TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

29th Sugarcane Scientists Meet

(April 26-27, 2021)

Lead Center

Sugarcane Research Station
Tamil Nadu Agricultural University
Cuddalore – 607 001

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore - 641 003

2021

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PROCEEDINGS

29th Sugarcane Scientists' Meet
(April 26-27, 2021)

The 29th Sugarcane Scientists Meet was held during April 26-27, 2021 at the Tamil Nadu Agricultural University, Coimbatore, through on-line connecting all scientists across the University College Campuses, Research Stations and KVKs besides main campus. **Dr. K.S. Subramanian**, Director of Research welcomed the sugarcane scientists of TNAU and provided current sugarcane production in the country and the State of Tamil Nadu. **Dr. N. Kumar**, Vice Chancellor emphasized the importance of sugarcane in the country as a sugar crop as well as energy crop. Since sugarcane area has drastically reduced in the past five years, TNAU and Sugarcane Breeding Institute, Coimbatore, has a big role to play in sustaining sugar production the State. Despite globally, India stands second in sugar production (30.3 million tonnes in 2018-19) next to Brazil (32 million tonnes), there is regional imbalance within the country.

The Director of Research elucidated the sugarcane production scenarios in the State of Tamil Nadu. He joined with the Vice Chancellor highlighting the reduction in area, cane production and sugar production by 64%, 67% and 32.9%, respectively, in the past five years. He flagged off few issues such as promotion of TNAU (Co. 13339 & CoG 6) and SBI (Co. 11015 Atulya) improved sugarcane varieties in the sugar mill area up to 20%, encourage farmers to adopt Sustainable Sugarcane Initiative (SSI), large scale demo of sugarcane booster in 1000 acres as per Commissionerate sugars, ratoon management, complete mechanization and assessment of extraneous materials. The Action Taken Reports on the 28th Sugarcane Scientists Meet was presented by Technical Directors. During the pre-review, the technical directors had reviewed the on-going university research projects (7), action plan projects (11), core projects (4), AICRPs (1) besides externally funded projects (6).

The outcome of the review process was presented by **Dr. S. Geetha**, Director (CPBG), **Dr. S. Panneerselvam**, Director (WTC), **Dr. R. Santhi**, Director (DNRM) and **Dr. K. Prabakar**, Director (CPPS). **Dr. A. Velayutham**, Dean (i/c), AC & RI, Echangkottai, narrated the assessment of extraneous materials in sugarcane which is the need of the hour in the context of machine harvest was determined as 6.5%. The extraneous materials include tops, sheath and others etc which was assessed as suggested by the Commissioner of Sugars during the 85th Scientific Workers Conference of the TNAU. The Director of Research summarized the activities of the Sugarcane Scientists Meet and suggested strenuous efforts required to bring back the glory of the sugar industry in the State of Tamil Nadu. The way forward includes inclusion of improved recently released varieties, farm mechanization, timely harvest and payment to the farmers. **Dr. A. Velayutham**, Dean (i/c), AC & RI, Echangkottai, proposed a formal vote of thanks.

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The proceedings of the 29th CSM on Sugarcane meet is furnished as below

I. CROP IMPROVEMENT

A. Decisions made on the entries for Variety Release/ART/OFT/MLT
B. Action Plan 2021-2022
C. Research projects on Sugarcane
D. Remarks on the ongoing projects

II. CROP MANAGEMENT

A. Decisions made on OFT
B. Action Plan 2019-2022
C. Research projects on Sugarcane
D. Remarks on the ongoing projects

III. NATURAL RESOURCE MANAGEMENT

A. Decisions made on OFT
B. OFT/Action Plan 2021-2022
C. Research projects on Sugarcane
D. Remarks on the ongoing projects

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A. Decisions made on OFT
B. Action Plan 2021-2022
C. Research projects on Sugarcane
D. Remarks on the ongoing projects

V. GENERAL REMARKS

VI. LIST OF PARTICIPANTS

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I. CROP IMPROVEMENT

A. Decisions made on the entries for variety release /ART/MLT evaluation

i). Entries for variety release proposal/ART/OFT/MLT (2020-2021)

Recommendations for Central Release/State Release/ART/MLT/AICRP trials

A1. Variety release

Culture recommended for state release during 2022: **G 2005 047**

S. No.	Clone	Parentage	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Reaction to red rot
1.	G 2005-047	89 V 74 GC	132.0	13.0	17.2	MR
	Co 86032		110.3	13.0	14.3	
	CoG 94077		112.5	12.8	14.4	

Special features:

1. Early maturing, high yielding and sugar recovery
2. High sugar purity and jaggery recovery
3. Performs better under salt affected soils
4. Moderately resistant to red rot

ii). Cultures identified for ART 2021-22

The clones *viz.,* C 2014-516, G 2008-019, G 10045, Co 14004, Co 14012 and check varieties *viz.,* CoC 13339, CoG 6, TNAU Si 8, Co 86032 and Co 11015 were planted in ART I plant during 2021-22 as non replicated trial in mill site for 20 rows of 5 m row length per entry.

The traits need to be recorded are listed below

1. Number of millable Cane (`000/ha) at harvest
2. Stalk length (cm) at harvest
3. CCS (%) at 10^{th} month and 12^{th} month
4. Cane yield (t/ha) at harvest
5. Sugar yield (t/ha) at harvest

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iii). Cultures identified for testing under Multi Location Trial 2022-23

S. No.	Clone	Parentage	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Reaction to red rot (by plug method)
1.	C 16122	CoN 05071 PC	131.6	12.9	17.0	MR
2.	C 16337	Co 775 GC	128.4	13.0	16.7	
3.	C 16338	Co 775 GC	133.7	13.1	17.5	
4.	G 2014-036	G 08 007 GC	130.0	13.3	18.3	
5.	Si 2014–049	CoSi (SC) 6 GC	158.5	12.4	19.6	
6.	Co 17001	Co 0327 x Co 0218	109.6	15.18	16.6	
7.	Co 13003	Co 86011 x CoT 8201	145.2	15.0	21.8	R (nodal method)
8.	Co 15003	CoM 0265 x Co 89003	106.5	13.9	14.9	

Standards: Co 86032, Co 11015, CoC 13339, TNAU Si 8 and CoG 6 (all testing centres shall multiply the standards in their locations to reduce the burden of seed cane transport)
Plot size: 5 m row length x 5 rows x 1.2 m row space

Replications: Three

Time of planting: Jan – Feb 2022

Age of the crop: 12 month

Seed rate: 12 buds per meter

Traits to be observed:

1. Germination% at 30 DAP
2. Number of tillers ('000/ha) at 120 DAP
3. Number of shoots ('000/ha) at 240 DAP
4. Number of millable Cane ('000/ha) at harvest
5. Stalk length (cm) at harvest
6. Stalk diameter (cm) at harvest
8. Single cane weight (kg) at harvest
9. Cane yield (t/ ha) at harvest
10. CCS (%) at 10^{th} month and 12^{th} month
11. Sugar yield (t/ha) at harvest

Locations:

1. SRS, Cuddalore
2. SRS, Sirugamani
3. SRS, Melalathur
4. CPBG, TNAU, Coimbatore
5. SBI, Coimbatore

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Scientist's in-charge:

1. Dr. R. Sudhagar, Associate Professor (PBG), SRS, Melalathur
2. Dr. M. Shanmuganathan, Asst. Professor (PBG), SRS, Cuddalore
3. Dr. M. Sakila, Asst. Professor (PBG), SRS, Sirugamani
4. Dr. Asish K Binodh, Assistant Professor (PB&G), DCPBG, TNAU, Coimbatore
5. Scientist designated by the Director, SBI, Coimbatore

iv.) Clones identified for proposing to AICRP (S) – ZVT – 2021

S. No.	Clone no.	Parentage	Maturity group	Cane yield (t/ha)	CCS %	Sugar yield (t/ha)	Reaction to red rot
1.	C 16122	CoN 05071 PC	Early	131.6	12.9	17.0	MR
2.	C 16337	Co 775 GC	Early	128.4	13.0	16.7	MR
3.	C 16338	Co 775 GC	Mid-late	133.7	13.1	17.5	MR
4.	G 2008-019	CoV 92102 GC	Mid-late	129.7	13.4	18.2	MR

B. Action Plan (2021 – 2022)

Action plan 1 to 6 may be followed as per the plan.

<table>
<tr><td rowspan="5">Action Plan 7.</td><td colspan="4">Inter-generic hybridization between Erianthus and Saccharum spp. for development of pre breeding population for increasing cane yield in plant and ratoon crop, bio mass content and wider adaptability to varied climatic conditions</td></tr>
<tr><td>Activity</td><td>Centres</td><td>Plan of work</td><td>Deliverables</td></tr>
<tr><td><u>2021-22</u>
Crossing at NHG, ICAR-SBI, CBE</td><td>SRS, Cuddalore</td><td rowspan="2">Crossing between high sugar varieties (CoC 671, Co 86032, Co 94012, Co 11015, CoC 13339 etc.) and E. arundinaceus.</td><td rowspan="3">Development of pre breeding population for increasing cane yield in plant and ratoon crop, bio mass content and wider adaptability.</td></tr>
<tr><td>Crossing at Sirugamani</td><td>SRS, Sirugamani</td></tr>
<tr><td><u>2022-23</u>
Fluff seedling development and evaluation</td><td>SRS, Cuddalore</td><td>Fluff seedling evaluation and selection of hybrids with tall and thick stem, good HRR Brix, more tillers, high individual cane weight.</td></tr>
<tr><td><u>2023-24</u>
Multiplication of selected clones and conducting SMT for quality analysis</td><td>SRS, Cuddalore
SRS, Melalathur
SRS, Sirugamani</td><td>The selected clones will be multiplied and the juice quality will be assessed in the multiplication plot and selected clones supplied to other stations for further crossing and evaluation for yield, biomass and wider adaptability</td><td></td></tr>
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C. RESEARCH PROJECTS ON SUGARCANE

S. No.	Discipline/Station	University Research Projects	AICRP project	Externally Funded Project	Total	No. of Scientists
1.	SRS, Cuddalore	1	1	-	2	2
2.	SRS, Melalathur	1	-	-	1	1
3.	SRS, Sirugamani	2	-	-	2	1
4.	DCPBG, TNAU, CBE	1	-	1	1	1
	Total	**5**	**1**	**-**	**6**	**5**

D. REMARKS OF ONGOING PROJECTS

No.	Project No. and Title	Project leaders	Duration	Remarks
D1. University Research Projects (URPs)				
1.	CPBG/CDL/PBG/SUG/ 2020/ 001 Evaluation and identification of high yielding and quality varieties with inbuilt red rot resistance to cater the needs of Tamil Nadu cane farmers and sugar mills	PI: Dr. C. Babu, Professor (PBG) and Head, SRS, Cuddalore Co PI: Dr. V. Ravichandran, Asst. Professor (Pl. Pathology), SRS, Cuddalore	Apr 2020-Mar 2025	The project shall be continued. Thrust may give for high sugar clones.
2.	CPBG/MLT/PBG/SUG/ 2019/001 Evolution of high yielding and quality sugarcane clones with red rot tolerance	PI: Dr. R. Sudhagar, Associate Professor (PBG) and Head, SRS, Melalathur	Dec 2019 – Nov 2022	The project shall be continued. Separate trial may be conducted for jaggery yield assessment.
3.	CPBG/SRS/PBG/SUG/ 2020/001 Development of improved sugar content varieties in sugarcane through mutagenesis.	PI: Dr. M. Sakila, Assistant Professor (PBG), SRS, Sirugamani	Dec 2020 – Dec 2025	The project shall be continued. Care must be taken during selection in M_1 population.
4.	CPBG/SRS/PBG/SUG/ 2021/002 Evolving mid-late maturing sugarcane	PI: Dr. M. Sakila, Assistant Professor (PBG),	Feb 2021 - Jan 2026	The project shall be continued. Explore the possibilities to select the clones for co-gen

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	varieties with resistance to red rot and smut disease suitable for Cauvery delta zone.	SRS, Sirugamani		and distillery purpose.
5.	CPBG/CBE/PBG/SUG/ 2020/001 Maintenance of hybridization garden of Sugarcane with core germplasm	PI: Dr. Asish K Binodh Assistant Professor (PBG) DCPBG, Coimbatore	August 2020 - July 2025	The project shall be continued.
D2. AICRPs				
6.	AICRP/PBG /CUD/SUG /025 AICRP on Sugarcane	Dr. M. Shanmuaganthan, Asst. Professor (PB&G)	Continuous	The project shall be continued.

II. CROP MANAGEMENT

A. DECISION MADE ON OFT

I. Technology for adoption

1. Optimization of fertilizer dose for chewing cane selection from Venkettanpettai

The land race of Venkatanpettai chewing cane applied with 125% more of the recommended dose of N, P, K recorded the highest brix value of 19.2 which is an important parameter for chewing cane with highest marketable cane of 118.2 (000/ha).

2. New generation herbicides molecules and its combination on management of creeper weeds in sugarcane

Post emergence directed spraying of Halosulphuron @ 0.2% on 4 to 5 months combined with detrashing in the 5^{th} and the 7^{th} month effectively controls the creeper weeds such as *Ipomea alba, Coccinia grandis, Chinchosia minima* and *Halothria madraspatnansis* to the extent of 50 per cent over hand weeding.

3. Silicon nutrition on physiology, yield and quality of sugarcane under drought condition

Soil application of silica solublizer @ 12.5 kg + 50kg FYM/ha + Sett treatment of 0.5% K_2SiO_3 alone + 2.5% urea and potash spray on 15 days interval from 60 to 150 DAP can be recommended to increase drought tolerance of sugarcane crop.

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B. Action Plan- 2019-2022

Action Plan	Optimisation of fertigation schedule for sugarcane through micro- irrigation techniques under SSI	Treatment details	Activity
Objective To optimize the irrigation requirement, improve the fertilizer use efficiency and reduce the cost of cultivation. **Period** November 2019 to November 2022	**Theme Leader:** **Dr.S.Panneerselvam**, Director, Water Technology Centre, TNAU, Coimbatore **Implementing centres:** SRS, Sirugamani SRS, Melalathur	**Treatments:** **A. Drip irrigation with SSI** I_1- Subsurface drip at 75 % PE – Irrigation once in two days I_2- Subsurface drip at 100 % PE – Irrigation once in two days I_3- Farmers practice – surface irrigation **B. Nutrient levels (300:100:200 kg NPK/ha)** N_1- 100 % of recommended dose of NPK/ha through water soluble N_2- 125 % of recommended dose of NPK/ha through water soluble N_3- 100 % of recommended dose of NPK/ha through Urea, Super and MOP N_4- 125 % of recommended dose of NPK/ha through Urea, Super and MOP	Field experiments were conducted with promising sugarcane varieties CoC 13339, Co Si 8 and promising culture G2005047 in three locations *viz*., Cuddalore, Sirugamani and Melalathur respectively. In all the locations the crop was harvested and data on yield and quality parameters were recorded and analysed. In all the three locations, Sub Surface Drip Irrigation at 100 % PE once in two days found to be the best and increased cane yield to the tune of 20 percent over farmers method of surface irrigation. Provision of irrigation through Sub Surface Drip system ensured Optimum supply of water and nutrients. Moreover, 50 percent of water saving was realized in drip method of irrigation. Application 125 % of RDF of N:P:K /ha through water soluble could enhance yield to the tune of 20 per cent over 100% RDF through soil application and recorded mean cane and sugar yields of 134.70 and 16.31 tonnes $ha^{-1,}$ respectively.

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		I_3 - **Farmers practice** Application of 300:100:200 kg of NPK/ha sett treatment with fungicides, flooding irrigation, trash burning and no-detrashing. Spacing 90 cm, manual cutting and planting, sett treatment with fungicides, flooding irrigation, manual weeding, trash burning, no detrashing and earthing up, manual harvesting.	

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C. RESEARCH PROJECTS ON SUGARCANE

List of Projects

PROJECTS	Agronomy	Crop Physiology	TOTAL
Action Plan	1	-	1
University Research Projects	-	2	2
On Farm Trial	2	1	3
Total	3	3	6

D. REMARKS ON THE ONGOING PROJECTS

E. Agronomy

S. No.	Project number and title	Period	Investigators	Remarks
1.	DCM/CDR/AGR/ SUG/2020/001/Action plan Optimisation of fertigation schedule for sugarcane through micro- irrigation techniques under SSI	2019 to 2022	**Theme Leader: Dr.S.Panneerselvam**, Director, Water Technology Centre, TNAU, Coimbatore **Implementing centre:** SRS, Sirugamani SRS, Melalathur	The project may be continued in the ratoon crop at SRS, Sirugamani and SRS, Melalathur

2. Crop Physiology

S. No.	Project number and Title	Period	Investigators	Remarks
1.	**DCM/CDR/CRP/SUG/ 2018/CP174** Studies on the effect of organic and inorganic inoculants on post-harvest deterioration under manual and mechanical harvest in sugarcane	2019 to 2021	PI:Tmt. R. Anitha Asst. Prof.(CRP) Co-PI: Dr. G. Gayathry Asst.Prof. (AGM)	The project may be closed and completion report may be submitted after submission of a research article in NAAS rated (>6.00) /impact factor journal

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2.	**DCM/CDL/CRP/SUG/ 2021/001** Studies on the effect of nutrient solution along with growth promoting hormones and beneficial soil microbes on population of cane, physiology and yield of sugarcane	2020 to 2024	PI:Tmt. R. Anitha Asst. Prof.(CRP) Co-PI: Dr. G. Gayathry Asst. Prof. (AGM)	Currently PI is doing Ph.D. in TNAU, Coimbatore. Hence the project may be kept in abeyance.

III. NATURAL RESOURCE MANAGEMENT

A. DECISION MADE ON OFT

I. Technology for adoption

- *Kombucha,* a functional beverage derived from Symbiotic Cultures of Bacteria and Yeast (SCOBY) was developed, optimized and standardized**.** The product *Kombucha* will be submitted for Technology Transfer through Director, ABD, TNAU, Coimbatore.

- Placement of Nutri-pellet pack @ 4 pellets plant^{-1} (50% as basal and 50% at 90 DAP) + Sugar industry bio compost (SIBC) @ 2 t ha^{-1} resulted in increased growth, yield parameters, Commercial Cane Sugar percentage (CCS) and sugar yield with mean cane yield of 128.5 t ha^{-1} and BCR of 1.85. This technology is suitable for SSI method of planting in areas where fertigation is not feasible through drip irrigation.

- Soil compaction due to mechanization can be managed by chisel ploughing at early stages of land preparation and application of FYM @ 12.5 t ha^{-1} which recorded the highest cane and sugar yield of 157.8 and 15.9 t ha^{-1} respectively when compared to farmer's practice of disc ploughing (134.0 t ha^{-1} cane yield and 13.5 t ha^{-1} sugar yield). The practice of chisel ploughing improved the soil physical properties such as bulk density, porosity, hydraulic conductivity and infiltration rate.

B. OFT/ACTION PLAN (2021-2022)

a. OFT 1: Evaluation of "TNAU Trash-D" for *in-situ* sugarcane trash decomposition (2021-2022) Objective: To evaluate the effect of "TNAU Trash-D" formulation on *in-situ* trash decomposition in ratoon cane

ACTION:
Lead centre & Scientist In-charge

SRS, Cuddalore: Dr. G. Gayathry, Asst. Professor (Agricultural Microbiology)
Dept. of ENS, TNAU, Coimbatore: Dr. P. Kalaiselvi, Asst. Professor (ENS)

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Co-ordinating centres & Scientists in-charge

1. ADAC&RI, Trichy : Dr. K.G. Anitha, Assistant Professor (Ag.Micro.) & Dr. J.Ejilane, Assistant Professor (Ag.Micro.)
2. IOA, Kumulur : Dr.M. Baskar, Assoc. Professor (SS&AC)
   AEC&RI, Kumulur : Dr. A. Barani, Assoc. Professor (ENS)

Treatments

T_1 : TNAU Trash - D (32.5 kg ha^{-1}) *
T_2 : TNAU Biomineralizer (24 kg ha^{-1})*

* (along with cow dung (500 kg ha^{-1}) + urea (25kg ha^{-1}) + Rock phosphate (250 kg ha^{-1}) + Gypsum (250 kg ha^{-1})

Application: First dose is applied immediately after stubble shaving operation *i.e.,* within 7-10 days after harvest, clearing of trashes on the ridges to the furrows, and second dose on 30^{th} and the third dose on 50^{th} day after harvest. If rock phosphate is not available SSP @ 100 kg ha^{-1} may be used.

Note: TNAU Trash -D formulation

- Liquid formulation of *Bacillus mucilaginosus* (10^9 cfu ml^{-1})
- Fungal cultures namely *Chaetomium globosum* TNAU cg 6 and *Trichoderma viridi* TNAU TV1 (each 10^6 cfu ml^{-1})
- Cow dung (40 kg per tonne of trash) or Yeast molasses (20 litres per tonne of trash) (to be added during field application)
- Rock phosphate (20 kg per tonne of trash) or SSP (10 kg per tonne of trash) (to be added during field application)
- Gypsum (20 kg per tonne of trash) (to be added during field application)

Observations and Analysis

1. Organic C, N, P, K and Si (initial, 10^{th}, 30^{th}, 50^{th} days of ratooning in trash)
2. *In-situ* CO_2 Analysis
3. Soil rhizosphere bacterial and fungal population on 10^{th}, 30^{th}, 50^{th} days of ratooning
4. Cane yield

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b. Action Plan: 2021-2022 (To be continued)

Action Plan	**Studies on the effect of "TNAU Trash - D" formulation for *in-situ* decomposition of sugarcane trash and its impact on the yield of ratoon cane**		
		Activity	**Deliverables**
Impact of TNAU Trash-D in augmentation of soil fertility for improved cane productivity **Justification:** * TNAU Trash -D A bacterial and fungal consortium along with inorganic nutrients developed and standardised exclusively for sugarcane trash decomposition at SRS, Cuddalore	**Scientists in-charge** **SRS, Cuddalore** 1. Dr.G.Gayathry, Asst. Prof. (Ag. Micro.) **TNAU, Coimbatore** 2. Dr. P. Kalaiselvi, Asst. Professor (Environmental Sciences), TNAU, CBE	**Treatments:** T_1-TNAU Trash-D @ 20 kg ha^{-1}* at 15 days interval + 125 % RDF T_2– TNAU Trash-D @ 30 kg ha^{-1}* at 15 days interval + 125 % RDF T_3 – TNAU Trash-D @ 20 kg ha^{-1}* at15 days interval + 100 % RDF T_4 – TNAU Trash-D @ 30 kg ha^{-1}* at 15 days interval + 100 % RDF T_5 – TNAU Trash-D @ 20 kg ha^{-1}* at 15 days interval + 75 % RDF T_6 – TNAU Trash-D @ 30 kg ha^{-1}* at 15 days interval + 75 % RDF T_7 – 100 % RDF alone + untreated trashes (Control) *10^{th}, 25^{th}, 40^{th} after harvest of the plant crop (TNAU Trash-D should be mixed with cow dung slurry (400 kg in 1000 liters of water per hectare and sprayed with boom sprayer on the trashes) **Replications:** Three	A ready to use and trash decomposing mix can be developed and disseminated to farmers for *in-situ* trash decomposition

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		Observations to be recorded: Growth and yield parameters, soil nutrient status, C:N ratio, Quantification of soil hydrolytic enzymes (dehydrogenases, urease and phosphatase), estimation of growth promoters (IAA and Cytokinins) **Rationale** To alleviate the activity of burning of trashes after cane harvest and to study the effect of trash decomposing microbial consortium for increased soil fertility and sustainable sugarcane yield.	

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C. RESEARCH PROJECTS ON SUGARCANE

a. List of Projects

PROJECTS	SS&AC	AGM	TOTAL
Action Plan	-	1	1
University Research Projects	-	1	1
AICRP Projects	1	-	1
Externally Funded Projects	-	1	1
On Farm Trial	3	-	3
Total	**4**	**3**	**7**

D. REMARKS ON THE ONGOING PROJECTS

1. Soil Science and Agricultural Chemistry

S. No.	Project number and title	Period	Investigators	Remarks
1.	NRM/CDR/SAC/ SUG/2016/001 Assessing the effect of mechanization on soil compaction in sugarcane and developing suitable management strategies.	Nov' 2016 to Dec' 2020	Dr.M.Jayachandran Professor (Agronomy), AC&RI, Eachankottai & Dr. N. Chandrasekaran, Professor (SS&AC) Dept. of Soil Science & Agrl. Chemistry, TNAU, Cbe	Completion report to be submitted at the earliest.
2.	AICRP/NRM/CBE/SAC/004 All India Coordinated Research Project on Micro and Secondary nutrients and Polluted elements in soils and plants: Optimizing the rate and frequency of foliar spraying of multi-micronutrients for improving the productivity of sugarcane.	2020-2021	Dr. D. Jegadeeswari, Assoc. Prof. (SS&AC) Dept. of Soil Science & Agrl. Chemistry, TNAU, Cbe	The project may be continued.

2. Agricultural Microbiology

S. No.	Project number and Title	Period	Investigators	Remarks
1.	NRM/CDL/AGM/SUG/2020/00 1 *In-situ* decomposition of sugarcane trash and stubbles using biosolublizers and its impact on the yield of	July 2019 to July 2021	Dr. G. Gayathry Asst. Professor (Agrl. Micro), SRS, Cuddalore	The findings of the project may be proposed for OFT.

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	manual and machine harvested ratoon cane.			
2.	NRM/CDL/AGM/ SUG/2020/New (Action plan: 2020-2021) Studies on the effect of trash solubilizers for *in-situ* decomposition of sugarcane trash and its impact on the yield of ratoon cane.	July 2020 to July 2023	Dr. G. Gayathry Asst. Professor (Agrl. Micro) & Dr. P. Kalaiselvi, Asst. Professor (ENS), TNAU, Cbe	The project may be continued in plant crop followed by a ratoon crop.
Externally funded project				
1.	GoI/NRM/CDL/AGM/2017 Fermentative Production of GABA enriched *Kombucha*: a value-added functional plant beverage (FPB) from underutilized fruits.	March 2017 to March 2020	PI- Dr. G. Gayathry Asst. Professor (Agrl. Micro) SRS, Cuddalore Co-PI: Dr. N.O. Gopal, Professor (Agrl. Micro), Dept. of Microbiology, TNAU, Cbe	The technology may be given for adoption by ToT process thorough Directorate of Agri Business Development, TNAU, Coimbatore. The completion report may be submitted at the earliest.

On Farm trials of 2020 – 2021 to be continued for 2021-2022

S. No.	Title and Period	Coordinating centre and Scientists	Scientists incharge and centres	Remarks
1.	**OFT- 1:** Assessing the effect of mechanization on soil compaction in sugarcane and developing suitable management strategies (2020-2022)	Dr. N. Chandrasekaran Professor (SS&AC), Dept. of Soil Science & Agrl. Chemistry, TNAU, Cbe	Dr.M. Jayachandran Professor (Agronomy) (AC&RI, Eachangkottai) Dr. G. Gayathry, Assistant Professor (Ag.Microbiol.), SRS, Cuddalore	Recommended for adoption based on the results of Cuddalore centre. The ongoing OFT at Coimbatore may be completed and the pooled results are to be reported to DNRM at the earliest.
2.	**OFT- 2:** Nutri - pellet Pack Fertilization in Sugarcane (2019-2021)	Dr. D. Jegadeeswari, Assoc. Prof. (SS&AC) Dept. of Soil Science & Agrl. Chemistry, TNAU, Cbe	Scientist in-charge: Dr. L. Chitra Professor (SS&AC, HC &RI (W), Trichy) Dr. G. Gayathry, Assistant Professor (Ag.Microbiol.) SRS, Cuddalore	Recommended for adoption.

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3.	**OFT-3:** Developing multi micronutrient foliar formulation for alleviating the micronutrient deficiencies in sugarcane (2020-2022)	Dr. D. Jegadeeswari, Assoc. Prof. (SS&AC) Dept. of Soil Science & Agrl. Chemistry, TNAU, Cbe	Scientist in-charge: Dr. G. Gayathry, Assistant Professor (Ag.Microbiol.) SRS, Cuddalore Dr. M. Baskar, Assoc. Prof (SS&AC), IoA, Kumulur	May be continued and the results are to be reported as and when the trials are completed.

IV. CROP PROTECTION

A. DECISION MADE ON OFT

I. Technology for adoption

- Installation of sex pheromone trap @20/acre was effective in mass trapping of moths of internode borer which registered a maximum mean male catch / trap of 7.02 with the lowest mean per cent damage of INB (19.36 %), maximum yield of 100.6 t ha^{-1} and maximum CB ratio of 1.96

B. ACTION PLAN (2021-2022)

a. FOR OFT

OFT 1: Evaluation of insecticides against early shoot borer under wider row planting

Treatments

T_1 Fipronil 5 SC @ 1.5 litre/ha

T_2 Chlorantraniliprole 18.5 SC @ 375 ml/ha

T_3 Untreated control

Design: RBD Replications: 7

Time of application at 15% incidence

Theme Leader: Dr. S. Douressamy, AC & RI, Vazhavachanur

Centers:

AC & RI, Vazhavachanur	Dr. S. Douressamy
AC&RI, Eachenkottai	Dr. A. Thirumurugan
SRS, Cuddalore	Dr. S. Pasupathy
KVK, Sirugamani	Dr. Sheeba Jasmine
ARS, Bhavanisagar	Dr. K. Ganesan

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b. For information

- Two clones *viz*., C 2016-261 and 2016-335 were identified as moderately susceptible to early shoot borer (ESB) damage and 18 clones *viz*., C 2016-031, C 2016-035, C 2016-038, C 2016-069, C 2016-086, C 2016-097, C 2016-108, C 2016-122, C 2016-183, C 2016-261, C 2016-270, C 2016-282, C 2016-304, C 2016-331, C 2016-337, C 2016-338, C 2016-415, C 2016-418 were identified as less susceptible to internode borer

- The application of Chlorantraniliprole 18.5 SC recorded significantly lowest cumulative mean per cent damage of early shoot borer (6.56%) with 69.39 % reduction in damage over control and registered highest cane yield (94.75 t /ha) with highest BC ratio of 1.92.

- The incidence of white grub was noticed in Thiruvannamali dt. (1.9 to 2.8 Nos./m row).

- Incidence of Rhinocerous beetle (2 %) was recorded in Co 11015 during May, 2020 in Kallakurichi district and Red spider mite damage of leaf (3 %) and fall army worm was recorded on Co 86032 with tiller damage and leaves damage of 31.00% and 35.21% respectively.

- Six Cuddalore clones *viz*., C 16035, C 16108, C16122, C 16337, C 16338 and C 16038 and 5 Melalthur clones *viz*., 17G010, 17G016, 17G043, 17G060 and 17G068 were identified as moderately resistant to red rot disease.

- Four Cuddalore clones *viz*., C 15005, C 15006, C 15011 and C 15603 and 12 Melalathur clones *viz*., 15G010, 15G012, 15G028, 16G012, 16G013, 16G031, 16G032, 16G045, 16G051, 16G064, 16G077 and 16G080 were identified as moderately resistance to smut disease

- Sett treatment with propiconazole (1 ml l^{-1} for 15 min + foliar spraying @ 1 ml l^{-1} at 60 and 90 days after planting) was effective in managing the smut disease which recorded minimum smut incidence of 8.3 % with higher germination (80.2 %), number of millable cane 124.62 (000'/ha) and the maximum cane yield of 117.86 t ha^{-1}.

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c. Action plan (2021 -22) (To be continued)

Action plan No. 1	**Surveillance of pests and diseases of sugarcane (contd.)**		
Theme leader	Dr. S. Pasupathy, Professor (Agrl. Entomology), SRS, Cuddalore Dr. V. Ravichandran Asst. Prof. (Plant Pathology), SRS, Cuddalore		
Activity	**Name of the scientist(s) and centre**	**Observations to be made**	**Deliverables**
Pests • Monitoring emerging pests (borer complex, sucking pests, root feeders, mites, defoliator (if any). Assessment of insect pest and natural enemies population *in situ*, light and pheromone traps. Impact of light trap on non-target arthropods. • Fixed plot and roving survey (on campus fixed plot study at SRS, Cuddalore, SRS/KVK, Sirugamani) and roving survey at fortnightly interval in the District identified during the district specific crop season. **Diseases** • Monitoring and surveillance of red rot, smut, wilt and YLD in endemic areas of the respective district. • Fixed plot and roving surveys should be conducted. Weather parameters should be collected • Correlation studies with weather parameters and developing forewarning model • A forewarning model may be developed for red rot disease using the available data	**SRS, Cuddalore** Dr. S. Pasupathy Dr.V. Ravichandran **AC&RI, Vazhavachanur** Dr. S. Douressamy **AC&RI, Kudumiyanmalai** Dr.P.Chandramani **AC & RI, Killikulam** Dr.N.Balakrishnan **AC & RI, Eachankottai** Dr. A.Thirumurugan, **ARS, Bhavanisagar** Dr. K. Ganesan **KVK, Sirugamani** Dr. Sheeba Jasmine **ACRC,TNAU, Coimbatore** Dr. S. Kokilavani	Monitoring to be done throughout the year. Forecasting and forewarning of pest and disease incidence for making management decisions.	Forecasting the outbreak of pests and diseases in sugarcane at appropriate times, for taking up management measures by the farmers. Prediction analysis on the incidence of pests and diseases.

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Action plan No. 2	**Identification of resistant sources with mechanism of resistance for major pests and diseases**		
Theme Leader	Dr. S. Pasupathy, Professor (Agrl. Entomology), SRS, Cuddalore Dr. V. Ravichandran, Assistant Professor (Plant Pathology), SRS, Cuddalore		
Activity	**Name of the scientist(s) and centre**	**Observations to be made**	**Deliverables**
• Screening pre-release cultures from breeders both under natural and artificial condition as per the standard screening methods for key insect pests and diseases of sugarcane. • Identification of resistant sources and study of physical and biochemical characters conferring resistance	**SRS, Cuddalore** Dr. S. Pasupathy Dr.V.Ravichandran,	**Pests** • Early shoot borer, internode borer and emerging pests. • The mechanism of resistance (antixenosis, antibiosis & tolerance) has to be studied **Diseases** • Red rot and smut to be screened both by artificial inoculation and natural condition • The mechanism of resistance (physical, biochemical and molecular) has to be studied.	Identification of resistant clones and resistance mechanisms for pests and diseases of sugarcane for utilizing in breeding programmes.

Action plan No. 3	**Yield loss assessment of sugarcane mite (New)**		
Theme leader	Dr. S. Thirumurugan, AC & RI, Eachankottai		
Activity	**Name of the scientist(s) and centre**	**Observations to be made**	**Deliverables**
Population dynamics of sugarcane leaf mite, *Schizotetranychus andropogoni* Hirst (Tetranychidae) and Yield loss assessment	**SRS, Cuddalore** Dr. S. Pasupathy **KVK, Sirugamani** Dr. Sheeba Jasmine	**Observations**: 1. Mite population per 2 cm^2 area/ leaf @ 3 leaves per cane @ one each at top, middle and bottom per clump. 2. Number of eggs/ 2 cm^2 area per leaf	The economic importance of the leaf mite will be elucidated

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	AC&RI, Madurai **TNAU, Coimbatore**	@ three leaves per clump Natural enemy population from three leaves/ clump Cane yield/ha at different infestation levels and intensity	

Action plan No. 4	**Management of smut disease in sugarcane (Contd.)**		
Theme leader	Dr. V. Ravichandran, Assistant Professor (Plant Pathology), SRS, Cuddalore		
Action Plan	**Name of the scientist(s) and centre**	**Observations to be made**	**Deliverables**
Management of smut disease in sugarcane	**SRS, Cuddalore** Dr.V.Ravichandran, Assistant Professor (Plant Pathology) **SRS, Sirugamani** Dr.V.Ravichandran, **AC&RI, Killikulam** Dr.R.Kannan (2 locations)	**Experiment I** **Treatments** T_1 – Sett treatment with propiconazole 1 ml l^{-1} for 15 min + foliar spraying @ 1 ml l^{-1} at 60 and 90 days after planting . T_2 – Sett treatment with *Bacillus subtilis* (Bpv 57) @ 10 g l^{-1} for 15 min + foliar spraying @ 1 g l^{-1} at 60 and 90 days after planting . T_3 – Sett treatment with *Chetoemium globosum* (Cg6) @ 10 g l^{-1} for 15 min + foliar spraying @ 1 g l^{-1} at 60 and 90 days after planting . T_4 – Sett treatment with carbendazim 1 g l^{-1} for 15 min + foliar spraying @ 1 g l^{-1} at 60 and 90 days after planting . T_5 - Untreated control Replications : Four Design: RBD **Observations** Smut & Red rot severity Yield and BC ratio	Technology for the management of smut disease in sugarcane

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		Experiment II **Treatments** T_1 – Sett treatment with propiconazole 1 ml l^{-1} along with 1.0 % urea for 15 min + foliar spraying @ 1 ml l^{-1} at 60 and 90 days after planting . T_2 – Sett treatment with *Bacillus subtilis* (Bpv 57) @ 10 g l^{-1} along with 1.0 % urea for 15 min + foliar spraying @ 1 g l^{-1} at 60 and 90 days after planting . T_3 – Sett treatment with *Chetoemium globosum* (Cg6) @ 10 g l^{-1} along with 1.0 % urea for 15 min + foliar spraying @ 1 g l^{-1} at 60 and 90 days after planting . T_4 – Sett treatment with carbendazim 1 g l^{-1} along with 1.0 % urea for 15 min + foliar spraying @ 1 g l^{-1} at 60 and 90 days after planting . T_5 - Untreated control Replications : Four Design: RBD **Observations** Smut & Red rot severity Yield and BC ratio	

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C. RESEARCH PROJECTS ON SUGARCANE

Discipline	Centre	URP	AICRP	Total
Agricultural Entomology	SRS, Cuddalore	2	-	2
	AC&RI, Echankottai	1	-	1
Plant Pathology	SRS, Cuddalore	1	1	2
	Total	**4**	**1**	**5**

D. REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS

1. Agricultural Entomology

S. No.	Project number and title	Period	Investigators	Remarks
1.	CPPS / CDL / ENT / SUG 2020/ 001 Screening of Sugarcane clones for field resistance against endemic pests of Cuddalore region	Feb 2019 to Jan 2021	Dr.S.Pasupathy, Professor (Agrl. Entomology) SRS, Cuddalore	The results are to be consolidated and completion report should be submitted
2.	CPPS / CDL / ENT / SUG / 2020 / 002 Surveillance of major insect pests of Sugar cane in Cuddalore district	Feb 2019 to Jan 2021	Dr.S.Pasupathy, Professor (Agrl. Entomology), SRS, Cuddalore	The results are to be consolidated and completion report should be submitted
3.	CPPS/EKT/ENT/SUG/ 2019/001 Developing technology capsule for the management of pests and diseases of sugarcane under wider row planting.	June 2019 to May 2022	Dr.A.Thirumurugan Professor (Entomology) and Head , Dr.K.Yamunarani Asst. Professor (Plant Pathology) AC&RI, Echankottai	The project may be continued.

Plant Pathology

S. No.	Project No. and Title	Period	Investigators	Remarks
1.	AICRP/PBG/CUD/SUG/ 025 AICRP on sugarcane	2019 to 2020	Dr.V.Ravichandran, Asst. Professor (Plant Pathology) SRS, Cuddalore	The project may be continued as per the technical programme of AICRP (S)
2.	CPPS / CDR / PAT / SUG / 2020 / New Evaluation of sugarcane clones for smut disease resistance and its management	Sept 2020 to August 2023	Dr.V.Ravichandran, Asst. Professor (Plant Pathology) SRS, Cuddalore	The project may be continued.

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V. GENERAL REMARKS

CROP IMPROVEMENT

- Action may taken up to spread the TNAU released sugarcane varieties in sugar mill area (**Action:** SRS, Cuddalore, Melalathur and Sirugamani)
- A separate trial may be planted during special season (2021-22) by assembling high sugared clones (>24 HR Brix) identified from various station trials along with the check varieties, CoC13339, Co 11015 and Co 86032 (**Action:** SRS, Cuddalore, Melalathur and Sirugamani)
- Development of sugarcane variety specific to high jaggery yield through crossing between high sugared varieties (**Action:** SRS, Melalathur and Cuddalore)
- Strengthen the germplasm collection by assembling more collections from Tamil Nadu and other state released sugarcane varieties (**Action:** SRS, Cuddalore, Melalathur and Sirugamani)
- Explore the possibilities of making *Erianthus arundinaceus* x high sugar variety cross for developing inter-generic hybrids at NHG, ICAR-SBI, Coimbatore and SRS, Sirugamani (**Action:** SRS, Cuddalore and Sirugamani)
- The sodicity trials may taken up at SRS, Sirugamani in the identified fields instead of ADAC&RI, Trichy (**Action:** SRS, Sirugamani)
- A separate field may be dedicated at SRS, Sirugamani for Screening for water logging tolerance (**Action:** SRS, Sirugamani)
- Red rot screening through spore spray technique may be followed this year fluff seedlings also for any two high sugar variety cross combinations (**Action:** SRS, Cuddalore)
- Simultaneous screening of clones for dual tolerance for drought and sodicity/salinity to be continued with another set of clones (**Action:** SRS, Melalathur and Sirugamani)
- A special meeting may be arranged by The Director, Agri Business Development to popularize the jaggery varieties of TNAU to the jaggery producers (**Action:** SRS, Melalathur and DABD, TNAU, Coimbatore)

CROP MANAGEMENT

- Intensive efforts should be taken to cultivate sugarcane with full mechanization packages.

NATURAL RESOURCE MANAGEMENT

- In multi micronutrient foliar formulation, the days of spray may be redefined in view of practicality (Action: Dept.of SS&AC, DNRM, Cbe).
- The product *Kombucha* may be submitted for Technology Transfer through an appraisal and proposal submission to the Director, ABD, TNAU, Coimbatore. A suitable Tamil name must be selected and renamed before release (Action: SRS, Cuddalore).

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CROP PROTECTION

- All the scientists are instructed to monitor the insect pests, diseases and nematodes of sugarcane in their districts regularly. If any outbreak of existing pests, disease and nematodes or occurrence of new insect pests, diseases and nematodes noticed, it should be reported to the Director (CPPS) immediately.
- Monthly pest and disease surveillance report should be submitted to the Professor and Head, Department of Agrl. Entomology, CPPS on or before 25th of every month without fail in the Google forms for consolidation.
- Pest/disease forewarning models may be developed for important pests and diseases in sugarcane involving scientists from Mathematics, statistics and ACRC, TNAU, Coimbatore by convening a joint meeting. At least a forewarning model for red rot may be developed using the available data.

VI. LIST OF PARTICIPANTS

University officers

1 Dr. K. S. Subramanian, Director of Research, TNAU, Coimbatore
2 Dr. S. Geetha, Director, CPBG, TNAU, Coimbatore
3 Dr. V. Geethalakshmi , Director, CMS, TNAU, Coimbatore
4 Dr. V. Ambethgar, Director, TRRI, Aduthurai
5 Dr. R. Santhi, Director, NRM, TNAU, Coimbatore
6 Dr. K. Prabakar, Director, CPPS, TNAU, Coimbatore
7 Dr. S. Mohankumar, Director, CPMB &B, TNAU, Coimbatore
8 Dr. S. Panneerselvam, Director, WTC, TNAU, Coimbatore
9 Dr. S. Sundareswaran, Director, Seeds, TNAU, Coimbatore
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11 Dr. M. Kalyanasundaram, Dean, AC&RI, TNAU, Coimbatore
12 Dr. J. S. Kennedy, Dean, SPGS, TNAU, Coimbatore
13 Dr. T. Raguchendar, Dean, DSW, TNAU, Coimbatore
14 Dr. S.D. Sivakumar, Director, ABD, TNAU, Coimbatore
15 Dr. K.R. Ashok, Director, CARDS, TNAU, Coimbatore

Professor and Heads of various Departments, TNAU, Coimbatore

16 Dr. C.R.Chinnamuthu, P&H, Dept. of Agronomy
17 Dr. N.Sathiah, P&H, Dept. of Agrl. Entomology
18 Dr. G.Karthikeyan, P&H, Dept. of Plant Pathology
19 Dr. R. Gnanam, P&H, Dept. of Bioinformatics
20 Dr.M.K.Kalarani, P&H, Dept. of Crop Physiology
21 Dr. S. Manickam, P&H, Dept. of Sustainable Organic Agriculture
22 Dr. P. Subramanian, P&H, Dept. of Renewable energy Engg,
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24 Dr. S.P. Ramanathan, P&H, ACRC
25 Dr. V. Gomathi, P&H, Dept. of Ag. Microbiology
26 Dr. P. Malarvizhi, P&H, Dept. of Soil Science and Agrl. Chemistry
27 Dr. M. Maheswari, P&H, Dept. of Environmental Sciences
28 Dr. S. Pazhanivelan, P&H, Dept. of RS&GIS

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Professors/Associate Prof./Asst. Prof, TNAU, Coimbatore

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33 Dr. D. Jegadeeswari, Assoc. Professor (SS&AC)
34 Dr.S.Gokilavani, Assistant Professor (Agronomy)
35 Dr. V. Bhaskaran, Assistant Professor (Entomology)
36 Dr. Asish K Binodh, Assistant Professor (PB&G)

List of participants in 29th sugarcane scientist meet (online mode)

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1	Dr. C. Babu Professor and Head	94436 69045	babutnau@gmail.com
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