



SIRDI

SUGAR INDUSTRY
RESEARCH & DEVELOPMENT INSTITUTE

BELIZE, C.A.

**Transforming the Northern
sugarcane sector through applied
research to build resiliency to climate
change and improve livelihood of
sugarcane farmers.**

SIRDI established under Sugar Industry Act, No 27, of 2001
Activated in May 2009 .

SUGAR INDUSTRY OF BELIZE

Composition of the **SUGAR INDUSTRY CONTROL BOARD: 11 members (2015)**

Mill

Farmers

Government

Business Community

Location:

Sugar Belt:
Northern Districts of Corozal and Orange Walk

Mill:

1 north and a second west Santander

Mill capacity:

- 1.3 M tons
- As of 2012, BSI changed ownership- bought by ASR group

Farmer Organizations Sugar Industry (Amendment) Act 2015 :

BSCFA

PSCPA

CSCPA

NSCGA

5,008 cane farmers registered to deliver cane for 2020-2021 crop

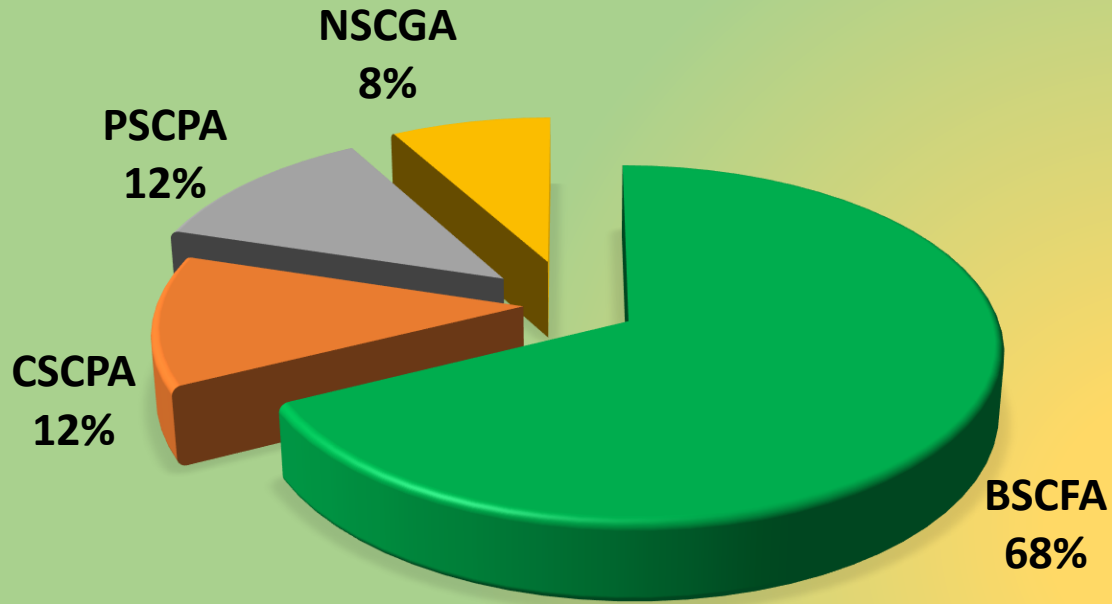
Sugar cane production 2020

893,662.00 M tons cane

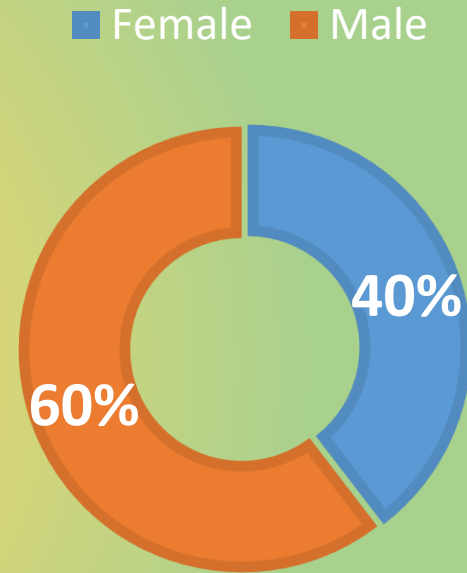
87,759 M tons sugar

\$54.74 price /ton
\$55.24

Cane Farmer's Profile 2020-2021

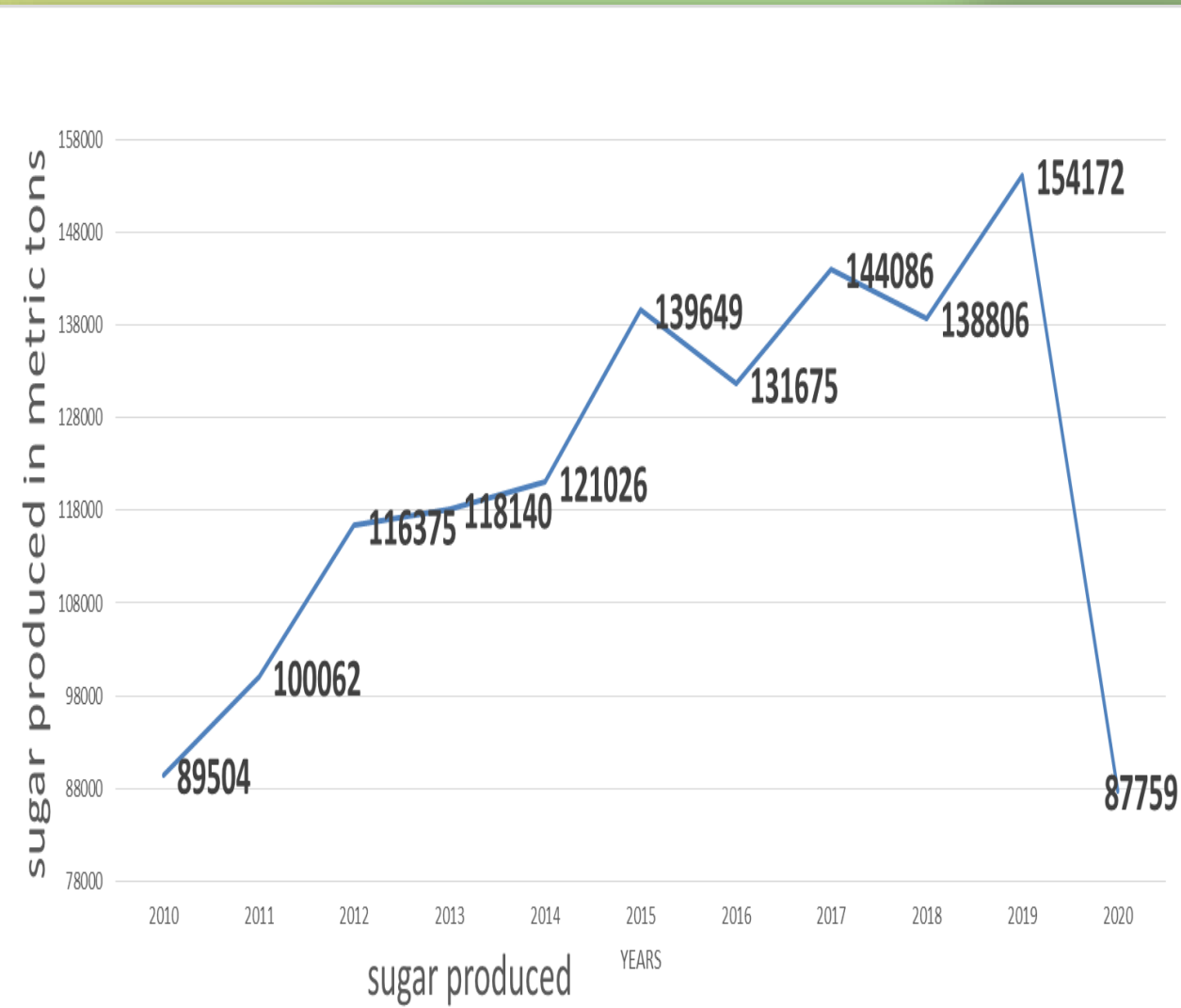
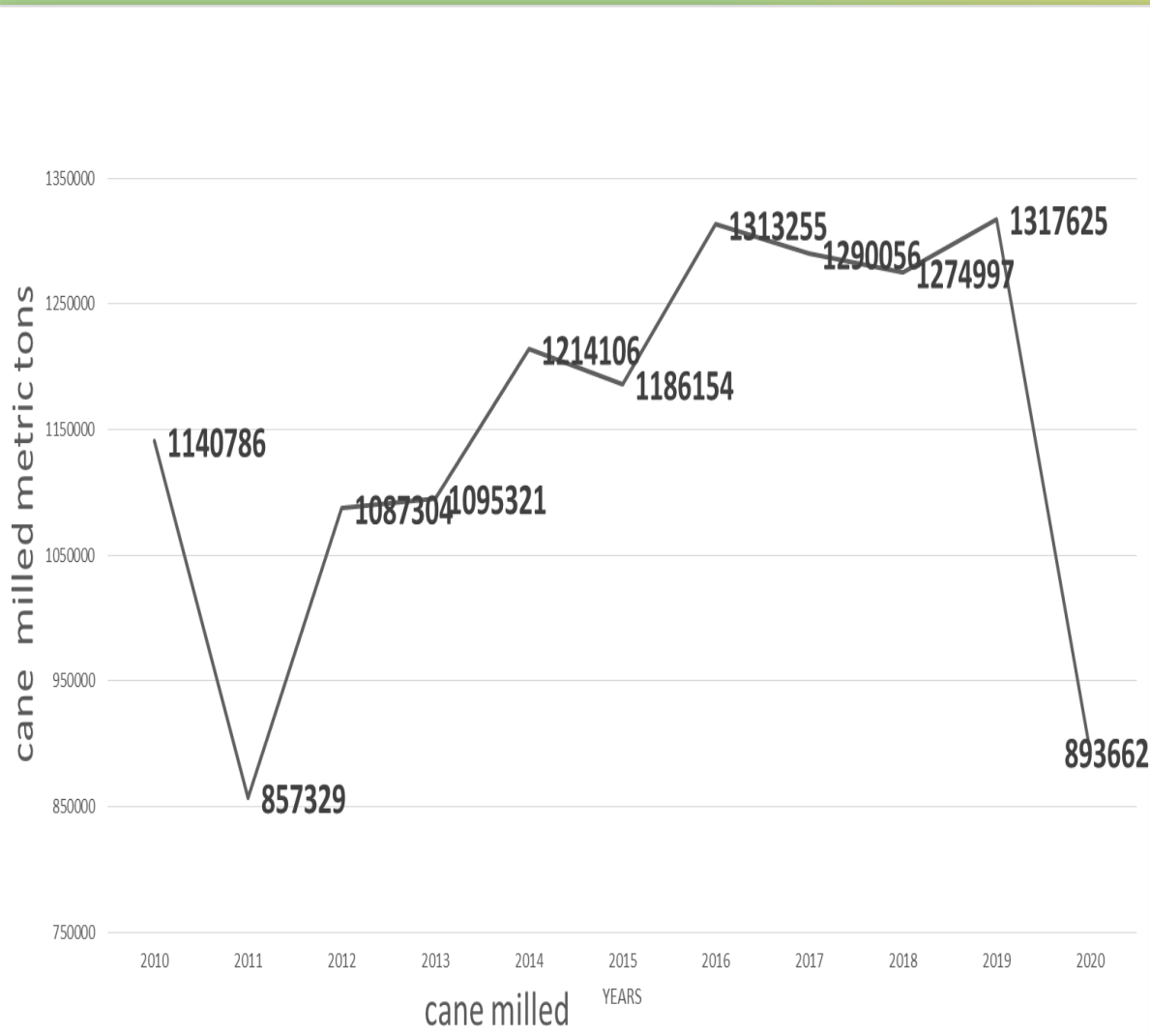


Members Number			
BSCFA	3358	CZL	1548
		OW	1810
CSCPA	619		
NSCGA	402		
PSCPA	625		
SIRDI	1		
BSI/CGP	2		
IND	1		
<u>Total</u>	<u>5,008</u>		



GENDER	COUNT OF FARMERS
FEMALE	1,983
MALE	3,025
<u>Total</u>	<u>5,008</u>

Industry performance



Mandate



SIRDI objectives are well defined under the Sugar Act (2001) and includes the following: research, develop and adopt technological innovations and production options for the benefit of the industry.

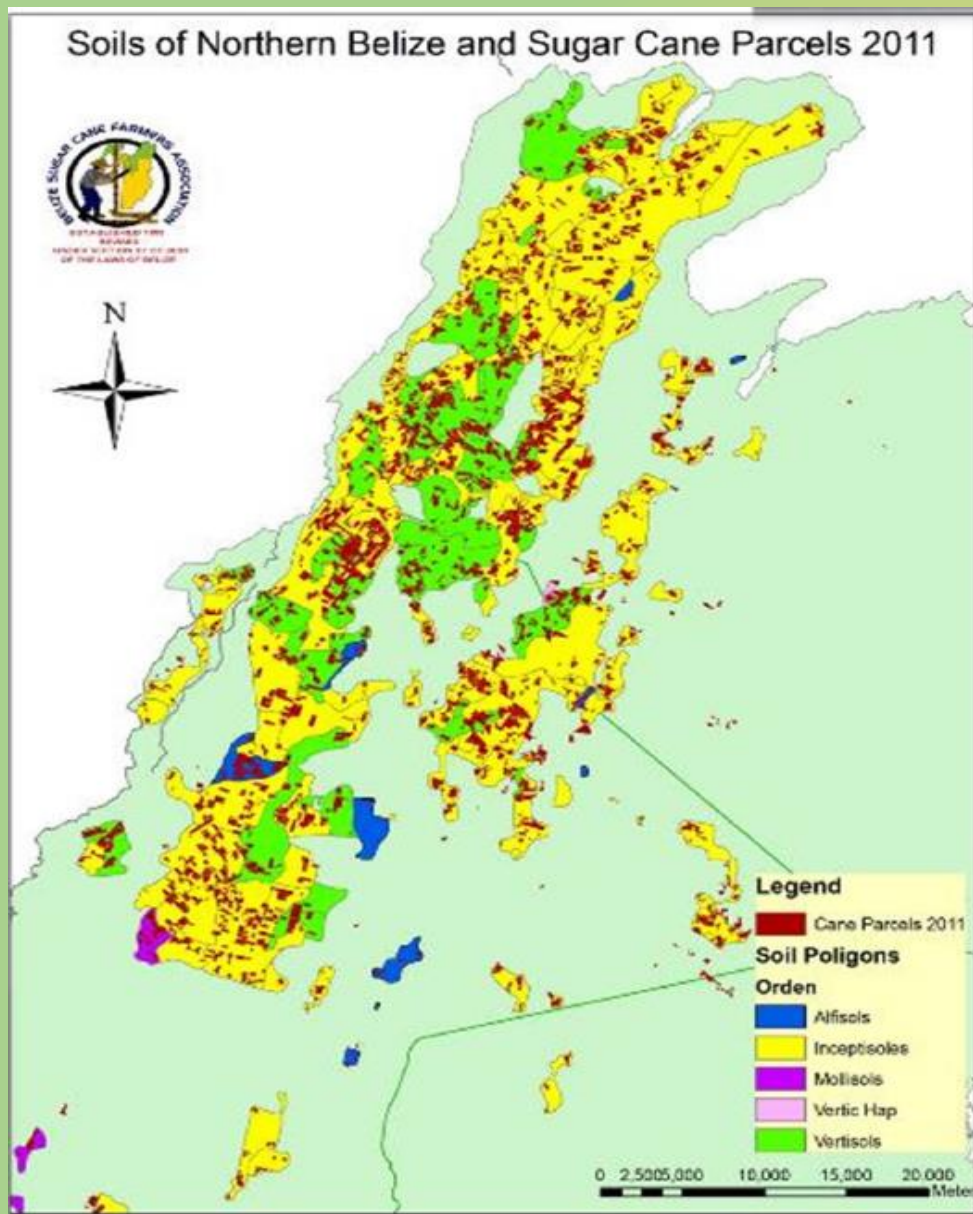
Establish norms and standards and provide technical services to the Sugarcane Production Committee (SCPC) for determining sugarcane quality.

Research Activities



To provide research-based solutions that enhance the **viability** of the sugarcane industry in Belize, through a multidisciplinary approach to develop improved varieties and environmentally friendly production strategies that will enhance **productivity, profitability** and **sustainability**.

Soil Study of the Northern Sugar Belt



Inceptisols: This soil type occupies 71.9% of the total sugar cane area. It is located primarily in the northeastern portion from the Belize Sugar Industries, coinciding with the branches of Corozal, Xaibe, Louisville and San Narciso. Most of the soils in this order have medium to coarse texture, generally moderate to good drainage, good organic matter content and a slightly acidic pH.



Vertisols: This soil type occupies 24.50% of the total sugar cane area. It is mainly located in the south central portion from the BSCFA, coinciding with the branches of San Narciso, San Jose, Orange Walk and Yo Creek. It's pH is also slightly acidic to neutral and its organic matter content is medium to high. This soil type has a medium to fine texture and drainage is generally moderate to imperfect.



Mollisols: This soil type occupies 0.99% of the total sugar cane area. It is mainly located in the southwestern portion from BSI, coinciding with the San Lazaro branch. It is a deep dark soil with high organic matter content and a saturation ratio above 50 percent. It has mild to severe compaction, a clay loam to clay texture and moderate to imperfect drainage. It is characterized by a slightly acidic to neutral soil reaction with good moisture retention capacity.




Alfisols: This soil type occupies 2.61% of the total sugar cane area. It is mainly located in the Southeast portion from BSI, coinciding with the branches of Orange Walk, San Lazaro and Guinea Grass. It is an average deep soil with reddish coloration. It has light to heavy compaction, a clay loam to clay texture and moderate drainage. This soil type also has an acidic soil reaction and a medium to low organic matter content.

Soil Study of the Northern Sugar Belt

Cultivo	Tipo de Fertilizante	Momento de Aplicacion	Rate Sacos/Acre
Caña Planta	18-46-0	Incorporado al Fondo del surco de Siembre	1
	15-4-28	30-50 dias despues de la Siembra	3
Caña Soca	15-4-28	30-50 dias de despues de la Cosecha	4

Legend

 Sugarcane Under Production


Orden

 Alfisols

 Inceptisol

 Mollisols

 Vertic Hap

 Vertisols

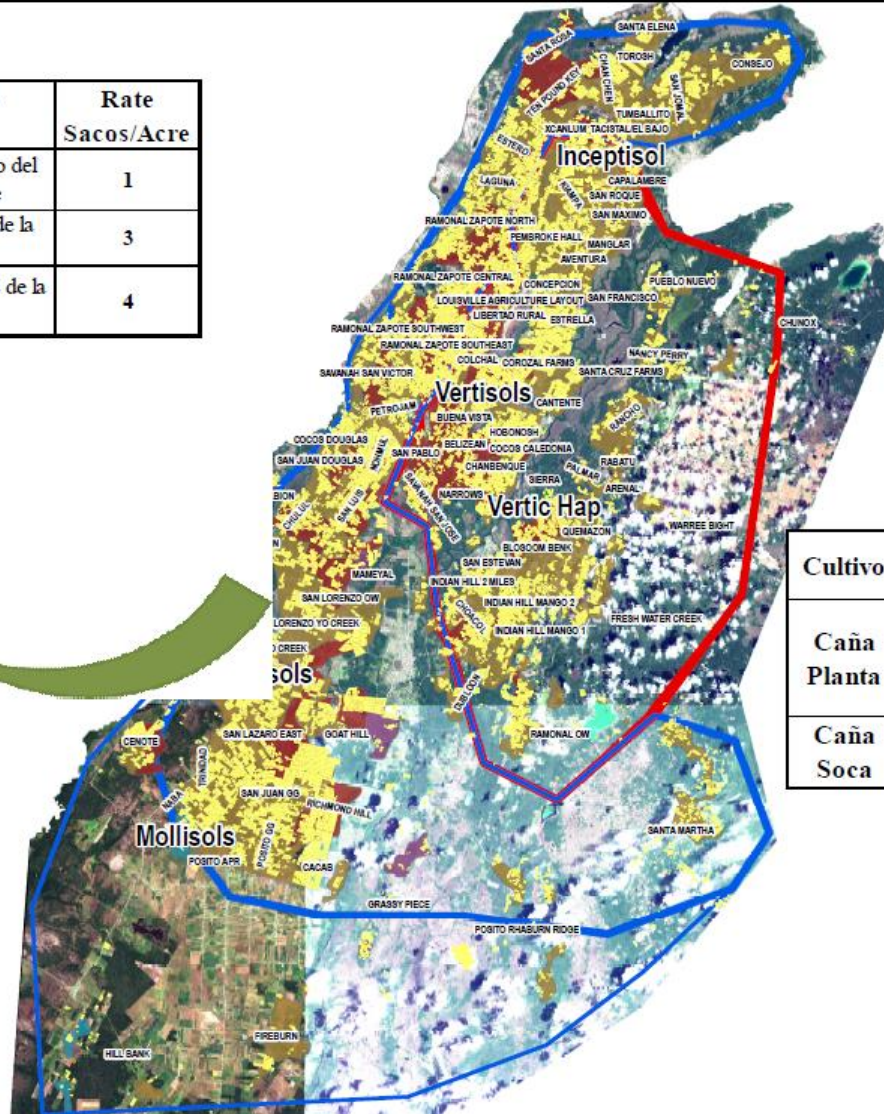
PHOSPHORUS

 LOW

 MEDIUM

Date: 5/12/2017

Author: VP



Cultivo	Tipo de Fertilizante	Momento de Aplicacion	Rate Sacos/Acre
Caña Planta	18-46-0	Incorporado al Fondo del surco de Siembre	1
	15-4-28	30-50 dias despues de la Siembra	3
Caña Soca	17-8-22	30-50 dias de despues de la Cosecha	4

Plant nutrition: fertilizer application, dosage, time, methods.

- Study of the effect of different levels of nitrogen, phosphorus and potassium on sugarcane yield in Belize.



Treatments	N (kg ha ⁻¹)	P (kg ha ⁻¹)	K (kg ha ⁻¹)
I	N ₀ P ₀ K ₀	N ₀ P ₀ K ₀	N ₀ P ₀ K ₀
II	N ₀ P ₆₀ K ₁₈₀	N ₁₅₀ P ₀ K ₁₈₀	N ₁₅₀ P ₆₀ K ₀
III	N ₅₀ P ₆₀ K ₁₈₀	N ₁₅₀ P ₂₅ K ₁₈₀	N ₁₅₀ P ₆₀ K ₄₀
IV	N ₁₀₀ P ₆₀ K ₁₈₀	N ₁₅₀ P ₅₀ K ₁₈₀	N ₁₅₀ P ₆₀ K ₈₀
V	N ₁₅₀ P ₆₀ K ₁₈₀	N ₁₅₀ P ₇₅ K ₁₈₀	N ₁₅₀ P ₆₀ K ₁₂₀
VI	N ₂₀₀ P ₆₀ K ₁₈₀	N ₁₅₀ P ₁₀₀ K ₁₈₀	N ₁₅₀ P ₆₀ K ₁₆₀
VII		N ₁₅₀ P ₂₀₀ K ₁₈₀	N ₁₅₀ P ₆₀ K ₂₀₀
VIII			N ₁₅₀ P ₆₀ K ₃₀₀



Evaluation of pre-emergent herbicides

- Evaluate three pre-emergent herbicide molecules and its effect on weed control in sugarcane.



Response Variables:

1. Weed density
2. Phytotoxicity
3. Yield
4. Cost of control

Variety Development Program



Stage VI

2009 Series – 9 BBz varieties (Ow)
2008 Series – 7 BBz varieties in 2 locations (Ow/Czl)
2005 Series – 3 BBz varieties (Ow)
2004 Series – 2 BBz varieties (Ow)
2002 Series - 6 BBz varieties (Ow)
Cuban – 9 commercial varieties

4th year of evaluation:

These varieties are going to be placed in the initial seed increase at **stage VI** to accelerate the release process, but will be under strict scrutiny.

Results:

Selection of 15 varieties on stage V to be placed in the initial seed increase

BBZ:

BBz02-403
BBz02-552
BBz02-125
BBz05-260
BBz08-1107
BBz08-808
BBz09-506
BBz09-192

Cuban:

C90-317
C323-68
C86-156
Ja64-19
B-80250

Others

BBz03-061

Parameters:

- Growth
- Quality



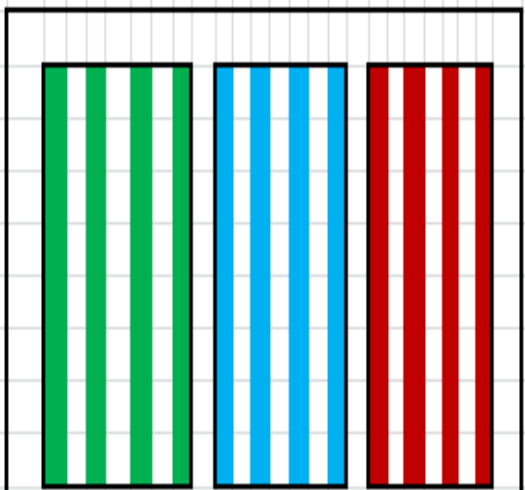
The impact of different sugarcane humidity regimes in a Vertisol soil under the agro climatic conditions

To explain the irrigation regime in sugarcane areas with irrigation potential.

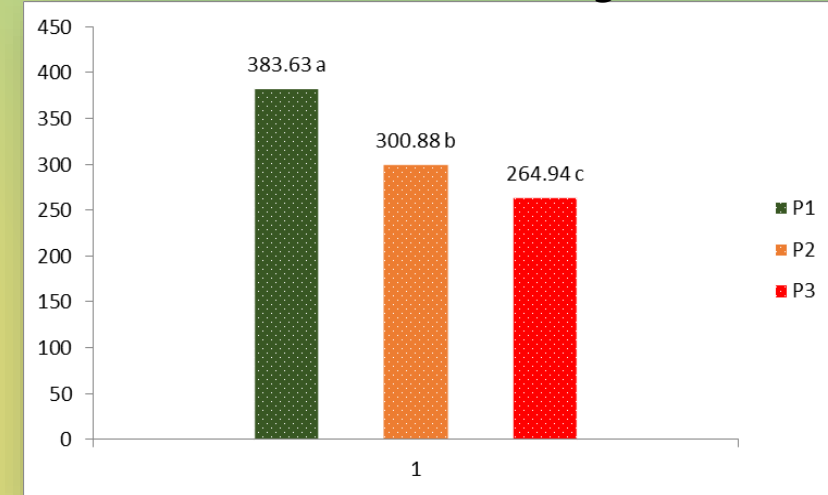
To assist in mitigating the impact of drought by making an efficient and rational use of water.

Experimental Design

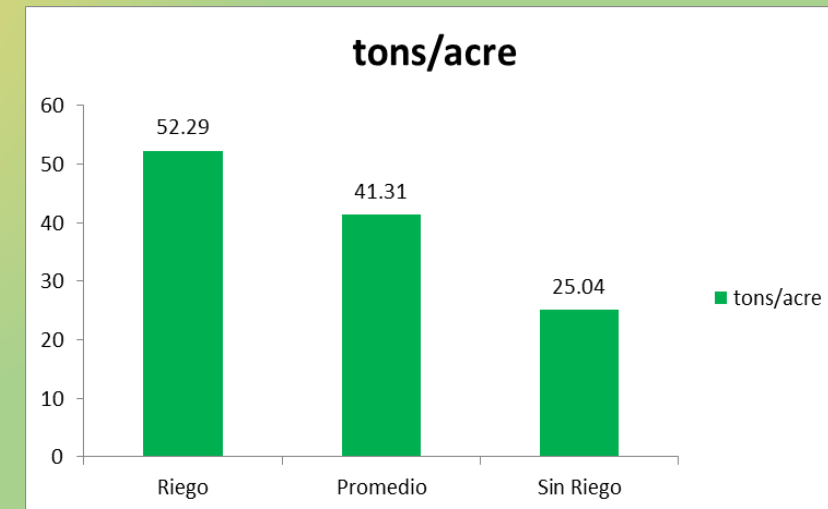
Field Work and Data collection



Results - Stalk height



Result - Yield



Renewable Biomass Fuel Production



Green Climate Fund Caribbean Community Climate Change Centre

PURPOSE OF THE PROJECT

To demonstrate the long-term feasibility of bioenergy production in Belize, based on an indigenous fast growing perennial grass - **Arundo donax** - cultivated on marginal lands.

PROJECT GOAL

To implement a project that would generate the necessary information for assessing the viability of a potentially significant source of **green energy for Belize**, displacing costlier and greenhouse gas emitting fuels, and which would help to reduce the cost of imported energy and the economic strains on the national economy.

The project would introduce a new energy crop for Belize, providing an opportunity for expanded domestic use of bioenergy and potential for future exports.

Wild cane biomass project



Renewable Biomass Fuel for Belize ”

BEL is financing Project: *“Pilot Demonstration of the generation of electrical energy through the use of Arundo donax as a supplemental feedstock in cogeneration in Belize”*

the research component to test the feasibility of cultivating the wild cane.

- Collaboration with CARDI and SIRDI to design, establish, and analyze results of Agronomic (research) Trials with wild cane.
- Technical information for improved cultivation practise and risk management.
- Identification of the species



Stem borer project

An in-depth study on stem borer population and the damages caused to sugarcane production in northern Belize.

The main component of the project are:

- **Population dynamics of stem borer in the northern sugar belt**
- **Identification of the pest (species in Belize).**
- **Evaluation of the agro-industrial effects of sugarcane stem borer.**
- **Determine the effect of stem borer on the main commercial sugarcane varieties**
- **Integrated Pest Management (IPM) Focus on 2 strategies being cultural and biological**



Agricultural Services

Mitigating and Adapting to the effects of Climate Change



Minimum tillage implement (Escarificador C 101 M) use for replanted sugarcane fields after harvesting bypassing the use of conventional tillage practices. One pass of implement will destroy sugarcane stools and open furrow for seed cane planting. One benefit a lower cost in land preparation for replanting



Hay rake (trash liner) use for harvest residue management. Assist in reducing the second burning by neatly aligning harvest residue within the field (sugarcane rows). There are many benefits to the soil in leaving the harvest residues within the field, soil restoration being the lead.



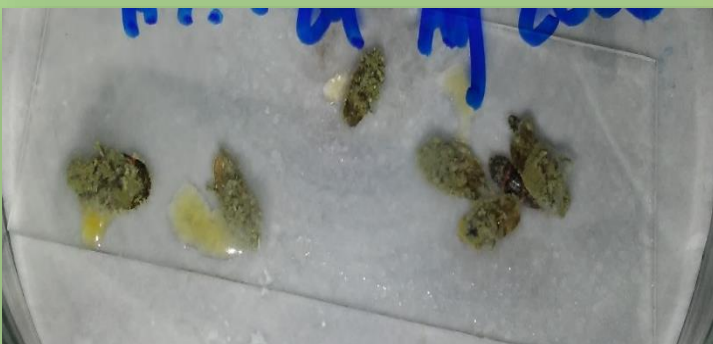
Double row fertilizer applicator, which incorporates the fertilizer and reduces the incidence of loss due to volatilization and runoff. It can be adjusted to apply different rate per acre (1 to 4 bags per acre). The fertilizers are place within the rooting zone of the sugarcane crop.



Drain ditcher, use for creating surface drainage to ensure that during time of excessive rainfall, flooding areas don't remain inundated for long periods. The ditcher is ideal for the creation of secondary and tertiary drains for the master drainage plan designed for the northern districts.



Production of fungus, *Metarhizium anisopliae*



Lab Trials



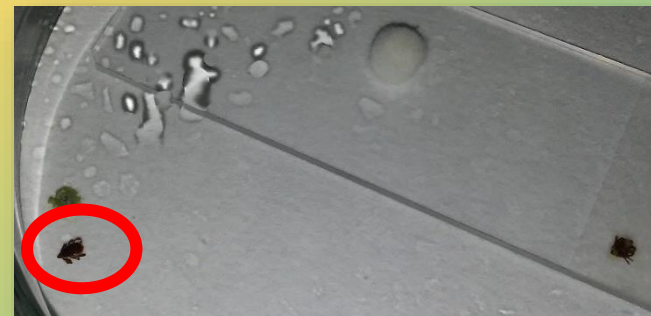
Central American Locust

Schistocerca piceifrons piceifrons



Armyworm

Spodoptera frugiperda

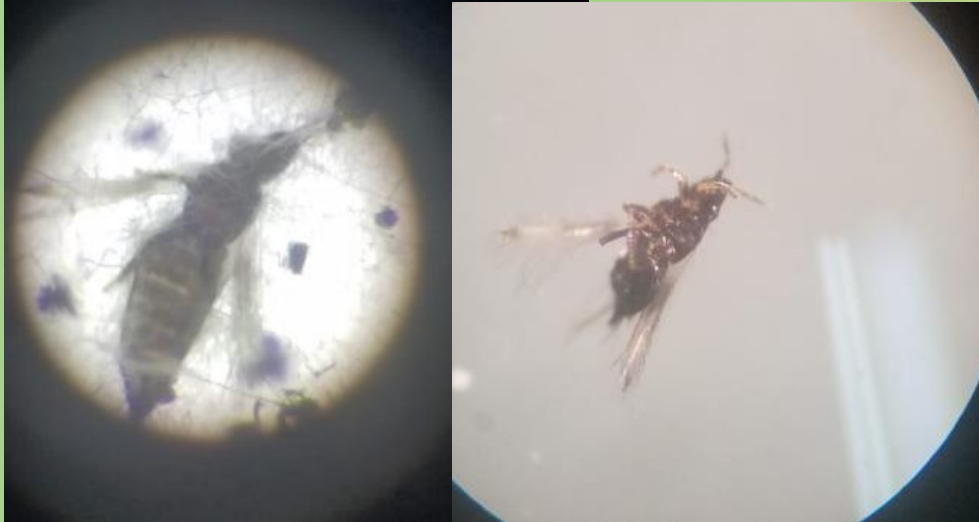


Ticks



Coconut Weevil

(South American Palm Weevil)



Asian bean Thrip

Megalurothrips usitatus

40 thrips inoculated 38 showed signs of infection. (4 days after inoculation)

Ridge #	Trt #	Treatments	Dosages	Amount of Water/ Acre	Area Applied	Threshold (amount of thrips)	10 days after Application Control
4	1	Metarhizium	.5 dose	20 gals	0.5	100 A / 20 N	42%
		Dipax	2cc/lt				
		Diatomea	15grs/lt				
2	2	Metarhizium	.5 dose	20 gals	0.5	80A / 45N	95%
		Dipax	2cc/lt				
		Damoil	.5gal/100gal				
5	3	Metarhizium	.5 dose	20 gals	0.5	127 A / 35 N	48%
		Dipax	2cc/lt				
		Damoil	.5gal/100gal				
		Diatomea	15grs/lt				
3	4	Metarhizium	.5 dose	20 gals	0.5	70 A / 20N	90%
		Dipax	2cc/lt				
		Soybeans oil	3lts/acre				
		Soap	.375 lts/ acre				
1	5	Soybeans Oil	3lts/acre	20 gals	0.5	48 A / 45N	85%
		Soap	.375 lts/ acre				

Capital Agriculture (Spanish Lookout)

Field established Selena Village, Cayo District

A good control using Metarhizium especially on the high population of thrips on the flowering and podding stage of the plants.

THANKS!



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