TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

39th Millets and Forage Crops Scientists' Meet 2021
(9th and 11th June 2021)

Lead Centre

Department of Millets,
CPBG, Coimbatore

Directorate of Research
Tamil Nadu Agricultural University
Coimbatore 641 003

2021

PROCEEDINGS

39th Millets and Forage Crops Scientists' Meet 2021
(9th and 11th June 2021)

The 39th Millets & Forage Crops Scientists Meet was held during June 9th and 11th, 2021 at the Tamil Nadu Agricultural University, Coimbatore, through on-line connecting all scientists across the University College Campuses, Research Stations and KVKs besides main campus. **Dr**. **K.S. Subramanian**, Director of Research welcomed the gathering and set the stage for the 39th Millets & Forage Crops Scientists Meet. **Dr. N. Kumar**, Vice Chancellor anchored the event and highlighted the status of millets in the State and the country. In the past two decades, the area under millets reduced by 50% while total grain production and productivity nearly doubled in the same period. In Tamil Nadu, the millet productivity has increased from 2.46 to 3.70 tonnes per ha vividly indicating the influence of improved varieties and technologies in the past decade.

The Director of Research flagged off a few researchable issues such as early notification of newly released varieties to make an entry in the seed chain, augment speed breeding programs for early release of improved climate resilient varieties, unraveling the therapeutic varieties of sorghum genotypes, development of high β carotene and QPM pyramided maize inbred lines and hybrids, sustainable millet initiative to enhance productivity, mycorrhiza-assisted micronutrient fertilization, rhizospheric engineering, seed pelletizing for machine sowing, monetization fall army worm interventions, hydroponic maize fodder production and value added products from millets to promote nutritional security in women and children. The action taken reports on the 38th Scientists Meets were presented by Director (CPBG), Director (Crop Management) and Dr. Senthilvel, Asst. Prof. (Plant Pathology). During the pre-review, the technical directors had reviewed the on-going university research projects (63), action plan projects (7), core projects (12), AICRPs (5) besides externally funded projects (8).

The outcome of the review process was presented by **Dr. S. Geetha**, Director (CPBG), **Dr. S. Mohankumar**, Director (CPMB), **Dr. S. Sundareswaran**, Director (Seeds), **Dr. V. Geethalakshmi**, Director (Crop Management), **Dr. R. Santhi**, Director (DNRM) and **Dr. K. Prabakar**, Director (CPPS). In the concluding remarks the Vice Chancellor suggested scientists to examine the genetic makeup of Super Napier Grass, development of bioherbicides, planting geometry in accordance with machine sowing, complete mechanization for millets and bird scaring devices etc. The Director of Research wrapped up the meet with few points of way forward in looking at the science part of nano ceria in improving seed set in sorghum, biofortification of millets, therapeutic value of red sorghum, forewarning of invasive pests and diseases using mathematical models and promote value addition of millets with minimal processing to ensure nutritional benefits. **Dr. T. Kalaimagal,** Prof. (PBG), Department of Millets proposed a formal vote of thanks.

The proceedings of the 39th Millets & Forage Crops Scientists meet are furnished below in the following headings:

I. CROP IMPROVEMENT

A. Entries for variety release proposal/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 OF THE VICE CHANCELLOR

V. LIST OF PARTICIPANTS

I. CROP IMPROVEMENT

MILLETS

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

A1. Variety Release:

1. Maize

Culture	Pedigree	Duration (days)	Grain yield (kg/ha)	Yield increase over checks (%)	Special features
CMH 12 686	UMI N09153-1-2 x UMI 1210	95-100	7596	COH(M)8 (14.1) NK6240 (15.6) CO6 (10.0)	Medium maturing High yielding Orange semi dent kernels MR to charcoal rot

2. Kuthiraivali

Culture	Pedigree	Duration (days)	Grain yield (kg/ha)	Yield increase over check (%)	Special features
TN*Ef*317	DHBM 99-6 x RBM 36	90	2715	CO(KV)2 (11.2) MDU 1 (14.7)	High yield, Large panicle, Bold seeds

A2. ADAPTIVE RESEARCH TRIALS

1.Sorghum

S.No.	Culture	Parentage	Duration (days)	Grain yield (kg/ha)	Special attributes
1.	TNS 661 (R)	TNS 603 x IS 18551	100	3016	Pearly white grain Moderately resistant to shoot fly and stem borer
Checks : CO 32 and K 12					
Observations to be recorded: Days to 50 % flowering, plant height, grain yield, straw yield pest and disease incidence					

2.Pearl Millet					
S.No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	TNBH 1619	ICMA 10444 A x PT 6679	90	3147	High grain yield, Bold, Semi Compact and DM resistance, Fe -53 ppm
Checks; CO 9 hybrid and private hybrid					
Observations to be recorded: Days to 50 % flowering, Days to maturity, seed set per cent, grain yield kg/ha, straw yield kg/ha and pests and disease score if any					

3.Maize (Irrigated)					
S.No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	CMH 12 686	UMI N09153-1-2 x UMI 1210	100-105	7596	Medium maturing High yielding Orange semi dent kernels MR to charcoal rot
Checks: CO 6, S6668, P 3401, COH(M)8					
Observations to be recorded: 50 % 5asseling, 50% silking, Grain yield (kg/ha), shelling percentage					

4.Maize (Rainfed)					
S.No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	CMH 15- 005	UMI 1220 x UMI 1210	105	5276	High yielding, drought tolerant suited for rainfed situations
2.	VaMH 12013	UMI 1200 x VIM 419	100	5009	Suitable for rainfed condition, Orange yellow dent kernels, moderately resistant to TLB
Checks: CO 6, S6668, P3502, COH(M) 8					
Observations to be recorded: 50 % tasseling, 50% silking, grain yield (kg/ha), shelling percentage					

5.Tenai					
S.No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	TN*Si* 337	CO 6 x ISe 198	82-85	2043	High tillering Alternative crop in rain-fed system Absence of tip sterility Blast tolerant
Checks : CO (Te) 7 and ATL 1					
Observations to be recorded: Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any.					

6.Panivaragu					
S.No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	TN*Pm*247	PV1403 x PV1673	65-70	2113	High yield, Large panicles Bold seeds
Check : ATL 1					
Observations to be recorded: Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any.					

7.Samai					
S. No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	TNPsu 223	CO3xKadiri 10	85	1523	Open panicle Bold and grey grain Tolerant to shoot-fly Drought tolerant
2.	TNPsu 224	CO2 x BL 41/3	90	1539	Semi-compact panicle Yellow grains High bulk density
Check: CO (Samai) 4, ATL 1					
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu					

Distribution of ART			
Sorghum			
Season	***Kharif* (Jun-Jul)**	***Rabi* (Sep-Oct)**	***Summer* (Feb-March)**
Districts	18 districts, 36 locations Villupuram(2), Vellore (2) Tiruvallur(2), Thiruvannamalai (2), Cuddalore(2), Dharmapuri(2), Krishnagiri(2), Salem (2) Namakkal (2), Coimbatore(2) Tirupur (2), Erode (2), Trichy(2), Perambalur(2), Karur(2), Madurai(2), Dindigul(2), Virudhunagar (2)	7 districts, 14 locations Madurai, Dindigul, Virudhunagar, Ramnad, Sivagangai Thoothukudi and Thirunelveli	14 districts, 28 locations Dharmapuri, Krishnagiri, Salem,Namakkal, Coimbatore,Tirupur, 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, Virudunagar, Trichy, Vellore, Aruppukottai, Villupuram, Madurai	9 KVKs, 18 trials, 2 trials/KVK Pudukottai, Cuddalore, Trichy, Vellore, Thiruvallur, Villupuram, Salem, Madurai, Dharmapuri
Pearl millet			
Season	***Kharif* (Jun-Jul)**	***Rabi* (Sep-Oct)**	***Summer* (Feb- March)**
Districts	20 districts, 67 locations Kallakuruchi (8) Villupuram(8), Cuddalore(8), Thiruvannamalai (5), Ariyalur(4), Salem (2),Thirupathur(2) Tiruvallur(2),Karur(2), Dharmapuri(2),Krishnagiri(2), Namakkal (2), Coimbatore(3) Tirupur(2) Vellore (4), Ranipet (3),Erode (2), Trichy(2), Perambalur(2), Karur(2)	10 districts, 30 locations (Each 3 trials/district) Thoothukudi,Madurai, Dindigul, Theni,Virudhunagar, Ramnad, Sivagangai , and Thenkasi, Pudukottai,Dindigul,	10 districts, 30 locations (Each 3 trials/district) Dharmapuri, Krishnagiri, Salem Namakkal, Coimbatore Tirupur , Trichy, Perambalur, Karur, Pudukkottai
KVK	9 KVKs, 16 trials, 2 trials/KVK Cuddalore, Trichy, Thiruvallur, Vellore, Villupuram,Salem,Dharmapuri,Thirupur, Kallakuruchi	7 KVKs, 12 trials, 2 trials/KVK Pudukottai, Vellore, Ramanathapuram, Aruppukottai, Madurai, Kallakuruchi	4 KVKs, 8 trials, 2 trials/KVK Cuddalore, Trichy, Villupuram, Dharmapuri Thirupur,

Maize			
Season	***Kharif* (Jun-Jul)**	***Rabi* (Sep-Oct)**	***Summer* (Feb-March)**
	Districts		
Irrigated	Theni, Namakkal, Thiruvannamalai (3 districts 15 trials)	-	-
Rainfed	-	Dindigul, Madurai, Thoothukudi, Virudhunagar, Thirunelvelli (5districts 25 trials)	-

Small millets	
Tenai	
Season	***Kharif* 2021-22 (Rainfed)**
Districts	Villupuram, Vellore, Cuddalore, Dharmapuri, Salem, Namakkal, Madurai, Virudhunagar, Thoothukudi, Thirunelveli (Each district 5 locations) (10 districts, 50 locations)
Panivaragu	
Season	***Kharif* 2021-22 (Rainfed)**
Districts	Villupuram, Vellore, Thiruvanamalai, Salem, Namakkal, Madurai, Theni, Virudhunagar, Thoothukudi, Tirunelveli (Each district 5 locations) (10 districts, 50 locations)
Samai	
Season	***Kharif* 2021-22 (Rainfed)**
Districts	Villupuram, Vellore, Thiruvanamalai, Salem, Namakkal, Madurai, Theni, Virudhunagar, Thoothukudi, Tirunelveli (Each district 5 locations) (10 districts, 50 locations)

A3. ON FARM TRIALS					
1.Forage sorghum					
S. No.	**Crop / Culture**	**Parentage**	**DFF (days)**	**GFY (t/ha)**	**Special attributes**
1.	TNFS 220	TNS 623 x ICSV 700	60	31.97	Plant Height -270 cm; Brix-12 %; TSS-9.74%
Check: K 11 **Observations to be recorded:** Days to 50% flowering, plant height (cm), Green Fodder Yield (kg/plot), Pest and disease score if any					
Kharif'2021/Summer' 2022		June-July/Feb-March		Erode, Coimbatore, Namakkal, Dindigul, Salem, Thiruppur	

2.Maize (Rainfed)					
S.No.	**Culture**	**Parentage**	**Duration (days)**	**Grain yield (kg/ha)**	**Special attributes**
1.	CMH 15- 005	UMI 1220 x UMI 1210	105-110	5276	High yielding, drought tolerant suited for rainfed situations
2.	VaMH 12013	UMI 1200 x VIM 419	100-105	5009	Suitable for rainfed condition, Orange yellow dent kernels, moderately resistant to TLB
Checks: CO 6, S6668, P 3401, COH(M)8					
Observations to be recorded: 50 % tasseling, 50% silking, Grain yield (kg/ha), shelling percentage					
Districts : Dindigul, Madurai, Thoothukudi, Virudhunagar, Thirunelvelli (5 locations each)					

A4. MULTI LOCATION TRIALS

1.Sorghum	
Design : RBD	No. of replications : Four
Plot size : 4 × 2.7 m^2	Seed Quantity : 100 g/entry/location
Spacing : 45 × 15 cm	Season: kharif, rabi, Summer

Salient Features of the proposed cultures

Culture	Parentage	Duration (days)	Yield (kg/ha)	Special traits
TKSV1158 (R)	TKSV 818 x CSV 17	95-100	2580	Creamy white grain; Early duration Resistance to midge; Photo insensitive
TKSV1146 (R)	ICSB 539 x K 8	100-105	2455	Creamy white grain, Bold grain Tolerant to midge, Photo insensitive Suitable for rainfed situation
TNS 676	CO 26 x EP 60	100-105	2211	Early duration, Yellow orange grain , Moderately resistant to stem borer, downy mildew and grain mould.
TNS 680	CO 26 x EP 58	100-104	2289	Early duration, Yellow orange grain , Moderately resistant to shoot fly, Downy mildew, Resistant to grain mould

Checks: CO 32, K12		
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	95:45:45 NPK kg/ha	
Observations to be recorded: Days to 50 % flowering, Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any		

2.Red Sorghum	
Design : RBD	No. of replications : Four
Plot size : 4 × 2.7 m^2	Seed Quantity : 100 g/entry/location
Spacing : 45 × 15 cm	Season: Kharif, Rabi, Summer

Salient Features of the proposed culture

Culture	**Parentage**	**Duration (days)**	**Yield (kg/ha)**	**Special traits**
AURS 013 (R)	Selection from Ushilampatti local	90-95	1850	Compact panicle type Early maturity than Paiyur2 Moderately Resistant to shoot fly and Stem borer

Checks: Paiyur 2 and Ushilampatti local		
Kharif(7)	(June – July)	Coimbatore, Paiyur, Bhavanisagar, Madurai, Yethapur, Salem, Thiruppur
Rabi (3)	(Sept-Oct)	Kovilpatti, Aruppukkottai, Vaigaidam
Summer (2)	(Jan – Feb)	Coimbatore, Bhavanisagar
Fertilizer dose	95:45:45 NPK kg/ha	
Observations to be recorded: Days to 50 % flowering, Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any		

3.White Sorghum	
Design : RBD	No. of replications : Four
Plot size : 4 × 2.7 m^2	Seed Quantity : 100 g/entry/location
Spacing : 45 × 15 cm	Season: Kharif, Rabi, Summer

Salient Features of the proposed cultures

Culture	**Parentage**	**Duration (days)**	**Yield (kg/ha)**	**Special traits**
TKS 18013	Selection from K4	85-90	1850	Compact panicle with white grain Moderately Resistant to shoot fly and Stem borer

Checks: K4 and Tenkasilocal		
Kharif(7)	(June – July)	Coimbatore, Bhavanisagar, Madurai, Yethapur, Salem, Thiruppur
Rabi (3)	(Sept-Oct)	Kovilpatti, Aruppukkottai, Vaigaidam
Summer (2)	(Jan – Feb)	Coimbatore, Bhavanisagar
Fertilizer dose	95:45:45 NPK kg/ha	
Observations to be recorded: Days to 50 % flowering, Days to maturity, grain yield kg/ha, straw yield kg/ha and pests and disease score if any		

4.Pearl Millet	
Design : RBD	No. of replications : 4
Plot size : 4 × 3 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 of the proposed cultures

Culture	**Parentage**	**Duration (days)**	**Yield (kg/ha)**	**Special traits**
TNBH 17025	98222A x PT 6679	85-90	3720	High yield, Bold seed, DM tolerant, Compact ear head
TNBH 17032	ICMA 06111A x PT6679	85-90	3641	High yield, bold seed, Semi compact ear head, DM tolerant
Checks : Pearl millet Hybrid CO 9, 86M38				
Observations to be recorded: Days to 50 % flowering, Days to maturity, seed set per cent, grain yield kg/ha, straw yield kg/ha and pests and disease score if any.				
Seasons				
Pearl millet MLT I	*Kharif*Irrigated (June – July) (7)	Coimbatore, Paiyur, Yethapur, Bhavanisagar, Vaigaidam, Vridhachalam, Tindivanam and Athiyanthal		
Pearl millet MLT II	*Rabi* irrigated (Sep- Oct) (6)	Kovilpatti, Aruppukkottai, Paiyur and Tindivanam		
Pearl millet MLT III	*Summer* (February-March)	Coimbatore,Pattukkottai, Paiyur, Bhavanisagar, Vriddhachalam and Vaigaidam		

5. Maize (Irrigated)	
Design : RBD	No. of replications : 4
Plot size : 4 × 3.6 m^2	Seed Quantity : 100 g/entry/location
Spacing : 60 × 25 cm	Season :*kharif, rabi (irrigated)*

Features of the proposed cultures

Hybrids	**Parentage**	**Duration (days)**	**Yield (kg/ha)**	**Special traits**
CMH 14-716 (R)	N09-162 x UMI 1210	100-105	9329	Yellow semi dent kernels Moderately resistant to charcoal rot

CMH 17025	52327 x 52485	100-105	9662	Orange yellow semi dent kernels Moderately resistant to charcoal rot

Seasons		
Maize MLT I	*Kharif* Irrigated (June – July) (7)	Coimbatore, Vagarai, Bhavanisagar, Paiyur, Athiyanthal, Vaigaidam, Virinjipuram
Maize MLT III	*Rabi* irrigated (Dec – Jan) (6)	Coimbatore, Vagarai, Bhavanisagar, Paiyur, 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), Grain yield (kg/ha), pests and disease score if any		

6. Maize (Rainfed):

Design : RBD	No. of replications : 4
Plot size : 4 × 3.6 m^2	Seed Quantity : 100 g/entry/location
Spacing : 60 × 25 cm	Season: Rabi (Rainfed)

Features of the proposed cultures

Hybrids	**Parentage**	**Duration**	**Yield (kg/ha)**	**Special traits**
VaMH 16008 (R)	UMI1200 X VIM 396	95-100	5438	High grain yield Suitable for rainfed conditions Moderately Resistant to TLB Semi dent kernels
VaMH 16018	UMI 564 x UMI 528	95-100	6636	High grain yield Suitable for rainfed conditions Moderately Resistant to TLB Semi dent kernels
Checks: Maize Hybrid CO 6, P 3502				

Seasons		
Maize MLT III	Rainfed (Sept-Oct) (5)	Aruppukkottai, 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		

Small Millets MLT

7. Ragi

Design : RBD	No. of replications : 4
No. of rows : 6 rows	Seed Quantity : 100 g/entry/location
Spacing : 22.5 × 10 cm	Season:Kharifi (Rainfed)

Features of the proposed cultures

Culture	Parentage	Duration	Yield (kg/ha)	Special traits
TN*Ec* 1324 (white)	TNEc 1228 x GE 276	120	2567	Compact ear head, Bold and white grains, Medium tall, Blast tolerant
TN*Ec* 1326 (white)	KWFM 49 x KOPN 565	125	2650	Top curved earhead, Bold and white grains, Blast tolerant, Input responsive
PYR 20-5	Paiyur 1 x Venchuruttai	127-130	3600	Compact ear head, Bold and white grains, Medium tall, Blast tolerant
TN*Ec* 1335 (Extra early)	TNAU 946 x TNAU 824	83	2468	Top curved earhead, Purple pigmented, Drought tolerant Blast resistant, Extra early duration
TN*Ec*1338 (Extra early)	GE 2991 x VL 281	85	2422	Extra early duration, non lodging compact earhead, blast tolerance bold grains
Check: ATL 1 and CO 9				
Fertilizer schedule: 40: 20:00 Kg of NPK /ha				
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu				

8. Varagu

Design : RBD	No. of replications : 4
No. of rows : 6 rows	Seed Quantity : 100 g/entry/location
Spacing : 22.5 × 10 cm	Season: Kharif (Rainfed)

Features of the proposed cultures

Culture	Parentage	Duration	Yield (kg/ha)	Special traits
TN*PSc* 310	PLS from GPLM 589	115	3630	Semi dwarf, High tillering Non lodging, Drought tolerant

TN*PSc* 313	PLS from GPLM 463	110	3726	Input responsive, High biomass Longer panicle, Bold seeds
Check: ATL 1				
Fertilizer schedule: 40: 20:00 Kg of NPK /ha				
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu				

9. Kudiraivali

Design : RBD	No. of replications : 4
No. of rows : 6 rows	Seed Quantity : 100 g/entry/location
Spacing : 22.5 × 10 cm	Season: Kharifi (Rainfed)

Features of the proposed cultures

Culture	Parentage	Duration	Yield (kg/ha)	Special traits
TN*Ef* 322	VL 207 x TNEf 19	95	3164	Compact panicle, High test weight, High biomass, Non lodging, High Fe content : 17.6 mg/100g
TN*Ef*323	TNAU 201 x VL 322	90	3168	Large panicle, No shattering More tillers, Non lodging High Fe content : 18.3 mg/100g
Check:MDU 1				
Fertilizer schedule: 40: 20:00 Kg of NPK /ha				
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu				

10. Samai

Design : RBD	No. of replications : 4
No. of rows : 6 rows	Seed Quantity : 100 g/entry/location
Spacing : 22.5 × 10 cm	Season:Kharifi (Rainfed)

Features of the proposed cultures

Culture	Parentage	Duration	Yield (kg/ha)	Special traits
TN*PSu* 237	TNPSu115 xTNPSu 317	85	2665	Open panicle, Bold and grey grain, Tolerant to shoot-fly, Drought tolerant, Fe and Zn content: 6.5 – 10.9mg/100g
TN*PSu* 239	TNPSu 210 x TNAU 12	90	2744	Semi-compact panicle, Yellow grains, High bulk density, Fe and Zn content -5.3 – 8.6 mg/100g

Check: ATL 1
Fertilizer schedule: 40: 20:00 Kg of NPK /ha
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu

11. Tenai

Design : RBD	No. of replications : 4
No. of rows : 6 rows	Seed Quantity : 100 g/entry/location
Spacing : 22.5 × 10 cm	Season: Kharifi (Rainfed)

Features of the proposed cultures

Culture	Parentage	Duration	Yield (kg/ha)	Special traits
TN*Si*382	TNSi 337 x GS 206	82	2769	Large panicle, More biomass, Input responsive, Bold grains, High in Carotenoids: 254ppm
TN*Si* 385	TNSi 348 x TNSi 223	85	2705	More tillers, Drought tolerance, Dense panicle, Non lodging, High in Carotenoids: 269ppm
Checks: ATL 1				
Fertilizer schedule: 40: 20:00 Kg of NPK /ha				
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu				

12. Panivaragu

Design : RBD	No. of replications : 4
No. of rows : 6 rows	Seed Quantity : 100 g/entry/location
Spacing : 22.5 × 10 cm	Season:Kharifi (Rainfed)

Features of the proposed cultures

Culture	Parentage	Duration	Yield (kg/ha)	Special traits
TN*Pm* 282	TNPm 247 x TNPm 244	72	2471	Open panicle, Bold grains, Tolerant to shoot-fly, Drought tolerant
TN*Pm* 283	GPUP 25 x TNPm 276	70	2390	Semi compact panicle, Tolerant to shoot fly, High test weight, Input responsive
Checks: ATL 1				

Fertilizer schedule: 40: 20:00 Kg of NPK /ha
Centres: Coimbatore, Paiyur, Bhavanisagar, Vaigaidam, Aruppukottai, Kovilpatti, Athiyandal, Chettinadu

Forage Crops
I. Cultures identified for MLT
Cumbu Napier hybrid grass (continued)

Design : RBD	No. of replications : 2
Plot size : 4 m × 3 m	No. of cuttings/plot: 40 cuttings/entry/location
Spacing : 60 cm × 50 cm	Season: *Kharif* 2021

Features of the proposed cultures

Entry	Parentage	Duration	GFY (t/ha/yr)	Special features
TNCN 1534	IP 20379 x FD 434	Perennial	390.60	High biomass More leaf stem ratio
TNCN 1536	IP18308 x FD 470	Perennial	383.00	
Check: CO (BN) 5				
No. of MLTs conducted during 2019-20: 9 (Coimbatore, Killikulam, Kovilpatti, Vridhachalam, Bhavanisagar, Aliyarnagar, Yethapur, Paiyur and Mettupalayam). Will be continued for 2020-21 also				
No. of MLTs conducted during 2020-21: 9+7 (16) (Additional locations *viz*., Pongalur, Melalathur, Vamban, Sirugamani, Paramakudi, Aruppukottai and Ambasamudram)				
2021-22: MLT to be continued during 2021-22: 16 locations				

Important cut off Dates - MLT and ART

Activities	Season	Tentative date/month
Dispatch of seed materials from the lead centre	*Kharif*	2nd week of June
	Rabi	2nd week of August
	Summer	1st week of January
Visit of MLT/monitoring teams	*Kharif*	1st fortnight of September
	Rabi	1st fortnight of December
	Summer	1st fortnight of April
Date for receiving the trials results for compilation	*Kharif*	2nd week of November
	Rabi	1st week of February
	Summer	3rd week of June

Monitoring team to visit Millets MLT 2021-22

Team	Stations to be visited
Dr.T.Kalaimagal Dr. N. Kumari Vinodhana Dr. D. Kavithamani Dr. A. Sudha	Bhavanisagar, Vagarai

Dr. R. Ravikesavan Dr. C. Vanniarajan	Kovilpatti, Aruppukkottai, Vaigaidam, Chettinadu
Dr. K. R. V. Sathyasheela Dr. N. Malini Dr. Radhajayalakshmi	Coimbatore, Madurai
Dr. A. Nirmalakumari Dr. Rajesh	Paiyur, Virinjipuram
Dr. K. Iyanar Dr. T. Srininvasan	Athiyanthal, Vridhachalam
Dr.A.Yuvaraj Dr.K.Geetha	Yethapur, Veppanthattai

Forage Crops
Monitoring team to visit Cumbu Napier hybrid grass MLT 2021-22

Team	Stations to be visited
Dr. K.N.Ganesan Dr.T. Ezhilarasi Dr. S.D. Sivakumar	Coimbatore, Bhavanisagar, Aliyarnagar, Pongalur, Yethapur and Mettupalayam
Dr. Sudhakar	Paiyur
Dr. Iyanar	Melalathur
Dr.N.Ananthi	Paramakudi, Ambasamudram,
Dr. Muthuramu	Aruppukottai, Kovilpatti and Killikulam
Dr.A. Subramanian	Vamban, Sirugamani
Dr. C. Babu	Vridhachalam

Time of visit

Season	Month of monitoring team visit
Kharif 2021	Appropriate stage may be fixed in discussion with the scientist in-charge of conducting MLT. Monitoring team can inspect the crop just before the cutting to assess the superiority of the genotypes in MLT.
Rabi/rainfed	
Late *rabi/ Summer*	

B. ACTION PLAN
1. ACTION PLAN - 2021-2022
1.1 Millets

S.No	Details of action plan	Work plan for 2020-2021	Centre	Scientists
1	**Theme 1:Germplasm characterization in Millets**			
	Characterization of **Maize** lines	Characterization of 100 Maize lines	Coimbatore	Dr. N.KumariVinodhana
		Characterization of 100 Maize lines	Vagarai	Dr. K.R.V. Sathyasheela
	Characterization of **Sorghum** lines	Characterization of 100 Sorghum lines	Coimbatore	Dr. D. Kavithamani
		Characterization of 100 Sorghum lines	Kovilpatti	Dr. N. Malini
2	**Theme No 2 Evolution of Shoot fly and Midge resistant sorghum varieties**			
	Theme Leader Dr. T. Kalaimagal, Professor (PBG), Department of Millets, Coimbatore			
		• Raising and evaluation of F_3 at Coimbatore for both pests • Raising and evaluation of F4 at Kovilpatti.	Coimbatore Kovilpatti	Dr. T. Kalaimagal Professor (PBG) Dr.N. Malini, AP (PBG)
3	**Theme No 3 Evolution of high yielding single cut forage sorghum varieties with improved quality traits**			
	Theme Leader Dr. D. Kavithamani, Asst.Prof (PBG), Department of Millets, Coimbatore			
		• Raising and Evaluation of $F_3$and selection • Raising and Evaluation of F_4 and selection	Coimbatore	Dr. D. Kavithamani, Asst.Prof (PBG), Department of Millets,
4	**Theme No 4 Development of biofortified Pearl millet hybrids for high Fe and Zn**			
	Theme Leader Dr. K. Iyanar, Associate Professor (PBG), Department of Millets, Coimbatore			
		• Hybrid evaluation and assessing the level of Fe and Zn under multilocation testing and seed multiplication of identified hybrids.	Coimbatore	Dr.T.Chitdeshwari Professor (SS&AC) Dr.I.Johnson Asst. Prof (Pl.Pathology)

5	**Theme 5 Development of Synthetics in Pearl millet**			
	Theme Leader Dr. K. Iyanar, Associate Professor (PBG), Department of Millets, Coimbatore			
		• Evaluation of Syn2 population involving parents PT 6067, PT 6570, PT 6480 • Eavaluation of Syn3 population	Coimbatore	Dr. K. Iyanar, Associate Professor (PBG),
6	**Theme 6 Screening of maize inbreds for Charcoal rot**			
	Theme Leader Dr. N. KumariVinodhana, AP (PBG), Dept. of Millets, Coimbatore			
		• Evaluation of already synthesised hybrids • Screening of new set of inbreds under sick plot condition and scoring for charcoal rot • Identification of promising inbreds resistant to charcoal rot and utilization in the breeding program.	**Coimbatore**	Dr.Sendhilvel Asst.Prof (Pl.Pathology)
7	**Theme 7 Screening of maize inbreds and hybrids for drought tolerance**			
	Theme Leader Dr. R. Ravikesavan, Professor and Head, Department of Millets, Coimbatore			
		• Crossing with identified drought tolerant inbreds • Screening new set of inbreds and hybrids for drought • Seed multiplication of drought tolerant inbreds • Evaluation of hybrids	Coimbatore Vagarai Veppanthattai	Dr.N.KumariVinodhana, AP (PBG), Dr.A.Senthil AP (CRP), Dr.K.R.V. SathyaSheela, AP (PBG) Dr. K.Sakthivel Asst.Professor (PBG)

8	**Theme 8 *Introgression of crtRB1*/ lcyE allele using marker-aided selection in to the elite inbredsof maize**			
	Theme Leader Dr. R. Ravikesavan, Professor and Head, Department of Millets, Coimbatore			
		• Raising BC_2F_1 and Marker assisted selection of BC_1 population • Effecting the BC_2 cross • Raising BC_2F_1 and Marker assisted selection of BC_2 population • Effecting the BC_3 cross	**Coimbatore**	Dr.N.Senthil, Professor, DPMB&B,
9	**Theme 9. Development of FAW tolerant / resistant maize hybrids**			
	Theme Leader - Dr. R. Ravikesavan, Professor and Head, Department of Millets, Coimbatore			
		• Raising F2s and further backcrossing • Screening of new set of germplasm lines • Screening of new set of germplasm lines	**Coimbatore** **Vagarai**	Dr.R.Ravikesavan Prof(PBG) Dr.N.KumariVinodhana Asst.Prof (PBG) Dr.T.Srininvasan, Asst.Prof (Ento) Dr.N.Lakshmi Narayanan Assoc.Prof (PBG) Dr.K.R.V.Sathyasheela, Asst.Prof (PBG
10	**Theme 10 Farmers' participatory selection of high yielding Barnyard millet and long duration blast resistant Ragi varieties (CEM, ATL, AC&RI, Madurai, RRS, Paiyur)**			
	Theme Leader Dr. A. Nirmalakumari, Professor (PBG), CEM, Athiyandal			
		• Validation of culture performance through OFT (July'21-Nov'21) • Drawing inference from data analysis and proposing for variety release (Dec'21-Mar'22)	**Madurai**	Dr.C.Vanniarajan Professor and Head Dept. of Pl.Breeding and Genetics

11	**Theme 11.Evaluation of grain Amarathus for its suitability to North eastern zone of TN**			
	Theme Leader Dr.A.Nirmalakumari, Professor and Head, CEM, Athiyanthal			
		• Evaluation of promising entries under MLT during 2021-2022 • Evaluation of promising entries under OFT/ART during 2022-2023 • Identification and release of a variety 2023-2024	CEM, Athiyanthal	Dr.A.Nirmalakumari, Professor (PBG**)**

1.2. Forage Crops

Theme : Development of high water use efficient CN hybrids (2021-22)				
Theme Leader :Dr. K. N. Ganesan, Professor and Head, Department of Forage Crops, Coimbatore				
S. No.	**Details of action Plan**	**Work Plan for 2021-22**	**Centre**	**Scientists**
1.	Development of high water use efficient CN hybrids	Evaluation of F_1 hybrids for green fodder yield	Coimbatore	Dr. K.N.Ganesan, Dr. T. Ezhilarasi Dr. S.D. Sivakumar Dept. of Forage Crops Dr.V.Ravichandran, Crop Phy. Dr. G.Thiyagarajan (WTC)

Theme : Development of high yielding *Stylosanthes* variety suitable for pasture land (2019-22)				
Theme Leader :Dr. K. N. Ganesan, Professor and Head, Department of Forage Crops, Coimbatore				
S. No.	**Details of action Plan**	**Work Plan for 2021-22**	**Centre**	**Scientists**
1.	Development of high yielding *Stylosanthes* variety suitable for pasture land	Additional accessions of the germplasms may be collected. Evaluation of all the accessions may be conducted for suprioritry of green fodder yield. Studies to brake seed dormancy and to enhance seed setting	Coimbatore	Dr. T. Ezhilarasi Dr. K.N.Ganesan Dr. S.D. Sivakumar Dept. of Forage Crops Dr. S. Kavitha Asst. Prof. (SS&T), Dept. of PGR

2. Activities for New Action Plan 2021 - 2024
Millets

S. No	Proposed action plan	Proposed Activities for 2021-22	2022-23	2023-24	Centre	Scientist
1	**Theme :Development of high yielding grain sorghum suited for Tamil Nadu**					
	Team leader : Dr. T. Kalaimagal, Professor (PBG), Department of Millets, Coimbatore					
	Development of high grain yielding sorghum varieties	• Effecting crosses between CO 30 and CO 32 with K8 and CO 26	• Evaluation of F_1's • Raising and evaluation of F_2 for grain yield	• Raising and Evaluation of F_3 • Raising and Evaluation of F_4 • Raising and Evaluation of F_5 and identification of high yielding lines with desirable yield traits	Coimbatore	Dr. T. Kalaimagal Professor (PBG) Dr.D. Kavithamani Asst.Professor (PBG)
		• Evaluation of the available stabilized lines under MLT in few locations	• Evaluation of the superior lines under MLT in different locations	• Nominating the superior entries for OFT/ART		`

	Forage Crops					
II	**Theme**	**Utilization of High Biomass Yielding Forage Crops and Sweet Sorghum for Biofuel Production**				
	Theme leaders	**Dr.K.N.Ganesan, Prof & Head, Dept of Forage crops, TNAU, Coimbatore. Dr.P.Subramanian, Prof & Head, Dept of Renewable Energy Engineering, TNAU, Coimbatore**				
	Utilization of High Biomass Yielding	i. Assembling the accessions of Napier grasses, Guinea grasses and released	i. Identification of low lignin genotypes of forage crops and	i. Mass multiplication of high biomass and high biogas	Coimbatore	Dr. S. D. Sivakumar, Assoc. Prof. (Agron.,) Dept of Forage crops TNAU, Coimbatore.

	Forage Crops and Sweet Sorghum for Biofuel Production	hybrids of Bajra-Napier and sweet sorghum ii. Characterization of above forage crops and sweet sorghum to identify the accessions with higher biomass yield. iii. Developing production technologies to enhance the bio mass yield as well as quick rejuvenation after each cut of harvest in fodder crops identified iv. Production technologies for enhancing the propagule production from unit area	sweet sorghum ii. Identifying the harvesting stage of forage crops and sweet sorghum for high biomass and biogas production iii. Breeding for low lignin biomass genotypes in selected forage crops iv. Optimization of dose and time of application of BDS for forage crop	yielding forage crops and sweet sorghum. ii. Utilization of BDS for cultivation of forage crops, sweet sorghum and field trials iii. Demonstration and field trials on high biomass yielding forage crops and sweet sorghum. iv. Public private partnership build up		Dr. T. Ezhilarasi Asst. Prof. (PBG) Dept of Forage Crops TNAU, Coimbatore. Dr.T. Kalaimagal Professor (PBG) Dr. D.Kavithamani Asst. Prof. (PBG) Dept of Millets TNAU, Coimbatore.
		i. Characterization (proximate and ultimate compositions) of different forage crops *viz*., Napier Grass, Guinea Grass, Perennial fodder sorghum, Bajra	i. Screening of high biomass yielding genotypes and evaluation of low lignin cultivars of forage crops for biofuel production ii. Optimization of suitable	i. Evaluation of biofuel (biogas/ ethanol) production pathways based on benchmarks ii. Optimization and pilot scale trials on enhanced		Dr. S. Karthikeyan, Prof.(Microbiology), Dept. of Ren. Energy Engg., TNAU, Coimbatore. Dr. D. Ramesh, Assoc. Prof. (Bioenergy) Dept. of Ren. Energy

		Napier Hybrids and Sweet sorghum. ii. Assessing the biofuel production (biogas/ ethanol) potential of different forage crops iii. Screen native hyper methanogenic strains for anaerobic digestion of forage crops* biomass iv. Screen hyper ethanologenic strains for ethanol fermentation of forage crops* biomass	pretreatment process for enhanced biofuel production iii. Standardization of saccharification parameters for ethanol production iv. Determining the suitable combination of forage crops, sweet sorghum and other biomass for co-digestion to enhance biofuel yield	biofuel yield from the identified high biomass forage crops iii. Valorization of bio-digested slurry (BDS) and fermented stillage for their manurial value and/or feed value. iv. LCA and cost economics of the biofuel production pathway		Engg., TNAU, Coimbatore

C. Research projects and Remarks

Millets and Forage crops

A total number of 45 projects including URPs, AICRP and Externally funded projects of Millets and Forage crops and CPMB handled by 24 scientists were reviewed by the respective Directors of CPBG and CPMB. The abstract of the projects reviewed is furnished below:

Crops	Centres	URP	AICRP	Externally funded	Others	Total	Scientists
Sorghum	Coimbatore	4	1	-	-	5	2
	Kovilpatti	3	-	-	-	3	1
	Aruppukottai	1	-	-	-	1	1
	Paiyur	1	-	-	-	1	1
	Trichy	1	-	-	-	1	1
	Madurai	1	-	-	-	1	1
	Sub total	**11**	**1**	**-**	**-**	**12**	**7**
Pearl millet	Coimbatore	**2**	**1**	**-**	**-**	**3**	**1**
Maize	Coimbatore	3	1	-	-	4	2
	Vagarai	2	1		-	3	2
	Sub total	**5**	**2**	**-**	**-**	**7**	**4**
Small millets	Athiyandal	3	1	-	3	7	1
	Paiyur	1	-	-	-	1	1
	Madurai	2	-	-	-	2	2
	Sub total	**6**	**1**	**-**	**3**	**10**	**4**
PGR	Coimbatore	**1**	**-**	**-**	**-**	**1**	**1**
CPMB&B	Coimbatore	**1**	**-**	**3**	**-**	**4**	**3**
Forage Crops	Dept. of Forage Crops, TNAU	4	1	1	-	6	2
	AC&RI, Killikulam	1	-	-	-	1	1
	ADAC&RI, Trichy	1	-	-	-	1	1
	Total	**6**	**1**	**1**		**8**	**4**
Grand total		**32**	**6**	**4**	**3**	**45**	**24**

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

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

I.University Research Projects

Sl. No	Project No and Title	Period	Investigators	Remarks of DCPBG
I	**SORGHUM**			
1.	CPBG/CBE/PBG/SOR/2018/001 Collection and characterization of sorghum germplasm	April 2018 to March 2023	Dr. D. Kavithamani Assistant Professor (PBG), Dept. of Millets	The germplasmaccessions have to be characterized with descriptor traits instead of DUS traits. Economically important genotypes have to be recorded for further utilization.
2.	CPBG/CBE/PBG/SOR/2018/002 Development of dual purpose varieties of sorghum resistant to major pests (Shoot fly/Stem borer/ Midge)	June 2018 to May 2023	Dr. T. Kalaimagal Professor (PBG) Dept. of Millets	The seeds of F3 generation of crosses *viz*., CO(S)28xPaiyur2 and CO 30 x Paiyur 2 have to be transferred to CPBG/CBE/PBG/SOR/2020/001: Evolution of red sorghum varieties suited for Tamil Nadu.
3.	CPBG/CBE/PBG/SOR/2020/001: Evolution of red sorghum varieties suited for Tamil Nadu	September 2020 to August 2025	Dr.T.Kalaimagal Professor (PBG) Dept. of Millets	Crosses are to be effected between red sorghum x red sorghum types. Crosses may be attempted between different panicle types.
4.	CPBG/CBE/PBG/SOR/2019/001 Development of high yielding fodder sorghum varieties with improved quality traits	Feb' 2019 to June 2022	Dr. D. Kavithamani Assistant Professor (PBG) Dept. of Millets	The promising forage sorghum lines available in the F3 may be studied further to develop the superior single cut fodder sorghumvarieties. One popular article on CSV 33MF may be submitted tovalarumvelanmai.
5.	CPBG/KPT/PBG/SOR/2020/003 Evolution of high yielding, drought tolerant sorghum varieties suitable for rainfed condition in southern districts of Tamil Nadu.	Oct. 2020 to Sep.2025	Dr. N. Malini Assistant Professor (PBG) ARS, Kovilpatti	TKSV 1036 culture may be screened for pest and disease incidence during 2021-22. A separate project may be proposed for red sorghum development.

6.	CPBG/KPT/PBG/SOR/2017/001 Nucleus and Breeder seed production of sorghum varieties of Tamil Nadu.	Dec'2016 to Nov' 2019	Dr. N. Malini, Assistant Professor (PBG), ARS, Kovilpatti	The allotted indent must be produced without any short fall.
7.	CPBG/ KPT/ PBG/SOR/2019/New Collection and characterization of sorghum germplasm	Oct' 2019 to Sep' 2022	Dr. N. Malini, Asst. Professor (PBG) ARS, Kovilpatti	The germplasm accessions have to be characterized with descriptor traits instead of DUS traits. Economically important genotypes have to be recorded for further utilization.
8.	CPBG/APK/PBG/SOR/2018/001 Evolution of dual purpose sorghum varieties suitable for rainfed regions of south Tamil Nadu	Sep' 2018 to Aug' 2023	Dr. M. Gnanasekaran Asst. Professor (PBG) RRS, Aruppukottai	During Kharif2021 the stabilized lines have to be raised at ARS, Srivilliputhur. Explore the possibility of evaluating the same at Madurai.
9.	CPBG/MDU/PBG/SOR/2019/001 Evolution of high yielding red sorghum (*Sorghum bicolor*) varieties suitable for industrial utilities	Feb' 2019 to Jan' 2024	Dr. A. Yuvaraja, Assoc. Professor (PBG) AC&RI, Madurai	The nutritional status of identified red sorghum genotypes may be confirmed. Promising genotypes may be registered with NPBGR. Explore the possibility of preparing nonalcoholic beverages using red sorghum genotypes.
II	**PEARL MILLET**			
1.	CPBG/CBE/PBG/SMM/2020/ 002: Evolution of high yielding hybrids/varieties in pearl millet (*Pennisetumglaucum* (L.) Br. R.)	April 2021 to March 2025	Dr. K.Iyanar, Assoc. Prof. (PBG) Department of Millets, TNAU, Coimbatore	Promising hybrids may be evaluated in different locations along with check hybrids and quality parameters *viz*., Fe and Zn may be confirmed for development of biofortified products. Parental purity may be maintained and compact type ear head utilized for development of hybrids. Action may be initiated to develop OPVs.
2.	CPBG/CBE/PBG/SMM/2020/ 001 :Maintenance of genetic purity and production of nucleus	July 2021 to June 2025	Dr. K.Iyanar, Associate Professor (PBG)	The parental purity should be maintained for the hybrids. Efforts may be taken to maintain the vigour and uniformity of released OPVs/Composites.

	seeds of parental lines of hybrids and open pollinated varieties (OPV) in pearl millet		Department of Millets, TNAU, Coimbatore	
III	**MAIZE**			
1.	CPBG/CBE/PBG/MAZ/2018/001 Development of high yielding sweet corn hybrids suitable for Tamil Nadu	June 2018 to May 2023	Dr.R.Ravikesavan Professor (PBG) & Head	High yielding sweet corn hybrids may be developed and nominated for testing under AICRP and MLT trials
2.	CPBG/CBE/PBG/MAZ/2018/002 Development of high yielding single cross maize hybrids in late (> 95 d) and medium (> 85-95 d) maturitysuitable for irrigated ecosystems.	June 2018 to May 2023	Dr.N.Kumari Vinodhana, Asst.Professor (PBG)	The parental inbreds and promising hybrids developed may be subjected to FAW screening
3.	CPBG/CBE/PBG/MAZ/2018/003 Germplasm maintenance and Breeder seed production in Maize	June 2018 to May 2023	Dr.N.Kumari Vinodhana, Asst.Professor (PBG)	The promising inbreds identified based on characterization with good cob characters may be utilized in breeding programme
4.	CPBG/VGI/PBG/MAZ/2020/002 Development of high yielding single cross maize hybrids suitable for rainfed ecosystems	April 2020 to March 2025	Dr. S. Lakshmi Narayanan Associate Professor and Head (PB&G)	The inbreds used in the development of promising hybrids shall be subjected to FAW screening
5.	CPBG /VGI/PBG/MAZ/2020/001 - Collection, Characterisation and Maintenance of Maize germplasm	July 2019 to June 2022	Dr.K.R.V.SathyaSheela Assistant Professor (PB&G)	Inbreds possessing market appealing colour with yield contributing cob traits shall be identified for utilization in breeding programmes.

IV	**SMALL MILLETS**			
1.	CPBG/ATL/PBG/SMM/2020/001: Development of high yielding varieties in Small Millets suitable for Tamil Nadu	August,2019 to July, 2024	Dr. A. Nirmalakumari, Prof. (PBG) and Head CEM, Athiyandhal	While sharing the germplasm to other institutes, a copy of the same has to be sent to Dept. of PGR for documentation purpose. New white ragi cultures may be evaluated under MLT during 2021-22. Non replicated trials may be laid out during *Kharif* and *Rabi* 2021-22 to check the duration of extra early ragi genotypes
2.	CPBG/ATL/PBG/SMM/2020/002: Induced mutation in Kodo millet for earliness, non-lodging and non-shattering variations	August, 2020 to July, 2023	Dr. A. Nirmalakumari, Prof. (PBG) and Head CEM, Athiyandhal	More number of plants may be screened in M_2 generation. The mutants may be critically evaluated
3.	CPBG/ATL/PBG/BSP/2020/003: Maintenance Breeding in Small Millets Varieties	October,2020-September, 2023	Dr. A. Nirmalakumari, Prof. (PBG) and Head CEM, Athiyandhal	The allotted indent must be produced without any short fall
4.	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	PI- Dr. C. Vanniarajan, Professor and Head Co-PI- Dr. S. Kanchana, Professor and Head, CSC&RI, Madurai	The high yielding genotypes may be shot listed and quality analysis need to be done in single location for uniform estimation. Promising genotypes may be registered with NPBGR.
5.	CPBG/MDU/PBG/BSP/2020/001 Nucleus and Breeder seed production of Madurai varieties of rice, Barnyard millet and black gram	September 2019 to August 2022	Dr.A.Yuvaraja AssociateProfessor (PB&G)	The allotted indent must be produced without any short fall

6.	CPBG/PAI/PBG/SMM/2017/001 Development of high yielding long duration ragi varieties (Eleusinecoracona(L.) Gaertn) suitable for rainfed areas of North Western zone	Apr. 2017 to Mar. 2022	Dr. K.Geetha, Professor (PB&G) RRS, Paiyur	The promising ragi culture PYR 20-5 must be studied for blast resistance along with ATL1. The culture may be evaluated under MLT during 2021
V	**FORAGE CROPS**			
1.	CPBG / CBE / PBG / FRG/2021/001 Evolving superior single cross fodder maize hybrid with desirable forage attributes.	November 2020 to October 2025	Dr. K.N.Ganesan	The selfed cobs of the elite AICRP single cross hybrids may be raised and selected single plants may be selfing to develop new inbreds. The newly synthesized F_1 hybrids may be evaluated for green fodder yield.
2.	CPBG/CBE/PBG/FRG/2020/001 Evolution of forage grass for high biomass and quality	April 2020 to March 2025	Dr. T. Ezhilarasi	Exploration to collect newer accessions of Guinea grass may be taken up and evaluated for green fodder yield.
3.	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	Green fodder harvesting intervals may be standardized for agathi.
4.	CPBG/CBE/PBG/FRG/2020/003 Maintenance breeding in Forage Crops	October 2020 to September 2025	Dr. T. Ezhilarasi	Nucleus/breeder seed production may be programmed as per the indents communicated.

5.	CPBG/KKM/PBG/2017/001 Development of Cumbu Napier Hybrids with Superior Quality traits for Tamil Nadu	April 2017 to March 2020 Extended: April 2020 to March 2022	Dr. N. Aananthi	The elite bajra germplam lines identified may be shared with the Dept. of Forage Crops and evaluated along with the elite progenies.
6.	CPBG / TRY / PBG / BUF / 2020 / 001.Development of high yielding Buffel grass (Cenchrus sp.)	September 2020 to August 2025	Dr.A.Subramanian	The superior accessions of Buffel grass under sodic soil condition may be multiplied and evaluated for green fodder yield and quality.

AICRP Projects

Sl. No	Project No.	Period	Investigators	Remarks of DCPBG
I	**SORGHUM**			
1.	AICRIP/PBG/CBE/SOR/006 ICAR – AICRP on Sorghum	Continuous Project	Dr. T.Kalaimagal, 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.
II	**PEARL MILLET**			
1.	AICRP /PBG/CBE/PEM/009 All India Coordinated Research Project on pearl millet	Continuous Project	Dr. K.Iyanar Associate Professor (PBG) Dept. of Millets	Efforts may be taken to identify the potential of AICRP nominated entries and utilization for improvement of yield plateau.

III	**MAIZE**			
1.	AICRP /PBG/CBE/ MAZ/004 Evaluation of hybrids and composites from All India Coordinated Research Project on Maize	Continuous Project	Dr. R. Ravikesavan Professor and Head Dr.N.KumariVinodhana Assistant Professor (PBG)	More hybridsmaybenominated for AICRP trials
2.	AICRP/PBG/VGI/MAZ/005 ICAR – AICRP on Maize	Continuous Project	Dr.K.R.V.SathyaSheela Asst professor (PB&G) MRS, Vagarai	The project may be continued. The promising hybrids in the AICRP trials shall be utilized for the new inbred development.
IV	**SMALL MILLET**			
1.	AICRP / PBG / ATL / SMM / 008 ICAR – AICRP on Small Millets	Continuous Project	Dr. A. Nirmalakumari Professor (PB & G) CEM. Athiyanthal	The Coordinated trials may be laid out and promising entries have to be utilized in the crossing programme.
V	**AICRP on FC & U**			
	AICRP/PBG/CBE/FCR/026 AICRP on Forage Crops	August 2020 to March 2022	Dr. K.N.Ganesan	The elite cultures identified from breeding programmes may be nominated for AICRP evaluation.

Externally Funded Projects Forage Crops				
	DBT/CPBG/CBE/FC/2019/R004 Establishment of biotech KISAN hub in Two aspirational districts of Tamil Nadu (Virudhunagar and Ramanathapuram)	April 2019 to March 2021	Dr. K.N.Ganesan	The objectives of the project have to be fulfilled without any deviation.

Ia. CENTRE FOR PLANT MOLECULAR BIOLOGY AND BIOTECHNOLOGY

A. Action Plan 2021-22

S.No.	Theme	Proposed plan of work during 2021-2022
1	Theme 2: Evolution of shoot fly and midge resistant sorghum (Dr. N. Senthil and Team)	• Validation of markers linked to shoot fly resistance in sorghum • Developing breeder friendly markers for shoot fly resistance in sorghum • Initiating molecular breeding for developing shoot fly resistant sorghum genotypes
2.	Theme 10: DNA finger printing of varieties/hybrids and pre-release cultures (PI: Dr. R. Gnanam; Dr N. Senthil)	DNA Finger printing of newly released varieties and pre-release cultures will be carried out;

A1. New Action Plan (2021-2024)

Theme: UNRAVELLING NUTRITIONAL AND THERAPEUTIC CLUES IN SORGHUM

Unraveling therapeutic clues of sorghum Dr. M. Raveendran Dr. N. Manikanda Boopathi	Work Plan (2021-22) • Non-targetted metabolomics using LC-MS/MS • Re-sequencing of the panel using GBS/RAD • GWAS analysis of yield and metabolite accumulation

B. Remarks of the Ongoing URPs / Externally Funded Projects in CPMB

University Research Projects

Sl. No.	Project No. and Title	Duration	Investigators	Remarks
1	CPMB/VVNR/BIC/2019/001: Studies on profiling of nutritional and anti-nutritional factors in selected minor millets	June'2019 - May 2021	Mr. S. Pandarinathan AP, Biochemistry	Project to be continued for one more year. Reliable and reproducible protocols may be used for quantifying nutritional and anti-nutritional factors

2	DBT/CPMB/MDU/DPB/2015/R003: Enrichment of nutritional quality in maize through molecular breeding	March'2015 – Sep'2020	Dr. N. Senthil, Professor, DPMB&B	Project completed. Leads obtained may be used for proposing externally funded projects
3	CPMB/CBE/PBT/2018/CP004: DNA fingerprinting and barcoding of varieties and hybrids and pre- release cultures for varieties/hybrids identification and notification	April'2018 – Sep'2020	Dr. R. Gnanam, Professor& Head, DPMB&B, Dr. N. Senthil, Professor (Biotechnology) Dr. N. Manikanda Boopathi, Assoc. Professor (Biotechnology) Dr. P. Jayakanthan, Asst. Professor (Bioinformatics)	Project activities may be continued under new URP
4	ICAR-CRP/CPBG/CBE/PGR/2015/R001 Consortia Research Platform (CRP) of ICAR on "Bio-fortification in selected crops for Nutritional Security-Low phytate maize" at TNAU, Coimbatore	April'2020 – Mar'2025	Dr. A. John Joel, Professor (DPB)	Project may be continued

II. CROP MANAGEMENT

MILLETS

A. Technologies for adoption/OFT

Adoption

1. **Response of sorghum varieties to sowing windows under rainfed *Vertisols***
   Under dryland *vertisols* in Southern zone of Tamil Nadu, pre-monsoon sowing (sowing at 15 days before the normal onset of Northeast monsoon) of sorghum variety CO 30 is recommended for maximizing productivity and profitability.
2. **Weed management for irrigated maize**
   Pre-emergence application of atrazine @ 1 kg *a.i.* /ha at 3 DAS followed by post emergence application of Tembotrione @ 120g *a.i*/ha at 25 DAS in a sequence is recommended for better weed management in irrigated maize. Under situations of non-application of pre-emergence herbicide, early post emergence application of either Tembotrione @ 120 g *a.i*/ha + Atrazine @ 0.75 kg *a.i.*/ha (or) Topramezone @ 25.2 g *a.i*/ha + Atrazine @ 0.75 kg *a.i.*/ha at 15 DAS is found equally effective in controlling weeds.
3. **System of Finger millet Intensification (SFI) for rainfed agro ecosystem**
   System of Finger Millet Intensification with adoption of 7.5 kg /ha seed rate with a spacing of 30 x 10 cm and hand weeding on 15th DAS and mechanical weeding on 30th DAS is recommended for maximizing the productivity of direct sown finger millet under rainfed ecosystem.
4. **Kodomillet (*Paspalum scrobiculatum*) based intercropping system**
   Varagu + Blackgram (1:1) intercropping system is best suited for getting higher yield and net income for irrigated and rainfed agro-ecosystems of Tamil Nadu.
5. **Organic cultivation practices for Finger millet**
   Soil application of 6.5 t FYM + raising sunnhemp & ploughing *in situ* on 45 DAS + foliar spray of 3 % Panchakavya at 45 DAP is a set of practices recommended for achieving higher yield with economics of organic finger millet cultivation.
6. **Optimization of N, P and K requirement for Barnyard millet (var. MDU 1) in Red and Black soils**
   The on farm trials conducted at Coimbatore, Madurai and Athiyandhal showed thatin light textured red soil, application of 50:15:15 kg NPK ha^{-1}recorded maximum mean grain yield of 1862 kg ha^{-1} and B:C ratio of 2.36, followed by the application of 40:15:15 kg NPK ha^{-1} (1703 kg ha^{-1}). The increase was 20.12 per cent over the recommended dose of 44:22:0 kg NPK ha^{-1} which recorded 1550 kg ha^{-1}. In black soil, application of 40:15:15 kg NPK ha^{-1} recorded maximum mean grain yield of 1892 kg ha^{-1} and B:C ratio of 2.41 followed by the application of 50:15:15 kg NPK ha^{-1} respectively.Therefore, application of 50:15:15 kg NPK ha $^{-1}$for light textured red soil and 40:15:15 kg

NPK ha^{-1} for heavy textured black soil can be recommendedto achieve higher yield of barnyard millet and to sustain the soil fertility status.

7. **Fertiliser Prescription Equations under IPNS for Little millet on Inceptisol**

   Targeting of 1.75 to 2.00 t ha^{-1} grain yield of Little millet under STCR-IPNS is found to be ideal in terms of yield (1.81 and 2.03 t ha^{-1}), Response Ratio (8.48 & 9.59 kg kg^{-1}), Benefit Cost Ratio (1.96 &1.44) and soil fertility maintenance. Therefore, Soil Test Crop Response based fertiliser prescriptions under Integrated Plant Nutrition System (STCR-IPNS for 1.75 & 2.00 t ha^{-1}) *i.e.* application of fertiliser N, P_2O_5 and K_2O based on initial soil test values along with FYM @12.5 t ha^{-1} can be recommended for achieving higher yield, response ratio and BCR for Little millet on Irugur soil series (Typic Ustropept) and allied soil series of Tamil Nadu.

On Farm Trial

OFT 1. Effect of Potassium on partitioning efficiency and productivity of minor millet crops

Objective:

- To study the effect of Potassium on partitioning efficiency and productivity in minor millet crops under rain fed condition

Crops : Foxtail millet and Little millet

Treatments

T1: Control
T2: Foliar spray of K_2SO_4 (1%) at 35 DAS
Season: *Kharif / Rabi,* 2021

Observations to be recorded:

Physiological traits *viz*, specific leaf weight, NAR, RGR, TDMP at different stages, yield parameters, yield and economics

Centres and Scientists

Co –ordinating centre : RRS, Paiyur
Scientists incharge : Dr. R. Sivakumar, Asst Prof. (Crop Physiology)
Dr. P. Parasuraman, Professor and Head
Other centres & scientists in charge :
Dept. of Crop physiology, TNAU, CBE : Dr. A. Senthil, Assoc. Prof. (Crop Physiology)
CEM, Athiyandal : Dr. K. Ananthi, Asst. Prof. (Crop Physiology)

OFT 2. Evaluation of organic production system in Barnyard millet

Objective:

- To evaluate the best performing organic package of practices for barnyard millet.

Treatments

T1 - 75% organic (organic manures equivalent to 75% N requirement of the system) + innovative organic practice (3% *Panchakavya* + Azophos @ 2kg/ha)
T2 - State recommendation (FYM 10 t/ha + Azophos @ 2kg/ha +100% RDF)
T3 - RDF alone
Season: *Kharif / Rabi* 2021

Observations to be recorded:

All growth and yield parameters, grain yield, straw yield and economics

Centres and Scientists

Coordinating Centre	:Dept. of Sus. Organic Agriculture, TNAU, CBE
Scientists incharge	: Dr. S. Manickam, Prof. & Head
	Dr. M. Suganthy, Assoc. Prof. (Agrl. Entomology)
Other Centres	:
CEM, Athiyandal	: Dr. K. Sathya, Asst.Prof. (Agronomy)
AC&RI, Madurai	: Dr. E. Subramanian, Asst. Prof. (Agronomy)
RRS, Paiyur	: Dr. P. Parasuraman, Prof. & Head

OFT 3. Verification of land configurations and nutrient recommendation for dual sorghum (K 12) in dryland Vertisols tract of Southern Tamil Nadu

Objective: To evaluate the land configuration and nutrient management for dual sorghum

Treatments

Main plot: Land configuration

M_1: Tied ridges
M_2: Farmer's practice (sowing with cultivator)

Sub plot: Fertilizer treatments

S_1: STCR - IPNS based NPK
S_2: 100% NPK (40:20:20 kg ha^{-1}) + FS 1% $FeSO_4$ + 0.10% citric acid + 0.50% $ZnSO_4$ ha^{-1}

Duration : One Year (2021-2022)

Observations to be recorded

- Initial and Post harvest soil analysis for pH, EC, available N,P & K and organic carbon
- Weather parameters: Crop seasonal rainfall, rainy days
- Yield parameters
- Grain and straw yield
- Rainwater use efficiency

Lead Centres and Scientists:

Agrl. Research Station, Kovilpatti
Dr. K.Baskar, Professor and Head
Dr. V. Sanjeev Kumar, Asst.Professor (SS&AC)

Co-ordinating centres & Scientist In-charge

Regional Research Station, Aruppukottai
Dr.S.Srinivasan, Professor and Head

OFT 4. Evaluation of Sorghum Varieties for their tolerance to Sodicity

Objective: To evaluate sorghum varieties for their tolerance to Sodicity

Treatments

Exchangeable Sodium Percentage (ESP): 20 – 40%
Sorghum varieties**:** K 12, CO 30 & local variety of the area
Duration:One Year (2021-2022)

Observations to be recorded

- Initial and Post harvest soil analysis for pH, EC, and ESP
- Grain and straw yield

Lead Centres and Scientists:

Dr.P. Balasubramanian, SS&AC, ADAC &RI, Trichy
Dr. A. Subramanian, Assoc. Professor (PBG)
Dr.A.Alagesan, Asst.Professor (Agronomy)

Co-ordinating centre & Scientists In-charge

i.AC&RI, Kudumiyanmalai :

Dr. P. P. Mahendran, Prof. & Head (SS&AC)
Dr. R. Jagadeeswaran, Assoc. Prof. (SS&AC)
Dr. M.Madhan Mohan, Assoc. Prof.(PBG) &Head

ii. KVK, Villupuram :

Dr. P.Sridhar , Programme Coordinator
Dr. G. Gomadhi, Asst.Prof (SS&AC)
Dr. K. Parameswari, Asst.Prof (Seed Tech)

iii. RRS, Paiyur

Dr. M. Vijayakumar, AP (SS&AC)
Dr. K. Geetha, Professor (PBG)

OFT 5. Economising phosphorus use in maize - groundnut sequence

Objective

To economise phosphorus use in maize - groundnut sequence

Treatments

Maize	Groundnut
T_1 : Recommended dose of phosphorus (RDP) as SSP	T_1 :RDP as SSP
T_2 : 75 % RDP as chitosan coated DAP	T_2 :RDP as SSP
T_3 : 75 % RDP as chitosan coated DAP	T_3 :75 % RDP as chitosan coated DAP

Observations/ Analysis

Grain yield
P uptake
Available P status (initial and post-harvest)
Response Ratio
P recovery percentage

Lead centre & Scientist In-charge

Department of SS&AC, TNAU, Coimbatore
Dr. S.Meena, Professor (SS&AC)

Co ordinating centre&Scientist In-charge

ARS, Bhavanisagar: Dr.D. Muthumanickam, Professor (SS&AC)
IoA, Kumulur : Dr. M. Baskar, Assoc. Professor (SS&AC)

B. Action Plan

Action Plan 1: Validation of STCR-IPNS based Fertiliser Prescriptions for hybrid maize under drip fertigation

Rationale

- Rational usage of fertiliser inputs
- Site specific & balanced nutrient supply for higher yield
- Nutrient requirement of the crop, nutrient contribution from soil, fertilizer and organic manure are taken care of
- Higher FUE and water use efficiency along with sustained soil health and productivity

Objectives

To validate STCR-IPNS fertilizer prescription equation developed for hybrid maize under drip fertigation

Duration: 2 Years (2021-2023)

Treatments

T_1 : STCR-NPK alone-8.0 t ha^{-1}
T_2: STCR-NPK alone-9.0 t ha^{-1}
T_3: STCR-NPK alone-10.0 tha^{-1}
T_4 : STCR-IPNS -8.0 t ha^{-1}
T_5 : STCR-IPNS -9.0 t ha^{-1}
T_6 : STCR-IPNS -10.0 t ha^{-1}
T_7 : Blanket recommendation
T_8 : Blanket + FYM
T_9 : Farmer's Practice
T_{10}:Absolute control

Soil Type : Palaviduthi soil series

Observations to be recorded

- Grain and Straw Yield

Analysis

- Initial soil fertility status and Post harvest soil fertility status

Centre and Scientists involved

Department of SS&AC, TNAU, Coimbatore
Dr. M. Gopalakrishnan, Assistant Professor (SS&AC)
Dr. S. Maragatham, Associate Professor (SS&AC)

Action Plan 2: Development of an efficient plant probiotics to combat moisture deficit stress and yield increase in finger millet (outcome from Univ PDF-CE-Millets)

Scope:

- *Rhizobium esperanzae* CRB6, a potential microbe for drought tolerance and PGP attributes to finger millet (FM)
- Metabolites released by CRB6 confirms its functional potential and
- its compatibility with other microbes offer scope for developing probiotic consortia for FM

Objectives:

- To formulate and optimize suitable delivery mechanism of the microbial consortium for stage specific application
- To evaluate the efficiency of the consortium to combat moisture stress and yield increase

Duration: 2 Years (2021-2023)

Treatments:

$T_{1:}$ Un inoculated control
$T_{2:}$ STCR based RDF
T_3: Liquid formulation *R. esperanzae* CRB6
+ *Bacillus subtilis* CRB7 + *B. altitudinus* FD48 + Yeast SA8+AMF
T_4. NF of above bioinoculants
T_5. T_2+T_3
T_6. T_2+T_4

Parameters to be recorded:

- Live cell based formulation- seed biotization methods
- Physiological parameters : RWC, LAI, stomatal conductance, chlorophyll stability index, transpiration rate etc
- Drought tolerant indices
- Biochemical parameters: Antioxidants and ROS scavenging ability
- Molecular responses (Auxin, ABA, ethylene responsive genes, SA activation, metabolites and genes for plant growth, defense and disease resistance)
- Agronomic traits: Nutrient uptake, RSA (under semi-solid culture) , plant biomass, and yield parameters

Lead Centre & Scientists:

Department of Agricultural Microbiology, TNAU, Coimbatore.
Dr. U. Sivakumar, Prof (AGM); Dr. A. Nirmala Kumari, P&H, CEM, Athiyandhal & Dr.TCK.Sugitha (Fr. PDF, CEM, Athiyandhal)

Coordinating Centres:

1.CEM, Athiyandhal ; Dr. A. Nirmala Kumari, Prof &Head
2.ORS, Tindivanam; Dr.R.Brindhavathy, Assoc.Prof (AGM)
3.RRS, Paiyur ; Dr.P.Parasuraman, Professor (Agronomy)
4.TRRI, Aduthurai ; Dr.S.Sivasankaridevi, Asst.Professor (AGM)
5.TNAU, Coimbatore; Dr. R.Ravikesavan, Prof & Head (Millets), Dr.A.Ramalakshmi Asst.Prof (AGM) & Dr.U.Sivakumar, Prof (AGM)

Action Plan 3 : Dissecting the microbiome of little millet (*Panicum sumatransae* L.) and their mechanism of stress tolerance towards crop growth and fitness ((continued)

Centre & Scientist: Dept.of Agrl. Microbiology, TNAU, Coimbatore
Dr. U. Sivakumar, Professor (Agrl. Microbiology)

Research Projects and remarks
Research Projects -DCM

Crop	Centre	URP	Action plan	Core project	AICRP	EFP	Total
Agronomy							
	Dept. of Agronomy	-	-	-	5	-	5
Sorghum	ARS, Kovilpatti	1	-	-	-	-	1
	Dept. of Agronomy	1	-	-	4	-	5
Pearl Millet	ARS, Kovilpatti	-	-	-	-	-	-
	Dept. of Agronomy,	-	2	-	5	-	7
	MRS, Vagarai	2	-	-	4	-	6
Maize	ARS, Kovilpatti	-	-	-	1	-	1
Finger Millet	ADAC&RI, Trichy	1	-	1	-	-	2
	RRS, Paiyur	2	-	-	-	-	2
	CEM, Athiyandal	-	1	-	-	-	1
	CEM, Athiyandal	-	1	-	7	-	8
Minor Millets	AC&RI, Madurai	2	-	-	-	-	2
	Total	9	4	1	26	-	40
Sustainable Organic Agriculture							
Pearl millet	DSOA, Coimbatore	-	-	-	1	-	1
Finger Millet	DSOA, Coimbatore	-	-	-	1	-	1
Minor Millet	DSOA, Coimbatore	-	-	-	1	-	1
	Total	-	-	-	3	-	3
Crop Physiology							
Sorghum	Dept. of Crop Physiology, Coimbatore	1	-	-	-	-	1
Finger Millet	Dept. of Crop Physiology, Coimbatore	-	-	1	-	-	1
	Dept. of Crop Physiology,	1	-	-	-	-	1
	Coimbatore						
	RRS, Paiyur	2	-	-	-	-	2
Minor Millet	CEM, Athiyandal	1	-	-	-	-	1
	Total	**5**	**-**	**1**	**-**	**-**	**6**

C. Research Projects and Remarks

Directorate of Crop Management

University Research Project (URP)

Agronomy		
S. No.	Project No. & Title	Remarks
Sorghum		
1	AICRP/ DCM/ KPT/ AGR/003 Response of sorghum varieties to sowing windows (September' 2016 to June 2021) Dr. S. Subbulakshmi, Asst. Professor (Agronomy), ARS, Kovilpatti	Project to be closed and completion report to be submitted
2	DCM/KPT/AGR/SOR/2020/001 Conservation agriculture for rainfed sorghum under V*ertisols* (September 2020 to June 2022) Dr. A.Solaimalai, Assoc. Professor (Agronomy), ARS, Kovilpatti	Project to be continued
Pearl millet		
3	Action Plan DCM/CBE/AGR/SMM/2020/001 Studies on performance of pre release pearl millet hybrids under different spacing and nutrient levels (July, 2019 - June, 2022) Dr. R. Karthikeyan, Asst Prof. (Agronomy) Dr. K. Iyanar, Associate Prof. (PB&G) Dept. Of Millets, CBE Dr. A. Renuka Devi, Asst. Prof (SS&AC) Dept. Of Agronomy, TNAU, CBE	Project to be continued
Maize		
4	DCM/VGI/AGR/MAZ/2017/001 Optimizing the pre emergence herbicide and time of post emergence weed management practice in irrigated maize (June , 2017 to May, 2021) Dr. M. Senthivelu,Assistant Professor (Agronomy)	Project to be closed and completion report to be submitted
Finger Millet		
5	DCM/TRY/AGR/SMM/2018/001 Effect of irrigation scheduling on the performance of finger millet varieties in sodic soil of Trichy district, Tamil Nadu (May, 2018 to May, 2020) Dr. S. Avudaithai, Professor (Agronomy) & Head Dept. of Agronomy, ADAC&RI, Trichy	Project to be closed and completion report to be submitted

6	DCM/TRY/AGR/SMM/2018/CP 152 Organic finger millet (*Eleusine coracana.* L.) production under sodic soil (Feb,2019 – Sep,2020) Dr. S. Rathika, Assistant Prof. (Agronomy) Dr.P.Janaki, Associate Prof.(SS&AC) ADAC&RI, Trichy	Project to be closed and completion report to be submitted
7	DCM/PAI/AGR/SMM/2020/002 Evaluation of Integrated Weed Management approaches on Irrigated Ragi (*Eleusine coracana*L.) (Dec 2020 to Mar 2022) Dr.G.Guru, Assoc. Professor (Agronomy), RRS, Paiyur	Project to be continued
8	DCM/PAI/AGR/SMM/2020/003 Evaluation of Integrated Weed Management approaches on rainfed Ragi (*Eleusine coracana*L.) (Dec 2020 to Mar 2022) Dr.G.Guru, Assoc. Professor (Agronomy), RRS, Paiyur	Project to be continued
Minor Millets		
9	DCM/MDU/AGR/SMM/2020/002 Evaluation of *Vrikshayurvedic farming* practices in kodo millet (*Paspalum scrobiculatum)* (July, 2020 to June,2021) Dr. C. Swaminathan, Professor (Agronomy) Dept. of Agronomy, AC&RI, Madurai	Project to be continued
10	DCM/MDU/AGR/SMM/2020/001 Developing *Vrikshayurvedic farming* protocols for panivaragu (*Panicum miliaceum)* (January 2020 to June 2021) Dr. C. Swaminathan, Professor (Agronomy) Dept. of Agronomy, AC&RI, Madurai	Project to be continued
AICRP Experiments on sorghum		
11	AICRP/PBG/CBE/SOR/006 Evaluation of pre-released kharif grain sorghum genotypes for their productivity under rainfed environment Dr. N. Vadivel, Assoc. Prof. (Agronomy), Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
12	AICRP/PBG/CBE/SOR/006 Performance of pre-released sweet sorghum genotypes under rainfed environment Dr. N. Vadivel, Assoc. Prof. (Agronomy), Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
13	AICRP/PBG/CBE/SOR/006 Quantifying the response of kharif grain sorghum to different levels and sources of sulphur Dr. N. Vadivel, Assoc. Prof. (Agronomy), Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet

14	AICRP/PBG/CBE/SOR/006 Performance of sorghum under different tillage systems Dr. N. Vadivel, Assoc. Prof. (Agronomy), Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
15	AICRP/PBG/CBE/SOR/006 Evaluation of parching sorghum (Hurda) genotypes for crop diversification Dr. N. Vadivel, Assoc. Prof. (Agronomy), Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
All India Coordinated Research Project (AICRP) on Pearl Millet		
16	AICRP/PBG/CBE/PEM/009 Effect of mulching and hydrogel on the productivity of pearl millet under rainfed conditions (June, 2017 to May, 2021) Dr. R. Karthikeyan, Asst. Prof. (Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
17	AICRP/PBG/CBE/PEM/009 Performance of different weed management practices on pearl millet productivity (June 2018 to May, 2021) Dr. R. Karthikeyan, Asst. Prof. (Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
18	AICRP/PBG/CBE/PEM/009 Nutrient management through organic sources in rainfed pearl millet (June 2018 to May, 2021) Dr. R. Karthikeyan, Asst. Prof. (Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
19	AICRP/PBG/CBE/PEM/009 Effect of tillage and nutrient management systems on pearl millet productivity (June,2020 - May, 2023) Dr. R. Karthikeyan, Asst. Prof. (Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
All India Coordinated Research Project (AICRP) on Maize		
20	Action Plan Performance evaluation of pre release sweet corn hybrid (CSCH-15001) under varying planting density and nutrient levels (June,2019 - July,2021) Dr.A. P.Sivamurugan, Asst. Professor (Agronomy) Dr. R. Ravikesavan, Professor (PBG) & Head Dept. of Millets, TNAU, Coimbatore Dr. C. Bharathi, Asst. Professor(SS&AC), Dept. of Agronomy, TNAU, Coimbatore	Project to be closed
21	Action Plan Optimizing spacing and nutrient levels for pre release late maturity maize hybrids (Jan,2020 - July,2021)	Project to be closed

	Dr.A. P.Sivamurugan, Asst. Professor (Agronomy) Dr. R. Ravikesavan, Professor (PBG) & Head Dept. of Millets, TNAU, Coimbatore Dr. C. Bharathi, Asst. Professor(SS&AC), Dept. of Agronomy, TNAU, Coimbatore	
22	AICRP/PBG/CBE/MAZ/004 Weed management in maize (June,2019 - May,2021) Dr.A.P.Sivamurugan, Asst. Prof.(Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
23	AICRP/PBG/CBE/MAZ/004 Performance of pre release medium maturity maize genotypes under varying planting density and nutrient levels in *kharif* season (June,2020 - May,2021) Dr.A.P.Sivamurugan, Asst. Prof.(Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
24	AICRP/PBG/CBE/MAZ/004 Long term trial on integrated nutrient management in maize (June,2018 -May,2021) Dr.A.P.Sivamurugan, Asst. Prof.(Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
25	AICRP/PBG/CBE/MAZ/004 Ecological intensification of climate resilient maize based cropping systems (Greengram-Maize) (June 2019 to May, 2021) Dr.A.P.Sivamurugan, Asst. Prof.(Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
26	AICRP/PBG/CBE/MAZ/004 Push-pull strategy for FAW management (June,2020 - May,2021) Dr. A.P. Sivamurugan, Asst. Prof. (Agronomy) Dept. of Millets, TNAU, Coimbatore	Project may be continued/ closed as per the proceeding of the AICRP meet
27	Action Plan DCM / VGI / AGR / MAZ / 2020 / 001 Grain cum fodder production in maize based intercropping system under irrigated condition (July 2020 to June 2023) Dr. M. Mohamed Amanullah Professor (Agronomy), MRS, Vagarai	Project to be continued
28	AICRP/PBG/VGI/MAZ/005 (Agronomy) Performance of pre-release medium maturity genotypes under varying planting density and nutrient levels in *Kharif* season (June, 2020 - May, 2021) Dr. M. Senthivelu Assistant Professor (Agronomy), MRS, Vagarai	Project may be continued/ closed as per the proceeding of the AICRP meet

29	AICRP/PBG/VGI/MAZ/005 (Agronomy) Ecological Intensification for Climate Resilient Maize based Cropping System(Greengram - Maize) (June, 2020 - May, 2021) Dr. M. Senthivelu Assistant Professor (Agronomy), MRS, Vagarai	Project may be continued/ closed as per the proceeding of the AICRP meet
30	AICRP/PBG/VGI/MAZ/005 (Agronomy) Weed Management in Maize Systems (June, 2020 - May, 2021) Dr. M. Senthivelu Assistant Professor (Agronomy), MRS, Vagarai	Project may be continued/ closed as per the proceeding of the AICRP meet
31	AICRP/PBG/VGI/MAZ/005 (Agronomy) Agro-Ecological Options for Fall Army Worm (FAW) Management (June, 2020 - May, 2021) Dr. M. Senthivelu Assistant Professor (Agronomy), MRS, Vagarai	Project may be continued/ closed as per the proceeding of the AICRP meet
All India Coordinated Research Project (AICRP) on Minor Millets		
32	Action Plan - Studies on the production potential of foxtail millet + oilseed intercropping system in Jawadhu hills of Tamil Nadu (2020-2023) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project to be continued
33	Action Plan Finger Millet Intercropping with Blackgram and Red gram under Irrigated Eco-system (2020-21) Dr. K. Sathiya, Assistant Professor (Agronomy) Dr. K. Ananthi Assistant Professor (Crop physiology) Centre of Excellence in Millets, Athiyandal	Project to be continued
34	AICRP/PBG/TVM/GNT/019 Response of pre-released Kodo millet varieties to different levels of fertilizer under rainfed conditions (2019 -2021) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet
35	AICRP/PBG/TVM/GNT/019 Response of pre-released Browntop millet varieties to different levels of fertilizer under rainfed conditions (2020-21) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet
36	AICRP/PBG/TVM/GNT/019 Response of Kodo millet to liquid biofertilizers and their mode of application (2020-21) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet

37	AICRP/PBG/TVM/GNT/019 Response of Brown top millets to liquid biofertilizers and their mode of application (2020-21) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet
38	AICRP/PBG/TVM/GNT/019 Response of millets to different doses of potassium nutrient (2020-21) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet
39	AICRP/PBG/TVM/GNT/019 Chemical weed control studies in Kodo millet (2020-21) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet
40	AICRP/PBG/TVM/GNT/019 Assessing the performance and yielding ability of millets in Rice fallows (2020-21) Dr. K. Sathiya, Asst. Professor (Agronomy) CEM, Athiyandal	Project may be continued/ closed as per the proceeding of the AICRP meet
Sustainable Organic Agriculture, TNAU, Coimbatore		
41	ICAR / DCM / CBE / SOA / 2015 / R001 NPOF : Evaluation of organic, inorganic and integrated production systems in Pearl millet (2018 – 2023) Dr. S. Manickam, Professor and Head & Dr. M. Suganthy, Assoc. Prof. (Agrl. Ento.)	Project to be continued
42	ICAR / DCM / CBE / SOA / 2015 / R001 NPOF :Evaluation of organic, inorganic and integrated production systems in barnyard millet (April, 2018 to March, 2023) Dr. S. Manickam, Prof. & Head, Dr. M. Suganthy, Assoc. Prof. (Agrl. Entomology) DSOA, TNAU, Coimbatore	Project to be continued Results to be given for OFT
43	ICAR / DCM / CBE / SOA / 2015 / R001 NPOF :Evaluation of organic, inorganic and integrated production systems in Finger millet (April, 2018 to March, 2023) Dr. S. Manickam, Prof. & Head, Dr. M. Suganthy, Assoc. Prof. (Agrl. Entomology) DSOA, TNAU, Coimbatore	Project to be continued
Crop Physiology		
44	DCM/CBE/CRP/SOR/2019/001 Assessment of Nanoceria Toxicity At Different Trophic Levels And Its Influence on Sorghum Yield Under Terminal Drought Stress (Nov 2019 to Dec 2021)	Project to be continued

	Dr. M. Djanaguiraman, Assistant Professor, Dept. of Crop Physiology, TNAU, Coimbatore Dr. R. Raghu, Assistant Professor (Agrl. Microbiology) O/o of Dean (Agriculture), TNAU, CBE	
45	DCM/CBE/CRP/CSF/2018/CP009 Development of Crop specific foliar formulations for yield enhancement in selected crops (rice, redgram, sesame and finger millet) under normal and water deficit environments (April 2019 To Sep. 2020) Dr. P. Jeyakumar, Professor (CRP) Co- Project Leaders Dr. V. Ravichandran, Assoc. Prof. (CRP) Dr. S. Vincent, Professor (CRP) Dr. S. Srinivasan, Asst. Prof. (CRP) Dr. N. Sritharan, Asst. Prof. (CRP)	Project to be closed and completion report to be submitted
46	DCM/CBE/CRP/SMM/2020/001 Physiological characterization of minor millets for the traits associated with photosynthesis (April 2019 To March 2021) Dr. A. Senthil, Associate Professor Dept. of Crop Physiology, TNAU, Coimbatore	Project to be closed and completion report to be submitted
47	URP - Physiological evaluation of Tenai and Panivaragu genotypes for low temperature tolerance November 2020 to October 2023 Dr.K. Ananthi, Assistant Professor (Crop Physiology) CEM, Athiyandal	Project to be continued
48	**URP -** DCM / PAI / CRP / SMM / 2019 / 001 Physiological manipulation of source and sink relationship in samai (2019 – 2021) Dr. R. Sivakumar, Asst Professor (Crop Physiology) RRS, Paiyur	Projects to be closed Completion report to be submitted for both the projects due to the results of these projects are combined and recommended for OFT during 2021-22
49	**URP -** DCM / PAI / CRP / SMM / 2020 / 001 Improvement of growth, physiology and yield in Foxtail millet (*Setaria italica*) through plant growth regulators with potassium (2020 – 2022) Dr. R. Sivakumar, Asst Professor (Crop Physiology) RRS, Paiyur	

Research Projects and Remarks -DNRM

Project	Soil Science & Agrl. Chemistry	Agrl. Microbiology
Action Plan	-	1
University Research Project /Core Project /PDF	4	4
All India Coordinated Research Project	1	-
Externally Funded Project	4	-
On Farm Trial/ Validation	2	
Student Thesis	5	1
Total	**16**	**6**

III.Remarks on the ongoing University Research Projects /AICRP/ Externally Funded projects

S. No.	Project details	Remarks
I.	**Department of Soil Science and Agrl. Chemistry**	
A.	**University Research Project on Sorghum**	
1.	NRM/KPT/SAC/SOR/2019/001 Yield maximization through optimization of nutrients for dual sorghum (K12) in different land configurations of dryland Vertisols tract of southern Tamil Nadu October 2019 to September 2022 Dr. K. Baskar, Prof.(SS&AC), ARS, Kovilpatti	• Completion report may be submitted • Recommended for OFT
B.	**University Research Project / Core Project on Maize**	
2.	**NRM/CBE/SAC/PME/2019/001:** Permanent Manurial Experiment of Coimbatore Under irrigated Tropical Agro Ecosystem (Nov. 2018 to March 2024) Dr.G.Sridevi , Assistant Professor (SS & AC) -PI & Dr. D. Jayanthi,Associate Professor (SS & AC)	• Findings may be given for information Compendium on the research findings from the project has to be prepared and released during TNAU Golden Jubilee Celebrations.
3.	**NRM / CBE / SAC /MA2/ 2018/ CP 012 :** Economizing Phosphorus Use in Maize – Groundnut Production by Exploiting Native Phosphorus Build up in Soil (Aug. 2018 to Sep. 2020) Dr. S.Meena, Professor (SS&AC)	• Findings may be given for information • Completion report submitted to Director of Research.
4.	**NRM/CBE/SAC/LTM/2018/CP 063:** Impact of long-term organic and inorganic nutrient management on soil biochemical and biological processes for soil health sustainability (Nov.2018 to Sep.2020) Dr. M. Malarkodi, Asst. Prof (SS & AC),KVK, Sandhiyur Dr. D. Balachandar, Professor (Agrl. Microbiology), AGM, TNAU, Cbe	• Findings may be given for information • Completion report may be submitted to Director of Research.

C.	**AICRPs / NICRA with experiments on Sorghum**	
5.	**AICRP/NRM/TRY/005:** Evaluation of different crops for their tolerance to sodicity levels (April 2018 to March, 2020) Dr.P.Balasubramaniam Professor & Head (SS & AC), ADAC & RI, Trichy	• Details may be included in AICRP Annual Report • Recommended for OFT.
6.	**AICRP/DCM/KPT/SAC/AGR/1971/004 :** Real time monitoring and management of drought in major rainfed crops (October 2019 to September 2021) Dr. K. Baskar, Prof. (SS&AC), ARS, Kovilpatti	• May be continued as per the technical programme
7.	**NICRA/DCM/ KPT/AGR/2017/R004:**Studies on foliar sprays to cope with midseason drought for enhancing the productivity of sorghum under dryland situations in vertisols (2020-2021) Dr. K. Baskar, Prof. (SS&AC), ARS, Kovilpatti	As per the technical programme the project may be closed.
D.	**AICRPs with experiments on Finger Millet**	
8.	**AICRP/NRM/CBE/SAC/002 :** AICRP on Long Term Fertilizer Experiments-Soil Quality, Crop Productivity and Sustainability as influenced by Long Term Fertilizer Application and Continuous Cropping of Finger Millet-Maize sequence in Swell-Shrink Soil Continuous project Dr. D. Jayanthi, Associate Professor (SS & AC) (Project Leader) Dr.G.Sridevi , Assistant Professor (SS & AC) (Co Project Leader)	• Data generated may be brought as compendium and released. • Articles should be published in high NAAS rating and impact factor journal.
E.	**AICRPs with experiments on Small Millets**	
9.	**AICRP/NRM/CBE/SAC/002 :** AICRP on Soil test crop response Soil Test Crop Response Correlation Studies under IPNS for Little Millet (2017-2020) Dr. J. Balamurugan, Asst. Prof. (SS&AC) Dr. R. Santhi, Director (DNRM) Dr. S. Maragatham, Assoc.Prof (SS&AC) Dr. M. Gopalakrishnan, Asst. Professor (SS&AC)	• Project may be closed and details may be included in AICRP Annual Report. • Recommended for Adoption.
10.	**AICRP/NRM/CBE/SAC/002 :** Soil Test Crop Response Correlation Studies under IPNS for Foxtail millet (2019 -2022) Dr. S.Maragatham, Associate Professor (SS&AC) Dr. J.Balamurugan, Asst. Prof.(SS&AC) Dr. M.Gopalakrishnan, Asst. Prof.(SS&AC)	• To be continued • Findings may be given for information

F.	**Externally Funded Projects**	
11.	**DBT/NRM/CBE/SSAC/2019/R009:** Exploiting Plant-Microbial interactions to unlock the fixed nutrients in calcareous soils for increasing the crop productivity and soil fertility (Sept.2019 - Sept. 2022) Dr. T. Chitdeshwari, Professor (SS&AC) Dr.U.Sivakumar, Professor (Agrl. Microbiology)	• Findings may be given for information • To be continued.
II.	**Department of Agrl. Microbiology**	
A.	**University Research Project on Maize**	
1.	NRM/CBE/AGM/MAZ/2020/001: Multifunctional bacterium, arbuscularmycorrhizal fungi (AMF) and *Azospirillumbrasilense* mediated effect on the growth of maize in calcareous soil (Sep,2020 - Aug, 2023) Dr. T. Kalaiselvi, Professor (Agrl. Micro.) Dr. M.R.Latha, Assoc. Professor (SS&AC)	• The isolates may be enumerated from calcareous soil for the present study. • The project may be continued
B.	**University Research Project on Sorghum**	
2.	*NRM/KPT/AGR/SOR/2020/001* Effect of AM fungi on growth and yield of sorghum under rainfed condition (Oct, 2019 - Aug, 2021) Dr. S. Subbulakshmi, Asst. Prof (Agronomy) Dr. JeberlinePrabina, Assoc. Professor (Agrl. Microbiology), AC & RI, Killikulam Dr. N. Sritharan, Asst. Professor (Crop Physiology), AC & RI, Madurai	• One more field experiment may be conducted for confirmation studies.
C.	**Action Plan/URP on Small Millets**	
3.	**Action Plan :** Dissecting the microbiome of little millet (*Panicum sumatransae* L.) and their mechanism of stress tolerance towards crop growth and fitness (2019-2021) Dr. U. Sivakumar, Professor (Agrl. Microbiology)	• To be continued
4.	University PDF: Decoding microbiome associated with Finger millet: A holistic approach on their metabolites and mechanisms towards crop fitness (Nov, 2018 to May, 2020) Dr. P. Parasuraman, Professor & Head, RRS, Paiyur Dr. U. Sivakumar, Professor (Agrl.Micro) Dr. A. NirmalaKumari, Professor & Head CEM, Athiyandhal	• Completion report submitted to Director of Research. • Based on the findings a new action plan may be proposed.
5.	**NRM/MDU/AGM/2020/003**: Microbial nutrient supplementation for certain localized minor millets (Aug, 2020-July 2023) Dr. R.Thamizhvendan, Professor (Agrl. Micro)	• To be continued

Seed Centre

A. List of projects reviewed

Project	Ongoing projects
University Research projects	2
Action Plan	1
AICRP	1
Total	**4**

Remarks on the ongoing projects reviewed
Action Plan

Title	Centre & Scientist in-charge	Duration	Remarks
Seed pelleting for mechanized sowing of small millets	**AC&RI, TNAU, CBE** Dr.P.R.Renganayaki Professor and Head, DSST, TNAU, CBE Dr.S.Lakshmi Assoc. Prof. (SST) Dr.A.P.Mohankumar Asst. Prof.(Farm Mach.) **AEC&RI, Kumulur** Dr.V.Alex Albert Asst. Prof. (SST) **CEM, Athiyandal** Dr.K.Sathya Asst. Prof.(Agron)	2019-2022	The project may be continued. In the pelleting consortia, the beneficialmicrobes may be included to mitigatedrought condition in consultationwith Professor and Head, Dept. of Microbiology, TNAU, Coimbatore.

University Research Projects

Sl. No.	Title	Scientist in-charge	Duration	Remarks
1	SEC/CBE/SST/SOR/2020/001 Assessment of seed storage potential of sorghum genotypes	Dr.S.Kavitha Asst. Prof. (SST)	August 2020 to July 2022	The project may be continued. Proportion of corneous and vitreous endosperm may be observed / measured through image analyser.
2	SEC/BSR/SST/MAZ/2019/001 Study on mitigating the impact of heat stress on flowering phenology, seed yield and quality in maize	Dr.K.Malarkodi Assoc. Prof. (SST) Dr.V.Manonmani Professor (SST) DSST, TNAU, Coimbatore Dr.Babu Rajendra Prasad Asst. Prof. (CRP) TNAU, Coimbatore	September 2019 to August 2021	The project may be extended for one more year to complete the field experiments. Extension proposal may be submitted for approval.

AICRP

Sl. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
1	AICRP/STR/CBE/SEP/001 Integrated approach for enhancing seed yield and quality in Millets	Dr.C.Vanitha Asst. Prof. (SST)	2016-2021	The project may be closed and completion report may be submitted for approval.

Action Plan(2019-2022) :"Seed pelleting for mechanized sowing of small millets" will be continued.

Objectives

- Standardization of pelleting protocols for small millets.
- Evaluation of seed pellets for quality parameters by including beneficial microbes.
- Optimizing the size of seed pellets for air assisted seed drill sowing.
- Evaluation of seed pellets of small millets through air assisted seed drill sowing under field condition.

Co-ordinating centre&Scientist in-charge:	AC&RI, TNAU, CBE	Dr.P.R.Renganayaki Professor and Head DSST, TNAU, CBE Dr.S.Lakshmi Assoc. Prof. (SST) Dept. of Pulses TNAU, CBE Dr.V.Gomathi Professor and Head Dept. of Agrl. Microbiology TNAU, CBE Dr.A.P.Mohankumar Asst. Prof. (Farm Mach.) AEC&RI, TNAU, CBE	Preparation of seed pellets Standardization of microbial consortia for seed pellets Evaluation of field performance of pelleted seeds
Centres& Scientist in-charge	AEC&RI, Kumulur	Dr.V.Alex Albert Asst. Prof. (SST) KVK, Sirugamani	Evaluation of field performance of pelleted seeds
	CEM, Athiyandal	Dr.K.Sathya Asst. Prof. (Agron)	Evaluation of field performance of pelleted seeds

Experiment 1: Standardization of suitable drought mitigating microbial consortia for pelleting

Treatments

The treatments with different combinations of beneficial microbes and TNAU pelleting mixture will be formulated and their efficiency on seed germination and seedling growth will be studied in consultation with microbiologist and seed technologist and the suitable pelleting consortia will be standardized.

Observations

Relevant laboratory observation will be recorded.

Experiment 2: Field evaluation of pelleted seeds with microbial consortia sown by air assisted seed drill

Treatment details

T_1 - Control (unpelleted seeds sown by conventional method)

T_2 - Unpelletedseeds sown by air assisted seed drill

T_3 - Seeds pelleted with TNAU pelleting mixture and sown by air assisted seed drill

T_4 - Seeds pelleted with TNAU pelleting mixture added with microbial consortia and sown by air assisted seed drill

Plot size : 50 cents per treatment
Replication : Non replicated trial

Observations

- Seed rate
- No. of seeds placed per hill
- Field emergence %
- Population at 30,60 DAS and at maturity
- Days to initiation of flowering and 50 % flowering
- No. of total tillers and productive tillers
- Seed yield, straw yield and BC ratio
- Microbial population (cfu) of Azospirillium in soil at vegetative, flowering and maturity stages
- Microbial population (cfu) of Phosphobacteria in soil at vegetative, flowering and maturity stages
- Microbial population (cfu) of Rhizobium in soil at vegetative, flowering and maturity stages
- Period of survival of microbes in the pelleting seed material

FORAGE CROPS

1. Adoption

1. Hydroponic Fodder production under contingency conditions

Adopting the seed rate @ 400 g per. Sq. ft., primed with 0.1% All 19 nutrient solution for 24 hours and harvesting on 9th DAS is suitable for achieving higher maize green fodder yield in low cost hydroponic fodder production system during lean season as a contingency measure.

A. Research Projects on Forage crops

Centre	URPs	AICRP projects	Externally funded projects	Total	No. of Scientist (s)
Dept. of Forage Crops, TNAU	1	5	2	8	1
Dept. of Agronomy, AC&RI, MDU	-	1	-	1	2
MRS, Vagarai & ARS, Kovilpatti	1	-	-	1	1
Total	**2**	**6**	**2**	**10**	**4**

B. Ongoing URPs /AICRPs / Externally Funded Projects

Sl.No	Project No. and Title	Remarks
I. University research projects		
1	**DCM/CBE/AGR/FRG/2020/002** Optimizing the spacing and fertilizer levels in fodder maize pre release culture TNFM 131-9 (June 2019 to May 2021) Dr. S. D. Sivakumar,Assoc. Prof. (Agronomy) & Dr.R.Karthikeyan, Asst.Prof (Agron.)	• Project may be closed. Findings may be given for information
2	**DCM/VGI/AGR/FRG/2020/001** Influence of seed rate, seed priming with chemicals and time of harvest on the productivity of maize fodder under hydroponics system	• Project may be closed. Findings may be given for adoption

	(October 2020 to September 2021) Dr. M. Mohamed Amanullah, Professor (Agron), MRS, Vagarai Dr. G. Sudhagar,Assist. Prof. (Agronomy),ARS, Kovilpatti	
AICRP on FCU projects		
3	K-17-AST-1:Studies on the performance of top feeds under varied planting geometry with and without intercrop (June 2017 to May 2021) Dr. S. D. Sivakumar, Assoc. Prof. (Agronomy)	Project may be closed. Findings may be submitted in ensuing AICRP meet
4	Studies on organic source of nutrient on green forage yield and quality of fodder Cowpea - Fodder maize under irrigated situation (K-17-AST-1). (June 2019 to May 2022) Dr. Dr. S. D. Sivakumar, Assoc. Prof. (Agronomy)	Project may be continued.
5	Optimizing the feedstuffs for air evacuating method of silage production in polybags (June 2020 to May 2022) Dr. S. D. Sivakumar, Assoc. Prof. (Agronomy)	Project may be continued.
6	Precision water management in bajra napier hybrid grass (June 2020 to May 2023) Dr. S. D. Sivakumar, Assoc. Prof. (Agronomy)	Project may be continued.
7	AVTPM-2-1: Second Advanced Varietal Trial in Forage Pearl millet (Agronomy) (June 2020 to May 2021) Dr. S. D. Sivakumar, Assoc. Prof. (Agronomy)	Project may be closed. Findings may be submitted in ensuing AICRP meet
AICRP on NRM projects		
8	Evaluation of performance and response of Cumbu Napier Hybrid CO (BN) 5 to different levels of fertilization through Drip Fertigation (Jan. 2020 to Dec. 2021) Dr. R. Indirani, Asst. Prof. (SS&AC) and Dr. K. Kalaichelvi Asst. Prof. (Agronomy), AC&RI, Madurai	Project may be closed. Findings may be submitted in ensuing AICRP meet
Externally funded projects		
9	**TANII:** Pelletization of forage crops for enhancing livestock productivity (April 2019 to March 2021) Dr. S. D. Sivakumar Assoc. Prof. (Agron.) and Dr. K. N.Ganesan P &H (Forage Crops)	Project may be closed
10	**DBT/CPBG/CBE/FC/2019/R004** Establishment of biotech KISAN hub in Two aspirational districts (Virudhunagar and Ramanathapuram) of Tamil Nadu (April 2019 to September 2022) Dr. S. D. Sivakumar Assoc. Prof. (Agron.) and Dr. K. N. Ganesan P &H (Forage Crops)	Project may be continued.

III. CROP PROTECTION

A. Technologies for Adoption/OFT/Information

1. For adoption : Nil
2. For On Farm Trial

OFT 1: Botanicals for the management of *Sitophilus oryzae* in sorghum

T1	*Acorus calamus* TNAU formulation (Sweet flag 6%EC) @ 10 ml / kg of seed
T2	*Azadirachta indica* (Neem) leaf powder 10 g/kg seed
T3	*Vitex negundo* (Nochi) leaf powder 10 g/kg seed
T4	Emamectin benzoate 5%SG 40 mg/kg seed
T5	Untreated control

Design: CRD
Replication: Four

Observationsto be recorded:

- Mortality assessment will be made immediately after treatment on 3rd, 7th and 15th day after insect release and at monthly intervals up to 6 months.
- Per cent germination after six months

Centres to be involved:

AC&RI, Killikulam (MS)	**:**	Dr. Abdul Razak, Professor (Entomology)
Coordinating Centres	**:**	
Seed Centre, TNAU, Coimbatore	**:**	Dr. R. Arulprakash Asst. Professor (Entomology)
AC&RI, Madurai	**:**	Dr. Zadda Kavitha Asst. Professor (Entomology)
HC&RI (W), Trichy	**:**	Dr. V.R. Saminathan, Assoc. Professor (Entomology)
* MS – Monitoring scientist		

OFT 2: Management of leaf blight disease in barnyard millet

S. No.	Treatments
T1	*Bacillus subtilis* (Bbv57) - seed treatment @ 10g/kg + foliar spray @ 1 g/lit at 30 and 45 DAS
T2	Foliar spray of carbendazim 12% + mancozeb 63% @ 0.2% at 30 and 45 DAS
T3	Farmer's practice

Design : RBD; Replication : 7; Season : Rabi
Observations: PDI, Yield (kg/ha), BC ratio

Centres to be involved:

AC&RI, Killikulam (MS) (Thoothukudi) *	:	Dr. M. Paramasivan, Assistant Professor
Coordinating Centres	:	
CEM, Athiyandal (Thiruvannamalai)	:	Dr. M. Rajesh, Assistant Professor
RRS, Aruppukottai (Virudhunagar)	:	Dr. P. Mareeswari, Assistant Professor
AC &RI, Madurai (Madurai)	:	Dr. S. Thiruvudainambi, Professor
* MS – Monitoring scientist		

OFT 3: Biological management of rust disease in Pearl Millet

S. No.	Treatments
T1	Spraying of *Bacillus subtilis* (Bbv57) @ 0.2% at 30 and 45 DAS
T2	Foliar spray of mancozeb @ 0.2% at 30 and 45 DAS
T3	Farmer's practice

Design : RBD; Replication : 7; Season : *Kharif*
Observations: PDI , Yield (Kg/ha), BC ratio

Centres to be involved:

Dept. of Millets, TNAU, CBE(MS) *	:	Dr. I. Johnson, Assistant Professor
Coordinating Centres	:	
CEM, Athiyandal (Thiruvannamalai)	:	Dr. M. Rajesh, Assistant Professor
RRS, Aruppukottai (Virudhunagar)	:	Dr. P. Mareeswari, Assistant Professor
AC&RI, Killikulam (Thoothukudi)	:	Dr. M.Paramasivan, Assistant Professor
KVK, Tindivanam (Villupuram)	:	Dr. S. Thangeshwari, Assistant Professor
* MS – Monitoring scientist		

3. For information

a. Agricultural Entomology

I. Sorghum

- *Acorus calamus* seed treatment @ 10 ml / kg of sorghum seed was found to be effective upto first three months against *Sitophilus oryzae* and the efficacy declined below 50 per cent beyond 3 months.
- Thiamethoxam 25 WG @ 0.4g/l was effective in reducing the damage caused by earhead pest complex coupled with the highest grain yield (2046 kg/ha) and BCR (1:1.70) followed by fipronil 5 SC @ 0.5ml/l (1952 kg/ha and 1: 1.61).

II. Maize

- The drone spraying with either atomizer or jet nozzle was more or less as effective as other equipment particularly the battery operated backpack sprayer
- A refined IPM module *viz.,* application of neem cake @ 250 kg/ha at the time of last ploughing to increase the plant and soil health; seed treatment with

cyantraniliprole 19.8% +thiamethoxam19.8% FS @ 4 ml/kg seed; border cropping with cowpea, gingelly, redgram or sunflower in garden land conditions and fodder sorghum in dry land conditions @ three rows of selected crop; monitoring of FAW adults using pheromone traps @ 12/ha and damage score at weekly intervals following TNAU 1-5 scale; application of chlorantraniliprole 18.5 SC @ 0.4 ml/ lit (or) flubendiamide 20 WG @ 0.5 g/lit at early stage (15 - 20 DAE) followed by azadirachtin 1500 ppm @ 5 ml/lit on need basis; *Metarhizium anisopliae* (TNAU-MA-GDU isolate) @ 2.5 kg/ha (1.6 x 10^{11} spores / ml) at 35 -40 DAE; emamectin benzoate 5 SG @ 0.4 g/lit or novaluron 10 EC @ 1.5 ml/lit or spinetoram 11.70 SC @ 0.5 ml/lit at late whorl stage (35 - 40 DAE) on need basis; spinetoram 11.70 SC @ 0.5 ml/lit (or) emamectin benzoate 5 SG @ 0.4 g/lit (which is not sprayed at late whorl stage) at tasseling and cob formation stage (60 DAE), if required, is recommended.

b. Plant Pathology

I. Sorghum

- The landraces and UVT entries of sorghum *viz*., Vilathikulam local, Kalugumalai local 1, Kottathur local 6, Nainagaram (TKS 15004), T. Kalupatti (TKS 15007), PYR-2 (RS), SPV 4021, SPV 2680, SPV 2570, SPV 2571, SPV 2569, TNS 678, TNS 696, TNS 697, IS 36504 and IS 36505 showed resistance against ergot, grain mould, anthracnose, rust and downy mildew diseases.
- Spraying of tebuconazole 25.9% EC (0.1%) @1ml/l has recorded a minimum incidence of ergot disease (13.34%) in sorghum with the highest grain yield of 2064 kg/ha.

II. Maize

- For the management of charcoal rot disease in maize, seed treatment with *Bacillus subtilis* (Bbv57) @ 10g/kg of seeds and soil application of *B. subtilis* and *T. viride* @ 2.5kg/ha each at tasseling stage recorded a minimum disease incidence of 3.96% with maximum yield of 6064 kg/ha as against 23.6 % in control with the yield of 4952 kg/ha.
- The TNAU maize inbreds *viz.,* UMI 1220, UMI 1221, UMI 1210 , UMI 1223, UMI 1230 , N09-154-4, N10-105, N09 -164-2, N09 -154-2, N09-153-1-2, S9-2, N 66, NS-333-4-1-3, 52099, 52485, 52327, 52021, 52547, 72603, 70996, 72106, 71051, 71300, 71212, 70281, 701-2-3-3-2-3, N123 and VL-1018300 showed resistant reaction to charcoal rot disease.
- Seed treatment (10g/kg) with *Bacillus subtilis (Bbv57)* and soil application (2.5kg/ha) recorded lower *Fusarium* Post Flowering Stalk Rot (PFSR) incidence (2.0%) in maize compared with untreated control (7.5%).
- Maize leaf blight pathogen (*Helminthosporium* sp.) spore load @ 2.6 to 4.1 no/microscopic field, minimum temperature 19.2 to 23.4°C, dew fall ranged

from 0.11-0.16 mm for 7 days, relative humidity 77-85.7%, or cloudy drizzling for three or more days will lead to the occurrence of the leaf blight disease incidence in maize

- Seed treatment@10g/kg of seed and soil application @2.5 kg/ha of *Bacillus subtilis* (Bbv57) recorded 78.46% reduction in Banded Leaf and Sheath Blight (BLSB) disease incidence in maize and recorded higher grain yield (6.7t/ha). Foliar spraying of hexaconazole @0.2% showed 71.30% reduction of BLSB and recorded the grain yield of 6.5 t/ha.

III. Pearl millet

- Maximum parasitization of pearl millet rust pustules was noticed in the treatment with *Sphaerellopsis paraphysata* conidial suspension spray @10^5 spores/ml (77%), while, there was no parasitization was observed in mancozeb (0.2%) sprayed plants.
- Pearl millet entries *viz*., PT 6705 and GMR 72 showed 3.13 and 1.47 per cent downy mildew incidence under sick plot conditions. Pearl millet Rust disease was the predominant disease on TNAU entries and the incidence was ranged from 7.0 to 13.0 per cent while, blast incidence was recorded in few entries and the incidence ranged from 0.5 to 1.5 grade.

IV. Small millets

- Different varietal mixtures of pre-released cultures (TNEc 1285 + TNEc 1294 + TNEc 1310) of ragi along with blast resistant check variety (GE4449) at 1:1 ratio was found to register lesser incidence (5.78%) of finger blast than susceptible check variety *viz.,* Udara mallike (27.57%).
- Spraying of tricyclazole75% WP @ 0.1% during flowering stage and followed by a second spray at 15 days later reduce the ragi blast disease incidence of 28.21%over control and increase of the yield up to 58.58 % over control. Out of 27 finger millet entries screened against blast disease, none of the lines were shown to be resistant. Three lines *viz.,* PR1731, GPU104 and KMR702 were recorded moderately resistant reaction to leaf blast, neck blast and finger blast diseases.
- In Foxtail millet, 16 entries were screened against blast, rust and brown spot diseases, among them three entries *viz.,* SiA 3159, SiA3303 and IIMR FxM-7 were shown moderately resistant reaction to all the diseases.

B. Action Plan (2021-2022)

I. Agricultural Entomology

1. Survey of major insect pests of millets and development of prediction models
2. Insect pest complex of sorghum earhead and their management.
3. Extent of damage by avian fauna in Millets and measures for management
4. Evaluation of N alkyl chitosan against maize fall armyworm, *Spodoptera frugiperda* (NEW)
5. Evaluation of IPM modules against FAW (NEW)

II. Plant Pathology

6. Monitoring of major diseases of millets and development of disease prediction models
7. Validation of Decision Support System for the management of maize leaf blight disease
8. Evaluation of biointensive Technology for management of maize charcoal rot disease
9. Biological management of rust disease in pearl millet
10. Management of sorghum downy mildew
11. Host specific interaction and biological management of *Magnaporthe grisea* on neutri cereals (New)
12. Epidemiology for fungal diseases of foxtail millet

Action Plan – 1: Survey of major insect pests of millets and development of prediction models

Theme Leader	**Dr. S. Douressamy, Professor (Entomology), AC&RI, Vazhavachanur**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Survey of major pests of millets and documentation (One on campus fixed plot and roving plot study in the District identified during the district specific crop season)	**AC&RI, VVNR** Dr. S. Douressamy, Professor and Head, Dept. of Plant Protection (Crop: Pearl millet, Ragi, Tenai, Samai) (Location: Tiruvannamalai Dt.) **RRS, VRI** Dr. S. Jayaprabhavathi, (Crop: Pearl millet, Ragi, Tenai, Varagu) (Location: Cuddalore Dt.) **TNAU, CBE** Dr. T. Srinivasan, Asst. Professor (Entomology) (Crop: Sorghum, Pearl millet) ((Location: Coimbatore Dt.) **KVK, MDU** Dr. B. Usharani, Asst. Professor (Entomology) (Crop: Sorghum, Kudiraivali) (Location: Madurai) **KVK, APK** Dr. J. Ramkumar, Asst. Professor (Entomology) (Crop: Sorghum, Kudiraivali) (Location: Virudhunagar)	• Fixed plot on campus survey at weekly interval • Roving survey in millet growing regions at fortnightly interval • Periodical recording of weather parameters and correlation of pest population and damage with weather parameters. • Documentation of emerging pests.	• Documentation of pests of millets • Development of bulletin on pests of millets • Regression model for one or two major insect pest of millets

Action Plan 2: Insect pest complex of sorghum earhead and their management.

Theme Leader	**Dr. R. Nalini, Professor and Head, Dept. of Plant Protection, AC&RI, Kudumiyanmalai**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Documenting the insect pest complex of sorghum earhead and evaluation of insecticides starting from milky stage T1 – Thiamethoxam 25 WG 0.4g/l T2 – Azadirachtin 1500 ppm (5 ml/l) T3 – Fipronil 5 SC (0.5ml/l) T4 – Untreated control Treatments: 4; Replication: 5 Design: RBD (The study has to be conducted during Rabi season)	**AC&RI, KDM** Dr. R. Nalini, Professor & Head **TNAU, CBE** Dr. K. Premalatha, Asst. Professor (Entomology) **AC&RI, KKM** Dr. M. Ravi,Asst. Professor (Entomology)	• Collection and identification of earhead infesting pest complex starting from milky stage to grain maturity stage • Preparation of bulletin on earhead pests • Pre-treatment observations on major earhead pests • Post treatment observations after spraying at weekly intervals (7,14 days after spraying)	• Documentation of the earhead infesting pests of sorghum. • Development of Bulletin on the earhead pests. • Management of earhead infesting pest complex

Action Plan 3: Extent of damage by avian fauna in Millets and measures for management

<table>
<tr><td colspan="2">Theme Leader</td><td colspan="3">Dr. Y.S. Johnson Thangaraj Edward, Professor (Entomology), AC&RI, Vazhavachanur</td></tr>
<tr><td colspan="2">Activity</td><td>Scientist incharge and Centre</td><td>Observations</td><td>Deliverables</td></tr>
<tr>
<td colspan="2">Assessment of damage by birds in different millet crops
• Maize
• Sorghum
• Pearl millet

<table>
<tr><th></th><th>Maize</th><th>Sorghum</th><th>Pearlmillet</th></tr>
<tr><td>T1</td><td>Pearl millet - 3 rows (border crop) + reflective ribbons + scare crows (5/ac)</td><td>Pearl millet - 3 rows (border crop) + reflective ribbons + scare crows (5/ac)</td><td>Maize - 3 rows (border crop) + reflective ribbons + scare crows (5/ac)</td></tr>
<tr><td>T2</td><td>Reflective ribbons + scare crows (5/ac)</td><td>Reflective ribbons + scare crows (5/ac)</td><td>Reflective ribbons + scare crows (5/ac)</td></tr>
<tr><td>T3</td><td>Control</td><td>Control</td><td>Control</td></tr>
</table>
</td>
<td><u>AC&RI, VVNR</u>
Dr. Y. S. Johnson Thangaraj Edward, Professor (Entomology)
<u>TNAU, CBE</u>
Dr. T. Srinivasan, Asst. Professor (Entomology)
<u>AC&RI, MDU</u>
Dr. K. Suresh, Asst. Professor (Entomology)
<u>KVK, VRD</u>
Dr. J. Ramkumar, Asst. Professor (Entomology)
<u>KVK, RMD</u>
Dr. Elanchezhiyan, Asst. Professor (Entomology)
<u>RRS, VRI</u>
Dr.C. Vijayaraghavan, Asst. Professor (Entomology)
<u>ARS, BSR</u>
Dr. K. Ganesan, Asst. Professor (Entomology)
<u>Centres and Crops as follows</u>
<table>
<tr><th>Centre</th><th>Maize</th><th>Sorghum</th><th>Pearl millet</th></tr>
<tr><td>AC&RI,</td><td>x</td><td>√</td><td>√</td></tr>
</table>
</td>
<td>• Recording No. of earheads/ cobs damaged by birds at 5 points in the field (4 corners & one at middle) @ 50 plants/ point

• Expressed as % bird damage

• Documenting other management options followed by farmers</td>
<td>• Management of bird problem in millets

• Grading system for bird injury will be formulated</td>
</tr>
</table>

	VVNR					
	RRS, VRI	x	√	√		
	TNAU, CBE	√	x	√		
	ARS, BSR	√	x	√		
	AC&RI, MDU	√	√	X		
	KVK, VRD	√	√	X		
	KVK, RMD	√	√	X		

Action Plan 4: Evaluation of N alkyl chitosan against maize fall armyworm, *Spodoptera frugiperda* (NEW)

Theme Leader	**Dr. M. Shanthi, Professor and Head, Dept.of Agrl. Entomology, AC&RI, Madurai**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
• Preparation of N-alkyl chitosan in glacial acetic acid 1%. • Determination of LC_{50} under laboratory bioassay • Pot culture experiments	**AC&RI, MDU** Dr. M. Shanthi, Prof & Head, Dept. of Agrl. Entomology **TNAU, CBE** Dr. T. Srinivasan, Asst. Professor (Entomology) **AC&RI, KKM** Dr. M. Ravi, Asst. Professor (Entomology) **ADAC&RI, TRY** Dr. P. Yasodha, Asst. Professor (Entomology)	• Per cent mortality • Leaf area fed • Larval, and pupal period • Adult life span • Malformations, if any	Evolving a novel product for the management of maize FAW

Action Plan 5: Evaluation of IPM modules against FAW (NEW)

Theme Leader	**Dr. N. Sathiah, Professor and Head (Entomology) and Nodal Scientist - FAW**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Evaluation of three IPM modules under field conditions in comparison with untreated control IPM modules to be laid out in once acre demo plots preferably in stations or campuses (with minimum of 25 cents each for different modules and another 5 cents for control)	All FAW operating centres under CBE, MDU, TRY and KKM zone **Coimbatore zone (Dr. S.V. Krishnamoorthy)** Thiruvannamalai – Dr. S.Douressamy Kallakurichi – Dr. Y.S. Johnson Thangaraj Edward Coimbatore – Dr. T. Srinivasan Tiruppur – Dr. P. S. Shanmugam Erode – Dr. K. Ganesan Salem - Dr. B. Geetha Namakkal – Dr. Suganya Kanna Tirupattur – Dr. P. Thilagam Vellore – Dr. K. Sasikumar Dharmapuri & Krishnagiri – Dr. K. Govindan **Madurai zone (Dr. M. Shanthi)** Madurai – Dr. Zadda Kavitha Dindigul - Dr. G. Srinivasan Theni – Dr. P. Indira gandhi Pudukottai – Dr. Raja Ramesh Ramanathapuram – Dr. K. Elancheziyan **Trichy zone (Dr. Gailce Leeo Justin)** Cuddalore – Dr. L. Allwin Perambalur - Dr. P. Yasodha Karur – Dr. R. Sheeba jasmine Trichy – Dr. V.R. Saminathan Ariyalur – Dr. M. Chandrasekaran Thanjavur – Dr. V.G. Mathirajan	• Per cent leaf damage and FAW score at 14, 28 and 42 days after emergence (DAE), per cent tassel damage and % cob damage and cob score at the time of harvest. • Number of natural enemies at 14, 28, 42 DAE and at tasselling and cob formation stage • Yield (kg/ha) • BC ratio	• A refined IPM module for adoption by maize farmers throughout the state.

	Tiruvarur - Dr. V.G. Mathirajan Nagapattinam – Dr. V. Radhakrishnan Villupuram – Dr. C. Vijayaraghavan **Tirunelveli zone (Dr. M.R. Srinivasan)** Tenkasi & Tirunelveli – Dr. N. Balakrishnan Thoothukudi – Dr. M. Ravi Virudhunagar – Dr. J. Ramkumar		

Common package to be followed for all modules

- Neem cake-100kg / ac at last ploughing
- Seed treatment with Cyantraniliprole 19.8% + thiamethoxam19.8% FS @ 4 ml/kg &*Bacillus subtilis* @ 10 g/kg seed
- Border crop @ three rows - Garden land-cowpea/ gingelly/sunflower & Rainfed- fodder sorghum
- Monitoring of FAW adults -pheromone traps @ 5 Nos/ ac
- Application of azadirachtin 1500ppm @ 5ml/lt (on need basis) at late window I
- Release of *Telenomus remus @* 1.25 lakh/haat early Window II **
- *Metarhizium anisopliae* @ 2.5 kg/ha (TNAU-MA-GDU isolate) at early Window II **

Window based application of insecticides

Particulars	Module 1	Module 2	Module 3
Window I	Chlorantraniliprole 18.5SC @ 0.4ml/lt	Flubendamide 480SC @ 0.5 ml/lt	Chlorantraniliprole 18.5SC @ 0.4ml/lt
Window II	Emamectin benzoate 5SG @ 0.4g/lt	Spinetoram 11.7SC @ 0.5ml/lt	Novaluron 10EC @ 1ml/lt

** *Telenomus remus* and *Metarhizium anisopliae* will be supplied by Dr. S. Jeyarani, Professor (Entomology), TNAU, Coimbatore

Action Plan – 6: Survey of major diseases of millets and development of prediction models

Theme Leader	**Dr. I. Johnson, Asst. Prof. (Pl. Path.), Dept. of Millets, TNAU, Coimbatore**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
1. Fixed plot on/off campus 2. Roving survey in millet growing regions.	**TNAU, CBE** Dr. I. Johnson, asst. Professor (Pl. Pathology) (Crop: Pearl millet, Sorghum, Maize; Location: Coimbatore & Erode) **AC&RI, MDU** Dr. R. Akila, Asst. Professor (Pl. Pathology) (Crop: Maize, Sorghum & Kudiraivali; Location: Madurai) **MRS, Vagarai** Dr. R. Radhajeyalakshmi, Asst. Professor (Pl. Pathology) (Crop: Maize, Sorghum, Pearl millet; Location: Dindigul&Tiruppur) **CEM, ATDL** Dr. M. Rajesh, Asst. Professor (Pl. Pathology) (Crop: Ragi, Tenai, Pearl millet, Samai; Location: Dharmapuri, Krishnagiri, Salem,Tiruvannamalai & Vellore **RRS, VRI** Dr. G. Senthilraja Asst. Professor (Pl. Pathology) (Crop: Maize, pearl millet, Ragi, Varagu, Tenai; Locaton: Villupuram, Perambalur, Cuddalore & Kallakurichi) **AC&RI, KKM** Dr. M .Paramasivam, Asst. Professor (Pl. Pathology) (Crop: Ragi, Tenai, Pearl millet & Samai; Location: Thoothukudi)	• Occurrence of major diseases • Periodical recording of weather parameters	Regression model diseases of millets

3. Forewarning model for ragi blast with available data has to be developed and revalidated by CoE, Athiyandal centre.	**CEM, ATDL** Dr. M. Rajesh, Asst. Professor (Pl. Pathology)	• Disease incidence in forecasting based management and normal method of management.	1. Precision in ragi blast disease management 2. Reduction of cost cultivation. 3. Need based spray of fungicide.

Action Plan : 7 - Validation of Decision Support System for the management of maize leaf blight disease

Theme Leader	**Dr. V. Sendhilvel, Asst. Prof. (Pl. Pathology) Dept. of Millets, TNAU, Coimbatore**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
1. To study the periodical spore trapping after sowing. 2. Ensuring the Predicted necrotic spot to be developed 8 to 9th week after sowing while prevailing the thumb rule 3. Weather parameters for the occurrence of foliar disease to be validated	**TNAU, CBE** Dr. V. Sendhilvel, Asst. Professor (Pl. Pathology) (Location: Coimbatore) **MRS, VGI** Dr. R. Radhajeyalakshmi, Asst. Professor (Pl. Pathology) (Location: Dindigul) **CEM, ATDL** Dr. M. Rajesh, Asst. Professor (Pl. Pathology) (Location: Thiruvannamalai) **ADAC&RI, TRY** Dr. P. T. Sharavanan, Asst. Professor (Pl. Pathology) (Location: Perambalur)	Observation to be recorded • Weekly spore count. • Day of first occurrence of the disease. • Weather parameters during the first occurrence of the disease (RH, Rainfall, Temperature, Dew fall) • PDI for leaf blight disease	• Disease forewarning model development for effective disease management
Validation of prediction model	Dr. S. Kokilavani, ACRC, TNAU, Coimbatore		

Action Plan: 8 Evaluation of biointesive technology for management of maize charcoal rot disease

Theme Leader	**Dr. V. Sendhilvel, Asst. Prof. (Pl. Path.,) Dept. of Millets, Coimbatore**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Bio intensive management of maize charcoal rot Treatments : T1- Seed treatment with *Bacillus subtilis* (Bbv 57)@ 10g/kg of seeds T2- Seed treatment with *Bacillus subtilis* (Bbv 57)@ 10g/kg of seeds and soil application of *B. subtilis* (Bbv 57)and *T. viride* @ 2.5kg/ha each at Tasseling stage T3 - Spot drenching with carbendazim @ 1g/l T4 – Control	**TNAU, CBE** Dr. V. Sendhilvel, Asst. Professor (Pl. Pathology) **MRS, VGI** Dr. R. Radhajeyalakshmi, Asst. Professor (Pl. Pathology) **CEM, ATDL** Dr. M. Rajesh, Asst. Professor (Pl. Pathology) **ADAC&RI, TRY** Dr. P. T. Sharavanan, Asst. Professor (Pl. Pathology) **TCRS, YPR** Dr. N. Indra, Asst. Professor (Pl. Pathology)	Charcoal rot disease incidence (%), 2.Yield in Kg; 3.BCR	Biological control of charcoal rot of maize

Action Plan : 9 Biological management of rust disease in pearl millet

Theme Leader	**Dr. I. Johnson, Asst. Prof. (Pl. Path.), Dept. of Millets, Cbe**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Evaluation of actinobacteria for rust disease management in pearl millet Treatments 1. *Streptomyces rochei*@ 0.2% 2. *Bacillus subtilis* (Bbv 57 @ 0.2%) 3. Mancozeb 0.2% 4. Control Foliar application of talc formulations on 30th and 45th day after sowing for biocontrol treatment Foliar application of mancozeb@0.2% on 30th day and if necessary on 45th day	**<u>TNAU, CBE</u>** Dr. I. Johnson, Asst. Prof. (Pl. Pathology)	• Percentage of parasitisation, • PDI on 60th day after sowing. • Yield • B C ratio	• Effective biocontrol strategy for rust management

Action Plan : 10 Management of sorghum downy mildew

Theme Leader	**Dr. A. Sudha, Asst. Professor (Plant Pathology)**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
Assess the downy mildew severity on fodder sorghum in Tamil Nadu and Integrated Management of downy mildew disease Treatments 1. ST with metalaxyl @6g/kg 2. ST with *Bacillus subtilis* (Bbv 57) @ 5ml/kg 3. ST with metalaxyl @6g/kg and *Bacillus subtilis* (Bbv 57) @ 5ml/kg 4. ST with metalaxyl @ 6g/kg and *Bacillus subtilis* (Bbv 57) @ 5ml/kg + spraying of mancozeb @ 2.5g/litre on 15th day followed by spraying of *Bacillus subtilis*(Bbv57) @ 0.2 % on 30th day 5. ST with metalaxyl @6g/kg + spraying of mancozeb 2.5g/litre on 15th and 30th day 6. Spraying of mancozeb @2.5g/litre on 15^{h} day followed by *B. subtilis* (Bbv57) @ 0.2 % on 30th day 7. ST and foliar spraying of *Bacillus subtilis* (Bbv57) @ 0.2 % on 15th and 30th day if necessary on 45th day 8. Foliar spraying of *B. subtilis* (Bbv57) @ 0.2 % on 15th , 30th and on 45th day 9. Control Replication: Three Design: RBD Season: Kharif	**TNAU,CBE** Dr.A.Sudha, Asst. Prof. (Pl. Pathology) **TCRS, YPR** Dr. N. Indra, Asst. Prof. (Pl. Pathology) **CEM, ATDL** Dr.M.Rajesh, Asst. Prof. (Pl. Pathology) **RRS, APK** Dr. P. Mareeswari, Asst. Prof. (Pl. Pathology)	• PDI • Yield (straw) • BC ratio • Downy mildew severity report on fodder sorghum in Tamil Nadu	Effective IDM will be developed

Action Plan : 11 Host specific interaction and biological management of *Magnaporthe grisea* on neutri cereals (New)

Theme Leader	**Dr. M. Rajesh, Asst. Professor (Plant Pathology), CEM, Athiyandal**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
• Cross infectivity • Exploitation of endophytes from rainfed small millets ecosystems	**CEM, ATDL** Dr. M. Rajesh, Asst. Prof. (Pl. Pathology) **RRS, VRI** Dr. G. Senthilraja, Asst. Prof. (Pl. Pathology)	• Isolation of pathogen causing blast disease in millets. • Confirmation of host specificity of *M. Grisea* through cross infectivity in cumbu, ragi, tenai and other millets • Isolation, characterization and evaluation of endophytes against *M. grisea*	• Host specificity of *M. grisea* will be identified • Non chemical methods of blast disease management

Action Plan : 12 Epidemiology for fungal diseases of foxtail millet

Theme Leader	**Dr. M. Rajesh, Asst. Professor (Plant Pathology), CEM, Athiyandal**		
Activity	**Scientist incharge and Centre**	**Observations**	**Deliverables**
• Fortnightly sowing of foxtail millet for fungal disease assessment • Development of epidemiological model	**CEM, ATDL** Dr. M. Rajesh, Asst. Prof. (Pl. Pathology)	• Periodical recording of disease incidence along with weather parameters throughout the cropping period. • Formulation and validation of mathematical model to predict the disease	• Development of mathematical model for forewarning of foxtail fungal diseases

List of URP/AICRP/EFP

Type of project	AEN	PAT	Total
University sub projects	5	5	10
University Core Project	1	-	1
AICRP projects	1	4	5
Student thesis	1	-	1
Externally funded project (EFP)	1	-	1
Total	**9**	**9**	**18**

Remarks on the ongoing Research Projects:
Section-C - General Recommendations

a. All the scientists are instructed to monitor the insect pests and diseases of Millets in their districts regularly. In case of outbreak of existing pests or diseases or occurrence of new insect pests and diseases the same has to be reported to the Director (CPPS) immediately.
b. The Scientists identified for pest and disease surveillance in the state are requested to upload the data in the Google Forms on or before 25th of every month for consolidation by the Head of the Departments. The Heads of the Department are instructed to submit the monthly pest and disease surveillance report to the Director CPPS on or before 2ndof every month without fail.
c. The monthly progress made under the OFT and Action Plans should be submitted to the respective Head of the Departments by the Monitoring Scientist/Theme Leader o/b 25th of every month and a consolidated report of the progress made should be made by the respective Head of the Departments to Director CPPS along with the Monthly Reports.
d. Entries found to be resistant to pests and diseases have to be handed over to Breeders. The action taken should be intimated to the Director CPPS and concerned Heads of the Departments at CPPS, TNAU, Coimbatore.
e. A forecasting model for Ragi blast with the available data has to be developed before August 2021 (Action: Dr. M. Rajesh, Asst. Professor (Pl. Pathology), CEM, Athiyandal)
f. A compendium on small millet diseases has to be published within a month (Action : Dr. G. Senthilraja, Asst. Professor (Pl. Pathology), RRS, Vridhachalam

C. Remarks on the Research Projects

1. AGRICULTURAL ENTOMOLOGY

S. No.	Project details	Remarks
1.	**CPPS/CBE/ENT/MAZ/2019/001** Pest Succession and documentation of insect pests	The natural enemies observed have to be

	and natural enemies fauna in maize ecosystem **Dr. T. Srinivasan,** Asst. Professor (Agrl. Entomology) **Period:** Aug, 2019 – Sept, 2021	identified at species level. One more crop has to be raised and the documentation to be continued. The project may be continued.
2.	**CPPS/MDU/ENT/MAZ/2019/002** Development of botanical formulation for the management of fall army worm (*Spodoptera frugiperda*) in maize **Dr. M.Shanthi,** Professor and Head, Department of Agrl. Entomology **Dr. K. Senthil,** Assistant Professor (Agricultural Chemicals), Department of Soils and Environment, AC&RI, Madurai **Period:** September 2019 to August 2021	As per the suggestions of the RPAC Chairman, the project may be deleted.
3.	**CPPS/MDU/ENT/MAZ/2019/001** Monitoring and Management of Maize Fall Army Worm, *Spodoptera frugiperda* (J.E.Smith) with Plant Based Insecticides. **Dr. Zadda Kavitha,** Assistant Professor (Agrl. Entomology), Dept. of Agrl. Entomology, AC&RI, MDU **Dr. K. Senthil ,** Assistant Professor (Agricultural Chemicals) Department of Soils and Environment, AC&RI, Madurai **Period**: September 2019 to August 2022	As per the suggestions of the RPAC Chairman, the project may be deleted.
4.	**CPPS/VGI/ENT/MAZ/2019/001** Influence of Organics on the management of Fall Army Worm in maize under irrigated condition **Dr.N.M.Arivudainambi,** Assistant Professor (Agrl. Entomology), MRS, Vagarai **Period:** Oct, 2019 to Sept, 2022	As per the suggestions of the RPAC Chairman, the project may be deleted.
5.	**CPPS/VGI/ENT/MAZ/2019/002** Eco-friendly management of Fall Army worm in maize under irrigated Condition **Dr. N.M. Arivudainambi,** Assistant Professor (Agrl. Entomology), MRS, Vagarai **Period:** Oct, 2019 to Sept, 2022	As per the suggestions of the RPAC Chairman, the project may be deleted.
6.	**CPPS/CBE/ENT/MAZ/2018/ CP073** Management strategies for fall armyworm, *Spodoptera frugiperda* in maize **Dr. N. Muthukrishnan**, Professor (Entomology), AC&RI, VVNR **Period:** November 2018 to September 2020	The project may be closed and closure proposal submitted immediately.

7.	**AICRP (Maize) - AICRP/PBG/CBE/MAZ/004** AICRP on Maize Improvement – Continuous project Screening Evaluation of maize lines against major pests of maize and development of management strategies **Dr. T. Srinivasan**, Asst. Prof. (Entomology), Dept. of Millets, TNAU, Coimbatore	The project may be continued
8.	**GoTN – F36OT** Developing Integrated Pest Management Module for Maize Fall Armyworm and Validation under Areawide Integrated Pest Management (AWIPM) through Farmer Participatory Approach in Tamil Nadu **Dr. N. Sathiah**, Professor and Head , Dept. of Agrl. Entomology (Lead PI& Nodal Scientist) **Dr. N. Muthukrishnan**, Dean, AC&RI, Vazhavachanur (Lead PI) **Dr. K. Prabakar**, Director, (CPPS) (Team Leader)	The project may be continued

2. PLANT PATHOLOGY

S. No.	Project details	Remarks
SORGHUM		
1.	**CPPS/CBE/PAT/SOR/2019/001** Management of Sorghum ergot disease caused by *Claviceps sorghi* by biocontrol agents and fungicides **Dr. A. Sudha,** Asst. Prof. (Pl.Pathology), Dept.of Millets, TNAU, Coimbatore **Period:** June, 2019 to May, 2022	The project may be continued.
MAIZE		
2.	**CPPS/CBE/PAT/MAZ/2018/001** Biointensive management of charcoal rot in Maize **Dr. V. Sendhilvel**, Asst. Prof. (Pl. Pathology), Dept. of Millets, TNAU, Coimbatore **Period:** March, 2018 to April, 2021	Data for OFT to be generated. The project may be closed. The completion report may be sent.
3.	**CPPS/VGI/PAT/MAZ/2017/001** Studies on the genetic diversity of maize downy mildews in Tamil Nadu **Dr. R. Radhajeyalakshmi,** Asst. Prof. (Pl. Pathology), MRS, Vagarai **Period:** January, 2021 to December, 2024	The project may be continued.

PEARL MILLET		
4.	**CPPS/CBE/PAT/SMM/2018/001** Biological management of pearl millet rust disease using mycoparasite, *Sphaerellopsis filum*(Biv.) B.Sutton **Dr. I. Johnson**, Asst. Prof. (Pl. Pathology), Dept. of Millets, TNAU, Coimbatore **Period:** April, 2018- March, 2021	The project may be closed and the completion report may be submitted immediately.
SMALL MILLETS		
5.	**CPPS/ATL/PAT/SMM/2020/001** Integrated disease management of finger millet blast with bio-agents and new molecule fungicides **Dr. M. Rajesh**, Asst. Prof. (Pl. Pathology) CEM, Athiyandal **Period:** June, 2019 to May, 2021	The project may be closed and the completion report may be submitted immediately.
6.	**CPPS/ATL/PAT/SMM/2020/NEW** Assessment of fungal seed borne pathogens and field infection of major fungal diseases incidence on tenai/ foxtail millet and its management **Dr. M. Rajesh**, Asst. Prof. (Pl. Pathology) CEM, Athiyandal, **Period**: July 2019 to June, 2021	The project may be closed and the completion report may be submitted immediately.
7.	**CPPS/ATL/PAT/SMM/2020/002** Management of finger millet blast disease through varietal composite **Dr. M. Rajesh**, Asst. Prof. (Pl. Pathology), CEM, Athiyandal, **Period**: June 2020 – May 2022	The actual principle and strategy behind the project may be explained. The project may be continued.
AICRP PROJECTS		
8.	**AICRP (Sorghum) - AICRIP/PBG/CBE/SOR/006** Dr. A. Sudha, Asst. Prof. (Pl. Pathology), Dept. of Millets, TNAU, Coimbatore **Period**: Continuous project	The project may be continued
9.	**AICRP (Maize) - AICRP/PBG/CBE/MAZ/004** Dr. V. Sendhilvel, Asst. Prof. (Pl. Pathology), Dept. of Millets, TNAU, Coimbatore **Period**: Continuous project	The project may be continued
10.	**AICRP (Pearl millet) - AICRP/PBG/CBE/PEM/009** Dr. I. Johnson, Asst. Prof. (Pl. Pathology), Dept. of Millets, TNAU, Coimbatore **Period**: Continuous project	The project may be continued
11.	**AICRP (Small Millets) - AICRP/PBG/ATL/SMM/008** Dr. M. Rajesh, Asst. Prof. (Pl. Pathology), CEM, Athiyandal, **Period**: Continuous project	The project may be continued

IV. Remarks of the Vice Chancellor

Crop Improvement

The Vice Chancellor appreciated the efforts of Plant Breeders and expressed that there are sufficient number of varieties and hybrids are available in millet crops. Varieties amenable for mechanization may be developed in millet crops.

- Nutritional profile for Cumbu Napier hybrid grass CO (BN) 5, Super Napier and Australian Red Napier may be carried out.

- Exploration may be taken up for collecting newer accessions of *Cenchrus* sp in different districts Tamil nadu.

Crop management

- Hydroponic fodder production system under natural shade (below trees) may be studied **(Action: Dept. of Forage Crops, TNAU, CBE & MRS, Vagarai).**
- Utilization of microbes (PPFM and others) for water saving in Cumbu Napier hybrid grass under micro-irrigation may be explored **(Action: Dept. of Forage Crops and Dept. of Agrl. Microbiology, TNAU, Coimbatore).**
- Study on non-chemical weed management with leaf extracts of casuarina, tamarind *etc*. and their allelopathic effect on weeds and millet crops may be initiated**. (Action: AICRP- WM unit, Dept. of Agronomy, TNAU, CBE)**
- Establishment of "Millets demonstration plots" comprising of all major and millet crops including maize at ADA farm, Karumanthurai has to be attempted. **(Action: CEM, Athiyandal)**
- Study on the utilisation of shrubs and bushes present along the Cauvery river bank in the sodic soils of Trichy area and their effect of decreasing the sodicity problem may be assessed. **(Action: Dept. of Agronomy & Soil Science, ADAC&RI, Trichy)**
- Chitosan coated DAP @ 75 % RDP may be tried in pulses also. **(Action: Dept. of Soil Science & Agricultural Chemistry, Coimbatore)**

Crop Protection

- A prediction model has to be developed for one or two major pests and diseases in consultation with ACRC, Coimbatore.
- Drone spraying may be tried in farmers fields at the earliest and based on its feasibility and efficacy, the technique can be launched in the ensuing Farmers day scheduled during September 2021.
- The bird scaring technique may be standardised for millet crops

V. List of Participants

Crop Improvement

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