“Novel Mechanized Priming Technology using Sugarcane Sett Treatment Device to protect Seed and Crop Health”

‘Sugarcane Sett Treatment Device’

Mechanized Priming Technology

CONTENTS.

1

Conceptualization of the technology.

2

Formulation of Technology by developing prototype.

Validation of prototype for effective delivery of various inputs.

3

Development and validation of Sett Treatment Device under field conditions.

4

Technology protection dissemination and adoption by factories and Entrepreneurs.

5

Technology ahead.

SUGARCANE DISEASES.

Invariably planting material serves as primary source for spread of all the diseases.

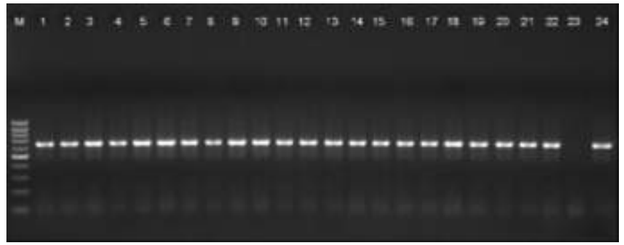
DISEASE MANAGEMENT TECHNOLOGIES IN SUGARCANE

Management of bacterial and phytoplasm Diseases – Thermotherapy

Aerated steam therapy

RSD & GSD

Management of viral diseases by Meristem culture and virus indexing



Management of fungal diseases

Fungicides

Biocontrol agents

Hot Water treatment

THE PROBLEM.

Farmer's practice	Recommended practice	Practical Application ?
Most of the farmers do not give pre treatment. Some of them follow only ~ 30 min to 1hr dipping.	Overnight soaking of setts.	Bigger container and more quantity of fungicide. (due to voluminous material)

MECHANISED SYSTEM PROTOTYPE.

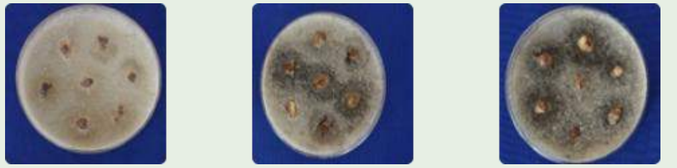
Uptake

Efffectiveness

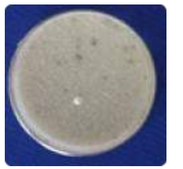
Vacuum Level

Duration

BUDS



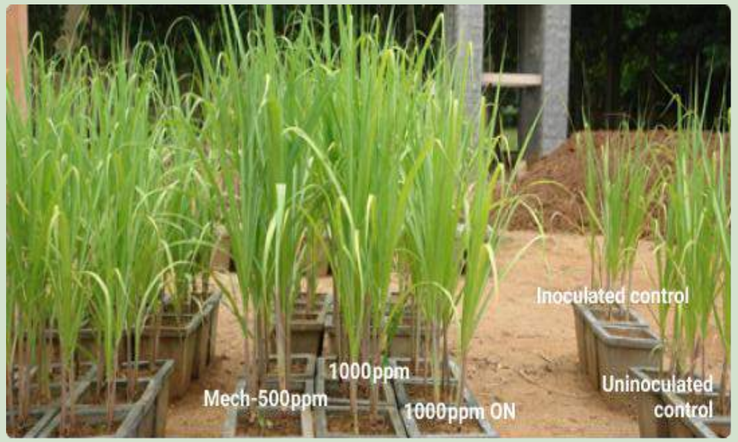
Colletotrichum falcatum



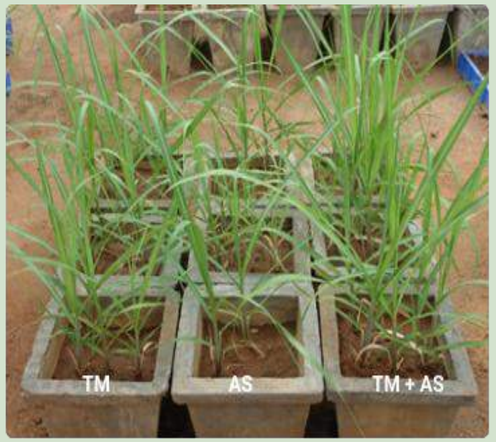
RIND

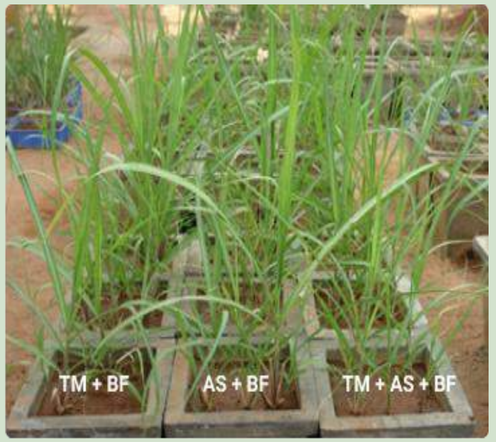
Untreated | Mechanized | Overnight soaking

VALIDATION OF PROTOTYPE.

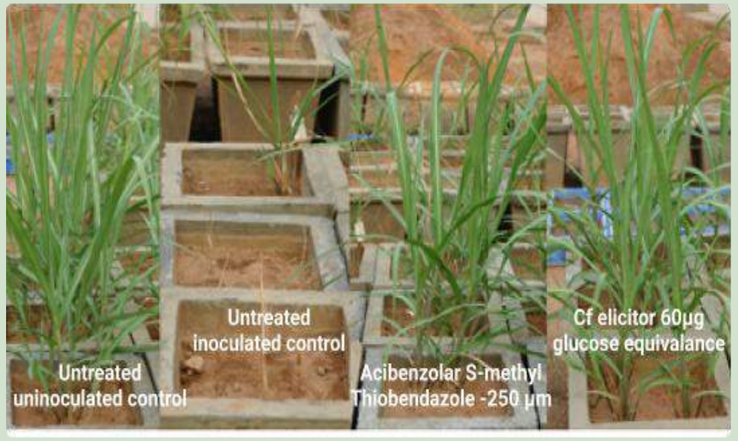


Mech - Mechanized, ON – Overnight soaking

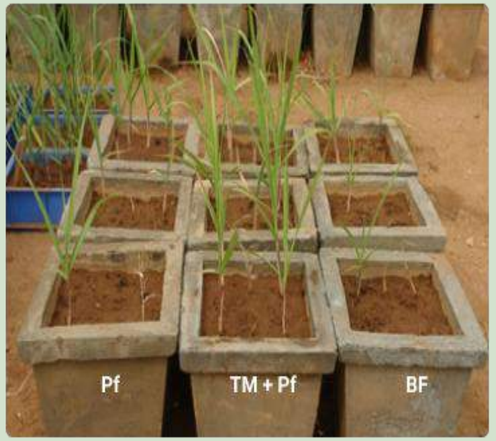




Fungicides, Biofertilizers



Inducers



Fungicides, Bacterial BCA

FIELD STUDY ON EFFICACY OF MECHANIZED SETT TREATMENT AGAINST SOIL-BORNE INOCULUM OF RED ROT.

OVERNIGHT SOAKING

Chemical
3900 g

Cost
Rs. 4875

Time
~18 to 24 hrs

MECHANIZED TREATMENT

Chemical
260 g

Water
200 l

Cost
Rs. 326

Time (with 2 units)
3 hrs (10 times)

Patent on "Rapid treatment for planting materials of sugarcane and other vegetatively propagated crops" – Filing, Publishing, Awarding (2011 – 2024)

(12) PATENT APPLICATION PUBLICATION (21) Application No.3323/CHE/2011 A

(19) INDIA

(22) Date of filing of Application :26/09/2011 (43) Publication Date : 21/06/2013

(54) Title of the invention : RAPID TREATMENT FOR PLANTING MATERIALS OF SUGARCANE AND OTHER VEGETATIVELY PROPAGATED CROPS

(51) International classification	:A01N
(31) Priority Document No	:NA
(32) Priority Date	:NA
(33) Name of priority country	:NA
(86) International Application No	:NA
Filing Date	:NA
(87) International Publication No	: NA
(61) Patent of Addition to Application Number	:NA
Filing Date	:NA
(62) Divisional to Application Number	:NA
Filing Date	:NA

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Address of Applicant :SUGARCANE BREEDING INSTITUTE COIMBATORE - 641 007 Tamil Nadu India
(72)**Name of Inventor :**
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2)RASAPPA VISWANATHAN
3)PURUSHOTHAMAN PADMANABAN
4)AMALRAJ RAMESH SUNDAR
5)KUPPUSAMY HARI
6)VELUSAMY JAYAKUMAR

(57) Abstract :
This invention relates to a novel mechanized method for effective impregnation of any agrochemicals and/or microorganisms and other substances into sugarcane planting materials viz., single/ two/ three budded setts and bud chips for protection from diseases/ pests and improvement of plant growth. This method is suitable for any planting material like stem cuttings, rhizomes, bulbs and tubers of different vegetatively propagated crops. This method uses vacuum, temperature and agitation at different levels individually or in combination. This method of sett treatment is a novel method over conventional method of sett soaking. This method has advantages viz., mechanized operation, rapidity, effectiveness, amenable for large scale application, capable of delivering more than one agrochemical/ microbes, uniform impregnation of agrochemical/microorganisms into seed material, possibility to combine physical and chemical method of treatment and lesser requirement of agrochemical.

INTELLECTUAL PROPERTY INDIA
PATENTS | DESIGNS | TRADE MARKS
GEOGRAPHICAL INDICATIONS

GOVERNMENT OF INDIA

Controller General of Patents,Designs and Trademarks
Department of Industrial Policy and Promotion
Ministry of Commerce and Industry

Application Details

APPLICATION NUMBER	3323/CHE/2011
APPLICATION TYPE	ORDINARY APPLICATION
DATE OF FILING	26/09/2011
APPLICANT NAME	INDIAN COUNCIL OF AGRICULTURAL RESEARCH
TITLE OF INVENTION	RAPID TREATMENT FOR PLANTING MATERIALS OF SUGARCANE AND OTHER VEGETATIVELY PROPAGATED CROPS
FIELD OF INVENTION	BIOTECHNOLOGY
E-MAIL (As Per Record)	
ADDITIONAL-EMAIL (As Per Record)	vijay52in@yahoo.com
E-MAIL (UPDATED Online)	
PRIORITY DATE	NA
REQUEST FOR EXAMINATION DATE	05/03/2015
PUBLICATION DATE (U/S 11A)	21/06/2013
FIRST EXAMINATION REPORT DATE	26/12/2018

Application Status

Published – 2013; FER issued – 2018;
2022 – NBA submitted; Hearing Over

The Patent Office Journal 21/06/2013 14785

Technology Patent awarded in 2024

ICAR-SBI

&

ICAR-CIAE

MECHANIZED TREATMENT

- Simple
- Rapid – 15 – 30 min.
- Effective with uniformity
- Economical – less quantity of inputs
- Ecofriendly – repeated use
- Practically feasible
- Amenable for large scale application
- Able to deliver many inputs at a time
- Protects sugarcane setts from **biotic and abiotic stress.**

CONVENTIONAL TREATMENT

❖ Adopted by Sugar factories and Entrepreneurs for **Healthy Nursery & Disease Management.**

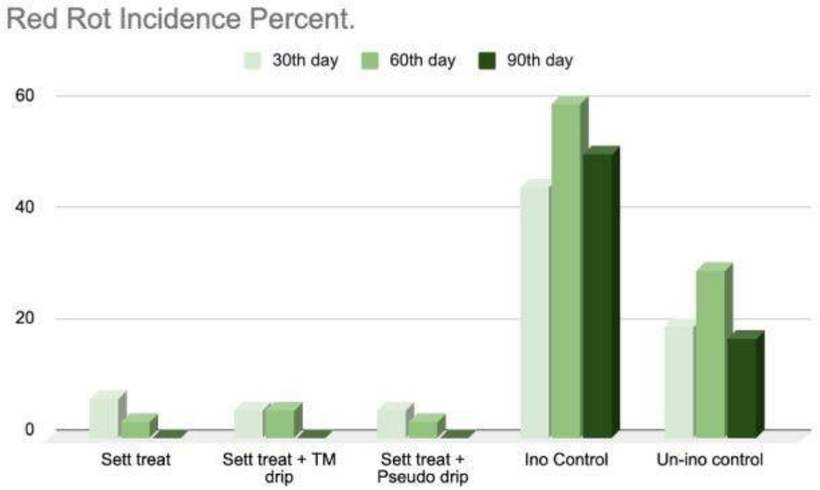
Different types of Sugarcane Sett Treatment Device developed against Conventional overnight soaking

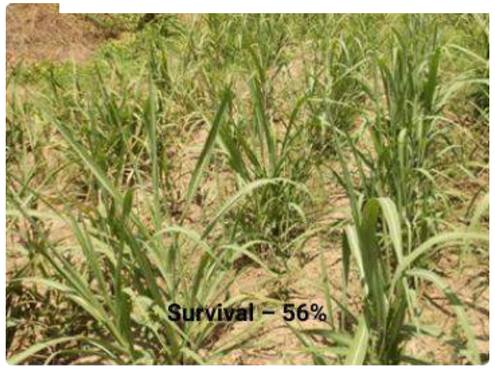
VALIDATION OF MECHANIZED SETT TREATMENT IN FACTORY AREAS.

MECHANIZED

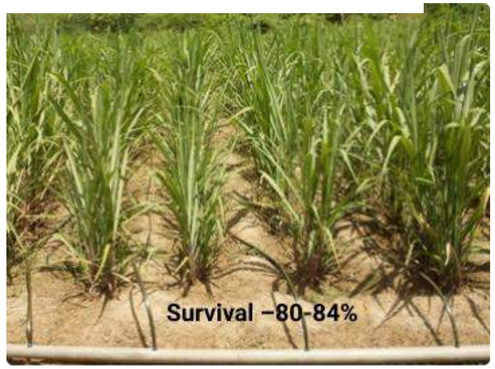
CONVENTIONAL

Evaluation of fungicides and microbes for **red rot management** by different delivery methods.





Inoculated Control



Mechanized sett treatment + drip (TM) /
P. fluorescens - 90 DAP

Evaluation of fungicide for **smut management** by different delivery methods.

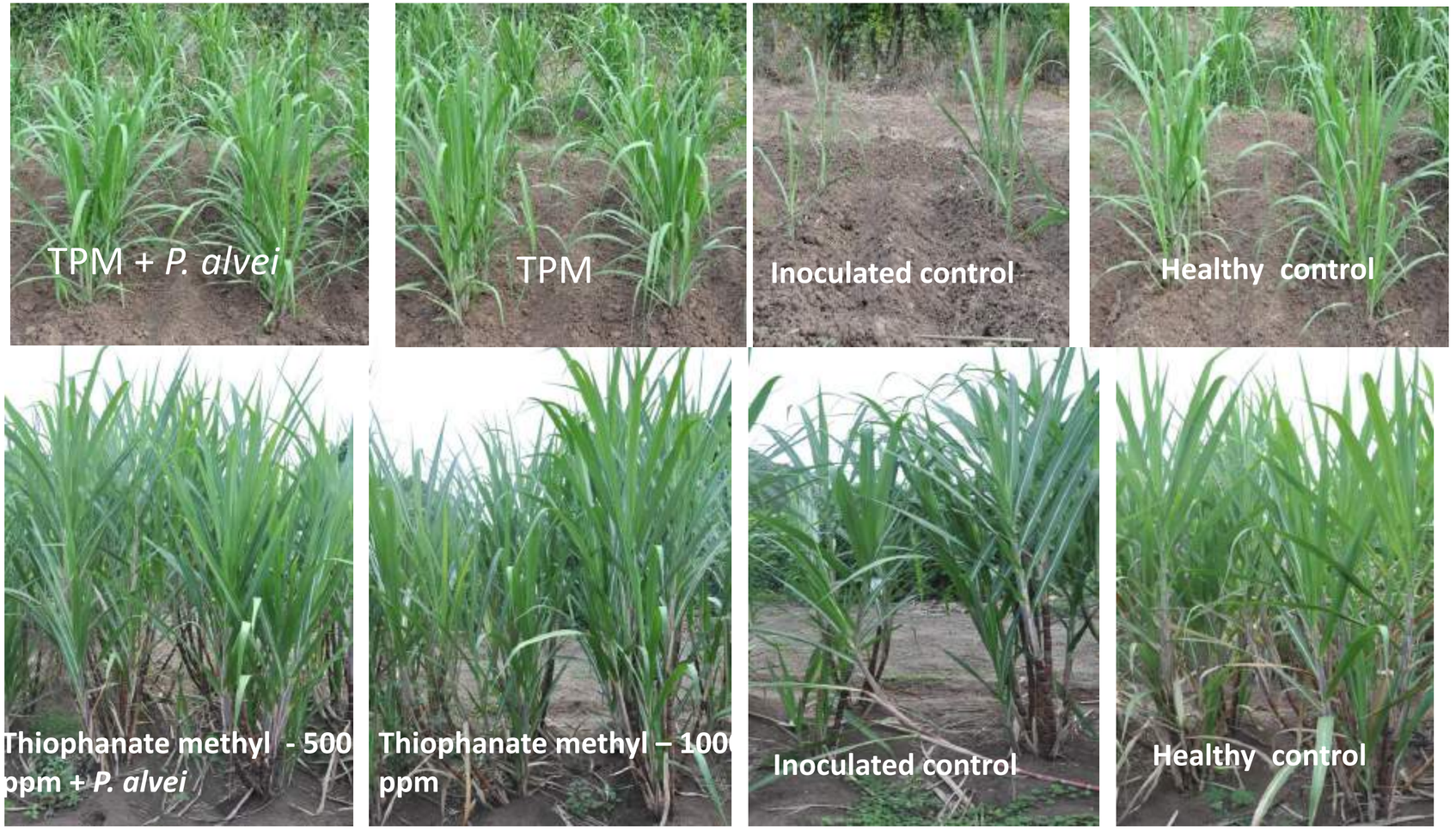
Control - Healthy

Control - Infected

Mechanized treatment
Propiconazole–100 ppm

Mechanized treatment + Spray
Propiconazole–100 ppm

Efficacy of mechanized sett treatment in STD with chemicals/ Bioagents for the management of Red rot



Licensee – 1 -2016

Licensee – 2 - 2020

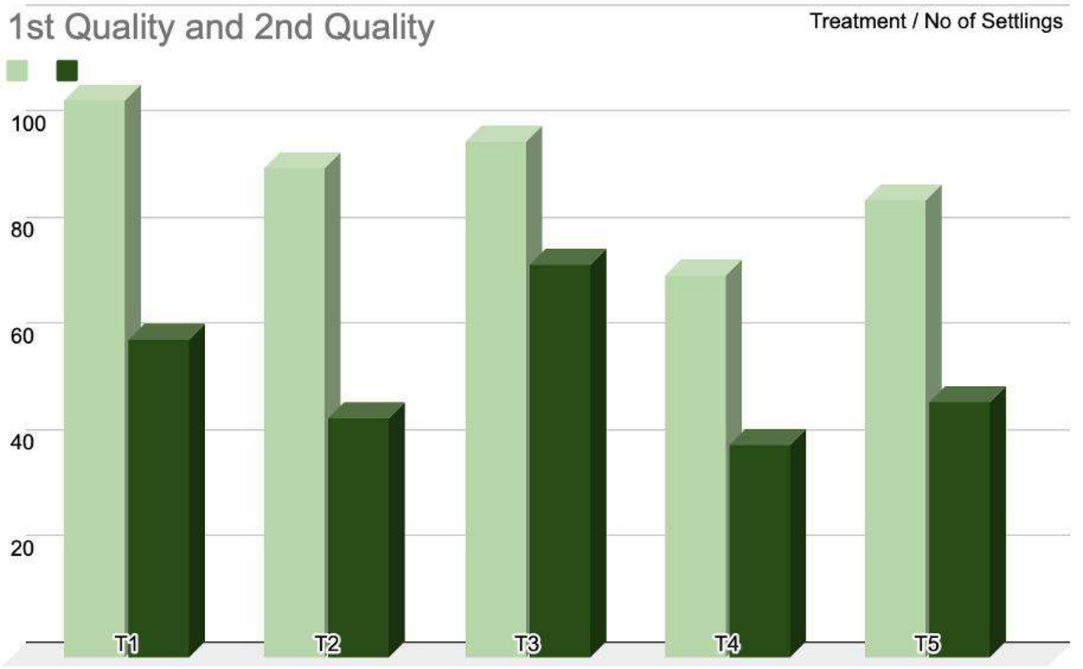
ADRINNOVATE - 2020

Commercialization of the technology in 2016 from the institute and through Agrinnovate, 2020

ROLE OF SETT TREATMENT FOR

HEALTHY NURSERY PROGRAMME.

Sett Treatment Device
to treat single bud setts



T1 - Carbendazim - 0.05% + Fipronil - 0.05 % + Urea - 0.05 % + ZnSo4 - 0.05% + FeSo4 - 0.05%

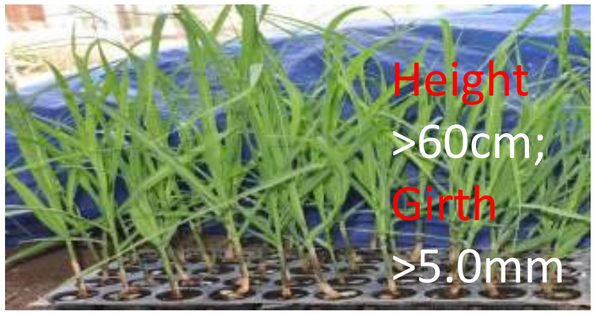
T2 - Carbendazim - 0.1% + Fipronil - 0.1 % + Urea - 0.1 % + ZnSo4 - 0.1% + FeSo4 - 0.1%

T3 - T1 + Liquid biofertilizers - 0.05%;

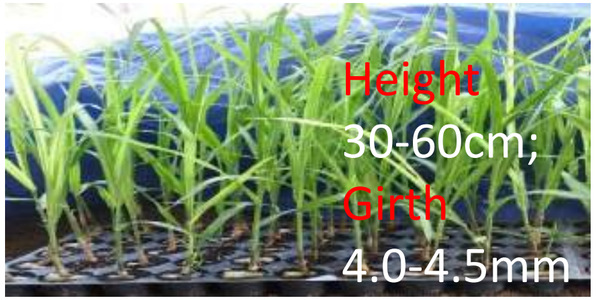
T4 - T3 + Humic acid - 0.1%

- T5 - Control

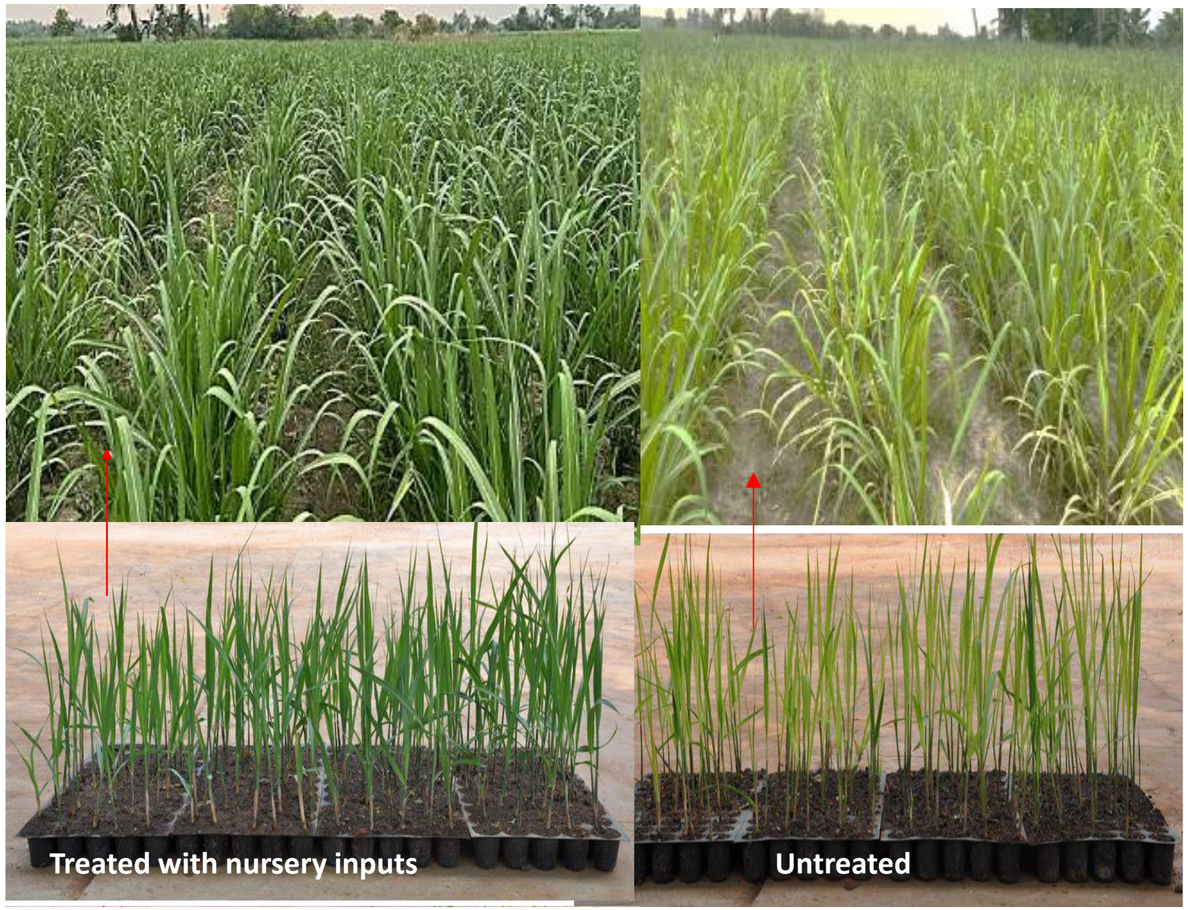
1st quality



2nd quality



Application of Mechanized priming technology to protect Seed and Crop Health



Treating single bud setts with Fungicide + Insecticide + Urea +ZnSO4 + FeSO4

Performance of settlings from mechanized sett treatment against pokkah boeng

Sett treatment with fungicide & insecticide + Nutrients (SSI)

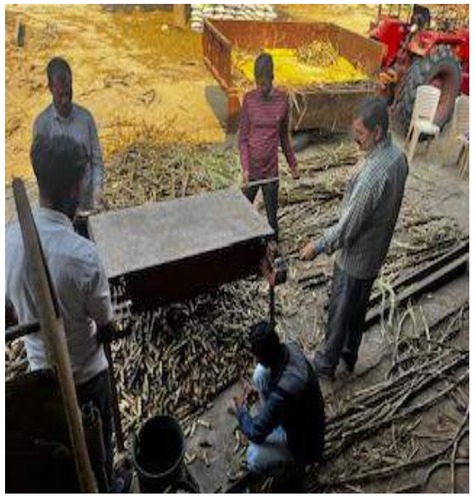
Infected cntrol

Efficacy of sett treatment with nursery inputs against pokkah boeng and mealy bug – 4th month crop Co 11015

Integrated Management of Sugarcane Red rot under sub-tropical - Mankapur, BCSM, UP (2023-24)

T1 T2 C

Mechanized sett treatment followed by drenching	% germination	No. of shoots/ Meter	No. of tillers/ Meter	Yield tons/ ha
T1 Thiophanate methyl	**83.5%**	**3.7**	**12.4**	**97.4** **17.6%**
T2 Thiophanate methyl + - *Paenibacillus alvei*	**83.0%**	**3.2**	**14.9**	**106.5** **28.6%**
Control	**65.7%**	**2.5**	**8.9**	**82.8**







Demo plot on integrated management of red rot in Sub-tropical region Akbarpur, BCSM, UP (2024-25)

Integrated Management of Sugarcane Red rot

- Selection of healthy disease free planting material

- Mechanized sett treatment with Thiophanate methyl (TPM) at 1000 ppm (0.1%) or TPM at 500 ppm + 0.5% *Paenibacillus alvei* before planting

- Soil drenching or drip delivery of TPM at 0.1% alone or TPM at 500 ppm + 0.5% *Paenibacillus alvei* between 60 to 90 DAP

- If needed, foliar spray with TPM at 0.1% 90 DAP

- Secondary application of fungicide could be continued further by drip delivery/ drone spray frequently during conducive conditions to avoid secondary spread of red rot.

- Soil application of Trichoderma will give additional protection and improve the growth of the crop

ICAR-CS-SBI-Technology-2024-068

भाकृअनुप
ICAR

INDIAN COUNCIL OF AGRICULTURAL RESEARCH

Certified that

Dr. P. Malathi
(Lead Developer)

Associate Developers
Dr. R. Viswanathan
Dr. A. Ramesh Sundar

of

ICAR-Sugarcane Breeding Institute (SBI)
Coimbatore

has developed the technology

Integrated management of red rot in Sugarcane

16th July, 2024
New Delhi

(D.K. Yadava)
Assistant Director General (Seed)

(Tilak Raj Sharma)
Deputy Director General (Crop Science)

Dissemination of the Technology

State Level: **NADP-RKVY**

National Level: AICRP & NFSM

AICRP : Confirmed Management of fungal diseases and Healthy Nursery Programme -2021-2024 – 13 AICRP Centers under 4 Zones

NFSM: Centrally Sponsored National Food Security and Nutrient Mission

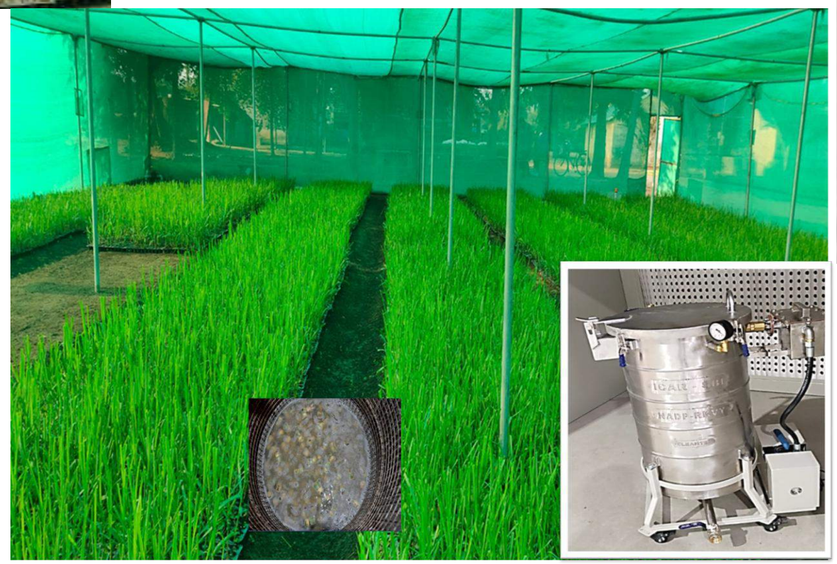
DISSEMINATION OF TECHNOOGY - State wise

Mechanized priming of planting material and technology popularization for revival of sugarcane productivity in Tamil Nadu

NADP-RKVY

Tamil Nadu

Sugar Mills 2022-23



Subsidy of 40-50% granted under SMAM-Operational Guidelines – 2024
By Ministry of Agriculture and Farmers Welfare, New Delhi

Annexure-I

Pattern of Assistance and Maximum Permissible Subsidy

Type of Agricultural Machinery	For SC, ST, Small & Marginal farmers, Women and NE States beneficiary		For other beneficiary	
	Maximum Permissible subsidy per Machine/ Equipment per beneficiary (Rs in Lakhs)	Pattern of Assistance	Maximum Permissible subsidy per Machine/ Equipment per beneficiary (Rs. in Lakhs)	Pattern of Assistance
Tractors				
(i) Tractor 2WD (up to 20 PTO HP)	2.00	50%	1.60	40%
(ii) Tractor 4WD (up to 20 PTO HP)	2.45	50%	1.96	40%
(iii) Tractor 2WD (above 20 PTO HP and up to 40 PTO HP)	3.00	50%	2.4	40%
(iv) Tractor 4WD (above 20 PTO HP and up to 40 PTO HP)	3.60	50%	2.88	40%
(v) Tractor 2WD (above 40 PTO HP and up to 50 PTO HP)	4.50	50%	3.60	40%
(vi) Tractor 4WD (above 40 PTO HP and up to 50 PTO HP)	5.45	50%	4.36	40%
(vii) Tractor 2 WD (Above 50 PTO HP)	6.00	50%	4.80	40%
(viii) Tractor 2 WD (Above 50 PTO HP)	6.50	50%	5.20	40%
Power Tillers				
(i) Power Tiller (8 BHP and up to 11 BHP)	1.00	50%	0.80	40%
(ii) Power Tiller (Above 11 BHP)	1.20	50%	1.00	40%
Combine Harvesters				
(i) Combine Harvester (self-propelled)	9.60	50%	7.68	40%
(ii) Combine Harvester -Tractor	3.60	50%	2.88	40%
Plant Protection Equipments				
(i) Manual sprayer: Knapsack/foot/Battery operated sprayer.	0.01	50%	0.008	40%
(ii) Solar powered Knapsack Sprayer	0.02	50%	0.016	40%
(iii) Bullock Cart mounted solar powered high clearance sprayer	0.40	50%	0.32	40%
(iv) Bullock Cart mounted air mist canopy sprayer	0.48	50%	0.384	40%
(v) Powered Knapsack sprayer/Power Operated sprayer (capacity 8 - 12 litres)- ≤ 0.75 hp engine)	0.03	50%	0.024	40%
(vi) Powered Knapsack sprayer/Power Operated sprayer (capacity above 12- 16 litres): (> 0.75 to 1.00 hp engine)	0.04	50%	0.032	40%
(vii) Powered Knapsack sprayer/Power Operated sprayer (capacity above 16 litres (> 1.0 hp engine)	0.10	50%	0.08	40%
(viii) Powered Knapsack Mist blower sprayer cum Duster (> 1.0 hp engine)	0.10	50%	0.08	40%
(ix) Tractor Operated Sprayer (air carrier/assisted)	1.38	50%	1.104	40%
(x) Battery operated Sprayer (Boom Type)	0.05	50%	0.04	40%
(xi) Battery Operated Boom Sprayer (walk behind type)	0.05	50%	0.04	40%
(xii) Tractor Operated Sprayer (boom type)	0.41	50%	0.328	40%
(xiii) Eco Friendly Light Trap	0.02	50%	0.016	40%
(xiv) Solar insect trap	0.04	50%	0.032	40%
(xv) Tractor Operated Electrostatic Sprayer	2.50	50%	2.00	40%
(xvi) Bird Scarer	0.75	50%	0.60	40%
(xvii) Self-propelled high ground clearance sprayers (Boom type)	4.00	50%	3.20	40%
(xviii) Tractor mounted precision spraying machines	3.50	50%	2.80	40%

(xxi) Pseudostem injector for Banana	0.08	50%	0.064	40%
(xxii) Tractor operated EPN/Bio agent applicator for sugarcane	0.23	50%	0.184	40%
(xxiii) Power Operated Sugarcane sett Treatment Device (30 – 120 Litres capacity)	0.30	50%	0.24	40%
Specialized Agricultural				

NADP-RKVY


Madhuranthagam Co-op Sugar Mills, Entrepreneurs - 4


Tiruttani Co-op Sugar Mills, Entrepreneurs - 4


The Salem Co-Operative Sugar Mills, Entrepreneurs - 3


MRK Co-Operative Sugar Mills, Entrepreneurs - 5


Kallakurichi - I Co-op Sugar Mills, Entrepreneurs - 6


Velur Co-op Sugar Mills, Entrepreneurs - 4


Cheyyaru Co- op Sugar Mills, Entrepreneurs - 4


Tiruppattur Co-Operative Sugar Mills, Entrepreneurs - 3


Dharmapuri Co-Operative Sugar Mills Entrepreneurs - 1


Subramanya Siva Co-Op Sugar Mills, Entrepreneurs - 6


Kallakurichi - II Co-op Sugar Mills, Entrepreneurs - 6


Arignar Anna Public Sugar Mills Entrepreneurs - 4


CHENGALRAYAN CO-Operative Sugar Mills – Entrepreneurs - 5


Perambalur Public Sugar Mills Enrepreneurs - 5

Training cum Demonstrations to the 100 Entrepreneurs Developed in Tamil Nadu

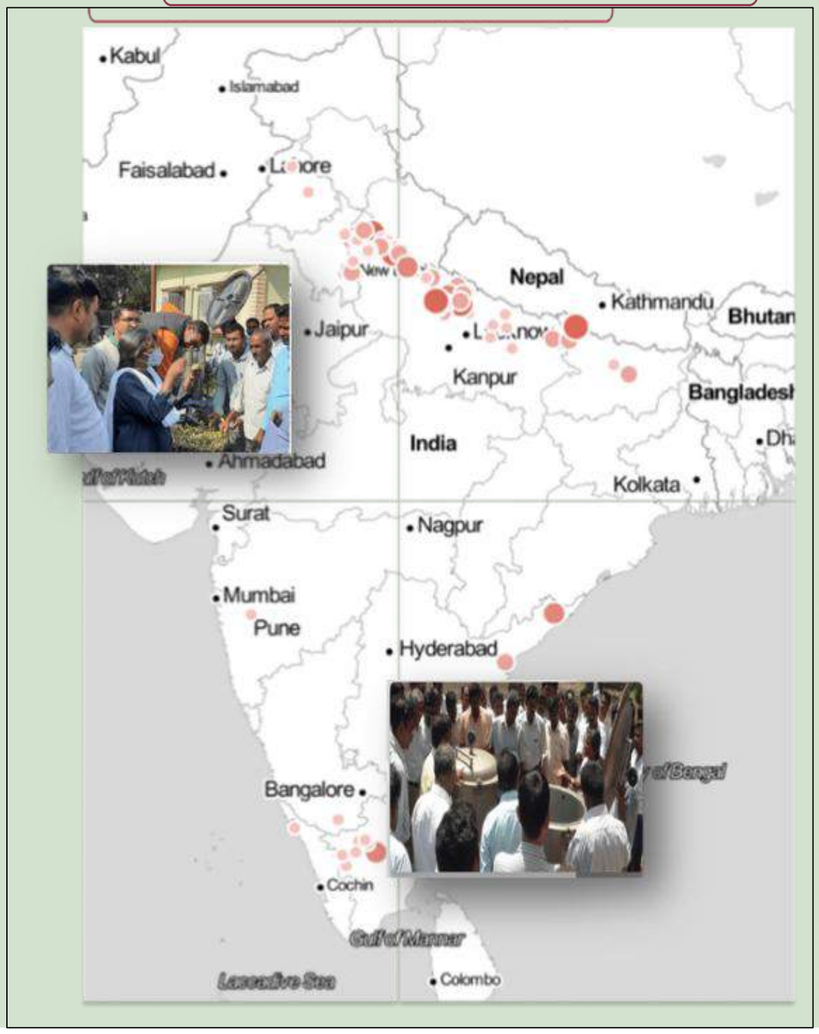
Training cum Demonstrations to cane staff at Sugar Mills, UP – Sub-tropical India

BIHAR Entrepreneurs NFSM

Training cum Demonstrations to the Entrepreneurs, Bihar – Sub-tropical India

Adoption by sugar mills and Entrepreneurs all over India for Healthy Nursery Programme and Disease management

- ★ **Patented Technology**
- ★ **Commercialized**
- ★ **>400 installations in India**



INTELLECTUAL PROPERTY INDIA

क्रम सं/SL No :041180222

पेटेंट कार्यालय,भारत सरकार | The Patent Office, Government Of India

पेटेंट प्रमाण पत्र | Patent Certificate

(पेटेंट नियमावली का नियम 74) (Rule 74 of The Patents Rules)

पेटेंट सं. / Patent No. : 516028

आवेदन सं. / Application No. : 3323/CHE/2011

फाइल करने की तारीख / Date of Filing : 26/09/2011

पेटेंटी / Patentee : INDIAN COUNCIL OF AGRICULTURAL RESEARCH

प्रमाणित किया जाता है कि पेटेंटी को, उपरोक्त आवेदन में यथाप्रकटित *RAPID TREATMENT FOR PLANTING MATERIALS OF SUGARCANE AND OTHER VEGETATIVELY PROPAGATED CROPS* नामक आविष्कार के लिए, पेटेंट अधिनियम, 1970 के उपबंधों के अनुसार आज तारीख सितम्बर 2011 के छब्बीसवें दिन से बीस वर्ष की अवधि के लिए पेटेंट अनुदत्त किया गया है।

It is hereby certified that a patent has been granted to the patentee for an invention entitled *RAPID TREATMENT FOR PLANTING MATERIALS OF SUGARCANE AND OTHER VEGETATIVELY PROPAGATED CROPS* as disclosed in the above mentioned application for the term of 20 years from the 26th day of September 2011 in accordance with the provisions of the Patents Act,1970.

"Rapid treatment for planting materials of sugarcane and other vegetatively propagated crops" (Patent Number: 516028 (2024); Indian Application No: 3323/CHE/2011) by ICAR-Sugarcane Breeding Institute

अनुदान की तारीख : 27/02/2024
Date of Grant

Controller of Patents

टिप्पणी - इस पेटेंट के नवीकरण के लिए फीस, यदि इसे बनाए रखा जाना है, सितम्बर 2013 के छब्बीसवें दिन को और उसके पश्चात प्रत्येक वर्ष में उसी दिन देय होगी।

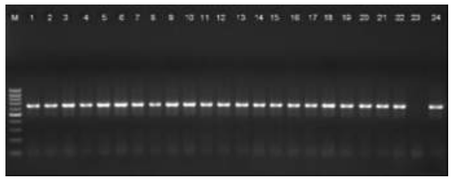
Note - The fees for renewal of this patent, if it is to be maintained, will fall / has fallen due on 26th day of September 2013 and on the same day in every year thereafter.

DISEASE MANAGEMENT TECHNOLOGIES IN SUGARCANE

Management of bacterial and phytoplasm Diseases

Aerated steam therapy

Management of viral diseases



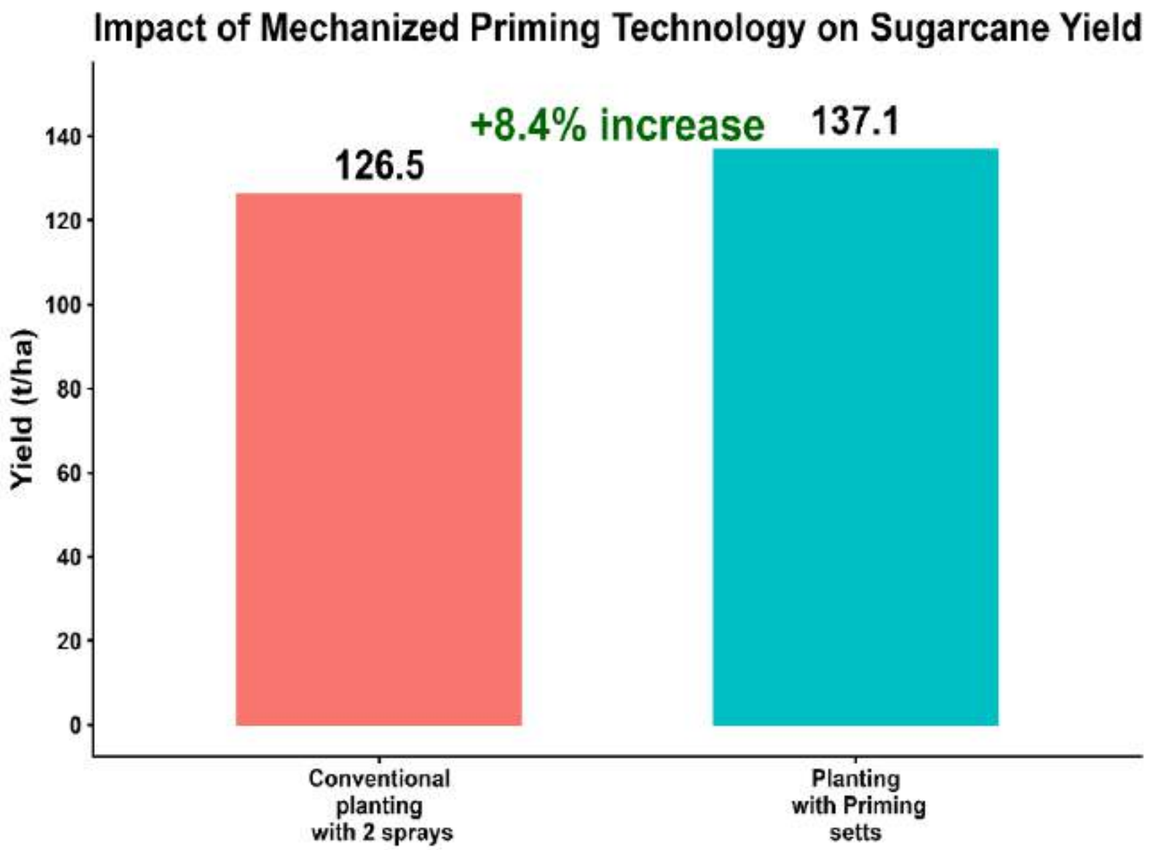
Meristem culture combined with virus indexing

Management of fungal diseases

Sugarcane Sett Treatment Device

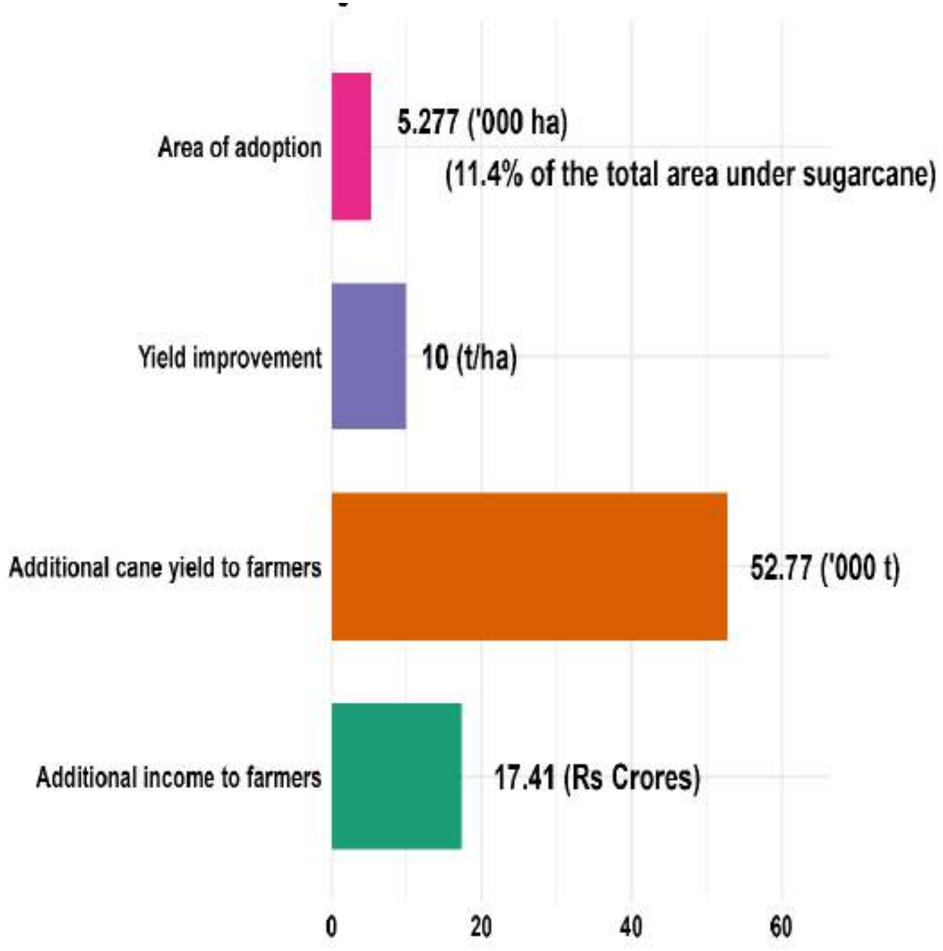
Economic potential/ Impact – Improved yield

(i). At Farm level



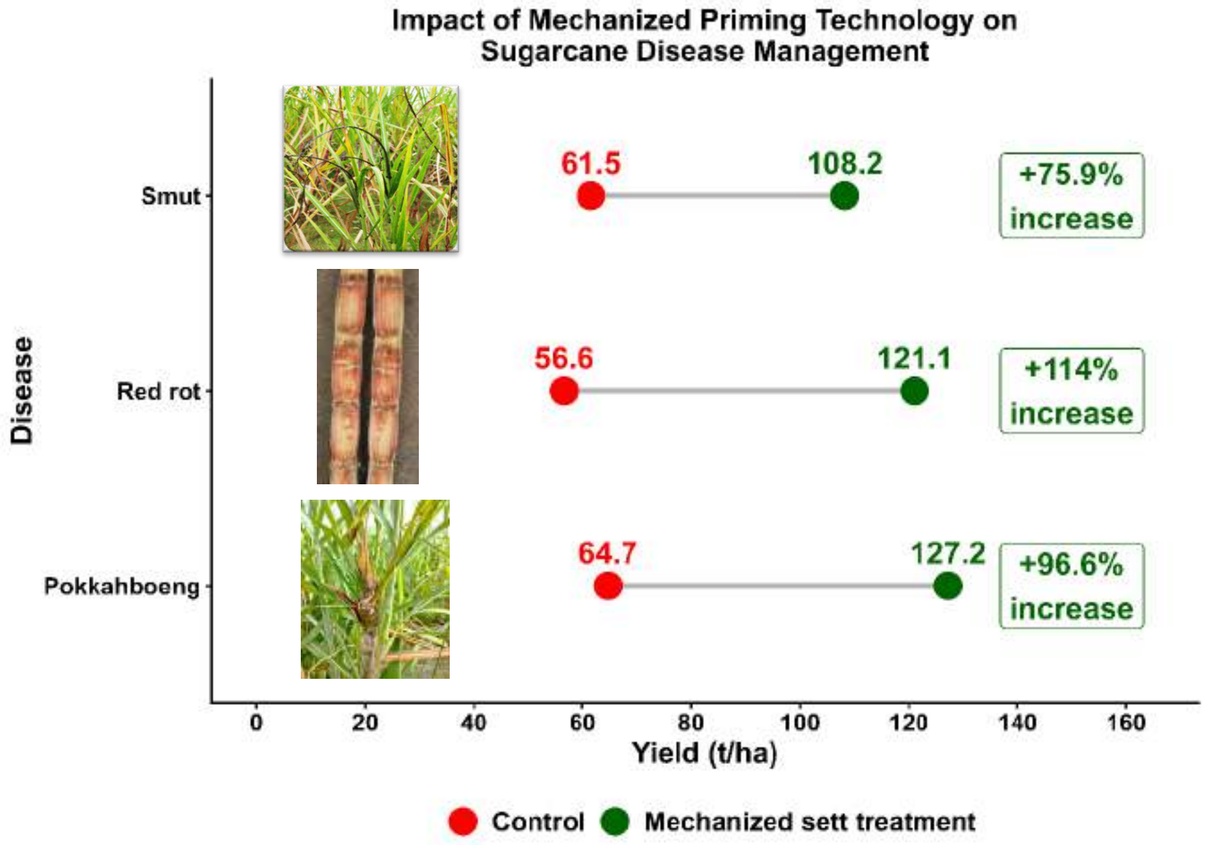
(ii). At Large scale

Impact of Mechanized priming of planting material in Tamil Nadu

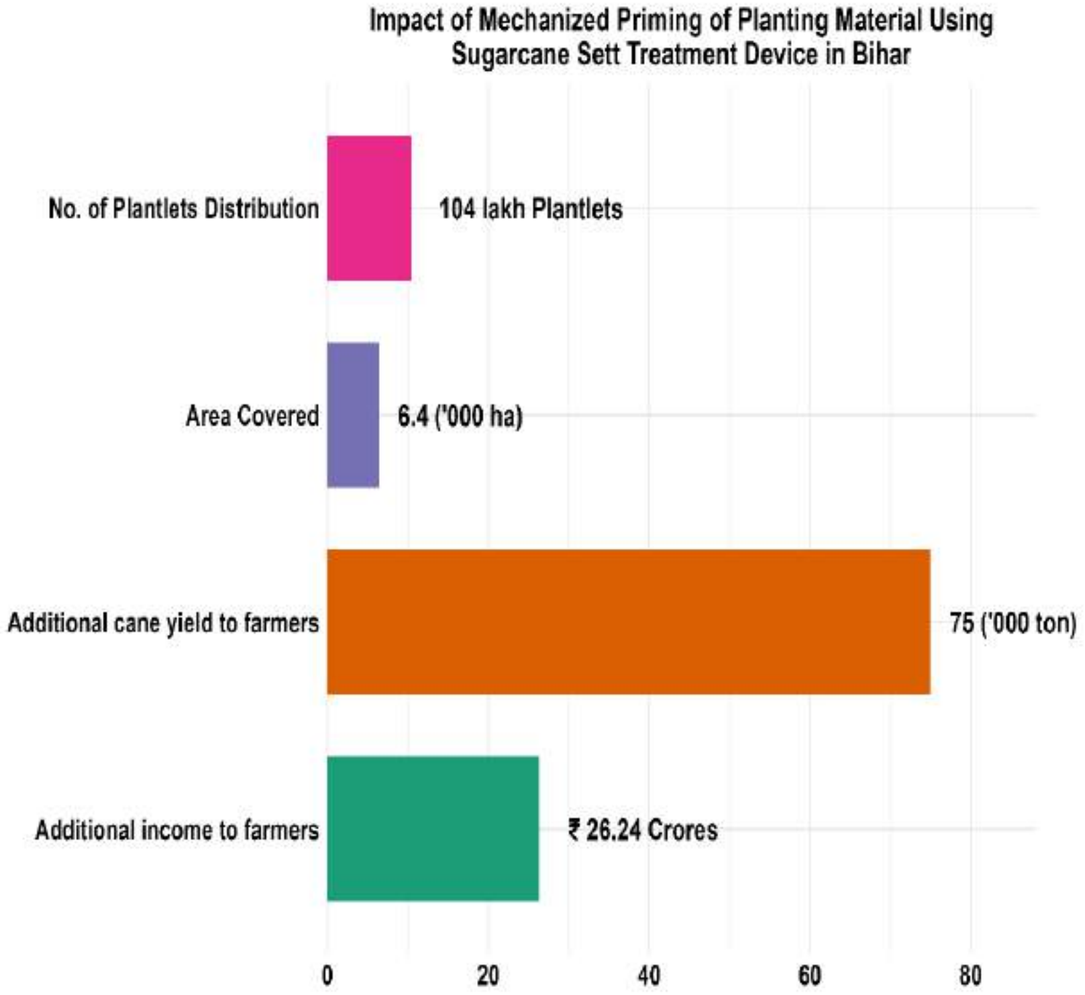


Economic potential/ Impact – Disease management

(i). At Farm level

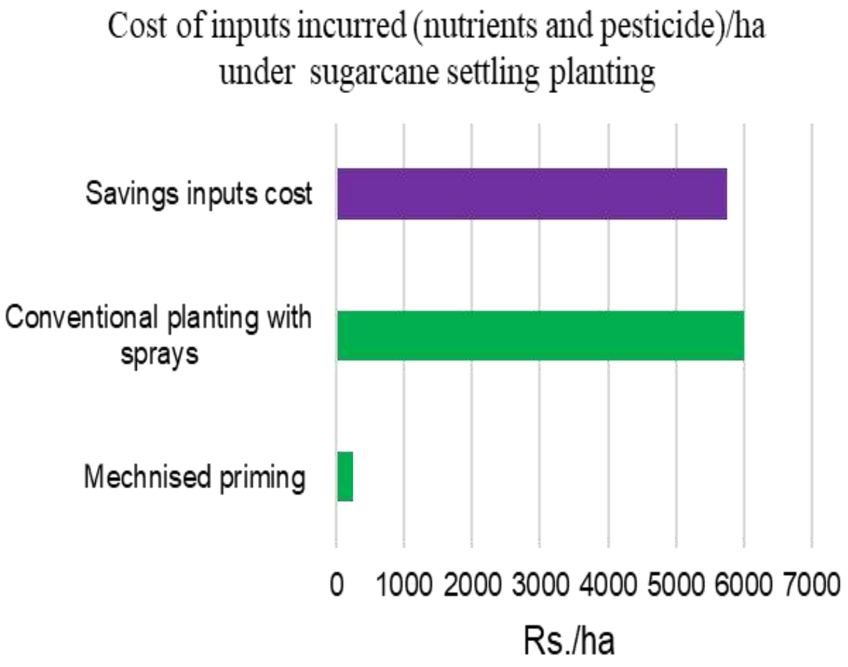


(ii). At Large scale – sustainable cultivation of Co 0238



Social Impact

(i). Reduced input cost



(ii). Promotes Organic/ Natural farming:

Liquid bioformulations for mechanized sett treatment

(iii) Entrepreneurship

Entrepreneurship for Youth – Men and Women

Mechanized priming Technology – **Women Friendly**

EMPLOYMENT FOR WOMEN

Sett Treatment Activity at the Institute Sett Treatment Chamber

Process of Mechanized priming of two budded setts with various agro-inputs

Process of Healthy settling development by Mechanized priming of single budded setts with various agro-inputs

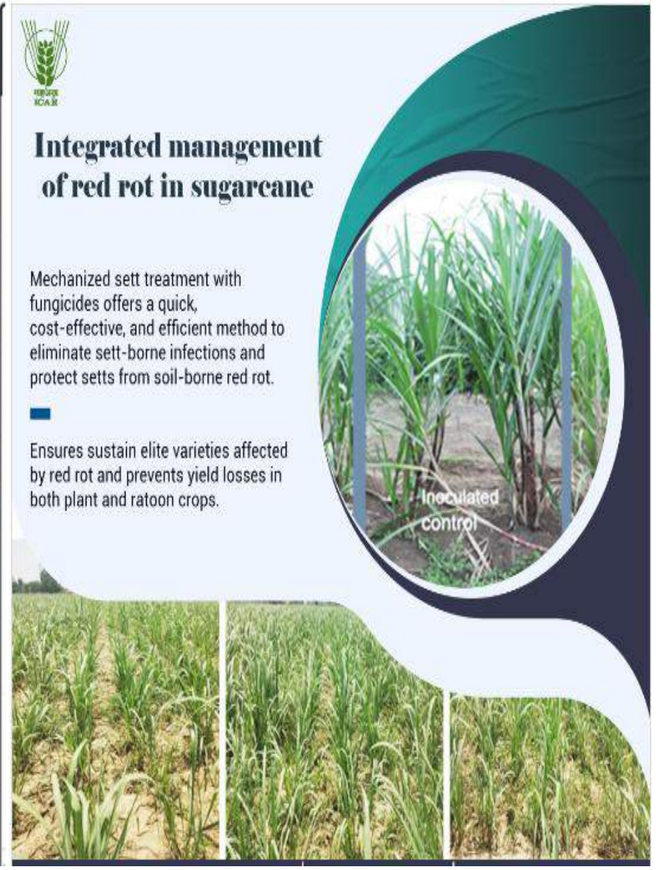
Sett Treatment Facility established at ICAR-SBI

Sett Treatment Chamber at ICAR-SBI

Technology recognition by ICAR and Ministry

Instagram **One ICAR Technology**

One ICAR Technology



Indian Council of Agricultural Research's post

Indian Council of Agricultural Research
26 September 2025 ·

ICAR-SBI's Mechanized Priming Technology is revolutionizing sugarcane and other vegetatively propagated crops. Using the Sugarcane Sett Treatment Device (STD), this patented innovation integrates physical, chemical, and biological inputs for smart pest & disease management—validated across ICAR centres.

With 500+ installations in states like Tamil Nadu, Uttar Pradesh, and Bihar, the technology delivers healthy nurseries, controls red rot, smut, wilt & pokkah boeng, and boosts crop productivity.

Supported under SMAM with 40–50% subsidy, it's empowering farmers, sugar mills & rural entrepreneurs.

#ICAR Shivraj Singh Chouhan Ministry of Agriculture & Farmer's Welfare, Government of India Press Information Bureau - PIB, Government of India

Integrated Disease Management Strategy

Sett Treatment Device (STD)

Mechanized priming of planting material of Sugarcane

Physical – Hot water

Chemical – Fungicides, Nutrients

Biological – Fungal and Bacterial BCA

STD – Hot Water Treatment (STD-HWT)

NEW VISTAS | OTHER CROPS

(Inter-Institutional)

"Smart delivery of agro-inputs using Sett Treatment Device for biotic and abiotic stress management in sugarcane and other vegetatively propagated crops"

SETT TREATMENT DEVICE

TURMERIC

TAPIOCA

BANANA

SUGARCANE

POTATO

Effect of physical, chemical and biological agents on germination, growth and vigour of Banana

T1 T2 T3 T4 T5 T6

Effect of vacuum based hot water treatment against nematode incidence in Turmeric

Germination after Vacuum based hot water treatment

TNAU

Efficacy of mechanized sett treatment with chemicals on Tapioca - Germination and Vigour

ICAR- CTCRI
Thiruvananthapuram

Control

Hot water

Hot water followed by Chemicals

Validation of hot water treatment for the management of potato scab

ICAR – Sugarcane Breeding Institute

Acknowledgement

- ICAR
- Directors, SBI
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- NADP-RKVY
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