per hour	298.30	298.26	303.63	301.88	301.95
Tons fibre per hour	43.83	43.48	44.51	43.49	44.11
Overall time efficiency	78.66	77.46	76.47	82.90	82.40
Cane					
Sucrose % cane	13.69	13.47	12.92	13.74	13.52
Fibre % cane	14.95	14.86	14.95	14.66	14.84
Mixed juice					
Sucrose purity(MJ adj.)	86.49	86.03	85.55	85.59	85.81
(Glucose + Fructose)/ash in M.J.(unadj.)	0.93	0.97	1.01	1.06	1.03
Milling					
Imbibition % fibre	349	367	372	380	369
Extraction (sucrose based)	97.61	97.82	97.84	98.03	97.98
Pol % bagasse	1.06	0.97	0.92	0.91	0.90
Moisture % bagasse	50.26	49.77	49.76	49.57	49.93
Bagasse % cane	30.80	30.19	30.30	29.67	30.30
LCV bagasse kJ/kg	7218	7308	7377	7468	7397
Available kJ in bag./kg brix in M.J.(adj)	14387	14408	15124	14080	14515
Recoveries					
Boiling house recovery (sucrose based)	88.05	87.56	87.51	88.25	88.00
Overall recovery (sucrose based)	85.94	85.65	85.61	86.52	86.23
Tons cane per ton sugar	8.46	8.63	8.99	8.37	8.53
Filter cake					
Pol % filter cake	1.64	1.69	1.68	1.63	1.56
Filter cake % cane	1.33	1.53	1.47	1.33	1.25
Final molasses					
Brix % final molasses	84.67	84.84	84.72	84.83	83.97
Sucrose/refractometer brix purity	37.46	37.68	37.43	36.70	36.94
Final molasses @ 85^0 brix % cane	4.01	4.12	4.08	4.23	4.16
Average sugar polarisation	99.54	99.53	99.52	99.49	99.48
Sucrose lost % sucrose in cane					
Lost in bagasse	2.39	2.18	2.16	1.97	2.02
Lost in filter cake	0.16	0.19	0.19	0.16	0.14
Lost in final molasses	9.32	9.79	10.03	9.61	9.65
Undetermined losses	2.19	2.19	2.00	1.76	1.96
Lost in boiling house	11.67	12.17	12.22	11.52	11.75
Total losses	14.06	14.35	14.39	13.48	13.77
M^3 massecuite per ton Bx in MJ					
A - massecuite	0.92	0.92	0.95	0.94	0.92
B - massecuite	0.34	0.36	0.36	0.35	0.33
C - massecuite	0.22	0.23	0.24	0.23	0.23
Total	1.48	1.51	1.55	1.52	1.49
Exhaustion of massecuites					
A - massecuite	63.12	62.41	63.48	64.38	64.40
B - massecuite	59.79	59.72	58.92	59.55	58.63
C - massecuite	54.92	55.74	55.05	56.88	56.46
Brix of syrup	65.14	65.89	65.73	65.85	65.32

TABLE E
AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS
FOR SOUTH AFRICAN FACTORIES (SEASON 2008 - 2009)

End of month period		29 MAR 2008	03 MAY 2008	31 MAY 2008	28 JUN 2008	02 AUG 2008	30 AUG 2008	27 SEP 2008	01 NOV 2008	29 NOV 2008	27 DEC 2008	31 JAN 2009
Tons of sugar made and estimated	Month	11877	182288	261160	267773	380651	310563	294152	321652	183254	63267	0
	To-date	11877	194165	455325	723098	1103750	1414312	1708464	2030116	2213370	2276637	2276637
Tons cane crushed	Month	183016	1651920	2326505	2313036	3086998	2421048	2241073	2651089	1735313	645416	0
	To-date	183016	1834936	4161442	6474478	9561476	11982524	14223597	16874686	18609999	19255415	19255415
Tons cane crushed per hour actual crushing	Month	223.01	268.11	308.16	315.11	313.51	306.67	295.92	299.75	282.89	270.56	0.00
	To-date	223.01	262.81	286.37	296.02	301.45	302.49	301.43	301.17	299.36	298.30	298.30
Sucrose % cane	Month	12.37	12.54	12.96	13.32	14.10	14.67	15.03	14.02	12.68	12.17	0.00
	To-date	12.37	12.52	12.76	12.96	13.33	13.60	13.83	13.86	13.75	13.69	13.69
Fibre % cane	Month	14.91	15.08	14.62	14.48	14.10	14.41	14.85	15.73	16.62	16.20	0.00
	To-date	14.91	15.06	14.82	14.70	14.50	14.49	14.54	14.73	14.91	14.95	14.95
RV % cane	Month	11.19	11.36	11.82	12.23	12.98	13.47	13.78	12.75	11.44	10.90	0.00
	To-date	11.19	11.34	11.61	11.83	12.18	12.44	12.65	12.66	12.54	12.49	12.48
Tons cane per ton sugar	Month	15.41	9.06	8.91	8.64	8.11	7.80	7.62	8.24	9.47	10.20	0.00
	To-date	15.41	9.45	9.14	8.95	8.66	8.47	8.33	8.31	8.41	8.46	8.46
Extraction (sucrose based)	Month	96.78	97.50	97.68	97.58	97.74	97.77	97.69	97.59	97.28	97.16	0.00
	To-date	96.78	97.43	97.57	97.57	97.63	97.66	97.66	97.65	97.62	97.61	97.61
Imbibition % fibre	Month	332	362	348	346	348	347	353	355	336	336	0
	To-date	332	359	353	350	350	349	350	351	349	349	349
Pol % bagasse	Month	1.26	1.00	0.99	1.08	1.10	1.11	1.13	1.05	1.02	1.02	0.00
	To-date	1.26	1.03	1.01	1.03	1.05	1.06	1.08	1.07	1.07	1.06	1.06
Moisture % bagasse	Month	51.06	50.46	50.68	50.53	50.21	50.01	49.97	49.99	50.14	50.80	0.00
	To-date	51.06	50.52	50.61	50.58	50.46	50.37	50.31	50.26	50.24	50.26	50.26
Boiling house recovery (sucrose based)	Month	-	89.78	88.25	88.60	89.03	89.01	88.98	88.24	85.51	82.59	0.00
	To-date	-	86.27	87.40	87.84	88.25	88.42	88.51	88.47	88.21	88.05	88.05
Overall recovery (sucrose based)	Month	-	87.54	86.20	86.45	87.02	87.03	86.93	86.11	83.18	80.25	0.00
	To-date	-	84.06	85.27	85.71	86.16	86.35	86.45	86.39	86.12	85.94	85.94
Mixed juice sucrose purity	Month	85.10	85.22	86.07	86.77	87.51	87.12	86.93	86.15	85.72	84.46	0.00
	To-date	85.10	85.21	85.70	86.09	86.57	86.69	86.73	86.64	86.56	86.49	86.49
Pol/sucrose ratio in mixed juice	Month	0.9870	0.9877	0.9913	0.9917	0.9932	0.9975	0.9975	1.0008	0.9978	0.9926	0.0000
	To-date	0.9870	0.9876	0.9897	0.9904	0.9914	0.9927	0.9936	0.9947	0.9950	0.9949	0.9949
Sucrose/refractometer brix purity in final molasses	Month	38.19	37.93	36.05	36.80	37.47	36.45	37.08	37.95	39.27	40.94	0.00
	To-date	38.19	37.76	36.83	36.82	37.03	36.91	36.94	37.11	37.33	37.46	37.46
Sucrose lost in final molasses % sucrose in cane	Month	-	11.07	9.05	8.88	8.56	8.35	8.75	9.56	11.51	12.32	0.00
	To-date	-	10.48	9.67	9.38	9.10	8.94	8.90	9.01	9.22	9.32	9.32
Undetermined lost sucrose % sucrose in cane	Month	-	-1.29	2.28	2.09	2.01	2.25	1.87	1.75	2.37	4.42	0.00
	To-date	-	2.71	2.47	2.33	2.22	2.23	2.16	2.10	2.12	2.19	2.19
Pol/sucrose ratio FM	Month	0.9202	0.9124	0.9177	0.9158	0.9283	0.9415	0.9454	0.9611	0.9771	0.9739	0.0000
	To-date	0.9202	0.9174	0.9175	0.9169	0.9206	0.9248	0.9283	0.9338	0.9385	0.9399	0.9399

TABLE F
CANE VARIETIES AND RAINFALL
(SEASON 2008 - 2009)
PERCENTAGE BY MASS

Factory	N 11	N 12	N 14	N 16	N 17	N 19	N 21	N 22	N 23	N 24	N 25	N 26	N 27	N 28	N 29	N 30	N 31	N 32	N 36	NCo 376	MIXED VARIETY	UNKNOWN & OTHER	% BURNT	* RAINFALL
ML	-	-	8.8	-	-	25.6	0.1	1.5	5.5	0.8	42.4	0.6	-	0.1	-	0.8	-	10.6	2.0	-	1.1	0.1	99.9	539
KM	-	-	23.1	-	-	29.4	-	1.2	5.3	0.7	22.6	0.1	-	0.3	-	0.4	-	11.2	2.4	-	3.2	0.1	99.7	540
PG	-	-	16.2	-	1.4	7.5	-	0.6	10.6	0.1	27.0	9.4	-	0.3	-	0.3	-	1.1	16.3	-	3.6	5.5	99.6	315
UF	-	1.3	1.7	-	4.8	23.1	0.5	2.4	0.3	-	1.5	0.2	8.1	-	6.8	-	-	-	0.5	9.1	7.2	32.6	98.8	618
FX	-	1.0	1.7	-	3.5	5.4	0.2	0.2	3.4	0.1	12.0	0.3	26.9	0.5	4.9	0.2	-	0.1	3.9	-	2.0	33.8	84.8	369
AK	-	16.9	0.3	5.1	2.3	4.5	1.9	-	-	-	0.7	-	18.0	-	5.1	-	1.5	-	0.6	4.3	7.5	31.3	96.0	299
DL	-	14.2	0.1	4.9	2.4	2.5	1.6	0.1	-	-	-	-	17.8	0.2	3.7	-	2.4	0.6	-	8.1	0.7	40.9	93.4	353
MS	-	13.9	0.1	7.8	2.7	2.4	1.3	-	-	-	0.4	-	10.0	-	6.4	-	2.8	-	-	22.5	5.2	24.5	78.8	477
GH	-	21.7	0.3	5.7	1.9	2.6	0.6	-	-	-	0.2	-	11.9	-	1.8	-	3.0	2.7	-	8.9	2.3	36.1	77.6	406
NB	0.2	63.1	-	11.0	0.1	-	1.0	-	0.2	-	0.4	0.1	0.6	-	0.4	0.1	9.8	-	3.0	-	0.6	9.4	98.3	281
UC	0.1	52.9	-	19.3	-	0.2	1.2	-	0.2	-	0.6	0.1	0.1	-	0.1	-	8.7	-	3.7	-	0.1	12.7	98.2	463
ES	-	71.3	-	7.8	0.1	-	0.1	-	-	-	-	-	0.5	0.1	0.2	0.7	12.2	-	-	-	0.3	6.6	91.7	434
SZ	-	41.0	0.2	6.6	-	-	0.8	-	-	-	-	-	5.6	-	3.1	-	0.7	-	-	3.8	10.6	27.6	73.2	1396
UK	-	24.7	0.3	1.5	-	-	1.5	-	0.1	-	-	-	3.1	-	1.8	-	2.5	-	-	5.2	3.8	55.5	93.8	925
Average SA Factories	-	21.1	5.0	4.3	1.3	8.9	0.7	0.5	2.2	0.2	9.6	0.7	7.4	0.1	2.4	0.2	2.6	2.4	2.3	4.5	3.8	20.0	91.5	
UB	-	-	2.0	-	-	11.0	-	-	33.7	0.1	22.6	-	-	-	-	-	-	-	-	21.4	9.2	-	-	389
NH	-	-	20.8	-	-	-	-	-	0.5	-	22.1	-	-	-	0.4	-	-	24.5	-	-	7.0	24.6	-	344
DW	-	-	6.7	-	-	16.5	-	-	-	-	9.2	0.3	-	-	-	-	-	-	-	12.6	2.3	52.5	-	39
HV	-	-	56.0	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	4.4	0.3	39.5	-	216
TR	-	-	45.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	28.7	1.1	25.0	-	276
NK	-	-	1.5	-	-	28.8	-	0.6	22.3	-	41.6	-	-	-	-	-	-	-	-	0.2	4.4	0.7	-	842
MW	-	-	-	-	-	10.6	-	-	-	-	7.5	-	0.3	-	-	0.3	-	0.3	-	77.5	2.7	0.9	-	709
RU	-	-	-	-	-	12.4	-	-	-	-	11.7	-	-	-	-	0.4	-	0.2	-	71.2	3.5	0.7	-	894
MA	-	-	-	-	-	44.6	-	-	32.1	-	3.5	-	-	4.0	-	-	-	-	-	15.7	-	0.1	-	150

*** Rainfall during the crushing season**

TABLE G
TRANSPORT SUMMARY - SOUTH AFRICAN FACTORIES
(SEASON 2008 - 2009)
PERCENTAGE OF CANE TRANSPORTED

MILLS	ML	KM	PG	UF	FX	AK	DL	MS	GH	NB	UC	ES	SZ	UK	AVERAGE
SOUTH AFRICAN RAILWAYS	-	-	-	-	20.6	-	-	-	-	-	-	-	-	-	1.9
TRAMS	-	-	-	74.1	-	-	0.2	-	-	-	-	-	-	-	4.0
TANKERS	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
ARTICULATED TRUCK DRIVEN VEHICLES															
- Interlink	-	-	11.4	20.1	59.2	23.2	32.9	88.2	45.1	24.3	18.1	27.3	91.3	75.5	36.5
- Tri-Axle	-	-	3.2	-	4.1	0.6	4.6	0.5	1.2	3.4	0.5	10.2	-	0.1	1.9
- Hilo	8.4	2.2	22.3	3.3	0.2	0.1	6.9	-	0.7	2.8	0.6	-	4.7	16.0	4.6
RIGID CHASSIS VEHICLES															
- Truck	82.7	68.4	2.3	-	-	44.5	5.8	-	36.2	40.2	36.9	39.4	3.9	1.3	28.9
- Lorry	1.5	0.9	0.9	-	-	-	0.1	-	-	1.1	13.3	-	-	-	0.9
TRACTOR DRIVEN VEHICLES															
- Hilo	0.3	-	13.2	0.9	0.6	7.7	17.3	0.7	14.6	21.7	2.6	20.8	-	-	6.3
- Rig	1.7	-	1.5	-	15.3	12.6	14.4	1.2	2.0	1.5	8.1	-	-	0.3	4.0
- Interlink	5.4	28.5	45.2	1.7	-	11.4	17.8	9.4	0.3	5.0	19.9	2.3	-	6.9	11.0

TABLE H
COMPARATIVE DATA OF REPORTING SOUTH AFRICAN FACTORIES FROM 1925 ONWARDS

YEAR	% Cane		Cane/sugar ratio		Extraction	Pol % fibre in Bagasse	% Bagasse		Imbibition %		Mixed Juice		F Molasses	Recoveries *	
	Sucrose *	Fibre	Tel Quel	96° Pol			Pol	Moisture	Cane	Fibre	Purity *	RS ** to sucrose * ratio	Purity *	Boiling House	Overall
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**	**46.28**	**309**	**84.85**	**5.37**	**38.4**	**88.92**	**85.54**
Average 1981 - 1984	**12.44**	**15.88**	**9.44**	**9.12**	**97.12**	**2.36**	**1.09**	**51.74**	**52.60**	**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	51.25	348	86.46	4.82	37.2	88.97	86.99
2001	13.11	14.97	8.81	8.5	97.74	2.02	0.95	50.81	54.32	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	53.26	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
Average 2005 - 2008	**13.44**	**15.33**	**8.61**	**8.31**	**97.83**	**2.01**	**0.97**	**49.84**	**53.5**	**367**	**85.92**	**4.78**	**37.3**	**87.84**	**85.93**

* From 1925 to 1980 values are based on pol; from 1981 onwards values are based on sucrose

Proc S Afr Sug Technol Ass (2009) 82: 1 - 29