

# SUGAR CANE



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## SPECIAL EDITION THE CFC SUGAR CANE PROJECT

### Editorial

In 2003 Jamaica signed an agreement with the Common Fund for Commodities, a United Nations Agency, headquartered in Holland, for a project entitled "Enhancing the viability and competitiveness of Caribbean Sugar Industries." The project was to be completed in three years and would cost some US \$2.5 million of which \$1.5 million would be in the form of a grant from the CFC. The rest would be provided by the host country, mainly in the form of services performed in its execution.

The project was conceptualised and proposed to the CFC for funding by this Institute (SIRI), which then became the designated Project Executing Agency. Caroni Ltd of Trinidad & Tobago was put forward as a Collaborating Institution. However radical changes in the structure and function of Caroni Ltd over the last few years have hampered that industry's participation in the project to date.

Implementation of the project began in Jamaica in January 2004. At this time the project is therefore past the mid-point. This special edition of Sugar Cane is devoted to reporting on progress under the main components of the project.

Small holders are the main focus. Each component is geared at improving their efficiency and cost effectiveness as one of the goals is to maintain rural stability. If the cane grower on small holdings can sustain profitable operations, then he is encouraged to remain in rural areas and not become a part of rural/urban drift.

Originally, the project was conceived to address the age old problem of yield decline in sugar cane. This was to be mainly through carrying out a programme of crop rotation, rarely practised by cane farmers. It was however expanded to include:

- » Establishing seed cane nurseries on small holdings
- » Farmer participatory variety evaluation
- » Farmer participatory training in improved agro-economic and management practices

- » Setting up and operation of a pilot centre pivot irrigation scheme among contiguous small cane farming holdings
- » Research and development into factors causing yield decline in sugar cane
- » Determining viable farm modules
- » Dissemination of information gathered under the project

The Jamaican aspects are well advanced, despite setbacks occasioned by severe weather – droughts at the start of 2004 and 2005, a direct hit by Hurricane Ivan in 2004, and glancing blows by hurricanes Dennis, Emily and Wilma in 2005.

The Project's reach extends way beyond the 90 growers so far directly involved in one form or another. The seed cane nursery project, for instance has completely transformed the status of the small holder from being at the end of the chain receiving new varieties to one of equal prominence to any within the industry. Every major farming district now has its own supply of good quality seed stock so that the beneficiaries are in effect any one of the thousands of small holders who may undertake replanting. There are also significant spin-offs in rural employment in the various operations involved in this multifaceted project. \*

*Pic. Farmer Meverly Anderson, of Lakes Pen St Catherine, 3rd left, stands in front of plot prepared for drip irrigation along with visiting CFC representatives from left, Prof Galves, Dr Marieanela Cordoves and Miss Eltha Brown (CFC Project Manager) and Lancelot White (SIRI's irrigation specialist)*



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# COMPONENT 1

## Establishing Seed Cane Nurseries On Small Holdings

### Objectives

The main objectives of the Nursery Cane project were:

- » To fast track the delivery of newer high yielding, disease resistant, recommended varieties to growers on small holdings
- » To facilitate more rapid multiplication and distribution of newer varieties across the industry
- » To increase the supply of pure stand, seed cane for commercial use

### Background

Prior to this programme, small holders were at the tail end of the variety distribution process which was usually started on major estates. Small holders therefore tended to have on their farms older varieties many of which would have outlived their more productive phases. Under the CFC project, that position was being rapidly reversed. Within two years, small holders had become the prime source of good nursery stock of newer varieties in the industry and the large estates were often looking to the small holders for seed cane.

### Status

By December 2005, seed cane nurseries of elite varieties, totalling 60.9 ha, were established on farmers' holdings across the industry. A total of 28 farmers were directly benefiting by having secondary nurseries on their farms. New elite varieties such as BJ78100, BJ8532, BJ82156, BJ7938 and J9501 were amply distributed among farmers across the industry. The programme had employment generation benefits for suppliers of equipment in land preparation, workers involved in harvesting, loading transportation, planting, fertilizing, weeding, draining, irrigating, and roguing seed cane. Most importantly, growers in all regions had improved access to elite varieties.

One noticeable difference this project has made is that the small holder who now gets hold of these varieties tends to utilise the material received much more efficiently than would the traditional estates. Many small holders are still prepared to use manual planting methods which, though relatively tedious, give superior germination and are therefore less wasteful of material which at that stage in the multiplication of a new variety, is still in relatively short supply. The level of attention given to small holders' plots also tends to be greater because of the close working relationship with the SIRI area agronomist. Stands therefore tend to be well maintained and provide seed cane of the desired quality. \*



*Traditional “dibbled” top system of planting done by farmer Sybron gives superior germination rate*



*Nursery of BJ8252, one of the new elite varieties, now widely distributed on farmer' holdings through CFC project*



*CFC seed cane nursery in Mid Clarendon*



# COMPONENT 2

## Farmer Participatory Evaluation Of Varieties



*CFC Farmer Variety Evaluation plot, Clarendon*

### Objective:

*To involve sugar cane growers in the evaluation and selection of elite varieties suited for their farms*

Under this component, SIRI with advice from its Extension agents, selects suitable sites and farmers with a better track record of following recommendations, for establishing variety comparison plots. With the growers' participation, a plot is planted with two to three recently released elite varieties in contiguous strips of 6 to 25 rows, running the entire length of the field. The farmers are afforded the opportunity to observe the growing habits and productive capabilities of the varieties on their holdings. As each variety will exhibit varying adaptability to a particular area, the farmer is able to choose for himself, with the assistance of SIRI's variety specialist, the one(s) better suited to his farm. ✱

*CFC Project Farmer stands before variety evaluation plot, Westmoreland*





# COMPONENT 3

## Farmer Participatory Training In Improved Agronomic And Management Practices



*Cane growers gather in Clarendon for CFC sponsored Field Day*



*Training seminar for growers under CFC project*



*“Dual row planting” for increased productivity in CFC project demonstration plot, Clarendon*

### Objective

*To increase through training the viability and sustainability of cane farming by technology transfer and adoption by farmers of cost efficient appropriate techniques*

The programme is aimed at improving the growers' productivity and efficiency by targeting all aspects of cane farming from planting to harvesting. Methods vary from seminars to field days and setting up of demonstration plots on farmers' holdings highlighting various facets of what are generally regarded as “best practice.”

Training activities vary with time of year and are geared to focus on improved practices in the respective seasonal activities. For instance, at the start of the year with the industry engaged primarily in cane harvesting, training is geared then at improving cane quality in deliveries to the factories. In 2005 therefore, with the country having been hit by hurricane Ivan in the previous September, training was directed at reducing inclusion of damaged canes as this would lower quality and therefore reduce earnings to the grower. The main thrust was to outline management approaches necessary to reduce extraneous matter in loads and maximize cane quality measured as Jamaica Recoverable Cane Sugar (JRCS) which is the basis for cane price determination

### Training for Improved Agronomy

Where planting was in progress, focus was shifted to achieve improvements in agronomic practices. Emphasis was given to good field establishment, weed control practices, and management of resources. Two major Field Days were held in Clarendon in 2005 highlighting “best practice” under irrigated growing conditions in demonstration plots set up in 2004. Growers, brought in from across the industry, were introduced to the new dual row planting technique and recently released high yielding disease resistant varieties, J9501 and BJ78100.

Demonstration plots totalling 30.74 ha, highlighting various aspects of cane growing have been a main tool used in farmer training. Plots have been established in all the major cane growing areas since the start of the programme in 2004. The plots often serve a dual purpose. For instance, plots at Springvale (0.4 ha) and Barrackhood (0.4 ha) in St Catherine were planted to BJ78100, BJ7465 and BJ7938 to first demonstrate variety adaptability, performance and proper management. Later these were cut back and the varieties distributed to other farmers in the area thus facilitating a wider distribution of these recommended varieties among growers.



# COMPONENT 4

## Setting Up And Operation Of A Pilot Centre Pivot Irrigation Scheme Among Contiguous Small Cane Farming Holdings

### Centre Pivot

GIS technology was used to identify a suitable site in the irrigated cane growing area for installation of a centre pivot irrigation scheme that would benefit as many farmers as possible. The site should be free of physical impediments and have convenient access to adequate and reliable irrigation water and electricity. This resulted in the selection of a zone in Content, Clarendon comprising some 60.8 ha and involving 18 individual cane growers. Farm plots under the influence of the pivot would range in size from 0.5 to 18 hectares.

Sensitisation meetings were held in which the growers concerned were informed of the proposal to upgrade the irrigation technology from the traditional but wasteful furrow irrigation to the highly efficient centre pivot system. The farmers were encouraged to form a Water User Group to manage the system. A Chairman and Executive of the Group were elected and persons (also from within the Group) selected for training for operating the system. The group would also put in place arrangements for collection of proportionate fees from cane sales to cover payment of operators, utility bills and repairs and maintenance. CFC Funds used in assisting farmers in rehabilitating fields would be collected over a 3-year period and deposited in a Water Users' account, opened at a local bank, thus providing a financial foundation for continuity of the project when CFC funding ceased. Some growers would also have to give up areas of land to allow for parking of the system, building a pump house and laying of underground conduits for water and electricity. Systems to compensate growers who made such sacrifices were also discussed.

A lengthy tendering and contractor selection process followed by hurricane Ivan resulted in the pivot not being installed until the end of 2004. The pump house was constructed but further delays were occasioned by a late start up of the Monymusk factory in 2005 (harvest necessary for clearing the site of cane to permit track preparation). Then there were problems in getting electricity connected. All this led to the first test run not being conducted

until during August 2005 and commissioning not being achieved until May 2006. Meanwhile, fields received a total of eight cycles of wetting in the second half of 2005 allowing farmers to see some impact in the form of improved cane yield in 2006.



*Group of farmers associated with CFC sponsored centre pivot, Content, Clarendon*



*CFC sponsored Centre Pivot irrigation machine, shortly after erection*



*Control panel for CFC centre pivot at Content, Clarendon*

## Drip Irrigation

With installation of the centre pivot nearing completion, attention was turned to establishing small scale drip irrigation systems on various farmers' holdings. With the assistance of SIRI's Extension agents, a number of potential sites were located in the irrigated area. A prerequisite was that the sites should already have access to reliable pressurized irrigation water supply.

The project would involve a total of 8 farm plots – 5 in the parish of Clarendon and 3 in St Catherine – covering a total of just under 23 ha. Four sites were at Vernamfield and another at Gravel Hill in Clarendon. Three were located within the Bernard Lodge/Lakes Pen area of St Catherine.

Installation began in March, 2005. Mapping and design were accomplished through the use of a GPS hand held instrument and IKONOS Satellite imagery. All plots were laid out in dual row format (two rows of cane atop each

bank) with the drip irrigation tubes buried between.

By the end of November 2005 all five plots in Clarendon were installed with drip tubes and the fields planted to sugar cane. A second drip tube laying device was fabricated by SIRI to speed up installation. However, the only tractor that could have operated this tube layer became dysfunctional thus impeding progress. Further problems arose when the SIRI tractor was transported from Clarendon to St Catherine but could not be used for a prolonged period as a result of wet field conditions. The project however highlighted a chronic shortage of agricultural tractors in St Catherine. SIRI used drip tube-laying equipment in its possession for installation at the various sites. Also, SIRI personnel directly conducted and supervised installation.

Some plots under this component have already been cut back and material used as seed cane. However, plots were established too late for harvesting in 2006. ❄

*Land prepared for drip tube installation, Lakes Pen, St. Catherine*





# COMPONENT 5

## Research And Development Into Factors Causing Yield Decline In Sugar Cane

### Objective

*To investigate the phenomenon of yield decline with a view to facilitate a boost in productivity on small farms through the application of appropriate corrective measures*

### Rationale

The project is guided by certain hypotheses:

- » There is no single factor responsible for all the noted productivity decline
- » There is more likely to be a case of multiple factors acting together
- » Decline may be addressed through investigation and application of appropriate technological package(s)



*Red kidney beans in crop rotation, Westmoreland*

### Approach

Adoption and immediate application of proven techniques:

- » Use of a combination of scientific and local knowledge
- » Reliance on knowledge of market forces governing alternate crops, seasonality of supplies, marketing arrangements and past experience

- » Suitability for given soil characteristics
- » Crop duration (planting to harvest) – should be within one year
- » Assumed agronomic and economic benefits of crop

The crops tried at various locations include Sea Island Cotton, sweet potato, carrot, string beans, red peas and cucumber.\*

### Crop Rotation

The above considerations led to the application of crop rotation:

Sequence: Alternate crop → a legume → sugar cane

Crops were selected for rotation with sugar cane bearing in mind:

- » Marketability and value
- » Non-graminaceous (thus having different nutrient requirements and supporting different pest and pathogenic complex)



*Sweet potato in rotation rotation, Westmoreland*



# COMPONENT 5

CONTD...



*Sweet potato, left, and carrot, right, in rotation with sugar cane, Westmoreland*



*Sea Island Cotton in rotation with sugar cane, Clarendon*



*Farmer inspecting insect trap for cotton pest monitoring, Clarendon*

# COMPONENT 6

## Determining Viable Farm Modules

### Objectives

- » *To conduct technical and economic evaluation of different farm modules*
- » *To establish requirements for viability in the Jamaican sugar industry in light of prevailing economic environment*

### Criteria

In order to collect information for this study, growers within the industry were first categorized along the following criteria:

- » Farm size
- » Machinery – owned or rented services
- » Farming systems
- » Rain-fed conditions
- » Irrigated conditions
- » Traditional furrow irrigation
- » Technologically more efficient irrigation systems

### Farm Size

With respect to size of their holdings, growers were grouped as follows:

- Less than 2 ha
- >2 – 4 ha
- >4 – 10 ha
- >10 – 50 ha
- >50 – 200 ha
- > 200 ha

### Equipment Ownership

A further subdivision was made based on whether farms:

- » Owned and operated machinery and equipment or
- » Rented such services

### Ecological areas

Information also had to be gathered from the 5 major ecological zones in which canes are grown in Jamaica – the Wet West, West East, Irrigated Areas, Dry North and Central Uplands.

### Procedure

The initial approach to data collection had to be modified when it was found that growers failed to respond in a desired manner. That approach involved:

- » Developing a Record Keeping Handbook (to ensure good quality primary data)
- » Conducting a series of training seminars in use of this handbook, followed by handbook distribution
- » Production of a Cost Management Brochure entitled “Three Easy Steps to determine if your farm is viable” - followed by distribution and training

A total of 75 growers were so drafted to keep satisfactory records so that proper assessment of profitability could be conducted. However, despite follow up, it was found that growers tended to merely keep the Handbooks as “souvenirs” and it became clear that this approach would not provide data needed for the study. Not much attempt was being made to undertake record keeping and growers clearly needed ongoing and individual attention.

### Modified Approach

The new approach taken in 2005 was to develop a Survey Questionnaire and conduct farm visits to directly gather information needed. A data collection officer was hired on a temporary basis and given the task of surveying a target of 200 growers. The Survey was designed to cover the range of farm sizes and sought to ascertain:

- » Cane Production & Productivity for 3 years
- » Off Farm Income/Employment etc.

### *Growers being trained in Record Keeping*

