Mission Statement

The mission statement of the Sugar Industry Authority is to enforce the provisions of the Sugar Industry Control Act, so as to ensure the viability of the sugar industry. This it does by taking a leadership role in the development of the industry and by being a strong and efficient organization with highly motivated and professional employees.
### SUGAR INDUSTRY AUTHORITY

**BOARD OF DIRECTORS FOR THE PERIOD**

**NOVEMBER 1, 2013 – OCTOBER 31, 2014**

<table>
<thead>
<tr>
<th>Name</th>
<th>Position</th>
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<tbody>
<tr>
<td>Ambassador Derick Heaven</td>
<td>Chairman</td>
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<tr>
<td>Mr. Robert Henriques</td>
<td>Member</td>
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<tr>
<td>Mr. Allan Rickards</td>
<td>Member</td>
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<tr>
<td>Mrs. Cynthia Sankar</td>
<td>Member</td>
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<tr>
<td>Dr. Huaixiang Wu</td>
<td>Member</td>
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<tr>
<td>Mr. Leonard Green</td>
<td>Member</td>
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<tr>
<td>Mr. Vincent Morrison</td>
<td>Member</td>
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<td>Mr. Peter Haley</td>
<td>Secretary</td>
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INTRODUCTION

The 2013/14 crop commenced at the Frome Sugar Factory on December 13, 2013 and ended at the Golden Grove Sugar Factory on July 21, 2014. The duration of the crop was 228 days compared to 211 days for the previous crop. It was a very promising crop which saw factories experiencing varying degrees of increases, ranging from 5% at the Frome Sugar Factory to 75% at the Everglades Sugar Factory. Appleton and Worthy Park Sugar Factories had their highest ever sugar output. While Everglades Sugar Factory made significant progress following its closure in 2011.

PRODUCTION

Sugar production for the 2013/14 crop was 154,361 tonnes of 96° sugar. This represents a 20% increase over the previous year’s figure of 128,196 tonnes. The volume of cane crushed, excluding cane to distilleries, increased by 27% to 1,779,258 tonnes when compared to the previous year’s figure of 1,402,564 tonnes. There were several factors responsible for the increase in production. Chief among them was the increased supply of cane from cane farmers. There was a 33% increase in cane supplied by farmers moving from 573,352 tonnes in 2012/2013 to 763,025 tonnes in 2013/2014. Cane supplied by the Estates also increased, surpassing the one million tonnes mark for the first time since 2008. The Estate produced 1,016,233 tonnes cane, 22% more than it produced in 2012/13. (See table below). The industry benefited from the almost ideal weather condition during the crop, with adequate rainfall during the growing period and favourable sunshine during the harvesting period.

Cane productivity increased during the period. This was reflected in the tonnes cane per hectare tc/h moving from 48.03 in 2012/13 to 59.89 in 2013/14. As mentioned before Appleton and Worthy Park Sugar Factories had their highest ever sugar output, producing 33,890 and 27,650 tonnes respectively. The Everglades Sugar Factory performed creditably producing 11,724 tonnes sugar in 2013/14 compared to 6,674 tonnes in 2012/13 and 3,984 tonnes made in 2011/12.
SELECTED PRODUCTION STATISTICS FOR THE 2013 & 2014 CROPS

<table>
<thead>
<tr>
<th></th>
<th>2013</th>
<th>2014</th>
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<tbody>
<tr>
<td>Cane Milled (‘000 tonnes)</td>
<td>1,402</td>
<td>1,779</td>
</tr>
<tr>
<td>Farmers</td>
<td>573</td>
<td>763</td>
</tr>
<tr>
<td>Estates</td>
<td>829</td>
<td>1,016</td>
</tr>
<tr>
<td>96º Sugar Production (‘000 tonnes)</td>
<td>128.20</td>
<td>154.36</td>
</tr>
<tr>
<td>Hectares Reaped (‘000)</td>
<td>29.00</td>
<td>29.70</td>
</tr>
<tr>
<td>Tonnes cane/hectare</td>
<td>48.03</td>
<td>59.89</td>
</tr>
<tr>
<td>Tonnes cane /tonne sugar</td>
<td>10.99</td>
<td>11.53</td>
</tr>
<tr>
<td>Tonnes sugar/hectare</td>
<td>4.39</td>
<td>5.20</td>
</tr>
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</table>
The Cane Expansion Programme continued throughout the year, with funds from the European Union made available through the Sugar Transformation Unit (STU) of the Ministry of Agriculture and Fisheries and managed by the Sugar Industry Authority. The programme provides loans to farmers as well as assistance with the installation of Drip Irrigation systems aimed at improving irrigation efficiency and productivity. During the 2013/2014 crop a total of 4,433 ha of canes were replanted, this represents 76% of the 5,851 targeted for the year.

Chart 2

CANE QUALITY & FACTORY EFFICIENCY

The Jamaica Recoverable Cane Sugar (JRCS), a measure of cane quality declined from 10.49 in 2013 to 9.92 in 2014. The decline in JRCS was the result of lower sucrose content of canes as a result of wet fields during harvesting, and illicit cane burning. Worthy Park recorded the best JRCS of 11.41, while Golden Grove had the lowest of 8.79. The JRCS at Frome had the largest decline (1.26 units), moving from 10.17 in 2013 to 8.91 in 2014, its lowest in five years. The lower JRCS resulted in lower cane payments in that area. (Please see table 3 for details).

The Factory Recovery Index (FRI), a measure of factory efficiency, remained relatively stable when compared to the previous year’s figure. The FRI in 2014 was 89.31 while the FRI in 2013
was 88.28. The Everglades factory which had significant challenges in the previous year saw a significant improvement in their FRI, moving from 65.06 in 2012 to 92.10 in 2013. The improvements at the Everglades factory were mainly a result of the restructuring and upgrading at the factory. This is the first time in over ten years that the factory is surpassing the industry standard FRI of 91.

The Golden Grove Sugar Factory on the other hand saw its FRI decreasing from a high of 92.55 in 2012 to 84.66 in 2013. The decline in FRI was a result of operational issues at the factory. Worthy Park and Appleton continued to do well with FRI of 96.19 and 95.32 respectively. Factories that fail to meet the industry standard of 91% are required to pay for the short-fall since farmers are paid at 91% irrespective of the factories’ performance. As a result Frome, Monymusk and Golden Grove must pay the farmers from the factories’ earnings.

PRICES

The price per tonne sugar paid to growers and manufacturers increased from $78,303 in 2013 to $80,020 in 2014. This represents a 2% increase when compared to the previous year’s figure and represents the highest price paid to date. The industry continues to benefit from attractive prices in the EU, mainly as a result of changes to the EU Common Agricultural Policy and subsequent termination of the Sugar Protocol. The changes have resulted in a short-fall in the amount of sugar exported to the EU by preferential suppliers. As a result, refiners are competing aggressively and consequently prices have been increasing. It is widely expected that there will be a reduction in future sugar prices when the current three year contract ends. Also it is expected that prices will fall when the Sugar Protocol ends in 2017. The division of the payment between cane growers and manufacturers, according to the split of 62% to growers and 38% to manufacturers was as follows:

<table>
<thead>
<tr>
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<th>2012/13</th>
<th>2013/14</th>
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<tbody>
<tr>
<td>Cane Growers</td>
<td>(62%) $48,548</td>
<td>$49,612</td>
</tr>
<tr>
<td>Sugar Manufacturers</td>
<td>(38%) $29,755</td>
<td>$30,408</td>
</tr>
<tr>
<td></td>
<td>$78,303</td>
<td>$80,020</td>
</tr>
</tbody>
</table>

TIME LOSS

The average grinding time for all factories was 70.12% of the total available time. This represents a significant increase compared to the previous year’s figure of 58.66%. Time loss attributed to the factory was 11.82%. This represents a marginal improvement when compared to the previous year’s figure of 12.73%. Mechanical stoppages were the main contributor to factory stoppages accounting for 6.60%. There was an increase in non-factory stoppages moving from 28.62% in 2013 to 18.51 % in 2014. This increase was due mainly to the better weather conditions. Worthy Park, operating at 86.42%, was the only factory that surpassed the industry standard operating time of 85%. All other factories found it difficult, with Appleton and Frome having the next best times of 74.82% and 73.85% respectively. (See table 5 for details)
MARKETING

The volume of sugar exported was 88,509 tonnes, of which 77,457 tonnes valued at US$59,406,000 (gross value) were shipped to the EU, 11,016 tonnes went to the United States at a value of US$ 5,883,000 and the balance of 36 tonnes went to the Cayman Islands at a value of US$ 51,000. There was a 14% reduction in the average price per tonne sugar received from exports, decreasing from US$863 in 2012/13 to US$ 738 in 2013/14.

Chart 3(a)

![Chart 3(a)](image1)

Chart 3(b)

Chart 3(b)
LOCAL SALES OF RAW SUGAR

The amount of locally produced raw sugar sold on the domestic market during the 2013/2014 crop was 44,669 tonnes. This is 24,964 tonnes more than the 19,705 tonnes sold for the 2012/2013 crop. It is important to note that no brown sugar was imported during the period. Given the changes in the international sugar market, mainly the European Union with falling sugar prices, the local sugar market now offers one of the best prices for sugar.

SUGAR CANE PROCESSING COURSE AT UWI

Sugar Cane Processing continues to be one of the industrial processes selected for study in the Applied Chemistry Programme within the Department of Chemistry at the University of the West Indies. The course which is held in the second semester in collaboration with SIA/SIRI consists of lectures, tutorials, work study and a field trip. Ludlow Brown of the SIA conducted the lectures and tutorials.

During the review period the students went on a field trip to Golden Grove Sugar Factory. Two students did the work study component of the programme at SIRI. They engaged in projects
which involved the continuation of collecting data on methods for the determination of dextran, in addition to the development of a method based on turbidity in assessing total polysaccharide.

The planning and supervision of the projects were done by SIA’s Quality Control Department, members of the Central Analytical Laboratory and Dr. Ian Thompson of the UWI.

**WORLD SUGAR SITUATION**

World sugar cane production for the 2013/14 crop was 149.4 mln tonnes, 1.1mln tonnes above last year’s production of 148.3 mln tonnes. There were strong performances in several key regions such a Brazil, India and China. Brazil produced 34.3 mln tonnes of sugar, 180k more than it produced in 2012/13. India’s production was 26.3 mln tonnes. This was more than the amount forecast for the year. The increase in production was due mainly to increase availability of good water.

World sugar beet production was 35mln tonnes, down 2.2 mln tonnes from the amount produced in 2012/13. The amount produced was higher than the 34.4mln forecast at the start of the season. The increase in production was due to the exceptional mild winter experienced in Europe.

Sugar consumption continues to rise. The strong growth observed in 2013 has continued in 2014, helped by lower prices and improved affordability. Sugar consumption reached 175.9 mln tonnes, 2.6% increase over last year’s figure and the strongest increase over the last five years.

Sugar prices fell for 2013/2014, hitting a six-year low at one point. The forecast for the world production deficit next season, and sharply improved prospects for Brazilian production are the reasons for the decline. Raw sugar futures for May stood at 12.07 cents a pound, the lowest for a spot contract since January 2009.

The "massive devaluation" this year in the Brazil real, which has lost some 18% against the dollar so far this year, "places sugar production at a much bigger advantage than that of ethanol”,

Brazil's sugar, unlike its ethanol, is produced mainly for the export market, and unlike its ethanol, becomes more competitive to foreign buyers as the real depreciates.
SUGAR INDUSTRY RESEARCH INSTITUTE (SIRI)

The Institute’s main function continued to be the provision of technical and research services to the Authority which ensures that the industry adheres to the prescribed standards governing its operations. These standards are of vital importance because they determine the level of payments made to cane growers and manufacturers of raw sugar for their produce.

Variety Development

Variety Improvement

The variety development programme continued work that targeted finding varieties with increased sucrose, cane yield, response to best practices, and disease resistance. Twelve variety trials that spanned the five agro-ecological areas were harvested and analyzed during the year. There were 6 first objective (Lattice) and 6 final trials that each contained 23 and 7 test varieties, respectively. One of the aims of the programme is to introduce varieties from other cane-growing jurisdictions worldwide. One foreign variety lattice trial and a foreign variety final trial were established and evaluated.
The varieties BJ9719, BJ9764, BJ9736, BJ9755, BJ9702, BJ9722, BJ9428, BJ9432, and BBZ921101 appeared to be outstanding prospects. They were placed in pre-commercial nurseries and were being expanded.

Three variety trials from the BJ08 (Everglades), BJ07 (Frome), and the BJ99 Series (Worthy Park) were planted in 2014. These will be evaluated in 2015.

To facilitate better harvest management practices among growers, work continued on the development of ripening curves in three field trials that contained 67 potential varieties.

Early stage nursery establishment was as follows:

* A nursery that contained the BJ2015 Stage 1 was assessed and tagged. Selected clones from different families were analyzed using near-infra-red technology (N.I.R.) on the SpectraCane Analyzer funded by a European Union sponsored project. This was the basis for requesting the subsequent Series from the West Indies Central Sugar Cane Breeding Station (WICSCBS) in Barbados.

* The BJ2016 Stage 1 nursery was planted at New Yarmouth. It contained 48,000 seedlings; each being a potential variety.

* Approximately 2,000 potential varieties from the BJ2015 Series were established in a Stage 2 nursery at New Yarmouth.

* Two Stage 3 nurseries of the BJ2014 Series were planted; one at Frome and the other at Monymusk. One BJ2011 Stage 3 nursery was assessed at Frome.

* Over 3,000 clones from the BJ2011 Stage 2 trial at Baugh’s Farm, and other samples from lattice and final trials, were analyzed using the SpectraCane Analyzer.

Lattice propagation nurseries (LPN) were established as seed sources for the 2015 planting season as follows: Frome (BJ03), Appleton (BJ06), Everglades (BJ04), Monymusk (BJ03), Worthy Park (BJ04), and Golden Grove (BJ07).

Staff made visits to small, medium, and large farms to aid in identification of varieties and the promotion of best agricultural practices. Meetings were held with estate managers and supervisors. Staff participated in the annual Cane Breeding Workshop, SAC Technical Committee meeting, and made a presentation at the annual Jamaica Association of Sugar Technologists Conference.

**Pest and Disease Mitigation**

**Entomology**

The department continued its thrust at augmenting field populations of the parasitic wasp, *Cotesia flavipes*, to control the sugar cane stalk borer.

Parasite release was initiated on a relatively isolated cane field at Kinloss, Trelawny, planted out with the variety BJ7015 that showed unprecedented stalk borer damage. From an initial release in
August 2014, there was rapid parasite establishment and recovery from the field by November 2014 owing to the high levels of borer infestation. Elsewhere, it would have taken years before any such recovery was possible. Relatively high parasitism of the stalk borer by the native parasites *Lixophaga diatraeae* and *Agathis stigmaterus* was observed but that was insufficient to satisfactorily suppress the level of borer damage.

At Sheckles Farm, Clarendon, the variety BJ7015 was also severely affected. Though borer damage surveys often suggested that the environment tended to exert a stronger influence on the degree of damage than the variety there is now a sufficient body of evidence pointing to a particular proneness of BJ7015 to borer damage which together with the incidence of eyespot and orange rust disease support the recommendation for the gradual phasing out of this variety.

At Sheckles the management took the decision to change the variety before it ran the full course of the ratooning cycle. Other affected locations island-wide were Waterwell and Exeter at Monymusk, Farm 1 at New Yarmouth, Holland Estate, and Bullhead in Westmoreland.

The high incidence of borer damage observed at Kinloss and Bullhead farms suggested that even within rain-fed areas there might be pockets of high infestation. These are possibly influenced by local environmental peculiarities.

The annual Borer Damage Survey was successfully conducted on Wray and Nephew farms. Wray & Nephew farms are located in both rain-fed and irrigated zones and could provide useful indicators as to whether recent gains in the borer control programme were maintained in 2014. There was inadequate support for the survey from other areas of the industry.

A severe and widespread attack of the Canefly, particularly on the variety CR892023 at Holland, prompted planning for corrective measures to mitigate against economic losses. All varieties suffered some degree of attack. The preparations included securing of the necessary insecticide and crop dusting services prior to the start of the next crop.

Natural enemies, such as the assassin bug, *Zelus longipes*, were active in the field but their numbers were insufficient to curb the severe Canefly attack. This would mark the first need for spraying against the Canefly in the Jamaican industry since 2004 when a minor outbreak was treated at Caymanas.

Developing outbreaks of the Canefly in and around Golden Grove Estate did not have the severity as at Holland Estate. No decision was therefore taken to spray but the situation was being monitored.

The high susceptibility of CR892023 to the Canefly lends credence to the argument for cultivation of this variety to be gradually reduced.

**Pathology**

The department continued its policy of treating for ratoon stunting disease (RSD) prior to release of new varieties to growers. Germination levels of 80% were achieved on over 5,000 cuttings.
Final-phase assessments on two previously established Smut trials were conducted during the year to establish resistance ratings for test varieties. This trial consisted of 18 varieties from the BJ01 series and 27 from the BJ04 series.

Plant phase assessment: A total of 26 varieties from the BJ03 and 52 from the BJ07 series were screened against smut. Six standard commercial varieties were included in the tests for comparison.

At Worthy Park commercial application of fungicides was conducted on the more severely affected areas, approximating 700 hectares, in 2014. An estimated yield increase averaging 7% was recorded on the susceptible varieties BJ9186, BJ7504, BJ7015 and BJ78100.

An attempt was made to establish rates for effective commercial application of fungicides. Two of five branded products showed effective control. The trial revealed that product efficacies varied based on season and frequency of application, rates used, and developmental phase of the disease.

The average yield at Worthy Park in 2013 was 69.30 tc/ha. Yield increased to 79.57 tc/ha for the 2014 crop, or by some 13%, and was thought to be largely a consequence of the spray programme. Observed reductions in Rust inoculum levels were concluded to be a direct result of fungicide treatment.

**Crop Improvement**

**Cane Physiology**

To facilitate improved efficiencies in the usage of equipment within the industry, the Institute engaged in the provision of services and training to recalibrate, adjust, and test a boom sprayer at Fred M. Jones and Worthy Park estates. Components on the boom sprayer were checked and repairs recommended prior to the equipment being calibrated and verified.

In conjunction with chemical houses the institute acted to increase awareness of weed control options among stakeholders. This was carried out by way of a Weed Control Demonstration that was fielded to have results for viewing by farmers some 15 to 20 days after treatment when the effects became evident.

The Institute continued to test various products entering the market. The aim was to ascertain dosages of application for efficacy. The products tested included combinations of Velzone, Diuron, Penzene, and Terbutryn. The products were tested on eleven small to medium farms and at Pan Caribbean. There were indications that the cocktails were still effective but there were instances suggesting a need for drastic review of programmes.

In other tests done at the request of Extension Area Agronomists, different rates of various products were applied on three participating farms.
Formal trials continued with testing of the bio-stimulants Agrispon, Agrigro, and Quicksol. The pre-treatment data, when analysed, indicated that there were significant growth differences already existing between varieties involved in the trials. At the end, yield data indicated that there were no significant differences between treatments. The only product that suggested it might have produced some growth response was Quicksol for which further tests will be conducted.

A paper in the area of Cane Physiology was presented at the annual Jamaica Association of Sugar Technologists Conference in November.

**Nutrition**

The Nutrition Department continued its efforts to develop research activities targeting judicious use of fertilizers among growers for economic cane cultivation and environmental prudence.

A study aimed at assessing the responses of three varieties to Nitrogen (at application rates of 50 and 80 kg/ha) was concluded on the St Ann Clay Loam soil type at Sheckles Farm, New Yarmouth. The variety CR892023 showed cane yield but not sugar yield improvements. BT80311 and BJ78100 showed no cane yield improvements but BT80311 showed sugar yield improvements. Similarly, for Potassium (K) rates - between 83 and 104 kg K/ha - CR892023 and BT80311 but not BJ78100 showed yield increases. Peak tc/ha, JRCS, and ts/ha responses were obtained around 104 kg K/ha.

A re-evaluation of the classification of soil textures was conducted across the industry on five select soils in 2014. The major soils were classified in the 1950s to 1960s primarily on their topsoil characteristics without due consideration for the areas of greatest clay concentration throughout the soil profile. These characteristics impacted variety choices, approach to land preparation, as well as productive capabilities. The re-classification formed the basis for recommendations and adoption of best management practices.

The Sugar Industry Research Institute undertook the assessment of the possible effects of distillers waste on soil pH, soil salinity, and soil nutrient contents at Worthy Park. This by-product of the rum industry has variable concentrations of nutrients, and could be beneficial in crop production if applied judiciously. However, precaution is required in the application of distillers waste to cane fields as a result of its high biological oxygen demand (BOD) and chemical oxygen demand (COD) which can be sources of pollution to water bodies within close proximity to fields.

At the usual application rates of 20,000-40,000 L/ha the pH and nutrient levels of the dunder were not found to be limiting factors to cane production on the estate. Nutrients such as Phosphorus and Potassium were high and in instances were sufficient to warrant reductions in the rates of inorganic fertilizer for those nutrients.

Samples of soil and leaf were routinely submitted and analysed at the SIRI laboratory. Varying levels of nutrient adequacies and deficiencies were observed. Of 124 samples that were submitted from across the industry the numbers recorded as deficient were are listed as: Phosphorus (66),
Potassium (104), Calcium (24) and Magnesium (41). The evaluations formed the bases for fertilizer recommendations to the estates and private farms.

**Agricultural Engineering**

During the period, Energy, Land and Water Management activities were conducted to address severe, unprecedented drought conditions that prevailed and that had led to water shortages and uncontrolled bush fires at some locations.

The department participated in the monitoring of water balance, water use, and irrigation efficiency of drip irrigation systems. Funding for the projects was accessed through the Cane Expansion Fund and the Sugar Transformation Unit. The Department provided hydraulic designs aided by GIS/GPS technology at Harmony Pen in St Catherine, and at Budleigh in Clarendon. In each instance farms were greater than 100 hectares in size.

Operation of the center pivot established at Content, Clarendon continued to be adversely affected by lack of cooperation among the intended beneficiaries of this project sponsored by the Common Fund for Commodities. Its performance was reviewed and revealed undesirable yield levels, a reduction in area covered from 55 ha to approximately 36 ha, and a decrease in the number of participating farmers from 18 to fewer than 13.

A pivot installed by New Yarmouth Estate at Ashley Hall was monitored and found to be operating effectively.

The department undertook soil mapping using GIS technology to assist Pan Caribbean Sugar Company on proposed irrigation re-development schemes in Clarendon and St. Catherine.

In efforts to facilitate expansion of cane cultivation, the department conducted a soil classification exercise that helped delineate soil types and field boundaries on behalf of the St Elizabeth Parish Council. The exercise revealed that the cane areas exceeded 2,436 ha and 1,759 ha for the Appleton and St Elizabeth Farmers respectively.

An investigation was conducted to assess the likely impact of the construction of the Linstead leg of Highway 2000 on natural sinkholes that influenced drainage at Cambria Farms. The re-blocking of fields and re-establishment of intervals at were proposed as possible intervention measures for restoring drainage and other activities on the farm.

The automatic weather station at the SIRI office site in Mandeville functioned for only a few months during the year and affected routine data collection. The Government Meteorological Department reported that it had challenges managing the wireless computer system which operates the network of weather stations. The equipment is designed to collect data on wind speeds, wind pressure and direction, temperature, rainfall, solar radiation, and instantaneous ground temperature. SIRI continued to use a 5-inch diameter aluminium rain gauge for rainfall data collection and offered assistance for training to the industry in its use.
The Department’s staff participated in collaborative work and seminars with the Jamaica Institution of Engineers (JIE) through its Agricultural and Civil Engineering (AAIC) Division, the University of Technology (UTECH) that spearheaded a joint training exercise in the proposed Jamaica Logistics Hub, and the Caribbean Maritime Institute (CMI).

Personnel from the department participated in a seminar titled “GIS in Climate Change and Disaster Management,” hosted by the Land Information Council of Jamaica (LICJ) in collaboration with Ministry of Water, Land, Environment and Climate Change.

One departmental staff attended the International Sugar Organization (ISO) conference in Montego Bay.

**Economics and Statistics**

Despite a marginally higher sugar price, up from $78,530 in 2013 to $80,020 in 2014, average cane price for the 2014 crop decreased by approximately 6% to $4,633.91 per tonne cane (tc). It was established from the cane price calculations for all six factories evaluated, that lower prices per tonne were paid during the 2014 crop compared with 2013. Cane Price ranged from $3,878.93 at Golden Grove to $5,736.83/tc at Worthy Park; a difference of $1,858/tc largely due to the varying JRCS of canes delivered. All factories, except for Everglades and Monymusk, recorded year-on-year decreases in price paid.

The annual cost of production study found that break-even yields ranged from 66.13 tc/ha for the irrigated areas to 52.24 tc/ha for rain-fed areas. Profitability would be achieved above those yield levels. It was argued that a forecast for cuts in the price paid for sugar could be mitigated by growers achieving higher JRCS levels. At 11.4 JRCS rain-fed farms could be profitable at yields of 65-75 tc/ha while irrigated farms would need to achieve 80-85 tc/ha.

A study of the impact of harvesting rates on the industry revealed year-on-year increases leading to rates becoming 24.21% to 37.19% of cane price across five factory areas (Everglades was not included). The median rate was 28.59% at Worthy Park. Costs to hire a contractor and increases in fuel prices were major factors in these rate movements.

The 2014 Cane Yield Survey covered 14,830 ha or roughly 50% of the total cane area reaped, and 938,680 tonnes or approximately 52% of the cane harvested. Among estates and large farms it showed average cane yields that ranged from 81.86 tc/ha at Holland to 36.20 tc/ha at Bernard Lodge. All the sampled estates/farms had increased cane productivity over the previous crop. Increases ranged from highs of 21.23, 19.52, and 16.53 tc/ha at Holland, Frome and Appleton estates, respectively, to less than 2 tc/ha at Bernard Lodge. Golden Grove, Worthy Park, and Holland surpassed the benchmark yield of 85 tc/ha for rain-fed areas.

Holland, Appleton and Cambria surpassed the benchmark 7.5 ts/ha for the rain-fed areas. Sugar productivity for Golden Grove fell slightly below at 7.04 ts/ha. New Yarmouth achieved 7.55 ts/ha against the benchmark of 8.5 ts/ha for the Irrigated areas. Bernard Lodge and Monymusk
performed at 4.55 ts/ha and 5.33 ts/ha, respectively. All the estates except New Yarmouth registered increases over the previous year.

The Economics and Statistics Department provided management and technical oversight to the Cane Expansion Fund (CEF). It provided industry scenarios on cost of production, the levels of financing necessary for replanting, and to acquire tillage, cultivation and harvesting equipment, as well as likely returns on investments.

**The Cane Expansion Fund (CEF)**

In 2006, as a response to changes to the European Union Sugar Regime, including a 36 percent reduction in the price paid for African, Caribbean and Pacific (ACP) sugar entering the EU market, the Government of Jamaica approved a strategy to restructure the sugar cane sector. The *Revised Jamaica Country Strategy for the Adaptation of the Sugar Industry: 2006 to 2020* (JCS II) was approved in September 2008. Subsequently, the Revised Sugar Area Development Programme (SADP II) was developed to guide the implementation of JCS II.

SADP II consists of three (3) Components, as follows:

- **Component 1**: Strengthening Commercial Competitiveness (Sugar Cane Sector);
- **Component 2**: Socio-Economic Development of Sugar Dependent Areas;
- **Component 3**: Supporting the National Policy Environment.

In support of Component One (1), the Cane Expansion Fund was established to provide capital injection by way of loans and grants to the sugar cane sector to boost productivity and strengthen the commercial competitiveness of the industry.

Since the inception of the CEF the fund has seen some J$1.8 billion injected with outflows in the form of loans and grants to registered farmers and contractors in the sugar cane industry. This has resulted in growth evident in higher yields of production and a more attractive industry for investors. A decision was taken in April 2014 to halt all new applications subjected to the availability of funds and shift in the objective of the CEF to focus more on enhancing efforts to collect being the driver for the revolving nature of the fund.

For the 2014 planting period outflows from the CEF was done in the form of loans for Planting, Drip Irrigation in the form of Grants, Equipment Purchases and Repairs, and Land Clearing. Approval was given to 117 applicants for the amount of approximately J$315M with 1026 hectares of cane being planted. Table seen below:
Table 1 Loan Application/Approval

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<th>DATE</th>
<th>LOAN TYPE</th>
<th>APPLICATION</th>
<th>LOAN APPROVAL</th>
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<tbody>
<tr>
<td></td>
<td></td>
<td>#  $  ha</td>
<td>#  $  ha</td>
</tr>
<tr>
<td>2014</td>
<td>Repairs</td>
<td>5  6,946,014 -</td>
<td>2,150,000 -</td>
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<td></td>
<td>Equipment</td>
<td>14 169,878,820 -</td>
<td>102,893,595 -</td>
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<td></td>
<td>Irrigation/Grant</td>
<td>15 64,904,507 115</td>
<td>27,009,872 43</td>
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<td></td>
<td>Replanting</td>
<td>179 307,292,067 1,249</td>
<td>177,323,785 830</td>
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<td></td>
<td>Land clearing</td>
<td>48  24,259,160.00 498</td>
<td>5,865,800.00 153</td>
</tr>
<tr>
<td></td>
<td>Total</td>
<td>261 573,280,568 1,862</td>
<td>315,243,052 1,026</td>
</tr>
</tbody>
</table>

Chart 1 Loan Applications
Chart 2  Loan Approval

It must be noted that from the projections for loan payments for the period, the fund collected approximately J$244M representing a total of 76% of the total amount with a shortfall of approximately J$79M. The information is represented below:

Table 2 2014 Actual Collection by Factory Area

<table>
<thead>
<tr>
<th>FACTORY AREA</th>
<th>TOTAL DUE FOR PAYMENT*</th>
<th>TOTAL COLLECTED</th>
<th>OUTSTANDING</th>
<th>% Collected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appleton</td>
<td>45,823,908.72</td>
<td>44,930,451.29</td>
<td>1,459,163.27</td>
<td>98%</td>
</tr>
<tr>
<td>Everglades</td>
<td>45,788,852.85</td>
<td>33,743,200.03</td>
<td>12,233,152.83</td>
<td>74%</td>
</tr>
<tr>
<td>Frome</td>
<td>48,027,709.44</td>
<td>35,615,523.32</td>
<td>12,451,704.06</td>
<td>74%</td>
</tr>
<tr>
<td>Monymusk</td>
<td>71,175,411.47</td>
<td>40,868,484.13</td>
<td>30,977,554.95</td>
<td>57%</td>
</tr>
<tr>
<td>St. Thomas</td>
<td>35,405,338.35</td>
<td>29,346,827.14</td>
<td>8,915,482.66</td>
<td>83%</td>
</tr>
<tr>
<td>Worthy Park</td>
<td>73,338,195.14</td>
<td>59,736,115.41</td>
<td>13,628,155.92</td>
<td>81%</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>319,559,415.97</strong></td>
<td><strong>244,240,601.32</strong></td>
<td><strong>79,665,213.69</strong></td>
<td><strong>76%</strong></td>
</tr>
</tbody>
</table>
Chart 3

<table>
<thead>
<tr>
<th>Factory Area</th>
<th>TOTAL DUE FOR PAYMENT*</th>
<th>TOTAL COLLECTED</th>
<th>OUTSTANDING</th>
<th>% Collected*</th>
</tr>
</thead>
<tbody>
<tr>
<td>Appleton</td>
<td>45,823,908</td>
<td>44,930,451</td>
<td>1,459,163</td>
<td>98%</td>
</tr>
<tr>
<td>Everglades</td>
<td>45,788,852</td>
<td>33,743,200</td>
<td>12,233,152</td>
<td>74%</td>
</tr>
<tr>
<td>Frome</td>
<td>48,027,709</td>
<td>35,615,523</td>
<td>12,451,704</td>
<td>74%</td>
</tr>
<tr>
<td>Mony Musk</td>
<td>71,175,411</td>
<td>30,977,554</td>
<td>30,977,554</td>
<td>57%</td>
</tr>
<tr>
<td>St. Thomas</td>
<td>35,405,338</td>
<td>8,915,482</td>
<td>8,915,482</td>
<td>83%</td>
</tr>
<tr>
<td>Worth Park</td>
<td>73,338,195</td>
<td>13,628,155</td>
<td>13,628,155</td>
<td>81%</td>
</tr>
<tr>
<td>Total</td>
<td>319,559,415</td>
<td>244,240,605</td>
<td>79,665,213</td>
<td>76%</td>
</tr>
</tbody>
</table>

Care must be extended in appreciation of the presented table as the figures include refunded payments of J$10M and prepayment of J$8M.

The CEF has the potential to revolve and once collections increases we should see the availability of more funds for lending.

Sugar Technology

Core Laboratory Training Seminars

The prelude to the 2013/2014 Sugar cane crop commenced with Core Lab training across all six (6) Sugar Estates. A Sugar Technology Team along with the Instrumentation Technicians made presentations on topics which included: *An Alternative Method for Determining Cane Preparation, Using the DASA System for Dextran Determination of Cane Juice, Core Laboratory Equipment - Use and Care* and *Occupational Health and Safety.*

Collaborative Core Laboratory Testing

As part of the process to ensure adherence to laboratory procedures and uniformity across Core Laboratories, collaborative cane testing exercises were conducted at Core Labs in the months of
January and February. Overall, each Core Laboratory demonstrated marked improvement when compared to previous collaborative exercises. However, more improvement is needed to increase the level precision and accuracy obtained by the respective Laboratories. The second collaborative cane testing exercise was conducted on Wednesday February 26, 2014 at the six Core Laboratories. No marked improvement was observed in this test.

**Collaborative Sugar Testing**

The Sugar Technology team organized a Collaborative Sugar Testing exercise with the factories to have a comprehensive evaluation of the performance of all factory laboratories with respect to Pol and moisture analysis of raw sugar in January 2014. Most factories, with the exception of Frome, required some level of corrective action as they failed to achieve the desired level of accuracy and/or precision as it relates to pol testing.

**Mill Tests**

February 24, 2014 conducted a Mill Test at Worthy Park upon request of the factory management. It was concluded that cane preparation and the general conditions for milling were satisfactory. However, mill pol extraction, although satisfactory, was less than that attained in previous mill tests which could be due to poorer quality of canes entering the mills. A detailed report of the findings was sent to the Factory Management.

**Polysaccharide Problems at Worthy Park**

Late in the crop Worthy Park began experiencing processing problems reportedly due to the increased levels of polysaccharide induced viscosity. Samples of the different working material were collected and tests for total polysaccharide levels were carried out. Laboratory Investigations by Mr. Blake and Mr. Cameron revealed that the issue was the same as described in previous studies done by the Institute and getting to the root cause would require additional resources to allow for identification and implication of the polysaccharide or class of polysaccharides involved.

Other activities included the;

1. **Evaluation of the MCA kit for Use to Determine Dextran in Cane Juice**
2. **Verification of Dextranase Activity using the Thiosulphate Titration Assay method,**
3. **Participation in the Internal Audit Exercise of the Central Laboratory, a requirement of the ISO 17025 standard.**

**Mechanical Engineering**

**General Maintenance of Core Laboratories**
Out-of-crop maintenance which entailed the repairing or replacing of damaged and malfunctioning component parts; setting of press gaps; adjustments of sequence cycles and pressure switches were carried out just before the start of the crop at all factories.

Repainting of the Core Sampler structure at Worthy Park, Monymusk and Golden Grove was done along with the Core Laboratory buildings at Appleton, Golden Grove and Worthy Park.

The installation of aluminum sliding windows fitted with window blinds was done at the Core Laboratory at Everglades.

On the request of the SIA, the data entry rooms at Core Laboratories at Monymusk, Appleton, Frome and Golden Grove were extended to allow for closer monitoring and management by Audit Managers.

All air conditioning units in the Core Laboratories were serviced and new units installed where necessary.

A total of 141,094 samples were taken, up from 116,554 samples in the previous crop. An overall average of 92.99 percent testing at the end of the crop was achieved, down from 93.83 percent in the previous crop.

**Core Sampler Maintenance**

**Frome**

The No.3 hydraulic press cylinder, control solenoid valve, the No.2 hydraulic press main contactor and the No.3 Core Sampler hydraulic pump were damaged and had to be replaced. The pressure switches on all three (3) Core Samplers had to be adjusted. A number of burst hydraulic hoses were replaced. Routine building up of all three (3) shredder hammers were carried out so as to maintain the required preparation index (PI).

**Appleton**

The hydraulic press proximity switch, control solenoid valve, core sampler control auxiliaries were damaged as well as some burst hydraulic hoses were replaced.

**Monymusk**

The No.2 core sampler was damaged extensively by an overloaded cane truck and remained out of service for the sugar crop. The No.1 hydraulic press main contactor, control solenoid valve and the No.1 core sampler shredder timer were damaged and had to be replaced. All leaking hydraulic hoses were replaced.
**Worthy Park**

The hydraulic press main contactor and core sampler shredder timer were damaged; both had to be replaced along with some burst hydraulic hoses.

**Golden Grove**

The core sampler main contactor, overload relay, auxiliaries and shredder flow control valve were damaged and had to be replaced along with some burst hydraulic hoses. The hydraulic ejector cylinder was leaking and had to be repaired.

**Everglades**

The core sampler carriage track was damaged by overloaded cane trucks and the hydraulic press cylinder was leaking oil, both had to be repaired.

**Preventive Maintenance Service at Factories**

**Laser Alignment**

Laser alignment of steam turbines, high speed gearboxes, boiler feed pumps, motors and powerhouse alternators was carried out at Frome, Golden Grove, Everglades and Appleton sugar factories.

**Dynamic Balancing**

Dynamic Balancing of boiler fans, bagacillo fans and centrifugal baskets was carried out at Frome, Appleton, Golden Grove, Worthy Park and Everglades sugar factories.

**Ultrasonic Thickness Testing**

This service was utilized mainly by Worthy Park, Appleton, Everglades and Golden Grove sugar factories.

**Vibration Measurements**

Vibration measurements were done at Worthy Park, Frome, Golden Grove, Everglades and Appleton sugar factories.

**Instrumentation**

**Instrumentation Service to Laboratories**

**Central Laboratory - SIRI**

All laboratory instruments were serviced, new installations made and instruments commissioned. This included the calibration and servicing of balances, centrifuges, spectrophotometer, ovens,
NIR Polarimeter, water distiller and the water deionizer. A new water deionizer was also installed and commissioned.

**EU Laboratory – SIRI**

Similar to the Central laboratory, all major instruments and equipment were serviced, calibrated and certificates issued as required. This included the installation and commissioning a new oven and a Freeze dryer; the servicing and calibration of the NIR polarimeter and repairing of the Vacuum sealer.

**Core and Factory Laboratories**

All Core Laboratory instruments were serviced and returned to their respective factories.

**Calibration and Certification of Truck Scales**

All truck scales were serviced and calibrated in preparation for certification by the Jamaica Bureau of standards. Report printers and communication ports were also serviced. All truck scales were certified with the aid of the Jamaica Bureau of Standards.

**Maintenance of Sugar Samplers**

All sugar samplers located at each factory were serviced and then returned to their respective locations. Modification was done at Monymusk to move the sampler to a more suitable location.

**Environmental Monitoring & Management**

**Pollution Control Programme**

The Institute continued to provide service to the industry with regards to the testing of wastewater samples from both factory and distillery operation. The Pan Caribbean Monymusk Division and the Everglades Hampden distillery both utilized the services of the Institute to assist in the monitoring of their trade effluent. However, results indicate that both facilities at the time of sampling were not in line with the NRCA Trade Effluent Standards.

**Wastewater Regulations**

The sugar industry is now in the preparatory mode for the recently gazetted NRCA (Wastewater & Sludge) Regulations, 2013. Each facility has to submit licence applications to the NEPA in order to comply. Historical data on wastewater analyses done by the Institute as a part of our...
wastewater monitoring programme have been requested by some factories. Sugar factories are required to provide NEPA with profiles of their wastewater as a part of the information required for the licence application.

According to the Regulations, “any person or entity whose business, industry, manufacturing or trade operations, involve the discharge of trade effluent or sewage effluent or both, as the case may be, from a treatment plant into the environment, shall apply to the Authority for a licence to discharge such effluent into the environment.”

Entities discharging wastewater without a licence after the twelve month commencement date would be committing an offence under section 12 of the Act.

**Laboratory Department**

The Central Laboratory has been designated an approved testing facility for wastewater by the Ministry of Health. This means that companies requiring tests for wastewater discharged at their facilities can have these done at the laboratory and the results would be accepted by the Ministry. The Central Laboratory has successfully maintained its ISO 17025:2005 accreditation status for testing of sugar methods and has begun work to expand the scope to include testing of soils. The accreditation mark shows that the Laboratory has developed and maintained the policies and procedures necessary to ensure accuracy and reliability of results, increased customer satisfaction to reduce non-conformances. Proficiency testing (PT) was continued with Sugar PT Scheme offered by LGC Laboratories, UK, and WEPAL scheme for plant tissue and soils. Proficiency testing allows laboratories to improve accuracy and build techniques of analysts and to demonstrate continuous improvement in the quality management system.

Work continued on the EU-ACP project “The Development of an Alternative Method for Determining Dextran in Process Materials in ACP Sugar Producing Countries.” This project spans three countries and is headquartered in the laboratory.

**Test methods**

The Laboratory continued to provide analytical support to the industry and samples for routine work and research projects from both the Agricultural and Factory Services Divisions were tested. The analyses were conducted on wastewater, water for irrigation, soils, plant tissue, dunder, sugarcane juice, raw sugar and molasses samples (see figure 1 below). Testing support was also provided to local farmer groups in the testing of water, soil and plant tissue samples.
The laboratory continued to analyse daily, weekly and special sugar samples sent from the factories for pol, moisture, dextran, starch, affined and whole raw colour, ash and reducing sugar. Evaluation of the results showed that the methods were performing well. This was supported by the results obtained from the PT where all results submitted by the laboratory were accepted. For the 2014 sugar crop industry averages of all the parameters tested were within the industry specification with the exception of moisture (0.37%), dextran (559MAU) and whole raw colour (2700IU). The moisture and dextran values exceeded the threshold. However the industry average for whole raw colour was better than the specification. The sugar pol of 98.92°Z for 2014 was the highest over the last three years.

b) Molasses Methods
The methods used for molasses analysis continued to perform well. The test results generated in the laboratory showed that there was a continuous improvement in the exhaustion of final molasses at all the factories. This meant that the factories were losing less sugar in the molasses than they did in previous years.

c) Wastewater Testing
The analysis of wastewater was conducted using internationally recognized methods resulting in the testing facility being given the approval mark by the Ministry of Health.

d) Irrigation Water Testing
The number of samples analysed during the year showed that there was no statistically significant change in the salinity and sodium absorption ratio (SAR) of the water samples from those wells analysed with average values being classified as medium to high in salinity and medium to moderately high in sodium.
Assuring the Quality of Test Results

The Central Laboratory implemented a quality assurance programme which takes into consideration quality control to ensure validity of test undertaken. The programme is aimed at increasing the accuracy of test results and to prevent non-conforming work.

International activities

a) Evaluation of Laboratory Methods
The Laboratory continued to participate in the plant tissue and soil material exchange programmes conducted by Wageningen University of the Netherlands (WEPAL), collaborative testing organized by the Sugar Technology Department involving SIRI’s Laboratory and the factory laboratories as well as sugar PT provided by LGC Laboratories, UK. Participation in the sugar PT ensures that over 80% of the sugar methods are internationally validated. Participation was done to assess precision and accuracy of analytical test methods and the skills of the analysts. In all the reports, statistical analysis showed that the results obtained by SIRI were not significantly different from the results obtained by the other participants.

c) EU-ACP Phosphate project
The final report for the project “Optimizing phosphorus in sugar cane to decrease production costs and to protect fresh water resources in ACP states” is being drafted.” On completion, this work will be published in international journals and should inform fertilizer usage in sugarcane agriculture in ACP countries and other territories.

d) EU-ACP Dextran project
The Laboratory embarked on developing and validating a method for dextran that employs the use of NIR polarimetry. This project is entitled - ‘Developing and introducing an alternative method to determine dextran in sugarcane juice and raw sugar’. This project is coordinated by the Laboratory at SIRI and will involve sugar laboratories from Belize and Guyana.

Training:
Training for members of staff was revamped with more emphasis being placed on internal training opportunities. Several training sessions were conducted to ensure that staff members were knowledgeable on the quality management system that was implemented and corrective and preventive measures implemented.

Information Systems

The specialized duties of Systems Administrator, Network Administrator, Database Administrator, Internet and Network Security, Web Developing, and, Graphics Designing, were carried out by all Department personnel during the year under review. Other activities such as computer and peripheral repairs, servicing and computer assembly were done at both the Sugar Industry Authority (SIA) and the Sugar Industry Research Institute (SIRI).
Visits were made to the factories’ core and sugar laboratories to provide technical support. Technical support was also given at the various pre-crop Seminars hosted by the Sugar Technology Unit and the Extension Services Department.

**New and Existing Programmes**

**SIA Factory Programme:** The new version of the SIA factory Operation is currently being tested to replace the old MS Access database.

**Motor Vehicle Programme:** This is used by the SIRI administrative department to keep records of privately owned and company owned vehicles. It keeps track of service and maintenance costs, fuel costs, mileage travelled, as well as vehicle documents information. This programme was rewritten using a newer programming language.

**Re-Coded Central Lab Analysis Programme:** The central lab analysis programme is used by the central laboratory to store data produced from the following testing procedures:

- Soil
- Leaf
- Molasses
- Local Sugar
- Export Sugar
- Water

The stored data is then used to generate reports which are then made available to clients. The central laboratory requested changes to the application and the reports generated, and, as a result, the application was overhauled and the interface given a more user-friendly appearance. In addition, authentication and database access routines were standardized and unique document numbers were added to each report for reference and identification purposes.

**User Resource Management System:** System users are required to have access to specific resources on a network which may include shared folders and printers. The user resource management system was created to support newer operating system versions such as Windows 8. The system was developed but as there was a slow adaptation to the Windows 8 environment, the need for its implementation has not become urgent and as a result its implementation was delayed.

**Data Capture System:** The data capture system was created to streamline the capture and reporting of data from the polarimeter and refractometer at the core laboratories. The core laboratory computer is connected to the equipment by a serial cable over which the data is transmitted.

The data capture system allows authorized users to run reports on the samples captured and also to export necessary sample information for import into the core programme. All samples that are captured are also exported to a log file for reprocessing if required. The data capture system is also capable of logging information from a dextran analysis if this is required and the polarimeter is placed in the correct operating mode.

**Core Programme:** The core programme is the main management system used at the core labs to track the quality of tested cane and calculating the resultant payment to be made to farmers. Work began on rewriting this programme in a current language to enhance its user friendliness and its efficiency.

**Dextran Rotation System:** In the analysis of dextran the major factor contributing to the time taken to process a sample is the time it takes to rotate/agitiate that sample.
A multi-rotational device was created to validate the effects of rotating multiple samples simultaneously to see if it could reduce the time taken to process samples and by extension increase the through-put of the analysis process.

**Balance Data Capture System:** Due to the design of and limitations of the devices used to capture sugar quality information at the core labs, a study was conducted on ways of integrating the wet and dry sample information into the data captured and reported on by the data capture system.

Presently, the refractometers used are limited in that they do not allow the user to input a sample number by means of a keypad. The only available option is to use a remote control device which is limited and cumbersome to use. A replacement refractometer was identified but it was extremely expensive and as a result, a cost effective device which could interface with the current refractometer and allow the user to enter a sample number was developed. A Balance Data Capture System Device was therefore designed, fabricated, and programmed to achieve this purpose. Such a system would also capture data from the balances used to measure the weights of wet and dry samples.

Work on this project was halted in order to focus on more pressing issues but it will be continued in the next year.

**Cane Farmers Registration Programme:** Regular maintenance was undertaken and occasional changes made to this program at the request of the users. Suggestions were made to rewrite it in a more current language.

**The Scale programme** is still being used at Worthy Park, Everglades, St. Thomas Sugar, Ocho Rios and Marcus Garvey. Maintenance had to be carried out at all these location most of which were done online except for Ocho Rios and Marcus Garvey. Attempt was made to fully integrate the scale data into the estate payment system but this was incomplete and will be completed for the next crop. Ocho Rios on the other hand did not fully implement the belt scale into the system; this was due to problems with the infrastructure. This will be revisited for the coming crop.

**Publications**

- Annual Report 2013
- Cane Growing Manual
- JAST related publications
- Sugarcane Magazine

Weekly reports from the Core and Factory laboratories as well as the SIRI Central laboratory were collected, analyzed and the results sent out to the various recipients, on a weekly basis. Technical repairs and services were carried out at SIA, SIRI and the various Core laboratories. Technical support was given at the various pre-crop and weed seminars hosted by SIRI’s Sugar Technology Unit, Agronomy Department and Extension Services Department.

There was continued maintenance and updating of the SIA/SIRI Website and regular maintenance and management of the Internet and local area network undertaken.

**Publications at JAST**

1. Maintaining ISO accreditation through Improvement in Quality Assurance Programme, - Yvette Bryan and Maureen Wilson

2. Vision 2020: Building Quality into Core Laboratory operations - Yvette Bryan and Maureen
Wilson

3. Validation of Celite as a Replacement for Octapol in Pol Analysis for Cane Juice - Yvette Bryan and Maureen Wilson

4. Dextran Determination Using the DASA System: The Jamaican Experience - Yvette Bryan, Dwayne Cameron and Maureen Wilson

THE EUROPEAN UNION

In June 2013 a political agreement on the Reform of the Common Agricultural Policy (CAP) was reached between the Commission, the European Parliament and the Council. The agreement included extending the current market provision for sugar until 2016/17 and abolishing sugar and isoglucose production quota, as well as minimum beet prices, thereafter. These provisions were presented as a way of bringing the sugar sector more in line with other agricultural sectors in the EU.

Until 2016/2017, it will still be the prerogative of the Commission to adopt acts determining the appropriate quantity of out-of quota sugar and imported raw sugar that can be released onto the Union market. The quotas for the production of sugar, isoglucose and inulin syrup at the national or regional level during the transitional period until September 2017 remain fixed at basically the final level of quotas allocated in the marketing year 2010/2011.

The new regime will still have general safeguard measures that the European Commission can use in case of market disturbances. For example, it will still be possible to make use of private storage aid in case of domestic prices falling significantly below the reference price.

Several studies have assessed the potential impacted of abolishing sugar production quotas in the EU. According to a recent impact study by the European Commission, domestic sugar prices could decrease by 45% compared to 2012. The study concluded that only beet growers that achieve yields above 70 tonnes/ha would remain in business while others might switch to alternative crops. It forecasts sugar consumption in the 28 countries of the bloc to drop 3.9% by 2023, that is, to 17.1 mln tonnes from the current 17.8 mln tonnes.

Sugar production, by contrast, is forecast to increase to 119.3 mln tonnes of beet (up from 110.7 mln tonnes currently). Sugar prices in the bloc are forecast decline significantly to EUR 405/tonne by 2023, from EUR 584/tonne in 2014. Moreover, isoglucose consumption is expected to rise from 0.7 mln tonnes during the 2013-2016 period to 2.2 mln tonnes in 2023, following the expiry of isoglucose production quotas in 2017. Imports are expected to decline, but would not disappear due to the seasonality and concentration of production in the bloc. Sugar imports are projected to be halved, from 3.9 mln tonnes in 2013 down to 2 mln tonnes in 2023 and exports are expected to increase to 2 mln tonnes.
OUTLOOK 2014/2015

World sugar output is expected to fall for a third successive season, and at an accelerated rate, as the impact of lower prices feeds through into mill closures and thus a return to a significant world production deficit.

The forecast for 2014-15 season estimates that world production will fall 2.25 mln tonnes behind consumption – the biggest shortfall in six seasons. It estimates that output will fall 2 mln tonnes, extending a run of declines from a 2012-13 peak of 185.67 mln tonnes.

The constant decline in prices has affected mills' profits and farmers' revenues. "The direct consequence of this has been the bankruptcy of mills, for example in Brazil, a build-up in cane arrears, and in India and Pakistan, lower renovation rates and field inputs.

Consumption, meanwhile, is expected to grow by 1.7%, albeit a little lower than trend rate, a reflection of the lower oil price. Many oil-exporting nations, such as Nigeria and Russia, are major buyers for sugar, for which their appetite may be curtailed by the damage to their economy from lower crude values.

The deficit envisaged for 2014/2015 would follow four years of surplus totaling more than 30 mln tonnes.

WORLD SUGAR PRODUCTION 2014/2015

<table>
<thead>
<tr>
<th>Production Area</th>
<th>Tonnes (mln)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Europe</td>
<td>26.3</td>
</tr>
<tr>
<td>Africa</td>
<td>11.5</td>
</tr>
<tr>
<td>North &amp; Central America</td>
<td>22.3</td>
</tr>
<tr>
<td>South America</td>
<td>47.5</td>
</tr>
<tr>
<td>Asia</td>
<td>71.3</td>
</tr>
<tr>
<td>Oceania</td>
<td>3.8</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td><strong>182.7</strong></td>
</tr>
</tbody>
</table>


## SENIOR EXECUTIVE COMPENSATION
### 2014

<table>
<thead>
<tr>
<th>Position of Senior Executive</th>
<th>Year</th>
<th>Salary ($)</th>
<th>Gratuity or Performance Incentive ($)</th>
<th>Travelling Allowance or Value of Assigned Motor Vehicle ($)</th>
<th>Pension or Other Retirement Benefits ($)</th>
<th>Other Allowances ($)</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Executive Chairman</td>
<td>2014</td>
<td>6,029,448.00</td>
<td>1,507,362.00</td>
<td>140,012.04</td>
<td>-</td>
<td>-</td>
<td>7,676,822.04</td>
</tr>
<tr>
<td>Dir. Finance &amp; Administration</td>
<td>2014</td>
<td>4,800,000.00</td>
<td>1,200,000.00</td>
<td>140,012.04</td>
<td>-</td>
<td>70,224.00</td>
<td>6,210,236.04</td>
</tr>
<tr>
<td>Director of Research</td>
<td>2014</td>
<td>4,700,000.00</td>
<td>1,175,000.00</td>
<td>140,012.04</td>
<td>-</td>
<td>70,224.00</td>
<td>6,085,236.04</td>
</tr>
<tr>
<td>Real Estate Manager</td>
<td>2014</td>
<td>4,000,000.00</td>
<td>1,000,000.00</td>
<td>140,012.04</td>
<td>-</td>
<td>70,224.00</td>
<td>5,210,236.04</td>
</tr>
<tr>
<td>Mgr. Information &amp; Planning</td>
<td>2014</td>
<td>4,500,000.00</td>
<td>1,125,000.00</td>
<td>140,012.04</td>
<td>-</td>
<td>70,224.00</td>
<td>5,835,236.04</td>
</tr>
<tr>
<td>Agriculture Service Manager</td>
<td>2014</td>
<td>4,609,199.00</td>
<td>-</td>
<td>140,012.04</td>
<td>-</td>
<td>66,000.00</td>
<td>4,815,211.04</td>
</tr>
<tr>
<td>Head, Extension Services</td>
<td>2014</td>
<td>3,834,535.00</td>
<td>-</td>
<td>140,012.04</td>
<td>-</td>
<td>66,000.00</td>
<td>4,040,547.04</td>
</tr>
<tr>
<td><strong>TOTAL</strong></td>
<td></td>
<td><strong>32,473,182.00</strong></td>
<td><strong>6,007,362.00</strong></td>
<td><strong>980,084.28</strong></td>
<td><strong>-</strong></td>
<td><strong>412,896.00</strong></td>
<td><strong>39,873,524.28</strong></td>
</tr>
</tbody>
</table>
2014

Notes

<table>
<thead>
<tr>
<th>Position of Director</th>
<th>Year</th>
<th>Fees ($)</th>
<th>Motor Vehicle Upkeep/Travelling or Value Assigned Motor Vehicle ($)</th>
<th>Honoraria ($)</th>
<th>All other Compensation Including Non-Cash Benefits as applicable ($)</th>
<th>Fees ($)</th>
<th>Total ($)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Manufacturer’s Representative</td>
<td>2014</td>
<td>91,670.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>91,670.70</td>
</tr>
<tr>
<td>AJCFA Representative</td>
<td>2014</td>
<td>71,169.70</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>70,224.00</td>
<td>141,393.70</td>
</tr>
<tr>
<td>Farmers’ Representative</td>
<td>2014</td>
<td>45,000.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>70,224.00</td>
<td>115,224.00</td>
</tr>
<tr>
<td>Union Representative</td>
<td>2014</td>
<td>52,500.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>70,224.00</td>
<td>122,724.00</td>
</tr>
<tr>
<td>Pan Caribbean</td>
<td>2014</td>
<td>66,502.01</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>70,224.00</td>
<td>136,726.01</td>
</tr>
<tr>
<td>Independent</td>
<td>2014</td>
<td>7,500.00</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>7,500.00</td>
<td>7,500.00</td>
</tr>
<tr>
<td>TOTAL</td>
<td></td>
<td>334,342.41</td>
<td>-</td>
<td>-</td>
<td>-</td>
<td>288,396.00</td>
<td>615,238.41</td>
</tr>
</tbody>
</table>

1. When a non-cash benefit is received (e.g. government housing), the value of that benefit shall be quantified and stated in the appropriate column above.

2. The Executive Chairman is not compensated for attending board meetings.
## APPENDIX TABLES

### TABLE 1: CANE MILLED (TONNES) 2013 & 2014

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>2013 Estates</th>
<th>2013 Farmers</th>
<th>2013 Total</th>
<th>2014 Estates</th>
<th>2014 Farmers</th>
<th>2014 Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frome</td>
<td>205,090</td>
<td>235,080</td>
<td>440,170</td>
<td>251,454</td>
<td>254,502</td>
<td>505,956</td>
</tr>
<tr>
<td>Monymusk</td>
<td>166,929</td>
<td>54,088</td>
<td>221,017</td>
<td>169,052</td>
<td>101,126</td>
<td>270,178</td>
</tr>
<tr>
<td>Everglades</td>
<td>42,099</td>
<td>30,526</td>
<td>72,625</td>
<td>67,161</td>
<td>64,119</td>
<td>131,280</td>
</tr>
<tr>
<td>Golden Grove</td>
<td>85,951</td>
<td>95,559</td>
<td>181,510</td>
<td>112,781</td>
<td>142,243</td>
<td>255,024</td>
</tr>
<tr>
<td>Appleton</td>
<td>245,051</td>
<td>48,810</td>
<td>293,861</td>
<td>293,896</td>
<td>75,906</td>
<td>369,802</td>
</tr>
<tr>
<td>Worthy Park</td>
<td>84,092</td>
<td>109,289</td>
<td>193,381</td>
<td>121,889</td>
<td>125,129</td>
<td>247,018</td>
</tr>
<tr>
<td>TOTAL</td>
<td>829,212</td>
<td>573,352</td>
<td>1,402,564</td>
<td>1,016,233</td>
<td>763,025</td>
<td>1,779,258</td>
</tr>
</tbody>
</table>

### TABLE 2: TONNES 96° SUGAR PRODUCED: 2009-2014

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frome</td>
<td>37,847</td>
<td>40,830</td>
<td>41,686</td>
<td>34,278</td>
<td>36,700</td>
<td>38,603</td>
</tr>
<tr>
<td>Monymusk</td>
<td>19,342</td>
<td>17,004</td>
<td>28,668</td>
<td>26,329</td>
<td>18,501</td>
<td>23,091</td>
</tr>
<tr>
<td>Everglades</td>
<td>3,833</td>
<td>1,457</td>
<td>3,984</td>
<td>6,674</td>
<td>1,172</td>
<td></td>
</tr>
<tr>
<td>Golden Grove</td>
<td>11,486</td>
<td>12,587</td>
<td>16,123</td>
<td>15,524</td>
<td>14,107</td>
<td>19,403</td>
</tr>
<tr>
<td>Appleton</td>
<td>31,625</td>
<td>29,025</td>
<td>31,033</td>
<td>29,794</td>
<td>29,513</td>
<td>33,890</td>
</tr>
<tr>
<td>Worthy Park</td>
<td>21,685</td>
<td>20,903</td>
<td>22,083</td>
<td>21,680</td>
<td>22,701</td>
<td>27,650</td>
</tr>
<tr>
<td>TOTAL</td>
<td>125,818</td>
<td>121,806</td>
<td>139,593</td>
<td>131,589</td>
<td>128,196</td>
<td>154,361</td>
</tr>
</tbody>
</table>

### TABLE 3: CANE QUALITY- JAMAICA RECOVERABLE CANE SUGAR (JRCS) 2009-2014

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frome</td>
<td>11.34</td>
<td>9.85</td>
<td>10.69</td>
<td>9.98</td>
<td>10.17</td>
<td>8.91</td>
</tr>
<tr>
<td>Everglades</td>
<td>10.87</td>
<td>11.22</td>
<td>10.59</td>
<td>10.59</td>
<td>10.06</td>
<td>10.15</td>
</tr>
<tr>
<td>Golden Grove</td>
<td>10.87</td>
<td>9.47</td>
<td>10.21</td>
<td>9.70</td>
<td>9.27</td>
<td>8.79</td>
</tr>
<tr>
<td>Appleton</td>
<td>10.69</td>
<td>10.10</td>
<td>10.50</td>
<td>9.73</td>
<td>10.58</td>
<td>9.96</td>
</tr>
<tr>
<td>Worthy Park</td>
<td>12.06</td>
<td>11.75</td>
<td>11.35</td>
<td>11.78</td>
<td>12.21</td>
<td>11.41</td>
</tr>
<tr>
<td>AVERAGE</td>
<td>11.09</td>
<td>10.28</td>
<td>10.70</td>
<td>10.39</td>
<td>10.49</td>
<td>9.93</td>
</tr>
</tbody>
</table>

Note: Since the inception of the core sampling method of testing cane quality in 1991, cane suppliers have been paid by the Jamaica Recoverable Cane Sugar (JRCS) as measured by the core sampling operation.
TABLE 4: FACTORY RECOVERY INDEX (FRI) 2009-2014

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>(Rating)</th>
<th>2009</th>
<th>2010</th>
<th>2011</th>
<th>2012</th>
<th>2013</th>
<th>2014</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frome</td>
<td>3</td>
<td>91.16</td>
<td>86.42</td>
<td>80.64</td>
<td>83.05</td>
<td>84.34</td>
<td>89.47</td>
</tr>
<tr>
<td>Monymusk</td>
<td>6</td>
<td>74.66</td>
<td>83.07</td>
<td>91.85</td>
<td>82.10</td>
<td>80.00</td>
<td>79.35</td>
</tr>
<tr>
<td>Everglades</td>
<td>5</td>
<td>67.71</td>
<td>39.91</td>
<td>65.06</td>
<td>92.10</td>
<td>87.23</td>
<td></td>
</tr>
<tr>
<td>Golden Grove</td>
<td>4</td>
<td>86.11</td>
<td>82.96</td>
<td>88.36</td>
<td>92.55</td>
<td>84.66</td>
<td>87.37</td>
</tr>
<tr>
<td>Appleton</td>
<td>2</td>
<td>96.59</td>
<td>97.15</td>
<td>97.70</td>
<td>95.20</td>
<td>95.32</td>
<td>92.22</td>
</tr>
<tr>
<td>Worthy Park</td>
<td>1</td>
<td>96.95</td>
<td>96.44</td>
<td>96.21</td>
<td>96.95</td>
<td>96.19</td>
<td>98.09</td>
</tr>
<tr>
<td>AVERAGE</td>
<td></td>
<td>88.82</td>
<td>88.15</td>
<td>89.50</td>
<td>87.73</td>
<td>88.28</td>
<td>89.31</td>
</tr>
</tbody>
</table>

Note: Cane payments are now based on a standard Factory Recovery Index (FRI) of 91%. Factories below 91% are required to make up for their inefficiency while those above gain benefits. The FRI is derived from the core sample testing of the sugar cane entering a factory and this measure has replaced a former measure of Overall Efficiency which was derived in the Factory, that is to say, the sugar is measured coming into the factory rather than going out.

TABLE 5: TIME ACCOUNT 2013 & 2014
(TIME LOSS AS A % OF TOTAL AVAILABLE TIME)

<table>
<thead>
<tr>
<th>FACTORIES</th>
<th>Total Time Loss</th>
<th>STOPPAGES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Frome</td>
<td>52.43</td>
<td>26.16</td>
</tr>
<tr>
<td>Monymusk</td>
<td>46.01</td>
<td>34.56</td>
</tr>
<tr>
<td>Everglades</td>
<td>49.31</td>
<td>41.26</td>
</tr>
<tr>
<td>Golden Grove</td>
<td>46.36</td>
<td>45.16</td>
</tr>
<tr>
<td>Appleton</td>
<td>29.44</td>
<td>25.19</td>
</tr>
<tr>
<td>Worthy Park</td>
<td>19.45</td>
<td>13.58</td>
</tr>
<tr>
<td>TOTAL</td>
<td>41.34</td>
<td>31.04</td>
</tr>
</tbody>
</table>

Total time loss (time not available for milling) is broken down into causes for stoppages related to (1) "factory" such as factory breakdown (11) "non-factory" such as weather, lack of cane or strikes and (111) time devoted to weekend cleaning and expressed as a percentage of total available time.
### TABLE 6: SUGAR EXPORTS BY DESTINATION 2010-2014

<table>
<thead>
<tr>
<th>DESTINATION</th>
<th>2010 QUANTITY (TONNES)</th>
<th>2010 VALUE (US) ($'000)</th>
<th>2011 QUANTITY (TONNES)</th>
<th>2011 VALUE (US) ($'000)</th>
<th>2012 QUANTITY (TONNES)</th>
<th>2012 VALUE (US) ($'000)</th>
<th>2013 QUANTITY (TONNES)</th>
<th>2013 VALUE (US) ($'000)</th>
<th>2014 QUANTITY (TONNES)</th>
<th>2014 VALUE (US) ($'000)</th>
</tr>
</thead>
<tbody>
<tr>
<td>European Union</td>
<td>78,639</td>
<td>36,527</td>
<td>94,441</td>
<td>51,119</td>
<td>103,118</td>
<td>95,341</td>
<td>82,405</td>
<td>71,086</td>
<td>77,457</td>
<td>59,406</td>
</tr>
<tr>
<td>USA</td>
<td>13,980</td>
<td>9,152</td>
<td>16,283</td>
<td>13,187</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>11,016</td>
<td>5,883</td>
</tr>
<tr>
<td>Other</td>
<td>280</td>
<td>162</td>
<td>31</td>
<td>33</td>
<td>36</td>
<td>41</td>
<td>64</td>
<td>78</td>
<td>36</td>
<td>51</td>
</tr>
<tr>
<td>TOTAL</td>
<td>92,899</td>
<td>45,841</td>
<td>110,755</td>
<td>64,339</td>
<td>103,154</td>
<td>95,382</td>
<td>82,469</td>
<td>71,164</td>
<td>88,509</td>
<td>65,340</td>
</tr>
</tbody>
</table>

*Annual Report 2014 (2)*