EIGHTY-FIFTH ANNUAL REVIEW OF THE MILLING SEASON IN SOUTHERN AFRICA (2009-2010)

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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 2009-2010 milling season in South Africa was slightly down on the 2008-2009 season in terms of cane quality and recoveries, and the tonnage of cane harvested was also lower, despite the same Length of Milling Season (LOMS) as the 2008-2009 season. Time efficiencies were also down, with higher No-cane, Foreign Matter and Scheduled Stops as well as Lost Time % Available (LTA). Extraction performance continued the substantial decline of the previous three seasons. Losses to molasses stopped the downward slope of the previous two seasons, although an increased Undetermined Loss resulted in a lower Boiling House Recovery (BHR) and Overall Recovery (OR). These were partly as a result of poorer cane quality, however, and this resulted in slight increases in Corrected BHR (CRB) and Value Recovery (VR).

Regarding the SMRI Affiliate member mills in neighbouring countries, those in Swaziland, Malawi and Zimbabwe experienced poorer recoveries than in the previous season, while the Nakambala mill in Zambia showed the most notable improvement over previous seasons, following a major capacity upgrade. The Nakambala mill also achieved sugar production of 315 043 tonnes, a record in the history of the SMRI Factory Performance reporting.

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

Introduction

This paper reviews the 2009-2010 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]. Note that all Swaziland data for 2009-2010 in this review refers to Ubombo mill only and Mozambique data is for Maragra mill only[2].

[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 2009-2010 season were not available at the time of compilation of this review.

Detailed information on factory performance in 2009-2010 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.

Cane crop

Cane varieties

The varietal distribution at southern African mills for the 2009-2010 season is shown in Appendix Table F. There were no significant changes in South Africa since the 2008-2009 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 N14 was not crushed at NK. This variety has been replaced by N19 and N23.

Burning

The overall percentage of cane burnt in South Africa decreased slightly from the level of the previous season, or 91.5 to 90.6% (Appendix Table F), with the largest decrease at SZ, where only 69.2% of the cane was burnt, well below the rest of the industry. All cane harvested on the seaward side of the N2 freeway at Sezela is unburnt due to developments in the region.

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 and RV reversed the upward trends of the previous two seasons and dropped to 11.71% and 12.42% respectively, still well above the 10 year averages of 11.59 and 12.23%. This trend in RV was reflected in individual mill results, with most mills recording very similar values to their previous seasons. Notable exceptions were GH, NB, UC and ES which recorded values notably lower, and SZ and UK which recorded notably higher values. The Ash % Cane decreased slightly to 1.79% for the SA industry (Figure 1b), above the 10-year average of 1.75%. The mixed juice sucrose purity also reversed the trend of the previous two seasons, decreasing to a value of 86.14%, slightly below the 10-year average.

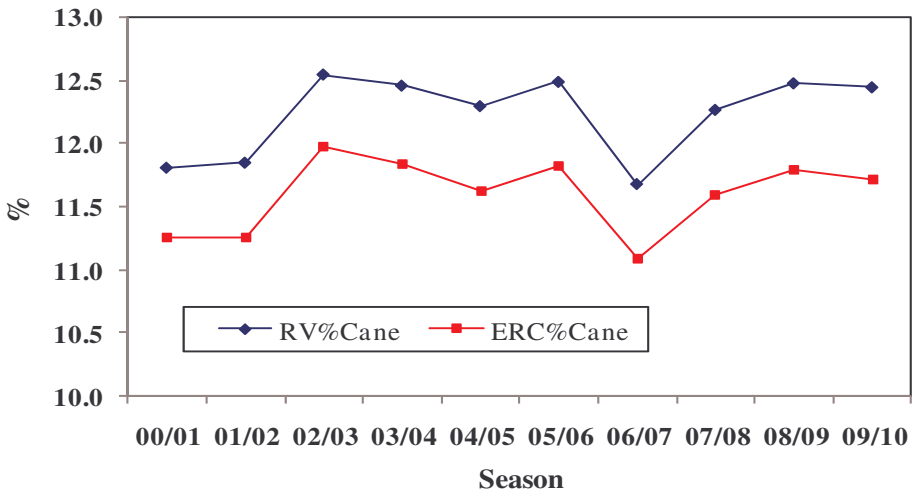

Figure 1a. Recoverable Value (RV) % cane and Estimated Recoverable Crystal (ERC) % cane in South Africa.

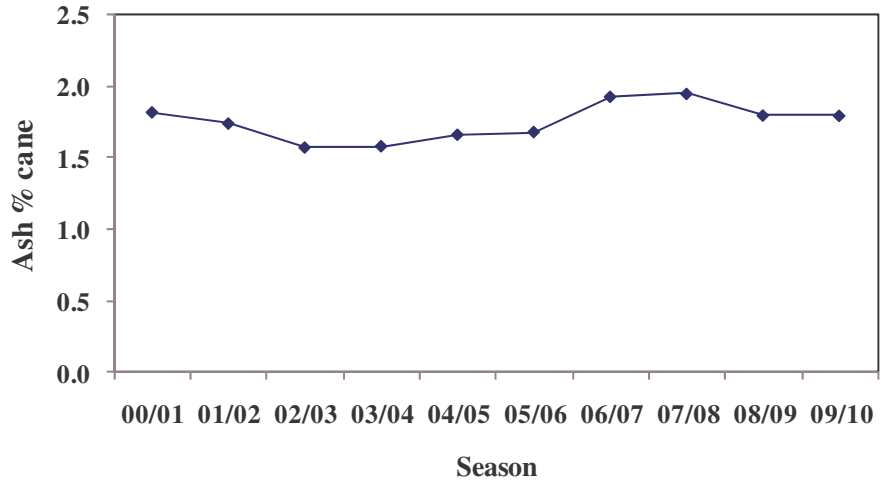

Figure 1b. Ash % cane in South Africa.

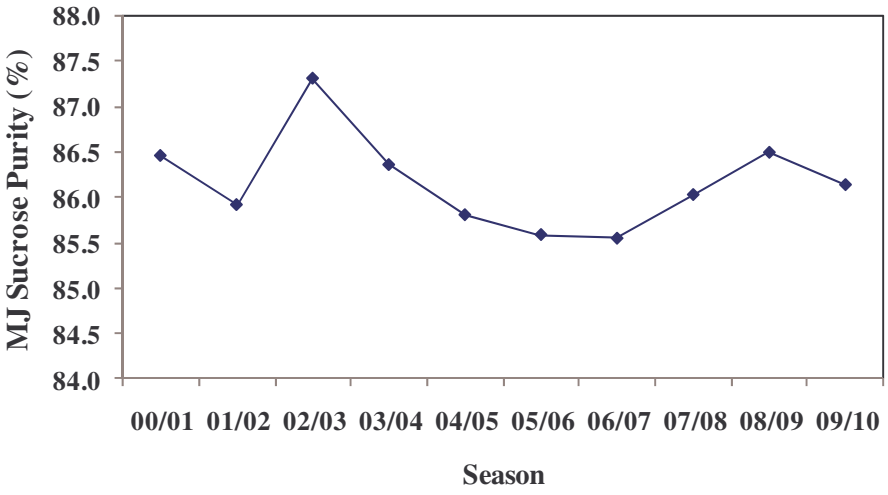

Figure 1c. Mixed juice sucrose purity in South Africa.

The monthly RV % cane for the past three seasons in South Africa (Figure 2) shows that the cane quality during the 2009-2010 season was similar to the previous two years, although it flattened out in July rather than increasing to a peak in September. Rainfall (Figure 3) was low for the year until October and this may have contributed to the levelling off of the RV % cane curve.

Rainfall was concentrated over October and November in most areas. The exception was the irrigated Mpumalanga areas, where October was relatively dry, followed by high rainfall in November. The total rainfall recorded at mills during the crushing season ranged from 267 mm at Eston to 1511 mm at Umzimkulu (Appendix Table F).

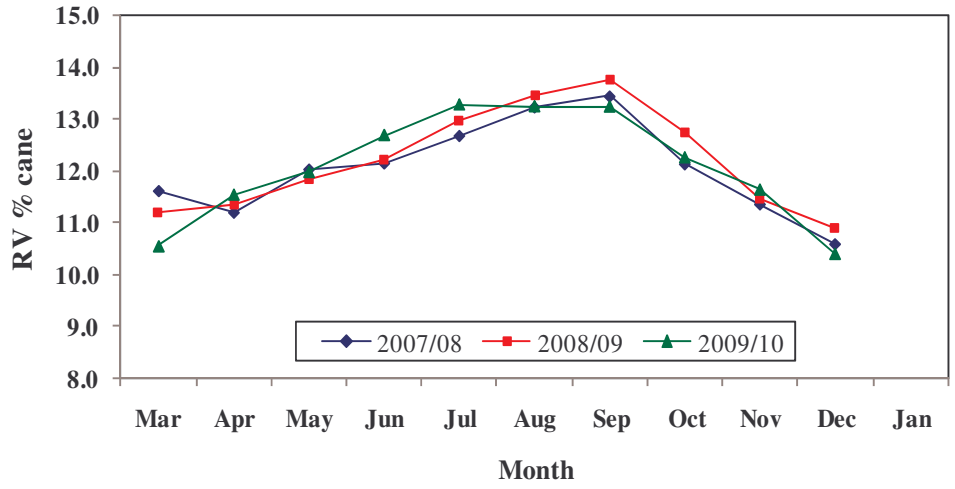

Figure 2. Monthly RV % cane in South Africa for the 2007-2008, 2008-2009 and 2009-2010 seasons

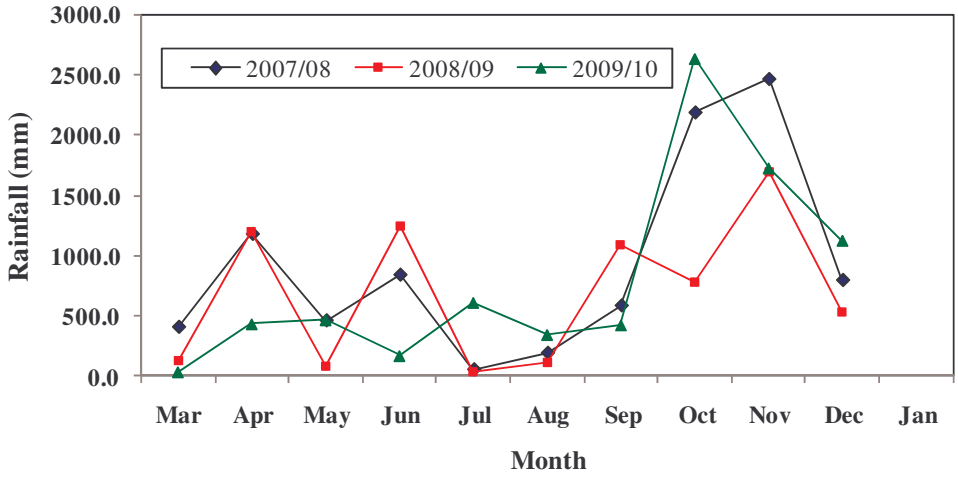

Figure 3. Monthly total rainfall at crushing for South African mills for the 2007-2008 to 2009-2010 seasons (values are the monthly rainfalls summed over all mills crushing during the month).

Considering the whole region, cane quality in terms of ERC % cane dropped slightly from 2008-2009 to 2009-2010 in all countries under review, other than Tanzania.

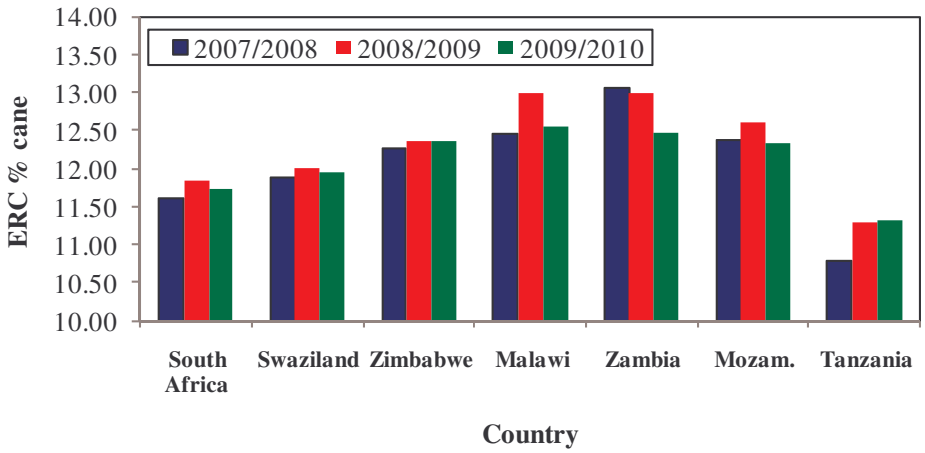

Figure 4. ERC % cane in southern Africa from 2007-2008 to 2009-2010.

Cane tonnage

Initial predictions for the 2009-2010 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 2008-2009 despite assuming normal summer rainfall in most regions and improved water supplies in the Komati, Malelane and Umfolozi mill areas. The estimate increased to 105% of the 5-year potential following good rains in January and February, but dropped again after this, as lower than expected rainfall was experienced in March and the winter rainfall was below average. A reduction of around 4% from the 2008-2009 crop size was predicted by Canesim, although this was above the 5-year potential. The final tonnage of cane crushed during 2009-2010 was 18.66 million tonnes, which, while better than the initial low estimates, was the lowest since the 1995-1996 season, and continued the declining trend (Figure 5). The tonnage has dropped by an average of 3% per year for the past four seasons.

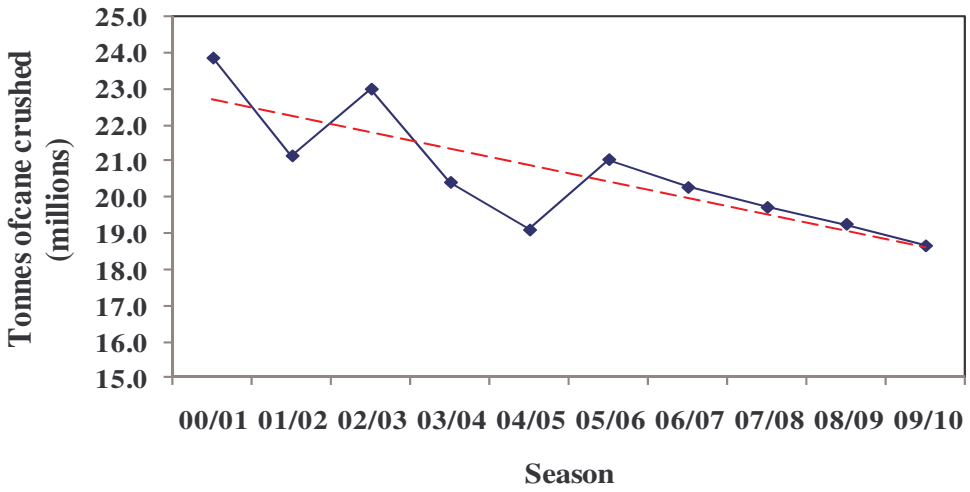

Figure 5. Tons of cane crushed in South Africa for the past ten seasons.

Looking more closely at the various regions from 2005-2006 to 2009-2010 (Figure 6), it is evident that the Zululand region suffered the most as far as cane supplies are concerned, with a 21% decrease over the four year period. This region includes Pongola, Umfolozi, Felixton and Amatikulu mills. The North Coast, South Coast and Midlands mills' cane tonnage also dropped, while Mpumalanga mills increased tonnage by just over 5% over the same four year period. The reasons for the dwindling sugarcane supply are dealt with in detail in the agricultural annual review by Singels *et al*., 2010.

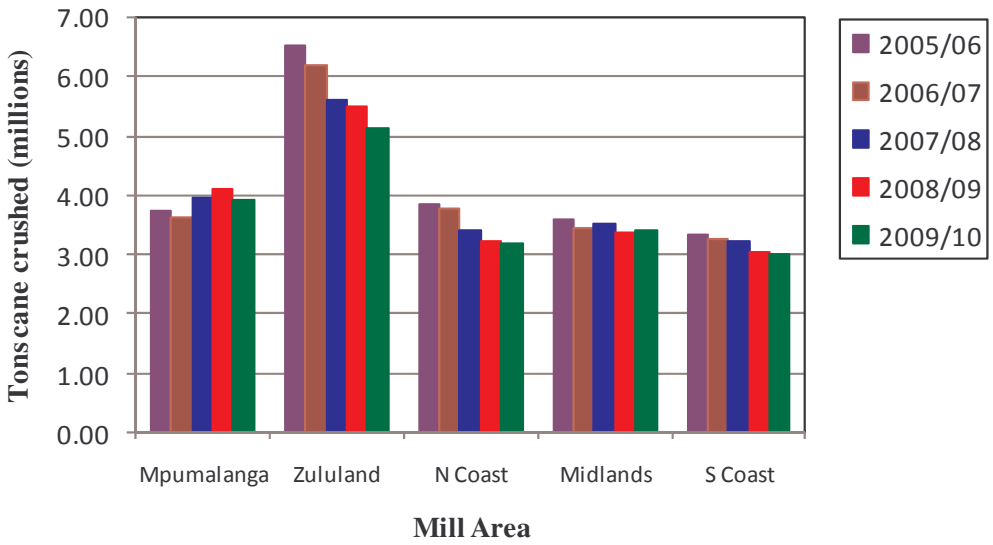

Figure 6. Tonnes of cane crushed in various mill areas from 2005-2006 to 2009-2010.

Factory performance

Length of milling season

The 2009-2010 season in South Africa ran from 3 March 2009 (UC) until 29 December 2009 (Umfolozi), with only Umfolozi crushing after the Christmas holidays. The average length of the season was 249 days, the same as the previous season. UC had the longest season of 291 days, with Maidstone having the shortest of 208 days. The lengths of the milling seasons in other southern African countries ranged from 195 days at Maragra in Mozambique to 280 days at Nakambala in Zambia.

Time efficiences

The time efficiencies for South Africa in the 2009-2010 season dropped after a reasonably good 2008-2009 season. The Overall Time Efficiency (OTE) was the second lowest in the past five years, only slightly above the low in 2006-2007 (Figure 7). The drop was due to increases in Scheduled Stops, No-Cane stops and Foreign Matter stops. Although the Other Stops decreased slightly as a percentage of available hours, it was off a lower base, and therefore the LTA increased from the previous season. Hours for Force Majeure increased from 425 hours in 2008-2009 to 1088 hours in 2009-2010, due mainly to a lengthy stop at Amatikulu during the season as a result of a fire in the factory.

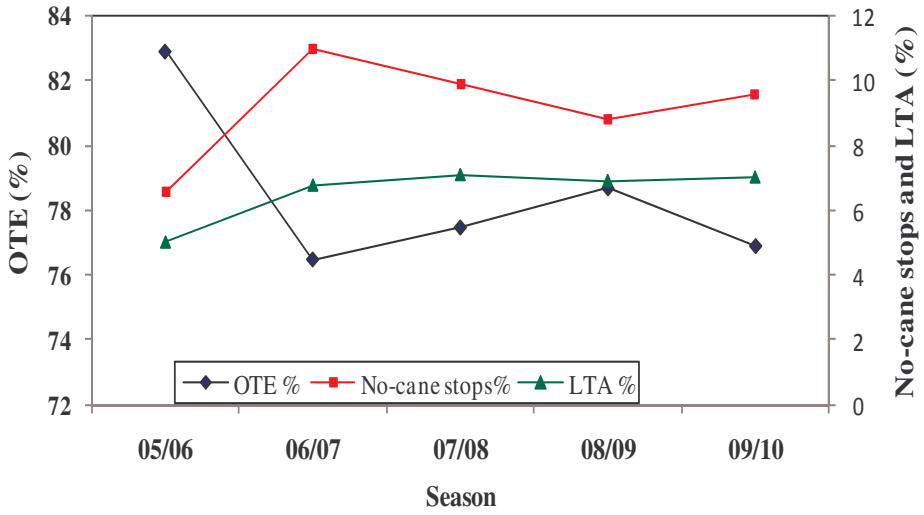

Figure 7. Overall Time Efficiency (OTE), No-cane stops and Lost Time % Available (LTA) in South Africa from 2005-2006 to 2009-2010.

The No-cane stops increased at most mills in 2009-2010 over those in 2008-2009 (Figure 8) indicating a poorer supply of cane, with the exception of Felixton, Gledhow and Umzimkulu. The greatest improvement was at Gledhow, as the result of a 26% increase in cane supply, following a 23% reduction in cane supply due to a change in delivery patterns by growers the previous season. Monthly values of No-cane stops exceeded 10% for April, October, November and December, the last three mainly due to the high rainfall experienced.

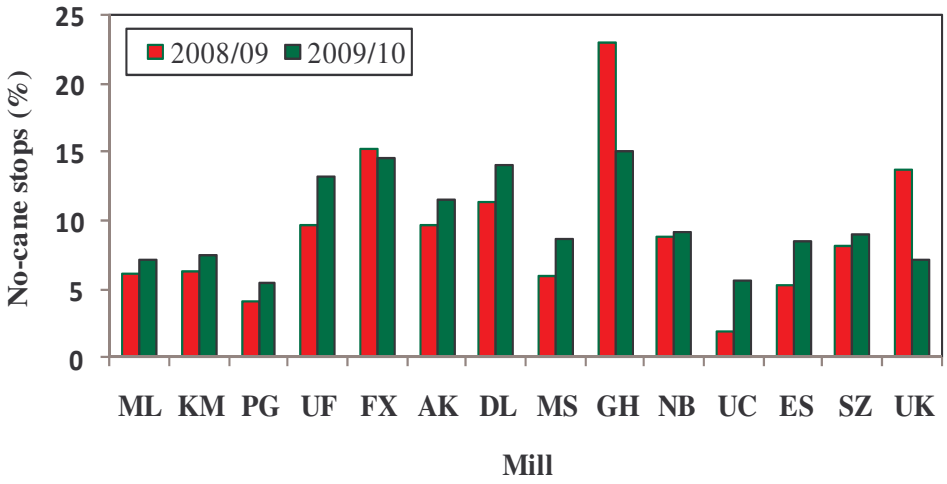

Figure 8. No-cane stops at South African mills for the 2008-2009 and 2009-2010 seasons.

Overall time efficiencies for Malawi, Swaziland (Ubombo), Mozambique (Maragra) and Tanzania were again better than the South African industrial average, while Zambia and Zimbabwe suffered from considerable No-cane stops and 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 (Figure 9) continued its declining trend from the record value of 98.03% in the 2005-2006 season to a value of 97.44% in 2009-2010, down from 97.61% in the previous season, and the lowest value since the 1984-1985 season (97.44%). This is a disturbing trend, and is often explained by the fact that less imbibition is being applied to the extraction stage to reduce energy requirements in the factory. This is not borne out in the tonnes of coal burnt which, if Sezela is omitted because of the downstream factory, increased from 8.37 tonnes coal/1000 tonnes cane in 2008-2009, to 9.08 tonnes coal/1000 tonnes cane in 2009-2010. Some of the drop in extraction can certainly be ascribed to reduced imbibition rates at individual mills, but not all, as some mills increased imbibition with little, or no effect, on extraction.

Figure 9 shows that the Corrected Reduced Extraction (CRE) value, which corrects for variations in cane quality, has also dropped to the lowest value in the past 10 years (and the lowest since 1989-1990), yet the imbibition rate, while low, is still similar to the value recorded in 2000-2001. The pol % bagasse value of 1.14% in 2009-2010 is the highest value recorded for the industry since the 1982-1983 season of 1.19%.

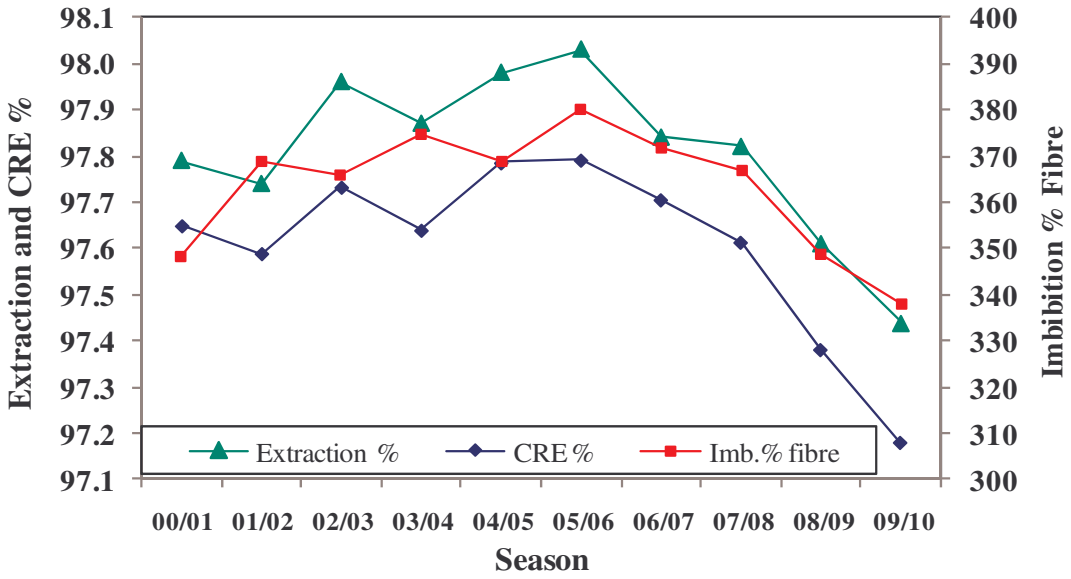

Figure 9. Extraction, Corrected Reduced Extraction (CRE) and Imbibition % Fibre for the South African industry from 2000-2001 to 2009-2010.

The extraction values for individual South African factories for the 2008-2009 and 2009-2010 seasons are shown in Figure 10. It can be seen that only three factories improved their extraction values from 2008-2009 to 2009-2010, while most showed a decrease in extraction performance.

In the 2009-2010 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 2009-2010, pol-based extraction increased at only three factories from the 2008-2009 season (Figure 11), with results from Hippo Valley being the most alarming, showing a substantial drop of 1.47% (following on from a drop of 2.18% the previous season), again due to poor cane quality (high fibre of 16.13%), reduced imbibition rates (199% on fibre in cane), and pol losses arising from frequent operational stops (OTE of 58.12%). Nakambala and Msolwa both showed improved performances after lower values in 2008-2009.

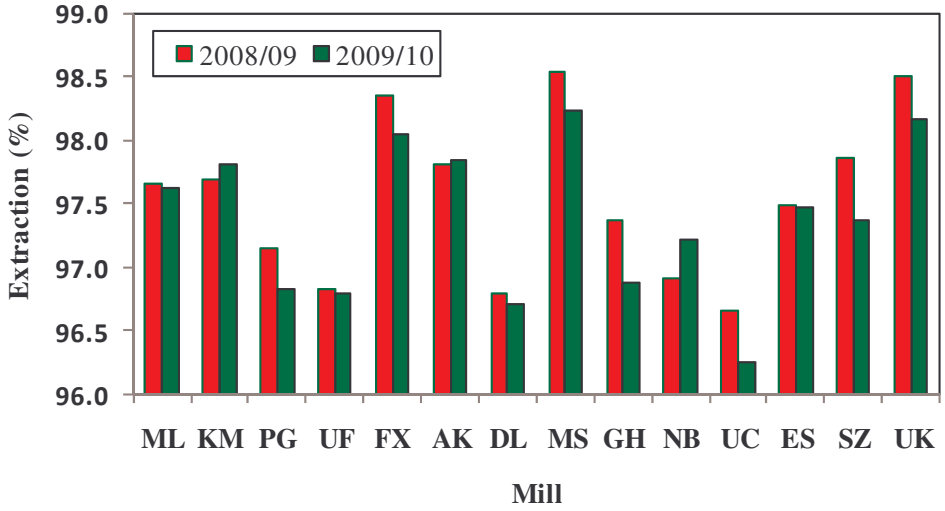

Figure 10. Extraction at South African mills for the 2008-2009 and 2009-2010 seasons.

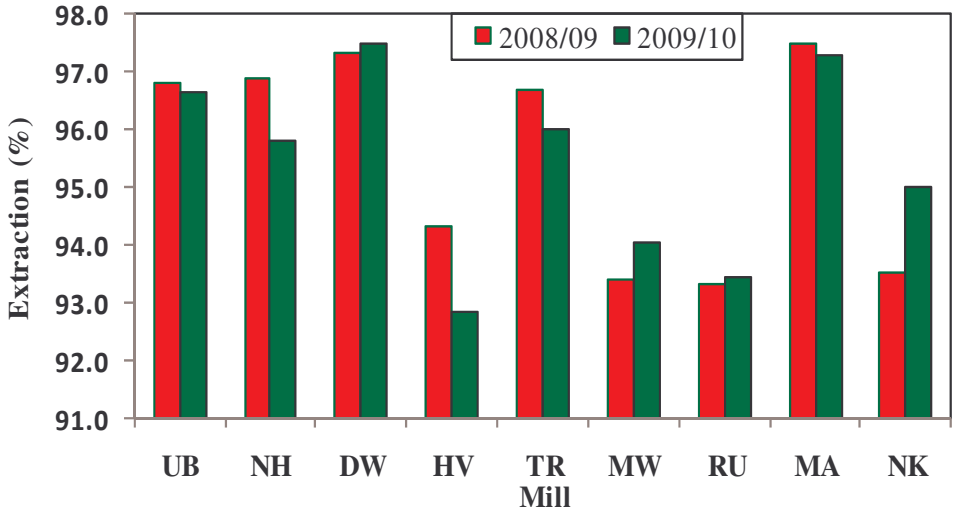

Figure 11. Pol-based extraction at southern African mills for the 2008-2009 and 2009-2010 seasons.

Boiling house performance

Boiling house performance in South Africa in 2009-2010 showed some improvement over the 2008-2009 season, with the season average Boiling House Recovery (BHR) for the industry at 87.88% (Figure 12). Although down on the 88.05% recorded in 2008-2009, this is mainly the

result of lower mixed juice purity. This is confirmed by the increase in Corrected Reduced BHR (CRB) to 86.67%, indicating better boiling house work. The overall loss of sucrose to molasses as a percentage of sucrose in cane (Figure 13) has increased to 9.39% but is still below the 10-year average of 9.43%.

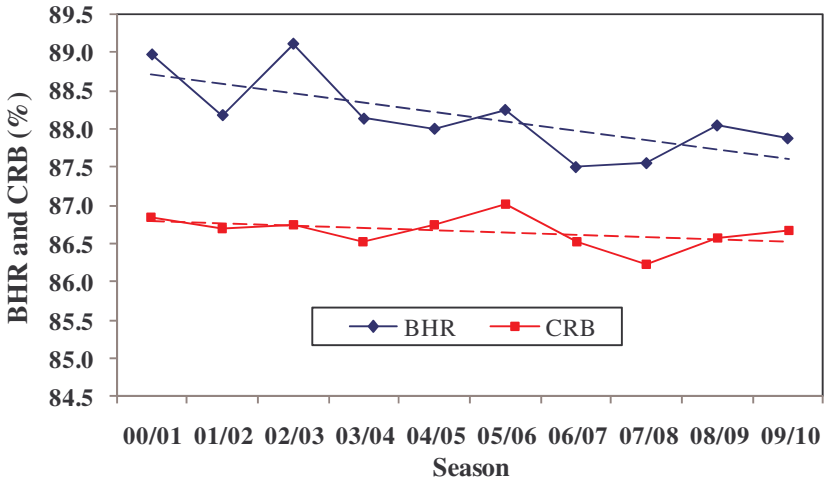

Figure 12. Boiling House Recovery (BHR) and Corrected Reduced BHR (CRB) in South Africa from 2000-2001 to 2009-2010 (with linear trendlines).

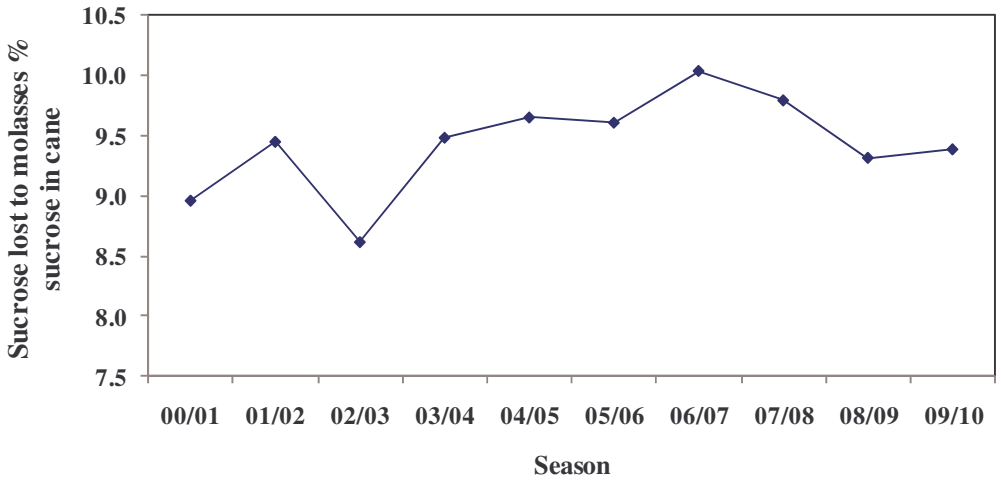

Figure 13. Sucrose loss to molasses in South Africa from 2000-2001 to 2009-2010.

Undetermined Loss % sucrose in cane in 2009-2010 increased to a new 10-year high at 2.27% (Figure 14), the highest value since 1993-1994. Although several mills (Malelane, Komati, Gledhow and particularly Pongola) showed noticeable improvements over their 2008-2009 values (Figure 15), Umfolozi, Felixton, Umzimkulu and particularly Darnall showed substantial increases in undetermined losses.

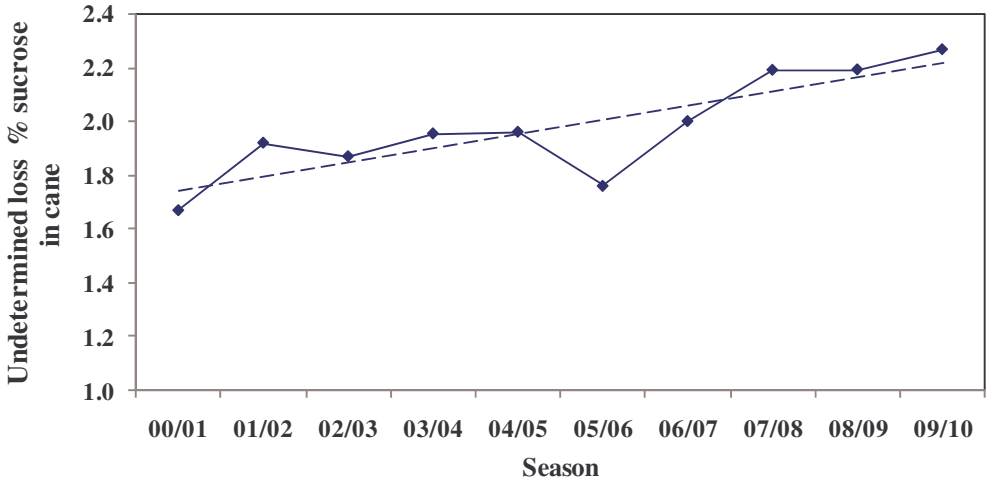

Figure 14. Undetermined loss in South Africa from 2000-2001 to 2009-2010 (with linear trendline).

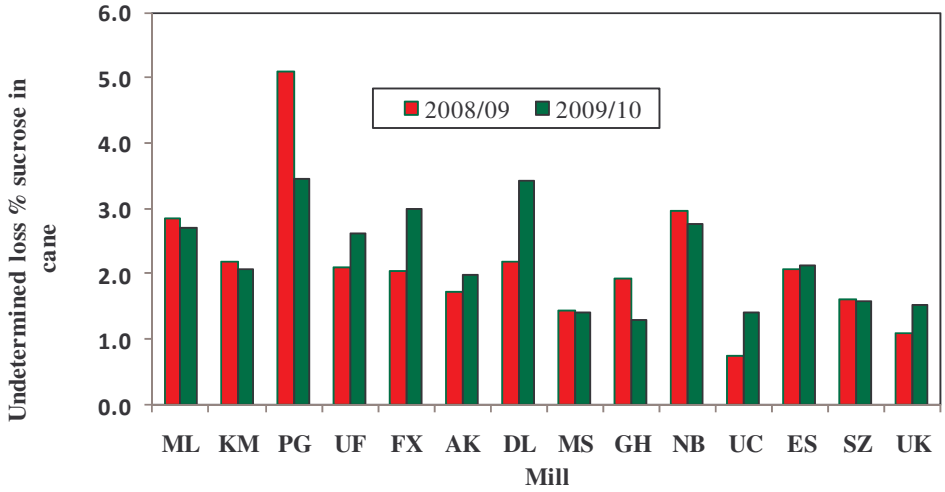

Figure 15. Undetermined loss % sucrose in cane at South African mills for the 2008-2009 and 2009-2010 seasons

Among the Affiliate mills, those in Zimbabwe showed substantial reductions in pol-based BHR, with extremely poor values in 2009-2010 compared with 2008-2009 (Figure 16). This was mainly the result of very high undetermined losses (Appendix Table A2). However, Nakambala in Zambia recovered somewhat, having completed a substantial expansion which took place concurrently with crushing over the previous two seasons. This impacted on performance and increased the potential for losses.

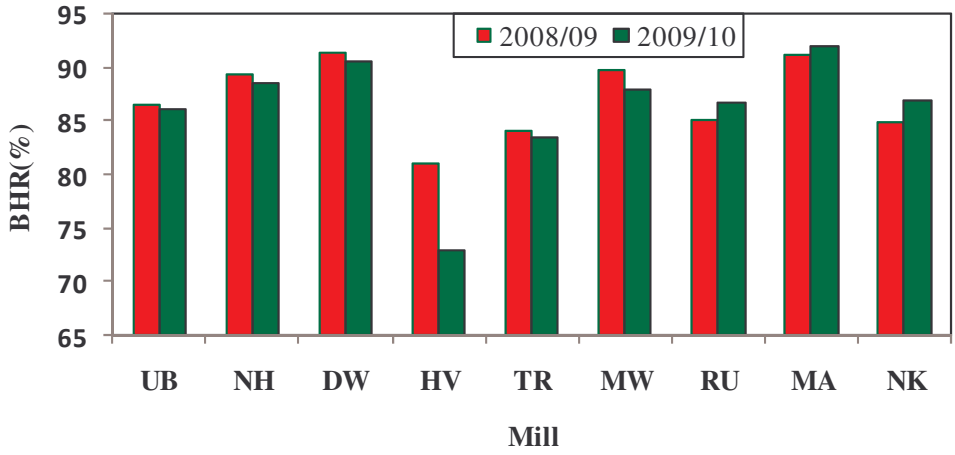

Figure 16. Pol-based BHR at southern African mills for the 2008-2009 and 2009-2010 seasons.

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 17. Although OR decreased, the VR showed some improvement over the values reported for 2007-2008 and 2008-2009. The VR is equal to the nine-year average (since VR was introduced), while the OR is well below the long-term average. One contributing factor to the higher VR is that the price of sugar increased by 13% and that of molasses by 22%. This increased the molasses credit slightly in the value recovery. There was also a change in the 3-year rolling factors. It is of interest that, should the 2008-2009 factors have been used for the 2009-2010 recoveries, the VR would have increased by only 0.01%, rather than by 0.26%.

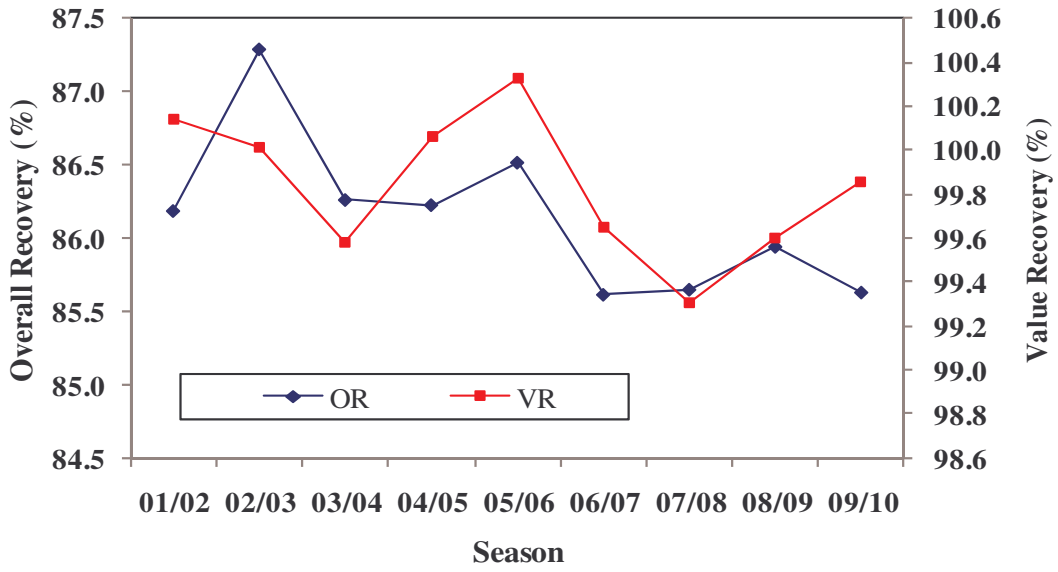

Figure 17. Overall Recovery (OR) and Value Recovery (VR) in South Africa from 2001-2002 to 2009-2010.

The Affiliated mills returned pol-based overall recoveries that ranged from an extremely low 67.76% at Hippo Valley to a very good value of 89.53% at Maragra.

Cane to sugar ratio

The cane to sugar ratios of the South African industry and the Affiliate mills are shown in Figure 18. This illustrates better seasons in Zambia, Mozambique and Tanzania, while Swaziland, Malawi 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 in Zambia recovered slightly from the previous season during which the mill was undergoing a major capacity expansion.

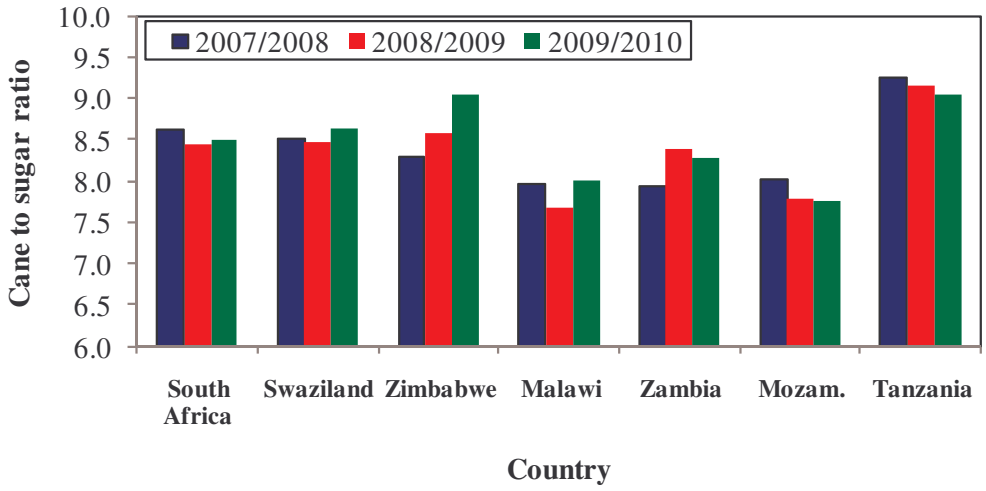

Figure 18. Cane to sugar ratio in southern Africa from 2007-2008 to 2009-2010.

Sugar quality

The trends in the Very High Pol (VHP) sugar quality with respect to colour are shown in Figure 19. The affinated sugar colour dropped to below 700 ICUMSA units for the first time since 2005-2006, while the average VHP sugar colour remained marginally above the 1500 ICUMSA target level. This is most likely as a result of mills controlling centrifugal wash to maintain this colour.

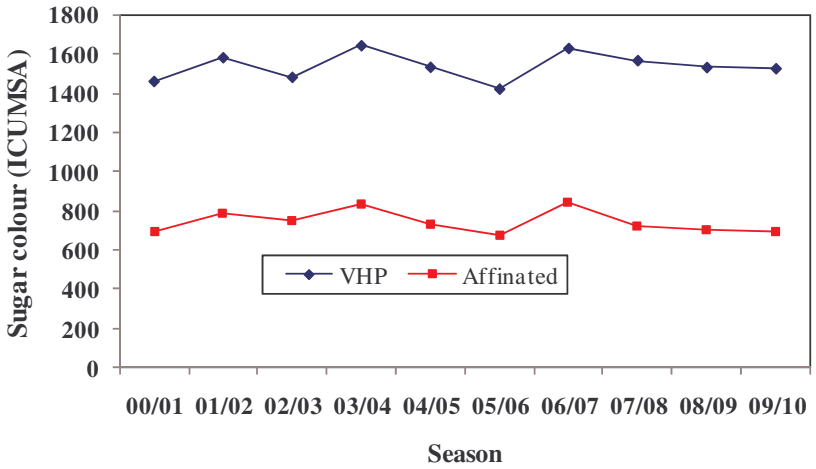

Figure 19. Very high pol (VHP) and affinated sugar colour in South Africa from 2000-2001 to 2009-2010.

Conclusions

The 2009-2010 milling season in South Africa was slightly down on the 2008-2009 season in terms of cane quality and recoveries, and the tonnage of cane harvested was also lower, despite the same Length of Milling Season (LOMS) as the 2008-2009 season. Time efficiencies were down, with higher No-cane, Foreign Matter and Scheduled Stops as well as LTA. Extraction performance continued the substantial decline of the previous three seasons. Losses to molasses stopped the downward slope of the previous two seasons, although an increased Undetermined Loss resulted in a lower Boiling House Recovery (BHR) and Overall Recovery (OR). These were partly as a result of poorer cane quality, however, and this resulted in slight increases in Corrected BHR (CRB) and Value Recovery (VR).

Regarding the Affiliate mills in neighbouring countries, those in Swaziland, Malawi and Zimbabwe experienced poorer recoveries than in the previous season, while the Nakambala mill in Zambia showed the most notable improvement over previous seasons, following a major capacity upgrade. The Nakambala mill also achieved sugar production of 315 043 tonnes, a record in the history of the SMRI Factory Performance reporting.

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.

REFERENCES

Singels A, McFarlane S, Way M, Ferrer S and van der Laan M (2010). A review of South African sugarcane production in the 2009/2010 season from an agricultural perspective. *Proc S Afr Sug Technol Ass* 83 (in press).

APPENDIX: DATA TABLES

Table A1: Cane crushed and sugar made, cane composition and time accounts, performances and losses – South African mills (Season 2009-2010)

Table A2: Cane crushed and sugar made, cane composition and time accounts, performances and losses – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2009-2010)

Table B1: Analysis of bagasse, juices, filter cake, syrup and final molasses – South African Mills (Season 2009-2010)

Table B2: Analysis of bagasse, juices, filter cake, syrup and final molasses – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2009-2010)

Table C1: Massecuites, exhaustions, clarifying agents and additional fuels – South African mills (Season 2009-2010)

Table C2: Massecuites, exhaustions, clarifying agents and additional fuels – Swaziland, Malawi, Zimbabwe, Tanzania and Mozambique factories (Season 2009-2010)

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

Table E: Average manufacturing results by monthly periods for South African mills (Season 2009-2010)

Table F: Cane varieties and rainfall (Season 2009-2010)

Table G: Transport summary – South African factories (Season 2009-2010)

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

TABLE A1
CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION, THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES
SOUTH AFRICAN FACTORIES (SEASON 2009 - 2010)

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 ESTIMATEI	202329	-	-	286338	124678	119644	-	-	186999	151411	131218	-	-	104266
Refined % total sugar	51.38	-	-	-	94.43	-	-	-	-	-	-	-	-	-
Moisture % all sugar	0.03	-	-	0.09	0.02	0.10	-	-	0.10	0.16	0.09	-	-	0.04
Pol % all sugar	99.97	-	-	99.41	99.89	99.45	-	-	99.40	99.41	99.38	-	-	99.55
Tons cane crushed total	1656847			2280798	1126893	1066417			1642988	1288510	1144455			890355
Tons cane crushed per tandem		1150436	1130362				740931	902057				194220	696135	
Season started on	1-Apr-2009	-	-	1-Apr-2009	25-Mar-2009	14-Apr-2009	-	-	5-May-2009	15-Apr-2009	16-Apr-2009	-	-	6-May-2009
Season completed on	20-Dec-2009	-	-	20-Dec-2009	20-Dec-2009	29-Dec-2009	-	-	8-Dec-2009	20-Dec-2009	9-Dec-2009	-	-	30-Nov-2009
Length of season (days)	263	-	-	263	270	259	-	-	217	249	237	-	-	208
TIME ACCOUNT														
Overall time efficiency (%)	88.81	80.76	78.55	79.65	77.23	70.93	69.75	70.15	69.95	74.46	70.51	28.85	70.02	49.48
Scheduled stops% gross available time	0.00	3.06	2.49	2.77	5.49	2.59	8.67	7.87	8.27	8.38	8.03	46.95	17.69	32.28
Lack of cane % gross available time	7.08	6.60	8.23	7.42	5.40	13.24	14.68	14.23	14.45	11.58	13.98	9.03	8.40	8.71
Other stops % gross available time	4.02	8.71	9.52	9.12	10.12	12.83	6.37	7.43	6.90	5.00	6.27	1.63	3.50	2.57
Foreign matter % gross available time	0.09	0.86	1.22	1.04	1.76	0.40	0.53	0.32	0.43	0.58	1.21	13.54	0.39	6.95
Lost time % available crush.time	4.33	9.74	10.81	10.27	11.58	15.32	8.37	9.58	8.98	6.30	8.17	5.35	4.76	4.93
Force majeure stops (hours)	227	138	0	69	8	11	32	36	34	702	5	0	0	0
THROUGHPUTS PER CRUSHING HOUR														
Tons cane	298.89	232.98	233.76	466.74	222.28	241.59	203.96	246.24	450.37	324.13	285.19	134.47	197.65	332.13
Tons fibre in bagasse	42.73	31.21	31.44	62.65	31.44	32.40	30.66	36.89	67.58	50.49	43.72	20.02	32.41	52.43
Tons brix in mixed juice (adj)	48.24	38.19	38.06	76.25	33.53	36.12	31.49	37.98	69.50	49.10	42.54	21.17	30.66	51.83
Tons sucrose in mixed juice (adj)	41.73	32.78	32.80	65.58	28.62	30.97	26.85	32.34	59.21	42.35	36.62	17.95	26.02	47.35
Tons non-suc in mixed juice (adj)	6.51	5.42	5.25	10.67	4.90	5.15	4.64	5.64	10.28	6.75	5.91	3.21	4.64	7.85
Tons of sugar produced	36.50	-	-	58.60	24.59	27.10	-	-	51.26	38.09	32.70	-	-	41.99
COMPOSITION OF CANE CRUSHED														
Sucrose % cane	14.30	14.38	14.35	14.37	13.30	13.24	13.43	13.40	13.41	13.35	13.28	13.57	13.41	13.44
Pol % cane	14.23	14.31	14.27	14.29	13.23	13.17	13.40	13.40	13.40	13.35	13.24	13.50	13.40	13.42
Fibre % cane	14.30	13.35	13.50	13.42	14.17	14.02	15.03	14.98	15.01	15.58	16.31	15.02	16.36	16.07
Brix % cane	16.78	17.01	16.87	16.94	15.86	15.66	16.13	16.13	16.13	15.66	15.71	16.20	16.04	16.07
Ash % cane	1.41	1.26	1.26	1.26	1.27	2.31	1.89	1.85	1.87	1.57	2.05	-	-	-
ERC % cane	12.33	12.35	12.37	12.36	11.31	11.33	11.33	11.29	11.31	11.46	11.31	11.51	11.32	11.37
ERC % sucrose in cane	86.18	85.85	86.19	86.02	85.02	85.58	84.39	84.27	84.33	85.84	85.17	84.85	84.46	84.55
RV % cane	13.05	13.10	13.10	13.10	12.02	12.02	12.07	12.03	12.05	12.14	12.00	12.24	12.05	12.09
MERC % cane	12.52	12.49	12.51	12.50	11.47	11.48	11.36	11.32	11.34	11.59	11.45	11.58	11.38	11.42
EXTRACTION														
Extraction (sucrose based)	97.62	97.80	97.80	97.80	96.82	96.78	98.05	98.04	98.05	97.83	96.70	98.38	98.19	98.23
Corrected reduced extraction	97.23	97.23	97.25	97.24	96.42	96.17	97.94	97.92	97.93	97.81	96.66	98.25	98.28	98.27
Imbibition % fibre	336	321	316	319	306	365	406	346	373	360	289	308	334	328
Diffusion Rate Index	9	-	-	-	8	8	-	-	-	-	-	-	-	-
Preparation index	-	92	93	92	-	-	90	90	90	92	90	91	91	91
Pol factor	98.67	100.22	99.40	99.81	98.63	98.77	98.16	98.34	98.26	99.71	99.82	98.90	99.70	99.53
Brix factor	100.45	101.45	100.28	100.87	100.36	100.86	100.35	100.48	100.42	100.76	101.46	100.96	101.59	101.45
RECOVERIES														
Boiling house recovery (sucrose)	87.44	-	-	88.82	85.83	87.05	-	-	86.05	89.41	88.74	-	-	88.28
CRB	86.04	-	-	87.62	85.57	85.80	-	-	86.20	88.22	87.57	-	-	88.81
Overall recovery (sucrose)	85.36	-	-	86.87	83.10	84.25	-	-	84.36	87.47	85.81	-	-	86.73
Ton cane per ton sugar	8.19	-	-	7.97	9.04	8.91	-	-	8.79	8.51	8.72	-	-	8.54
Ton cane per ton 96° pol sugar	7.86	-	-	7.69	8.69	8.60	-	-	8.49	8.22	8.43	-	-	8.23
Value Recovery (%)	99.20	-	-	100.54	98.51	98.19	-	-	99.48	101.31	99.80	-	-	102.29
Crystal Recovery Efficiency (XRE)	100.09	-	-	102.15	99.55	99.51	-	-	102.18	103.24	101.85	-	-	104.56
BALANCES														
Sucrose lost % sucrose in cane														
- lost in bagasse	2.38	-	-	2.20	3.18	3.22	-	-	1.95	2.17	3.30	-	-	1.77
- lost in filter cake	-	-	-	-	0.02	0.51	-	-	-	-	0.29	-	-	-
- lost in final molasses	9.56	-	-	8.87	10.25	9.41	-	-	10.69	8.39	7.19	-	-	10.10
- undetermined losses	2.70	-	-	2.06	3.45	2.61	-	-	2.99	1.97	3.41	-	-	1.41
Non sucrose ratio	1.04	-	-	1.02	1.03	1.01	-	-	0.96	0.94	0.93	-	-	1.04
Fructose ratio FM/MJ	1.04	-	-	0.93	0.99	0.93	-	-	0.89	0.82	0.83	-	-	1.04
Glucose ratio FM/MJ	0.92	-	-	0.66	0.90	0.66	-	-	0.65	0.63	0.58	-	-	0.80

*** Cane diffuser**

TABLE A1 (continued)
CANE CRUSHED AND SUGAR MADE, CANE COMPOSITION, THROUGHPUTS AND TIME ACCOUNTS, PERFORMANCES AND LOSSES
SOUTH AFRICAN FACTORIES (SEASON 2009 - 2010)

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	-	-	129408	167561	89293	144520	-	-	227917	128693	2194275
Refined % total sugar	-	-	99.89	100.00	-	-	-	-	-	-	23.63
Moisture % all sugar	-	-	0.02	0.02	0.06	0.08	-	-	0.13	0.06	0.08
Pol % all sugar	-	-	99.93	99.93	99.65	99.48	-	-	99.37	99.49	99.58
Tons cane crushed total			1154811	1430770	754186	1207697			1955480	1054882	18655089
Tons cane crushed per tandem	347813	806998					930708	1024772			
Season started on	-	-	16-Apr-2009	27-Mar-2009	3-Mar-2009	10-Mar-2009	-	-	15-Apr-2009	5-May-2009	3-Mar-2009
Season completed on	-	-	6-Dec-2009	7-Dec-2009	19-Dec-2009	18-Nov-2009	-	-	22-Dec-2009	23-Dec-2009	29-Dec-2009
Length of season (days)	-	-	234	255	291	253	-	-	251	232	249
TIME ACCOUNT											
Overall time efficiency (%)	67.37	83.37	75.37	81.98	80.71	83.95	79.03	87.95	83.51	83.00	76.88
Scheduled stops% gross available time	3.30	4.12	3.71	5.62	6.09	4.01	4.11	4.86	4.49	6.56	6.65
Lack of cane % gross available time	22.72	7.44	15.08	9.13	5.68	8.39	12.90	5.06	8.97	7.05	9.57
Other stops % gross available time	6.50	4.74	5.62	2.70	6.89	2.46	3.63	1.24	2.43	2.73	5.79
Foreign matter % gross available time	0.11	0.33	0.22	0.57	0.62	1.19	0.32	0.89	0.61	0.66	1.11
Lost time % available crush.time	8.80	5.38	6.94	3.19	7.87	2.85	4.40	1.40	2.83	3.19	7.00
Force majeure stops (hours)	2	0	1	4	15	9	2	3	3	0	1088
THROUGHPUTS PER CRUSHING HOUR											
Tons cane	92.98	174.30	275.92	282.24	135.66	238.31	197.28	193.84	390.92	227.71	293.55
Tons fibre in bagasse	14.91	26.97	43.16	35.78	19.89	33.15	31.53	31.29	62.81	34.39	42.88
Tons brix in mixed juice (adj)	13.95	25.83	41.04	43.58	20.39	36.97	30.35	29.49	59.79	35.95	45.42
Tons sucrose in mixed juice (adj)	11.92	22.17	35.17	38.05	17.83	32.17	26.15	25.34	51.45	31.14	39.13
Tons non-suc in mixed juice (adj)	2.03	3.66	5.87	5.52	2.56	4.80	4.20	4.15	8.34	4.81	6.30
Tons of sugar produced	-	-	30.92	33.05	16.06	28.52	-	-	45.56	27.78	34.53
COMPOSITION OF CANE CRUSHED											
Sucrose % cane	13.16	13.16	13.16	13.87	13.66	13.85	13.63	13.42	13.52	13.93	13.68
Pol % cane	13.12	13.11	13.11	13.78	13.62	13.79	13.59	13.38	13.48	13.89	13.63
Fibre % cane	16.29	16.37	16.34	13.81	14.81	14.07	16.12	16.28	16.21	15.10	14.87
Brix % cane	15.65	15.65	15.65	16.14	15.92	16.13	16.12	15.91	16.01	16.33	16.14
Ash % cane	3.61	3.10	3.25	1.61	1.38	2.45	-	-	-	1.67	1.79
ERC % cane	11.16	11.16	11.16	12.02	11.81	12.00	11.61	11.41	11.51	11.99	11.71
ERC % sucrose in cane	84.79	84.79	84.79	86.70	86.43	86.63	85.24	85.06	85.15	86.09	85.62
RV % cane	11.86	11.86	11.86	12.70	12.48	12.68	12.33	12.12	12.22	12.70	12.42
MERC % cane	11.31	11.32	11.32	12.23	12.02	12.19	11.80	11.60	11.69	12.12	11.86
EXTRACTION											
Extraction (sucrose based)	97.42	96.63	96.87	97.22	96.24	97.46	97.29	97.43	97.36	98.16	97.44
Corrected reduced extraction	97.51	96.63	96.91	96.40	95.87	97.01	97.31	97.51	97.42	98.02	97.18
Imbibition % fibre	340	354	349	273	286	410	290	310	301	458	338
Diffusion Rate Index	10	10	10	7	8	7	11	10	11	8	8
Preparation index	-	-	-	-	93	-	-	-	-	-	91
Pol factor	99.22	99.46	99.39	99.36	97.78	99.14	99.82	99.22	99.51	99.78	99.20
Brix factor	99.96	100.33	100.22	99.81	99.42	99.78	101.15	100.73	100.93	101.34	100.60
RECOVERIES											
Boiling house recovery (sucrose)	-	-	87.85	86.80	89.75	88.19	-	-	88.00	88.75	87.88
CRB	-	-	87.34	84.53	86.41	85.53	-	-	86.35	87.03	86.67
Overall recovery (sucrose)	-	-	85.09	84.39	86.37	85.95	-	-	85.68	87.11	85.63
Ton cane per ton sugar	-	-	8.92	8.54	8.45	8.36	-	-	8.58	8.20	8.50
Ton cane per ton 96° pol sugar	-	-	8.57	8.20	8.14	8.06	-	-	8.29	7.91	8.20
Value Recovery (%)	-	-	100.92	98.24	99.47	99.07	-	-	100.26	100.85	99.86
Crystal Recovery Efficiency (XRE)	-	-	102.35	98.88	100.60	99.96	-	-	101.35	102.50	101.33
BALANCES											
Sucrose lost % sucrose in cane											
- lost in bagasse	-	-	3.13	2.78	3.76	2.54	-	-	2.64	1.84	2.56
- lost in filter cake	-	-	0.33	0.81	0.09	0.13	-	-	0.15	-	0.16
- lost in final molasses	-	-	10.15	9.26	8.35	9.24	-	-	9.95	9.51	9.39
- undetermined losses	-	-	1.30	2.76	1.42	2.14	-	-	1.58	1.53	2.27
Non sucrose ratio	-	-	0.99	1.05	0.94	1.04	-	-	1.02	1.00	1.00
Fructose ratio FM/MJ	-	-	0.83	0.96	0.76	0.94	-	-	0.94	0.84	0.92
Glucose ratio FM/MJ	-	-	0.57	0.71	0.41	0.63	-	-	0.66	0.58	0.69

*** 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 2009 - 2010)

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	-	-	210659	178647	116305	-	-	87750	-	-	170871	-	-	315043	50620	69894	87761
Refined % total sugar	-	-	43.88	31.21	21.92	-	-	0.00	-	-	10.07	-	-	7.60	0.00	0.00	0.00
Moisture % all sugar	-	-	0.14	0.04	0.09	-	-	0.19	-	-	-	-	-	0.06	0.11	0.09	-
Pol % all sugar	-	-	99.56	99.50	99.15	-	-	98.82	-	-	99.02	-	-	99.46	99.16	99.36	99.06
Tons cane crushed total			1821688	1509621	851199			875465			1462827			2612413	451951	638017	680978
Tons cane crushed per tandem	1E+06	788920				568646	306819		1253612	209215		1407389	1205024				
Season started on	-	-	4-May-2009	13-Apr-2009	20-Apr-2009	-	-	7-May-2009	-	-	14-Apr-2009	-	-	3-Apr-2009	23-May-2009	25-May-2009	24-Apr-2009
Season completed on	-	-	1-Jan-2010	12-Dec-2009	4-Dec-2009	-	-	24-Dec-2009	-	-	31-Dec-2009	-	-	2-Apr-2010	29-Dec-2009	5-Feb-2010	5-Nov-2009
Length of season (days)			242	243	228			231			261			280	220	256	195
TIME ACCOUNT																	
Overall time efficiency (%)	83.42	82.08	82.76	82.76	83.48	61.54	53.46	58.12	77.57	40.86	64.88	75.97	71.72	73.91	89.13	80.17	87.17
Scheduled stops% gross available time	4.27	4.44	4.35	4.29	3.49	2.64	2.75	2.68	3.19	4.57	3.67	1.63	1.26	1.45	4.22	4.61	3.05
Lack of cane % gross available time	9.36	11.58	10.45	6.86	3.28	9.86	10.53	10.14	3.78	25.75	11.38	14.64	14.13	14.39	2.87	8.95	6.35
Other stops % gross available time	1.55	1.35	1.45	4.96	9.50	25.95	33.22	29.03	15.43	28.39	19.91	7.74	12.85	10.22	3.75	6.19	0.00
Foreign matter % gross available time	1.41	0.55	0.99	1.14	0.24	0.01	0.04	0.03	0.03	0.43	0.17	0.01	0.04	0.02	0.03	0.09	3.43
Lost time % available crush.time	1.82	1.62	1.72	5.65	10.22	29.66	38.32	33.31	16.59	41.00	23.48	9.25	15.19	12.15	4.04	7.17	0.00
Force majeure stops (hours)	11	10	11	36	51	0	0	0	0	0	0	104	76	90	18	88	20
THROUGHPUTS PER CRUSHING HOUR																	
Tons cane	214.76	172.81	388.66	317.72	187.79	169.48	143.42	318.66	259.08	155.44	473.04	291.64	279.99	572.30	98.37	132.83	168.47
Tons fibre in bagasse	25.97	22.45	48.51	43.44	26.99	26.65	23.30	50.70	38.13	22.49	69.45	40.74	37.07	78.02	13.55	19.67	21.00
Tons brix in mixed juice	32.71	26.83	59.69	48.38	31.77	25.96	23.96	50.36	41.67	24.66	75.94	47.08	44.46	91.69	14.61	19.46	26.94
Tons pol in mixed juice	28.65	23.13	51.93	42.25	28.10	22.34	20.50	43.25	35.92	21.42	65.54	40.52	38.33	78.98	12.42	16.68	23.37
Tons non-pol in mixed juice	4.05	3.70	7.76	6.13	3.68	3.62	3.45	7.12	5.75	3.24	10.40	6.57	6.13	12.72	2.19	2.78	3.57
Tons of sugar produced	-	-	44.94	37.60	25.66	-	-	31.94	-	-	55.26	-	-	69.02	11.02	14.55	21.71
COMPOSITION OF CANE CRUSHED																	
Pol % cane	13.82	13.84	13.83	13.88	15.35	14.20	15.39	14.62	14.42	14.49	14.43	14.48	14.59	14.53	13.43	13.44	14.26
Fibre % cane	14.13	14.04	14.09	13.92	14.44	15.94	16.48	16.13	14.93	14.76	14.91	14.09	14.02	14.06	14.91	16.00	13.31
Brix % cane	16.05	16.33	16.17	16.12	17.72	16.83	18.31	17.35	17.27	17.12	17.25	17.15	17.26	17.20	16.23	16.13	16.69
Ash % cane	-	-	-	3.62	-	-	-	-	0.99	0.99	0.99	-	-	-	2.91	3.38	1.41
ERC % cane	11.99	11.87	11.94	12.05	13.41	12.12	13.10	12.46	12.23	12.41	12.26	12.40	12.50	12.45	11.28	11.33	12.33
ERC % pol in cane	86.76	85.80	86.34	86.82	87.33	85.30	85.12	85.23	84.81	85.68	84.94	85.63	85.73	85.68	84.03	84.33	86.48
EXTRACTION																	
Extraction (pol based)	96.55	96.72	96.63	95.78	97.46	92.79	92.92	92.84	96.15	95.10	96.00	95.94	93.87	94.98	94.03	93.43	97.28
Corrected reduced extraction	95.34	95.87	95.58	94.94	96.94	92.55	92.62	92.57	95.66	94.35	95.47	95.12	92.17	93.79	93.10	93.03	96.33
Imbibition % fibre	320	299	310	242	361	187	220	199	279	260	276	312	259	288	250	258	281
Diffusion Rate Index	13	13	13	7	7	-	-	-	-	-	-	-	-	-	-	-	-
Preparation index	-	-	-	-	-	92	92	92	90	90	90	91	91	91	79	78	88
Pol factor	99.43	99.28	99.37	97.55	99.97	92.91	98.23	94.80	99.27	96.12	98.80	97.37	97.85	97.59	96.09	96.53	100.00
Brix factor	99.91	100.73	100.27	99.20	101.72	95.19	100.61	97.13	101.38	97.73	100.84	98.89	99.45	99.15	97.63	98.74	100.00
RECOVERIES																	
Boiling house recovery (pol)	-	-	86.17	88.54	90.54	-	-	72.99	-	-	83.49	-	-	86.92	87.97	86.69	92.03
Overall recovery (pol)	-	-	83.26	84.81	88.24	-	-	67.76	-	-	80.15	-	-	82.55	82.72	81.00	89.53
Ton cane per ton sugar	-	-	8.65	8.45	7.32	-	-	9.98	-	-	8.56	-	-	8.29	8.93	9.13	7.76
Ton cane per ton 96º pol sugar	-	-	8.34	8.15	7.09	-	-	9.69	-	-	8.30	-	-	8.00	8.64	8.82	7.52
BALANCES																	
Pol lost % pol in cane																	
- lost in bagasse	-	-	3.37	4.22	2.54	-	-	7.16	-	-	4.00	-	-	5.02	5.97	6.57	2.72
- lost in filter cake	-	-	0.29	0.14	0.06	-	-	-	-	-	0.69	-	-	0.45	0.37	0.25	0.28
- lost in final molasses	-	-	9.80	8.95	6.83	-	-	12.53	-	-	8.77	-	-	8.93	8.12	9.23	6.37
- undetermined losses	-	-	3.28	1.88	2.33	-	-	12.55	-	-	6.39	-	-	3.05	2.82	2.96	1.09
Non-pol ratio	-	-	1.13	1.00	0.98	-	-	1.12	-	-	1.03	-	-	1.00	0.97	1.08	0.95

TABLE B1
ANALYSIS OF BAGASSE, JUICES, FILTER CAKE, SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2009 - 2010)

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	1.11	1.18	1.15	1.17	1.42	1.48	0.77	0.81	0.79	0.92	1.27	0.71	0.70	0.70
Moisture % bagasse	50.99	47.66	48.91	48.29	49.77	50.94	53.41	51.85	52.57	48.77	53.37	50.88	51.28	51.20
Fibre % bagasse	46.91	50.05	48.95	49.50	47.62	46.60	44.53	45.99	45.32	49.59	44.34	47.66	47.20	47.29
Ash % bagasse	3.04	-	-	2.45	3.33	5.31	-	-	-	3.46	-	-	-	-
LCV (kJ per kg bagasse) #	7084	-	-	7749	7267	6669	-	-	-	7482	-	-	-	-
MIXED JUICE														
Mixed juice (adj) % cane	117.62	116.24	115.09	115.67	113.74	120.23	127.60	119.56	123.18	125.09	109.79	114.60	120.28	119.04
Brix % mixed juice (adj)	13.72	14.10	14.15	14.12	13.26	12.44	12.10	12.90	12.53	12.11	13.58	13.73	12.90	13.07
Sucrose purity (adj)	86.50	85.82	86.19	86.00	85.37	85.74	85.27	85.15	85.20	86.25	86.10	84.81	84.87	84.85
Apparent purity (adj)	85.93	85.39	85.74	85.49	84.78	85.27	85.12	85.14	84.99	86.07	85.67	84.36	84.79	84.26
Purity difference (MJ adj - DAC)	-0.27	0.19	0.36	0.27	0.01	-0.65	0.18	0.28	0.24	0.10	0.16	-0.71	-0.31	-0.40
(Glucose + fructose) % sucrose (unadj)	4.68	-	-	4.87	5.14	4.89	-	-	4.22	4.05	4.65	-	-	4.41
Suspended solids % MJ (unadj)	0.12	0.12	0.12	0.12	0.19	0.50	0.23	0.21	0.22	0.28	0.89	0.15	0.21	0.20
Pol/sucrose ratio (MJ unadj)	0.9946	0.9950	0.9948	0.9949	0.9948	0.9946	0.9982	0.9998	0.9991	0.9994	0.9968	0.9947	0.9991	0.9981
CLARIFIED JUICE														
Brix % clarified juice	13.56	-	-	13.85	13.00	11.81	-	-	12.23	12.25	13.25	-	-	12.71
Apparent purity (%)	85.85	-	-	85.37	85.14	83.99	-	-	83.94	85.78	85.66	-	-	82.47
Purity difference (CJ - MJ)	-0.08	-	-	-0.11	0.36	-1.28	-	-	-1.05	-0.29	-0.01	-	-	-1.79
Average pH	7.1	-	-	6.9	7.0	7.1	-	-	7.1	7.1	7.0	-	-	7.1
CLARIFIER MUD														
Tons clarifier mud	69594	80871	35497	116368	24447	-	74347	78630	152977	84532	-	1799	54553	56352
Pol % clarifier mud	11.90	12.37	12.37	12.37	12.26	-	9.98	10.06	10.03	9.86	-	10.91	11.41	11.40
Brix % clarifier mud	14.10	14.78	14.76	14.77	14.45	-	11.99	12.10	12.05	11.72	-	13.09	13.69	13.67
Insoluble solids % clarifier mud	3.34	2.83	3.02	2.89	9.40	-	3.16	3.15	3.15	5.66	-	4.58	3.99	4.00
FILTER CAKE														
Pol % filter cake	-	-	-	-	1.22	1.84	-	-	-	-	0.97	-	-	-
Moisture % filter cake	-	-	-	-	55.07	70.00	-	-	-	-	-	-	-	-
Filter cake % cane	-	-	-	-	0.17	3.70	-	-	-	-	4.00	-	-	-
Filter wash index	-	-	-	-	102.0	105.3	-	-	-	-	102.5	-	-	-
Purity difference (CJ - filtrate)	-	-	-	-	-	6.18	-	-	-	-	1.40	-	-	-
SYRUP														
Brix % syrup	68.93	-	-	64.67	66.24	54.87	-	-	62.77	66.66	66.53	-	-	69.20
Apparent purity (%)	85.21	-	-	85.00	85.28	84.06	-	-	83.61	85.93	85.90	-	-	84.10
Purity difference (syrup - MJ)	-0.72	-	-	-0.48	0.49	-1.21	-	-	-1.38	-0.14	0.23	-	-	-0.16
Average pH	5.9	-	-	6.0	6.1	5.7	-	-	6.1	6.1	6.1	-	-	6.0
FINAL MOLASSES														
Refractometer brix	82.31	-	-	86.39	85.29	83.63	-	-	86.17	85.35	82.53	-	-	88.79
Pol/refractometer brix purity (%)	35.15	-	-	32.81	35.05	34.26	-	-	38.25	35.98	30.79	-	-	33.01
Sucrose/refractometer brix purity (%)	37.35	-	-	35.75	37.24	37.29	-	-	39.92	36.72	33.61	-	-	35.21
Conductivity ash (%)	13.02	-	-	16.28	13.29	14.32	-	-	15.36	15.44	15.94	-	-	16.35
(Glucose + fructose)/ash ratio	1.15	-	-	0.85	1.13	0.88	-	-	0.72	0.73	0.77	-	-	0.80
Fructose (%)	7.91	-	-	7.83	7.88	7.49	-	-	6.49	6.51	7.31	-	-	7.53
Glucose (%)	7.04	-	-	5.94	7.11	5.16	-	-	4.58	4.83	4.96	-	-	5.51
TPD based on molasses (made)	7.0	-	-	3.6	7.2	5.4	-	-	5.5	3.4	0.6	-	-	1.9
TPD based on mixed juice	6.5	-	-	4.3	6.8	6.1	-	-	5.8	4.6	2.0	-	-	2.0
Final molasses @ 85° brix % cane	4.31	-	-	4.19	4.31	3.93	-	-	4.23	3.59	3.34	-	-	4.54
Pol/sucrose ratio	0.9411	-	-	0.9179	0.9413	0.9186	-	-	0.9582	0.9798	0.9161	-	-	0.9375

*** Cane diffuser**

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

TABLE B1 (continued)
ANALYSIS OF BAGASSE, JUICES, FILTER CAKE, SYRUP AND FINAL MOLASSES
SOUTH AFRICAN FACTORIES (SEASON 2009 - 2010)

SYMBOLS OF FACTORIES	GH-A *	GH-B	GH-AVE	NB	UC *	ES *	SZ-A *	SZ-B *	SZ-AVE	UK *	INDUSTRY
FINAL BAGASSE											
Pol % bagasse	0.99	1.36	1.25	1.43	1.57	1.22	1.15	1.07	1.11	0.84	1.14
Moisture % bagasse	51.12	49.98	50.33	50.49	52.55	49.73	48.13	47.69	47.90	48.79	50.24
Fibre % bagasse	46.99	47.47	47.32	46.92	44.74	48.15	49.58	50.15	49.87	49.45	47.57
Ash % bagasse	-	-	3.12	3.99	2.96	6.64	-	-	3.09	3.68	2.81
LCV (kJ per kg bagasse) #	-	-	7198	7000	6757	6688	-	-	7710	7433	7263
MIXED JUICE											
Mixed juice (adj) % cane	120.35	122.14	121.60	107.57	109.13	128.13	114.07	117.89	116.07	138.91	118.75
Brix % mixed juice (adj)	12.47	12.13	12.23	14.35	13.77	12.11	13.49	12.91	13.18	11.37	13.03
Sucrose purity (adj)	85.42	85.82	85.70	87.32	87.46	87.01	86.16	85.94	86.04	86.62	86.14
Apparent purity (adj)	85.17	85.47	85.30	86.66	87.19	86.55	85.95	85.67	85.49	86.23	86.01
Purity difference (MJ adj - DAC)	0.72	0.98	0.90	0.99	0.20	0.56	0.52	0.30	0.41	-0.06	0.21
(Glucose + fructose) % sucrose (unadj)	-	-	5.00	4.29	4.01	4.15	-	-	4.61	3.75	4.51
Suspended solids % MJ (unadj)	0.21	0.73	0.58	1.06	0.14	0.13	0.12	0.12	0.12	0.21	0.31
Pol/sucrose ratio (MJ unadj)	0.9971	0.9959	0.9963	0.9937	0.9969	0.9954	0.9976	0.9969	0.9972	0.9970	0.9963
CLARIFIED JUICE											
Brix % clarified juice	-	-	11.92	14.00	14.25	12.16	-	-	12.54	11.04	12.82
Apparent purity (%)	-	-	85.69	87.23	86.35	86.01	-	-	85.72	85.57	85.72
Purity difference (CJ - MJ)	-	-	0.39	0.57	-0.84	-0.55	-	-	0.23	-0.66	-0.29
Average pH	-	-	7.1	7.1	7.0	7.0	-	-	6.9	6.9	7.0
CLARIFIER MUD											
Tons clarifier mud	-	-	-	-	-	171	-	-	-	62315	566756
Pol % clarifier mud	-	-	-	-	-	9.65	-	-	-	8.76	10.81
Brix % clarifier mud	-	-	-	-	-	11.82	-	-	-	10.31	12.88
Insoluble solids % clarifier mud	-	-	-	-	-	4.40	-	-	-	5.16	4.07
FILTER CAKE											
Pol % filter cake	-	-	1.23	2.26	1.79	1.64	-	-	1.67	-	1.66
Moisture % filter cake	-	-	70.00	75.00	72.15	73.44	-	-	67.99	-	71.72
Filter cake % cane	-	-	3.50	4.97	0.71	1.09	-	-	1.20	-	1.29
Filter wash index	-	-	102.6	102.5	96.7	99.6	-	-	105.1	-	101.7
Purity difference (CJ - filtrate)	-	-	1.76	0.74	5.58	1.67	-	-	2.97	-	3.12
SYRUP											
Brix % syrup	-	-	66.68	68.79	67.70	62.47	-	-	64.98	67.38	65.45
Apparent purity (%)	-	-	85.95	87.15	86.83	85.98	-	-	86.11	85.73	85.77
Purity difference (syrup - MJ)	-	-	0.65	0.50	-0.36	-0.57	-	-	0.62	-0.50	-0.24
Average pH	-	-	6.1	6.0	6.5	6.0	-	-	5.9	5.9	6.0
FINAL MOLASSES											
Refractometer brix	-	-	83.50	83.20	83.58	83.58	-	-	82.60	85.72	84.45
Pol/refractometer brix purity (%)	-	-	36.69	35.24	36.86	35.35	-	-	35.41	37.40	35.13
Sucrose/refractometer brix purity (%)	-	-	38.68	38.23	39.56	38.45	-	-	38.10	38.91	37.49
Conductivity ash (%)	-	-	14.02	12.31	12.76	12.82	-	-	12.54	13.52	14.16
(Glucose + fructose)/ash ratio	-	-	0.78	0.99	0.72	0.87	-	-	0.92	0.72	0.87
Fructose (%)	-	-	6.63	7.46	6.25	6.91	-	-	7.09	6.11	7.18
Glucose (%)	-	-	4.27	4.71	2.89	4.24	-	-	4.39	3.59	5.10
TPD based on molasses (made)	-	-	5.7	7.4	6.2	6.6	-	-	6.3	6.2	5.3
TPD based on mixed juice	-	-	7.5	8.2	8.8	7.9	-	-	7.5	7.4	6.0
Final molasses @ 85º brix % cane	-	-	4.06	3.95	3.39	3.92	-	-	4.15	4.01	4.03
Pol/sucrose ratio	-	-	0.9485	0.9216	0.9317	0.9195	-	-	0.9295	0.9611	0.9369

*** 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 2009 - 2010)

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	1.88	1.66	1.78	1.99	1.36	2.98	3.11	3.02	1.67	2.16	1.74	1.90	2.89	2.36	2.69	2.77	1.57
Moisture % bagasse	49.11	49.41	49.25	50.37	47.17	49.90	49.04	49.59	52.05	52.02	52.04	51.60	52.83	52.17	49.12	48.95	46.84
Fibre % bagasse	47.64	47.65	47.64	46.57	50.03	45.72	46.37	45.95	44.39	44.13	44.35	45.14	42.72	44.02	46.24	46.43	50.33
Ash % bagasse	-	-	4.14	-	-	-	-	-	-	-	-	-	-	-	5.65	4.84	2.55
LCV (kJ per kg bagasse) #	-	-	7212	-	-	-	-	-	-	-	-	-	-	-	6915	7100	8009
MIXED JUICE																	
Mixed juice % cane	113.25	111.56	112.52	103.73	123.21	95.05	100.78	97.06	107.87	104.88	107.44	112.66	103.26	108.33	104.58	106.27	110.30
Brix % mixed juice	13.45	13.92	13.65	14.68	13.73	16.12	16.57	16.28	14.91	15.12	14.94	14.33	15.38	14.79	14.20	13.79	14.50
Apparent purity (%)	87.61	86.21	87.00	87.33	88.43	86.04	85.59	85.87	86.21	86.87	86.30	86.06	86.22	86.13	85.03	85.70	86.75
Purity difference (MJ - DAC)	1.12	0.21	0.72	-0.23	0.29	-0.45	-0.47	-0.46	0.92	0.84	0.90	0.31	0.33	0.32	0.98	0.45	1.32
Suspended solids % mixed juice	1.80	0.94	1.43	0.24	0.06	0.22	0.23	0.23	0.20	0.28	0.21	0.18	0.76	0.43	1.09	1.13	0.77
CLARIFIED JUICE																	
Brix % clarified juice	-	-	14.40	14.98	13.39	-	-	17.26	-	-	14.56	-	-	15.48	14.26	14.41	14.37
Apparent purity (%)	-	-	86.44	87.92	88.30	-	-	83.31	-	-	85.35	-	-	85.84	85.93	86.82	86.84
Purity difference (CJ - MJ)	-	-	-0.56	0.59	-0.13	-	-	-2.56	-	-	-0.95	-	-	-0.29	0.90	1.12	0.09
Average pH	-	-	7.1	7.0	7.0	-	-	6.6	-	-	7.2	-	-	6.9	6.8	7.0	7.2
CLARIFIER MUD																	
Tons clarifier mud	-	-	-	-	-	34523	22918	57441	563	-	563	23773	-	23773	-	-	-
Pol % clarifier mud	-	-	-	-	-	15.10	16.11	15.50	11.54	-	11.54	9.27	-	9.27	-	-	-
Brix % clarifier mud	-	-	-	-	-	18.84	20.23	19.40	14.38	-	14.38	10.87	-	10.87	-	-	-
Insoluble solids % clarifier mud	-	-	-	-	-	3.73	3.36	3.58	3.91	-	3.91	4.97	-	4.97	-	-	-
FILTER CAKE																	
Pol % filter cake	-	-	1.46	1.22	0.91	-	-	-	-	-	3.90	-	-	2.55	1.51	0.93	1.14
Moisture % filter cake	-	-	-	0.47	71.38	-	-	-	-	-	-	-	-	77.45	51.81	-	70.86
Filter cake % cane	-	-	2.73	1.59	1.00	-	-	-	-	-	2.56	-	-	2.55	3.29	3.62	3.53
Filter wash index	-	-	94.8	98.0	102.6	-	-	-	-	-	102.6	-	-	95.5	99.5	95.6	100.9
Purity difference (CJ - filtrate)	-	-	3.36	3.05	1.56	-	-	-	-	-	2.40	-	-	1.83	2.04	2.75	0.77
SYRUP																	
Brix % syrup	-	-	66.96	63.27	67.36	-	-	58.00	-	-	63.05	-	-	66.36	66.29	65.23	60.76
Apparent purity (%)	-	-	86.03	87.85	88.28	-	-	83.53	-	-	84.96	-	-	85.86	86.23	85.67	86.93
Purity difference (syrup - MJ)	-	-	-0.97	0.52	-0.15	-	-	-2.34	-	-	-1.34	-	-	-0.27	1.20	-0.03	0.18
Average pH	-	-	5.9	6.2	6.1	-	-	6.0	-	-	7.1	-	-	6.3	6.6	6.5	6.1
FINAL MOLASSES																	
Refractometer brix	-	-	85.23	80.27	85.71	-	-	80.32	-	-	86.80	-	-	86.71	82.34	83.90	81.66
Pol/refractometer brix purity	-	-	37.84	39.95	36.58	-	-	43.18	-	-	37.05	-	-	37.54	34.51	36.03	32.46
Purity difference (true - target)	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-
Reducing sugars (%) $	-	-	37.83	-	-	-	-	16.01	-	-	-	-	-	-	-	-	-
Sulphated ash (%)	-	-	0.00	-	-	-	-	9.54	-	-	-	-	-	-	-	-	-
Reducing sugars/ash ratio	-	-		-	-	-	-	1.68	-	-	-	-	-	-	-	-	-
Final molasses at 85º brix % cane	-	-	4.21	3.66	3.37	-	-	4.99	-	-	4.02	-	-	4.07	3.72	4.05	3.29

*** 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 2009 - 2010)

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)	1.16	-	1.30	1.00	0.98	1.03	0.93	1.02	1.15	1.17	1.11	1.05	1.05	1.00	0.93
Refractometer brix of massecuite	93.00	92.25	92.91	92.28	93.56	92.23	93.08	92.89	92.60	92.62	92.29	92.86	93.12	92.59	92.82
Purity of massecuite (%)	86.70	84.54	85.69	84.61	84.56	85.93	86.14	84.56	86.64	87.73	86.68	85.69	86.55	85.45	86.02
Purity of A-molasses (%)	72.95	66.36	70.72	68.43	67.04	67.50	66.65	66.55	70.59	71.49	71.58	69.87	67.43	67.33	69.26
Purity drop	13.75	18.18	14.97	16.18	17.52	18.43	19.49	18.01	16.05	16.24	15.10	15.82	19.13	18.12	16.76
Exhaustion (%)	58.63	63.93	59.66	60.57	62.86	65.99	67.84	63.68	62.99	64.92	61.30	61.27	67.84	64.90	63.39
Pty of A-massecuite - purity syrup (%)	1.49	-0.46	0.41	0.55	0.95	0.00	0.24	0.46	0.69	0.57	-0.15	-0.29	0.44	-0.28	0.58
Purity of remelt (%)	86.69	82.49	85.05	83.32	86.51	84.43	83.89	84.71	84.87	85.19	85.53	85.91	85.97	84.99	84.94
B - MASSECUITE															
m^3 per ton brix in mixed juice (adj)	0.64	-	0.51	0.31	0.27	0.36	0.23	0.33	0.46	0.54	0.38	0.37	0.37	0.43	0.35
Refractometer brix of massecuite	94.24	95.11	94.72	95.25	95.18	94.05	94.31	93.73	95.07	94.93	94.35	95.97	95.00	94.52	94.73
Purity of massecuite (%)	72.43	68.01	70.98	67.25	68.58	68.93	67.86	67.09	70.90	71.52	71.61	70.22	68.78	70.37	70.19
Purity of B-molasses (%)	52.34	44.70	50.20	42.89	46.87	48.91	44.89	47.27	46.79	49.52	50.00	46.63	44.60	50.27	48.36
Purity drop	20.09	23.31	20.79	24.36	21.71	20.02	22.97	19.82	24.11	22.00	21.61	23.59	24.18	20.11	21.84
Exhaustion (%)	58.20	61.98	58.80	63.43	59.58	56.85	61.42	56.02	63.91	60.94	60.35	62.95	63.45	57.45	60.24
C - MASSECUITE															
m^3 per ton brix in mixed juice (adj)	0.09	-	0.45	0.24	0.28	0.26	0.27	0.31	0.29	0.25	0.18	0.23	0.25	0.31	0.22
Refractometer brix of massecuite	96.57	97.03	97.08	97.00	97.25	96.86	96.84	96.40	96.83	97.42	98.10	97.41	96.26	97.43	96.99
Purity of massecuite (%)	55.05	52.35	55.40	52.91	56.64	55.98	52.97	54.24	53.63	54.97	52.98	53.44	54.19	56.67	54.75
Purity of C-molasses (%)	35.15	32.81	35.05	34.26	38.25	35.98	30.79	33.01	36.69	35.24	36.86	35.35	35.41	37.40	35.13
Crystal content (%)	29.64	28.22	30.41	27.52	28.96	30.26	31.04	30.56	25.91	29.69	25.04	27.25	27.99	29.99	29.35
Exhaustion (%)	55.75	55.55	56.55	53.62	52.58	55.80	60.50	58.44	49.90	55.43	48.18	52.35	53.65	54.32	55.26
TOTAL VOLUME ALL RAW MASSECUITES															
m^3 per ton brix in mixed juice (adj)	1.89	-	2.26	1.55	1.53	1.65	1.43	1.66	1.90	1.96	1.66	1.65	1.67	1.74	1.51
WHITE SUGAR MASSECUITES															
Massecuite (kg sugar per m^3)	183	-	503	-	-	-	-	-	548	366	-	-	-	-	416
Tons limestone per 1000 tons white sugar	-	-	52.60	-	-	-	-	-	36.48	-	-	-	-	-	20.02
Tons coke per 1000 tons white sugar	-	-	6.41	-	-	-	-	-	4.08	-	-	-	-	-	2.06
Tons phosphoric acid per 1000 tons white sugar	-	-	-	-	-	-	-	-	-	1.43	-	-	-	-	0.38
Tons sulphur per 1000 tons white sugar	0.37	-	-	-	-	-	-	-	0.19	0.19	-	-	-	-	0.15
Phosphoric acid ppm mixed juice (unadj)	-	-	-	-	-	-	-	-	-	-	36.46	52.95	0.78	4.28	5.31
Flocculant ppm mixed juice (unadj)	3.65	2.51	4.65	7.86	3.45	3.97	1.74	3.73	3.24	6.86	5.01	6.52	5.88	2.13	4.36
Tons lime per 1000 tons cane	1.88	1.53	0.40	0.62	0.74	-	0.48	1.01	-	0.80	0.44	0.52	0.52	0.54	0.75
Enzyme (ppm sugar)	-	-	-	-	-	-	33.15	3.02	8.88	-	-	4.57	26.06	4.48	5.92
ADDITIONAL FUELS PER 1000 TONS CANE															
Tons of coal	12.64	0.46	20.84	6.16	16.25	4.69	0.94	27.17	9.83	17.02	5.79	0.85	10.87	0.83	9.29
Tons of wood	0.24	0.02	-	-	-	-	0.26	0.04	-	-	0.19	0.57	-	-	0.09
Converted into bagasse *	50.87	1.86	83.35	24.65	65.00	18.78	4.09	108.73	39.31	68.08	23.40	4.10	43.49	3.33	37.26

*** 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 2009 - 2010)

SYMBOLS OF FACTORIES	UB	NH	DW	HV	TR	NK	MW	RU	MA
A - MASSECUITE									
m^3 per ton brix in mixed juice (adj)	1.05	1.53	1.31	0.93	-	0.57	1.15	1.18	1.03
Refractometer brix of massecuite	93.77	93.64	91.98	92.23	92.82	93.30	92.70	93.21	91.86
Purity of massecuite (%)	85.92	89.46	88.01	83.55	84.86	86.35	85.48	86.70	86.88
Purity of A-molasses (%)	71.43	74.88	72.51	65.82	67.10	71.01	71.50	70.02	68.36
Purity drop	14.49	14.58	15.50	17.73	17.76	15.34	13.98	16.69	18.52
Exhaustion (%)	59.03	64.88	64.07	62.09	63.61	61.27	57.37	64.19	67.38
Pty of A-massecuite - purity syrup (%)	-0.11	1.61	-0.27	0.02	-0.10	0.49	-0.75	1.03	-0.05
Purity of remelt (%)	86.75	86.07	87.71	81.72	84.04	83.28	86.33	85.32	85.82
B - MASSECUITE									
m^3 per ton brix in mixed juice (adj)	0.40	0.35	0.51	0.38	-	-	0.47	0.45	0.37
Refractometer brix of massecuite	95.60	93.82	94.43	92.50	94.61	94.72	95.08	94.10	93.21
Purity of massecuite (%)	70.15	74.13	70.60	68.51	67.41	71.27	72.16	70.19	69.81
Purity of B-molasses (%)	49.18	55.79	48.91	51.38	47.94	52.57	50.55	48.15	44.76
Purity drop	20.97	18.34	21.69	17.13	19.47	18.70	21.61	22.04	25.04
Exhaustion (%)	58.82	55.95	60.13	51.43	55.48	55.32	60.56	60.56	64.94
C - MASSECUITE									
m^3 per ton brix in mixed juice (adj)	0.25	0.19	0.23	-	-	0.24	0.26	0.27	0.21
Refractometer brix of massecuite	98.14	97.59	96.57	93.39	97.53	97.32	97.24	96.62	95.19
Purity of massecuite (%)	54.94	58.08	52.80	54.98	55.84	56.85	53.22	53.24	50.35
Purity of C-molasses (%)	37.84	39.95	36.58	43.18	37.05	37.54	34.51	36.03	32.46
Crystal content (%)	27.00	29.46	24.70	19.40	29.11	30.09	27.78	25.99	25.22
Exhaustion (%)	50.07	51.98	48.45	37.78	53.45	54.39	53.68	50.53	52.62
TOTAL VOLUME ALL RAW MASSECUITES									
m^3 per ton brix in mixed juice (adj)	1.70	2.07	2.05	-	-	-	1.89	1.90	1.60
WHITE SUGAR MASSECUITES									
Massecuite (kg sugar per m^3)	194	159	534	-	302	601	-	-	-
Tons limestone per 1000 tons white sugar	-	0.71	-	-	-	0.83	-	-	-
Tons coke per 1000 tons white sugar									
Tons phosphoric acid per 1000 tons white suga	0.15	-	0.16	-	-	0.59	-	-	-
Tons sulphur per 1000 tons white sugar									
Phosphoric acid ppm mixed juice (unadj)	-	-	-	-	-	-	-	-	-
Flocculant ppm mixed juice (unadj)	-	0.2	2.8	3.3	2.6	2.1	2.7	0.1	4.1
Tons lime per 1000 tons cane	0.9	0.9	0.8	0.9	-	0.7	0.6	1.2	-
Enzyme (ppm sugar)	-	-	-	-	-	-	-	-	-
ADDITIONAL FUELS PER 1000 TONS CANE									
Tons of coal	4.26	-	-	0.06	4.28	-	-	-	0.46
Tons of wood	-	-	0.18	0.01	-	-	0.58	0.14	-
Converted into bagasse *	17.06	-	0.22	0.24	17.11	-	0.70	0.17	1.82

*** 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 sulphu

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

	2009/2010	2008/2009	2007/2008	2006/2007	2005/2006
Throughput and time efficiency					
Tons cane per hour	293.55	298.30	298.26	303.63	301.88
Tons fibre in bagasse per hour	42.88	43.83	43.48	44.51	43.49
Overall time efficiency	76.88	78.66	77.46	76.47	82.90
Cane					
Sucrose % cane	13.68	13.69	13.47	12.92	13.74
Fibre % cane	14.87	14.95	14.86	14.95	14.66
Mixed juice					
Sucrose purity (MJ adj)	86.14	86.49	86.03	85.55	85.59
(Glucose + Fructose)/ash in MJ (unadj)	0.95	0.93	0.97	1.01	1.06
Milling					
Imbibition % fibre	338	349	367	372	380
Extraction (sucrose based)	97.44	97.61	97.82	97.84	98.03
Pol % bagasse	1.14	1.06	0.97	0.92	0.91
Moisture % bagasse	50.24	50.26	49.77	49.76	49.57
Bagasse % cane	30.71	30.80	30.19	30.30	29.67
LCV bagasse (kJ/kg)	7263	7218	7308	7377	7468
Available kJ in bag/kg brix in MJ (adj)	14415	14387	14408	15124	14080
Recoveries					
Boiling house recovery (sucrose based)	87.88	88.05	87.56	87.51	88.25
Overall recovery (sucrose based)	85.63	85.94	85.65	85.61	86.52
Tons cane per ton sugar	8.50	8.46	8.63	8.99	8.37
Filter cake					
Pol % filter cake	1.66	1.64	1.69	1.68	1.63
Filter cake % cane	1.29	1.33	1.53	1.47	1.33
Final molasses					
Brix % final molasses	84.45	84.67	84.84	84.72	84.83
Sucrose/refractometer brix purity	37.49	37.46	37.68	37.43	36.70
Final molasses @ 85º brix % cane	4.03	4.01	4.12	4.08	4.23
Average sugar polarisation	99.58	99.54	99.53	99.52	99.49
Sucrose lost % sucrose in cane					
Lost in bagasse	2.56	2.39	2.18	2.16	1.97
Lost in filter cake	0.16	0.16	0.19	0.19	0.16
Lost in final molasses	9.39	9.32	9.79	10.03	9.61
Undetermined losses	2.27	2.19	2.19	2.00	1.76
Lost in boiling house	11.81	11.67	12.17	12.22	11.52
Total losses	14.37	14.06	14.35	14.39	13.48
M^3 massecuite per ton Bx in MJ					
A-massecuite	0.93	0.92	0.92	0.95	0.94
B-massecuite	0.35	0.34	0.36	0.36	0.35
C-massecuite	0.22	0.22	0.23	0.24	0.23
Total	1.51	1.48	1.51	1.55	1.52
Exhaustion of massecuites					
A-massecuite	63.39	63.12	62.41	63.48	64.38
B-massecuite	60.24	59.79	59.72	58.92	59.55
C-massecuite	55.26	54.92	55.74	55.05	56.88
Brix of syrup	65.45	65.14	65.89	65.73	65.85

TABLE E
AVERAGE MANUFACTURING RESULTS BY MONTHLY PERIODS
FOR SOUTH AFRICAN FACTORIES (SEASON 2009 - 2010)

End of month period		28 MAR 2009	02 MAY 2009	30 MAY 2009	27 JUN 2009	01 AUG 2009	29 AUG 2009	26 SEP 2009	31 OCT 2009	28 NOV 2009	02 JAN 2010
Tons of sugar made and estimated	Month	12779	147068	259738	292354	360418	286831	282880	280734	193540	77932
	To-date	12779	159847	419585	711939	1072358	1359189	1642069	1922803	2116343	2194275
Tons cane crushed	Month	169306	1350939	2275873	2412085	2847019	2279964	2255930	2429907	1772328	861738
	To-date	169306	1520245	3796118	6208203	9055222	11335186	13591116	16021023	17793351	18655089
Tons cane crushed per hour (actual crushing)	Month	173.32	265.17	300.41	307.04	308.45	305.00	300.82	295.35	292.17	240.96
	To-date	173.32	250.40	278.16	289.08	294.90	296.88	297.53	297.20	296.69	293.55
Sucrose % cane	Month	11.71	12.76	13.19	13.85	14.49	14.45	14.45	13.50	12.92	11.66
	To-date	11.71	12.65	12.97	13.31	13.68	13.84	13.94	13.87	13.78	13.68
Fibre % cane	Month	14.78	13.88	14.18	13.89	13.87	14.84	15.02	16.14	16.55	16.89
	To-date	14.78	13.98	14.10	14.02	13.97	14.14	14.29	14.57	14.77	14.87
RV % cane	Month	10.55	11.54	11.97	12.68	13.27	13.23	13.23	12.25	11.63	10.40
	To-date	10.55	11.43	11.75	12.11	12.47	12.61	12.73	12.65	12.55	12.45
Tons cane per ton sugar	Month	13.25	9.19	8.76	8.25	7.90	7.95	7.97	8.66	9.16	11.06
	To-date	13.25	9.51	9.05	8.72	8.44	8.34	8.28	8.33	8.41	8.50
Extraction (sucrose based)	Month	96.35	97.07	97.55	97.58	97.60	97.51	97.49	97.35	97.29	97.05
	To-date	96.35	96.99	97.33	97.43	97.49	97.49	97.49	97.47	97.45	97.44
Imbibition % fibre	Month	312	344	334	337	344	344	341	330	337	332
	To-date	312	340	336	337	339	340	340	338	338	338
Pol % bagasse	Month	1.32	1.28	1.10	1.17	1.21	1.17	1.17	1.09	1.03	1.00
	To-date	1.32	1.28	1.18	1.17	1.18	1.18	1.18	1.16	1.15	1.14
Moisture % bagasse	Month	52.78	51.25	50.41	50.27	50.40	50.18	49.97	49.74	50.12	49.93
	To-date	52.78	51.44	50.82	50.61	50.55	50.47	50.38	50.28	50.26	50.24
Boiling house recovery (sucrose based)	Month	66.51	87.52	88.34	89.30	89.17	88.87	88.64	87.45	86.46	80.17
	To-date	66.51	85.37	87.19	88.04	88.42	88.51	88.53	88.37	88.20	87.88
Overall recovery (sucrose based)	Month	64.08	84.96	86.18	87.14	87.02	86.65	86.41	85.13	84.12	77.81
	To-date	64.08	82.80	84.86	85.78	86.19	86.29	86.31	86.14	85.95	85.63
Mixed juice sucrose purity	Month	84.98	84.53	85.53	86.49	86.54	87.16	87.06	86.17	85.34	83.69
	To-date	84.98	84.58	85.16	85.69	85.97	86.22	86.36	86.34	86.24	86.14
Pol/sucrose ratio in mixed juice	Month	0.9917	0.9883	0.9925	0.9932	0.9967	0.9998	0.9997	0.9998	0.9977	0.9927
	To-date	0.9917	0.9886	0.9910	0.9919	0.9935	0.9948	0.9957	0.9963	0.9964	0.9963
Sucrose/refractometer brix purity in final molasses	Month	39.88	36.40	35.38	35.86	36.80	38.20	37.81	38.58	39.18	41.66
	To-date	39.88	36.67	35.92	35.89	36.18	36.58	36.78	37.05	37.27	37.49
Sucrose lost in final molasses % sucrose in cane	Month	8.71	10.91	9.26	8.41	8.72	8.91	8.67	9.79	10.41	13.51
	To-date	8.71	10.68	9.81	9.25	9.07	9.04	8.97	9.09	9.22	9.39
Undetermined lost sucrose % sucrose in cane	Month	23.28	0.96	1.97	1.91	1.73	1.81	2.28	2.24	2.53	5.56
	To-date	23.28	3.27	2.48	2.25	2.08	2.02	2.06	2.09	2.13	2.27
Pol/sucrose ratio FM	Month	0.9386	0.9107	0.9077	0.9128	0.9121	0.9439	0.9522	0.9678	0.9629	0.9821
	To-date	0.9386	0.9131	0.9100	0.9110	0.9114	0.9181	0.9238	0.9308	0.9342	0.9369

TABLE F
CANE VARIETIES AND RAINFALL
(SEASON 2009 - 2010)
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 (mm)
ML	-	-	9.1	-	-	22.9	-	1.3	6.3	0.4	40.4	0.6	-	0.1	-	0.9	-	9.6	5.9	-	1.5	1.2	99.9	435
KM	-	-	22.1	-	-	28.5	-	0.8	6.3	0.6	22.2	0.2	-	0.2	-	0.4	-	10.8	4.2	-	2.9	0.7	99.8	410
PG	-	-	16.6	-	1.2	6.6	-	0.6	9.4	0.1	25.3	7.2	-	0.2	-	0.2	-	0.8	16.8	-	4.2	10.6	98.8	852
UF	-	0.3	1.4	0.1	3.7	17.2	0.3	1.6	2.2	-	2.5	0.3	7.9	-	4.1	-	0.2	-	0.3	5.7	5.4	46.8	97.0	436
FX	-	2.2	1.8	0.2	2.8	3.5	0.2	0.1	1.8	-	7.3	0.3	27.2	-	3.3	0.1	0.1	-	3.5	5.1	3.2	37.2	85.0	486
AK	-	16.0	0.2	4.0	2.5	4.1	2.5	0.1	-	-	0.9	-	19.7	-	4.1	-	1.5	-	0.6	4.0	6.0	33.9	96.6	515
DL	-	12.1	0.1	3.2	2.9	2.9	1.2	-	-	-	-	-	23.5	-	4.6	-	4.5	0.1	0.1	6.6	0.3	37.8	91.3	595
MS	-	14.4	0.1	4.2	3.0	1.8	1.6	-	-	-	0.3	-	9.5	0.3	4.7	-	6.3	-	0.1	17.9	3.0	32.8	80.7	470
GH	-	16.1	0.1	7.9	1.6	2.2	0.6	-	-	-	0.1	0.3	13.0	-	3.1	-	3.9	-	0.1	10.9	7.3	32.8	77.3	647
NB	-	54.1	-	18.0	-	-	0.7	-	0.1	-	0.2	-	0.4	-	0.2	-	8.5	-	4.0	-	-	13.8	99.4	473
UC	0.1	62.5	-	10.8	-	-	1.2	0.1	0.1	-	0.4	0.3	0.4	-	0.2	0.1	9.8	-	3.0	-	0.3	10.6	97.1	605
ES	-	67.3	-	7.3	0.1	-	0.1	-	-	-	-	0.2	0.4	0.1	0.1	0.5	13.5	-	1.1	-	0.3	9.0	89.4	267
SZ	-	33.0	0.1	5.9	-	-	0.7	-	-	-	-	-	4.3	-	2.5	-	0.5	-	-	1.8	12.3	39.0	69.2	1233
UK	-	28.3	0.2	1.1	-	-	1.0	-	-	-	-	-	1.5	-	1.2	-	2.1	-	0.1	4.6	3.8	56.1	91.4	1511
Average SA Factories	-	20.1	4.8	3.9	1.1	7.9	0.7	0.4	2.2	0.1	8.7	0.6	7.5	0.1	1.9	0.2	3.1	2.2	2.9	3.4	3.9	24.2	90.6	
UB	-	-	2.0	-	-	11.6	-	-	32.6	0.1	26.2	-	-	-	-	-	-	-	-	17.4	10.0	-	-	423
NH	-	-	13.0	-	-	-	-	-	0.6	-	18.8	-	-	-	0.5	-	-	28.5	-	-	5.9	32.8	-	177
DW	-	-	6.9	-	-	17.4	-	-	1.1	-	10.6	-	-	-	-	-	-	0.4	-	2.9	3.5	57.2	-	52
HV	-	-	76.3	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	2.3	21.4	-	-	144
TR	-	-	83.6	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	-	11.3	1.0	4.1	-	753
NK	-	-	-	-	-	23.5	-	0.2	16.2	-	51.7	-	-	-	-	-	-	0.1	-	-	4.9	3.4	-	785
MW	-	-	-	-	-	11.4	-	-	-	-	16.1	-	0.2	-	-	0.4	-	0.1	-	24.3	42.6	4.8	-	425
RU	-	-	-	-	-	11.4	-	-	-	-	16.1	-	0.2	-	-	0.4	-	0.1	-	24.3	42.6	4.8	-	805
MA	-	-	-	-	-	31.7	-	-	40.5	-	12.0	-	1.4	7.5	0.5	-	-	-	-	6.2	0.1	0.1	-	96

* Rainfall during the crushing season

TABLE G
TRANSPORT SUMMARY - SOUTH AFRICAN FACTORIES
(SEASON 2009 - 2010)
PERCENT OF CANE TRANSPORTED

FACTORIES	ML	KM	PG	UF	FX	AK	DL	MS	GH	NB	UC	ES	SZ	UK	AVERAGE
SOUTH AFRICAN RAILWAYS					21.6										1.9
TRAMS				70.8			0.1								4.1
TANKERS															
ARTICULATED TRUCK DRIVEN VEHICLES															
- Interlink	0.7		5.1	25.4	65.9	21.2	32.0	86.4	51.5	23.1	21.3	29.4	91.9	77.2	36.9
- Tri-Axle			6.1		0.5	0.9	6.3	0.5	3.4	3.3		10.2		0.7	2.1
- Hilo	4.0		23.8	2.1	0.7	0.1	10.7		2.7	2.8	0.1		4.1	15.1	4.3
RIGID CHASSIS VEHICLES															
- Truck	90.0	71.1	1.2		1.6	44.7	5.9	0.2	31.7	41.0	34.5	40.0	3.9	0.9	29.9
TRACTOR DRIVEN VEHICLES															
- Hilo			12.7	0.5	0.6	6.5	15.8	0.9	2.0	22.3	2.4	18.8			5.5
- Rig	3.1	27.0	0.8	0.4	9.0	14.6	16.3	1.2	8.6	1.6	8.5			0.3	7.5
- Interlink		1.9	48.2	0.9		12.0	12.3	10.8		4.7	19.8	1.7		5.7	6.9

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

PERIOD (SEASON)	Percent Cane		Cane to sugar Ratio		Extraction	Pol % fibre in Bagasse	Percent Bagasse		Imbibition Percent		Mixed Juice		Final Molasses Suc/brix Purity	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
Average 2005 - 2009	**13.49**	**15.24**	**8.59**	**8.29**	**97.75**	**2.09**	**1.00**	**49.92**	**52.7**	**361**	**85.96**	**4.73**	**37.4**	**87.85**	**85.87**