



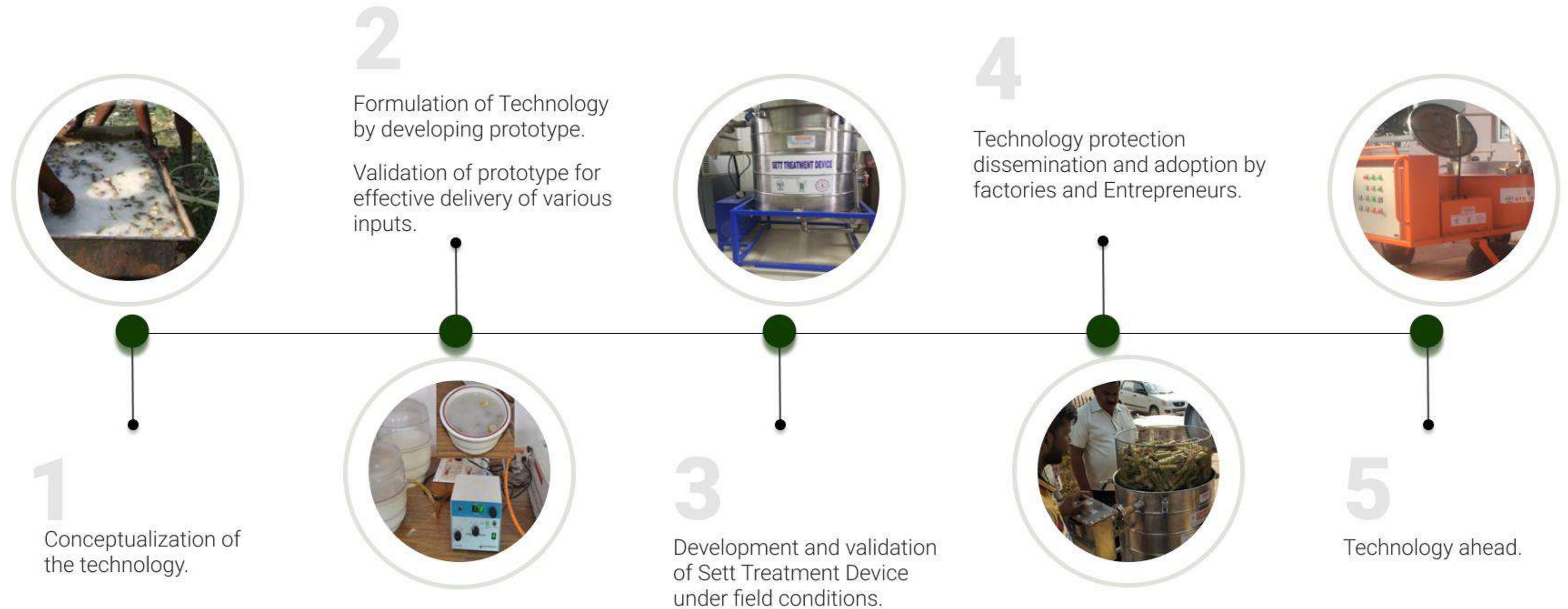
“Novel Mechanized Priming Technology to protect Seed and Crop Health in Sugarcane and other Vegetatively propagated crops”



‘Sugarcane Sett Treatment Device’

Mechanized Priming Technology

CONTENTS.





SUGARCANE DISEASES.

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

Fungal Diseases in Sugarcane



Bacterial, Phytoplasmal and Viral Diseases in Sugarcane



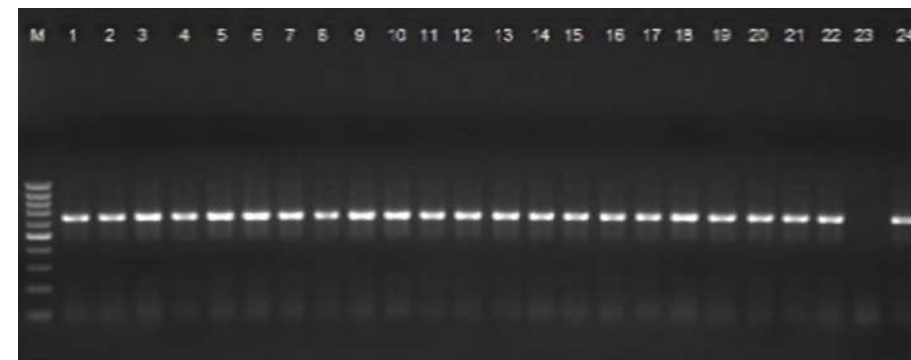
DISEASE MANAGEMENT TECHNOLOGIES IN SUGARCANE

Management of bacterial and
phytoplasma 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

Most of the farmers do not give pre treatment.
Some of them follow only ~ 30 min to 1hr dipping.

Recommended practice

Overnight soaking of setts.

Practical Application ?

Bigger container and more quantity of fungicide.
(due to voluminous material)

MECHANISED SYSTEM PROTOTYPE.



Uptake
Effectiveness

Vacuum Level
Duration

BUDS



Colletotrichum falcatum



RIND



Untreated

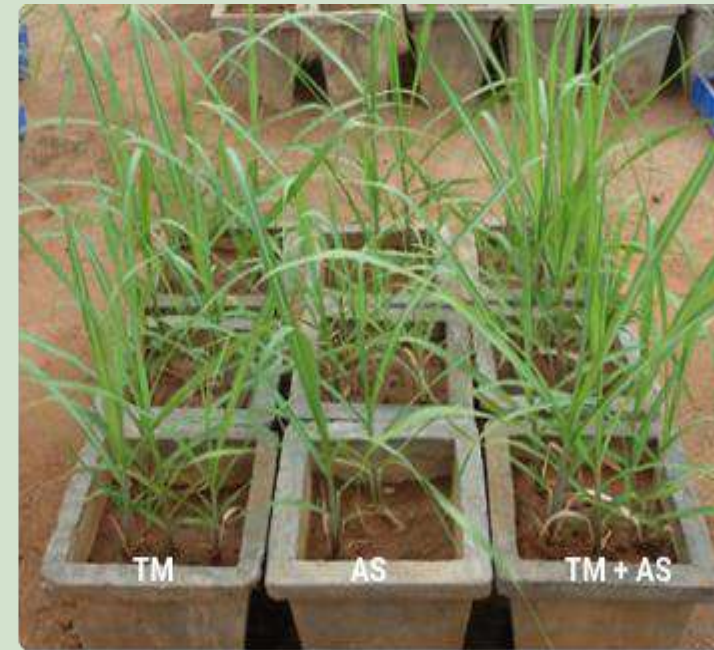
Mechanized

Overnight soaking

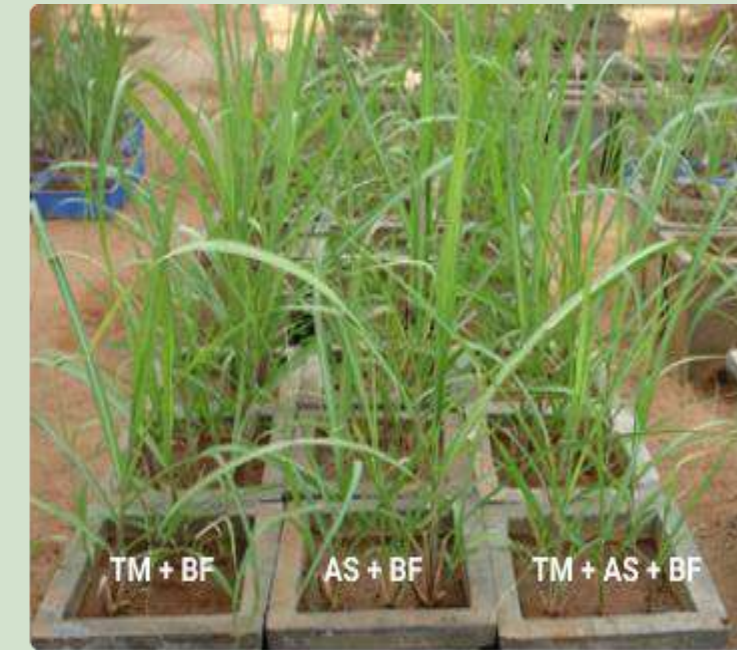
VALIDATION OF PROTOTYPE.



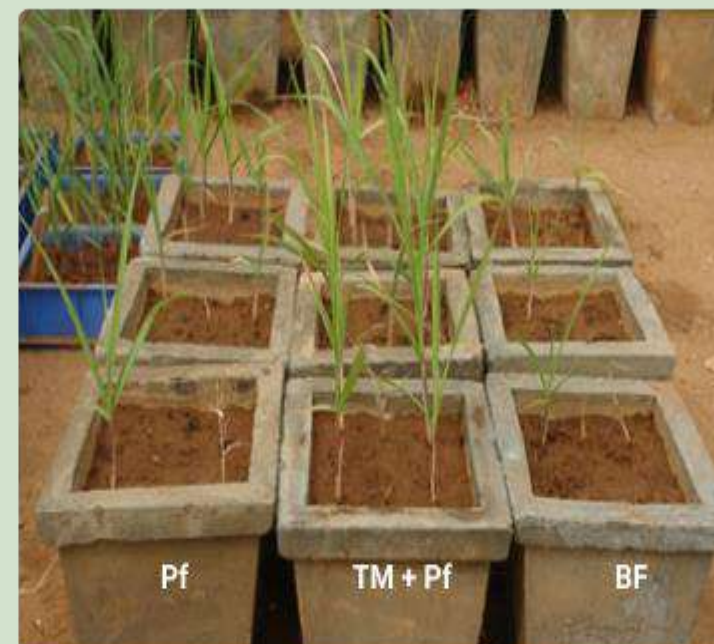
Mech - Mechanized, ON – Overnight soaking



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	(71)Name of Applicant : 1)INDIAN COUNCIL OF AGRICULTURAL RESEARCH Address of Applicant :SUGARCANE BREEDING INSTITUTE COIMBATORE - 641 007 Tamil Nadu India
(31) Priority Document No :NA	(72)Name of Inventor : 1)PALANIYANDI MALATHI 2)RASAPPA VISWANATHAN 3)PURUSHOTHAMAN PADMANABAN 4)AMALRAJ RAMESH SUNDAR 5)KUPPUSAMY HARI 6)VELUSAMY JAYAKUMAR
(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	
(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.	

			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.

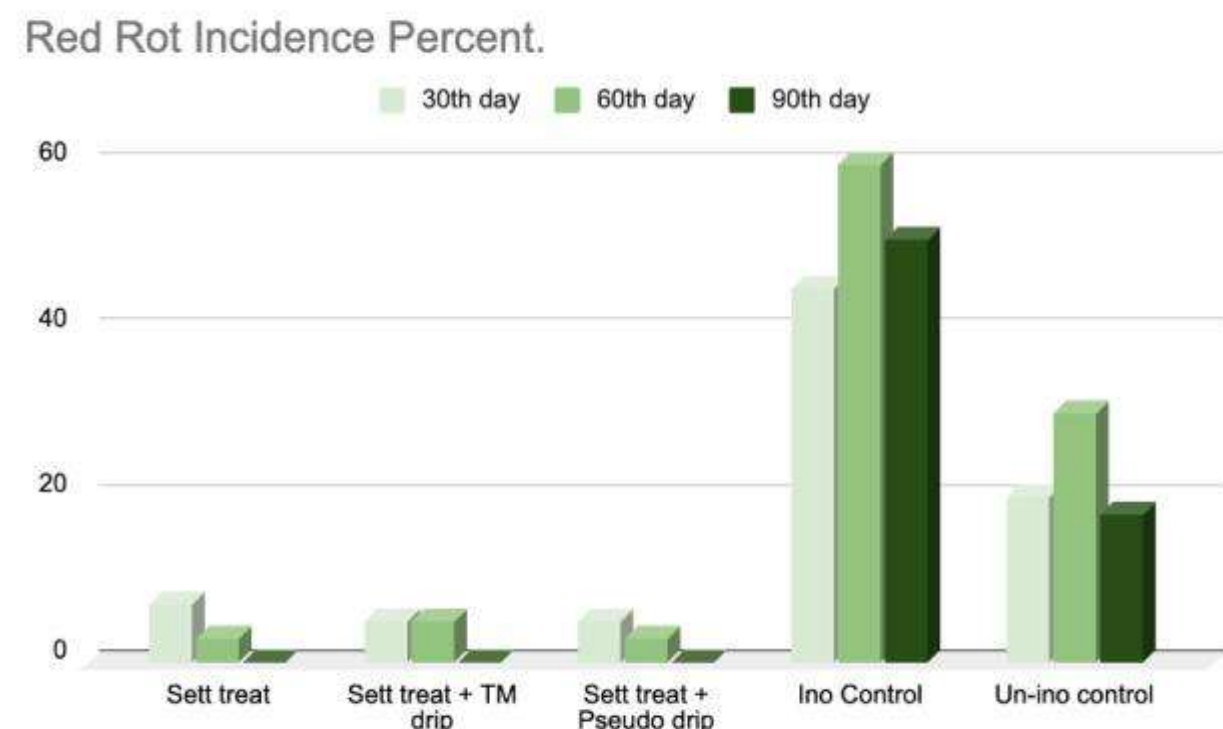
MECHANIZED



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

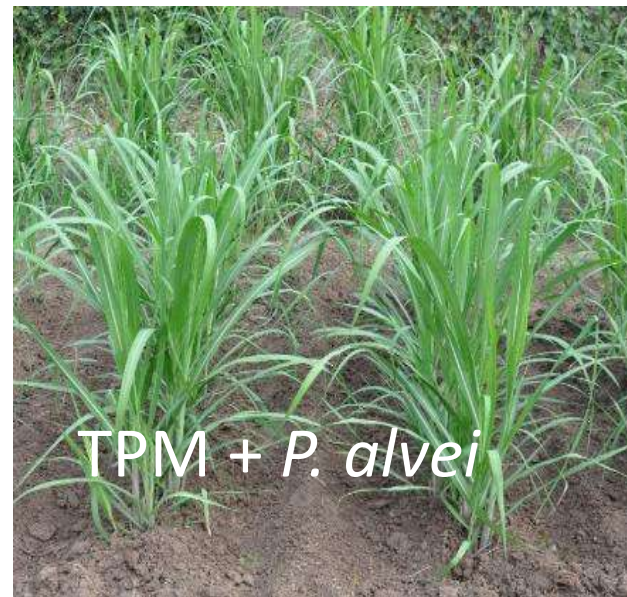


Mechanized treatment
Propiconazole-100 ppm



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



भारत सरकार
GOVERNMENT OF INDIA
कृषि एवं किसान कल्याण मंत्रालय
MINISTRY OF AGRICULTURE AND FARMERS WELFARE



कृषि अनुसंधान एवं शिक्षा विभाग
DEPARTMENT OF
AGRICULTURAL RESEARCH AND EDUCATION

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Sugarcane Sett Treatment Device

[Print](#)

Background:
Sugarcane is a major industrial crop of the country grown in about 4.7 million hectares in both tropical and subtropical regions. Under various climatic conditions, it is subjected to a number of biotic and abiotic stress during its growth. Effective management of any stress is associated with practicability of management practice. For most of the management of diseases, seed treatment plays major role for easy, effective, economical and rapid method of delivering agrochemicals/ microbes. As sugarcane is propagated only by vegetative means, disease problem in the seed canes affects crop health. However, treating sugarcane setts that are required in large volumes for field planting is almost impractical due to its high volume and longer period of soaking. Hence a practically feasible, rapid and effective delivery system having long-term effects with preventive/ protective principles in the integrated management system is required under field conditions. All these factors form the base for the present invention on mechanized means of sett treatment in sugarcane which has been specifically tested for disease management with fungicides/ microbes and validated for producing healthy nursery with various agro-inputs. **Technology Details:**
This invention relates to a novel method for effective impregnation of agrochemicals and/or microorganisms and other agro-inputs into sugarcane planting materials viz., single/ two/ three budded setts and bud chips for protection from diseases/ pests and improvement of plant growth. This device works under the principle of negative pressure or vacuum infiltration. This mechanized means of sett treatment is a novel method over conventional method of sett soaking. Also, this method is suitable for different planting materials like stem cuttings, rhizomes, bulbs and tubers of different vegetatively propagated crops. This method has several advantages viz., mechanized operation, rapidity, effectiveness, amenable for large scale application, capable of delivering more than one agrochemical/ microbe, uniform impregnation of agrochemical/microorganisms into seed material, possibility to combine physical and chemical method of treatment and lesser requirement of agrochemical as compared to conventional soaking. Also, there is no similar technology or unit available for comparison.

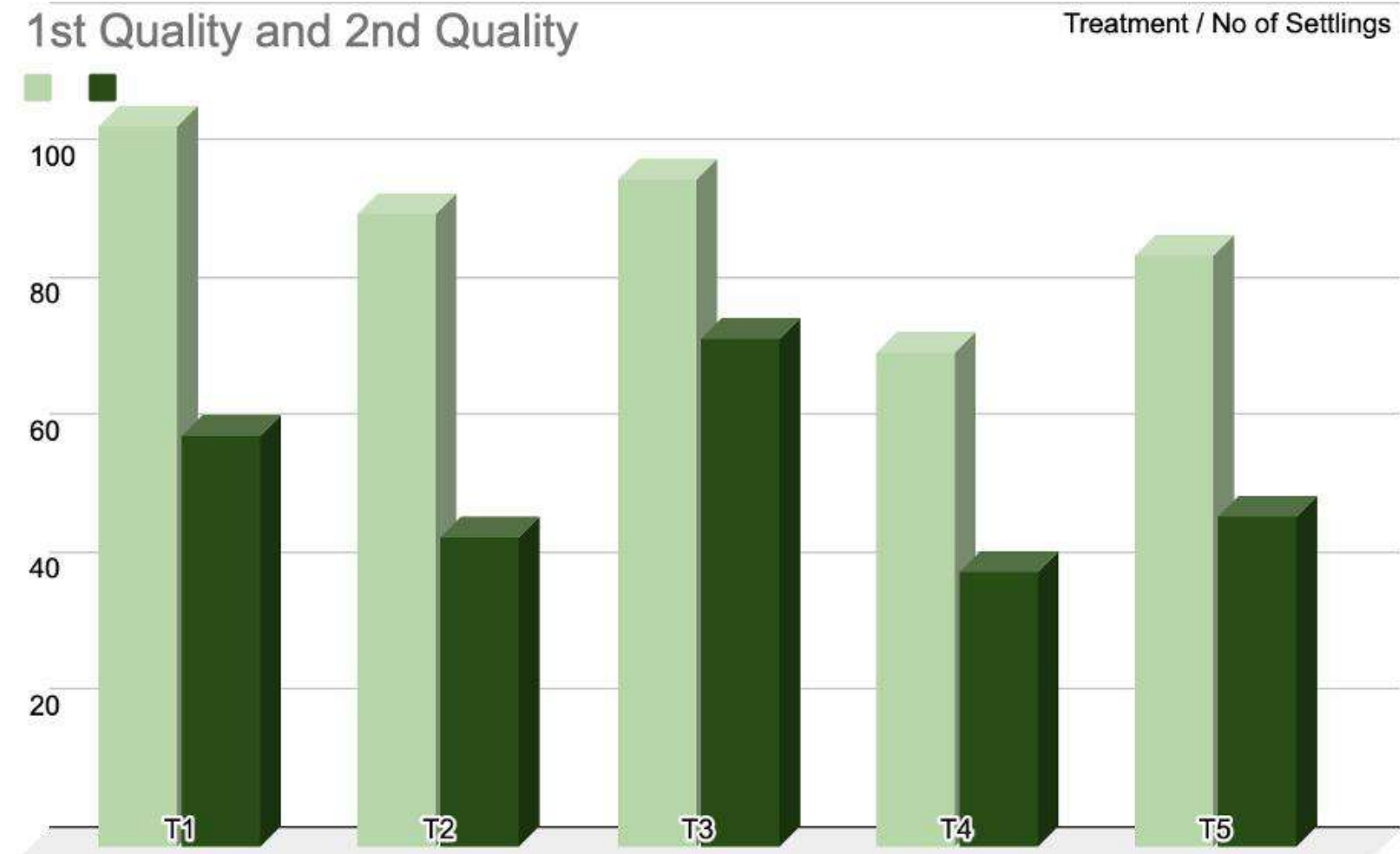
[Express your Interest](#)



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%;

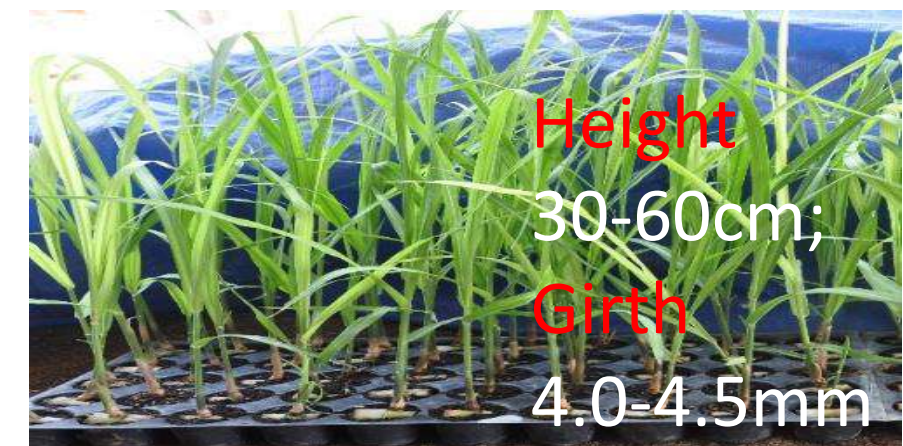
T4 - T3 + Humic acid - 0.1%

• T5 - Control

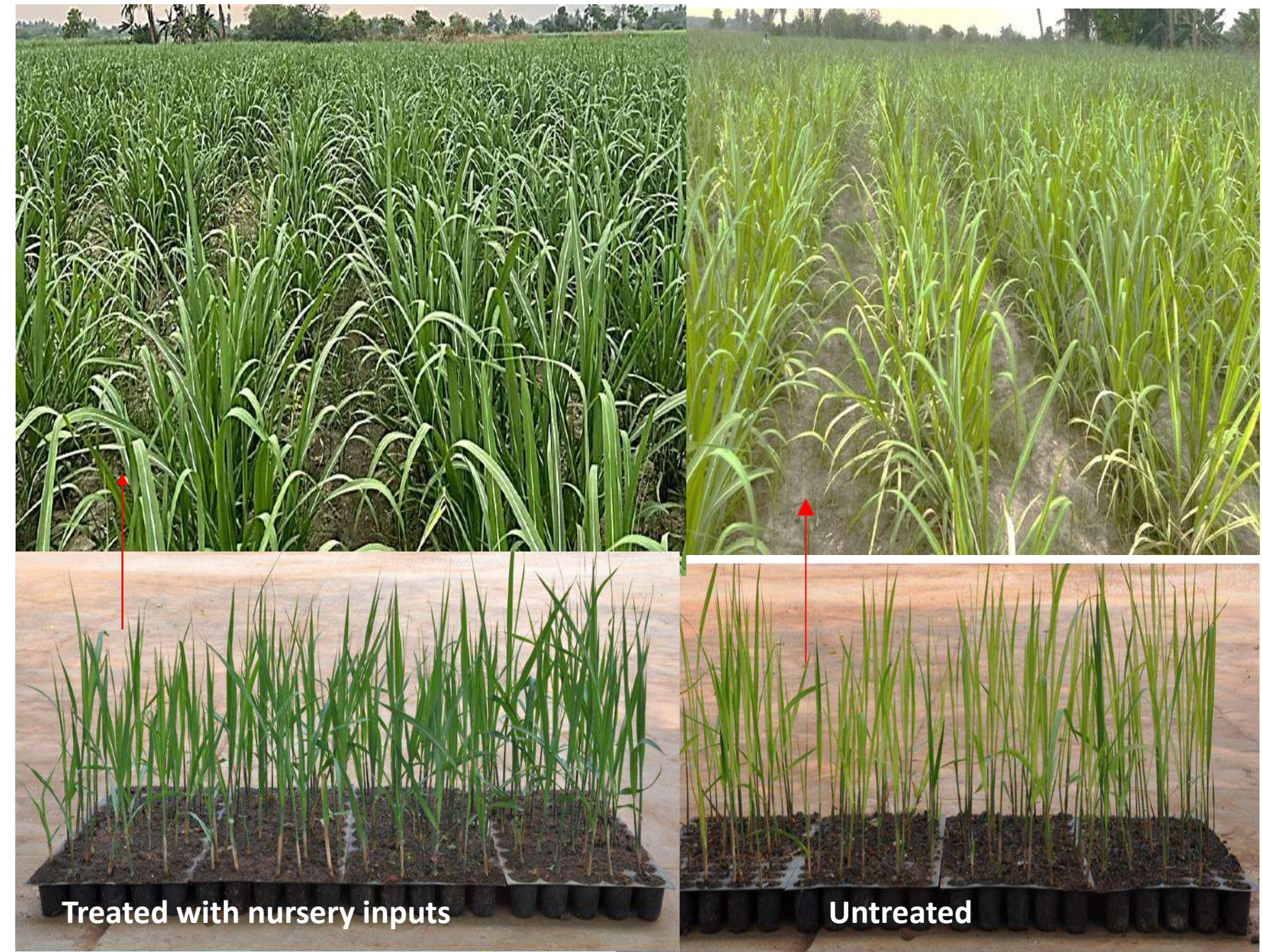
1st quality



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)



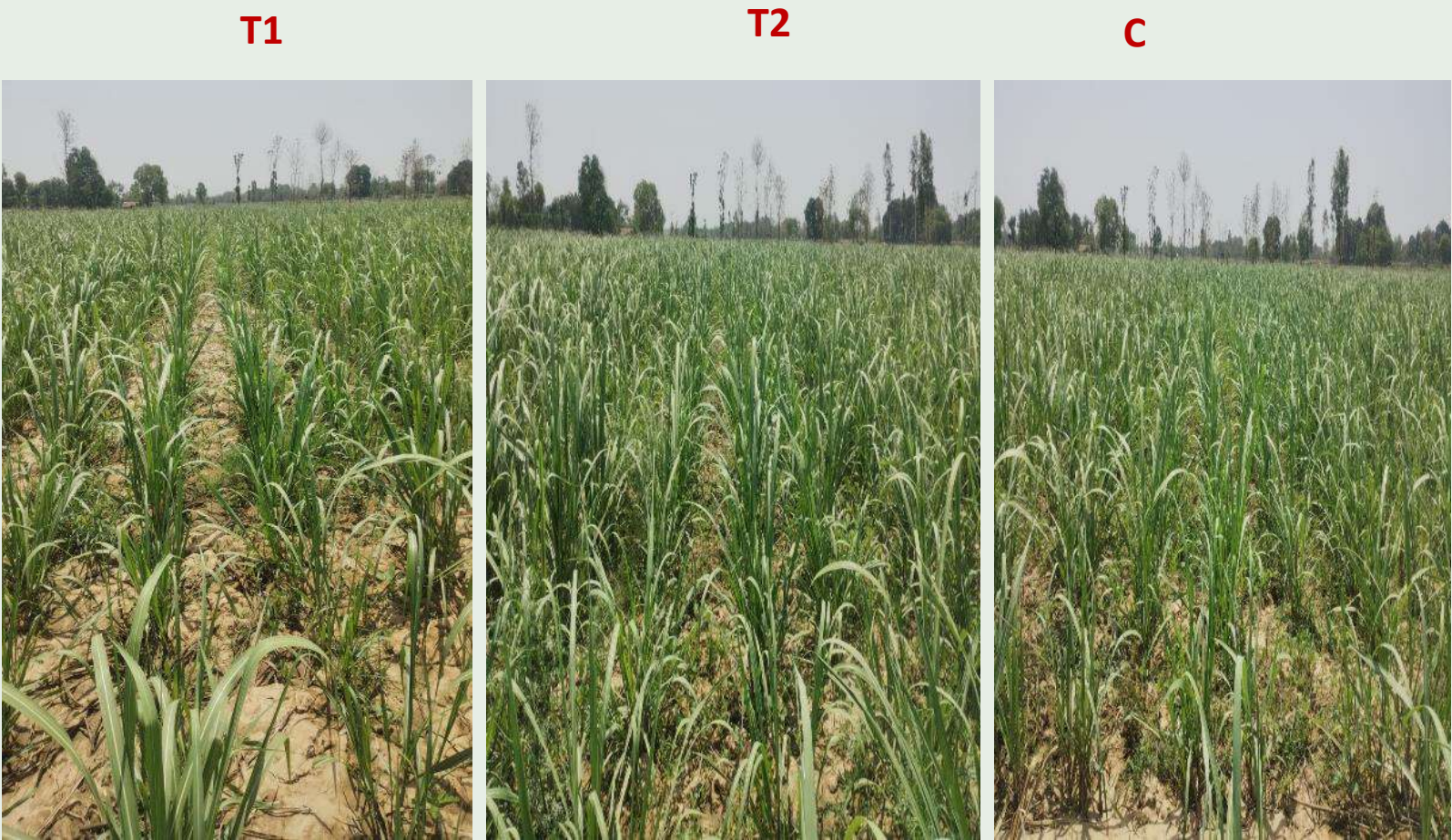
Infected cntrol



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)



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 + - <i>Paenibacillus alvei</i>	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



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**

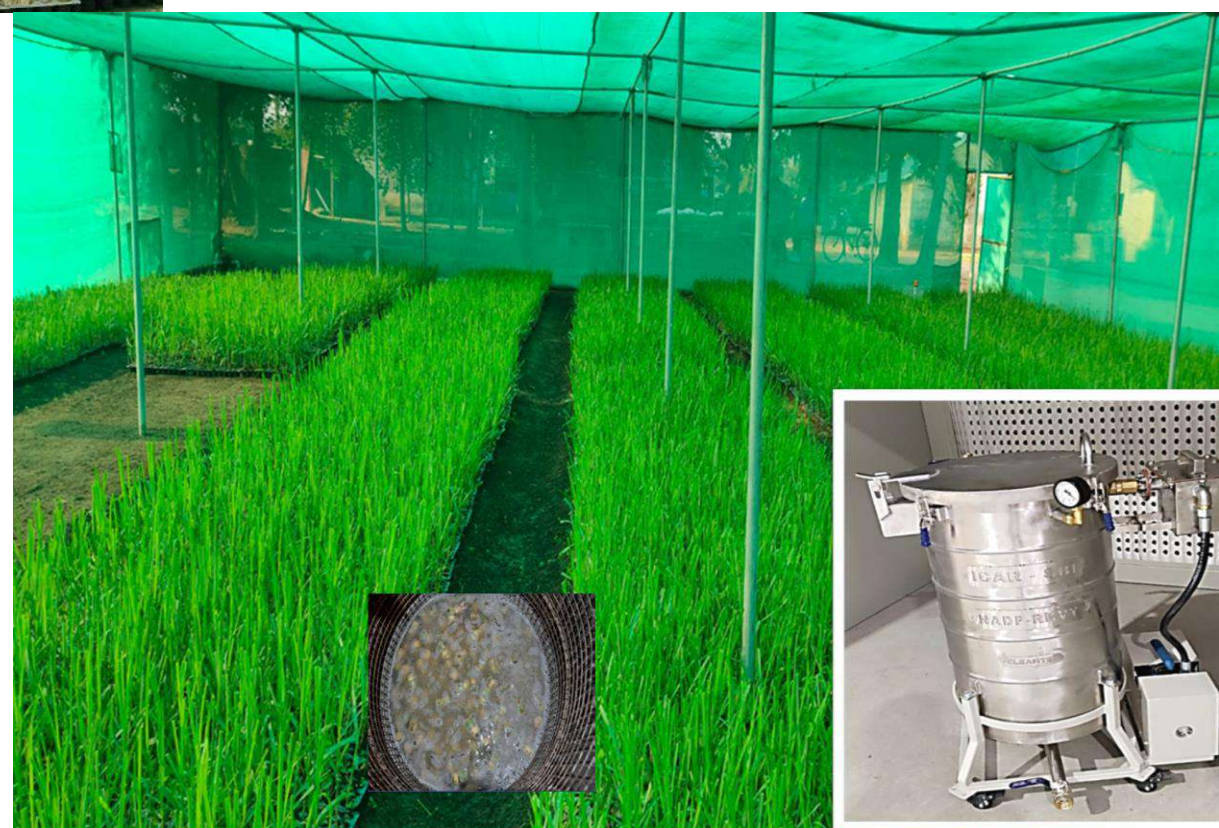
NFSM: Centrally Sponsored National Food Security and Nutrient Mission

DISSEMINATION OF TECHNOLOGY - 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%

Page | 32

(xxi) pseudostem injector for Banana	0.00	50%	0.004	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				



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



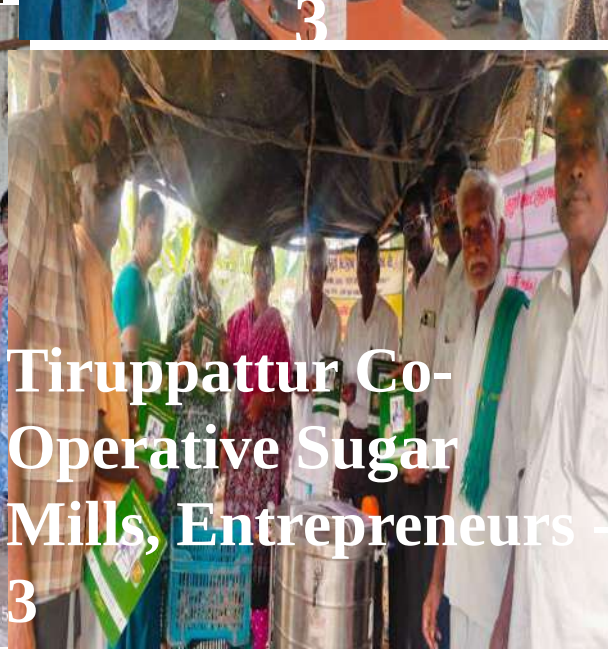
Kallakurichi - I Co-op Sugar Mills, Entrepreneurs - 6



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, Entrepreneurs - 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

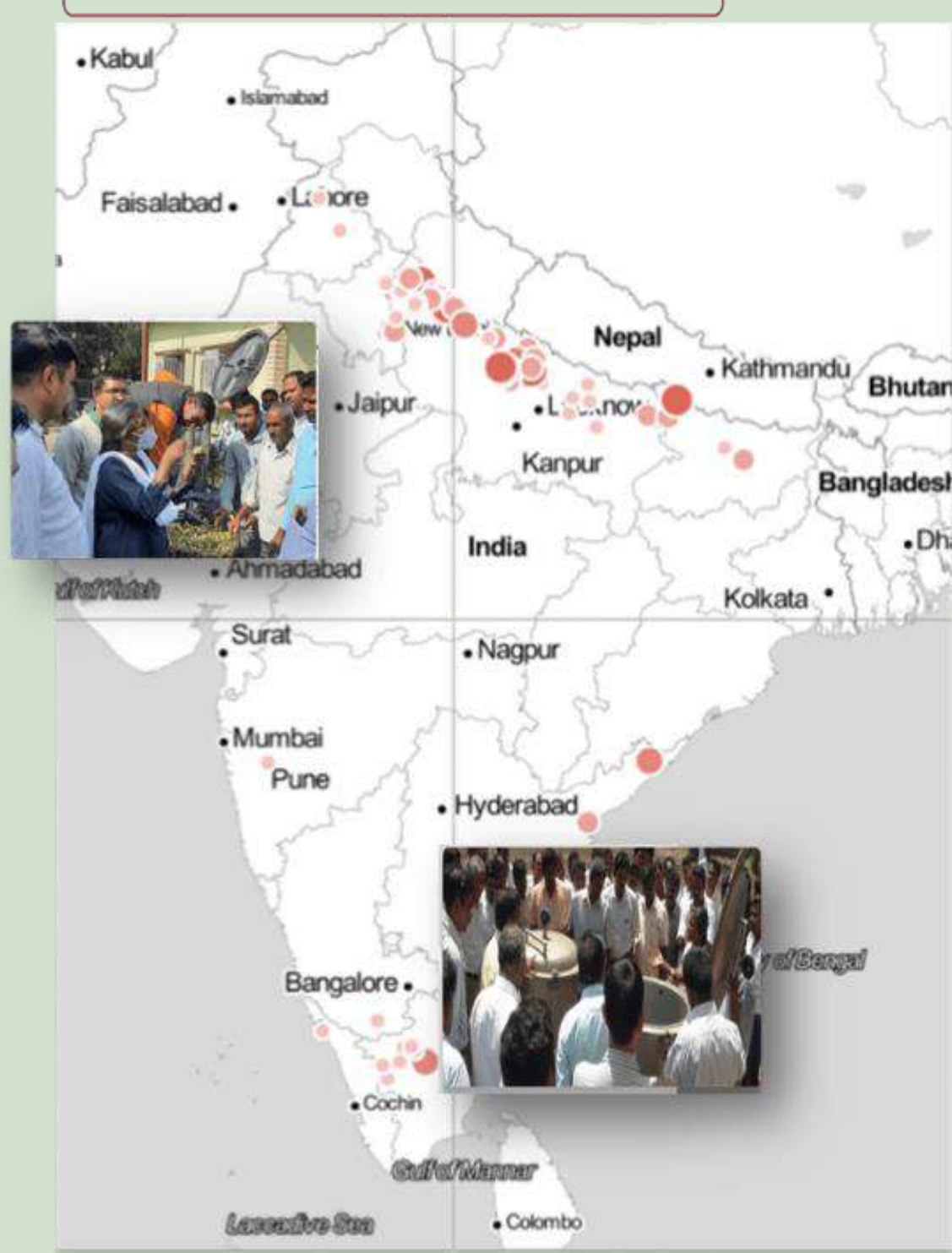
NFSM



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



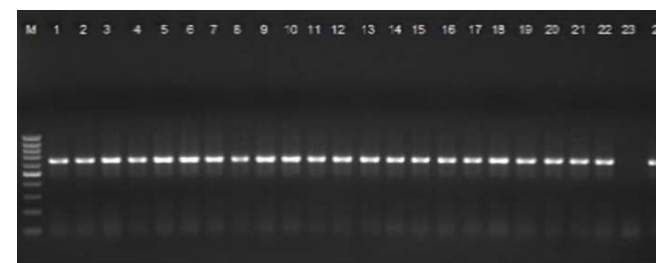
DISEASE MANAGEMENT TECHNOLOGIES IN SUGARCANE

Management of bacterial and phytoplasma Diseases



Aerated steam therapy

Management of viral diseases



Meristem culture combined with virus indexing

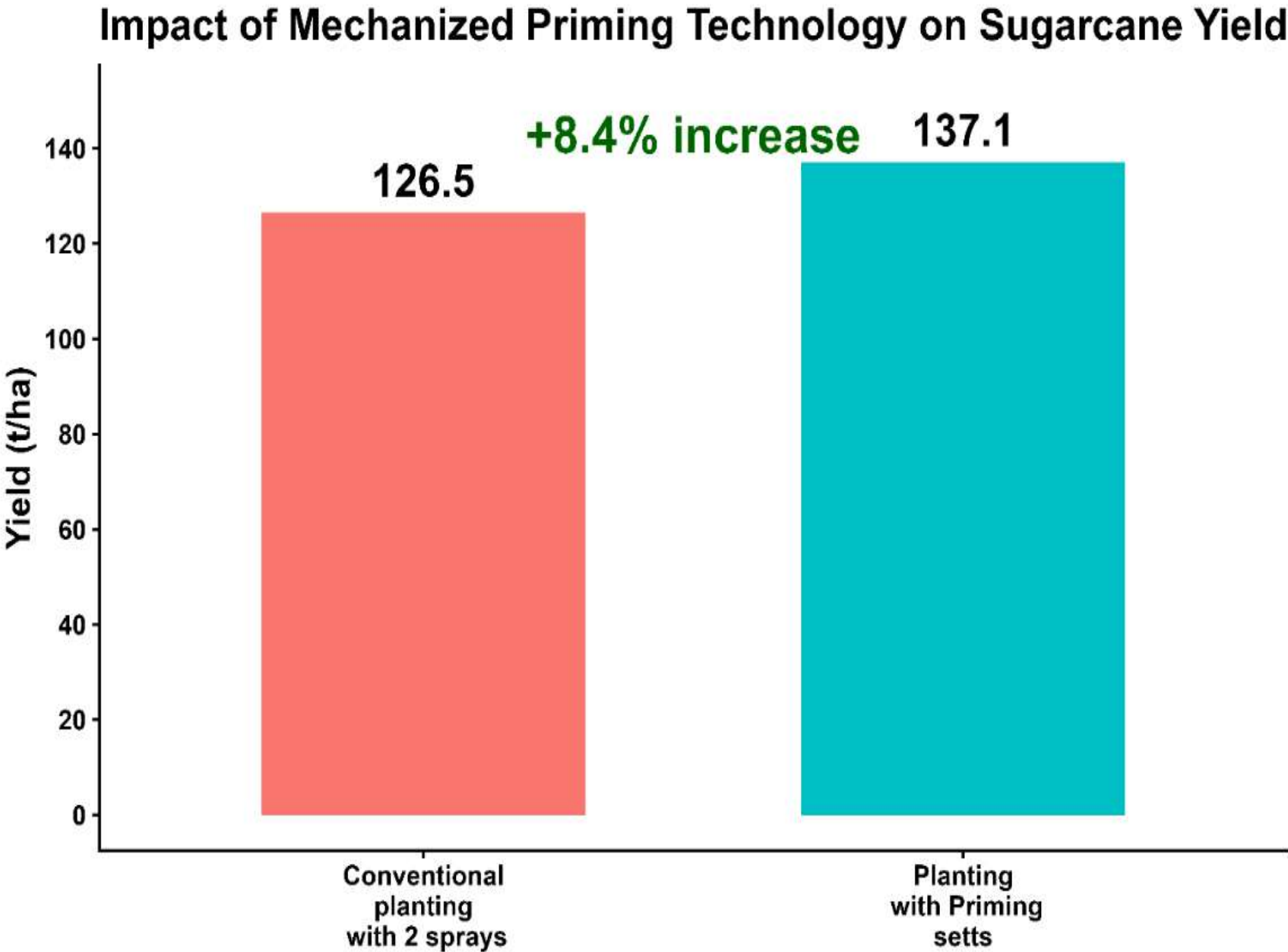
Management of fungal diseases



Sugarcane Sett Treatment Device

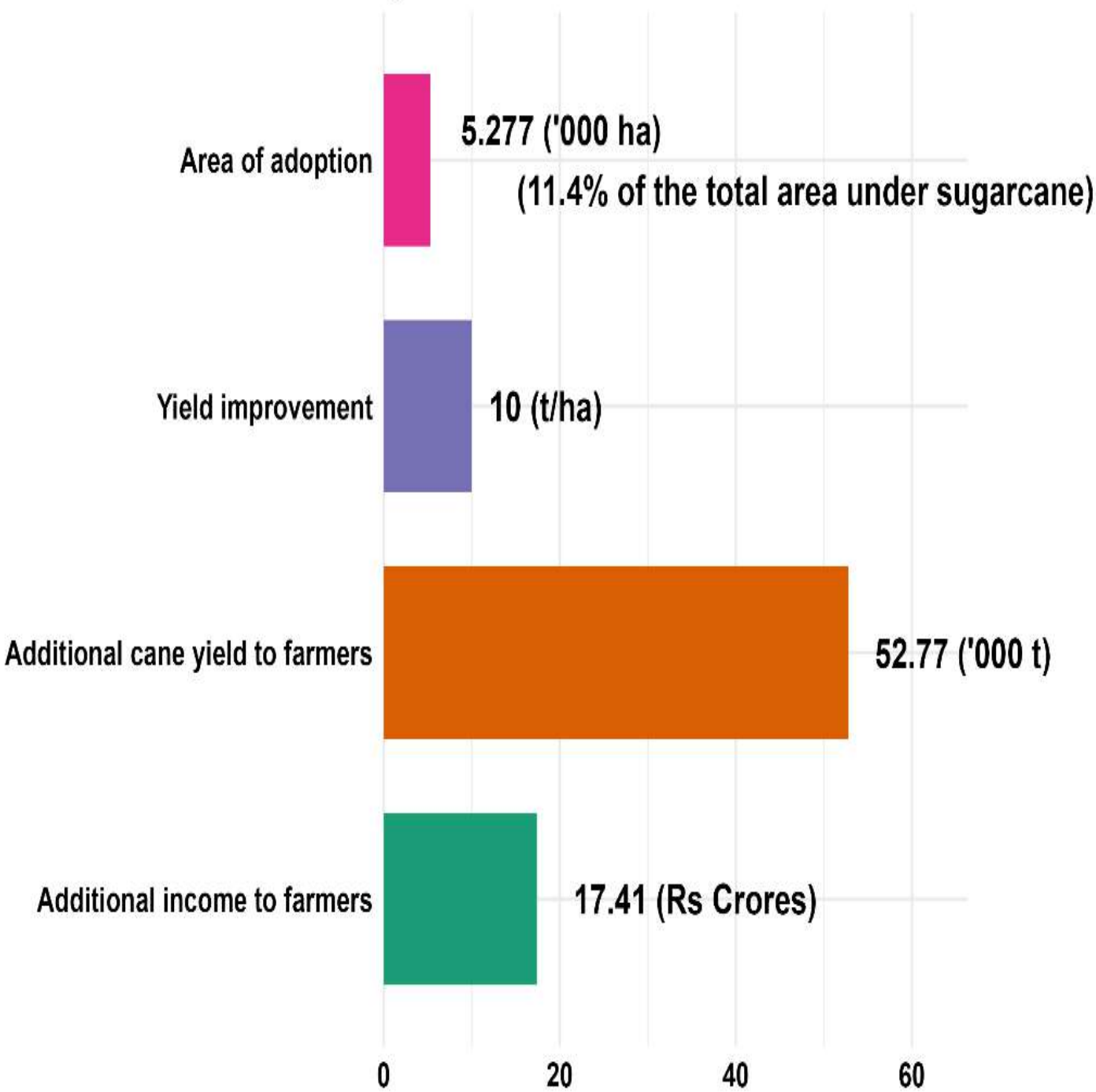
Economic potential/ Impact – Improved yield

(i). At Farm level



(ii). At Large scale

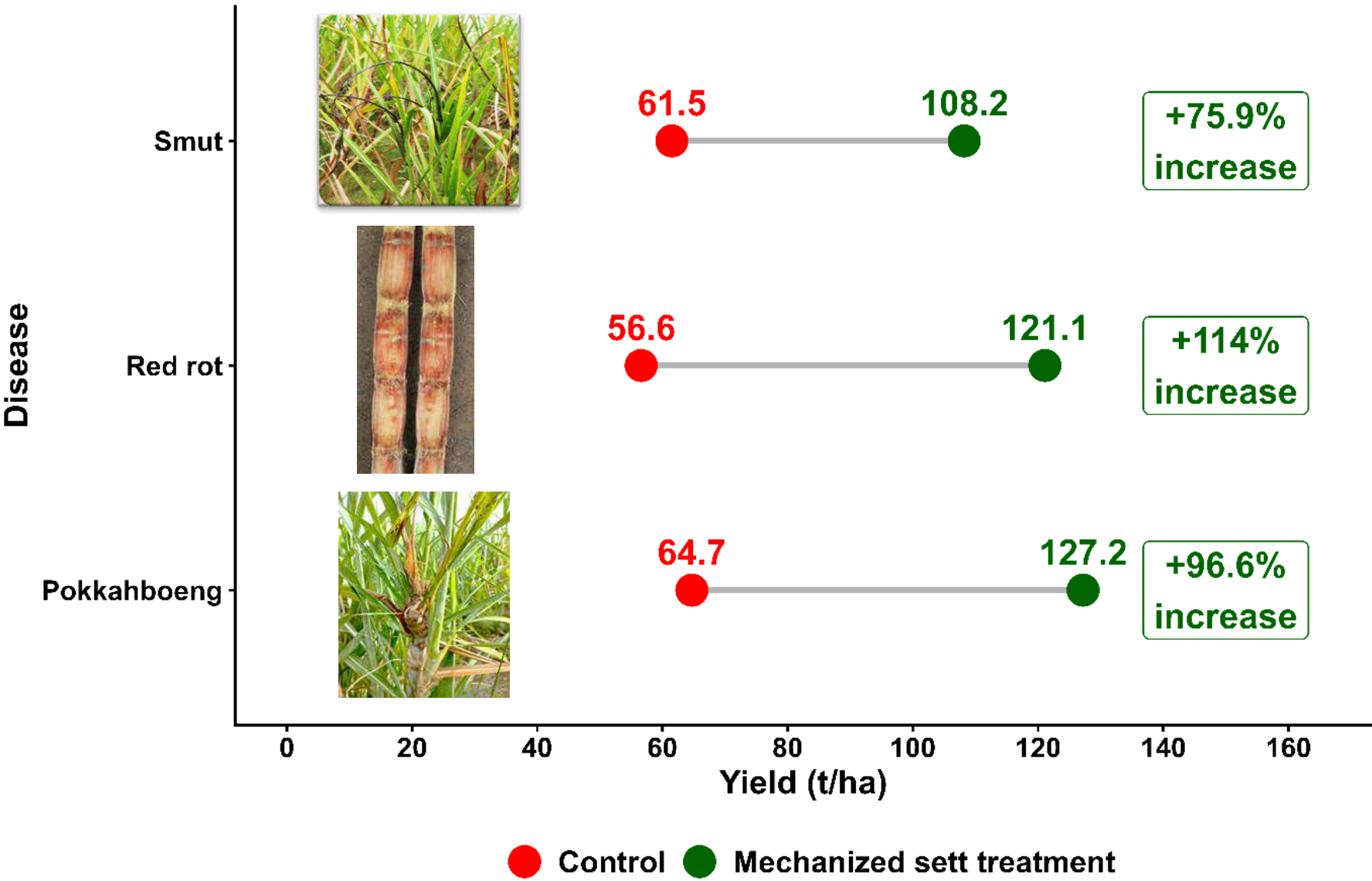
Impact of Mechanized priming of planting material in Tamil Nadu



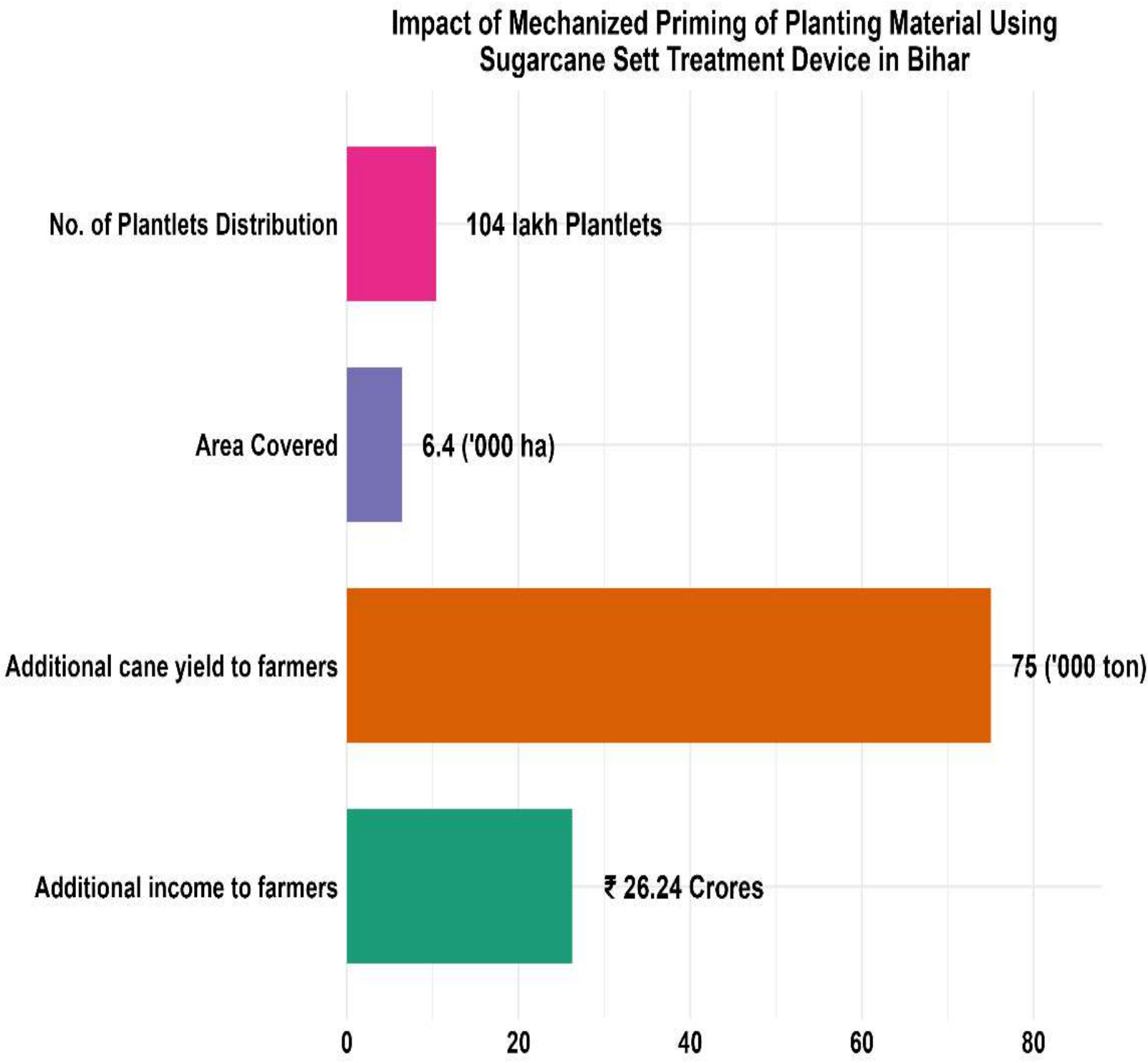
Economic potential/ Impact – Disease management

(i). At Farm level

Impact of Mechanized Priming Technology on Sugarcane Disease Management



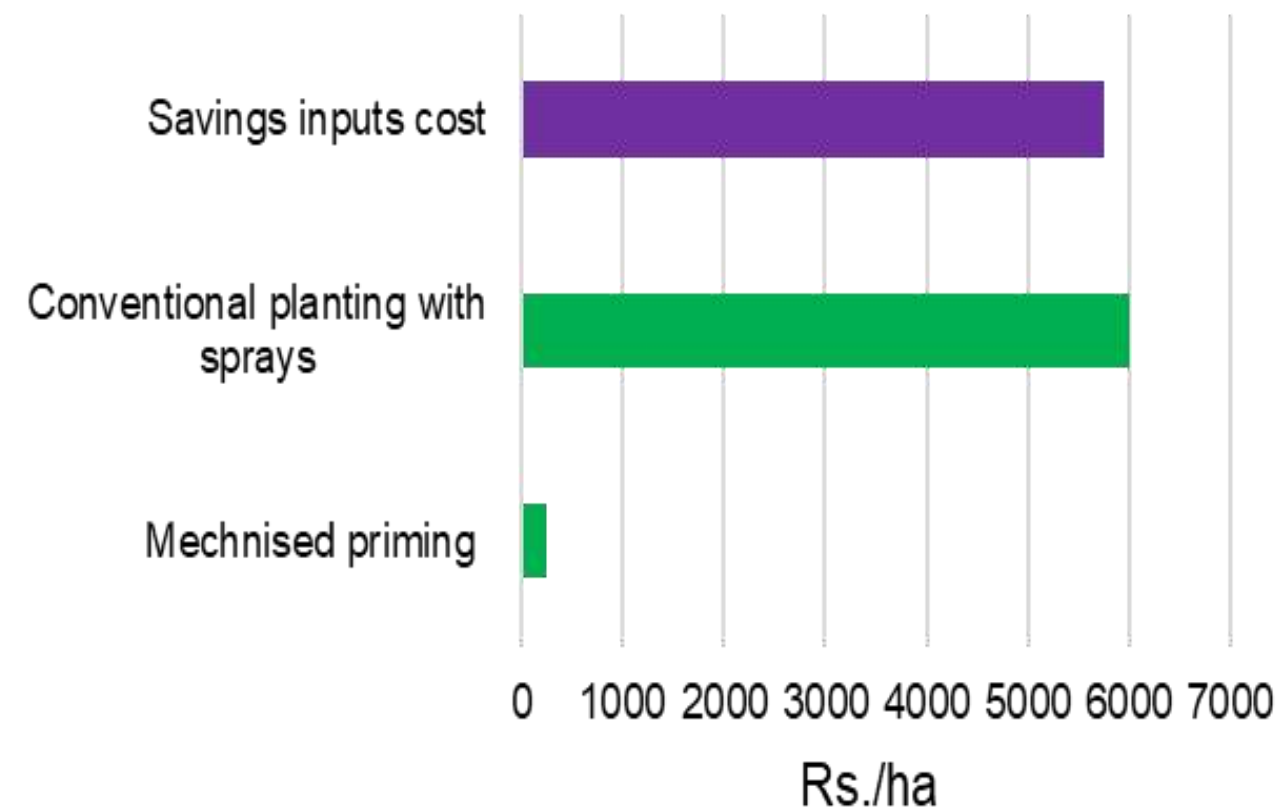
(ii). At Large scale – sustainable cultivation of Co 0238



Social Impact

(i). Reduced input cost

Cost of inputs incurred (nutrients and pesticide)/ha
under sugarcane settling planting



(ii). Promotes Organic/ Natural farming:



Liquid bioformulations for mechanized sett treatment

(iii) Entrepreneurship



Entrepreneurship for Youth – Men and Women

Mechanized priming Technology – Women Friendly



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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

Mechanized Priming in Sugarcane Sett Treatment Device enables Smart delivery of Agro inputs



- Developed against conventional overnight soaking for the management of fungal diseases.
- Rapid: 15 – 30 min.
- Economical, ecofriendly and practically feasible.
- Amenable for large scale application.
- Protects sugarcane setts from biotic and abiotic stress.
- Protects from fungal diseases viz., red rot, smut, wilt and pokkah boeng, early season pests and nutrient deficiency.

Integrated management of red rot in sugarcane

Mechanized sett treatment with fungicides offers a quick, cost-effective, and efficient method to eliminate sett-borne infections and protect setts from soil-borne red rot.

Ensures sustain elite varieties affected by red rot and prevents yield losses in both plant and ratoon crops.



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

MECHANIZED PRIMING TECHNOLOGY ICAR-SUGARCANE BREEDING INSTITUTE INNOVATION



The Device (STD)

Sugarcane Sett Treatment Device (STD) primes planting material by combining hot water dip, chemical & bio-agent delivery in one mechanized unit—ensuring quick, uniform, and effective treatment.

Why it matters ?

Healthy nurseries + Efficient delivery of inputs
Controls red rot, smut, wilt & pokkah boeng + Higher yields & productivity

Adoption

500+ units across India | Rapidly expanding in Tamil Nadu, UP & Bihar

Support

40–50% subsidy under Sub-Mission on Agricultural Mechanization | Boosts farmer & rural entrepreneurship

Integrated Disease Management Strategy

Mechanized priming of planting material of Sugarcane

Physical – Hot water

Chemical –
Fungicides, Nutrients

Biological –
Fungal and Bacterial
BCA



Sett Treatment Device (STD)

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
- ❖ Team - Pathology
- ❖ NADP-RKVY
- ❖ NFSM