TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

42nd Millets and Forage Crops Scientists Meet
(31st May 2024)

LEAD CENTRE

Department of Millets &
Department of Forage Crops
Centre for Plant Breeding and Genetics
TNAU, Coimbatore

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore

2024

PROCEEDINGS

42nd Millets and Forage Crops Scientists' Meet

The 42nd Millets and Forage Crops Scientists Meet was held on 31.05.2024 at the Rasi Seeds Hall, TNAU, Coimbatore. The Vice Chancellor, **Dr. V. Geethalakshmi**, offered the opening remarks and highlighted the importance of millets on climate resilience and nutrition. The Vice Chancellor highlighted the importance of 'Tamil Nadu Millet Mission programme' in Agriculture Budget 2023-24 which has been implemented in 25 districts of Tamil Nadu. The scheme is focused to bring new improved varieties and latest technologies to the farmers in 25 millet crops growing districts of Tamil Nadu and also to convert fallow land under millet cultivation and crop diversification in 50,000 acres. Speaking on millets as a climate-resilient crop for the future with low pest incidence, the Vice Chancellor emphasized the challenges in millets cultivation and suggested for increasing the millets productivity by enhancing demand through developing value-added products. The importance of cultivating forage crops in bridging the gap between demand and supply of forage crops was stressed.

Dr. M. Raveendran, Director of Research, in his speech emphasized on biofortification in millet crops, nutrient use efficiency for sustainable production and industrial application of nutri-rich millets. He stressed on the identification of yield gaps and technologies needed for upscaling the millet cultivation in farmers' holdings.

Dr. R. Ravikesavan, Director, CPBG, **Dr. M. K. Kalarani**, Director, Crop Management, **Dr. P. Balasubramaniam**, Director, NRM and **Dr. M. Shanthi**, Director, CPPS presented the research highlights, action taken on previous Millets and Forage Crops Scientists Meet, recommendations and Action Plan for the year 2024-25 for their respective directorates involved in millets and forage crops research.

The proceedings of the 42nd Crop Scientists' Meet on Millets and Forage Crops are furnished under the following headings:

I. CROP IMPROVEMENT
A. Entries for variety release/OFT/ART/MLT
B. Action Plan Projects
C. Research Projects and remarks

II. CROP MANAGEMENT
A. Technologies for adoption/OFT
B. Action Plan Projects
C. Research Projects and remarks

III. CROP PROTECTION
A. Technologies for adoption/OFT/Information
B. Action Plan Projects
C. Research Projects and remarks

IV. REMARKS

V. LIST OF PARTICIPANTS

I. CROP IMPROVEMENT

MILLETS

A. Entries identified for variety release/ART/OFT/MLT

A1. Varieties / Hybrids identified for State Release:

1. Maize

Culture	Duration (days)	Grain yield (kg/ha)	Yield inc. over check (%)	Special features
CMH 15-005	105-110	6540	11.3 % over CO6 (5870 kg/ha)	Drought tolerant and suited for rainfed condition. Orange yellow semi-dent kernels. Moderately resistant to Charcoal Rot

A2. Varieties / Hybrids identified for Central Release: (National forage maize trial)

1. Maize – Forage

Culture	Duration (days)	Green forage yield (q/ha)	Yield inc. over check (%)	Special features
CMH 12-686	100-110	386.5	11.4 % over COH(M) 8 (347.0 q/ha)	The hybrid ranked first under All India Trials and recorded superior forage quality traits of 43.2% ADF, 64.2% NDF and 57.4% IVDMD It recorded Drymatter yield of 88.4 q/ha with 11.6% superiority over the check COH(M) 8 (79.2 q/ha), and with crude protein content of 8.3% with 2.5% increase over COH(M) 8 (8.1%)

A3. Adaptive Research Trials (Rainfed)

1. Sorghum

S. No.	Culture	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	TNS 695	100-105	2740	• High yielding, yellowish white grains, Resistant to stem borer, and Downy Mildew • 10.5% higher grain yield over CO 32 (2480 kg/ha)

Checks: CO 32, CO 34, K 13

Observations to be recorded: Days to 50 % flowering, plant height, grain yield, straw yield, pest and disease incidence

2. Maize (Irrigated)

S. No.	Culture	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	CMBH 19011	105-110	69 80	Beta carotene introgressed CO 6 maize hybrid with β-Carotene content of 9.60 (µg/g), which is 10 times higher over CO6 Grain yield is on par with CO 6 (6970 kg/ha)

Checks: CO 6, COH(M) 11, S6668, Advanta PAC 751 elite

Observations to be recorded: 50 % tasseling, 50% silking, grain yield (kg/ha), shelling percentage

3. Maize (Rainfed)

S. No.	Culture	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	CMH 15-005 (R)	105-110	6540	Drought tolerant, Orange yellow semi dent kernels 11.3% increased grain yield over CO 6 (5870 kg/ha) Moderate resistance to Charcol Rot.
2.	VAH 20001	95-100	6030	Suitable for rainfed conditions yellowish orange semi-dent kernels; 9.6% higher grain yield over CO 6 (5498 kg/ha) Moderately Resistant to TLB

Checks: CO 6, COH(M) 11, S6668, Advanta PAC 751 elite

Observations to be recorded: 50 % tasseling, 50 % silking, grain yield (kg/ha), shelling percentage

4. Panivaragu

S. No.	Culture	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	TN*Pm* 247 (R)	65-70	211 5	Large panicle, bold grains (18.2% higher grain yield over ATL 1 (2500 kg/ha)

Checks: ATL 1, ATL2

Observations to be recorded: Days to maturity, grain yield kg/ha, straw yield (kg/ha) and pests anddisease score if any.

5. Samai

S. No.	Culture	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	TNP*su* 223 (R)	85	1525	Open panicle, Bold and grey grain, Tolerant to shoot-fly; Drought tolerant (6.2% higher grain yield over ATL 1 (1620 kg/ha)
2.	TNP*su* 224 (R)	90	1540	Semi-compact panicle, yellow grains, (7.3% higher grain yield over ATL 1 (1650 kg/ha)

Check: ATL 1
Observations to be recorded: Days to maturity, grain yield (kg/ha), straw yield (kg/ha) and pestsand disease score if any.

Distribution of ART 2024-25			
1. Sorghum			
Season	***Kharif* (Jun-Jul)**	***Rabi* (Sep-Oct)**	***Summer* (Feb-March)**
Districts	18 districts, 36 locations Villupuram, Vellore, Tiruvallur, Thiruvannamalai, Cuddalore, Dharmapuri, Krishnagiri, Salem, Namakkal, Coimbatore, Tiruppur, Erode, Trichy, Perambalur, Karur, Madurai, Dindigul, Virudhunagar	7 districts, 14 locations Madurai, Dindigul, Ramnad, Virudhunagar, Sivagangai, Thoothukudi, Tirunelveli	14 districts, 28 locations Dharmapuri, Krishnagiri, Salem, Namakkal, Coimbatore, Tiruppur, Trichy, Perambalur, Karur, Pudukkottai, Madurai, Theni, Dindigul,Virudhunagar
KVK	6 KVKs, 12 trials, 2 trials/KVK Cuddalore, Trichy, Vellore, Villupuram, Salem, Madurai	8 KVKs, 16 trials, 2 trials/KVK Pudukottai, Cuddalore, Virudhunagar, Trichy, Vellore, Villupuram, Madurai	9 KVKs, 18 trials, 2 trials/KVK Pudukottai, Cuddalore, Trichy, Vellore, Tiruvallur, Villupuram, Salem, Madurai, Dharmapuri

2. Maize			
Season	**Kharif (Irrigated) (June-July)**	**Rainfed (Sep-Oct)**	**Late Rabi (Irrigated) (Dec-Jan)**
Districts	12 Districts (5 locations each) Coimbatore, Tiruppur, Salem, Namakkal, Erode, Perambalur, Theni, Dharmapuri, Krishnagiri, Karur, Cuddalore, Villupuram	5 districts (5 Locations each) Dindigul, Madurai, Thoothukudi, Virudhunagar, Tenkasi	12 Districts (5 locations each) Coimbatore, Tiruppur, Salem, Namakkal, Erode, Perambalur, Theni, Dharmapuri, Krishnagiri, Karur, Cuddalore, Villupuram

3. Small millets	
Panivaragu	
Season	***Kharif***
Districts	(7 districts each with 7 locations) Villupuram, Vellore, Salem, Thiruvanamalai, Namakkal, Dharmapuri, Krishnagiri
Season	***Rabi***
Districts	(5 districts each with 5 locations) Madurai, Theni, Virudhunagar,Thoothukudi, Tirunelveli
Samai	

Season	***Kharif***
Districts	(7 districts each with 7 locations) Villupuram, Vellore, Salem, Thiruvanamalai, Namakkal, Dharmapuri, Krishnagiri
Season	***Rabi***
Districts	(5 districts each with 5 locations) Madurai, Theni, Virudhunagar,Thoothukudi, Tirunelveli

A4. ON FARM TRIALS * Since the hybrid was tested only under rainfed condition, OFTs has been proposed to get adequate data on its performance under rainfed condition.

1. Maize (Rainfed)

S. No.	Culture	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	CMH 15- 005 (R)	105-110	6540	Drought tolerant, Orange yellow semi dent kernels. Moderate resistance to Charcoal Rot and TLB.

Checks: CO 6, COH(M) 11, S6668, Advanta PAC 751 elite

Observations to be recorded: 50 % tasseling, 50% silking, Grain yield (kg/ha), shelling percentage

Districts: Dindigul, Madurai, Thoothukudi, Virudhunagar, Tenkasi (5 locations each)

A5. MULTI LOCATION TRIALS

1. Sorghum

Design: RBD	No. of replication: Four
Plot size: 4.0 × 3.0 m^2	Seed quantity: 100 g/entry/location
Spacing: 45 × 15 cm	Season: *Kharif*, *Rabi*, Summer

Salient Features

Culture	Duration(days)	Yield (kg/ha)	Special traits
TNS 709	105-110	3505	Moderate Resistance to stem borer, midge and downy mildew
TNS 714	105-110	3440	Moderate Resistance to stem borer, midge and downy mildew

Checks: CO 32, CO 34, K 13

Kharif (4)	(June – July)	Coimbatore, Paiyur, Bhavanisagar, Athiyanthal
Rabi (5)	(Sept-Oct)	Kovilpatti, Yethapur, Aruppukkottai, Paiyur, Vaigaidam
Summer (3)	(Jan – Feb)	Coimbatore, Bhavanisagar and Vaigaidam
Fertilizer dose		90:45:45 NPK kg/ha

Observations to be recorded: Days to 50 % flowering, Days to maturity, grain yield kg/ha, strawyield kg/ha and pests and disease score if any

2. Forage Sorghum

Design: RBD	No. of replication: 4
Plot size: 4.0 × 3.0 m^2	Seed quantity: 100 g/entry/location
Spacing: 45 × 15 cm	Season: *Kharif*, *Rabi*, Summer

Salient Features

Culture	Duration (days)	Fodder yield (t/ha)	Special traits
TNFS 239 (R)	65-70	34.0	Tall plant with thin stem suitable for single cut

TNFS 259	65-70	37.0	High green fodder yield, tall plant type,Suitable for single cut
TNFS 261	65-70	38.0	More foliage with high biomass yield, Suitable for single cut

Checks: K 11 and CSV 35F		
Kharif (4)	(June – July)	Coimbatore, Bhavanisagar, Paiyur, Virinjipuram
Rabi (3)	(Sept-Oct)	Vaigaidam, Melalathur, Athiyanthal, Kovilpatti
Summer (2)	(Jan – Feb)	Coimbatore, Bhavanisagar
Fertilizer dose		80:40:40 NPK kg/ha
Observations to be recorded: Days to 50% flowering, Plant height, green fodder yield.		

3. Forage Sorghum with BMR * Though fodder yield is low, but with low lignin content for high fodder digestibility

Design: RBD	No. of replication: 4
Plot size: 4.0 × 3.0 m^2	Seed quantity: 100 g/entry/location
Spacing: 45 × 15 cm	Season: *Kharif*, *Rabi*, Summer

Salient Features

Culture	Duration (days)	Fodder yield (t/ha)	Special traits
TNFS 257	65-70	31.5	Suitable for single cut with BMR trait with high fodder digestibility
TNFS 258	65-70	32.0	Suitable for single cut with BMR trait with high fooder digestibility

Check: CSV 43 BMR		
Kharif (4)	(June – July)	Coimbatore, Bhavanisagar, Paiyur, Virinjipuram
Rabi (3)	(Sept-Oct)	Vaigaidam, Melalathur, Athiyanthal
Summer (2)	(Jan – Feb)	Coimbatore, Bhavanisagar
Fertilizer dose		80:40:40 NPK kg/ha
Observations to be recorded: Days to 50% flowering, Plant height, Green fodder yield		

4. Pearl Millet

Design: RBD	No. of replication: 4
Plot size: 4.0 × 3.0 m2	Seed quantity: 100 g/entry/location
Spacing: 50 × 15 cm	Season: *Kharif*, *Rabi* and Summer
Fertilizer schedule: 80: 40:40 NPK Kg/ha	

Salient Features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNBH 2118	85-90	4030	High grain yield, Compact earhead, DM resistance

Checks: Pearl millet Hybrid CO 10, 86M38, Ankur 045

Observations to be recorded: Days to 50 % flowering, Days to maturity, seed set per cent, grainyield (kg/ha), straw yield (kg/ha), pests and disease score if any.

Seasons

Pearl millet MLT I	*Kharif* (June – July) (7)	Coimbatore, Paiyur, Yethapur, Bhavanisagar, Vridhachalam, Tindivanam and Athiyanthal
Pearl millet MLT II	*Rabi* (Sep- Oct) (5)	Kovilpatti, Aruppukkottai, Paiyur Vaigaidam and Pudukottai
Pearl millet MLT III	*Summer* (February-March) (6)	Coimbatore, Pattukkottai, Paiyur, Bhavanisagar,Vridhachalam and Vaigaidam

5. Maize (Irrigated)

Design: RBD	No. of replication: 3

Plot size: 4.0 × 3.6 m^2	Seed quantity: 200 g/entry/location
Spacing: 60 × 25 cm	Season: *kharif, rabi* (irrigated)

Slient Features

Hybrids	Duration (days)	Yield (kg/ha)	Special traits
CMH 19015	100 - 105	9460	Medium maturity, Orange yellow semi dent kernels; Resistant to Charcol Rot
CMH 21028	105 - 110	9625	Late maturity, Orange yellow semi dent kernels; Resistant to Charcol Rot
CMBH 19011(R)	105 - 110	9055	High beta carotene maize hybrid, β-Carotene content 9.60 (µg/g), 10 times higher β Carotene over CO6

Checks	CO6, COH(M) 11, S6668, Advanta PAC 751 elite

Seasons

Maize MLT	*Kharif* (June – July) (7)	Coimbatore, Vagarai, Paiyur, Bhavanisagar, Athiyanthal, Vaigaidam, Virinjipuram
Maize MLT	*Rabi* (Dec – Jan) (6)	Coimbatore, Vagarai, Paiyur, Bhavanisagar, Vaigaidam, Virinjipuram

Fertilizer schedule: 250: 75:75 NPK Kg/ha

Observations to be recorded: Days to 50 % tasseling, Days to 50 % silking, Plant height (cm), Grainyield (kg/ha), pests and disease score if any

6. Maize (Rainfed)

Design: RBD	No. of replication: 4
Plot size: 4.0 × 3.6 m^2	Seed quantity: 200 g/entry/location
Spacing: 60 × 25 cm	Season: *Rabi* (Rainfed)

Salient features

Hybrids	Duration (days)	Yield (kg/ha)	Special traits
VAH 21007	100-105	7245	Suitable for rainfed conditions, Moderately Resistant to TLB Yellowish orange semi-dent kernels

Checks: CO 6, COH(M) 11, S6668, Advanta PAC 751 elite, VGIH(M) 2

Seasons

Maize MLT	Rabi (Sept-Oct) (5)	Aruppukottai, Kovilpatti, Yethapur, Veppanthattai, Vagarai

Fertilizer schedule: 250:75:75 NPK Kg/ha

Observations to be recorded: Days to 50 % tasseling, Days to 50 % silking, Plant height (cm), Grain yield (kg/ha), pests and disease score if any

7. Sweet corn

Design: RBD	No. of replication: 4
Plot size: 4 × 3.6 m^2	Seed quantity: 200 g/entry/location
Spacing: 60 × 25 cm	Season: *Rabi* (Rainfed)

Salient features

Hybrids	Duration (days)	CobYield (kg/ha)	Special traits
CSCH 18006 (R)	75	14315	10.2 % yield increase over Misthi
CSCH 20025	75	14692	10.6 % yield increase over Misthi
CSBH 23004	75	13200	Biofortified sweet corn hybrid – 16 µg/g Beta carotene

Checks: Misthi, Sugar 75

Seasons		
Kharif	Irrigated (June – July) (7)	Coimbatore, Vagarai, Paiyur, Bhavanisagar, Athiyanthal,Vaigaidam, Virinjipuram

Fertilizer schedule: 250:75:75 NPK Kg/ha

Observations to be recorded: Days to 50 % tasseling, Days to 50 % silking, Plant height (cm),Green cob yield (kg/ha), pests and disease score if any

Small Millets MLT

8. Ragi

Design: RBD	No. of replications: 4
No. of rows: 6 rows	Seed quantity: 100 g/entry/location
Spacing: 22.5 × 10 cm	Season: *Kharif & Rabi*

Salient features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNEc 1349	120-125	3310	Compact earhead, bold grains, blast tolerant

Check: ATL 1, PYR 2, GPU 66

Fertilizer schedule: 60:30:30 kg of NPK /ha

Centres:

Kharif (June-July): Coimbatore, Paiyur, Bhavanisagar, Athiyandal, Yethapur, Virinjipuram, Tindivanam

Rabi (Sep-Oct): Vaigaidam, Aruppukottai, Kovilpatti, Chettinadu

9. Varagu

Design: RBD	No. of replication: 4
No. of rows: 6 rows	Seed quantity: 100 g/entry/location
Spacing: 22.5 × 10 cm	Season: *Kharif & Rabi*

Salient features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNPsc 324	115-120	2815	Uniform maturity and non-lodging, purple shade at the base of the culm, Erect plant and flag leaf, Open panicle

Check: ATL 1, ATL 2

Fertilizer schedule: 44:22:00 kg of NPK /ha

Centres:

Kharif (June-July): Coimbatore, Paiyur, Bhavanisagar, Athiyandal, Vridhachalam, Virinjipuram, Tindivanam

Rabi (Sep-Oct): Madurai, Vaigaidam, Aruppukottai, Kovilpatti, Chettinadu

10. Kudiraivali

Design: RBD	No. of replication: 4
No. of rows: 6 rows	Seed quantity: 100 g/entry/location
Spacing: 22.5 × 10 cm	Season: *Kharif & Rabi*

Salient features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNEf 326	80-85	2410	Resistant to shoot fly and stem borer Drought tolerant, non lodging, Sturdy culm, Suitable for mechanical harvesting

Check: MDU 1, ATL1

Fertilizer schedule: 44:22:00 kg of NPK /ha

Centres:

Kharif (June-July): Coimbatore, Paiyur, Bhavanisagar, Athiyandal, Vridhachalam, Virinjipuram, Tindivanam

Rabi (Sep-Oct): Madurai, Vaigaidam, Aruppukottai, Kovilpatti, Chettinadu

11. Samai

Design: RBD	No. of replication: 4
No. of rows: 6 rows	Seed quantity: 100 g/entry/location
Spacing: 22.5 × 10 cm	Season: *Kharif & Rabi*

Salient features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNPsu 245	82-85	1710	Semi-compact panicle, High bulk density

Check: ATL 1

Fertilizer schedule: 44:22:00 kg of NPK /ha

Centres:

Kharif (June-July): Coimbatore, Paiyur, Bhavanisagar, Athiyandal, Vridhachalam, Virinjipuram, Tindivanam

Rabi (Sep-Oct): Madurai, Vaigaidam, Aruppukottai, Kovilpatti, Chettinadu

12. Tenai

Design: RBD	No. of replication: 4
No. of rows: 6 rows	Seed quantity: 100 g/entry/location
Spacing: 22.5 × 10 cm	Season: *Kharif & Rabi*

Salient features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNSi 396	80-85	2350	More tillers. Drought tolerance, Dense panicle, non lodging

Checks: ATL 1, ATL 2

Fertilizer schedule: 44:22:00 kg of NPK /ha

Centres:

Kharif (June-July): Coimbatore, Paiyur, Bhavanisagar, Athiyandal, Vridhachalam, Virinjipuram, Tindivanam

Rabi (Sep-Oct): Madurai, Vaigaidam, Aruppukottai, Kovilpatti, Chettinadu

13. Panivaragu

Design: RBD	No. of replication: 4
No. of rows: 6 rows	Seed quantity: 100 g/entry/location
Spacing: 22.5 × 10 cm	Season: *Kharif & Rabi*

Salient features

Culture	Duration (days)	Yield (kg/ha)	Special traits
TNPm 294	62-65	2077	Semi compact panicle, Tolerant to Shoot fly, Input responsive

Checks: ATL 1, ATL2

Fertilizer schedule: 44: 22:00 kg of NPK /ha

Centres:

Kharif (June-July): Coimbatore, Paiyur, Bhavanisagar, Athiyandal, Vridhachalam, Virinjipuram, Tindivanam

Rabi (Sep-Oct): Madurai, Vaigaidam, Aruppukottai, Kovilpatti, Chettinadu

Monitoring team to visit Millet crops MLT (2024-25)	
Monitoring team	**Stations to be visited**
Dr. D. Kavithamani Dr. N. Kumari Vinodhana Dr. T. Srininvasan Dr.V. Paranidharan	Bhavanisagar, Vagarai
Dr. B. Meenakumari Dr. A. Sudha Dr. S. Lakshmi Narayanan	Kovilpatti, Aruppukkottai,
Dr. S. Sivakumar Dr.V. Paranidharan Dr. S. Lakshmi Narayanan	Vaigaidam, Chettinadu
Dr. K. R. V. Sathyasheela Dr. D. Shoba Dr. P. Suthamathi	Coimbatore, Madurai, Pudukottai
Dr. M. Vaithiyalingan Dr. P. Suthamathi Dr. P. T. Sharavanan	Paiyur, Virinjipuram, Tindivanam
Dr. K. Iyanar Dr. T. Srininvasan Dr. I. Johnson	Athiyanthal, Vridhachalam
Dr. S. Sivakumar Dr.V. Paranidharan Dr. T. Srininvasan	Yethapur, Veppanthattai

FORAGE CROPS

I. Entries identified for variety release/ART/OFT/MLT (2024-2025)

I.1. Cultures identified for OFT

Entry	Parentage	Duration	GFY (t/ha/yr)	Yield increase over check	Special features
TNCN 1534	IP 20379 x FD 434	Perennial	390.60	16.1 % over CO (BN) 5 11.5% over CO 6	High biomass, More leaf stem ratio

I.2. Cultures identified for MLT

a. Cumbu Napier hybrid grass MLT

Design: RBD	No. of replications: 3
Plot size: 4 m × 3 m	No. of cuttings/plot: 40 cuttings/entry/location
Spacing: 60 cm × 50 cm	Season: *kharif* 2024
Fertilizer: 150:50:40 kg/ha	

Entry	Parentage	Duration (days)	GFY (t/ha)	Special features
TNCN 2301	GP 16021 x FD 434	Perennial	385.42	High Biomass; more leaf stem ratio Crude Protein - 12.5%
TNCN 2313	GP 15073 x FD 482	Perennial	380.92	High Biomass; more leaf

				stem ratio Crude Protein - 12.3%
TNCN 2117 (R)	CO 8 x FD 453/1	Perennial	364.14	High biomass, Crude protein content - 13.5%
Check hybrids: CO (BN) 5 and CO 6				
Observations to be recorded: Green fodder yield per plot				
2024-25: Coimbatore, Bhavanisagar, Vagarai, Melalathur, Paiyur				

b. Fodder Maize MLT

Design: RBD	No. of replications: 3
Plot size: 4 m× 3 m	Seed quantity: 250 g/entry/location
Spacing: 30 × 15 cm	Season: *kharif* 2024
Fertilizer: 80:40:0 kg/ha (40 kg N basal + 40 kg N after 30 days)	

Entry	Parentage	Duration (days)	GFY (t/ha)	Special features
TNFM 2315	UMI 1210 x N66	60-65	60.8	High green fodder yield; crude protein - 14.3%
TNFM 2335	UMI 1200B x DM12-1/2	60-65	57.6	High green fodder yield; crude protein - 14.5%
TNFMH 2125 (R)	UMI1201 x N 66	60-65	62.0	High green fodder yield; Crude protein - 14.5%
Check hybrids: COH(M) 8 and African Tall				
Observations to be recorded: Green fodder yield per plot				
2024-25: Coimbatore, Bhavanisagar, Vagarai, Melalathur, Veppanthattai, Paiyur				

b. Fodder Cumbu MLT

Design: RBD	No. of replications: 5
Plot size: 4 m × 3 m	Seed quantity: 100 g/entry/location
Spacing: 30 × 15 cm	Season: *kharif* 2024
Fertilizer: 40:20:0 kg/ha	

Entry	Parentage	Duration (days)	GFY (t/ha)	Special features
TNFCU 2305	PT 4685 X GP18219	55-60	43.7	High green fodder yield; crude protein - 11.8%
TNFCU 2306	CO 8 x GP16026-2	55-60	42.3	High green fodder yield; crude protein - 11.5%
Check hybrids: CO 8				
Observations to be recorded: Green fodder yield per plot				
2024-25: Coimbatore, Bhavanisagar, Vagarai, Melalathur, Veppanthattai, Paiyur				

d. Fodder Cowpea MLT

Design: RBD	No. of replications: 4
Plot size: 4 m × 3 m	Seed quantity: 250 g/entry/location
Spacing: 30 × 15 cm	Season: *kharif* 2024
Fertilizer: 20: 40: 20 kg/ha	

Entry	Parentage	Duration (days)	GFY (t/ha)	Special features
TNFC 1905 (R)	UPC 953 × CO 9	55-60	35.00	High Green Fodder Yield Crude protein -19.5 %
TNFC 1910 (R)	CL 350 x CO 9	55-60	33.50	High Green Fodder Yield Crude protein – 19.8 %
Check hybrids: CO 9 and TNFC 0926				
Observations to be recorded: Green fodder yield per plot				
2024-25: Coimbatore, Bhavanisagar, Vamban, Melalathur, Paiyur, Killikulam				

Monitoring team to visit Cumbu Napier hybrid grass OFT/MLT 2024-25

Team	Stations to be visited
Dr. R. Pushpam Dr. T. Ezhilarasi	Coimbatore, Bhavanisagar, Vagarai, Melalathur, Veppanthattai, Paiyur, Vamban, Killikulam,

Time of visit

Season	Month of monitoring team visit
Kharif 2024	Appropriate stage may be fixed in discussion with the scientist in-charge of conducting MLT. Monitoring team can inspect the crop just before cutting to assess the superiority of the genotypes in MLT.

B. ACTION PLAN

1. ACTION PLAN- 2024-25

1.1 Millets

S. No.	Details of action plan	Work plan for 2024-2025	Centre	Scientists
1	**Theme 1: Germplasm characterization in Millets**			
	DUS characterization of **Sorghum** accessions	Characterization of 100 Sorghum accessions	Coimbatore	Dr. D. Kavithamani Asst. Prof. (PBG)
		Characterization of 100 Sorghum accessions	Kovilpatti	Dr. S. Shantha Assoc. Prof. (PBG)
	DUS characterization of **Maize** accessions	Characterization of 100 Maize accessions	Coimbatore	Dr. N. KumariVinodhana Asst. Prof. (PBG)
		Characterization of 100 Maize accessions	Vagarai	Dr. K.R.V. Sathyasheela Asst. Prof. (PBG)
2	**Theme 2: Development of biofortified Pearl millet hybrids for high Fe and Zn**			
	Theme Leader: Dr. K. Iyanar, Professor (PBG), Department of Millets, Coimbatore			
	• Synthesis of new crosses with identified donors • Assesssing the potential of the new hybrids		Coimbatore	Dr. K. Iyanar Professor (PBG),
3	**Theme 3: Introgression of *crtRB1*/lcyE alleles using marker-aided selection into the elite inbreds of maize**			
	Theme Leader: Dr. S. Sivakumar, Professor and Head, Department of Millets, Coimbatore			
	• Seed multiplication and testing the performance of the beta carotene introgressed inbred UMI 1201 β+ in Multilocation. • Evaluation of BC_2F_2 population (UMI 1205 x UMI 1200 β+/UMI 1230 β+) and carrying out marker assisted selection for the presence of *crtRB1*/lcyE alleles		Coimbatore	Dr. R. Ravikesavan, Director (CPBG) Dr.N. Kumari Vinodhana Asst. Professor (PBG) Dr. N. Senthil Director (CPMB&B)
4	**Theme 4: Development of FAW tolerant/resistant maize hybrids**			
	Theme Leader: Dr. S. Sivakumar, Professor and Head, Department of Millets, Coimbatore			
	• Screening of promising maize hybrids and inbreds for FAW resistance • Evaluation of new crosses developed from resistant inbreds/donors (wild sps. *Z. parviglumis, Z. luxurians and Z. mexicana* obtained from CIMMYT,		Coimbatore Vagarai	Dr. N. Kumari Vinodhana Asst. Professor (PBG) Dr.T. Srinivasan,

	Hyderabad) • Development of back crosses with elite inbreds/donors (wild sps)		Assoc. Professor (Ento) Dr. K.R.V. Sathyasheela, Asst. Professor (PBG)
5.	**Theme 5: Development of maize hybrids suitable for high density planting**		
	Theme leader: Dr. S. Sivakumar, Prof & Head, Dept of Millets, TNAU, Coimbatore		
	• Effecting crosses among the selected compact maize inbred lines (with leaf angle of 11° - 30°) • Evaluation of new crosses under spacing of 45 x 20cm by comparing with control (60 x 25 cm) for high density planting	Coimbatore Vagarai	Dr.N. Kumari Vinodhana Asst. Prof. (PBG) Dr.P. Kathirvelan Assoc. Prof. (Agron.) Dr.K.R.V. Sathya sheela Asst. Prof. (PBG) Dr. T. Selvakumar Assoc. Prof. & Head
6	**Theme 6: Development of extra early varieties in finger millet**		
	Theme leader: Dr. M. Vaidhiyalingan, Professor & Head (PBG), CEM, Athiyandal		
	• Seed multiplication of the promising lines • Evaluation of earliness at different locations	Athiyandal	Dr. M. Vaidhiyalingan, Professor & Head (PBG),

I. 2. Forage Crops - Action Plan

Action Plan 2022 -25

Theme Leader: Dr. R. Pushpam, Prof & Head, Dept of Forage crops				
S. No.	**Details of action Plan**	**Work Plan for 2024-25**	**Centre**	**Scientists**
1.	Development of high biomass yielding genotypes of forage maize	i Preliminary evaluation trial for the superior performing single cross fodder maize hybrids. ii Multiplication of elite inbreds for large scale multiplication of superior single cross fodder maize hybrids	Dept. of Forage Crops	Dr. T. Ezhilarasi Dept. of Forage Crops

Action Plan 2023 -26

Theme Leader: Dr. R. Pushpam, Prof & Head, Dept of Forage crops				
S. No.	**Details of action Plan**	**Work Plan for 2024-25**	**Centre**	**Scientists**
1.	Development of superior lucerne varieties through polycross breeding	i Out of selected promising progenies, the best 20-25 progenies will be identified on the basis of one year data on green fodder yield and dry matter yield and pest / disease resistance. ii From selected progenies, most promising individual plants (40-50) will be identified, tagged and numbered.	Dept. of Forage Crops	Dr. T. Ezhilarasi Dept. of Forage Crops

2.1. Activities for New Action Plan 2024 – 2027 (Millets)

New Action Plan 1

Theme	**Development of high yielding red sorghum varieties with major pest and disease resistance**		
Theme leader	Dr. B. Meenakumari, Professor (PBG), Dept of Millets, TNAU, Coimbatore		
Theme members	**2024-25**	**2025-26**	**2026-27**
Dept. of Millets, Coimbatore Dr. D. Kavithamani Assistant Professor (PBG) **AC&RI, Madurai** Dr. S. Lakshmi Narayanan Professor (PBG)	• Raising and Evaluation of segregating population (F_3 & F_4) • Selection of desirable progenies with resistance to major pest and disease	• Raising and Evaluation of segregating population (F_5 & F_6) • Selection of stabilized progenies with resistance to major pest and disease	• Identification of high yielding red sorghum lines • Nomination to state/national trials

C. Research Projects on Millets and Forage crops

A total number of 51 projects including URPs, AICRP and Externally funded projects of Millets and Forage crops, Seed science & technology and CPMB handled by 37 scientists were reviewed by the respective Directors of CPBG, CPMB&B and SST. The abstract of the projects reviewed is furnished below:

Crops	Centres	URP	AICRP	EFP	Others	Total	Scientists
Sorghum	Coimbatore	4	1	-	-	5	3
	Kovilpatti	3	-	-	-	3	1
	Madurai	1	-	-	-	1	1
	Virinjipuram	1	-	-	-	1	1
	Sub total	**9**	**1**	**-**	**-**	**10**	**6**
Pearl millet	Coimbatore	**2**	**1**	**-**	**-**	**3**	**1**
Maize	Coimbatore	3	1	-	-	4	2
	Vagarai	2	1	-	-	3	1
	Sub total	**5**	**2**	**-**	**-**	**7**	**3**
Small millets	Athiyandal	2	1	-	3	6	1
	CBE	-	-	1	-	1	6
	Paiyur	2	-	-	-	2	2
	Madurai	1	-	-	-	1	1
	Trichy	1	-	-	-	1	1
	Sub total	**6**	**1**	**1**	**3**	**11**	**11**
PGR	Coimbatore	**2**	**-**	**-**	**-**	**2**	**2**
SST	Coimbatore	**4**	**-**	**-**	**-**	**4**	**6**
CPMB&B	Coimbatore	**4**	**-**	**2**	**-**	**6**	**5**
Forage Crops	Dept. of Forage Crops, TNAU	4	1	2	-	**7**	**2**
	Dept. of Genetics & Plant Breeding	1	-	-	-	**1**	**1**
	Total	**5**	**1**	**2**	**-**	**8**	**3**
Grand total		**37**	**6**	**5**	**3**	**51**	**37**

URP: University Research Project, AICRP: ICAR funded AICRP projects,
EFP: Externally funded projects

D. Remarks of the Ongoing URPs/ AICRPs/Externally Funded Projects in Crop Improvement

I. University Research Projects

Project No and Title	Period	Investigators	Remarks
Sorghum			
CPBG/CBE/PBG/SOR/2020/001: Evolution of red sorghum varieties suited for Tamil Nadu	September 2020 to August 2025	Dr. R. Chandirakala Professor (PBG)	Promising entries may be evaluated in yield trials. New red sorghum collections may be included as parents in crossing programme.
CPBG/CBE/PBG/SOR/2023/272- Development of high yielding dual purpose sorghum varieties with resistance / tolerance to major pests and diseases	October 2023 to September 2028	Dr. B. Meena Kumari Professor (PBG)	Promising entries may be screened for major pest and diseases
CPBG/CBE/PBG/MILLETS & FORAGES/ 2023/264: Development of high yielding fodder sorghum varieties with improved fodder quality traits	October 2023 to September 2026	Dr. D. Kavithamani Asst. Professor (PBG)	The promising forage sorghum lines may be evaluated under yield trials
CPBG/CBE/PBG/MILLETS & FORAGES/ 2023/ 265: Germplasm collection, characterization, maintenance and breeder seed production in sorghum	October 2023 to September 2026	Dr. D. Kavithamani Asst. Professor (PBG)	Genotypes with economically important traits shall be identified and used in the crop improvement programme.
CPBG/KPT/PBG/SOR/2020/003 Evolution of high yielding, drought tolerant sorghum varieties suitable for rainfed condition in southern districts of Tamilnadu.	October 2020 to September 2025	Dr. S. Santha Professor (PBG)	The promising entries may be screened for drought tolerance and evaluated under yield trials
CPBG/KPT /MIL / 2022 /001 Evolution of high yielding red sorghum genotypes suitable for rainfed condition of Tamil Nadu.	October 2021 to September 2024	Dr. S. Santha Professor (PBG)	The promising red sorghum lines may be evaluated under yield trials
CPBG/KPT/PBG/SOR/New Nucleus and Breeder Seed Production of Sorghum varieties of Tamil Nadu	October 2023 to September 2026	Dr. S. Santha Professor (PBG)	The allotted indent must be produced without any short fall.
CPBG/MDU/PB/SOR/2019/001	February 2019 to	Dr. S. Lakshmi Narayanan	The project may be closed and new Project may

Evolution of high yielding red sorghum (*Sorghum bicolor*) varieties suitable for industrial utilities	January 2024	Professor (PBG)	be proposed.
CPBG/VRM/MIL/2023/001 Developing high yield with early maturity and photo insensitive version of Thalaivirichan sorghum through induced mutagenesis	December 2021 to November 2024	Dr. A. Gopikrishnan Asst. Professor (PBG)	The promising photo insensitive with early maturity lines may be evaluated under yield trials
Pearl millet			
CPBG/CBE/PBG/SMM/2020/002 Evolution of high yielding hybrids/varieties in pearl millet (*Pennisetum glaucum* (L.) Br. R.)	April 2020 to May 2025	Dr. K. Iyanar Professor (PBG)	Hybrids with different genetic background may studied. Action should be inititated to developed OPV.
CPBG/CBE/PBG/SMM/ 2020/001 Maintenance of genetic purity and production of nucleus seeds of parental lines of hybrids and open pollinated varieties in pearl millet	June 2020 to May 2025	Dr. K. Iyanar Professor (PBG)	Efforts may be taken to maintain the vigour and uniformity of released OPVs/Composites.
Maize			
CPBG/CBE/PBG/MILLETS&FORAGES/2023/269-Development of high yielding speciality corn hybrids suitable for culinary purpose	October 2023 to September 2028	Dr. S. Sivakumar Professor & Head Dr. N. Kumari Vinodhana Asst. Professor (PBG)	High yielding speciality corn hybrids may be developed and nominated for testing under State/National trials
CPBG/CBE/PBG/MILLETS&FORAGES/2023/267-Development of high yielding single cross maize hybrids of different maturity suitable for irrigated ecosystems	October 2023 to September 2026	Dr. N. Kumari Vinodhana Asst. Professor (PBG) Dr. S. Sivakumar Professor & Head	High yielding SCHs in maize may be developed and nominated for testing under State/National trials
CPBG/CBE/PBG/MILLETS&FORAGES/2023/268 Germplasm collection, characterization, maintenance and Breeder seed production in maize	October 2023 to September 2026	Dr. N. Kumari Vinodhana Asst. Professor (PBG) Dr. S. Sivakumar Professor & Head	New maize germplasm may be collected to strengthen the germplasm pool and utilized in breeding programme. Nucleus/breeder seed production may be programmed as per the indents communicated by the DCPBG.
CPBG/VGI/PBG/MAZ/2020/002 Development of high yielding single cross maize hybrids suitable for rainfed ecosystems	April 2020 to March 2025	Dr. K.R.V. Sathya Sheela Asst. Professor (PBG)	The promising advanced maize hybrids may be nominated for testing under State/National trials

CPBG/VGR /PBG/ MILLETS & FORAGES /2023/273 Collection, Characterization and maintenance of maize germplasm	September 2023 to August 2026	Dr. K.R.V. Sathya Sheela Asst. Professor (PBG)	New maize germplasm may be collected to strengthen the germplasm pool and utilized in breeding programme.
SMALL MILLETS			
CPBG/ATL/PBG/SMM/2020/001: Development of high yielding varieties in Small Millets suitable for Tamil Nadu	August,2019 to July,2024	Dr. M. Vaithiyalingan Professor & Head	The project may be closed and new Project may be proposed.
CPBG/ATL /PBG/Millets and Forages/ 2023/ 270: Maintenance breeding in small millet varieties	October 2023 to September 2026	Dr. M. Vaithiyalingan Professor & Head	Nucleus/breeder seed production may be programmed as per the indents communicated by the DCPBG.
CPBG/MDU/PBG/SMM/2019-001 Evolution of high yielding, high nutritive value and problem soil tolerant barnyard millet variety better than MDU 1	June 2019 to May 2024	Dr. G. Anand Assoc. Professor (PBG)	The project may be closed and new project may be proposed.
CPBG/MIL/TRY/2024/NEW: Evolution of high yielding short duration Finger millet (*Eleusine coracana* (L.) Gaertn) variety suitable for salt affected soils to replace TRY1 Ragi	January 2024 to December 2028	Dr. P. Satheesh kumar Asst. Professor (PBG)	Promising lines/varieties may be included in the crossing programme to develop salt tolerant varieties
CPBG/PYR/PBG/MILLETS&FORAGES/2023/120 Evolution of high yielding blast resistant ragi varieties suitable for North Western region of TN	November 2022 to October 2027	Dr. K. Geetha, Professor (PBG) Dr. P. Suthamathi, Professor (PBG)	Advanced cultures may be screened for blast resistance
DRES/PAI/PBG/BSP/2018/001: Maintenance and production of nucleus and breeder seeds of rice, horsegram and millet varieties released from RRS, Paiyur	December 2018 to December 2023	Dr. K. Geetha, Professor (PBG)	The project may be closed and new Project may be proposed.
Plant Genetic Resources			
CPBG/CBE/PBG/MIL/2023/001: *Ex-situ* conservation of germplasm in cereals, millets and forage crops and its management in seed gene bank	November 2022 to October 2025	Dr. R. Saraswathi, Professor & Head Dr. P. R. Renganayaki Professor (SST)	New germplasm lines may be explored and included in the gene bank.
CPBG/CBE/PBG/ NON / 2023 -001	November 2022	Dr. R. Saraswathi	Suitable cryopreservation techniques may be

Optimization of cryopreservation techniques for orthodox and non-orthodox seeds for different crops	to October 2025	Dr. D. Malarvizhi Dr. P. R. Renganayaki	standardised.
CPMB &B			
CPMBB/DPB/2021/R001 Incorporation of crtRB1 allele into a sweet corn inbreds and northeastern land races for development of biofortified sweet corn	Feb 2022 to Feb 2025	Dr. N. Senthil Director, CPMB&B	The project may be continued
CPMB/CBE/DPB/MIL/001: Genetic mapping of nutritional and novel agronomic traits in sorghum	Nov'2021 to Oct'2023	Dr. M. Raveendran Director of Research	The project may be closed
CPMB/DBT/DPMB/2022/001E28 AHH - Agricultural Bioinformatics – BIC	March 2022 to March 2027	Dr. M. Jayakanthan, Asst. Prof (CPMB&B)	The project may be continued
CPMB/CBE/PBG/ RICE/2023/216 DNA finger printing of pre-release cultures of rice and millets	August 2023 to July 2025	Dr. S. Geethanjali Assoc. Professor (PBG)	The project may be continued
Seed Science & Technology			
SEC/CBE/MIL/2023/001 Evaluation of efficacy of seed planter and drone for sowing of pelleted seeds in small millets	March 2023 to February 2025	**Seed Centre** Dr. C. Vanitha Dr. K. Nelson Navamaniraj Dr. K. Malarkodi **Sub Centres** Dr. V. Vakeswaran, Dr. K. Sathya, Dr. M. Vaithiyalingan Dr. M. Kathiravan, Dr. P. Ayyadurai,	Field trial has been taken up in all the three locations as per the project plan and the results have been presented in the CSM on Millets 2024. The project may be closed and completion report may be submitted
DSC/VBN/SST/Millets and Forages 2023/084 Standardization of Hydrophilic polymer Seed Coating technique to improve the productivity of Finger millet under rainfed condition.	February 2023 to January 2026	Dr. V. Vijayalakshmi Assistant Professor (SST) ICAR - KVK, Vamban	Project may be continued
SEC/AYD/MIL/2023/001	February 2023 to	Dr. C. Vanitha	Project may be continued

Assessment of seed storage potential of TNAU released small millet varieties in seed supply chain	January 2025	Assoc. Prof. (SST) CEM, Athiyandal, Thiruvannamalai	
SEC/VAZ/MIL/2023/001 Micronutrient seed priming and coating technology to enhance nursery establishment, seedling vigour and yield potential in Ragi	February 2023 to January 2025	Dr. M. Kathiravan Assoc. Prof. (SST) AC&RI, Vazhavachanur, Thiruvannamalai	Project may be continued
Other projects			
NFSM/CPBG/CEM/MIL/2018/R010: Enhancing Breeder Seed Production for increasing indigenous production of millets in India	2018-2023	Dr. M. Vaithiyalingan Professor and Head	Project may be closed and completion report may submitted
AICRP/NFSM/ADT/CEM/PBG/2021/001 Creation of seed-Hubs for increasing production of millets in India	2021-2025	Dr. M. Vaithiyalingan Professor and Head	Project may be continued
PPVFRA/CPBG/CEM/MIL/2015/R009: DUS Testing of Small millets as a Co Nodal Centre under PPV&FRA – Sub-mission on seeds and planting materials	Continuous	Dr. M. Vaithiyalingan Professor and Head	Project may be continued
Externally funded projects - CPBG			
ICARNBPGR/CPBG/ CBE/MIL/2023/R001 Consortium Research Platform (CRP) on Agrobiodiversity – Characterization of National Gene Bank Finger Millet Genetic Resources	December 2023 to November 2024	**PI:** Dr. S. Sivakumar Dr. K. Iyanar **CO PI:** Dr. B. Meenakumari Dr. Asish K. Binodh Dr. D. Kavithamani Dr. N. Kumari Vinodhana	The promising germplasm accessions may be evaluated and utilized in the finger millet improvement programme
CPMB&B			
ICAR-CRP/CPBG/CBE/PGR/ 2015/R001: TNAU Coimbatore Center of Consortia Research Platform (CRP) of ICAR on Bio-fortification in selected crops for Nutritional Security-Low phytate maize	April'2020 to Mar'2025	Dr. A. John Joel, Professor (DPB)	The project may be continued

CPMBB/DPB/2021/R001 Development and Validation of KASP marker for fine mapping of Sorghum shootfly resistance QTLs region and its utilization in marker assisted breeding	May 2023 to May 2026	Dr. N. Senthil Director, CPMB&B	The project may be continued
Forage crops			
CPBG/CBE/PBG/FRG/2021/001 Evolving superior single cross fodder maize hybrid with desirable forage attributes.	November 2020 to October 2025	Dr. R. Pushpam Prof. & Head	Project may be continued.
CPBG/CBE/PBG/FRG/2020/001 Evolution of forage grass for high biomass and quality	April 2020 to March 2025	Dr. T. Ezhilarasi Assist. Prof. (PBG)	Project may be continued.
CPBG/CBE/PBG/FRG/2020/002 Evolving leguminous forage crops for high green fodder yield and quality	June 2020 to May 2025	Dr. T. Ezhilarasi Assist. Prof. (PBG)	Project may be continued.
CPBG/CBE/PBG/FRG/2020/003 Maintenance breeding in Forage Crops	October 2020 to September 2025	Dr. R. Pushpam, Prof. & Head Dr. T. Ezhilarasi Assist. Prof. (PBG)	Nucleus/breeder seed production may be programmed as per the indents communicated by the DCPBG.
CPBG/CBE/PBG/MIL/2021/001 Evolving high green fodder yielding pearl millet varieties with enhanced crude protein	July, 2021 to June, 2026	Dr. Asish K Binodh, Assoc. Prof. (PBG), Dept. of GPB & Dr. R. Pushpam, Prof.&Head	Advanced progenies may be evaluated for fodder quality. The project may be continued.
Seed Science & Technology			
DSC/KDM/SST/MILLETS & FORAGES/2023/086 Studies on seed dormancy in guinea grass (*Panicum maximum* Jacq.) genotypes	March 2023 to Feb. 2025	Dr. K. Parameswari Assoc. Prof. (SST) AC&RI, Kudumiyanmalai	Project may be continued
DSC/TRY/SST/MILLETS & FORAGES /2023 /169 Seed technological studies in *Daincha* cultures (TRD 20 004 & GB Pant)	Feb. 2023 to Jan. 2025	Dr. K. Raja, Assoc. Prof. (SST) ADAC & RI, Trichy	Project may be continued
DSC/KUM/SST/MILLETS & FORAGES /2023/075 Studies on the effect of different plant derived smoke on seed germination of	March 2023 to Feb. 2026	Project Leader Dr. P. Masilamani, Professor (SST), Dept. of BEAS, AEC&RI,	Project may be continued

forage crops		Kumulur Co-Project Leaders Dr. P. Rajkumar, Dean, AEC&RI, Kumulur Dr. S.D. Sivakumar, Principal (IOA), AEC&RI, Kumulur	
II. AICRP Projects – 06			
Sorghum			
AICRIP/PBG/CBE/SOR/006- ICAR – All India Coordinated Research Project on Sorghum (Breeding)	Continuous Project	Dr. B. Meenakumari, Prof. (PBG), Dr. D. Kavithamani Asst. Prof. (PBG)	The Coordinated trials may be laid out and promising entries have to be utilized in the crossing programme.
Pearl millet			
AICRP /PBG/CBE/PEM/009- ICAR-All India Coordinated Research Project on pearl millet	Continuous Project	Dr. K. Iyanar Professor (PBG) Dept. of Millets	Efforts may be taken to identify the potential of AICRP nominated entries and utilization for improvement of yield plateau.
Maize			
AICRP/PBG/CBE/MAZ/004- Evaluation of hybrids and composites from All India Coordinated Research Project on Maize	Continuous Project	Dr. S. Sivakumar Prof. and Head (Millets) Dr.N. KumariVinodhana Asst. Professor (PBG)	Hybrids with high yielding potential may be identified and evaluated for its suitability to Tamil Nadu and nominated for AICRP trials
AICRP/PBG/VGI/MAZ/005 ICAR – AICRP on Maize	Continuous Project	Dr.K.R.V. Sathya Sheela Asst.Professor (PBG) MRS, Vagarai	Hybrids with high yielding potential may be identified and evaluated for its suitability to rainfed situation in Tamil Nadu and nominated for AICRP trials
Small millets			
AICRP/PBG/ATL/SMM/008 All India Co-ordinated Research Project on Small Millets (D32 BA)	Continuous Project from 2015	Dr. M. Vaithiyalingan Professor and Head CEM, Athiyanthal	The Coordinated trials may be laid out and promising entries have to be utilized in the crossing programme
Forage crops			
AICRP/PBG/CBE/FCR/026 AICRP on Forage Crops	Continuous	Dr. R. Pushpam Prof. & Head	AICRP Trials may be laid out as per the technical programme finalized in the respective NGM.

II. CROP MANAGEMENT

A. Technologies for adoption / OFT

Adoption

1. Cost effective farm mechanization for Finger millet

Seed drill sowing with 40 cm spacing + Pre emergence herbicide application of Oxyfluorfen @ 0.05 kg ha^{-1} on 3 DAS + Ragi booster @ 7.5 kg ha^{-1} through drone + Power weeder + Combine harvester has recorded 3198 kg ha^{-1} of grain yield, straw yield of 6443 kg ha^{-1}, net returns of Rs.83,930 ha^{-1} with BCR of 3.99. By adopting this technological capsule, seed saving of 7.5 kg (50%), labour saving of 45 mandays and cost saving of Rs.16,500 ha^{-1} could be possible. This is recommended to be included in SFI components.

2. Finger millet intercropping with Blackgram under irrigated eco-system

Finger millet intercropping with blackgram in 4:1 ratio recorded higher ragi equivalent yield (2990 kg ha^{-1}) and B:C ratio of 2.98, besides maintenance of soil fertility and improve nutritional security.

3. Improving drought tolerance in Sorghum through nanoceria

Foliar application of nanoceria @ 25 mg l^{-1} twice, first spray on 7 days after flowering and second spray a week after first spray increased the grain yield (16 %) over water spray through increased antioxidant defense system.

4. Quantifying the efficacy of liquid maize maxim formulation on Maize yield

Foliar application of liquid maize maxim formulation (3 %) in 20 litre spray volume per acre at tasseling and grain filling stages by drone, increased the grain yield by 14 % by increasing photosynthetic rate and photochemistry.

5. Optimizing technology package for Tenai

Mechanized sowing, inter cropping with field bean @ 6:1 ratio and foliar spraying with Panchagavya @ 3 % at vegetative and flowering stage recorded higher Tenai Equivalent Yield of 2559 kg ha^{-1} and net returns of Rs. 66327 ha^{-1} with BCR of 2.81.

6. Grain nutritional maximization in Proso millet

Application of humic acid @ 20 kg ha^{-1} along with RDF and $ZnSO_4$ (20 kg ha^{-1}) registered higher yield (1289 kg ha^{-1}), Net income (Rs. 27320 ha^{-1}) with improved grain nutrition (protein: 13.8 %, Fe: 51.9 ppm, Zn: 35.2 ppm & P: 2722 ppm)

7. Crop Model of improved forage varieties for balanced nutrition to animals

A cost-effective balanced nutritional fodder model with 13 cents per milch animal yielding 10 litres of milk daily which incorporates grasses CO (BN) 5 in 5 cents boasting productivity of 19.73 kg day^{-1}, Cereal fodder multicut Sorghum CO 31 in 4 cents with daily productivity of 8.3 kg and leguminous fodder velimasal CO 2 in 4 cents with daily productivity of 5.7 kg. Together, these components fulfill per day green fodder requirement of 10 % of animal body weight, amounting to 30 kg for 5 to 7 months

On Farm Trial (OFT)

OFT 1. Conservation agriculture for rainfed sorghum under vertisols

Objectives:

- To study the effect of conservation agricultural practices on growth, yield and productivity of sorghum under rainfed condition

Treatments:

T_1: Conservation agriculture + 100 % RDF (40:20:0 kg N, P_2O_5 & K_2O /ha)
T_3: Conservation agriculture + 75 % RDF + crop residue compost application @ 12.5 t/ha + Biofertilizers
(*Conservation agriculture - minimum tillage with tractor drawn cultivator alone, along the field and across the field and growing greengram as cover crop)

Co-ordinating Centre : **Dr. G. Guru,** Associate Professor (Agronomy), ARS, Kovilpatti

Sub Centres : **Dr. T. Rangaraj,** Prof. (Agronomy), RRS, Aruppukottai
Dr. R. Veeraputhiran, Assoc. Professor (Agronomy), CRS, Srivilliputhur

Observations to be recorded: Initial and post-harvest soil characters**,** soil moisture content, weather parameters prevailed, crop growth and yield parameters**,** energy productivity and economics

OFT 2. Nutrition enhancement (Fe & Zn) of Pearl millet through Agronomic fortification

Objectives:

- To identify the suitable variety, standardize the source and method of application of micro nutrient and develop a compendium technology for enhancement of Fe & Zn in pearl millet through agronomic bio fortification

Treatments

T_1: CO 10 (composite) + soil application of 100 % Zn through chemical form $ZnSO_4$ @ 25 kg ha^{-1} and foliar application $ZnSO_4$ @ 0.5 % + 0.5 % spray of $FeSO_4$
T_2: CO 10 (Composite) with soil application of recommended quantity $ZnSO_4$ @ 25 kg ha^{-1}

Co-ordinating Centre : **Dr. S. Vallal Kannan**, Assoc. Prof. (Agron.), CSRC, Ramanathapuram

Sub Centres : **Dr. T. Rangaraj,** Professor (Agronomy), RRS, Aruppukottai
Dr. S. Rani, Assistant Professor (Agronomy) AC & RI, Madurai

Observations to be recorded
Growth and yield parameters, economics and Zn and Fe content in grain

OFT 3. INM approaches under different land configuration methods for sustainable rainfed maize productivity in *Vertisols*

Objectives:

- To assess performance of nitrogen through different organic and inorganic sources and to evaluate effectiveness of different land configuration methods for improving the RWUE and productivity of rainfed maize.

Treatments:

T_1 : Broad Bed Furrow + 40 kg N (Urea)
T_2 : Broad Bed Furrow + 20 kg N (Vermicompost) + 20 kg N ha^{-1} (Urea) + 3% Panchakavya spray on 30 DAS
T_3 : Broad Bed Furrow + 20 kg N (*Leucaena*) + 20 kg N ha^{-1} (Urea) + 3% Panchakavya spray on 30 DAS

Co-ordinating Centre	:	**Dr. G. Guru** Associate Professor (Agronomy) ARS, Kovilpatti
Sub Centres	:	**Dr. T. Rangaraj,** Professor (Agronomy) RRS, Aruppukottai **Dr. J. Prabhakaran**, Associate Professor (Agronomy), AC & RI, Madurai

Observations to be recorded: Initial and post-harvest soil characters, Weather parameters prevailed, Crop growth and yield parameters**,** Energy productivity, Economics

For information

1. **Integrated weed management approaches for irrigated Finger millet**
   Application of Oxyfluorfen @ 0.05 kg ha^{-1} on 3 DAS *fb* weeding with Power weeder on 30 DAS increased weed control efficiency (82.1%), grain yield (12.7%) with BCR (2.11).

2. **Standardization of detopping techniques on grain & fodder yield of newly released maize hybrid COH (M)11**
   Total green fodder obtained through detopping in maize hybrid COH (M) 11 at 90 DAS with 4 leaves was 1080 kg ha^{-1} and the cost involved for detopping was Rs.1750 ha^{-1}. The yield penalty witnessed owing to detopping was 590 kg ha^{-1} which resulted net monetary loss of Rs.10410 ha^{-1}. Therefore, detopping technique is not recommended for newly released maize hybrid COH (M)11.

3. **Understanding Drought Tolerance Mechanism in Sorghum**
   Stay green is a trait associated with narrow root angle and deeper rooting depth, reduced transpiration rate, higher photosystem II quantum yield (F_v/F_m ratio), and Individual seed mass contributing to grain yield under terminal drought stress.

4. **Enhancing bio-fortified pearl millet hybrid productivity and quality through micronutrients under irrigated situation**
   Soil application of Zinc sulphate @ 25 kg ha^{-1}, Ferrous sulphate @ 20 kg ha^{-1}

with foliar spray of borax @ 0.2 % at 20-25 DAS along with RDF recorded higher growth, yield attributes and grain yield (3293 kg ha^{-1}) along with net returns (Rs. 52340 ha^{-1}) and B:C ratio (2.49)

5. **Response of pearl millet to split application of nitrogen at different growth stages under irrigated condition**
   Application of higher dose of N (125 % RDN) registered taller plants (202.8 cm), more number of productive tillers (4.31), higher grain yield (3186 kg ha^{-1}) and stover yield (4421 kg ha^{-1}) and followed by application of 112.5 % RDN. Split application of nitrogen twice at 50% N at sowing + 50% N at boot stage (35-40 DAS) or thrice at 25% N at sowing + 50% N at tillering (20-25 DAS) + 25% N at boot stage (35-40 DAS) recorded highest plant height, total number of tillers, effective tillers, grain yield and stover yield.

6. **INM Approaches under different land configuration methods for sustainable rainfed maize productivity in *vertisols***
   Broad Bed Furrow with basal application of 20 kg N (vermicompost @1.0 ton/ha) + 20 kg N/ha (Urea) + Foliar spray of Panchagavya (3%) on 30 DAS recorded higher grain yield of 7968 kg/ha (28.5 %). RWUE (11.50 kg/ha) mm, net returns (Rs.155853/ha and BCR (4.16).

6. **Assessment of climate change impact and adaptation strategies for sustaining the maize production in different Agro-climatic Zones of Tamil Nadu**
   Eight districts in Tamil Nadu *viz*., Ariyalur, Dindigul, Erode, Perambalur, Salem, Tiruppur, Theni and Thiruchirapalli were identified as Most Efficient Cropping Zones. The projected increase in temperature during SWM was estimated by 3.2 % during near century and 3.5 % during mid-century while during NEM, 3.5 % during near century and 4.6 % during mid- century. Similarly, the projected increase in rainfall during SWM (mean annual rainfall of 399 mm) will be + 13 to + 34 % during near century and + 10 to + 25 % in mid-century. Whereas, during SWM (mean annual rainfall of 410 mm) it will be + 11 to + 31 % increases during near century and +8 to +36 % in mid-century.

New Action Plan (2024-26)

Action Plan 1. Enhancing the productivity of minor millets through foliar nutrition under irrigated ecosystem

Objective

- To quantify the effect of foliar spray of nutrient formulations on yield of minor millets under irrigated ecosystem

Duration **:** 2024-2026
Crop **:** Minor millets (5 Nos.)
Design **:** RBD
Replication **:** Five
Season **:** *Rabi*
Plot size **:** 12 m^2

Treatments

T_1 - Control (Water spray)
T_2 - Formulation I (1 %)
T_3 - Formulation II (1 %)
T_4 - Formulation III (1 %)
T_5 - Ragi booster (1 %)

Time of spray: 50 % Flowering

Observations to be recorded: No. of productive tillers plant^{-1}, panicle length (cm), panicle weight (g), partitioning efficiency, grain and straw yield (kg ha^{-1}) and BCR

Co-ordinating Centre	:	Dr. P. Ayyadurai, Asst. Professor (Agronomy), Centre of Excellence in Millets, Athiyandal
Sub Centres	:	Dr. M. Djanaguiraman Associate Professor (Crop Physiology), TNAU, Coimbatore. Dr. G. Guru Associate Professor (Agronomy), ARS, Kovilpatti Dr. S. Rathika Assoc. Professor (Agronomy), ADAC&RI, Trichy

Action Plan 2. Standardizing nano urea dose and application in pearl millet

Objective

- To study the response of pearl millet to application of foliar spray of nano urea and identify suitable dose of nano urea for pearl millet

Duration: 2024-2026

Design: RBD **Replication:** three **Season:** *kharif* / *rabi* **Plot size:** 20 m^2

Treatments

T_1 : Control (No nitrogen)
T_2 : 100 % RDN (¼ (basal), ½ (3 week), ¼ (5 week))
T_3 : 100 % RDN (¼ (basal), ½ (3 week), ¼ (5 week)) + foliar spray (water) at 3rd & 5th week
T_4 : 75% RDN + foliar spray of nano urea @ 2 ml/l at 3rd & 5th week
T_5 : 75% RDN + foliar spray of nano urea @ 3 ml/l at 3rd & 5th week
T_6 : 75% RDN + foliar spray of nano urea @ 4 ml/l at 5th week
T_7 : 75% RDN + foliar spray of nano urea @ 6 ml/l at 5th week
T_8 : 50% RDN + foliar spray of nano urea @ 2 ml/l at 3rd & 5th week
T_9 : 50% RDN + foliar spray of nano urea @ 3 ml/l at 3rd & 5th week
T_{10} : 50% RDN + foliar spray of nano urea @ 4 ml/l at 5th week
T_{11} : 50% RDN + foliar spray of nano urea @ 6 ml/l at 5th week

Note: RNPK - 80:40:40 kg ha^{-1} & 100 % - P & K applied as basal

Observations to be recorded: Plant height (cm), Total number of tillers plant^{-1}, Effective number of tillers plant^{-1}, Test weight (g), Grain yield (q ha^{-1}), Dry fodder

yield (q ha^{-1}), Protein content in grain (%), N and P content from grain and fodder and Economics

Co-ordinating Centre	:	Dr. V. Vasuki, Assoc. Prof. (Agronomy), Dept. of Millets, TNAU, Cbe
Sub Centres	:	1. Dr. M.P. Kavitha, Associate Professor (Agronomy), ARS, Vaigai Dam 2. Dr. S. Subbulakshmi, Associate Professor (Agronomy), ARS, Kovilpatti 3. Dr. C. Harisudan, Associate Professor (Agronomy), RRS Vridhachalam 4. Dr. K. Sivagamy, Assistant Professor (Agronomy), KVK, Tirur 5. Dr. J. Bhuvaneshwari, Assistant Professor (Agronomy), VoC AC & RI, Killikulam 6. Dr. T. Sampathkumar, Assistant Professor (Agronomy), AC & RI, Madurai

Action Plan 3. Maximizing maize productivity through complete mechanization

Objectives

- To standardise mechanized maize farming practices *viz*., crop establishment, weeding, foliar nutrition, spraying PP chemicals through drone and harvesting & processing for drudgery reduction
- To study the effect of mechanized practices on growth, yield attributes, yield and resource use efficiency of maize under irrigated condition
- To work out productivity, cost effectiveness, profitability and energy use efficiency of maize under mechanized farming

Duration: 2024-25
Replication: Non replicated **Season:** *Kharif* **Plot size:** 20 cents

Treatments

T_1 – Non mechanized (sowing, weeding, spraying and harvesting operations done manually)

T_2 - Hand push dibbler + atrazine @ 1.0 kg ha^{-1} through drone + power weeder weeding at 15 & 30 DAS + liquid maize maxim (at tasselling and grain filling stages) and PP chemicals through drone + harvesting & processing by combine harvester

Co-ordinating Centre	:	Dr. P. Kathirvelan, Associate Professor (Agronomy), Department of Millets, TNAU, Coimbatore
Sub Centres	:	1. Dr. S. K. Natarajan, Associate Professor (Agronomy) TCRS, Yethapur 2. Dr. T. Selvakumar, Associate Professor (Agronomy) & Head, MRS, Vagarai 3. Dr. S. Somasundaram, Professor (Agronomy) & Head, CRS, Veppanthattai

Observations to be recorded

- **Growth attributes**
  Establishment rate / population density (m^{-2}), vigour index, plant height (cm) at harvest, root length (cm), volume biomass (g) at 25 and 45 das, anthesis silking interval (days)**,** days to 50% tasselling**,** days to 50% silking**,** dry matter production (kg ha^{-1}) at harvest
- **Weed Parameters**
  Weed density (m^{-2}) at 25 and 45 DAS**,** weed dry weight (g m^{-2}) at 25 and 45 DAS**,** weed dominance at vegetative and tasselling stages
- **Yield attributes**
  No. of cobs plant $^{-1}$**,** no. of grain rows cob^{-1}**,** no. of grains row^{-1}**,** shelling %**,** test weight (g)**,** grain and stover yield (t ha^{-1}) and harvest index (HI)
- **Economic indices**: Net returns (Rs. ha^{-1}) and B:C ratio
- **Energy indices:** Total energy input (MJ ha^{-1}), energy output (MJ ha^{-1})**,** net energy returns (MJ/ha), energy use efficiency (%)

Remarks of the Ongoing AP/ URPs/AICRPs/Externally Funded Projects in Crop Management

ACION PLAN

S. No.	Project No. and Title	Project leaders	Remarks
1.	Assessing dry fodder yield and quality parameters of promising maize hybrid as influenced by preservation technique (Hay)	**Co ordinating Centre**: **TNAU, Coimbatore** Dr. R. Karthikeyan, Dr. P. Kathirvelan Dr. M. Thirunavukkarasu **Sub Centres: MRS, Vagarai:** Dr. T. Selvakumar and Dr. N. Satheeshkumar **ARS, Bhavanisagar:** Dr. K. Ramah	Project to be closed
2.	Quantifying the efficacy of liquid maize maxim formulation on maize yield applied through drone	**Coordinating Centre TNAU, Coimbatore** Dr. M. Djanaguiraman, Dept. of Crop Physiology **Sub Centres: RRS, Aruppukottai** Dr. V. Rajababu **AC&RI, Vazhavachanur** Dr. K. Ananthi MRS, Vagarai: Dr. T. Selvakumar	Project to be closed and technology recommended for adoption
3.	Standardization of detopping techniques on grain and fodder yield of newly released maize hybrid COH (M)11	**Coordinating Centre: Dept. of Agronomy, TNAU, Coimbatore:** Dr. P. Kathirvelan **Sub Centre: MRS, Vagarai:** Dr. T. Selvakumar	Project to be closed and technology to given for information

4.	Optimizing Spacing and Nutrient Levels for Pre-Release Sweet Corn Hybrids	Dr. S. Sivakumar Prof & Head, Dept of Millets Dr. P. Kathirvelan Associate Professor (Agronomy) Dr. C. Bharathi, Assoc. Prof. (SS & AC)	Project to be continued To be tested with one more closer spacing of 60x15 cm along with 60x20 cm during ensuing *kharif/rabi* 2024 season
5.	Understanding Drought Tolerance Mechanism in Sorghum	Dr. M. Djanaguiraman, Dept. of Crop Physiology, CBE	Project to be closed and technology to be given for information
6.	Grain nutritional maximization in proso millet	**Coordinating Centre: CEM, Athiyandal** Dr. K. Sathya **Sub Centre:** Dr.P. Ayyadurai AC & RI, Vazhavachanur **RRS, Paiyur** Dr. C. Sivakumar	Project to be closed and recommended for adoption

S. No.	Project No. and Title	Project leaders	Remarks
Sorghum			
1	**AICRP/PBG/CBE/SOR/006** 6RA-21: Boron nutrition of rabi grain sorghum (Agronomy)- 3rd year of study	Dr. S. Natarajan Asst. Prof. (Agronomy)	Project to be continued
2.	**AICRP/PBG/CBE/SOR/006** 8RA-22: Organic rabi sorghum production (permanent plot study for 5 years) - New study	Dr. S. Natarajan Asst. Prof. (Agronomy)	Project to be continued
3.	**AICRP/PBG/CBE/SOR/006** 9 RA & P-22: Foliar nutrition for boosting of rabi sorghum productivity - new study	Dr. S. Natarajan Asst. Prof. (Agronomy)	Project to be continued
4.	**AICRP/PBG/CBE/SOR/006** 1KB: Performance of pre-released sweet sorghum and high biomass biofuel genotypes under rain fed environments	Dr. S. Natarajan Asst. Prof. (Agronomy)	Project to be continued
5.	**AICRP/PBG/CBE/SOR/006** 1KA: Evaluation of pre released kharif grain sorghum hybrid and varieties for the productivity under rain fed environment	Dr. S. Natarajan Asst. Prof. (Agronomy)	Project to be continued
6.	**AICRP/PBG/CBE/SOR/006** 1KSCS23: Intra Millet intercropping system refinement and development	Dr. S. Natarajan Asst. Prof. (Agronomy)	Project to be continued
7.	**ICAR / DCM / CBE / SOA / 2015 / R001** **Network Project on Organic**	Dr. R. Krishnan, Prof. & Head Dr. P. Janaki, Prof.	Project to be continued

S. No.	Project No. and Title	Project leaders	Remarks
	Farming: Evaluation and validation of natural farming ecosystem in sorghum-based cropping system	(SS&AC) Dr. E. Parameswari, Associate Professor (ENS)	
8.	**DCM/KPT/AGR/SOR/2020/001:** "Conservation Agriculture for Rainfed Sorghum under vertisols"	PI: Dr. G. Guru Assoc. Prof. (Agronomy) Co PI: Dr. V. Sanjivkumar Asst. Professor (SS&AC)	Project to be closed and recommended for OFT. Completion report to be submitted
9.	**AICRP/ DCM/ KPT/ AGR/003** Response of sorghum varieties to sowing windows	Dr. S. Subbulakshmi, Assoc. Prof. (Agron.), ARS, Kovilpatti	Project to be continued
Pearl millet			
10.	**AICRP/PBG/CBE/PEM/009** Enhancing bio-fortified pearl millet hybrid productivity and quality through micronutrients under irrigated situation	Dr. V. Vasuki Assoc. Prof. (Agron.)	Project to be closed and technology recommended for adoption at 59th Online AGM of AICRP – PM
11.	**AICRP/PBG/CBE/PEM/009** Contribution of production factors to the yield and economics of pearl millet	Dr. V. Vasuki Assoc. Prof. (Agron.)	Project to be closed and technology recommended for adoption at 59th Online AGM of AICRP – PM
12.	**AICRP/PBG/CBE/PEM/009** Response of pearl millet to split application of nitrogen at different growth stages under irrigated condition	Dr. V. Vasuki Assoc. Prof. (Agron.)	Project to be closed and technology recommended for adoption at 59th Online AGM of AICRP – PM
13.	**AICRP/PBG/CBE/PEM/009** PMAT - 7 Productivity of pearl millet [Pennisetum glaucum (L.) R. Br. Emend. Stuntz] – Mustard / Chick pea cropping sequence as influenced by organic and natural farming	Dr. V. Vasuki Assoc. Prof. (Agron.)	Project to be continued
14.	**ICAR/DCM/CBE/SOA/2015/R001** Network Project on Organic Farming: Evaluation of organic, inorganic and integrated production systems in Pearl millet	Dr. R. Krishnan, Prof. & Head Dr. M. Suganthy, Prof. (AEN)	Project to be continued
15.	**DCM/ KVK MDU/ MIL/ 2022** entitiled "Nutrition enhancement (Fe&Zn) of Pearlmillet through Agronomic fortification"	Dr. S. Vallal Kannan, Assoc. Prof. (Agron.) CSRC, Ramanathapuram Dr. R. Renuka Associ. Prof. AC&RI, Madurai Dr. S. Arokiyamary	Project to be closed and recommended for OFT. Completion report to be submitted

S. No.	Project No. and Title	Project leaders	Remarks
		Assoc. Prof. (FSN), AEC&RI, Kumulur Dr. T. Sivakumar, Prof. (CRP), Dept. of SS&T, AC&RI, Madurai	
Maize			
16.	**AICRP/PBG/CBE/MAZ/004** MAT 1. Performance of prerelease genotypes under varying nutrient levels in Kharif season (2023)	Dr. P. Kathirvelan Associate Professor (Agronomy)	Project to be continued
17.	**AICRP/PBG/CBE/MAZ/004** MAT 1. Performance of pre-release sweet corn genotypes of sweet corn under varying nutrient levels during Kharif 2023 season	Dr. P. Kathirvelan Associate Professor (Agronomy)	Project to be continued
18.	**AICRP/PBG/CBE/MAZ/004** Mat 1. Performance of pre-release baby corn genotypes of baby corn under varying nutrient levels during Kharif 2023 season	Dr. P. Kathirvelan Associate Professor (Agronomy)	Project to be continued
19.	**AICRP/PBG/CBE/MAZ/004** MAT-5: Long term trial on integrated nutrient management in maize system	Dr. P. Kathirvelan Assoc. Prof. (Agron.)	Project to be continued
20.	**AICRP/PBG/CBE/MAZ/004** MAT 6. Efficacy of nano urea in maize systems in sole maize	Dr. P. Kathirvelan Assoc. Prof. (Agron.)	Project to be continued
21.	**AICRP/PBG/CBE/MAZ/004** MAT 10. Weed management in maize systems (Maize-Soybean) in Coimbatore.	Dr. P. Kathirvelan Assoc. Prof. (Agron.)	Project to be continued
22.	**AICRP/PBG/CBE/MAZ/004** New on Station Trial: Management of *Rottboellia cochinchinensis* in maize field in Coimbatore-*Kharif* 2023	Dr. P. Kathirvelan Assoc. Prof. (Agron.)	Project to be continued
23.	**AICRP/PBG/VGI/MAZ/005 (Agronomy)** **MAT 1.** Performance of pre-release genotypes under varying planting density and nutrient levels in *kharif* season	Dr. T. Selvakumar Assoc. Prof. (Agron.)	Project to be continued
24.	**AICRP/PBG/VGI/MAZ/005 (Agronomy)** Efficacy of nano urea in maize	Dr. T. Selvakumar Assoc. Prof. (Agron.)	Project to be continued
25.	**AICRP/PBG/VGI/MAZ/005 (Agronomy)** **MAT 10.** Weed management in maize system	Dr. T. Selvakumar Assoc. Prof. (Agron.)	Project to be continued
26.	**DCM/CBE/ACRC/AMT/Millets/ & Forages/2023/002**	Dr. S. Kokilavani, Assistant Professor	Project to be continued

S. No.	Project No. and Title	Project leaders	Remarks
	Assessment of climate change impact and adaptation strategies for sustaining the maize production in different Agro-climatic Zones of Tamil Nadu	(Agril. Meteorology), Dr. K. Boomiraj Associate Prof. (ENS) Dr. Ga. Dheebakaran Assoc. Prof. (Agron.)	Findings given for information
27.	**DCM/KPT/MIL/2022/001:** Integrated nutrient management approaches under different land configuration methods for sustainable rainfed maize productivity in Vertisol	Dr. G. Guru, Assoc. Prof (Agronomy) Dr. K. Baskar, Prof & Head, ARS, Kovilpatti	Project to be closed and recommended for OFT Completion report to be submitted
Small millets			
28.	**ICAR / DCM / CBE / SOA / 2015 / R001 Network Project on Organic Farming**: Evaluation of organic, inorganic and integrated production systems in finger millet	Dr. R. Krishnan, Prof and Head Dr. M. Suganthy, Prof. (Agrl. Ento.)	Project to be continued
29.	**ICAR / DCM / CBE / SOA / 2015 / R001 Network Project on Organic Farming**: Evaluation of organic, inorganic and integrated production systems in barnyard millet	Dr. R. Krishnan, Prof and Head Dr. M. Suganthy, Prof. (Agrl. Ento.)	Project to be continued
30.	**AICRP/PBG/ATL/SMM/008** Response of pre-released proso millet varieties to different levels of Fertilizer under rainfed conditions	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
31.	**AICRP/PBG/ATL/SMM/008** Response of pre-released Brown top millet varieties to different levels of Fertilizer under rainfed conditions	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
32.	**AICRP/PBG/ATL/SMM/008** Effect of mulching and hydrogel on the productivity of Barnyard millet under rainfed conditions	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
33.	**AICRP/PBG/ATL/SMM/008** Response of Finger millet to non-chemical (organic) farming under rainfed and irrigated situation	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
34.	**AICRP/PBG/ATL/SMM/008** Screening of Finger millet cultivars for Nitrogen use efficiency	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
35.	**AICRP/PBG/ATL/SMM/008** Nano fertilizer use in little millet	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
36.	**AICRP/PBG/ATL/SMM/008** Evaluation of ratoonability in barnyard millet	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued

S. No.	Project No. and Title	Project leaders	Remarks
37.	**AICRP/PBG/ATL/SMM/008** Evaluation of ratoonability in kodo millet	Dr. K. Sathiya Assoc. Prof. (Agron.), CEM, Athiyandal	Project to be continued
38.	**DCM/KDM/AGR/MILLETS&FORAGES/2023/183** Synergistic interaction of potassium fertilizer and potassium solubilizing bacteria on improving the productivity of Kodamillet (*Paspalum scorbiculatum*) under irrigated condition.	**Project Leader** Dr. R. Jeyasrinivas, Assoc. Prof. (Agron.) AC&RI, Kudumiyanmalai **Co- Project leader** Dr. M. Sundar, Prof. (AGM) Dr. J. Rajkumar, Assoc. Prof. (CRP), AC&RI, Kudumiyanmalai Dr. M. Vijayakumar, Asst. Prof. (SS&AC), AC&RI, Kudumiyanmalai	Project to be continued
39.	**DCM/ VNR/ CRP/ Millets and Forages/ 2023/ 178** "Foliar application of chemicals and plant growth regulators to prevent lodging in Tenai and Panivaragu"	Dr. K. Ananthi, AP (Crop Physiology) AC&RI, Vazhavachanur	Project to be continued
Forage Crops			
40.	DCM/CBE/FC/AGR/MIL/2022/001 Effect of different nitrogen sources on growth, yield and quality of fodder maize	Dr. S. R. Shri Rangasami Assoc. Prof. (Agron.), Dept. of Forage Crops Dr.N. Satheeshkumar Assoc. Prof. (Agron.) MRS, Vagarai	Project to be continued
41.	AICRP/PBG/CBE/FCR/026 Yield maximization in fodder maize through micro-nutrients and bio-fertilizers	Dr. S. R. Shri Rangasami Assoc. Professor (Agron.), Department of Forage Crops, TNAU, Coimbatore	Project to be continued
42.	AICRP/PBG/CBE/FCR/026 Minor Millets for Fodder and Grain as influenced by Nitrogen Management under Rainfed ecosystem	Dr. S. R. Shri Rangasami Assoc. Professor (Agron.), Department of Forage Crops, TNAU, Coimbatore	Project to be continued
43.	DCM/CBE/AGR/MILLETS &Forage/2023/172 Enhancement of seed setting in Hedge Lucerne (CO 2) through crop geometry and foliar spray of nutrients and growth regulators	Dr. S. R. Shri Rangasami Assoc. Prof. (Agron.), Dept. of Forage Crops, TNAU, Coimbatore	Project to be continued
44.	DCM/CBE/AGR/Millets & Forages/2023/189. Performance of fodder maize to different sowing and weed control methods.	Dr.S.P. Sangeetha Asst. Prof (Agron)	Project to be continued

Large Scale Demonstrations in Farmers' field during 2024 – 2025

S. No.	Title of the technology	Location and Demonstrations (Nos).	Scientist in charge
1.	**System of Finger Millet Intensification (SFI)** Seed drill sowing with 40 cm spacing + Pre emergence herbicide application of Oxyfluorfen @ 0.05 kg ha^{-1} on 3 DAS + Ragi booster @ 7.5 kg/ha through drone + Power weeder + Combine harvester The trial has to be conducted one acre in 5 demonstrations.		
	Coordinating Centre	TNAU, Coimbatore (5)	Dr. P. Kathirvelan and Dr. N. Sritharan
	Sub Centres	TCRS, Yethapur (5)	Dr. S. K. Natarajan
		CEM, Athiyanthal (5)	Dr. P. Ayyadurai
		KVK, Papparapatty (5)	Dr. C. Sivakumar
		ORS, Tindivanam (5)	Dr. K. Sathya
2.	**Improving Terminal Drought Tolerance of Sorghum Through Nanoceria** The trial has to be conducted in one acre in 5 demonstrations. Sorghum has to be grown under normal conditions, and drought stress has to be imposed upon the completion of the flowering stage. The following two treatments have to be imposed as per the details given below: T_1 – control, and T_2 – nanoceria foliar spray @ 20 mg L^{-1} at 7 days after flowering and 1 week thereafter. The following yield traits have to be recorded at harvest. (1) number of plants m^{-2}, (2) total dry matter production (kg m^{-2}), (3) grain yield (kg m^{-2}), (4) total dry matter production (kg ha^{-1}), (5) grain yield (kg ha^{-1}), and (6) harvest index.		
	Coordinating Centre	TNAU Coimbatore (5)	Dr. M. Djanaguiraman
	Sub Centres	KVK, Madurai (5)	Dr. E. Subramanian
		AC&RI, Vazhavachanur (5)	Dr. K. Ananthi
		RRS, Arupukottai (5)	Dr. S. Krishna Surender
		KVK, Virudhachalam (5)	Dr. K. Natarajan
		ARS, Kovilpatti (5)	Dr. S. Manoharan
3.	**Improving the grain yield of maize through maize liquid formulation sprayed through drone** The trial has to be conducted in one acre in 5 demonstrations. Maize has to be grown under normal conditions, and the two treatments, namely T_1 – control and T_2 – drone spray of Maize liquid formulation @ 3 % at tasselling and 15 days thereafter, have to be imposed. The following yield traits have to be recorded at harvest. (1) number of plants m^{-2}, (2) total dry matter production (kg m^{-2}), (3) grain yield (kg m^{-2}), (4) total dry matter production (kg ha^{-1}), (5) grain yield (kg ha^{-1}), and (6) harvest index.		
	Coordinating Centre	TNAU Coimbatore (5)	Dr. M. Djanaguiraman
	Sub Centres	MRS, Vagarai (5)	Dr. T. Selvakumar
		KVK, Madurai (5)	Dr. E. Subramanian
		AC&RI, Vazhavachanur (5)	Dr. K. Ananthi
		KVK, Virudhachalam (5)	Dr. K. Natarajan

NATURAL RESOURSES MANAGEMENT

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

Project reviewed

Department	OFT	Action Plan	Research Projects	Student Thesis	Total	Scientists involved
Soil Science & Agrl. Chemistry	-	3	3	3		13

I. Technologies for Adoption / OFT

A. Adoption: Nil

B. For Information

1. TNAU – Water Soluble Fertiliser for Hybrid Maize through Fertigation

For supplying 75, 19.5 and 37 kg of N, P_2O_5 and K_2O ha^{-1} for hybrid maize under fertigation,the study conducted on comparison of three levels of TNAU WSF @ 60,80 and 100 kg ha^{-1} showed that the application of TNAU-WSF @ 100 kg ha^{-1} andbalance of N and K through conventional fertilizers recorded the highest grain yield of 8503 kg ha^{-1} and BC ratio of 1.90 and was found to be comparable with application of TNAU-WSF @ 80 kg ha^{-1} and balance of N,P and K as conventional fertilizer through fertigation.

2. Optimization of fertilizer levels for hybrid maize under rainfedVertisols tract of Southern Tamil Nadu

For hybrid maize under rainfedVertisol conditions, application of 75 % RDF to irrigated hybrid maize (188:56:56 kg N: P_2O_5: K_2O ha^{-1})recorded the highest grain and stover yield followed by 50% RDF (125:38:38 kg N:P_2O_5: K_2O ha^{-1}).The total plant NPK uptake, net income (Rs.58940 ha^{-1}), Benefit CostRatio (2.83) and Relative Water Use Efficiency (5.71 kg ha^{-1} mm) were higher with 75 % RDF of irrigated hybrid maize.

3. Permanent Manurial Experiment of Coimbatore Under irrigated Tropical Agro Ecosystem with Sunflower – Maize sequence

The results from the 111 years of PME experiment revealed that in Maize (175^{th}crop) and Sunflower (176^{th}crop), STCR-IPNS treatment recorded the highest maize grain yield (8224 kg ha^{-1}) and sunflower seed yield (2392 kg ha^{-1}) followed by 100% NPK+FYM @12.5 t ha^{-1} (7629 and 2329 kg ha^{-1} respectively). A build up in organic carbon was observed from 3.2 g kg^{-1} to 4.26 g kg^{-1} in control and 9.13 g kg^{-1} in INM. Also, a significant increase of active pool of microbial biomass carbon (335 mg kg^{-1}) and microbial biomass nitrogen (50.5 mg kg^{-1}) was recorded in INM treatment.

4. Long Term Effect of Fertilisation Practices in Finger Millet – Maize sequence on Soil Quality, Crop Productivity and Sustainability in a Swell Shrink Soil

The results of the Long-Term Fertiliser Experiment with Maize (115th crop) and Finger millet (116th crop) showed that INM practice of application of 100 per cent NPK along with FYM @10 t ha^{-1} significantly increased the grain yield of Finger millet and Maize (2723 kg ha^{-1} and 6373 kg ha^{-1} respectively). The continuous application of nitrogen alone in the fertiliser schedule without P and K resulted in a considerable reduction in yield (40.2 % in Maize and 43.7 % in Finger millet) when compared to 100 % NPK. Sustainable Yield Index values were higher under INM and the lowest values were observed in 100 % N alone and control in both the crops.

Soil Organic Carbon, Carbon stock and Carbon sequestration were higher in INM treatment. The SOC status recorded in INM was 7.48 g kg $^{-1}$ in Maize and 7.50 g kg $^{-1}$ in Finger Millet and was 149.3 and 150 percent higher when compared to the initial SOC value of 3.0 g kg $^{-1}$. The post harvest soil available nutrient status was significantly higher under INM followed by 150 % NPK.

5. Fertiliser Prescription for Finger Millet through Integrated Plant Nutrition System based on Inductive cum Targeted Yield Concept on *Alfisol*

Soil Test Crop Response based Fertilizer Prescription Equations (FPEs) under Integrated Plant Nutrition System have been developed for Finger millet on red non-calcareous soil -Palaviduthi soil series : FN = 4.78 T – 0.34 SN – 0.64 ON; FP_2O_5 = 2.29 T – 1.34 SP – 0.82 OP ;FK_2O = 4.36 T – 0.38 SK – 0.68 OK, where, FN, FP_2O_5 and FK_2O are fertiliser N, P_2O_5 and K_2O in kg ha^{-1}, respectively; T is the yield target in q ha^{-1}; SN, SP and SK respectively are alkaline $KMnO_4$-N, Olsen-P and NH_4OAc-K in kg ha^{-1} and ON, OP and OK are the quantities of N, P and K in kg ha^{-1} supplied through FYM.

The results of two validation experiments conducted on Palaviduthi soil series proved the validity of the FPEs for finger millet. Among the treatments, STCR - IPNS - 4.0 t ha^{-1} has proved its superiority and recorded higher mean yield (3849 kg ha^{-1}) and BCR (1.94).

6. Nutraceutical value of *Eleusine coracana* L. (Finger Millet) in sodic soil

In sodic soil, of the different organic foliar formulations tried, application of fish aminoacid (0.5 %), sea weed extract (0.5 %), jeevaamirtham (3 %) + sea weed extract (0.5 %) at tillering, flowering, milky stage and grain filling stage increased the protein, fat, fibre, calcium and iron content of Finger millet grain.

7. Soil Test Crop Response - Integrated Plant Nutrition System based FertiliserPrescriptionforPearl millet on *Alfisol*

Soil Test Crop Response based Fertilizer prescription equations (FPEs) under Integrated Plant Nutrition System have been developed for hybrid Pearl millet on red non-calcareous soil -Palaviduthi soil series through refinement experiment. The Pearl millet hybrid (CO 10) requires 2.23 kg, 1.19 kg, and 2.22 kg of N, P_2O_5 and K_2O respectively for one quintal of grain. The fertilizer prescription equations ; FN = 4.74 T – 0.33 SN – 0.77 ON ; FP_2O_5 = 2.64 T – 1.63 SP – 0.86 OP; FK_2O = 3.33 T – 0.18 SK – 0.60 OK, where, FN, FP_2O_5 and FK_2O are fertiliser N, P_2O_5 and K_2O in kg ha^{-1},

respectively; T is the yield target in q ha^{-1}; SN, SP and SK respectively are alkaline $KMnO_4$-N, Olsen-P and NH_4OAc-K in kg ha^{-1} and ON, OP and OK are the quantities of N, P and K in kg ha^{-1} supplied through FYM.

8. Soil Organic Carbon Stock and Clay Mineral Interaction in Long Term Fertilizer Experiments

The clay minerology studies of LTFE by XRD indicated the presence of montmorillonite (12.0-15.0 A ^{0}), vermiculite (14.0-15.0 A ^{0}), illite (9.0 -10.0 A ^{0}) and other 2:1 interstartified minerals. It can be concluded that the LTFE soil has mixed minerals of 2:1 type of clay minerals *viz.*, montmorilloniteinterstratified with illite and vermiculite.

The results of mineralogical composition of sandy loam (Alfisol) soils of PME showed ten well established bands indicating 1:1 type of kaolinite clay. The strong and narrow bands identified at 3592, 3532, 3467, 3393 and 1415 cm^{-1} of O-H stretching also showed the presence of kaolinite in soil. The other silicate mineral was also found at 1033 cm^{-1} of Si–O–Si, Si–O stretching with strong and moderate vibration of 1:1 type of kaolinite samples.

9. Long Term Irrigation of Dairy Soiled Water and its Influence on Soil Characteristics, Fodder Production and Economising Nutrient Usage

Dairy Soiled Water (DSW) released from 60 cows of TNAU farm contained significant quantities of N (561 kg), P (72 kg) and K (570 kg) $year^{-1}$. The fodder yield, quality and soil properties were significantly influenced by DSW irrigated field which recorded higher green fodder yield (375 tha^{-1} $year^{-1}$), crude protein (1.35 %) and soil organic carbon (1.35%) than normal fertilizer applied field. The increase when compared to thefield applied with recommended dose of fertilize was 11.4 % for green fodder yield, 11.1 % for crude protein and 42.2% for soil organic carbon. In the DSW field, there was a fertilizer saving 525 kg N, 50 kg P_2O_5 and 50 kg K_2O ha^{-1}.

II. Action Plan proposed for 2024-2025

Action Plan 1: TNAU Water Soluble Fertilizer on Yield Maximization and Nutrient Use Efficiency in Hybrid Maize

Objective

To assess the effect of graded levels of TNAU Water Soluble Fertilizer through fertigation on yield maximization and nutrient use efficiency in Hybrid Maize.

Treatments

Main plot

M_1 - Absolute control
M_2 - 25 % RDF(basal soil application)
M_3 - 50 % RDF(basal soil application)
M_4 - 100 % RDF(basal soil application)

Sub plot

S_1 - Absolute control
S_2 - TNAU - WSF @ 25 kg ha^{-1}
S_3 - TNAU - WSF @ 50 kg ha^{-1}
S_4 - TNAU - WSF @ 75 kg ha^{-1}
S_5 - TNAU - WSF @ 100 kg ha^{-1}

S_2-S_5: will be fertigated from25 DAS for M_2
S_2-S_5: will be fertigated from 45 DAS for M_3
S_2-S_5: will be fertigated from 65 DAS for M_4

RDF : 250:75:75kg N: P_2O_5:K_2O ha^{-1}; Design : Split Plot Design ; Replications : Two

Observations and Analysis

- Yield parameters and Yield
- Initial and post harvest soil nutrient status
- NPK uptake by plant at harvest
- Nutrient use efficiency
- Benefit Cost Ratio

Lead Centre: Dept. of SS&AC, CBE, Dr. S. Thiyageshwari, Professor (SS&AC) and Dr. R. Rajeswari, Assistant Professor (SS&AC)

Sub Centre : MRS, Vagarai ; Dr. T. Selvakumar, Assoc. Professor and Head

Action Plan 2: Optimization of fertilizer levels for hybrid maize under rainfed Vertisol stract of Southern Tamil Nadu

Objectives

- ✓ To optimize the fertilizer dose for higher productivity of rainfed hybrid maize
- ✓ To quantify the nutrient budgeting in rainfed hybrid maize under Vertisol condition

Treatments

T_1 : Absolute control
T_2 : 40:20:0 kg N:P_2O_5:K_2O ha^{-1} (RDF for Vertisols)
T_3 : 188:56:56 kg N:P_2O_5:K_2O ha^{-1} (75 % RDF of Irrigated hybrid maize)
T_4 : 125:38:38 kg N:P_2O_5:K_2O ha^{-1} (50 % RDF of Irrigated hybrid maize)
T_5: Nano N spray alone (At critical stages)
T_6 : T_2 + Nano N spray two times (vegetative and tasseling stages)
T_7 : T_3 + Nano N spray two times (vegetative and tasseling stages)
T_8 : T_4 + Nano N spray two times ((vegetative and tasseling stages)

Period: 2024-2025; Design: RBD; Replications: Three

Observations and Analysis

- Initial and post harvest nutrient analysis
- Growth and Yield Parameters
- Yield
- Nutrients uptake
- Nutrient Use Efficiency
- Benefit Cost Ratio

Centre & Scientists In-charge

Dr. B. Bakiyathu Saliha, Professor and Head & Chief Scientist - AICRPDA
Dr. V. Sanjivkumar, Asst. Professor (SS&AC), ARS, Kovilpatti

Action Plan 3: Effect of Long-Term Irrigation of Dairy Soiled Water on Fodder Production on Soil Quality and Economising Nutrient Usage (continued from 2023-2024)

Objectives

- ✓ Characterization of dairy soiled water of TNAU, Veterinary unit
- ✓ Assessment of its long-term effect on fodder production, quality, nutrition and soil quality

WorkPlan

- ✓ Collection, quantification and characterization of dairy soiled water at intervals by analyzing OC, oxygen demand, N, P, K, Ca, Mg, S and micronutrients
- ✓ Assessment of fodder quality, yield and soil quality at different cutting intervals
- ✓ Determination of seasonal fluxin chemical composition of DSW, quality of soil and fodder and nutrient budgeting

Period: Two Years (2023 to 2025)

Scientists In-charge:

Dr. K. Sathiya Bama, Professor (SS&AC), Dept. of SS&AC, TNAU, Coimbatore
Dr. R. Pushpam, Prof. & Head, Dept. of Forage Crops, TNAU,Coimbatore
Dr. M. Thirunavukkarasu, Asst. Prof. (VAS), Dept. of Agronomy, TNAU, Coimbatore

I. Remarks on the ongoing University Research Projects/AICRP/EFPs

S.No.	Project details	Remarks
I.	**Department of Soil Science and Agrl. Chemistry**	
A.	**University Research Projecton Maize**	
1.	**NRM/CBE/SAC/PME/2019/001:** Permanent Manurial Experiment of Coimbatore Underirrigated Tropical Agro Ecosystem (Nov.2018 to March 2024) Dr. G. Sridevi, Asst. Professor (SS&AC) - PL Dr. S. Meena, Professor (SS&AC) - Co PL	• Findings may be given forinformation. • Completion report to be submitted and a new number is to be obtained • To be continued
2.	ADAC&R I/ TRY / SS&AC / MIL / 2013 / 001. Improvement of Nutraceutical value and Eleusinian content of *Eleusine coracana* L. (Finger millet) in sodic soil (January 2023- December, 2024)	• To be continued

	Dr. V. Dhanushkodi, Asst. Professor (SS&AC) Dr. S. Rathika, Asst. Professor (Agronomy) Dr. K. Senthil, Professor (Agrl. Chemicals) Dr. T. Uma Maheshwari, Asst. Prof. (AGM)	
B.	**AICRP Projects**	
1.	**AICRP/NRM/CBE/SAC/002: AICRP on Long Term Fertilizer Experiments** - Soil Quality, Crop Productivity and Sustainability as influenced by Long Term Fertilizer Applicationand Continuous Cropping of Finger Millet - Maize sequence in Swell – Shrink Soil (Continuous project from 1972) Dr. S. Meena, Professor (SS&AC) (PL) Dr. G. Sridevi, Asst. Prof. (SS&AC) (Co-PL)	• Findings may be given for information • Data generated from LTFE to be published in high NAAS rated journal
C.	**Action Plan Projects**	
1.	Evaluation of TNAU–WSF in Hybrid Maize through fertigation	• To be continued with revised treatments
2.	Optimization of fertilizer levels for hybrid Maize under rainfed Vertisols tract of Southern TamilNadu	• To be continued with revised treatments
3.	Effect of Long-term irrigation of dairy soiled water on fodder production soil quality and economizing nutrient usage	• To be continued as per the programme
D.	**Student Thesis**	
1.	Fertiliser Prescription for Finger Millet through Integrated Plant Nutrition System based on Inductive cum Targeted Yield Concept on Alfisol	• Findings may be given for information
2.	Soil Test Crop Response - Integrated Plant Nutrition System based Fertiliser Prescription for Pearl Millet on Alfisol	• Findings may be given for information
3.	Studies on Soil Organic Carbon Stock and Clay Mineral Interaction in Long Term Experiments (LTFE AND PME)	• Findings may be given for information

AGRICULTURAL MICROBIOLOGY

Research projects on Millets

Crop	Centre	Action plan	URP	AICRP	Externally funded	Student thesis	OFT	Total
Maize	Dept. of Microbiology, TNAU, CBE	-	1	-	-	1	-	2
Little millet		1	-	-	-	-	-	1
Finger millet		1	-	-	-	-	-	1
Total		2	1	-	-	1	-	4

A. Technologies for Adoption: Nil.

B. Technologies for Information

1. Multifunctional bacterium, arbuscular mycorrhizal fungi (AMF) and *Azospirillum brasilense* mediated effect on the growth of maize in calcareous soil

Among 10 isolates from calcareous soil PGP traits (Multimineral solublization, IAA, GA, EPS, Proline and glycine betaine production, lipase and protease enzymes). 5 Isolates were screened as superior strains. These isolates were further screened for biocontrol activity against selected pathogens. Three strains were screened and consortia was prepared after assessing the compatibility. The effect of multifunctional bacterial consortia, *Azospirillum brasilense* and arbuscularmycorrhizae fungi (AMF) on maize growth in calcareous soil is under progress in pot culture conditions.

2. Dissecting the microbiome of little millet (*Panicum sumatransae* L.) and their mechanism of stress tolerance towards crop growth and fitness

Bacillus albus LRS2, *Alcaligenes fecalis* LSB6, *Bacillus amyloliuefaciens* LAB6, *Bacillus velezensis* LLB10 were potential drought tolerant (AAC deaminase, proline, ascorbic acid, dodecanoic acids) and plant growth prompting strains (IAA, Gibberellic acids). Microbial consortia treated seeds enhanced metabolites (butenoic acid, glycine, leucine and acetic acid) in the seed exudates conferring drought tolerance and also support seedling establishment and enhance plant health and overall fitness. Root secreted metabolites from consortia treated plants under moisture stress were mainly associated with stress responses, amino acid biosynthesis and production of secondary metabolites. Higher levels of stress-responsive compounds, such as d-mannitol, Benzoic acid, β-D-Glucopyranoside, cis-Vaccenic acid, salicylic acid, coumarins, myristonylpantothenate and l-(+)-Ascorbic acid were observed.

OFT

1. Field evaluation of efficient plant probiotics to combat moisture deficit stress and yield increase in finger millet

Trt.	Existing	Proposed Revision
T_1	STCR - based RDF	RDF
T_2	STCR based RDF + Liquid formulation of *Rhizobium esperanzae* CRB6 + *Bacillus subtilis* CRB7 + Yeast SA8+ AMF	75 % RDF + Liquid formulation of *Rhizobium esperanzae* CRB6 *+ Bacillus subtilis* CRB7 + Yeast SA8 + AMF
T_3	STCR-based RDF + Nano-formulation of above inoculants	50% RDF + Liquid formulation of *Rhizobium esperanzae* CRB6*+Bacillus subtilis* CRB7 + Yeast SA8 + AMF

Coordinating centre

TNAU, Coimbatore:

Dr. U. Sivakumar, Prof. and Head, Dept. of Ag. Microbiology, TNAU, Coimbatore
Dr. R. Ravikesavan, Director (CPBG), TNAU, Coimbatore
Dr. P. Parasuraman, Prof. and Head, Dept. of Agronomy, TNAU, Coimbatore

Sub Centres
TNAU, Coimbatore
Dr. A. Ramalakshmi
Oilseeds Research Station, Tindivanam
Dr. R. Brindavathy, Prof. (Ag. Micro.)
Centre of Excellence in Millets, Athiyandal
Dr. K. Sathiya AS P(Agronomy)
Regional Research Station, Paiyur
Dr. C. Sivakumar, Professor (Agronomy)
Dr. M.S.S ADAC & RI, Eachangkottai
Dr. R. Uma Maheswari

Remarks on the ongoing Action Plans/ URPs/ Core/ AICRPs/ Externally Funded Projects

S. No.	Title of the Project	Investigator	Period	Remarks
University Research Project – 2				
1.	Multifunctional bacterium, arbuscular mycorrhizal fungi (AMF) and *Azospirillum brasilense* mediated effect on the growth of maize in calcareous soil	Dr. T. Kalaiselvi, Professor (Agrl. Micro.) Dr. M. R. Latha Professor (SS&AC)	Sep. 2020-Aug. 2023	Project may be continued
Action Plan -1				
	Action Plan 2: Dissecting the microbiome of little millet (*Panicum sumatransae* L.)	Dr. U. Sivakumar Professor, Dept. of Agrl. Microbiology	2019-2021	Project completed. Completion

	and their mechanism of stress tolerance towards crop growth and fitness			report may be submitted
1	Field evaluation of efficient plant probiotics to combat moisture deficit stress and yield increase in finger millet	**Coordinating centre** **TNAU, Coimbatore** Dr. U. Sivakumar, P&H Dept. of Ag. Microbiology; Dr. R. Ravikesavan, Director (CPBG), Dr. A. Nirmala Kumari, Fr. P&H (PBG), CEM, Athiyandhal, Dr. P. Parasuraman, P & H (Agron), Dr. T. C. K. Sugitha (Fr. PDF, CEM, Athiyandhal **Sub Centres** **TNAU, Coimbatore** Dr. A. Ramalakshmi ORS, Tindivanam Dr. R. Brindavathy, Prof. (Ag. Micro.), CEM, Athiyandal Dr. K. Sathiya ASP (Agronomy), RRS, Paiyur Dr. C. Sivakumar, Prof. (Agronomy) Dr. M.S.S AC & RI, Eachangkottai Dr. R. Uma Maheswari	2021-2023	On Farm trials may be conducted
Student's Thesis				
PG				
1	Eliciting the effect of seed coating of bioinoculants consortia (NPK &NPKZn) in maize through classical & molecular approaches	Name of the student: Ms. C. Priyadharshini ID.No.: 2020511006 M.Sc. in Agrl. Micro., Name of the Chairperson: Dr. M. Gnanachitra Prof. (Microbiology)	2020 - 2022	For Information

III. CROP PROTECTION

List of URP/ AICRP/ EFP

Type of project	AEN	PAT	Total
University Research Projects	1	7	8
AICRP projects	2	4	6
Total	**3**	**11**	**14**

A. Technologies for Adoption/OFT/Information

1. FOR ADOPTION

1. Management of sorghum downy mildew in sorghum

- Seed treatment with *Bacillus subtilis* (Bbv 57) at 5ml/kg + spraying of metalaxyl 4% + mancozeb 64% WP at 2.5g/litre on 30th and 45th DAS is recommended for the management of sorghum downy mildew in sorghum.

2. FOR ON FARM TRIAL

OFT 1: Field evaluation of Chitosan-O-Arginine against maize fall armyworm

Treatments

- T1 - CS – O Arginine 5 g/lit
- T2 - CS – O Arginine 10 g/lit
- T3 - Azadirachtin 1500 ppm @ 5 ml/lit
- T4 - Emamectin benzoate 0.5 g/lit
- T5 - Untreated check

Design: RBD

Replication: Four

Observations to be recorded:

- Per cent infestation & FAW score at 5 & 10 DAT
- Yield (kg/ha),
- BC ratio
- Phytotoxicity for CS-O-Arg

Centres to be involved:

TNAU, Coimbatore (Team Leader)	:	Dr. M. Shanthi, Director, CPPS
Coordinating Centres	:	
AC&RI, Coimbatore	:	Dr. T. Srinivasan
AC&RI, Madurai	:	Dr. Zadda Kavitha
AC&RI, Killikulam	:	Dr. K. Elanchezhiyan
ADAC&RI, Trichy	:	Dr. A. Kalyanasundaram

OFT 2: Management of Turcicum leaf blight caused by *Exserohilum turcicum* in maize by chemical fungicides

Treatments: 1st spray on appearance of disease and 2nd spray at 15 days interval

- T1 - Carbendazim12%+ Mancozeb63%WP @ 1000 g/ha

- T2 - Kresoxim-methyl 44.3% SC @ 500 ml/ha
- T3 - Azoxystrobin 18.2% + Difenoconazole 11.4% w/w SC @ 500 ml/ha
- T4 - Pyraclostrobin 133 g/l + Epoxiconazole 50g/l SE @750 ml/ha
- T5 - Control

Design: RBD
Replication: Four
Plot size: 5x4m^2
Season: *Kharif*
Line: CM202/COHM6
Observations to be recorded:

- Disease severity – Per cent disease index
- Yield parameters
- CB ratio
- Fungicide residue

Centres to be involved:

TNAU, Coimbatore (Team Leader)	**:**	Dr. V. Paranidharan, TNAU, Coimbatore
Coordinating Centres	**:**	
AC&RI, Coimbatore	**:**	Dr. V. Paranidharan
RRS, Ambasamudram	**:**	Dr. N. Rajinimala
RRS, Aruppukottai	**:**	Dr. R. Akila
RRS, Paiyur	**:**	Dr. S. Sundaramoorthy

3. For information

a. Agricultural Entomology

I. Maize

- Roving surveys in maize during October – December 2023 revealed severe incidence of maize fall armyworm (> 60-65 %) was recorded in Cuddalore, Ariyalur, Madurai, Tirunelveli, Theni, Perambalur and Thoothukudi districts. More than 1200 farmers were benefited from the awareness programmes conducted through ATMA, International Year of Millets, CIMMYT and AICRP programmes.
- Out of a total of 21 wild crosses evaluated for fall armyworm resistance, UMI1230 x *Z.m. luxurians* was found to be resistant while 17 crosses were recorded as moderately resistant. With respect to 17 maize inbreds screened at TNAU, Coimbatore, Maize Research Station Vagarai and AC&RI, Madurai, a total of 13 were registered as moderately resistant.
- Two rounds of spraying with Chitosan – O - Arginine @ 10 g/lit is effective for the management of fall armyworm in maize, the efficacy of which was next only to emamectin benzoate 5SG @ 0.5 g/lit. CS-O-Arginine @ 10 g/lit registered 65.9% reduction in infestation over control and was next only to Emamectin benzoate 0.5 g/lit (85.9 % reduction). The yield was maximum in Emamectin benzoate (4349 kg/ha) followed by CSO 10g/lit (3815 kg/ha) while control registered 2647 kg/ha.
- Field populations of FAW maintained susceptibility to emamectin benzoate 5% SG and novaluron 10%EC. The susceptibility index of *S. frugiperda* revealed that, for a 10-fold decrease in LC_{50},18 generation will be required for emamectin benzoate 5% SG and 108 generations for novaluron 10 % EC.

- Garlic essential oil @ 650 µl/kg seeds exhibited 93.3 % adult mortality and 90.32 % reduction in F1 progeny of maize weevil, *Sitiophilus oryzae* without affecting germination. GC EAG analysis revealed ketones *viz.,* 3-heptenone & 3-hexanone in major proportions that elicited behavioural responses in females.
- Field demonstrations at four locations of Sulur and Sultanpet blocks of Coimbatore district, under TNAU-CIMMYT collaborative research, revealed a reduction in FAW infestation to the tune of more than 40-60 percent in IPM plots. In all the locations, the plots with insecticidal treatment registered higher yields (4500-6750 kg/ha), followed by IPM plots (4000-6000 kg/ha). The yield in farmer's practice across locations ranged between 2500-4000 kg/ha. In terms of cost-benefit ratio, the IPM plots (4.37) were next only to the insecticidal intervention (4.66). More than 290 farmers and 90 extension personnel participated and benefitted from the Interactive field days organised under the programme.

II. Pearl millet

- Field trials for the Management of shoot fly in sorghum and pearl millet using newer insecticides conducted at Coimbatore, Tiruppur, and Madurai & Virudhunagar districts revealed that seed treatment with Thiamethoxam 30FS @ 3 g/kg seed followed by spraying with acetamiprid 20SP @ 1.5 ml /lit @ 10 DAE was effective against shoot fly infestation. About 90 per cent plant stand was restored in the effective treatments while only 66.91 and 76.60 per cent plant stand was noticed in the untreated check of sorghum and cumbu crops, respectively.

III. Fodder sorghum

- In trials conducted for the management of shoot fly and fall armyworm in fodder sorghum, the per cent shoot fly incidence reduced from 7.03% to 3.83% in treated plots and the fall armyworm damage reduced from 9.91% to 2.09% in the treated plots. The avoidable yield loss was found to be between 4.60% and 8.83%.

b. Plant Pathology

I. Sorghum

- Spraying of mancozeb at 0.2 % on 30 and 40 DAS recorded least rust incidence (3.45 %) in sorghum and maximum grain (2196 kg/ha) and straw (3770 kg/ha) yield followed by the application of *Bacillus subtilis* (Bbv 57) at 0.5 % on 30DAS + *Streptomyces rochei* at 0.5 % on 45DAS which recorded 6.67 per cent rust incidence and 2149 kg/ha and 3763.75 kg/ha of grain and straw yield respectively. Maximum C:B ratio of 1:1.64 was obtained in spraying of mancozeb followed by application of *B. subtilis (*Bbv 57) at 0.5 % on 30DAS + *S. rochei* at 0.5% on 45DAS showed C:B ratio of 1:1.58.
- The survey results on the occurrence of sorghum diseases in major growing areas revealed that, downy mildew incidence at vegetative stage was ranged from 0.0 to 17.51 PDI in Salem district. Grain mould incidence was noticed severely from grades 1 to 6 (0–35 %) during maturity in Aruppukottai district.
- Totally 165 entries were screened against foliar and grain diseases of sorghum in AICRP Sorghum screening trials. Of them, the following entries were showing resistance against foliar and grain diseases of sorghum
    - AVHT-GS- SPH2024, SPV2966, SPV2978, SPV2961

- IHT-GS- SPH2054; SPV3047; IVT-GS., SPV3049, SPV3054, SPV3058, SPV3062, SPV3063, SPV3065, SPV3066, SPV3053, SPV3050, SPV3057
- IAVHT-MC- SPH2018, SPH2019, SPH2043, SPH2045, SPH2046
- AVHT-SC- SPV2998, SPV2879, SPV2982, SPV2985, SPV2887, SPV2983, SPV2878, SPV2886
- IVHT-SC - SPH2055, SPV3068, SPV3075, SPV3076, SPV3077, SPV3074, SPH2056
- IAVHT-SS- SPH2059, SPH2060, SPV2890, SPV3078, SPV3079, SPV3081

II. Maize

- Evaluation of Maize genotypes by artificial screening against stalk rots incited by *Macrophomina phaseolina* was conducted during *Kharif* and *Rabi 2023*: From the *kharif* trials more than 36 entries showed resistance and from the rabi trials more than 28 entries showed resistance against *M. phaseolina* stalk rot.
- Development of maize lines resistant to post flowering stalk rot: Out of 38 TNAU germplasms screened, 16 entries showed resistance against post flowering soft rot.
- Study was conducted to quantify the total aflatoxin contamination in poultry feed which is collected from poultry feed industries. The raw materials such as maize kernels, maize gluten, soybean meal, broken rice, paddy husk, groundnut cake, rapeseed pellet, sunflower pellet and four different processed poultry feeds, i.e., pre starter, starter, finished and layer mash. Overall incidence of AFB1 was recorded as 86.00 % (n=43/50); whereas, in the feed ingredients, AFB1 was recorded as 96.66 % (n=29/30), and in the finished feeds, the incidence of AFB1 was 70.00 % (n=14/20). Layer mash feed recorded the highest frequency (100 %) of aflatoxin contamination with a mean value of 30.18 µg/kg.
- For aflatoxin detoxification, out of 39 yeasts, nine yeast isolates (YSL3, YSL5, YSL15, YSL16, YSP6, YSP10, YSP12, YSF4 andYSF9) showed antagonism against *Aspergillus flavus* fungal growth. Out of nine, *Kluyveromyces marxianus* strains such as YSL3, YSL16, YSP12 and YSF9 displayed strong suppression (+++) against *A. flavus* and the maximum inhibition of 64.07 % was recorded by YSL16 followed by YSP12, which showed 59.56 % inhibition.
- Experiment was conducted to assess the impact of water activity (a_W) different a_w levels (0.99, 0.96, 0.93, 0.90 & 0.87) and different temperatures (17 °C, 27 °C & 37 °C) were tested on maize kernel for the growth of *Aspergillus flavus*, aflatoxin production and aflatoxin biosynthetic gene (*omt*) expression. Results revealed that the *A. flavus* showed a faster growth rate at 27 ^{o}C at 0.96 aw along with the highest growth rate of appx. 10 mm/ day. The maximum aflatoxin B1 concentration of 444.73µg/kg was recorded at 12th day with 0.96 a_w.
- The abundance of aflatoxin biosynthetic *omt* (O-methyltransferase) gene expression was higher (325.52 X 109) per gram of sample, favoured at 0.96 aW (28 ^{o}C) by using Real time-PCR analysis.
- The web application model was developed to predict the *turcicum* leaf blight in maize using PHP - Hypertext Preprocessor JAVA- SCRIPT for the management of maize leaf blight.

- Effective colonization and sporulation of *Trichoderma viride* was achieved in the shank based solid substrate medium amended with special ingredients (submitted for patenting) and inoculated with 100 ml of glycerol (15 %) based spore ($7X10^9$ cfu/ml) suspension.
- Studies on the genetic diversity of maize downy mildew pathogens based on the symptoms and partial *cox2* sequencing revealed that, the *Peronosclerospora*, the Indian isolate was the most predominant species infecting maize. Severe chlorosis followed by crazy top symptom was due to *Peronosclerospora maydis* and *Sclerophthora macrospora* while, dwarfing and chlorosis was due to *P. sorghi* and chlorotic streaks throughout the leaf blade was developed by *P. philippinensis*. The *cox*2 expressions in kernels revealed the seed-borne nature of these pathogens.
- Spraying of Azoxystrobin 18.2% + Difenconazole 11.4% at 0.10 ml /l during tasseling and early silking stage was highly effective against ear rot complex of maize recorded only 16.67 PDI as against the control (88.17 PDI)

III. Pearl millet

- Spraying of Tricyclazole 75 WP at 500 g/ha on 30th and 45th DAS recorded least blast incidence of 8.09 PDI with a CB ratio of 2.42, which was statistically on par with spraying of Azoxystrobin 16.7% + Tricyclazole 33.3% SC at 500ml/ha and Azoxystrobin 25 SC at 500 ml/ha recorded CB ratio of 1:2.39 and 1:2.30, respectively
- Spraying of *Streptomyces rochei* at 0.5% (30DAS) + *Bacillus subtilis* (Bbv 57) at 0.5% (45DAS) or *B. subtilis* (Bbv 57) at 0.5% (30DAS) + *S. rochei* at 0.5% (45DAS) were effective against pearl millet rust and showed CB ratio of 1:2.05 and 1:1.98, respectively
- Among the seventeen summer pearl millet entries screened, 16 entries were completely free from downy mildew while, SHT 102 showed 2.16 per cent downy mildew incidence.
- Among one hundred and six initial pearl millet hybrid entries screened during *Kharif* 2023, 86 were found to be completely free from downy mildew disease, while, 20 entries were showing less than five per cent disease incidence even at 60 DAS under sick plot conditions.
- In 32 advanced pearl millet entries, 26 entries were completely free from downy mildew disease, six entries have recorded less than five % downy mildew. Rust incidence ranged from 9.0 to 24.0 PDI and blast incidence of up to grade 2.5 were also recorded.
- During survey, downy mildew, rust and blast diseases were predominantly recorded up to 8 %, 12 PDI and 5 Grade, respectively in Erode, Kallakurichi, Villupuram, Cuddalore and Coimbatore districts of Tamil Nadu in pearl millet.
- Among the 27 TNAU pearl millet entries screened, 23 were free from downy mildew incidence while the entries *viz*., RP 3 FA x RPT 213734 (1.47%), Syn 3-2-2 (1.85%), Super Jothi Amogha (3.85%) and ICMA 04111 x RPT 212423 (4.32%) were showing resistant reaction and recorded less than five per cent downy mildew incidence under sick plot condition.

IV. Small millet

- Seed treatment with *Bacillus subtilis* (Bbv 57) at10g/kg seed + foliar spray of Azoxystrobin 23% SC at 1ml/l at tillering stage as well as boot leaf stage recorded low level of blast, brown spot and rust disease in foxtail millet
- The blast disease in finger millet was documented and correlated with weather parameters for developing a disease prediction model. The blast incidence noticed from 20 DAS and reached maximum level at 50 DAS in both time of sowings. The incidence of blast is more in sowing taken up during third week of August. The leaf blight incidence was noticed during 35 DAS and more in sowing taken up during third week of August. Leaf blight is significantly influenced by RH positively in both time of sowing
- The AICRP entries were screened against foliar and grain diseases in small millets. The entries from finger millet viz., SKMFM 3014, IIMR FM 3796, FMK GPU 67 recorded lower incidence of leaf blast. KMR 716, WWN 35, VL 406, VL 347 recorded lower incidence of finger blast and VL 376 recorded lower incidence of neck blast incidence in the trial.
- Foxtail millet entries *viz*., IIMR FxM 12, TNSi 394, TNSi 390 and KOPFx 2107 were recorded with low incidence of leaf blast and rust and CRS FxM 4 recorded low level of rust incidence
- Little millet entries TNPSu 242, TNPSu 241 and DHLM 36-3 were recorded with least incidence of brown spot disease.
- Spraying of *Streptomyces rochei* at 0.5% (30DAS) + *Bacillus subtilis* (Bbv 57) at 0.5% (45DAS) or *B. subtilis* (Bbv 57) at 0.5% (30DAS) + *S. rochei* at 0.5% (45DAS) were effective against foxtail millet rust and showed CB ratio of 1:2.12 and 1:2.10, respectively

B. Action Plan (2024-2025)

Theme I: Pest and disease surveillance and forecasting

Action Plan – 1: Monitoring major pests on millets & forages and development of prediction models (Contd…)

Theme Leader	**Dr. T. Srinivasan, Assoc. Professor (Entomology), TNAU. Coimbatore**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Survey of major pests of millets and documentation (One on campus fixed plot survey in the district identified during the district specific crop season) Besides this, roving survey will be undertaken by scientists identified for "Pest Monitoring" in different districts	**FIXED PLOT SURVEY** **AC&RI, VVNR** • Dr. A.P. Sivaraman - Ragi, Tenai **TNAU, CBE** • Dr. T. Srinivasan – Maize, sorghum **AC&RI, MDU (Madurai District)** • Dr. Zadda Kavitha - Maize **ROVING SURVEY** **ADAC&RI, Trichy** • Dr. A. Kalyanasundaram - Maize, Sorghum **TNAU, CBE** • Dr. T. Srinivasan – Maize, Sorghum **AC & RI, MDU** • Dr. B. Usharani - Sorghum	• Fixed plot on campus survey at weekly interval and roving survey at fortnightly intervals • The major pests pertaining to the crop alone to be included for developing prediction models. • Periodical recording of weather parameters • Correlation of pest population/ infestation with weather parameters. • Documentation of new/ emerging pests.	**2024-2026:** Correlation of weather data with pest incidence **2026-2027:** Development of forewarning models for major pests of millets.

Action Plan 2: Monitoring of major diseases of millets and development of disease prediction models (Contd…)

Theme leaders	**Dr. A. Sudha, Assoc. Prof. (Pl. Path.), Dept. of Millets, Coimbatore**		
Activity	**Centre**	**Observations**	**Deliverables**
1. Fixed plot on/off campus 2. Roving survey in millet growing regions ***500 Nos. of photos on different stages of symptoms of major diseases has to be submitted to Director (CPPS)** [Maize – Dr. V. Paranidharan & Dr. R. Akila Pearl millet – Dr. I. Johnson & Dr. M. Paramasivam Sorghum – Dr. A. Sudha & Dr. P. Mareeswari Ragi, Tenai – Dr. T. Sharavanan & Dr. S. Sundaramoorthy]	**Fixed plot survey:** **TNAU, Coimbatore**: • Dr. V. Paranidharan – Maize • Dr. I. Johnson – Pearl millet • Dr. A. Sudha – Sorghum **CEM, Athiyandal:** • Dr. T. Sharavanan – Ragi, Tenai, Samai **Roving survey:** • Coimbatore, Erode, Tiruppur - Pearl millet, Sorghum, Maize (Dr. V. Paranidharan, Dr. I. Johnson & Dr. A. Sudha, Dept. of Millets, TNAU, CBE) • Madurai, Theni, Dindigul - Maize, Sorghum, Pearl millet & Kudiraivali (Dr. P. Mareeswari, AC& RI, MDU) • Virudhunagar, Tuticorin – Maize, Sorghum, Pearl millet & Kudiraivali (Dr. R. Akila, RRS, APK) • Krishnagiri, Dharmapuri, Salem, - Ragi, Tenai, Pearl millet, Samai (Dr. S. Sundaramoorthy, RRS, Paiyur) • Tiruvannamalai, Vellore, Kallakurichi - Ragi, Tenai, Pearl millet, Samai (Dr. P. T. Sharavanan, CEM, Athiyandal) • Perambalur, Villupuram, Cuddalore - Maize, Pearl millet, Ragi, Varagu, Tenai (Dr. M. Paramasivam, RRS, Vridhachalam)	• Occurrence of major diseases • Periodical recording of weather parameters	**2024-2026:** Correlation of weather data with disease incidence **2026-2027:** Development of forewarning models for major diseases of millets.
Foxtail Millet – Epidemiology of fungal diseases	• Dr. P. T. Sharavanan, CEM, Athiyandal		

Theme II: Screening against major pest and diseases of millets

Action Plan 3: Screening of germplasm entries/ inbreds against major pests and diseases of millets

Theme leaders	**Dr. T. Srinivasan,** Assoc. Prof. (Agrl. Ento.), Dept. of Millets, Coimbatore **Dr. I. Johnson,** Assoc. Prof. (Pl. Path.), Dept. of Millets, Coimbatore		
Activity	**Centre**	**Observations**	**Deliverables**
Screening of germplasm entries/ inbreds of TNAU against major pests and diseases of milllets	**Insect Pests** **TNAU, Coimbatore** Dr. T. Srinivasan, (Sorghum, Maize) **Diseases** **TNAU, Coimbatore** Dr. V. Paranidharan (Maize) Dr. A. Sudha (Sorghum) Dr. I. Johnson (Pearl Millet) **CEM, Athiyandal** Dr. T. Sharavanan (Small millets)	• Periodical recording of pest and disease intensity by using standard protocol	**2024-2026:** Identifying resistant sources for major pest and diseases of millets **2026-2027:** Documenting mechanism of resistance in resistant donars

Theme III: Biological management of pest and diseases
Action Plan 4: Conserving natural enemies through intercropping fodder sorghum with legumes (New)

Theme Leader	**Dr. K. Premalatha, Assoc. Professor (Entomology)**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Evaluation of different legumes as intercrops and border crops for enhancing natural enemies and suppression of pests. **Treatment details** Main crop – Fodder sorghum (var: Co 32 single cut; 60 x 15 cm) Border crop – Fodder cowpea (var: TN FC 0926) / field bean (Local variety) @ 2 rows around main crop Intercrop – Fodder cowpea / field bean @ 60 x 15 cm **T1** Main crop + Fodder cowpea as a border crop **T2** Main crop + Fodder cowpea as intercrop (2: 1 ratio) **T3** Main crop) + field bean as border crop **T4** main crop + field bean as inter crop (2: 1 ratio) **T5** – Main crop with TNAU plant protection mdeasures **T6** Control (Fodder sorghum as a sole crop)	**IoA, Kumulur** Dr. V. Radhakrishnan, Assoc. Professor (Entomology) **KVK, Tirur** Dr. V. A. Vijayashanthi Asst. Professor (Entomology)	**Main crop** • % shoot fly infestation @ 14 & 21 DAE • % FAW infestation @ 30 & 45 DAE • Population of natural enemies (coccinellid, hymenopterans/ 10 plants) **Inter crop/ Border crop** • Population of natural enemies (coccinellid, hymenopterans/ 10 plants) • Green fodder yield in both main and border/ intercrops. • BC ratio	**2024 – 2025:** Identifying the best intercrop/ border crop **2025 – 2026:** Demonstrations in farmers fields through OFT **2026 – 2027:** Technology will be released for adoption

Action Plan 5: Standardising release techniques for FAW egg parasitoid, *Telenomus remus* (New)

Theme Leader	**Dr. T. Srinivasan, Assoc. Professor (Entomology)**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
• Egg parasitoid *Telenomus remus* @ 30,000 per acre to be released in field at different spots *viz*., o Releasing at 10 points/ ac o Releasing at 20 points/ ac • Release will be done at 10 - 15 days after emergence • Release to be made through paper cups, polythene cups, *etc*.	**TNAU, CBE** Dr. T. Srinivasan, Asst. Prof. (Entomology) (Crop: Sorghum, Maize) **AC&RI, MDU (Madurai Dt.)** Dr. Zadda Kavitha, Assoc. Prof. (Ento.) **AC&RI, VVNR** Dr. P. Yasodha, Assoc. Prof. (Ento.)	• 5 days after release, at least five egg masses to be collected from released fields • Extent of parasitism by *T. remus* to be observed under microscope	**2024-2025:** Identifying the best method of parasitoid release **2025-2026:** OFT with developed technology **2026-2027:** Technology will be released for adoption

Action plan 6: Biological management of rust diseases (New)

Theme leader	**Dr. I. Johnson, Assoc. Prof. (Pl. Path.), Dept. of Millets, Cbe**		
Activity	**Centre**	**Observations**	**Deliverables**
Evaluation of bacterial and actinobacterial formulation (Talc) for rust disease management in Pearl millet, Sorghum, Foxtail millet **Treatments** 1. *B. subtilis* (Bbv 57) at 0.5% (30 & 45 DAS) 2. *B. subtilis* (BST 8) at 0.5% (30 & 45 DAS) 3. *B. amyloliquefaciens at* 0.5% (30 & 45 DAS) 4. *B. velezensis* at 0.5% (30 & 45 DAS) 5. Mancozeb 0.5% (30 & 40 DAS) 6. Control	**Pearl millet** Dr. I. Johnson, TNAU, Coimbatore Dr. M. Paramasivam, RRS, Vridhachalam **Sorghum** Dr. A. Sudha, TNAU, Coimbatore Dr. R. Akila, RRS, Aruppukottai **Pearl millet, Sorghum, Foxtail millet** Dr. P. T Sharavanan, CEM, Athiyandal Dr. S. Sundaramoorthy, RRS, Paiyur	Variety & Season: • Pearl millet (COH 10, *Kharif*) • Sorghum (CO 30, *Rabi*) • Foxtail millet (ATL 1, *Rabi*) Replications : 4 Design : RBD **Observations:** • PDI on 15 days after last spray, grain and straw yield • Fungicide residue analysis in all the fungicide treatments	**2024-2025:** Identifying the best biocontrol agent for rust disease management **2025-2026:** OFT with effective biocontrol agent **2026-2027:** Biological management strategy will be released for adoption

Theme IV: Chemical management of pest and diseases
Action plan 7: Management of blast disease on nutricereals (Contd.)

Theme leader	**Dr. P.T. Sharavanan, Assoc. Prof. (Pl. Path.), CEM, Athiyandal**		
Activity	**Centre**	**Activities and Observations**	**Deliverables**
• Management of blast on pearl millet T1 - Carbendazim 50WP at 500 g/ha T2 - Tricyclazole 75 WP at 500 g/ha T3 - Azoxystrobin 25 SC at T4 – Zineb 68% + Hexaconazole 4% WP at 1000g/ha T5 - Azoxystrobin 16.7%+Tricyclazole 33.3% SC at 500ml/ha T6 –*Bacillus subtilis* (Bbv 57) – ST at 10g/kg + SA at 2.5kg/ha + FS at0.5% on appearance of disease and repeat after 15 days if necessary T7 - Control On appearance of blast symptoms and 15 days later based on necessity	Dr. P. T. Sharavanan, CEM, Athiyandal Dr. R. Akila, RRS, APK Dr. P. Mareeswari, AC& RI, MDU Dr. I. Johnson (trial at Vridhachalam)	Variety : COH 10 Season : *Kharif*, 2024 Replications : 3 Design : RBD **Observations:** • PDI on 15 days after last spray, grain and straw yield • Fungicide residue analysis in all the fungicide treatments	**2024-2025:** Identifying the best treatment for blast disease management **2025-2026:** OFT with effective treatment **2026-2027:** Effective management strategy will be released for adoption

Theme V: Post harvest pest and disease management
Action plan 8: Development of bio-formulation for aflatoxin detoxification in maize and their feeds (NEW)

Theme leader	**Dr. V. Paranidharan, Prof. (Pl. Path.), Dept. of Millets, Coimbatore**		
Activity	**Centre**	**Observations to be made**	**Deliverables**
1. Evaluation of screened microbes (Yeast, Bacteria) and botanicals for aflatoxin detoxification 2. Development of consortia-based formulations for aflatoxin management in maize and their feeds	Dr. V. Paranidharan, TNAU, Coimbatore Dr. N. Rajinimala, AC&RI, Killikulam	• Identification of effective yeast and bacteria strains • Composition & substrate of medium, starter culture growth, stability and organoleptic properties	**2024-2025:** Identifying the best bioagent for effective detoxification **2025-2026:** Optimization of growth parameters for the bioagent and documenting organoleptic properties **2026-2027:** Validation of developed technology and released for adoption

C. Remarks on the Research Projects

a. Agricultural Entomology

S. No.	Project No. & Title	Duration	Name of the Project Leader	Remarks
I. Maize				
1.	**CPPS/CBE/AEN/ MILLETS & FORAGES / 2023/ 250 -** Effect of non-host plant sprays on maize and its influence on the preference and performance by fall armyworm, *Spodoptera frugiperda*	Sept, 2022 - Aug, 2025	**Dr. T. Srinivasan** Assoc. Prof. (Agrl. Entomology)	The project may be continued
2.	**NEW** - Biological control of fall armyworm in maize with fungal and viral entomopathogens	Aug 2023 – Nov 2024	**Dr. V. Ambethgar** Prof. & Head, Dept. of Crop Protection, ADAC &RI, Trichy	The project may be continued

All India Coordinated Research Projects

S. No.	Project No. & Title, Period and Project leader	Duration	Name of the Project Leader	Remarks
1.	AICRP (Maize) AICRP/PBG/CBE/MAZ/004	Continuous project	**Dr. T. Srinivasan** Assoc. Prof. (Entomology), Dept. of Millets, TNAU, Cbe	The projects may be continued as per AICRP technical programme

b. PLANT PATHOLOGY

S. No.	Project No. & Title	Duration	Name of the Project Leader	Remarks
I. Sorghum				
1.	**CPPS/CBE/MIL/MIL/2022 /001** Development of forewarning model for major diseases of sorghum in Correlation with meteorological parameters	June, 2022 to May, 2025	**Dr. A. Sudha** Assoc. Prof. (Pl. Path.), Dept. of Millets, Coimbatore	The project may be continued
II. Maize				
2.	**CPPS/CBE/PAT/MIL/2021 /001** Development of maize shank-based substrate for the multiplication of *Trichoderma viride* for charcoal rot disease management in maize	March 2021 To April 2024	**Dr. V. Sendhilvel** Assoc. Prof. (Pl. Path.), ACRC, Coimbatore	• Compare the technique with standard *T. viride* development technology and validate. • Completion report may be submitted on time

3.	**CPPS/VGR/PAT/Millets & forages/ 2023/ 072**: Management of ear rot complex and assessing the quality parameters of maize kernels for food safety standards	January 2023 to December 2025	**Dr. R. Radhajeyalakshmi** Asst. Prof. (Pl. Path.), Dept. of fruit science, HC&RI, Periyakulam	The project may be continued
III. Pearl Millet				
4.	**CPPS/CBE/PAT/Millets & Forages/2024/048**: Upgradation of mobile - based diagnostic system for blast, ergot and smut diseases of pearl millet using deep learning algorithm	January, 2024 to June, 2025	**Dr. I. Johnson** Assoc. Prof. (Pl. Path.), Dept. of Millets, Coimbatore **Dr. Balaji Kannan,** Prof. & Head, Dept. of PS & IT, AEC&RI, Cbe	The project may be continued
IV. Ragi and Small millet				
5.	**CPPS/ATL/PAT/millets & Forages/2023/174**: Management of foliar diseases of foxtail millet (*Setaria italica* L.)	Sep, 2022 to Aug, 2025	**Dr. P. T. Sharavanan,** Assoc. Prof. (Pl. Path.), CEM, Athiyandal	The project may be continued
6.	**CPPS/ATL/PAT/millets & Forages/2023/175:** Forewarning model for foliar diseases of barnyard millet (*Echinochloa frumentacea*) and its management	Sep, 2022 to Aug, 2025	**Dr. P. T. Sharavanan,** Assoc. Prof. (Pl. Path.), CEM, Athiyandal	The project may be continued

All India Coordinated Research Projects

S. No.	Project No. & Title, Period and Project leader	Duration	Name of the Project Leader	Remarks
1.	AICRP (Sorghum) - AICRIP/PBG/CBE/SOR/006	Continuous project	**Dr. A. Sudha,** Assoc. Prof. (Pl. Path.), Dept. of Millets, TNAU, Cbe	The projects may be continued as per AICRP technical programme
2.	AICRP (Maize) - AICRP/PBG/CBE/MAZ/004 Period: Continuous project	Continuous project	**Dr. V. Paranidharan,** Prof. (Pl. Pathology), Dept. of Millets, TNAU, Cbe	
3.	AICRP (Pearl millet) - AICRP/PBG/CBE/PEM/009	Continuous project	**Dr. I. Johnson,** Assoc. Prof. (Pl. Path.), Dept. of Millets, TNAU, Cbe	
4.	AICRP (Small Millets) - AICRP/PBG/ATL/SMM/008	Continuous project	**Dr. T. Sharavanan,** Assoc. Prof. (Pl. Patho.), CEM, Athiyandal	

IV. REMARKS

a. General Remarks

- Multi-disciplinary approach for biofortification in all millet crops may be adopted to adress mal nutrition (**Action**: DNRM, CPMB, CPBG, DCM).
- Crop oriented machineries need to be designed for each of the millet crops for end-to-end mechanization (**Action**: AEC&RI, Coimbatore/Kumulur)
- Efforts may be taken to popularize the value-added products developed in millet crops through KVKs (**Action**: CSC&RI/DEE)
- All the Scientists may be encouraged to publish research article with higher NAAS score and impact factor and to obtain external funded projects.

b. Crop Improvement

- Efforts may be taken to intensify research on development of bio-fortified varieties in major millet crops (**Action**: DCPMB&B/DCPBG)
- Popularization the newly released millet crop varieties and potential millet crop/ varieties may be identified for specific zones. (**Action**: DCPBG/ DEE).
- Studies on profiling of nutritional quality traits in forage crops may be carried out and documented (**Action**: CPBG)
- Development of triploid fodder sorghum varieties may be initiated (**Action**: DCPBG)
- Research on development of multi-cut forage pearl millet varieties may be initiated (**Action**: DCPBG).

c. Crop Management

- Efforts may be taken to sudy the climate resilience and nutrient use efficiency of millet crops (**Action**: DCM, DNRM)
- Research on development of Nano Urea for millet crops may be taken up and popularized (**Action**: DNRM)
- Liquid formulation of TNAU Maize Maxim may be popularized (**Action**: DNRM/DEE)

d. Crop Protection

- App developed for insect and disease forecasting and monitoring may be popularized (**Action**: DCPPS/DEE).
- The maize entries found resistance to FAW may be studied critically (**Action**: DCPPS).
- All the Plant Protection Scientists are instructed to monitor the insect pests and diseases of Millets in their districts regularly and disseminate the Integrated Management strategies of major pests and diseases of millets (**Action**: All Scientists).

V. List of Participants

S. No.	Name	Designation and Department
1.	Dr. R. Ravikesavan	Director, CPBG, TNAU, Coimbatore
2.	Dr. P. Rajkumar	Dean (Engg.), AEC&RI, Kumulur
3.	Dr. S. Kanchana	Dean, CSC&RI, Madurai
4.	Dr. C. Vanniarajan	Dean, ADAC&RI, Trichy
5.	Dr. M.K. Kalarani	Director, CM, TNAU, Coimbatore
6.	Dr. P. Balasubramaniam	Director, NRM, TNAU, Coimbatore
7.	Dr. M. Shanthi	Director, CPPS, TNAU, Coimbatore
8.	Dr. N. Senthil	Director, CPMB&B, TNAU, Coimbatore
9.	Dr. P.P. Murugan	Director, EE, TNAU, Coimbatore
10.	Dr. R. Umarani	Director, Seed Centre, TNAU, Coimbatore
11.	Dr. S. Vallalkannan	Programme Coordinator, KVK, Ramanad
12.	Dr. M. Vaithiyalingam	Prof. & Head, CEM, Athiyandal
13.	Dr. P. Parasuraman	Prof. & Head, Agronomy, TNAU, Coimbatore
14.	Dr. R. Krishnan	Prof. & Head, NOFRC, TNAU, Coimbatore
15.	Dr. S. Sivakumar	Prof. & Head, Millets, TNAU, Coimbatore
16.	Dr. N.K. Sathiyamoorthy	Prof. & Head, ACRC, TNAU, Coimbatore
17.	Dr. D. Ramesh	Prof. & Head, REE, AEC&RI, Coimbatore
18.	Dr. M. Murugan	Prof. & Head, Agrl. Entomology, TNAU, Coimbatore
19.	Dr. K. Angappan	Prof. & Head, Pl. Pathology, TNAU, Coimbatore
20.	Dr. D. Selvi	Prof. & Head, SS&AC, TNAU, Coimbatore
21.	Dr. B. Bhakiyathu Saliha	Prof. & Head, ARS, Kovilpatti
22.	Dr. A. Senthil	Prof. & Head, CRP, TNAU, Coimbatore
23.	Dr. R. Pushpam	Prof. & Head, Forage Crops, TNAU, Coimbatore
24.	Dr. R. Saraswathi	Prof. & Head, PGR, TNAU, Coimbatore
25.	Dr. S. Lakshmi Narayanan	Professor (PBG), AC&RI, Madurai
26.	Dr. K. Iyanar	Professor (PBG), Millets, TNAU, Coimbatore
27.	Dr. U. Sivakumar	Professor (AGM), TNAU, Coimbatore
28.	Dr. C. Sivakumar	Professor (Agronomy), KVK, Papparapetty
29.	Dr. Y.S. Johnson Thangaraj	Professor, Dept. of Agrl. Ento., TNAU, Coimbatore
30.	Dr. S. Thiyageshwari	Professor (SS&AC), TNAU, Coimbatore
31.	Dr. A. Kalyanasundaram	Professor (Agrl. Ento.), ADAC&RI, Trichy
32.	Dr. S. Meena	Professor (SS&AC), TNAU, Coimbatore
33.	Dr. S. Maragatham	Professor (SS&AC), TNAU, Coimbatore
34.	Dr. K. Malarkodi	Professor, Seed Centre, TNAU, Coimbatore
35.	Dr. K. Sathiya Bama	Professor (SS&AC), TNAU, Coimbatore
36.	Dr. P. Suthamathi	Professor (PBG), RRS, Paiyur
37.	Dr. S. Santha	Professor (PBG), ARS, Kovilpatti
38.	Dr. T. Kalaiselvi	Professor (AGM), Microbiology, TNAU, Coimbatore
39.	Dr. M. Gnanachitra	Professor (AGM), Microbiology, TNAU, Coimbatore
40.	Dr. V. Paranidharan	Professor (Pl. Patho.), Millets, TNAU, Coimbatore
41.	Dr. B. Meena Kumari	Professor (PBG), Millets, TNAU, Coimbatore
42.	Dr. M. Sugathy	Professor (Ento.), NOFRC, TNAU, Coimbatore
4 3.	Dr. P. Geetha	Professor (FSN), TNAU, Coimbatore
44.	Dr. V. Manonmani	Professor (SST) and Head, SST, TNAU, Coimbatore

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45.	Dr. C. Babu	Professor (PBG), Directorate of Research, TNAU, Coimbatore
46.	Dr. P.R. Renganayagi	Professor (SST), PGR, TNAU, Coimbatore
47.	Dr. G. Anand	Assoc. Professor (PBG), KVK, Madurai
48.	Dr. T. Selvakumar	Assoc. Professor and Head, MRs, Vagarai
49.	Dr. I. Johnson	Assoc. Professor (Pl. Patho.), Millets, TNAU, Coimbatore
50.	Dr. T. Srinivasan	Assoc. Professor (Ento.), Millets, TNAU, Coimbatore
51.	Dr. P. Yasodha	Assoc. Prof., Dept. of Pl. Protection, HC&RI(W), Trichy
52.	Dr. R. Karthikeyan	Assoc. Professor (Agron.), CM, TNAU, Coimbatore
53.	Dr. S.R. Shri Ranjasami	Assoc. Prof. (Agron.), Forage Crops, TNAU, Coimbatore
54.	Dr. V. Sendhilvel	Assoc. Professor (Pl. Patho.), ACRC, TNAU, Coimbatore
55.	Dr. P.T. Sharavanan	Assoc. Professor (Pl. Patho.), CEM, Athiyandal
56.	Dr. G. Guru	Assoc. Professor (Agron.), ARS, Kovilpatti
57.	Dr. B. Rajagopal	Assoc. Professor (Biotech.), TNAU, Coimbatore
58.	Dr. N. Sritharan	Assoc. Professor (CRP), TNAU, Coimbatore
59.	Dr. M. Paramasivan	Assoc. Professor (Pl. Patho.), RRS, Virdhachalam
60.	Dr. M. Kathiravan	Assoc. Professor (SS&AC), AC&RI, Vazhavachanur
61.	Dr. K. Nelson Navamaniraj	Assoc. Professor (SST), COE, TNAU, Coimbatore
62.	Dr. R. Parimala Devi	Assoc. Professor (AGM), REE, AEC&RI, Coimbatore
63.	Dr. K. Raja	Assoc. Professor, Nano Technology, TNAU, Coimbatore
64.	Dr. V. Vakeswaran	Assoc. Professor, ARS, Bhavanisagar
65.	Dr. Asish K Binodh	Assoc. Professor, CPBG, TNAU, Coimbatore
66.	Dr. G. Preetha	Assoc. Professor (Ento.), Seed Centre, TNAU, Coimbatore
67.	Dr. K. Parameswari	Assoc. Professor (SST), KVK, Vamban
68.	Dr. C. Vanitha	Assoc. Professor, Seed Centre, TNAU, Coimbatore
69.	Dr. A. Sudha	Assoc. Professor (Pl. Patho.), Millets, TNAU, Coimbatore
70.	Dr. K. Premalatha	Assoc. Professor (Ento.), Forage Crops, Coimbatore
71.	Dr. R. Akila	Assoc. Professor (Pathology), RRS, Aruppukkottai
72.	Dr. B. Usharani	Assoc. Professor (Entomology), AC&RI, Madurai
73.	Dr. Zadda Kavitha	Assoc. Professor (Entomology), AC&RI, Madurai
74.	Dr. V. Vasuki	Assoc. Professor (Agron.), Millets, TNAU, Coimbatore
75.	Dr. P. Kathirvelan	Asst. Professor (Agronomy), Millets, TNAU, Coimbatore
76.	Dr. M. Djanaguiraman	Asst. Professor (CRP), TNAU, Coimbatore
77.	Dr. A. Gopikrishnan	Asst. Professor (PBG), TNAU, Coimbatore
78.	Dr. K. Ananthi	Asst. Professor, Crop Physiology, AC&RI, Vazhavachanur
89.	Dr. M. Deivamani	Asst. Professor (Pl. Patho.), KVK, Papparapetti
80.	Dr. P. Ayyadurai	Asst. Professor (Agronomy), CEM, Athiyandal
81.	Dr. S. Rajeswari	Asst. Professor (SS&AC), TNAU, Coimbatore
82.	Dr. N. Jayakanthan	Asst. Professor (Biotech.), TNAU, Coimbatore
83.	Dr. P. Vijayakumary	Asst. Professor, REE, AEC&RI, Coimbatore
84.	Dr. S.P. Sangeetha	Asst. Professor, Agronomy, TNAU, Coimbatore
85.	Dr. S. Kokilavani	Asst. Professor, ACRC, TNAU, Coimbatore
86.	Dr. K. Vanitha	Asst. Professor, CRP, TNAU, Coimbatore
87.	Dr. V. Vijayalakshmi	Asst. Professor, AC&RI, Kudimiyanmalai
88.	Dr. V. Dhanushkodi	Asst. Professor (SS&AC), KVK, Needamangalam
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91.	Dr. D. Kavithamani	Asst. Professor (PBG), Millets, TNAU, Coimbatore
92.	Dr. N. Kumari Vinodhana	Asst. Professor (PBG), Millets, TNAU, Coimbatore
93.	Dr. T. Ezhilarasi	Asst. Professor (PBG), Forage Crops, Coimbatore
94.	Dr. P. Satheeshkumar	Asst. Professor (PBG), ADAC&RI, Trichy
95.	Dr. K.R.V. Sathya Sheela	Asst. Professor (PBG), MRS, Vagarai
96.	Dr. N.G. Shobhana	WOS-A, Plant Biotechnology, CPMB&B, Coimbatore

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