Submission on Agriculture to the Guyana Sugar Corporation Commission of Inquiry.

OCTOBER 2015

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COMMISSIONERS |

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Guyana Sugar Industry Commission of Inquiry- Agriculture Report

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Guyana Sugar Industry Commission of Inquiry – Report Agriculture

The Guyana Sugar Industry is in a significant decision making phase, following successive years of financial loss, that have required subventions from the Central Government in 2013, 2014 and 2015. These subventions have been used mainly to service debt and do not reflect any long term investment in the Business. The Agriculture Report is a component of a wide-ranging Commission of Inquiry appointed by the Central Government and tasked with identifying the root causes underlying the Industry's poor performance, and to chart a way forward towards a more financially viable and sustainable future. The Agriculture sub-Committee comprises Dr. Harold Davis and Mr. John Piggott, both of whom have had extensive experience within the sugar industry of Guyana and several other countries.

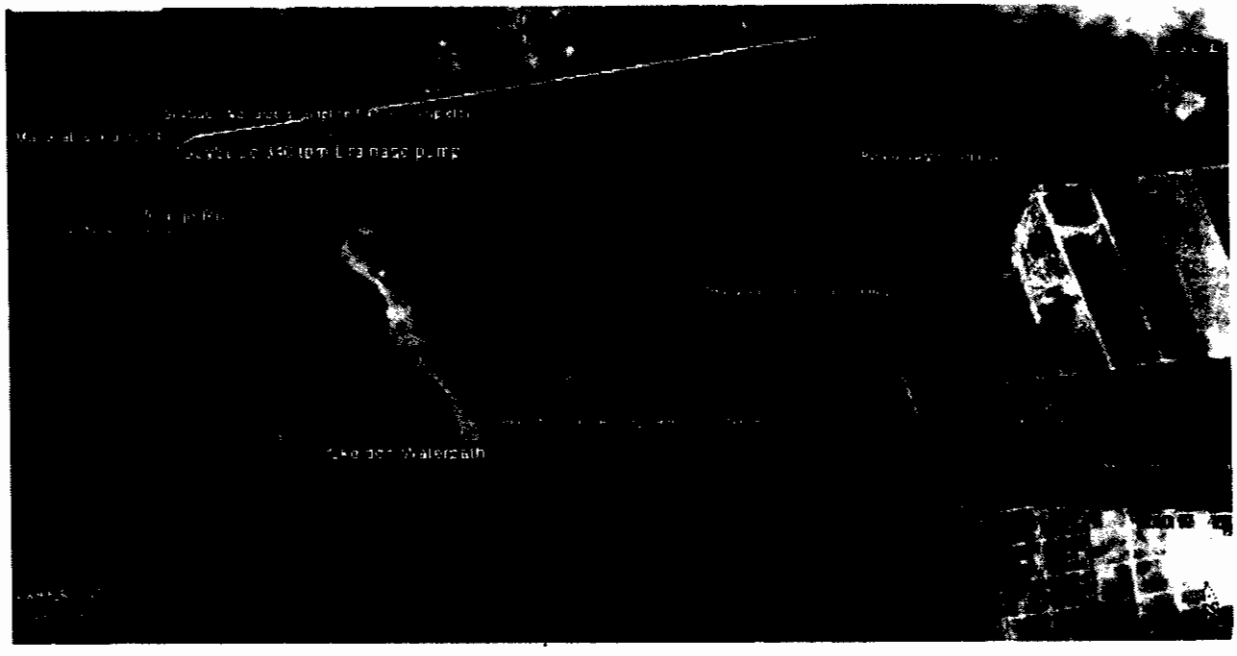
Executive Summary

Agriculture is the basis of production for the sugar industry and the single largest contributor to operating cost. The Industry has faltered financially over the past 7 years and this can be attributed largely to poor yields. The members of the Agriculture sub- Committee of the Commission visited and held in-depth discussions with each operating estate and Service Department during the initial 8 weeks of the Study. This reports reflects views from the estates' technical and managerial staff as much as the views and experience of the writers.

Average cane yields have plummeted since 2009 on most estates. Blairmont and Albion estates have maintained some respectability in production, but even on these estates, the performance has been well below their potential. Poor production has been highlighted by unacceptable plant cane yields on each estate. Ratoon maintenance and productivity has also been poor. Several contributing factors were identified for these yields, **most of which could be linked to estates and support staff falling short of fundamental agronomic and agriculture management standards**, including quality of tillage, timing of planting, shortages of inputs, chronic weed competition and in too many cases, harvesting canes out of season. In 2015, over 5000 hectares of First Crop canes had yet to receive fertiliser in August. While the fertilizer has since been delivered, there will be an undetermined impact on the 2016 production.

Skeldon Estate has been a special consideration throughout the exercise. This estate received considerably more inputs in agriculture and factory than other estates but has not produced at the projected efficiencies since the commissioning of the new mill. From the Agriculture perspective, cane quality has continued to be compromised by a high percentage of over age cane in each crop compounded by delays in crop start leading to machine harvesting in wet and consequent high percentages of extraneous matter and muds delivered to the factory. These conditions combined with delays in delivery to the mill have resulted in consistently very poor sugar recoveries since the new mill was commissioned in 2009. Skeldon has experienced relatively low average rainfall since 2008, but the external drainage for the expanded cultivation is inadequate. A new 340 TPM drainage pump has been sited on the banks of the Canje that will substantively address this issue. The NDIA is expected to complete the required

6Km canal to link the pump to the estate's drainage system at Sookram's Cross. This project is sufficiently important for Guysuco to consider undertaking the drain on its own, should financial approval from the NDIA be subject to delays.



The report offers guidance on the management and technical interventions that will promote better yields that if achieved would result in improvements in sustainable productivity by 2020.

Unfortunately, projected costs of production for agriculture will probably not be low enough for the industry to be profitable at prices projected for the European Market where the bulk of Guyana's sugar is sold after 2017. The recommendation from this report is that the Industry needs to add other revenue streams in addition to raw sugar. Since all factories will have to cope with increasing volumes of machine loaded or harvested canes, it is inevitable that changes in Boiler plant will be required. It is proposed that the opportunity be taken to design the operations for export of seasonal power. A suggestion is also made to consider the manufacture of food grade plantation white sugars by a new technology involving ultrafiltration.

Mechanization is increasingly important to sugarcane production in Guyana. Although progress has been made with the development and operation of equipment and results indicate the potential for significant cost efficiencies not only in harvesting but for crop agronomy and maintenance. It has been a disappointment that although the Bell Loader has been accepted as the preferred mode of operation by cane harvesters, who are more productive with less physical effort, the operation has not resulted a cost incentive to the Industry. It is proposed here that the Union work with Guysuco to eliminate additional payment for "obstacles and other extras" from the cut and stack operation that already includes a built in compensation of 15% for these factors.

Mechanization of sugarcane harvesting has been accompanied by several challenges to agriculture management and operations in the factories that receive significant volumes of these canes. The importance of achieving Kill to Mill intervals of under 24 hrs is imperative for billeted canes if unacceptable cane quality is to be avoided. Agriculture Managers have not recognised the opportunity mechanized harvesting offers for early release of punts from harvesting fronts and recycling from mill reception that can contribute to efficient utilization of punts and also significantly reduce Kill to Mill intervals.

The importance of Cane Farming to the future production for the sugar industry is considered. It is however noted that apart from the new farmers at Skeldon, the Berbice region has seen an overall decline in cane farming. The prospects for developing these as independent operators will have to be encouraged. It is also proposed that the concept of a "farmer owned" cane supply for Wales Estate should be studied as a production model for that estate.

The importance of system development and continued innovation is recognized for mechanization and in research and development. The appointment of a mechanization Coordinator is proposed. This individual would be provided with the resources to focus on addressing critical issues such as land levelling, haul-out improvements, irrigation and cane delivery management for a mechanized industry. It is also recognised that Research and Development has a vital role to play in maintaining agronomic standards, resolving problems as they arise, and finding technical solutions to potential areas of concern. The support of senior management will be vital if the effectiveness of this unit is to be preserved.

This report is presented in 11 sections. The first 4 relate to the current production issues on Estates and Farmers cultivations, including cost and medium term productivity Improvements. Sections 5 to 7 address the development issues mechanization, research and also avenues for improving procurement. Strategies for managing current and predicted climatic events and the environment are discussed in sections 8 and 9. Opportunities for Diversification are addressed in Section 10. Section 11 summarizes significant findings and recommendations.

1-Introduction

1.1 This assignment is being undertaken at a time when the state owned Guyana Sugar Corporation appears to be at a significant crossroads, having for the past 3 years been forced to seek subventions rising from G$5B in 2013 to G$12B in 2015, from the Government to cover an increasing debt that has accumulated to G$82B, a figure that is anticipated to increase, particularly when the sugar supply contracts between the ACP countries and the EU refineries are re –negotiated after 2017.

1.2 -Agriculture is the largest component of operating expenditure in the sugarcane industry and also provides the largest opportunity for cost efficiencies and improved productivity. The Agriculture team members have visited each estate and have paid attention to critical areas of the Guysuco and Cane Farmers cultivations in order to assess growing conditions, infrastructure and the effectiveness of operations, including the coordination with the Factories. In depth discussions were held with Estates management and with and with the Central Technical staff of the Agriculture Services, Research, Factory Operations and Materials Control Depts. A special session was also held with the Engineering and Operational staff who have been active in mechanization development. Guysuco has also provided detailed records of historical and current production, environment and cost data which were reviewed to show the way forward.

1.3 -The majority of these visits were made together with the Factory team members and both teams were thus enabled to develop a common perspective of the critical issues as they relate to cane supply, quality and operational issues in both field and factory.

2 –Overview and Current Situation

2.1 Sugarcane and sugar production from the Guyana Industry have experienced significant changes over the 16 years from 2000 to 2015. Production from the first seven years of the period reflected the efforts made across the Industry to operate within the set guidelines of an Agriculture Improvement Programme that was formally launched in 2000 to improve relatively stagnated productivity of the 1990s This programme was developed by and coordinated by the Central Agriculture Depts and entailed investments in prime movers and implements and emphasized strict adherence to guidelines for tillage and to established agronomic standards that were common during the 1970's.

2.2 These efforts produced consistent satisfactory cane of the order of 3.4 million tonnes annually. It appeared perfectly reasonable to anticipate in excess of 4 million tonnes of cane after the expanded cultivation from Skeldon contributed to production. In 2005, intense prolonged rainfall and severe floods, particularly in Demerara disrupted agriculture operations for 2005 and 2006. An apparent recovery in agriculture performance in 2007 proved to be short lived as heavy rainfall in 2008 again disrupted operations and resulted in depressed yields. Consistently poor productivity since 2010 cannot be simply attributed solely to adverse weather, as average growing conditions have prevailed since 2009. It is apparent that the operating principles established for the preceding years may have been quickly forgotten.

2.3 The Board and Management of Guysuco had recognised the continuing problems and have published reviews of the Industry Strategic Plan in 2009, 2013 and 2014. These reviews have recognized the deficiencies in the Industry performance and its technical and operating shortcomings, all of which are evident today. Unfortunately none of these plans have resulted in tangible measures to retrieve the production decline.

2.4 Records and accounts suggest that planting outside of the recommended windows, non-adherence to tillage standards and poor timing of inputs have been frequent. **The imposition of ill-advised and technically unsound directives on agriculture practices were also a disturbing and unfortunate feature particularly over the past three years.**

2.5 Difficulties with cash availability and credit have been experienced since the delay in commissioning the new Skeldon Factory and the continuing high expenditure on the project. Agriculture was significantly affected. In 2012, with the objective of reducing costs, the rates of fertiliser N was reduced by 25% and the percentage of the cheaper source urea was also increased. The ratio of ammonium sulphate to urea in the recommended fertiliser mix is effective in minimising volatilisation of N from urea. At the same time potash fertiliser was curtailed. The subsequent year 2013, cane and sugar yields were the lowest since 1992.

2.6 The reductions in fertiliser were not justified by the available technical information nor the Research Dept. The fertiliser regime was eventually restored after June of 2013. Although the reduction in production should not be attributed to this sole cause, the measure is symptomatic

of a willingness to compromise agriculture standards. Previous history in the Guyana Industry (1970s) has demonstrated the need for caution before making adjustments to fertiliser policy.

2.7 The very poor production year in 2013 was followed by panic bringing forward of canes in 2014 to produce more acceptable gross results. This was short term thinking at best that did not address the fundamental causes of the poor yield that have since continued. The practice of Bringing Forward immature canes to the preceding crop, not only sacrifices the potential production that may have resulted from harvesting those canes at maturity, it also risks compromising the subsequent development from those areas by exposure of the young developing stools to end of season rainfall and in some cases having adverse physiological impacts for subsequent crops. This practice appears to have become institutionalised as a standard practice over the past 5 years.

Year	First Crop- Ha	Second Crop- Ha	Total - Ha
2011	43	2678	2721
2012	741	1913	2654
2013	948	1718	2663
2014	2032	3237	5269
2015	1813	0 budgeted	1813 to date

Table 2.1 – Progressive Brought Forward Areas 2011 -2015

2.8 Successive seasons of poor performance have forced the Industry to seek subventions from the Central Government, that have been made at increasing levels in 2013, 2014 and 2015 when $12B were approved. Despite this, unavailability of cash during the production periods has led to shortages of fertilizers and agrichemicals at critical crop development stages.

Year	2002	2004	2005	2007	2008	2012	2013	2014
Ha Estates.	41295	45213	41907	39758	44262	43616	40676	45302
Ha Farms	4852	5081	4871	4317	4035	5387	5287	5667
T cane Estates	3322456	3394983	2738299	2861253	2554288	2405853	2163889	2513741
T cane Farms	348806	325303	264723	237927	212281	303517	294836	307074
TC/Ha Estates	80.5	75.1	65.3	72.0	57.7	55.2	53.2	55.5
TC/TS Estates	11.2	11.37	12.11	11.55	12.16	12.23	12.98	12.95
TC/Ha Farms	71.9	67.7	54.4	55.1	52.6	56.3	55.8	54.2
T Sugar	331052	325303	246047	266481	226270	218007	186755	216361
TC/TS Farms	12.6	12.85	13.24	12.6	13.1	14.22	14.89	14.53
Rainfall (mm)	1773	1990	2484	2554	3002	1827	1807	1802

Table 2.2 Cane and Sugar production Trends 2002 to 2014

2.9 These disturbing trends have suggested that without planned subsidies from the Government, this industry would be unable to sustain itself. This is clearly unacceptable for an Industry that has been developed as a business required to produce profitable returns for its shareholders.

2.10 All estates have recorded lower efficiencies and poor output during the past 5 years. It is apparent that these impacts have been generally more severe on the Demerara Estates than in

Berbice. However any conclusion on the inherent weakness in Demerara relative to Berbice, should be viewed with caution, as preference is commonly given to the Berbice region when there is competition for resources.

2.11 –The actual causative factors to the present poor agriculture productivity are several and complex, but the observations and data outlined are symptomatic of poor or weak management. Senior agriculture personnel and managers have admitted being aware of the pitfalls of some of the measures that were implemented but themselves felt helpless to voice their concerns in the environment in which they were operating. The team has observed and taken note of the following:

- High turnover of managerial and supervisory staff for various reasons including migration
- Managers in many instances are transferred between estates before coming to grips with issues on their present estate
- High and increasing frequency of Bringing Forward canes (including the 2015 First Crop) rising to over 5000ha in 2014
- Low yield of plant cycle cane, inclusive of flood fallowed fields (Appendix 6) attributed to poor land preparation and late season planting
- Plant fields established from older (3R) cycles seed cane is increasing
- Increasing occurrence of renewed planting older, less productive varieties e.g. DB 66113 and D7761
- Short, weakly developed stalks in several areas including early cycles. This can be to some extent attributed to soil compaction resulting from traffic of cane loaders and trailer over fields in damp conditions.
- Steep decline of cane yield between cycles
- Approximately 30% -35% improvements in tillage and planting achievement from 2009 to 2011 produced disappointing results in subsequent seasons' productivity, calling into question the quality of output attained. The GuySuCo tillage fleet is insufficient in numbers and serviceable condition to achieve a 20% replant programme in an typical Crop period. The important criteria should therefore be on the quality of tillage rather than the quantity of land disturbed and planted. Evidence of poor crop husbandry and maintenance as indicated by large gaps in field and prolific weed growth.
- Labour shortages in crop maintenance e.g. weeding, chemical weed control
- Poor condition of estate infrastructure including access roads, bridges, canals and revetment. This has to a large extent impacted adversely on the condition of the punt fleet, that although presently adequate for all estates does incur high expenditure for repairs and re-bottoming.
- Lack of discipline in field labour, evidenced by prolonged disputes and excessive demands for " extras" payment

- Unwillingness of some agricultural management to display initiative in principled settling of disputes
- Staff not forthcoming with responses to queries raised on issues

2.12 All of these direct and indirect factors will probably pose a challenge in the present environment to precisely replicate the efforts of the 2000 to 2005 period that had placed emphasis on intensive field assessment and timely interventions. The increasing absence of institutional memory through migration of experienced Field practitioners will be a significant factor, which will have to be addressed by a robust training and mentoring programme.

2.13 Estates would also have to work towards increasing the extent of mechanisation for as many crop maintenance operations as possible. In this regard, the awareness of the capacity and limitations of field machinery is very limited among many agriculture senior and supervisory staff. This deficiency in non-specialist staff can be addressed by formal and informal training by the Agriculture Engineers and other staff members who have been exposed to machine operation and management. There has been a noticeable improvement in urgency and commitment displayed in the Industry since the commencement of the team's visits and interactions with Estates' and Head Office Staff. We would like to hope that our advice and encouragement may have contributed to the current improvements in performance now being observed in the Industry.

2.14.-The changes in relative productivity in cane for individual estates are summarised in the discussion following

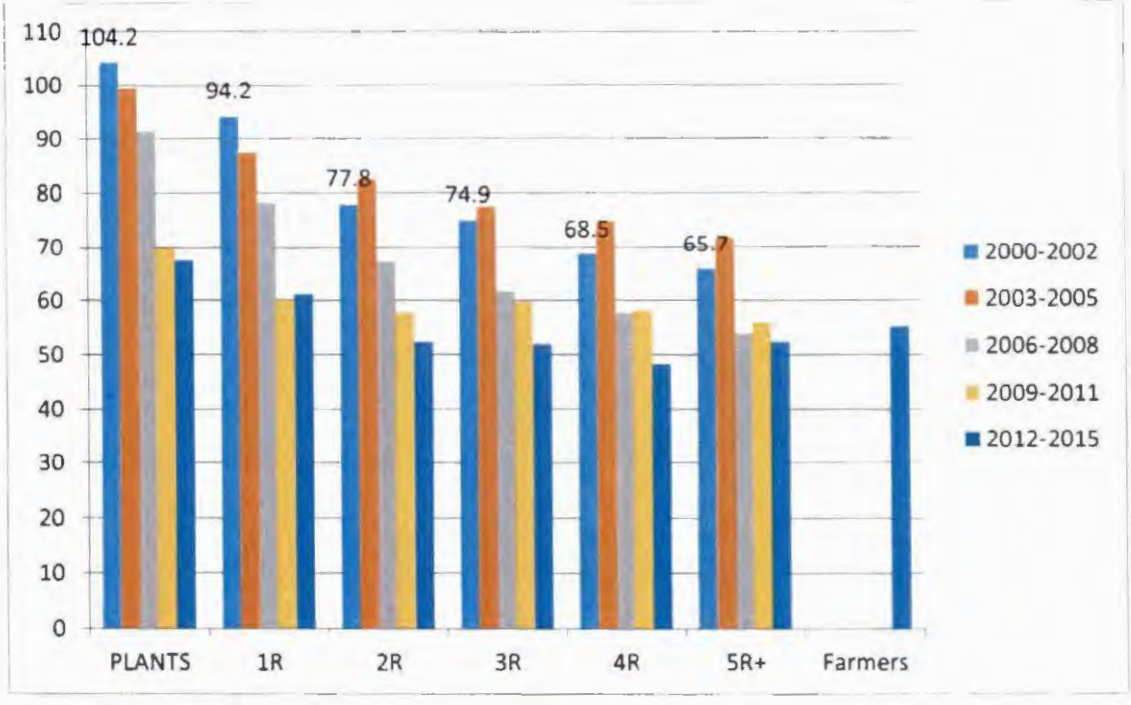


Fig 2.1 Cycle Productivity Trends Skeldon - 2000 to 2015

2.14.-1 Initial impressions of the Skeldon cultivation were that the most of the current crop appeared to be in an active growth phase, although stalks are relatively short in relation to the stated physiological ages of the areas inspected. A high proportion of the Skeldon crop (inclusive of the farmers' canes) will be harvested as carry over acreage. The estate's plan is to harvest all the available canes for delivery to the mill that is reportedly in a sounder condition for continuous operation. The Estate proposes to commence rehabilitation of the cultivation with attention on establishing field gradients and in field drainage with the land levelling equipment. It is also expected the external drain linking the estate from Sookram's Cross to the new Manarabisi/ No.66 Creek drainage pump at the Canje River would be completed before the end of 2015. It is anticipated that this measure should impact on the responsiveness of the Skeldon cultivation to drier conditions. The No.66 drain is included among proposals for funding and execution by the National Drainage and Irrigation Authority (NDIA). However it will be critical to the Skeldon Agriculture Operations and as such Guysuco should be prepared to finance its construction should the project evaluation process experience delays.

2.14.2 Concern must be expressed over the significant decline in plant and ratoon cycle yields since 2008. Average Plant cycle yield for the years 2006 to 2008 was 91 tons cane per ha that declined to under 70 tons cane per ha after 2009. Relative ratoon productivities were similarly affected.

2.14.3 For successive seasons, Skeldon has experienced difficulty in harvesting its standing crop because of restricted access to fields and forced harvesting in wet soil conditions. The principal cause was the unreliability of the Factory that influenced late starts. The result has been increasing areas of over-age canes in both the estate' and farmers' cultivations.

2.14.4 200 hectares of Plant canes in the Estate Expansion Blocks 10 and 13 were ploughed in during 2011 and 2012, after being judged as un-harvestable. During the same period a further 50 ha of first ratoon canes were also abandoned from Manarabisi Block 2. Previously In 2009, a flash flood in the Manarabisi section forced the loss of 209 ha. This incident was a consequence of the drainage canal to the No 19 pump not being completed.

2.14.5 Traffic of heavy machines over wet soils has contributed to soil compaction and stool losses that are reflected in the pronounced yield decline and depressed yields

2.14.6 These problems have as much to do with the inadequate drainage capacity and the fundamental error made at the onset of the expansion programme in which only cursory attention was paid to land levelling for establishing the required field gradients. This was further compounded in the succeeding tillage and replant cycles in which tillage could only be conducted well past the recommended cut-off periods with the risks of early exposure to heavy rainfall.

2.14.7 Discussions with estate personnel did not provide reassurance that they have fully appreciated the consequences of the late season planting, these may be symptoms of a combination of inexperience and unclear decision making over the recent years. The present plan to utilise the precision levelling equipment is a welcome change, but these good intentions will not produce the desired results unless the operators and supervisory personnel are adequately trained in the pre levelling surveys and operating plans for each field.

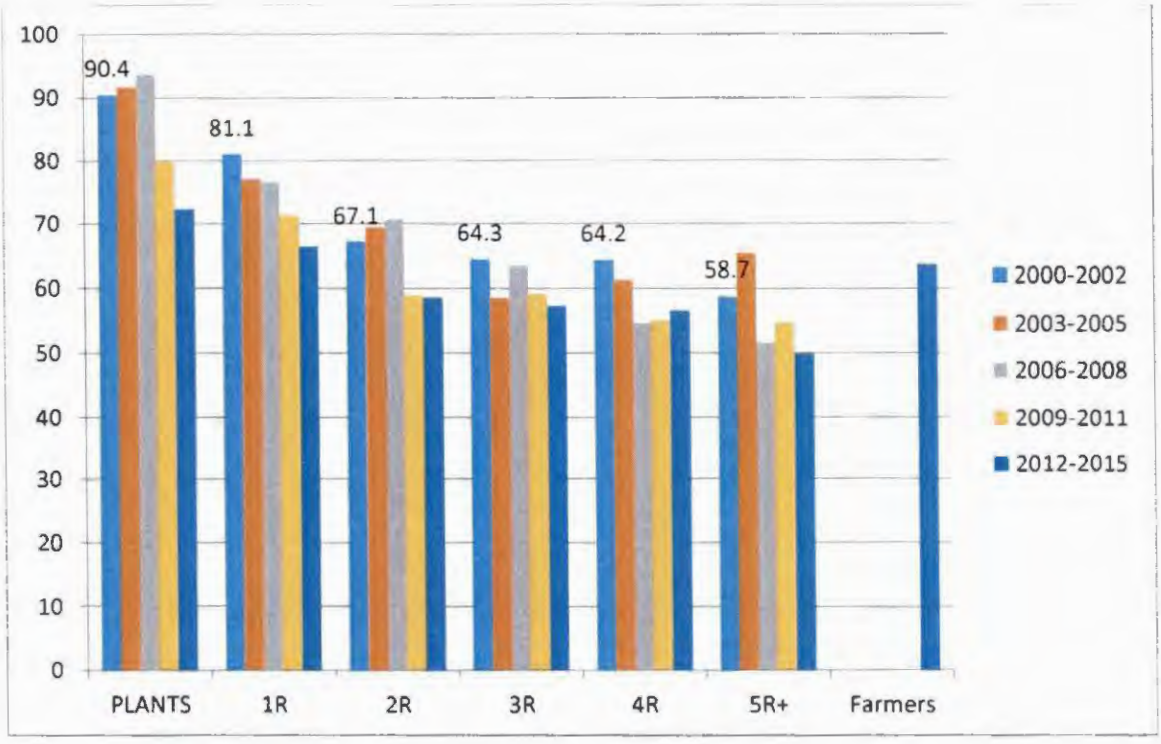


Fig 2.2 Cycle Productivity Trends Albion 2000 to 2015

2. 14.8 Cane yield decline since 2008 has also been recorded at Albion Estate. Average cane yield has also not been stable over the same period. This estate has recorded a very high occurrence of repeated "bringing forward" of canes since 2009. The impact on productivity is reflected in a 15% decline in yield from the 1st to the 2nd ratoon cycle. The colour of several areas of the latter harvested sections of the 2015 first crop, appear pale. These areas much of which were brought forward had not received fertilizers.

2.14.9 Albion has been a relatively stable Estate but still suffered tremendously in the First Crop 2013 with a production of 10,127 tonnes sugar primarily from a combination of Bringing Forward Canes and a fertiliser adjustment programme in 2012.

Table 2.3 ALBION First Crop 2002 to 2015

Year	ha	sugar	cane	tc/ha	ts/h	tc/ts
2002	3,240.0	25,314	255,634	78.90	7.81	10.10
2003	3,327.9	24,789	227,267	68.29	7.45	9.17
2004	3,256.5	23,077	241,092	74.03	7.09	10.45
2005	3,476.7	16,206	191,730	55.15	4.66	11.83
2006	3,485.1	21,849	231,005	66.28	6.27	10.57
2007	3,427.0	24,370	244,738	71.41	7.11	10.04
2008	4,297.6	26,299	297,319	69.18	6.12	11.31
2009	3,413.4	17,140	182,577	53.49	5.02	10.65
2010	3,285.6	17,785	183,868	55.96	5.41	10.34
2011	4,315.8	27,738	324,112	75.10	6.43	11.68
2012	3,420.4	16,140	172,598	50.46	4.72	10.69
2013	2,513.4	10,127	118,501	47.15	4.03	11.70
2014	3,040.8	16,918	184,343	60.62	5.56	10.90
2015	3,376.8	21,386	225,823	66.87	6.33	10.56

2.14.10 Starting with Carry Over canes from 1039 Ha in Second Crop 2010 to the First Crop of 2011 followed by Bringing Forward 747 Ha in the Second Crop of 2011 triggered a serious juggling of the crop ratios. An attempt to balance the First Crop 2012 had 208 Ha Brought forward from the Second Crop 2012 but that was further aggravated by another 794 Ha being brought forward from the First Crop 2013.

2.14.11 The 2013 First Crop only harvested 2,513 Ha producing an all-time low of only 10,127 tonnes sugar even though 174 Ha was Brought Forward from the Second Crop of 2013.

2.14.12 The 2014 First Crop had another 547 Ha brought forward from the Second Crop 2014 which was intended to re-balance the two crops in any one year.

2.14.13. The "policy" of Bringing Forward cane into the First Crop 2015 from the Second Crop in 2015 was restricted to only 118 Ha and there is no budgeted Brought Forward cane to be made in the Second Crop 2015.

2.14.14. Notwithstanding these deficiencies, the cultivation at Albion appears closer to what might be expected in a managed situation than most of the other estates. This has been reflected in the early results of the 2015 Second Crop in cane production and factory recoveries. Albion has managed to maintain its access roads in a reasonable state of repair, permitting staff to access the cultivation and make time crop maintenance decisions. It is our view that this estate should be in a position to return to a productive and relatively cost

effective operation with modest capital intervention and provision of timely agronomic inputs and equipment spares.

2.14.15. The Agriculture Department of Albion is at present, capable of satisfying the factory demand but only with the use of Bell Loaders. The Estate is not confident that the status quo will remain, as labour availability is a critical issue each year. A programme of continuing field conversion to prepare for mechanised crop maintenance and eventually harvesting is a sensible measure.

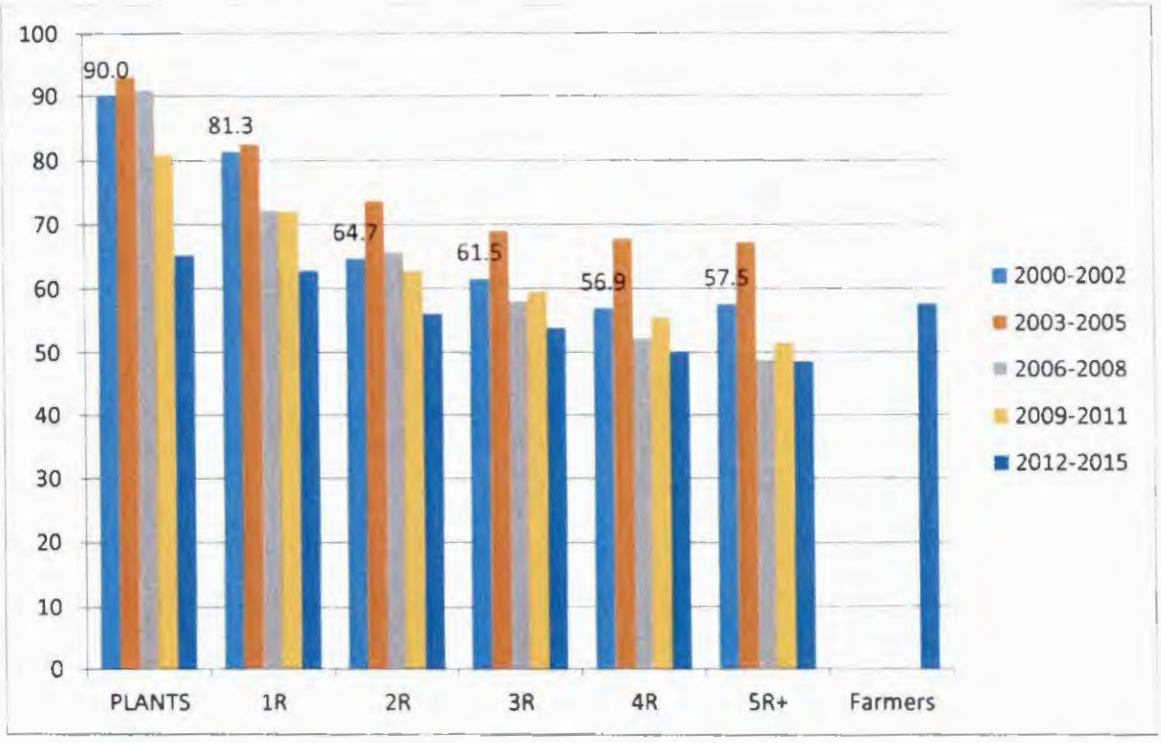


Fig 2.3 Cycle Productivity Trends Rose Hall 2000 to 2015

2.14.16 Rose Hall Estate like Albion has maintained its cultivation access roads in fair condition. However the cane yields in all cycles have declined significantly particularly after 2011, when Plant Cycle average yield fell from 81 tons cane per Ha to just 65 tons cane per Ha. The prime ratoon cycle yields were also averaged only 60 tonnes of cane per ha falling to 50 tons cane per ha at the third ratoon cycle. The estate has acknowledged that these conditions reflect poor supervision of tillage and crop establishment. Large sections of the developing 2015 First Crop appeared weak. It was claimed that this may have been due to non-application of fertilizers.

2.14.17 There are signs of modest improvements in crop development for the Second Crop of 2015. Rose Hall has reported an increased labour turnout and recruitment for the early part of the crop. It remains to be seen whether this would be sustained.

Table 2.4 Rose Hall First Crop 2002 to 2015

Year	ha	sugar	cane	tc/ha	ts/h	tc/ts
2002	2121.0	14,782	150,077	70.76	6.97	10.15
2003	2440.8	16,637	161,387	66.12	6.82	9.70
2004	2402.6	14,693	181,202	75.42	6.12	12.33
2005	2541.8	14,231	181,859	71.55	5.60	12.78
2006	2554.2	13,509	159,932	62.62	5.29	11.84
2007	2329.4	13,800	160,494	68.90	5.92	11.63
2008	2690.3	14,047	167,086	62.11	5.22	11.89
2009	2230.7	10,347	123,984	55.58	4.64	11.98
2010	1846.0	7,201	88,425	47.90	3.90	12.28
2011	2466.6	13,702	182,621	74.04	5.56	13.33
2012	2177.7	9,896	122,888	56.43	4.54	12.42
2013	1812.4	5,082	72,791	40.16	2.80	14.32
2014	2090.0	8,599	111,575	53.39	4.11	12.98
2015	2018.5	8,290	113,171	56.07	4.11	13.65

2.14.18 Rose Hall Estate suffered similar First Crop imbalances from Brought Forward cane between 2011 and 2015 with the largest manipulation in First Crop 2014 having 446 Ha. This was followed by 459 Ha in the Second Crop 2014 totalling 905 Ha for the year 2014.

2.14-19 Rose Hall has produced for several seasons poorer cane quality that the neighbouring estates Albion and Blairmont. The reasons for this are not obvious. The maturity sample data do appear consistent with mature canes of the varieties under test. However the factory has continued to experience steam generation problems that have at various times been attributed to muds in Bell Loaded cane. The team's visit to the Roy Hanoman cultivation where the Bell Loader fleet was at work, did indeed see evidence that the cutting was not done to the required standard, with poor stacking and significant quantities of extraneous matter being picked up with bundles. This could only be attributed to poor supervision that is disappointing given that Rose Hall has had the longest Industry experience with the Bell Loaders.

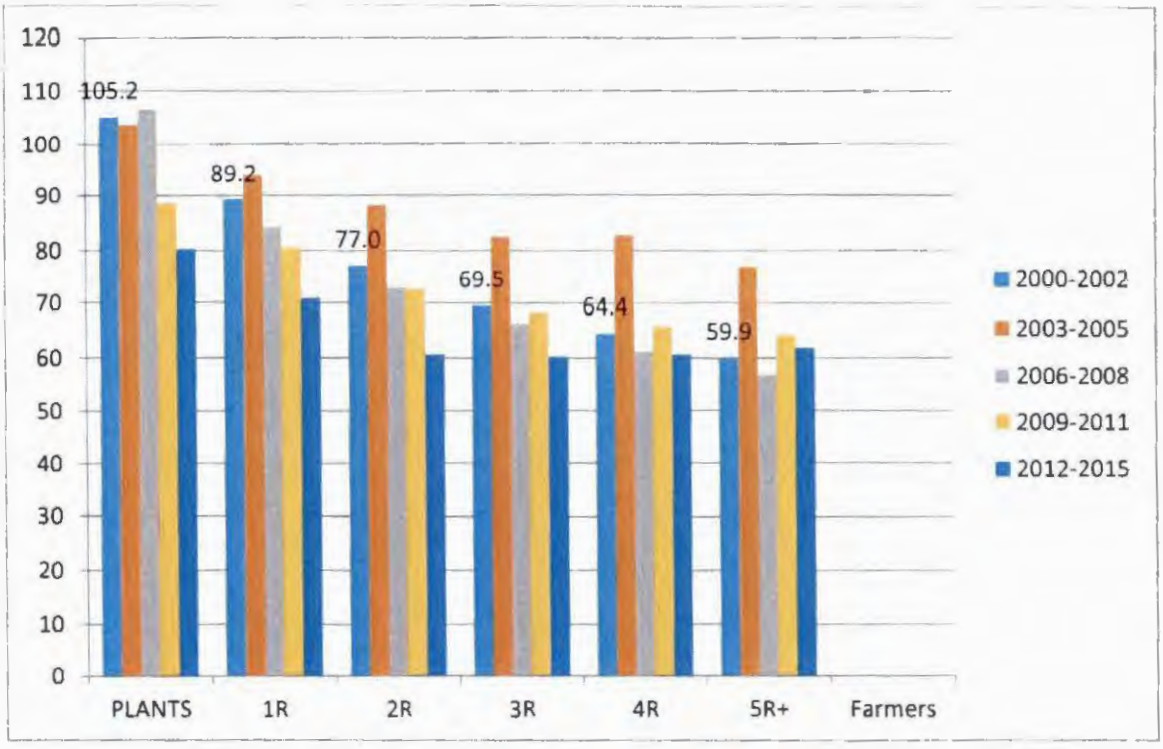


Fig 2.4 Cycle Productivity Trends Blairmont 2000 to 2015

2.14.20 Blairmont Estate has for several years recorded the highest cane yields in Guysuco. Average cane yields of early cycle cane have declined significantly since 2011. The estate has however maintained its older cycle yields at around 60 tons cane per ha. This would indicate that while work standards in ratoon maintenance on the estate have been maintained, the underlying causes for reduced Plant cane productivity will have to be further investigated. One possible cause that cannot be ignored is the impact of forced tillage, particularly during years of 2010 to 2011, when the emphasis appears to have been on attaining the new acreage at all cost. To verify this would require on site investigations that would not be possible during the time permitted by this Inquiry.

2.14.21 Access to the cultivation was good permitting staff the opportunity to effectively undertake crop maintenance tasks. Some sections of the 2015 First Crop were beginning to display obvious symptoms of lack of fertiliser. This was more apparent in the blocks that had been Brought Forward during the preceding crop's campaign.

Table 2.5 Blairmont First Crop 2002 to 2015

Year	ha	sugar	cane	tc/ha	ts/h	tc/ts
2002	2,112.0	17,629	181,451	85.91	8.35	10.29
2003	2,296.6	19,024	186,220	81.09	8.28	9.79
2004	2,316.2	19,511	204,039	88.09	8.42	10.46
2005	2,191.5	15,280	180,513	82.37	6.97	11.81
2006	2,313.1	13,361	157,559	68.12	5.78	11.79
2007	2,038.9	14,474	153,689	75.38	7.10	10.62
2008	2,527.2	15,040	193,678	76.64	5.95	12.88
2009	2,102.6	12,882	135,111	64.26	6.13	10.49
2010	2,058.1	12,111	122,425	59.48	5.88	10.11
2011	2,396.7	17,611	205,787	85.86	7.35	11.69
2012	2,216.2	12,801	149,134	67.29	5.78	11.65
2013	1,802.9	6,286	82,726	45.88	3.49	13.16
2014	1,887.2	10,776	121,048	64.14	5.71	11.23
2015	2,164.3	13,681	160,249	74.04	6.32	11.71

2.14.22 Blairmont did not escape the consequences of Bringing Forward of cane and the fertiliser adjustment programme of 2012 as can be seen in the 6,286 tonnes production in the First Crop 2013. The reduced harvested area of 1,803 Ha and the extremely low 46 tonnes cane per hectare contributed to that record low production.

2.14.23 Blairmont has sufficient cane harvesters for a cut and stack operation. A visit to the operations in field to observe the operation, highlighted that the cane was properly stacked and that the operators were achieving good results despite the damp soil conditions. The tyres on the Bell Loaders were not the recommended Trellborg that Guysuco now considers very expensive. The fitted tyres though of low ground pressure specification will not match the Trellborgs that can be deflated to 6psi in wet conditions. Under the conditions of the operation the repeated passes of the Bells were leaving depression on the soil surface. These, it is anticipated will self-repair once the soil dries but there is a measurable risk for soil compaction that will contribute to reduced ratoon vigour.

Bell Loader on damp soil

2.14.24 Like Albion, it would be prudent to prepare for the eventual necessity for more dependence on machines in other areas of operation.

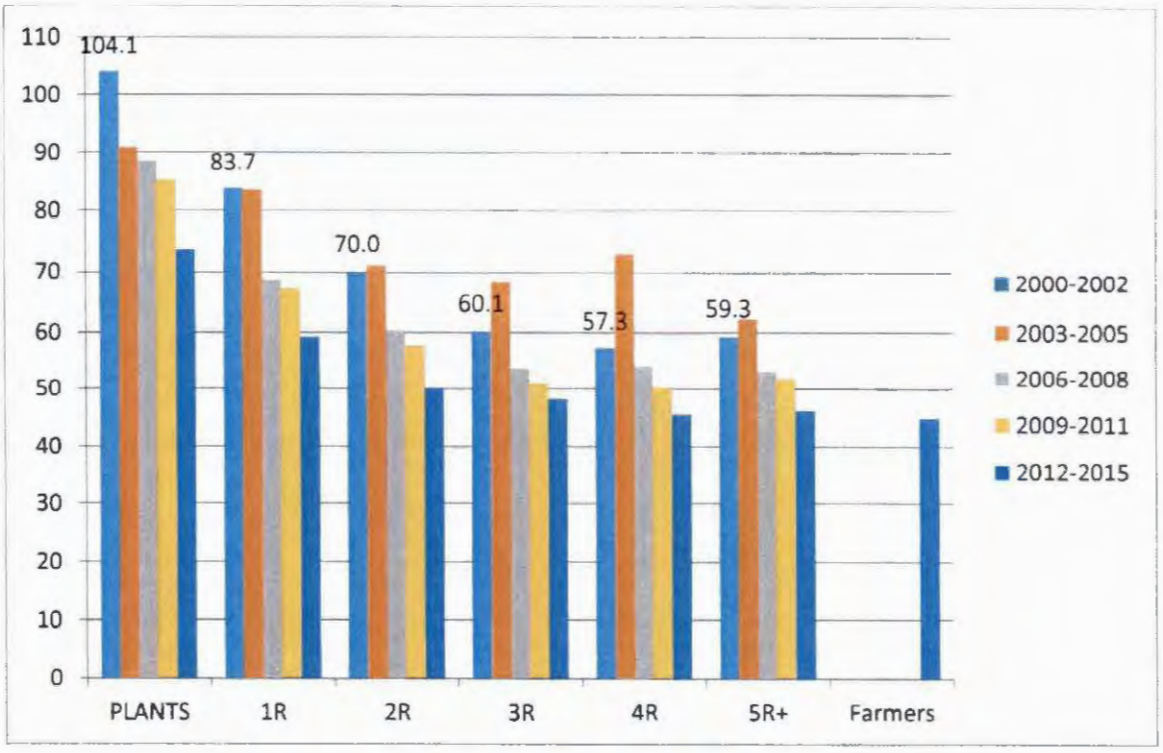


Fig 2.5 Cycle Productivity Enmore 2000 to 2015

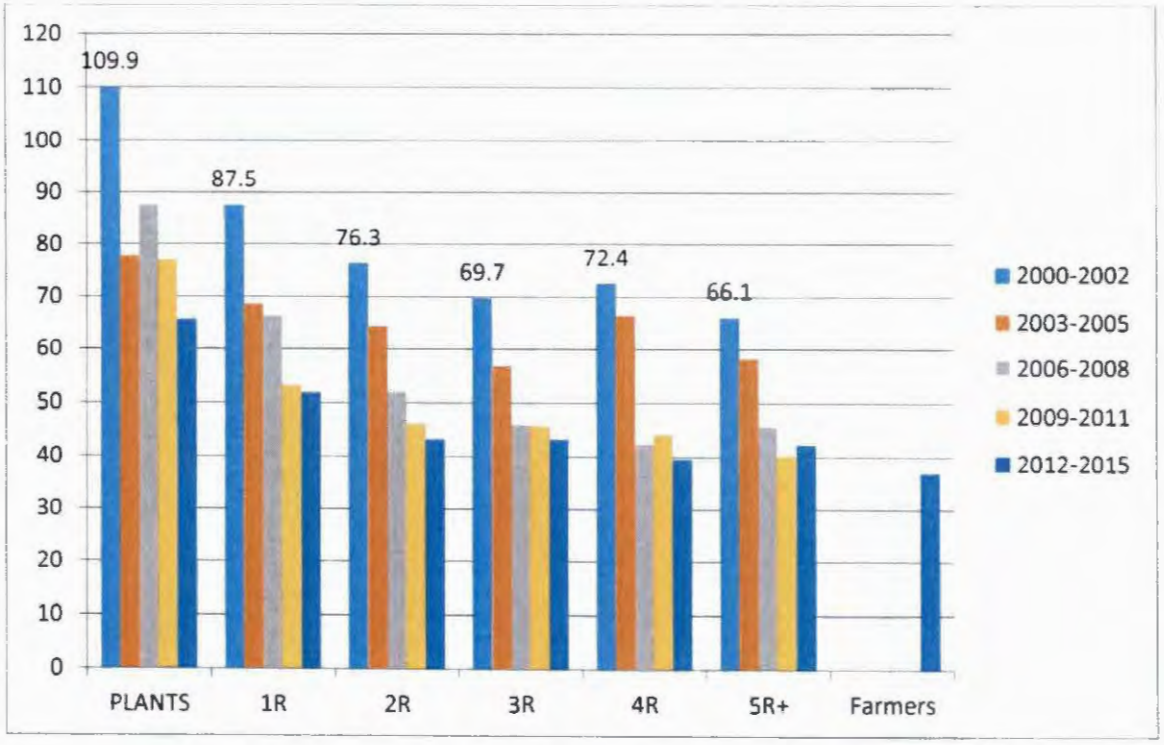


Fig 2.6 Cycle Productivity La Bonne Intention 2000 to 2015

2.14.25 -The East Demerara cultivation comprising the Enmore and LBI Estates is still in transition towards being integrated into a single operating unit, following the closure of the LBI factory. This has been an area of the coast where labour availability has been problematic for several years. Yield decline across cycles has been chronic, more so in LBI. Both sections are dependent on machine loading and the management has reported that the acquisition of two Case 8800 Combine Harvesters in 2014 enabled East Demerara to take off its entire crop for the first time since 2010. East Demerara has some of the better contoured "broad bed" converted fields in the Industry, having commenced their conversion programmes around 2000

Harvested Broad Bed

Weedy canal and field

2.14.26. Unfortunately, it is difficult to enter any section of the cultivation without gaining the impression of neglect and that staff are either not visiting or are not making the effort to maintain sanitation. The cultivation is threatened by the spread of the *Antidesma ghesaembilla* shrub and guinea grass, both of which will have to be subjected to an aggressive campaign with an eradication objective. It is fortunate that Enmore has recently been able to recruit persons to weed control and spray gangs, both of which were under strength for several seasons.

Table 2.6 ENMORE & LBI Cultivations First Crop 2002 to 2015

EHP	ha	sugar	cane	tc/ha	ts/h	tc/ts
2002	1,519.0	10,683	126,284	83.14	7.03	11.82
2003	1,711.2	10,809	109,189	63.81	6.32	10.10
2004	1,745.3	12,619	123,708	70.88	7.23	9.80
2005	1,092.7	5,344	63,679	58.28	4.89	11.92
2006	1,250.7	7,666	78,935	63.11	6.13	10.30
2007	1,630.4	12,078	121,539	74.55	7.41	10.06
2008	1,645.0	9,377	95,545	58.08	5.70	10.19
2009	1,569.2	9,731	101,163	64.47	6.20	10.40
2010	1,560.3	7,810	79,781	51.13	5.01	10.21
2011	2,011.4	9,435	137,515	68.37	4.69	14.57
2012	1,297.8	6,116	72,760	56.06	4.71	11.90
2013	1,348.8	3,565	60,013	44.49	2.64	16.83
2014	2,306.5	8,734	113,552	49.23	3.79	13.00
2015	1,598.8	7,164	88,169	55.15	4.48	12.31

LBI	ha	sugar	cane	tc/ha	ts/h	tc/ts
2002	1,933.1	12,615	149,368	77.27	6.53	11.84
2003	1,980.8	11,480	122,996	62.09	5.80	10.71
2004	2,142.3	12,546	145,943	68.12	5.86	11.63
2005	1,538.0	5,346	66,541	43.26	3.48	12.45
2006	1,301.0	6,307	70,494	54.18	4.85	11.18
2007	1,309.0	7,647	82,735	63.20	5.84	10.82
2008	1,566.3	7,596	83,310	53.19	4.85	10.97
2009	1,544.0	5,903	70,178	45.45	3.82	11.89
2010	1,573.6	7,858	84,361	53.61	4.99	10.74
2011	1,043.4	3,673	58,923	56.47	3.52	16.04
2012	761.6	2,262	30,097	39.52	2.97	13.30
2013	1,035.9	2,607	44,566	43.02	2.52	17.09
2014	1,622.4	5,278	71,159	43.86	3.25	13.48
2015	970.3	3,148	38,450	39.63	3.24	12.21

2.14.27 East Demerara like the Berbice Estates followed a similar decline in production in the First Crop of 2013. The two estates then brought forward 1824 Ha in the Second Crop 2014 which produced 5880 tonnes sugar. Adding the relatively small 107 tonnes from the 2014 First Crop, that Brought Forward total of 5987 tonnes sugar out of the East Demerara production of

30,933 tonnes sugar is a significant 19%. This high percentage of brought forward sugar production must have contributed to the lower First Crop 2015 Estates' production of 10,312 tonnes which included 909 tonnes of sugar from 252 Ha of cane Brought Forward from Second Crop 2015. Since 2011 both Enmore and LBI had been unable to harvest the crop area and had consistently carried over approximately 1500 ha annually. This would also have contributed to the estates' low productivity and also poor recoveries each year until 2013. No Estate has a budget for any Brought Forward cane in the Second Crop 2015 and barring any unforeseen adverse conditions ought to be achieved.

2.14.28 The East Demerara senior staff have morale issues, having in the past year dismissed a group of workers who were found guilty of dumping fertilizers instead of performing their task. These persons were reinstated on the instruction of Senior Management. This is a dangerous precedent as it undermines the management on the ground and has led to feelings of insecurity over their authority. There is also the possibility that similar incidents and other poor work practices will continue on this estate, unless management is given the firm support required.

2.14.29 Accessibility within the cultivation is restricted and this has probably contributed to the proliferation of aquatic vegetation within the canals. A mechanical weed cleaner has been constructed and introduced and is reported to be coping with this problem.

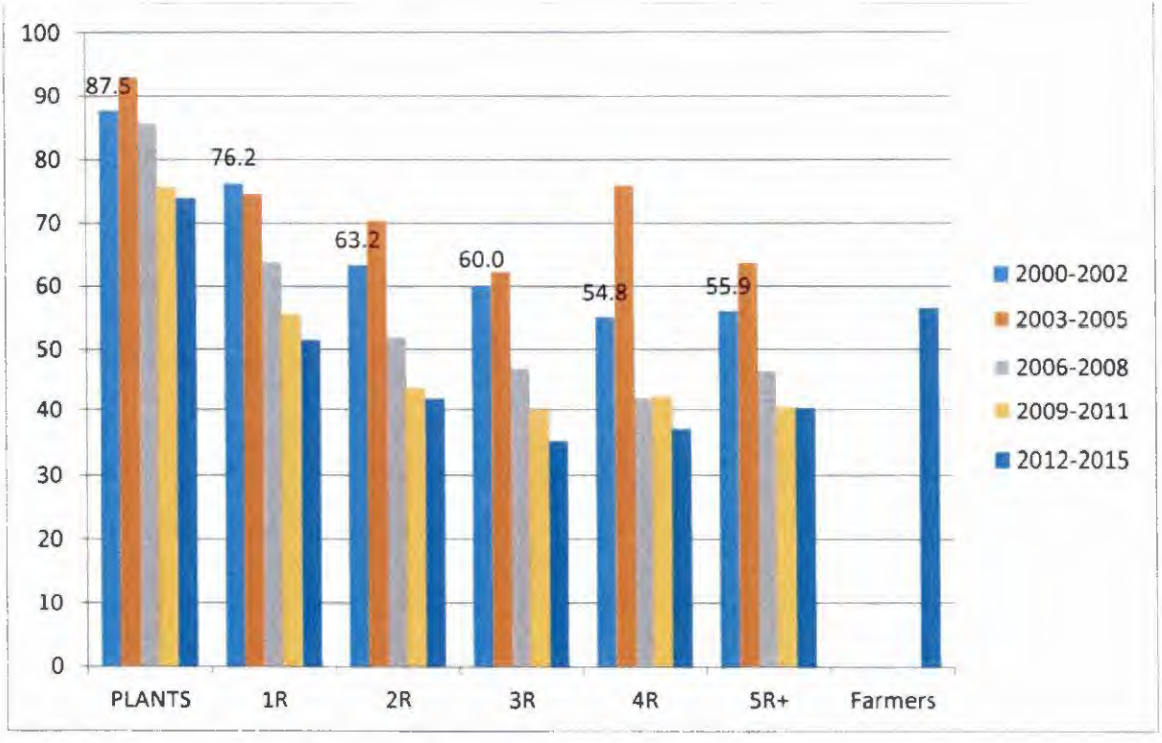


Fig 2.7 Cycle Productivity Wales 2000 to 2015

2.14.30 Wales Estate has also reported very steep productivity drop between successive cycles, particularly since 2008. These effects are compounded by an intractable infestation by

Tanner grass. Apart from the weed infestation, there is also growing evidence of rodent incursions that is linked to prolific weed growth and poor sanitation in the fields.

2.14.31 The weed problems at this estate did not develop overnight and is evident from the successive years of poor productivity over which alarms appear not to have been raised. The Wales Management Accounts reveal very high expenditure on repeated applications of herbicide that seemingly are not effective. Large sections of the estate appear to have been abandoned. These include the Eccles and Powell's Polder sections that are known to comprise some of the most productive soils on the estate. The Wales area accountability record does not list any area as either Temporary (TAB) or permanently abandoned. However 421 ha or 12.5% of the estate cultivation was identified as Untilled Out of Cane, this was an increase of 122 ha since December 2014 (Appendix 6)

Rodent Damage

Tanner Grass Infestation

2.14.3 The Weeds Agronomist is supporting the Estate with its efforts and the Management has also initiated an investigation into whether the large quantities of herbicide issued from the Chemical Weed Control Bond are actually being used in the Estate Cultivation. Farmers' plots within the cultivation do not appear to be as seriously affected.

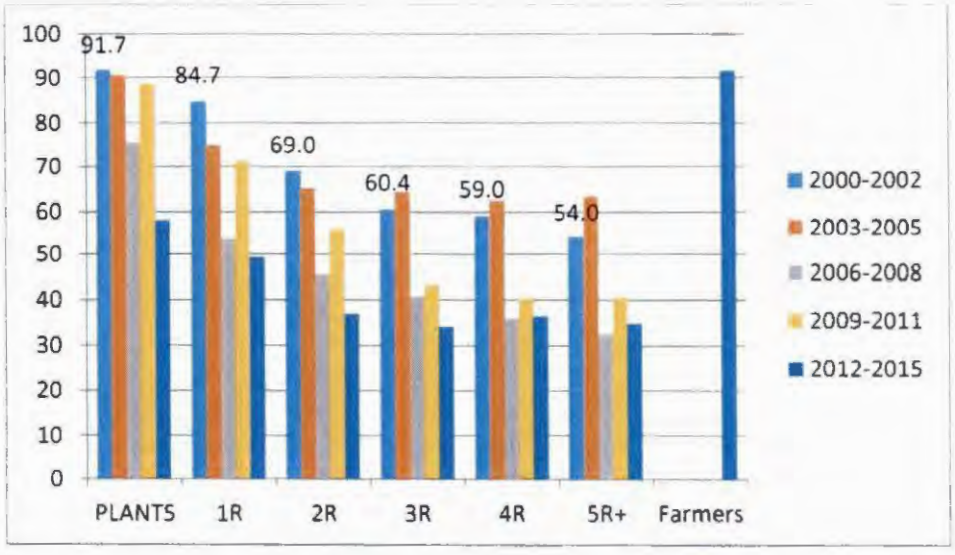


Fig 2.8 Cycle Productivity Uitvlugt 2000 to 2015

2. 14.33 Uitvlugt Estate has also reported very poor average yields across all cycles since 2011. This estate has also recorded a sharp exodus of field labour and has been making serious efforts

to prepare for mechanization for which a project document from the Caribbean Development Bank is in circulation. The risk to this project is the high rainfall in Uitvlugt.

2.14.34 Analysis of the distribution of rainfall on the estate (Section 8) suggests that a significant input from mechanised harvesting would have to be planned around a crop duration not exceeding 24 weeks.

2.14.35 Cane yield in sections of the cultivation are compromised by significant infestation with the noxious weed Tanner grass and also *Antidesma ghesaembrilla*. The Weeds Agronomist is working with the estate on an eradication strategy for these weeds. Uitvlugt has embarked on a field conversion programme to a machine adaptable layout from their English cambered bed fields. The cane growth in these blocks has been very satisfactory in comparison with the other sections of the estate that are characterised by large gaps and dense weed growth.

2.14.36 Notwithstanding, Uitvlugt has persisted with the practice of Bringing Forward sections of its cultivation every production season. This practice is not consistent with any attempt at improving the cultivation.

2.14.37 In 2104 the estate leased 1496 ha of its cultivation to Farmers, 284 ha have been developed It is intended that this "new" farmers' cultivation will be machine adaptable. After the release of this land, the estate still has 676 ha or 14.6 of the reduced cultivation out of cane.

3. Recommended Actions and Medium Term Prospects

3.1 Sugar estates are currently on a very restricted expenditure regime. Productivity will however only improve by judicious expenditure on areas that can reduce constraints. The availability of fertilizers at the appropriate times is an essential and first measure that should be guaranteed. The same consideration applies to agrichemicals, specifically herbicides. It is advisable to have the requisite supply of these materials, available for the commencement of each forthcoming crop.

3.2 This planning measure would ensure that the first steps in agronomic management are not compromised. Estates' fertiliser bonds were designed with the capacity to store and supply stock for each crop. The Industry's traditional suppliers have been more than willing to hold consignment stock of agrichemicals once tenders have been approved.

3.3 Having ensured the availability to the fundamental inputs, estates would be well advised to adhere as closely as is practical to the established operational guidelines for sugarcane. The following measures should be addressed as priority areas:

1. Field Workshops to work towards 100% availability in optimal working condition of all prime movers, tillage implements, ditchers, excavators, cane loaders, harvesters and associated equipment, and crop maintenance equipment.
2. Conduct regular equipment assessment to effectively plan maintenance and spares requirements and where necessary determine obsolescence and programme replacement.
3. Negotiate for consignment stores of essential equipment spares with agricultural machinery suppliers.
4. Plan and adhere to determined maintenance schedules for estate roads and civil infrastructure, including sluices, drainage pumps and water management structures
5. Update and re-issue the Guysuco Agriculture Operations Manual as a technical reference and for training.
6. Continuous training in all agriculture practices for staff and workers, including mentoring by more experienced persons.
7. Tillage to be conducted only at soil moisture and friability range established as suitable for specific soils and individual operations.
8. Planting to cease by established "cut off" dates March 31st for the First Crop and November 15th for the Second Crop, unless determined by environmental conditions in which case appropriate advice would be provided from the Centre.
9. Re-establish effective primary, secondary and commercial seed cane nursery programmes on all estates.
10. Seed cane to be drawn only from certified commercial seed fields in accordance with individual estate variety development programme agreed with the Breeding and Selection Unit of the Agriculture Research Centre (ARC).

11. Cultivation status reports projected daily work programme to be discussed by Field supervisory and senior staff each afternoon.
12. Crop surveillance including surveys and nutrition monitoring (foliar and soil sampling) to guide agriculture planning and actions, that would include as appropriate members of the Central Technical Staff.
13. Development and Implementation of CANEPRO Cultivation Management support System with the Information Systems Department (ISD).

3.4 In addition to the above listed general measures, the follows interventions will be immediately critical to specific estates. These include:

(a) The completion of the 6.4 km main drain linking Sookram's Cross to the Manarabisi/No66 Pump station at the Canje River.
(b) Laser levelling of graded Ridge and Furrow and Broad bed fields at Skeldon and East Demerara that are scheduled for rehabilitation.
(c) Eradication programme for Guinea grass and *Antidesma ghesaembilla* at East Demerara.
(d) Eradication programme for Tanner Grass at Wales.
(e) Rodent control at Wales.
(f) Eradication Programme for Tanner Grass and *Antidesma ghesaembilla* at Uitvlugt.
(g) Conversion programme to machine adaptable layouts for Albion, Rose Hall, Blaimont and Uitvlugt estate.

3.5 The practice of flood fallow would be utilised to the greatest extent that is practical on fields with responsive soils. The benefits of the practice on eliminating seed banks of noxious weeds and for control of pests and pathogens are well established. Flood fallow also promotes structure development and relieves subsoil compaction in some clay soils. Unfortunately increasing labour shortages for the more manual operations, point to the increasing role of semi-mechanized and mechanized planting. Flood fallow is not a practical option for either operation as the soil is required to be dry.

3.6 On fields that have been converted to machine adaptable layouts, alternative fallow methods such as legume fallow would be practised when required i.e. land settlement after conversion, to manage, pests, weeds and soil pathogens or for topsoil improvement.

3.7 The Guysuco Estates and Agriculture Dept have identified Capital requirements for 2016 to 2020 of G$21B or US$102M. Of this sum G$ 13.9B or US$ 68.1M (Appendix 2) should be spent between 2016 to 2018, to restore and secure estates at a satisfactory operating condition. The expenditure is distributed among Civil Works - $15.5; Accessibilty and Cane Transport $15.5M, Mechanisation $21.8M, Tillage Equipment$4.7M and Drainage and Irrigation requirements $4.4M. Based on the information that only critical requirements can be funded, we have identified projects valued at G$5.5B or US$ 26.1M highlighted in table 3.1 as critical. It is recognised that the reduced investment will impact on the attainment of performance and

production targets, and unless the full investment is made, estates will remain vulnerable to increased operational costs.

CRITCAL AGRICULTURE CAPITAL ITEMS						
ESTATE	Description	AGRIC CAPITAL G$M				TOTAL US $
		2016	2017	2018	TOTAL	
Skeldon	ACCESSIBILITY & CANE TRANSPORT	54.0	150.0	150.0	**354.0**	1,678,050
	CIVIL STRUCTURES	75.6	118.0	118.0	**311.6**	1,519,800
	DRAINAGE & IRRIGATION	0	20.0	20.0	**40.0**	195,120
	MECHANIZATION	35	153.8	153.8	**342.6**	1,671,300
	TILLAGE &PLANTING	0	17.9	17.9	**35.8**	174,498
TDTAL	**SKELDON**	**164.6**	**459.7**	**459.7**	**1,084.0**	5,238,768
ALBION	ACCESSIBILITY & CANE TRANSPORT	34.8	100.0	100.0	**234.8**	1,072,220
	CIVIL STRUCTURES	78.0	150.0	150.0	**378.0**	1,843,854
	MECHANIZATION	20.3	70.0	70.0	**160.3**	781,553
	TILLAGE &PLANTING	0	15.5	15.5	**31.0**	151,002
TOTAL	**ALBION**	**133.1**	**335.5**	**335.5**	**804.1**	3,848,704
ROSE HALL	ACCESSIBILITY & CANE TRANSPORT	48.8	50.0	50.0	**138.8**	677,160
	CIVIL STRUCTURES	48.7	120.0	120.0	**288.7**	1,408,300
	DRAINAGE & IRRIGATION	19.9	0	0	**19.9**	97,100
	MECHANIZATION	25.7	65.0	65.0	**155.7**	759,710
	TILLAGE &PLANTING	0	18.9	18.9	**37.8**	184,470
TOTAL	**ROSE HALL**	**143.1**	**253.9**	**253.9**	**650.9**	3,126,790
Blairmont	ACCESSIBILITY & CANE TRANSPORT	35.8	60.0	60.0	**145.8**	711,160
Blairmont	CIVIL STRUCTURES	36.3	85.0	85.0	**206.3**	1,006,280
Blairmont	MECHANIZATION	58.3	100.0	100.0	**258.3**	1,260,000
Blairmont	TILLAGE &PLANTING	0	16.5	26.5	**33.0**	161,000
TOTAL	**Blairmont**	130.4	261.5	261.5		3,138,490
East Demerara	ACCESSIBILITY & CANE TRANSPORT	49.5	60.0	60.0	**159.5**	778,140
	CIVIL STRUCTURES	28.2	50.0	50.0	**128.2**	625,440

	ORAINAGE & IRRIGATION	0	0	0	**0**	
	MECHANIZATION	24.0	153.7	80	**257.7**	
	TILLAGE &PLANTING	0	19.0	19.0	**38.0**	
TOTAL	**East Demerara**	**101.7**	**282.7**	**209.0**		2,846,210
Wales	ACCESSIBILITY & CANE TRANSPORT	10.0	26.5	26.5	**53.0**	
Wales	CIVIL STRUCTURES	17.2	20.0	20.0	**57.2**	
Wales	DRAINAGE & IRRIGATION	0	0	0	**0**	
Wales	MECHANIZATION	0	0	0	**0**	
WALES	TILLAGE &PLANTING	11.7	25.0	25.0	**61.7**	
TOTAL	**WALES**	**38.7**	**71.5**	**71.5**		838,450
Uitvlugt	ACCESSIBILITY & CANE TRANSPORT	28.8	35.0	35.0	**88.8**	
	CIVIL STRUCTURES	24.1	30.0	30.0	**84.1**	
	ORAINAGE & IRRIGATION	0	0	0	**0**	
	MECHANIZATION	0	1.8	14.0	**15.8**	
	TILLAGE &PLANTING	0	14.7	14.0	**28.7**	140,000
TOTAL	**Uitvlugt**	**52.9**	**81.5**	**93.0**		1,060,310
CDB Equipment	**Uitvlugt, Albion, Rose Hall**					6,900,000
INUSTRY TOTAL					**5,609.5**	

Table 3.1 Recommended Essential Agriculture Capital

3.8 The areas of critical investment are directed primarily to Infrastructure, cane transport, improving staff access to the cultivation, securing the progress of Mechanised Operations at Skeldon, East Demerara and layout conversion at Albion, Rose Hall and Blairmont. We have also recognised that the CDB has approved a soft loan of $12.0M for the mechanisation support to Albion, Rose Hall and Uitvlugt, $6.9M of this loan is directed to harvesting and levelling equipment. We recommended that this offer should be taken advantage of.

3.9 On the assumption that these Capital inputs are made and that there are no restrictions to timely supply of fertilizers and herbicides, production projections were developed for the period 2015 to 2020. These are summarised in Tables 3.2 to 3.4

Estate	Estate Ha	Estate Cane	Estate sugar	Estate TC/Ha	Farm Ha	Farm cane (T)	Farm sugar	Farm TC/Ha	Sugar (T)
Skeldon	8040	459365	30361	57.1	2408	127444	8455	52.8	38816
Albion	8965	589026	53692	65.7	119	6480	518	51.4	54352
R. Hall	6305	363793	27149	57.7	647	39513	3041	61.1	30189
Blairmont	5732	402878	35872	70.3	-	-	-	-	35872
Enmore	4356	230388	17999	52.9	119	4773	367	40	18366
LBI	2699	127785	9906	47.4	82	3640	270	44.3	10175
Wales	2717	131222	10498	48.3	2126	117987	9290	55.5	19788
Uitvlugt	3933	174702	13659	44.4	285	24208	1847	85	15506
Industry	42745	2479158	199136	58.0	5786	325538	23929	56.3	223064

Table 3.2 Estimated Cane and Sugar Production 2015

Estate	Estate Ha	Estate Cane (T	Estate sugar	Estate TC/Ha	Farm Ha	Farm Cane (T)	Farm sugar	Farm TC/Ha	Sugar (T)
Skeldon	8582	526135	40472	61.3	2408	130032	9632	54	50104
Albion	9002	622672	59302	69.2	150	8550	684	57	59986
R. Hall	6314	383699	29976	60.8	680	43160	3243	62	33220
Blairmont	5493	397688	38237	72.4	-	-	-	-	38237
Enmore	4472	252956	20076	56.6	119	6562	513	55	20588
LBI	2699	141720	11248	52.5	81	3240	249	40	14433
Wales	2833	166957	13464	57.9	2220	136400	10740	62	24204
Uitvlugt	3933	199815	15858	50.8	800	57600	4751	72	20430
Industry	43378	2691622	228624	62.1	6438	384544	29633	62.1	258266

Table 3.3 Estimated Cane and Sugar Production 2017

Estate	Estate Ha	Estate Cane	Estate Sugar	Estate TC/Ha	Farm Ha	Farm Cane	Farm Sugar	Farm TC/ha	Sugar (TI
Skeldon	8532	626008	49683	73.4	2800	156800	12062	56	61745
Albion	9002	679488	65970	75.5	200	11600	928	58	66898
R. Hall	6314	437245	34702	69.3	680	40120	3134	59	37836
Blairmont	5493	419895	40375	76.4	-	-	-	-	40375
Enmore	4472	307102	24766	68.7	95	5320	409	56	25182
LBI	2699	178720	14184	66.2	81	3240	249	40	14433
Wales	2915	201050	16214	69.0	2470	165470	13029	67	29243
Uitvlugt	3984	233953	18867	58.7	1000	72000	5806	72	24874
Industry	43411	3083461	264631	71.0	7326	454550	35755	62.1	300386

Table 3.4 Estimated Cane and Sugar Production 2020

3.10. It is forecast that the Industry cane production by incremental steps would attain to the level of 3.5M tonnes by 2020. Sugar output is projected at around 300,000 tonnes. On the assumption that these production indicators are met by 2020, it is expected that investments in critical areas would be increased with emphasis on cost saving and efficiency measures.

3.11 At the projected production levels in 2020 it is to be noted that the cane supply to Uitvlugt will only last 21 operating weeks while Wales would have 26 weeks of cane, as

opposed to typical crop budgets of 32 weeks. This observation supports the opportunity for expanding the contributions of private cane farmers to the Uitvlugt factory. The Enmore factory on the other hand, would have canes available for 33 weeks at present milling rates. Since it is anticipated that approximately 40% of the Enmore factory canes would be derived from combine harvesting, the Enmore milling rate could be increased to 120 tonnes cane per hour to complete the crop in an efficient 27 week period.

3.12 The attainment of these production objectives should be closely monitored on individual estates that would be considered as separate cost centres. Estates Managers and their teams would be held accountable for attainment of the progressive productivity goals. **It is recognised that there are limitations of experience within Estates that will require support and operational guidance from a strong Central Technical Team. In this regard, it is recommended that a Head of Agriculture be appointed at the top Executive level i.e. Director. This individual would hold ultimate accountability for the Agriculture programme objectives and with his team of senior technical personnel provide the necessary leadership in adaption to change that the envisaged programmes will require.**

3.13 Most of the operating units on the estates would function effectively with the current management structure. Since the 1990's there have been several attempts to change the Field senior staff structure and functions only to return to roles that have been consistent since the 1980's. In effect there have been changes in names but not substantive function.

3.14 With the increasing importance of mechanization in agricultural operations, the opportunity should be taken to recruit Mechanical Engineering graduates into the technical operating streams of the Estates. On estates with a high level of Mechanization, the following modified structure is proposed.

3.15 This structure would simplify the current Field structure to two senior managers reporting to the Agriculture Manager. The Engineering Manager would be an experienced Agriculture Engineer and would through his reports hold responsibility for both combine harvesting and machined loading and cane transport, as well as for tillage and maintenance of the estates' infrastructure. The Crop Manager's responsibilities would be similar those of the current Crop

Production Managers. They would also be required to be conversant with the application of machines to crop management such as plantings, application of fertilizers and agrichemicals and cultivation. Most modern agriculture and agronomy training programmes are structured around machine use and operation.

3.16 Maintaining the same guidelines for inputs and investment, production is projected to attain 3.8M tonnes of cane and 326,000 tonnes of sugar by 2025. This should be regarded as indicative of "steady state" production, with similar output levels forecast to 2030. These production estimates are consistent with those independently developed by Guysuco for the same period. The additional investments of US$1.1M (each year) in 2016 and 2017 for tillage machines and implements would enable the annual achievement of at least 20% quality land preparation and planting from 2017. These measures would accelerate the attainment of a 3.5M tonnes of cane to 2019 and a steady state production of 3.8M tonnes of cane by 2022. It is our recommendation that the tenders for these additional equipment be prepared as a priority before the end of 2015. The projected agriculture cost summary data for Production year 2020 are highlighted in Table 3.5. Details together with those of Production Years 2014, 2017, 2025 are included in Appendix 2

Table 3.5 Summary of Industry Agriculture Costs 2020

Agric Units	Skeldon	Albion	Rose Hall	Blairmont	Enmore	LBI	Wales	Uitvlugt	Industry
Harvest Hectares	8,582	9,002	6,314	5,493	4,472	2,699	2,915	3,894	**43,461**
ESTATE HECTARES	**8,903**	**9,616**	**6,689**	**5,808**	**4,693**	**2,988**	**3,356**	**4,500**	**46,553**
Tonnes Cane Estate	626,008	679,488	427,245	419,895	307,102	178,720	201,050	233,953	**3,073,481**
Tonnes Cane per Ha	**73**	**75**	**68**	**76**	**69**	**66**	**69**	**59**	**71**
Tonnes Sugar Estate	49,683	65,970	37,055	40,375	24,766	14,184	16,214	18,867	**267,114**
Tonnes Sugar farmers	12,063	926	3,134	-	416	249	13,020	5,806	**35,613**
TOTAL TONNES SUGAR	**61,745**	**66,896**	**40,189**	**40,375**	**25,182**	**14,433**	**29,234**	**24,673**	**302,727**
Ha Tilled	1,780	1,925	1,355	1,162	940	600	672	900	**9,334**
Ha Planted	1,780	1,925	1,355	1,162	940	600	672	900	**9,334**
G$ per Tonne cane	$8,193	$7,104	$8,253	$6,793	$7,966	$8,426	$14,017	$11,111	**$8,388**
G$ per Tonne Sugar	$83,067	$72,157	$87,738	$72,518	$97,145	$104,336	$96,397	$105,356	**$85,158**
G$ per Ha	$576,127	$501,959	$527,191	$504,112	$521,258	$503,978	$839,683	$577,654	**$553,776**

US¢ / lb sugar	20¢	17¢	21¢	18¢	23¢	25¢	23¢	25¢	21¢

3.17 The unit cost data highlight that Field production costs across the Guyana Sugar Industry though significantly improved from 27 US¢ per pound, reported in the 2014 accounts, will remain high. The major cost components are harvesting, crop maintenance, and overheads. In developing these estimates, it was recognised that integration of the agriculture units of LBI and Enmore into a single unit is still incomplete. It is anticipated in the projections that this process would be completed before 2017. This immediate impact on field operations will be the elimination of duplication of the Workshop, and stores as well as rationalisation of the tillage, harvesting and crop husbandry sub departments into single units. This measure would result in a 33% reduction of Field Management cost.

3.18 The data also indicate that this business would not be viable if the income is based solely on raw sugar and molasses exports even for the lower priced producers, Albion and Blairmont, particularly if sales are dominated by prices pegged to the World Market. Once Factory and Administrative costs are added to the field costs, only those two estates would appear to be close to a breakeven position.

3.19 For the Guyana sugar Industry to prosper even under efficient management in the future, it is readily apparent that other income earning streams will have to be added. The most stable prospect with constant demand will be power. While it is unfortunate that the experience with Cogeneration at the Skeldon factory has not been encouraging, there are possibilities for power export from the smaller mills during the production seasons. The investment would require at the onset changes to existing obsolete boiler plant and other equipment to enhance the efficiency of dealing with mechanically loaded canes. This was the approach initially followed by Mauritius (Lau, Kong Win Chang and Guiness, 2003) before power evolved as the principal income stream for that Industry. In Guyana's case the introduction of hydropower as the country base load would be compatible with power generation from bagasse during the dry season when output from the dams is reduced. The availability of second hand 45 and 68 bar boiler plant from closed mills in Brazil and Hawaii would seem to be "low hanging fruit" if this approach is pursued.

3.20 Another interesting possibility is the production of refined sugar quality plantation white sugar in a raw factory, using ultrafiltration technology (Chou et al, 2003). This process should at least be investigated as it seems to offer opportunities for access to the food grade white sugar market within the region at a lower investment and energy consumption cost than a conventional refinery.

3.21 These potential projects will require significant investment. These sums cannot be generated within the Industry at this time, nor is the possibility of these coming from the

State's reserves likely. This implies that the rational way forward would be to seek private investment into this industry.

3.22 There are two other areas of interest that have emerged from the cost data examination, the first is the lower harvesting cost on the estates that have significant combine harvesting. This offers a significant incentive to pursue and refine mechanization to impact on a wider range of agriculture operations. The introduction of machines to load hand cut canes has gained wide acceptance by cane harvesters as it is less onerous and can offer greater rewards than the traditional "cut and load". The practice unfortunately, has not had a significant impact on reducing cost. It is **recommended that Guysuco's management engage the support of the Union and work towards an agreement in which the added costs for "obstacles and extras" could be removed from consideration in Machine (Bell) loaded canes.**

3.23 The cost for Field Management at Skeldon and Wales includes cane purchases that are incurred while maintaining a complete Agriculture establishment. Wales high cost for production of cane is not reflected in the estate's "cost per pound of sugar" that has a favourable benefit from low priced farmers' sugar.

3.24 A detailed study in the first instance should be conducted to examine the impact on cost by supplying all of Wales cane requirements from farmers. At present, approximately 50% of the cane is from this source. This of course suggests the possibility of operating by the Belize Industry Model. The study will have to determine the true costs of "farmers" production at Wales. This study should also explore the option of a single production entity in West Demerara., supplied mainly by independent cane farmers. A number of cane farmers and other persons in West Demerara have already expressed interest in expanding involvement with cane farming to approximately 5,000 hectares. These applications should be carefully vetted in order to ascertain the support these individuals would require to successfully manage larger areas. (Appendix 3)

4 Cane Farming Issues

4.1 The National Cane Farming Committee Act Chapter 69:04 of the Laws of Guyana prepared a formal contract between the Cane Farmer and the Sugar Factories referred to as the "manufacturer".

4.2 The Guyana Sugar Corporation Inc. now has the responsibility and functions of the "manufacturer" as detailed in the NCFC Act and has maintained that relationship with the Cane Farmers in accordance with the Act.

4.3 Traditionally Cane Farmers have produced 10% of Annual Sugar Production from the early 1970s with gradual increases up to 13% and a peak of 15% when the Estate Production was affected in 1977 as a result of Industrial unrest.

Table 4.1 Industry Sugar Production

Year	Estate	Farmers	Total	%
1974	298,140	39,464	337,604	12%
1975	261,943	36,818	298,761	12%
1976	294,596	35,479	330,075	11%
1977	205,582	35,726	241,307	
1978	285,179	35,258	323,437	12%

4.4 Cane Farmers' annual production of over 30,000 tonnes of sugar was consistent during the years 1971 to 1983 and then declined rapidly to under 20,000 tonnes for nine years followed by a resurgence which has settled to just over 20,000 tonnes representing 10% of the current Industry production.

Table 4.2 Industry Sugar Production

Year	Estate	Farmers	Total	%
2010	196,158	24,660	220,818	11%
2011	212,244	24,261	236,505	10%
2012	196,665	21,343	218,007	10%
2013	166,723	19,797	186,520	11%
2014	195,225	21,133	216,358	10%

4.5 Wales Estate, as an example, depends heavily on Cane Farmers to meet its production targets when 10,000 tonnes Farmers' Sugar represented 30% of the production in the early 1970s while today that same 10,000 tonnes is 50% of Wales' total.

Table 4.3 Wales Sugar Production

Year	Estate	Farmers	Total	%
2010	11,538	10,149	21,687	47%
2011	11,079	10,880	21,959	50%
2012	9,967	9,286	19,254	48%
2013	12,742	10,004	22,746	44%
2014	9,457	9,441	18,898	50%
2015	10,214	11,009	21,223	52% Act 1st Crop + 2nd Crop Budget

4.6 This historical and current 10,000 tonnes sugar production from the Wales Cane Farmers is unlikely to go much higher although some Cane Farmers have already been offered and have started to grow their own cane on Wales Estate Temporary Abandoned Lands.

4.7 There is an assumption that a Cane Farmer will produce higher tonnages of Cane per hectare and of a better quality than the Estate, an assumption which is not unreasonable at this time since the 2014 Wales Estate productivity is at an all-time low of 44 TC/Ha while the Farmers have maintained a cane yield of 55 TC/Ha over several years.

4.8 Wales Cane Farmers should be able to increase their Tonnes Cane per Hectare from its present 55 TC/Ha to 65 TC/Ha which will in the long term provide the Factory with 146,000 tonnes cane capable of producing 11,230 tonnes sugar at 13 TC/TS.

4.9 This matches a similar initiative at Uitvlugt Estate where Cane Farmers have been allocated Temporary Abandoned Blocks in the Cultivation for the purpose of growing their own cane. Uitvlugt Estate Factory services its own cultivation as well as that of Leonora after the Leonora Factory was closed in 1982. Both Uitvlugt and Leonora Factories were supplied by Cane Farmers between 1964 to1988, with a peak production of 15,053 tonnes in 1979.

4.10 Since the commissioning of the new Skeldon Factory in 2009, there has been renewed emphasis on Skeldon Cane Farmers to supply cane to produce 36,000 tonnes sugar annually, representing 33% of the rated capacity of the new 110,000 tonne Factory.

4.11 This Skeldon Cane Farming initiative was significantly different from previous efforts in that it required a completely different approach geared towards mechanized field operations from planting to harvesting.

4.12 The challenges for mechanized field operations were no different from those evolving on the Estate cultivations starting with specific field layouts and precise land preparation of new lands with its appropriate levelling and gradients for drainage.

4.13 Unfortunately many "shortcuts" were adopted and there was no real attempt to establish levels and gradients compatible with mechanized operations.

4.14 The traditional Cane Farmers at Skeldon in the 1970s consisted of relatively small units in the form of 2 Cooperatives and 2 Individuals totally about 300 Hectares. They were consistently more efficient than the Estate producing 2,500 tonnes sugar which was a respectable 9% of the Estate production.

4.15 The last time traditional Skeldon Farmers produced over 2000 tonnes sugar was 1985 and then it vacillated between 1,300 to 1,800 tonnes until 2004.

Table 4.4 Skeldon Sugar Production

Year	Estate	Farmers	Total	%
2000	33,656	1,444	35,100	4%
2001	34,719	1,575	36,924	4%
2002	37,162	1,795	38,957	3.6
2003	31,917	1,353	33,280	4%
2004	35,119	1,397	36,516	3.80%

4.16 In 2005 original Skeldon Cane Farmers only produced 962 tonnes sugar further declining to 599, 497 and 778 tonnes in 2006, 2007 and 2008 respectively.

4.17 Since the New Skeldon Cane Farming expansion started in 2008/2009 there has been a rapid production increase of Cane Farmers' Production. The Cane Farming Cultivation expansion was accompanied by the Estate also expanding in lands adjoining the original 4955 hectare cultivation.

Table 4.5 Expansion of Skeldon Estate & Farmers Hectares

		ESTATE Ha	FARMERS Ha
	Prior to SSMP	4955	3666
EXPANSION	**2009**	2838.7	1336.2
	2010	766.2	831.1
	2011	289.3	285.1
	2012	0	180.3
	2013	53.4	163.4
	2014	0	0
	2015	0	0
TOTAL Expansion		3947.6	2796.1
Total Cultivation: Old + Exp		**8902.6**	**3102.7**
To Be Brought in Cane		737.4	1883.9

4.18 This expansion of cultivated land resulted in adjustments in the Sugar Production ratios between the Estate and Cane Farmer from 4% to 24% without increasing total production which is yet to reach the 38,000 tonnes produced in 2002.

Table 4.6 Skeldon Sugar Production

Year	Estate	Farmers	Total	%
2009	22,718	3,009	25,727	12%
2010	25,127	8,123	33,250	24%
2011	21,417	7,993	29,410	27%
2012	25,134	8,130	33,264	24%
2013	19,223	6,321	25,544	24%
2014	28,897	6,993	35,890	19%
2015	30,360	8,454	38,814	22% [Actual First Crop & Budgeted Second Crop]
2002	37,162	1,435	38,957	3.6% [Record Production]

4.19 This significant reduction in Estate sugar production from the record 38,957 tonnes in 2002 to under 30,000 tonnes in spite of the additional 3,900 hectares put under cane is a result of a combination of lower Cane Yields from 88 Tonnes Cane per Hectare to 55 TC/Ha and lower quality Canes from 11 Tonnes Cane per Tonne Sugar to 16 TC/TS.

Table 4.7 Skeldon Cane Farmers Production Summary 1999 to 2014

Year	Hectares	Sugar	Cane	TC/Ha	TS/Ha	TC/TS
1,999	302.0	1,678	22,530	74.60	5.56	13.43
2,000	310.0	1,444	20,086	64.79	4.66	13.91
2,001	304.0	1,575	22,871	75.23	5.18	14.52
2,002	298.0	1,435	21,752	72.99	4.82	15.16
2,003	305.2	1,363	20,763	68.03	4.47	15.23
2,004	304.8	1,397	23,073	75.70	4.58	16.52
2,005	290.2	962	17,683	60.93	3.31	18.38
2,006	215.6	599	10,004	46.40	2.78	16.70
2,007	115.2	497	8,479	73.60	4.31	17.06
2,008	176.5	777	11,930	67.59	4.40	15.35
2,009	690.2	3,009	56,556	81.94	4.36	18.80
2,010	1,438.2	8,123	136,669	95.03	5.65	16.82
2,011	2,119.6	7,993	150,732	71.11	3.77	18.86
2,012	2,416.7	8,132	140,781	58.25	3.36	17.31
2,013	2,119.4	6,312	118,613	55.97	2.98	18.79
2,014	2,376.7	6,993	117,511	49.44	2.94	16.80

4.20 These fundamental issues affected the Skeldon Cane Farmers in no small way as the figures in Table 4.7 above show.

4.21 The lower quality Canes was a direct of:-

- Cane being harvested well beyond their Peak Maturity
- Excessive Burning to Grinding Intervals
- Questionable Factory Performance

4.22 The less than satisfactory performance of the Cane Farmers' Cultivation led to several letters referring to the manner in which the Cane Quality parameters were administered in the Factory. Without going into the tedious exercise of a Financial Analysis of each Cane Farmer it was shown that the Skeldon Cane Farmers were paid substantial sums at the end of each year's transactions.

Table 4.8 Total Amount Paid to Skeldon Farmers for the Last Five Years

	2009	2010	2011	2012	2013	2014
			G$			
Total Gross Owed to the Farmers for the Year for Canes Supplied	248,698,334	545,540,863	736,696,381	824,232,853	716,752,094	535,045,551
Less Expenses deducted	113,172,523	164,765,919	253,798,952	222,443,339	152,348,102	162,317,667
Net Paid to the Farmers for the Year for Canes Supplied	**135,525,811**	**380,774,944**	**482,897,429**	**601,789,520**	**564,403,992**	**372,727,884**
% of income deducted for expenses	**46%**	**30%**	**34%**	**27%**	**21%**	**30%**

4.23 There is no doubt that there may be some cash flow problems arising from the payment schedule and corresponding deductions as Cane is delivered. The traditional method of payment is by advances for canes delivered especially during the First Crop. The Final Payment is not due until the 31st March the following year.

4.24 All payment for the Skeldon Cane Farmers is made through their respective Bank Accounts. The Estate retains 30% of each payment made and sends the balance to the respective Banks.

4.25 Those Cane Farmers who had Bank Loans were responsible for whatever deductions were made by their respective Banks.

4.26 The Loans that were negotiated with the Bank were paid direct to the Farmers based on Certificates of the %age of work that was completed jointly by the Skeldon Estate Equipment & Personnel and the Farmer

4.27 All the development work done by the Skeldon Estate on behalf of the Cane Farmers was held in the respective Farmers' debtors account and amortised over four -five years period after harvesting of the plant canes. There is no interest charged on these sums and the Estate

started the recovery of those development sums after the Cane was Harvested and Sugar made.

4.28 None of the sums drawn down from the Bank Loans by the respective Cane Farmers was paid to Skeldon Estate or GuySuCo during the developmental land preparation phases and subsequent husbandry and Harvesting operations.

4.29 The Skeldon Cane Farmers currently owe the Corporation over G$1.4B for routine operational work to date since the sums incurred for developmental works were subsequently recovered.

4.30 The total value of Sugar produced by Skeldon Cane Farmers from 2009 to 2014 is G$3.607BThe total expenses deducted by Skeldon Estate was G$1.069B, which is 30% of gross earnings, leaving a net paid into the Cane Farmers' respective Bank Accounts of G$2.538B

4.31 While this special interest in Cane Farmers exists at Skeldon, there has been a loss of Cane Farmers from the Industry over the years representing about 1400 hectares especially at Albion & Rose Hall Estates.

4.32 The converse is the newer developments at Wales and Uitvlugt Estates where temporarily abandoned blocks [TAB] of land in the respective cane cultivations have been offered to Cane Farmers to produce cane. Both Wales and Uitvlugt Factories suffer from very low cane deliveries as a result of relatively poor cane cultivations.

4.33 Between Wales and Uitvlugt Factories, it has been noted that one Factory with some investment should be able to process all the cane now done by the two. Wales Factory has 50% of its cane supply delivered by private Cane Farmers and their production has been at a stable 10,000 tonnes sugar with indications that some cane farmers have already started to put other crops on their cane lands. This assessment is in progress and the actual acreage involved is being compiled.

4.34 The Wales Cane Farmers supply of cane for 2015 has been given as 139,000 tonnes which at 12.70 TC/TS can produce 10,600 tonnes sugar. The projected supply of cane for 2016 is 135,000 tonnes.

4.35 Uitvlugt Estate was able to attract some of Wales' Cane Farmers to plant sections of the estate cultivation which were temporarily abandoned [TAB] for a number of years. The Uitvlugt cultivation was not under full production because of the inability to harvest its cane.

4.36 In 2013 the Cane Farmers started their investment in the Uitvlugt [TAB] cultivation and delivered 3,130 tonnes cane in the First Crop of 2014 that produced 243 tonnes sugar, In the second Crop 2014 some 4,182 tonnes cane produced 301 tonnes sugar making the total of 544 tonnes sugar for 2014 at an overall quality of 13.44 tonnes cane per tonne sugar (TC/TS). As plant cane crop, that 71.3 hectares had very good productivity of 102.55 tonnes cane per hectare (TC/Ha) which was budgeted at 80 TC/Ha.

4.37 Those Uitvlugt Cane Farmers delivered 17,562 tonnes cane in the first Crop of 2015 that produced 1,317 tonnes sugar at 13.33 tonnes cane per tonne sugar (TC/TS). The budget for the Second Crop 2015 is 12,900 tonnes cane to be delivered, which at 13.20 tonnes cane per tonne sugar (TC/TS) can produce 982 tonnes sugar. The Uitvlugt Cane Farmers have increased their production from 544 tonnes sugar in 2014 to 2,299 tonnes in from 30,525 tonnes cane 2015. The 2015 field productivity at 86.52 tonnes cane per acre reflects satisfactory husbandry practices.

4.38 The Cane Projections for 2016 from those Cane Farmers is 19,500 tonnes in the First Crop and 23,700 tonnes in the Second Crop totalling 43,200 tonnes cane producing 3,186 tonnes sugar for the year.

These results are summarised in the tables below

2014	Ha	sugar	cane	tc/ts	tc/ha	ts/ha
First Crop	30.7	243	3,130	12.88	101.95	7.92
Second Crop	40.6	301	4,182	13.89	103.01	7.41
YEAR	71.3	544	7,312	13.44	102.55	7.63

2015	Ha	sugar	cane	tc/ts	tc/ha	ts/ha
First Crop	200.3	1,317	17,562	13.33	87.68	6.58
Second Crop	152.5	982	12,963	13.20	85.00	6.44
YEAR	352.8	2,299	30,525	13.27	86.52	6.52

2016	Ha	sugar	cane	tc/ts	tc/ha	ts/ha
First Crop	250.0	1,477	19,500	13.2	78.00	5.91
Second Crop	289.6	1,708	23,700	13.9	81.83	5.90
YEAR	539.6	3,186	43,200	13.58	80.06	5.90

Unless new replanting takes place after 2017 these field productivity results will be compromised.

4.40 The reality facing these Cane Farmers is their cost of production, and the price being paid for their sugar produced will determine how much further expansion can take place. There is much doubt that at this point in time there is any incentive for rehabilitation of the current 540 Ha cultivation to maintain the 80 TC/Ha or improve it.

4.41 The Basic Average Price for Sugar in 2013 was G$136,472 per tonne to which molasses is added and a transport differential is deducted leaving a gross of 70% for the farmer of about G$103,000 per tonne sugar.

4.42 In 2014 that Basic Average Price dropped to G$91,297 per tonne which gave the cane farmers an average of G$72,000 per tonne sugar

4.43 It has been projected that for 2015 the Cane Farmer should not expect more that G$62,000 per tonne sugar.

4.44 The Uitvlugt Cane Farmer initiative will be under the microscope in 2016 as the Estate Factory continues to struggle for a reliable supply of cane. The Cane Farmer is a business enterprise no different from any other and if the revenue stream is lower than the projected cost of production there will be no incentive to invest in either rehabilitation or expansion.

4.45 While every effort can be made to keep the present Cane Farmers' part of the Uitvlugt cultivation producing cane, it cannot be done if the Farmers are incurring losses. An important part of the "contract" with those Uitvlugt Cane Farmers is that they were required to convert the land for mechanised operations which can eventually lead to billet harvesting. One Cane Farmer has invested in a billet harvester which is being modified to a whole stalk harvester with the expert assistance of the John Deere Agents.

4.46 The higher rainfall experienced at Uitvlugt has traditionally excluded the development of mechanised operations. As this mechanised option is being developed, there has to a conscious effort to start those mechanical operations, especially harvesting, at the beginning of the dry season and accelerating it to finish before the onset of the rains.

4.47 The result of the same initiative at Wales Estate cultivation with Farmers cultivating Estate land has not been as dramatic and while some more sugar can be produced, the net result of other farmers going out of cane production is showing nothing positive. Production from the Estate land leased to the Co-ops is being shown in the respective Co-operative gross returns and will be separated for future analysis.

4.48 Further the Lands leased from Wales were not converted for any mechanical operations and the formal lease document has not been completed as some members of the Co-op have refused to put their respective signatures. The Estate is prepared to assist those Cane Farmers who may request Bell Loader support.

4.49 The proposal for handing over the Wales Estate cultivation to Cane Farmers, lock stock and barrel, needs to be studied very carefully since the primary objective is to have a sustained increase in the supply of cane to the Factory.

5 Progress and Prospects for Mechanisation

5.1 Development Stages and Background

5.1.1 Sugar cane cultivation in Guyana has over 300 years developed as a bedded culture that effectively removes water from around cane roots during periods of intense rainfall and once well maintained has been demonstrated to support high yields. These beds either extend along the length (380m) – English cambered beds or width (115m) – Dutch cambered beds of each field. This system is adapted to only manual agricultural practices. Increasing labour costs have placed considerable pressure on the Industry to remain competitive despite genera improvements in productivity.

5.1.2 The first serious attempt at commercial scale mechanisation in Guyana was in 1976 when 128 ha of former cambered bed fields were levelled and converted to Louisiana type ridge and furrow at Diamond estate. In this project, canal areas were filled in to facilitate traffic from within the fields to a trans-loading site. The harvest system comprised a tracked whole stalk harvester, a R6 Continuous Loader, tracked infield tipper transporters and an elevator for trans-loading the R6 billets into punts. Subsidence in former canal sites was a major restriction. Traffic was severely limited by soft soil conditions. The tracked equipment experienced excessive undercarriage wear, probably because of the difficult soil conditions. This programme was discontinued in 1985. An important and lasting development from the period has been the dumper, by which a punt could lifted out of the water and the contents tipped onto the mill feed table

5.1.3 The deficiencies in the Diamond Project, were linked to the attempt to superimpose a layout on land without sufficient recognition of the existing topography and drain sites). From 1986 to 1990, a programme of phased conversion to Louisiana banks on wide (22m to 33m) beds, on which harvesting equipment comprising soldier (S30 and S32) Harvesters and slewed SP1800 Loaders operated in-field. The whole-stalk cane was transferred into punts with a grab trans-loader. This equipment worked satisfactorily at close to their rated potential of 24 to 30 tonnes per hour, when conditions were favourable. East Demerara, Blairmont and Skeldon were the main operating sites for this programme. The return of Field workers to estates in the early 1990's after removal of pay restrictions, resulted in a management decision to cease commercial mechanized harvesting.

5.1.4 During the 1990s, emphasis was placed on adapting machinery to the impacts of traffic on soft soils. One study indicated very clearly that improved flotation combined with weight transfer between prime mover and loaded trailer could reduce wheel slip and soil deformation Given the limited opportunity time available for land development and the extensive work that would be entailed in changing field layouts to land forms more amenable to mechanised harvesting, it was desirable to consider any system that increase the productivity of labour (average 2.5 tonnes per man day). The Bell tricycle loader was introduced in 1992 and was demonstrated to significantly improve the productivity of labour working on standard "Dutch"

cambered beds. The ability to operate at low ground pressures (< 80 kPa), when equipped with the appropriate (750mm) Trellborg tires, and manoeuvrability of these machines can extend their function on damp soils. The advantage of these machines in the "Dutch" camber system is that because of the short distances to loading sites, the machines are able to traverse from cane windrow or bundle to load directly into cane punts without any intermediate stage. Cutting and Stacking of cane for loading by the Bell Loader has become the preferred and predominant mode of harvest in the Industry. In 2014, **1,356,799 tonnes of a total 2,536,206 tonnes of cane harvested across the Industry were loaded by the Bells. This accounts for 53% of cane loaded. Reports from the management of each estate, indicate that the proportions of machine loaded canes continue to increase.**

5.1.5 Notwithstanding the usefulness of the Bell Loaders as an intermediate stage for mechanized loading, the capacity to benefit fully from technology developments in land management and agriculture engineering requires flexibility of agriculture systems to accommodate field machinery. This requires modifying field layouts to forms less restrictive to traffic. Guysuco and expatriate technical personnel have expended considerable effort from the mid-1990s to the early 2000s in conceptualizing and evaluating layouts that would facilitate mechanization for sugar estate lands, Two approaches were adopted, . The first applied to "English cambered bed" fields that have been converted to wider cambered beds of widths varying from 30 m to 45 m. The selection of the design bed width is influenced by the topography and land elevation. Cane is planted in flat culture along the length of these beds. Surface runoff is shed across the camber into lateral drains that discharge directly into the main drainage canal via discharge tubes.

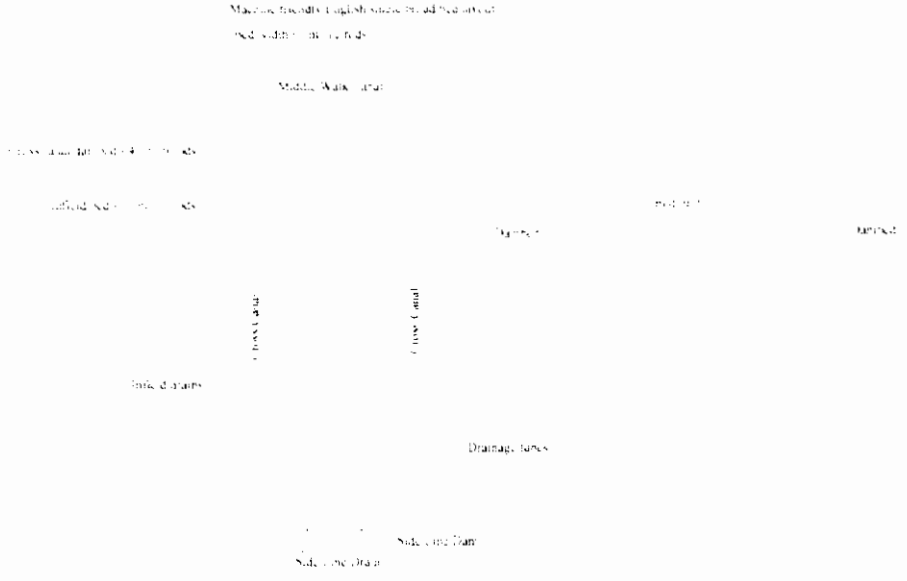


Fig 5.1 Wide camber bed layout

5.1.6 The second approach was encouraged for new land development for sugar cane, primarily on the Skeldon Expansion areas. These fields are in ridge and furrow with the design grade to a slope of 1:500. The design distance for drain flow through the furrows is 170m to shallow machine crossable trace drains that discharge through a small culvert into a parallel collector leading to the main drainage canal over a flow distance of 500m at a 1:1000 slope. Attainment of the stipulated gradients is critical to effective runoff of these fields. This layout offers few restrictions to the movement of field machinery, provided the design specifications are achieved.

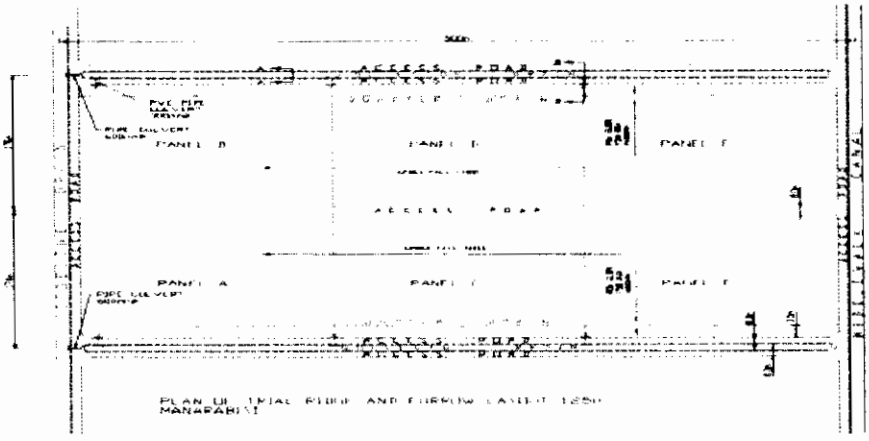


Fig 5.2 Graded Ridge and Furrow Layout

5.1.7. During construction much of these new lands did not receive the benefit of laser land levelling because of operational difficulties with the equipment and when these issues were finally resolved, the equipment was not effectively utilized. This added to the anticipated problems of soil settlement that exacerbated the occurrences of low spots and localized water logging within sections of the fields. These issues would have to be addressed in the present cycle of land rehabilitation, when full use must be made of this Technology. The broad bed fields will also require laser levelling in the direction of the discharge to the side line drains.

5.1.8 A potential risk is that Guysuco currently has only two persons who possess more than basic training for pre-construction surveys and cut-fill design for precision levelling. One of them on leave pursuing an engineering degree, the other is in a Senior Management position. It would be advisable to conduct further intensive on-site training by the laser equipment suppliers when tillage has actually commenced. Guysuco should also identify with some urgency suitable persons who can be trained to conduct and interpret the pre levelling surveys.

5.1.9.1 The decision to proceed with a fully mechanised option for the expanded Skeldon cultivation only arose because the evidence as early as 2002 was that labour was increasingly difficult to attract. For mechanised harvesting in the Guyana environment, it was recognised that several potential challenges have to be faced:

a) Foreign exchange for machines, spares and fuel;

b) Training of mechanics and re-equipping agriculture workshops;

c) Purchase of spare parts;

d) High mud in cane when harvesting in wet conditions;

e) High extraneous matter levels;

f) Reduced harvesting season length to reduce risk of wet weather harvesting;

g) Reduced ratoon yields;

h) Infield cane losses;

i) Increased deterioration of chopped cane as opposed to whole stalk cane;

j) Social and political difficulties if willing labour was displaced.

5.1.10 System development work spearheaded by the Research Dept with support from the Booker Tate Agriculture Engineers and Project Team, addressed most of the technical issues that has culminated with the specifications of the current harvesting fleet. Each harvesting unit comprises a billet or combine harvester, three haul-out trailers with prime movers and a billet cane elevator. In the first instance the ground contact pressure under the harvester could be significantly reduced to less than 10psi by fitting wide 600 mm track plates of and extending the track frames to the rear. These features were installed on the first fleet of John Deere 3510 machines. Neither John Deere nor Case have been willing to apply this modification to the more recently supplied machines, indicating that the small size of the orders could not justify this deviation from their production lines. Both the John Deere 3520 and Case 8880 machines are however lighter than the original John Deere 3510 harvesters and were supplied with 550 mm wide track plates. They have performed satisfactorily in damp conditions.

Night Loading with Elevator

5.1.11 The Billet cane Elevators and haul out wagons are fabricated in Guyana from a collaborative Agric Research/Australian design. The haul outs also feature a weight transfer hitch developed in the ARC to more evenly distribute load between the haul out and the haulage tractor rear wheels. Trellborg low ground-pressure tyres are a standard feature on these haul outs. The rear axles on the haul out have been further modified to a more flexible design that permits greater manoeuvrability at the canal edge loading areas. The Research

Centre also developed a cultivation implement that is very effective in alleviating soil damage caused by the traffic of loaded trailers.

5.1.12 While these efforts can be considered successful, there continues to be the need for system development with the mechanized harvesting fleet, in the light of the problems that have manifested with the operation, must of which were predicted. **Under these circumstances, the decision in 2010 to effectively disband the collaborating group of Engineers and Technical staff of the Research and Agriculture Services Depts. and assign them to principal roles unrelated to mechanization was very premature.**

5.1.13 The new cane cultivation culture that has been developed for mechanized agriculture also provides an opportunity for reviewing alternative and more water conserving irrigation practices than the traditional flood irrigation methods. Winch operated travelling "rain gun" equipment were evaluated very extensively in the Skeldon project. The issue with this approach was non uniform distribution of water that affected the relative rates of emergence and early development in different sections of the fields. A variant of the winch operated system with the rain gun nozzles replaced by a linear move sprinkler has been proposed. A flexible hose furrow irrigation system has also demonstrated good potential in the ridge and furrow fields. Flood irrigation has continued to the dominant practise because of cost and ready availability of water.

5.2. Current Operating Issues

5.2.1 The early campaigns with the Skeldon Harvesting fleet was associated with several machinery failures many of which were attributed to neglect of maintenance guidelines and poor decision making by supervisory staff who did not fully appreciate and still struggle with the complexities of handling a fleet of machinery. In efforts to satisfy cane supply to the factory after late crop starts, arising from factory unreliability, from 2010 to 2012, the machines worked in very wet infield conditions. This resulted in major damage to the fleet and the fields. Large sums were expended to rehabilitate the machines. A major effort has commenced to correct the situation in the fields. The interventions from the Dealer supported by personal interest from Guysuco's Field Engineers enabled several training sessions at the John Deere facilities and on site. These have effectively developed a core team of competent operators and mechanics who seem alert to the capabilities of their equipment and appear to be largely self-monitoring. The operators and mechanics of the new machines at Enmore were given hands on exposure to the Skeldon operation before the delivery of these new machines.

5.2.2 The Harvesting fleet as seems to be common in many areas of the Industry is at risk because of availability of spares. One of the machines is temporarily out of service. Fortunately the John Deere dealer on his own initiative and on the word of Guysuco's Agriculture Services Manager, has acquired the spares and is holding them in consignment stock. Guysuco is required to pay to uplift them. The present fleet 8 billet harvesters is capable of satisfying the

supply of cane from both farmers and estate cultivations at the present factory processing rate of 250 tonnes cane per hour. On attainment of the factory design capacity of 350 tonnes cane per hour another two harvesting units will be required.

5.2.3 The conditions under which the Skeldon Harvesting fleet have operated since have been very poor. Ground conditions have been wet for most of each year despite the lower rainfall regime relative to the other estates. The Installed drainage capability on the expanded estate is insufficient to effectively maintain a cultivation of this size that is further exacerbated by long conveyance path from the Manarabisi sections to the Block 19 Pump station. The importance of activation of the pump station at the Manarabisi/ No 66 cannot be overemphasized.

5.2.4 The harvesting environment for the Skeldon operation was also influenced by factory unreliability that has caused the late start and shorter crop duration in successive seasons. This has led to the accumulation of over age canes in both the Estate and Cane Farmers' cultivations

5.2.5 Harvesting operations in wet conditions starts the cycle of pronounced ratoon decline that can be attributed to soil compaction especially in the Billet harvested and Bell Loaded areas. Additional efforts at correcting this soil deterioration are done but these are never 100% effective, particularly in severe cases of soil deformation.

5.2.6 Invariably where ever Mechanical or Semi Mechanical harvesting is being done in adverse conditions, excessive soil will be delivered to the Factories with the cane. This will affect Factory Performance as the existing equipment is not designed for high percentages of extraneous matter.

5.2.7 Damp conditions and relatively short operating seasons arising from a combination of weather impacts and factory unreliability have contributed to a high percentage of overage canes that in many cases have lodged and exacerbated the problems with mud and high extraneous matter contents delivered to the factory. Reactions to the new operation at Enmore have also been very focused on extraneous matter and mud. The generally negative conversation has unfortunately not been helpful for the overall impressions of mechanization in the industry that has positive features and cost implications that have tended to be overlooked

Operation	Unit Cost G$
Manual Harvesting	$2155 per tonne cane
Cut & Stack – Machine Loaded	$ 2139 per tonne cane
Combine Harvesting	$ 1371 per tonne cane
Manual Planting	$66000 per Ha
Semi – Mechanical Planting	$ 55000 per Ha
Manual Fertilizing	$ 5290 per Ha
Mechanical Fertilizing	$ 3450 per ha
Chemical Weed control (Knapsack)	$ 3810 per Ha
Chemical Weed Control (Boom spray)	$ 2700 per Ha

Table 5.1 Indicative Costs of Main Agriculture Operations- Guyana

5.2.8 Mechanized harvesting has become the principal strategy for Skeldon and is anticipated to expand in East Demerara over the next 4 years. It is therefore necessary that the Agriculture and Factory Operations Depts. collaborate on strategies that would maintain cane deliveries, reduce the extent of extraneous matter and to manage the inevitable increased soil load of canes delivered to the factories.

5.3 Harvest Management and Cane Deliveries

5.3.1 Mechanized harvesting and loading are not subject to the same restrictions of waiting for individual punts to be loaded for payment assignments as is manual cane cutting. These operations permit punts to be hauled to the mill as soon as the requisite numbers for a haulage train have been loaded. This facilitates the recycling and reuse of punts and would allow for significant impacts on reducing Kill to Mill intervals. This opportunity has not been fully appreciated by harvesting managers who continue to plan their operations for traditional manual operations. Mechanised harvesting is also continuous over 24 hours, and once efficiently managed and coordinated will reduce the requirement for accumulating a large dock of punts before early cane deliveries, prior to grinding.

Estate	Cut & Load	Cut & Stack	Combine Harvested
Skeldon	85,483 tonnes	209,405 tonnes	177,424 tonnes
Enmore	152, 065 tonnes	62,795 tonnes,	56,096 tonnes

Table 5.2 Cane distribution to factories with combine harvesting -2014

5.3.2 Mechanized farming will increase in importance in the Guyana Sugarcane Industry. The positive impacts on costs of operation have already been demonstrated. There are however constraints and areas for improvements that cannot be underestimated. Many of these issues will have technical and managerial solutions that need to be addressed with appropriate urgency and technical support. **The programme should be coordinated by a very senior and experienced Engineer or Manager,** with the necessary support who would have authority to co-opt as required individuals with the required expertise to address system and technical development issues that will arise as this programme develops. Areas that require priority attention at this time include:

1. Development of expertise in survey techniques, cut fill design and planning for precision levelling.
2. Precision land levelling for ridge and furrow and Broad bed fields.
3. Planning and monitoring of Field rehabilitation of fields involved in mechanized harvesting, particularly at Skeldon.
4. Identify and introduce a fertilizer blend suitable for effective dispensing by mechanical band and placement applicators.
5. Develop and evaluate alternatives to flood irrigation.
6. Coordinate and guide Field Conversion programme.
7. Develop a conversion sequence for Dutch layout fields.

8. Coordinate regular discussion and training sessions on cane loading and delivery for estates' management.
9. Development and testing (with ISD) of a cane delivery and optimised harvesting scheduling schedules.
10. Revisit and test alternate modes of cane transport including road and also a hydraulically driven propeller tug prime mover.
11. Address extraneous matter cane quality issues in collaboration with Factory Operations Technical staff.
12. Further evaluation and testing of low ground pressure haul out equipment including tracked options for effective operation in damp conditions.
13. Development of punt restraint and punt movement system to improve efficiency at field loading sites.
14. Introduction and evaluation of precision farming including agronomic inputs, weed control and controlled tillage.

6 AGRICULTURE PROCUREMENT

6.1 The Guyana Sugar Corporation Inc. established a Procurement Policy which is second to none.

6.1.1 It requires a system of three quotations from which to choose a qualified supplier in accordance with the specifications provided in the bid documents.

6.1.2 Over the years, with increasing operational deficits, the Corporation has developed a special relationship with some suppliers who would provide goods and services in spite of delayed payments.

6.2 Fertiliser

6.2.1 The process of bidding for fertilisers has morphed into those who would bid to supply the major supplies such as Fertiliser requiring about US$4M per year.

6.2.2 The inability to negotiate adequate supplies particularly of Fertiliser has developed a chronic field problem of relatively poor cane nutrition with the resultant lower cane yields and corresponding higher levels of weed infestation.

6.2.3 The lower cane yields has had a deleterious effect on controlling harvesting costs with escalating demands for "extras" usually paid for conditions which reduce the rate at which the Cane Harvester is expected to perform.

6.2.4 Demands for "extras" are accompanied by unfavourable industrial relations which invariably escalate into prolonged strike action in all areas of harvesting including those not requiring "extras".

6.2.5 This unstable state of industrial affairs is often accelerated by the prolonging of the crop into the unfavourable wet season as the time lost earlier in the crop forces continued operations in order to achieve the production targets.

6.3 AGRO CHEMICALS

6.3.1 The aftermath of the financial crisis has reduced the number of credible suppliers to three which in its own right is a blessing in disguise.

6.3.2 The quality of the Agrochemicals with respect to unacceptable levels of contaminants has been maintained because the regular suppliers have avoided manufacturing sources that do not comply with the standard specifications in the order.

6.4 STEEL PLATES

6.4.1 There has been much concern expressed by all the Estates on the timely acquisition of the quantity of Steel Plates ordered for punt fabrication, repairs and re-bottoming. The standard quarter inch steel plate which in metric terms is six delta two millimeters and this specification is clearly stated on the orders. The suppliers have been delivering the metric equivalents of quarter inch plate that are approximately 6 mm thick. steel plates.

6.4.2 The re-bottoming programmes have not been in keeping with the respective planned schedules and therefore repairs have escalated. This has had some negative effects on the Estates' harvesting programmes because of the numbers of unserviceable punts in the fleets.

6.4.3 While the physical measurements of the steel plates supplied can confirm the thickness deficiencies the question of the quality of the steel is still being questioned. In re-bottoming a punt, one of the observations is the ease with which the band of steel can be bent to fit the round areas at the front and back of the punt without using clamps. **The need to re-bottom "new" punts because of unusual wear cannot be the result only of steel quality as there is evidence of poor maintenance of navigation canals and associated structures. This is further accompanied by undesirable operational issues such as the number of punts being pulled in a single train.**

6.4.4 There is no doubt that additional wear and deformation of the punt fleet is being experienced on all locations and there is a reluctance to admit that in the wetter conditions, the larger horsepower tractors are used to deliver the cane from the fields to the factories and far longer punt trains than the standard 35 punts are being used without regard for the eventual problems being faced today.

6.4.5 The visibly poor state of more than half the punt fleet which forms a key part of the assets of the Corporation displayed significant elongation and other forms of structural deformities.

Elongated Punts

Ripped Punt Head

6.4.6 The Corporation, to its credit, recognised the dire state of its punt fleets and established a Punt Management Review. The May 2015 report identified a Punt Age durability Analysis which will put into place an improvement in punt record keeping and its corresponding asset register of over 4,300 punts. All these initiatives are being supported by the Information Systems Department which is constantly visiting the Estates refining the forms and supporting documents.

6.4.7 The expenditure for punt repairs for the last 10 years, (2005 to 2014), was G$1,378.96M, ranging from as low as G$108.38M in 2009 to G$202.20M in 2014.

6.4.8 Over the same 10 year period punt re-bottoming expenditure was G$1,185.56M for 1,643 punts. The rate and consistency of re-bottoming over the years varied considerably and was dependent on the availability of steel plates.

6.4.9 A hydraulic press has been fabricated at Skeldon which can press out the punt sides in just 10 minutes.

6.4.10 The Budgeted 2014 fabrication of 400 new punts were completed in August 2015 as only 290 were completed at the end of 2014. Steel Plate for the Budgeted 2015 fabrication of 350 new punts has not been approved to date.

6.5 MACHINERY SPARES

6.5.1 The Field machinery fleet continues to expand as more specialised equipment especially for Mechanised Harvesting develops. The range of equipment is often influenced by the agencies providing the funding which adds to the maintenance spares woes.

6.5.2 The ability to pay for spares with the orders cannot be maintained in the present production and financial crisis, resulting in maintenance and repairs delays and increased fleet unavailability. None of the Estates can complete its tillage programme with the availability and efficiency state of the current fleet of tillage equipment.

6.5.3 The local agents for some of the specialised equipment, for example the John Deere Harvesters, recognised the critical state of some of their equipment and have been providing training modules for both the operators and maintenance personnel resulting in higher availability and better reliability of those machines.

7 Research and Development

7.1 In a technology dependent Industry, an effective research and development function is an asset to its sustainability. The Guyana Sugar Corporation's Research Development Departments have contributed to technological change and adaptation to environmental conditions in several areas:

- A robust variety development programme that has an independent capability for breeding as well as very strong linkage to the West Indies Central Sugarcane Breeding Station
- A well-established Integrated Management Programme for insect pests and weeds, which includes effective biological control for the ubiquitous moth borer Diatraea Sp. Most other insect pests are controlled by cultural methods with minimal chemical intervention.
- A mammalian pest management strategy, the principles of which have been successfully adapted by other Industries
- Soil Management and Cane Nutrition policy that has been responsive to changes in the environment since its formal institution in the 1960's.
- Established a robust Industrial Environmental Monitoring Capability
- Climate change assessment and adaptation strategies
- A lead role in mechanization system development within the Caribbean region
- Sugar cane and sugar chemistry analytical capability for supporting cane quality and process studies
- Lead role in Sugarcane for Energy Studies for Caribbean Industries.
- Regionally recognised Analytical Laboratory.

7.2 Most of the Department's established programmes including the Laboratory analyses continue to be executed. However there has been little interest or major actions emanating from the Dept.'s initiatives on the estates over the past 6 years. This a distinct variation from the previously established role of the Dept. when it was clear that the Industry Agriculture Policy emanated from the Department and the Scientists and Technical Officers were representatives of the Director and were acting on his authority when visiting estates. The subtle change in the recent past implies that estates could look elsewhere for the authority on guidance given by the Dept. and are in fact free to ignore it should they not agree with or understand the information.

7.3 Morale in the Dept. is low and more than one member of the group has expressed uncertainty over the Dept.'s future.

7.4 Subscriptions to Technical Journals and for Professional Memberships have been curtailed.

7.5 Likewise there are no budget allocations for research and development projects initiated by the Department.

7.6 The tractors that were used to service the Breeding and Selection Cultivation and trials were removed after the Field Engineering section of the Department was closed. The ARC is dependent on LBI estate for support for cultivation and trials. Requests have not always been given priority by the estate.

7.7 The current Head of Research also admits to being insecure. He has not been confirmed in his position despite having acted in the role for 6 years. Apart from having an uncomfortable relationship with the executive management, he also seems to be conscious of having to justify his status to the group he leads as he has not been a practising researcher.

7.8 It has also been claimed that the executive management and Board of the day have also foisted projects onto the Dept. over the objections of the scientists. Recent examples of this have been an attempt to adjust the crop fertilizer regime without previous investigation and an ill-advised large scale research programme to introduce a "Biofertilizer" of uncertain origin into the crop nutrition programme. The Company has risked US$145,260 in purchase of this material. The researcher assigned to the project has expressed unease over the inadequate information on technical specifications for the material. The depressed production from the 2013 crop has indicated the pitfalls of arbitrary changes in agronomic practices. The latter trials are currently being harvested but the observations in field have not been favourable to the material.

7.9 There seems to have been no consistent appraisal of the nutritional status of the growing crop in order to adequately correct any deficiencies to optimise yield potential. The frequent episodes of inadequate fertilizer applications at the standard recommended times have further aggravated the downward trend in cane productivity. The Central Laboratory has however maintained as far as possible the programs set up to monitor Crop Nutrition trends. The data though limited, are beginning to highlight the occurrence of minor nutrient deficiencies and also that the average foliar N values have declined in recent years. These are important indicators and should warrant further investigations

7.10 These and other examples highlight the pitfalls of the temptation to disregard the evidence of accumulated knowledge in the interest of desirable financial objectives.

7.11. The Dept. has had a vacancy for an experienced Soil Scientist/Crop Nutrition Scientist for several years. This deficiency may contributed to the confusion that have influenced the attempted adjustments to fertiliser regimes. Efforts must continue to fill this vacancy or train an individual who has the aptitude and interest in the discipline.

7.12 Most of the issues raised in relation to plant nutrition have been addressed. There is documentation in the Research Dept. that can offer guidance at this time. In the absence of an incumbent scientist, recourse to these reports and recommendations should be sought.

Table 7.1 COMMERCIAL VARIETIES

Variety	ARC % as revised July 2009	2007	2008	2009	2010	2011	Mean TS/H per variety since 2008	Mean TC/H (PI – 5R+) per variety from 2008 to 2011
D 15841	5 - 10	6.9	6.1	5.0	4.2	3.2	4.55	56.7
D 7661	1 - 5	10.8	9.9	9.1	7.0	6.0	4.95	57.5
D 89138	5 - 10	15.7	12.3	9.8	7.4	4.6	4.525	55.3
D 9017	15 - 20	9.1	9.5	12.1	12.7	13.8	5.187	64.5
D 93222	1 - 5	1.1	2.4	3.2	3.7	3.5	5.212	71.5
D 93409	5 - 10	5.2	6.2	6.3	7.3	7.5	5.375	66.9
DB66113	1 – 2*	3.6	2.8	2.1	1.7	1.1	4.3	58.9
DB75159	15 - 20	6.3	6.4	7.6	7.9	7.6	4.518	59.2
DB7569	25 - 30	35.7	34.6	32.6	27.7	29.9	4.84	58.4
DB9314	5 - 10	0.1	0.5	0.7	1.3	2.4	5.8	72.7
DB9633	15 - 20	1.5	5.8	9.0	16.6	18.4	5.98	72.1
R 570	1 – 2**	1.7	1.4	1.5	1.1	0.8	4.6	55.1

7.13. The relationship with the West Indies Central Sugarcane Breeding Station has been maintained. The Dept has also continued the Demerara Breeding Programme that is based at LBI. The recent acquisition of Belize Sugar Industries by the American Sugar Refiners has enabled an expanded relationship of the WICSCBS with the USDA station at Canal Point. This, it is anticipated will strengthen the regional sugarcane breeding effort.

7.14 No variety has attained commercial status since 2008 when DB 9314 and DB9633 were released as commercial. These two and D93409 appear to be the most productive varieties in general cultivation. However the Department has recommended the withdrawal of D93409 because of smut and as a temporary measure two older varieties D7661 and DB66113 have been recommended for limited extension. This is unfortunate because neither variety is as productive as D 93409.

7.15 Since 2007, 27 varieties have been released to estates have had released for Stage 5 and Stage 6 evaluation. The Industry should be in a good position to find new commercials in a short time, if both parties exert the effort to pursue these evaluations purposefully. **The varieties D 9584 and D98633 have had sufficient evaluation to justify extension for Industry wide pre- Commercial trials and factory testing. These should proceed without further delay.**

The releases DB 98209, DB 9854 and D 98281 should also be given priority for accelerated trials as the data from Stage 4 and 5 trials indicate their superior pol %cane. .

Table 7. 2 Varieties Recommended for Stage VI

VARIETY	Year released	Status	PARENTAGE	ISSCT RATING	INDEXED VALUES		
					TC/H	Pol % Cane	TS/H
D9824			D93287 x D93274	HR	101	102	104
D98490			D89190 x Poly C	R	99.5	100	99
D98122		Was withdrawn	D9181 x Poly C	HR	97	105	102
DB9925	March/April 2009	In Trials	DB75159 x Poly C	R	102	98	100
DB99126			DB75159 x Poly C	R	112	92	102
DB99590			DB75159 x D8415	R	108	103	110
D99460			DB9420 x Poly C	R	102	99	100
DB9984			B85342 x Poly C	S	97	104	100
DB9969			B90505 x Poly C	R	109	99	110
D96308			D9119 x Poly C	R	111	101	113
D96261			DB79327 x Poly C	HR	117	96	112
DB9855			BT65282 x C8751	MR	106	109	116
DB99269			B85342 x Poly C	R	113	101	114
D98225			D89158 x Poly C	VHR	107	99	105

D98239	Mar/	D89192 x Poly C	R	95	109	104
DB99176	April 2011	B89666 x Poly C	R	102	105	106
D99192*		DB94109 x Poly C	R	101	103	104
D99187*		DB9486 x Poly C	R	110	101	111
D98602		D8601 x Poly C	MR	107	95	102
D98623*		DB93117 x Poly C	VHR	117	100.2	119
D99325		D8921 x Poly C	HR	121	99	118
DB99367		D8494 x Poly C	MR	109	104	112

7.16 Productivity data are now being obtained from Co 8602 that had been introduced as tissue culture plantlets from India. The objective reports on this variety indicate that it is comparable to the standard DB7869 in quality and gross yield, but that it may have a semi-recumbent habit that is an undesirable agronomic trait. The variety has been recommended for inclusion at the Stage VI trials for evaluation against the other varieties listed as promising.

7.17 The Research Department does indeed continue to generate helpful information that the industry is well advised to take advantage of. The Department must build on its strengths to enhance its image and relevance to the estates. In present circumstances support from the Executive Management will be necessary to emphasise the Dept.'s continuing value to the Industry.

8 Weather and Climate Change

8.1 Agriculture on coastal Guyana is very influenced by climatic variations. The country's sugarcane crop is grown under predominantly rain-fed conditions and the quantity, intensity and distribution of precipitation has a significant impact on the productivity of the sugar cane crop. The average growing environment for sugarcane can be described as moderate rainfall for Skeldon in the eastern coast (Mean Annual Rainfall 1615 mm) rising to 2693mm in the west at Uitvlugt. The quantity of rainfall is variable and is rarely consistent in successive years. The infrastructure for drainage and water management in the sugar estates has been developed to cope with the extreme events of heavy and deficient rainfall, both of which can adversely influence the growth of sugarcane. Excessive rainfall is more damaging as prolonged flooding, when this occurs will kill young cane stools. Wet conditions during harvesting create conditions for long term damage to soil physical properties.

8.2 During the past two decades increasing concern has been expressed over Global climate change. Guyana's low elevation coastal zone is acknowledged to be among the more vulnerable environments to progressively rising sea levels and unstable climatic variations.

8.3 A recent (2009) report to the United Nations Framework for Climate Change (UNFCC) that was developed from data collected from Vulnerability Climatic Assessment Studies in 2008 has indicated from the application of two Atmospheric Oceanic Global Circulation Models (A-OGCM) that the medium term trend would be for a decreasing rainfall in coastal Guyana, with more intense storms during the "wet seasons" and extended droughty conditions in the drier seasons. During the same period higher tide levels and storm surges are predicted. The study has pointed to the importance of strengthening the coastal defence infrastructure to minimise risk to the country's major population centres and productive areas.

8.4 The implied risk to sugarcane can however be turned to an advantage by practising more effective water management including replacing high volume surface irrigation methods with more conservative drip or low volume overhead methods.

8.5 Guysuco maintains and monitors rainfall and climatic trends and collaborates with the Hydrometeorology Dept. in the interpretation of medium term climatic trends. The Industry has coped with severe drought and flood events. In both cases risks and management responses for each estate have been well documented.

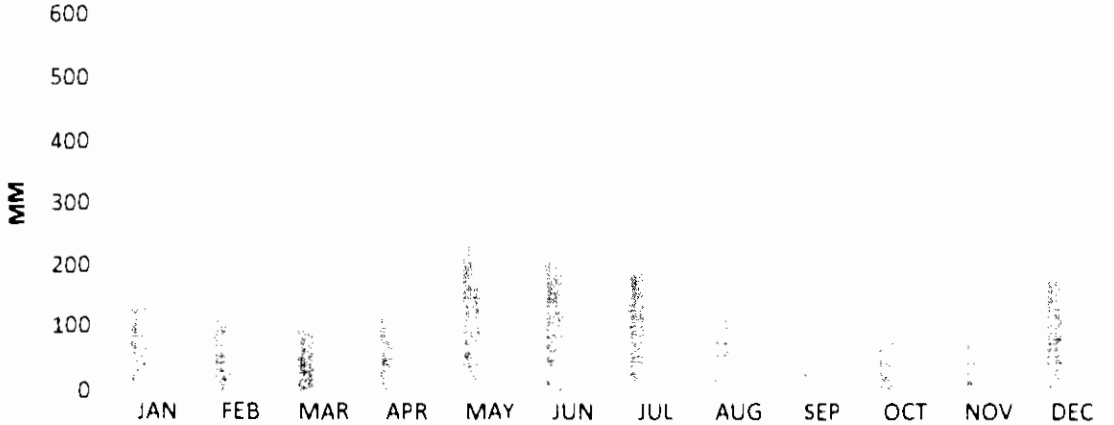
8.6 This material is used as resource material for training and strategy planning sessions that are conducted whenever a risk of an extreme weather event is indicated. This practice should continue. The Industry's Climatologist and Hydraulics Engineer would be the responsible individuals.

8.7 There has however been little evidence for any definitive climatic change trend affecting the sugar industry, despite frequent assertions that these have been occurring over the recent years. Weather on the coast has always been very variable, particularly during the months of

January and February. The mean rainfall over the past 20 years has been consistent with the historical pattern, although it is evident that the past decade has been a period of above average rainfall for which there is also a precedent.

8.8 Uncertainty of rainfall or climate probably causes greater concern today because there is more dependence on machinery for agricultural operations during the cropping periods. Wet conditions restrict access to fields and will risk damage to the soil and crop by compacting effects of machinery traffic. The established custom in Guysuco is to plan for a combined operating crop period of 32 weeks in situations more dependent on machinery, it would be appropriate to determine and plan for the driest available weeks. Rainfall distributions can be analysed to highlight this as follows:

Fig 8.1 SKELDON ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	132.04	117.04	94.87	117.2	237.95	208.63	190.32	115.88	41.82	78.17	72.21	177.26
MAX	415	418.2	486.9	254.1	511.6	389.6	402.3	232.3	170.7	396.9	147.2	558.6
MIN	20.5	2	22	27.7	42.7	92.2	81	23 5	1.3	7.2	14.2	60.2

Table 8.1 Summary of wet months SKELDON ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	45%	25%	15%
February	50%	30%	15%
March	20%	10%	5%
April	60%	25%	10%
May	95%	85%	65%
June	95%	80%	45%
July	95%	70%	35%
August	55%	30%	5%
September	5%	5%	0%
October	20%	5%	0%
November	30%	0%	0%
December	65%	45%	25%

Fig.2 ALBION ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014

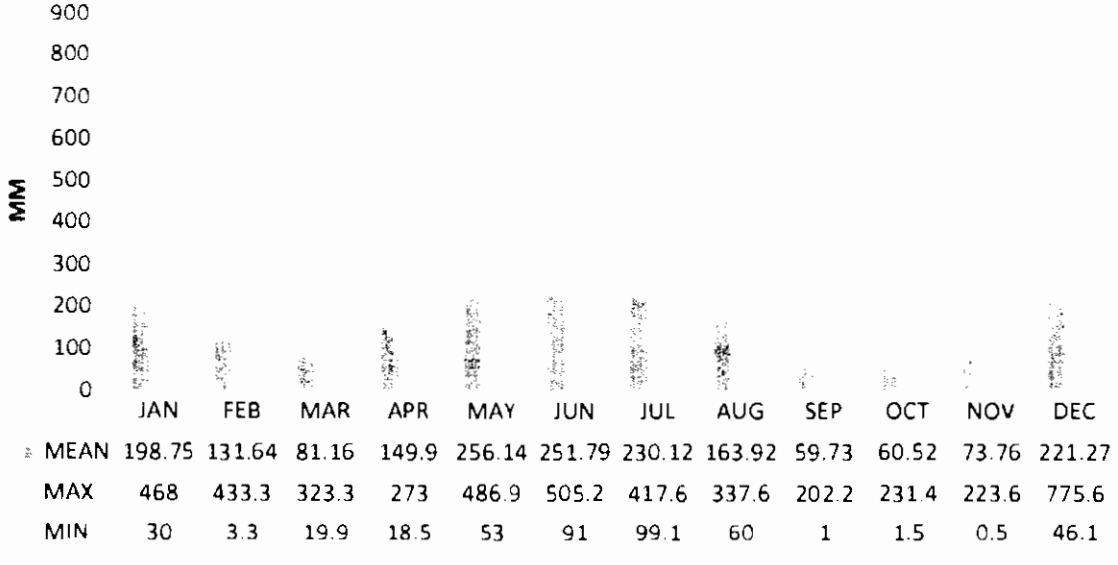


Table 8.2 Summary of wet months ALBION ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	70%	60%	40%
February	45%	35%	25%
March	25%	10%	5%
April	60%	55%	45%
May	90%	75%	65%
June	90%	85%	65%
July	95%	80%	70%
August	70%	55%	30%
September	15%	5%	5%
October	20%	5%	5%
November	30%	15%	5%
December	75%	50%	35%

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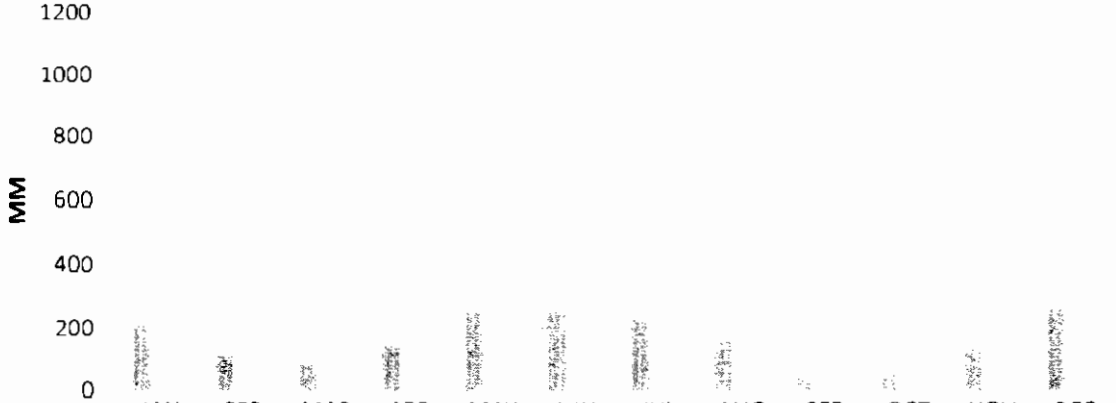
Fig 8.3 ENMORE ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	217.6	115.3	85.9	146.3	264.1	254.7	227.5	158.7	50	55	132.4	264.6
MAX	710.2	351.5	397	316	560.6	393	405	387.5	233	207	271.2	1068.4
MIN	16	10	15.5	1.3	66.9	85	70.5	9.9	0	3.6	4.6	45.9

Table 8.3 Summary of wet months ENMORE ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	65%	55%	50%
February	40%	30%	20%
March	25%	10%	10%
April	70%	45%	20%
May	85%	80%	75%
June	95%	95%	70%
July	90%	80%	60%
August	80%	65%	20%
September	10%	5%	5%
October	10%	5%	5%
November	60%	40%	25%
December	70%	65%	50%

Fig 8.4 UITVLUGT ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014

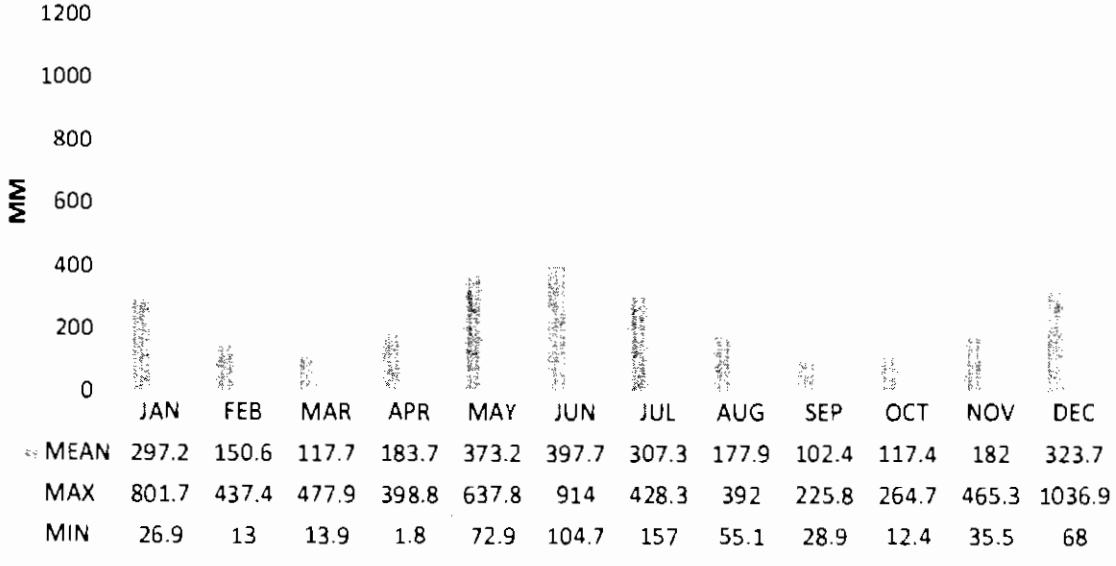


Table 8.4 Summary of wet months UITVLUGT ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	80%	65%	55%
February	50%	40%	30%
March	50%	25%	15%
April	70%	60%	45%
May	95%	95%	85%
June	100%	95%	80%
July	100%	100%	90%
August	80%	45%	40%
September	40%	15%	5%
October	50%	30%	10%
November	70%	55%	30%
December	85%	75%	75%

8.9 On the assumption that a monthly rainfall under 150mm would be sufficiently dry to permit harvesting in most cases, this analysis strongly suggests that with the dry month restriction the "Second Crop" harvest campaign should not commence before August on the majority of estates. In Uitvlugt with a 45% occurrence of August rainfall exceeding 200mm, would commence later than the other estates. This rainfall distribution does warrant consideration of a harvest campaign lasting from mid- August of one year through to the end of April of the succeeding year, with a short break during December and January. It would probably be advisable to keep factories in a state of readiness to resume operations as soon as conditions permit, following the year end rainfall, that is commonly unpredictable and perform major maintenance from May to July.

8.10 Skeldon is the only estate where conditions are indicated to be dry enough to consider an end of July start. The present conditions are at variance with this observation. It has been determined that the installed Skeldon external drainage is well below the design requirements. The activation of the new Manarabisi/No66 pump and drainage link should impact on this deficiency. However similar wet conditions prevail in the Crabwood Creek and Molsen Creek cane farming areas. The drainage infrastructure in these areas should be assessed and an appropriate plan prepared without further delay.

9 Environmental Matters

9.1 The Guyana Sugar Industry has carefully established a sound reputation for responsible environmental stewardship. The Industry had made significant progress towards certification under the ISO 14001 by 2008. Unfortunately the process has not been completed following the departure by migration of the former Manager of Analytical and Environmental Services who was the sponsor of the programme.

9.2 Notwithstanding the systems of monitoring by analyses of effluents and discharges from Factories and Agriculture activities has continued. The Guyana Environment Protection Agency has been coordinating this programme with full support from the Guysuco Analytical Services Section.

9.3 There have been no reports of water bourne diseases or health hazards on GuySuCo's estates. Good quality of potable water is supplied at all times to field labour.

9.4 Crop Protection for the Industry is based on an Integrated Management approach that emphasises the use of agrichemicals, biological control and cultural practices as appropriate. Agrichemical usage is predominantly herbicides. There is minimal use of insecticides. Fipronil is usually recommended for treatment of termites although Chlorpyryphos has also been used as an alternative. Guidelines for agrichemicals usage, storage, and disposal were published by the Agrichemical Safety Committee in 1996. These continue to be followed. In 2008 the Agriculture Research Dept. published a Manual on rodent control, emphasising surveillance, prevention and baiting strategies. Both publications have been found useful as reference by other Industries

9.5 Aerial spraying is the method of choice for broadcast application of herbicides. This method ensures uniform cover and treatment, accuracy is guaranteed by the SATLOC GPS system. Large areas are achieved in a single day. This practice also minimise exposure of humans to chemicals there are strict rules governing aerial spraying. These include the proximity to housing areas and non-sugar cultivations. Increasing urban spread particularly in Demerara and farming in Berbice restricts the extent to which the equipment can be used. Care is taken to contain washings from spray aircraft, knapsack and boom spray equipment. These ae treated in containment ponds that are tested prior to release.

9.6 The majority of the chemicals used on sugar estates are low dose chemicals of short life cycle or that are readily degraded. Two of the widely used a chemicals in the Sugar Industry, glyphosate and 2,4D amine have recently (2015), been placed on the WHO's International Agency for Research on Cancer (IARC) list of possible carcinogens. There is however considerable evidence that does not support a link with cancer for either chemical.

9.7 In 2007, the US EPA issued a ruling that the available evidence does not support a link between 2,4D exposure and cancer in humans. The EPA reinforced this conclusion in 2012,

stating that new studies and the Agency's comprehensive review leads to the conclusion that 2, 4-D tolerances were safe at "normal" exposure levels. The European Food Safety Authority has also concluded in in a 2011 ruling that residue limits of 2,4D were not expected to be of concern to European consumers. This is however widespread agreement that the more volatile ester forms of 2,4D could constitute environmental hazards.

9.8 The IARC published risk with Glyphosate has generated considerable discussion which is to be expected, given the chemical's widespread use as a broad spectrum non selective herbicide. Most regulatory agencies have not endorsed the IARC position. The comprehensive Agriculture Health Study of the United States has found no evidence for association of glyphosate with the incidence of cancer among the large sample population of applicators (De Roos etal, 2005). The USA EPA is currently conducting a detailed review of the available data on glyphosate toxicity and epidemiology. The German Federal Institute for Risk Assessment published in 2013 a detailed Review of the toxicology of glyphosates that concluded that the available data did not support any labelling of glyphosates as carcinogens.

9.9 Small Sugar Industries such as Guyana will have to act in their best interest if they are to remain competitive. This includes using cost effective agronomic technology. The Industries should not panic over the recent alleged disclosures on its main herbicides but will have to remain vigilant on the growing evidence either for or against a cancer link over the next few years. In the meantime the Research Dept. will have to investigate the efficacy and cost implications of alternatives to these agrochemicals.

10 Opportunities for Diversification

10.1 The implications from market prospects suggest that Industries dependent on raw sugar exports will face an uncertain future unless they have access to favourable bilateral trade arrangements and can maintain low costs. While there is scope for significant cost reduction mainly by improved productivity in the Guyana sugar estates, these are unlikely to be sufficient to make this Industry profitable under a single commodity production model.

10.2 It is therefore necessary to explore alternative options for economic activity from the existing plant and lands under sugarcane cultivation. During the 1970's and 1980's, in consequence of reduction of the available quota from the USA, the Guyana Industry had embarked (with grant funding from the USA) on an ambitious programme of diversifying agriculture production. Several programmes were evaluated with varying levels of economic and productivity success. The more prominent were dairy cattle (for cheese), rice, aqua-culture and field grains. In the decades following with more emphasis on the core activity – sugarcane production, a number of studies were conducted on options for vertical diversification within the sugar cane crop.

10.3 ETHANOL

10.3.1 Between 2002 and 2006, in depth studies were conducted in Guysuco to assess the feasibility of Fuel ethanol (Davis et al, 2005). This was followed by a formal assessment of the scope of this work by an ECLAC consultant (Horta and Coviello, 2008). That report endorsed the findings of the Guysuco assessment that had concluded that while there was no cost incentive to substitute sugar production by ethanol, conversion of surplus molasses to fuel ethanol should be a cost effective measure to provide 11.3 M liters of anhydrous ethanol for blending into a 10% mix with gasoline. Productivity indices from this study are summarised in Tables 10.1

Table 10.1 Alternatives for modernization of a sugar mill in Guyana (2005)

Alternative	Sugar production (tons)	Molasses production (tons)	Ethanol production (thousands of litres)	Electric power generation (MWh)
Original situation	80,182	32,073	-	-
Sugar only	73,409	29,364	-	25,200
Sugar and ethanol from exhausted molasses	73,409	(14,098)	11,300	25,200
Sugar and ethanol from rich molasses	56,283	-	11,300	25,200

Table 10.2 Cost of production of ethanol from molasses (2005 study)

Component	Estimated cost (US$/litre)
Raw material (molasses)	0.1731
Energy (steam and electric power)	0.0196
Chemicals	0.0303
Wages	0.0097
Maintenance	0.0082
Other fixed costs	0.0051
Total	0.2461

10.3.2 At the time this work was undertaken the analyses indicated that at a price of under US$320 per tonne of sugar, the production of ethanol could be price competitive. This would be the projected price of sugar after 2017. However the price of oil has also fallen significantly and at current prices of US$.28 per liter (equivalent to $45 per Barrel) the price received for sugar would have to fall below $170 per tonne for fuel ethanol from cane to offer an alternative to sugar. These prices are moreover significantly below the Guyana Sugar Industry cost of production.

10.3.3 The ECLAC and Guysuco analyses also indicated that at the extant price of fuel, production of fuel ethanol from molasses (after consideration of contract commitments) would be an advantageous value added prospect. The 2014 price received for molasses was US$ 121 per tonne. This would be equivalent to a value of $0.46 per liter converted to ethanol. At current fuel prices, further processing to fuel ethanol is not justified.

10.4 COGENERATED POWER

10.4.1 Over the production plan period, an increasing proportion of cane supplied to factories will be derived from machine harvested and loaded canes. This will inevitably require investments in the factories of the necessary equipment to cope with higher levels of extraneous matter and mud. Replacement of aging Boiler plant is projected in most cases. Estates should take advantage of this requirement to install high or medium pressure boilers

and perform the necessary modifications to the drives and process that will reduce power requirements and enable the export of power from each mill during the cropping season.

10.4.2 The Indicative cost for an Installed Boiler and Turbine Alternator equipment is US$ 11.M The export of power was indicated to be a significant contributor to income in previous industry studies including the ECLAC (2008) study. Seasonal (6month) supply would enable the Utility to rest and service generating equipment in a phased predicable manner. The generation of power from bagasse will also be compatible with a base power production based on hydro-power that may be the likely medium term development plan for the Guyana Utility Company. The design of these projects and export potential would have to be determined in a detailed feasibility study.

Boiler Pressure	Operating Temperature	Export potential
31 Bar	440 Degrees C	76 kwh/t cane
45 Bar	440 Degrees C	92kwh/t cane
82 Bar	525 Degrees C	143 kwh/t cane

Table 10.3 Benchmarked Boiler and Power Export Indicators – Mauritius

10. 5 WHITE SUGAR

10. 5.1. Construction of a refinery is a medium term consideration in the Guysuco Strategic Plan. A lower cost alternative would be the production of plantation white sugar in a raw sugar factory using Ultra Filtration and poly anions processing aids. This technology was developed in the first decade of the 21st century and is claimed to have energy and environmental advantages over more conventional sulphitation, carbonation and"Blanco Directo" processes. This grade of sugar would satisfy the requirements of most food processers but not bottlers. The Factory Team has recommended evaluation of this option as well as that of a conventional refinery.

10.6 Several presentations sought to offer options for diversification of the field operations in the event of any factory closures. The options were classified as CROPS, LIVESTOCK and AQUACULTURE.

10.7 CROPS

10.7.1 The only other Crop that has the scale of land use similar to the Sugar Industry is Rice which has low labour requirements relative to the evolving Sugar Industry. The low labour input in rice cultivation is not attractive as an alternative to the operations in the cane fields.

10.7.2 The National Agriculture Research & Extension Institute is evaluating other crops that may have commercial potential for coastal agriculture. These include maize, soybeans, passion fruit and other orchard crops, Meringa and Quinoa among others. Some Wales Cane Farmers are also major suppliers and exporters of pineapple.

10.7.3 The product of any other crops on an extended scale will suffer from prices influenced by seasonal oversupply unless some form of processing is integrated in the production cycles.

10.7.4 It would be foolhardy to plan for any extensive farming that requires abundant labour which is one of the main reasons why the Cane Cultivation at Uitvlugt is so unproductive with a factory that can only work every other day.

10.8 LIVESTOCK

10.8.1 Proposals for Beef Cattle Units that can mature within 10 years have been considered, but to replace all the cane cultivation land in phases will require capital investments outside the scope of this inquiry and points once more to the involvement of private investment.

Parameters	1	2	3	4	5	6	7	8	9	10
Calving Rate (%)	60	60	60	60	70	70	70	70	75	75
Calf Mortality (%)	10	10	10	10	10	10	10	10	10	10
Culling Cows (%)	0	0	0	5	7	10	10	10	10	10
Culling Heifers (2-3 yrs.) (%)	0	0	0	0	0	0	0	0	0	0
Culling Bulls (%)	0	0	0	0	0	0	33	33	33	33
Mortality (9-24 mths) (%)	10	10	10	5	5	5	5	5	5	5
Mortality (Adult) (%)	5	5	5	5	5	5	5	5	5	5
Bull: Adult females	1:30	1:30	1:30	1:30	1:30	1:30	1:30	1:30	1:30	1:30

YEAR	0	1	2	3	4	5	6	7	8	9	10
HERD COMPOSITION											
Breeding Bulls	6	6	6	7	7	7	7	8	9	10	12
Breeding Cows (purchased)	200	190	180	171	194	212	221	235	273	311	352
Male Calves		51	49	46	53	67	70	75	88	107	121
Female Calves		51	49	46	53	67	70	75	88	107	121
Bulls/Steers (1-2 yrs.)		0	46	44	44	50	64	66	71	84	102
Bulls/Steers (2-3 yrs.)		0	0	41	42	41	47	60	62	67	79
Bulls/Steers (3-4 yrs.)		0	0	0	41	42	41	47	60	61	66
Heifers (1-2 yrs.)		0	46	44	44	50	64	66	71	84	102
Heifers (2-3 yrs.)		0	0	41	42	41	47	60	62	67	79
Total herd		298	376	440	520	577	631	692	784	898	1034
Total Animal Units (au)*	156	174	207	259	323	348	377	418	475	534	613

As a general comment, the physical land area would pose no problem for beef cattle development on areas already not producing harvestable cane. It is not envisioned that any cane cultivation would be closed to accommodate diversification of the land not in actual cane production.

The unit of 1,000 beef animals would require 650 hectares of land with the assumption that controlled rotational grazing would be the primary management system.

If feedstock has to be developed, other sugar industries have a broiler production capability utilizing bagasse as litter. The bagasse chicken litter is collected and stored, to be later mixed with molasses and fed to the cattle. Those broiler units can be contract farms supplying chicken to a processing entity like Bounty Farms.

Other options for livestock development would not utilize the land assets now under cane or temporarily abandoned lands and will require serious feasibility studies.

The contentious issue of the INVESTMENT required, points to the need for other agencies or private individuals having a stake in these diversification proposals.

10.9 AQUACULTURE

10.9.1 The Sugar Industry layout with fields surrounded by dam beds is considered an ideal opportunity for the development of aquaculture.

10.9.2 The intensive system which requires relatively dense fish populations will have to include feeding regimes to support those populations.

10.9.3 It has been posited that the water quality will have be improved by forms of aeration requiring energy demanding options. Not enough detailed studies have been done so far to determine the variations in the water quality and the means by which it can be improved to acceptable high stock production levels.

10.9.4 Tractor powered PTO driven units have been offered as suitable means of achieving the optimal oxygen levels in the initial stages and could evolve into the more sophisticated aeration systems. The harvesting operations may dictate that there should be actual modification of the existing bed layout used for cultivating sugar cane and may become more attractive as the expansion proceeds.

10.9.5 Fortunately the supply of water or the drainage of the production ponds ought not to be critical factors as has been experienced in other aquaculture enterprises. Like the livestock proposals, sections of the cultivations temporarily abandoned especially in the Demerara Estates can be started as pilot projects preferably with private investment proposals.

11- Summary – Significant Observations and Recommendations

11.1. General

11.1.2 Since 2009 there has been a precipitate decline in cane yield and sugar output. Unsettled weather has not been a factor.

11.1.3 Restricted cash flows and poor credit arising from high expenditure on issues associated with the new Skeldon factory have led to reduced spending on inputs for agriculture.

11.1.4 There were reports of several instances of deviation from established guidelines for sound agricultural management. These have included, superficial tillage, planting outside of the recommended planting windows, and late timing of inputs.

11.1.6 -Attempts made to adjust fertilisation policy by reducing the rates of basal fertiliser contributed to a significant yield reductions in the succeeding seasons.

11.1.7. Severe weed infestation in East Demerara, Wales and Uitvlugt Estates have occurred because of poor management of inputs and neglect of the cultivation

11.1.8 The practice of bringing forward canes to achieve production targets, appears to have become institutionalised as a standard practice over the past 5 years. This practice not only sacrifices the potential production that may have resulted from harvesting those canes at maturity, it also risks compromising the subsequent development from those areas by exposure of the young developing stools to end of season rainfall and in some cases having adverse physiological impacts for subsequent crops.

11.1.9 Shortage of cash resulted in non- availability of fertilizer for over 6000 ha after completion of the 2015 First Crop

11.1.10. Subventions totalling G$12B were allocated from the Central Government to support the Sugar Industry operating expenses.

11.1.11 ***Central Government support will be necessary in the foreseeable short term, it is recommended the level of support should be agreed for the commencement of the production year and expenditure an agriculture should be linked to the attainment of progressive targets for a plan of improved production on each estate.***

11.1.12 *Emphasis of this programme will include adherence to agriculture guidelines on timing of operations and inputs, work quality, training and experience sharing, feedback from field inspection and surveillance to be included in planning for daily work programmes, resuscitation of seed nurseries and adherence to variety distribution agreed with the Breeding and Selection Dept.*

11.1.13 *Estates' management will be accountable for attainment of production targets for individual estate*

11.1.14 ***The appointment of a Director of Agriculture is recommended. This individual would be ultimately accountable far attainment af the agriculture production objectives.*** *The Director and his team would identify and address weaknesses in estates' efforts, including training, and will provide the leadership for the necessary changes required to modernize the Guyana Sugar Industry*

11.2 Production and Cost

11.2.1. With the information that financial support would continue to be provided for operating expenditure and justified critical capital, estimates of cane and sugar production were projected up to 2025. The projected expenditure US$ 29M is significantly less than the requirement of US$ 68 M.

11.2. 2. It is forecast that 3.5M tonnes of cane and 300,000 tonnes of sugar should be produced by 2020. This would increase to 3.8M tonnes of cane and 326,000 tonnes of sugar by 2025. Acquisition of new tillage equipment in 2016 and 2017 would enable the attainment of 3.5M tonnes of cane by 2019. The production of 3.8M tonnes of cane should be viewed as an indicator of steady state production. These estimates are of the same order of magnitude as those submitted by Guysuco.

11.2.3. Analyses of the production cost indicated that by 2020, average Industry agriculture cost of production should be 20¢ per pound of sugar. **In this scenario, even the lower cost Albion and Blairmont estates at 17¢ and 18¢ per pound respectively would not be profitable in the post 2017 European market for raw sugar.**

11.2.3. It is concluded that the production of raw sugar for export would not guarantee a sustainable future for the Guyana Sugar Industry

11.2.3 ***It was recommended that the production of power for expart should be considered for each factory. It is envisaged that the exparted power would be seasanal. This project wauld require commitment an a Feed In Tariff (FIT) from GPL.***

11.2.4 *The production of food grade Plantation white sugar using a new technology, Ultra Filtration is also recommended for further consideration.* ***There is a potential market of 200,000 tonnes for white sugar in CARICOM***

11.2.5 The 2020 production cost data also indicated that at prices for raw sugar, it would be cheaper for the Wales factory to purchase cane from farmers than to cultivate its own cane.

11.2. 6 It is also evident from the cane production estimates that there would be insufficient cane in West Demerara to satisfy the complete requirements for two factories.

11.2.7. ***On this evidence, it is recommended that a formal evaluation of the financial implications for Guysuco and the farmers of transferring all of the Wales cane supply to farmers. The actual cost of production for farmers' canes would be an impartant factar far***

this work. The evaluation should also consider the feasibility of rationalising the West Demerara cane production around one factory.

11.3. Cane Farming

11.3.1 *The development of mechonised Cane Forming ot Skeldan from 2007 has had more than its fair share of challenges combined with new Factory technology.* ***This initial investment by private Cane Farmers was plagued by harvesting schedules way outside the original plan and by a relatively chronic erratic Factory Performance.***

11.3.2. ***Other forms of private Cane Farmers investment initiated at Wales and Uitvlugt Estates in 2011 encouraged farmers to plant cane on the Estate temporary abandoned lands (TAB) and this should be analysed for the economic and financial returns.***

11.4 Skeldon Issues

11.4.1. Skeldon has experienced difficulty in harvesting its standing crop because of restricted access to fields and forced harvesting in wet soil conditions for successive seasons, with consequent soil compaction and damage to cane stools Unreliability of the Factory has influenced late starts and reduced the crop duration. As a result has been increasing areas of over-age canes in both the estate' and farmers' cultivations.

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11.4.2 These problems were influenced by inadequate drainage capacity for the expanded area and the fundamental error made from the onset of the programme in which only cursory attention was paid to land levelling.

11.4.3. In 2015 a 340 TPM drainage pump was installed by the NDIA on the banks of the Canje to drain the Manarabisi sections of the cultivation. The drainage canal to the estate at Sookram's Cross remains to be completed.

11.4.4. ***It is recommended that Guysuco actively pursue the construction of the canal during the 2015 dry season and undertake the task if there is a delay in approval for funding from the NDIA.***

11.4.5. *Land levelling will be conducted on oll fields scheduled for rehobilitotion commencing the Second Crop of 2015. Guysuco has been advised to arrange for on-site training on operation ond survey methods ond interpretation by the loser system supplier.*

11.5- Mechanisation

11.5.1.. Mechanical loading of hand cut cane has been widely accepted by labour and is now the main contributor to the supply of cane. The task allows for greater harvesting productivity

and potential earnings. The rate of compensation for the practice has overestimated the effort and time involved for the output.

11.5.2 *An additional 15% of the set cut and load rate is paid to compensate for stacking that was intended to include field difficulties. This has been overlooked in practice.* ***It is recommended that Guysuca should wark with the Unian ta eliminate the additianal payments for obstacles and extras still incurred in cut and Stack***

11.5.3. Progress has been made with the development of a commercial combine harvesting operation. At the commencement of operations at Skeldon, there were unfortunately several breakdowns and mechanical failures that could have been avoided if the mechanization support term had not been disbanded.

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11.5.4. The advent of mechanically harvested and loaded canes has proven a challenge to the factories. Extraneous matter and excess soil from the field cause major problems with steam generation and processing.

11.5.5. Machine traffic in wet soil results in soil compaction, stool loss and inevitably has impacted on yield decline on fields so affected.

11.5.6. These problems and other issues will have to be solved and managed for this mode of operation to be adapted to the conditions that will prevail in coastal Guyana.

11.5.7. ***The appointment of an experienced senior Agricultural Engineer os Mechanisation Coordinator is recommended.*** *This individual wauld co-apt as required, competent persons within the Industry to work with him in addressing the several technical and system development areas required for a robust and sustainable mechanised industry.*

11.5.8. *The beneficial cost impacts of mechanization an various operations are already being reflected in the Industry Management Accaunts. The transformation of the Industry to one in which the mechanized optian becomes the method of choice will largely depend on the adaptability of the Management and Supervisory staff.* ***It is recommended that the Industry seeks to recruit Mechanical Engineering graduates into the Field technical streams.*** *On estates with a high extent af mechanization the following structure is proposed for the senior Agriculture organization:*

This structure simplifies the current Field Management structure and places greater emphasis on technology than people management. *The Engineering Manager would be an experienced Agriculture Engineer and would through his reports hold responsibility for harvesting tillage and maintenance of the estates' infrastructure. The Crop Manager would also be required to be conversant with the application of machines to crop management such as planting, application of fertilizers and agrichemicals and cultivation. .*

11. 6 Agriculture Procurement

11.6.1 The main agricultural items were identified as Fertiliser, Steel Plates mechanical spares, and Agrochemicals. The tender system is not really competitive as the number of compliant bids that satisfy the Corporation's payment terms rarely exceeds two. Those agencies remaining have been sympathetic to the financial constraints of the Corporation but still require payment upfront before delivery of the orders.

11.6.2 Unfortunately the delays in supplies have compromised too many of the routine operations which have been manifested by a combination of desperate alternatives in order to maintain sugar in the bag.

11.7. Research

11.7.1. The value of the Research Dept. and its potential for contribution to the operations of the Industry in a difficult period has been largely ignored. Support for capacity building such as subscriptions to journals and professional associations for the Technical staff were withdrawn

11.7.2 There has been no new commercial variety released to the industry since 2008, although 27 varieties have been released to estates for Stage VI evaluation. A major variety D93409 is being withdrawn from cultivation because of the smut disease. Two older varieties DB66113 and D7661 have been re-introduced to replace it. This is not a positive development.

11.7.3 ***It is recommended that the Dept. and estates progress the pre-commercial and factory response evaluations on D 9584 and D 98633. One or both of these could gain acceptance within the cultivation as commercial canes.***

11.7.4 ***This Dept. will need strong support from the Executive management if it is to effectively discharge its role.*** *It is only foir that o decision be token on the stotus of the Heod of Research who has been acting for the past six years.*

11.8 Weather

11.8.1 Global Climatic Trends predict a drier climate for coastal Guyana, with more intense rainfall events in the wet seasons and extended droughty conditions in the dry seasons. The sugar industry has been a collaborator in the work leading to these predictions. The Industry and crop would be in a position to adapt to these changes

11.8.2. *Analyses of rainfall trends over the post two decades indicates that the middle of August would be the oppropriate time for Estotes to commence operations in the "Second Crop". In order to take advantage of the driest weeks of the year, a production schedule extending from mid-August to the end of April could be evaluated. Production would stop from the late December and January, but factories would be kept in reodiness for continued operations as soon as the weather permits*

11.9. Environment

11.9.1. The International Agency for Research on Cancer (IARC) of the World Health Organisation (WHO) has listed 2,4D Amine and Glyphosate as possible carcinogens. These are the two most widely used agrichemicals in the Guyana Sugar Industry.

11.9.2. **The IARC findings on both chemicals have been disputed by several independent scientific studies and are not supported by the Environmental Regulatory Agencies of major Agricultural countries including the USA and Europe**. The controversy will very likely continue for the next several years.

11.9.3 *Small Industries like Guyana will have to act in their best Interests and keep a close eye on these developments. The available evidence on all positions should be made available to interested parties. In the meanwhile the Research Dept. would be required to search for and evaluate effective replacement chemicals.*

11.10. Diversification

11.10.1. *The production of fuel ethonol was considered using the production parameters of previous studies in 2005 and 2008.* ***The low prices of oil and its related products at this time are not in favour of substituting sugarcane nor molasses to fuel ethanol production.***

11.10.2. ***Power export by cogeneration is the most stable value added product from sugarcane. The example of Mauritius is considered an example of a sugar industry that has***

been transfarmed ta a majar pawer generatian campany. *This project is discussed in Section 13 of the Factories Report.*

11.10.3. *The production of other crops on an extended scale will not engage the Field labour that is likely to be displaced by any form of contraction of field operations on any estate*

11.10.4. *Livestock in the form of Beef herds can be a viable option especially for estate cultivations with temporary abandoned lands without compromising the residual sugarcane production and factory supply. Aquaculture could be considered similarly but will require further feasibility study for a commercial operation.*

11.11. Overall Recommendation

This study cansiders that with dedicated management and attentian ta detail, agriculture autput will imprave ta acceptable levels. Ta secure stable agriculture perfarmance additianal Capital investment af US$76.3M has been identified in additian ta rautine capital and maintenance requirements. The State has clearly stated that it will be unable ta sustain subsidisatian at these levels. The cast analyses far agriculture praductian indicate that na estate would be prafitable at prajected prices far raw sugar. It wauld therefare be necessary far ecanamic value added praductian far a viable and sustainable future. Our study recagnises the patential value af Cageneratian and pawer expart as well as the appartunities that faad grade white shauld present far markets within the regian. These prajects wauld entail significant capital investment that will be unavailable fram the public funds. We therefare canclude that private investment and awnership is the way farward ta transfarming the Sugar Industry inta a madern pragressive business.

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Appendix 1

Industry Production Trends

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 039.6	30360	459 395	57.14	3.78	15.13	2 408.1	8454	127 253	52.84	3.51	15.05	10 447.7	38 814	586 648	56.15	3.72	15.11
Albion	8 964.5	54331	589 024	65.71	6.06	10.84	120.9	624	8174	67.61	5.16	13.10	9 085.4	54 955	597 198	65.73	6.05	10.87
Rose Hall	6 305.1	28884	364 423	57.80	4.58	12.62	646.3	3069	40694	62.96	4.75	13.26	6 951.4	31 953	405 117	58.28	4.60	12.68
Blairmont	5 732.3	35152	402 873	70.26	6.13	11.46							5 732.3	35 152	402 873	70.28	6.13	11.46
Enmore	4 389.5	18928	231 484	52.74	4.31	12.23	127.8	396	5 072	39.29	3.10	12.68	4 517.3	19 324	236 506	52.36	4.28	12.24
LBI	2 693.8	10060	127 048	47.16	3.73	12.63	66.8	267	3 592	53.78	3.99	13.46	2 760.6	10 327	130 641	47.32	3.74	12.65
Wales	2739.6	10214	124 730	45.55	3.73	12.21	2362.8	11009	139 034	58.84	4.66	12.63	5 102.4	21 223	263 764	51.69	4.16	12.43
Uitvlugt	3 934.8	13396	174 816	44.43	3.40	13.05	352.8	2299	30 524	86.52	6.52	13.28	4 287.6	15 695	205 340	47.89	3.66	13.08

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 358.7	33754	488 087	58.39	4.04	14.46	2 564.7	8621	129 312	50.42	3.36	15.00	10 923.4	42 375	617 399	56.52	3.88	14.57
Albion	9 030.0	54964	616 092	68.23	6.09	11.21	127.9	630	7681	61.62	4.93	12.50	9 157.9	55 595	623 973	68.13	6.07	11.22
Rose Hall	6 314.9	31062	395 573	62.64	4.92	12.74	646.7	2912	37508.6	58.00	4.50	12.88	6 961.6	33 974	433 081	62.21	4.88	12.75
Blairmont	5 666.2	33180	387 842	68.45	5.86	11.69							5 666.2	33 180	387 842	68.45	5.86	11.69
Enmore	4 789.5	16964	221 826	51.71	3.95	13.08	183.5	608	8 346	45.48	3.31	13.73	4 473.0	17 572	230 172	51.46	3.93	13.10
LBI	2 659.1	9934	141 652	53.27	3.74	14.26	53.0	94	1 325	25.00	1.76	14.17	2 712.1	10 027	142 977	52.72	3.70	14.26
Wales	2934.4	11468	144 036	49.09	3.91	12.56	2370.1	10611	134 764	56.86	4.48	12.70	5 304.5	22 079	278 800	52.56	4.16	12.63
Uitvlugt	4 016.8	15625	205 862	51.25	3.89	13.18	539.6	3185	43 249	80.15	5.90	13.58	4 556.4	18 810	249 111	54.67	4.13	13.24

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 482.0	39137	528 348	62.29	4.61	13.50	2 408.0	9288	130 032	54.00	3.86	14.00	10 890.0	48 425	658 380	60.46	4.45	13.60
Albion	9 001.6	57432	626 010	69.54	6.38	10.90	128.0	635	7936	62.00	4.96	12.50	9 129.6	58 067	633 946	69.44	6.36	10.92
Rose Hall	6 314.9	33203	415 032	65.72	5.26	12.50	646.0	2959	38760	60.00	4.58	13.10	6 960.9	36 161	453 792	65.19	5.19	12.55
Blairmont	5 493.1	34125	385 615	70.20	6.21	11.30							5 493.1	34 125	385 615	70.20	6.21	11.30
Enmore	4 472.3	19943	243 305	54.40	4.46	12.20	183.5	636	8 074	44.00	3.46	12.70	4 655.8	20 579	251 379	53.99	4.42	12.22
LBI	2 798.0	12364	150 837	54.69	4.48	12.20	55.0	146	1 925	35.00	2.69	13.00	2 813.0	12 512	152 762	54.31	4.45	12.21
Wales	3041.1	13794	166 911	54.89	4.54	12.10	2300.0	10222	128 800	56.00	4.44	12.60	5 341.1	24 017	295 711	55.37	4.50	12.31
Uitvlugt	4 110.0	17189	220 018	53.53	4.18	12.80	700.0	3977	52 500	75.00	5.68	13.20	4 810.0	21 166	272 518	56.66	4.40	12.88

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 482.0	43330	563 284	66.41	5.11	13.00	2 500.0	10185	137 500	55.00	4.07	13.50	10,982.0	53 515	700 784	63.81	4.87	13.10
Albion	9 001.6	59385	647 300	71.91	6.60	10.90	128.0	625	7808	61.00	4.88	12.50	9,129.6	60 010	655 108	71.76	6.57	10.92
Rose Hall	6 314.9	35008	437 603	69.30	5.54	12.50	646.0	2982	38760	60.00	4.62	13.00	6,960.9	37 990	476 363	68.43	5.46	12.54
Blairmont	5 493.1	36133	397 465	72.36	6.58	11.00							5,493.1	36 133	397 465	72.36	6.58	11.00
Enmore	4,472.3	21979	263 752	58.97	4.91	12.00	183.0	634	8 052	44.00	3.46	12.70	4 655.3	22 613	271 804	58.39	4.86	12.02
LBI	2 798.0	13434	161 206	57.61	4.80	12.00	55.0	172	2 200	40.00	3.13	12.80	2,853.0	13 606	163 406	57.28	4.77	12.01
Wales	3066.1	15589	187 072	61.01	5.08	12.00	2300.0	10304	128 800	56.00	4.48	12.50	5,366.1	25 893	315 872	58.86	4.83	12.20
Uitvlugt	4 160.0	18893	238 051	57.22	4.54	12.60	850.0	4708	61 200	72.00	5.54	13.00	5,010.0	23 601	299 251	59.73	4.71	12.68

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
Year 2011																		
Skeldon	8,532.0	46717	597,972	70.09	5.48	12.80	2,600	10947	145,600	56.00	4.21	13.30	11,132.0	57,664	743,572	66.80	5.18	12.89
Albion	9,001.6	61088	665,856	73.97	6.79	10.90	128.0	625	7808	61.00	4.88	12.50	9,129.6	61,712	673,664	73.79	6.76	10.92
Rose Hall	6,314.9	36630	457,877	72.51	5.80	12.50	646.0	2982	38760	60.00	4.62	13.00	6,960.9	39,612	496,637	71.35	5.69	12.54
Blairmont	5,493.1	39168	430,851	78.43	7.13	11.00							5,493.1	39,168	430,851	78.43	7.13	11.00
Enmore	4,472.3	23807	283,303	63.35	5.32	11.90	95.0	392	4,940	52.00	4.13	12.60	4,567.3	24,199	288,243	63.11	5.30	11.91
LBI	2,798.0	14393	171,280	61.22	5.14	11.90	55.0	173	2,200	40.00	3.15	12.70	2,853.0	14,567	173,480	60.81	5.11	11.91
Wales	3091.1	17214	204,841	66.27	5.57	11.90	2300.0	10573	131,100	57.00	4.60	12.40	5,391.1	27,786	335,941	62.31	5.15	12.09
Uitvlugt	4,190.0	20189	252,366	60.23	4.82	12.50	1,000.0	5349	69,000	69.00	5.35	12.90	5,190.0	25,538	321,366	61.92	4.92	12.58

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
Year 2020																		
Skeldon	8,532.0	48891	625,805	73.35	5.73	12.80	2,600	10947	145,600	56.00	4.21	13.30	11,132.0	59,838	771,405	69.30	5.38	12.89
Albion	9,001.6	62170	677,653	75.28	6.91	10.90	128.0	614	7680	60.00	4.80	12.50	9,129.6	62,784	685,333	75.07	6.88	10.92
Rose Hall	6,314.9	37702	471,271	74.63	5.97	12.50	646.0	2982	38760	60.00	4.62	13.00	6,960.9	40,683	510,031	73.27	5.84	12.54
Blairmont	5,493.1	40441	444,851	80.98	7.36	11.00							5,493.1	40,441	444,851	80.98	7.36	11.00
Enmore	4,472.3	25751	301,288	67.37	5.76	11.70	95.0	392	4,940	52.00	4.13	12.60	4,567.3	26,143	306,228	67.05	5.72	11.71
LBI	2,798.0	15412	183,402	65.55	5.51	11.90	55.0	173	2,200	40.00	3.15	12.70	2,853.0	15,585	185,602	65.06	5.46	11.91
Wales	3111.1	17993	214,117	68.82	5.78	11.90	2300.0	10573	131,100	57.00	4.60	12.40	5,411.1	28,566	345,217	63.80	5.28	12.09
Uitvlugt	4,230.0	21384	267,300	63.19	5.06	12.50	1,000.0	5349	69,000	69.00	5.35	12.90	5,230.0	26,733	336,300	64.30	5.11	12.58

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
Year 2021																		
Skeldon	8,532.0	50143	641,824	75.23	5.88	12.80	2,700	11571	153,900	57.00	4.29	13.30	11,232.0	61,714	795,724	70.84	5.49	12.89
Albion	9,001.6	63667	687,599	76.39	7.07	10.80	128.0	614	7680	60.00	4.80	12.50	9,129.6	64,281	695,279	76.16	7.04	10.82
Rose Hall	6,314.9	38651	475,404	75.28	6.12	12.30	646.0	3005	38760	60.00	4.65	12.90	6,960.9	41,655	514,164	73.86	5.98	12.34
Blairmont	5,493.1	42516	459,178	83.59	7.74	10.80							5,493.1	42,516	459,178	83.59	7.74	10.80
Enmore	4,472.3	26832	313,932	70.19	6.00	11.70	95.0	392	4,940	52.00	4.13	12.60	4,567.3	27,224	318,872	69.82	5.96	11.71
LBI	2,798.0	15964	189,970	67.89	5.71	11.90	55.0	173	2,200	40.00	3.15	12.70	2,853.0	16,137	192,170	67.36	5.66	11.91
Wales	3111.1	18477	219,873	70.67	5.94	11.90	2300.0	11129	138,000	60.00	4.84	12.40	5,411.1	29,606	357,873	66.14	5.47	12.09
Uitvlugt	4,230.0	22558	277,460	65.59	5.33	12.30	1,100.0	5976	75,900	69.00	5.43	12.70	5,330.0	28,534	353,360	66.30	5.35	12.38

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
Year 2022																		
Skeldon	8,532.0	50748	649,574	76.13	5.95	12.80	2,800	12000	159,600	57.00	4.29	13.30	11,332.0	62,748	809,174	71.41	5.54	12.90
Albion	9,001.6	64022	691,432	76.81	7.11	10.80	128.0	614	7680	60.00	4.80	12.50	9,129.6	64,636	699,112	76.58	7.08	10.82
Rose Hall	6,314.9	38996	479,646	75.95	6.18	12.30	646.0	3005	38760	60.00	4.65	12.90	6,960.9	42,000	518,406	74.47	6.03	12.34
Blairmont	5,493.1	43765	472,658	86.05	7.97	10.80							5,493.1	43,765	472,658	86.05	7.97	10.80
Enmore	4,472.0	27501	321,760	71.95	6.15	11.70	95.0	392	4,940	52.00	4.13	12.60	4,567.0	27,893	326,700	71.53	6.11	11.71
LBI	2,798.0	16415	195,344	69.82	5.87	11.90	55.0	173	2,200	40.00	3.15	12.70	2,853.0	16,589	197,544	69.24	5.81	11.91
Wales	3111.1	18755	223,184	71.74	6.03	11.90	2300.0	11129	138,000	60.00	4.84	12.40	5,411.1	29,884	361,184	66.75	5.52	12.09

Uitvlugt	4 230 0	23159	284 850	67 34	5 47	12 30	1 100 0	5976	75 900	69 00	5 43	12 70	5 330 0	29 135	360 750	67 68	5 47	12 38

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest ares (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 532 0	51012	652 948	76 53	5 98	12 80	2 950	12865	171 100	58 00	4 36	13 30	11 482 0	63 876	824 048	71 77	5 56	12 90
Albion	9 001 0	64074	691 994	76 88	7 12	10 80	128 0	614	7680	60 00	4 80	12 50	9 129 0	64 688	699 674	76 64	7 09	10 82
Rose Hall	6 314 9	38996	479 646	75 95	6 18	12 30	646 0	3005	38760	60 00	4 65	12 90	6 960 9	42 000	518 406	74 47	6 03	12 34
Blairmont	5 493 1	43799	473 030	86 11	7 97	10 80							5 493 1	43 799	473 030	86 11	7 97	10 80
Enmore	4 472 0	27759	324 782	72 63	6 21	11 70	95 0	392	4 940	52 00	4 13	12 60	4 567 0	28 151	329 722	72 20	6 16	11 71
LBI	2 798 0	16604	197 592	70 62	5 93	11 90	55 0	173	2 200	40 00	3 15	12 70	2 853 0	16 778	199 792	70 03	5 88	11 91
Wales	3111 1	18835	224 135	72 04	6 05	11 90	2300 0	11129	138 000	60 00	4 84	12 40	5 411 1	29 964	362 135	66 92	5 54	12 09
Uitvlugt	4 230 0	23630	290 650	68 71	5 59	12 30	1 100 0	5976	75 900	69 00	5 43	12 70	5 330 0	29 606	366 550	68 77	5 55	12 38

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Hsrvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 532 0	51012	652 948	76 53	5 98	12 80	3 050	13530	179 950	59 00	4 44	13 30	11 582 0	64 542	832 898	71 91	5 57	12 90
Albion	9 001 0	64074	691 994	76 88	7 12	10 80	128 0	614	7680	60 00	4 80	12 50	9 129 0	64 688	699 674	76 64	7 09	10 82
Rose Hall	6 314 9	38996	479 646	75 95	6 18	12 30	646 0	3005	38760	60 00	4 65	12 90	6 960 9	42 000	518 406	74 47	6 03	12 34
Blairmont	5 493 1	43799	473 030	86 11	7 97	10 80							5 493 1	43 799	473 030	86 11	7 97	10 80
Enmore	4 472 0	27882	326 220	72 95	6 23	11 70	95 0	392	4 940	52 00	4 13	12 60	4 567 0	28 274	331 160	72 51	6 19	11 71
LBI	2 798 0	16692	198 632	70 99	5 97	11 90	55 0	173	2 200	40 00	3 15	12 70	2 853 0	16 865	200 832	70 39	5 91	11 91
Wales	3111 1	18843	224 235	72 08	6 06	11 90	2300 0	11129	138 000	60 00	4 84	12 40	5 411 1	29 972	362 235	66 94	5 54	12 09
Uitvlugt	4 230 0	23787	292 580	69 17	5 62	12 30	1 100 0	5976	75 900	69 00	5 43	12 70	5 330 0	29 763	368 480	69 13	5 58	12 38

Estates	Estate						Farmers						Industry Total					
	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts	Harvest area (ha)	Tonnes sugar	Tonnes cane	tc/ha	ts/ha	tc/ts
[illegible]																		
Skeldon	8 532 0	51012	652 948	76 53	5 98	12 80	3 100	13752	182 900	59 00	4 44	13 30	11 632 0	64 763	835 848	71 86	5 57	12 91
Albion	9 001 0	64074	691 994	76 88	7 12	10 80	128 0	614	7680	60 00	4 80	12 50	9 129 0	64 688	699 674	76 64	7 09	10 82
Rose Hall	6 314 9	38996	479 646	75 95	6 18	12 30	646 0	3005	38760	60 00	4 65	12 90	6 960 9	42 000	518 406	74 47	6 03	12 34
Blairmont	5 493 1	43799	473 030	86 11	7 97	10 80							5 493 1	43 799	473 030	86 11	7 97	10 80
Enmore	4 472 0	27908	326 520	73 01	6 24	11 70	95 0	392	4 940	52 00	4 13	12 60	4 567 0	28 300	331 460	72 58	6 20	11 71
LBI	2 798 0	16713	198 882	71 08	5 97	11 90	55 0	173	2 200	40 00	3 15	12 70	2 853 0	16 886	201 082	70 48	5 92	11 91
Wales	3111 1	18843	224 235	72 08	6 06	11 90	2300 0	11129	138 000	60 00	4 84	12 40	5 411 1	29 972	362 235	66 94	5 54	12 09
Uitvlugt	4 230 0	23787	292 580	69 17	5 62	12 30	1 100 0	5976	75 900	69 00	5 43	12 70	5 330 0	29 763	368 480	69 13	5 58	12 38

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Albion

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	ha											
Harvest	ha	10,602.60	8,832.90	8,899.60	8,964.50	9,102.00	9,002.00	9,002.00	9,002.00	9,001.60	9,001.60	9,001.60
Cover to F		794.50										
Draw Down	ha	240.00	220.00	187.80	220.00	220.00	220.00	220.00	220.00	220.00	220.00	220.00
Full 9 month fallow	ha	-	150.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Prepared land	ha	850.10	755.90	529.00	294.00	394.40	494.40	494.40	494.40	494.40	494.40	394.40
Area in cultivation	ha	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00	9,616.00
Area in cut excl F fallow @ 31.12	ha	8,765.90	8,860.10	9,037.00	9,322.00	9,221.60	9,221.60	9,221.60	9,221.60	9,221.60	9,221.60	9,221.60
Flood Fallow prepared during the year	ha		200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Flood Fallow @31.12	ha		200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Draw Down during the year	ha	600.00	550.00	550.00	550.00	550.00	550.00	550.00	550.00	550.00	550.00	550.00
Planting during the year	ha	1,011.50	1,508.30	1,787.90	1,398.00	1,440.00	1,630.00	1,630.00	1,850.00	1,925.00	1,925.00	1,925.00
% planting	%	11%	16%	19%	15%	15%	17%	17%	19%	20%	20%	20%
Flood Fallowing % planting	%		9.04	11.19	14.31	13.89	12.27	12.27	10.81	10.39	10.39	10.39
Planting from FF	ha											
Commercial	ha		156.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00	200.00
Dunbed seed	ha			20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00	20.00
Total	ha		156.00	220.00	220.00	220.00	220.00	220.00	220.00	220.00	220.00	220.00
Planting P & P	ha											
Commercial	ha	861.50	1,254.30	1,463.90	1,074.00	1,190.00	1,280.00	1,280.00	1,500.00	1,555.00	1,555.00	1,555.00
Seed cane	ha	150.00	104.00	104.00	184.00	140.00	150.00	150.00	150.00	150.00	150.00	150.00
Total	ha	1,011.50	1,358.30	1,567.90	1,178.00	1,210.00	1,430.00	1,430.00	1,650.00	1,705.00	1,705.00	1,705.00
Total planting FF + P & P	ha	1,011.50	1,508.30	1,787.90	1,398.00	1,440.00	1,630.00	1,430.00	1,850.00	1,925.00	1,925.00	1,925.00
Check	ha	1,011.50	1,508.30	1,787.90	1,398.00	1,440.00	1,630.00	1,630.00	1,850.00	1,925.00	1,925.00	1,925.00
%Planting												
% Seed Cane												
Putting land under water from FF	ha											
FF Land	ha		200.00	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0	200.0
Total mechanical Tillage	ha	1,476.60	1,475.00	1,629.4	1,398.0	1,440.0	1,630.0	1,630.0	1,850.0	1,925.0	1,925.0	1,925.0
Harvest area	ha											
Plants excl seed canes	ha	1,827.5	980.6	1,358.6	1,727.70	1,274.00	1,300.00	1,480.00	1,480.00	1,700.00	1,700.00	1,755.00
1 ratoon	ha	2,045.4	1,801.1	1,341.2	1,353.30	1,841.00	1,478.00	1,450.00	1,630.00	1,630.00	1,850.00	1,925.00
2 ratoon	ha	1,914.5	1,714.8	1,724.9	1,003.20	1,353.00	1,851.00	1,478.00	1,450.00	1,630.00	1,630.00	1,630.00
3 ratoon	ha	1,318.9	1,915.4	1,612.9	1,270.00	1,004.00	1,353.00	1,831.00	1,378.00	1,450.00	1,630.00	1,630.00
4 ratoon	ha	1,056.3	803.0	1,538.0	1,483.00	1,270.00	1,004.00	1,353.00	1,871.00	1,378.00	1,450.00	1,630.00
5 ratoon	ha	1,840.0	1,623.0	1,524.0	2,126.80	2,370.00	2,136.00	1,510.00	1,193.00	1,214.00	742.00	435.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	10,002.60	8,837.90	8,899.6	8,964.50	9,102.00	9,002.00	9,002.00	9,002.00	9,002.00	9,002.00	9,002.00

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Albion

	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
Cane yields (combines FF & P&P yields)	**tc/ha**											
Plants	tc/ha	59.06	75.05	83.76	79.62	85.00	87.00	88.00	89.00	90.00	96.00	97.00
1 ratoon	tc/ha	64.36	59.52	74.94	73.80	74.00	80.00	81.00	82.00	83.00	86.00	86.00
2 ratoon	tc/ha	58.15	58.12	58.71	67.66	70.00	70.00	75.00	75.00	77.00	78.00	79.00
3 ratoon	tc/ha	56.35	56.87	56.13	64.42	65.00	66.00	67.00	71.00	71.00	72.00	73.00
4 ratoon	tc/ha	47.18	61.60	60.66	57.26	61.00	62.00	63.00	64.00	67.00	67.00	68.00
5 ratoon	tc/ha	46.87	46.55	54.45	54.99	55.00	56.00	57.00	57.00	58.00	58.00	58.00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	56.12	58.21	63.76	65.71	67.19	69.17	71.65	73.29	75.48	78.54	79.92
potential	tc/ha	75.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00	83.00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	107,924	73,596	113,794	137,559	108,290	113,100	130,240	131,720	153,000	163,200	170,235
1 ratoon	tonne	131,637	107,199	85,523	99,874	135,494	110,240	117,450	133,660	135,290	159,100	165,550
2 ratoon	tonne	111,328	99,670	101,273	67,910	94,710	128,170	103,350	108,750	125,510	127,140	128,770
3 ratoon	tonne	74,321	108,936	90,538	81,813	65,260	89,298	122,677	97,838	102,950	117,360	118,990
4 ratoon	tonne	49,838	49,468	93,296	84,917	77,470	62,248	85,239	119,744	92,326	97,150	110,840
5 ratoon	tonne	86,248	75,554	82,987	116,953	130,350.00	119,616.00	86,070.00	68,001.00	70,412.00	43,036.00	25,056.00
6 ratoon	tonne	-	-									
7+ ratoon	tonne											
Estate cane production	tonne	561,296	514,423	567,411	589,026	611,574	622,672	645,026	659,713	679,488	706,986	719,441
Farmers' Cane Production	tonne	6,803	8,739	8,142	8,174	6,480	8,550	8,250	9,520	11,600	12,400	12,400
Total Cane Production	tonne	568,099	523,162	575,553	597,200	618,054	631,222	653,276	669,233	691,088	719,386	731,841
Percent estate canes	%	98.80	98.33	98.59	98.63	98.95	98.65	98.74	98.58	98.32	98.28	98.31
Percent famers cane	%	1.20	1.67	1.41	1.37	1.05	1.35	1.26	1.42	1.68	1.72	1.69
Pol % cane - Estate	%	11.00	11.00	10.74	11.20	11.20	11.30	11.30	11.30	11.30	11.50	11.50
Pol % cane - Farmers	%	9.70	10.00	9.40	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Tc/Ts Estate Cane	tc/ts	10.49	11.03	11.24	10.97	10.90	10.50	10.30	10.30	10.30	10.20	10.20
Tc/Ts Farmers' Cane	tc/ts	12.74	14.26	13.29	12.39	12.50	12.50	12.50	12.50	12.50	12.50	12.50
Farmers' HA	Ha	131.0	125.50	121.90	119.40	120.00	150.00	150.00	170.00	200.00	200.00	200.00
TCHA (Farmers)	tc/ha	51.93	69.63	66.79	51.38	54.00	57.00	55.00	56.00	58.00	62.00	62.00
Sugar Production - Estate	tonne	53,508	46,644	50,467	53,692	56,108	59,302	62,624	64,050	65,970	69,312	70,533
Sugar Production - Farmers	tonne	534	613	612	660	518	684	660	762	928	992	992
Total sugar production	tonne	54,042	47,257	51,080	54,352	56,626	59,986	63,284	64,811	66,898	70,304	71,525
Vary Production												
Estate hectares harvested		10,002.6	8,837.9	8,899.6	8,964.5	9,102.0	9,002.0	9,002.0	9,002.0	9,002.0	9,002.0	9,002.0
Farmers hectares harvested		131.0	125.5	121.9	119.4	120.0	150.0	150.0	170.0	200.0	200.0	200.0
Total Hectares Harvested		10,133.60	8,963.40	9,021.50	9,083.90	9,222.00	9,152.00	9,152.00	9,172.00	9,202.00	9,202.00	9,202.00
Estate cane production		561,296	514,423	567,411	589,026	611,574	622,672	645,026	659,713	679,488	706,986	719,441
Farmers' Cane Production		6,803	8,739	8,142	8,174	6,480	8,550	8,250	9,520	11,600	12,400	12,400
Total Cane Production		568,099	523,162	575,553	597,200	618,054	631,222	653,276.00	669,233	691,088	719,386	731,841
		-	-	-	-	-	-	-	-	-	-	-
Sugar Production - Estate		53,508	46,644	50,467	53,692	56,108	59,302	62,623.88	64,050	65,970	69,312	70,533
Sugar Production - Farmers		534	613	612	660	518	684	660.00	762	928	992	992
Total sugar production		54,042	47,257	51,080	54,352	56,626	59,986	63,283.88	64,811	66,898	70,304	71,525
		-	-	-	-	-	-	-	-	0.00	(0.00)	(0.00)
TOTAL TCH		56.06	58.37	63.80	65.74	67.02	68.97	71.38	72.96	75.10	78.18	79.53
TOTAL TCTS		10.51	11.07	11.27	10.99	10.91	10.52	10.32	10.33	10.33	10.23	10.23
TOTAL TSH		5.33	5.27	5.66	5.98	6.14	6.55	6.91	7.07	7.27	7.64	7.77

Guyana Sugar Corporation Inc.
Production Forecast 2015 - 2020
Blairmont

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	6,138.40	5,843.00	5,656.60	5,732.20	5,493.10	5,493.10	5,493.10	5,493.10	5,493.10	5,493.10	5,493.10
Cover B/F		762.10	320.00	-	-	-	-					-
Draw Down	ha	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00
Full 6 month fallow	ha	-	-	50.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Prepared land	ha	31.20	169.00	5.30	180.00	180.00	180.00	180.00	180.00	180.00	180.00	180.00
Area in cultivation	ha	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10	5,808.10
Area in cul excl F fallow @31.12	ha	5,776.90	5,638.50	5,802.80	5,628.10	5,628.10	5,628.10	5,628.10	5,628.10	5,628.10	5,628.10	5,628.10
Hood Fallow prepared during the year	ha	-	-	50.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Hood Fallow @ 31.12	ha		50.00	50.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Draw Down during the year	ha	180.00	330.00	330.00	330.00	330.00	330.00	330.00	330.00	330.00	330.00	330.00
Planting during the year	ha	686.50	804.40	1,190.50	964.00	870.00	870.00	970.00	1,030.00	1,162.00	1,162.00	1,162.00
% planting	%	12%	14%	20%	17%	15%	15%	17%	18%	20%	20%	20%
Hood Fallowing % planting	%			4.20	7.78	8.62	8.62	7.73	7.28	6.45	6.45	6.45
Planting from FF	**ha**											
Commercial	ha	-	-	45.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Dambed seed	ha	-		5.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00	10.00
Total	ha			50.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Planting P & P	**ha**											
Commercial	ha	530.50	664.40	1,000.50	759.00	665.00	665.00	755.00	815.00	947.00	947.00	947.00
Seed cane	ha	150.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
Total	ha	680.50	804.40	1,140.50	899.00	805.00	805.00	895.00	955.00	1,087.00	1,087.00	1,087.00
Total planting FF + P & P	ha	680.50	804.40	1,190.50	964.00	870.00	870.00	970.00	1,030.00	1,162.00	1,162.00	1,162.00
Check	ha	680.50	804.40	1,190.50	964.00	870.00	870.00	970.00	1,030.00	1,162.00	1,162.00	1,162.00
%Planting												
% Seed Cane												
Putting land under water from FF	**ha**											
FF Land	ha	0%	0%	50.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00	75.00
Total mechanical Tillage	ha	698.80	864.50	1,117.70	964.00	870.00	870.00	970.00	1,030.00	1,162.00	1,162.00	1,162.00
Harvest area	**ha**											
Plants excl seed canes	ha	990.9	680.8	760.0	1,190.50	824.00	730.00	730.00	830.00	890.00	890.00	890.00
1 ratoon	ha	1,215.2	982.6	791.8	652.40	1,330.00	964.00	870.00	870.00	930.00	970.00	970.00
2 ratoon	ha	1,488.2	891.8	972.2	761.40	652.00	1,440.00	964.00	870.00	830.00	930.00	970.00
3 ratoon	ha	704.6	1,461.5	695.5	785.60	761.00	652.00	1,330.00	964.00	870.00	970.00	970.00
4 ratoon	ha	523.5	656.8	1,172.9	614.80	786.00	761.00	652.00	1,330.00	964.00	970.00	970.00
5 ratoon	ha	1,210.9	1,170.0	1,256.2	1,722.50	1,140.00	1,086.00	947.00	629.00	929.00	723.00	723.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	6,138.4	5,843.0	5,656.6	5,732.20	5,493.00	5,493.00	5,493.00	5,493.00	5,493.00	5,493.00	5,493.00

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Blairmont

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Cane yields (combines FF & P&P yields)	**tc/ha**											
Plants	tc/ha	77.55	78.921	86.26	79.87	84.00	86.00	88.00	90.00	92.00	97.00	103.00
1 ratoon	tc/ha	69.03	61.884	75.90	84.00	76.00	79.00	81.00	84.00	86.00	87.00	89.00
2 ratoon	tc/ha	60.61	55.774	64.68	69.28	78.00	74.00	75.00	76.00	80.00	82.00	80.00
3 ratoon	tc/ha	63.99	56.402	61.40	66.35	66.00	74.00	71.00	71.00	72.00	73.00	75.00
4 ratoon	tc/ha	61.02	55.188	61.03	63.42	63.00	64.00	69.00	66.00	67.00	69.00	71.00
5 ratoon	tc/ha	66.52	53.646	61.20	63.17	61.00	60.00	61.00	60.00	61.00	61.00	64.00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	66.61	59.16	67.25	70.28	71.08	72.40	73.58	77.90	76.44	81.15	82.83
potential	tc/ha	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00	85.00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	77,306	53,706	66,250	95,085	69,216	62,780	64,240	74,700	81,880	86,330	91,670
1 ratoon	tonne	83,883	60,807	60,095	54,802	101,080	76,156	70,470	73,980	83,420	84,390	86,330
2 ratoon	tonne	90,192	49,745	62,881	52,750	50,856	98,420	72,300	66,120	69,600	79,540	77,600
3 ratoon	tonne	45,084	82,432	42,704	52,125	50,226	48,248	94,430	68,444	62,640	70,810	72,750
4 ratoon	tonne	31,946	36,231	71,578	38,991	49,518	48,704	44,988	87,780	64,588	66,930	68,870
5 ratoon	tonne	80,489	62,766	76,882	109,126	69,540	63,360.00	57,767.00	57,767.00	57,767.00	57,767.00	57,767.00
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	408,901	345,687	380,390	402,878	390,436	397,668	404,195	427,891	419,895	445,767	454,987
Farmers' Cane Production	tonne	-	-	-	-	-	-	-	-	-	-	-
Total Cane Production	tonne	408,901	345,687	380,390	402,878	390,436	397,668	404,195	427,891	419,895	445,767	454,987
Percent estate canes	%	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Percent famers cane	%	-	-	-	-	-	-	-	-	-	-	-
Pol % cane - Estate	%	10.80	11.00	10.85	11.80	11.80	11.80	11.80	11.80	11.80	11.80	11.80
Tc/Ts Estate Cane	tc/ts	11.29	12.12	11.36	11.23	10.80	10.40	10.40	10.40	10.40	10.40	10.40
Tc/Ts Farmers' Cane	tc/ts											
Farmers' HA	Ha											
TCHA (Farmers)	tc/ha											
Sugar Production - Estate	tonne	36,218	28,528	33,499	35,872	36,151	38,237	38,865	41,143	40,375	42,862	43,749
Sugar Production - Farmers	tonne	-	-	-	-	-	-	-	-	-	-	-
Total sugar production	tonne	36,218	28,528	33,499	35,872	36,151	38,237	38,865	41,143	40,375	42,862	43,749
Vary Production												
Estate hectares harvested		6,138.40	5,843.0	5,656.6	5,732.2	5,493.0	5,493.0	5,493.0	5,493.0	5,493.0	5,493.0	5,493.0
Farmers hectares harvested		-	-	-	-	-	-	-	-	-	-	-
		-	-	-	-	-	-	-	-	-	-	-
Estate cane production		408,900.94	345,687	380,390	402,878	390,436	397,668	404,195	427,891	419,895	445,767	454,987
Farmers' Cane Production		-	-	-	-	-	-	-	-	#REF!	#REF!	#REF!
Total Cane Production		408,900.94	345,687	380,390	402,878	390,436	397,668	404,195	427,891	419,895	445,767	454,987
Sugar Production - Estate		36,217.98	28,528	33,499	35,872	36,151	38,237	38,865	41,143	40,375	42,862	43,749
Sugar Production - Farmers		-	-	-	-	-	-	-	-	#REF!	#REF!	#REF!
Total sugar production		36,217.98	28,528	33,499	35,872	36,151	38,237	38,865	41,143	40,375	42,862	43,749
		-	-	-	-	-	-	-	-	0.00	(0.00)	0.00
TOTAL TCH		66.61	59.16	67.25	70.28	71.08	72.40	73.58	77.90	76.44	81.15	82.83
TOTAL TCTS		11.29	12.12	11.36	11.23	10.80	10.40	10.40	10.40	10.40	10.40	10.40
TOTAL TSH		5.90	4.88	5.92	6.26	6.58	6.96	7.08	7.49	7.35	7.80	7.96

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Enmore

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	3,809.60	3,445.00	5,261.20	4,659.90	4,472.30	4,472.30	4,472.30	4,472.30	4,472.30	4,472.30	4,472.30
Cover/B/F		388.60	803.89	655.60								
Draw Down	ha	50.00	100.00	100.00	100.00	108.00	108.00	100.00	100.00	100.00	100.00	100.00
Full 6 month fallow	ha	-	-	-	-	-	-	-	-	-	-	-
Prepared land	ha	257.80	435.80	297.00	120.80	120.80	120.80	120.80	120.80	120.80	120.80	120.80
Area in cultivation	ha	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10	4,693.10
Area in cul excl. Fallow @31.12	ha	4,435.30	4,357.30	4,396.10	4,572.30	4,572.30	4,572.30		4,572.30	4,572.30	4,572.30	4,572.30
Flood Fallow prepared during the year	ha	-	-	-	-	-	-	-	-	-	-	-
Flood Fallow @31.12	ha	-	-	-	-	-	-	-	-	-	-	-
Draw Down during the year	ha	140.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00	240.00
Planting during the year	ha	601.30	442.00	554.30	714.00	657.00	704.00	798.00	830.00	940.00	940.00	940.00
% planting	%	13%	9%	12%	15%	14%	15%	17%	18%	20%	20%	20%
Flood Fallowing % planting	%											
Planting from FF	**ha**											
Commercial	ha											
Dashed seed	ha											
Total	ha											
Planting P & P	**ha**											
Commercial	ha	341.30	342.00	454.30	614.00	557.00	604.00	698.00	730.00	840.00	840.00	840.00
Seed cane	ha	60.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00	100.00
Total	ha	601.30	442.00	554.30	714.00	657.00	704.00	798.00	830.00	940.00	940.00	940.00
Total planting FF + P & P	ha	601.30	442.00	554.30	714.00	657.00	704.00	798.00	830.00	940.00	940.00	940.00
Check	ha	601.30	442.00	554.30	714.00	657.00	704.00	798.00	830.00	940.00	940.00	940.00
%Planting												
% Seed Cane												
Putting land under water from FF	**ha**											
FF Land	ha	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%	0%
Total mechanical Tillage	ha	601.30	396.80	624.10	714.00	657.00	704.00	798.00	830.00	940.00	940.00	940.00
Harvest area	**ha**											
Plants excl. seed canes	ha	612.20	341.30	689.70	532.40	614.00	557.00	604.00	698.00	730.00	840.00	840.00
1 ratoon	ha	820.90	560.40	693.80	688.00	632.00	714.00	657.00	704.00	798.00	940.00	940.00
2 ratoon	ha	601.50	862.90	829.90	550.90	385.00	632.00	714.00	657.00	704.00	940.00	940.00
3 ratoon	ha	663.80	654.80	867.50	688.60	551.00	385.00	632.00	714.00	657.00	830.00	940.00
4 ratoon	ha	422.20	512.50	962.20	691.40	689.00	551.00	385.00	632.00	714.00	704.00	780.00
5 ratoon	ha	689.50	513.60	1,218.00	1,507.20	1,601.00	1,633.00	1,480.00	1,067.00	869.00	218.00	112.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	3,809.60	3,445.00	5,261.20	4,358.50	4,472.00	4,472.00	4,472.00	4,472.00	4,472.00	4,472.00	4,472.00

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Enmore

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Cane yields (combines FF & P&P yields)	**tc/ha**				3,823 10							
Plants	tc/ha	79 44	76 80	67 56	72 17	75 00	78 00	82 00	84 00	86 00	89 00	91 00
1 ratoon	tc/ha	58 85	64 00	57 20	56 41	67 00	70 00	73 00	76 00	78 00	80 00	83 00
2 ratoon	tc/ha	51 22	50 74	48 16	51 34	53 00	63 00	66 00	69 00	72 00	72 00	73 00
3 ratoon	tc/ha	47 99	53 38	44 25	49 10	48 00	50 00	60 00	63 00	66 00	67 00	68 00
4 ratoon	tc/ha	39 84	47 12	46 47	45 25	46 00	46 00	48 00	54 00	60 00	60 00	62 00
5 ratoon	tc/ha	41 85	49 56	43 77	51 00	47 00	46 00	48 00	50 00	52 00	53 00	57 00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	53 88	55 26	49 92	52 90	54 16	56 56	60 83	64 83	68 67	73 13	75 31
potential	tc/ha	80 00	80 00	80 00	80 00	80 00	80 00	80 00	80 00	80 00	80 00	80 00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	48,632 00	26,211 39	46,597 00	38,423 31	46,050 00	43,446 00	49,528 00	58,632 00	62,780 00	74,760 00	76,440 00
1 ratoon	tonne	48,307 00	35,863 39	39,684 73	21,717 85	42,344 00	49,980 00	47,961 00	53,504 00	62,244 00	75,200 00	78,020 00
2 ratoon	tonne	30,806 00	43,780 39	39,967 73	28,283 21	20,405 00	39,816 00	47,124 00	45,333 00	50,688 00	67,680 00	68,620 00
3 ratoon	tonne	31,833 00	34,927 39	38,383 73	33,810 26	26,448 00	19,250 00	37,920 00	44,982 00	43,362 00	55,610 00	63,920 00
4 ratoon	tonne	16,819 00	24,148 39	44,708 73	31,285 85	31,694 00	25,346 00	18,480 00	34,128 00	42,840 00	42,240 00	43,400 00
5 ratoon	tonne	28,859 00	25,456 00	53,316 73	76,867 20	75,247 00	75,118 00	71,040 00	53,350 00	45,188 00	11,554 00	6,384 00
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	205,256	190,387	262,659	230,388	242,188	252,956	272,053	289,929	307,102	327,044	336,784
Farmers' Cane Production	tonne	3,638	4,472	4,723	4,772	5,369	6,562	4,940	5,320	5,320	5,320	5,320
Total Cane Production	tonne	208,894	194,859	267,382	235,160	247,557	259,518	276,993	295,249	312,422	332,364	342,104
Percent estate canes	%	98 26	97 71	98 23	97 97	97 83	97 47	98 22	98 20	98 30	98 40	98 44
Percent famers cane	%	1 74	2 29	1 77	2 03	2 17	2 53	1 78	1 80	1 70	1 60	1 56
Pol % cane - Estate	%	9 80	9 10	9 00	10 20	10 20	10 50	11 00	11 00	11 00	11 00	11 00
Pol % cane - Farmers		9 50	8 90	9 00	9 80	9 80	9 80	10 00	10 00	10 00	10 00	10 00
Tc/Ts Estate Cane	tc/ts	12 17	14 56	13 62	12 80	12 80	12 60	12 40	12 40	12 40	12 40	12 40
Tc/Ts Farmers' Cane	tc/ts	15 71	15 37	13 64	13 00	13 00	12 80	12 80	12 80	12 80	12 80	12 80
Farmers' HA	Ha	79 00	102 10	99 30	119 30	119 30	119 30	95 00	95 00	95 00	95 00	95 00
TCHA (Farmers)	tc/ha	46 05	43 80	47 56	40 00	45 00	55 00	52 00	56 00	56 00	56 00	56 00
Sugar Production - Estate	tonne	16,866	13,077	19,290	17,999	18,921	20,076	21,940	23,381	24,766	26,375	27,160
Sugar Production - Farmers	tonne	232	291	346	367	413	513	386	416	416	416	416
Total sugar production	tonne	17,097	13,368	19,636	18,366	19,334	20,588	22,326	23,797	25,182	26,790	27,576
Vary Production												
Estate hectares harvested		3,809 60	3,445 0	5,261 2	4,355 5	4,472 0	4,472 0	4,472 0	4,472 0	4,472 0	4,472 0	4,472 0
Farmers hectares harvested		79 00	102 1	99 3	119 3	119 3	119 3	95 0	95 0	95 0	95 0	95 0
Total Hectares Harvested		3,888 60	3,547 10	5,360 50	4,474 80	4,591 30	4,591 30	4,567 00	4,567 00	4,567 00	4,567 00	4,567 00
Estate cane production		205,256	190,387	262,659	230,388	242,188	252,956	272,053	289,929	307,102	327,044	336,784
Farmers' Cane Production		3,638	4,472	4,723	4,772	5,369	6,562	4,940	5,320	5,320	5,320	5,320
Total Cane Production		208,894	194,859	267,382	235,160	247,557	259,518	276,993	295,249	312,422	332,364	342,104
		-	-	-	-	-	-	-	-	-	-	-
Sugar Production - Estate		16,866	13,077	19,290	17,999	18,921	20,076	21,940	23,381	24,766	26,375	24,766
Sugar Production - Farmers		232	291	346	367	413	513	386	416	416	416	416
Total sugar production		17,097	13,368	19,636	18,366	19,334	20,588	22,326	23,797	25,182	26,790	27,576
		-	-	-	-	-	-	-	-	0 00	(0 00)	0 00
TOTAL TCH		53 72	54 93	49 88	52 55	53 92	56 52	60 65	64 65	68 41	72 78	74 91
TOTAL TCTS		12 22	14 58	13 62	12 80	12 80	12 60	12 41	12 41	12 41	12 41	12 41
TOTAL TSH		4 40	3 77	3 66	4 10	4 21	4 48	4 89	5 21	5 51	5 87	6 04

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020

	2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
Planting - FF - Commercial	-	150.00	485.00	475.00	475.00	475.00	425.00	425.00	425.00	425.00	425.00
Planting - FF - Dam bed seed	-	-	55.00	55.00	55.00	55.00	50.00	50.00	50.00	50.00	50.00
Planting - PP - Commercial	4,939.40	4,993.60	6,059.00	5,988.00	5,851.00	6,469.00	6,915.00	7,544.00	7,881.00	7,881.00	7,881.00
Planting - PP - Seed Cane	893.10	989.00	917.00	904.00	940.00	955.00	955.00	978.00	978.00	978.00	978.00
Total Planting	5,832.50	6,052.60	7,516.00	7,422.00	7,321.00	7,954.00	8,345.00	8,997.00	9,334.00	9,334.00	9,334.00
Estates' Hectares Harvested	43,615.95	40,703.85	45,362.36	42,745.20	43,479.00	43,378.00	43,328.00	43,411.00	43,411.00	43,411.00	43,411.00
Farmers' Hectares Harvested	5,386.90	5,287.40	5,607.42	5,786.40	6,178.30	6,438.30	6,875.70	7,195.70	7,325.70	7,325.70	7,325.70
Total Hectares Harvested	49,002.85	45,991.25	50,969.78	48,531.60	49,657.30	49,816.30	50,203.70	50,606.70	50,736.70	50,736.70	50,736.70
Estates' Canes Harvested	2,405,853	2,166,246	2,529,824	2,479,158	2,592,830	2,691,622	2,829,375	2,970,116	3,083,461	3,232,627	3,307,882
Farmers' Canes Harvested	303,505	294,836	307,074	325,538	356,071	384,544	414,291	441,720	454,550	454,550	454,550
Total Canes Harvested	2,709,358	2,461,082	2,836,898	2,804,696	2,948,901	3,076,166	3,243,666	3,417,836	3,538,011	3,719,165	3,802,820
Estates' Sugar Production	196,677	166,958	195,225	199,136	213,129	228,634	243,164	256,325	266,984	280,693	284,759
Farmers' Sugar Production	21,342	19,797	21,133	23,929	26,607	29,633	31,965	34,098	35,755	35,755	35,755
Total Sugar Production	218,019	186,755	216,358	223,064	239,736	258,266	275,130	290,423	302,739	316,013	326,132
Estates' tch	55.16	53.22	55.83	58.00	59.63	62.05	65.30	68.56	71.03	74.47	76.20
Farmers' tch	56.84	55.76	54.18	56.26	57.63	59.73	60.25	61.59	62.05	62.05	62.05
Total TCH	55.29	53.51	55.66	57.79	59.39	61.75	64.61	67.54	69.73	73.30	74.95
Estates' tcts	12.23	12.97	12.96	12.45	12.12	11.77	11.64	11.61	11.55	11.52	11.62
Farmers' tcts	14.22	14.89	14.53	13.60	13.38	12.98	12.96	12.95	12.71	12.71	12.71
Total TCTS	12.43	13.18	13.11	12.57	12.30	11.91	11.79	11.77	11.69	11.66	11.66
Estates' tsh	4.51	4.10	4.31	4.66	4.98	5.27	5.61	5.90	6.15	6.47	6.56
Farmers' tsh	3.96	3.74	3.73	4.11	4.31	4.66	4.65	4.74	4.88	4.88	4.88
Total TSH	€ 4.45	€ 4.06	€ 4.24	€ 4.60	€ 4.85	€ 5.18	€ 5.48	€ 5.74	€ 5.97	€ 6.29	€ 6.43

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Wales

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	2,332.50	3,305.80	2,894.90	2,717.20	2,883.00	2,883.00	2,883.00	2,915.00	2,915.00	2,915.00	2,915.00
Cover b/f		244.80										
Draw Down	ha	50.00	84.20	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00	65.00
Full o mouth fallow	ha			120.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00	30.00
Prepared land	ha	363.90	392.20	418.80	120.00	120.00	120.00	120.00	120.00	120.00	120.00	120.00
Area in cultivation	ha	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10	3,356.10
Area in cul excl. Fallow @ 31.12	ha	2,992.20	2,963.90	2,937.30	3,236.10	3,236.10	3,236.10	3,236.10	3,236.10	3,236.10	3,236.10	3,236.10
Flood Fallow prepared during the year	ha		-	120.00	85.00	85.00	85.00	30.00	30.00	30.00	30.00	30.00
Flood Fallow @ 31.12	ha			120.00	85.00	85.00	85.00	30.00	30.00	30.00	30.00	30.00
Draw Down during the year	ha	140.00	180.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00	165.00
Planting during the year	ha	566.00	512.20	484.00	580.00	620.00	620.00	672.00	672.00	672.00	672.00	672.00
% planting	%	17%	15%	14%	17%	18%	18%	20%	20%	20%	20%	20%
Flood Fallowing % planting	%	-	-	24.78	14.66	13.71	13.71	4.46	4.46	4.46	4.46	4.46
Planting from FF	**ha**											
Commercial	ha			105.00	75.00	75.00	75.00	25.00	25.00	25.00	25.00	25.00
Dumbed seed	ha			15.00	10.00	10.00	10.00	5.00	5.00	5.00	5.00	5.00
Total	ha	-		120.00	85.00	85.00	85.00	30.00	30.00	30.00	30.00	30.00
Planting P & P	**ha**											
Commercial	ha	516.00	462.20	284.00	450.00	490.00	490.00	597.00	597.00	597.00	597.00	597.00
Seed cane	ha	50.00	50.00	30.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00	45.00
Total	ha	566.00	512.20	314.00	495.00	535.00	535.00	642.00	642.00	642.00	642.00	642.00
Total planting FF + P & P	ha	566.00	512.20	434.00	580.00	620.00	620.00	672.00	672.00	672.00	672.00	672.00
Check	ha	566.00	512.20	434.00	580.00	620.00	620.00	672.00	672.00	672.00	672.00	672.00
%Planting												
% Seed Cane												
Putting land under water from FF	**ha**											
FF Land	ha											
Total mechanical Tillage	ha	684.20	403.50	519.20	580.00	620.00	620.00	672.00	672.00	672.00	672.00	672.00
Harvest area	**ha**											
Plants excl. seed canes	ha	448.20	568.80	412.00	438.30	535.00	575.00	575.00	627.00	627.00	627.00	627.00
1 ratoon	ha	737.20	397.60	907.70	330.50	468.00	580.00	620.00	620.00	672.00	672.00	672.00
2 ratoon	ha	303.00	882.20	398.10	909.90	331.00	468.00	580.00	620.00	620.00	620.00	620.00
3 ratoon	ha	305.20	580.30	431.40	311.70	610.00	331.00	468.00	580.00	620.00	580.00	580.00
4 ratoon	ha	403.30	200.60	422.80	337.60	312.00	610.00	331.00	468.00	326.00	306.00	260.00
5 ratoon	ha	238.00	231.40	612.90	689.20	627.00	389.00	369.00			196.00	196.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	2,332.50	3,305.80	2,894.90	2,717.20	2,883.00	2,883.00	2,883.00	2,915.00	2,915.00	2,915.00	2,915.00

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Wales

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
				2,482 90								
Cane yields (combines FF & P&P yields)	**tc/ha**											
Plants	tc/ha	77 30	68 33	80 10	79 11	80 00	82 00	84 00	86 00	86 00	91 00	91 00
1 ratoon	tc/ha	56 71	54 97	43 13	66 11	67 00	68 00	72 00	74 00	76 00	76 00	76 00
2 ratoon	tc/ha	43 23	44 40	38 70	38 61	59 00	60 00	61 00	65 00	66 00	67 00	68 00
3 ratoon	tc/ha	30 75	39 43	33 94	37 20	37 00	55 00	55 00	55 00	58 00	62 00	64 00
4 ratoon	tc/ha	47 79	32 89	34 47	30 20	36 00	36 00	51 00	51 00	51 00	51 00	52 00
5 ratoon	tc/ha	40 30	43 60	37 62	42 60	38 00	38 00	38 00	-	-	47 00	47 00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	51 44	48 09	43 95	48 29	52 48	57 91	63 37	67 19	68 97	70 39	71 46
target	tc/ha	76 00	84 00	84 00	84 00	84 00	84 00	84 00	84 00	84 00	84 00	84 00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	26,916 70	38,867 23	33,005 37	34,673 91	42,800 00	47,150 00	48,300 00	53,922 00	53,922 00	57,057 00	57,057 00
1 ratoon	tonne	41,805 97	21,858 03	26,208 12	21,849 36	31,356 00	39,440 00	44,640 00	45,880 00	51,072 00	51,072 00	51,072 00
2 ratoon	tonne	13,099 40	38,055 50	15,406 86	23,548 24	19,529 00	28,080 00	35,380 00	40,300 00	40,920 00	41,540 00	42,160 00
3 ratoon	tonne	9,383 88	21,698 29	14,982 14	11,595 24	22,570 00	18,205 00	25,740 00	31,900 00	35,960 00	31,000 00	38,400 00
4 ratoon	tonne	19,274 09	6,598 66	14,574 20	10,195 52	11,232 00	21,960 00	16,881 00	23,868 00	19,176 00	15,300 00	10,400 00
5 ratoon	tonne	9,495 76	31,887 07	23,055 45	29,359 92	23,826 00	12,122 00	11,742 00			9,212 00	9,212 00
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	119,976	158,965	127,232	131,222	151,313	166,957	182,683	195,870	201,050	205,181	208,301
Farmers' Cane Production	tonne	113,785	128,167	124,629	117,987	127,600	136,400	158,061	163,000	165,470	177,818	177,818
Total Cane Production	tonne	233,761	287,132	251,861	249,209	278,913 0	303,357 0	340,743 8	358,870 2	366,519 9	382,999 4	386,119 4
Percent estate canes	%	51 32	55 36	50 52	52 66	54 25	55 04	53 61	54 58	54 85	53 57	53 95
Percent farmers cane	%	48 68	44 64	49 48	47 34	45 75	44 96	46 39	45 42	45 15	46 43	46 05
Pol % cane - Estate	%	10 30	9 76	9 39	10 00	10 20	10 20	10 20	10 20	10 20	10 20	10 20
Pol % cane - Farmers	%	10 00	9 80	9 41	9 80	10 00	10 00	10 00	10 00	10 00	10 00	10 00
Tc/Ts Estate Cane	tc/ts	12 04	12 48	13 46	12 50	12 40	12 40	12 40	12 40	12 40	12 40	12 40
Tc/Ts Farmers' Cane	tc/ts	12 25	12 81	13 20	12 70	12 70	12 70	12 70	12 70	12 70	12 70	12 70
Farmers' HA	Ha	2,055 00	2,244 90	2,255 82	2,126 00	2,200 00	2,200 00	2,469 70	2,469 70	2,469 70	2,469 70	2,469 70
TCHA (Farmers)	tc/ha	55 37	57 10	55 25	55 50	58 00	62 00	64 00	66 00	67 00	72 00	72 00
Sugar Production - Estate	tonne	9,965	12,742	9,456	10,498	12,203	13,464	14,733	15,796	16,214	16,547	16,798
Sugar Production - Farmers	tonne	9,289	10,004	9,441	9,290	10,047	10 740	12,446	12,835	13,029	14,001	14,001
Total sugar production	tonne	19,253	22,746	18,897	19,788	22,250	24,204	27,178	28,631	29,243	30,548	30,800
Vary Production												
Estate hectares harvested		2,332 5	3,305 8	2,895 0	2,717 2	2,883 0	2,883 0	2,883 0	2,915 0	2,915 0	2,915 0	2,915 0
Farmers hectares harvested		2,055 0	2,244 9	2,255 8	2,126 0	2,200 0	2,200 0	2,469 7	2,469 7	2,469 7	2,469 7	2,469 7
Total Hectares Harvested		4,387 50	5,550 70	5,150 78	4,843 20	5,083 00	5,083 00	5,352 70	5,384 70	5,384 70	5,384 70	5,384 70
Estate cane production		119,976	158,965	127,232	131,222	151,313	166,957 00	182,683 00	195,870 00	201,050 00	205,181 00	208,301 00
Farmers' Cane Production		113,785	128,167	124,629	117,987	127,600	136,400 00	158,060 80	163,000 20	165,470 00	177,818 00	177,818 00
Total Cane Production		233,761	287,132	251,861	249,209	278,913	303,357 00	340,743 80	358,870 20	366,520 00	382,999 00	386,119 00
		-	-	-	-	-	-	-	-	0 00	(0 00)	(0 00)
Sugar Production - Estate		9,965	12,742	9,456	10,498	12,203	13,464 27	14,732 50	15,795 97	16,084 00	16,547 00	16,798 00
Sugar Production - Farmers		9,289	10,004	9,441	9,290	10,047	10,740 16	12,445 73	12,834 66	13,039 00	14,001 00	14,001 00
Total sugar production		19,253	22,746	18,897	19,788	22,250	24,204 43	27,178 23	28,630 63	29,243 00	30,548 00	30,800 00
		-	-	-	-	-	-	-	-	0 00	(0 00)	0 00
TOTAL TCH		53 28	51 73	48 90	51 46	54 87	59 68	63 66	66 65	68 07	71 13	71 71
TOTAL TCTS		12 14	12 62	13 33	12 59	12 54	12 53	12 54	12 53	12 53	12 54	12 54

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Wales

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
TOTAL TSH		4.39	4.10	3.67	4.09	4.38	4.76	5.08	5.32	5.43	5.67	5.72

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Uitvlugt

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	3,057.30	4,795.70	4,379.30	3,933.00	3,933.00	3,933.00	3,933.00	3,984.00	3,984.00	3,984.00	3,984.00
Cover b/f												
Draw Down	ha	50.00	100.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00	90.00
Fall 6 month fallow	ha											
Prepared land	ha	1,041.80	800.00	547.30	50.00	50.00	50.00	150.00	150.00	150.00	150.00	150.00
Area in cultivation	ha	6,005.90	5,505.90	4,634.30	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00	4,500.00
Area in cul excl. F/fallow @ 31.12	ha	4,964.10	5,205.90	4,087.00	4,450.00	4,450.00	4,450.00	4,350.00	4,350.00	4,350.00	4,350.00	4,350.00
Flood Fallow prepared during the year	ha	-			-	-	-	-	-			-
Flood Fallow @ 31.12	ha	-			-	-	-	-	-			-
Draw Down during the year	ha	120.00	280.00	80.00	250.0	225.0	225.0	225.0	225.0	225.0	225.0	225.0
Planting during the year	ha	849.30	731.8	874.0	750.0	750.0	800.0	800.0	900.0	900.0	900.0	900.0
% planting	%	9%	13%	19%	17%	17%	18%	18%	20%	20%	20%	20%
Flood Fallowing % planting	%				-	-	-	-	-	-	-	-
Planting from FF	**ha**											
Commercial	ha	-	-			-	-					-
Dumbed seed	ha		-			-	-					-
Total	ha	-	-	-	-	-	-	-	-	-	-	-
Planting P & P	**ha**											
Commercial	ha	469.30	650.80	771.00	675.0	675.0	720.0	720.0	797.0	797.0	797.0	797.0
Seed cane	ha	80.00	78.00	103.00	75.0	75.0	80.0	80.0	103.0	103.0	103.0	103.0
Total	ha	549.30	731.80	874.00	750.0	750.0	800.0	800.0	900.0	900.0	900.0	900.0
Total planting FF + P & P	ha	549.30	731.80	874.00	750.0	750.0	800.0	800.0	900.0	900.0	900.0	900.0
Check	ha	549.30	731.80	874.00	750.0	750.0	800.0	800.0	900.0	900.0	900.0	900.0
%Planting												
% Seed Cane												
Putting land under water from FF	**ha**											
FF Land	ha	0%	0%									
Total mechanical fillage	ha	549.30	649.00	891.20	750.00	750.00	800.00	800.00	900.00	900.00	900.00	900.00
Harvest area	**ha**											
Plants excl. seed canes	ha	937.70	518.0	659.80	800.90	675.00	675.00	720.00	720.00	797.00	797.00	797.00
1 ratoon	ha	686.20	1,024.4	465.10	575.20	964.00	750.00	750.00	800.00	800.00	800.00	800.00
2 ratoon	ha	717.10	750.3	944.30	405.90	525.00	964.00	750.00	750.00	800.00	800.00	800.00
3 ratoon	ha	892.60	554.3	558.40	621.00	486.00	525.00	964.00	750.00	750.00	750.00	750.00
4 ratoon	ha	791.60	775.6	455.00	402.00	621.00	486.00	525.00	964.00	750.00	700.00	700.00
5 ratoon	ha	1,032.10	1,196.5	1,301.70	1,062.50	692.00	863.00	174.00		87.00	137.00	137.00
6 ratoon	ha											
7 ratoon	ha											
Total	ha	5,057.30	4,823.2	4,379.30	3,932.50	3,933.00	3,933.00	3,933.00	3,984.00	3,984.00	3,984.00	3,984.00

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Uitvlugt

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Cane yields (combines FF & P&P yields)	**tc/ha**			3,719.50								
Plants	tc/ha	62.98	56.03	54.85	61.42	65.00	68.00	70.00	72.00	75.00	83.00	85.00
1 ratoon	tc/ha	54.16	42.40	49.94	55.55	55.00	57.00	59.00	62.00	65.00	71.00	73.00
2 ratoon	tc/ha	44.75	36.40	30.38	44.30	51.00	51.00	52.00	53.00	57.00	61.00	64.00
3 ratoon	tc/ha	38.26	38.71	34.86	31.86	41.00	47.00	48.00	49.00	50.00	51.00	55.00
4 ratoon	tc/ha	40.32	34.50	41.54	41.43	32.00	39.00	45.00	46.00	47.00	48.00	50.00
5 ratoon	tc/ha	35.44	36.13	38.86	33.21	38.00	34.00	37.00		44.00	44.00	48.00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	45.67	39.68	40.37	44.43	48.06	50.80	53.96	55.79	58.72	62.66	65.30
target	tc/ha	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00	69.00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	59,053.97	29,057.83	36,193.00	52,876.48	43,875.00	45,900.00	50,400.00	51,840.00	59,775.00	66,151.00	67,745.00
1 ratoon	tonne	37,164.15	43,437.66	22,979.00	31,952.36	53,020.00	42,750.00	44,250.00	49,600.00	52,000.00	56,800.00	58,400.00
2 ratoon	tonne	32,087.06	27,530.05	28,687.00	17,981.37	29,325.00	49,164.00	39,000.00	39,750.00	45,600.00	48,800.00	51,200.00
3 ratoon	tonne	34,151.81	21,459.30	19,466.00	19,785.06	16,646.00	27,025.00	46,272.00	36,750.00	37,500.00	38,250.00	41,250.00
4 ratoon	tonne	31,920.09	26,692.83	18,900.00	16,654.86	19,872.00	15,834.00	25,875.00	44,344.00	35,250.00	33,600.00	35,000.00
5 ratoon	tonne	36,578.17	43,229.55	50,583.00	35,451.68	26,296.00	19,142.00	6,438.00		3,828.00	6,028.00	6,576.00
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	230,955	191,407	176,808	174,702	189,034.00	199,815.00	212,235.00	222,284.00	233,953.00	249,629.00	260,171.00
Farmers' Cane Production	tonne	-	-	7,312	24,208	45,000	57,600	56,000	70,000	72,000	72,000	72,000
Total Cane Production	tonne	230,955	191,407	184,120	198,910	234,034.00	257,415.00	268,235.00	292,284.00	305,953.00	321,629.00	332,171.00
Percent estate canes	%	100.00	100.00	96.03	87.83	80.77	77.62	79.12	76.05	76.47	77.61	78.32
Percent famers cane	%	-	-	3.97	12.17	19.23	22.38	20.88	23.95	23.53	22.39	21.68
Pol % cane - Estate	%	9.50	9.50	9.18	9.50	9.50	9.80	9.80	10.20	10.20	10.20	10.20
Pol % cane - Farmers	%	-	-	9.10	9.20	9.50	9.80	9.80	10.00	10.00	10.00	10.00
Tc/Ts Estate Cane	tc/ts	13.65	13.76	13.22	12.79	12.80	12.60	12.60	12.40	12.40	12.40	12.40
Tc/Ts Farmers' Cane	tc/ts	-		13.43	13.11	12.80	12.60	12.60	12.60	12.40	12.40	12.40
Farmers' HA	Ha	-	-	71.3	284.8	600.0	800.0	800.0	1,000.0	1,000.0	1,000.0	1,000.0
TCHA (Farmers)	tc/ha	-	-	102.6	85.0	75.0	72.0	70.0	70.0	72.0	72.0	72.0
Sugar Production - Estate	tonne	16,920	13,909	13,372	13,659	14,768	15,858	16,844	17,926	18,867	20,131	20,982
Sugar Production - Farmers	tonne			544	1,847	3,516	4,571	4,444	5,556	5,806	5,806	5,806
Total sugar production	tonne	16,920	13,909	13,916	15,506	18,284	20,430	21,288	23,482	24,674	25,938	26,788
Vary Production												
Estate hectares harvested		5,057.30	4,823.7	4,379.3	3,932.5	3,933.0	3,933.0	3,933.0	3,984.0	3,984.0	3,984.0	3,984.0
Farmers hectares harvested		-	-	71.30	284.80	600.00	800.00	800.00	1,000.00	1,000.00	1,000.00	1,000.00
Total Hectares Harvested		5,057.30	4,823.70	4,450.60	4,217.30	4,533.00	4,733.00	4,733.00	4,984.00	4,984.00	4,984.00	4,984.00
Estate cane production		230,955.25	191,407	176,808	174,702	189,034	199,815	212,235	222,284	233,953	249,629	260,171
Farmers' Cane Production		-	-	7,312	24,208	45,000	57,600	56,000	70,000	72,000	72,000	72,000
Total Cane Production		230,955.25	191,407	184,120	198,910	234,034	257,415	268,235	292,284	305,953	321,629	332,171
		-	-	-	-	-	-	-	-	-	-	-
Sugar Production - Estate		16,919.80	13,909	13,372	13,659	14,768	15,858	16,844	17,926	18,867	20,131	20,982
Sugar Production - Farmers		-	-	544	1,847	3,516	4,571	4,444	5,556	5,806	5,806	5,806
Total sugar production		16,919.80	13,909	13,916	15,506	18,284	20,430	21,288	23,482	24,674	25,938	26,788
		-	-	-	-	-	-	-	-	-	-	-
TOTAL TCH		45.67	39.68	41.37	47.17	51.63	54.39	56.67	58.64	61.39	64.53	66.65
TOTAL TCTS		13.65	13.76	13.23	12.83	12.80	12.60	12.60	12.45	12.40	12.40	12.40

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
Uitvlugt

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
TOTAL TSH		3.35	2.88	4.13	3.68	4.03	4.32	4.50	4.71	4.95	5.26	5.37

Guyana Sugar Corporation Inc.
Production Forecast 2015 - 2020
LBI

	Unit	2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	1,878.20	2,118.93	1,374.00	2,698.60	2,698.60	2,698.60	2,698.60	2,698.60	2,698.60	2,698.60	2,698.60
Cover b/f		642.50	587.00	456.00								
Draw Down	ha	25.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00	60.00
Full 6 month fallow	ha	-			-				-			-
Prepared land	ha	194.10	265.70	107.60	130.00	130.00	130.00	70.00	70.00	70.00	70.00	70.00
Area in cultivation	ha	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00	2,988.00
Area in cul excl. F fallow @31/12	ha	2,793.90	2,722.30	2,880.40	2,858.00	2,858.00	2,858.00	2,918.00	2,918.00	2,918.00	2,918.00	2,918.00
Flood Fallow prepared during the year	ha											
Flood Fallow @31/12	ha											
Draw Down during the year	ha	90.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00	140.00
Planting during the year	ha	421.50	314.20	651.60	366.00	420.00	500.00	520.00	560.00	600.00	600.00	600.00
% planting	%	14%	11%	22%	12%	14%	17%	17%	19%	20%	20%	20%
Flood Fallowing % planting	%											
Planting from FF	**ha**											
Commercial	ha		-		-		-	-	-		-	
Damhed seed	ha			-			-	-				
Total	ha			-			-	-	-		-	
Planting P & P	**ha**											
Commercial	ha	371.50	274.20	611.60	326.00	380.00	460.00	480.00	520.00	560.00	560.00	560.00
Seed cane	ha	50.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Total	ha	421.50	314.20	651.60	366.00	420.00	500.00	520.00	560.00	600.00	600.00	600.00
Total planting FF + P & P	ha	421.50	314.20	651.60	366.00	420.00	500.00	520.00	560.00	600.00	600.00	600.00
Check	ha	421.50	314.20	651.60	366.00	420.00	500.00	520.00	560.00	600.00	600.00	600.00
% Planting												
% Seed Cane												
Putting land under water from FF	**ha**											
FF Land	ha											
Total mechanical Tillage	ha	421.50	396.80	624.00	366.00	426.00	500.00	520.00	560.00	600.00	600.00	600.00
Harvest area	**ha**											
Plants excl. seed canes	ha	297.4	375.06	326.50	652.70	326.00	380.00	460.00	480.00	520.00	560.00	560.00
1 ratoon	ha	440.3	398.97	635.10	92.30	665.00	366.00	420.00	500.00	520.00	600.00	600.00
2 ratoon	ha	441.9	478.96	639.90	441.80	92.00	665.00	366.00	420.00	500.00	600.00	600.00
3 ratoon	ha	243.1	326.42	872.90	434.70	442.00	92.00	665.00	366.00	420.00	520.00	560.00
4 ratoon	ha	230.6	139.92	501.50	559.82	425.00	443.00	92.00	665.00	366.00	250.00	200.00
5 ratoon	ha	225.3	402.71	404.10	527.36	749.00	754.00	696.00	268.00	373.00	162.00	179.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	1,878.2	2,118.93	1,374.00	2,698.60	2,699.00	2,699.00	2,699.00	2,699.00	2,699.00	2,699.00	2,699.00

Guyana Sugar Corporation Inc.
Production Forecast 2015 -2020
LBI

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
		1,581	1,744	3,054	2,046	2,373	2,319					
Cane yields (combines FF & P&P yields)	tc/ha											
Plants	tc/ha	71.28	73.69	61.31	65.54	70.00	74.00	78.00	80.00	82.00	84.00	86.00
1 ratoon	tc/ha	50.63	53.63	51.96	57.06	60.00	65.00	69.00	73.00	74.00	74.00	74.00
2 ratoon	tc/ha	45.22	43.93	42.17	47.62	53.00	56.00	61.00	64.00	68.00	68.00	68.00
3 ratoon	tc/ha	39.49	48.57	43.71	41.03	44.00	50.00	54.00	59.00	60.00	60.00	64.00
4 ratoon	tc/ha	33.80	42.20	43.56	35.99	40.00	42.00	48.00	51.00	56.00	56.00	58.00
5 ratoon	tc/ha	44.45	45.73	41.09	40.07	37.00	39.00	40.00	46.00	48.00	52.00	54.00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	48.37	51.97	46.31	47.35	48.82	52.51	57.56	62.84	66.22	69.00	70.57
potential	tc/ha	82.00	82.00	82.00	82.00	82.00	82.00	82.00	82.00	82.00	82.00	82.00
Cane Production (combines FF & P & P yields)	tonne											
Plants	tonne	21,170	27,636	19,649	42,778	22,820	28,120	35,880	38,400	42,640	47,040	48,160
1 ratoon	tonne	22,290	21,396	32,999	5,267	39,900	23,790	28,980	36,500	38,480	44,400	44,400
2 ratoon	tonne	19,982	20,688	26,984	21,039	4,876	37,240	22,326	26,880	34,000	40,800	40,800
3 ratoon	tonne	9,599	15,850	38,159	17,425	19,448	4,600	35,930	21,594	25,200	31,200	35,840
4 ratoon	tonne	7,792	5,904	21,846	20,147	17,000	18,564	4,416	33,915	20,496	14,000	11,600
5 ratoon	tonne	10,022	18,647	16,604	21,128.91	27,713	29,406	27,840.00	12,328.00	17,904.00	8,788.00	9,666.00
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	90,854	110,122	156,240	127,785	131,757.00	141,720	155,352	169,617	178,720	186,228	190,466
Farmers' Cane Production	tonne	2,383	1,546	3,079	3,640	3,240	3,240	3,240	3,240	3,240	3,240	3,240
Total Cane Production	tonne	93,237	111,668	159,319	131,425	134,997.00	144,960	158,592	172,857	181,960	189,468	193,706
Percent estate canes	%	97.44	98.62	98.07	97.23	97.60	97.76	97.96	98.13	98.22	98.29	98.33
Percent famers cane	%	2.56	1.38	1.93	2.77	2.40	2.24	2.04	1.87	1.78	1.71	1.67
Pol % cane - Estate	%	9.50	9.10	9.17	10.10	10.20	10.40	10.40	10.60	10.60	10.60	10.60
Pol % cane - Farmers	%	9.00	8.65	9.16	9.70	9.80	10.00	10.00	10.20	10.20	10.20	10.20
Tc/Ts Estate Cane	tc/ts	13.68	15.29	14.11	12.90	12.80	12.60	12.60	12.60	12.60	12.60	12.60
Tc/Ts Farmers' Cane	tc/ts	15.59	15.03	14.11	13.50	13.50	13.00	13.00	13.00	13.00	13.00	13.00
Farmers' HA	Ha	53.30	39.10	98.30	82.10	81.00	81.00	81.00	81.00	81.00	81.00	81.00
TCHA (Farmers)	tc/ha	44.70	39.55	31.32	44.34	40.00	40.00	40.00	40.00	40.00	40.00	40.00
Sugar Production - Estate	tonne	6,641	7,203	11,076	9,906	10,294	11,248	12,330	13,462	14,184	14,780	15,116
Sugar Production - Farmers	tonne	153	103	218	270	240	249	249	249	249	249	249
Total sugar production	tonne	6,794	7,306	11,294	10,175	10,534	11,497	12,579	13,711	14,433	15,029	15,366
Vary Production												
Estate hectares harvested		1,878.2	2,119	3,374	2,699	2,699	2,699	2,699	2,699	2,699	2,699	2,699
Farmers hectares harvested		53.3	39.10	98.30	82.10	81.00	81.00	81.00	81.00	81.00	81.00	81.00
Total Hectares Harvested		1,931.45	2,158.1	3,472.30	2,780.70	2,780.00	2,780.00	2,780.00	2,780.00	2,780.00	2,780.00	2,780.00
Estate cane production		90,854	110,122	156,240	127,785	131,757	141,720	155,352	169,617	178,720	186,228	190,466
Farmers' Cane Production		2,383	1,546	3,079	3,640	3,240	3,240	3,240	3,240	3,240	3,240	3,240
Total Cane Production		93,237	111,668	159,319	131,425	134,997	144,960	158,592	172,857	181,960	189,468	193,706
		-	-	-	-	-	-	-	-	-	-	-
Sugar Production - Estate		6,641	7,203	11,076	9,906	10,294	11,248	12,330	13,462	14,184	14,780	15,116
Sugar Production - Farmers		153	103	218	270	240	249	249	249	249	249	249
Total sugar production		6,794	7,306	11,294	10,175	10,534	11,497	12,579	13,711	14,433	15,029	15,366
		-	-	-	-	-	-	-	-	(0.00)	(0.00)	0.00
TOTAL TCH		48.27	51.74	45.88	47.26	48.56	52.14	57.05	62.18	65.45	68.15	69.68
TOTAL TCTS		13.72	15.28	14.11	12.92	12.82	12.61	12.61	12.61	12.61	12.61	12.61
TOTAL TSH		3.52	3.39	3.25	3.66	3.79	4.14	4.52	4.93	5.19	5.41	5.53

Guyana Sugar Corporation Inc.
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		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	6,288.10	6,662.50	6,720.00	6,305.10	6,314.00	6,314.00	6,314.00	6,314.00	6,314.00	6,314.00	6,314.00
Cover Ho												
Draw Down	ha	147.90	148.40	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00	155.00
Full 6 month fallow	ha			150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Prepared land	ha	213.60	282.20	341.40	220.00	220.00	220.00	220.00	220.00	220.00	220.00	220.00
Area in cultivation	ha	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90	6,688.90
Area in cul excl. F.fallow at 31/12	ha	6,475.30	6,400.70	6,347.50	6,468.90	6,468.90	6,468.90	6,468.90	6,468.90	6,468.90	6,468.90	6,468.90
Flood Fallow prepared during the year	ha	-	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Flood Fallow @ 31/12	ha		150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Draw Down during the year	ha	348.00	300.00	350.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00	300.00
Planting during the year	ha	798.70	844.80	1,299.40	1,290.00	1,005.00	1,005.00	1,140.00	1,340.00	1,340.00	1,340.00	1,340.00
% planting	%	12%	14%	19%	19%	15%	15%	17%	20%	20%	20%	20%
Flood Fallowing % planting	%	-		11.54	11.63	14.93	14.93	13.16	11.19	11.19	11.19	11.19
Planting from FF	**ha**											
Commercial	ha			135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00	135.00
Dashed seed	ha			15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00	15.00
Total	ha			150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Planting F & P	**ha**											
Commercial	ha	648.7	694.8	999.40	1,005.00	720.00	720.00	855.00	1,055.00	1,055.00	1,055.00	1,055.00
Seed cane	ha	150.0	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Total	ha	798.7	844.80	1,149.40	1,155.00	870.00	870.00	1,005.00	1,205.00	1,205.00	1,205.00	1,205.00
Total planting FF + P & P	ha	798.7	844.80	1,299.40	1,290.00	1,005.00	1,005.00	1,140.00	1,340.00	1,340.00	1,340.00	1,340.00
Check	ha	798.7	844.80	1,299.40	1,290.00	1,005.00	1,005.00	1,140.00	1,340.00	1,340.00	1,340.00	1,340.00
%Planting												
% Seed Cane												
Putting land under water from FF	**ha**											
FF Land	ha	0%	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00	150.00
Total mechanical Tillage	ha	848.10	844.80	1,273.50	1,305.00	1,020.00	1,020.00	1,155.00	1,355.00	1,355.00	1,355.00	1,355.00
Harvest area	**ha**											
Plants excl. seed canes	ha	1,212.2	804.0	680.0	1,268.80	1,140.00	855.00	855.00	990.00	1,190.00	1,190.00	1,190.00
1 ratoon	ha	1,283.9	1,077.4	991.8	425.30	1,419.00	1,290.00	1,005.00	1,005.00	1,140.00	1,340.00	1,340.00
2 ratoon	ha	960.1	1,182.9	1,113.3	1,015.50	425.00	1,419.00	1,290.00	1,005.00	1,005.00	1,140.00	1,340.00
3 ratoon	ha	900.2	1,221.6	1,060.9	955.90	1,016.00	425.00	1,419.00	1,290.00	1,005.00	1,005.00	1,340.00
4 ratoon	ha	833.9	913.1	1,209.9	842.80	956.00	1,016.00	425.00	1,419.00	1,290.00	1,005.00	1,005.00
5 ratoon	ha	1,598.2	1,464.7	1,664.9	1,796.80	1,358.00	1,309.00	1,420.00	605.00	684.00	644.00	99.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	6,288.1	6,662.5	6,720.0	6,305.0	6,314.00	6,314.00	6,314.00	6,314.00	6,314.00	6,314.00	6,314.00

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		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Cane yields (combines FF & P&P yields)	**tc/ha**			6,040 00	5,036 30							
Plants	tc/ha	61 98	64 90	72 30	73 00	76 00	79 00	81 00	84 00	86 00	92 00	94 00
1 ratoon	tc/ha	61 01	55 47	71 97	64 00	67 00	69 00	73 00	75 00	78 00	79 00	80 00
2 ratoon	tc/ha	60 53	52 00	56 77	56 00	60 00	62 00	65 00	69 00	70 00	70 00	72 00
3 ratoon	tc/ha	56 35	50 16	55 48	55 00	53 00	57 00	59 00	62 00	65 00	65 00	65 00
4 ratoon	tc/ha	52 67	47 25	50 62	53 00	51 00	50 00	54 00	55 00	59 00	60 00	60 00
5 ratoon	tc/ha	50 85	41 91	49 71	50 00	50 00	49 00	48 00	49 00	50 00	54 00	54 00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	57 08	50 91	57 53	57 70	59 82	60 77	62 80	65 81	69 25	72 06	74 17
potential	tc/ha	82 00	82 00	82 00	82 00	82 00	82 00	82 00	82 00	82 00	82 00	82 00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	75,128	52,177	49,166	92,622	86,640	67,545	69,255	83,160	102,340	109,480	111,860
1 ratoon	tonne	78,281	59,759	71,379	27,219	95,073	89,010	73,365	75,375	88,920	105,860	107,200
2 ratoon	tonne	58,119	61,459	63,204	56,868	25,500	87,978	83,850	69,345	70,350	79,800	96,480
3 ratoon	tonne	50,727	61,264	58,855	52,575	53,848	24,225	83,721	79,980	65,325	65,325	87,100
4 ratoon	tonne	43,924	43,141	61,210	44,668	48,756	50,800	22,950	78,045	76,110	60,300	60,300
5 ratoon	tonne	81,289	61,389	82,763	89,840	67,900	64,141	63,360	29,645	34,200	34,236	5,346
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	387,468	339,189	386,577	363,793	377,717	383,699 00	396,501 00	415,550 00	437,245 00	455,001 00	468,286 00
Farmers' Cane Production	tonne	36,115	33,299	41,678	39,513	38,350	42,160	40,800	39,440	40,120	42,160	42,160
Total Cane Production	tonne	423,583	372,488	428,255	403,306	416,067	425,859 00	437,301 00	454,990 00	477,365 00	497,161 00	510,446 00
Percent estate canes	%	91 47	91 06	90 27	90 20	90 78	90 10	90 67	91 33	91 60	91 52	91 74
Percent famers cane	%	8 53	8 94	9 73	9 80	9 22	9 90	9 33	8 67	8 40	8 48	8 26
Pol % cane - Estate	%	9 50	9 60	9 43	9 50	9 80	10 20	10 40	10 60	10 80	10 80	10 80
Pol % cane - Farmers		9 80	9 12	9 10	9 80	9 80	10 00	10 20	10 20	10 20	10 20	10 20
Tc/Ts Estate Cane	tc/ts	12 33	13 23	13 25	13 40	13 00	12 80	12 40	12 20	11 80	11 80	11 80
Tc/Ts Farmers' Cane	tc/ts	12 01	13 51	14 00	13 00	13 20	13 00	12 80	12 80	12 80	12 80	12 80
Farmers' HA	Ha	651 90	656 40	644 10	646 70	650 00	680 00	680 00	680 00	680 00	680 00	680 00
TCHA (Farmers)	tc/ha	55 40	50 73	64 71	61 10	59 00	62 00	60 00	58 00	59 00	62 00	62 00
Sugar Production - Estate	tonne	31,425	25,633	29,168	27,149	29,055	29,976	31,976	34,061	37,055	38,559	39,685
Sugar Production - Farmers	tonne	3,007	2,465	2,977	3,041	2,905	3,243	3,188	3,081	3,134	3,294	3,294
Total sugar production	tonne	34,432	28,098	32,145	30,189	31,960	33,220	35,163	37,143	40,189	41,853	42,979
Vary Production												
Estate hectares harvested		6,788 1	6,662 5	6,720 0	6,305 1	6,314 0	6,314 0	6,314 0	6,314 0	6,314 0	6,314 0	6,314 0
Farmers hectares harvested		651 9	656 4	644 1	646 7	650 0	680 0	680 0	680 0	680 0	680 0	680 0
Total Hectares Harvested		7,440 00	7,318 9	7,364 10	6,951 80	6,964 00	6,994 00	6,994 00	6,994 00	6,994 00	6,994 00	6,994 00
Estate cane production		387,468	339,189	386,577	363,793	377,717	383,699	396,501	415,550	437,245	455,001	468,286
Farmers' Cane Production		36,115	33,299	41,678	39,513	38,350	42,160	40,800	39,440	40,120	42,160	42,160
Total Cane Production		423,583	372,488	428,255	403,306	416,067	425,859	437,301	454,990	477,365	497,161	510,446
		-	-	-	-	-	-	-	-	-	-	-
Sugar Production - Estate		31,425	25,633	29,168	27,149	29,055	29,976	31,976	34,061	37,055	38,559	39,685
Sugar Production - Farmers		3,007	2,465	2,977	3,041	2,905	3,243	3,188	3,081	3,134	3,294	3,294
Total sugar production		34,432	28,098	32,145	30,189	31,960	33,220	35,163	37,143	40,189	41,853	42,979
		-	-	-	-	-	-	-	-	(0 00)	(0 00)	(0 00)
TOTAL TCH		56 93	50 89	58 15	58 01	59 75	60 89	62 53	65 05	68 25	71 08	72 98
TOTAL TCTS		12 30	13 26	13 32	13 36	13 02	12 82	12 44	12 25	11 88	11 88	11 88
TOTAL TSH		4 63	3 84	4 37	4 34	4 59	4 75	5 03	5 31	5 75	5 98	6 15

Guyana Sugar Industry
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		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Summary of areas												
Area in Canes	**ha**											
Harvest	ha	2,609.3	5,067.00	8,116.70	8,039.60	8,582.00	8,582.00	8,532.00	8,532.00	8,532.00	8,532.00	8,532.00
Cover b f												
Draw Down	ha	94.50	170.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00	170.00
Full 6 month fallow	ha	-	-	-	-	-	-	-	-	-	-	-
Prepared land	ha	530.00	441.90	491.90	150.00	150.00	200.00	200.00	200.00	200.00	200.00	200.00
Area in cultivation	ha	8,858.40	8,902.60	8,902.60	8,902.60	8,902.00	8,902.00	8,902.00	8,902.00	8,902.00	8,902.00	8,902.00
Area in cul excl. F fallow @ 31-12	ha	8,327.80	8,460.70	8,410.70	8,752.00	8,752.00	8,702.00	8,702.00	8,702.00	8,702.00	8,702.00	8,702.00
Flood Fallow prepared during the year	ha	-	-	-	-	-	-	-	-	-	-	-
Flood Fallow @ 31-12	ha	-	-	-	-	-	-	-	-	-	-	-
Draw Down during the year	ha	259.20	300.00	340.00	412.00	412.00	412.00	412.00	412.00	412.00	412.00	412.00
Planting during the year	ha	1,233.1	894.90	723.70	1,335.00	1,514.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00
% planting	%	14%	10%	8%	15%	17%	20%	20%	20%	20%	20%	20%
Flood Fallowing % planting	%	-	-	-	-	-	-	-	-	-	-	-
Planting from FF	**ha**	-	-	-	-	-	-	-	-	-	-	-
Commercial	ha	-	-	-	-	-	-	-	-	-	-	-
Dambed seed	ha	-	-	-	-	-	-	-	-	-	-	-
Total	ha	-	-	-	-	-	-	-	-	-	-	-
Plantiog P & P	**ha**											
Commercial	ha	1,000.0	644.90	473.70	1,085.00	1,264.00	1,530.00	1,530.00	1,530.00	1,530.00	1,530.00	1,530.00
Seed cane	ha	233.1	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00	250.00
Total	ha	1,233.1	894.90	723.70	1,335.00	1,514.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00
Total planting FF + P & P	ha	1,233.1	894.90	723.70	1,335.00	1,514.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00
Check	ha		894.90	723.70	1,335.00	1,514.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00
%Planting		14%	10%	8%	15%	17%	20%	20%	20%	20%	20%	20%
% Seed Cane		3%	3%	3%	3%	3%	3%	3%	3%	3%	3%	3%
Putting land under water from FF	**ha**	-	-	-	-	-	-	-	-	-	-	-
FF Land	ha	-	-	-	-	-	-	-	-	-	-	-
Total mechanical Tillage	ha	1,361.80	894.90	837.00	1,335.00	1,514.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00	1,780.00
Harvest area	**ha**											
Plants excl. seed canes	ha	1,025.6	877.6	1,069.10	635.90	1,168.00	1,264.00	1,530.00	1,530.00	1,530.00	1,530.00	1,530.00
1 ratoon	ha	1,442.8	807.8	1,376.20	921.00	804.00	1,415.00	1,514.00	1,780.00	1,780.00	1,780.00	1,780.00
2 ratoon	ha	560.3	863.9	1,110.90	1,385.20	921.00	804.00	1,415.00	1,514.00	1,780.00	1,780.00	1,780.00
3 ratoon	ha	648.9	324.1	804.10	974.70	1,385.00	921.00	804.00	1,415.00	1,514.00	1,780.00	1,780.00
4 ratoon	ha	388.8	184.5	466.70	271.80	975.00	1,385.00	921.00	804.00	1,415.00	1,315.00	1,460.00
5 ratoon	ha	3,543.2	2,909.1	3,280.70	3,381.90	3,463.00	2,823.00	2,348.00	1,489.00	513.00	537.00	202.00
6 ratoon	ha											
7+ ratoon	ha											
Total	ha	2,609.3	5,067.0	8,116.70	8,039.60	8,585.00	8,582.00	8,532.00	8,532.00	8,532.00	8,532.00	8,532.00

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		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
Cane yields (combines FF & P&P yields)	**tc/ha**											
Plants	tc/ha	62 67	73 98	68.39	71 69	75.00	80.00	83.00	87.00	90.00	95.00	97.00
1 ratoon	tc/ha	57 93	58 07	64 88	67 05	68.00	71.00	75.00	77.00	81.00	83.00	84.00
2 ratoon	tc/ha	51 68	44 68	56 03	62 00	64.00	65.00	67.00	71.00	72.00	75.00	77.00
3 ratoon	tc/ha	52 68	52 37	51 03	53 07	59.00	60.00	61.00	64.00	67.00	70.00	71.00
4 ratoon	tc/ha	47 24	51 94	42 02	52 47	51.00	56.00	57.00	58.00	61.00	65.00	66.00
5 ratoon	tc/ha	48 49	53 80	56 91	51 99	50.00	50.00	53.00	54.00	55.00	58.00	58.00
6 ratoon	tc/ha											
7+ ratoon	tc/ha											
mean	tc/ha	52 72	55 77	58 21	57 14	58 12	61 31	65 79	69 77	73 37	76 98	78 46
potential	tc/ha	77 00	83 00	83 00	83 00	83.00	83.00	83.00	83.00	83.00	83.00	83.00
Cane Production (combines FF & P & P yields)	**tonne**											
Plants	tonne	64,271 0	64,925 0	73,119 0	45,587 7	87,375.0	101,120 0	126,990 0	133,110 0	137,700 0	145,350 0	148,410 0
1 ratoon	tonne	83,557 0	29,489 0	89,283 0	61,753 1	54,672 0	100,465 0	113,550 0	137,060 0	144,180 0	147,740 0	149,520 0
2 ratoon	tonne	28,958 0	38,600 0	62,239 0	84,022 4	58,944 0	52,260 0	94,805 0	107,494 0	128,160 0	133,500 0	137,060 0
3 ratoon	tonne	34,182 0	16,973 0	41,035 0	51,727 3	79,945 0	55,260 0	49,044 0	90,560 0	101,438 0	124,600 0	126,380 0
4 ratoon	tonne	18,365 0	9,583 0	19,611 0	40,496 3	49,725 0	75,880 0	52,497 0	46,632 0	86,315 0	85,475 0	96,360 0
5 ratoon	tonne	171,814 0	156,496 0	187,220 0	175,778 2	168,150 0	141,150 0	124,444 00	80,406 00	28,215 00	20,126 00	11,716 00
6 ratoon	tonne											
7+ ratoon	tonne											
Estate cane production	tonne	401,147 0	316,066	472,507	459,365	498,811 00	526,135	561,330	595,262	626,008	656,791	669,446
Farmers' Cane Production	tonne	140,781 0	118,613	117,511	127,244	130,032	130,032	143,000	151,200	156,800	173,600	182,000
Total Cane Production	tonne	541,928	434,679	590,018	586,609	628,843 00	656,167	704,330	746,462 00	782,808 00	830,391 00	843,046 00
Percent estate canes	%	74 02	72 71	80 08	78 31	79 32	80 18	79 70	79 74	79 97	79 09	79 41
Percent famers cane	%	25 98	27 29	19 92	21 69	20 68	19.82	20 30	20 26	20 03	20 91	21 59
Pol % cane - Estate	%	9 5%	8 5%	8 4%	9 2%	9 8%	10 2%	10 5%	10 5%	10 5%	10 5%	10 5%
Pol % cane - Farmers	%	9 0%	8 2%	8 2%	8 9%	9 0%	9 8%	9 8%	9 8%	9 8%	10 0%	10 0%
Tc/Ts Estate Cane	tc/ts	15 96	16 44	16 35	15 13	14 00	13 00	12 80	12 80	12 60	12 60	12 60
Tc/Ts Farmers' Cane	tc/ts	17 32	18 76	16 80	15 05	14 50	13 50	13 50	13 50	13 00	12 80	12 80
Farmers' HA	Ha	2,416 7	2,119 40	2,376 7	2,408 1	2,408 0	2,408 0	2,600 0	2,700 00	2,800 00	2,800 00	2,800 00
TCHA (Farmers)	tc/ha	58 25	55 97	49 44	52 84	54 00	54 00	55 00	56 00	56 00	62 00	65 00
Sugar Production - Estate	tonne	25,135	19,223	28,897	30,361	35,629	40,472	43,854	46,504 84	49,683 17	52,126 27	53,130 63
Sugar Production - Farmers	tonne	8,128	6,321	6,993	8,455	8,968	9,632	10,593	11,200 00	12,061 54	13,562 50	14,218 75
Total sugar production	tonne	33,263	25,544	35,890	38,816	44,597	50,104	54,446	57,704 84	61,744 71	65,688 77	67,349 38
Vary Production												
Estate hectares harvested		7,609 30	5,667	8,116 7	8,039 6	8,583 0	8,582 0	8,532 0	8,532 0	8,532 0	8,532 0	8,532 0
Farmers hectares harvested		2,416 70	2,119 4	2,377	2,408	2,408	2,408	2,600	2,700	2,800	2,800	2,800
TOTAL Hectares Harvested		10,026 00	7,786 40	10493 40	10,447 70	10,991 00	10,990 00	11,132 00	11,232 00	11,332 00	11,332 00	11,332 00
Estate cane production		401,147	316,066	472,507	459,365	498,811	526,135	561,330	595,262	626,008	656,791	669,446
Farmers' Cane Production		140,781	118,613	117,511	127,244	130,032	130,032	143,000	151,200	156,800	173,600	182,000
Total Cane Production		541,928	434,679	590,018	586,609	628,843	656,167	704,330	746,462	782,808	830,391	851,446
-				-	-	-	-	-	-	-	-	0 01
Sugar Production - Estate		25,135	19,223	28,897	30,361	35,629	40,472	43,854	46,505	49,683	52,126	53,131
Sugar Production - Farmers		8,128	6,321	6,993	8,455	8,968	9,632	10,593	11,200	12,062	13,563	14,219
Total sugar production		33,263	25,544	35,890	38,816	44,597	50,104	54,446	57,705	61,745	65,689	67,349
				-	-	-	-	-	-	0.00	0.00	(0.00)
TOTAL TCH		54 05	55 83	56 23	56 15	57 21	59 71	63 27	66 46	69 08	73 28	75 14
TOTAL TCTS		16 29	17 02	16 44	15 11	14 10	13 10	12 94	12 94	12 68	12 64	12 64

Guyana Sugar Industry
Production Forecast 2015 -2020
Skeldon

		2012	2013	2014	2015	2016	2017	2018	2019	2020	2023	2025
	Unit											
TOTAL TSH		3.32	3.28	3.42	3.72	4.06	4.56	4.89	5.14	5.45	5.80	5.94

Appendix 2

Agriculture Operating Costs and Capital Requirements

ACCESSIBILITY & CANE TRANSPORT INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost GSM
Skeldon	All weather roads	25	120000	3000000	615
Skeldon	Cane Punts	700	4878	3414600	700.0
Skeldon	45/66 Tractor JD	8	33980	271840	55.7
Skeldon	55 HP tractors With Winch	12	70000	840000	172.2
Skeldon	Vehicles	10	30000	300000	61.5
Skeldon	Motor Cycle	30	1500	45000	9.2
ALBION	45 HP Tractor	15	48644	729660	149.5
ALBION	Cane Punts	380	4878	1853640	380.0
ALBION	Paddle tug Engines	5	7318	36590	7.5
ALBION	All weather road	30	97561	2926830	600.0
ALBION	Vehicles	10	3000	30000	6.2
ALBION	Motor Cycle	30	1500	45000	9.2
ROSE HALL	Prime Mover Mahendra Tractor	2	48644	97288	19.9
ROSE HALL	Cane Punts	350	4878	1707300	350.0
ROSE HALL	45/66 Tractor JD	10	33980	339800	69.7
ROSE HALL	Motor Grader	1	97087	97087	19.9
ROSE HALL	All weather road	25	24272	606800	124.4
ROSE HALL	Vehicles	10	3000	30000	6.2
ROSE HALL	Motor Cycle	30	1500	45000	9.2
Blairmont	Cane Punts	300	4878	1463400	300.0
Blairmont	All weather road	25	24272	606800	124.4
Blairmont	45/66 Tractor JD	8	33980	271840	55.7
Blairmont	55 Hp Tractor	4	24390	97561	20.0
Blairmont	Vehicles	7	3000	21000	4.3
Blairmont	Motor Cycle	25	1500	37500	7.7
East Demerara	Cane Transport - 45 hp tractor	10	19512	195122	40.0
East Demerara	All weather roads	30	61789	1853659	380.0
East Demerara	Establishing new link rear end of LBI	1	200000	200000	41.0
East Demerara	Punts	280	4878	1365840	280.0
East Demerara	Vehicles	8	3000	24000	4.9
East Demerara	Motor Cycle	26	1500	39000	8.0
Wales	ALL WEATHER ROADS	15	50000	750000	153.8
Wales	CANE PUNTS	180	4390	790244	162.0
Wales	DUMP LORRY	1	30000	30000	6.2
Wales	Cane Transport - 45 hp tractor	10	19512	195122	40.0
Wales	Vehicles	6	3000	18000	3.7
Wales	Motor Cycle	20	1500	30000	6.2
Uitvlugt	Cane Punts	300	4878	1463400	300.0
Uitvlugt	All weather road	30	24272	728160	149.3
Uitvlugt	45/66 Tractor JD	10	33980	339800	69.7
Uitvlugt	55 Hp Tractor	5	24390	121951	25.0
Uitvlugt	Vehicles	8	3000	24000	4.9
Uitvlugt	Motor Cycle	23	1500	34500	7.1

ALL WEATHER RDADS

ESTATE	Description	Quantity KM	Unit Price US$	Cost US$	Cost G$M
Skeldon	All weather roads	25	120000	3000000	615
ALBION	All weather road	30	97561	2926830	600 9
ROSE HALL	All weather road	25	24272	606800	124 4
Blairmont	All weather road	25	24272	606800	124.4
East Demerara	All weather roads	30	61789	1853659	380.0
Wales	ALL WEATHER ROADS	15	50000	750000	153.8
Uitvlugt	All weather road	30	24272	728160	149 3
East Demerara	Establishing new link near end of LBI	1	200000	200000	41 0

CANE PUNTS

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Skeldon	Cane Punts	700	4878	3414600	700 0
ALBION	Cane Punts	380	4878	1853640	380 0
ROSE HALL	Cane Punts	350	4878	1707300	350 0
Blairmont	Cane Punts	300	4878	1463400	300 0
East Demerara	Punts	280	4878	1365840	280 0
Wales	CANE PUNTS	180	4390	790244	162 0
Uitvlugt	Cane Punts	300	4878	1463400	300 0

CANE TRANSPORT TRACTORS

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Skeldon	45/66 Tractor JD	8	33980	271840	55 7
Skeldon	55 HP tractors With Winch	12	70000	840000	172.2
ALBION	45 HP Tractor	15	48544	728160	149.3
ROSE HALL	Prime Mover Mahendra Tractu	2	48544	97088	19 9
ROSE HALL	45/66 Tractor JD	10	33980	339800	69 7
Blairmont	45/66 Tractor JD	8	33980	272840	55 7
Blairmont	55 Hp Tractor	4	24390	97561	20 0
East Demerara	Cane Transport - 45 hp tractor	10	19512	195122	40 0
Wales	Cane Transport - 45 hp tractor	10	19512	195122	40 0
Uitvlugt	45/66 Tractor JD	10	33980	339800	69 7
Unvlugt	55 Hp Tractor	5	24390	121951	25 0
TDTAL		94			

TUGS

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
ALBION	Paddle tug Engines	5	7318	36590	7 5
TDTAL		5			

GRADER

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
ROSE HALL	Motor Grader	1	97087	97087	19 9
TOTAL		1			

DUMP LORRY

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Wales	DUMP LORRY	1	30000	30000	6 2
TDTAL		1			

VEHICLES

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Skeldon	Vehicles	10	30000	300000	61.5
ALBION	Vehicles	10	3000	30000	6 2
ROSE HALL	Vehicles	10	3000	30000	6.2
Blairmont	Vehicles	7	3000	21000	4.3
East Demerara	Vehicles	8	3000	24000	4 9
Wales	Vehicles	6	3000	18000	3 7
Uitvlugt	Vehicles	8	3000	24000	4 9
TOTAL					

MOTOR CYCLES

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Skeldon	Motor Cycle	30	1500	45000	9.2
ALBION	Motor Cycle	30	1500	45000	9.2
ROSE HALL	Motor Cycle	30	1500	45000	9.2
Blairmont	Motor Cycle	25	1500	37500	7.7
East Demerara	Motor Cycle	26	1500	39000	8 0
Wales	Motor Cycle	20	1500	30000	6 2
Uitvlugt	Motor Cycle	23	1500	34500	7 1

				Cost US$	Cost G$M

CIVILS INFRASTRUCTURE INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	High bridges	16	68293	1092688	224.0
Skeldon	Aqueducts	7	46341	324387	66.5
Skeldon	Heavy duty revetment - Meters	1000	830	830000	170.2
Skeldon	Heavy duty revetment Meters	1000	830	830000	170.2
Skeldon	Light duty revetment Meters	10000	162	1620000	332.1
ALBION	High bridges	16	68293	1092688	224.0
ALBION	Aqueducts	8	46341	370728	76.0
ALBION	Heavy duty revetment - Meters	2000	830	1660000	340.3
ALBION	Heavy duty revetment Meters	1000	830	830000	170.2
ALBION	Light duty revetment Meters	12000	162	1944000	398.5
ROSE HALL	Heavy duty revetment – Meters	1500	830	1245000	255.2
ROSE HALL	Heavy duty revetment - Meters	1200	830	996000	204.2
ROSE HALL	Light duty revetment - Meters	11000	162	1782000	365.3
ROSE HALL	Check Sluices to control water in low lying areas	10	19417	194170	39.8
ROSE HALL	Installing two worms at EV and GBL Sluices	2	7282	14564	3.0
Blairmont	Heavy duty revetment Meters	1000	830	830000	170.2
Blairmont	Light duty revetment Meters	10000	162	1620000	332.1
Blairmont	Aqueduct	4	146341	585366	120.0
Blairmont	High bridges	10	68293	682930	140.0
Blairmont	Sluice	1	146341	146341	30.0
East Demerara	Modification of building/ facilities			97561	20.0
East Demerara	Admin building			195122	40.0
East Demerara	Fertilizer bond Building			195122	40.0
East Demerara	High Bridges - Concrete	12	58537	702439	144.0
East Demerara	Flat Bridges - Concrete	10	24390	243902	50.0
East Demerara	Light duty revetment along CNC Meters	8000	162	1296000	265.7
East Demerara	Replacement of aqueduct	3	146341	439024	90.0
Wales	FLAT BRIDGES	8	48780	195122	40.0
Wales	LIGHT DUTY revetment - Meters	6000	162	972000	199.3
Wales	HIGH BRIDGES	8	58537	292683	60.0
Uitvlugt	High Bridges	10	70000	700000	143.5
Uitvlugt	Aqueducts	6	100000	600000	123.0
[illegible]				[illegible]	[illegible]

CIVILS INFRACTURE INVESTMENTS BY TYPE

BRIDGES

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	High bridges	16	68293	1092688	224.0
ALBION	High bridges	16	68293	1092688	224.0
Blairmont	High bridges	10	68293	682930	140.0
East Demerara	High Bridges - Concrete	12	58537	702439	144.0
East Demerara	Flat Bridges - Concrete	10	24390	243902	50.0
Wales	FLAT BRIDGES	8	48780	195122	40.0
Wales	HIGH BRIDGES	8	58537	292683	60.0
Uitvlugt	High Bridges	10	70000	700000	143.5
TOTAL		**90**		**5002452**	**1025.5**

AQUEDUCT

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Aqueducts	7	46341	324387	66.5
ALBION	Aqueducts	8	46341	370728	76.0
Blairmont	Aqueduct	4	146341	585366	120.0
East Demerara	Replacement of aqueduct	3	146341	439024	90.0
Uitvlugt	Aqueducts	6	100000	600000	123.0
TOTAL		**28**		**2319505**	**475.5**

REVETMENT

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Heavy duty revetment - Meters	1000	830	830000	170.2
Skeldon	Heavy duty revetment Meters	1000	830	830000	170.2
Skeldon	Light duty revetment Meters	10000	162	1620000	332.1
ALBION	Heavy duty revetment - Meters	2000	830	1660000	340.3
ALBION	Heavy duty revetment : Meters	1000	830	830000	170.2
ALBION	Light duty revetment : Meters	12000	162	1944000	398.5
ROSE HALL	Heavy duty revetment – Meters	1500	830	1245000	255.2
ROSE HALL	Heavy duty revetment :- Meters	1200	830	996000	204.2
ROSE HALL	Light duty revetment :- Meters	11000	162	1782000	365.3
Blairmont	Heavy duty revetment Meters	1000	830	830000	170.2
Blairmont	Light duty revetment Meters	10000	162	1620000	332.1
East Demerara	Light duty revetment along CNC Meters	8000	162	1296000	265.7
Wales	LIGHT DUTY revetment - Meters	6000	162	972000	199.3
TOTAL		**65700**		**16455000**	**3373.3**

SLUICES

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
ROSE HALL	Check Sluices to control water in low lying areas	10	19417	194170	39.8
ROSE HALL	Installing two worms at EV and GBL Sluices	2	7282	14564	3.0
Blairmont	Sluice	1	146341	146341	30.0
TOTAL		**13**		**355075**	**72.8**

BUILDINGS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
East Demerara	Modification of building/ facilities			97561	20.0
East Demerara	Admin building			195122	40.0
East Demerara	Fertilizer bond Building			195122	40.0
TOTAL				**487805**	**100.0**

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
GRAND TOTAL				24619938	5047.3

DRAINAGE & IRRIGATION INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Overhead Irrigators	8	97561	780488	160
ROSE HALL	Irrigator	10	72815	728150	149.3
ROSE HALL	Self-driven dam bed pumps- irrigators	9	48543	436887	89.6
ROSE HALL	Irrigator/Tugs	6	48500	291000	59.7
East Demerara	Drainage - Excavator	6	170732	682927	140.0
Wales	Drainage - Excavator	6	170732	682927	140.0
Uitvlugt	Drainage Pumps	2	650000	1300000	266.5
Uitvlugt	Irrigators	10	50000	500000	102.5

DRAINAGE & IRRIGATION INVESTMENYS BY MACHINE TYPE

IRRIGATORS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Overhead Irrigators	8	97561	780488	160.0
ROSE HALL	Irrigator	10	72815	728150	149.3
ROSE HALL	Self-driven dam bed pumps- irrigators	9	48543	436887	89.6
ROSE HALL	Irrigator/Tugs	6	48500	291000	59.7
Uitvlugt	Irrigators	10	50000	500000	102.5
TOTAL		**43**		**2736525**	**561.0**

EXCAVATOR					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
East Demerara	Drainage - Excavator	6	170732	682927	140
Wales	Drainage - Excavator	6	170732	682927	140
TOTAL		**12**		**1365854**	**280**

DRAINAGE PUMPS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Uitvlugt	Drainage Pumps	2	650000	1300000	266.5
TOTAL		**2**		**1300000**	**266.5**

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M	Cat
Skeldon	All weather roads	25	120000	3000000	615	ACC
Skeldon	Cane Punts	700	4878	3414600	699.993	ACC
Skeldon	45/66 Tractor JD	8	33980	271840	55.7272	ACC
Skeldon	55 HP tractors With Winch	12	70000	840000	172.2	ACC
Skeldon	Vehicles	10	30000	300000	61.5	ACC
Skeldon	Motor Cycle	30	1500	45000	9.225	ACC
[illegible]	[illegible]				[illegible]	
Skeldon	High bridges	16	68293	1092688	224.00104	CV
Skeldon	Aqueducts	7	46341	324387	66.499335	CV
Skeldon	Heavy duty revetment - Meters	1000	830	830000	170.15	CV
Skeldon	Heavy duty revetment Meters	1000	830	830000	170.15	CV
Skeldon	Light duty revetment Meters	10000	162	1620000	332.1	CV
[illegible]	[illegible]				[illegible]	
Skeldon	Overhead Irrigators	8	97560.97561	780488	160	OI
[illegible]	[illegible]				[illegible]	
Skeldon	Harvesters and associated equipment	4	750000	3000000	615	MECH
Skeldon	Excavators	8	176850	1414797	290.0	MECH
Skeldon	Tractors - Fertilising	10	82142.85714	821428.5714	168.4	MECH
Skeldon	Boom Sprayer Implement	5	7000	35000	7.2	MECH
Skeldon	Land Conversion	2000	1500	3000000	615.0	MECH
Skeldon	Bell Loader	3	75000	225000	46.1	
[illegible]	[illegible]				[illegible]	
Skeldon	Tillage tractors	9	70000	630000	129.15	TP
Skeldon	Trailing Final Harrow	9	9709	87381	17.913105	TP
Skeldon	Plows	9	7540	67860	13.9113	TP
[illegible]	[illegible]				[illegible]	
ALBION	45 HP Tractor	15	48544	728160	149.2728	ACC
ALBION	Cane Punts	380	4878	1853640	379.9962	ACC
ALBION	Paddle tug Engines	5	7318	36590	7.50095	ACC
ALBION	All weather road	30	97561	2926830	600.00015	ACC
ALBION	Vehicles	10	3000	30000	6.15	ACC
ALBION	Motor Cycle	30	1500	45000	9.225	ACC
[illegible]	[illegible]				[illegible]	
ALBION	High bridges	16	68293	1092688	224.00104	CV
ALBION	Aqueducts	8	46341	370728	75.99924	CV
ALBION	Heavy duty revetment - Meters	2000	830	1660000	340.3	CV
ALBION	Heavy duty revetment : Meters	1000	830	830000	170.15	CV
ALBION	Light duty revetment : Meters	12000	162	1944000	398.52	CV
[illegible]	[illegible]				[illegible]	
ALBION	Super long reach excavator	8	176849.6842	1414797.474	290.0	MECH
ALBION	Spring Tines Implement	4	9709	38836	8.0	MECH
ALBION	Planting trailer Implement	4	12135	48540	10.0	MECH
ALBION	Furrow coverer Implement	2	14563	29126	6.0	MECH
ALBION	Harvesters and associated equipment	2	780488	1560976	320.0	MECH
ALBION	Tractors LGRP Spreader	8	82390.33333	659122.6667	135.1	MECH
ALBION	LGRP SPREADER Implement	5	24390	121950	25.0	MECH
ALBION	Land Conversion	1000	1500	1500000	307.5	MECH
ALBION	Dump lorry- 10 Ton Tools	3	31707	95121	19.5	MECH
ALBION	Trolly jack- 20 ton Tools	2	8536	17072	3.5	MECH
ALBION	FWS Service unit Tools	1	72816	72816	14.9	MECH
ALBION	Portable welding plant Tools	2	2184	4368	0.9	MECH
ALBION	Lathe Tools	1	24272	24272	5.0	MECH
ALBION	Distilling unit Tools	1	1951	1951	0.4	MECH
ALBION	Heavy duty tool kit Tools	8	2439	19512	4.0	MECH
ALBION	Floor crane Tools	1	19512	19512	4.0	MECH
ALBION	Air compressor Tools	2	3902	7804	1.6	MECH
ALBION	Lighting plant Tools	6	8780	52680	10.8	MECH
	Bell Loader	3	75000	225000	46.1	
[illegible]	[illegible]				[illegible]	
ALBION	160 HP Tractor	12	58252	699024	143.29992	TP
ALBION	Trailing Final Harrow	10	9709	97090	19.90345	TP
ALBION	Plows	10	7540	75400	15.457	TP
ALBION	Tractor 100hp	10	38835	388350	79.61175	TP
[illegible]	[illegible]				[illegible]	

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M	Cat
ROSE HALL	Prime Mover-Mahendra Tractor	2	48544	97088	19.90304	ACC
ROSE HALL	Cane Punts	350	4878	1707300	349.9965	ACC
ROSE HALL	45/66 Tractor JD	10	33980	339800	69.659	ACC
ROSE HALL	Motor Grader	1	97087	97087	19.902835	ACC
ROSE HALL	All weather road	25	24272	606800	124.394	ACC
ROSE HALL	Vehicles	10	3000	30000	6.15	ACC
ROSE HALL	Motor Cycle	30	1500	45000	9.225	ACC
ROSE HALL	Heavy duty revetment - Meters	1500	830	1245000	255.225	CV
ROSE HALL	Heavy duty revetment - Meters	1200	830	996000	204.18	CV
ROSE HALL	Light duty revetment - Meters	11000	162	1782000	365.31	CV
ROSE HALL	Check Sluices to control water in low lying areas	10	19417	194170	39.80485	CV
ROSE HALL	Installing two worms at EV and G8L Sluices	2	7282	14564	2.98562	CV
ROSE HALL	Irrigator	10	72815	728150	149.27075	DI
ROSE HALL	Self-driven dam bed pumps- Irrigators	9	48543	436887	89.561835	DI
ROSE HALL	Irrigator/Tugs	6	48500	291000	59.655	DI
ROSE HALL	100 HP tractor	7	48544	339808	69.7	MECH
ROSE HALL	Spring Tines Implement	3	9709	29127	6.0	MECH
ROSE HALL	80/66 Tractor JD	4	38835	155340	31.8	MECH
ROSE HALL	Land conversion Cultivation	2000	1500	3000000	615.0	MECH
ROSE HALL	Excavator LR	7	176849.6842	1237947.789	253.8	MECH
ROSE HALL	Front end loader	1	121360	121360	24.9	MECH
ROSE HALL	Fertilizer applicator Implement	3	58252	174756	35.8	MECH
ROSE HALL	LGPL spreader Implement	3	58252	174756	35.8	MECH
ROSE HALL	Planting trailer Implement	4	12135	48540	10.0	MECH
ROSE HALL	Furrow opener Implement	4	7282	29128	6.0	MECH
ROSE HALL	Furrow coverer Implement	4	14563	58252	11.9	MECH
ROSE HALL	Tyre repair machine Tools	1	48550	48550	10.0	MECH
ROSE HALL	Trench cleaner Tractor	1	72815	72815	14.9	MECH
ROSE HALL	Backhoe Excavator	1	38835	38835	8.0	MECH
ROSE HALL	FWS Service unit Tools	1	72816	72816	14.9	MECH
ROSE HALL	Portable welding plant - Electrical Tools	6	19420	116520	23.9	MECH
ROSE HALL	Portable welding plant - Portable Tools	2	24270	48540	10.0	MECH
ROSE HALL	Lathe Tools	1	24272	24272	5.0	MECH
ROSE HALL	Boom Sprayer Implement	3	9709	29127	6.0	MECH
	Bell Loader	4	75000	300000	61.5	
ROSE HALL	180 HP Tractor	10	72815	728150	149.27075	TP
ROSE HALL	Mould Board Plow	10	9709	97090	19.90345	TP
ROSE HALL	Tandem Harrow	8	9709	77672	15.92276	TP
ROSE HALL	Low bed trailer	1	121360	121360	24.8788	TP
ROSE HALL	10/32 inverted narrow	4	29125	116500	23.8825	TP

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M	Cat
Blairmont	Cane Punts	300	4878	1463400	299.997	ACC
Blairmont	All weather road	25	24272	606800	124.394	ACC
Blairmont	45/66 Tractor JD	8	33980	271840	55.7272	ACC
Blairmont	55 Hp Tractop	4	24390.2439	97560.97561	20	ACC
Blairmont	Vehicles	7	3000	21000	4.305	ACC
Blairmont	Motor Cycle	25	1500	37500	7.6875	ACC
	[illegible]				[illegible]	
Blairmont	Heavy duty revetment Meters	1000	830	830000	170.15	CV
Blairmont	Light duty revetment Meters	10000	162	1620000	332.1	CV
Blairmont	Aqueduct	4	146341.4634	585365.8537	120	CV
Blairmont	High bridges	10	68293	682930	140.00065	CV
Blairmont	Sluice	1	146341.4634	146341.4634	30	CV
	[illegible]				[illegible]	
Blairmont	Harvesters and associated equipment	2	780488	1560976	320	MECH
Blairmont	Tractors LGRP Spreader	4	80085	320341	65.7	MECH
Blairmont	LGRP SPREADER Implement	3	24390	73171	15.0	MECH
Blairmont	Boom Sprayer Implement	3	9756	29268	6.0	MECH
Blairmont	Fertilizer Hopper Implement	3	4878	14634	3.0	MECH
Blairmont	Land Development (840 Ha) Conversion	1056.74	1500	1585110	324.9	MECH
Blairmont	110 Hp Tractor	6	58537	351220	72.0	MECH
	Bell Loader	3	75000	225000	46.1	
	[illegible]				[illegible]	
Blairmont	Dundi Ditcher	10	5000	50000	10.25	TP
Blairmont	160 HP Tractor	10	58252	582520	119.4166	TP
Blairmont	Trailing Final Harrow	8	9709	77672	15.92276	TP
Blairmont	Plows	10	7540	75400	15.457	TP
	[illegible]				[illegible]	
East Demerara	Cane Transport - 45 hp tractor	10	19512	195122	40	ACC
East Demerara	All weather roads	30	61789	1853659	380	ACC
East Demerara	Establishing new link rear end of LBI	1	200000	200000	41	ACC
East Demerara	Punts	280	4878	1365840	279.9972	ACC
East Demerara	Vehicles	8	3000	24000	4.92	ACC
East Demerara	Motor Cycle	26	1500	39000	7.995	ACC
	[illegible]				[illegible]	
East Demerara	Modification of building/ facilities			97560.97561	20	CV
East Demerara	Admin building			195121.9512	40	CV
East Demerara	Fertilizer bond Building			195121.9512	40	CV
East Demerara	High Bridges - Concrete	12	58536.58537	702439	144	CV
East Demerara	Flat Bridges - Concrete	10	24390.2439	243902	50	CV
East Demerara	Light duty revetment along CNC Meters	8000	162	1296000	265.68	CV
East Demerara	Replacement of aqueduct	3	146341.4634	439024	90	CV
	[illegible]				[illegible]	
East Demerara	Drainage - Excavator	6	170731.7073	682926.8293	140	DI
	[illegible]				[illegible]	
East Demerara	Croo Care - 100 hp Tractor - Repair work	12	80038	960455	196.9	MECH
East Demerara	Crop Care - 100 hp + boom sprayer implement	6	82927	497561	102.0	MECH
East Demerara	Crop Care - 100 hp + dondi implement	8	87805	702439	144.0	MECH
East Demerara	100 hp +fertilizer hopper Implement	6	82927	497561	102.0	MECH
East Demerara	Retooling of FWS Tools	1	73171	73171	15.0	MECH
East Demerara	Harvesters and associated equipment	3	750000	2250000	461.3	MECH
	Bell Loader	3	75000	225000	46.1	
	[illegible]				[illegible]	
East Demerara	Tillage - 100 hp Tractor with dondi	12	82926.82927	995122	204	TP
East Demerara	100 hp Tractor	8	68292.68293	546341	112	TP
East Demerara	Mould Board Plow	10	9709	97090	19.90345	TP
East Demerara	Tillage -150 hp tractor	13	82926.82927	1078049	221	TP
	[illegible]				[illegible]	

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M	Cat
Wales	ALL WEATHER ROADS	15	50000	750000	153.75	ACC
Wales	CANE PUNTS	180	4390.243902	790244	162	ACC
Wales	DUMP LORRY	1	30000	30000	6.15	ACC
Wales	Cane Transport - 45 hp tractor	10	19512.19512	195122	40	ACC
Wales	Vehicles	6	3000	18000	3.69	ACC
Wales	Motor Cycle	20	1500	30000	6.15	ACC
[illegible]	[illegible]				[illegible]	
Wales	FLAT BRIDGES	8	48780.4878	195121.9512	40	CV
Wales	LIGHT DUTY revetment : Meters	6000	162	972000	199.26	CV
Wales	HIGH BRIDGES	8	58536.58537	292682.9268	60	CV
[illegible]	[illegible]				[illegible]	
Wales	Drainage - Excavator	6	170732	682927	140	DI
[illegible]	[illegible]				[illegible]	
Wales	110 Hp Tractor	7	69921.95122	489453.6585	100.338	MECH
[illegible]	[illegible]				[illegible]	
Wales	Dundi Ditcher	8	5000	40000	8.2	TP
Wales	160 HP Tractor	8	58252	466016	95.53328	TP
Wales	Trailing Final Harrow	7	9709	67963	13.932415	TP
Wales	Plows	7	7540	52780	10.8199	TP
[illegible]	[illegible]				[illegible]	
Uitvlugt	Cane Punts	300	4878	1463400	299.997	ACC
Uitvlugt	All weather road	30	24272	728160	149.2728	ACC
Uitvlugt	45/66 Tractor JD	10	33980	339800	69.659	ACC
Uitvlugt	55 Hp Tractop	5	24390.2439	121951.2195	25	ACC
Uitvlugt	Vehicles	8	3000	24000	4.92	ACC
Uitvlugt	Motor Cycle	23	1500	34500	7.0725	ACC
[illegible]	[illegible]				[illegible]	
Uitvlugt	High Bridges	10	70000	700000	143.5	CV
Uitvlugt	Acqueducts	6	100000	600000	123	CV
[illegible]	[illegible]				[illegible]	
Uitvlugt	Drainage Pumps	2	650000	1300000	266.5	DI
Uitvlugt	Irrigators	10	50000	500000	102.5	DI
[illegible]	[illegible]				[illegible]	
Uitvlugt	Implements - Tillage	15	15000	225000	46.1	MECH
Uitvlugt	Excavators -	4	176850	707399	145.0	MECH
Uitvlugt	Tractors - LGRP	6	70000	420000	86.1	MECH
Uitvlugt	Spreaders - LGRP Implement	6	10000	60000	12.3	MECH
Uitvlugt	Tractors - Fertilising	4	69922	279688	57.3	MECH
Uitvlugt	Hoppers/Spreaders - Fertilising Implement	4	12000	48000	9.8	MECH
Uitvlugt	Tractors - Spraying	4	70000	280000	57.4	MECH
Uitvlugt	Boom Sprayers - Spraying Implement	4	7000	28000	5.7	MECH
Uitvlugt	Tractors - Inter Row Cultivation	4	70000	280000	57.4	MECH
Uitvlugt	Implements - Inter Row Cultivation	4	5000	20000	4.1	MECH
Uitvlugt	Harvesters with associated equipment	3	750000	2250000	461.3	MECH
Uitvlugt	Laser Leveling Implement	1	35000	35000	7.2	MECH
Uitvlugt	Extension and Upgrade of Workshop	1	1000000	1000000	205.0	MECH
	Bell Loader	3	75000	225000	46.1	
[illegible]	[illegible]			[illegible]	[illegible]	
Uitvlugt	Tractors - Planting	12	70000	840000	172.2	TP
Uitvlugt	Bell Loaders - Planting	3	80000	240000	49.2	TP
Uitvlugt	Trailers - Planting	10	5000	50000	10.25	TP
Uitvlugt	Dondi Tractors - Planting	6	70000	420000	86.1	TP
Uitvlugt	Dondi Ditchers - Planting	6	20000	120000	24.6	TP
[illegible]	[illegible]			[illegible]	[illegible]	

MECHANIZATION INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Harvesters and associated equipment	4	750000	3000000	615
Skeldon	Excavators	8	176850	1414797	290.0
Skeldon	Tractors - Fertilising	10	82143	821429	168.4
Skeldon	Boom Sprayer implement	5	7000	35000	7.2
Skeldon	Land Conversion	2000	1500	3000000	615.0
Skeldon	Bell Loader	3	75000	225000	46.1
ALBION	Super long reach excavator	8	176850	1414757	290.0
ALBION	[illegible]	4	9709	38836	8.0
ALBION	[illegible]	4	12135	48540	10.0
ALBION	[illegible]	2	14563	29126	6.0
ALBION	Harvesters and associated equipment	2	780488	1560976	320.0
ALBION	Tractors LGRP Spreader	8	82390	659123	135.1
ALBION	LGRP SPREADER implement	5	24390	121950	25.0
ALBION	Land Conversion	1000	1500	1500000	307.5
ALBION	Dump lorry- 10 Ton Tools	3	31707	95121	19.5
ALBION	Trelly jack- 20 ton Tools	2	8536	17072	3.5
ALBION	FWS Service unit Tools	1	72816	72816	14.9
ALBION	Portable welding plant Tools	2	2184	4368	0.9
ALBION	Lathe Tools	1	24272	24272	5.0
ALBION	Distilling unit Tools	1	1951	1951	0.4
ALBION	Heavy duty tool kit Tools	8	2439	19512	4.0
ALBION	Floor crane Tools	1	19512	19512	4.0
ALBION	Air compressor Tools	2	3902	7804	1.6
ALBION	Lighting plant Tools	6	8780	52680	10.8
ALBION	Bell Loader	3	75000	225000	46.1
ROSE HALL	100 HP tractor	7	48544	339808	69.7
ROSE HALL	Spring Tines implement	3	9709	29127	6.0
ROSE HALL	80/66 Tractor JD	4	38835	155340	31.8
ROSE HALL	Land conversion Cultivation	2000	1500	3000000	615.0
ROSE HALL	Excavater LR	7	176850	1237948	253.8
ROSE HALL	Front end loader Excavator	1	121360	121360	24.9
ROSE HALL	Fertilizer applicator implement	3	58252	174756	35.8
ROSE HALL	LGPL spreader implement	3	58252	174758	35.8
ROSE HALL	Planting trailer implement	4	12135	48540	10.0
ROSE HALL	Furrow opener implement	4	7282	29128	6.0
ROSE HALL	Furrow coverer implement	4	14563	58252	12.9
ROSE HALL	Tyre repair machine Tools	1	48550	48550	10.0
ROSE HALL	Trench cleaner Tractor	1	72815	72815	14.9
ROSE HALL	Backhoe Excavator	1	38835	38835	8.0
ROSE HALL	FWS Service unit Tools	1	72816	72816	14.9
ROSE HALL	Portable welding plant - Electrica Tools	6	19420	116520	23.9
ROSE HALL	Portable welding plant - Portable Tools	2	24270	48540	10.0
ROSE HALL	Lathe Tools	1	24272	24272	5.0
ROSE HALL	Boom Sprayer implement	3	9709	29127	6.0
ROSE HALL	Bell Loader	4	75000	300000	61.5
Blairmont	Harvesters and associated equipment	2	780488	1560976	320.0
Blairmont	Tractors LGRP Spreader	4	80085	320341	65.7
Blairmont	LGRP SPREADER implement	3	24390	73171	15.0
Blairmont	Boom Sprayer implement	3	9756	29268	6.0
Blairmont	Fertilizer Hopper implement	3	4878	14634	3.0
Blairmont	Land Development (840 Ha) Conversion	1056.74	1500	1585110	324.9
Blairmont	110 Hp Tractor	6	58537	351220	72.0
Blairmont	Bell Loader	3	75000	225000	46.1
East Demerara	Crop Care - 100 hp Tractor - Repair work	12	80038	960455	196.9
East Demerara	Crop Care - 100 hp + boom sprayer implement	6	82927	497561	102.0
East Demerara	Crop Care - 100 hp + dondi implement	8	87805	702439	144.0
East Demerara	100 hp +fertilizer hopper implement	6	82927	497561	102.0
East Demerara	Retooling of FWS Tools	1	73171	73171	15.0
East Demerara	Harvesters and associated equipment	3	750000	2250000	461.3
East Demerara	Bell Loader	3	75000	225000	46.1
Wales	110 Hp Tractor	7	89922	489454	100.3
Uitvlugt	Implements - Tillage	15	15000	225000	46.1
Uitvlugt	Excavators -	4	176850	707399	145.0
Uitvlugt	Tractors - LGRP	6	70000	420000	86.1
Uitvlugt	Spreaders - LGRP implement	6	10000	60000	12.3
Uitvlugt	Tractors - Fertilising	4	69922	279688	57.3
Uitvlugt	Hoppers/Spreaders - Fertilising implement	4	12000	48000	9.8
Uitvlugt	Tractors - Spraying	4	70000	280000	57.4
Uitvlugt	Boom Sprayers - Spraying implement	4	7000	28000	5.7
Uitvlugt	Tractors - Inter Row Cultivation	4	70000	280000	57.4
Uitvlugt	Implements - Inter Row Cultivation	4	5000	20000	4.1
Uitvlugt	Harvesters with associated equipment	3	750000	2250000	461.3
Uitvlugt	Laser Leveling implement	1	35000	35000	7.2
Uitvlugt	Extension and Upgrade of Workshop	1	1000000	1000000	205.0
Uitvlugt	Bell Loader	3	75000	225000	46.1
[illegible]				[illegible]	[illegible]

MECHANIZATION INVESTMENTS BY MACHINE TYPE

BILLET HARVESTERS & ASSOCIATED EQUIPMENT

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Harvesters and associated equipment	4	750000	3000000	615
ALBION	Harvesters and associated equipment	2	780488	1560976	320.0
Blairmont	Harvesters and associated equipment	2	780488	1560976	320.0
East Demerara	Harvesters and associated equipment	3	750000	2250000	461.3
Uitvlugt	Harvesters with associated equipment	3	750000	2250000	461.3
TOTAL		14		10621952	2177.5

EXCAVATOR

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Excavators	8	176850	1414797	290.0
ALBION	Super long reach excavator	8	176850	1414797	290.0
ROSE HALL	Excavator LR	7	176850	1237948	253.8
ROSE HALL	Front end loader Excavator	1	121360	121360	24.9
ROSE HALL	Backhoe Excavator	1	38835	38835	8.0
Uitvlugt	Excavators -	4	176850	707399	145.0
TOTAL		29		4935136	1011.7

TRACTORS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Tractors - Fertilising	10	82143	821429	168.4
ALBION	Tractors LGRP Spreader implement	8	82390	659123	135.1
ROSE HALL	100 HP tractor	7	48544	339808	69.7
ROSE HALL	80/66 Tractor JD	4	38835	155340	31.8
ROSE HALL	Trench cleaner Tractor	1	72815	72815	14.9
Blairmont	Tractors LGRP Spreader	4	80085	320341	65.7
Blairmont	110 Hp Tractor	6	58537	351220	72.0
East Demerara	Crop Care - 100 hp Tractor - Repair work	12	80038	960455	196.9
Wales	110 Hp Tractor	7	69922	489454	100.3
Uitvlugt	Tractors - LGRP	6	70000	420000	86.1
Uitvlugt	Tractors - Fertilising	4	69922	279688	57.3
Uitvlugt	Tractors - Spraying	4	70000	280000	57.4
Uitvlugt	Tractors - Inter Row Cultivation	4	70000	280000	57.4
TOTAL		77		5429672	1113.1

IMPLEMENTS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Boom Sprayer implement	5	7000	35000	7.2
ALBION	Spring Tines Implement	4	9709	38836	8.0
ALBION	Planting trailer implement	4	12135	48540	10.0
ALBION	Furrow coverer implement	2	14563	29126	6.0
ALBION	LGRP SPREADER Implement	5	24390	121950	25.0
ROSE HALL	Spring Tines Implement	3	9709	29127	6.0
ROSE HALL	Fertilizer applicator implement	3	58252	174756	35.8
ROSE HALL	LGPL spreader implement	3	58252	174756	35.8
ROSE HALL	Planting trailer implement	4	12135	48540	10.0
ROSE HALL	Furrow opener implement	4	7282	29128	6.0
ROSE HALL	Furrow coverer implement	4	14563	58252	11.9
ROSE HALL	Boom Sprayer implement	3	9709	29127	6.0
Blairmont	LGRP SPREADER Implement	3	24390	73171	15.0
Blairmont	Boom Sprayer Implement	3	9756	29268	6.0
Blairmont	Fertilizer Hopper Implement	3	4878	14634	3.0
East Demerara	Crop Care - 100 hp + boom sprayer implement	6	82927	497561	102.0
East Demerara	Crop Care - 100 hp + dondi implement	8	87805	702439	144.0
East Demerara	100 hp +fertilizer hopper implement	6	82927	497561	102.0
Uitvlugt	Implements - Tillage	15	15000	225000	46.1
Uitvlugt	Spreaders - LGRP Implement	6	10000	60000	12.3
Uitvlugt	Hoppers/Spreaders - Fertilising Implement	4	12000	48000	9.8
Uitvlugt	Boom Sprayers - Spraying Implement	4	7000	28000	5.7
Uitvlugt	Implements - inter Row Cultivation	4	5000	20000	4.1
Uitvlugt	Laser Leveling Implement	1	35000	35000	7.2
TOTAL				3047772	624.8

LAND CONVERSION					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Land Conversion	2000	1500	3000000	615.0
ALBION	Land Conversion	1000	1500	1500000	307.5
ROSE HALL	Land Conversion Cultivation	2000	1500	3000000	615
Blairmont	Land Development (840 Ha) Conversion	1056.74	1500	1585110	324.9
TOTAL		6057		9085110	1862.4

TOOLS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
ALBION	Dump lorry: 10 Ton Tools	3	31707	95121	19.5
ALBION	Trolly jack: 20 ton Tools	2	8536	17072	3.5
ALBION	FWS Service unit Tools	1	72816	72816	14.9
ALBION	Portable welding plant Tools	2	2184	4368	0.9
ALBION	Lathe Tools	1	24272	24272	5.0
ALBION	Distilling unit Tools	1	1951	1951	0.4
ALBION	Heavy duty tool kit Tools	8	2439	19512	4.0
ALBION	Floor crane Tools	1	19512	19512	4.0
ALBION	Air compressor Tools	2	3902	7804	1.6
ALBION	Lighting plant Tools	6	8780	52680	10.8
ROSE HALL	Tyre repair machine Tools	1	48550	48550	10.0
ROSE HALL	FWS Service unit Tools	1	72816	72816	14.9
ROSE HALL	Portable welding plant - Electrical Tools	6	19420	116520	23.9
ROSE HALL	Portable welding plant - Portable Tools	2	24270	48540	10.0
ROSE HALL	Lathe Tools	1	24272	24272	5.0
East Demerara	Retooling of FWS Tools	1	73171	73171	15.0
TOTAL				698977	143.3

BELL LOADERS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Bell Loader	3	75000	225000	46.1
ALBION	Bell Loader	3	75000	225000	46.1
ROSE HALL	Bell Loader	4	75000	300000	61.5
Blairmont	Bell Loader	3	75000	225000	46.1
East Demerara	Bell Loader	3	75000	225000	46.1
Uitvlugt	Bell Loader	3	75000	225000	46.1
TOTAL				1425000	292.1

FIELD WORKSHOP UPGRADE					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Uitvlugt	Extension and Upgrade of Workshop	1	1000000	1000000	205
TOTAL				1000000	205.0

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M

AGRICULTURE CAPITAL INVESTMENT									
ESTATE	Description	AGRIC CAPITAL G$M						TOTAL US $	TOTAL G$M
		2016	2017	2018	2019	2020	TOTAL		
Skeldon	ACCESSIBILITY & CANE TRANSPORT	322.7	322.7	322.7	322.7	322.7	**1613.6**	[illegible]	1613.6
	CIVIL STRUCTURES	192.6	192.6	192.6	192.6	192.6	**962.9**	[illegible]	962.9
	DRAINAGE & IRRIGATION	32.0	32.0	32.0	32.0	32.0	**160.0**	[illegible]	160.0
	MECHANIZATION	348.3	348.3	348.3	348.3	348.3	**1741.7**	[illegible]	1741.7
	TILLAGE &PLANTING	32.2	32.2	32.2	32.2	32.2	**161.0**	[illegible]	161.0
TOTAL	**SKELDON**	**927.8**	**927.8**	**927.8**	**927.8**	**927.8**		22630470	4639.2
Albion	ACCESSIBILITY & CANE TRANSPORT	230.4	230.4	230.4	230.4	230.4	**1152.1**	[illegible]	1152.1
	CIVIL STRUCTURES	241.8	241.8	241.8	241.8	241.8	**1209.0**	[illegible]	1209.0
	MECHANIZATION	242.5	242.5	242.5	242.5	242.5	**1212.3**	[illegible]	1212.3
	TILLAGE &PLANTING	51.7	51.7	51.7	51.7	51.7	**258.3**	[illegible]	258.3
TOTAL	**ALBION**	**766.3**	**766.3**	**766.3**	**766.3**	**766.3**		18690956	3831.6
Rose Hall	ACCESSIBILITY & CANE TRANSPORT	119.8	119.8	119.8	119.8	119.8	**599.2**	[illegible]	599.2
	CIVIL STRUCTURES	173.5	173.5	173.5	173.5	173.5	**867.5**	[illegible]	867.5
	DRAINAGE & IRRIGATION	59.7	59.7	59.7	59.7	59.7	**298.5**	[illegible]	298.5
	MECHANIZATION	250.9	250.9	250.9	250.9	250.9	**1254.7**	[illegible]	1254.7
	TILLAGE &PLANTING	46.8	46.8	46.8	46.8	46.8	**233.9**	[illegible]	233.9
TOTAL	**ROSE HALL**	**650.8**	**650.8**	**650.8**	**650.8**	**650.8**		15872108	3253.8
Blairmont	ACCESSIBILITY & CANE TRANSPORT	102.4	102.4	102.4	102.4	102.4	**512.1**	[illegible]	512.1
	CIVIL STRUCTURES	158.5	158.5	158.5	158.5	158.5	**792.3**	[illegible]	792.3
	MECHANIZATION	170.5	170.5	170.5	170.5	170.5	**852.7**	[illegible]	852.7
	TILLAGE &PLANTING	32.2	32.2	32.2	32.2	32.2	**161.0**	[illegible]	161.0
TOTAL	**Blairmont**	463.6	463.6	463.6	463.6	463.6		11308050	2318.2
East Demerara	ACCESSIBILITY & CANE TRANSPORT	150.8	150.8	150.8	150.8	150.8	**753.9**	[illegible]	753.9
	CIVIL STRUCTURES	129.9	129.9	129.9	129.9	129.9	**649.7**	[illegible]	649.7
	DRAINAGE & IRRIGATION	28.0	28.0	28.0	28.0	28.0	**140.0**	[illegible]	140.0
	MECHANIZATION	213.5	213.5	213.5	213.5	213.5	**1067.3**	[illegible]	1067.3
	TILLAGE &PLANTING	111.4	111.4	111.4	111.4	111.4	**556.9**	[illegible]	556.9
TOTAL	**East Demerara**	**633.6**	**633.6**	**633.6**	**633.6**	**633.6**	**3167.8**	15452507	3167.8
Wales	ACCESSIBILITY & CANE TRANSPORT	74.3	74.3	74.3	74.3	74.3	**371.7**	[illegible]	371.7
	CIVIL STRUCTURES	59.9	59.9	59.9	59.9	59.9	**299.3**	[illegible]	299.3
	DRAINAGE & IRRIGATION	28.0	28.0	28.0	28.0	28.0	**140.0**	[illegible]	140.0
	MECHANIZATION	20.1	20.1	20.1	20.1	20.1	**100.3**	[illegible]	100.3
	TILLAGE &PLANTING	25.7	25.7	25.7	25.7	25.7	**128.5**	[illegible]	128.5
TOTAL	**WALES**	**208.0**	**208.0**	**208.0**	**208.0**	**208.0**	**1039.8**	5072310	1039.8
Uitvlugt	ACCESSIBILITY & CANE TRANSPORT	111.2	111.2	111.2	111.2	111.2	**555.9**	[illegible]	555.9
	CIVIL STRUCTURES	53.3	53.3	53.3	53.3	53.3	**266.5**	[illegible]	266.5
	DRAINAGE & IRRIGATION	73.8	73.8	73.8	73.8	73.8	**369.0**	[illegible]	369.0
	MECHANIZATION	240.2	240.2	240.2	240.2	240.2	**1200.9**	[illegible]	1200.9
	TILLAGE &PLANTING	68.5	68.5	68.5	68.5	68.5	**342.4**	[illegible]	342.4
TOTAL	**Uitvlugt**	**546.9**	**546.9**	**546.9**	**546.9**	**546.9**	**2734.7**	13339898	2734.7
INDUSTRY	ACCESSIBILITY & CANE TRANSPORT	1111.7	1111.7	1111.7	1111.7	1111.7	**5558.7**	[illegible]	5558.7
	CIVIL STRUCTURES	1009.4	1009.4	1009.4	1009.4	1009.4	**5047.1**	[illegible]	5047.1
	DRAINAGE & IRRIGATION	221.5	221.5	221.5	221.5	221.5	**1107.5**	[illegible]	1107.5
	MECHANIZATION	1486.0	1486.0	1486.0	1486.0	1486.0	**7429.9**	[illegible]	7429.9
	TILLAGE &PLANTING	368.4	368.4	368.4	368.4	368.4	**1841.9**	[illegible]	1841.9
TOTAL		**4197.0**	**4197.0**	**4197.0**	**4197.0**	**4197.0**		102366299	20985.1

TILLAGE & PLANTING INVESTMENTS					
Estate	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Tillage tractors	9	70000	630000	129.2
Skeldon	Trailing Final Harrow	9	9709	87381	17.9
Skeldon	Plows	9	7540	67860	13.9
ALBION	160 HP Tractor	12	58252	699024	143.3
ALBION	Trailing Final Harrow	10	9709	97090	19.9
ALBION	Plows	10	7540	75400	15.5
ALBION	Tractor 100hp	10	38835	388350	79.6
ROSE HALL	180 HP Tractor	10	72815	728150	149.3
ROSE HALL	Mould Board Plow	10	9709	97090	19.9
ROSE HALL	Tandem Harrow	8	9709	77672	15.9
ROSE HALL	Low bed trailer	1	121360	121360	24.9
ROSE HALL	10/32 inverted harrow	4	29125	116500	23.9
Blairmont	Dundi Ditcher	10	5000	50000	10.3
Blairmont	160 HP Tractor	10	58252	582520	119.4
Blairmont	Trailing Final Harrow	8	9709	77672	15.9
Blairmont	Plows	10	7540	75400	15.5
East Demerara	Tillage - 100 hp Tractor with dondi	12	82927	995122	204
East Demerara	100 hp Tractor	8	68293	546341	112
East Demerara	Mould Board Plow	10	9709	97090	19.9
East Demerara	Tillage -150 hp tractor	13	82927	1078049	221
Wales	Dundi Ditcher	8	5000	40000	8.2
Wales	160 HP Tractor	8	58252	466016	95.5
Wales	Trailing Final Harrow	7	9709	67963	13.9
Wales	Plows	7	7540	52780	10.8
Uitvlugt	Tractors - Planting	12	70000	840000	172.2
Uitvlugt	Bell Loaders - Planting	3	80000	240000	49.2
Uitvlugt	Trailers - Planting	10	5000	50000	10.3
Uitvlugt	Dondi Tractors - Planting	6	70000	420000	86.1
Uitvlugt	Dondi Oitchers - Planting	6	20000	120000	24.6
TOTAL				8984330	1841.6

TILLAGE & PLANTING INVESTMENTS BY MACHINE TYPE

TRACTORS

Estate	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Tillage tractors	9	70000	630000	129.2
ALBION	160 HP Tractor	12	58252	699024	143.3
ALBION	Tractor 100hp	10	38835	388350	79.6
ROSE HALL	180 HP Tractor	10	72815	728150	149.3
Blairmont	160 HP Tractor	10	58252	582520	119.4
East Demerara	Tillage - 100 hp Tractor with dondi	12	82927	995122	204
East Demerara	100 hp Tractor	8	68293	546341	112
East Demerara	Tillage -150 hp tractor	13	82927	1078049	221
Wales	160 HP Tractor	8	58252	466016	95.5
Uitvlugt	Tractors - Planting	12	70000	840000	172.2
Uitvlugt	Dondi Tractors - Planting	6	70000	420000	86.1
TOTAL		**110**		**7373572**	**1511.6**

TRACTORS

HARROW

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Trailing Final Harrow	9	9709	87381	17.9
ALBION	Trailing Final Harrow	10	9709	97090	19.9
ROSE HALL	Tandem Harrow	8	9709	77672	15.9
ROSE HALL	10/32 inverted harrow	4	29125	116500	23.9
Blairmont	Trailing Final Harrow	8	9709	77672	15.9
Wales	Trailing Final Harrow	7	9709	67963	13.9
TOTAL		**46**		**524278**	**107.5**

HARROW

PLOWS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Plows	9	7540	67860	13.9
ALBION	Plows	10	7540	75400	15.5
ROSE HALL	Mould Board Plow	10	9709	97090	19.9
Blairmont	Plows	10	7540	75400	15.5
East Demerara	Mould Board Plow	10	9709	97090	19.90345
Wales	Plows	7	7540	52780	10.8
TOTAL		**56**		**465620**	**95.5**

PLOWS

TRAILERS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
ROSE HALL	Low bed trailer	1	121360	121360	24.9
Uitvlugt	Trailers - Planting	10	5000	50000	10.3
TOTAL		**11**		**171360**	**35.1**

TRAILERS

DITCHERS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Blairmont	Dundi Ditcher	10	5000	50000	10.3
Wales	Dundi Ditcher	8	5000	40000	8.2
Uitvlugt	Dondi Ditchers - Planting	6	20000	120000	24.6
TOTAL		**24**		**210000**	**43.05**

DITCHERS

BELL LOADER

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Uitvlugt	Bell Loaders - Planting	3	80000	240000	49.2
TOTAL		**3**		**240000**	**49.2**

BELL LOADERS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
GRAND TOTAL				8984836	1821.9

ACCESSIBILITY & CANE TRANSPORT INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	All weather roads	20	120000	2400000	492
Skeldon	Cane Punts	400	4878	1951200	400.0
Skeldon	45/66 Tractor JD	5	33980	169900	34.8
Skeldon	Husbandry tractors	10	70000	700000	143.5
ALBION	45 HP Tractor	10	48544	485440	99.5
ALBION	Cane Punts	250	4878	1219500	250.0
ALBION	Paddle tugs	3	7318	21954	4.5
ALBION	All weather road	15	97561	1463415	300.0
ROSE HALL	Prime Mover-Mahendra Tractor	1	48544	48544	10.0
ROSE HALL	Cane Punts	250	4878	1219500	250.0
ROSE HALL	45/66 Tractor JD	5	33980	169900	34.8
ROSE HALL	Motor Grader	1	97087	97087	19.9
ROSE HALL	All weather road	15	24272	364080	74.6
Blairmont	Cane Punts	160	4878	780480	160.0
Blairmont	All weather road	10	24272	242720	49.8
Blairmont	45/66 Tractor JD	5	33980	169900	34.8
Blairmont	55 Hp Tractor	2	24390.2439	48780	10.0
East Demerara	Cane Transport - 45 hp tractor	6	19512	117073	24.0
East Demerara	All weather roads	15	61789	926829	190.0
East Demerara	Establishing new link Road rear end of LBI	1	200000	200000	41.0
East Demerara	Punts	150	4878	731700	150.0
Wales	ALL WEATHER ROADS	3	50000	150000	30.8
Wales	CANE PUNTS	100	4390.243902	439024	90.0
Wales	DUMP LORRY	1	30000	30000	6.2
Wales	Cane Transport - 45 hp tractor	6	19512.19512	117073	24.0
Uitvlugt	Cane Punts	160	4878	780480	160.0
Uitvlugt	All weather road	10	24272	242720	49.8
Uitvlugt	45/66 Tractor JD	5	33980	169900	34.8
Uitvlugt	55 Hp Tractor	2	24390.2439	48780	10.0
TOTAL				**15505981**	**3178.7**

ALL WEATHER ROADS					
ESTATE	Description	Quantity KM	Unit Price US$	Cost US$	Cost G$M
Skeldon	All weather roads	20	120000	2400000	492
ALBION	All weather road	15	97561	1463415	300.0
ROSE HALL	All weather road	15	24272	364080	74.6
Blairmont	All weather road	10	24272	242720	49.8
East Demerara	All weather roads	15	61788 61789	926829	190.0
East Demerara	Establishing new link Road rear end of LBI	1	200000	200000	41.0
Wales	ALL WEATHER ROADS	3	50000	150000	30.8
Uitvlugt	All weather road	10	24272	242720	49.8
TOTAL		89		5989764	1227.9

CANE PUNTS					
ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Skeldon	Cane Punts	400	4878	1951200	400.0
ALBION	Cane Punts	250	4878	1219500	250.0
ROSE HALL	Cane Punts	250	4878	1219500	250.0
Blairmont	Cane Punts	160	4878	780480	160.0
East Demerara	Punts	150	4878	731700	150.0
Wales	CANE PUNTS	100	4390	439024	90.0
Uitvlugt	Cane Punts	160	4878	780480	160.0
TOTAL		1470		7121884	1460.0

CANE TRANSPORT TRACTORS					
ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Skeldon	45/66 Tractor JD	5	33980	169900	34.8
Skeldon	55 HP tractors With Winch	10	70000	700000	143.5
ALBION	45 HP Tractor	10	48544	485440	99.5
ROSE HALL	Prime Mover Mahendra Tractor	1	48544	48544	10.0
ROSE HALL	45/66 Tractor JD	5	33980	169900	34.8
Blairmont	45/66 Tractor JD	5	33980	169900	34.8
Blairmont	55 Hp Tractor	2	24390.2439	48780	10.0
East Demerara	Cane Transport - 45 hp tractor	6	19512.19512	117073	24.0
Wales	Cane Transport - 45 hp tractor	6	19512.19512	117073	24.0
Uitvlugt	45/66 Tractor JD	5	33980	169900	34.8
Uitvlugt	55 Hp Tractor	2	24390.2439	48780	10.0
TOTAL		57		2245291	460.3

TUGS					
ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
ALBION	Paddle tug engines	3	7318	21954	4.5
TOTAL		3		21954	4.5

ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
ROSE HALL	Motor Grader	1	97087	97087	19.9
TOTAL		1		97087	19.9
		DUMP LORRY			
ESTATE	Description	Quantity Each	Unit Price US$	Cost US$	Cost G$M
Wales	DUMP LORRY	1	30000	30000	6.2
TOTAL		1		30000	6.2

				Cost US$	Cost G$M
[illegible]				[illegible]	[illegible]

CIVIL INFRASTRUCTURE INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	High bridges	8	68,293	546,344	112.0
Skeldon	Aqueducts	6	46,341	278,046	57.0
Skeldon	Heavy duty revetment - Meters	1000	830	830,000	170.2
Skeldon	Heavy duty revetment Meters	1000	830	830,000	170.2
Skeldon	Light duty revetment Meters	4000	162	648,000	132.8
ALBION	High bridges	10	68,293	682,930	140.0
ALBION	Aqueducts	6	46,341	278,046	57.0
ALBION	Heavy duty revetment - Meters	2000	830	1,660,000	340.3
ALBION	Heavy duty revetment : Meters	1000	830	830,000	170.2
ALBION	Light duty revetment : Meters	7000	162	1,134,000	232.5
ROSE HALL	Heavy duty revetment - Meters	1000	830	830,000	170.2
ROSE HALL	Heavy duty revetment - Meters	1000	830	830,000	170.2
ROSE HALL	Light duty revetment - Meters	6000	162	972,000	199.3
ROSE HALL	Check Sluices to control water in low lying areas	8	19,417	155,336	31.8
ROSE HALL	Installing two worms at EV and GBL Sluices	2	7,282	14,564	3.0
Blairmont	Heavy duty revetment Meters	500	830	415,000	85.1
Blairmont	Light duty revetment Meters	2000	162	324,000	66.4
Blairmont	Aqueduct	4	146,341	585,366	120.0
Blairmont	High bridges	4	68,293	273,172	56.0
Blairmont	Sluice	1	146,341	146,341	30.0
East Demerara	Modification of building/ facilities			97,561	20.0
East Demerara	Admin building			195,122	40.0
East Demerara	Fertilizer bond - Building			195,122	40.0
East Demerara	High Bridges - Concrete	4	58,537	234,146	48.0
East Demerara	Flat Bridges - Concrete	4	24,390	97,561	20.0
East Demerara	Light duty revetment along CNC Meters	2000	162	324,000	66.4
East Demerara	Replacement of aqueduct	1	146,341	146,341	30.0
Wales	FLAT BRIDGES	4	48,780	195,122	40.0
Wales	LIGHT DUTY revetment : Meters	2000	162	324,000	66.4
Wales	HIGH BRIDGES	5	58,537	292,683	60.0
Uitvlugt	High Bridges	6	70,000	420,000	86.1
Uitvlugt	Aqueducts	5	100,000	500,000	102.5
TOTAL				[illegible]	[illegible]

CIVILS INFRACTURE INVESTMENTS BY TYPE

BRIDGES

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	High bridges	8	68,293	546,344	112
ALBION	High bridges	10	68,293	682,930	140
Blairmont	High bridges	4	68,293	273,172	56
East Demerara	High Bridges - Concrete	4	58,537	234,146	48
East Demerara	Flat Bridges - Concrete	4	24,390	97,561	20
Wales	FLAT BRIDGES	4	48,780	195,122	40
Wales	HIGH BRIDGES	5	58,537	292,683	60
Uitvlugt	High Bridges	6	70,000	420,000	86
TOTAL		**45**		**2,741,958.20**	**562**

AQUEDUCT

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Aqueducts	6	46341	278,046	57
ALBION	Aqueducts	6	46341	278,046	57
Blairmont	Aqueduct	4	146341	585,366	120
East Demerara	Replacement of aqueduct	1	146341	146,341	30
Uitvlugt	Aqueducts	5	100000	500,000	103
TOTAL		**22**		**1,787,799.32**	**366**

REVETMENT

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldor	Heavy duty revetment - Meters	1000	830	830,000	170
Skeldor	Heavy duty revetment Meters	1000	830	830,000	170
Skeldor	Light duty revetment Meters	4000	162	648,000	133
ALBION	Heavy duty revetment - Meters	2000	830	1,660,000	340
ALBION	Heavy duty revetment Meters	1000	830	830,000	170
ALBION	Light duty revetment : Meters	7000	162	1,134,000	232
ROSE HALL	Heavy duty revetment – Meters	1000	830	830,000	170
ROSE HALL	Heavy duty revetment :- Meters	1000	830	830,000	170
ROSE HALL	Light duty revetment - Meters	6000	162	972,000	199
Blairmont	Heavy duty revetment Meters	500	830	415,000	85
Blairmont	Light duty revetment Meters	2000	162	324,000	66
East Demerara	Light duty revetment along CNC Meters	2000	162	324,000	66
Wales	LIGHT DUTY revetment : Meters	2000	162	324,000	66
TOTAL		**30500**		**9,951,000.00**	**2,040**

SLUICES

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
ROSE HALL	Building Check Sluices to control water in low lying areas	8	19417	155,336	32
ROSE HALL	Installing two worms at EV and GBL Sluices	2	7282	14,564	3
Blairmont	Sluice	1	146341	146,341	30
TOTAL		**11**		**316,241.46**	**65**

BUILDINGS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
East Demerara	Modification of building/ facilities			97,561	20
East Demerara	Admin building			195,122	40
East Demerara	Fertilizer bond - Building			195,122	40
TOTAL				**487,804.88**	**100**

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
				15,284,804	**3,133**

DRAINAGE & IRRIGATION INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Overhead Irrigators	6	97561	585366	120
ROSE HALL	Irrigator	7	72815	509705	104.5
ROSE HALL	Self-driven dam bed pumps - Irrigators	6	48543	291258	59.7
ROSE HALL	Irrigator/Tugs	4	48500	194000	39.8
East Demerara	Drainage - Excavator	4	170732	682927	140.0
Wales	Drainage - Excavator	4	170732	682927	140.0
Uitvlugt	Drainage Pumps	2	650000	1300000	266.5
Uitvlugt	Irrigators	4	50000	200000	41.0
[illegible]				[illegible]	[illegible]

DRAINAGE & IRRIGATION INVESTMENYS BY MACHINE TYPE

IRRIGATORS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Overhead Irrigators	6	97561	585366	120
ROSE HALL	Irrigator	7	72815	509705	104.5
ROSE HALL	Self-driven dam bed pumps - Irrigators	6	48543	291258	59.7
ROSE HALL	Irrigator/Tugs	4	48500	194000	39.8
Uitvlugt	Irrigators	4	50000	200000	41.0
TOTAL		**27**		**1780329**	**365.0**

EXCAVATOR					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
East Demerara	Drainage - Excavator	4	170732	682927	140.0
Wales	Drainage - Excavator	4	170732	682927	140.0
TOTAL		**8**		**1365854**	**280**

DRAINAGE PUMPS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Uitvlugt	Drainage Pumps	2	650000	1300000	266.5
TOTAL		**2**		**1300000**	**266.5**

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
[illegible]				[illegible]	[illegible]

AGRICULTURE CAPITAL INVESTMENT						
ESTATE	Description	AGRIC CAPITAL G$M				TDTAL US $
		2015	2016	2017	TOTAL	
Skeldon	ACCESSIBILITY & CANE TRANSPORT	356.8	356.8	356.8	**1070.3**	5211157
	CIVIL STRUCTURES	214.0	214.0	214.0	**642.1**	3130390
	DRAINAGE & IRRIGATION	40.0	40.0	40.0	**120.0**	585346
	MECHANIZATION	459.9	459.9	459.9	**1379.7**	6730246
	TILLAGE &PLANTING	35.8	35.8	35.8	**107.3**	523464
TOTAL	**SKELDON**	**1106.5**	**1106.5**	**1106.5**		16192598
ALBION	ACCESSIBILITY & CANE TRANSPORT	218.0	218.0	218.0	**654.0**	3190369
	CIVIL STRUCTURES	313.3	313.3	313.3	**939.9**	4584978
	MECHANIZATION	270.2	270.2	270.2	**810.7**	3954881
	TILLAGE &PLANTING	22.0	22.0	22.0	**65.9**	321421
TOTAL	**ALBION**	**823.5**	**823.5**	**823.5**		12051097
ROSE HALL	ACCESSIBILITY & CANE TRANSPORT	129.8	129.8	129.8	**389.3**	1899111
	CIVIL STRUCTURES	191.5	191.5	191.5	**574.4**	2801908
	DRAINAGE & IRRIGATION	68.0	68.0	68.0	**204.0**	994964
	MECHANIZATION	344.4	344.4	344.4	**1033.1**	5039601
	TILLAGE &PLANTING	47.1	47.1	47.1	**141.3**	689313
TOTAL	**ROSE HALL**	**780.7**	**780.7**	**780.7**		11424891
Blairmont	ACCESSIBILITY & CANE TRANSPORT	84.9	84.9	84.9	**254.6**	1241880
Blairmont	CIVIL STRUCTURES	119.2	119.2	119.2	**357.5**	1743877
Blairmont	MECHANIZATION	198.2	198.2	198.2	**594.6**	2900573
Blairmont	TILLAGE &PLANTING	20.7	20.7	20.7	**62.0**	302589
TOTAL	**Blairmont**	422.9	422.9	422.9		6188919
East Demerara	ACCESSIBILITY & CANE TRANSPORT	135.0	135.0	135.0	**405.0**	1975628
	CIVIL STRUCTURES	88.1	88.1	88.1	**264.4**	1289654
	DRAINAGE & IRRIGATION	46.7	46.7	46.7	**140.0**	682927
	MECHANIZATION	289.3	289.3	289.3	**867.9**	4233758
	TILLAGE &PLANTING	97.7	97.7	97.7	**293.0**	1429033
TOTAL	**East Demerara**	**656.8**	**656.8**	**656.8**		9611172
Wales	ACCESSIBILITY & CANE TRANSPORT	50.3	50.3	50.3	**150.9**	736098
Wales	CIVIL STRUCTURES	55.5	55.5	55.5	**166.4**	811805
Wales	DRAINAGE & IRRIGATION	46.7	46.7	46.7	**140.0**	682927
Wales	MECHANIZATION	23.9	23.9	23.9	**71.7**	349610
WALES	TILLAGE &PLANTING	20.7	20.7	20.7	**62.0**	302589
TOTAL	**WALES**	**197.0**	**197.0**	**197.0**		2883025
Uitvlugt	ACCESSIBILITY & CANE TRANSPORT	84.9	84.9	84.9	**254.6**	1241880
	CIVIL STRUCTURES	62.9	62.9	62.9	**188.6**	920000
	DRAINAGE & IRRIGATION	102.5	102.5	102.5	**307.5**	1500000
	MECHANIZATION	336.6	336.6	336.6	**1009.7**	4925243
	TILLAGE &PLANTING	77.2	77.2	77.2	**231.7**	1130000
TOTAL	**Uitvlugt**	**664.0**	**664.0**	**664.0**		9717123
INDUSTRY	ACCESSIBILITY & CANE TRANSPORT	1059.6	1059.6	1059.6	**3178.7**	15505981
	CIVIL STRUCTURES	1044.5	1044.5	1044.5	**3133.4**	15284804
	DRAINAGE & IRRIGATION	303.8	303.8	303.8	**911.5**	4446193
	MECHANIZATION	1922.5	1922.5	1922.5	**5767.4**	28133423
	TILLAGE &PLANTING	321.1	321.1	321.1	**963.2**	4698436
TOTAL		**4651.4**	**4651.4**	**4651.4**		68068826

	AGRICULTURE CAPITAL INVESTMENT					
	Description	AGRIC CAPITAL G$M				TOTAL US $
		2015	2016	2017	TOTAL	
INDUSTRY	MECHANIZATION	1922.5	1922.5	1922.5	**5767.4**	[illegible]
	DRAINAGE & IRRIGATION	303.8	303.8	303.8	**911.5**	[illegible]
	CIVIL STRUCTURES	1044.5	1044.5	1044.5	**3133.4**	[illegible]
	ACCESSIBILITY & CANE TRANSPORT	1059.6	1059.6	1059.6	**3178.7**	[illegible]
	TILLAGE &PLANTING	321.1	321.1	321.1	**963.2**	[illegible]
TOTAL	TOTAL	**4651.4**	**4651.4**	**4651.4**		68068826

MECHANIZATION INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Harvesters and associated equipment	3	750,000	2,250 000	461 3
Skeldon	Excavators	5	176,850	884,248	181 3
Skeldon	Tractors - Fertilising	7	82,143	575 000	117 9
Skeldon	Boom Sprayer Implement	3	7,000	21,000	4.3
Skeldon	Land Conversion	2000	1,500	3,000 000	615 0
ALBION	Super long reach excavator	5	176,850	884,248	181 3
ALBION	Spring Tines Implement	2	9,709	19,418	4 0
ALBION	Planting trailer Implement	2	12,135	24,270	5 0
ALBION	Furrow coverer Implement	1	14,563	14,563	3.0
ALBION	Harvesters and associated equipment	1	780,488	780,488	160.0
ALBION	Tractors LGRP Spreader	6	82,390	494,342	101 3
ALBION	LGRP SPREADER Implement	1	24,390	24,390	5 0
ALBION	Land Conversion	1000	1,500	1,500 000	307 5
ALBION	Dump lorry 10 Ton Tools	1	31,707	31,707	6 5
ALBION	Trolly jack- 20 ton Tools	2	8,536	17,072	3 5
ALBION	FWS Service unit Tools	1	72,816	72,816	14.9
ALBION	Portable welding plant Tools	2	2,184	4,368	0 9
ALBION	Lathe Tools	1	24,272	24,272	5 0
ALBION	Distilling unit Tools	1	1,951	1,951	0 4
ALBION	Heavy duty tool kit Tools	8	2,439	19,512	4 0
ALBION	Floor crane Tools	1	19,512	19 512	4 0
ALBION	Air compressor Tools	1	3,902	3,902	0 8
ALBION	Lighting plant Tools	2	8,780	17,560	3 6
ROSE HALL	100 HP tractor	5	48,544	242 720	49 8
ROSE HALL	Spring Tines Implement	2	9,709	19,418	4 0
ROSE HALL	80/66 Tractor JD	2	38,835	77 670	15 9
ROSE HALL	Land conversion Cultivation	2000	1,500	3,000 000	615 0
ROSE HALL	Excavator LR	5	176,850	884,248	181 3
ROSE HALL	Front end loader Excavator	1	121,360	121,360	24 9
ROSE HALL	Fertilizer applicator Implement	2	58,252	116,504	23.9
ROSE HALL	LGPL spreader Implement	2	58,252	116,504	23.9
ROSE HALL	Planting trailer Implement	2	12,135	24,270	5.0
ROSE HALL	Furrow opener Implement	2	7,282	14,564	3.0
ROSE HALL	Furrow coverer Implement	2	14,563	29 126	6.0
ROSE HALL	Tyre repair machine Tools	1	48,550	48,550	10.0
ROSE HALL	Trench cleaner Tractor	1	72,815	72,815	14.9
ROSE HALL	Backhoe Excavator	1	38,835	38,835	8.0
ROSE HALL	FWS Service unit Tools	1	72,816	72,816	14.9
ROSE HALL	Portable welding plant - Electrical Tools	4	19,420	77,680	15 9
ROSE HALL	Portable welding plant - Portable Tools	2	24,270	48,540	10 0
ROSE HALL	Lathe Tools	1	24,272	24,272	5.0
ROSE HALL	Boom Sprayer Implement	1	9,709	9,709	2.0
Blairmont	Harvesters and associated equipment	1	780,488	780,488	160 0
Blairmont	Tractors LGRP Spreader	4	80,085	320,341	65 7
Blairmont	LGRP SPREADER Implement	1	24,390	24,390	5.0
Blairmont	Boom Sprayer Implement	1	9,756	9,756	2.0
Blairmont	Fertilizer Hopper Implement	1	4,878	4,878	1 0
Blairmont	Land Development (840 Ha) Conversion	1056 74	1,500	1,585,110	324 9
Blairmont	110 Hp Tractor	3	58,537	175,610	36.0
East Demerara	Crop Care - 100 hp Tractor -Repair work	9	80,038	720,341	147 7
East Demerara	Crop Care - 100 hp + boom sprayer Implement	4	82,927	331,707	68 0
East Demerara	Crop Care - 100 hp + donds implement	6	87,805	526,829	108 0
East Demerara	100 hp +fertilizer hopper Implement	4	82,927	331,707	68 0
East Demerara	Retooling of FWS Tools	1	73,171	73,171	15.0
East Demerara	Harvesters and associated equipment	3	750,000	2,250,000	461 3
Wales	110 Hp Tractor	5	69,922	349,610	71 7
Uitvlugt	Implements - Tillage	15	15,000	225,000	46.1
Uitvlugt	Excavators	4	176,850	707,399	145.0
Uitvlugt	Tractors - LGRP	3	70,000	210,000	43.1
Uitvlugt	Spreaders - LGRP Implement	3	10,000	30,000	6.2
Uitvlugt	Tractors - Fertilising	2	70,000	140,000	28 7
Uitvlugt	Hoppers/Spreaders - Fertilising Implement	2	12,000	24,000	4.9
Uitvlugt	Tractors - Spraying	2	70,000	140,000	28 7
Uitvlugt	Boom Sprayers - Spraying Implement	2	7,000	14,000	2.9
Uitvlugt	Tractors - Inter Row Cultivation	2	70,000	140,000	28 7
Uitvlugt	Implements - Inter Row Cultivation	2	5,000	10,000	2 1
Uitvlugt	Harvesters with associated equipment	3	750,000	2,250,000	461.3
Uitvlugt	Laser Leveling Implement	1	35,000	35,000	7.2
Uitvlugt	Extension and Upgrade of Workshop		1,000,000	1,000,000	205 0

MECHANIZATION INVESTMENTS BY MACHINE TYPE

BILLET HARVESTERS & ASSOCIATED EQUIPMENT

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Harvesters and associated equipment	3	750,000	2,250,000	461.3
ALBION	Harvesters and associated equipment	1	780,488	780,488	160.0
Blairmont	Harvesters and associated equipment	1	780,488	780,488	160.0
East Demerara	Harvesters and associated equipment	3	750,000	2,250,000	461.3
Uitvlugt	Harvesters with associated equipment	3	750,000	2,250,000	461.3
TOTAL		11		8,310,976	1703.8

EXCAVATOR

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Excavators	5	176,850	884,248	181.3
ALBION	Super long reach excavator	5	176,850	884,248	181.3
ROSE HALL	Excavator LR	5	176,850	884,248	181.3
ROSE HALL	Backhoe Excavator	1	38,835	38,835	8.0
ROSE HALL	Front end loader Excavator	1	121,360	121,360	24.9
Uitvlugt	Excavators -	4	176,850	707,399	145.0
TOTAL		21		3,520,339	721.7

TRACTORS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Tractors - Fertilising	7	82,143	575,000	117.9
ALBION	Tractors LGRP Spreader	6	82,390	494,342	101.3
ROSE HALL	100 HP tractor	5	48,544	242,720	49.8
ROSE HALL	80/66 Tractor JD	2	38,835	77,670	15.9
ROSE HALL	Trench cleaner Tractor	1	72,815	72,815	14.9
Blairmont	Tractors LGRP Spreader	4	80,085	320,341	65.7
Blairmont	110 Hp Tractor	3	58,537	175,610	36.0
East Demerara	Crop Care - 100 hp Tractor with implements Repair work	9	80,038	720,341	147.7
Wales	110 Hp Tractor	5	69,922	349,610	71.7
Uitvlugt	Tractors - LGRP	3	70,000	210,000	43.1
Uitvlugt	Tractors - Fertilising	2	70,000	140,000	28.7
Uitvlugt	Tractors - Spraying	2	70,000	140,000	28.7
Uitvlugt	Tractors - Inter Row Cultivation	2	70,000	140,000	28.7
TOTAL		51		3,658,449	750.0

IMPLEMENTS

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Boom Sprayer Implement	3	7,000	21,000	4.3
ALBION	Spring Tines Implement	2	9,709	19,418	4.0
ALBION	Planting trailer Implement	2	12,135	24,270	5.0
ALBION	Furrow coverer Implement	1	14,563	14,563	3.0
ALBION	LGRP SPREADER Implement	1	24,390	24,390	5.0
ROSE HALL	Spring Tines Implement	2	9,709	19,418	4.0
ROSE HALL	Fertilizer applicator implement	2	58,252	116,504	23.9
ROSE HALL	LGPL spreader Implement	2	58,252	116,504	23.9
ROSE HALL	Planting trailer Implement	2	12,135	24,270	5.0
ROSE HALL	Furrow opener Implement	2	7,282	14,564	3.0
ROSE HALL	Furrow coverer Implement	2	14,563	29,126	6.0
ROSE HALL	Boom Sprayer Implement	1	9,709	9,709	2.0
Blairmont	LGRP SPREADER Implement	1	24,390	24,390	5.0
Blairmont	Boom Sprayer Implement	1	9,756	9,756	2.0
Blairmont	Fertilizer Hopper Implement	1	4,878	4,878	1.0
East Demerara	Crop Care - 100 hp + boom sprayer Implement	4	82,927	331,707	68.0
East Demerara	Crop Care - 100 hp + dondi implement	6	87,805	526,829	108.0
East Demerara	100 hp +fertilizer hopper Implement	4	82,927	331,707	68.0
Uitvlugt	Implements - Tillage	15	15,000	225,000	46.1
Uitvlugt	Spreaders - LGRP Implement	3	10,000	30,000	6.2
Uitvlugt	Hoppers/Spreaders - Fertilising Implement	2	12,000	24,000	4.9
Uitvlugt	Boom Sprayers - Spraying Implement	2	7,000	14,000	2.9
Uitvlugt	Implements - Inter Row Cultivation	2	5,000	10,000	2.1
Uitvlugt		1	35,000	35,000	7.2
TOTAL		64		2,001,004	410.2

LAND CONVERSION					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Land Conversion	2000	1,500	3,000,000	615
ALBION	Land Conversion	1000	1,500	1,500,000	307.5
ROSE HALL	Land conversion Cultivation	2000	1,500	3,000,000	615.0
Blairmont	Land Development (840 Ha) Conversion	1057	1,500	1,585,110	324.9
TOTAL		6057		9,085,110	1862.4

TOOLS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
ALBION	Dump lorry- 10 Ton Tools	1	31,707	31,707	6.5
ALBION	Trolly jack- 20 ton Tools	2	8,536	17,072	3.5
ALBION	FWS Service unit Tools	1	72,816	72,816	14.9
ALBION	Portable welding plant Tools	2	2,184	4,368	0.9
ALBION	Lathe Tools	1	24,272	24,272	5.0
ALBION	Distilling unit Tools	1	1,951	1,951	0.4
ALBION	Heavy duty tool kit Tools	8	2,439	19,512	4.0
ALBION	Floor crane Tools	1	19,512	19,512	4.0
ALBION	Air compressor Tools	1	3,902	3,902	0.8
ALBION	Lighting plant Tools	2	8,780	17,560	3.6
ROSE HALL	Tyre repair machine Tools	1	48,550	48,550	10.0
ROSE HALL	FWS Service unit Tools	1	72,816	72,816	14.9
ROSE HALL	Portable welding plant - Electrical Tools	4	19,420	77,680	15.9
ROSE HALL	Portable welding plant - Portable Tools	2	24,270	48,540	10.0
ROSE HALL	Lathe Tools	1	24,272	24,272	5.0
East Demerara	Retooling of FWS Tools	1	73,171	73,171	15.0
TOTAL				557,701	114.3

FIELD WORKSHOP UPGRADE					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Uitvlugt	Extension and Upgrade of Workshop	1	1,000,000	1,000,000	205.0
TOTAL				1,000,000	205.0

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M

TILLAGE & PLANTING INVESTMENTS					
ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
Skeldon	Tillage tractors	6	70,000	420,000	86.1
Skeldon	Trailing Final Harrow	6	9,709	58,254	11.9
Skeldon	Plows	6	7,540	45,240	9.3
ALBION	160 HP Tractor	4	58,252	233,008	47.8
ALBION	Trailing Final Harrow	2	9,709	19,418	4.0
ALBION	Plows	4	7,540	30,160	6.2
ALBION	Tractor 100hp	1	38,835	38,835	8.0
ROSE HALL	180 HP Tractor	5	72,815	364,075	74.6
ROSE HALL	Mould Board Plow	5	9,709	48,545	10.0
ROSE HALL	Tandem Harrow	4	9,709	38,836	8.0
ROSE HALL	Low bed trailer	1	121,360	121,360	24.9
ROSE HALL	10/32 inverted harrow	4	29,125	116,500	23.9
Blairmont	Dundi Ditcher	4	5,000	20,000	4.1
Blairmont	160 HP Tractor	4	58,252	233,008	47.8
Blairmont	Trailing Final Harrow	2	9,709	19,418	4.0
Blairmont	Plows	4	7,540	30,160	6.2
East Demerara	Tillage - 100 hp Tractor with dondi	4	82,927	331,707	68.0
East Demerara	100 hp Tractor	2	68,293	136,585	28.0
East Demerara	Mould Board Plow	5	9,709	48,545	10.0
East Demerara	Tillage -150 hp tractor	11	82,927	912,195	187.0
Wales	Dundi Ditcher	4	5,000	20,000	4.1
Wales	160 HP Tractor	4	58,252	233,008	47.8
Wales	Trailing Final Harrow	2	9,709	19,418	4.0
Wales	Plows	4	7,540	30,160	6.2
Uitvlugt	Tractors - Planting	8	70,000	560,000	114.8
Uitvlugt	Bell Loaders - Planting	3	80,000	240,000	49.2
Uitvlugt	Trailers - Planting	8	5,000	40,000	8.2
Uitvlugt	Dondi Tractors - Planting	3	70,000	210,000	43.1
Uitvlugt	Dondi Ditchers - Planting	4	20,000	80,000	16.4
TOTAL				4,698,436	963.2

TILLAGE & PLANTING INVESTMENTS BY MACHINE TYPE

TRACTORS

	ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
TRACTORS	Skeldon	Tillage tractors	6	70,000	420,000	86.1
	ALBION	160 HP Tractor	4	58,252	233,008	47.8
	ALBION	Tractor 100hp	1	38,835	38,835	8.0
	ROSE HALL	180 HP Tractor	5	72,815	364,075	74.6
	Blairmont	160 HP Tractor	4	58,252	233,008	47.8
	East Demerara	Tillage - 100 hp Tractor with dondi	4	82,927	331,707	68.0
	East Demerara	100 hp Tractor	2	68,293	136,585	28.0
	East Demerara	Tillage -150 hp tractor	11	82,927	912,195	187.0
	Wales	160 HP Tractor	4	58,252	233,008	47.8
	Uitvlugt	Tractors - Planting	8	70,000	560,000	114.8
	Uitvlugt	Dondi Tractors - Planting	3	70,000	210,000	43.1
	TOTAL		**52**		**3,672,422**	**752.8**

HARROW

	ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
HARROW	Skeldon	Trailing Final Harrow	6	9,709	58,254	11.9
	ALBION	Trailing Final Harrow	2	9,709	19,418	4.0
	ROSE HALL	Tandem Harrow	4	9,709	38,836	8.0
	ROSE HALL	10/32 inverted harrow	4	29,125	116,500	23.9
	Blairmont	Trailing Final Harrow	2	9,709	19,418	4.0
	Wales	Trailing Final Harrow	2	9,709	19,418	4.0
	TOTAL		**20**		**271,844**	**55.7**

PLOWS

	ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
PLOWS	Skeldon	Plows	6	7,540	45,240	9.3
	ALBION	Plows	4	7,540	30,160	6.2
	ROSE HALL	Mould Board Plow	5	9,709	48,545	10.0
	Blairmont	Plows	4	7,540	30,160	6.2
	East Demerara	Mould Board Plow	5	9,709	48,545	10.0
	Wales	Plows	4	7,540	30,160	6.2
	TOTAL		**28**		**232,810**	**47.7**

TRAILERS

	ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
TRAILERS	ROSE HALL	Low bed trailer	1	121,360	121,360	24.9
	Uitvlugt	Trailers - Planting	8	5,000	40,000	8.2
	TOTAL		**9**		**161,360**	**33.1**

	DITCHERS					
	ESTATE	Description	Quantity	Unit Price L	Cost US$	Cost G$M
DITCHERS	Blairmont	Dundi Ditcher	4	5,000	20,000	4.1
	Wales	Dundi Ditcher	4	5,000	20,000	4.1
	Uitvlugt	Dondi Ditchers - Planting	4	20,000	80,000	16.4
	TOTAL		**12**		**120,000**	**24.6**

	BELL LOADER					
	ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
BELL LOADERS	Uitvlugt	Bell Loaders - Planting	3	80,000	240,000	49.2
	TOTAL		**3**		**240,000**	**49.2**

ESTATE	Description	Quantity	Unit Price US$	Cost US$	Cost G$M
GRAND TOTAL				4,698,436	963.2

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All Estates Compare Consol.
year 2014

	Skeldon Actual	Albion Actual	Rose Hall Actual	Blairmont Actual	Enmore Actual	LBI Actual	Wales Actual	ICBU Actual	Industry Tot. Actual
Agriculture UNITS									
Hectares Harvested	8,117	8,900	6,724	5,656	5,112	3,374	2,895	4,451	45,228
Tonne Cane - Estate	472,502	567,411	386,578	380,390	269,138	156,148	127,230	176,809	2,536,206
Tonne Cane Per Hectare - Estate	58	64	57	67	53	46	44	40	56
Tonnes Sugar - Estate	28,840	50,467	29,168	33,499	19,272	11,076	9,456	13,362	195,140
Tonnes Sugar - Farmers	7,050	612	2,978	-	347	237	9,442	554	21,220
Tonne Sugar - Estates & Farmers	35,890	51,079	32,146	33,499	19,619	11,313	18,898	13,916	216,360
Tonnes Sugar Per Hectare	4	6	4	6	4	3	3	3	4
Hectares cultivation	8,903	9,616	6,689	5,808	4,693	2,988	3,356	4,500	46,553
Hectares Tilled	453	1,478	1,055	908	482	305	504	70	5,255
Hectares Planted	724	1,794	1,300	1,190	647	652	485	875	7,666
Total Cost ($000) By Activity									
Mech Tillage -	34,881	103,460	71,459	73,592	28,920	15,114	40,320	5,460	373,206
Preparatory Work	13,590	29,560	-	-	14,942	-	24,696	2,800	85,588
Field Works	172,350	201,111	113,797	83,173	95,454	62,139	121,344	141,582	990,950
Plant Cane	184,620	466,388	324,950	316,646	186,278	159,618	174,564	258,037	2,071,101
Ratoon Cane	519,469	584,989	430,323	441,191	419,184	286,790	312,649	356,048	3,350,644
Harvesting	1,308,656	1,729,241	1,309,172	1,205,405	897,209	569,436	408,559	617,602	8,045,280
Field Equipment	343,510	231,450	152,983	95,730	69,032	31,517	132,520	57,001	1,113,743
Water Management	85,989	247,284	173,088	75,082	161,006	135,343	41,175	58,374	977,341
Field Workshop									
Field Management	1,852,154	866,314	884,078	639,322	588,476	432,498	1,236,905	530,732	7,030,479
Total	**4,515,219**	**4,459,797**	**3,459,850**	**2,930,142**	**2,460,501**	**1,692,455**	**2,492,732**	**2,027,636**	**24,038,331**
UNIT COST $000 By Activity									
Mech Tillage - (Till ha)	77	70	68	81	60	50	80	78	71
Preparatory work (Till ha)	30	20			31		49	40	16
Field Works (Cultiv ha)	19	21	17	14	20	21	36	31	21
Plant Cane (Plant ha)	255	260	250	266	288	245	360	295	270
Ratoon Cane (Ha Harvest)	64	66	64	78	82	85	108	80	74
Harvesting (Tonnes cane)	2.77	3.05	3.39	3.17	3.33	3.65	3.21	3.49	3.17
Field Equipment (cultv ha)	39	24	23	16	15	11	39	13	24
Water Management (cultv ha)	10	26	26	13	34	45	12	13	21
Field Workshop									
Field Management (cultv ha)	208	90	132	110	125	145	369	118	151
Agriculture cost per Unit									
Agriculture Cost-G$ per tonne Sugar	125,807	87,311	107,629	87,470	125,414	149,608	131,908	145,705	111,104
Agriculture Cost -US ¢ Per LB Sugar	30.39	21	26	21	30	36	32	35	27
Agriculture Cost-G$ per Ha	507,185	463,775	517,283	504,492	524,281	566,417	742,747	450,586	516,369
Agriculture Cost- G$ Per tonne cane	9,556	7,860	8,950	7,703	9,142	10,839	19,592	11,468	9,478

Guysuco
All Estates Compare Consol.
Projected 2017

	Skeldon Projected	Albion Projected	Rose Hall Projected	Blairmont Projected	Enmore Projected	LBI Projected	Wales Projected	ICBU Projected	Industry Tot. Projected
Agriculture UNITS									
Hectares Harvested	8,582	9,002	6,314	5,493	4,472	2,699	2,833	3,933	43,328
Tonne Cane - Estate	526,635	622,672	377,717	397,668	252,956	141,720	166,957	199,815	2,686,140
Tonne Cane Per Hectare - Estate	61	69	60	72	57	53	59	51	62
Tonnes Sugar - Estate	40,472	59,302	29,976	38,237	20,076	11,248	13,464	15,858	228,633
Tonnes Sugar - Farmers	9,632	684	3,243	-	513	249	10,740	4,571	29,632
Tonne Sugar - Estates & Farmers	50,104	59,986	33,219	38,237	20,589	11,497	24,204	20,429	258,265
Tonnes Sugar Per Hectare	5	7	5	7	4	4	5	4	5
Hectares cultivation	8,903	9,616	6,689	5,808	4,693	2,988	3,356	4,500	46,553
Hectares Tilled	1,780	1,630	1,020	870	704	500	620	800	7,924
Hectares Planted	1,780	1,630	1,005	870	704	500	620	800	7,909
Total Cost ($000) By Activity									
Mech Tillage -	124,600	110,840	71,400	65,250	42,240	24,777	49,600	62,400	551,107
Preparatory Work	53,400	16,300	-	-	21,824	10,000	30,380	32,000	163,904
Field Works	172,350	201,111	113,797	83,173	95,454	62,139	121,344	141,582	990,950
Plant Cane	409,400	423,800	251,250	231,420	168,960	120,000	223,200	236,000	2,064,030
Ratoon Cane	549,248	591,720	404,096	384,510	375,648	215,920	305,964	330,372	3,157,478
Harvesting	1,369,251	1,868,016	1,208,694	1,232,771	758,868	453,504	550,958	679,371	8,121,433
Field Equipment	343,510	231,450	152,983	95,730	69,032	31,517	132,520	57,001	1,113,743
Water Management	85,989	247,284	173,088	75,082	161,006	135,343	41,175	81,000	999,967
Field Workshop									
Field Management	1,852,154	866,314	884,078	639,322	588,476	289,836	1,236,905	810,000	7,167,085
Total	**4,959,902**	**4,556,835**	**3,259,386**	**2,807,258**	**2,281,508**	**1,343,036**	**2,692,046**	**2,429,726**	**24,329,697**
UNIT COST $000 By Activity									
Mech Tillage - (Till ha)	70	68	70	75	60	50	80	78	70
Preparatory work (Till ha)	30	10			31	20	49	40	21
Field Works (Cultiv ha)	19	21	17	14	20	21	36	31	21
Plant Cane (Plant ha)	230	260	250	266	240	240	360	295	261
Ratoon Cane (Ha Harvest)	64	66	64	70	84	80	108	84	73
Harvesting (Tonnes cane)	2.60	3.00	3.20	3.10	3.00	3.20	3.30	3.40	3.02
Field Equipment (cultv ha)	39	24	23	16	15	11	39	13	24
Water Management (cultv ha)	10	26	26	13	34	45	12	18	21
Field Workshop									
Field Management (cultv ha)	208	90	132	110	125	97	369	180	154
Agriculture cost per Unit									
Agriculture Cost-G$ per tonne Sugar	98,992	75,965	98,118	73,417	110,812	116,816	111,223	118,935	94,204
Agriculture Cost -US ¢ Per LB Sugar	23.91	18	24	18	27	28	27	29	23
Agriculture Cost-G$ per Ha	557,136	473,866	487,312	483,335	486,141	449,477	802,135	539,939	522,628
Agriculture Cost- G$ Per tonne cane	9,418	7,318	8,629	7,059	9,019	9,477	16,124	12,160	9,057

Guysuco
All Estates Compare Consol.
Projected 2020

	Skeldon Projected	Albion Projected	Rose Hall Projected	Blairmont Projected	Enmore Projected	LBI Projected	Wales Projected	ICBU Projected	Industry Tot. Projected
Agriculture UNITS									
Hectares Harvested	8,582	9,002	6,314	5,493	4,472	2,699	2,915	3,984	43,461
Tonne Cane - Estate	626,008	679,488	427,245	419,895	307,102	178,720	201,050	233,953	3,073,461
Tonne Cane Per Hectare - Estate	73	75	68	76	69	66	69	59	71
Tonnes Sugar - Estate	49,683	65,970	37,055	40,375	24,766	14,184	16,214	18,867	267,114
Tonnes Sugar - Farmers	12,062	926	3,134	-	416	249	13,020	5,806	35,613
Tonne Sugar - Estates & Farmers	61,745	66,896	40,189	40,375	25,182	14,433	29,234	24,673	302,727
Tonnes Sugar Per Hectare	6	7	6	7	6	5	6	5	6
Hectares cultivation	8,903	9,616	6,689	5,808	4,693	2,988	3,356	4,500	46,553
Hectares Tilled	1,780	1,925	1,355	1,162	940	600	672	900	9,334
Hectares Planted	1,780	1,925	1,355	1,162	940	600	672	900	9,334
Total Cost ($000) By Activity									
Mech Tillage -	106,800	130,900	92,140	81,340	47,000	29,732	53,760	70,200	611,872
Preparatory Work	53,400	19,250	-	-	29,140	12,000	32,256	36,000	182,046
Field Works	172,350	201,111	113,797	83,173	95,454	62,139	121,344	141,582	990,950
Plant Cane	400,500	500,500	338,750	309,092	216,200	144,000	241,920	265,500	2,416,462
Ratoon Cane	549,248	591,720	404,096	384,510	380,120	229,415	314,820	318,720	3,172,649
Harvesting	1,565,020	2,038,464	1,367,184	1,259,685	859,886	571,904	643,360	795,440	9,100,943
Field Equipment	343,510	231,450	152,983	95,730	69,032	31,517	132,520	81,000	1,137,742
Water Management	85,989	247,284	173,088	75,082	161,006	135,343	41,175	81,000	999,967
Field Workshop									
Field Management	1,852,154	866,314	884,078	639,322	588,476	289,836	1,236,905	810,000	7,167,085
Total	**5,128,971**	**4,826,993**	**3,526,116**	**2,927,934**	**2,446,314**	**1,505,886**	**2,818,060**	**2,599,442**	**25,779,716**
									-
UNIT COST $000 By Activity									
Mech Tillage - (Till ha)	60	68	68	70	50	50	80	78	66
Preparatory work (Till ha)	30	10			31	20	48	40	20
Field Works (Cultiv ha)	19	21	17	14	20	21	36	31	21
Plant Cane (Plant ha)	225	260	250	266	230	240	360	295	259
Ratoon Cane (Ha Harvest)	64	66	64	70	85	85	108	80	73
Harvesting (Tonnes cane)	2.50	3.00	3.20	3.00	2.80	3.20	3.20	3.40	2.96
Field Equipment (cultv ha)	39	24	23	16	15	11	39	18	24
Water Management (cultv ha)	10	26	26	13	34	45	12	18	21
Field Workshop									
Field Management	208	90	132	110	125	97	369	180	154
Agriculture cost per Unit									
Agriculture Cost-G$ per tonne Sugar	83,067	72,157	87,738	72,518	97,145	104,336	96,397	105,356	85,158
Agriculture Cost -US ¢ Per LB Sugar	20.06	17	21	18	23	25	23	25	21
Agriculture Cost-G$ per Ha	576,127	501,959	527,191	504,112	521,258	503,978	839,683	577,654	553,776
Agriculture Cost- G$ Per tonne cane	8,193	7,104	8,253	6,973	7,966	8,426	14,017	11,111	8,388

Appendix 3

Cane Farming Records

Guyana Sugar Corporation Inc
Agriculture Services - Cane Farming

Cane Farmers' Register as at 1/1/2015

Estate	Individual/Co-operative/Farming Co.	No. of Farmers	Area	Cane Area	Remarks
Skeldon	SWR Cane Farmers Co-op Marketing Society Ltd (SWR1)	24	76.7	-	Abdn. Last harvest 2nd Crop 2014
	Upper Corentyne Agric Producers Co-op Society (SWR 2)	66	79.3	70.8	
	Stockholm Farm (SWR 3)	2	25.0	-	Abdn. Last harvest 2nd Crop 2005
	Baijnauth and Sons Limited (SWR 4)	4	43.5	21.4	
	R. Prasad Cane Farming Inc.	1	425.1	369.9	
	Corentyne Cane Farming Inc. (Corcane)	2	500.1	409.9	
	H. N. Sugrim	1	182.2	182.2	
	Moleson Creek Cane Farmers Inc (Mo-cane)	2	29.0	-	Abdn 29.0 ha. Last harvest 2nd Crop 2007
	Rahim and Son Farm House Cane Inc	2	87.7	81.2	
	Crabwood Creek Cane Farmers Company Inc	14	237.0	219.5	
	SWR Agri Co-op Land Society Ltd (H. Scheme)	85	550.1	528.0	
	Leeds Pioneer Co-operative Land Society Limited	96	259.6	223.0	
	Johannesburgh Cane Farming Inc	129	15.0	-	Abdn 15 ha. Last harvest 2nd Crop 2009
	Anacane	6	156.6	156.6	
	Corentyne Gold Inc(Anand Singh)	2	98.5	97.2	
	Raja's Cane Farming Inc	1	103.2	21.4	
	S and R Abdulla Cane Farming Inc	2	97.7	-	Absconded
	Skeldon Total	**439**	**2,966.3**	**2,381.1**	
Albion	L/Kenny Cane Farmers Co-op Marketing Society Ltd	187	182.7	-	Abdn. Last harvest 2nd Crop 2010
	Bloomfield Cane Farmers Co-op Marketing Society Ltd.	202	183.8	-	Abdn. Last harvest 1st Crop 2012
	PMU Cane Farmers Co-operative Marketing Society Ltd.	95	334.7	119.4	Unable to replant & becoming abandon
	Sue-Young	1	134.7	-	Abdn. Last harvest 1st Crop 2009
	Albion Total	**485**	**835.9**	**119.4**	
Rose Hall	Lochaber Corporation	1	372.5	372.5	
	R Hanoman	1	231.0	231.0	Old ratoons. Undecided about replanting
	Good Samaritan Co-operative Land Society Ltd.	57	375.8	-	Abdn. Last harvest in 2013
	Nowrang Persaud	1	21.7	21.7	Old ratoons yielding poorly
	Isabella Collins	1	21.5	21.5	
	Rose Hall Total	**61**	**1,022.5**	**646.7**	
Enmore	Friendship farmers	13	76.5	32.0	
	Buxton farmers	41	105.5	78.3	
	Enmore Total	**54**	**182.0**	**110.3**	
LBI	GARI	1	68.8	44.4	
	BV/Triumph	36	329	3.2	Farmers lack interest
	Plaisance	45	150.1	17.5	Farmers lack interest
	Diamond	28	344.5	-	Navig maint preventing c/transport
	Mocha/Archadia Cane Farmers Co-operative Society	12	34.4	-	Abdn. Last harvest in 2006
	Plantation Houston Sugar Estate Company Ltd	1	685.1	-	Abdn. Last harvest 1st Crop 2011
	LBI Total	**123**	**1,315.8**	**65.1**	
Wales	La Grange Cane Farmers Co-op Marketing Society Ltd	120	207.3	51.7	
	Canal #1 Front Cane Farming Group	13	100.6	26.1	
	Canal #1 Back Cane Farming Group	62	388.4	30.1	
	La Retraite/Stanleytown Cane Farmers Co-op Society	154	808.9	1,339.3	
	Canal #2 Cane Farmers Marketing Co-op Society Ltd.	191	470.2	346.5	
	Belle Vue Cane Farmers Marketing Co-op Society Ltd	55	265.2	198.0	
	S/ Progressive Cane Farmers Marketing Co-op Society Ltd.	28	23.8	58.1	
	GI Sisters Cane Farmers Marketing Co-op Society Ltd	92	101.3	22.4	
	Free & Easy Cane Farmers Marketing Co-op Society Ltd.	25	71.0	27.1	
	ML Vbg/Shtille CF Marketing Co-op Society Ltd	22	25.3	3.1	
	Growth & Consumer Cane Farmers Co-op Society Ltd	12	212.4	24.9	
	Wales Total	**774**	**2,674.4**	**2,127.3**	1/3 area in old cycles
ICBI	Paul Cheong	1	288.7	99.3	
	Pradeep Chandar	1	219.0	106.5	
	Ganesh Ramrattan	1	98.8	-	
	Premraj Ramraj	1	208.0	83.8	
	T & H Deonarine	2	173.0	84.7	
	N F Agriculture Inc.	1	449.1	-	
	B. Ramdass	3	59.4	-	
	ICBI Total	**10**	**1,496.0**	**374.3**	
	Grand Total	**1,944**	**11,492.3**	**5,824.2**	

Applications for lands at Uitvlugt - September 2015		
NAME	ADDRESS	HECTARES
DEODAT SINGH	23 Adelphi New Road East Canje Berbice	800
DENISE PAMELA GLEN	952 Sec C Block Y Golden Grove EBD	100
HEMCHAND LALL RAM	Lot X 26 Anna Catherina Forth Street WCD	40
PARASRAM MAHADEO	53 Versailles H/S WBD	500
NIVALDO BONFIM	NF Agriculture Inc. 106 Lamaha Street Georgetown	500
TRIBUWAN LOOKNAUTH	109 Zeeburg WCD	50
MAHADEO UMRAOW	Eagle Transportation & General Construction Inc. 110 Regent Road Bourda G/town	150
	SUB TOTAL	2140
NAME	ADDRESS	HECTARES
JAVID ALI	Area 'M' Pln. Tuschen EBD	445
SHIRAZ ALI	Two Brothers Corp. 17 Vergenoegen EB Essepuibo	283
AKBAR KHAN	30 Coglan Dam WBD	81
THAKUR SATROHAN	O Mes Delices Canal Number One WBD	81
NARAINDAT CYRIL	Lot 12 Lesperance Canal No. 1 WBD	40
SHIRAZ ALI	Two Brothers Corp. 17 Vergenoegen EB Essepuibo	660
RAJENDRA PERSAUD	2 West Half Java, Canal # 1 WBD	405
SHAZAM RAMZAN ALLI/NEAZABAM ALLY	Lot 5 Monbijou Canal No. 1 WBD	61
RAGOBIR GURDYAL	341 Tuschen North EB Essequibo	20
SEODAT PURAN	S.P Worldwide Import & Export 109 Goedverwagting ECD	121
JAIPAUL SUKHAL	216 Temple Street Windsor Forest WCD	40
DEVENDRA BALDEO	B & M Trading Enterprise 149 A Regent Road Bourda	40
NAZIM HUSSAIN/SEDIK HUSSAIN	Lot 1 & 2 Endeavour Canal # 2 Polder WBD	202
NANRAJ BISSESSAR	13 Soesdyke Canal # 1 WBD	202
RAJENDRADEO GEORGE	Lot 1 Rotter Dam WCD	121
	SUB TOTAL	2806
	TOTAL	4946
S. MARAJ	S. Maraj Contracting Services 25 Success Leguan Essequibo	Not stated
SHAIRAZ ALI	Two Brothers Corp. Rice Millers, Gas Station Mining 16/17 Vergenoegen, EB Essequibo	Not stated
JOHN BRIDGLALL	Soil Water Company 15 Back Street Junior Staff Compound Diamond EBD	minimum one section of the land

TOTAL AMOUNT PAID TO SKELDON FARMERS FOR 2014

	SWP1	SWP2	SWP4	R Presbad	Corcane	H N Suprim	AnaCane	Rahim & Son	Raja	CWC Company	Cor Gold	Hunter Scheme	Leeds/Pioneer	Johanesburg	Sub Total
A Hectares Harvested	42.1	88.9	43.5	406.6	338.3	182.2	141.7	82.3	79.4	229.2	58.0	437.8	268.8	0	2,376
B Tonnes Cane Supplied	1,122	4,120	2,285	18,216	17,107	11,847	9,655	4,575	3,339	17,036	2,868	18,797	11,976	0	122,943
C Tonnes Sugar Produced	36	192	156	1019	1,007	705	621	277	201	875	98	1318	688	0	6,993
D Tonnes Cane per Hectare B/A	26.80	58.94	52.53	44.80	50.40	65.02	68.10	55.50	42.05	74.30	49.45	42.90	45.40	0	52
E Tonnes Sugar per Hectare C/A	0.86	2.75	3.61	2.50	2.90	3.87	4.40	3.40	2.49	4.50	1.69	3.00	2.60	0	3
F Tonnes Cane per Tonne Sugar A/B	31.17	21.46	14.55	17.80	17.00	16.80	15.50	16.50	16.86	16.40	29.27	14.10	17.30	0	18
[illegible]	36.95	196.89	159.78	1045.50	1027.75	723.77	638.90	282.44	201.55	698.85	99.91	1351.03	705.84	0	7,168
PUNTS USED	269	625	457	2,844	2,684	1,650	1,455	640	581	1,785	498	2,706	1,690	0	17,884
Tonnes Cane per Punt	4.17	6.59	5.00	6.41	6.37	7.18	6.64	7.15	5.75	9.54	5.76	6.95	7.09	0.00	6.87
G Sugar Value per Tonne ($74,642)	$74,643	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642	$74,642
	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	G$M	
H Total Gross Owed to Farmers for Cane Supplied	2.8	14.6	11.9	78.0	76.7	54.0	47.7	21.1	15.0	52.2	7.5	100.8	52.7	0.0	$535
I Less Expenses Deducted	838,506	4,400,986	2,342,674	25,730,042	23,103,565	16,261,034	14,422,237	6,360,940	4,623,211	15,769,039	2,244,786	30,362,404	8,858,288	0	$155,317,662
J Net Paid to the Farmers H-I	1,919,733	10,220,229	9,583,722	52,108,140	53,610,098	37,762,334	33,266,354	14,720,823	10,420,823	36,394,702	5,212,977	70,480,947	33,827,050	-	$369,727,932
K % of net income deducted for expenses	30%	30%	20%	33%	30%	30%	30%	30%	31%	30%	30%	30%	17%		29%

Independent Auditors' Report to the Chairman of the National Cane Farming Committee

NATIONAL CANE FARMING COMMITTEE Cap. 69:04
Cane Farmers Contract (General Conditions) Rules
Farmer's Basic Share after Adjustment for Transport Differential

SKELDON ESTATE	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
Basic Average Price	$89,315	$102,104	$105,667	$110,580	$107,440	$92,825	$109,800	$128,074	$136,472	$91,297	
Less Transport Differential	$1,363	$1,489	$1,500	$1,085	$1,692	$2,904	$2,412	$2,231	$1,890	$1,917	
Net Average Sugar Price	$87,952	$100,615	$104,166	$109,495	$105,748	$89,921	$107,389	$125,842	$134,581	$89,380	
Plus Molasses	$8,894	$8,577	$7,919	$9,960	$15,691	$22,225	$28,456	$19,100	$24,164	$17,251	
Final Proceeds Sugar and Molasses	$96,846	$109,193	$112,085	$119,455	$121,439	$112,146	$135,845	$144,942	$158,746	$106,631	
Farmers Share 70%	**$67,792**	**$76,435**	**$78,460**	**$83,618**	**$85,007**	**$78,502**	**$95,091**	**$101,459**	**$111,122**	**$74,642**	**$62,000**

Appendix 4

Agriculture Policy Matters

		Brought Forward Canes													Carried Over Canes											
		First Crop					Second Crop				Year				First Crop					Second Crop					Year			
Year	Estate	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts
2007	SWR	1.5	123	10	82.0	12.3	3.3	203	17	61.5	11.9	4.8	326	27	67.9	12.1	50.7	3197	230	63.1	13.9	44.2	0	0	0.0	#DIV/0!	95.4	3197	230	33.5	13.9
	AN	191.3	14197	1245	74.2	11.4	4.8	402	40	83.8	10.1	196.1	14599	1285	74.4	11.4	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	RH	131.5	9540	718	72.5	13.3	20.1	1723	75	60.8	16.3	151.6	10763	793	71.0	13.6	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	BCE	25	2102	178	84.1	11.8	299.8	21323	1774	71.1	12.0	324.9	23425	1952	72.1	12.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	EHP	18.5	1291.7	116.6	69.6	11.1	42.7	2861	252	67.9	11.4	223.2	15728	1418	70.7	11.1	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	LBI	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#####	###	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	GV	74.1	6086	821	82.1	74.1	18.4	980	53.3	53.3	18.4	92.5	7066	135.4	76.4	52.2	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	ICBu	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#####	###	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
2008	SWR	2.8	181	14	64.6	12.9	21.4	877	75	38.6	55.1	24.2	1008	29	41.7	4#.8	520.2	37169	2734	71.5	13.6	274.4	7889	238	28.8	44.1	794.6	45058	2964	56.7	15.2
	AN	27.6	1619	142	58.7	11.4	707.3	37685	3076	53.3	12.3	734.9	39304	3218	53.5	12.2	783.3	55688	4713	71.1	11.8	152.9	10004	756	65.4	13.2	936.2	65692	5469	70.2	12.0
	RH	20.1	1095	83	54.5	13.2	308	23426	1347	58.9	17.4	418.1	24521	1430	58.6	17.1	269	19379	1643	72.0	11.8	0	0	0	0.0	0.0	269	19379	1643	72.0	11.8
	BCE	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#####	###	578.8	56058	3670	96.9	15.3	216	13080	993	60.6	13.2	794.8	69138	4663	87.0	14.8
	EHP	0	0	0	0.0	0.0	91.3	4014	343	44.0	11.7	91.3	4014	343	44.0	11.7	82.1	2994	266	36.5	11.3	0	0	0	0.0	0.0	82.1	2994	266	36.5	11.3
	LBI	191.6	9178	773	47.9	11.9	0	0	0	0.0	0.0	191.6	9178	773	47.9	11.9	44.7	862	66	19.3	13.1	0	0	0	0.0	0.0	44.7	862	66	19.3	13.1
	GV	42.3	3799	89.8	89.8	42.3	145.9	8435	135.76	57.8	22.8	188.2	12234	205.59	65.0	59.5	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	ICBu	152.1	7924	539	52.1	14.7	0	0	0	0.0	0.0	152.1	7924	539	52.1	14.7	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
2009	SWR	36.3	2760	203	76.0	13.6	0	0	0	0.0	0.0	36.3	2760	203	76.0	13.6	646.7	29625	1840	45.8	16.1	0	0	0	0.0	0.0	646.7	29625	1840	45.8	16.1
	AN	15.6	878	96	56.3	9.1	514	34685	2918	67.5	11.9	529.6	35564	3014	67.2	11.8	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	RH	39.4	1858	151	47.0	12.8	416.5	27462	2014	65.9	13.6	455.9	29312	2165	64.3	13.5	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	BCE	15.2	1322.2	120	87.0	11.0	25.7	1162	110	45.2	10.6	40.9	2484.3	230	60.7	10.8	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	EHP	19.1	1491	129	78.1	11.6	0	0	0	0.0	0.0	19.1	1491	129	78.1	11.6	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	LBI	7.7	432	39	60.0	11.1	29	1438	123.6	49.6	11.6	36.2	1870	162.6	51.7	11.5	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	GV	124.7	9506.4	750	54.4	12.7	112.2	5532.5	371	49.3	14.9	286.9	15038.9	1121	52.4	13.4	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	ICBu	0	0	0	0.0	0.0	13.8	42	534	3.0	0.1	13.8	42	534	3.0	0.1	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
2010	SWR	0	0	0	0.0	0.0	48.8	3793	224	77.7	16.9	48.8	3793	224	77.7	16.9	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	AN	24.3	1282.9	79.9	52.8	16.1	71.5	5152	351	72.1	14.7	314.5	17981	1150	57.2	15.6	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	RH	18.5	1135	75	61.4	15.1	14.3	1131	88	79.1	12.9	32.8	2266	163	69.1	13.9	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	BCE	17.2	1020	83.6	59.4	12.2	0	0	0	0.0	0.0	17.2	1020	83.6	59.3	12.2	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	EHP	0	0	0	0.0	0.0	2.5	27.7	1.5	110.8	18.5	2.5	27.7	1.5	110.8	18.5	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	LBI	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	GV	32.5	1569	100	41.8	15.2	0	0	0	0.0	0.0	32.5	1569	100	41.8	15.7	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
	ICBu	5	409	36	81.8	11.4	34.3	850	61	59.4	13.9	19.3	1259	97	65.2	13.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	#DIV/0!	#DIV/0!
2011	SWR	0	0	0	0.0	0.0	51.1	2316	66	45.3	35.1	51.1	2316	66	45.3	35.1	473.7	38749	2159	81.8	17.9	1359.8	60417	2888			1833.5	99161	5047	54.1	19.6
	AN	0	0	0	0.0	0.0	747.4	38361	3134	51.3	12.2	747.4	38361	3134	51.3	12.2	1039.3	89517	7200	86.1	12.4	346.5	19355	1421			1385.8	108872	8621	78.6	12.6
	RH	0	0	0	0.0	0.0	603	30312	1925	50.3	15.7	603	30312	1925	50.3	15.7	237.5	54320	3996	73.7	13.6	279.5	17054	1117			1017	71374	5113	70.2	14.0
	BCE	0	0	0	0.0	0.0	439	25385	2032	57.8	12.5	439	25385	2032	57.8	12.5	284.3	25137	2010	88.4	12.5	0	0	0			284.3	25137	2010	88.4	12.5
	EHP	7.8	235	16	83.9	14.7	121.6	7046	459	57.9	15.4	124.4	7281	475	58.5	15.3	828.3	64254	4387	76.4	14.4	187	12621	1010			1015.3	75875	5397	74.7	14.1
	LBI	42.8	1850.5	109.9	56.4	16.8	78	2405	110	34.4	21.9	102.8	4255.5	219.9	41.4	19.4	4208	276972	190336	65.8	14.5	54.4	2307.8	154.36			475.2	30005.03	2058	63.1	14.6
	GV	0	0	0	0.0	0.0	104	2917	260	28.0	11.2	104	2917	260	28.0	11.2	299.1	15961.9	1175.6	53.4	13.6	67.7	2048	161			366.8	18009.9	1336.6	49.1	13.5
	ICBu	7.2	179	10	24.9	17.9	541.8	23341	1444	43.1	16.2	549	23520	1454	42.8	16.2	976.8	63409	4591	64.9	13.8	152.2	3333	228			1129	66742	4839	59.1	13.8
2012	SWR	59.4	3290	151	55.4	21.8	443.3	19008	935	42.9	20.3	502.7	22298	1086	44.4	20.5	0	0	0	0.0	0.0	386.4	14695	781	38.0	18.8	386.4	14695	781	38.0	18.8
	AN	207.9	11214	904	54.0	12.4	793.5	40870	3514	51.4	11.6	1001.4	52084	4418	52.0	11.8	0	0	0	0.0	0.0	374.6	16981	1493	45.3	11.4	374.6	16981	1493	45.3	11.4
	RH	116.7	7000	583	60.0	12.0	262.3	11631	763	44.3	15.2	379	18631	1346	49.2	13.8	0	0	0	0.0	0.0	95.1	4617	386	48.5	12.0	95.1	4617	386	48.5	12.0
	BCE	353.3	26099.9	2258	73.9	11.6	408.8	18090	1436.6	44.3	12.6	762.1	44189.9	3694.6	58.0	12.0	0	0	0	0.0	0.0	34.9	668	59	19.1	11.3	34.9	668	59	19.1	11.3
	EHP	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	447.5	21202	1663	47.4	12.7	447.5	21202	1663	47.4	12.7
	LBI	4.1	218	27.6	53.2	7.9	5.1	245	14.5	48.8	17.2	9.2	467	42.1	50.8	11.1	0	0	0	0.0	0.0	207.6	8121.6	535.2	39.1	15.2	207.6	8121.6	535.2	39.1	15.2
	GV	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	190	8638	718	45.5	12.0	190	8638	718	45.5	12.0
	ICBu	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	0	0	0	0.0	0.0	56.2	2326	174	41.4	13.4	56.2	2326	174	41.4	13.4

		Brought Forward Canes										Year					First Crop					Carried Over canes					Year				
		First Crop					Second Crop															Second Crop									
Year	Estate	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts	ha	tc	ts	tch	tcts
2013	SWR	162.1	8223	425	**50.7**	**19.3**	0	0	0	**####**	**###**	162.1	8223	425	50.7	19.3	117.7	3479	213	30.9	16.3	0	0	0	**######**	**######**	117.7	3479	213	30.9	16.3
	AN	1744	8904	641	**51.1**	**13.5**	362.7	19115	1400	**52.7**	**13.7**	537.1	28019	2061	52.2	13.6	0	0	0	0.0	0.0	0	0	0	**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	RH	44.4	1418	92	**31.9**	**14.6**	275.6	15064	967	**54.7**	**15.6**	320	16482	1064	51.5	15.5	0	8	0	8.0	0.0	19	295	19	**15.5**	**15.5**	19	295	19	15.5	15.5
	BCF	260	12792.5	986	**49.2**	**13.0**	257.3	16081.7	1203.5	**62.5**	**12.3**	517.3	28874.2	2189.5	55.8	12.6	0	0	0	0.0	0.0	0	0	0	**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	EHP	0	0	0	**0.0**	**0.0**	41.9	2356	175	**56.2**	**13.5**	41.9	2356	175	56.2	13.5	292.5	11992	705	41.0	17.0	202.6	8591	636	**42.4**	**13.5**	495.1	20583	1341	41.6	15.3
	LBI	0	0	0	**0.0**	**0.0**	20.4	1654.14	119.13	**81.1**	**13.9**	20.4	1654.14	119.13	81.1	13.9	635	26928.1	580.9	42.4	46.4	165.8	7439.7	618.96	**44.9**	**12.0**	800.8	34367.82	1199.9	42.9	28.6
	GV	0	0	0	**8.0**	**0.0**	475.1	15501.2	1098.3	**32.6**	**24.1**	475.1	15501.2	1098.3	32.6	14.1	244.5	13414	1145	54.9	11.7	0	0	0	**######**	**######**	244.5	13414	1145	54.9	11.7
	tCBu	306.7	10341	698	**33.7**	**14.8**	286.7	13095	931	**45.8**	**14.1**	592.4	23436	1629	39.6	14.4	0	0	0	0.0	0.8	0	0	0	**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
2014	SWR	38.7	2604	107	**67.3**	**24.3**	48.2	2479	146	**51.4**	**17.0**	86.9	5083	254	58.5	20.1	2028.9	127771	6974	63.0	18.3	342.5	11186	581	**32.7**	**19.3**	2371.4		7554	58.6	18.4
	AN	546.7	29578	2400.4	**54.1**	**12.3**	265.3	18353	1482	**69.2**	**12.4**	812	47931	3882.35	59.0	12.3	18.9	1058	95.28	0.0	0.0	0	0	0	**######**	**######**	18.9		95.28	56.0	11.1
	RH	446.2	20887	1493	**46.8**	**14.0**	459.2	31290	2080	**68.1**	**15.0**	905.4	52177	3573	57.6	14.6	0	0	0	0.0	0.0	0	0	0	**######**	**######**	0		0	#DIV/0!	#DIV/0!
	BCF	397.1	24519	2099	**61.7**	**11.7**	186.3	12934.3	1037.9	**69.4**	**12.5**	583.4	37453.3	3136.9	64.2	11.9	0	0	0	0.0	0.0	0	0	0	**######**	**######**	0		0	#DIV/0!	#DIV/0!
	EHP	30.8	1307	107	**42.4**	**12.2**	1012.5	51152	3371	**50.5**	**15.2**	1043.3	52464	3478	50.3	15.1	803.5	44236	3442.5	53.8	12.6	0	0	0	**######**	**######**	803.5		3442.5	53.8	12.6
	LBI	0	0	0	**####**	**###**	781.2	37205	2402.15	**47.6**	**15.5**	781.2	37204.95	2402.15	47.6	15.5	583.8	25411.8	1922	43.5	13.2	0	0	0	**######**	**######**	583.8		1922	43.5	13.2
	GV	259.3	7453.08	508.08	**28.7**	**14.7**	283.4	11762.7	650.4	**45.3**	**13.7**	460.5	16558.08	1174.08	36.0	14.1	0	0	0	#DIV/0!	#DIV/0!	0	0	0	**######**	**######**	0		0	#DIV/0!	#DIV/0!
	tCBu	313.1	12594	949	**40.2**	**13.3**	201.2	9105	666	**53.8**	**14.7**	3550.4	186880	12784.5	52.6	14.6	0	0	0	0.0	0.0	0	0	0	**######**	**######**	0		0	#DIV/0!	#DIV/0!
2015	SWR	0	0	0	**####**	**###**				**####**	**###**	0	8	0	####	###	145.7	9007	535	61.8	16.8				**######**	**######**	145.7	9007	535	61.8	16.8
	AN	118.5	7246	549.06	**61.1**	**13.2**				**####**	**###**	118.5	7246	549.06	61.1	13.2	38	2373	219	0.0	0.0				**######**	**######**	38	2373	219	62.4	10.8
	RH	401.3	20871	1348	**52.0**	**15.5**				**####**	**###**	401.3	20871	1348	52.0	15.5	0	0	0	0.0	0.0				**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	BCF	296.8	18665	1419.2	**62.9**	**13.2**				**####**	**###**	296.8	18665	1419.2	62.9	13.2	0	0	0	0.0	0.0				**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	EHP	163.7	7891	593	**48.2**	**13.3**				**####**	**###**	163.7	7891	593	48.2	13.3	0	0	0	#DIV/0!	#DIV/0!				**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	LBI	87.8	4344.26	315.72	**49.5**	**13.8**				**####**	**###**	87.8	4344.26	315.72	49.5	13.8	0	0	0	#DIV/0!	#DIV/0!				**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	GV	479.6	23755	1820	**49.5**	**13.1**				**####**	**###**	479.6	23755	1820	49.5	13.1	0	0	0	#DIV/0!	#DIV/0!				**######**	**######**	0	0	0	#DIV/0!	#DIV/0!
	tCBu	265.5	10952	747	**41.3**	**14.7**				**####**	**###**	265.5	10952	747	41.3	14.7	0	0	0	0.0	0.0				**######**	**######**	0	0	0	#DIV/0!	#DIV/0!

Approved Fertiliser application for the industry from 2011 2016

Type Canes Fertilized	Fertiliser	Rate of Application per hectare					
		2011	2012	2013	2014	2015	2016
Plant canes							
Flood Fallow	Sulphate of Ammonium	176	176	176	176	176	176
	Di-ammonium phosphate	59	59	59	59	59	59
	Muriate of Potash	118	118	118	118	118	118
Plough and Plant (LGRP Applied)	Sulphate of Ammonium	235	235	235	235	235	235
	Urea	59	59	59	59	59	59
	Di-ammonium phosphate	59	59	59	59	59	59
	Muriate of Potash	88	88	88	88	88	88
Plough and Plant (No LGRP Applied)	Sulphate of Ammonium	176	176	176	176	176	176
	Urea	59	59	59	59	59	59
	Di-ammonium phosphate	118	118	118	118	118	118
	Muriate of Potash	88	88	88	88	88	88
Ratoon Canes							
1R+	Sulphate of Ammonium	235	235	235	235	235	235
	Urea	118	118	118	118	118	118
	Muriate of Potash	***	***	***	***	***	***

****VB.* Muriate of Potash will be applied to all Plant and Ratoon crops with the exception of the following soils:

1.1 Whittaker # 37.

1.2 Tain # 9.

i. These soils, however, should receive 88 Kg Muriate of Potash on every even number ratoon crop

ii. Corentyne Series #11 & #12 Soils and Skeldon Series #13 soils of the new Skeldon development should be amended similarly to the Whittaker and Tain Series soils

N.B.

In 2012 there was an adjustment downwards for the SOA and MOP

Type Canes Fertilized	Fertiliser	2012	Adjusted 2012 rates	% of Orginal rate
Flood Fallow	Sulphate of Ammonium	176	126	-28
	Urea	0	25	
	Di-ammonium phosphate	59	59	0
	Muriate of Potash	118	0	-100
Plough and Plant (LGRP Applied)	Sulphate of Ammonium	235	101	-57
	Urea	59	82	39
	Di-ammonium phosphate	59	59	0
	Muriate of Potash	88	0	-100
Plough and Plant (No LGRP Applied)	Sulphate of Ammonium	176	95	-46
	Urea	S9	62	5
	Di-ammonium phosphate	118	118	0
	Muriate of Potash	88	0	-100
1R+	Sulphate of Ammonium	235	101	-57
	Urea	118	126	7
	Muriate of Potash	***	0	-100

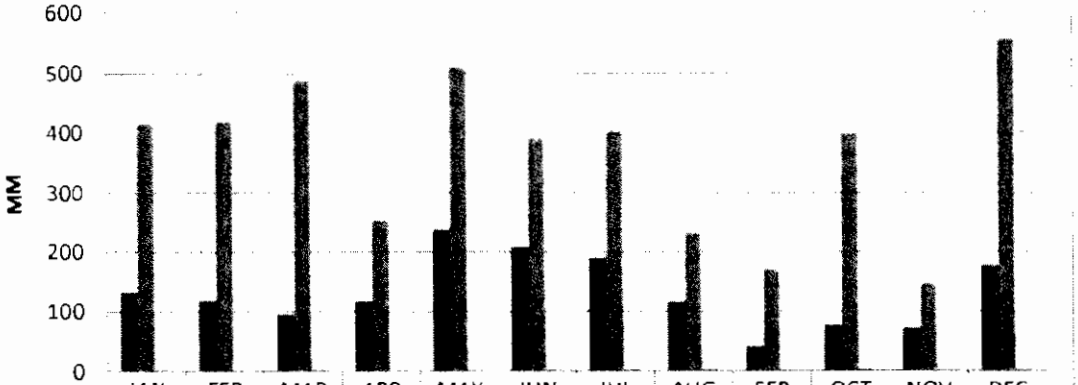
CROP DURATION FOR THE PERIOD 2002 TO 2015

	Estates		2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015
BERBICE	Skeldon	1st Crop	15	13	16	18	14	17	19	14	11	16	9	6	15	10
		2nd crop	16	19	23	21	22	23	12	16	20	19	19	17	21	
	Albion	1st Crop	14	12	16	13	13	16	21	13	11	22	13	8	11	13
		2nd crop	15	19	23	20	22	23	19	20	22	21	25	25	21	
	Rose Hall	1st Crop	14	12	14	14	12	16	18	12	8	18	13	8	11	11
		2nd crop	15	19	23	20	21	23	18	21	22	24	24	25	24	
	Blairmont	1st Crop	14	13	16	12	14	13	20	12	10	19	18	9	11	13
		2nd crop	16	18	22	22	19	24	16	20	22	20	23	22	21	
DEMERARA	Enmore	1st Crop	14	12	13	8	6	12	12	12	9	22	12	13	15	13
		2nd crop	13	17	19	18	20	20	18	18	21	22	21	21	22	
	L.B.I	1st Crop	14	12	14	8	8	12	12	11	11	18	10	13	15	11
		2nd crop	13	18	19	19	23	22	18	17	22	22	18	19	18	
	Wales	1st Crop	12	11	14	8	7	10	11	12	9	19	11	13	13	12
		2nd crop	12	18	18	16	17	16	18	18	20	18	14	20	17	
	Uitvlugt	1st Crop	16	13	16	9	10	10	11	10	7	20	13	13	12	15
		2nd crop	13	18	21	19	21	17	15	19	19	20	21	23	15	

Appendix 5

Historical Rainfall and Climate

SKELDON ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014

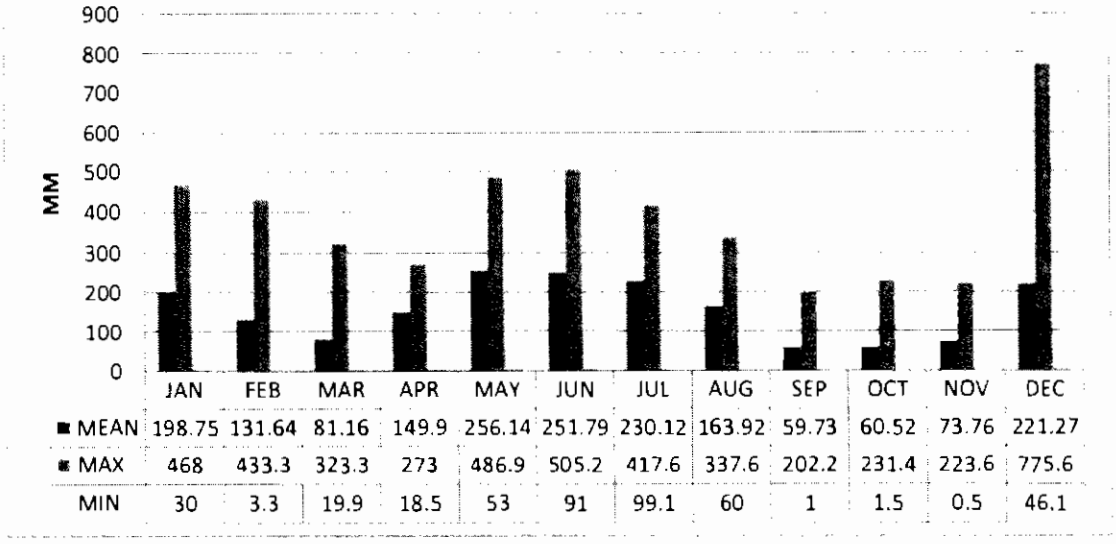


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	132.04	117.04	94.87	117.2	237.95	208.63	190.32	115.88	41.82	78.17	72.21	177.26
MAX	415	418.2	486.9	254.1	511.6	389.6	402.3	232.3	170.7	396.9	147.2	558.6
MIN	20.5	2	22	27.7	42.7	92.2	81	23.5	1.3	7.2	14.2	60.2

Summary of wet months SKELDON ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	45%	25%	15%
February	50%	30%	15%
March	20%	10%	5%
April	60%	25%	10%
May	95%	85%	65%
June	95%	80%	45%
July	95%	70%	35%
August	55%	30%	5%
September	5%	5%	0%
October	20%	5%	0%
November	30%	0%	0%
December	65%	45%	25%

ALBION ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014

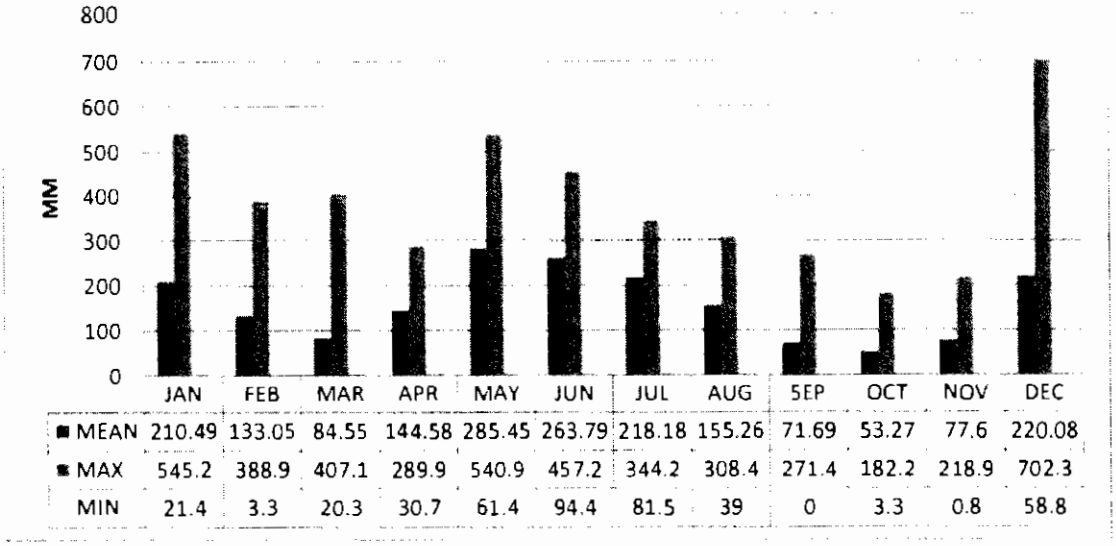


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	198.75	131.64	81.16	149.9	256.14	251.79	230.12	163.92	59.73	60.52	73.76	221.27
MAX	468	433.3	323.3	273	486.9	505.2	417.6	337.6	202.2	231.4	223.6	775.6
MIN	30	3.3	19.9	18.5	53	91	99.1	60	1	1.5	0.5	46.1

Summary of wet months ALBION ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	70%	60%	40%
February	45%	35%	25%
March	25%	10%	5%
April	60%	55%	45%
May	90%	75%	65%
June	90%	85%	65%
July	95%	80%	70%
August	70%	55%	30%
September	15%	5%	5%
October	20%	5%	5%
November	30%	15%	5%
December	75%	50%	35%

ROSEHALL ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014

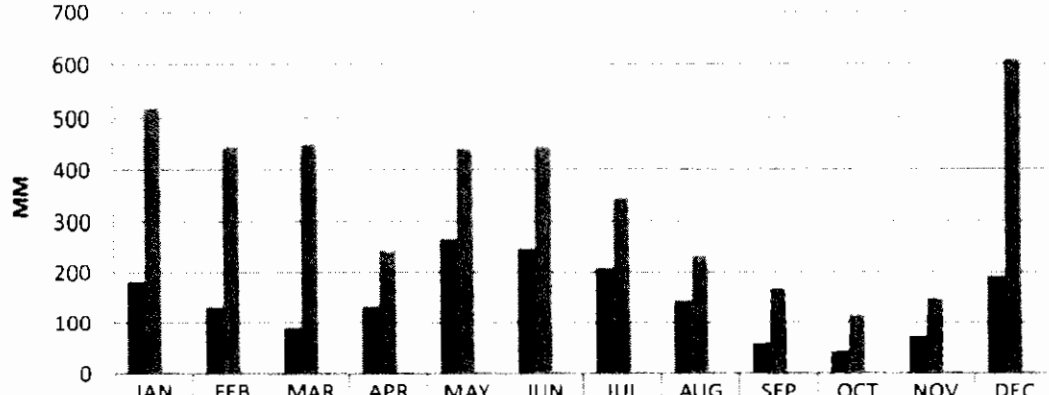


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	210.49	133.05	84.55	144.58	285.45	263.79	218.18	155.26	71.69	53.27	77.6	220.08
MAX	545.2	388.9	407.1	289.9	540.9	457.2	344.2	308.4	271.4	182.2	218.9	702.3
MIN	21.4	3.3	20.3	30.7	61.4	94.4	81.5	39	0	3.3	0.8	58.8

Summary of wet months ROSEHALL ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	75%	55%	40%
February	45%	35%	30%
March	15%	5%	5%
April	60%	55%	30%
May	90%	90%	75%
June	95%	80%	65%
July	90%	75%	50%
August	65%	50%	30%
September	25%	15%	10%
October	15%	5%	0%
November	35%	10%	5%
December	80%	55%	35%

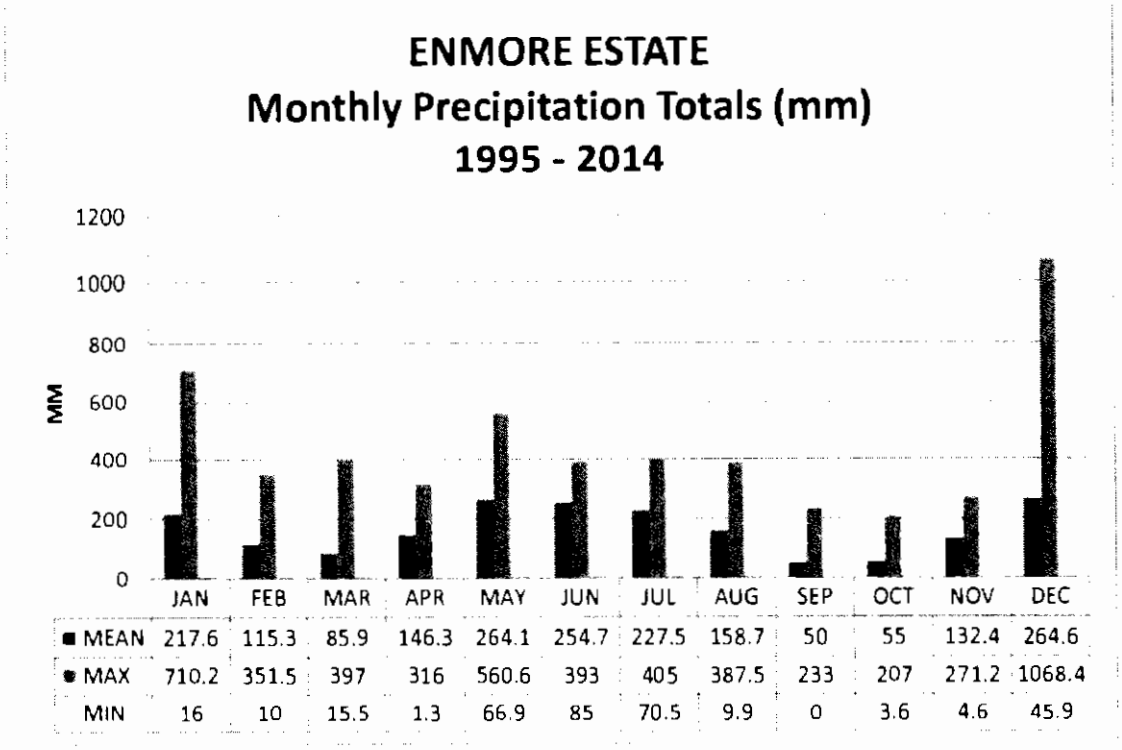
BLAIRMONT ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014



	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	182.1	133.3	90.3	134.1	266.6	247.3	207.9	145.9	58.7	41.4	70.8	191.5
MAX	520.6	446.7	450.3	243.8	442.7	446.3	345.8	232.5	168.8	117.5	150	609.3
MIN	18	6.6	11.7	24.3	49.5	107.2	97.3	33.2	5.1	5.6	8.1	45

Summary of wet months BLARIMONT ESTATE 1995 -2014

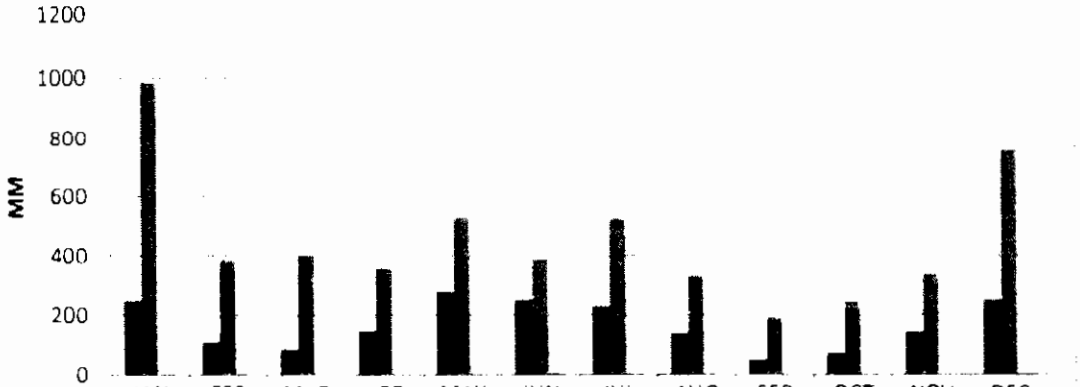
Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	65%	50%	30%
February	40%	30%	25%
March	30%	15%	5%
April	60%	50%	20%
May	90%	90%	60%
June	100%	95%	65%
July	95%	80%	45%
August	80%	60%	10%
September	15%	10%	0%
October	5%	0%	0%
November	25%	5%	0%
December	70%	55%	30%



Summary of wet months ENMORE ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	65%	55%	50%
February	40%	30%	20%
March	25%	10%	10%
April	70%	45%	20%
May	85%	80%	75%
June	95%	95%	70%
July	90%	80%	60%
August	80%	65%	20%
September	10%	5%	5%
October	10%	5%	5%
November	60%	40%	25%
December	70%	65%	50%

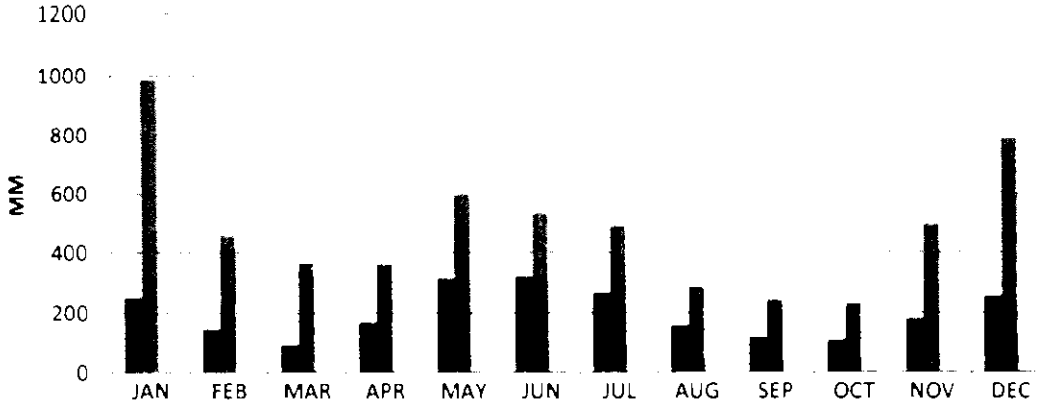
L.B.I. ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014



Summary of wet months L.B.I. ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	70%	65%	55%
February	35%	25%	15%
March	20%	10%	10%
April	65%	40%	30%
May	90%	80%	75%
June	95%	75%	65%
July	100%	80%	55%
August	70%	40%	15%
September	20%	5%	5%
October	25%	10%	10%
November	70%	50%	25%
December	80%	65%	50%

WALES ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014

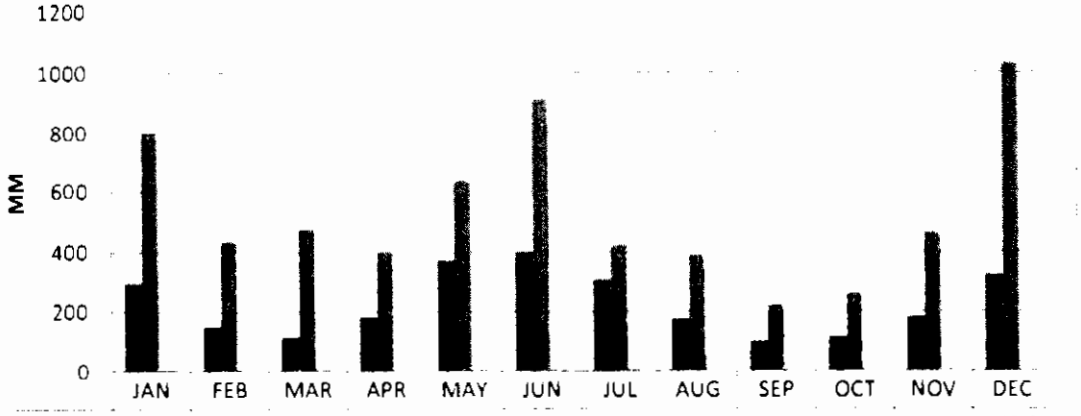


	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
MEAN	254	145.3	91.9	167.7	315.4	322.3	269.2	158.3	118.8	110.4	179.3	258.7
MAX	989	463.7	367	364	601.9	536.4	493.2	292.6	246.7	235	498.7	787.2
MIN	27.9	6.9	13.7	12.2	64.3	115.6	89.9	46.5	31.5	35	43.6	63

Summary of wet months WALES ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	70%	60%	40%
February	45%	40%	25%
March	30%	15%	10%
April	65%	55%	40%
May	95%	90%	80%
June	100%	95%	90%
July	95%	90%	75%
August	75%	65%	15%
September	55%	25%	5%
October	4%	20%	15%
November	75%	50%	45%
December	80%	65%	50%

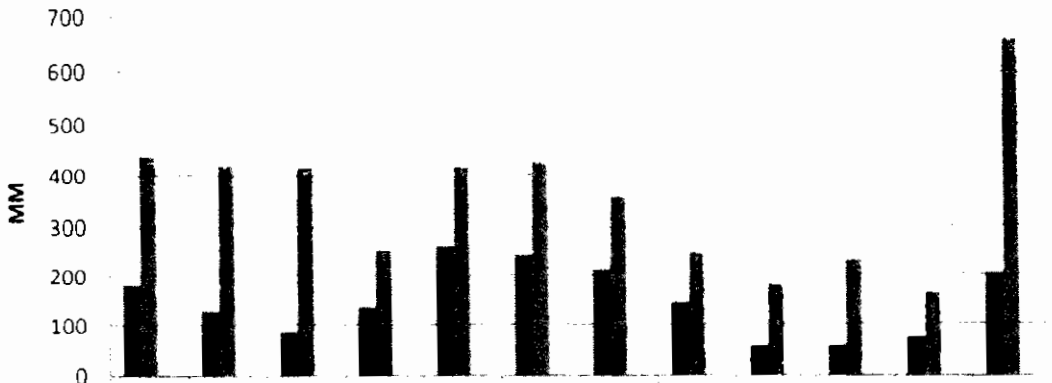
UITVLUGT ESTATE
Monthly Precipitation Totals (mm)
1995 - 2014



Summary of wet months UITVLUGT ESTATE 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	80%	65%	55%
February	50%	40%	30%
March	50%	25%	15%
April	70%	60%	45%
May	95%	95%	85%
June	100%	95%	80%
July	100%	100%	90%
August	80%	45%	40%
September	40%	15%	5%
October	50%	30%	10%
November	70%	55%	30%
December	85%	75%	75%

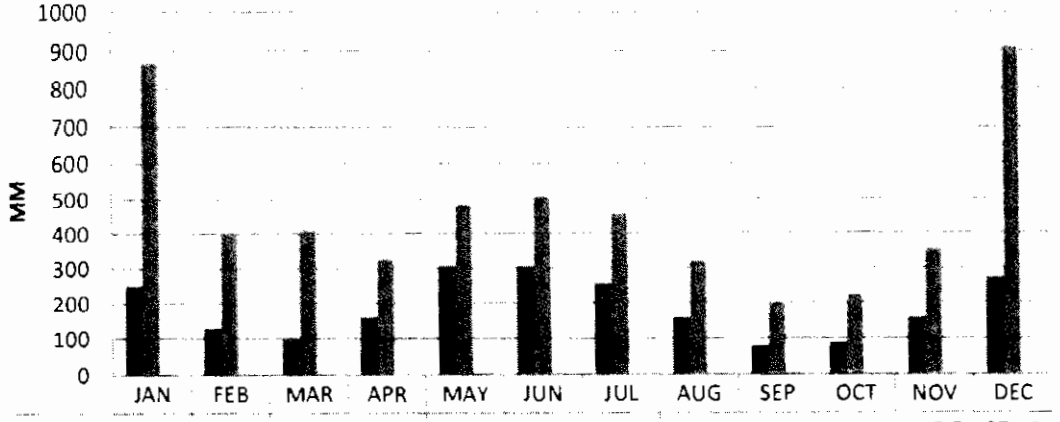
BERBICE ESTATES
Monthly Precipitation Totals (mm)
1995 - 2014



Summary of wet months BERBICE ESTATES 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	70%	55%	35%
February	40%	35%	20%
March	20%	10%	5%
April	60%	60%	25%
May	90%	85%	75%
June	100%	85%	70%
July	100%	80%	50%
August	70%	50%	15%
September	15%	10%	0%
October	5%	5%	5%
November	25%	5%	0%
December	80%	50%	25%

DEMERARA ESTATES
Monthly Precipitation Totals (mm)
1995 - 2014



Summary of wet months DEMERARA ESTATES 1995 -2014

Month	% Incidence > 100 mm	% Incidence > 150 mm	% incidence > 200 mm
January	70%	60%	50%
February	45%	30%	20%
March	35%	10%	10%
April	70%	55%	35%
May	95%	90%	85%
June	100%	95%	85%
July	100%	95%	85%
August	80%	50%	25%
September	25%	5%	5%
October	30%	15%	5%
November	70%	50%	25%
December	80%	70%	65%

GUYSUCO AGRICULTURE RESEARCH CENTRE
RAINFALL (IN MM)

BERBICE

#	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
35	1990	373.2	123.1	216.6	357.0	231.1	249.6	224.9	215.3	34.9	33.6	109.5	339.4	2508.2
36	1991	104.0	33.4	71.8	226.7	100.0	306.1	279.5	235.2	138.5	58.9	52.8	181.9	1788.8
37	1992	62.7	118.5	42.8	48.4	216.2	147.5	197.6	145.2	21.2	40.2	52.5	88.7	1181.5
38	1993	189.2	101.5	209.8	62.6	136.0	241.1	102.6	133.7	105.7	76.1	233.9	132.0	1724.1
39	1994	110.0	52.6	184.5	79.0	217.8	184.5	253.6	117.4	58.9	160.2	93.9	143.8	1656.1
40	1995	54.2	18.9	76.4	37.4	282.9	377.3	202.6	135.9	13.9	32.9	79.5	164.5	1476.1
41	1996	279.3	271.9	50.9	56.0	256.2	427.4	359.0	127.3	37.6	13.2	73.4	62.9	2014.9
42	1997	240.2	196.5	49.4	59.8	188.7	120.6	106.3	60.0	5.3	10.5	10.5	67.1	1114.8
43	1998	43.8	4.6	41.0	171.8	200.4	286.2	146.1	185.5	71.8	48.3	135.1	163.8	1498.1
44	1999	149.9	88.6	92.7	184.6	87.0	238.4	231.3	173.7	29.5	80.7	17.9	312.8	1687.0
45	2000	441.0	123.8	95.8	151.5	369.8	330.8	187.0	162.3	47.8	18.5	103.8	111.8	2143.5
46	2001	42.8	19.3	34.8	62.3	196.2	303.5	183.5	89.8	182.4	35.4	54.2	72.8	1276.7
47	2002	170.1	50.9	96.3	202.4	273.4	294.2	107.2	84.3	36.7	39.6	74.7	123.6	1553.2
48	2003	28.1	43.7	27.6	44.1	286.1	200.4	242.3	98.0	73.5	51.0	66.7	137.1	1298.4
49	2004	169.4	43.4	84.4	220.5	343.1	185.9	235.6	105.6	154.5	58.2	14.9	155.5	1771.0
50	2005	368.6	175.0	38.8	202.9	252.7	140.8	195.0	186.1	77.5	27.8	129.8	400.9	2195.8
51	2006	415.4	92.1	76.6	25.3	352.9	311.0	135.2	68.5	67.5	79.9	96.1	124.4	1844.6
52	2007	119.5	62.5	158.7	226.4	343.1	282.0	261.8	237.5	102.3	70.2	48.9	402.7	2315.5
53	2008	181.0	421.8	118.4	197.4	278.2	259.8	170.4	135.2	78.3	87.9	30.4	661.5	2620.2
54	2009	224.9	79.4	123.2	166.6	52.3	161.8	195.5	45.9	15.4	85.2	19.7	63.9	1233.7
55	2010	61.8	68.0	51.7	167.2	265.9	149.7	271.6	249.5	60.5	69.6	115.3	191.7	1722.4
56	2011	113.0	260.0	416.9	58.3	241.9	206.9	187.9	157.7	25.8	232.3	50.3	144.2	2095.0
57	2012	363.6	292.5	41.4	253.3	418.6	126.3	296.6	182.7	9.5	13.0	166.1	190.8	2354.2
58	2013	38.5	167.4	32.2	171.0	397.0	223.4	274.3	186.1	46.2	65.7	98.4	367.2	2067.2
59	2014	112.0	97.1	47.2	70.2	144.7	231.2	244.1	233.3	23.9	47.1	86.7	131.2	1468.6
	mean	180.8	128.9	87.7	136.4	261.5	242.9	211.6	145.2	58.0	58.3	73.6	202.5	
	max	441.0	421.8	416.9	253.3	418.6	427.4	359.0	249.5	182.4	232.3	166.1	661.5	
	min	28.1	4.6	27.6	25.3	52.3	120.6	106.3	45.9	5.3	10.5	10.5	62.9	
60	2015													
	59 YEAR MEAN	**75.5**	**51.0**	**42.0**	**59.4**	**103.9**	**101.5**	**89.7**	**63.6**	**25.7**	**26.0**	**34.1**	**83.7**	**756.1**

GUYSUCO AGRICULTURE RESEARCH CENTRE
RAINFALL (IN MM)

DEMERARA

#	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
35	1990	240.8	119.0	206.0	117.5	414.2	312.9	375.3	331.6	211.8	139.1	222.3	542.9	3233.3
36	1991	199.9	49.3	10.1	44.4	337.8	236.9	248.2	66.6	24.9	91.5	95.5	246.8	1651.6
37	1992	62.2	121.4	101.3	416.6	163.5	340.8	91.8	138.3	25.9	85.3	13.5	83.4	1644.0
38	1993	121.1	79.3	34.4	75.1	88.8	490.0	291.5	215.8	54.7	98.9	212.3	278.7	2040.5
39	1994	139.8	52.9	40.6	188.2	317.3	299.7	271.9	226.5	22.2	76.1	131.2	247.0	2013.1
40	1995	109.1	53.6	19.3	5.5	156.8	345.8	220.7	192.3	85.9	48.0	134.8	132.1	1503.9
41	1996	98.7	31.4	58.2	69.6	275.3	348.2	259.0	201.6	38.9	26.8	177.8	98.1	1683.6
42	1997	449.0	154.9	86.1	103.1	359.1	290.3	303.4	104.6	21.6	15.3	81.8	140.5	2109.7
43	1998	42.1	21.1	28.6	96.6	103.3	428.5	292.7	196.6	52.8	77.8	97.0	618.0	2055.0
44	1999	205.9	69.8	47.8	24.6	553.5	313.9	195.2	98.1	30.0	66.2	86.0	87.6	1778.5
45	2000	57.9	12.3	87.4	59.5	204.7	325.4	343.4	156.9	137.3	71.4	79.4	385.3	1920.8
46	2001	270.2	45.3	119.3	194.3	607.3	431.4	440.2	199.0	123.5	25.3	258.3	247.0	2960.8
47	2002	161.9	248.2	166.5	251.7	230.6	449.3	267.7	68.7	125.8	88.6	274.4	164.5	2498.0
48	2003	282.3	135.8	23.2	142.3	459.9	214.8	215.2	224.4	41.0	70.2	62.4	200.6	2071.8
49	2004	378.7	98.6	91.4	239.9	292.0	283.0	436.8	268.8	94.5	73.3	331.1	203.4	2791.4
50	2005	172.9	75.8	96.9	141.0	417.4	512.2	320.4	344.7	109.8	140.9	275.1	397.1	3004.1
51	2006	303.7	140.6	202.9	430.5	484.2	316.8	193.7	131.8	98.5	155.2	326.0	96.7	2880.5
52	2007	56.3	17.3	25.7	103.1	167.0	359.4	274.2	273.9	320.3	351.0	294.9	821.0	3064.0
53	2008	337.9	110.4	182.3	114.9	68.8	391.3	343.2	196.9	167.7	152.7	135.8	210.9	2412.6
54	2009	271.3	66.0	64.1	126.3	362.6	377.8	382.1	224.5	113.2	123.8	229.0	488.3	2828.9
55	2010	506.1	413.1	221.1	208.9	406.6	506.7	190.3	86.0	39.7	4.6	201.1	228.4	3012.5
56	2011	68.4	38.4	38.1	168.5	330.4	289.1	312.6	97.7	122.8	89.2	114.5	148.7	1818.3
57	2012	179.0	28.5	19.6	79.8	456.8	307.9	288.3	365.1	89.1	94.3	114.5	196.5	2219.1
58	2013	122.1	16.8	243.7	190.9	379.9	319.1	317.3	185.5	89.5	94.7	89.7	255.3	2304.3
59	2014	82.1	13.0	156.6	130.9	244.8	309.7	291.1	130.9	63.4	155.6	358.6	267.7	2204.2
	mean	207.8	89.5	98.9	144.1	328.1	356.0	294.4	187.4	98.3	96.2	186.1	269.4	
	max	506.1	413.1	243.7	430.5	607.3	512.2	440.2	365.1	320.3	351.0	358.6	821.0	
	min	42.1	12.3	19.3	5.5	68.8	214.8	190.3	68.7	21.6	4.6	62.4	87.6	
60	2015													
	59 YEAR MEAN	**83.4**	**1.1**	**28.9**	**286.4**	**50.3**	**67.3**	**29.3**	**15.3**	**7.9**	**18.5**	**69.4**	**43.6**	**160.9**

GUYSUCO AGRICULTURE RESEARCH CENTRE
RAINFALL (IN MM)

INDUSTRY

#	YEAR	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEPT	OCT	NOV	DEC	TOTAL
35	1990	272.0	110.5	155.4	96.7	360.9	284.0	285.2	325.9	183.8	116.2	203.9	472.6	2867.1
36	1991	187.1	58.6	30.3	36.4	277.0	248.1	188.1	60.6	20.7	101.3	70.5	204.2	1482.6
37	1992	94.3	115.9	113.8	419.4	185.5	328.0	114.3	153.6	16.9	63.1	12.3	92.7	1709.8
38	1993	122.7	88.0	60.6	96.2	88.8	404.3	345.1	172.3	37.0	100.9	203.0	194.5	1913.3
39	1994	140.5	79.8	37.2	211.6	309.7	245.4	321.6	206.0	15.1	90.1	119.4	225.2	2001.6
40	1995	80.5	48.1	16.2	6.5	163.0	338.4	316.1	189.5	62.9	51.0	111.9	138.9	1522.9
41	1996	97.2	45.5	99.8	89.6	300.4	370.1	268.4	212.9	40.4	28.4	170.7	130.5	1853.9
42	1997	322.2	191.4	97.4	94.3	333.5	258.3	277.9	74.2	17.4	19.4	84.3	131.3	1901.5
43	1998	36.5	25.7	33.7	68.2	128.8	398.7	266.5	198.5	39.9	72.6	83.3	522.3	1874.6
44	1999	204.9	54.9	65.0	22.8	476.0	279.8	157.2	131.1	49.1	60.6	71.1	77.1	1649.4
45	2000	81.4	38.2	78.7	74.1	173.9	307.4	302.1	179.1	90.1	70.1	76.0	310.4	1781.5
46	2001	284.8	54.0	112.5	220.4	437.4	351.2	352.2	206.7	87.0	25.1	173.2	243.7	2548.3
47	2002	236.2	221.3	149.5	216.8	222.3	366.4	228.8	63.8	99.0	59.0	189.1	111.8	2164.0
48	2003	268.4	105.3	38.9	195.8	415.2	234.3	193.2	227.1	49.4	82.5	36.7	172.5	2019.2
49	2004	347.4	122.5	76.4	203.7	302.9	260.8	377.1	242.0	80.7	64.5	279.8	188.6	2546.5
50	2005	175.6	87.5	112.4	164.1	358.9	425.0	248.0	347.9	88.8	127.3	178.8	273.3	2587.5
51	2006	266.6	115.0	203.5	420.0	408.0	292.7	203.8	122.8	80.3	99.7	209.5	85.6	2507.4
52	2007	54.8	14.8	38.7	73.4	222.5	304.1	251.2	254.6	309.8	219.8	189.8	617.6	2550.9
53	2008	306.0	107.3	146.2	121.6	64.1	366.5	296.6	146.3	162.0	124.3	94.5	189.8	2125.2
54	2009	285.5	110.2	51.6	91.6	265.4	384.3	344.9	209.5	95.6	80.8	188.8	418.3	2526.4
55	2010	467.3	351.0	216.2	197.2	364.0	358.2	153.8	62.0	28.4	6.8	131.9	235.1	2571.9
56	2011	64.2	86.1	68.8	123.8	248.0	249.0	266.7	84.3	94.1	63.6	72.3	173.7	1594.5
57	2012	159.2	34.7	17.3	84.5	316.5	263.1	229.9	333.8	77.1	82.9	91.3	149.5	1839.8
58	2013	107.1	21.3	256.9	225.1	339.8	295.8	315.8	144.1	84.5	78.0	77.4	240.9	2186.5
59	2014	75.6	11.1	126.8	149.8	209.4	234.8	265.8	105.6	52.5	110.1	251.6	221.5	1814.6
	mean	196.1	92.3	100.3	142.1	287.5	316.9	265.8	176.8	84.4	76.3	138.1	231.6	
	max	467.3	351.0	256.9	420.0	476.0	425.0	377.1	347.9	309.8	219.8	279.8	617.6	
	min	36.5	11.1	16.2	6.5	64.1	234.3	153.8	62.0	17.4	6.8	36.7	77.1	
60	2015													
	59 YEAR MEAN	**80.3**	**1.1**	**31.8**	**332.5**	**55.0**	**52.4**	**31.4**	**19.0**	**7.4**	**18.9**	**64.2**	**52.9**	**207.2**

Appendix 6

Tillage, Planting and Machine Utilization

Hectares under Cultivation as At June 30th 2015							
Estate	tilled	Non - tilled	TAB	Total Out C	In Cane	total ha	% Out Of Cane
SWR	251.3	668.8	0	920.1	7982.5	8902.6	10%
AN	134.2	185.5	0	319.7	9296.3	9616	3%
RH	108.9	84.2	0	193.1	6495.4	6688.5	3%
BCF	5.3	19.4	0	24.7	5783.4	5808.1	0%
Ber	**499.7**	**957.9**	**0**	**1457.6**	**29557.6**	**31015.2**	**5%**
EHP	179.3	196.6	0	375.9	4317.2	4693.1	8%
LBI	72.3	172.3	0	244.6	2744.2	2988.8	8%
GV	109	421	0	530	2826.1	3356.1	16%
ICBu	97.4	533.9	44.7	676	3958.2	4634.2	15%
Dem	**458**	**1323.8**	**44.7**	**1826.5**	**13845.7**	**15672.2**	**12%**
Ind	**957.7**	**2281.7**	**44.7**	**3284.1**	**43403.3**	**46687.4**	**7%**

Estates	Flood Fallow			Plough and Plant		
	Fields	HA	TCH	Fields	HA	TCH
Skeldon	0	0	0	80/119 - 121	8.7	89.77
				80/41	2.6	111.15
				BK12/19 - 21	15.9	44.59
				BK15/1 - 24	145	41.15
				BK16/1 - 25	157.7	52.06
				BK9/1 - 9, 23	72.9	47.65
				MRP2 3/1	8	75.88
				MRP3A 3/7 - 8	9.8	26.22
				MRP4A 4/1 - 7 + 10 - 11	53.4	59.25
				NSG/9 - 23	68.6	62.16
	TOTAL	[illegible]	[illegible]	TOTAL	542.7	51.79
Albion	Hamp 61	4.67	76.08	TainOG 42-31	78.9	89.50
	Hamp 62	5.3	76.28	TainLDE 1-8	33.2	84.42
	Hamp 63	5.3	75.74	ResOG 8-9	8.7	89.61
	Hamp 64	5.3	77.02	AnkEW 31-47	55.1	70.11
	Hamp 65	5.3	76.18	PME 43-50	50.6	94.74
	Hamp 66	5.3	77.66	R/Hall 1A-4	23.4	90.01
	Hamp 67	5.3	75.85	Hamp 75-88	67.6	83.93
	Hamp 68	5.23	74.54	Belvd 75-77	18.7	96.97
	Hamp 69	5.23	76.24	Hamp A1-F	40.3	81.30
	Hamp 70	5.23	78.67	Belvd A1-2	12	85.34
	Hamp 71	4.93	77.34	ELC 1	3.5	92.90
	Hamp 72	4.93	79.75	ELE 1-19	115.4	81.14
	Hamp 73	4.93	75.31	Long John 15-20	9.5	88.78
	Hamp 74	4.93	78.69			
	RH (AN) 8	8.9	82.7			
	RH (AN) 7	8.1	99.15			
	RH (AN) 6	8	83.87			
	RH (AN) 5	7.9	88.62			
	Nigg 38	5.4	80.43			
	Nigg 37	5.31	86.06			
	Nigg 36	4.76	108.14			
	Nigg 35	4.93	114.46			
	Nigg 34	4.93	99.61			
	Nigg 33	3.31	83.82			
	Nigg 32	5.27	95.25			
	Tota	138.69	84.15	TOTAL	516.9	84.59
	FF 23	2.6	79.64	Rel 30-37	28.6	59.32
	FF 25	3.5	70.61	Ent A 10-13	18.1	76.45

Rose Hall	FF 27	3.6	74	Maz G 1-21	81.6	65
	FF 29	2.5	68.68	MazH 19	4.1	73.34
	FF 31	2.5	74.36	Owg W 12, 14 pt- 17 pt, 18	23.7	70.86
	FF 33	3.9	72.72	Maz C 6, 12-16	33.9	67.44
	FF 35	3.4	93.43	EntA 31bl- 37	25.8	79.97
				L26B 6- 20	21	68.84
				Owg W 45-53	24.7	77.6
	Total	22	76.34	Total	261.5	69.12
Blairmont	0	0	0	BHP 9-19	83	82.15
				RS 1-9	46.9	101.90
				RS 11-14C	22.3	98.95
				RS 16-17B	9.9	107.87
				BK 31A-39	43.2	73.24
				JWCB 1-11	37.5	86.05
				OL 17-22	29.6	109.06
				BHL 2-10	52.8	90.30
				RP 21-29	70.4	80.45
				ML 7-8	11.7	91.38
				ML 12A	4.2	85.95
	Total	0	0	Total	411.5	88.34
EHP		0	0	ENTW 32-38	23.2	65.04
				ENTW 40-58	45.6	66.18
				NPE 59-65	22.4	80.71
	Total	0	0	Total	91.2	69.46

Actual Tillage & Planting 2001 - 2015

		First Crop			Second Crop			Year		
Year	Estate	Tillage			Tillage			Tillage		
		Budget	Actual	Variance	Budget	Actual	Variance	Budget	Actual	Variance
2001	SWR		867.2			698.4		0	1565.6	
	AN		1232.6			1112.8		0	2345.4	
	RH		821.8			1296		0	2097.8	
	BCF		983.6			668.3		0	1651.9	
	BER		**3756.2**			**3775.5**		**0**	**7530.7**	
	EHP		510.6			558.9		0	1065.5	
	LBI		531.4			761.5		0	1292.9	
	GV		466.7			409.7		0	876.4	
	ICBU		576.7			656.1		0	1232.8	
	DEM		**2085.4**			**2386.2**		**0**	**4471.6**	
	IND		**5648.6**			**6161.7**		**0**	**12062.3**	
2002	SWR		330.8			857.1			1187.9	
	AN		486.6			1244.3			1730.9	
	RH		320.6			1037.3			1357.9	
	BCF		171.1			846.3			1017.4	
	BER		**1309.1**			**3985**			**5294.1**	
	EHP		272.7			665			937.7	
	LBI		307.9			889			1196.9	
	GV		268			505.1			773.1	
	ICBU		395.1			680.4			1075.5	
	DEM		**1243.7**			**2739.5**			**3983.2**	
	IND		**2552.8**			**6724.5**			**9277.3**	
2003	SWR		142.7			451.6			1192.3	
	AN		728.3			769.5			1497.8	
	RH		579.8			759.9			1338.7	
	BCF		513.9			692.1			1356	
	BER		**2721.7**			**2663.1**			**5384.8**	
	EHP		513.3			617.5			1130.8	
	LBI		615.9			602.5			1218.4	
	GV		402.2			242.5			644.7	
	ICBU		552.8			393			945.8	
	DEM		**2084.2**			**1655.5**			**3639.7**	
	IND		**4805.9**			**4516.6**			**8324.5**	
2004	SWR		230.1			576.7			806.8	
	AN		292.8			1105.5			1398.3	
	RH		352.6			554.2			906.8	
	BCF		330.4			686.2			1016.6	
	BER		**1205.9**			**2922.6**			**4128.5**	
	EHP		472			641.2			1113.2	
	LBI		312.5			904.3			1216.8	
	GV		192.6			497.5			690.1	
	ICBU		324.5			797.5			1122	
	DEM		**1301.6**			**2840.5**			**4142.1**	
	IND		**2507.5**			**5763.1**			**8276.6**	
2005	SWR		69.4			822.4			891.8	
	AN		287.5			1482.7			1770.2	
	RH		109.7			882.3			992	
	BCF		129.1			750.1			879.2	
	BER		**596**			**3737.5**			**4333.6**	
	EHP		244.9			700.8			945.7	
	LBI		121.5			742.5			864.1	
	GV		187.3			315.3			502.5	
	ICBU		267.3			724.1			991.4	
	DEM		**621.1**			**2482.7**			**3303.6**	
	IND		**1417.1**			**6220.2**			**7637.3**	
2006	SWR		422.1			643.8			1065.9	
	AN		646.6			1305.2			1951.8	
	RH		477.7			1157.4			1635.1	
	BCF		492.2			459.4			951.6	
	BER		**2030.6**			**3565.8**			**5604.4**	
	EHP		381.7			365.8			747.5	
	LBI		326.6			255.2			581.8	
	GV		354.2			394.2			748.4	
	ICBU		478.9			165.2			644.1	
	DEM		**1841.4**			**1186.4**			**2721.8**	
	IND		**3680**			**4746.2**			**8326.2**	

Actual Tillage & Planting 2001 - 2015

		First Crop			Second Crop			Year		
Year	Estate	Tillage			Tillage			Tillage		
2007	SWR	0			433.7			433.7		
	AN	395.7			661.8			1057.5		
	RH	249.9			703.8			953.7		
	BCF	95.1			281.6			376.7		
	BER	**740.7**			**2080.9**			**2821.6**		
	EHP	456.5			546.2			1003.7		
	LB	471.1			499.1			970.2		
	GV	352.4			574.6			927		
	ICBU	450.6			473.3			923.9		
	DEM	**1729.6**			**2095.2**			**3824.8**		
	IND	**2470.3**			**4175.1**			**6646.4**		
2008	SWR	26.8			184.7			211.5		
	AN	394.4			1160.1			1554.5		
	RH	275.4			697.4			972.8		
	BCF	127.4			606.2			733.6		
	BER	**524**			**2648.4**			**3472.4**		
	EHP	304			544.7			848.7		
	LBI	231.3			462.4			693.7		
	GV	254.5			358.7			613.2		
	ICBU	234.2			714.7			948.9		
	DEM	**1024**			**2080.5**			**3104.5**		
	IND	**1848**			**4728.8**			**6576.9**		
2009	SWR	1237	214.1	-1022.9	2387	2127.9	-259.1	4134	2342	-1792
	AN	734	294.8	-439.2	1102	1385.1	283.1	1836	1679.9	-156.1
	RH	554.1	152.9	-401.2	1050	909.8	-140.2	1604.1	1062.7	-541.4
	BCF	619.9	154.1	-465.8	736.3	917.8	181.5	1356.2	1071.9	-284.3
	BER	**3645**	**815.9**	**-2829.1**	**5286.3**	**5340.6**	**65.3**	**8930.3**	**6156.5**	**-2773.8**
2009	EHP	350.2	147.6	-202.6	476	739.7	263.7	826.2	887.3	61.1
	LBI	455.7	129.6	-326.2	657	622.1	-33.9	1112.7	752.6	-360.1
	GV	351.4	203.3	-148.1	341.9	584.8	242.9	693.3	788.1	94.8
	ICBU	400	341.3	-58.7	700	483.6	-216.4	1100	824.9	-275.1
	DEM	**1557.3**	**821.7**	**-735.6**	**2174.9**	**2431.2**	**256.3**	**3732.2**	**3252.9**	**-479.3**
	IND	**5202.3**	**1637.6**	**-3564.7**	**7460.2**	**7771.8**	**311.5**	**12662.5**	**8489.4**	**-3253.1**
2010	SWR	1998	1312.4	-685.6	2901.1	1091.3	-1809.8	4899.1	2403.7	-2495.4
	AN	928	884.9	-43.1	1407.2	730.2	-677	2335.2	1615.1	-720.1
	RH	668	646.6	-21.4	1004	391.5	-612.5	1672	1038.1	-633.9
	BCF	514	316.7	-197.3	838	541.4	-296.6	1452	1258.1	-193.9
	BER	**4208**	**3560.6**	**-647.4**	**6150.3**	**2754.4**	**-3395.9**	**10358.3**	**6315**	**-4043.3**
2010	EHP	461.3	233.5	-227.8	956.1	341.4	-614.7	1417.4	574.9	-842.5
	LBI	378	155	-223	861.6	218.1	-643.5	1239.6	373.1	-866.5
	GV	352	386.5	33.5	467	167.4	-319.6	839	552.9	-286.1
	ICBU	554	503.3	-50.7	831	159.2	-671.8	1385	662.5	-722.5
	DEM	**1745.3**	**1277.3**	**-468**	**3135.7**	**886.1**	**-2249.6**	**4881**	**2143.4**	**-2717.6**
	IND	**5553.3**	**4837.9**	**-1115.4**	**5288**	**3848.8**	**-6645.5**	**15235.3**	**8475.4**	**-6758.5**
2011	SWR	2370.5	280.6	-2089.9	2105	679.9	-1425.1	4475.5	960.5	-3515
	AN	953.8	914.1	-39.7	1455.2	1051	-404.2	2409	1965.1	-443.9
	RH	670	470.8	-199.2	1008	785.9	-222.1	1678	1256.7	-421.3
	BCF	612	320.7	-291.3	840	676.7	-163.3	1452	997.4	-454.6
	BER	**4606.3**	**1986.2**	**-2620.1**	**8485.2**	**3193.5**	**-2214.7**	**10014.5**	**5179.7**	**-4834.8**
2011	EHP	663.8	291.4	-372.4	499.8	292.6	-207.2	1163.6	584	-579.6
	LBI	380	196.5	-183.5	584.5	159.3	-425.2	964.5	355.8	-608.7
	GV	353	299.5	-53.5	487	201.4	-285.6	840	500.9	-339.1
	ICBU	568	475.3	-92.7	798.4	554.4	-244	1366.4	1029.7	-336.7
	DEM	**1964.6**	**1262.7**	**-702.1**	**2359.7**	**1287.7**	**-1182**	**4334.5**	**2470.4**	**-1864.1**
	IND	**6571.1**	**3248.6**	**-3322.2**	**7777.9**	**4401.2**	**-3375.7**	**14349**	**7650.1**	**-6698.6**
2012	SWR	1755.3	126.4	-1628.9	2684.6	1238.4	-1446.2	4439.6	1364.8	-3074.8
	AN	941	196.9	-744.1	1592	1279.7	-312.3	2533	1476.6	-1056.4
	RH	670	126.2	-543.8	1002	721.9	-280.1	1672	848.1	-823.9
	BCF	612	82	-530	840	636.8	-203.2	1452	698.8	-753.2
	BER	**3975.3**	**511.5**	**-3466.5**	**6118.3**	**3576.8**	**-2241.5**	**10096.6**	**4388.3**	**-5708.3**
2012	EHP	516.2	132.9	-383.3	698.9	598.7	-100.2	1215.1	731.5	-483.5
	LBI	297	95.4	-201.6	446	326	-120	743	421.4	-321.6
	GV	326	252.4	-73.6	514	431.8	-81.2	839	684.2	-154.8
	ICBU	601	195.5	-405.5	900	364.7	-535.3	1501	560.2	-940.8
	DEM	**1740.2**	**575.2**	**-1064**	**2557.9**	**1721.2**	**-836.7**	**4299.1**	**2397.4**	**-1900.7**
	IND	**5715.5**	**1157.7**	**-4538.6**	**8876.2**	**5598**	**-3075.2**	**14394.7**	**6755.7**	**-7609**

Actual Tillage & Planting 2001 - 2015

		First Crop			Second Crop			Year		
Year	Estate	Tillage			Tillage			Tillage		
2013	SWR	1691.5	306.7	-1384.8	2052.5	583.7	-1468.8	3744	890.4	-2853.6
	AN	934	607.5	-326.5	1470	867.5	-602.5	2404	1475	-929
	RH	569	396.3	-272.7	1003	543	-460	1572	939.3	-732.7
	BCF	514	404	-210	838	466.5	-371.5	1452	864.5	-581.5
	BER	**3908.5**	**1714.5**	**-2194**	**5363.5**	**2454.7**	**-2908.8**	**9272**	**4169.2**	**-5102.8**
	EHP	515	248.8	-266.2	662	148	-514	1177	396.8	-780.2
	LBI	300	266.4	-33.6	445	77.5	-367.5	745	343.9	-401.1
	GV	336	241.7	-94.3	563	161.8	-341.2	899	403.5	-435.5
	ICBU	301	424.1	-176.9	900	302.3	-597.7	1501	726.4	-774.6
	DEM	**1752**	**1181**	**-671**	**2510**	**689.6**	**-1820.4**	**4262**	**1870.6**	**-2391.4**
	IND	**5660.5**	**2895.5**	**-2765**	**7873.5**	**3144.3**	**-4729.2**	**13534**	**6039.8**	**-7494.2**
2014	SWR	745.8	415.4	-330.4	1522.4	955.4	-567	2268.2	1370.8	997.4
	AN	781	516.4	-264.6	1144	1113	-31	1925	1629.4	-295.6
	RH	540	471.8	-68.2	798	801.5	3.5	1338	1273.3	-64.7
	BCF	456	489.7	33.7	706	628	-78	1162	1117.7	-44.3
	BER	**2522.8**	**1893.3**	**-629.5**	**4170.4**	**3397.9**	**-772.5**	**6693.2**	**5291.2**	**-1402**
	EHP	360	289.7	-70.3	540	335	-205	900	624.1	-275.9
	LBI	240	325	85	360	299.8	60.2	600	624.8	24.8
	GV	241.8	299.4	57.6	524.4	219.8	-304.6	766.2	519.2	-247
	ICBU	820.6	782	-38.6	1014.2	429.5	-585.2	1835.3	1191.5	-643.8
	DEM	**1692.4**	**1675.5**	**13.1**	**2439.1**	**1294.1**	**-1155**	**4101.5**	**2959.6**	**-1141.9**
	IND	**4185.2**	**3568.8**	**-616.4**	**6609.5**	**4682**	**-1927.5**	**10794.7**	**8250.8**	**-2543.9**
2015	SWR	1212	537.3	-674.7			0	1212	537.3	-674.7
	AN	770	333.2	-436.8			0	770	333.2	-436.8
	RH	564	573.8	9.8			0	564	573.8	9.8
	BCF	466	364.4	-101.6			0	466	364.4	-101.6
	BER	**3012**	**1808.7**	**-1203.3**	**0**	**0**	**0**	**3012**	**1808.7**	**-1203.3**
	EHP	360	210.3	-149.7			0	360	210.3	-149.7
	LBI	240	77.1	-162.9			0	240	77.1	-162.9
	GV	228	311.1	83.1			0	228	311.1	83.1
	ICBU	500	310.3	-189.7			0	500	310.3	-189.7
	DEM	**1328**	**908.8**	**-419.2**	**0**	**0**	**0**	**1328**	**908.8**	**-419.2**
	IND	**4340**	**2717.5**	**-1622.5**	**0**	**0**	**0**	**4340**	**2717.5**	**-1622.5**

Berbice Estate For the YEAR 2014

	Machine Group		Availability							Utilization							
			Total* Hrs.	Sch. 1 & 2	Mach Repairs	Implem. Repair	Hrs. Avail.	% Actual Avail	% Budget Avail	Meals	Change Shift	Op.Trav. Time	Rain Fall	Machine Mvmt	Other	Hrs util	% Actual Util	% Budget utilisation
Skeldon	SSMP Tillage	TOTAL	0	0	0	0	0	#DIV/0!	75	0	0	0	0	0	0	0	#DIV/0!	80
	Tillage		4536	180	1982	84	2291	51	80	98	168	139	172	87	0	1627	81	80
	Dondi		2016	85	772	43	1116	55	80	43	42	55	87	74	0	816	86	80
	Excavator		1008	6	912	0	90	9	75	3	0	6	24	8	0	49	86	80
	Bell Loader		16800	457	2505	0	13839	82	80	456	600	892	4110	1987	3048	2747	49	80
	Mechanical Harvester		13440	612	3484	0	9345	70	75	314	384	1025	3074	191	1897	2461	42	80
Albion	D6		1008	0	0	0	1008	100	75	0	0	0	0	0	0	1008	100	80
	Tillage		19824	669	6689	250	12216	62	80	88	1166	487	6353	86	1398	2638	46	80
	Dondi		15120	452	4812	30	9826	65	80	436	856	649	2708	230	2896	2051	32	80
	Excavator		4368	119	2856	0	1393	32	75	91	126	114	161	2	608	291	24	80
	Bell Loader		16968	1107	2425	44	13392	79	80	844	132	844	534	350	4027	6661	55	80
Rose Hall	D6		0	0	0	0	0	#DIV/0!	75	0	0	0	0	0	0	0	#DIV/0!	80
	Tillage		20832	615	8663	293	11261	54	80	1240	228	487	6469	719	169	2747	72	80
	Dondi		13440	615	2644	267	9914	74	80	397	0	397	4923	528	1045	2624	63	80
	Excavator		3696	281	450	0	2965	80	75	157	60	157	748	32	856	955	45	80
	Bell Loader		15120	1190	233	0	13698	91	80	730	817	730	3953	3174	8	4285	77	80
Blairmont	D6		0	0	0	0	0	#DIV/0!	75	0	0	0	0	0	0	0	#DIV/0!	80
	Tillage		24528	878	8193	616	14841	61	80	333	303	371	5847	893	128	6966	87	80
	Dondi		8904	35	7536	5	1328	15	80	15	0	16	223	42	0	1032	97	80
	Excavator		6048	266	1160	0	4622	76	75	92	84	103	3145	125	36	1037	79	80
	Bell Loader		24506	1509	1121	0	21876	89	80	1455	2482	1509	8831	1432	12	6155	58	80

Demerara Estates for the YEAR 2014.

	Machine Group		Availability							Utilization								
			Total* Hrs.	Sch. 1 & 2	Mach Repairs	Implem. Repair	Hrs. Avail.	% Actual Avail	% Budget Avail	Meals	Change Shift	Op.Trav. Time	Rain Fall	Machine Mvmt	Other	Hrs util	% Actual Utilization	% Budget utilisation
Enmore	Billet Harv.	TOTAL	10416	228	243	0	9945	95	75	122	208	111	693	52	1011	7749	84	80
	Tillage		16632	715	4919	263	10736	65	80	687	0	576	2914	447	1577	4535	64	80
	Dondi		1848	109	748	52	939	51	80	97	0	83	35	3	83	638	71	80
	Excavator		2016	162	6	17	1831	91	75	152	0	192	0	0	713	774	42	80
	Bell Loader		12096	547	3829	0	7721	64	80	528	0	0	767	705	3379	2342	44	80
L.B.I	D6		0	0	0	0	0	#DIV/0!	75	0	0	0	0	0	0	0	#DIV/0!	80
	Tillage		11424	561	2313	434	8116	71	80	353	151	291	2378	230	1841	2872	54	80
	Dondi		5544	317	1009	531	3687	67	80	216	38	86	567	154	651	1975	68	80
	Excavator		3696	148	1553	0	1995	54	75	131	6	133	24	13	762	927	48	80
	Bell Loader		9480	808	381	0	8291	87	80	339	416	390	280	164	3895	2809	37	80
Wales	Bell Loader		9912	0	2352	0	7560	76	80	0	0	0	0	0	0	7560	100	80
	Tillage		16128	680	5906	190	9352	58	80	376	261	351	3511	420	726	3708	71	80
	Dondi		10080	171	6748	17	3144	31	80	97	52	65	1138	115	624	1054	58	80
	Excavator		6048	278	2829	0	2941	49	75	211	468	512	33	219	537	962	41	80
Uitvlugt	Plough		0	0	0	0	0	#DIV/0!	75	0	0	0	0	0	0	0	#DIV/0!	80
	Tillage		33600	831	16084	485	16200	48	80	535	756	336	7224	352	2319	4678	56	80
	Dondi		14820	566	1406	2821	10027	68	80	350	600	159	4595	227	1295	8772	166	80
	Excavator		21168	982	6626	142	13418	63	75	657	972	438	482	159	5100	5610	45	80
	Bell Loader		15660	1273	3247	0	11140	71	80	105	320	357	645	500	303	8910	90	80

Skeldon steam plant

Submission on Factories to the Guyana Sugar Corporation Commission of Inquiry

OCTOBER 2015

Joseph E.S. Alfred George H.E. James John D. Dow

COMMISSIONERS

FACTORIES

CONTENTS

FACTORIES

1 INTRODUCTION

1.1 GuySuCo within recent years survived on bailouts by the Government Of Guyana (G.O.G), loans from Banks and other types of borrowings, so much so that it is currently carrying a heavy debt burden and has been unable, as far back as 2009, to provide sufficient Capital and Routine funding to enable the industry to sustain itself. Substandard management performance indicated in Field and Factories is of major concern.

1.2 As a consequence, the G.O.G. established a Commission Of Inquiry (C.O.I.) to chart the way forward to return the Industry to profitability.

1.3. The Factories team comprised Messrs. Joseph Alfred (Mechanical Engineer), George James (Process Technologist) and John Dow (Electrical Engineer & Projects), all with many years of experience in the management of GuySuCo factories and whose highest levels of Management in GuySuCo were Regional Director, Demerara (Joseph Alfred); Chief Process Technologist (George James) and Projects Director (John Dow). Members of the Team also saw service overseas in factories and sugar estates in Caricom countries (Jamaica, St. Kitts, Barbados) and Africa (Zambia).

2 EXECUTIVE SUMMARY

2.1 It is the view of the commissioners dealing with the factory operations, that the sugar industry must remain in operation, in whole or in part. Turnaround to profitability is not possible, in the short or medium term, due to the constraints facing the Industry at the present time. Given the decision to privatise, management must have a free hand to attract the massive injections of cash so badly needed to sustain and improve operational capability of the factories.

2.2 For some time now, the West Demerara Estates (Wales (GV) & Uitvlugt(ICBU)) have performed poorly with declining production and unit costs of production amongst the highest in the industry (***see Appendix Fac Ops 1***). Neither GV nor ICBU can stand alone for want of a sufficient supply of canes (***see Appendix Fac Ops 2 for out-of-cane hours***). Current field projections will reveal that, in 2016, GV and ICBU will only be able to operate for 20 and 17 weeks per annum respectively, when the norm is at least 30 weeks. However, given the recent interest, at both GV and ICBU, of existing cane farmers to expand their holdings and of others to get into cane farming, the screening process should be accelerated to vet these applications. Should a sustained increase in cane supply not result from these proposals, the two estates should be rationalised and a study commenced to enquire the feasibility and make recommendations for the transfer of canes between the estates, which time does not permit during the life of this C.O.I.

2.3 The advent of mechanisation in harvesting operations in the Industry has brought with it an increased amount of extraneous matter, field soil in particular. Peter Rein in "Cane Sugar Engineering" states ***"Excessive soil in cane increases the cost of maintenance, leads to increased loss of sugar, reduces the capacity of the mill and the output of the boilers and leads to higher usage of supplementary fuels"***, the effects of which are currently being felt

throughout GuySuCo's factories. Mechanisation must continue in order to cope with the dwindling supply of manual cane cutters. Steps are already in train to pay more careful attention to field conversion and tighter supervision in field to limit the ingress of mud, trash and tops into the factories. While the factories have installed rudimentary cane washing on feeder tables and/or cane carriers, the effort is far from enough to cope with the problem. Whilst Cane Washing (laundering) has been suggested as a possible solution for the removal of mud, it is not recommended due to the very high costs and major structural adjustments to the front-end of the factories which will have to be incurred to establish these plants. **In any case, studies abound which establish that the preferred solution is leaving the soil in the cane fields**. After exhaustive studies by Peter Rein *et al* throughout the Industry, Rein concluded in his "Cane Sugar Engineering" as follows: *"removal of soil, separated by whatever means, is a costly operation, with no benefits. It all has to be loaded and transported to suitable solids dump sites.* ***There is no doubt that there are tremendous benefits in leaving the soil in the cane fields".***

2.4 Pinhole grates installed in the Boilers at Skeldon and Albion are not suitable to handle bagasse with sand and ash content in excess of 3% as a result of the excessive field soil (mud) in the bagasse due to mechanical loading and/or harvesting. Our recommended solution for this problem is to install CAD (Continuous Ash Discharge) stokers which continuously remove the ash from the grate such that the boiler design operating conditions can be continuously maintained. The CAD stokers are superior to Dump Grates as dumping causes fluctuations in evaporation, steam pressure and temperature which are undesirable in power generation mode, such as required at Skeldon. A ballpark cost ex factory of conversion of one of the boilers at Skeldon from Pin Hole Grates to CAD stokers is US$1,150,000. A John Thompson Case Study of conversion to CAD stokers of boilers in Tanzania to overcome problems due to large quantities of field soil being brought in with the cane is attached (**see Appendix Fac Ops 3).**

2.5 It is recommended that the sale of the Steam & Power plant at Skeldon to Skeldon Energy Inc. (S.E.I.) be reversed. **The Power Purchase Agreement (PPA) between GuySuCo and the Guyana Power & Light (GPL) needs to be urgently renegotiated as the 4 US cents/KWH (kilowatt Hour) for power generated by the Turbo Alternators is considered to be much too low. The 2 US cents/ KWH for power generated by the Wartsila engines is also considered to be low, notwithstanding the fact that the HFO fuel for these engines is supplied free of cost by GPL.**

2.6 An improved emphasis is required for the Planned Maintenance system, if it is to contribute significantly to the lifting of equipment maintenance standards and procurement. Routine Non Destructive Testing should be the norm.

2.7 It is recommended to retain Skeldon factory and make it reliable by remedying the faults and narrowing the mismatch between field and factory.

2.8 Since there is a ready market in Caricom for refined sugar, it is recommended that the feasibility study for a sugar refinery at Skeldon be updated.

2.9 The production of Ethanol is not recommended.

2.10 In order to attain further added value, the sale of Molasses (a by-product) as a health food is recommended - a suitable brand name should be registered.

2.11 It is recommended that the staffing of Factory Operations Head Office be strengthened by addition of a number of specialists to the present team. It is also recommended that the position of Technical Director as Head of this Department be reestablished.

3 METHODOLOGY

3.1 **Estate visits**. All 7 factories were visited during the Off-Crop period to observe maintenance practices. Subsequent visits were made to individual factories and the Demerara Sugar Terminals during the In-Crop grinding period of the 2nd Crop, 2015 to observe day-to-day operations. In consideration of the close relationship desired between Factory and Agriculture Departments in the Cane Sugar industry, the majority of visits were done jointly with the Agriculture team (Dr. Harold Davis and Mr. John Piggott). The Factory team participated in the Field visits, and, conversely, the Agriculture team participated in the Factory Visits.

Initial meetings were held at each location with the Estate Managers and their Departmental Heads - the main purpose of these interactions was to obtain a good overview of the Strengths, Weaknesses, Opportunities and Threats on each Estate from the viewpoint of the Managers on location. After these meetings, visits were made to either field or factory. Managers were, in the main, very frank and open in expressing their opinions and views (***see Appendix Fac Ops 4 for details of visits).***.

3.2 **Previous studies**. Statistics and production records were obtained from the vast amount of available data from GuySuCo and previous studies done on the local sugar industry. Business Plans and Strategic Plans for various periods were examined. The following persons offered valuable advice:

- Mr. Josh Ragnauth, former Factory Operations Manager of GuySuCo, who examined data and offered timely advice on existing operating shortcomings of factories and gave valuable advice on the way forward in processing.

- Mr. Peter McIntyre, Consultant Engineering & Sales, Industrial Watertube Boiler Business Unit, John Thompson, with regards to Boiler problems in the handling of high ash in bagasse.

4 GENERAL OBSERVATIONS

In our considered opinion, the major problems facing GuySuCo's factories at present are as follows:

4.1 **Extraneous matter.** This is comprised mainly of Field Soil, Trash and Tops. None of the factories was designed for the levels of extraneous matter being experienced at present. All Estates now have Bell Loaders, with two Estates (Skeldon & East Demerara) also having Chopstick Cane Harvesters (8 at Skeldon, 2 at East Demerara). These machines bring copious amounts of field soil, tops and trash into the factories. The extraneous matter creates operational problems in the following areas:

a) **Clarification.** The clay soils tend to stay in suspension such that the clarified juice does not settle at the desired rate. Factories have tried a cocktail of flocculants to increase settling rates with limited effect - grinding rates either have to be reduced to allow more time for settling or the factory has to stop grinding for sufficient time to allow settling to occur - failure to do so results in carryover of dirty juice to the evaporators - the end result is increased scaling of the evaporator tubes and poor sugar quality.

b) **Steam Generation.** The older boilers, such as the John Thompson (JT) boilers at Rose Hall and Uitvlugt, cannot cope successfully with high levels of field soil entering the factory with the cane. Factory time is lost due to low steam as the JT boiler furnaces have to be cleaned of ash much more frequently than would be the case if clean cane was being milled (the furnaces are cleaned manually by raking the ash from the furnace floor). These boilers, most in excess of 50 years old, were designed for pile-burning of coarse bagasse from the milling of clean, hand-cut cane. Over the years "top-hats" were introduced in the furnaces to allow burning of the finer bagasse which was produced by better preparation (knifing) of the cane - it was difficult for air to penetrate the piles of finer bagasse - the "top hats" introduced a source of air at the bottom of the piles to improve burning. Note that the improved preparation of cane was necessary to increase extraction at the Milling plant, with less sucrose lost in the bagasse.

   High levels of field soil in cane entering the factories also results in reduced throughput due to mill slippages, increased roller wear, increased boiler tube wear (due to erosion) and increased usage of Heavy Fuel Oil (HFO) at Skeldon and wood and/or diesel at the other factories.

c) **Boiling House**. Excessive levels of tops and trash are evident in the cane entering the factories - this produces increased colour in the sugar and reduced recoveries in the boiling house due to high viscosities which prevent brixing of the "C" massecuite to the required levels - high molasses purities, with consequent sucrose loss, and high TC/TS (Tonnes cane per Tonne sugar) are the inevitable result. The tops and trash also increase the volume of bagasse exiting the mills, causing more sucrose to be lost in bagasse going to the boilers. During visits to the fields whilst harvesting was in progress, it was evident that there is room for improvement in the standards of cane cutting, as poor topping and lots of trash in the cut cane were visible. Evidence of the high level of tops and trash was also observed in the cane in punts entering the factories.

   The exhaustibility of the final molasses, a by-product of value, is one of the most important criteria in determining the eventual quantum of sucrose recovered from the sugar cane. The final molasses purity will be improved if reductions in the extraneous matter can be achieved. In order to judge the exhaustibility of final molasses, the determination of the RS/A (reducing sugar to ash ratio) must be carried out, as this gives an accurate indication of the efficiency with which the molasses has been exhausted. It is recommended that this important routine analysis, which is no longer done in the factory laboratories, be resuscitated with immediate effect.

4.2 **Sugar Quality.** The industry in its present state produces raw sugar for the local and export markets. GuySuCo's 7 factories produce raws as commercial sugar as follows:

Skeldon.....Bulk only.
Albion.....Bulk only.
Rose Hall.....Bulk + 50 Kg bags for local direct consumption.
Blairmont.....Bulk + 50 Kg bags + packaged sugar for local consumption and export.
Enmore.....Bulk + 50 Kg bags + packaged sugar for local consumption and export.
Wales.....Bulk only.
Uitvlugt.....Bulk + 50 Kg bags for local direct consumption.

The standards required to be met by the various types of sugar are as shown in the Table below:

Table of Quality Standards specification

Quality Parameter	Unit	Bulk Raws	50 Kg local	Direct consumption (Packaged)
Polarisation	%	95.7 - 98.0	98.0 - 98.2	98.0 - 98.5
Moisture	%	0.35 - 0.6	0.25 - 0.4	0.15 - 0.4
Colour	ICUMSA	3000 - 6000	3500 - 4500	1500 - 3000
Insoluble solids	ppm	1500	800	≤ 500
Starch	ppm	150 - 250	150 - 250	150-180
Dextran	ppm	180-280	180-280	150-200
Ash	%	0.1 - 0.4	0.1 - 0.8	0.15

Only packaged sugar is ISO certified annually.

In the case of bulk raws the quality continues to vary below the specification and severe monetary penalties are occasionally meted out to the Corporation which impacts negatively on the revenues received. The unacceptable level of Dextran was directly related to the processing of stale cane, whilst starch, colour and ash were due to the delivery of a large percentage of trash and cane tops.

In 2014 penalties were incurred for shipments to the European Union. The premium was US$709,000 (equivalent to GYD145 Million) - however, penalties were GYD 14 Million, resulting in a reduced premium of GYD 131 Million.

4.3 **Burning to Grinding intervals (BGI).** Once it has been cut, cane is liable to deteriorate rapidly, especially in the case of billeted cane. The ideal BGI for chopper harvested (billeted) cane is less than 16 hours - this is hardly ever achieved at the Factories that receive chopstick cane (Skeldon and Enmore) - deterioration of cane billets is much more rapid, when compared to wholestalk cane, due to the number of cut ends which encourage increased microbial action. In 2014 only 25% of cane was delivered to the factories in less than 24 hours. Inversion of sucrose into fructose and glucose, occasioned by long delays in getting the canes to the factories, reduces the amount of recoverable sucrose from the cane.

4.4 **Factory operating hours**. One of the major problems is the inability of many of the factories to have reasonable weekly operating hours, due to heavy out-of-cane hours caused by poor attendance of manual cane harvesters, in particular. It becomes necessary to accumulate cane, often holding over cane from one day to the next - this practice causes increased BGI and the resultant loss of sugar. This stop-and-start operation results in further losses as clarifiers may have to be liquidated (if the stop is lengthy) and other losses occur in the process. The Crop may also have to be extended into the rainy season due to the increase in grinding weeks of the factory required to take off the canes. It should be noted that **long out-of-cane periods mask factory inefficiencies**, as repairs which would normally have incurred factory downtime are often done during out-of-cane periods. True factory time efficiency can only be established when the factory is fully supplied with cane.

4.5 **Staffing**. The visits to factories revealed that in many cases, senior staff were not sufficiently familiar with the operations of the factory equipment because of recent transfers, lack of knowledge or inexperience. Staff turnover is reportedly as high as 8% per annum. This high turnover results in a loss of continuity and impacts negatively on institutional memory in the factories.

5 REPORT ON FACTORIES

5.1 SKELDON

Design performance statistics v actual 2014. The stated objectives of the new Skeldon Factory were as follows in Columns 1 & 2 of the Table below - column 3 shows the actual achieved in year 2014:

Budgetted Performance Statisties		**2014 Aetual**
Pol% Cane	11.80%	8.37%
Fibre% Cane	16.80%	19.42%
sugar production	116,000 ts/y	35,890 ts.
cane consumption	1,150,000 tc/y	590,180 tc.
cane processing rate	8,400 tc/d	4,318 tc/d
cane processing rate	350 tc/h	179.90 tc/d
time efficiency	92.00%	86.14%
pol extraction	97.00%	92.21%
boiling house recovery	88.10%	76.96%
overall recovery	85.50%	70.97%
sugar production	35.5 ts/h	10.94 ts/h
sugar quality	99.3 pol	n/a
colour	<1350 icumsa	n/a
moisture	<0.18%	n/a

5.1.1 **Training deficiency and major remedial issues**. The new Skeldon Factory can be considered a "**sea change**" for GuySuCo - a new modern factory with equipment quite unfamiliar to GuySuCo's factory employees. The failure of this factory to date, 6 years after commissioning, is a poor reflection on Booker-Tate (the project managers) and CNTIC (the Chinese Turn-Key contractor). Among the new equipment in this factory are the following:

- Aero-belts (air supported rubber conveyor belts).
- Shredder.
- Diffuser.
- Continuous vacuum pans.
- Continuous vertical crystalliser.
- High pressure boilers.
- Condensing turbine.

This new equipment should have necessitated specialist training and exposure to engineers and process personnel in the years prior to commissioning - this training, in our opinion, needed to be much more detailed, with a structured training programme for each individual including as much hands-on exposure as possible, instead of 4 to 5 weeks "observing operations" at Komati factory in South Africa as stated by one of the individuals who was "trained". Furthermore, individuals sent for training should have been monitored closely during the training period to ensure that they were receiving the full benefit from the training programme.

Further to this, there were numerous design flaws that have had to be corrected at high cost to GuySuCo - some of the defects that required correction by Bosch Projects of South Africa were as follows:

- Inadequate Bagasse scratcher
- Inadequate Bagasse Ploughing.
- Faulty Bagasse distribution.
- Inadequate condensate storage (additional condensate tank required).

Bosch were paid in excess of US$1.3 Million to correct these defects.

Major material and mechanical failures are allegedly the fault of the Chinese Turn-key contractor, CNTIC - to date, equipment which has had to be changed, in just 6 years of operation, include, but are not necessarily limited to the following:

- All hubs on the Heavy Duty knives were replaced.
- Over 100 defective valves were changed.
- Leaking pipes, from 2" diameter upwards, were replaced (ongoing) - piping replacements were needed to such an extent that, during the Off-Crop visit to Skeldon, piping was being removed from the old factory to aid in the replacement of defective piping in the new Factory.
- 41 pumps replaced on year 2014 Capital.
- 18 pumps, including 2(two) electrical Boiler feed pumps replaced previously.

The need to do such major repair work each Off-Crop as faults pop up during the Crop is equivalent to factory staff having to be "fire fighting" all the time to correct defects - the inevitable result is routine planned Off-Crop work being sacrificed as manpower has to be diverted to these jobs.

5.1.2 **Incomplete commissioning and handover**. The Handover of the new factory was incomplete since too many operating faults emerged soon after commissioning - indeed, to date some of the equipment is still not commissioned (e.g. the sugar dryer). One comes to the conclusion that the factory should not have been taken over by GuySuCo when so many defects were apparent. The appointment of Booker-Tate, in 2000, to be Project Managers for the Factory, at the same time that Booker-Tate were managing GuySuCo, may have been a conflict of interest as stated by a former Chairman of GuySuCo who alleged that project problems were not brought to the attention of the Board at the time that they should have been.

5.1.3 **Initial sub-standard quality Boiler Feed water**. High pressure boilers, such as those at Skeldon, require water of the highest quality - whilst pure condensate is normally available when the factory is in operation, a source of good make-up water is necessary. The make-up water at Skeldon was planned to be provided from artesian well water treated to potable condition and then softened using demineralization technology.

The drilling of an artesian well on the Factory Site was contracted out. **G$52 Million was spent in a failed effort to establish this well**, after drilling at two sites in close proximity to one another failed, reportedly due to the drill mud disappearing into an underground void. No further attempt was made to establish a well on site after these two failures.

The factory should not have been commissioned without a source of good make-up water. Canal water, either raw, or passed through the treatment plant that was not designed to treat such poor quality water, was reportedly the only source of make-up water during the first 2 years of operation of the factory - the inevitable result of using this water was major internal scaling of the boiler tubes. Chemical cleaning to remove the build-up of scale from the tubes became necessary. CNTIC did a successful cleaning of #2 Boiler. The cleaning of #1 boiler was left to be done by local staff - ***this cleaning exercise was botched***, resulting in the melting down of the entire superheater bank of the boiler - **partial retubing of the boiler, at a reported cost of US$2.3 Million**, was done with assistance of the Chinese.

Deposits of scale on the blades of the turbines also resulted due to the use of this impure make-up water source, necessitating the removal of this scale, once again at GuySuCo's expense (G$9,767,707).

Make- up water quality has improved from 2013 as Artesian well water from Guyana Water Inc. has become available and feeds the factory demineralisation plant which provides the make-up water to the boiler plant. Skeldon supplies free electrical power to the well in return for the use of GWI's artesian well water.

5.1.4 **Clarifier muds recycling**. The decision of the Project Managers to recycle the Clarifier

muds to the Diffuser, instead of including a Filtration station in the design of the Factory, is considered to be a major blunder, as the high level of extraneous matter resulting from mechanical loading and mechanical harvesting in a country with high rainfall and poorly draining heavy clay soils seems not to have been considered. The return of the clarifier muds to the Diffuser resulted in a further increase in ash in bagasse (estimated to be in excess of 10%) with increased erosion of the boiler tubes and pinhole grate problems being the end result. GuySuCo have had to abandon this practice of mud recycling. The small Rotary vacuum Filter from the old Skeldon factory has been installed in the new Factory and a large 30' x 20' Rotary Vacuum Filter has been ordered from India to complement the small filter. It is expected that further costly modifications will be necessary to the rubber belt bagasse conveying system to produce sufficient bagacillo for these filters.

5.1.5 **Under-rated Punt Dumper and associated major mechanical failures**. One of the major constraints to the Skeldon factory has been the inability to feed sufficient cane into the factory due to the repeated failure of the "new design" punt dumpers which were supplied by Honiron - it is reported that, during performance tests the two punt dumpers were only capable of 299 tonnes cane per hour (tch) instead of the expected capacity of 350 tch. This was followed by repeated failures of the steel supporting structure which necessitated upgrading the steel supports and other works. GuySuCo, prior to the 1st Crop 2015, replaced the Outboard Punt Dumper, the more problematic of the two dumpers, with a winch type Punt Dumper at a cost of approximately US$1 million. This Punt Dumper, when installed, was found to be discharging the cane from the punts before the dumper reached the cane scale - GuySuCo, in order to make the Punt Dumper functional, lowered the Cane Scale as much as possible - this was still not enough - a portion of the northern side of the scale bin had to be cut off to allow the cane to enter the bin. This reduction, however, results in increased droppings when billeted cane is discharged from the punts - the canal below the Punt Dumper has to be cleaned of dropped cane more often than should be necessary (this cleaning takes about 45 minutes) and therefore reduces the amount of cane that can be fed into the factory during these cleaning times.

Further investigation of the Punt Dumper installation is required. Some of the questions that perhaps need to be answered by the Project Managers and others are:

- Knowing the importance of achieving the rated hourly cane input into the factory, what guarantees were written into the Honiron Contract to ensure the achievement of 350 tch?
- Why was the original installation accepted when performance trials showed that only 299 tch was achieved?.
- Was the minimum average punt weight correctly specified in the contract?
- Was adequate structural analysis done of the supporting steel structures to ensure that failure would not occur during instances of punts falling out of the cradle?
- Were the experiences of the punt dumper operation in GuySuCo factories fed to the suppliers in order to ensure that the steel supporting structure would be able to withstand all foreseeable incidents that could lead to failure?
- Why was the new winch-type punt dumper installation prior to the 1st crop 2015 accepted when the punt dumper was tilting at a level substantially lower than it

should in order to discharge cane into the existing cane scale?

- Was the correct information with regards to the height of the cane scale relative to factory ground floor level or any other relevant datum point given to the South African supplier of the winch-type punt dumper?

5.1.6 **Boiler retubing**. Factory Operations staff have advised that the present condition of the tubes of #2 Boiler (some failures are already occurring) indicates that complete retubing of the #2 boiler will be necessary in approximately 2 years. Factory Operations has estimated, based on the actual cost of partial retubing of #1 Boiler, that this complete retubing is likely to cost approximately US$4 Million. It is recommended, however, that, prior to undertaking this expenditure, an internal Non-Destructive Testing of the boiler tubes be undertaken by a Company that specialises in IRIS (Internal Rotating Inspection System) testing on a regular basis. SteelTest of South Africa is one such Company that can bid to do this job (**see Appendix Fac Ops 5**). This NDT examination will determine whether complete or partial retubing of the boiler is necessary. The interior surface of the tubes must be cleaned of all scale prior to this examination. The budget cost of the IRIS examination, excluding local costs, is approximately US$ 12,000.

5.1.7 **Potential gearbox failure**. The 5-stage Planetary Gearbox (manufactured by EICKHOFF of Germany), that drives the Diffuser, was reportedly making an unusual sound when in operation. During the In-Crop visit to Skeldon on 27th and 28th August, 2015 the factories team were able to confirm this observation by Skeldon factory staff. However, two sounds, in quick succession, were emanating form the Gearbox this crop compared with a single sound in previous crops. It was reported that the Gearbox had started making this unusual sound during the 1st Crop 2014. Furthermore, tests done on the Gearbox oil by MACORP in July 2014 revealed the presence of wear metals, with the Fe (iron) content as high as 681 ppm. Examination of an Oil sample during the Team's visit confirmed the presence of metallic particles in the oil.

It must be stressed that, should this Gearbox suffer a premature failure, Skeldon Factory, and all reaping of both Estate and Farmers' cane, would come to a complete halt until such time as a replacement Gearbox, most likely not a "shelf" item, could be received from the Manufacturer in Germany and installed. It is therefore recommended that an urgent order be placed for a replacement gearbox, whilst funding the visit of an Engineer to offer an opinion on the nature of the problem, as requested by GuySuCo's Factory Operations staff since mid-year 2014 (not approved due to shortage of funds).

This Gearbox weighs 33,850 Kg, without the motor. Previous experience dictates that the long 2016 Mid-year Off-Crop period will be insufficient time to remove the faulty Gearbox, ship same to Germany, repair, and return to Guyana. Air Freight is an option, but will be very costly. Replacement with a new gearbox is judged to be the best option. The landed cost of a new gearbox, based on a recent quote obtained by GuySuCo, is approximately US$500,000. The supply ex factory of 7 to 8 months confirms the fact that this gearbox is not a shelf item.

5.1.8 **Major expenditure**. The Punt Dumpers, Shredder, treated water to the Boiler Plant, insufficient pure condensate (entrainment in #2 vessel), amongst others, were (and some still are) major issues which required attention. From the commencement there was a

mismatch between field and factory which did not augur well for continuous operations. This has resulted in expenditure, both Capital and Routine, far in excess of what one would expect for a new factory. The level of the expenses necessitated that the other factories be starved of both routine and capital expenditure.

5.1.9 **Excessive expenditure since commissioning**. The failure to date of the new Factory and the inability therefore for the factory to produce a reasonable R.O.I (Return On Investment) has been a tremendous drain on GuySuCo's finances. The amount of Capital that has been spent on this new factory, since commissioning in 2009, has caused the 6 older factories to be starved of Capital (see Table I below).

TABLE I

Capital expenditure on Factories for the period 2009 to June 2015

Year	Skeldon G$M	Albion G$M	Rose Hall G$M	Blairmont G$M	E.D.E. G$M	Wales G$M	Uitvlugt G$M
2009	90.16	21.5	42.54	136.38	33.24+ 11.37 L.B.I	46.75	45.1
2010	110.26	18.8	35.94	18.1	67.02	12.77	78.51
2011	62.71	10.05	33.17	21.99	243.72**	33.39	9.86
2012	162.41	1.99	0	22.28	7.35	20.94	1.94
2013	0	0.32	0	0	5.34	0	0
2014	343.53	121.3	17.88	12.2	43.67	3.71	8.03
2015*	1.45	0	0	0	0	0	0
Total =	**770.52**	**173.96**	**129.53**	**210.95**	**411.71**	**117.56**	**143.44**

* GuySuCo has decided not to approve any capital expenditure in year 2015.
** Relocation of Punt Dumper from L.B.I factory to E.H.P. factory following the closure of L.B.I.

In addition to the G$770.52 million Capital funds spent on the Skeldon factory to date since commissioning, substantive other funds have been spent on the factory and charged to routine expenditure (**see Appendix Fac Ops 6**). Perusal of this Appendix indicates that some of the major items of expenditure were:

- Heavy Fuel Oil (HFO) purchases of **GS1.522 Billion** for the years 2009 to 2014
- Dieselene purchases of **G$ 309 Million** for the years 2009 to 2014.
- Transportation costs of **G$270 Million** for the years 2009,2010, 2011 and 2013.
- Payment to CNTIC of **G$152 Million** for technical support services in 2011.
- Purchase of Air Preheater tubes of **G$25 Million** for the years 2014 and 2015.

Having regard to the afore-mentioned, GuySuCo should seek some measure of redress from the Project Managers and/or the Turn-Key Contractor.

5.1.10 **Co-generation at Skeldon.** High pressure and high efficiency boilers, similar to those installed at Skeldon factory in order to produce surplus electrical energy for sale to GPL, come at a price and they have efficient waste heat recovery equipment in the form of airheaters and economizers which result in greater maintenance costs. The treatment of boiler feedwater for use in these high pressure boilers is much more expensive than that needed for the lower pressure boilers installed in the other GuySuCo factories.

The "rationale" for this installation is the added-value to be derived from the export of surplus electrical power and the sale of such to GPL. To be profitable, much of this power should be derived from the steam turbines during the Crop. GuySuCo, in order to provide firm power year-round to GPL also supplies power from Wartsila sets which use HFO (Heavy Fuel Oil) and/or Dieselene – providing power from these Diesel Generators is not considered to be Co-generation as GPL could have done the same by installing its own Wartsila power station in the upper Corentyne. Although the agreement with GPL mandates that they supply HFO "free-issue" to GuySuCo for these Wartsila sets, these machines are expensive to maintain and the price paid of US 2 cents per Kilowatt Hour to GuySuCo, even considering the free issue of fuel, may not provide a fair return.

The power derived and exported from the Steam Sets during the period 2009 – 2015 is very low when compared with the power exported from the Diesel Sets. The Income earned from the Export sales is shown in Table II below:

TABLE II

INCOME EARNED FROM EXPORT POWER 2009 - 2015

	INCOME	
YEAR	**From HFO/Diesel Wartsila Sets (G$)**	**From Steam Sets (G$)**
2009	198,173,056	Nil
2010	457,560,247	Nil
2011	175,776,463	67,466,730
2012	109110,125	53,759,079
2013	184,163,794	57,747,157
2014	166,377,178	74,388,659
2015*	63,302,894	34,465,159
TOTAL =	**G$1,354,463,757**	**G$287,826,784**

* Year To Date (July, 2015).

This Income indicates that the income generated from the Steam Sets (i.e. from Bagasse) is only 17.52 % of the total income, whereas the income generated from the Diesel Sets (i.e. from HFO and/or Diesel) is 82.48 %. When one considers, however, that the export power generated from the Steam Sets fetches a price twice that generated from the Diesel Sets (US 4 cents compared to US 2 Cents) this indicates that the export power from the Steam Sets during the period 2009 to July, 2015 was only 9.6% of the total export power compared to 90.4% from the Diesel Sets. This percentage is very low.

Every effort must be made to maximize the bagasse generated export power during Crop. GuySuCo's explanation for this low bagasse generated power is as follows *"In the early years due to the problems with the Factory and inadequate cane supply the power supplied by steam was quite minimal. With improved cane supply in 2015 and fewer factory breakdowns we expect the proportion of bagasse generated power to rise"*.

5.1.12 **Other factory concerns (Workshop etc.)** The workshop in the old factory is a safety and health hazard and does not meet the minimum standards required of a mechanical workshop. It is recommended that the new workshop, which has been budgetted for, but not approved to date, should be given priority for construction (**GS40 Million for mechanical workshop only**).

The lighting in the factory is poor. "In-house" improvements are on-going.

Sensitive equipment, such as the control panels for the centrifugals, which require an air-conditioned environment, are not adequately supplied. This is due to the failure of the air-conditioning units originally supplied as a part of the turn-key contract.

5.1.13 **Wharf sugar bin subsidence**. The sugar bin capacity at the Skeldon wharf was derated in 2001, from 1000 tons to 850 tons, following the failure of one of the Rendex steel piles which necessitated driving of a pipe steel pile close to the failed pile and establishing a connection betweenthe upper good section of the failed pile to the newly driven pile - this was possible as the failed pile was at the North-Eastern corner of the piled foundation and ready access for installation was available.

The pile failure was judged to be largely due to deterioration of the steel resulting from the non-functioning of the Cathodic Protection which was installed when the sugar bins were erected originally - this served to protect the steel piles from the salt water of the Corentyne river. Contact with the manufacturers of the cathodic protection, at that time, elicited the response that the unit was obsolete, spares were no longer available and a replacement was suggested. No replacement cathodic protection has been installed to date. The capacity of the sugar bins has been further derated to 650 tonnes. It is recommended that a replacement Cathodic Unit be ordered and installed as a matter of priority to prevent further deterioration of the Rendex piles. Regular checks and occasional replacement of the sacrificial anodes are necessary to ensure that the unit functions properly at all times. It must be stressed that failure to install this unit may result in ultimate failure of the piling supporting the sugar bins, particularly in view of the fact that occasional loading above the derated capacity has allegedly occurred from time to time.

It is suggested that the Cathodic Protection Units for these steel piles, those at the Wharf at the Demerara Sugar terminals and the steel sheet piling at Albion factory can be sourced at the same time.

5.1.11 **Inadequate drainage of Manarabisi**. In order to provide adequate drainage for Skeldon's cane expansion in Blocks 1,2, 3 and 4 of the Manarabisi area, two new Drainage Pump Stations were planned - the first, at No.74, with 2(two) 300 tpm diesel-

driven pumps, was installed and commissioned in 2001. The second drainage pump installation was planned for installation of a 180 tpm pump at No. 66 (at the Northern end of the Seaforth Canal). This would pump drainage water into the No. 66 creek which flows into the Corentyne River - it is understood, however, that the residents of that area objected to the siting of pumps at this location as they felt that their lands would be flooded during the high tides, although calculations had shown that the pumps would only increase the level in the creek by 2" whilst pumping. In view of these objections a decision was taken to construct the pump station on the Canje Creek close to the Manarabisi pump station, to pump into the Canje Creek rather than the Corentyne as originally planned - GuySuCo's financial difficulties reportedly prevented this installation at the time (i.e. soon after the No. 74 installation) and the National Drainage & Irrigation Authority (N.D.I.A.) eventually agreed to fund and construct the Pump Station and canal to link the Manarabisi drainage to the station. To date, however, although the pump station is substantially complete, there is no drainage as the canal to carry water to the pump is not complete and other works at the Pump station, such as building up the dam, are still to be done. The failure to provide adequate drainage for the Estate expansion in Blocks 1,2, 3 and 4 (Block 4 and a portion of Block 3 are still not cultivated).has resulted in the slow run-off of water when rain falls with all the adverse effects that this causes in a cane cultivation area - additional mud enters the factory with the mechanically harvested cane, damage to the fields, dams etc. It is recommended that the greatest urgency be given to the completion of the canal and other works necessary (by NDIA) to make the No. 66 drainage pump station functional.

5.2 ALBION

5.2.1 Albion Estate continues to perform satisfactorily with the lowest unit cost (**see Appendix Fac Ops 1**). With existing equipment, Albion is encouraged to strive to achieve 180 Tonnes Cane per hour when ideal conditions exist. Syrup brixes are lower than the normal target of 65 Brix expected, necessitating that the pans evaporate some water in single effect that should be evaporated in quadruple effect in the Evaporator station. It is recommended that flash recovery of the back pressure condensate to the 1st effect vapour and 1st vessel condensate to 2nd vapour be done - this will improve the evaporation rate.

5.2.2 The condition of the sheet piling under the pre-milling area is far from satisfactory with major erosion of piling and sub-soil leaching out from under the reinforced concrete close to the first mill. Repairs to this sheet-piling were not carried out during the mid-year 2015 Off-Crop due to shortage of funds.To our knowledge this sheet piling was protected from corrosion by the use of Cathodic Protection - it seems that this is no longer functional - indeed, it is likely that high staff turnover has resulted in a lack of knowledge of this installation. It is therefore recommended that new Cathodic Protection be ordered and installed to coincide with the repairs of the sheet piling.

5.2.3 There is a Pilot plant which presently produces both Anhydrous and Hydrated Ethanol - the hydrated ethanol is used in the factories as a substitute for Methylated Spirits in the production of slurry for seeding. This Pilot Plant was established by the Institute of Applied Science and Technology (IAST).

5.2.4 About 4ft height of bagasse storage is reported to be unusable due to high levels of moisture absorbed through the earthen section of the floor - this results in a considerable quantity of bagasse being unsuitable for return to the boilers. It is suggested that the entire floor be concreted.

5.2.5 During the 1st Crop, 2015 the turn-out of cane cutters was only 58%, with the maximum during dry weather being 68%. This low level of turn-out does not bode well for the future.

5.2.6 There is a problem with bagacillo supply when Bell loading is being done during wet weather, as the mud in bagasse reduces the quantity and quality of the bagacillo - this therefore has an adverse effect on the filtration.

5.2.7 The brixes of "A", "B" and "C" massecuites are below the desired levels and therefore hinder molasses exhaustion, which, in turn, affects overall recovery. Improvements in boiling practices would assist in attaining the desired Overall Recovery.

5.2.8 **Shortage of Capital.** Albion has been underfunded in their capital works. The 2009 to 2015 Capital summary is shown below:

	CAPITAL (GS Million)		
YEAR	**REQUESTED**	**RELEASED**	**MADE AVAILABLE (SPENT)**
2009	193.00	158.00	21.50
2010	61.00	61.00	18.80
2011	129.00	129.00	10.05
2012	110.00	110.00	1.99
2013	73.00	0.20	0.32
2014	207.60	207.60	121.30
2015	90.40	90.40	0.00
TOTAL=	864.00	756.20	173.96

5.3 ROSE HALL

5.3.1 There is a drainage problem on this location, necessitated by the need to keep the sideline levels higher than they should be in order to provide cooling water to the Factory - the Management of the Estate have done some work to improve this situation - however, this entails pumping some make-up water from the Canje which, if brackish, can cause major damage to factory condensers and cooling water piping. Caution is therefore urged in this practice.

5.3.2 The high final molasses purity at this location (36.25) is of concern - it is recommended that the Neutch apparatus be used regularly to check the purity drops between the 'C'

massecuite and the molasses produced by each of the Low Grade (LG) centrifugals, as observations during our In-Crop visit suggested that either too much water or steam was being used on one or other LG centrifugal - if this is so the excess water or steam would be dissolving too much sugar and thus increasing the final molasses purity. The lack of flowmeters on the two Western States centrifugals does not allow operators and supervising staff to monitor the quantity of water added to the centrifugal - replacement flowmeters must be provided.

5.3.3 Flowmeters are also needed at the Flocculant station to ensure that the flocculant dosage is equally divided between the two inlets to the clarifier.

5.3.4 The low attendance of cane cutters, once again, concerns us - should the field yields be increased, as expected, in future years, and low turnout of cane cutters continue, the factory will be hard pressed to take off the crop within the opportunity period and grinding into the traditional rainy periods will be the norm with consequent reduction in Overall Recovery of the factory, damage to fields and dams etc.

5.3.5 During our in-crop visit most of the belts on the Heavy Duty knife drive were slipping. Cane preparation was very poor as the distance between the knives and the carrier had been increased to reduce the likelihood of knife chokes. The replacement 'V' belts purchased recently were apparently inferior - quality belts from a reputable manufacturer must always be provided for use in this important application.

5.3.6 The #3 Mill requires special investigation and hinders throughput and mill efficiency - the complaint is that it is not taking the feed and the hydraulic pressure on this mill has been reduced as a consequence. Mill extraction, therefore, has been compromised. Hydraulic gauges and lift indicators on the mills must be functional at all times as these are an essential guide to mill operation.

5.3.7 The John Thompson boilers (5 out of 6 boilers) are not suited to burn mud-laden bagasse. Wood, used as a supplementary fuel in the boilers, cost approximately G$3 Million in 2014.

5.3.8 **Shortage of Capital**. Rose Hall has been underfunded in their capital works. The 2009 to 2015 Capital summary is shown below:

	CAPITAL (G$ Million)		
YEAR	**REQUESTED**	**RELEASED**	**MADE AVAILABLE (SPENT)**
2009	354.20	130.20	42.54
2010	150.2	150.20	35.94
2011	151.7	139.70	33.17
2012	23.60	23.60	0.00
2013	45.00	45.00	0.00
2014	151.00	151.00	17.88

2015	170.00	83.00	0.00
TOTAL=	1045.70	677.70	129.53

5.4 BLAIRMONT

5.4.1 This Estate has one of the better costs per unit (**see Appendix Fac Ops 1**). It also plays an important role in the packaging of sugar for local consumption and export.

5.4.2 The Pre-milling area is considered to be adequate.

5.4.3 There is a cracked Headstock on the Crusher at the Mills which has been repaired by welding and braced against the #1 Mill to reduce the likelihood of the crack opening again. A new pair of Headstocks was supplied by Surendra about 3 years ago and found to be to the wrong design. The headstock from the Wales crusher was sent to Blairmont and also found to be unsuitable.

5.4.4 There is a defect on the 100 tooth gear on the mill drives - this gear has been cracked for the last 3 crops. A replacement gear is expected to be received in October 2015 and is planned to be installed during the end-of-year Off-Crop.

5.4.5 Both Caterpillar diesel-alternators in the Power House are overdue for servicing, one for a top overhaul and the other for a Major Overhaul. Finance constraints have dictated the delay in servicing. The unit which is overdue for a major overhaul, costing approximately G$40 Million, has been derated as a precautionary measure. The overhauls must be done in order to prolong the life of these engines.

5.4.6 Two of the three boilers on this location have travelling grate stokers which make it easier to dispose the high level of ash when the extraneous matter in cane supply is high. However, the # 3 Bigelowe boiler which is de-ashed manually has to be cleaned 2 times/day during rainy weather compared with 1 time/day under normal conditions.

5.4.7 Sugar packaging. Storage for packaged sugar is limited, necessitating frequent collection of the sugar in order to avoid a bottleneck at this point. It is suggested that expansion of the packaging building to the South be made to allow the relocation of a packaging machine from Enmore as required from time to time. This will entail that bins, conveyors etc. be installed so that the basic machine can be hooked up easily when required.

5.4.8 Processing. Efforts should be made to get the non-functioning DCS system working once again.

5.4.9 **Shortage of Capital**. Blairmont has been underfunded in their capital works. The 2009 to 2015 Capital summary is shown below:

	CAPITAL (GS Million)		
YEAR	**REQUESTED**	**RELEASED**	**MADE AVAILABLE (SPENT)**
2009	1259.00	1199.00	136.38
2010	136.2	136.20	18.10
2011	62.5	62.5	21.99
2012	39.00	39.00	22.28
2013	87.00	8.00	0.00
2014	95.00	95.00	12.20
2015	101.00	101.00	0.00
TOTAL=	1779.70	1641.70	210.95

5.5 EAST DEMERARA ESTATE

5.5.1 The East Demerara Estate is underperforming with its' cost per unit among the highest in the Industry **(see Appendix Fac Ops 1)**. Difficulty in generating steam in Enmore factory (LBI having been closed in 2010) necessitates use of copious amounts of wood - the need to toss wood into the furnaces during grinding causes damage to the furnace refractory and moving grates of the bo0ilers. Purchase of wood in 2014 was in excess of G$8 million - this is amongst the highest in the Industry. Remedial action needs to be taken to right this undesirable situation. There are 2 mechanical harvesters and 9 bell loaders at this location - this results in excessive mud being delivered to the factory during, and some days after, rainy weather. This excess mud affects the process negatively.

5.5.2 It is recommended that the reverse rotation Heavy Duty knife and drive at LBI be relocated to EHP as this would assist in improved preparation of the cane, lower bagasse moisture and improved steam generation.

5.5.3 The arrangement whereby LBI canes are routed to EHP via the closed LBI factory must be discontinued and the more direct route be utilised - this will assist in reducing the high BGI and cost of cane transport.

5.5.4 The existing functional 8' Diameter x 16ft long Rotary Vacuum Filter is under capacity, particularly when dealing with dirty cane entering the factory. The additional filter, presently on Capital, is necessary to cope with the clarifier muds. In view of the fact that this location is the major unit for the production of packaged sugar it is imperative that all efforts be made to supply clean cane to the factory so that the quality of packaged sugar can be maintained - failure to do so will inevitably result in lost export markets.

5.5.5 Every effort should also be made to retain the highest quality production staff, suitably qualified, at this location in view of the important task of maintaining a high quality packaged sugar at all times.

5.5.6 There is need to complete the rationalisation of the two Estates to achieve improved control and lower costs.

5.5.7 **Shortage of Capital**. East Demerara Estate has been underfunded in their capital works. The 2009 to 2015 Capital summary is shown below:

	CAPITAL (G$ Million)		
YEAR	**REQUESTED**	**RELEASED**	**MADE AVAILABLE (SPENT)**
2009*	375.20	277.20	64.61
2010	159.00	159.00	67.02
2011	282.60	282.60	243.72
2012	259.60	259.60	7.35
2013	163.50	48.50	5.34
2014	150.00	150.00	43.67
2015	210.00	200.00	0.00
TOTAL=	1599.90	1376.90	411.71

* Sum of Capital for LBI & EHP factories prior to formation of East Demerara Estate.

5.6 WALES

5.6.1 There is a low cane cutter attendance (approx 48%) at this location which results in the factory being unable to achieve a reasonable number of grinding hours weekly. Estate cane yields are very low, averaging 39.82 Tonnes Cane per Hectare (TC/Ha) - this compares unfavourably with farmers' cane yields which are 59.35 TC/Ha.

5.6.2 There is a shortage of steam at this location as the #1 Boiler, an old rivetted design, was removed in 2000 and the crusher removed shortly thereafter due to an inadequacy of steam. The factory have concentrated recently on improving lagging, improved servicing of steam traps and reducing power requirements by better utilisation of the injection pumps - this has resulted in a much reduced time loss for Low Steam. When clean hand-cut cane was supplied in former years there was need only to clean the #2 boiler (Babcock & Wilcox) once per week - with the advent of mechanically loaded cane it has become necessary to clean much more frequently and the factory has to stop crushing whilst this boiler is being cleaned.

5.6.3 With the removal of the crusher this factory is now a 3 tandem Mill with the resultant reduction in Mill Extraction.

5.6.4 The Wales boiling house has the capacity to process 120 TCH - however, the throughput has been reduced to 100 TCH.

5.6.5 The wharf is in need of urgent repairs and the shipping of sugar by barge is compromised due to the need for a new self-propelled barge.

5.6.6 This estate is largely dependent on the supply of farmers' cane - however, in recent years, due to the decline in the sugar price, some of the farmers have changed to the cultivation of rice, pineapple and other crops - every effort must be made to bring those farmers back on board.

5.6.7 **Shortage of Capital**. Wales factory has been underfunded in their capital works. The 2009 to 2015 Capital summary is shown below:

	CAPITAL (G$ Million)		
YEAR	**REQUESTED**	**RELEASED**	**MADE AVAILABLE (SPENT)**
2009	183.20	148.20	46.75
2010	67.00	67.00	12.77
2011	75.00	75.00	33.39
2012	58.74	58.74	20.94
2013	111.00	0.00	0.00
2014	100.00	100.00	3.71
2015	190.00	190.00	0.00
TOTAL=	784.94	638.94	117.56

5.7 UITVLUGT

5.7.1 Turn-out of cane cutters at this location is approximately 50%. The supply of cane is only enough to keep the factory supplied for an average of 18 hours per day - cane therefore is often accumulated so that the factory can get a reasonable run, in order to reduce fuel use etc. This accumulation of cane increases the burning to grinding interval, which in turn reduces the recovery of sugar and affects sugar quality.

5.7.2 About 65 - 70% of estate canes is Bell loaded. Estate cane yields are very low (43 TC/Ha). Four out of a complement of 5 boilers in the factory are of the older John Thompson (JT) type that do not tolerate the increased levels of extraneous matter (mainly mud) which results from the mechanical loading of the canes. The JT boilers are being cleaned not more than 3 times per week, whereas the Thorn International (T.I.B.S) boiler, which has furnaces with dump grates, is cleaned once per shift. Copious supplies of wood are used in the factory to supplement the bagasse as fuel to the boilers.

5.7.3 It is our considered view that the frequency of cleaning of the JT boilers should be increased in an effort to determine whether it would be more economical to pay for the extra cleaning than purchasing large tonnages of wood. Purchase of wood in 2014 was in excess of G$12 Million.

5.7.4 This factory supplies bagged sugar to the local market. The wooden cladding on the bodies of all evaporators, pans and juice heaters needs to be refurbished - this will

reduce heat loss and assist in the reduction of steam demand.

5.7.5 **Replacement Boiler**. The increase in extraneous matter resulting from the change to mechanical loading (and possibly mechanical harvesting in the future) at Uitvlugt will require the upgrade of the Boiler plant. One new 132,000 pph (lbs per hour) boiler can replace the four (4) older type John Thompson boilers. Estimated costs are as follows:

60 tph (tonnes per hour) boiler, complete with CAD stoker .....US$4 Million F.A.S.
Estimated other costs (shipping, freight, foundation, erection)...US$1.5Million
Total Installed Cost..... ..US$5.5Million.

The new boiler will be complete with chimney, heat recovery equipment and wet gas scrubber to satisfy high environmental standards of flue gas emissions.

5.7.6 **Shortage of Capital**. Uitvlugt factory has been underfunded in their capital works. The 2009 to 2015 Capital summary is shown below:

	CAPITAL (G$ Million)		
YEAR	**REQUESTED**	**RELEASED**	**MADE AVAILABLE (SPENT)**
2009	194.70	164.70	45.10
2010	87.00	87.00	78.51
2011	91.20	86.80	9.86
2012	73.10	73.10	1.94
2013	66.20	0.00	0.00
2014	104.00	104.00	8.03
2015	164.95	0.00	0.00
TOTAL=	785.15	515.60	143.44

6 FACTORY OPERATIONS HEAD OFFICE ORGANOGRAM

The current organization structure (**see Appendix Fac Ops 7**) of Factory Operations places an excessive work load on the General Manager, Technical Services, and must be restructured for a better distribution of duties. It is acknowledged that the current Manager has the institutional memory, but given the backlog of capital projects and the urgent requirement for a greater attention to detail to increase operational efficiencies in all areas, the following structure (**see Appendix Fac Ops 8**) is proposed. It seeks to reactivate a former structure (with minor modifications) which worked well. It is the understanding that suitably qualified and experienced staff will be recruited from within, in the first instance, followed by external recruitment, if found necessary.

Training in all operational areas is a vital component and must take special note of new technology and the thrust towards automation.

7 PRIORITY FACTORY PROJECTS 2016-2020

A severe shortage of Capital spending on all factories (except Skeldon) has been identified, particularly during the years 2009 to 2015. By way of explanation GuySuCo has stated as follows: "*Regarding capital expenditure tables, released versus spent, underspend is attributable to not only lack of funds but also to a lack of capacity (in the team) to spend when funds were available earlier in the year (in each of the years). This lack of capacity (project management & engineering line management inexperience) got progressively worse each year*".

GuySuCo's Factory Operations Department was requested to identify their Priority Factory Capital Project requirements for the 5-year period 2016 – 2020. The lists, which also includes Capital requirements for Skeldon factory, are attached **(see Appendix Fac Ops 9)**.

8 DEMERARA SUGAR TERMINALS (DST).

8.1 DST is responsible in the main for the storage and shipping of bulk sugar and molasses within and without Guyana. More importantly, it arranges storage and shipping in a timely manner to GuySuCo's overseas buyers American Sugar Refiners (Tate & Lyle) at Thames Refinery, and others.

8.2 The installed storage capacity at DST is 40,000 Tons of Bulk Sugar - however, at the time of our visit on 17th August, 2015, only one of two bonds was in operation awaiting the purchase and installation of a new Steelband conveyor belt - the functional storage at the time was therefore reduced to 50% of its' capacity i.e. 20,000 Tons. Were Skeldon's production to improve as is indicated at present, DST will be hard pressed to cope with the restrictions occasioned by the enforced closure of one of its bonds.

8.3 Other vital pieces of equipment are old and in urgent need of replacement. The two grabs which unload sugar from the coastal vessels suffer frequent breakdowns as the electrical controls are obsolete and spares for the drum controllers and other electrical components are no longer available. Efforts should be made to replace the electrical drive motors and other components with variable frequency drives, joy-stick controls and other up-to-date equipment - it is assumed that the mechanical components, such as the gearboxes, grabs etc., although old, still have many years of useful life and do not need to be replaced at the present time.

8.4. The old Broome & Wade compressor which provides air for the proper functioning of the sugar scales, needs to be replaced. DST staff have indicated that the compressor's governor is faulty, no replacement is available due to obsolescence and, in order to avoid exceeding the over-pressure that can cause major damage, air is being released to atmosphere constantly. The restraint on Capital expenditure has resulted in the non-approval, to date, of a new compressor (DST's estimated cost G$5 Million).

8.5. The non-dredging of the Demerara River Navigation Channel is a hindrance which restricts individual sugar shipments to an average cargo of 8,000 to 8,500 tonnes instead of the previous capahility of 12,000 to 13,000 tonnes. The Manager of DST advises that

the original draught of the 12 to 15 kilometer channel was approximately 6.9 metres. This draught is now reduced to about 5 metres because of siltation (with a sailing draught of about 4.5 metres, leaving about 0.5 metres for the keel of the vessel). This shipping restriction, added to the temporary storage limitation of 20,000 tonnes, is a source of grave concern as any delay in the arrival of ships may result in factories having to stop production during the peak weeks of the 2nd Crop 2015 due to sugar congestion.

8.6 The DST electrical system operates on 50 Hz - steelband conveyors, compressor and other equipment operate on this frequency. The changeover to 60 Hz by GPL prevents this source from being used to power DST at present. DST's stand-by generator, a 600 KVA Perkins, 5 years old, has to be used whenever unloading sugar from coastal vessels or loading sugar for export. Conversion of the equipment to 60 Hz will be costly but needs to be considered in the long term - in the short term it may be prudent to source another stand-by unit that can be operated at both 50 Hz at present and 60 Hz in the future - this will allow quick changeover in the event of a failure of the stand-by generator during loading of ships, as resort to GuySuCo's Caterpillar mobile set or rentals, when failures occur, can cause inordinate delays.

8.7 There are leaks in the roofs of the Sugar Grab area and the offices. These roofs need to be fixed as soon as possible. Minor leaks in one of the sugar bond roofs were also observed. DST has requested G$10 Million in Capital for 2016 to fund roof repairs.

8.8 Renewal of the Cathodic Protection at the wharf is necessary in order to prevent corrosion of the Rendex piles supporting the wharf and outloading conveyor structure. DST has requested G$10 Million in the 2016 Capital Budget for the replacement of the Cathodic Protection unit. This is considered to be a priority.

8.9 It must be stressed that DST is a main artery in the GuySuCo system and any dislocation will cause major disruption throughout the industry.

9 PROCUREMENT

9.1 The Materials Management Department (MMD) is a also vital arm of the Industry. Its effectiveness, however, has been severely hampered by the fact that sufficient funds have not been available industry-wide for the timely acquisition of spare parts and equipment - as a consequence, standards of maintenance in all factories have been compromised with the obvious deleterious effects on efficiency. In the circumstances, therefore, careful thought and planning is required in the usage of the scarce resources available.

9.2 There is abundant evidence that factories, in raising Purchase Requisitions (PR's), have been delinquent in providing sufficient and accurate information, with the result that unnecessary delays in acquisition of items occur - there is an urgent requirement for training in this area. In some cases where the incorrect items were supplied despite the correct specifications from the MMD, suppliers have refused to refund monies already in their possession - this has resulted in some suppliers being black-listed -

notwithstanding this, however, a more robust effort must be made to recover the monies owed.

9.3 The high level of Obsolescent spares is of concern and requires urgent attention, as a large inventory rests on Estates and the MMD.

10 PLANNED MAINTENANCE

10.1 In the presentation to the COI on 8th August 2015, Peter Roberts, a specialist in Non-Destructive Testing and Planned Maintenance systems made the following remarks in his overview on the topic "Reliability Perspective":

"Maintenance is critical to productivity and life expectancy of physical assets. Improperly maintained or neglected plant requires expensive and frequent repairs leading to unnecessary loss of financial resources and poor use of human resources. Additionally, factory breakdowns lead to production and financial loss as well as induce stress on human resources".

Such a situation is applicable to GuySuCo today, since its financial resources are intolerant to improper planning and execution which leads to costly wastage.

10.2 The factory team's visits to Estates have revealed that Planned Maintenance systems are not operating properly and financial constraints are not helpful in this situation. Accurate records on which the system thrives are not up-to-date and there is an urgent need for intensive training in all aspects of the system including all managerial and non-managerial staff so that, among other things, critical assets are identified. Competent trainers are available and should be engaged to remedy this obvious lapse in the maintenance systems.

11 CANE FARMING

11.1 Cane Farming plays an important role in the production drive in GuySuCo. It is therefore necessary that a harmonious relationship exists between farmers and the Company. In terms of processing their canes the main concern lies with the result of the Tonnes Cane per Tonne Sugar (TC/TS) ratio. In the farmers' opinion, this ratio is too high as they allege that the cane they deliver is of better quality than the Estate's cane for which the TC/TS ratio is much lower. It is therefore the cane farmers' belief that some form of cheating takes place in the computation of their results.

11.2 An investigation into the procedures followed by the estate in handling of the farmers' cane revealed no malpractices along the way leading up to the allocation and declaration of the farmers' sugar from the cane delivered to the factory, hence the calculated TC/TS that results. The procedures followed by the estate personnel are clearly documented in the laws of Guyana National Cane Farming Committee Act Chapter 69:4.

11.3 The estates' laboratory staff are responsible for ultimately producing the results of the

farmers' cane by a method of sampling and analysis of the first expressed juice of the cane from which the brix, pol and purity are obtained therefrom. The results are incorporated into a formula, known as the Puerto Rican Formula and then ultimately combined with the results of the factory's cane juice which is used in the allocation process, in accordance with the Act.

11.4 Because of the Organisation Structure of the factory laboratories, it would be very difficult for any of the staff to tamper with the results of the farmers' cane in terms of the TC/TS ratio. Any fraudulent act would have to be a unified collaborative effort which does not seem possible.

12 ETHANOL

12.1 In as much as ethanol is a good source of energy in the fuel chain, its production at the present time and perhaps in the near future doesn't seem a viable option for GuySuCo to venture into (**refer Section 10.3 of Agriculture Report for detailed assessment of Ethanol**). The main reason for this is the continual fall in price of fossil fuels (gasoline and diesel). The recent find of off-shore oil deposits in the western sea bed of Guyana also makes the choice of ethanol less attractive at present.

13 REFINERY

13.1 The idea of producing a high quality "Bottlers Grade' refined sugar seems attractive. There exists a ready market in Caricom for a total of 200,000 metric tonnes of refined sugar of which Guyana's share is approximately 5,000 tonnes imported between GuySuCo and other industrial users. In order for the production of refined sugar in Guyana to be profitable, however, securing 40% CET is vital. To qualify for the CET the production of at least 75% of regional consumption will be necessary. Bearing in mind that all of the refined sugar for Caricom is imported, and the increased production of raw sugar by GuySuCo projected for approximately the next 5 years, it would seem to be lucrative to invest in a Refinery to process the excess raw sugar. However, the present price differential on the world market between raw and refined sugar is such that refining may not be justified. An updated feasibility study must be conducted to determine the way forward.

14 CO-GENERATION

14.1 The proceeds from the sale of raw sugar, particularly after 2017 when the EU abolishes sugar quotas, will pose enormous financial problems for a sustained industry, contracted or otherwise. Added-value products are necessary. In our view the main contributor to added-value to sustain the Sugar Industry in the long term will be Co-generation. This excess electrical power, generated by steam from Boilers fed with bagasse, can be provided by selected factories to the National Grid. Initial Capital costs are high as new high pressure Boilers, Turbo-alternators and associated equipment are required for this venture. The returns, however, are good provided favourable Power Purchase

Agreements can be negotiated with Guyana Power & Light.

The new Skeldon factory was designed to provide firm power to the Guyana Power & Light, In-crop by steam driven turbo-alternators and Off-crop by Wartsila Diesels. The experience gained from Skeldon can be utilized to convert other factories to provide power to the Grid.

A combined Albion/ Rose Hall factory, on a greenfield site with a capacity of 250 Tonnes Cane/hour (TCH) is suggested as the next co-gen facility to be considered. Instead of a Diffuser, however, the existing Milling plant at Albion, with the addition of 2(two) mills to take the milling tandem to a total of 6 mills is preferable. The mills at Albion, with minor modifications, are capable of a throughput of 250 TCH. The clarifier at Albion is also capable of an upgrade to 250 TCH.

From the foregoing, an attempt should be made to initiate a feasibility study of some estates which should include a thorough examination of similar co-generation projects elsewhere. In the latter regard, Mauritius comes readily to mind.

15 ENVIRONMENT

15.1 Samples of the factory effluents and discharges are taken by the factory laboratory staff, subdivided and analysed by both GuySuCo's Central Laboratory and the Environmental Protection Agency (**Refer Agriculture Report Section 9.2).**

16 MANAGEMENT

There is evidence that management performance has been adversely affected by unnecessary costly and ill thought out interventions.

Visits to Estates revealed not a little frustration reportedly due to some sharp management practices in the areas of placements and promotions. The standardized system of merit awards worked well in the past and should be resuscitated.

17 CONCLUSIONS

17.1 Given the financial constraints of the Government Of Guyana (GOG), notwithstanding its commitment and support for the sugar industry, it is apparent that the injection of funds, as needed by the Industry, cannot be satisfied.

The rejuvenation and the revitalization of the Sugar Industry with assurances of adequate funds for its various operations will have to be sourced from Private Enterprise. In this regard the privatisation of GuySuCo is recommended.

17.2 The commissioning of the Skeldon Factory was poorly managed and the Project should not have been taken over. It continues to require huge financial inflows to satisfy its

Capital and Routine needs. An effort should be made to seek adequate redress.

17.3 From as far back as 2009, the Industry has been unable to satisfy fully its Capital and Routine requirements. As a consequence improvements to Factory plant have been neglected due to an inordinate sum of money having to be spent on Skeldon factory. Factory efficiencies suffered.

17.4 All Estates are unable to break even in the short or medium term and unit costs of production are unacceptable. Whilst Albion, Rose Hall and Blairmont show prospects of improvement, Wales and Uitvlugt pose challenges to continuity. Additional cane farming on these two Estates is crucial to their survival.

17.5 The industry can no longer rely solely on the production of Raw Sugar. Added -value products are required. In addition to Skeldon, serious consideration should be given to Co-generation at a combined Albion/Rose Hall factory, on a green-field site, in the near future, provided this project could be co-funded by private capital.

17.6 The unit cost at East Demerara Estate is amongst the highest in GuySuCo. The proposed upgrade of Enmore Factory, recommended in 2010, at a cost of G$466 million, should be implemented to further the interest of value-added packaged sugar produced at this location. It should be noted, however, that this upgrade should be commensurate with matching field production.

17.7 The 2009 - 2013 and 2013-2017 plans have been overtaken by recent events and the projections are unrealistic.

17.8 With the conversion, at all factories, to load-cell cane scales, there is absolutely no justification for continuing with the current format for scale testing and this should be discontinued forthwith, and replaced by a reduced presence of representatives. The presence of several union representatives is considered a costly waste of human and financial resources.

17.9 All incentive schemes should be based on productivity and should have a high percentage attendance qualification requirement.

17.10 Given the possibility of a change in Management of the Industry, workers' entitlements should not be compromised. Leasing of land to qualified permanent workers for agricultural purposes may be one of the favourable considerations.

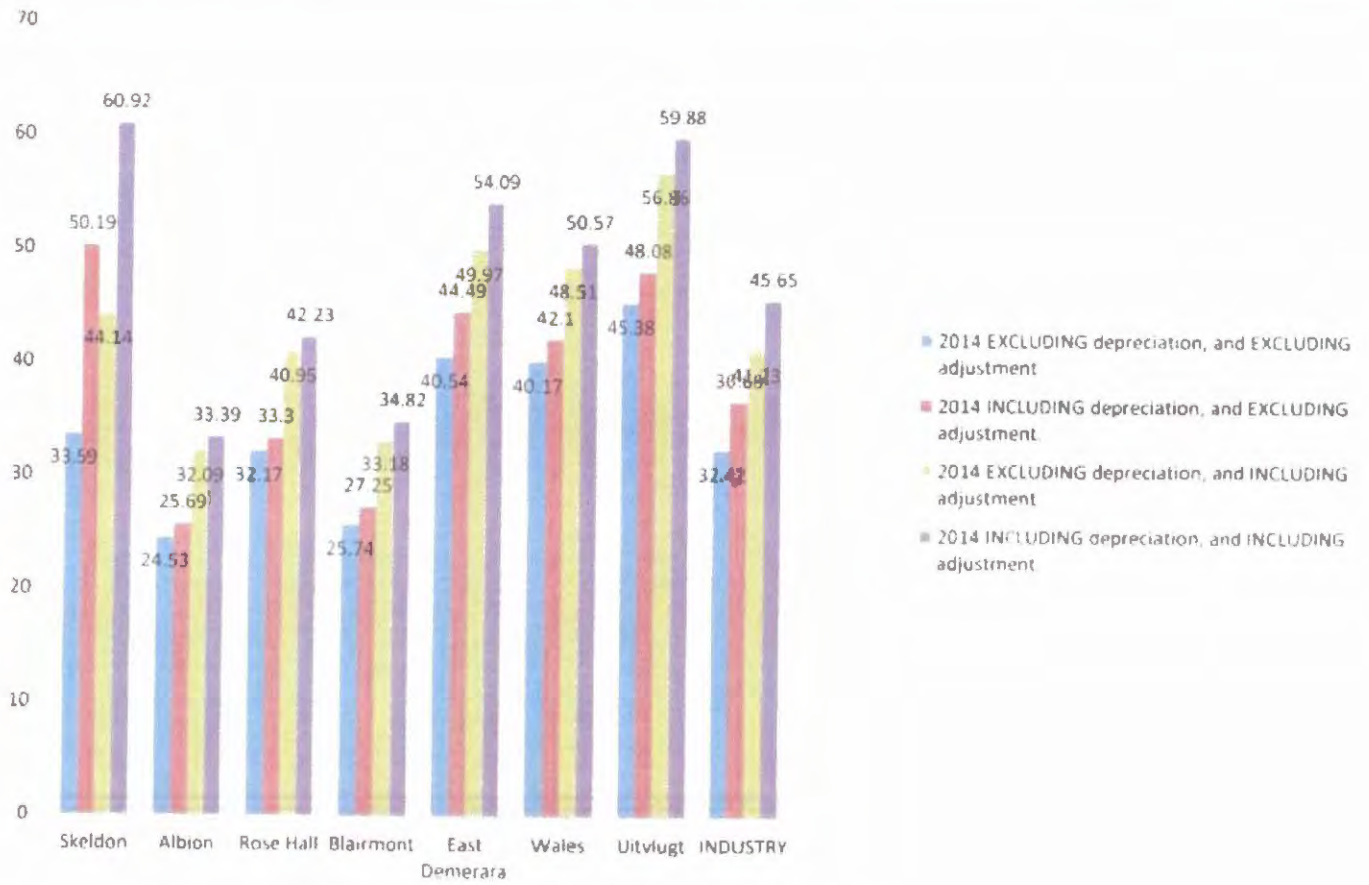
17.11 Every effort should be made to maintain staff houses and other staff welfare facilities in a proper state, as visits to Estates have revealed that, on most locations, there is need for considerable improvement. The reason for the neglect has reportedly been the non-availability of funds.

18 SUMMARY OF FINDINGS & RECOMMENDATIONS

	SUMMARY OF FINDINGS	RECOMMENDATIONS
1.	The commissioning of the new Skeldon factory was a disaster. The factory should **not** have been accepted with so many faults.	Redress should be sought from the Project Managers and/or Turn-key contractor.
2.	Adequately trained local counterparts were not in place before commissioning of the Skeldon factory. This is considered a major oversight.	Additional training, especially in the areas of automation, is required to cope with the new technology at SWR and other estates.
3.	Specification of sand and ash %cane of <3% for the new Skeldon factory is considered to have been a major blunder.	Consider changing the Boiler Pin-hole grates to Continuous Ash Discharge (CAD) stokers to cope with the high levels.
4.	The exclusion of Rotary Vacuum Filters from the design of the Skeldon Factory was a flawed decision.	Install Rotary Vacuum filters and bagacillo collection system of sufficient capacity.
5.	There appears to be an absence of adequate drawings of the new Skeldon plant (drawings are vital for the proper understanding of the functioning of equipment).	Request Booker-Tate and/or CNTIC to supply a complete set of drawings (in English).
6.	Entrainment has prevented the use of 1st vapour condensate at Skeldon.	Better control of boiling levels in the 1st effect evaporators is suggested, in the first instance.
7.	Increased mechanization has resulted in high levels of extraneous matter (especially field soil).	Better supervision of harvesting operations, especially during wet weather.
8.	All factories, except Skeldon, were starved of funding for Capital and routine expenditure, as far back as 2009. This situation precipitated the substandard performance of the other factories.	Funds must be made available to put the factories in reasonable operating mode.
9.	Some staff displayed inexperience in basic factory operations.	Accelerate training.
10.	Restructuring of Factory Ops. H/O is an urgent necessity for better work distribution and efficiency.	Refer to suggested structure in Appendix Fac Ops 8.
11.	The sale of the Steam & Power component of the Skeldon factory to Skeldon Energy Inc. is disadvantageous to GuySuCo.	Seek reversal of this sale.
12.	The rates per KWH for sale of power to G.P.L. from the co-gen plant at Skeldon are too low.	Seek a renegotiation of the Power Purchase Agreement between Guy5uCo and GPL.
13.	GV and ICBU suffer immensely from shortage of canes.	These Estates should be rationalized should additional canes not be forthcoming from farmers.
14.	Cane Scale testing on Estates wastes valuable and scarce resources.	With the advent and accuracy of Load Cells it is not necessary to check scales on a weekly basis.
15.	Staff welfare facilities have suffered from neglect in the past few years.	Funds should be made available to upkeep the facilities to enhance staff

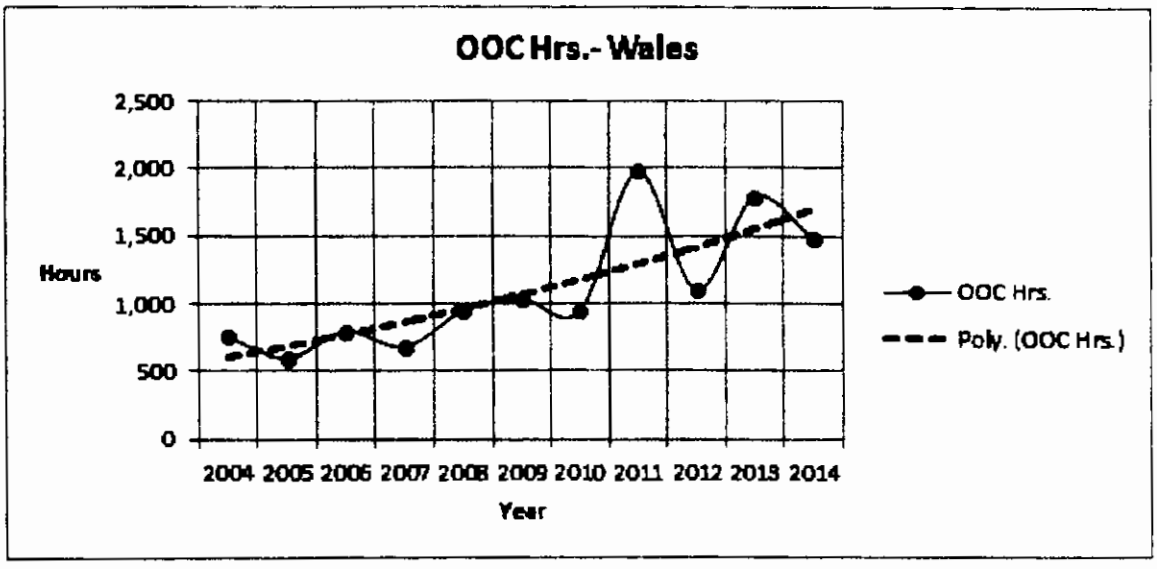
		morale.
16.	Factories have discontinued the measurement of the RS/A (Reducing sugars to Ash ratio), a measurement of the exhaustibility of molasses.	Factories to reintroduce this analysis with immediate effect.
17.	Externally influenced management decisions were not in the best interest s of informed technical decisions.	Management must be given the freedom to act professionally.
18.	In aggregate, huge sums of money are required to put the industry on a satisfactory operating mode.	Urgently encourage and involve the private sector in the management of the Industry.
19.	The Co-gen aspect, amongst others, of the Skeldon factory, requires immediate technical assistance .	Provide assistance at the earliest opportunity bearing in mind the financial benefits of Co-Gen.
20.	DST not operating at maximum capacity and efficiency.	Dredge the Demerara Navigational Channel to increase sugar cargo levels.

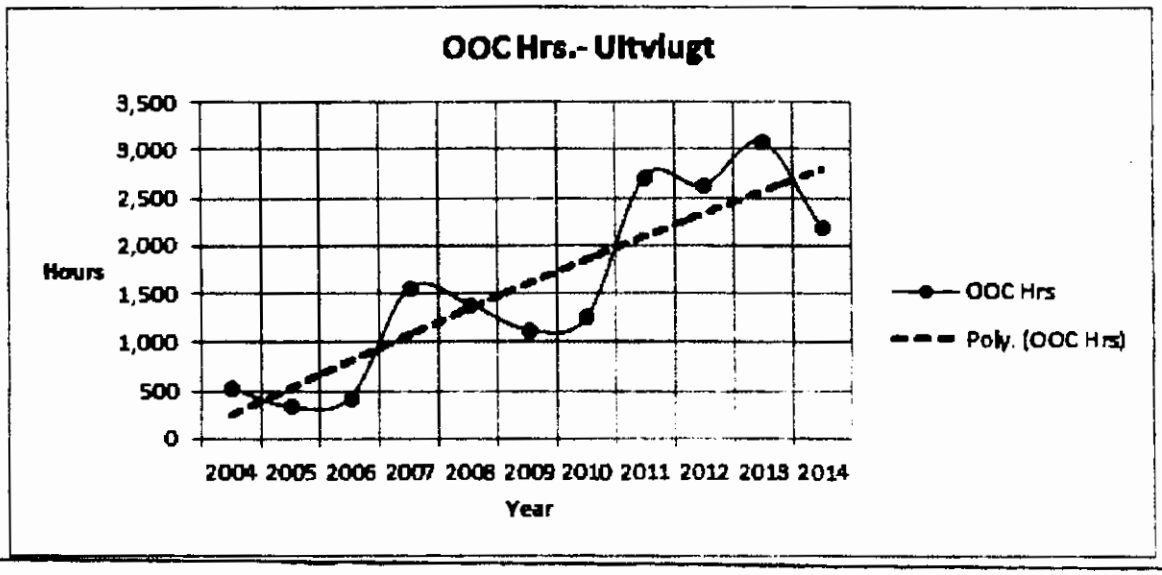
APPENDIX Fac Ops 1



ESTATES 2014 PRODUCTION COSTS
(US cents/lb)

APPENDIX FAC OPS. 2





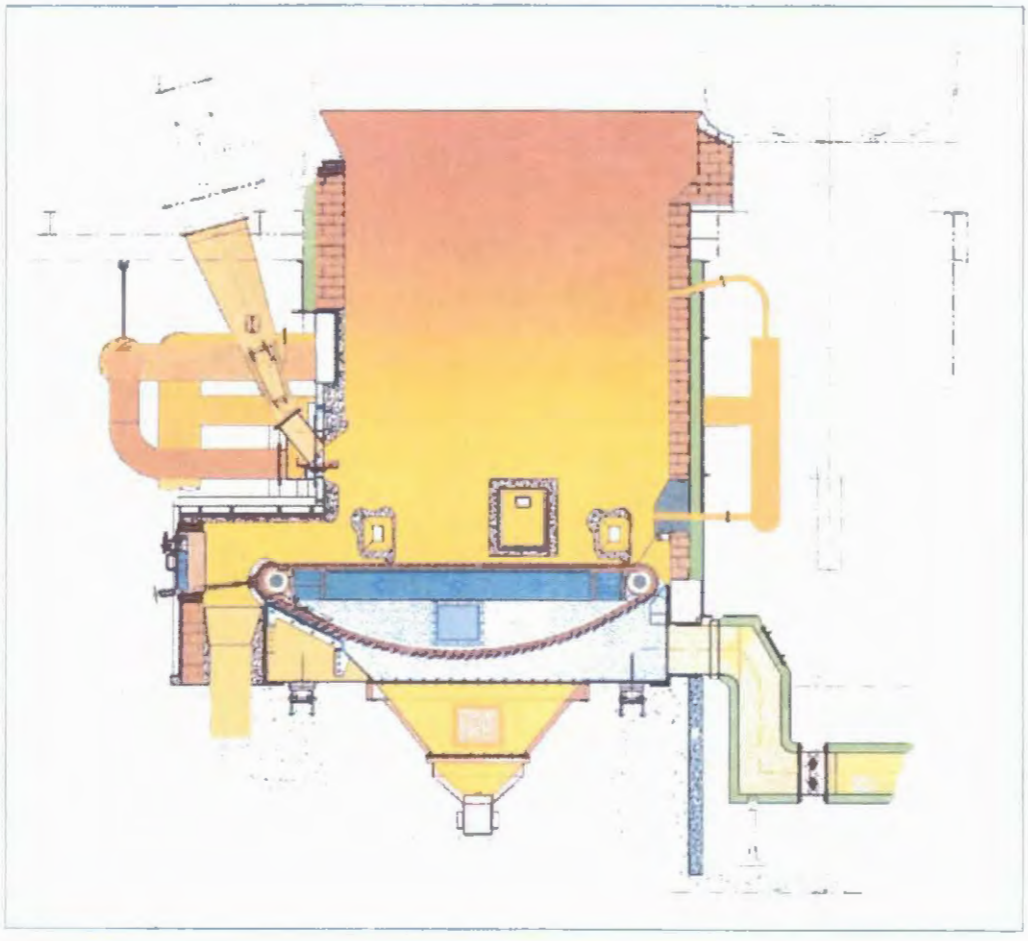
Year	Wales	Ultvlugt
2004	756	530
2005	599	343
2006	796	441
2007	680	1,559
2008	947	1,392
2009	1,037	1,132
2010	942	1,256
2011	1,972	2,719
2012	1,102	2,628
2013	1,786	3,080
2014	1,489	2,190

APPENDIX FAC OPS 3

Case Study No.38
Continuous Ash Discharge Stoker Retrofit on Two Boilers

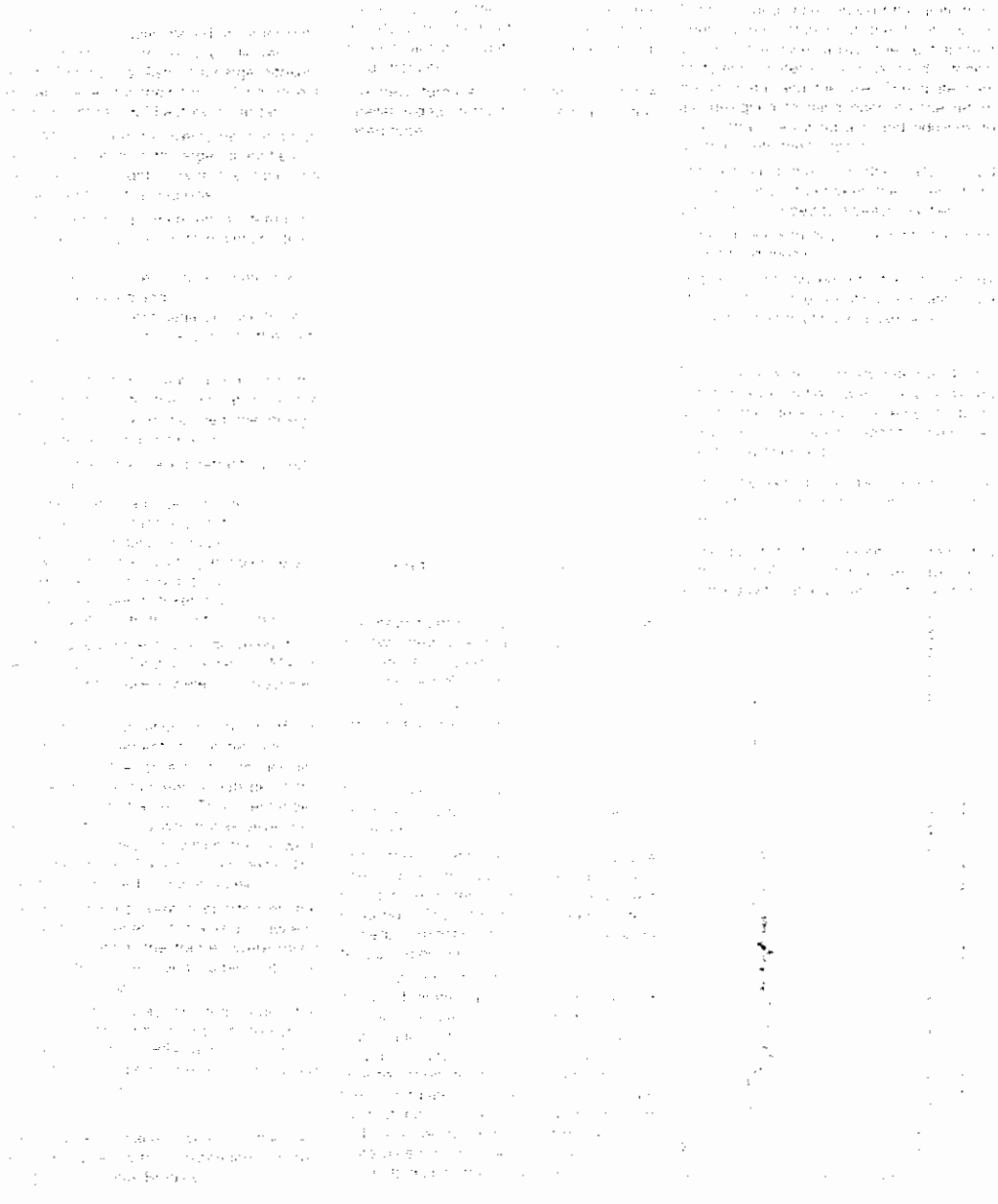
Features

- Catenary tensioned
- Continuous ash removal
- Self cleaning
- Variable speed drive
- Improved boiler availability
- Handles a wide range of fuels
- High combustion efficiency
- Low maintenance
- Uniform fuel and air distribution resulting in stable combustion



john thompson

ACTOM



APPENDIX FAC OPS 4

GCI FACTORY TEAMS VISITS TO ESTATES AND RELATED DEPARTMENTS AND SENIOR PERSONNEL WITH WHOM INTERACTED

ITEM	VISIT DATE	ESTATE / DEPT.VISITED	ESTATE MANAGER	AGRICULTURE MANAGER	FACTORY MANAGER	FINANCE MANAGER	HUMAN RESOURCES MANAGER	OTHER
1	THUR., 02-07-2015	SKELDON	J.LONCKE (AG)	N.PHOENIX	B.PERSAUD(AG)	A.POORAN(AG)	MS. K. DeFREITAS	-
2	FRI., 03-07-2015	SKELDON	J.LONCKE(AG)	N.PHOENIX	B.PERSAUD (AG)	A.POORAN(AG)	MS. K. DeFREITAS	-
3	WED., 08-07-2015	ALBION	H.GRIFFITH(AG)	I.SUCOOR (AG)	N.PERSAUD	-	V.WALTERS	-
4	THUR., 09-07-2015	ROSEHALL	Y.MANNA	V.SUBRAMANI	DEODAT SINGH	MS.M.PETERKIN	A.SINGH	-
5	TUES., 14-07-2015	BLAIRMONT	V.RAMNANDAN	F.PERSAUD	B.DHANRAJ	D.CHETRAM	L.PERSAUD	-
6	WED., 15-07-2015	EAST DEMERARA ESTATE(EHP)	C.VICTORINE	J.THOMAS(AG)	N.PERMANAND	MS.S.BRISTOL	R.HANIFF	-
7	THUR., 16-07-2015	WALES	T.SIMON(AG)	D.DHANRAM(AG)	C. OYEYIPO (AG)	MS.J.DOLPHIN(AG)	D.WILLIAMS	-
8	FRI., 17-07-2015	EAST DEMERARA ESTATE(LBI)	C.VICTORINE	-	-	-	-	FIELD MECHANISATION MEETING— R.BANGSTER, Y.PERSAUD, ANDRE PAUL, W.COLLINS (REG. WORKSHOP MANAGER), C. MACK
9	TUES., 21-07-2015	UITVLUGT	Y.PERSAUD	N.NARINE	L.MILES	P.RAMPERSAUD	MS.N.BEARS	
10	TUES., 28-07-2015							FACTORY OPERATIONS DEPT.(LBI) Y.ABDUL,G.M TECHNICAL SERVICES
11	FRI., 31-07-2015	ALBION	H.GRIFFITH(AG)	I.SUCOOR (AG)	N.PERSAUD	-	V.WALTERS	-
12	FRI., 31-07-2015	ROSEHALL	Y.MANNA	V.SUBRAMANI	DEODAT SINGH	-	A.SINGH	-
13	THUR., 06-08-2015	BLAIRMONT	V.RAMNANDAN	P.PERSAUD	B.DHANRAJ	D.CHETRAM	L.PERSAUD	-
14	THUR., 13-08-2015	EAST DEMERARA ESTATE(EHP)	C.VICTORINE	S.SADIQ	N.PERMANAND	-	R.HANIFF	-
15	WED., 19-08-2015	-	-	-	-	-	-	DEMERARA SUGAR TERMINALS— R.FERREIRA MANAGER
16	WED., 19-08-2015	-	-	-	-	-	-	FACTORY OPERATIONS (LBI) – D.SHARMA, MANAGER
17	THUR., 20-08-2015	UITVLUGT	Y.PERSAUD	N.NARINE	L.MILES	P.RAMPERSAUD	MS N.BEARS	-
18	SUN., 23-08-2015		-	-	-	-	-	FACTORY OPERATIONS (LBI) – D.SHARMA, MANAGER
19	WED., 26-08-2015	-	-	-	-	-	-	MATERIALS MANAGEMENT DEPT..OGLE– V.GOBERDHAN, MANAGER,
20	THUR., 27-08-2015	ROSEHALL	Y.MANNA	V.SUBRAMANI	DEODAT SINGH	-	A.SINGH	-
21	THUR., 27-08-2015	SKELDON	K.BRAMDEO	N.PHOENIX	J.LONCKE	-	K.DeFREITAS	
22	FRI., 28-08-2015	SKELDON	K.BRAMDEO	N.PHOENIX	J.LONCKE	-	K.DeFREITAS	

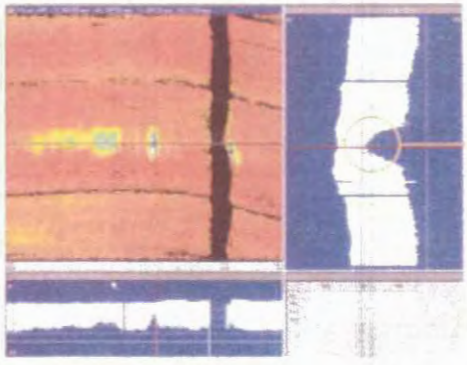
COMMENTS

1) On arrival on estates,the team met firstly with Estate Managers and heads of the various departments.
2) Various aspects of estates' operations and,in particular,the 2015 sugar production estimates were examined in great detail.Historical performances in both field and factory were noted and strengths and weaknesses identified.
3) Some visits to Estates and Departments were made either singly or jointly with the Field Team when the opportunity was taken to visit estates' factories as well as fields.Careful note was taken of the levels of maintenance matter presented to factories and its impact on operations
4) Visits to factories during the non-grinding and grinding periods enabled the team to assess clearly the impact on operations of the severe financial constraints.
5) The impact on field operations of the financial constraints were also noted.
6) Staff welfare was also taken into account.
7) A very lively interaction with management and non-management workers was evident throughout the visits.

INTERNAL ROTATING INSPECTION SYSTEM
HIGH-SPEED ULTRASOUND OPTION

NONFERROUS HEAT EXCHANGERS • NEST-DRUM • AIR COOLERS • SHELL • CARBON STEEL HEAT EXCHANGERS

IRIS



Sheet1

APPENDIX FAC OPS. 6

TABLE OF MAJOR ROUTINE BUDGET COSTS – SKELDON FACTORY

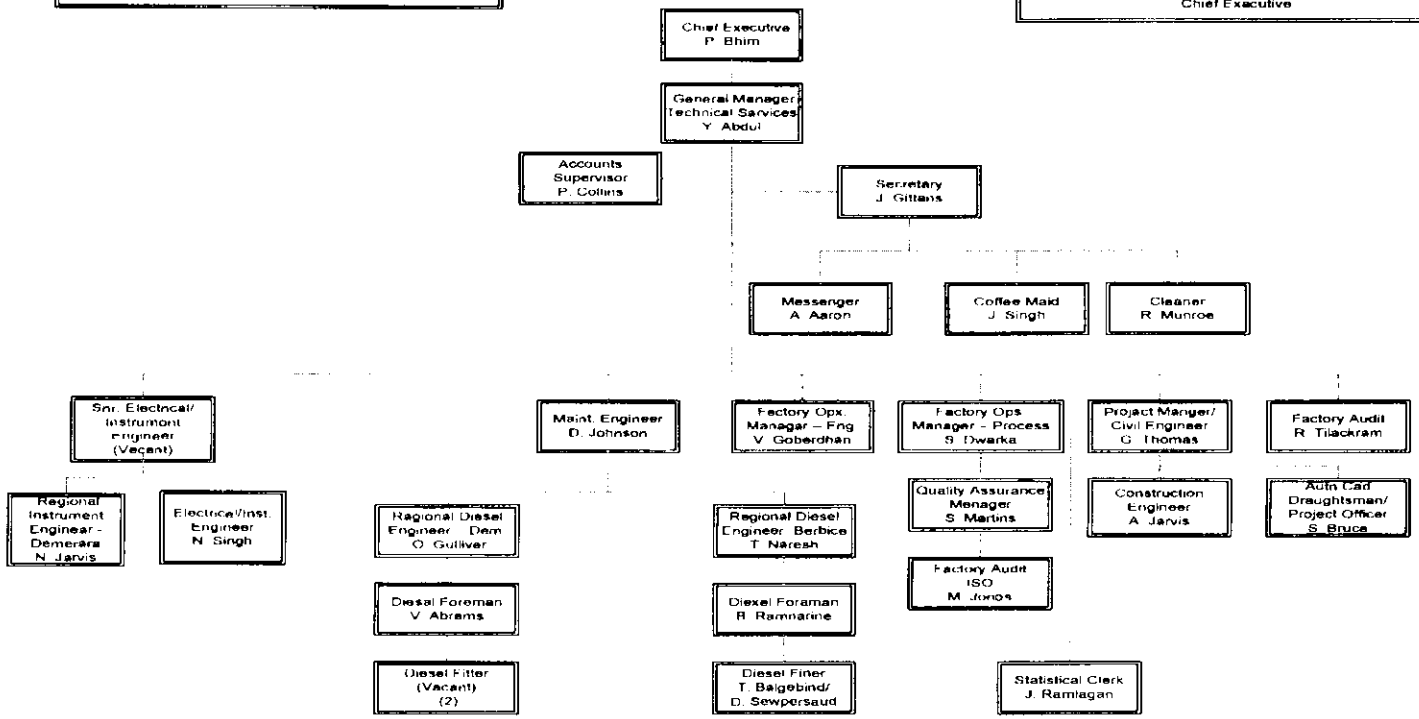
Item	2009	2010	2011	2012	2013	2014	2015
			MATERIALS				
Fuel HFO (Heavy Fuel Oil)	$311,734,272.00	$711,087,570.00	$196,205,205.00	$101,675,000.00	$48,230,000.00	$153,791,000.00	$1,511,000.00
Dieselene	$90,576,046.00	$95,014,023.00	$95,524,966.00	$15,186,662.00	$5,971,533.00	$6,672,081.00	
Lubricants	$21,361,996.00	$21,468,310.00	$19,897,556.00	$25,731,674.00	$35,082,508.00		
			OUTSIDE SERVICES				
Transportation Costs	$41,534,627.00	$95,376,002.00	$70,169,202.00		$63,975,459.00		
CNTIC Technical Support services rendered			$51,440,000.00				
CNTIC Technical Support services rendered			$30,561,095.00				
Consultancy/repairs Charges to No 2 boiler			$5,449,384.00				
			CO-GEN COSTS				
Fuel HFO (Heavy Fuel Oil)	$60,775,768.00						
Dieselene				$6,721,672.00			
Lubricants				$11,328,931.00		$28,986,965.00	
Caustic Soda		$12,044,951.00	$1,157,384.00				
Lower Air Preheater Tubes						$10,188,874.00	$15,096,938
Repairs to #1 DG Turbocharger						$6,315,840.00	
Pivotal Shoe Radial Bearing Pad							$6,162,584
Descale Back Pressure Steam Turbine							$9,767,707
Service technicians, tools & consumables						$28,282,538.00	
TOTAL CO-GEN COSTS=						**$73,774,017.00**	

APPENDIX FAC OPS 7

Factory Operations Department

Certified by. _____ Head of Dopartment

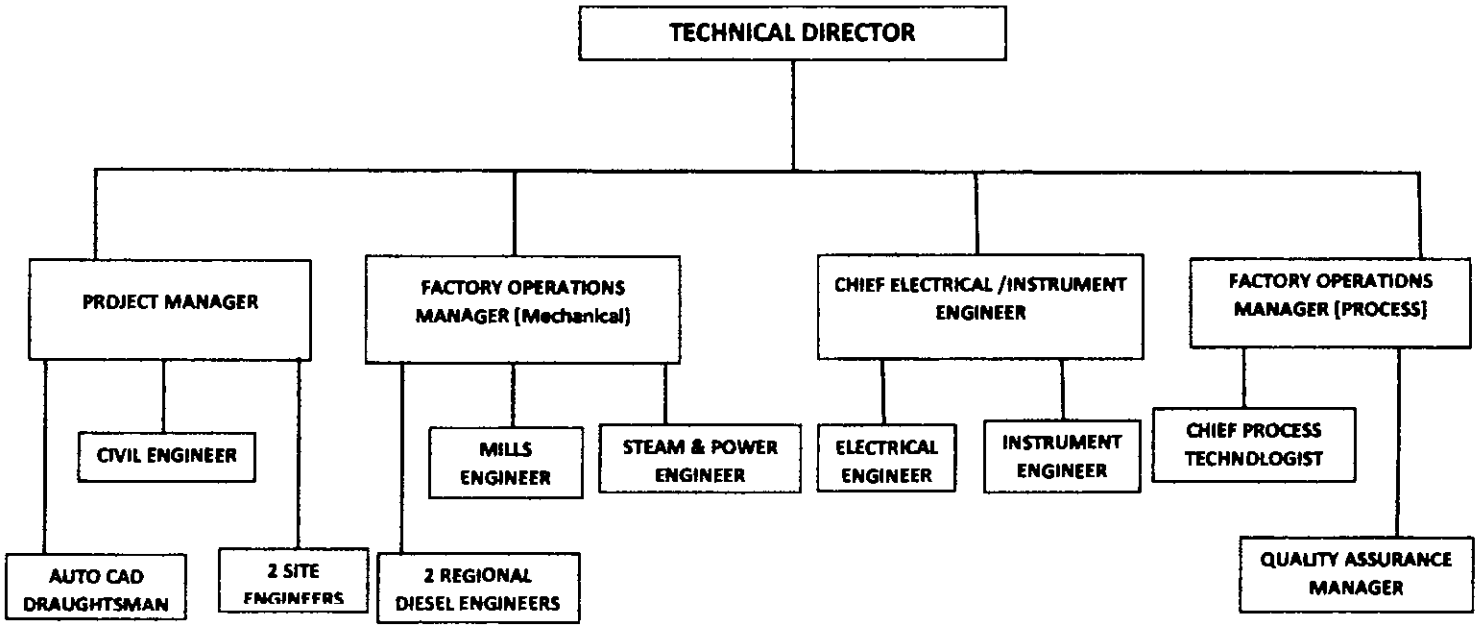
Approved by _____ Chief Executive



This position of the boxes on this chart are for purposes of identifying reporting relationships only. They are not meant to portray either status or grade.

APPENDIX FAC OPS 8

17



CEH

APPENDIX FAC OPS 9
Priority Factory Projects
2016 - 2020

Skeldon G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Overhaul of diffuser gearbox.	25				
2.	Replace critical inst. for evap. and CVP.	5	5		5	5
3.	Repairs to sugar and molasses wharf.	10	20	15		
4.	Factory Workshop and Install Machinery.	20	20	15		
5.	Replace inboard dumper with winch system	100	100			
6.	Repairs to sugar drier	5	5			
7.	Replace X002 gearbox and drive.	7				
8.	Replace Bob Cat and tractor and trailer		10	15		
9.	Rotate shredder 180◦.	20				
10.	Replace scratcher structure and front end loader.		25	20		
11.	Modify infeed carrier sprockets and chain.		10	5		
12.	Replace critical pumps and drive.		10	10	10	10
13.	Install external separator to evaporator.	20	5	5		
14.	Replace air compressors		10	10		
15.	Replace lifting screws and drives on diffuser.	7	7	5		
16.	Replace mill reduction gearbox components		40	20		
17.	Improvements to roads and access way.	5	5	10	5	5
18.	Replace tubes in boiler No. 2.	100	200	200		50
19.	Replace ID fans.	10	25	15		
20.	Install feed water pumps on boilers.	20	10			20
21.	Install mud removal system.	10	5			
22.	Install seed receiver.		10	10		
23.	Replace condenser and heaters.		10	10	10	10
24.	Automation of bagasse feeding.	15	10			
25.	Replace diffuser chain components					70
	Total	**379**	**542**	**365**	**30**	**170**

Priority Factory Projects
2016 - 2020

Albion G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Install carding drum.		5	5		
2.	Automation of cane carrier system.	5	10	5		
3.	Mill intercarrier gearbox replacement	7	7	7		
4.	Install 1 tonne crane workshop.		5			
5.	Refurbish mills and headstocks.	10	10	10	10	
6.	Replace gantry motor and resistance bank.	10	5	5		
7.	Install punt dumper		100	100		
8.	Install evaporator.		30	30		
9.	Install vacuum pan		30	30		
10.	Upgrade clarifier		15	15		
11.	Install OC filter.		10	20		
12.	Replacement of pumps and drives	10	10	10	10	10
13.	Replace air compressor.	10	10			15
14.	Overhauls of turbine and alternator	15	15	15	15	15
15.	Upgrade of switchboard.	10	10	10		
16.	Power factor correction.	10	10	10		10
17.	Extend bagasse logie.		15	15		
18.	Upgrade No. 3 boiler.		70	20		
19.	Install boiler feed water pump.		15	15		
20.	Replacement of lab equipment.		10	10		
21.	Replace front end loader.		15			
22.	Replace mill intercarrier chain and drive				50	50
23.	Overhaul of mill turbines				15	15
24.	Repair to mill revetment civil foundation				30	20
	Total	**87**	**407**	**332**	**130**	**135**

Priority Factory Projects
2016 - 2020

Rose Hall G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Install punt dumpers.		100	100		
2.	Upgrade of cane prep. Equipment.		75	75		
3.	Replacement of pumps and drives.	10	10	10	10	10
4.	Refurbish milling plant.		20	20	20	20
5.	Install donnelly chute.		20	20	15	
6.	Install boiler feed pump.		10	10		
7.	Replace condensate tank		20	10		
8.	Replace ID fan.		10	10	10	10
9.	Upgrade of boilers.		150	150	75	75
10.	Install diesel gen set.	15	20	20		
11.	Replace low grade centrifugal.	20	20	10		
12.	Upgrade cane carrier system.		10	10		
13.	Replace air compressor.	7	10			10
14.	Replace front end loader.		15			
15.	Replace lab instrument.	5	5	5		
16.	Extend bagasse logic.		15	15		
17.	Repair sugar and molasses wharf.	20	20			
18.	Replace boat engine.	3				5
19.	Install crane for mill lathe.	7				
20.	Upgrade of mill turbines.		75	75		
21.	Replace condensers.		15	15	15	15
22.	Replace low grade crystallisers and drives.	20	15	15	15	15
23.	Upgrade of sugar house building.	7	7	7		
24.	Replace workshop machine.	7	7	5		
	Total	**121**	**649**	**582**	**160**	**160**

Priority Factory Projects
2016 - 2020

Blairmont G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Upgrade of cane prep. Equipment.		150	50		
2.	Replace mill gearing	20	20	20		20
3.	Upgrade No. 3 boiler.		40	40		
4.	Install 2.5 MW turbines and generators.		100	100		
5.	Upgrade power house switchboard.	20	20	20		20
6.	Replace pump and drives.	5	10	10	10	10
7.	Replacement of front end loader.		15			
8.	Replace centrifugal.	25	25	10		
9.	Replace mill house crane.		10	10		
10.	Replace compressors.	15	10			
11.	Install mud filter.	25	25			
12.	Replace lab equipment.	5	5	5		
13.	Mill upgrade.	20	20	20	20	
14.	Replace ID fan.	10	10			
15.	Building repairs.	7	7	7		
16.	Replace condenser.	10	10	10	10	10
17.	Extend bagasse logie		15	10		
18.	Replace mill turbines.		40	10		
19.	Replace workshop machine.	7	10	7		
	Total	**169**	**542**	**329**	**40**	**60**

Priority Factory Projects
2016 - 2020

Enmore G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Replace HD knife with reverse rotation - Ex LBI.	25	20			
2.	Repairs to pumps and drives.	5	10	10	10	10
3.	Mill refurbishment.	15	15	15	20	
4.	Install donnelley chute on No. 1 mill.	7			10	
5.	Upgrade of boilers.	15	10	15	15	15
6.	Replace ID fans.	15	10	10		
7.	Replace gearbox on bagasse carrier.	15	10			
8.	Replace mud filters.	15	10			
9.	Install instrumentation on evaporator.	7	7	5		
10.	Upgrade of workshop equipment.	7	5	5	5	10
11.	Replace bagasse equipment.		15			
12.	Replace heaters and condensers.	15	15	15		
13.	Upgrade of power house bus bars.	10	10	10		
14.	Replacement of drainage pumps/drives.	25	25	20		20
	Total	**176**	**162**	**105**	**60**	**55**

Priority Factory Projects
2016 - 2020

Wales G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Install reverse assembly and cane conveyor.		75	75		
2.	Replace gantry motor and resistance bank.		15	10		15
3.	Upgrade of building structure .	7	7	7		
4.	Replace pumps and drives.	5	10	10	10	10
5.	Upgrade of mills and gearing.	20	20	10	15	20
6.	Upgrade of power house bus bar and switches.	10	10	5		
7.	Upgrades of boilers.	50	50	50	50	
8.	Reassemble crusher drive and headstock.	15	15			
9.	Replace lab instruments.	5	5	5		
10.	Replace cane carrier control.	10	5			
11.	Replace revetment to factory.	10	10	10		
12.	Upgrade and repairs to wharf.	5	10	10		
13.	Replace condensers and juice heaters.	15	10	10	10	10
14.	Replace HG and LG baskets.	20	25	15		
15.	Replace compressors.	7	7			
16.	Replace vacuum pans.	20		20		20
17.	Replace MCC with rubber conveyor				20	20
18.	Replace Bob Cat and Bagasse equipment.		15	10		
19.	Replace No. 2 boiler chimney.	10		15		
20.	Extend bagasse logie	10	10			
21.	Replace sugar barge and tug.	30	30			30
	Total	**249**	**329**	**262**	**105**	**125**

Priority Factory Projects
2016 - 2020

Uitvlugt G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1.	Upgrade of cane conveyor system.		15	15		
2.	Upgrade of leveller turbine.		30	10		
3.	Replacement of pumps and drives.	5	10	10	10	10
4.	Upgrade mill turbines.	15	25	25	25	
5.	Replace intergearing/reducer internals.	50	50	20		
6.	Upgrade of mills.	50	50	10	25	25
7.	Upgrade of boilers.	75	75	50		
8.	Replace boiler chimney.	20	15			
9.	Replace ID fans.	7	7			
10.	Replace lab instruments.	5	5	5		
11.	Replace bagasse equipment.		15			
12.	Replace workshop equipment.	5	5	5		
13.	Building upgrade.		10	5		15
14.	Install molasses tank.	20	10			
15.	Replace juice heaters	15	10	10		10
16.	Replace bagasse carrier gearbox.	7	7			
17.	Replace condensers.	15	10	10	10	10
18.	Replace centrifugals.	20	20	20		
19.	Install syrup clarifier.	10				10
20.	Replace revetment to factory.	10	10			
21.	Power factor correction.	7	7	7		
	Total	**336**	**386**	**202**	**70**	**80**

Cogeneration Plant 5 Years Projection

G$ MILLION

No.	Description	2016	2017	2018	2019	2020
1	Replace scratcher structure and front end loader.		25	20		
2	Replace air compressors		10	10		
3	Replace tubes in boiler No. 2.	100	200	200	50	75
4	Replace ID fans.	10	25	15		
5	Install feed water pumps on boilers.	20	10			25
6	Automation of bagasse feeding.	15	10			
	Total	**145**	**280**	**245**	**50**	**100**

MARKET ANALYSIS

Table of Contents

The data with respect to year 2025 are intended to be representative of the years 2025 thru' 2029 since no significant changes are expected to take place during those years.

Introduction

In July, 2015, The Government of Guyana established a commission to enquire into the operations of the Guyana Sugar Corporation (Guysuco), and to develop, to the extent possible, a plan to bring the sugar industry back to profitability. The common tasks included a report and recommendations on a series of operational areas including the marketing of the corporation's bulk sugar, and value added and by-products.

This report addresses all aspects of the aforementioned area and recommends ways forward. It is informed by estate visits, discussions with local and foreign stakeholders and the gathering of information from a wide variety of sources.

- The base figures used are actual for 2014 and projections will be for two 5-year periods and one six year period: 1. 2015 – 2019; 2. 2020 – 2024; 3) 2025 – 2030.

As at the end of 2014, Guyana's main markets for sugar were the European Union (EU) – 75%, Local – 12%, USA – 7%, and CARICOM – 6%. Each market is dealt with in turn along with a recommendation or recommendations.

The EU

Since Guyana exports as much as 75% of its production to the EU, any analysis must take into account what is likely to happen after 30 September, 2017 when quotas are abolished and there will be no distinction between quota and out-of-quota sugar. There will then be open competition with other countries exporting sugar to the EU and at a price more or less equal to the world price.

After 2017, prices in the EU will follow world prices up and down in a liberalised market situation. Imports will decrease as the EU sugar price falls. Guyana can continue to export sugar to the EU, more particularly to Tate & Lyle (T&L) since the refineries in London are not 'modern' and can continue to accept Guyana's relatively low quality sugar: 96^0 – 97^0 pol. However, according to the representative of Guysuco's marketing agent, even T&L would have a problem accepting sugar of a lower quality (based on a recent sample from Skeldon (SWR) estate) and other refineries would not do so unless price-reducing penalties are applied.

Over time, changing consumer preferences will also result in market share being taken by non-sugar low calorie sweeteners like stevia, splenda and sucralose in addition to artificial sweeteners like aspartame and saccharin (though it must be conceded that the latter two are being phased out). The foregoing suggests that:

- Guyana will continue to export sugar to the EU;
- There will however have to be a reordering of market priorities dependent upon the revenue-earning ability of each and the quantities associated therewith.
- We propose the following in order of priority: Local, Caricom, USA, EU. The EU will have moved from being a priority market to being a residual market though the largest quantities will continue to be exported there.
- However, this ordering could well change dependent on movement in WMP's. It could be argued that there is a direct relationship between the price obtained in the EU and the WMP. As the WMP increases (as it has since the end of July 2015), the price obtained in the EU (the market to which most of Guyana's sugar is exported) also increases.

The USA

Guyana exports approximately 12,700 tonnes of bulk sugar per annum to the USA under that country's Tariff Rate Quota System, and it is assumed that this will continue throughout the period under consideration. This quantity can increase under special circumstances though these are not easily predicted.

There is also a market for Guyana's special value-added sugar in the USA and Canada. It was intended to ship packaged Demerara Gold (DG) to these markets. However, after a lawsuit which was lost, DG can no longer be exported to North America as an exclusive Guyanese product.

Enmore estate (EHP) is producing "new" packaged sugar under the brand name "Enmore Crystals" (EC). The following is recommended:

- The name (or whatever may be the finally agreed name, e.g. Demerara Crystals) must be registered as a trade mark in Guyana and North America.
- Further, EC would be "new" to the diaspora. The package should therefore carry information easily identifying the origin of the sugar, especially the word "Demerara" along with other words e.g. 'grown in', 'original', 'genuine'.
- The foregoing must be accompanied by an aggressive, informative advertising campaign including comparative reference to 'Demerara Gold' as far as the law would permit. Later, dependent on the response, Guysuco could revert to reminder advertising.
- These advertising campaigns, paid for by Guysuco, could be carried out by whoever is responsible for the distribution of the sugar. The projected value of value-added

exports to the USA and Canada over the three year period 2015 – 2017 is US$1,681,000. This suggests that the cost to Guysuco for the information advertisements over the same period would be US$336,000. As was stated before, advertisements post 2017 would be reminder advertisements and these would cost significantly less.

Local

As was stated, the local market accounts for approximately 12% of Guysuco"s production in the form of bagged and packaged sugar. On the local market, more than 18,000 tonnes of bagged sugar were sold in 2014 and only 2665 tonnes of DG. A rather unsatisfactory state of affairs if Guysuco is to earn more revenue from local sales without increasing the price sugar. It is recommended:

- More DG packaged sugar be deliberately made available on the local market to gradually, as it were, wean the population off bagged sugar, albeit forceably. The likely results are reflected in the tables.
- Both packaged and bulk sugar are currently together available in the supermarkets. However, if only one type were available, that type (packaged) will have to be purchased at the relatively remunerative price of US$.26/lb. It is to be noted that any increases in price must be approved by the relevant government authority.
- At least 9,000 tonnes will continue to be consumed locally.

CARICOM

EHP factory has a capacity to package 40,000 tonnes which it has never done, while Blairmont Estate can package up to 10,000 tonnes. The price received for DG in CARICOM is approximately US$.33/lb (the highest return). Intuitively, it would seem that more DG would have to be promoted and shipped to CARICOM (cf. 2343 tonnes shipped in 2014).

Since there are other countries in the region e.g. Belize and Guatemala which are ready to ship sugar to the sugar consuming member states in CARICOM, both Guyana's packaged and bagged sugars must be marketed more aggressively to retain market share and premium prices.

DG is already known in the region and, in this regard, reminder advertising should be carried out. Guysuco currently pays about US$56,000 to its distributor in Trinidad to promote its sugar in the region. These advertisements must continue. This is primarily because in a situation of low world market prices (WMP), importers can purchase higher quality sugar outside of the region, pay the Common External Tariff (CET) and it would still be cheaper than purchasing sugar from a member country exporter like Guyana at a premium price.

There is a readily quantified market for refined sugar in the region, including Guyana. Indeed, Guyana imports refined sugar from Guatemala for use in the beverage industry and others which need that type of sugar to produce the best version of their final product (jams and jellies). The CARICOM market is estimated to be in the vicinity of 200,000 tonnes.

The SSMP had earmarked Skeldon estate to satisfy this refined sugar market. Having regard to all the well-known circumstances, it can be stated that this will never happen.

- However, if funding could be found to establish a refinery, as was stated above there would be a ready market for refined sugar for Guyana at a price in excess of US$. 30c/lb. Of course, under such circumstances, Guyana (Guysuco) would no longer expend foreign exchange to import refined sugar (from Guatemala).

Molasses

In 2014, the majority of Guysuco's molasses was shipped to the 'Other Islands' and Barbados, with DDL placing a significant third. Assuming that exports to all the current markets continue at negotiated prices:

- Guysuco must more seriously examine the possibility of selling (and exporting) molasses in small (400 – 500 ml.) bottles with the necessary promotion.
- Care must be taken, however, to ensure that any health benefits claimed could be verified as accurate so that the corporation would not be liable for damages for making false claims. This is especially the case when the product is exported to the USA and Canada

Co-Generation.

There is no significant revenue to be earned from the sale of bagasse at present. It is recommended that:

- All factories capable of generating excess power benefit from this value-added activity

- More particularly with respect to SWR, the sale of bagasse to the newly created company SEI should be discontinued and the creation of the company reversed. (This topic is discussed more extensively in section 14 of the "Factries" report.)

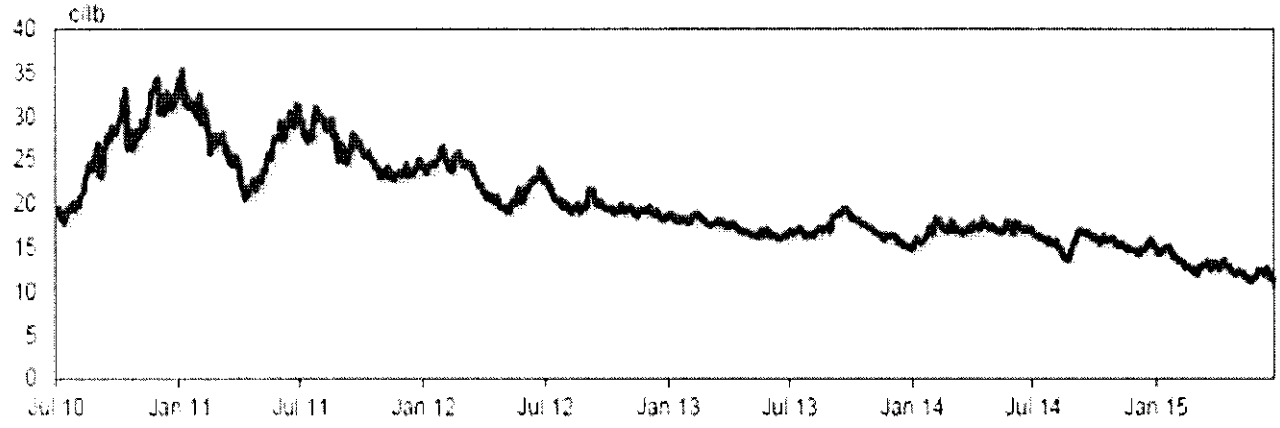
Price

The FAO and OECD of the UN project a gentle recovery of prices over the next decade, but a decline in real terms. Output will grow faster than demand over the long term (2015 – 2024) painting a downbeat picture on prices – US$.16.6c/lb by 2024 up from US$.11c/lb given today's prices but down in real terms because of inflation. Further, because of sugar substitutes and the growth of health consciousness, global sugar consumption will increase only 2% per year up to 2024. The price in 2030 is predicted to rise to $US.19c/lb. There are many uncertain, unpredictable and even unknown factors which can and do influence the WMP, e.g. weather (particularly drought and flood).

There are also influential factors which can be regarded as known e.g. 1) the increase of low calorie sugar substitutes and the increase in health consciousness leading to an increase in the overall supply of sugar and the associated fall in prices, and 2) movements in the value of the Brazilian Real because Brazil accounts for more than 68% of the trade in raw sugar and 51% world trade. It is to be noted that the Brazilian economy is now officially in recession. Further, the movement of the US dollar can also have an impact on the WMP

where a strengthening of the dollar will have a negative impact on WMP's and vice-versa.

No.11 July 2010 to date



The diagram above was adopted from Czarnikow's Market Briefing to Guysuco as at July 2015 and shows the movement of WMP's from July 2010 to July 2015. It is to be noted that the WMP as at September 2015 was approximately US$. 11c/lb and US$. 13.2c/lb as at the beginning of October, 2015

Having regard to the foregoing, it was decided to use the most conservative WMP prices in the projections based on 2 factors:

- 1) the WMP is unlikely to ever fall below $US. 10c/lb, at least in nominal terms;
- 2) if the price exceeds $US. 18c/lb, revenue can only increase with a positive overall effect;
- Guysuco must exert every effort to produce high quality sugar for every market so as to be able to negotiate a price higher than the WMP, regardless of its level.
- The percentage by which the WMP increases every year will be the extent to which, where applicable, some of the prices Guysuco's obtains in its different markets increases. This, however, would not apply with respect to the local market.

General

It is accepted by all that with respect to Guysuco, the current status quo cannot continue. In that context, it must also be accepted that there no 'sacred cows'. Accordingly, 2018 must be the year when, if radical changes do not take place, some changes must begin. The simple underlying reason being that changes in the EU come into effect from 1st October, 2017. Radical changes would include the closure of factories in both Demerara and Berbice, since, for Guysuco to continue to exist as a sugar producer, at least one of the current seven must be closed so that 'bad ones would not continue to keep the good ones down'.

However, if all factories continue to produce sugar after 2017, changes in the industry must take place. It must first be accepted that, given the current structure of the world market, increases in overall revenue earnings can only take place if there are more exports to the more lucrative markets, since no significant increases in prices are projected. In fact, prices of exports when projected to increase from one year to another, only do so at the same relatively low rate that WMP's are projected to increase from that particular year to the next.

The changes which must take place must therefore result in a reduction in costs. Such changes include:

1. The rationalisation of the employment structure with respect to both management and non-management. In this regard, the questions to be answered are whether Guysuco employs more persons than are necessary for an efficient operation and whether a reduction in employment numbers and costs would result in a more effective and efficient operation.

2. There must be increased efficiency in both field and factory performance leading significant improvements in sugar yields and quality. Improvements in sugar quality will have a great impact on market acceptance and price. This is relevant to all markets, especially the EU as T&L advised, but not with respect to the local market where increases in revenue take place as the proportion between DC bagged and packaged sugar is deliberately being changed or as was stated before, with the approval of the relevant government authority.

The tables in the appendix show comparative increases in exports and earnings in all markets and are structured as follows:

Table 1. 2015 – 2017

Table ii. 2018 – 2020

Table iii. 2021 – 2023

Table iv. 2024 and 2025. The data with respect to year 2025 are intended to be representative of the years 2025 thru' 2029

The following should be noted:

1. The projections with respect to exports to the EU were supplied by Guysuco.
2. The projections with respect to exports of value-added to the USA and Canada assume that the recommended advertisements have taken place and have borne fruit.

APPENDIX

Table i

COMPARATIVE SUGAR SALES 2015 – 2017

Destination	Product	Quantity (tonnes)	Quantity	Quantity	Price $US/mt	Price	Price	Value US$ '000	Value	Value	Unit Price US$.c/lb	Unit Price	Unit Price
		2015	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**	**2015**	**2016**	**2017**
E.U.	Bulk	151,171	158,000	160,000	329	320	320	49,735	50,560	51,200	14.93	14.52	14.52
	DC Bagged	2,400	3,000	3,000	490	490	490	1,176	1,470	1,470	22.23	22.23	22.23
USA	Bulk	27,682	12,636	12,636	439	483	514	12,152	6,103	6,495	19.92	21.91	23.32
	DC Bagged	540	540	540	500	500	500	270	270	270	22.69	22.69	22.69
	Value Added	225	440	1,200	550	550	585	124	242	702	24.95	24.95	26.54
Canada	DC Bagged	540	540	540	500	500	532	270	270	287	22.69	22.69	24.14
	Value Added	225	250	600	550	550	585	124	138	351	24.95	24.95	26.54
CARICOM	DC Bagged	24,609	26,970	30,000	530	543	543	13,070	24,199	27,431	24.05	31.76	33.80
	Value Added	4239	5,000	15,000	689	695	740	2,930	3,261	2,220	31.26	31.53	33.58
Rest of Region	DC Bagged	164	1,000	1,500	700	700	700	115	700	1,050	31.76	31.76	31.76
	Value Added	478	600	800	805	800	800	385	480	640	36.52	36.30	36.30
Total Exports		**212,273**	**209,156**	**225,816**				**80,351**	**87,693**	**92,116**			
Local	DC Bagged	18,652	16,200	12,000	476	476	476	8,878	7,711	5,712	21.60	21.60	21.60
	Value Added	3,078	4,000	8,500	576	576	576	1,773	2,304	4,896	26.13	26.13	26.13
Total Local		**21,730**	**20,200**	**20,500**				**10,651**	**10,015**	**10,608**			
Total Bulk		**178,853**	**170,636**	**172,636**									
Total DC Bagged		46,905	48,250	47,580									
Total Value Added		8,245	10,290	26,100									
TOTAL SALES		**234,003**	**229,356**	**246,316**				**91,002**	**97,708**	**102,724**			
Production		227,443	233,612	255,052									

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Table ii

COMPARATIVE SUGAR SALES 2018 – 2020

Destination	Product	Quantity (tonnes)			Price $US/ mt			Value US$ '000			Unit Price US$.c/lb		
		2018	2019	2020	2018	2019	2020	2018	2019	2020	2018	2019	2020
E.U.	Bulk	170,000	190,000	205,000	332	330	330	56,440	62,700	67,650	15.06	14.97	14.97
	DC Bagged	3000	3000	3000	490	490	490	1,470	1,470	1,470	22.23	22.23	22.23
USA	Bulk	12,636	12636	12636	439	460	480	5,510	5,813	6,065	19.92	20.87	21.78
	DC Bagged	540	540	540	500	500	500	270	270	270	22.68	22.68	22.68
	Value Added	2000	3000	4000	595	625	625	1,190	1,875	2,500	27.00	28.36	28.36
Canada	DC Bagged	540	540	540	500	500	500	270	270	270	22.68	22.68	22.68
	Value Added	1000	2000	2500	595	625	625	595	1,250	1,563	27.00	28.36	28.36
CARICOM	DC Bagged	30000	30000	30000	530	530	530	15,900	15,900	15,900	24.05	24.05	24.05
	Value Added	6000	8000	10000	690	690	700	4,140	5,520	7,000	31.30	31.30	31.76
Rest of Region	DC Bagged	500	700	800	700	700	700	350	490	560	31.76	31.76	31.76
	Value Added	600	700	800	790	790	790	474	553	632	35.84	35.84	35.84
Total Exports		**226816**	**251116**	**269816**				**88,609**	**96,111**	103,880			
Local	DC Bagged	11500	10500	10000	476	476	476	5,474	4,998	4,760	21.59	21.59	21.59
	Value Added	10500	12500	13500	576	576	576	6,048	7,200	7,776	26.13	26.13	26.13
Total Local		**22000**	**23000**	**23500**				**11,522**	**12,198**	**12,536**			
Total Bulk		**182636**	**202636**	**217636**									
Total DC Bagged		46080	45780	44880									
Total Value Added		17100	21900	26800									
TOTAL SALES		**248816**	**274116**	**293316**				**100,131**	**108,309**	**116.416**			
Production		273361	290423	300774									

Table iii

COMPARATIVE SUGAR SALES 2021 – 2023

Destination	Product	Quantity (tonnes)			Price $US/ mt			Value US$ '000			Unit Price US$.c/lb		
		2021	2022	2023	2021	2022	2023	2021	2022	2023	2021	2022	2023
E.U.	Bulk	205,000	210,000	215,000	330	330	330	67,650	69,300	70,950	14.97	14.97	14.97
	DC Bagged	3000	3000	3000	490	490	490	1,470	1,470	1,470	22.23	22.23	22.23
USA	Bulk	12,636	12636	12636	480	480	480	6,065	6,065	6,065	19.92	20.87	21.78
	DC Bagged	540	540	540	500	500	500	270	270	270	22.68	22.68	22.68
	Value Added	5000	6000	7000	625	625	625	3,125	3,750	4,375	28.36	28.36	28.36
Canada	DC Bagged	540	540	540	500	500	500	270	270	270	22.68	22.68	22.68
	Value Added	3000	4000	4000	625	625	625	1,875	2,500	2,500	28.36	28.36	28.36
.CARICOM	DC Bagged	30000	30000	30000	530	530	530	15,900	15,900	15,900	24.05	24.05	24.05
	Value Added	10500	11500	12000	690	690	700	7,245	7,935	8,400	31.30	31.30	31.76
Rest of Region	DC Bagged	500	700	800	700	700	700	350	490	560	31.76	31.76	31.76
	Value Added	800	800	800	790	790	790	632	632	632	35.84	35.84	35.84
Total Exports		**271516**	**279716**	**286316**				**104,852**	**106,082**	**111,392**			
Local	DC Bagged	9000	9000	9000	476	476	476	4,284	4,284	4,284	21.59	21.59	21.59
	Value Added	14000	14500	15000	576	576	576	8,064	8,352	8,640	26.13	26.13	26.13
Total Local		**23000**	**23500**	**24000**				**12,348**	**12,636**	**12,924**			
Total Bulk		**217636**	**222636**	**227636**									
Total DC Bagged		43780	43580	43880									
Total Value Added		33300	36800	38800									
TOTAL SALES		**294516**	**303216**	**310316**				**117,200**	**118,718**	**124,316**			
Production		311668	316649	319013									

Table iv

COMPARATIVE SUGAR SALES 2024 – 2025

Destination	Product	Quantity (tonnes)		Price $US/ mt		Value US$ '000		Unit Price US$.c/lb	
		2024	2025	2024	2025	2024	2025	2024	2025
E.U.	Bulk	217,000	220,000	330	330	71,610	72,600	14.97	14.97
	DC Bagged	3000	3000	490	490	1,470	1,470	22.23	22.23
USA	Bulk	12,636	12636	480	480	6,065	6,065	19.92	20.87
	DC Bagged	540	540	500	500	270	270	22.68	22.68
	Value Added	7000	7000	625	625	4,375	4,375	28.36	28.36
Canada	DC Bagged	540	540	500	500	270	270	22.68	22.68
	Value Added	4000	4000	625	625	2,500	2,500	28.36	28.36
.CARICOM	DC Bagged	30000	30000	530	530	15,900	15,900	24.05	24.05
	Value Added	12000	12000	690	690	8,280	8,280	31.30	31.30
Rest of Region	DC Bagged	500	700	700	700	350	490	31.76	31.76
	Value Added	800	900	790	790	632	711	35.84	35.84
Total Exports		**288016**	**291316**			**111,722**	**112,931**		
Local	DC Bagged	9000	9000	476	476	4,284	4,284	21.59	21.59
	Value Added	15000	15000	576	576	8,640	8,640	26.13	26.13
Total Local		**24000**	**24000**			**12,924**	**12,924**		
Total Bulk		**217636**	**222636**						
Total DC Bagged		43780	43580						
Total Value Added		38800	38900						
TOTAL SALES		**312016**	**315316**			**124,646**	**125,855**		
Production		319904	320132						