REFEREED PAPER

AN EXTENSION SPECIALIST'S YIELD AND GROSS REVENUE DATABASE, USED TO GUIDE RECOMMENDATIONS AND IMPROVE GROWER PROFITABILITY

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Abstract

For a number of years growers in all sectors of the sugar industry (rainfed and irrigated) have been of the opinion that yields are either plateauing or on the decline, resulting in sugarcane cultivation being less profitable. The South African Cane Growers' Association (SACGA) has on many occasions demonstrated the margins between production costs and the financial returns that growers receive, and since 2002 the margins of profit have been extremely tight. The profitability of growers is determined by certain uncontrollable economic factors, e.g. the price of recoverable value (RV), interest rates and the cost of essential inputs such as fertiliser, herbicides and labour. However, the effectiveness of managing these inputs and resources in achieving attainable yields is a major factor that influences the viability of sugarcane farming. Since 1997, Extension Specialists at Sezela and Umzimkulu have embarked on a project demonstrating the usefulness of a well maintained grower database to establish why certain growers can still farm profitably and others not.

When comparing individual grower's yields, cane quality and revenue on a homogenous ward basis, there are growers that continue to maintain high yields and revenues. Grower ward comparisons have been part of an Extension Specialist's 'tool kit' for technology transfer in two mill regions since 1997, being the Annual Yield Comparison projects carried out at Sezela and Umzimkulu. The database contains over 10 years of individual grower and ward data, and the specialist interpretation of this information is the key to identifying and promoting the critical best management practices (BMPs) that make sugarcane farming profitable.

Keywords: yield plateau, profitability, economic factors, homogenous ward, adoption, better management practices (BMPs).

Introduction

In an ideal world, each grower would have the same costs, production and revenue for their sugarcane business. However, the complexities of different soil types, climate and terrain result in different input demands to meet the attainable yields on a farm. Achieving an optimum yield from the farm is also determined by the efficiency of managing the limited resources available to the grower. Thus, depending on the level of management, there can be a vast difference in both tons cane and tons RV achieved per hectare.

With limited information available on individual grower productivity and revenues achieved, the need for a detailed grower database was recognised. By capturing annual cane yields and quality data per grower, the gross revenue received per hectare for each individual grower could then be determined on an annual basis. Determining net revenues could prove to be virtually impossible, as this would mean divulging the direct and indirect costs of each grower. Requesting all costings and revenue streams could pose a threat to such a project, as growers would object to extension having access to such confidential records. There is also the possibility that such data could distort the true costings for sugarcane cultivation, especially when there is the possibility of cross-subsidisation between different agricultural commodities on the farm.

To have a fair comparison of yields and revenues between growers, the mill area had to be divided up into homogenous eco-zones (wards).

When the relevant data has been acquired from the different industry stakeholders and entered into the database, the growers can be ranked according to revenue per hectare per annum, based on area cut for the previous season.

Based on revenue/ha/an, the top three growers would be identified for each ward. Extension, together with relevant South African Sugarcane Research Institute (SASRI) specialists, would investigate the best management practices (BMPs) adopted by these growers which had assisted them in achieving the optimum yields for their farms at higher profit margins.

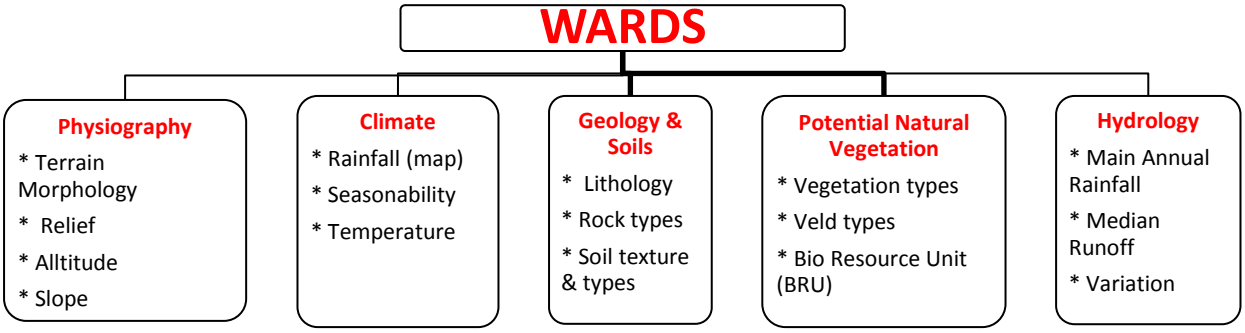
Through the medium of Study Group meetings, the top growers in each ward area would discuss and showcase the BMPs that are implemented on the farm. Such study group meetings would include both agronomic and economic principles of sugarcane cultivation to quantify the benefit of implementing such BMPs. Various SASRI specialists may be requested to participate at the study group meetings to provide technical advice in their field of expertise.

Materials and Methods

The general objective is to collect both cane yield and quality data for each individual grower on an annual basis. This data, once entered into a spreadsheet (Microsoft Excel), would then be used to calculate grower average revenue per hectare (gross) for the previous season. There are a number of extension areas in the sugar industry that have been collecting such data for use as an extension tool for the adoption of BMPs in their respective areas. This project has been included in the SASRI Annual Extension Specialist Programme of Work as the Annual Yield Comparison (AYC).

Determining homogenous ward areas

It is important to identify the different wards in a mill area, i.e. areas that display regional patterns which are reflected in spatially variable combinations of causal factors such as climate, mineral availability (soils and geology), vegetation and physiography. In this approach, wards are regions of relative homogeneity when it comes to soils, altitude and climate (Figure 1).



*Department of Water Affairs and Forestry Resource Quality Services (September 2005).
*BioResource Units are available from the Department of Agriculture and Rural Development (Camp, 1999).

Figure 1. General characteristics of wards.

Currently in the sugar industry, mill supply areas have been divided up into regions of similar soil parent materials and altitudes. This simple but effective method of macro-warding is used to determine pest and disease (P&D) ward areas.

At Sezela there are five separate P&D ward areas:

Ward 1 Coastal Dwyka
Ward 2 Coastal Granite
Ward 3 Hinterland Granite
Ward 4 Inland Natal Group Sandstone (NGS)
Ward 5 Inland Granite.

For the purpose of the AYC project at Sezela, the five P&D areas have been further divided according to geographic and topographical differences into nine separate homogenous eco-zones which better reflect the homogeneity of the separate ward characteristics:

Hibberdene North (coastal)
Hibberdene South (coastal)
Glen Echo (coastal/hinterland)
Ifafa (coastal)
Umzinto/Scottburgh (coastal)
Umzumbe (coastal)
Dumisa (inland)
Jolivet (inland)
Highflats/Ixopo (inland).

Of the nine ward areas, three are classified as inland and the remaining six are coastal (Figure 2). Once the homogenous eco-zones have been identified the growers will be grouped into their respective zones.

Data collection and stakeholders involved
Microsoft Excel is the software used to capture all the relevant grower information into a common database. For each separate homogenous ward area, two separate databases are used to capture the relevant grower information. The first database (Table 1) contains information used to calculate grower revenue for the season. The second database (Table 2) consists of cane quality data. For both tables, the data represents final figures for the previous season.

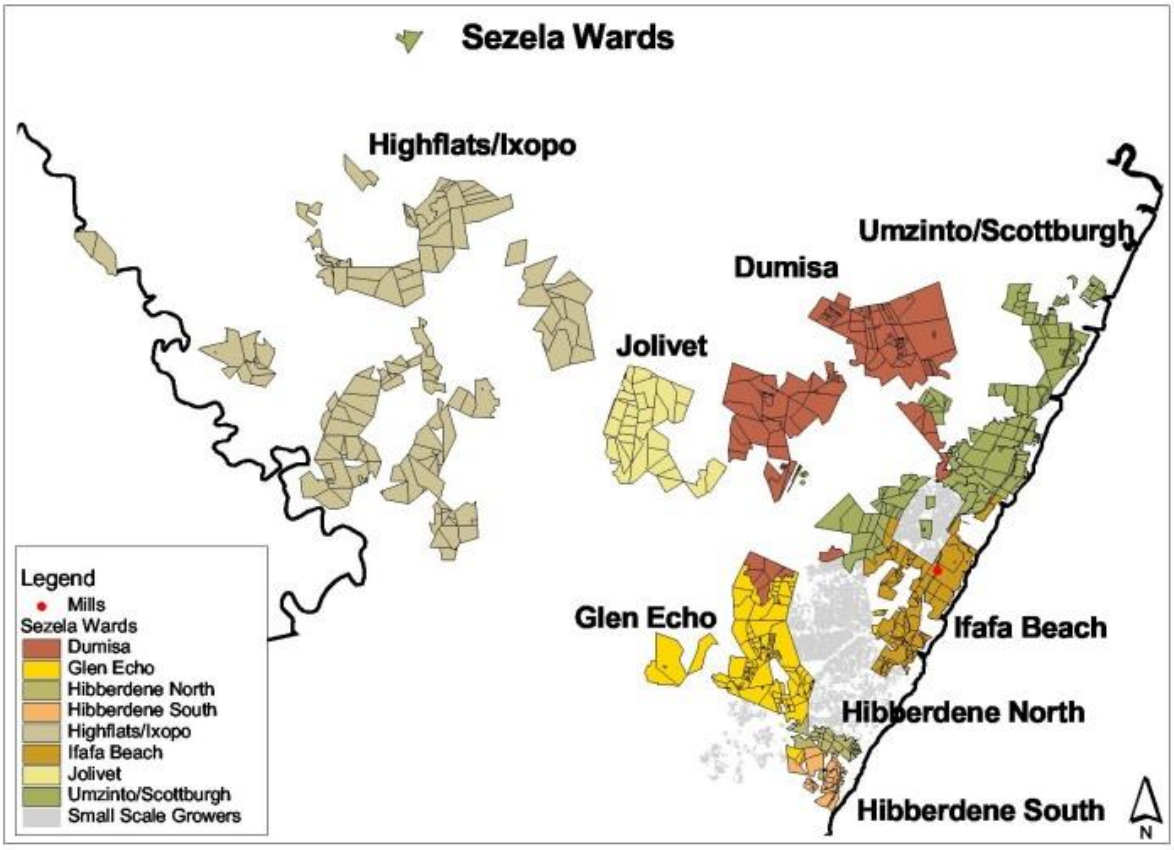


Figure 2. Map showing homogenous ward areas at Sezela (eco-zones).

The SASRI Extension Specialist would be the main person requesting and compiling the relevant data, while the regional SACGA economist would have full access to the data and would be assisting with the economic interpretation of the data collected.

The SACGA economist would also be comparing the information received from *CaneFarms*, a book keeping system specially developed for cane farmers (Chadwick, 1998), with the project spreadsheets. The stakeholders involved in supplying data and collecting and capturing data received are presented in Table 3.

All data captured would be supplied after the final Cane Testing Service (CTS) *To-Date Classification* information has been released for the previous season. Data are not collected on a monthly basis, as the purpose of the project is to investigate seasonal trends rather than monthly or weekly trends.

Table 1. Database headings for grower revenue (known as Table 1 – Revenue).

TABLE 1 - REVENUE
DUMISA (WARD 1) : 2011\2012 SEASON

Name	Quota No.	Rel RV %	Act. R V %	RV% DIFF	Age (m)	Area under cane	Area Harvested	Tons cane delivered	Tons cane/ha	Tons cane/ha per month	Tons Rel RV/ha	Tons Rel RV/ha/month	Revenue per ton cane	Revenue/ ha	Revenue/ ha/annum	Rel tons RV	Tons Act Suc	Act Suc %

Table 2. Database headings for grower quality (known as Table 2 – Cane Quality Data).

TABLE 2 - CANE QUALITY FIGURES
DUMISA (WARD 1) : 2011\2012 SEASON

		A										B					
Name	Grower Code	Tons Cane Delivered	Area Harvested (Ha)	Actual Sucrose % Cane	Non-Suc % Cane	Fibre % Cane	Purity	Dry Matter % Cane	Moisture % Cane	Brix % DM	Actual RV % Cane	Relative to group average (%)					Revenue per Ton RV %
												Suc%	DM%	Bx%DM	Purity	RV%	

Table 3. Industry stakeholder roles and responsibilities.

	Stakeholder	Roles and responsibilities
1.	SASRI Extension Specialists	Entering grower details (grower name, grower number) into database for Tables 1 and 2 for each ward area. Sending questionnaire to growers and entering answers into database (Table 1). Requesting and capturing final (March) grower cane quality data from CTS, i.e. the direct analysis of cane (DAC) data supplied electronically (Table 2). On completion of capturing all relevant information, the formulae in the spreadsheet is used to calculate the following: • Tons cane per hectare • Tons cane per hectare per month • Tons relative RV per hectare • Tons relative RV per hectare per month • Revenue per ton cane • Revenue per hectare • Revenue per hectare per annum. Calculate the weighted average totals for each column in the spreadsheets Once all data for each spreadsheet has been fully captured, send copies to the growers for final comment (normally allow three weeks for comment). On completion of adjusting data according to grower comments, send the final spreadsheets to each grower.
2.	SACGA Regional Economist	Collecting and comparing *CaneFarms* data to the annual yioeld comparison (AYC) data for individual growers.
3.	Cane Testing Service (CTS)	Mailing electronic database (*To-Date Classification* or DAC document) consisting of final individual grower's cane quality and delivery data to the Extension Specialist.
4.	SASRI Biometry	Supplying individual grower with cane quality and delivery data per ward per month.
5.	Grower	Providing weighted average age at harvest, area under cane and hectares harvested information for previous season. In reference to SASRI Extension Specialist questionnaire.

Type of data collected

- SASRI Extension Specialist's questionnaire:

By 28th February of every year, the Extension Specialist will send out a questionnaire to all growers requesting the weighted average age (months) for all fields harvested, the area under cane and the area harvested for the previous season. This data will be used to calculate tons cane/ha/month for each grower's farm and is captured in the *Growers* spreadsheet which is linked to the database Revenue/ha/annum (see Table 1). Growers are given a maximum of two months to return this questionnaire.

- CTS *To-date Classification*:

This data is supplied electronically in Microsoft Excel format and is only requested once the season end information has been finalised. The monthly *To-date Classification* or DAC data is available electronically if requested on a monthly basis. The following information is captured from CTS.

Revenue/ha/annum (Table 1)
Relative RV%
Actual RV%
Tons cane delivered
Relative tons RV
Tons actual sucrose
Actual sucrose %.

Cane quality (Table 2)
Actual sucrose %
Non-sucrose % cane
Fibre % cane
Purity % cane
Moisture % cane
Actual RV% cane.

- Grower questionnaire data:

The grower will complete the following:
Grower name
Farm name
Grower number
Area under cane (ha)
Area harvested (ha)
Weighted average age at harvest (months).

Data from the grower questionnaire is captured into a *Grower* database which is automatically linked to the *Revenue* database and the cane *Quality* database for each ward area.

The formula for calculating the weighted average can be difficult for the grower to calculate, as every field that was harvested needs to be included in the calculation (Table 4).

Table 4. Example of calculating weighted average age at harvest.

Field	Area (ha)	Age (months)	Calculation	Calculation continued
1	20	14	20 ha x 14 m	= 280
7	15	16	15 ha x 16 m	= 240
9	5	12	5 ha x 12 m	= 60
11	22	21	22 ha x 21 m	= 462
2	9	19	9 ha x 19 m	= 171
8	7	13	7 ha x 13 m	= 91
	78			**1304**
			Weighted average →	1304÷78 = **16.7 months**

Table 5. Revenue and quality database tables demonstrating where data is sourced.

TABLE 1 - REVENUE / ha /ANNUM RANKING 2011 / 2012
LARGE GROWERS WARD 8 - UMZINTO / SCOTTBURGH
SORTED PER REV/HA/ANNUM

Name	Grower Code	Rel RV %	Act. R V %	RV% DIFF A - R	Age (m)	Area under cane	Area Harvested	Tons cane	Tons cane/ha	Tons cane/ha per month	Tons Rel RV/ha	Tons Rel RV/ha/ month	Revenue per ton cane	Revenue/ ha	Revenue/ha/ an	Rel tons RV	Tons Act Suc	Act Suc %
Extension Specialist	Extension Specialist	CTS	CTS	Formulae	Grower Questionnaire	Grower Questionnaire	Grower Questionnaire	CTS	Formulae	Formulae	Formulae	Formulae	Formulae	Formulae	Formulae	CTS	CTS	CTS

TABLE 2 - CANE QUALITY FIGURES FOR WARD GROWERS
UMZINTO/SCOTTBURGH - WARD 8 - LARGE GROWERS (2011 / 2012 season)

		A										B					
Name	Grower Code	Tons Cane	Area Harvested (Ha)	Actual Sucrose % Cane	Non-Sucrose % Cane	Fibre % Cane	Purity	Dry Matter % Cane	Moisture % Cane	Brix % DM	Actual RV% Cane	Relative to group average (%)					Revenue per ton RV%
												Suc%	DM%	Bx%DM	Purity	RV%	
Extension Specialist	Extension Specialist	CTS	Grower Questionnaire	CTS	CTS	CTS	CTS	Formulae	CTS	Formulae	CTS	Formulae	Formulae	Formulae	Formulae	Formulae	Formulae

Completed databases (spreadsheets)

As and when the different stakeholders submit their information the extension specialist will populate the two databases and apply the relevant formula.

- Ward revenue database:

The *Revenue* spreadsheet (Table 6) is used to capture certain cane quality data from CTS *To-date Classification*, e.g. relative RV%, actual RV%, tons cane delivered, relative tons RV, tons actual sucrose and actual sucrose %.

Grower's name, cane age (m), area under cane and area harvested will be automatically linked from the *Grower* spreadsheet.

Formulae in the *Revenue* spreadsheet are used to calculate the following:

RV% difference (difference between actual RV% and relative RV %)
Tons cane/ha
Tons cane/ha/month
Tons relative RV/ha
Tons relative RV/ha/month
Revenue/ton cane
Revenue/ha
Revenue/ha/annum.

The Revenue spreadsheet (Table 6) is ranked from highest to lowest revenue/ha/an/area cut or revenue/ha/area under cane. The mean or weighted averages are calculated for the homogenous ward.

- Ward cane quality database:

Grower name, grower code, tons cane delivered, area harvested, actual sucrose % and actual RV% cane are linked from the *Revenue* database.

Certain cane quality parameters are manually captured from the CTS *To-date Classification*, e.g. non-sucrose % cane, fibre % cane, purity % cane and moisture % cane. Formulae are used to calculate dry matter % cane and brix % cane, while relative to group (ward) average, sucrose %, dry matter %, brix % dry matter, purity %, RV% and revenue per ton RV are calculated by formulae. There is no specific ranking of growers in this database (Table 7).

Once the spreadsheets have been completed for each grower per homogenous ward area, the averages (weighted and normal) are calculated and compared against both the mill and industry averages. It is advisable to check the grower questionnaire data, i.e. area under cane and area harvested against final estimates (from Mill Group Board) and from the South African Sugar Association's annual grower information survey. Growers will then receive a copy of both *Revenue* and *Quality* spreadsheets for final comment and corrections. It is important that the grower names are not visible (except for the recipient) as per the confidentiality agreement.

Once all data has been approved and checked by the growers, the weighted average for each homogenous ward area will be captured in a Total Production Spreadsheet which is used to compare cane quality, yield and revenue per season per ward area (Table 8).

Table 6. Completed Revenue Spreadsheet: Growers sorted from highest to lowest revenue per ha per annum per ward area.

LARGE GROWERS WARD 8 - UMZINTO / SCOTTBURGH
SORTED PER REV/HA/ANNUM

	Grower Code	Rel RV %	Act. R V %	RV% DIFF A - R	Age (m)	Area under cane	Area Harvested	Tons cane	Tons cane/ha	Tons cane/ha per month	Tons Rel RV/ha	Tons Rel RV/ha/ month	Revenue per ton cane	Revenue/ ha	Revenue/ha /annum	Rel tons RV	Tons Act Suc	Act Suc %
Z	215138A	12.87	12.99	-0.11	14.20	97.60	44.80	3 842.18	85.76	6.04	11.04	0.78	411.63	35 303.02	R 29 834	494.66	543.97	14.16
L	143440F	11.13	10.70	0.43	12.50	89.40	74.30	6 169.22	83.03	6.64	9.24	0.74	355.85	29 546.86	R 28 365	686.62	743.89	12.06
HH	225363A	11.55	12.74	-1.19	11.17	20.91	17.31	1 104.64	63.82	5.71	7.37	0.66	369.30	23 567.01	R 25 318	127.59	156.54	14.17
FF	223496B	12.73	13.06	-0.33	15.29	71.85	35.24	2 694.62	76.46	5.00	9.73	0.64	406.87	31 111.57	R 24 417	342.90	383.73	14.24
GG	225011A	12.51	12.74	-0.23	12.20	21.30	9.90	599.56	60.56	4.96	7.57	0.62	399.87	24 216.66	R 23 820	74.98	83.26	13.89
O	154221B	12.40	12.97	-0.57	13.10	138.60	109.50	6 881.92	62.85	4.80	7.79	0.60	396.55	24 922.56	R 22 830	853.53	976.72	14.19
P	200641A	11.02	11.94	-0.91	11.89	14.30	14.30	908.08	63.50	5.34	7.00	0.59	352.37	22 376.07	R 22 583	100.08	120.05	13.22
EE	215146B	12.27	12.27	0.00	16.05	103.15	60.50	4 543.30	75.10	4.68	9.22	0.57	392.45	29 471.45	R 22 035	557.66	612.69	13.49
M	143440G	10.93	10.60	0.34	12.50	87.10	63.00	3 681.32	58.43	4.67	6.39	0.51	349.58	20 427.36	R 19 610	402.50	440.87	11.98
BB	215140A	12.18	12.14	0.04	14.08	128.00	72.30	4 268.04	59.03	4.19	7.19	0.51	389.40	22 987.48	R 19 592	519.81	570.01	13.36
I	142009A	10.54	10.58	-0.04	13.17	894.00	527.60	32 116.54	60.87	4.62	6.42	0.49	336.97	20 512.11	R 18 690	3 384.77	3 848.63	11.98
G	133539B	11.73	11.73	0.00	16.50	813.00	606.41	41 025.22	67.65	4.10	7.93	0.48	375.00	25 369.56	R 18 451	4 811.64	5 335.87	13.01
J	143380B	10.72	10.71	0.01	16.50	803.00	642.50	43 032.10	66.98	4.06	7.89	0.48	376.46	25 213.59	R 18 337	5 066.66	5 649.57	13.14
K	143380C	11.78	11.95	-0.17	21.60	554.84	331.46	29 024.62	87.57	4.05	10.32	0.48	376.67	32 983.18	R 18 324	3 419.30	3 856.08	13.29
R	200647A	11.54	11.54	0.00	18.18	741.00	448.42	33 490.96	74.69	4.11	8.62	0.47	368.87	27 549.27	R 18 184	3 863.75	4 296.16	12.83
Q	200642A	11.55	11.55	0.00	14.10	420.00	345.00	19 565.48	56.71	4.02	6.50	0.46	366.40	20 779.15	R 17 684	2 242.13	2 531.38	12.83
F	133539A	10.30	10.27	0.03	13.70	1421.60	1129.44	68 348.46	60.52	4.42	6.24	0.46	329.44	19 935.88	R 17 462	7 042.27	7 982.99	11.68
B	121017A	10.99	10.88	0.11	16.84	1190.68	711.44	49 231.86	69.20	4.11	7.60	0.45	351.27	24 307.70	R 17 321	5 408.74	6 011.49	12.21
H	134043A	10.40	10.32	0.08	14.10	341.20	258.00	15 254.28	59.13	4.19	6.15	0.44	332.56	19 662.74	R 16 734	1586.64	1787.91	11.72
V	210252A	10.30	9.92	0.38	13.34	74.80	71.00	3 845.84	54.17	4.06	5.58	0.42	329.24	17 833.96	R 16 043	396.02	435.01	11.31
AA	215139A	11.02	10.23	0.79	15.34	110.60	36.05	2 066.02	57.31	3.74	6.32	0.41	352.44	20 198.33	R 15 801	227.74	238.37	11.54
D	121017K	11.89	11.69	0.20	17.83	739.93	454.54	27 145.96	59.72	3.35	7.10	0.40	380.15	22 702.99	R 15 280	3 227.52	3 521.16	12.97
II	227305A	12.15	12.10	0.05	17.00	1145.02	767.00	42 425.82	55.31	3.25	6.72	0.40	388.55	21 492.04	R 15 171	5 155.69	5 666.94	13.36
A	101812A	12.65	11.32	1.33	14.96	40.10	27.10	1 261.72	46.56	3.11	5.89	0.39	404.36	18 826.04	R 15 101	159.57	157.59	12.49
CC	215145A	10.47	9.27	1.21	14.91	210.00	98.80	5 217.70	52.81	3.54	5.53	0.37	334.91	17 686.95	R 14 235	546.54	554.89	10.63
W	210254A	11.60	11.40	0.20	13.80	134.20	98.70	4 254.00	43.10	3.12	5.00	0.36	370.84	15 983.39	R 13 899	493.40	540.52	12.71
N	154221A	11.87	10.36	1.51	12.30	83.00	59.00	2 124.22	36.00	2.93	4.27	0.35	379.58	13 666.26	R 13 333	252.18	248.23	11.69
S	210250A	10.50	10.24	0.26	16.09	101.20	49.00	2 602.52	53.11	3.30	5.58	0.35	335.77	17 833.77	R 13 301	273.31	301.11	11.57
JJ	227305B	10.07	10.19	-0.12	15.00	41.98	41.98	2 076.72	49.47	3.30	4.98	0.33	321.88	15 923.34	R 12 739	209.07	240.87	11.60
U	210251A	11.20	11.39	-0.20	13.74	119.50	83.00	3 309.34	39.87	2.90	4.46	0.32	357.97	14 272.89	R 12 465	370.51	418.33	12.64
E	132813B	10.97	10.88	0.10	14.22	86.00	50.00	2 089.36	41.79	2.94	4.59	0.32	350.84	14 660.46	R 12 372	229.26	253.97	12.16
DD	215146A	11.65	11.51	0.14	16.44	205.82	107.40	4 707.16	43.83	2.67	5.11	0.31	372.50	16 326.09	R 11 917	548.40	602.58	12.80
KK	230244A	10.67	10.73	-0.06	23.00	1225.80	623.40	35 856.18	57.52	2.50	6.37	0.28	354.26	20 375.76	R 10 631	3 972.78	4 540.03	12.17
T	210250B	10.62	11.28	-0.65	14.46	77.55	35.20	1 286.36	36.54	2.53	3.88	0.27	339.68	12 413.40	R 10 302	136.66	161.42	12.55
Y	214829A	10.64	10.89	-0.25	16.15	116.00	84.00	3 195.08	38.04	2.36	4.05	0.25	340.05	12 934.37	R 9 611	339.81	390.66	12.23
C	121017G	11.95	10.92	1.03	17.83	156.51	73.34	2 725.26	37.16	2.08	4.44	0.25	382.19	14 201.89	R 9 558	325.76	331.66	12.17
X	210256A	9.52	10.52	-1.00	13.75	70.00	49.10	1 259.30	25.65	1.87	2.44	0.18	304.48	7 809.19	R 6 815	119.92	149.44	11.87
	Weighted mean	**11.16**	**11.11**	**0.05**	**16.30**	**12 689.54**	**8 310.03**	**513 230.96**	**61.76**	**3.86**	**6.98**	**0.43**	**360.40**	**22 304.36**	**R 16 670**	**57 970.39**	**64 684.61**	**12.53**

Table 7. Completed ward cane quality spreadsheet.

TABLE 2 - CANE QUALITY FIGURES FOR WARD GROWERS
UMZINTO/SCOTTBURGH - WARD 8 - LARGE GROWERS (2012 / 2013 season)

	A										B					
											Relative to group average (%)					Revenue
	Tons Cane	Area Harvested (Ha)	Actual Sucrose % Cane	Non-Sucrose % Cane	Fibre % Cane	Purity	Dry Matter % Cane	Moisture % Cane	Brix % DM	Actual RV% Cane	Suc%	DM%	Bz%DM	Purity	RV%	per ton RV%
A	1 261.72	27.10	12.49	1.91	17.48	86.74	31.61	68.39	45.55	11.32	99.67	99.50	96.82	103.62	101.83	361.89
B	49 231.86	711.44	12.21	2.19	19.60	84.79	33.67	66.33	42.77	10.88	97.43	105.97	90.91	101.30	97.87	347.81
C	2 725.26	73.34	12.17	2.07	17.92	85.45	31.84	68.16	44.73	10.92	97.11	100.21	95.07	102.09	98.29	349.29
D	27 145.96	454.54	12.97	2.20	17.31	85.49	32.18	67.82	47.15	11.69	103.50	101.27	100.22	102.14	105.18	373.79
E	2 089.36	50.00	12.16	2.19	17.41	84.75	31.42	68.58	45.66	10.88	96.99	98.87	97.05	101.24	97.86	347.79
F	68 348.46	1 129.44	11.68	2.51	17.53	82.28	31.41	68.59	45.20	10.27	93.20	98.84	96.07	98.30	92.42	328.43
G	41 025.22	606.41	13.01	2.23	16.69	85.38	31.61	68.39	48.19	11.73	103.78	99.49	102.43	102.00	105.54	375.08
H	15 254.28	258.00	11.72	2.50	17.25	82.40	31.19	68.81	45.60	10.32	93.53	98.17	96.94	98.44	92.88	330.09
I	32 116.54	527.60	11.98	2.54	16.84	82.48	31.06	68.94	46.77	10.58	95.62	97.76	99.41	98.54	95.20	338.30
J	43 032.10	642.50	13.14	3.23	16.35	77.78	30.66	69.34	53.41	10.71	104.88	96.49	113.52	92.92	96.36	342.43
K	29 024.62	331.46	13.29	2.36	16.97	84.93	32.29	67.71	48.45	11.95	106.01	101.62	102.98	101.46	107.53	382.15
L	6 169.22	74.30	12.06	2.33	18.22	83.80	32.29	67.71	44.56	10.70	96.22	101.62	94.72	100.11	96.31	342.26
M	3 681.32	63.00	11.98	2.40	18.12	83.28	32.20	67.80	44.66	10.60	95.56	101.35	94.92	99.49	95.34	338.81
N	2 124.22	59.00	11.69	2.28	17.87	83.68	31.54	68.46	44.28	10.36	93.25	99.26	94.12	99.96	93.21	331.26
O	6 881.92	109.50	14.19	2.17	15.49	86.73	31.51	68.49	51.94	12.97	113.25	99.16	110.40	103.61	116.67	414.63
P	908.08	14.30	13.22	2.30	15.92	85.18	30.99	69.01	50.09	11.94	105.49	97.53	106.46	101.76	107.38	381.60
Q	19 565.48	345.00	12.83	2.34	15.12	84.58	30.13	69.87	50.35	11.55	102.38	94.83	107.02	101.04	103.91	369.29
R	33 490.96	448.42	12.83	2.25	16.97	85.06	31.72	68.28	47.55	11.54	102.36	99.83	101.07	101.61	103.78	368.81
S	2 602.52	49.00	11.57	2.31	17.80	83.39	31.40	68.60	44.19	10.24	92.32	98.83	93.92	99.62	92.10	327.31
T	1 286.36	35.20	12.55	2.19	17.09	85.12	31.51	68.49	46.79	11.28	100.13	99.16	99.46	101.69	101.45	360.54
U	3 309.34	83.00	12.64	2.05	18.36	86.04	32.69	67.31	44.94	11.39	100.87	102.89	95.52	102.79	102.50	364.27
V	3 845.84	71.00	11.31	2.47	17.68	82.10	31.20	68.80	44.16	9.92	90.26	98.20	93.86	98.08	89.24	317.13
W	4 254.00	98.70	12.71	2.32	16.65	84.58	31.37	68.63	47.89	11.40	101.39	98.73	101.80	101.04	102.54	364.39
X	1 259.30	49.10	11.87	2.40	16.88	83.19	30.86	69.14	46.23	10.52	94.69	97.12	98.26	99.38	94.65	336.36
Y	3 195.08	84.00	12.23	2.43	16.01	83.41	30.27	69.73	48.42	10.89	97.56	95.28	102.92	99.65	97.97	348.15
Z	3 842.18	44.80	14.16	2.02	15.70	87.51	31.62	68.38	51.17	12.99	112.97	99.51	108.77	104.54	116.84	415.23
AA	2 066.02	36.05	11.54	2.31	16.74	83.35	30.25	69.75	45.76	10.23	92.06	95.21	97.26	99.57	92.04	327.09
BB	4 268.04	72.30	13.36	2.15	15.57	86.16	30.74	69.26	50.42	12.14	106.57	96.75	107.18	102.93	109.21	388.12
CC	5 217.70	98.80	10.63	2.33	18.76	82.01	31.45	68.55	41.23	9.27	84.86	98.98	87.65	97.98	83.38	296.32
DD	4 707.16	107.40	12.80	2.32	15.90	84.68	30.70	69.30	49.24	11.51	102.15	96.62	104.67	101.16	103.56	368.04
EE	4 543.30	60.50	13.49	2.09	16.20	86.57	31.42	68.58	49.57	12.27	107.61	98.90	105.37	103.42	110.44	392.46
FF	2 694.62	35.24	14.24	2.07	15.35	87.32	31.34	68.66	52.04	13.06	113.63	98.63	110.61	104.32	117.50	417.58
GG	599.56	9.90	13.89	1.91	16.63	87.94	32.25	67.75	48.98	12.74	110.82	101.48	104.11	105.05	114.61	407.28
HH	1 104.64	17.31	14.17	2.65	16.35	84.27	32.81	67.19	51.25	12.74	113.08	103.27	108.94	100.67	114.63	407.38
II	42 425.82	767.00	13.36	2.19	16.37	85.89	31.60	68.40	49.22	12.10	106.58	99.44	104.62	102.61	108.89	386.96
JJ	2 076.72	41.98	11.60	2.57	16.60	81.83	30.51	69.49	46.46	10.19	92.55	96.01	98.76	97.76	91.68	325.81
KK	35 856.18	623.40	12.17	2.40	20.08	82.94	33.92	66.08	42.95	10.73	97.11	106.75	91.31	99.08	96.54	343.07
NORMAL AVERAG	**513 230.96**	**8 310.03**	**12.59**	**2.30**	**17.02**	**84.41**	**31.55**	**68.45**	**47.24**	**11.26**	**100.47**	**99.29**	**100.41**	**100.84**	**101.28**	**359.92**
WEIGHTED AVERA	**513 230.96**	**8 310.03**	**12.53**	**2.39**	**17.32**	**83.71**	**31.77**	**68.23**	**47.04**	**11.11**						**355.38**
MILL AVERAGE	**1 414 507.00**		**12.97**	**2.23**	**17.16**	**85.26**	**32.04**	**67.96**	**47.44**	**11.69**						
INDUSTRY AVERA	**15 618 339.00**		**13.49**	**2.31**	**15.36**	**85.37**	**31.04**	**68.96**	**50.90**	**12.22**						

Table 8 – Total Production: Seasonal revenue and quality data for a specific ward.

Year	Rel RV%	Sucrose %	Purity %	Fibre %	NS %	Ave Age (mths)	tc/ha	tc/ha/m	ts/ha	ts/ha/m	trrv/ha	trrv/ha/m	tc/ha/12m	ts/ha/12m	trrv/ha/12m	Rev/ha	Rev/ton cane	Diff/yr	% Diff R/ton	Diff p.a. R/ts	% Diff (S) Price
1997/1998		12.00	83.64	16.68		14.30	64.60	4.60	7.75	0.54			55.20	6.48		7 309.61	113.25				
1998/1999		13.20	83.12	16.73	2.39	14.10	60.40	4.30	7.97	0.57			51.60	6.84		7 616.21	123.37	10.12	8.94	-1.04	-0.11
1999/2000		13.65	84.40	15.95	2.53	14.20	59.40	4.20	8.11	0.57			50.40	6.84		7 133.61	119.34	-4.03	-3.27	-60.71	-6.44
2000/2001		12.29	84.20	16.29	2.34	14.48	72.45	5.06	8.90	0.77			60.72	9.24		8 722.50	120.39	1.05	0.88	112.41	12.76
2001/2002	11.11	12.35	83.46	16.29	2.44	14.31	60.12	4.19	7.42	0.52	6.69	0.47	50.28	6.23	5.64	9 045.73	150.16	29.77	24.73	224.43	22.59
2002/2003	12.51	13.70	86.35	16.07	2.16	13.36	65.64	4.93	8.99	0.67	8.25	0.62	59.16	8.08	7.44	10 174.11	172.04	21.88	14.57	15.00	1.23
2003/2004	11.73	12.93	83.99	16.13	2.38	14.05	50.65	3.61	6.55	0.47	5.93	0.42	43.32	5.59	5.04	8 051.30	158.65	-13.39	-7.78	-10.61	-0.86
2004/2005	11.87	13.11	84.11	15.77	2.49	14.01	58.05	4.15	7.61	0.54	6.94	0.50	49.80	6.52	6.00	9 004.74	154.95	-3.70	-2.33	-54.07	-4.42
2005/2006	12.34	13.53	84.94	15.67	2.40	13.54	61.62	4.58	8.34	0.62	7.60	0.56	54.96	7.39	6.72	10 557.97	171.52	16.57	10.69	83.61	7.16
2006/2007	11.06	12.30	83.60	15.75	2.41	13.63	63.87	4.72	7.86	0.58	7.06	0.52	56.64	6.92	6.24	12 010.24	188.13	16.61	9.68	281.14	22.45
2007/2008	12.05	13.22	84.41	16.10	2.44	14.28	65.02	4.58	8.60	0.60	7.84	0.55	54.96	7.22	6.60	13 337.84	205.03	16.90	8.98	0.04	0.00
2008/2009	11.20	12.41	83.94	17.12	2.39	14.27	64.96	4.56	8.06	0.56	7.27	0.51	54.72	6.78	6.12	14 619.36	225.20	20.17	9.84	278.63	18.17
2009/2010	12.16	13.45	83.93	16.24	2.57	13.78	60.80	4.42	8.18	0.59	7.39	0.54	53.04	7.12	6.48	16 879.65	277.77	52.57	23.34	245.96	13.58
2010/2011	12.40	13.81	82.79	17.12	2.86	13.80	42.43	3.11	5.86	0.42	5.28	0.39	37.32	5.10	4.68	13 585.62	318.99	41.22	14.84	259.41	12.61
2011/2012	9.96	11.35	81.53	17.60	2.51	15.63	49.56	3.21	5.63	0.36	4.99	0.32	38.52	4.32	3.84	15 064.14	304.42	-14.57	-4.57	401.23	17.32
2012/2013	11.16	12.53	83.71	17.32	2.39	16.30	61.76	3.86	7.74	0.47	6.98	0.43	46.32	5.70	5.16	22 304.36	360.40	55.98	18.39	161.99	5.96
	11.63	**12.86**	**83.88**	**16.43**	**2.45**	**14.25**	**60.08**	**4.26**	**7.72**	**0.55**	**6.85**	**0.49**	**51.06**	**6.65**	**5.83**	**11 588.56**	**197.73**				

Apart from individual growers receiving the AYC results from which they can compare themselves to the rest of the growers within the same ward area, it is important that this information is discussed between the growers and other industry stakeholders at various ward study group meetings.

Study group implementation

The formation of ward study groups is found to be the most effective extension mechanism for the dissemination of the yield comparison results and to discuss agronomic practices that have been adopted by the top growers within each ward area.

Effective study groups

For the group mechanism to function effectively, there are a number of qualities that need to be developed. These qualities are diagrammatically presented in Figure 3.

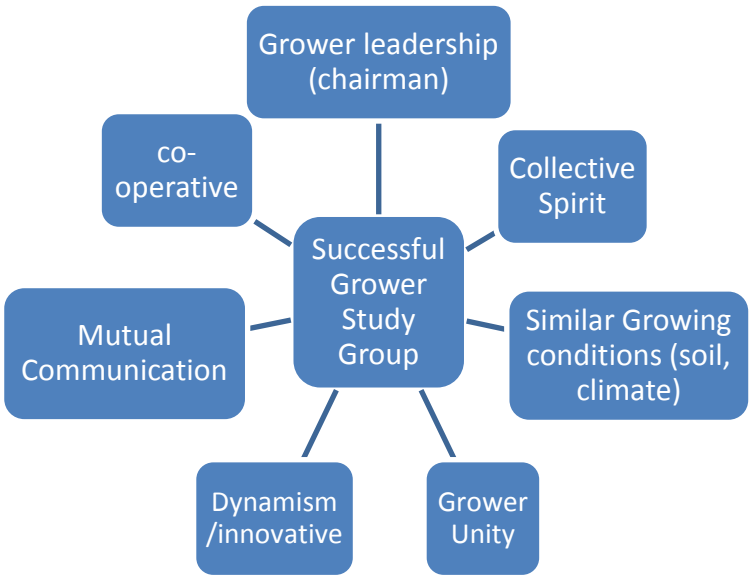


Figure 3. Dynamics of a successful study group.

It is imperative that the growers take ownership of the study group, and that a grower chairman is elected to help manage the running of the meetings. The study group approach is encouraged as the self-organisation by the growers, who are the basis for the sustainable bottom-up approach rather than the extensionist or researcher running the study group activities (top-down approach). Multi-stakeholder membership involving the miller, chemical representatives and machinery suppliers. are also vital for improved stimulation and learning at study group meetings.

In the same way, for a study group to attract participants and produce reasonable outputs depends primarily on the production inputs such as technology, knowledge, physical infrastructure and support services (Tek Bahadur Thapa, 2010). This is further clarified in Figure 4.

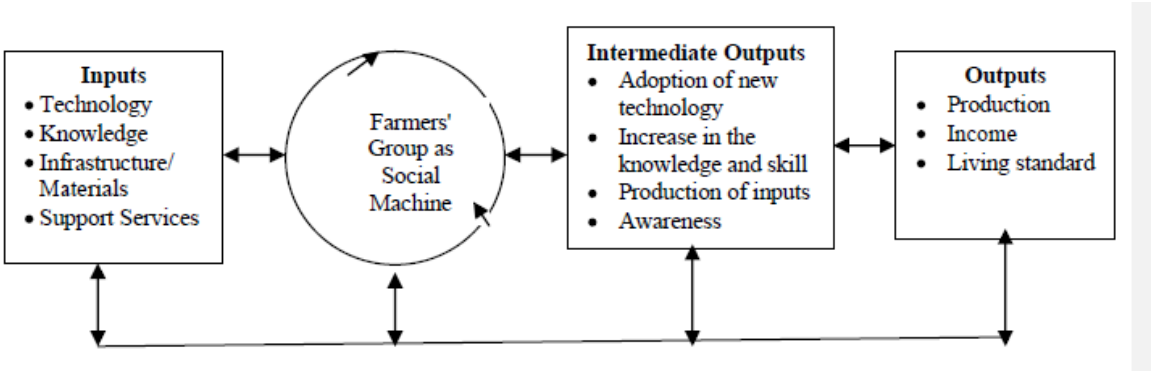


Figure 4. Process of input/output conversion through study groups.

Together with the SACGA Regional Economist and using the *CaneFarms* information, the top three growers need to be identified per homogenous ward area for the previous season.

Conceptual framework of study group

Once the top growers have been identified for a specific season within a homogenous ward area, it is important to visit the grower and carry out an audit of the specific BMPs that have been adopted. The Sustainable Sugarcane Farm Management System (SusFarMS) (Anon, 2012) 'progress tracker' can be used to identify the specific BMPs adopted by growers.

Both the economics and the agronomics of the BMPs that have been implemented need to be confirmed by the relevant SASRI specialists and SACGA regional economists. If there are certain BMPs that have made a marked improvement in farm revenue, through improved tons RV or efficiencies, the opportunity of participative 'on-farm' research may arise.

The main emphasis of technology outreach through the project would be through study group meetings held on a farm where fellow growers can visually observe the benefit of certain BMPs being implemented. Each grower, through receiving their cane quality, yield and revenue trends, will have a good idea as to how they compare with other growers under similar soil and climatic conditions. Each grower will also be able to identify the attainable yield for their specific ward and farm.

Study group meetings should ideally be held on the farm of one of the top producing growers in the specific ward area. The adoption of new technologies and better practices is often far quicker when these are demonstrated by fellow growers in the area. Growers are more convinced when they can see the benefits of certain practices being adopted by neighbouring farmers.

Besides growers promoting certain better practices, specialists and extension would also be given the opportunity to discuss the better practices that have been implemented on the farm which have made the enterprise more profitable. Equally important to the discussion and observation of technical aspects of producing sugarcane, is the interpretation of the economics of the different practices implemented and their financial returns. The role played by the local SACGA economist is thus essential for the success of the study groups.

Results and Discussion

There is a small percentage of sugarcane growers that subscribe to the SACGA *CaneFarms* book keeping system. This database could provide insight into the actual net revenue of growers in specific regions of the SA sugar industry. Both sets of databases (AYC and *CaneFarms*) could complement each other in verifying the accuracy of the individual databases, together with having a reliable database that represents the different regions.

Because the project database and the *CaneFarms* information deals with the individual grower revenue performances which to some extent could be used to determine the agricultural potential hence value of the farm, a strict set of protocols regarding the confidentiality of the data needs to be drawn up and signed by the relevant stakeholders. Essentially the database is only accessible to SASRI extension specialists and SACGA regional economists. On an annual basis growers will receive the results for all growers within their respective wards; however, only the name of the grower receiving the spreadsheet is revealed while the remaining growers are alphabetically listed with no names shown.

A number of interpretations can be derived from the database, starting from individual grower comparisons per ward area for the previous season, to long-term seasonal comparisons for individual growers and between different ward areas.

Previous season yield grower comparison per ward area

Each year all growers who participated in the project will receive a copy of the two databases: *Revenue* which ranks growers according to revenue/ha/an, and *Quality* which demonstrates the cane quality parameters between the individual growers within a specific ward area (Tables 6 and 7).

Figure 5 demonstrates the wide revenue margins between the top performing growers and the bottom growers within a ward for a specific season. For example, the top grower (Z) achieved R29 883/ha/an, while the bottom grower (X) received R6 815/ha/an, which amounts to a difference of R23 018/ha/an. On average, growers received a revenue of R16 669/ha per annum, which is R13 214 or 79.2% less than the top grower in the ward for the 2012/13 season. This difference in financial margins is common throughout the nine ward areas at Sezela. Revenue is based on the final RV price for that specific season.

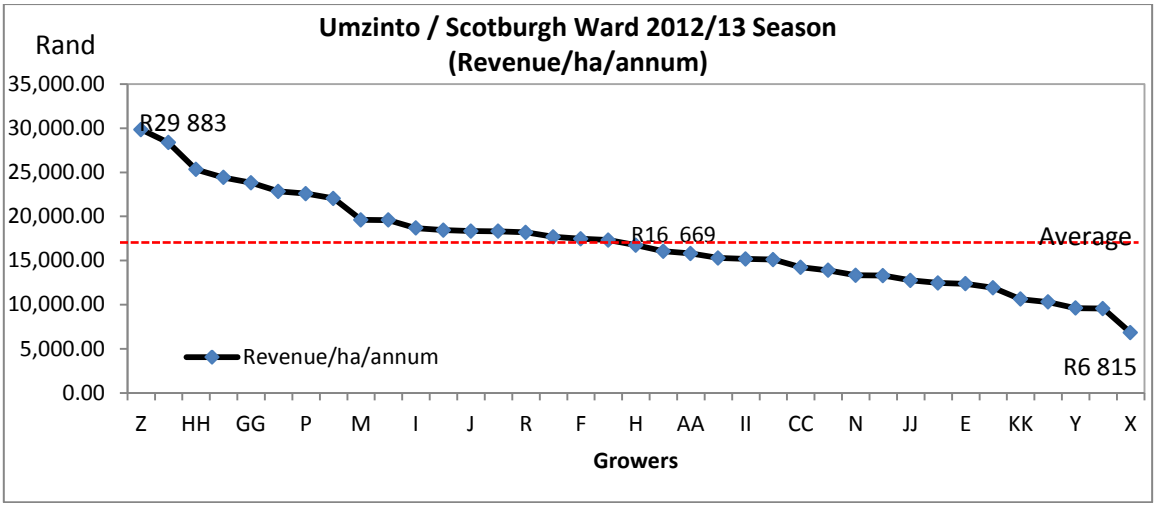


Figure 5. Ranking growers per ward according to revenue/ha/annum for a single season.

Ideally, one should have a database consisting of a number of consecutive years of grower information to determine who are the true top, middle and bottom performers for each ward area. Fortunately, at Sezela, the database consists of 16 years (1997 to 2012) of individual grower data from which reliable grower yield and revenue trends can be compared.

Individual grower trends

With having data covering a number of seasons, one is able to compare seasonal trends for each individual grower against the ward average, i.e. compare tons cane per hectare for the grower against the ward average over a number of seasons. To determine the top performing growers, one would need to identify those growers who are constantly producing good yields and achieving higher revenue than the ward average over a number of consecutive years. This data will also assist growers in determining the agronomic potential of their farm within a homogenous ward area, hence the objective is for growers to strive to maintain the agronomic potential of their farm.

An example of a top performing grower in the Umzinto/Scottburgh ward is the Illovo Sugar Miller-Cum-Planter (MCP) Sezela farm. The Umzinto/Scottburgh ward consists of coastal rainfed farms with relatively steep slopes and predominantly Glenrosa form soils derived from Granite parent materials. Derived from the past 16 years (1997-2012) of data, the attainable yield for this farm stands at 77.03 t/ha, which was achieved in the 2000/01 season. Over this period, the Sezela farm has produced an average yield of 65.89 t/ha against the ward averages of 60.08 t/ha, a difference of 9.6%. For the same period, Sezela farm achieved an average of 7.32 tons relative RV/ha, against an average of 6.85 tons for the ward, which is 6.86% higher than the ward average. On a revenue basis, Sezela farm averaged R10 229/ha/an, which is 5% higher than the ward average of R9 708/ha/an (Figure 6).

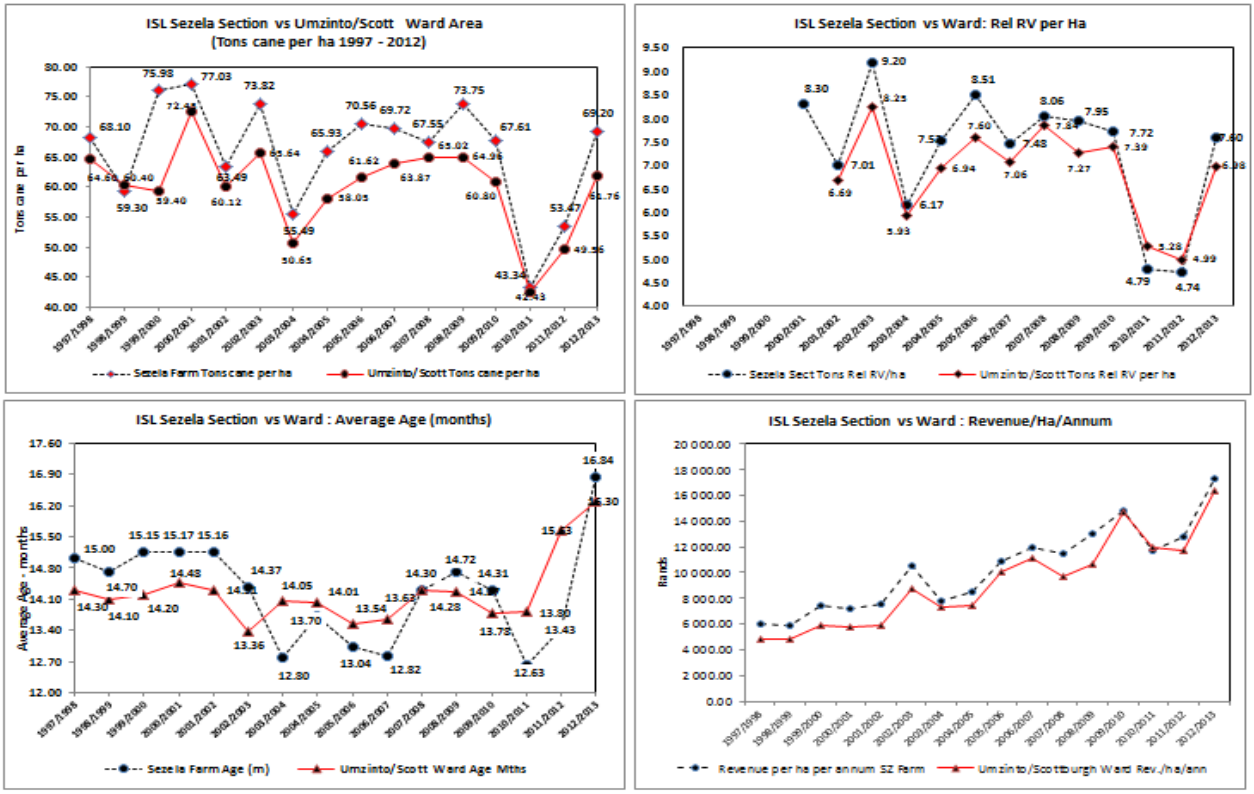


Figure 6. Sezela miller-cum-planter farm compared to the ward average cane yields, relative recovery value (RV) yields, harvest age and revenue graphs.

The main reasons for the Sezela farm constantly producing cane and RV yields higher than the ward average are as follows:

- On-farm nurseries with both first and second stage seedcane
- Adopted a 10% of area under cane replant programme
- Green cane harvesting for eight seasons
- All ratoon and plant fields are fertilised according to soil sample advice from the SASRI Fertiliser Advisory Services (FAS)
- Liming soils to ameliorate soil acidity and aluminium toxicity
- Good variety disposition
- Sound weed control
- Sound soil and surface water conservation practices
- Green manure/fallow certain fields
- Strict standards where labour is used, e.g. hand weeding.

Although a number of these practices are adopted by other growers within the same ward area, the Sezela MCP farm implements a 'whole field approach' whereby a larger number of these practices are implemented consecutively. This is especially done at replanting when the farm manager has the opportunity to implement a combination of BMPs. The level of management and correct timing of operations will also make the difference between a top and average grower.

Seasonal ward comparisons

Cane quality, yield and revenue trends can then be compared on a ward basis. In reference to the ward comparison graph, the cane yield trend for the Hibberdene North ward area is

constantly increasing, whereas other ward areas show distinct variations in cane yield. One BMP commonly implemented by all growers in the Hibberdene North ward area is green cane harvesting, which is having a noticeable impact on cane yield (Figure 7).

When comparing average data (1997-2012) for the Hibberdene North ward area against the remaining coastal ward areas (Hibberdene South, Glen Echo, Ifafa, Umzinto/Scottburgh and Umzumbe), there is a 16.4 t/ha (25.3%) difference in cane yield, i.e. 79.9 t/ha for Hibberdene North versus an average of 63.82 t/ha for the remaining coastal ward areas. Similarly, there is a 1.82 ton (25.9%) relative RV difference between the Hibberdene North growers and the remaining coastal ward areas, i.e. 8.87 trRV for Hibberdene North versus 7.04 trRV for the remaining coastal ward areas. When comparing revenue per hectare per annum, the Hibberdene North growers averaged R13 167/ha/an against R10 510/ha/an for the remaining coastal ward areas, which is a difference of R2 657/ha/an (25.3%).

For the inland ward areas, Jolivet has achieved a relatively constant yield of 89.95 t cane/ha and, although the Highflats/Ixopo area also achieved an average of 89.55 t cane/ha for the past 16 years (1997-2012), there has been a dramatic decline in yield over the past six seasons, i.e. 1997-2006 achieved 92.95 t/ha compared to 78 t/ha for 2007-2012, resulting in a 16% decrease in yield over the past six seasons (Figure 8).

In discussion at the study group meetings, the main reasons identified as the cause of the declining yields are:

- More frequent frost events resulting in the harvesting of immature cane
- The lack of replanting
- Soil acidity/aluminium toxicity resulting in poorer yields
- Replacing cane with more viable commodities, e.g. dairy, beef, maize and vegetables
- Higher input costs and labour intensive farming with sugarcane
- Long distance to the mill and increasing transport costs.

The growers in the Jolivet ward have maintained their yields at 89.9 t/ha, and remain the highest yielding ward at Sezela. There are a number of contributing factors which could have led to the success of these growers:

- Minimising in-field compaction through tramline row spacing (0.65 x 1.15) which, according to grower field records, has resulted in an increase of 21 t cane/ha and up to 30% reduction in herbicide costs.
- The use of first stage seedcane through on-farm nurseries
- Planting green manure crops such as black oats, forage sorghum
- Regular liming to correct soil acidity and aluminium toxicity
- Fertilising strictly to soil sample recommendation from FAS
- The introduction of new varieties N37, N48, N50, N55 and N56
- Managing surface water and soil erosion through sound soil conservation measures
- Very high level of management, such as attention to detail and good record keeping
- Good nitrogen management through subsurface application.

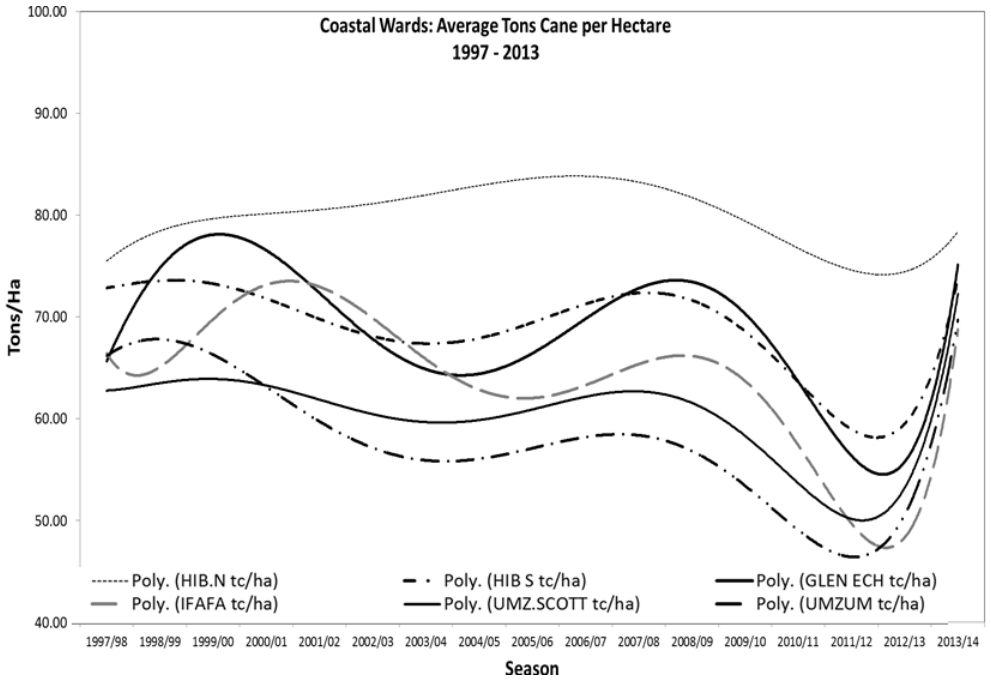


Figure 7. Average cane yields for the Sezela Coastal ward areas.

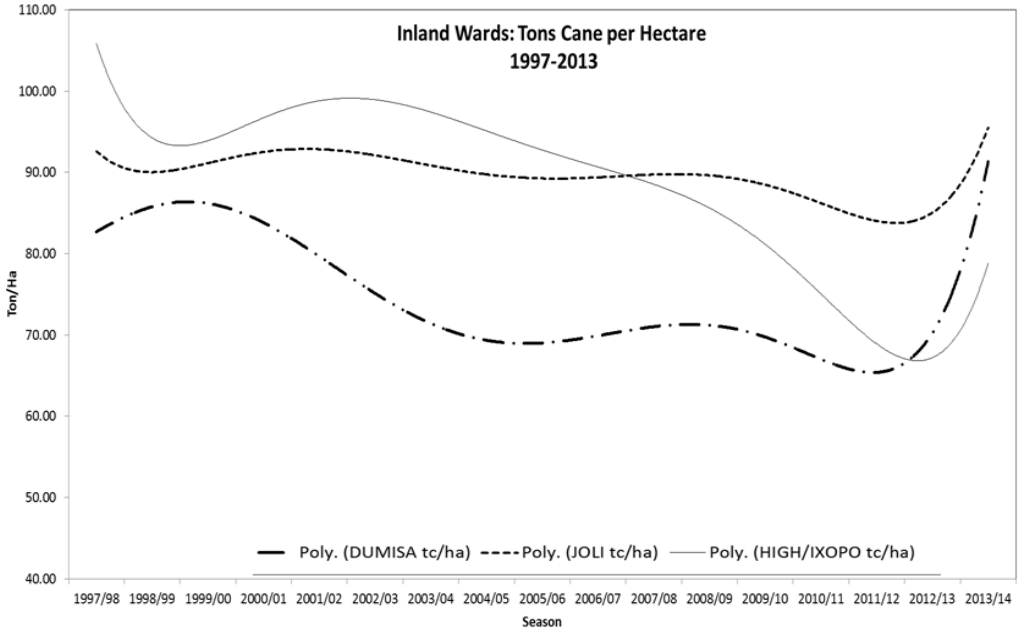


Figure 8. Average cane yields for the Sezela Inland ward areas.

Study group meetings

During the course of the study, various field days and study group meetings took place in the different ward areas. On occasions certain wards amalgamated, e.g. four coastal ward areas (Hibberdene North and South, Ifafa and Glen Echo) joined at one meeting.

In order to make a study group successful it is useful to have a theme that attracts the interest of the growers, hence a common theme at most group meetings was 'Farming Smarter – With Better Management Practices that Make a Difference.'

The study group meeting that stood out the most was a combined inland meeting which took place in the Jolivet ward area on the Moyeni farm belonging to the Roseveare Trust. This farm has been shown to achieve the highest yields and revenue of all the farms supplying sugarcane to the Sezela mill.

Growers from all inland ward areas were invited to attend and a number of industry stakeholders participated in the meeting; representatives from SACGA, farm equipment companies, Illovo Sugar and chemical representatives. SASRI specialists discussed the critical success factors which made this particular farm more productive than other farms in the district, namely:

- Farm performance (10 year history of yield and revenue data)
- Farming smarter
- Green manure crops
- Managing nitrogen and soil acidity
- On-farm nurseries
- Minimising soil compaction and stool damage
- Roseveare Trust experiences.

Apart from allowing the SASRI specialists to give presentations on certain management practices, the grower demonstrated a number of practices that he had implemented on the farm, such as tramline row spacing and the equipment used to implement this, lime application, green manure crops, seedcane nurseries and variety comparisons. Since this meeting there have been many growers that have adopted several of the practices demonstrated at the study group.

What has also been critical to the success of such study group meetings is that growers are comfortable that their names are disclosed in the yield and revenue spreadsheets provided at the meetings. In disclosing names, fellow growers know who the top performers are and this motivates growers to better themselves. This has resulted in stimulated debate between growers as to what factors are having the biggest impact on yield and revenue, and which practices have been implemented by the top growers that have had the most positive impact on their farms. The critical factors effecting cane profitability, together with the counteracting best practice to implement, are shown in Table 9.

Table 9. Factors affecting cane yield and profitability together with counteracting best management practices.

Factors affecting cane yield and profit margins	Best management practices implemented
Reduced age at harvest due to *Eldana saccharina* Walker (eldana) infestation.	Implement integrated pest management for eldana control, starting with the application of a pesticide (Fastac) to enable harvesting at an increasing age.
Increased soil acidity and aluminium toxicity.	Lime and gypsum application according to topsoil and subsoil sampling analysis results from the Fertiliser Advisory Service (FAS) at the South African Sugarcane Research Institute.

Decreased soil organic matter levels.	Trashing, green manure crops, application of organic manures.
Soil compaction and stool damage.	Change from mechanical infield loading and haulage to 'cut and stack', tramline row spacing, and ripping.
Poor variety performances.	On-farm observation trials with different varieties. Improve the variety disposition by not having more than 30% of total area under one variety type.
High input costs of fertiliser.	Fertilise according to soil and leaf sample results from FAS. Improve nitrogen management to minimise volatilisation and/or leaching.
Limited capital investment by land owners while there is uncertainty regarding land claims on their property.	Continue farming at a high standard, as reducing inputs will result in poorer yields and lower revenue, especially when there is so much uncertainty over time of change–over.
Threat of new pests and diseases, e.g. sugarcane thrips (*Fulmekiola serrata*) and brown rust (*Puccinia melanocephala*).	Ensure good quality seedcane and strict field hygiene. Fungicides and pesticides are available for the control of these pests and diseases.

Conclusion

Having a database which can determine an individual grower's cane quality, yield and revenue for a number of consecutive seasons has become an essential tool for use by extension specialists and economists to determine the top performing growers for each homogenous ward area. It is evident that there are large differences in both cane yield and revenue between growers within the same ward area and that through effective management and the adoption of a host of BMPs certain growers are able to achieve yields that are far greater than the ward average, hence giving them the potential to be more profitable.

With the assistance of both SASRI specialists and SACGA regional economists, it is possible to determine which agronomic practices adopted by the top growers are having the biggest impact on RV yield per hectare. The majority of top growers are effectively implementing a combination of practices, hence it is difficult to determine the exact return on investment for each practice implemented.

Study group meetings seem to be the ideal medium for stimulating discussion on the ward comparison results and identifying the critical BMPs that need to be adopted in the area. Having a successful top performing grower demonstrating the best practices adopted on his/her farm results in a far quicker adoption of these practices by fellow growers.

Recommendations

The formulae used to calculate tons cane per hectare per annum is based on the weighted average harvest age of cane calculated by the grower. Because this is a tedious task for the grower, there needs to be an investigation as to whether using total area under cane rather

than weighted average would be statistically correct, i.e. calculate tons cane per hectare per area under cane. This will remove the distortion that is sometimes created when growers miscalculate their weighted average ages for fields harvested in the previous season.

At present data is sourced from a number of industry stakeholders, which makes the process slow and cumbersome. Having access to a single central source of grower information such as the Laboratory Information Management System (LIMS), would vastly improve the accuracy and efficiency of data capturing.

The central database should include full closing estimates (fields cut and carried over), cane deliveries and quality (during the season and final figures from CTS), weather data and grower maps.

To stimulate further competition and adoption of best practices is to set a goal for all growers at the beginning of the season, e.g. to increase yields by 5% and increase RV by 4%. For a 10 000 ton grower currently achieving an average of 68 t/ha at 12% RV, this would result in an extra revenue of R305 904 at an RV price of R3116.66 per ton.

Acknowledgements

The authors would like to thank Extension Specialists Bruce Irons and Grant Buchanan for initiating the grower databases and determining the parameters for identifying the homogenous ward areas for Sezela. Thanks to Gail Jack for sending out grower questionnaires and capturing data into spreadsheets. Thanks also to CTS staff and Rogers Govindsamy at SASRI for providing grower cane quality data, and Stuart Ferrer at SACGA for providing economic advice. A special thanks to all the growers who participated in the Annual Yield Comparison project and especially to Donald Roseveare and Dudley Daniel for hosting grower days and providing information on best management practices adopted on their farms.

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