

**TAMIL NADU AGRICULTURAL UNIVERSITY**

**PROCEEDINGS**

**42<sup>nd</sup> Rice Scientists' Meet  
(2<sup>nd</sup> June, 2023)**

**Lead Centre**

**Tamil Nadu Rice Research Institute  
Aduthurai - 612 101, Thanjavur District**

**Directorate of Research  
Tamil Nadu Agricultural University  
Coimbatore - 641 003**

**2023**

## **PROCEEDINGS** **42<sup>nd</sup> Rice Scientists' Meet**

The 42<sup>nd</sup> Rice Scientists Meet was held on 2<sup>nd</sup> June, 2023 through hybrid mode. A total number of 160 scientists participated in the meeting of which 25 scientists by physical mode and 135 through online. Individual review of research projects, Action taken on OFT, Action plan was made by the concerned Technical Directors in the concurrent sessions arranged on 17.05.2023.

Respected Vice-Chancellor, **Dr. V. Geethalakshmi** chaired the session and offered opening remarks. Madam suggested to nominate more number of entries for testing under MLTs/ARTs. It was emphasized to maintain common data sheet for ART trials, coordinate visit by the individual scientists for monitoring and GEO tagging of such trials. It was suggested to constitute focussed theme-based groups and organize regular meetings among the scientists in each thematic group. The seed technologists, breeders and extension scientists were urged to concentrate on seed production and dissemination of elite rice variety to replace BPT 5204. The importance of exploration, collection and conservation of rice germplasm in TNAU, Ramiah Gene Bank was very much emphasized by the Vice-Chancellor. Madam also opined to obtain more AICRP centres in rice and to take actions to upgrade Tirur and Ambasamudhram as regular AICRP funded centres. It was suggested to strengthen research on Nano fertilizers and drone seeding in rice to minimize labour and cost of seeds. Also, submission of release proposals for technology release was insisted.

In his introductory remarks, **Dr. M. Raveendran**, Director of Research insisted to focus on development of high performing rice as well as high rated publication. It was suggested to concentrate on development of varieties with novel traits besides yield. Theme wise brain storming sessions to the scientists working on different aspects of rice was suggested. The scientists were urged to pay more attention on the emerging areas such as bio-fortification, HT rice, DSR techniques and mechanization.

The Action taken reports of 41<sup>st</sup> Rice Scientists Meet 2022, Research Highlights and Action plan for 2023-24 were presented by **Dr. R. Ravikesavan**, Director (CPBG), **Dr. M.K. Kalarani**, Director (CM), **Dr. P. Balasubramaniam**, Director (NRM) and **Dr. M. Shanthi**, Director (CPPS) for Crop Improvement, Crop Management, Natural Resource Management and Crop Protection disciplines respectively. **Dr. K. Subrahmanian**, Director, TRRI, Aduthurai proposed a formal vote of thanks.

The proceeding of the meet is furnished as below

### **I. CROP IMPROVEMENT**

- A. Cultures recommended for variety release/OFT/ART/MLT
- B. Action plan
- C. Project wise remarks

**II. CROP MANAGEMENT**

- A. For Adoption/OFT/Information
- B. Action plan
- C. Project-wise Remarks

**III. A. NATURAL RESOURCE MANAGEMENT  
B. DEPARTMENT OF AGRICULTURAL MICROBIOLOGY**

**IV. CROP PROTECTION**

- A. For Adoption/OFT/Information
- B. Action plan
- C. Project wise remarks

**V. REMARKS**

**VI. LIST OF PARTICIPANTS**

## I. CROP IMPROVEMENT

### A. CULTURES RECOMMENDED FOR VARIETY RELEASE/ART/OFT/MLT

#### I. Cultures recommended for release during 2024

##### 1. AD 17152

Parentage	:	IET 22075 / ADT 48
Duration	:	110-115 days under transplanted condition
Average yield	:	<ul style="list-style-type: none"><li>MLT (24): 6358 kg/ha which is 15.7 and 19.1 per cent higher than ASD 16 and ADT 37</li><li>ART (103): 5812 kg/ha which is 7.15 and 4.81 per cent higher than ASD 16 and ADT 37</li></ul>

##### 2. TNTRH 55

Parentage	:	TNAU 60S /CB SN 405 (TGMS hybrid)
Duration	:	115 -120 days under transplanted condition
Average yield	:	<ul style="list-style-type: none"><li>MLT (15): 5414 kg/ha which is 15.3% increase over ADT 39</li><li>ART (90): 5815 kg/ha</li></ul>
Medium slender grain type with good linear elongation upon cooking (LER: 1.76).		

##### 3. CB MAS 14142

Parentage	:	I.W.Ponni / Apo
Duration	:	120 days under transplanted condition
Average yield	:	<ul style="list-style-type: none"><li>MLT (15): 4647 kg/ha which is 6.2% over Pusa Basmati 1</li><li>ART (19): 5481 kg/ha</li></ul>
Aromatic Long slender grain with good linear elongation ratio. Resistant to Brown spot		

##### 4. ACK 12024

Parentage	:	Mutant of IW. Ponni
Duration	:	125 days under transplanted condition
Average yield	:	<ul style="list-style-type: none"><li>MLT (15): 5616 kg/ha which is 10.5% and 7.8% over TKM 13 &amp; ADT 39</li><li>ART (40): 4933 kg/ha</li></ul>
Medium Slender, HRR – 60 %, Intermediate amylose, Moderately resistant to BLB, Sheath blight & RTD		

#### II. Cultures identified for On Farm Trials (2023-24)

##### 1.AD 13253–Medium- Irrigated

Parentage	:	<b>AD 13253</b> (AD 01246 / CO(R) 49)
Duration	:	132 days
Average yield	:	MLT (15): 5414 kg/ha which is 15.3% increase over ADT 39 ART (90): 5815 kg/ha which is on par with ADT 39.
Salient Features	:	Moderate Resistance to BLB under Artificial condition, Medium Slender grain with good cooking properties

### III. Cultures identified for Second Year ART & OFT (2023-24)

#### 1. Rice 4/2022-23: Transplanted Mid Early (Oct.25<sup>th</sup> –Nov 10<sup>th</sup>, Sowing)

ACK 12024 (Mutant of IW. Ponni) Check: TKM 13	MLT (15): 5616 kg/ha which is 10.5% and 7.8% over TKM 13 & ADT 39 ART (40): 4933 kg/ha	Medium Slender, HRR – 60 %, Intermediate amylose Moderately resistant to BLB, Sheath blight & RTD	All Districts except Virudhunagar, Ramnad, Sivagangai and The Nilgiris
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#### 2. Rice 12/2023-24: Salt Stress Early (May – June / December – January, Sowing)

TR 15057 (IR 20 / CSR 23 / CSR 23) Check: TRY 5	4659 kg/ha in 115 days (13.4 % over ADT 53, 13.9% over TRY 2)	Salinity tolerant, Moderately resistant to BLB, sheath rot, Brown spot	Tiruvarur Nagapattinam Trichy Ramanathapuram Cuddalore Villupuram Tiruvallur Thoothukudi
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### IV. Cultures identified for first year of ART & OFT (2023-24)

#### 1. Rice 15/2023: Transplanted Medium (Sept. – Oct.)

<b>AD 18559</b> (Kalajoha / IW.Ponni) Checks: BPT 5204, CO 52	5619 kg/ha in 135 days (8.0 % over BPT 5204)	Excellent cooking quality similar to RNR 15048	All Districts except Virudhunagar, Ramnad, Sivagangai and The Nilgiris
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#### 2. Rice 10/2023 -24: Rainfed- Early (Sept.- Oct.)

<b>PM 17011</b> (ASD 16 / Chandaikar) Check: TKM 15 & CO 53	4400 kg / ha & 105-110 days	Short duration; Drought Tolerant; Suitable for direct seeding under rainfed and semi dry condition during NEM period (Sep – Oct)	Ramanathapuram, Sivagangai and Virudhunagar Districts
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### V. Multilocation Trials (2023-24)

**Table 1. MLT- I (100 – 120 days maturity; May – June Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
<b>Repeat</b>						
1.	AD 18028	AD 08010/AD 07073	115	MS	6420	ADT
2.	AD 19123	IR 72/FBR 1-15	115	MS	6369	ADT
3.	AS 19103	ASD 16/ADT 45	115	MS	6583	ASD
4.	CB 18527	CO 51 /IET 23750	115	MS	6742	CBE
5.	ACM 15016	JGL 1798/CB 05501	115	MS	6512	MDU
6.	TM 13367	IET 19577/BPT 5204	113	MS	6477	TKM
<b>New</b>						
7.	AD 20020	CO 51/AD 09225	115	MS	6934	ADT
8.	AD 21047	ADT 45 / Wayrarem	115	MS	6606	ADT
9.	CB 17511	CO 51 / ARC 10319	115	MS	7142	CBE
10.	CB 18577	CO 51 / CB 12599	113	MS	7326	CBE
11.	AS 20026	TPS 5 / IR 50	112	SB	6840	ASD

12.	TM 13379	IET 19577 / BPT 5204	115	MS	6635	TKM
13.	TM 13377	ASD 19 / BPT 5204	112	MS	6577	TKM
14.	ACK 13005	IR 68890 x Norungan	119	SB	6331	KKM
15.	TNTRH 131	TNAU 45S / CBSN 386	83	MS	7892	CBE
Checks	:	ADT 53, ADT 57, CO 54, CORH 3 and TPS 5				
Replications	:	Three				
Plot size	:	9 m <sup>2</sup>				
Spacing	:	15 x 10 cm				
Locations (11)	:	Aduthurai, Coimbatore, Ambasamudram, Tirur, Thirupathisaram, Madurai, Killikulam, Thanjavur, Paiyur, Cuddalore and Vaigai Dam				
Seed despatch	:	5.0 kg to be sent before 26.06.2023				

**Table 2. MLT- II (121 - 130 days' maturity; September-October Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
<b>Repeat</b>						
1.	AD 19601	AD07302/CO50	120	MS	6115	ADT
2.	CB 19127*	CR 1009/BG 358	125	SS	6829	CBE
<b>New</b>						
3.	AD 21198*	Turantdhan x IET 22075	123	MS	6309	ADT
4.	AD 21188*	Turantdhan x IET 22075	128	MS	6361	ADT
5.	AD 20269	ADT 45/CT9993	125	MS	6745	ADT
6.	CB 18585	CO 51/ CO 52	125	MS	6908	CBE
7.	CB 17537	CO 51/ WGL 536	124	MS	6532	CBE
8.	CB 20117	CO 52 / I.Samba Mashuri	125	MS	6760	CBE
9.	AS 20020	IR50/TPS 5	124	MS	6770	ASD
10.	TM 20125	ADT 37 / FL 478	125	MS	6493	TKM
11.	TM 15703	Swarna/ BPT 5204	125	MS	6432	TKM
12.	PM 18045	ADT 43 / Kichili samba	118	MS	3703	PMK
13.	ACK 20026	White Ponni X ACK 12024	128	MS	6707	KKM
14.	ACK 14090	ADT43 x IRBB60	121	MS	6905	KKM
15.	TNTRH 127	TNAU 45S / CBSN 361	128	MS	8720	CBE
Checks	:	TKM 13, *RNR 15048 (for SS cultures), US 312				
Replications	:	Three				
Plot size	:	9 m <sup>2</sup>				
Spacing	:	15 x 10 cm				
Locations (11)	:	Aduthurai, Coimbatore, Madurai, Ambasamudram, Tirur, Thirupathisaram, Killikulam, Thanjavur, Paiyur, Cuddalore and Vaigai Dam				
Seed despatch	:	5.0 kg to be sent before 26.06.2023				

**Table 3. MLT- III (131–140 days maturity; Sept.-October Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
<b>Repeat</b>						
1.	AD 18545	ADT46/AD09391	132	SB	8000	ADT
2.	CB 19136	CB 05022/CB 04044	132	SB	6771	CBE
3.	ADKKV 20001	Selection from <i>Karuppu kavuni</i>	134	MS	4856	ADT

4.	ADKKV 20002	Improved <i>Karuppu kavuni</i>	133	MS	4867	ADT
<b>New</b>						
5.	AD 18568	ADT 39/ NDR 359	132	MS		ADT
6.	AD 18600	AD 07302/ AD 08138	135	MS		ADT
7.	AD19509	AD 07302/ AD 08142	135	MS		ADT
8.	CB 20164	I.W. Ponni / CO 52	133	MS	6804	CBE
9.	CB 20166	CO 52 // CO 52 / ISM	136	MS	6767	CBE
10.	CB 20143	CB 12132 / Sriramsena	134	MS	6667	CBE
11.	TM 15127	ADT 43 / IET 21572	130	MS	6521	TKM
12.	TP 16020	TPS 5 / Athira	135	SB	5296	TPS
13.	ACK 14034	TPS 3 x JGL 3884	130	SB	6066	KKM
14.	ACM 20044	RNR 15048/ CB13543	130	MS	6598	ACM
15.	ACM 20045	RNR 15048/ CB13543	130	MS	6369	ACM
16.	TNTRH 99	TNAU 60S/ CB SN 82	126	MS	6756	CBE
Checks	:	ADT 54, CO 52, CO 56, TPS 3, CORH 4, <i>Karuppu kavuni</i>				
Replications	:	Three				
Plot size	:	9 m <sup>2</sup>				
Spacing	:	20 x 10 cm				
Locations (12)	:	Aduthurai, Coimbatore, Ambasamudram, Tirur, Thirupathisaram, Sirugamani, Madurai, Killikulam, Thanjavur, Paiyur, Cuddalore and Vaigai Dam				
Seed despatch	:	5.0 kg to be sent before 26.06.2023				

**Table 4. MLT- IV (> 140 days maturity; August Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
<b>Repeat</b>						
1.	AD 18145	CR 1009/MTU 1075	150	SB	6350	ADT
2.	ADMS 20032-2	Selection from <i>Mappillai samba</i>	143	SB	5920	ADT
3.	ADMS 20035-1	Selection from <i>Mappillai samba</i>	142	SB	5304	ADT
<b>New</b>						
4.	AD 20444	CR 1009/OR 23780-1	148	SB	7097	ADT
5.	AD 20389	CR 1009/MTU1075	152	SB	6499	ADT
6.	AD 20420	CR 1009/MTU1075	150	MS	6331	ADT
7.	ACK 20011	Gamma ray mutant of CR 1009	145	MS	6852	KKM
Checks	:	ADT 51, CR 1009 <i>Sub 1</i> , <i>Mappillai Samba</i>				
Replications	:	Three				
Plot size	:	9 m <sup>2</sup>				
Spacing	:	20 x 15 cm				
Locations (8)	:	Aduthurai, Coimbatore, Ambasamudram, Thirupathisaram, Sirugamani, Killikulam, Thanjavur and Needamangalam				
Seed despatch	:	5.0 kg to be sent before 26.06.2023				

**Table 5. MLT- V (Drought - September Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
<b>Repeat</b>						
1.	PM 18001	PM 02204/PM 09001	110	MS	4463	PMK

<b>New</b>						
2.	PM 19012	ADT 45 / PM 09001	112	MS	3995	PMK
3.	PM 19055	ASD 19 / PMK 1	111	MS	3908	PMK
4.	AD 21096	ADT43/CT 9993-13-3-1	110	MS	6192	ADT
5.	TM 14022	ADT 45 / <i>Kallurundaikar</i>	117	MS	4065	TKM
6.	CB 17561	CO 41/ CB 08504	105	MS	4699	CBE
7.	CB 17542	CO 41/ CO 51	102	MS	5026	CBE
8.	CB HTR 22011	Anna R 4/Robin HTM	111	MS	5835	CBE
9.	TNAU Pyr 01	IWP/Apo	118	MS	6268	CBE
Checks	:	TKM 15 & CO 53				
Replications	:	Three				
Plot size	:	9 m <sup>2</sup> (Direct seeding Natural Environment) 6 m <sup>2</sup> (Rain out Shelter)				
Spacing	:	20 x 10 cm				
Locations (5)	:	Natural Condition: Paramakudi, Tirur, Ramnad, Coimbatore and Madurai				
Locations (2)	:	ROS: Paramakudi and Coimbatore				
Seed despatch	:	4.0 kg to be sent before 31.06.2023				

**Table 6. MLT- VI (Salinity and Submergence - September Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
1.	TNAU Pyr 02#	IWP/FL478	114	MS	5697	CBE
2.	TNAU Pyr 03*	IWP/FR13A	116	MS	5937	CBE
Checks	:	CO 54, TRY 5, CO 43 <i>sub 1</i>				
Replications	:	Four				
Plot size	:	9 m <sup>2</sup>				
Spacing	:	20 x 10 cm				
Locations (2)	:	Natural Condition: Trichy, Ramnad, Aduthurai*				
Seed despatch	:	1.5 kg to be sent before 31.06.2023				

# Salinity screening to be conducted at Trichy

\*Submergence screening to be conducted at Aduthurai

**Table 7. MLT- VII (Bio-fortification)  
Both *Kuruvai* (June Sowing) and *Thaladi* (October Sowing)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
<b>Repeat</b>						
1.	AD 21160	RPHP 48/IR36	125	MS	4033	ADT
2.	AD 21205	Kodai /IR36	128	MS	4000	ADT
3.	AD 21270	Kodai/CO51	128	MS	4833	ADT
<b>New</b>						
4.	AD 21244	IG39 x CO 51	128	MS	5100	ADT
5.	AD 21225	IG39 x CO 51	125	MS	5300	ADT
6.	CB 21102	Paiyur 1 / Kavuni	135	MS	5630	CBE
Checks	:	DRR Dhan 45 as micronutrient (Zn) and yield checks CO 57				
Replications	:	Three				
Plot size	:	9 m <sup>2</sup>				
Spacing	:	20 x 10 cm				
Locations (4)	:	Aduthurai, Coimbatore, Tirur, Madurai, Ambasamudram				
Seed despatch	:	3.5 kg to be sent before 31.06.2023				



**Table 8. MLT- VIII Special MLT Fast Track (Direct sowing Herbicide trial)**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
1	CB HTR 22011	Anna R4/Robin HTM	111	MS	5835	CBE
2	CB HTR 22001	CO 51/Robin HTM	110	MS	6200	CBE
3	CB HTR 22002	CO 51/Robin HTM	110	MS		CBE
Checks		: CO 51, ADT 57 and Anna R 4				
Replications		: Three				
Plot size		: 9 m <sup>2</sup> (Direct seeding Natural Environment)				
Spacing		: 20 x 10 cm				
Locations (5)		: Paramakudi, Tirur, Thirupathisaram, Coimbatore and Aduthurai				
Seed despatch		: 2.0 kg to be sent before 31.06.2023				

**Table 9. MLT IX Special MLT Fast Track Organic Rice**

S. No.	Designation	Cross	Maturity	Rice grade	Yield (Kg/ha)	Nominating centres
1	CB 05022	CO 43/ADT 39	135	MS	4862	CBE
Checks		: CO 48, CO 57, CO 52, ADT 54				
Replications		: Four				
Plot size		: 9 m <sup>2</sup>				
Spacing		: 20 x 10 cm				
Locations (8)		: Coimbatore (Rice, NOFRC), Bhavanisagar, Ramnad, Tirur, Madurai, Killikulam and Aduthurai				
Seed despatch		: 5.0 kg to be sent before 31.06.2023				

**Trial should be conducted under organic condition.**

## **VI. Rice Multilocation Trials Monitoring Team 2023-24**

S. No.	MLT Stations	Monitoring Team
1.	Aduthurai, Thanjavur	Dr. S. Manonmani, P&H, Dept. of Rice, TNAU, CBE Dr. R. Latha, Assoc. Prof. (PBG), RRS, Thirupathisaram
2.	Coimbatore	Dr. P. Jeyaprakash, Prof. (PBG) and Head, ADAC&RI, Trichy Dr. S. Muthuramu, Assoc. Prof. and Head, ARS, Paramakudi
3.	Ambasamudram, Killikulam, Thirupathisaram	Dr. S. Banumathy, Professor and Head, RRS, Tirur Dr. R. P. Gyanamalar, Prof. (PBG), AC&RI, Madurai
4.	Madurai and Vaigaidam	Dr. M. Arumugam Pillai, P&H (GPB), AC&RI, Killikulam Dr. M. Dhandapani, Asst. Prof. (PBG), TRRI, Aduthurai
5.	Paramakudi, Ramanathapuram	Dr. S. Saravanan, Assoc. Prof. and Head, RRS, Ambasamudram
6.	Tirur	Dr. R. Suresh, Assoc. Prof. (PBG), Dept. of Rice, TNAU, CBE
7.	Cuddalore, Palur	Dr. R. Arulmozhi, Asst. Prof (PBG), TRRI, Aduthurai
8.	Trichy, Sirugamani	Dr. R. Pushpam, Prof. (PBG), Dept. of Rice, TNAU, CBE Dr. R. Pushpa, AP (PBG), TRRI, Aduthurai
9.	Paiyur	Dr. Yogameenakshi, Assoc. Prof. (PBG), RRS, Tirur

The services of the Entomologist and Pathologist in the MLT conducting centre or nearby research stations may be availed for pest and disease scoring.

The Monitoring team will visit at appropriate stage of the trial and report on

1. General Conduct of the Trial a. Plot size and Replications adopted b. Labelling of the plots
2. Admixtures, Disease and Pest Susceptibility if any
3. Top Two entries based on visual observations
4. General Remarks of the trial

## B. ACTION PLAN 2023-24

### THEME I. DEVELOPING CLIMATE SMART VARIETIES BY GENE PYRAMIDING

S. No.	Activity	Action Plan 2023-24
<b>Pyramiding of biotic stress resistance genes</b>		
1.	Development of Biotic stress tolerant rice through pyramiding of genes for BLB, Blast and BPH resistance <u>Aduthurai:</u> Dr.M. Dhandapani, AP (PB&G) Dr. K. Rajappan, Prof. (Pl. Patho.) Dr. P. Anandhi, ASP (Agrl. Ento.) <u>Coimbatore:</u> Dr. R. Suresh, Assoc. Prof. (PB&G) Dr. C. Gopalakrishnan, Prof. (Pl. Patho.) Dr. Sheela Venugopal, AP (Ento) <u>Ambasamudhram</u> Dr. S. Saravanan, Assoc. Prof. & Head <u>Thirupathisaram:</u> Dr. Latha, Assoc. Prof. (PBG) <u>Madurai</u> Dr. R. P. Gnanamalar, Prof. (PBG)	<u>Aduthurai:</u> Advancement of F <sub>4</sub> progenies of the multiple crosses: 1. TKM 13/ AD 13066 X CO 52/ BPT 2. TKM 13/ ADT 55 X TKM 13/ AD 13066 3. CO 52/ RP 206818 X TKM 7 / 1306 4. Attempting new crosses involving multiple stress tolerant donors and high yielding parents <u>Coimbatore:</u> Generation advancement of F <sub>3</sub> families of the cross - APD 19026 / RG 170) / (TKM 13 / AD (Bio) 09518)// (CO52 / PTB 33) to F <sub>4</sub> through marker assisted selection for blast, BLB and BPH. Phenotyping of F <sub>3</sub> families for false smut and blast at Gudalur. Sharing of promising materials with Amabasamudhram and Thirupathisaram
<b>Double trouble (drought + salinity) tolerance</b>		
2.	Development of rice genotypes tolerant to drought and salinity stress through marker aided selection <u>Coimbatore:</u> Dr. R. Pushpam, Prof. (PB&G) <u>Trichy:</u> Dr. P. Jayaprakash, Professor & Head Dept of GPB, ADAC & RI, Trichy <u>Paramakudi:</u> Dr. S. Muthuramu, ASP & Head	1. Advancement of Backcross progenies pyramided with QTLs for drought & salinity tolerance 2. Phenotyping under ROS and TPE for drought and salinity 3. New crosses will be attempted using the Multiple abiotic stress tolerant donors

### THEME II. BREAKING THE YIELD BARRIERS IN RICE

S. No.	Activity	Action Plan 2023-24
<b>CREATION OF TNAU 'MAGIC' PLATFORM</b>		
1.	Synthesis of TNAU 'MAGIC' population. <u>Aduthurai:</u> Dr. R. Pushpa, AP (PB&G) Dr. R. Arulmozhi, AP (PB&G)	<u>Aduthurai:</u> a.) Effecting the eight-way crosses and evaluating the eight-way crosses of the following crosses: 1. [(IR 20 / TRY3 // CR 1009/ <i>Thooyamalli</i> )/(CB 16533 / <i>Kranthi</i> // NLR 3449 / Norungan)] // [(I.W. <i>Ponni</i> /RNR

	<u>Coimbatore:</u> Dr. R. Pushpam, Prof. (PBG) Dr. R. Suresh, ASP (PB&G) <u>Tirur:</u> Dr. S. Banumathy, P&H, RRS, Tirur	15048 // <i>Erramallij</i> IR 64 Drt)/(CB 14514 / VGD 1 // ADT 37 / <i>Poongar</i> ) 2. [(TKM 13 /CR 1009//ADT 52/ <i>Mappilai Samba</i> )/ (I.W. <i>Ponni</i> /RNR 15048 // <i>Erramallij</i> IR 64 Drt)] // [(I.W. <i>Ponni</i> /RNR 15048 // ADT 37/ <i>Poongar</i> )/( <i>Erramallij</i> IR 64 Drt // CB 12122/WRM 23-25)] b.) Sharing of multi-parental cross population to all rice breeding centres of TNAU
<b>UTILIZATION OF TROPICAL JAPONICA LINES IN VARIETAL PROGRAM</b>		
1.	New Generation rice hybrids with high yield potential <u>Coimbatore:</u> Dr. S. Manonmani, P&H, Dept. of Rice	Development of three line and two-line rice hybrids utilizing inter sub specific, wild rice and <i>indica / tropical japonica</i> back cross derived restorer / male fertile lines

### THEME III. NUTRITIONALLY ENHANCED RICE VARIETIES

S. No.	Activity	Action Plan 2023-24
A.	Development of bio-fortified rice cultures <u>Aduthurai:</u> Dr. R. Pushpa, AP (PB&G) Dr. M. Dhandapani, AP (PB&G) <u>Coimbatore:</u> Dr. R. Pushpam, Prof. (PBG) Dr. R. Suresh, ASP (PB&G)	A. Conducting MLT – Biofortification B. Evaluation of segregating generation of the following crosses for nutritional traits: ADT 53/ <i>Kodai</i> , ADT 54/ <i>Kodai</i> , IR 36 / <i>Kodai</i> , TPS 5 / <i>Kodai</i> , ADT 39/ <i>Karuppunellu</i> , ADT 39/ <i>Kottanellu</i> , ADT 39/ <i>Savulu Samba</i> , ADT 43/ <i>Karuppunellu</i> , ADT 43/ <i>Kottanellu</i> and ADT 43 / <i>Savulu Samba</i> C. Attempting new crosses involving Fe and Zn rich donors and high yielding parents.

### THEME IV. LAND RACES IMPROVEMENT

S. No.	Activity	Action Plan 2023-24
A.	Release of improved traditional varieties <u>Aduthurai:</u> Dr. R. Pushpa, AP (PB&G) Dr. R. Arulmozhi, AP (PB&G) <u>Coimbatore:</u> Dr. S. Manonmani, P&H, Dept. of Rice Dr. M. Raveendran, Dir. of Research Dr. R. Pushpam, Prof. (PBG) Dr. R. Suresh, ASP (PB&G) <u>Ambasamudhram</u> Dr. S. Saravanan, Assoc. Prof & Head <u>Tirur:</u> Dr. S. Banumathy, P&H Dr. Yogameenakshi, ASP (PBG) <u>Thirupathisaram:</u> Dr. Latha, Assoc. Prof. (PBG) <u>Madurai:</u> Dr. R. P. Gyanamalar, Prof. (PBG) <u>Killukulam:</u> Dr. M. Arumugampillai. P&H, (GBP)	a. Conducting special MLT on PLS b. Improvement of Land races and pure line selection: Aduthurai – <i>Karppukavuni</i> Coimbatore – <i>Mappillai samba</i> Tirur – <i>Manakathai</i> Thirupathisaram – <i>Motta kuruva</i> , <i>Boothakaligaruppan</i> Madurai – <i>Chithiraikar</i>

## THEME V. DEVELOPMENT OF RICE VARIETIES FOR SUBMERGENCE TOLERANCE

S. No.	Activity	Action Plan 2023-24
A.	Evolving breeding lines for submergence tolerance, anaerobic and <i>In situ</i> germination <u>Aduthurai:</u> Dr. R. Pushpa, AP (PB&G) Dr. R. Arulmozhi, AP (PB&G) <u>Coimbatore:</u> Dr. R. Suresh, Assoc. Prof. (PBG) Dr. R. Pushpam, Prof. (PBG)	1. Evaluation of F3 population of ADT52/T198 and ADT51/T198 2. Developing pre-breeding materials using the identified donars viz., <i>Vasaramundane, Mandamaranellu, Aanaikomban, Uppumilagai, Katta samba, Karuthakar, Navara, Kottanel, Gopal bhog, Kandhasali, Kuruvai kalanjiyam, Mutrina samba</i> 3. Introgression of submergence tolerance into elite backgrounds and development of submergence tolerant popular varieties

### NEW ACTION PLANS:

## THEME VI. DEVELOPMENT OF RICE VARIETIES FOR DSR

S. No.	Activity	Action Plan 2023-24
A.	Development of rice varieties for DSR with herbicide tolerance, Anaerobic germination, Early vigour <u>Coimbatore:</u> Dr. S. Manonmani, P & H Dr. M. Raveendran, Dir. of Research Dr. R. Pushpam, Professor (PBG) Dr. R. Suresh, Assoc. Prof. (PBG) <u>Aduthurai:</u> Dr. M. Dhandapani, AP (PB&G) Dr. R. Arulmozhi, AP (PB&G) Dr. R. Pushpa, AP (PB&G) <u>Paramakudi:</u> Dr. S. Muthuramu, ASP and Head <u>Tirur:</u> Dr. Yogameenakshi, ASP (PBG) <u>Thirupathisaram:</u> Dr. R. Latha, Assoc. Prof. (PBG)	1. Evaluation of herbicide tolerance introgressed lines under DSR 2. Marker Assisted introgression of genes/qtls tolerance to herbicide tolerance, anaerobic germination and Early vigour

## THEME VII. EXPLOITING LAND RACES FOR NEW SOURCES OF RESISTANCE

S. No.	Activity	Action Plan 2023-24
A.	Exploiting land races for new sources of resistance to Sheath blight, False smut & YSB <u>Coimbatore &amp; Gudalur:</u> Dr. R. Suresh, Assoc. Prof (PBG) Dr. R. Pushpam, Professor (PBG) Dr. G. Gopalakrishnan, Prof. (Patho.) Dr. Sheela Venugopal, AP (Ento.) <u>Aduthurai:</u> Dr. R. Pushpa, AP (PB&G) Dr. R. Arulmozhi, AP (PB&G) Dr. K. Rajappan, Prof. (Plant Pathology) Dr. P. Anandhi, ASP (Agrl. Entomology) <u>Ambasamudhram</u>	Screening of germplasm lines for Sheath blight, False smut & YSB at hotspot locations

Dr. S. Saravanan, Assoc. Prof & Head Dr. L. Allwin, Assoc. Prof. (Agrl. Ento.) <u>Tirur:</u> Dr. Yogameenakshi, Assoc. Prof. (PBG) Dr. V. A. Vijayashanthi, AP (Agrl. Ento.) <u>Thirupathisaram:</u> Dr. R. Latha, Assoc. Prof. (PBG) Dr. K. Elanchezhyian, ASP (Ag. Ento.), AC&RI, KKM	
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## **THEME VIII. ACCELERATED DEVELOPMENT OF VARIETIES THROUGH - SPEED BREEDING**

S. No.	Activity	Action Plan 2023-24
A.	Accelerated development of rice varieties <u>Coimbatore:</u> Dr. S. Manonmani, P & H Dr. R. Pushpam, Professor (PBG) Dr. R. Suresh, Assoc. Prof (PBG) Dr. N. Sritharan, Assoc. Prof. (Physiology) Dr. G. Senthil Kumar, Assoc. Prof. (Agron.)	1. Standardization of RGA Protocol under speed breeding facility  2. Evaluation of segregating populations involving Mappillai Samba

### **CPMB**

## **THEME I. Next Generation Genomics and Bio-informatics for Allele Mining and Trait Discovery**

S. No.	Activity	Action Plan 2023-24
A.	Whole genome re-sequencing <u>CPMB</u> Dr. M. Raveendran Dr. S. Mohankumar Dr. S. Manonmani Dr. J. Ramalingam Dr. A. John Joel Dr. M. Jayakanthan Dr. N. Saranya	Exploiting IRRI-3K rice genome data for mining novel alleles of yield and stress tolerant genes
B.	Metabolomics Dr. A. John Joel Dr. M. Raveendran Dr. D. Uma Dr. V.P. Santhanakrishnan Dr. N. Senthil Dr. S. Vellaikumar	Metabolite profiling of local rice diversity for medicinal and therapeutic clues

## **THEME II. Newer Biotech Tools**

<b>THEME II. NEWER BIOTECH TOOLS</b>		
A.	Genome editing for trait improvement Dr. D. Sudhakar Dr. M. Raveendran Dr. L. Arul, Dr. S. Mohankumar Dr. E. Kokiladevi Dr. S. Varanavasiappan	<ul style="list-style-type: none"> <li>• Developing tools and techniques for Genome editing in rice</li> <li>• Haplotype diversity of yield and stress tolerant genes in rice and initiating assembly of elite haplotypes</li> <li>• Genomic and Structural studies to confer herbicide tolerance in rice through Computational Approach</li> </ul>

## SEED CENTRE

S. No.	Activity	Action Plan 2023-24
A.	Evaluation of seed coating technique for DSR (Direct Seeded Rice) in dry and puddled condition <u>Seed Centre, TNAU, Coimbatore</u> Dr. K. Malarkodi, Professor (SST) Dr. C. Vanitha, Assoc. Prof. (SST) Dept. of Rice, TNAU, Coimbatore Professor and Head <u>Vazhavachanur:</u> Dr. M. Kathiravan, Assoc. Prof. (SST) <u>Bhavanisagar:</u> Dr. V. Vakeswaran, Assoc. Prof. (SST) Vridhachalam: Dr. K. Natarajan, PC <u>Vamban</u> Dr. C. Menaka, Assoc. Professor (SST) Dr. V. Vijayalakshmi, Asst. Professor (SST)	To assess the effect of seed coating (TNAU <i>Vidhai Amirtham</i> ) and pelleting (TNAU Pelleting) technology on seedling establishment and yield performance of rice under DSR ecosystem

## C. PROJECT WISE REMARKS

### CSM 2023 CROP IMPROVEMENT

S. No.	Project No. & Title	Project Period & PI	Remarks
<b>PROJECTS ON GERmplasm MAINTENANCE</b>			
<b>COIMBATORE - CPBG</b>			
1.	CPBG/CBE/RICE/RIC/2021/002 Germplasm collection, evaluation and conservation in rice	June 2021 – May 2024 Dr. R. Suresh Asst. Prof. (PB&G)	• To be continued
<b>ADUTHURAI</b>			
1.	CPBG/ADT/PBG/RIC/2021/001 Characterization of rice germplasm for nutritional properties	June 2021- May 2024 Dr. R. Pushpa, Assistant Professor (PBG)	<ul style="list-style-type: none"> <li>• Micronutrient content in bio fortified lines and land races need to recheck in another lab</li> <li>• Focus should be given to release improved land races</li> <li>• Quickly advance the purified land races to yield trials</li> </ul>
<b>PROJECTS ON EVOLUTION</b>			
<b>ADUTHURAI</b>			
1.	CPBG/ADT/PBG/RIC/2022/001: Development of high yielding short duration rice varieties / culture with acceptable grain quality and resistance to major biotic stresses.	June 2022 to May 2027 Dr. R. Pushpa, AP (PBG) Dr. K. Rajappan, Professor (Pl. Pathology) Dr. P. Anandhi, ASP (Ento)	<ul style="list-style-type: none"> <li>• Doner like PTB should be used for crossing.</li> <li>• More no. of OFTs and demonstrations has to be laid to release the short bold culture AD 17152</li> </ul>
2.	CPBG/ADT/PBG/RIC/2017/006 Development of breeding stocks in rice with preferable nutritional properties	(Nov 2017- OCT 2022) Dr. R. Pushpa, Assistant Professor (PBG)	<ul style="list-style-type: none"> <li>• May be closed and the materials may be forwarded to CPBG/ ADT/ PBG/ RIC/ 2021/001</li> <li>• Characterization of rice germplasm for nutritional properties.</li> </ul>
3.	CPBG/ADT/PBG/RIC/2021/001: Development of high yielding, non-lodging, long duration (>	August 2020 to July 2025 Dr. R. Pushpa, Asst.	• More focus should be given to develop non-lodging, submergence

	140 days) rice varieties with tolerance to submergence and major biotic stresses	Professor (PBG) Dr. P. Anandhi, Assoc. Professor (Ento)	tolerant varieties. • Land races may be involved in the crossing programme to incorporate anaerobic germination and dormancy
4.	CPBG/ADT/RIC/2023/003 Development of medium duration rice varieties suitable for Tamil Nadu	Sep. 2022 to Aug. 2027 Dr. M. Dhandapani, Asst. Professor (PBG)	• New donors for biotic stresses (BLB, Blast & BPH) may be involved in the crossing programme • To be continued
<b>COIMBATORE – CPBG</b>			
1.	CPBG/CBE/RICE/RIC/2021/006 Developing early maturing (105-115 days) rice varieties resistant /tolerant to BPH and blast	June 2021 – May 2026 Dr. R. Pushpam, Professor (PB&G)	• CO 55 should be popularized aggressively • To be continued
2.	CPBG/CBE/RICE/RIC/2021/003 Evolution of medium duration rice varieties resistance to blast and false smut	June 2021 – May 2026 Dr. R. Suresh Assoc. Prof. (PB&G)	• To be continued
3.	CPBG/CBE/RICE/RIC/2021/004: Development of CMS based rice hybrids with appreciable heterosis for grain yield and acceptable quality	June 2021 to May 2026 Dr. S. Manonmani, Professor (PB&G)	• To be continued
4.	CPBG/CBE/RICE/RIC/2021/005 Development of parental lines for three –line hybrid breeding in rice	June 2021 to May 2026 Dr. S. Manonmani, Professor (PB&G)	• To be continued
5.	CPBG/CBE/RICE/RIC/2022/ 001 Evolution and evaluation of new TGMS lines and two-line TGMS hybrids in rice (URP serial No: URP 2022-0089)	Jan 2022 – Dec 2026 Dr. S. Manonmani, Professor (PB&G) Dr. D. Kumaresan, Professor (PB&G)	• To be continued
<b>COIMBATORE – CPMB&amp;B</b>			
1.	CPMB/CBE/PBT/RIC/2018/CP13 9: Cloning genes associated with K <sup>+</sup> uptake and inturn salt tolerance in rice	2018 - 20 Dr. L. Arul, Prof. (Biotech.)	• To be continued
<b>SEED CENTRE, TNAU, COIMBATORE</b>			
1.	SEC/BSR/SST/RIC/2019/002 Assessment of storage potential of TNAU rice varieties under seed chain	Dr. V. Vakeswaran Assoc. Prof. (SST) ARS, Bhavanisagar	• The project may be closed and completion report may be submitted.
2.	SEC/CBE/SST/RIC/2022/001 Seed storage studies in newly released Rice varieties of TNAU	Dr. R. Jerlin Professor (SST) DSST, TNAU, Cbe	• The project may be continued.
3.	SEC/CBE/SST/RIC/2022/001 Proteomic characterization of selected land races of paddy	Dr. T. Eevera Assoc. Prof. (SST) DSST, TNAU, Cbe	• The project may be continued.
<b>AMBASAMUDRAM</b>			
1.	CPBG/ASD/PBG/RIC/2019/001: Evolving high yielding short duration rice variety suitable for <i>Kar</i> and late <i>Pishanam</i> seasons of Thamirabarani tract	April 2019 – March 2024 Dr. S. Arumugachamy Professor (PB&G)	• Donor parents for major biotic stressed should be used in crossing programme • To be continued

<b>THIRUPATHISARAM</b>			
1.	CPBG/TPS/RIC/2022/001 Evolving medium duration, non-lodging high yielding rice variety suitable for Kumbapoo season in Kanyakumari district	February 2022 to January 2025 Dr. R. Latha, Assistant Professor (PB&G)	<ul style="list-style-type: none"> <li>F<sub>1</sub> seeds of CO 47/<i>Boothakalikaruppan</i> may be shared with Aduthurai for inclusion in MAGIC cross</li> <li>Seeds of <i>Karungkuruvai</i> (Kanyakumari Dt, Type) may be shared with Aduthurai for testing the Fe and Zn content</li> </ul>
2.	CPBG/TPS/PBG/RIC/2020/001. Introgression of nonlodging traits in traditional rice varieties <i>Mottakuruva</i> and <i>Kattisamba</i> by mutation breeding	Dec 2020 to Nov 2025 Dr. R. Latha, Assoc. Prof. (PB&G)	<ul style="list-style-type: none"> <li>Culture in OFT TP 08053 is drop out since there is no yield increase</li> </ul>
<b>TIRUR</b>			
1.	CPBG/TKM/PBG/RIC/2020/002 Developing Multi-Parental Advanced Generation Intercross (MAGIC) population in Rice	Dec, 2019 – Nov, 2024 Dr. P. Yogameenakshi, Assoc. Prof. (PBG)	<ul style="list-style-type: none"> <li>Transfer the drought materials to ARS, Paramakudi</li> </ul>
2.	CPBG/TIR/PBG/RIC/2021/001 Evolving high yielding medium duration rice varieties with good grain quality suitable for irrigated condition	Sep, 2021-Aug, 2026 Dr. S. Banumathy, Professor (PBG)	<ul style="list-style-type: none"> <li>To be continued</li> </ul>
3.	CPBG/TIR/PBG/RIC/2023/001 Development of short duration rice varieties with high yield and acceptable grain quality suitable for semidry/irrigated conditions	Dec, 2022 -Nov, 2027 Dr. P. Yogameenakshi, Assoc. Prof. (PBG)	<ul style="list-style-type: none"> <li>Best cultures for salinity and drought tolerance tested</li> </ul>
<b>MADURAI</b>			
1.	CPBG/MDU/PBG/RIC/2019/001: Evolution of high yielding fine grain quality medium duration rice variety suitable for Periyar Vaigai River Project Area	(December 2018 to November 2023) Dr. A. Sheeba, AP (PB&G) Dr. G. Sreenivasan Assoc. Professor (Agrl. Ento.)	<ul style="list-style-type: none"> <li>Fine grain cultures derived from RNR 15048 may be shared with Aduthurai, Coimbatore and Ambasamudhram.</li> <li>Efforts should be made to attempt diversified crossed involving fine grain parents other than RNR 15048</li> <li>The project may be closed</li> </ul>
<b>GUDALUR</b>			
1.	CPBG/GDR/PBG/Rice/2020/001. Development and Evaluation of TGMS lines in rice	Sept 2020 – Aug 2025 Dr. D. Kumaresan Professor (PBG)	<ul style="list-style-type: none"> <li>To be continued</li> </ul>
<b>AC &amp; RI, KILLIKULAM</b>			
1.	CPBG/ KKM/ PBG/ RIC/ 2014/ 001: Evolution of high yielding short duration rice variety (110-115 days) for kar and pishanam seasons of thoothukudi district.	June 2014 - March 2017- Extended up to March 2022 Dr. M. Arumugam Pillai, Prof. & Head	<ul style="list-style-type: none"> <li>The project may be closed and should submit completion report</li> </ul>
2.	CPBG/KKM/PBG/RIC/2017/001 Development of high yielding medium duration rice variety	April 2017 to March 2022 Dr. S. Saravanan, Asst.	<ul style="list-style-type: none"> <li>The project may be closed and should submit completion report</li> </ul>



	with desirable cooking quality traits suited for <i>Pishanam</i> season in Southern districts of Tamil Nadu	Professor (PBG)	
<b>PARAMAKUDI</b>			
1.	CPBG/PMK/PBG/RIC/2020/002 Development of early duration drought resilient rice genotypes with medium slender grain quality for rainfed rice ecosystem of Ramanathapuram District	Sep. 2020- Aug. 2025 Dr. S. Muthuramu, Assoc. Prof. (PBG) Dr. K. Thangaraj, Professor (PBG),	<ul style="list-style-type: none"> <li>To be continued</li> </ul>
<b>ADAC &amp; RI, Trichy</b>			
1.	<b>CPBG/TRY/ PBG/ RIC/2020/002</b> Development of short duration sodicity tolerant rice varieties (April 2020 – March 2025)	Dr.P.Jeyaprakash Professor (PB&G)	<ul style="list-style-type: none"> <li>Salinity tolerant entries has to be registered with NPBGR and should be given top priority</li> </ul>
<b>MISCELLANEOUS PROJECTS</b>			
<b>ADUTHURAI</b>			
1.	CPBG/ADT/PBG/RIC/2022/New: Nucleus seed production of medium and long duration rice varieties of TRRI, Aduthurai	Aug. 2022 to July 2025 Dr. R. Pushpa Asst. Prof. (PBG)	<ul style="list-style-type: none"> <li>Project may be continued</li> <li>More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
2.	CPBG/ADT/RIC/2023/004: Maintenance breeding of Short Duration Paddy Varieties (TRRI, Aduthurai) through Nucleus Seed production and Supply	July 2022 to May 2027 Dr. M. Dhandapani Asst. Professor (PBG)	
3.	CPBG/ADT/RIC/2023/002: Maintenance breeding of Paddy and Blackgram varieties of TRRI through production and supply of Breeder Seeds	2022- 25 Dr. R. Arulmozhi, Asst Professor (PB&G)	
<b>COIMBATORE - CPBG</b>			
1.	CPBG/CBE/RICE/RIC/2021/001 Maintenance breeding of "CO" rice varieties and breeder seed multiplication	June 2021 – May 2024 Dr. S. Manomani Professor (PB&G) Dr. R. Suresh Assoc. Prof. (PB&G)	<ul style="list-style-type: none"> <li>Project may be continued</li> <li>More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
<b>ADAC &amp; RI, TRICHY</b>			
1.	CPBG/TRY/PBG/RIC/2023/001 Nucleus seed production in crop varieties developed at ADAC&RI, Trichy	October 2022 to September 2025 Dr. A. Thanga Hemavathy, Assoc. Prof. (PB&G)	<ul style="list-style-type: none"> <li>Project may be continued</li> <li>More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
2.	CPBG/CBE/TRY/RIC/2021/001: Breeder seed production and distribution in Rice	June 2021 to May 2024 Dr. A. Thanga Hemavathy, Assoc. Prof. (PB&G)	
<b>AC &amp; RI, MADURAI</b>			
1.	CPBG/MDU/PBG/ BSP /2020/001 Nucleus and breeder seed production of MDU varieties of rice, barnyard millet and black	September,2019 to August, 2022 Dr. S. Lakshmi Narayanan, Prof.	<ul style="list-style-type: none"> <li>The project may be closed and should submit completion report</li> </ul>

	gram	(PB&G)	
<b>TIRUR</b>			
1.	CPBG/TKM/PBG/RIC/2020/001 Nucleus / Breeder seed production of TKM rice varieties	Dec, 2019 – Nov, 2022 Dr. A. Sheeba, Asst. Professor (PB&G) Dr. S. Banumathy, Professor (PBG)	<ul style="list-style-type: none"> <li>• The project may be closed and should submit completion report</li> </ul>
<b>VAIGAI DAM</b>			
1.	CPBG/VGM/PBG/RIC/2022/001: Breeder Seed Production of Rice VGD 1 and ADT 37	Nov 2021 to Oct 2024 Dr. M. Madhan Mohan, Prof. (PBG) & Head	<ul style="list-style-type: none"> <li>• Project may be continued</li> <li>• More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
2.	CPBG/VGM/PBG/RIC/2022/002: Breeder Seed Production of paddy varieties ADT (R) 45 and ADT 51	Nov 2021 to Oct 2024 Dr. C. Parameswari, Assoc. Prof. (PBG) Dr. M. Madhan Mohan, Professor (PBG) Dr. M. Jayaramachandran Asst. Prof. (PBG)	
<b>AC &amp; RI, KILLIKULAM</b>			
1.	CPBG/KKM/PBG/RIC/2017/002 Maintenance breeding for TNAU released rice varieties	Jan 2021- Dec 2026 Dr. S. Saravanan, Asst Prof. (PBG)	<ul style="list-style-type: none"> <li>• Project may be continued</li> <li>• More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
<b>PARAMAKUDI</b>			
1.	CPBG/PMK/PBG/RIC/2020/001 Maintenance breeding of rice varieties released from ARS, Paramakudi.	Sep, 2020 - Aug, 2025 Dr. S. Muthuramu, Assoc Prof. (PB&G)	<ul style="list-style-type: none"> <li>• Project may be continued</li> <li>• More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
<b>BHAVANISAGAR</b>			
1.	CPBG/CBE/BSR/RIC/2021/001 Maintenance breeding in popular rice varieties of Tamil Nadu	June 2021 – May 2026 Dr. K. Amudha ASP. (PB&G) Dr. S. Utharasu Asst. Prof. (PB&G)	<ul style="list-style-type: none"> <li>• Project may be continued</li> <li>• More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
<b>PATTUKKOTTAI</b>			
1.	CPBG/PAT/RIC/2023/001- Breeder seed production in Rice	Nov 2022-Oct 2025 Dr. S. Chitra Assoc. Prof. (PB&G)	<ul style="list-style-type: none"> <li>• Project may be continued</li> <li>• More attention and priority should be given to produce genetically pure nucleus seeds</li> </ul>
<b>SEED CENTRE: Externally Funded Project</b>			
1.	Implementation of PVP Legislation through DUS testing under ICAR and SAU Systems	Dr. V. Manonmani Professor and Head Dr. R. Vigneshwari Asst. Professor (SST)	<ul style="list-style-type: none"> <li>• The project may be continued.</li> </ul>
<b>AICRP</b>			
1.	AICRP/STR/CBE/SEP/001- AICRP on NSP Crops Seed Technology Research, Seed Centre, Coimbatore Quantification of the Seed Vigour in Field Crops Using a Universal Scale	Dr. K. Nelson Navamaniraj Asst. Prof. (SST)	<ul style="list-style-type: none"> <li>• The project may be continued.</li> </ul>

## II. CROP MANAGEMENT

### A. For Adoption/OFT/Information

#### FOR ADOPTION

##### 1. Standardization of crop geometry and fertilizer dose for rice variety ADT 54

Crop geometry of 20 cm x 20 cm with 125 kg N/ha (as RDF of 125:50:50 kg NPK/ha) to obtain higher grain yield (5854 kg/ha), with BC ratio (2.15) for medium duration rice variety ADT 54

##### 2. Standardization of seed rate of VGD 1 Rice

Seed rate of 15 kg/ha is recommended for VGD 1 rice to obtain higher grain yield of 6000 kg/ha with BC ratio of 2.02

##### 3. Evaluation of slot modifications in paddy drum seeder for wet seeded Rice

Drum seeder of oval slot with guiding strip utilized lower seed rate (26 kg/ha) with 3 seeds per hill registered higher grain yield of 5600 kg/ha (21% increase) and BC ratio (2.16)

##### 4. Increasing water use efficiency in wet seeded rice

Alternate Wetting and Drying Irrigation (AWDI) at 10 cm depletion in FWT from 21 DAS to 10 days prior to harvest + 125% RDF (150:50:50 kg NPK/ha) obtained higher grain yield (13%), water saving (21%) and BC ratio (2.83)

##### 5. Rice landrace suitable for organic farming

Rice landrace, *Athur Kichili Samba* is highly suitable for organic cultivation registering higher grain yield of 4560 kg/ha with B:C ratio of 2.08

#### ON FARM TRIALS (OFT)

##### OFT 1: Evaluating the agronomic efficiency of marine gypsum in sodic soil amelioration in irrigated lowland rice

###### Objective

To evaluate the performance of marine gypsum (50% Gypsum requirement) along with application of green manure for its efficiency in terms of sodic soil amelioration and rice crop yield.

###### Treatment details

T<sub>1</sub>: Reclamation through green manure incorporation @ 6.25 t/ha + 50 % gypsum requirement through marine gypsum @ 4.1 t/ha

T<sub>2</sub>: No reclamation

**Season:** *Rabi*, 2023

### Observations to be recorded:

**Yield characters:** No. of productive tillers / hill, No. of grains & filled grains / panicle, test weight, grain yield, straw yield, Harvest index and Agronomic efficiency

**Soil parameters:** Initial and post-harvest pH, EC, ESP

**Economics:** Cost of cultivation, Gross return, Net return and BCR

<b>Co-ordinating centre &amp; Scientists in-charge</b>	ADAC&RI, Trichy	Dr. S. Rathika, Assoc. Prof. (AGR) Dr. M. Baskar, Prof. & Head, Dept. of SS&AC
<b>Sub-centres &amp; Scientists in-charge</b>	AC&RI, Nagapattinam	Dr. A. Alagesan, Assoc. Prof. (AGR) Dr. A. Anuratha, Assoc. Prof. (SS&AC)
	CSRC/KVK, Ramanathapuram	Dr. S. Vallalkannan, Assoc. Prof. (AGR) Dr. T. Balaji, Asst. Prof. (SS&AC)

### OFT 2: Production of sturdy rice seedlings for machine transplanting

#### Objective

To produce vigorous seedlings to minimize the number of seedlings per hill in machine transplanting.

#### Treatment details

- T<sub>1</sub> – Nutrient media\* with seed fortification of 0.5% FeSO<sub>4</sub> + 0.5% ZnSO<sub>4</sub> + Vermiwash @1.0% on 10 DAS
- T<sub>2</sub> - Conventional method (Soil alone)

(\*Nutrient media - 70% soil + 20% well decomposed FYM + 10% rice hull + DAP @ 7g + Vermicompost @ 100 g + Azophos @ 14 g per tray of 0.18 m<sup>2</sup>)

### Observations to be recorded

#### a. Nursery

- Germination rate
- Shoot length
- Root length
- Seedling vigour Index

#### b. Main Field

- Number of plants/m<sup>2</sup> at planting
- Number of seedlings/ hill
- Yield parameters
- Grain yield (kg/ha)
- Straw yield (kg/ha)
- Economics

<b>Co-ordinating centre &amp; Scientist in-charge</b>	AC&RI, Killikulam	Dr. M. Hemalatha Professor (Agronomy)
<b>Sub-centres &amp; Scientists in-charge</b>	TRRI, Aduthurai	Dr. S. Anandha Krishnaveni Associate Professor (Agronomy)
	AC&RI, Coimbatore	Dr. G. Senthil Kumar, Assoc. Prof. (Agron.)
	KVK, Tirur	Dr. K. Sivagami, Asst. Prof. (Agronomy)
	ADAC&RI, Trichy	Dr. T. Ramesh, Assoc. Prof. (Agron.) & Head
	AC&RI, Madurai	Dr. T. Sampath Kumar, Asst. Prof. (Agron.)

## **FOR INFORMATION**

### **1. Agronomic management of yellowing symptom in *Rabi* rice**

Application of RDF in 4 equal splits (N&K - Basal, AT, PI and Flowering) + ZnSO<sub>4</sub> @ 25 kg/ha + rice foliar formulation I thrice from the appearance of yellowing symptoms on weekly intervals produced higher plant height, number of tillers/ hill, number of productive tillers / hill at harvest stage and higher grain and straw yield of 6145 and 7089 kg/ha apart from reduction of number of yellow leaves / hill in transplanted *Rabi* rice

### **2. Innovative labour-saving technique in direct seeded rice**

Among the different rice seeding methods, drum seeding recorded higher grain yield (4917 kg/ha) and on par with drone seeding (4674 kg/ha). PE application of Pretilachlor @ 0.75 kg/ha + EPoE application of Bispyribac sodium @ 25 g/ha through drone recorded higher grain yield (5034 kg/ha).

### **3. Influence of leaf anatomical traits on photosynthetic efficiency and yield of rice**

Rice genotypes G15 & G18 recorded more leaf width (1.13 cm) & mesophyll area compared to other genotypes. These genotypes showed higher leaf venation pattern (major vein width: 7.01 µm; minor vein width: 2.64 µm, More No. of veins) and interveinal distance (between major veins: 53.5 µm; between minor veins: 19.56 µm). Significant positive relationship occurred between total number of veins and photosynthetic rate.

### **4. Standardization of drip fertigation for short duration paddy**

Application of 100% recommended dose as WSF at seedling, AT, PI & Flowering stages (three times each) through drip fertigation recorded higher grain yield (5468 kg/ha), net return (₹ 60,393/ha) and BCR (2.39) with an additional revenue of ₹ 15808 /ha.

### **5. Response of different landraces of rice for organic farming**

Among the different land races tested, Athur Kichili Samba registered higher grain yield of 4560 kg/ha, net return of Rs.1,29,336/ha and B:C ratio of 2.08.

### **6. Evaluation of biofertilizers in mitigating greenhouse gas emission in puddled rice**

SRI rice cultivation + Azolla @ 250 kg/ha recorded higher grain yield (5596 kg/ha) with reduced methane emission of 25% in inorganic & 21% in organic farming.

### **7. Generation of Genetic Coefficients for rice variety CO-54 for simulation modeling**

DSSAT model simulated higher rice yield reduction in North Eastern Zone (22%) followed by Southern Zone (16%) and Cauvery Delta Zone (15%) in Tamil Nadu for the near century.

### **8. Identifying climate resilient rice genotypes for anaerobic stress tolerance**

Seeds germinated in mud pots and dipped in plastic trays having 13 cm water was identified as the most reliable and reproducible protocol for anaerobic stress tolerance. *Karuppukavuni* and *Kalanamak* were highly tolerant and TKM 13 and Anna R4 were moderately tolerant to anaerobic germination. Higher Iron and calcium contents were observed in tolerant genotypes under stress. GA content decreased under stress. The percent decrease was less in tolerant genotypes.

### **9. Study on Silicon mediated changes in anatomy and physiology of rice genotypes under salt stress condition**

Casparian bands and suberin deposition were more visible in *Pokkali* and CO 51 rice varieties and directly correlated with salt tolerance for reducing uptake of salt. Silicon application reduced the sodium potassium ratio (up to 33%) and ameliorated the yield reduction (25 to 16%) under salt stress.

### **10. Physiological characterization of traditional rice varieties for yield improvement**

Among the various traditional rice varieties studied, *Paal thondi*, *Thooyamalli*, *Kullakar*, *Poongar*, *Chithiraikar*, *Karung kuruvai*, *Arupatham kuruvai* were suitable for all seasons due to their photothermo insensitiveness and yielded higher compared to other varieties.

### **11. Standardization of seeding and fertilizer application techniques using drone in rice cultivation**

Drone seeding of rice with 50 kg/ha seed rate produced significantly higher yield attributes, grain yield and BCR over 70 kg/ha and was comparable with 60 kg/ha.

## **B. Action Plan (2022-2024)**

### **Action Plan 1: Agronomic management of yellowing symptom in *Rabi* rice**

#### **Objective**

To find out the suitable agronomic practices for the management of yellowing in *Rabi* rice

#### **Treatments**

- T<sub>1</sub> Conventional method - RDF in 4 equal splits (N&K - Basal, AT, PI and Flowering) + Zn SO<sub>4</sub> @ 25 kg/ha  
T<sub>2</sub> T<sub>1</sub> + Foliar Application of rice foliar formulation 1\* at critical stages  
T<sub>3</sub> STCR-IPNS based NPK application along with foliar spray of 0.25 % CuSO<sub>4</sub> + 0.5 % ZnSO<sub>4</sub>

**\*Formulation 1 will be supplied from the lead centre**

**Note** – Foliar spray will be given at appearance of yellowing symptom and subsequent 2<sup>nd</sup> and 3<sup>rd</sup> spray will be given at weekly intervals

**Project period** – September 2022 to August 2024

**Design:** RBD

**Replication:** Five

**Observation to be recorded**

1. Plant height at flowering stage
2. Number of tillers / hill
3. No. of yellow leaves / hill
4. Leaf area index
5. Grain and straw yield

<b>Centre &amp; Scientists in-charge</b>	AC&RI, Killikulam	Dr. M. Joseph, Professor (AGR) Dr. S. Srinivasan, Professor (Crop Physiology)
<b>Sub-centre &amp; Scientist In-charge</b>	RRS, Ambasamudram	Dr. S. Jothimani, Professor & Head (SS&AC) Dr. M. Paramasivan, Assistant Prof. (SS&AC)

**Action Plan 2: Innovative labour-saving technique in direct seeded rice**

**Objective**

- Evaluation of direct seeding methods under puddled condition by using drone.

**Treatments:**

T<sub>1</sub> – Drone seeding @ 50 kg/ha

T<sub>2</sub> - Drone seeding @ 40 kg/ha

T<sub>3</sub> – Drone seeding @ 30 kg/ha

\*Common to all treatments: PE herbicide (Pretilachlor 0.75 kg/ha) + EPoE herbicide (Bispyribac sodium 25g/ha) to be applied through drone at 2-3 leaf stage of weeds

**Duration:** 2022-2024

**Season:** *Kharif*

<b>Co-ordinating centres &amp; Scientists In-charge</b>	Dept of Agronomy, TNAU, Coimbatore	Dr. S. Radhamani, Professor (Agron)
	Dept of Rice, TNAU, Coimbatore	Dr. G. Senthil Kumar, Assoc. Prof. (Agron.)
	Dept of RS & GIS, TNAU, Coimbatore	Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC)
	KVK, Sirugamani	Dr. P. Murali Arthanari, Prof. & Head (Agron.)
<b>Sub-centres &amp; Scientists In-charge</b>	TRRI, Aduthurai	Dr. S. Elamathi, Assoc. Prof. (Agron)
	ADAC&RI, Trichy	Dr. T. Ramesh, Assoc. Prof. (Agron.)
	AC&RI, Killikulam	Dr. M. Hemalatha, Professor (Agron.)

**Action Plan 3: Soil weed seed bank, weed dynamics, pests load, soil fertility and productivity as influenced by rice + duck farming**

**Objectives**

- To study the efficacy of duck farming on soil weed seed bank, weed dynamics, weed control efficiency, pest load and soil physico-chemical properties in rice + duck farming

- To find out the effect of rice + duck farming on growth, yield and economics

### Treatment details

- T<sub>1</sub> – Control (conventional method)
- T<sub>2</sub> – Rice + Duck farming alone
- T<sub>3</sub> – Rice + Duck farming + 100 % RDF (NPK)
- T<sub>4</sub> – Green manure (*Daincha*) - Rice + Duck farming
- T<sub>5</sub> – Green manure (*Daincha*) - Rice + Duck farming + 75 % of RDF
- T<sub>6</sub> - Green manure (*Daincha*) - Rice + Duck farming + 100 % of RDF

**Centre:** Department of Agronomy, Coimbatore

**Duration:** Two years (2022-2024)

**Design:** RBD

**Replication:** Four

**Stock load:** 4 ducks/100m<sup>2</sup> for 3 hours daily from 20 DAT to flowering stage.

2-month-old ducklings -15 DAT & Grownup Ducks - 25 DAT

<b>Centre &amp; Scientist In-charge</b>	Department of Agronomy, TNAU, Coimbatore	Dr. G. Prabukumar, Associate Professor (Agronomy)
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### Action plan 4: Standardization of drip fertigation for short duration paddy

#### Objective

To standardize drip fertigation techniques in rice cultivation

#### Treatments

- S<sub>1</sub> : 100% Recommended N & K (120:40 kg NK/ha) (N&K through water soluble fertilizer N as Urea & K as SOP\*)
  - S<sub>2</sub> : 75% Recommended N & K (90:30 kg NK/ha) (N&K through water soluble fertilizer N as Urea & K as SOP\*)
  - S<sub>3</sub> : 50% Recommended N & K (60:20 kg NK/ha) (N&K through water soluble fertilizer N as Urea & K as SOP\*)
  - S<sub>4</sub> : Straight fertilizers: Blanket recommendation (120:40:40 kg NPK/ha)
- (\* N & K as 4 splits: Basal + 3 top dressing through fertigation once in 6 days interval)  
(100% P as basal through SSP for S<sub>1</sub>, S<sub>2</sub> and S<sub>3</sub> treatments)

**Design:** RBD

**Replication:** Five

**Duration:** Two years (2022-2024)

<b>Coordinating Centre &amp; Scientist In-charge</b>	KVK, Ramanathapuram	Dr. S. Vallal Kannan, Associate Professor (Agronomy)
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## C. Action Plan (2023-2024)

### Action Plan 5: Management of grass weed *Leptochloa chinensis* in wet direct seeded rice

#### Objective

- To identify the suitable weed management practices for the control of *Leptochloa chinensis* in wet direct seeded rice

#### Treatments

- T<sub>1</sub> - PE application of Pretilachlor 0.75 kg/ha *fb* one Hand weeding
- T<sub>2</sub> - PE application of Pretilachlor 0.75 kg/ha *fb* EPOE application of Bispyribac sodium at 25 g/ha
- T<sub>3</sub> - PE application of Pretilachlor 0.75 kg/ha *fb* EPOE application of Penoxulam + Cyhalofop butyl at 135 g/ha
- T<sub>4</sub> - PE application of Pyrazosulfuron ethyl at 20 g/ha *fb* EPOE application of Bispyribac sodium at 25 g/ha
- T<sub>5</sub> - PE application of Pyrazosulfuron ethyl at 20 g/ha *fb* EPOE application of Penoxulam + Cyhalofop butyl at 135 g/ha
- T<sub>6</sub> - Un weeded control

#### Design: RBD

#### Replication: Four

#### Duration: 2023-2024; Season: Kharif season

#### Observations to be recorded

- Weed flora and weed density at 30 and 60 DAS; Weed control efficiency
- Plant population m<sup>-2</sup>; Growth and yield attributes; Yield and economics

<b>Co-ordinating centre &amp; Scientists In-charge</b>	Dept of Agronomy, TNAU, Coimbatore	Dr. S. Radhamani, Professor (Agron)
		Dr. G. Senthil Kumar, Assoc. Prof. (Agron.)
<b>Sub-centers &amp; Scientists In-charge</b>	TRRI, Aduthurai	Dr. R. Nageswari, Assoc. Prof. (Agronomy)
	AC&RI, Killikulam	Dr. M. Joseph, Professor (Agronomy)
	RRS, Tirur	Dr. K. Sivagami, Assistant Prof. (Agron.)
	KVK, Ramnad	Dr. S. Vallal Kannan, Assoc. Prof. (Agron.)

### Action Plan 6: Evaluation of Imazethapyr herbicide tolerant genotype under direct seeded rice ecosystem

#### Objective

- To assess the weed control efficiency and imazethapyr herbicide tolerance rice cultivar.

#### Treatment details

- T<sub>1</sub>: Application of Imazethapyr herbicide spray (weed growth at 2 - 3 leaf stage @ 75 g/ha)
- T<sub>2</sub>: Without herbicide spray (Control)

#### Duration: 2023-2024

#### Observations to be recorded

- Weed flora and weed density at 1 day before herbicide application, 15, 30, 45 & 60 DAHA,
- Phytotoxicity scoring
- Weed control efficiency
- Plant population m<sup>-2</sup>; Growth, yield attributes and yield

<b>Co-ordinating centre &amp; Scientist In-charge</b>	Dept of Agronomy, TNAU, Coimbatore	Dr. G. Senthil Kumar, Assoc. Professor (Agron.)
<b>Sub-centres &amp; Scientists In-charge</b>	TRRI, Aduthurai	Dr. S. Elamathi, Assoc. Prof. (Agron.)
	AC&RI, Nagapattinam	Dr. A. Alagesan, Assoc. Prof. (Agron.)
	KVK, Tirur	Dr. K. Sivagami, Assrt. Prof. (Agron.)
	KVK, Ramnad	Dr. S. Vallal Kannan, ASP & Head (Agron.)

## **Action Plan 7: Performance of Improved *Kavuni* (CO 57) under organic cultivation**

### **Objective**

- To study the performance of Improved *Kavuni* (CO 57) rice under organic cultivation

### **Treatments**

V<sub>1</sub>: Improved *Kavuni* (CO 57)

V<sub>2</sub>: CO 48

**Duration:** One year (2023 - 2024)

### **Package of practices for organic rice cultivation**

#### ***Nursery practices***

#### **Seed treatment (g/kg)**

*Bacillus subtilis* - 10 g; Azospirillum - 30 g; Phosphobacteria - 30 g

#### **Soil application (per m<sup>2</sup>)**

FYM - 1.25 kg; Neem cake - 50 g; *Bacillus subtilis* - 5 g; Gypsum - 100 g at 10 DAS

#### ***Main field practices***

**Green manure crop:** *In-situ* incorporation of *Sesbania aculeate*

**Basal application:** Rock phosphate @ 250 kg / ha; Neem cake @ 250 kg / ha

**Soil application:** Azospirillum @ 2.5 kg / ha; Phosphobacteria @ 2.5 kg / ha; Split application of vermicompost @ 1 t / ha each at maximum tillering and panicle initiation stage

**Growth promotion:** Panchagavya @ 3 % at 30 and 45 DAT as foliar spray

**Insect pest management:** NSKE @ 5 % / Neem oil @ 3 %

**Disease management:** *Bacillus subtilis* (0.2 %)

### **Observations to be recorded**

- **Growth characters:** Plant height at harvest, DMP at harvest

- **Yield characters:** Days to 50% flowering, No. of productive tillers / hill, No. of grains & filled grains / panicle, test weight, grain yield, straw yield and HI
- **Economics:** Cost of cultivation, Net returns with and without premium price (25%) and BCR

<b>Co-ordinating centre &amp; Scientists In-charge:</b>	TNAU, Coimbatore	Dr. R. Krishnan, Professor and Head Dr. M. Suganthy, Prof. (Agrl. Ento.) Dr. G. Senthil Kumar, Assoc. Prof. (Agron.)
<b>Centres &amp; Scientists In-charge</b>	TRRI, Aduthurai	Dr. R. Nageswari, Assoc. Prof. (Agron.)
	ARS, Bhavanisagar	Dr. N. Sakthivel, Prof & Head
	AC&RI, Killikulam	Dr. S. Subbulakshmi, Asst. Prof. (Agron.)
	KVK, Tirur	Dr. K. Sivagami, Asst. Professor (Agron.)

### **Action Plan 8: Drone application of liquid formulation of rice booster for yield enhancement in rice**

#### **Objective**

To assess the impact of liquid formulation of rice booster through drone application on growth and yield in rice

#### **Treatments**

T<sub>1</sub>: Control

T<sub>2</sub>: Liquid formulation of rice booster (1%) by hand spray

T<sub>3</sub>: Liquid formulation of rice booster (3%)

T<sub>4</sub>: Liquid formulation of rice booster (4%)

T<sub>5</sub>: Liquid formulation of rice booster (5%)

By drone application

**(Foliar application by drone at booting stage and 15 days after first spray)**

**Duration:** June 2023 to May 2024

**Observations to be recorded:** Growth, Physiology and yield traits

<b>Co-ordinating centre &amp; Scientists In-charge</b>	TNAU, Coimbatore	Dr. V. Ravichandran, Prof. (CRP) Dr. D. Vijayalakshmi, Prof. (CRP)
<b>Centres &amp; Scientists In-charge</b>	RRS, Aruppukottai	Dr. K. Krishnasurendar, Asst. Prof. (CRP)
	KVK, Sirugamani	Dr. S. Nithila, Associate Professor, (CRP)
	AC& RI, Eachangkottai	Dr. C. Tamilselvi, Asst. Professor (CRP)

## PROJECT-WISE REMARKS

### I. ACTION PLAN

S. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
1.	Agronomic management of yellowing symptom in <i>rabi</i> rice	<b>Co-ordinating centre &amp; Scientist in-charge</b> <b>AC&amp;RI, Killikulam</b> i. Dr. M. Joseph, Professor (Agronomy) ii. Dr. S. Srinivasan, Professor (CRP)	2022-2024	<ul style="list-style-type: none"> <li>Project to be continued with modified treatments</li> <li>Findings given for Information</li> </ul>
2.	Innovative labour saving technique in direct seeded Rice	<b>Co-ordinating centre &amp; Scientist In-charge</b> 1. Dr. P. Murali Arthanari, Prof. & Head, SRS, Sirugamani 2. Dr. S. Radhamani, Prof. (Agron.), TNAU, Cbe 3. Dr. G. Senthil Kumar, ASP (Agron.) Dept of Rice*, TNAU, Coimbatore 4. Dr. R. Kumaraperumal, Assoc. Prof. (SS&AC), Dept of RS&GIS, TNAU, Coimbatore <b>Centres &amp; Scientist In-charge</b> 5. Dr. S. Elamathi, Assoc. Prof. (AGR), TRRI, ADT 6. Dr. T. Ramesh, Assoc. Prof. (AGR), KVK, Vamban 7. Dr. M. Hemalatha, Prof. (Agron.), AC&RI, KKM	2022-2024	<ul style="list-style-type: none"> <li>Project to be continued with modified treatments</li> <li>Findings given for Information</li> </ul>
3.	Soil weed seed bank, weed dynamics, pests load, soil fertility and productivity as influenced by rice-duck farming	<b>Co-ordinating centre &amp; Scientist in-charge:</b> i. Dr. G. Prabukumar, Assoc. Prof. (Agron.), Dept. of Agronomy, TNAU, Coimbatore-3	2022-2024	<ul style="list-style-type: none"> <li>Project to be continued</li> </ul>
4.	Influence of leaf anatomical traits on photosynthetic efficiency and yield of rice	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. M.K. Kalarani, Director (Crop Management), TNAU, Coimbatore ii. Dr. A. Senthil, Professor & Head, Dept. of Crop Physiology, TNAU, Coimbatore.	2022-2024	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Completion report may be submitted</li> </ul>
5.	Standardization of drip fertigation for short duration paddy	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. S. Vallal Kannan, ASP (Agron.), KVK, AC&RI, Madurai	2022-2024	<ul style="list-style-type: none"> <li>Project to be continued with modified treatments</li> <li>Findings given for Information</li> </ul>
6.	Response of different landraces of rice for organic farming.	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. R. Krishnan, Professor and Head, NOFRC,	June 2020 - July 2023	<ul style="list-style-type: none"> <li>Recommended for Adoption</li> <li>Project to be closed</li> </ul>

S. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
		TNAU, Coimbatore ii. Dr. M. Suganthy, Prof. (Agrl. Ento.), NOFRC, TNAU, Coimbatore		
7.	Evaluating the Agronomic efficiency of Marine Gypsum in sodic soil amelioration in irrigated lowland rice	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. A. Alagesan, Assoc. Professor (Agronomy), Dept. of SS&AC, ADAC&RI, Tiruchirappalli <b>Centres &amp; Scientist in-charge</b> ii. Dr. P. Janaki, Assoc. Prof. (SS&AC), AC&RI, Coimbatore iii. Dr. S. Nithila, Asst. Prof. (CRP), SRS, Sirugamani iv. Dr. J. Ejilane, Asst. Prof. (Agrl. Microbiology), AC&RI, Madurai	2020-2022	<ul style="list-style-type: none"> <li>• Project to be closed</li> <li>• Recommended for OFT</li> </ul>
8.	Evaluation of biofertilizers in mitigating greenhouse gas emission in puddled rice	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. N. K. Sathyamoorthy, Prof. (Agron.), ACRC, TNAU, Coimbatore ii. Dr. S. Kokilavani, Asst. Prof (Agron.), ACRC, TNAU, Coimbatore <b>Centres &amp; Scientist in-charge</b> iii. Dr. S. Anandha Krihsnaveni, Assoc. Prof. (Agron.), TRRI, Aduthurai iv. Dr. S. Arthirani, AP (Agrl. Met.), AC&RI, Madurai v. Dr. P. Kannan, ASP (SS&AC), AC&RI, Madurai	2021-2023	<ul style="list-style-type: none"> <li>• Findings given for information</li> <li>• Project to be closed</li> <li>• Completion report may be submitted</li> </ul>
9.	Standardization of crop geometry and fertilizer dose for newly released rice variety ADT 54	<b>Co-ordinating centre &amp; Scientist in-charge:</b> <b>TRRI, Aduthurai</b> 1. Dr. S. Elamathi, Associate Professor (Agronomy) 2. Dr. K. Manikandan, Assistant Professor (SS&AC) <b>Centre &amp; Scientist In-charge:</b> <b>ARS, Thanjavur</b> 3. Dr. T. Parthiban, Assistant Professor (Agronomy)	2021-2023	<ul style="list-style-type: none"> <li>• Project to be closed</li> <li>• Recommended for Adoption</li> <li>• Completion report may be submitted</li> </ul>
10.	Standardization of seed rate of VGD 1 rice	<b>Co-ordinating centre &amp; Scientist in-charge:</b> <b>ARS, Vaigaidam</b> i. Dr. R. Jeyasrinivas, Assoc. Prof. (Agronomy), AC&RI, Kudumiyamalai <b>Centres &amp; Scientist in-charge:</b>	2022-2023	<ul style="list-style-type: none"> <li>• Project to be closed</li> <li>• Recommended for Adoption</li> <li>• Completion report may be submitted</li> </ul>

S. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
		ii. Dr. S. Elamathi, ASP (Agron.), TRRI, Aduthurai iii. Dr. N. Sakthivel, Prof. & Head, ARS, Bhavanisagar		
11.	Generation of Genetic Coefficients for rice variety CO 54 for simulation modeling	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. N.K. Sathyamoorthy, Professor (Agronomy), ACRC, TNAU, Coimbatore ii. Dr. G. Senthil Kumar, ASP (Agron.), Dept. of Rice, TNAU, Coimbatore.	2022-2024	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Findings given for information</li> </ul>
<b>II. ON FARM TRIAL</b>				
1.	Evaluation of slot modifications in paddy drum seeder for wet seeded Rice	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. R. Durai Singh, Prof. & Head (Agron.), AC&RI, Madurai <b>Centres &amp; Scientist in-charge</b> ii. Dr. G. Prabhu Kumar, ASP (Agron.), TNAU, Cbe iii. Dr. S. Anandha Krishnaveni, ASP (Agron.), TRRI, ADT iv. Dr. M. Joseph, ASP (Agron.), AC&RI, Killikulam	2022-2023	<ul style="list-style-type: none"> <li>Recommended for Adoption</li> </ul>
2.	Increasing water and nutrient use efficiency in wet seeded rice	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. M. Joseph, Prof. (Agronomy), Dept. of Agronomy, AC&RI, Killikulam <b>Centres &amp; Scientist in-charge</b> 1. Dr. T. Sampathkumar, AP (Agron.), Dept. of Agronomy, AC&RI, Madurai	2022-2023	<ul style="list-style-type: none"> <li>Recommended for Adoption</li> </ul>
3.	Evaluation of the performance of pre-release culture CB 05022 under organic farming	<b>Co-ordinating centre &amp; Scientist in-charge</b> i. Dr. R. Krishnan, Prof & Head, NOFRC, TNAU, CBE ii. Dr. M. Suganthy, Prof. (Agr. Ento.), NOFRC, TNAU, CBE iii. Dr. G. Senthil Kumar, ASP. (Agronomy), Dept. of Rice, TNAU, CBE <b>Centres &amp; Scientist in-charge</b> iv. Dr. N. Sakthivel, Prof. (Agron.) & Head, ARS, BSR v. Dr. S. Elamathi, ASP (AGR), TRRI, Aduthurai vi. Dr. S. Subbulakshmi, AP (Agron.), AC&RI, KKM vii. Dr. S. R. Shri Rangasami, Asst. Prof. (Agron.), KVK, Pongalur	2022-2023	<ul style="list-style-type: none"> <li>To be Continued and recommended for MLT</li> </ul>

S. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
		viii. Dr. K. Sivagami, AP (Agronomy), RRS, Tirur ix. Dr. T. Sampathkumar, AP (Agron.), AC&RI, MDU		
<b>III. UNIVERSITY RESEARCH PROJECTS</b>				
1.	ADAC&RI/TRY/AGR/RIC/2023/001- Standardization of seeding and fertilizer application techniques using drone in rice cultivation	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. T. Ramesh, ASP and Head, Dept. of Agronomy, ADAC&RI, Tiruchirappalli. <b>Centres &amp; Scientist in-charge</b> 2. Dr. M. Baskar, Prof. & Head, Dept. of SS&AC, ADAC&RI, Tiruchirappalli 3. Dr. S. Rathika, ASP (Agronomy), Dept. of SS&AC, ADAC&RI, Tiruchirappalli. 4. Dr. K. P. Ragunath, ASP (SS&AC), CWGS, TNAU, Coimbatore.	2022-2024	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Results to be clubbed with action plan research "Innovative labour-saving technique in direct seeded rice"</li> </ul>
2.	DCM/KUM/RIC/2021/001 - Studies on the response of traditional rice cultivars under organic production systems	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. P. Rajarathinam, AP (AGR), IOA, Kumulur 2. Dr. R. Vinoth, TA (PBG), IOA, Kumulur 3. Dr. A. Vijayaprabhakar, TA (AGR), IOA, Kumulur 4. Dr. C. Sivaranjani, SRF (SS&AC), IOA, Kumulur	2021-2024	<ul style="list-style-type: none"> <li>Project to be continued</li> </ul>
3.	DCM/KKM/AGR/RIC/2020/003 Production of sturdy rice seedlings for machine transplanting	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. M. Hemalatha, Prof. & Head, Dept. of Agronomy, AC&RI, Killikulam 2. Dr. S. Jothimani, Prof. (SS&AC), AC&RI, KKM	2020-2023	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Completion report may be submitted</li> <li>Recommended for OFT</li> </ul>
4.	DCM/ CBE/ CRP/ RIC/ 2021/ 001 Identifying Climate Resilient Rice Genotypes for Anaerobic Stress Tolerance	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. D. Vijayalakshmi, Prof. (Crop Physiology), Dept. of Crop Physiology, TNAU, Coimbatore.	2021-2022	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Completion report may be submitted</li> </ul>
5.	DCM/ CBE/ CRP/RIC/2021/002 Study on Silicon mediated changes in anatomy and physiology of rice genotypes under salt stress condition	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. V. Ravichandran, Prof. (Crop Physiology), Dept. of Crop Physiology, TNAU, Coimbatore	2021-2022	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Completion report may be submitted</li> </ul>
6.	DCM/ CBE/ CRP/ RIC/ 2021/ 003 Physiological Characterization of Traditional Rice Varieties for Yield Improvement	<b>Co-ordinating centre &amp; Scientist in-charge</b> 1. Dr. K. Vanitha, AP (Crop Physiology), Dept. of Fruit Science, HC & RI, TNAU, Coimbatore. 2. Dr. N. Thavaprakash, Prof. (Agron.), CRS, Aliyanagar	2021-2024	<ul style="list-style-type: none"> <li>Project to be closed</li> <li>Completion report may be submitted</li> </ul>

S. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
<b>IV. ALL INDIA COORDINATED RESEARCH PROJECTS</b>				
1.	AICRP /PBG /ADT / RIC/ 002 - Nutrient response trials on selected AVT 2 rice cultures under high and low input management IME	Dr. S. Elamathi, ASP (Agron.), TRRI, Aduthurai	2022-2023	• Project to be continued
2.	AICRP /PBG /ADT / RIC/ 002 - Nutrient response trials on selected AVT 2 rice cultures under high and low input management Late	Dr. S. Elamathi, ASP (Agron.), TRRI, Aduthurai	2022-2023	• Project to be continued
3.	AICRP /PBG /ADT / RIC/ 002 - Developing suitable package of practices for wet DSR	Dr. S. Elamathi, ASP (Agron.), TRRI, Aduthurai	2022-2023	• Project to be continued
4.	AICRP /PBG /ADT / RIC/ 002 - Long term trial on weed dynamics in mono or double cropped rice system under different establishment methods	Dr. S. Elamathi, ASP (Agron.), TRRI, Aduthurai	2022-2023	• Project to be continued
5.	Water management for enhancing water use efficiency and productivity of mechanical transplanted rice	Dr. S. Elamathi, ASP (Agron.), TRRI, Aduthurai	2022-2023	• Project to be continued
6.	AICRP /PBG /CBE / RIC/ 003 Nutrient Management Trials – AVT 2 – Early (TP) Nutrient response trials on selected AVT 2 rice cultures under optimum and low input management	Dr. G. Senthil Kumar, ASP (Agron.), Dept. of Rice, TNAU, Coimbatore.	2022-2023	• Project to be continued
7.	Nutrient Management Trials – AVT 2 – Irrigated (Medium) Nutrient response trials on selected AVT 2 rice cultures under optimum and low input mgt.	Dr. G. Senthil Kumar, ASP (Agron.), Dept. of Rice, TNAU, Coimbatore.	2022-2023	• Project to be continued
8.	Nano fertilizers for increasing nutrient use efficiency, yield and economic returns in transplanted rice	Dr. G. Senthil Kumar, ASP (Agron.), Dept. of Rice, TNAU, Coimbatore.	2022-2023	• Project to be continued
9.	Developing a suitable package of practices for higher yield in wet DSR system	Dr. G. Senthil Kumar, ASP (Agron.), Dept. of Rice, TNAU, Coimbatore.	2022-2023	• Project to be continued



<b>S. No.</b>	<b>Title</b>	<b>Scientist involved / Lead scientist</b>	<b>Duration</b>	<b>Remarks</b>
10.	AICRP/PBG/CBE/RIC/003 Influence of silicon on improving abiotic stress tolerance in rice genotypes	Dr. N. Sritharan, ASP (Crop Physiology), Dept. of Rice, TNAU, Coimbatore	2022-2023	• Project to be continued
11.	AICRP/PBG/CBE/RIC/003 Screening for submergence tolerance in rice genotypes	Dr. N. Sritharan, ASP (Crop Physiology), Dept. of Rice, TNAU, Coimbatore	2022-2023	• Project to be continued
12.	AICRP/PBG/CBE/RIC/003 Physiological characterization of selected rice genotypes for multiple abiotic stress tolerance	Dr. N. Sritharan, ASP (Crop Physiology), Dept. of Rice, TNAU, Coimbatore – 641 003	2022-2023	• Project to be continued
<b>V. EXTERNALLY FUNDED PROJECTS</b>				
1.	NIAES/DCM/CBE/CRP/2019/R010 - Multi-site monitoring network of canopy micrometeorology and heat stresses in rice for evaluating the adaptation strategies under climate change (HOA: F38IB)	<b>Co-ordinating centre &amp; Scientist in-charge</b> Dr. D. Vijayalakshmi, Prof. (Crop Physiology), Dept. of Crop Physiology, TNAU, Coimbatore.	2019-2023	• Project to be closed • Completion report may be submitted

## Large Scale Demonstrations in Farmers' field during 2023 – 2024

S. No.	Title of the technology	Location and Demonstrations (Nos.)	Scientists In-charge
<b>AGRONOMY</b>			
1.	Alternate wetting and drying irrigation (AWDI)	Dept. of Agronomy, Coimbatore (5)	Dr. G. Senthilkumar
		TRRI, Aduthurai (10)	Dr. S. Elamathi
		KVK, Madurai (10)	Dr. E. Subramanian
		AC&RI, Killikulam (5)	Dr. M. Joseph
2.	Non puddled machine transplanted rice (NPTR)	TRRI, Aduthurai (10)	Dr. S. Elamathi
		ARS, Thanjavur (10)	Dr. T. Parthiban
3.	Slot modifications in paddy drum seeder for wet seeded rice	AC&RI, Madurai (10)	Dr. R. Durai Singh
		Dept. of Agronomy, Coimbatore (5)	Dr. G. Prabhukumar
		TRRI, Aduthurai (5)	Dr. S. Anandha Krishnaveni
		AC&RI, Killikulam (5)	Dr. S. Subbulakshmi
4.	Foliar spray of fermented egg extract in Organic farming	ADAC &RI, Trichy (10)	Dr. T. Ramesh
		Dept. of Agronomy, Coimbatore (5)	Dr. G. Senthilkumar
		TRRI, Aduthurai (5)	Dr. R. Nageswari
		KVK, Madurai (5)	Dr. E. Subramanian
<b>CROP PHYSIOLOGY</b>			
5.	Rice bloom	AC&RI, Killikulam (10)	Dr. S. Srinivasan
		AC&RI, Eachangkottai (10)	Dr. C. Tamil selvi
		AC&RI, Madurai (5)	Dr. K. Krishnasurendar
		KVK, Aruppukottai (5)	Dr. C. Rajababu
		Dept. of Crop Physiology (5), Coimbatore	Dr. V. Ravichandran

### III. A. NATURAL RESOURCE MANAGEMENT

Dept. of Soil Science and Agrl. Chemistry

#### A. Technologies for Adoption / OFT/ Information

##### A1). For adoption

#### **1. Management of Water logging associated soil problem in Rice ecosystem of Cauvery Delta Zone of Tamil Nadu**

Application of RDF +Gypsum @500 kg ha<sup>-1</sup>+ Cono weeding twice + Bioinoculant (ZSB+KB) application each @ 500 ml ha<sup>-1</sup> registered higher grain yield of 5596 kg ha<sup>-1</sup> and additional income of Rs.19,700/- and the increase in yield was 23.1% over Farmer's practice. Further, it reduced the algal growth from 10.2 to 1.8 gm<sup>-2</sup>. Cono weeding twice aids in proper aeration and enhanced the availability of nutrients.

#### **2. STCR-IPNS based Fertiliser Prescriptions for Rice on Kadambady soil series (Tiruvallur Dt.) and Mathur soil series (Tiruvannamalai Dt.)**

The results of four on farm trials two each on Kadambady and Mathur soil series with rice crop confirmed the validity of the STCR-IPNS based fertiliser prescriptions. In Kadambady soil series (Sandy clay loam), STCR-IPNS for a yield target of 7 t ha<sup>-1</sup> recorded higher mean grain yield (6778 kg ha<sup>-1</sup>), response ratio (13.3 kg kg<sup>-1</sup>) and BCR (2.18) besides maintaining/built-up in post - harvest soil fertility. The yield increase over blanket fertiliser recommendation and farmer's fertilisation practice was 10.6 and 44.2 per cent, respectively. It saves the fertiliser to the extent of 19 kg of N ha<sup>-1</sup>, if soil available N is 200 kg N ha<sup>-1</sup>.

In Mathur soil series (Sandy clay loam), STCR-IPNS based fertiliser prescription for a yield target of 7 t ha<sup>-1</sup> recorded higher grain yield (6730 kg ha<sup>-1</sup>) along with higher response ratio (13.32 kg kg<sup>-1</sup>) and BCR (2.12) besides maintenance of post-harvest soil fertility. The yield increase over blanket fertiliser recommendation and farmer's fertilisation practice was 10.5 and 47.9 per cent, respectively. It saves the fertilisers to the extent of 21 kg of N ha<sup>-1</sup>, if soil available N is 216 kg ha<sup>-1</sup>.

#### **3. Boron fertilisation for improving the yield and quality of rice**

The results of five on-farm trials conducted at Aduthurai, Coimbatore, Killikulam, Madurai and Thirupathisaram revealed that, in boron deficit soil conditions, application of STCR-IPNS based NPK + 10 kg borax ha<sup>-1</sup> registered higher mean grain yield of 6755 kg ha<sup>-1</sup> with the mean yield increase of 18.5 % over farmer's practice. Inclusion of borax in the fertilizer schedule improved grain quality, soil B availability and its uptake by rice crop.

## **A2). OFTs for the year 2023-2024**

### **1. Zinc nutrition for direct sown rice through Zinc lysinate**

#### **Objective**

To validate the performance of zinc lysinate for direct sown rice.

#### **Treatment Details**

- ✓ T<sub>1</sub>: Absolute control
- ✓ T<sub>2</sub>: RDF (as per STCR) + Zinc lysinate @ 2.5 kg ha<sup>-1</sup> + Foliar application twice (AT&PI) @ 0.2 %
- ✓ T<sub>3</sub>: Farmers' Fertilisation Practice

#### **Observations to be recorded**

- ✓ Biometric observations & Grain Yield, BCR
- ✓ Nutrient uptake and availability

#### **Coordinating scientists:**

Dr. J. Prabhakaran, Assoc. Professor (SS&AC), AC&RI, Madurai

Dr. K. Senthil, Assoc. Professor (Agrl. Chemicals), ADAC&RI, Trichy

#### **Location & Scientists**

Dr. T. Balaji, Asst. Prof (SS&AC) KVK, Ramnad

Dr. S. Muthuramu, Assoc. Prof & Head, ARS, Paramakudi

Dr. K. Manikandan, Asst. Prof (SS&AC), TRRI, Aduthurai

Dr. T. Sivasankari Devi, Asst. Prof (AGM), TRRI, Aduthurai

#### **Period: One year (2023-24)**

### **A3) For Information**

#### **1. Demonstration of STCR-IPNS based Fertiliser Prescription for Rice in Southern Zone**

The results of two field demonstrations showed that STCR-IPNS based fertiliser prescription recorded the higher grain yield of 5650 and 5825 kg ha<sup>-1</sup> and response ratio of 12.68 and 11.09 kg kg<sup>-1</sup> respectively in Irugur and Manakkarai soil series along with higher BCR besides maintenance of soil fertility. The corresponding yield increase in STCR-IPNS over blanket fertilizer recommendation and farmer's fertilisation practice was 7.8 and 39.5%; and 6.2 and 48.5%; The respective fertilizer saving was 26:10: 25 kg ha<sup>-1</sup> of FN: FP<sub>2</sub>O<sub>5</sub>: FK<sub>2</sub>O (if soil available N.P and K is 175:20:300 kg ha<sup>-1</sup> and 26: 17 kg ha<sup>-1</sup> of FN: FK<sub>2</sub>O (if soil available N and K is 190:280 kg ha<sup>-1</sup>). Exposure visit created an awareness among the farmers and students about the benefits of adopting STCR-IPNS technology in rice.

#### **2. Evaluation of skipping of phosphorus on rice productivity in high P status soil**

The results of field experiments conducted at Madurai, Killikulam and Aduthurai revealed that STCR-IPNS based recommendation registered the highest mean grain yield of 5974 kg ha<sup>-1</sup> followed by blanket recommendation +

FYM (5729 kg ha<sup>-1</sup>). With respect to skipping of P, STCR –IPNS recommendation with a maintenance dose (20 kg ha<sup>-1</sup>) could sustain the grain yield (5776 kg ha<sup>-1</sup>) with yield reduction of 3.4%. The highest BCR was observed in STCR –IPNS recommendations with phosphorus which was on par with STCR-IPNS with maintenance dose of P (20 kg ha<sup>-1</sup>). Soil P status was also maintained when P was applied as a maintenance dose.

### 3. Management of Multi-nutrient disorder in Rice

STCR-IPNS based NPK application along with foliar spray of 0.25 % CuSO<sub>4</sub> + 0.5 % ZnSO<sub>4</sub> and cono weeding twice at AT&PI recorded the higher grain yield of 4.92, 6.71 t ha<sup>-1</sup> and 7.95 t ha<sup>-1</sup> at Killikulam, Aduthurai and Thiupathisaram respectively, besides maintenance of soil fertility and the percentage of yield increase over STCR- NPK alone was 11.1, 12 and 11.9 % respectively. Whereas in ADAC&RI, Trichy, STCR-NPK + Foliar 1% MgSO<sub>4</sub> + 0.25 % CuSO<sub>4</sub> + 0.5 % ZnSO<sub>4</sub> recorded higher grain yield of 5.15 t ha<sup>-1</sup> with 32% yield increase over STCR- NPK alone besides maintenance of soil fertility

### 4. Response of rice varieties to salinity and sodicity stress

The Laboratory hydroponics experiment showed that Na to K ratio in rice shoots increased with increase in salinity (0-100 mL<sup>-1</sup>NaCl) and sodicity stress (0-30 mM Na<sub>2</sub>CO<sub>3</sub>). Rice varieties viz., TRY3 and TRY5 recorded lower Na to K ratio when compared to CO 51, Improved White Ponni, *Mapillai samba* and *Karuthakar* at all levels of salinity (0, 50,75 and 100 mL<sup>-1</sup>NaCl) and sodicity (0-30 mM Na<sub>2</sub>CO<sub>3</sub>). TRY 5 recorded higher protein and proline content under salinity/ sodicity stress. In TRY 5, 84 metabolites were identified under salinity stress (100 mM NaCl L<sup>-1</sup>) and 91 metabolites under sodicity stress (30 mM Na<sub>2</sub>CO<sub>3</sub> L<sup>-1</sup>).

### 5. Permanent manurial experiment in rice-based cropping system

In Aduthurai, the results of 31 years old continuous rice cropping (62 crops) (PME experiment) revealed that higher grain yield of 6279 kg ha<sup>-1</sup> was registered with the application of RDF (125:50:50 kg ha<sup>-1</sup> of NPK) +GM @ 6.25 t ha<sup>-1</sup> + Gypsum @ 500 kg ha<sup>-1</sup> during *Kuruai* season. During *Thaladi* season, addition of 150:60:60 kg ha<sup>-1</sup> of NPK + FYM@ 12.5 t ha<sup>-1</sup> + Gypsum @ 500 kg ha<sup>-1</sup> recorded higher grain yield (6163 kg ha<sup>-1</sup>). Higher SOC (10.8 g kg<sup>-1</sup>) and positive balance of NP and negative balance of K were recorded during 62<sup>nd</sup> cropping at TRRI, Aduthurai. It signifies that K fertilization in rice crop is vital and P fertilization schedule can be reduced considering continuous built - up of P in soil.

### 6. Zinc Lysinate for Semidry rice in Coastal soils of Ramanathapuram District

Results of field experiment inferred that sowing at first fortnight of October recorded the highest grain yield of rice (3090 kg ha<sup>-1</sup>) with BCR of 2.06. STCR based NPK application (75:19:37.5 kg ha<sup>-1</sup>) + 2.5 kg zinc lysinate ha<sup>-1</sup> as soil application + 0.20% foliar spraying twice (AT & PI) has recorded the highest grain yield (3312 kg ha<sup>-1</sup>), BCR (2.18) and nutrient uptake by rice.

## **7. Permanent Manurial Experiment on Rice**

In Madurai, the results of 46 years old PME showed that Integrated application of GLM @ 6.25 t ha<sup>-1</sup> conjoint with STCR based N, P<sub>2</sub>O<sub>5</sub> and K<sub>2</sub>O recorded the highest grain yield of rice (6275 kg ha<sup>-1</sup>). A positive balance of available P and negative balance of available N has been observed. A positive balance of OC status has been observed in all the treatments except the unmanured control. A depletion of available Cu and an increasing trend of available Fe, Mn and Zn were registered. Application of organics significantly increased the N, P and K uptake over control. Comparing the 60<sup>th</sup> crop, a decrease in bulk density and improvement in per cent porosity was observed in 64<sup>th</sup> rice crop.

## **8. Long term STCR-IPNS experiment on rice-rice sequence**

The 25-year-old long-term experiment on rice-rice sequence revealed that continuous cropping with rice and adoption of STCR-IPNS technology, maintenance of available N (280 to 266 kg ha<sup>-1</sup>), built up in SOC (4.6 to 8.6 g kg<sup>-1</sup>) and available P (20.2 to 27.8 kg ha<sup>-1</sup>) and lesser magnitude of available K decline (670 to 581 kg ha<sup>-1</sup>) were observed. An increase in yield by 26 % (6.85t ha<sup>-1</sup>) and 24.1 % (6.05 t ha<sup>-1</sup>) in *kharif* and *rabi* seasons, respectively over blanket was recorded. Fertilizer saving owing to STCR-IPNS application was 26 kg of P<sub>2</sub>O<sub>5</sub> ha<sup>-1</sup> and 25 kg of K<sub>2</sub>O ha<sup>-1</sup>, if soil available P and K are 28 and 438 kg ha<sup>-1</sup> respectively.

## **9. Optimization of silicon requirement for enhancing the growth and yield of rice in the intensively rice growing soils of Periyar- Vaigai Command area of Madurai district**

Field experimental result showed that exogenous application of Si sources significantly enhanced the growth, yield attributing characters and rice grain yield (3.6 to 23.4 %) compared to control. Application of Si at 150 kg ha<sup>-1</sup> either as potassium silicate or calcium silicate was found useful in registering significantly higher grain yield of 5715 /5865 kg ha<sup>-1</sup> as compared to other treatments.

## **10. Evaluation of Zinc Solubilizing Bacteria for enhancing Zinc nutrition in rice under Alkali soil**

Soil test based NPK+ FYM enriched Zinc sulphate@ 37.5 kg ha<sup>-1</sup> (1:10 ratio) + Soil application of ZSB (500 ml) registered the higher grain yield (5263 kg ha<sup>-1</sup>) and straw yield (7659 kg ha<sup>-1</sup>) and the yield increase was to the tune of 25 % compared to soil test based NPK+37.5 kg Zinc sulphate ha<sup>-1</sup>. Further, it increased the soil DTPA-Zn availability and Zn uptake by rice.

## **New Action Plans proposed for 2023-24**

### **Action Plan 1: Assessment of Nutrient Use Efficiency of TNAU-WSF in direct sown Rice under drip fertigation**

#### **Rationale**

- ✓ Cost effective balanced nutrient application is highly essential for improved crop productivity. Water soluble fertilizer could increase use efficiency of fertilizers and make the nutrients easily and speedily available to the crop

#### **Objective**

- ✓ To assess the effect of TNAU-WSF on the growth, yield and NUE of direct sown rice and its effect on soil quality under drip fertigation

#### **Treatments**

T<sub>1</sub> - Flooded irrigation+ RDF

T<sub>2</sub>- Drip irrigation +RDF

T<sub>3</sub>- Drip Fertigation (N&K through urea & MOP) + P as basal

T<sub>4</sub>-Basal application of RDF + 20 kg ha<sup>-1</sup> TNAU-WSF through drip in place of 3 splits of Top dressing

T<sub>5</sub> - 40 kg ha<sup>-1</sup>TNAU WSF using drip fertigation (Fertigation of N through urea (Remaining N)

T<sub>6</sub>-50 kg ha<sup>-1</sup>TNAU WSF using drip fertigation (Fertigation of N through urea (Remaining N)

T<sub>7</sub>- 60 kg ha<sup>-1</sup>TNAU WSF using drip fertigation (Fertigation of N through urea (Remaining N)

T<sub>8</sub>- 40 kg ha<sup>-1</sup>TNAU WSF using drip fertigation (2 sprays of nano urea & 2% WSF)

T<sub>9</sub>-50 kg ha<sup>-1</sup>TNAU WSF using drip fertigation (2 sprays of nano urea& 2% WSF)

T<sub>10</sub>-60 kg ha<sup>-1</sup>TNAU WSF using drip fertigation (2 sprays of nano urea& 2% WSF)

#### **Variety: ADT 57**

#### **Period: 1 year (2023-2024)**

#### **Design: RBD: Replication: Three**

#### **Observations to be recorded**

- ✓ Biometric observations
- ✓ Soil available nutrients at critical stages of plant growth
- ✓ Yield and yield attributes
- ✓ Nutrient use efficiency
- ✓ Irrigation use efficiency
- ✓ Economics

#### **Locations and Scientists involved**

##### **Lead Centre & Scientist In-charge:**

Dept. of Soils & Environment AC&RI, Madurai

Dr. S. Sheeba, Professor & Head (SS&AC)

Dr. J. Prabhakaran, Assoc. Prof. (SS&AC)

##### **Co-ordinating Centre & Scientist In-charge**

TRRI, Aduthurai:

Dr. R. Manikandan, Asst. Prof. (SS&AC)

## **Action Plan 2: Effect of Fly Ash on Improving Soil Properties and Rice Productivity**

### **Rationale**

Use of fly ash along with SSB needs to be explored for improving rice productivity

### **Objective**

To validate the fly ash application with SSB on rice yield and available nutrient status of soils

### **Treatment Details**

T<sub>1</sub>: Control

T<sub>2</sub>: Fly Ash @ 15 t ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup>

T<sub>3</sub>: Fly Ash @ 20 t ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup>

T<sub>4</sub>: Fly Ash @ 25 t ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup>

T<sub>5</sub>: Fly Ash @ 15 t ha<sup>-1</sup> + GM @ 6.25 t ha<sup>-1</sup>

T<sub>6</sub>: Fly Ash @ 20 t ha<sup>-1</sup> + GM @ 6.25 t ha<sup>-1</sup>

T<sub>7</sub>: Fly Ash @ 25 t ha<sup>-1</sup> + GM @ 6.25 t ha<sup>-1</sup>

T<sub>8</sub>: Fly Ash @ 15 t ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup> + SSB

T<sub>9</sub>: Fly Ash @ 20 t ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup> + SSB

T<sub>10</sub>: Fly Ash @ 25 t ha<sup>-1</sup> + FYM @ 12.5 t ha<sup>-1</sup> + SSB

T<sub>11</sub>: Fly Ash @ 15 t ha<sup>-1</sup> + GM @ 6.25 t ha<sup>-1</sup> + SSB

T<sub>12</sub>: Fly Ash @ 20 t ha<sup>-1</sup> + GM @ 6.25 t ha<sup>-1</sup> + SSB

T<sub>13</sub>: Fly Ash @ 25 t ha<sup>-1</sup> + GM @ 6.25 t ha<sup>-1</sup> + SSB

### **Observations to be recorded**

1. Biometric observations
2. Yield and yield attributes
3. Soil available nutrients and nutrient uptake
4. Benefit cost ratio

**Duration:** One Year

**Design:** RBD

**Replications:** 2

### **Lead Centre & Scientist**

Dr. S. Sheeba, Professor & Head, Dept. of S&E, AC&RI, Madurai

### **Co-ordinating centres & Scientist**

Dr. D. Lenin Raja, Asst. Prof, AC&RI, Killikulam

Dr. G. Porkodj, Asst. Prof, SRS, Cuddalore

## **Action Plan 3: Evaluating the Potential rice varieties suitable for saline and sodic soil conditions**

### **Rationale**

- ✓ Salt stress reduces the yield and quality of rice.
- ✓ It is of great significance to evaluate and select suitable salt-tolerant varieties for saline/sodic soil

### **Objectives**

- ✓ To evaluate the field performance of different rice varieties under the existing saline and sodic environments in different locations at farmer's field.



- ✓ To fix the tolerance limits of soil salinity / sodicity for rice varieties through micro plot/pot culture experiment

### **Micro plot/Pot culture experiments (Objective 2 only)**

#### **Treatments**

#### **1) Saline Environment (Nagapattinam and Ramanathapuram)**

Main plot: Soil Salinity Levels (EC): 1,2,4,6,8 dSm<sup>-1</sup>

Sub plot: Rice varieties: CO 56, TRY 3, TRY 5, CSR 46

#### **2) Sodic Environment (Tiruchirappalli)**

Main plot: Soil Sodicty Levels (ESP): 8, 16, 24, 32, 40 &48 %

Sub plot: Rice varieties: CO 56, TRY 3, TRY 5 & CSR 46

**Project period:** 2023-24 to 2024-25 (2 Years)

**Design:** Split Plot Design; **Replication:** 3 **Season:** *Rabi*, 2023-25

#### **Observations to be recorded:**

Plant height, Number of tillers / hills, Grain and straw yield, Na & K uptake, Na/K ratio and changes in pH, EC & ESP of soil

#### **Lead centre& Scientist In-charge**

Dr. A. Anuratha, Assoc. Prof. (SS&AC), AC&RI, Nagapattinam

Dr. A. Alagesan, Assoc. Prof (AGR), AC&RI, Nagapattinam

Dr. M. Dhandapani, Asst. Prof. (PBG), TRRI Aduthurai

#### **Co-ordinating centre & Scientist In-charge**

##### **1. CSRC, Ramanathapuram**

Dr. T. Balaji, Asst. Prof. (SS&AC),

Dr. S. Vallalkannan, Assoc. Prof. (AGR)

##### **2.ADAC& RI, Trichy.**

Dr. M. Baskar, P&H, SS&AC,

Dr. S. Rathika, Assoc. Prof. (AGR)

## Project wise remarks

S. No.	Title	Name and designation of the project leaders	Period	Remarks
<b>Action Plan (3)</b>				
1.	Demonstration of STCR-IPNS based fertilizer prescription for rice in Southern Zone (Phase III)	Dr. R. Santhi, Prof. & Head, Dept. of SS&AC, TNAU, Cbe. Coordinating Scientists Dr. S. Maragatham, Prof. (SS&AC), Dept. of SS&AC, TNAU, CBE Dr. S. Sheeba, P&H (S&E), AC&RI, Madurai Dr. D. Lenin raja, AP, (SS&AC), AC&RI, Killikulam	Aug, 2022 - July, 2023	<ul style="list-style-type: none"> <li>Fertilizer saving due to STCR-IPNS may be worked out</li> <li>Results may be given for information &amp; to be closed.</li> </ul>
2.	Evaluation of Skipping of Phosphorus on rice productivity in high P status soil	Dr. S. Sheeba, P&H (S&E), AC&RI, Madurai Co-ordinating centre: Dr. D. Lenin raja, Asst. Prof. (SS&AC), AC&RI, KKM Dr. K. Manikandan, Asst. Prof. (SS&AC), TRRI, ADT	2022-2024	<ul style="list-style-type: none"> <li>BCR may be worked out</li> <li>Soil available P status may be indicated</li> <li>Mid-term correction, if any, may be made to include in the subsequent crops and effective conclusion may be arrived in the current year.</li> <li>Results may be given for information</li> <li>To be continued</li> </ul>
3.	Management of multi-nutrient disorder in Rice	Dr. S. Jothimani, P&H, Dept. of SS&AC, AC&RI, KKM Dr. D. Janaki, Assoc. Professor, ADAC&RI, Trichy Dr. M. Paramasivan, Asst. Prof., Dept. of SS&AC, AC&RI, KKM Dr. K. Manikandan, Asst. Prof. TRRI, Aduthurai	2022 - 2023	<ul style="list-style-type: none"> <li>Field trials should be situation specific instead of general demonstration in different locations.</li> <li>Results may be given for information</li> <li>The research work may be combined with similar type of work being carried out in the Directorate of Crop Management and continued.</li> </ul>
<b>On Farm Trials (3)</b>				
1.	Management of water logging associated soil problem in the rice ecosystem of Cauvery delta zone of Tamil Nadu	Coordinating scientist Dr. K. Sathiya Bama, Prof. (SS&AC), Dept. of SS&AC, Coimbatore Dr. K. Manikandan, Asst. Prof. (SS&AC), TRRI, ADT	2022 to 2023	<ul style="list-style-type: none"> <li>Alternate wetting and drying are not feasible under waterlogged conditions. Hence, mention the applicability of the management for specific situation.</li> </ul>

S. No.	Title	Name and designation of the project leaders	Period	Remarks
		Dr. T. Sivasankari Devi, AP (AGM), TRRI, ADT Dr. A. Anuratha, Assoc. Prof. (SS&AC), AC&RI, Keezhvelur, Nagapattinam		<ul style="list-style-type: none"> <li>Microorganisms used for bio inoculation should be mentioned specifically.</li> <li>Results may be given for adoption</li> </ul>
2.	Validation of STCR-IPNS based fertilizer prescriptions for Rice In North Eastern Zone of Tamil Nadu	Dr. S. Maragatham, Prof. (SS&AC), Dept. of SS&AC, TNAU, Cbe Dr. S. Suganya, Assoc. Prof. (SS&AC), Dept. of SS&AC, TNAU, Cbe Dr. V. Arunkumar, AP (SS&AC), AC&RI, VVNR	Aug, 2022 to July, 2023	<ul style="list-style-type: none"> <li>Fertilizer saving due to STCR-IPNS may be worked out</li> <li>Results may be given for adoption</li> </ul>
3.	Boron fertilization for improving the yield and quality of rice	Lead centre and Scientist in charge Dr. S. Suresh, Professor (SS&AC), Thirupathisaram Coordinating centres & Scientists-in charge Dr. T. Chitdeshwari, Prof. (SS&AC), Dept. of SS&AC, TNAU, Cbe Dr. D. Leninraja, Asst. Prof. (SS&AC), Dept. of SS&AC, AC&RI, KKM Dr. K. Manikandan, Asst. Prof. (SS&AC), TRRI, ADT Dr. B. Bhakiyathu Saliha, Prof. (SS&AC), AC&RI, MDU	2022-2023	<ul style="list-style-type: none"> <li>Percentage of grain chaffiness may be given</li> <li>Demonstrations may be conducted in 1 – 2 ha area and given for technology release</li> <li>Results may be given for adoption.</li> </ul>
<b>University Research Projects (8)</b>				
1.	NRM/TRI/SS&AC/RIC/2022/001: Comparative metabolic response of rice varieties to salinity and sodicity stress	Dr. S. Meena, Professor & Director (COESSH), ADAC&RI, Trichy	Mar 2022-Feb 2025	<ul style="list-style-type: none"> <li>In further studies, Osmolite content may be explored</li> <li>Project may be continued as per the technical programme</li> </ul>
2	NRM/ADU/TRRI/ RIC/2022/001: Permanent Manurial experiment in rice-based cropping system	Dr. K. Manikandan, Asst. Prof. (SS&AC), TRRI, ADT Dr. T. Sivasankari Devi, Asst. Prof. (AGM), TRRI, ADT	April 2022 to March 2027	<ul style="list-style-type: none"> <li>Results may be given for information</li> <li>Research article may be prepared by utilizing long term data and to be published in high NAAS rated / impact factor journal.</li> </ul>
3.	NRM/MDU/SAC/RIC/2020 /001: Permanent Manurial Experiment on Rice	Dr. P. Christy Nirmala Mary, Prof. (SS&AC), Dept. of S&E, AC&RI, Madurai.	Oct'2020–Sep'2025	<ul style="list-style-type: none"> <li>Results may be given for information</li> <li>Research article may be prepared by utilizing long term data and to be published in high NAAS rated / impact factor journal.</li> </ul>

S. No.	Title	Name and designation of the project leaders	Period	Remarks
				<ul style="list-style-type: none"> <li>• Compendium may be completed and released in the current year.</li> </ul>
4.	NRM/MDU/SAC/RIC/2017/001 Optimization of silicon requirement for enhancing growth and yield of rice in the intensively rice growing soils of Periyar Vaigai Command area of Madurai District	Dr. P.P. Mahendran, Dean, AC&RI, Madurai	2017-2023	<ul style="list-style-type: none"> <li>• The Project may be concluded and results may be given for information</li> </ul>
5.	NRM.KKM/SAC/RIC/2021/001 Development of critical level based nutrient management for Rice in Tamiraparani command area	Dr. S. Jothimani, Professor and Head, Dept. of SS&AC, AC&RI, Killikulam	Nov 2020 - Oct, 2023	<ul style="list-style-type: none"> <li>• Nutrient use efficiency may be precisely worked out</li> <li>• Project may be continued for one more year.</li> </ul>
6.	NRM / TRY / SS & AC/ RIC / 2022 / 001 Enhancing the nutrient use efficiency of TNAU micronutrient mixtures through vermicompost and bio-inoculants for improving the productivity of rice in sodic soils.	Dr. M. Baskar, Prof. and Head (SS&AC), ADAC&RI, Trichy Dr. S. Meena, Project Director (COESSH), ADAC&RI, Trichy Dr. T. Uma Maheswari, Asst. Prof. (Ag. Micro.), ADAC&RI, Trichy	Apr, 2022 – Mar 2025	<ul style="list-style-type: none"> <li>• Bio inoculants may be obtained from Department of Agricultural Microbiology</li> <li>• Possibility for sterilization of vermicompost before bio-inoculant inoculation also be considered</li> <li>• Project may be continued as per technical programme</li> </ul>
7.	NRM/ RMD/ SSAC/ RIC/ 2021/001: Alleviation of zinc deficiency under abiotic stress conditions with amino acid encapsulated Zn fertiliser in Semidry rice for the Coastal soils of Ramanathapuram district	Dr. J. Prabhakaran, ASP (SS&AC), AC&RI, Madurai Dr. K. Senthil, AP (Agrl. Chemicals), ADAC&RI, Trichy Dr. T. Ragavan, Professor and Head	Jan,2021-Mar, 2023	<ul style="list-style-type: none"> <li>• Pooled yield data may be given</li> <li>• Project may be concluded and</li> <li>• OFT may be proposed</li> <li>• Patent processing may be completed and completion report may be submitted</li> </ul>
8.	NRM/KVK/MDU/RICE/2022/001 Evaluation of Zinc Solubilizing Bacteria for enhancing Zinc nutrition in rice-rice cropping system under alkaline conditions of Madurai Dt.	Dr. S. Krishnakumar, AP (SS&AC), KVK, Madurai Dr. M. Jeyabharathi, Asst. Professor (Agrl. Micro.), AC&RI, Madurai Dr. E. Subramanian, Prog. Coordinator, KVK, MDU	Jan, 2022 - Mar, 2023	<ul style="list-style-type: none"> <li>• Midterm corrections may be made for modification in the treatments</li> <li>• Cause of higher yield under ZSB applied plots may be explored</li> <li>• Project may be continued with revisions</li> </ul>

S. No.	Title	Name and designation of the project leaders	Period	Remarks
<b>Externally Funded Schemes (1)</b>				
1.	GSF-SPI/ KKM/ SSAC/ 2022/ S001. Neem coated urea and Nano urea on rice under Tamiraparani river basin	Dr. S. Jothimani, Professor & Head (SS&AC), Dept. of SS&AC, AC&RI, KKM Dr. K.S. Subramanian, Former DR, TNAU, Cbe Dr. K. Manikandan, Asst. Prof. (SS&AC), Dept. of SS&AC, AC&RI, KKM	July, 2022 - June, 2023	<ul style="list-style-type: none"> <li>Nano spray concentration may be ascertained</li> <li>Extension proposal may be submitted for continuation with the consent of sponsor</li> </ul>
<b>AICRP Projects (1)</b>				
1.	AICRP/NRM/CBE/SAC/002 Long term STCR-IPNS experiment on rice-rice sequence	Dr. S. Maragatham, Professor (SS&AC) Dr. R. Rajeswari, Asst. Professor (SS&AC) Dr. P. Malathi, Associate Professor (SS&AC)	Continuous expt.	<ul style="list-style-type: none"> <li>Fertilizer saving when compared to initial period may be calculated</li> <li>Results may be given for information</li> </ul>
<b>Student Thesis work (1)</b>				
1.	Nutrient Dynamics and Soil health in rice-based cropping systems	Kola Lakshmi Harika, ID 2020520007 M.Sc. (Ag) SS&AC Dr. S. Thiyageshwari, Professor (SS&AC) Dept. of SS&AC, TNAU, Coimbatore	2022-23	<ul style="list-style-type: none"> <li>Findings may be given for Information</li> <li>Previous crop history may be explored</li> </ul>

## **B. AGRICULTURAL MICROBIOLOGY**

### **A. Technologies for Adoption: Nil**

### **B. Information**

#### **1. Harpin, a protein based smart formulations for defense priming and health in rice**

Leaf apoplast of harpin (hpaG) primed plants challenge inoculated with *Xoo* revealed compounds *viz.*, nonanal, campesterol,  $\zeta$ -sitosterol, dodecanoic acid, benzoic acid, fumaric acid, hexanoic acid, benzene dicarboxylic acid, phytol, hexadecanenitrile, tributyl acetylcitrate and 9-octadecenamide suggest that these antimicrobial compounds might fight against rice BLB pathogen (*XOO*).

#### **2. Drought amelioration with xerophyte-derived PGPR bioinoculants in rice**

The bacterial strains *Bacillus altitudinis* MLSB2 (MT729974) and *Bacillus velezensis* VKSB5 (MT729963) improved the growth and yield of rice under both normal and moisture stress conditions and has to be evaluated for its efficiency as bioinoculants to mitigate moisture stress in rice. Further, inoculant applied plants also showed increased expression of defence genes such as *OsPR5*, *OsPR10*, *OsNPR1*, *OsPAL1* and the zinc transporter, *OsZIP4* under both normal and moisture stress conditions.

#### **3. Exploration and prospective of rhizosphere and guard cell bacterial interactions for alleviation of salt stress in rice**

Guard cell associated microbes such as *Enterobacter cloacae* GCH3, *Acinetobacter* sp. GCH4 from guard cell and *Acinetobacter calcoaceticus* RSH6, *Bacillus tequilensis* RSH8 from rhizosphere exceeded in plant growth promoting activities under saline stress conditions. *Enterobacter cloacae* GCH3 and *Bacillus tequilensis* RSH8 influenced most of the root architecture traits. Combined inoculation of *Enterobacter cloacae* GCH3 and *Bacillus tequilensis* RSH8 resulted in maximum growth and yield parameters of rice under saline conditions. The defence genes, *OsPR5*, *OsPR10*, *OsNPR1* and *OsPAL1* and the zinc transporter gene, *OsZIP4* were found to be up-regulated by the inoculation of halotolerant bacteria under both normal and saline conditions.

#### **4. Development of AMF -based microbial inoculant package for aerobic/semi dry rice: Understanding the mechanism of action by metabolomic, proteomic and transcriptomic analyses**

Abundance of AM fungi was more in Rice- pulse/sugarcane/millets crop rotation systems compared with Rice monoculture. Further, inorganically fertilised soil showed higher AM spore load and root colonization. Soil organic carbon had a positive influence on AM spore, root colonization and soil enzymes. Upon morphological examination of AM spores, *Acaulospora laevis* was found to be dominant, followed by *Rhizophagus intraradices*, *Glomus* sp, *Acaulospora* sp, *Gigaspora margarita*, *Scutellospora calospora*, *Rhizophagus aggregatus* and *Glomus microcarpum*. Based on the infectivity potential, *Rhizophagus intraradices* (60%) was

found to be more infectious than *Acaulo sporalaewis*. Hence *R. intraradices* can be taken for further experimentation.

## **5.Exploring bioinoculants for developing coated seeds for enhanced nutrient uptake in Rice**

NPK and NPK Zn liquid consortia developed for rice maintained the shelf life @  $10^7$ /ml up to 15 months of refrigerated storage conditions. Seed coating of rice with NPK & NPK Zn consortia-maintained shelf life an average of  $10^4$ /seed. NPKZn consortia treated rice seedling increased germination (16 %) and vigor index (25.57%) and other growth biometrics such as plant height, total number of tillers, productive tillers and grains/hill under pot culture condition than NPK consortia.

### **C. For On Farm Trial: Nil**

### **D. New action plan**

#### **1. Action plan (New): Development of Microbial consortium for drought mitigation of rice**

**Scientist In charge:** Dr. T. Sivasankari Devi, Asst. Prof. (Agrl. Micro.), TRRI, ADT  
**Objectives**

1. To develop a microbial consortium for drought mitigation of rice
2. Bio-efficacy of a microbial consortium for drought mitigation of rice under pot culture and field condition.

**Period:** 3 years (2023-2026)

**Work plan: Year 1**

#### **1. Development of drought mitigating microbial consortium for rice**

PPFM – *Methylobacterium aminovorans* Tm 13, and *Bacillus altitudinis* FD 48 showing potential drought mitigation are taken up for developing microbial consortium for drought mitigation of rice. Shelf life with Individual cell concentration of  $10^8$  cells per ml and Compatibility testing of all the bio-inoculants will be studied under *invitro* conditions

**Year 2**

#### **2. Bio-efficacy of a microbial consortium for drought mitigation of rice under pot culture and field condition.**

The consortium will be evaluated for 1. Method of application, 2. Dosage and time of application, 3. Frequency of application and study the survival of microorganisms in the plants

**Year 3**

#### **Field evaluation and bio-efficacy of a microbial consortium for drought mitigation of rice under field condition at (Tirur and Paramakudi)**

Comparing consortium with individual strains (PPFM and *Bacillus altitudinis* FD 48) along with un-inoculated control.

## PROJECT WISE REMARKS

Action Plan: Harpin, a protein based smart formulations for defense priming and health in rice.	Dr. U. Sivakumar P&H (Agrl. Micro.), TNAU, Cbe. Dr. R. Arul, Prof. (Biotechnology), 2021-2023 CPMB, TNAU, Cbe. Dr. C. Gopalakrishnan, Prof. (Plant Patho.), TNAU, Cbe	2021 to 2023	<ul style="list-style-type: none"> <li>The project may be extended for one year</li> </ul>
NRM/CBE/AGM/RIC/2020/001: Exploring bioinoculants for developing coated seeds for enhanced nutrient uptake in Rice	PI: Dr. M. Gnanachitra, Prof. (Agrl. Micro.) Co-PI: Dr. D. Balachandar, Prof. (Agrl. Micro.) Dr. Jerlin, Prof. (SST)	Nov. 2019 to Oct. 2022	<ul style="list-style-type: none"> <li>Fe deficiency is the major problem in direct seeded rice, suggested to add any material to enhance the Fe absorption.</li> <li>Interactions and adsorption of microorganisms on seed may be studied.</li> <li>Extended for 1 year to complete the field experiment</li> </ul>
NRM/KKM/AGM/RIC/2021/001: Microbial synthesis of Zinc nanospheres to enhance Zinc use efficiency in rice	Dr. M. Gomathy, Assoc Prof. (Agrl. Micro.) Dept. of SS & AC, AC&RI, Killikulam Dr. K.S. Subramanian, Professor and Head (CANT)-Retd.	Aug. 2020 to July 2023	<ul style="list-style-type: none"> <li>Literatures may be submitted: Proof of evidence for using ZSB for producing Zn nano particles</li> <li>Specific rice physiological responses targeted for Zn nano particles</li> <li>Included Zn nano particles treatments.</li> <li>Treatments may be given as Zn content instead of percent Zn nanoparticles.</li> <li>Zn nanoparticles may be purified and Zn content may be analyzed. Extended for 1 year</li> </ul>
DNRM-AGM-GoI-SERB-E28 AHR Evaluation of the impact of novel synthetic Microbial consortia on the growth and moisture stress alleviating potential in rice	Dr. T. Kalaiselvi, Prof., Dept. of Agrl. Micro., TANU, Coimbatore Dr. E. Kokiladevi, Prof. & Head, Dept. of Plant Biotechnology, Cbe Dr. S. K. Natarajan, Assoc. Prof. (Agron.) TNAU, Cbe Dr. M. R. Latha, Prof. (SS&AC), TNAU, Cbe	June 2022 to May 2025	<ul style="list-style-type: none"> <li>The project may be Continued</li> </ul>



## IV. CROP PROTECTION

### A. Technologies for Adoption/OFT/Information

#### A. Adoption/OFT/Information

##### I. Technology for Adoption

### Agri. Entomology

#### 1. IPM capsule for Rice gall midge

The following IPM Package reduced the gall midge incidence (75.99%) with highest cost benefit ratio of 2.09.

- i) Early sowing (July 3<sup>rd</sup> week- samba/ August 3<sup>rd</sup> week- *thaladi*).
- ii) Nursery: Fipronil 0.3 G @ 0.8 kg/ 8 cent 5 days before transplanting.
- iii) Azadirachtin 0.3% @ 2 l/ha on 25 DAT.
- iv) Fipronil 0.3 G @ 16.67 kg/ha on need basis.

### Plant Pathology

#### 1. Management of rice blast and sheath blight diseases

- Seed treatment with *B. subtilis* (Bbv57) @ 10 g/kg + 75 % RDF + soil incorporation of Daincha @ 6.25 t/ha and soil application of *B. subtilis* (Bbv57) @ 2.5 kg/ha + need based spraying of zineb 68% + hexaconazole 4% @ 1250g/ha was found to be effective in reducing the blast (6.20 %) and sheath blight (10.33 %) incidence and increasing the grain yield (10.35%) as compared to control with a CB ratio of 1:2.02.

**Recommendation:** Seed treatment with *B. subtilis* (Bbv57) @ 10 g/kg + 75 % RDF + soil incorporation of Daincha @ 6.25 t/ha and soil application of *B. subtilis* (Bbv57) @ 2.5 kg/ha + need based spraying of zineb 68% + hexaconazole 4% @ 1250g/ha is recommended for the management of rice blast and sheath blight diseases in rice.

## II. OFT

### Agri. Entomology

#### OFT 1: Effect of newer insecticide molecules on emerging pests (Hispa, whorl maggot, Black bug) in Rice

##### Treatments:

- T<sub>1</sub>- Thiamethoxam 25 WG @ 100 g/ ha  
T<sub>2</sub>- Chlorantraniliprole 18.5%SC@150ml/ ha  
T<sub>3</sub>- Diafenthiuron 50 WP @ 600 g/ ha  
T<sub>4</sub>-Fipronil 5%SC 1000 g/ha (std. check)  
T<sub>5</sub>- Control (Untreated check)

**Design:** RBD;

**Replications:** 4;

**Season:** *Rabi*

Treatment: Twice at fortnight intervals based on incidence of the pest (25 & 40 DAT)

##### Centers to be involved

TRRI, ADT	: Dr. P. Anandhi, Assoc. Professor (Entomology) *
KVK, TIRUR	: Dr. V. A. Vijayashanthi, Asst. Professor (Entomology)
RRS, Paiyur	: Dr. P. Govindan, Asst. Professor (Entomology)
RRS, Ambasamudram	: Dr. L. Allwin, Assoc. Professor (Entomology)

**\* MS-Monitoring Scientist**

**Observations to be recorded**

1. The population of Hispa and Black bug count will be recorded before and 3, 7 and 14 days after treatment (DAT) in 10 randomly selected plants per plot.
2. Whorl maggot damage will be recorded before and 7 and 14 DAT
3. Predators and parasitoid diversity in rice ecosystem/ ten plants at random in each plot.

**OFT 2. Efficacy of bio-products for the management of Earhead bug (EHB) and Black bug (BB) of rice**

T<sub>1</sub> - *Beauveria bassiana* @ 2.5 kg/ha\*

T<sub>2</sub> - *Lecanicillium lecanii* @ 2.5 kg/ha

T<sub>3</sub> - Malathion 5 % DP @ 10kg/ha

T<sub>4</sub> - Untreated check

\*(1 x10<sup>8</sup> cfu/ml)

**Design:** RBD;                   **Replications:** 5;                   **Season:** *Rabi*

Treatment: For BB, twice at fortnight intervals based on incidence and for EHB at flowering stage and 15 days later

**Centers to be involved**

TRRI, ADT	: Dr. P. Anandhi, Assoc. Professor (Entomology) *
TNAU, CBE	: Dr. Sheela Venugopal, Asst. Professor (Entomology)
KVK, TIRUR	: Dr. V. A. Vijayashanthi, Asst. Professor (Entomology)
RRS, Paiyur	: Dr. P. Govindan, Asst. Professor (Entomology)
RRS, Ambasamudram	: Dr. L. Allwin, Assoc. Professor (Entomology)

**\* MS-Monitoring Scientist**

**Observations to be recorded:**

1. Population of EHB/ BB at fortnight intervals/10 random hills/replication from flowering stage
2. Sweep net collection at weekly intervals (5 sweeps/ replication) (1 sweep is a semicircular sweep for 180° to and fro)
3. No. of dead cadavers or mycosed insects/m<sup>2</sup> / replication
4. Yield – kg/plot

**Plant Pathology**

**OFT 1: Management of rice diseases through new molecules**

**Treatments**

T<sub>1</sub> - Foliar spraying of azoxystrobin 18.2% W/W + difenoconazole 11.4% W/W SC @ 500ml/ha at the time of symptom appearance

T<sub>2</sub> - Foliar spraying of zineb 68% + hexaconazole 4% WP @ 1250g/ha at the time of symptom appearance

T<sub>3</sub> - Untreated control

Design                   :                   RBD  
Replications           :                   7  
Season                   :                   *Rabi*

**Centres to be involved:**

<b>ARS, Thanjavur [MS]*</b>	<b>: Dr. A. Ramanathan, Professor and Head</b>
AD AC&RI, Trichy	: Dr. M. Rajesh, Asst. Professor (Plant Pathology)
RRS, Ambasamudram	: Dr. N. Rajinimala, Assoc. Prof. (Plant Pathology)
AC & RI, Eachangkottai	: Dr. S. Mathiyazhahan, Assoc. Prof. (Plant Patho.)

**\* MS-Monitoring Scientist**

**Observations:** Severity of rice diseases, yield and CB ratio

**OFT 2: Forewarning of rice fungal diseases through spore trapping technology**

**Treatments**

- T<sub>1</sub> - Inoculum cum weather based application of azoxystrobin 16.7% + tricyclazole 33.3% SC @ 500 ml/ha two sprays @ 15 days interval
- T<sub>2</sub> - Farmer practice (Curative application of azoxystrobin 16.7% + tricyclazole 33.3% SC @ 500 ml/ha) three sprays @ 15 days interval
- T<sub>3</sub> - Untreated control
- |              |   |             |
|--------------|---|-------------|
| Design       | : | RBD         |
| Replications | : | 7           |
| Season       | : | <i>Rabi</i> |

**Centres to be involved:**

<b>HC&amp;RI, Jeenu [MS]*</b>	<b>: Dr. A. Kamalakannan, Prof. (Plant Pathology)</b>
Dept. of Rice, TNAU, CBE	: Dr. C. Gopalakrishnan, Professor (Plant Pathology)
RRS, Ambasamudram	: Dr. N. Rajinimala, Assoc. Professor (Plant Pathology)
TRRI, Aduthurai	: Dr. K. Rajappan, Professor (Plant Pathology)

**\* MS-Monitoring Scientist**

**Treatment spraying:** Two sprays @ 15 days interval

**Observations:**

- Sampling rods should be collected at weekly interval and sent to Coimbatore centre for assessment
- Blast, brown spot and false smut disease severity, yield and CB ratio should be worked out

**III. For Information**

**Agri. Entomology**

1. Gall midge incidence was recorded in Thanjavur and Mayiladuthurai district. The incidence was noticed in CR1009 Sub1, IR20, Swarna Sub 1, MTU 7029, ADT51 and ADT 42. Continuous cloudy or rainy weather, intensive management practices (high nitrogen and indiscriminate use of combination insecticides) and low incidence of parasitoid *Platygaster oryzae* may be the reasons for outbreak.
2. Outbreak of rice Brown Plant Hopper was noticed (30 to 100% hopper burn symptom) at Thiruvavur, Thanjavur and Cuddalore districts during January, 2023. Indiscriminate use of insecticides leads the outbreak. The varieties grown in the affected areas were Swarna Sub 1, MTU 7029 and ADT51. Dinotefuran 20 G @

150g / pymetrozine50 WG @ 300 g / Triflumezopyrim 10SC@235ml/  
Thiamethoxam 25 WDG @ 100g/ ha recommended to farmers.

### 3. Resistant entries against major insect pests

Pests	Entries identified	Category
Yellow Stem borer (Field)	ART 3-2, 15-3, MLT 203, 210, 213, 301, 503, 506, 507 512, 513 (Field Screening-ADT, ASD, MDU, BSR, CBE, TPS)	Moderately Resistant
BPH (Artificial)	ART 15-1, 15-2, 15-3, MLT- 101, 203, 214, 501- ADT, CBE	Moderately Resistant
WBPH (Artificial)	MLT- 101, 104, 109, 203, 214, 304, 401- CBE	Moderately Resistant

4. Yellow stem borer was the dominant species and peak incidence was noticed during 30<sup>th</sup> - 5<sup>th</sup> SMW. Late transplanted crop (beyond October) was relatively more susceptible to Pink Stem Borer. Stubbles of previous crop served as the source of infestation. The yield loss due to stem borer was 797kg/ha
5. Drone with atomizer nozzle was found to be the best for insecticide spray in rice ecosystem.
6. Seasonal incidence of rice mites was recorded along with climatic factors for developing a forecasting model. Mite incidence initiated during February, 2023 (7<sup>th</sup> MSW) and attained maximum during April 2023 (14<sup>th</sup> & 15<sup>th</sup> MSW). Mite incidence was found to be significantly positively correlated with maximum temperature.

### Plant Pathology

1. During *rabi* season of 2022, blast (8-28 PDI), brown spot (9.65- 25.23PDI), sheath blight (8-20PDI), bacterial leaf blight (5.0 -33.0 PDI), false smut (4.0 - 25.0 PDI) and grain discoloration (7.69 – 19.56 PDI) diseases were noticed in different parts of Tamil Nadu. Five years (2017-21) blast incidence at Coimbatore was correlated with weather parameters (minimum temperature and RH in the morning) and a prediction equation of  $Y = - 5 + (-1, 0.9) \text{ Min Temp} + (0.38, 0.42) \text{ RHm}$  was developed and test verified with 2022 data.
2. The MLT entries *viz.*, MLT 101, 203, 204 and 214 were found to be resistant to BPH, WPBH, YSB, blast, BLB, sheath blight, false smut and grain discoloration.
3. Seed treatment (10% extract) and spraying of *Zingiber officinale* @ 10% at tillering has recorded the lowest per cent disease index of bacterial leaf blight (5.61) compared to control (28.63).
4. Two foliar sprays of *Panchakavya* at 2 and 3 % at tillering and grain filling stages reduced bacterial leaf blight (15.69% and 15.83%) and blast (17.36 % and 20.43 %) with higher yield (5196 kg/ha and 4953 kg/ha), respectively.
5. Sequential application of liquid formulation of *Bacillus amyloliquefaciens* (B44) as seed bacterization (10ml/ kg), seedling dip (500ml/ha), soil application (1000ml / ha at 30 DAT) & foliar spray (500 ml/ha) at early boot stage, late boot and heading stage significantly reduced false smut severity (84.8 %).
6. Two foliar sprays either with neem oil (or) eucalyptus oil @ 2 per cent during 50 % flowering and second spray 15 days after first spray has significantly reduced aflatoxin content (14.7 and 15.1 µg/kg) when compared to control (93.4 µg/kg) and grain discoloration (4.5 and 4.7 %) when compared to control (17.8 %).

7. A portable LAMP based diagnostic kit for the detection of seed borne *Bipolaris oryzae* and *Sarocladium oryzae* was developed.

## **B. Action plan (2023-2024)**

### **1. Agricultural Entomology**

#### **Theme Areas:**

1. Prediction of changing insect pest scenario in rice ecosystems
2. Exploring insect resistance mechanisms
3. Species complex and population dynamics of stem borer species
4. Population dynamics, yield loss assessment and management of rice mite species (New)
5. Management of earhead bug in rice (New)

## Action Plan 1: Prediction of changing insect pest scenario in rice ecosystems

Theme leader	Dr. V.A. Vijayashanthi, KVK, Tirur (TL)		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables/ expected out come
1. Keeping vigilance on emerging pests either through introduction or shift in pest status. 2. Assessment of insect pest and natural enemies population <i>in situ</i> , light and pheromone trap. 3. Impact of light trap on non target arthropods. 4. Fixed and rowing survey (One on campus fixed plot and roving plot study at fortnightly interval in the district identified during the district specific crop season)	Dr. P. Anandhi, TRRI, Aduthurai Dr. Sheela Venugopal, TNAU, CBE Dr. K. Ganesan, ARS, BVS Dr. V.A. Vijayashanthi, KVK, Tirur Dr. K. Suresh, KVK, MDU Dr. B. Usharani, KVK, Aruppukkottai Dr. M. Ravi, KVK, Salem Dr. D. Rajabaskar, KVK, Dharmapuri Dr. Sheeba Jasmine, KVK, TRY Dr. L. Allwin, RRS, Ambasamudram Dr. V. Radhakrishnan, KVK, Needamangalam Dr. Patil Santhosh Ganapathi PSIT, CBE	<ul style="list-style-type: none"> <li>Fixed and rowing survey on pest incidence.</li> <li>Recording of weather parameters.</li> <li>Multiple correlation and regression, analysis with previous years weather data and pests damage and population data</li> </ul>	Forewarning on emerging pests. Intervention with suitable IPM package.

## Action Plan 2: Exploring insect resistance mechanisms

Theme Leader	Dr. Sheela Venugopal, TNAU, CBE	
Activity	Name of the Scientist(s) and Centre(s) – Proposed	Observations to be recorded
1. Identification of resistance sources for major insect pests. - Screening of TNAU (MLT/ART) entries - Screening of local germplasms a. Artificial screening for sucking pests (at ADT-BPH & CBE-BPH, WBPH&GLH) b. Field screening for stem borer: & leaf folder: - Should be planned coinciding with peak pest incidence period of the respective centre. Two planting dates at fifteen days interval preferable. - 2 rows of 10 hills each to be planted for each	Dr. Sheela Venugopal, TNAU, CBE-SB, BPH, WBPH, GLH Dr. P. Anandhi, TRRI, ADT-SB, LF, BPH Dr. K. Elanchezhyan, AC&RI, KKM-SB, LF Dr. Zadda Kavitha, AC&RI, MDU-SB, LF Dr. Kalyana Sundaram, ADAC&RI, TRY-SB, LF Dr. K. Ganesan, ARS, BSR Dr. Allwin, ARS, TPS-SB, LF-Hot spot for SB	Activity 1: If natural infestation is not adequate (eg. <10%), artificial inoculation to be made to build up pest incidence in centres where field screening is done. Artificial inoculation to be done twice, once at 25 DAT and another at 45 DAT by capturing adult moths (Stem borer and leaf folder) one week before inoculation by insect nets and releasing them in cages with rice seedlings for oviposition and then collecting egg masses and stapling them in susceptible check PB1 @ 1 egg mass /entry or by releasing adult moths @ 1pair / entry at weekly intervals from 15 DAT till flowering.

<p>test entry with two rows of susceptible check PB1 in between every five test entries and one row of resistant check, TKM 6, W 1263, Swarna and PTB 33 after every 10 test entries.</p> <p>2. Investigation of resistance mechanisms</p> <ul style="list-style-type: none"> <li>- Attributes contributing antixenosis &amp; antibiosis</li> </ul>		<p>Activity 2: For the best five resistant entries thus identified by each centre, host plant attributes like penultimate leaf length, hairiness (Trichome density), leaf sheath tightness in terms of angle of penultimate leaf <i>etc.</i>, and other biochemical attributes like phenol content, Silicon content <i>etc.</i>, could be recorded/estimated for those entries by each centre except TPS.</p>
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### Action Plan 3: Species complex, population dynamics due to stem borer in rice

Theme Leader	Dr. S. Sheeba Joyce Roseleen, Asst. Prof. (Ento.), HC&RI, Trichy		
Activity	Name of the Scientist(s) and Centre(s) – Proposed	Observations to be recorded	Deliverables
<p><b>Activity 1:</b> Seasonal incidence of stem borer complex (YSB, PSB, DHB) in rice Determination of species complex rice stem borer Light trap and pheromone trap to be installed; Lure in traps to be replaced once in 15 days</p>	<p><u>SRS, Sirugamani</u> Dr. S. Sheeba Joyce Roseleen, Asst. Prof. (Ento.) <u>TRRI, ADT</u> Dr. P. Anandhi, Assoc. Prof. (Ento.) <u>TNAU, CBE</u></p>	<ul style="list-style-type: none"> <li>• Weekly observation on the species trapped</li> <li>• Destructive sampling @ 10 tiller/40m<sup>2</sup></li> <li>• Relative abundance = Total number of each species/total number of individuals of all species x100</li> </ul>	<p>Stemborer complex in Tamil Nadu Yield loss due to the stemborer complex Natural enemy complex</p>
<p><b>Activity 2:</b> Population dynamics and distribution pattern of stem borer complex in rice in different seasons</p>	<p>Dr. Sheela Venugopal Asst. Professor (Entomology) <u>KVK, Needamangalam</u> Dr. V. Radhakrishnan, Assoc. Professor (Entomology)</p>	<ul style="list-style-type: none"> <li>• Stem borer catches/counts to be correlated with weather data and season</li> <li>• Natural enemies population</li> <li>• Larval parasitoids of the SBs</li> </ul>	<p>Seasonal incidence of stem borer species could be determined</p>

### Action Plan 4: Population dynamics, yield loss assessment and management of rice mite species

Theme Leader	Dr. E. Sumathi, Prof. (Entomology), TNAU, Coimbatore		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<p><b>Activity 1: Yield loss assessment due to mite infestation Variety CO 51</b> <b>T<sub>1</sub>. Protected:</b></p>	<p>Dr. E. Sumathi, TNAU, CBE Dr. P. Anandhi, TRRI, ADT Dr. Zadda Kavitha, AC&amp;RI,</p>	<ul style="list-style-type: none"> <li>• Population of mite from top, middle and bottom leaves (1x10 cm leaf length) at</li> </ul>	<p>Estimate on the per cent yield loss due to rice leaf mite will be made</p>

<p>Need based application of propargite 57 EC @ 2ml/lit and repeat the spray 15 days after first spraying</p> <p><b>T<sub>2</sub>. Unprotected Replications: 6</b> Design and analysis: Paired 't' test</p> <p><b>Activity 2: Management of rice mites</b> Variety CO 51</p> <p><b>Need based application of</b> T<sub>1</sub>. Azadirachtin 1% EC @ 3 ml/lit twice at 15 days interval T<sub>2</sub>. Spiromesifen 240SC @ 2 ml/lit twice at 15 days interval T<sub>3</sub>. Propargite 57 EC @ 2ml/lit twice at 15 days interval T<sub>4</sub>. Azadirachtin 1 % EC @ 3ml/lit as first spray followed by Spiromesifen 240SC @ 2 ml/lit 15 days later T<sub>5</sub>. Azadirachtin 1 % EC @ 3 ml/lit as first spray followed by propargite 57 EC 15 days later T<sub>6</sub>. Control</p>	<p>MDU Dr. K. Ganesan, ARS, BSR.</p>	<p>weekly intervals from the date when mite incidence is noticed.</p> <ul style="list-style-type: none"> <li>• Yield and BCR.</li> </ul>	<p>available.</p> <p>Effective molecule for rice leaf mite management will be identified.</p>
<p><b>Replications: 4; Design: RBD</b></p>			

### Action Plan 5: Management of Earhead bug in rice

Theme Leader	Dr. P. Chandramani, Professor (Entomology)		
Activity	Name of the Scientist(s) and Centre(s)	Observations to be recorded	Deliverables
<p>Foliar spray of T<sub>1</sub> - Chlorantraniliprole 18.5 SC @ 150ml/ha T<sub>2</sub> - Thiamethoxam 25 WDG @ 100g/ha T<sub>3</sub> - Malathion 50 EC @ 100 ml/ha T<sub>4</sub> - Azadirachtin 0.3% @ 2l/ha T<sub>5</sub> - Malathion 5 % DP @ 10kg/ha T<sub>6</sub> - Acephate 75 SP @ 1kg/ha T<sub>7</sub> - Untreated check At the time of pest incidence twice at fortnight interval Design: RBD Treatments: 7 Replication: 3; Plot size: 50 sq.m</p>	<p><u>TNAU, CBE</u> Sheela Venugopal, Asst. Professor (Agrl. Ento.) <u>AC&amp;RI, MDU</u> P. Chandramani, Prof. (Entomology) <u>ARS, BSR</u> Dr. K. Ganesan, Assoc. Professor (Entomology) <u>AC&amp;RI, KKM</u> Dr. K. Elanchezhyian, Assoc. Professor (Entomology)</p>	<p>1. Population of EHB at weekly intervals/10 random hills/replication from flowering stage 2. Sweep net collection at weekly intervals (5 sweeps/ replication) (1 sweep is a semicircular sweep for 180° to and fro) 3. No. of dead cadavers or mycosed insects/m<sup>2</sup> / replication 4. Yield – kg/plot</p>	<p>To find a suitable alternative for the management of earhead bug.</p>



## **2. Plant Pathology**

### **Theme Area**

1. Disease monitoring, surveillance, epidemiological studies and artificial intelligence-based diagnosis
2. Optimization of artificial inoculation and management of false smut
3. Management of sheath blight with chemicals and bio-agents
4. Management of Bacterial Leaf Blight of rice

**Action Plan 1: Disease monitoring, surveillance, epidemiological studies and artificial intelligence-based diagnosis  
(Cont.)**

Theme Leader	Dr. K. Rajappan, Professor, TRRI, Aduthurai		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables/ out come
<p>I. Monitoring of diseases under irrigated and direct sown rice (blast, sheath blight, sheath rot, bacterial blight, brown spot, grain discoloration and false smut) diseases</p> <p>1. Fixed plot survey 2. Roving survey Correlation with weather factors. (All centers)</p> <p>II. Development of forecasting model for major diseases using the available data in collaboration with ACRC.</p> <p>III. Artificial intelligence-based diagnosis (data set collection)</p>	<p>1. Dr. K. Rajappan, TRRI, Aduthurai 2. Dr. C. Gopalakrishnan, Dept. of Rice, Cbe 3. Dr. N. Revathy, AC&amp;RI, Madurai 4. Dr. M. Rajesh, ADAC&amp;RI, Trichy 5. Dr. J. Sheela, AC&amp;RI, Killikulam 6. Dr. N. Rajinimala, RRS, ASD 7. Dr. S. Mathiyazhahan, AC&amp;RI, Eachangkottai 8. Dr. M. Deivamani, KVK, Pappaparatti 9. Dr. Santhosh Patil, AP, Dept. of Physical Sciences, TNAU, Coimbatore</p>	<p>Per cent disease incidence / PDI as per standard grades. Correlation and regression analysis of disease progression during cropping periods in relation to weather parameters. Regular bulletins on disease scenario in the particular zone should be given for the benefit of farmers through press and media marking a copy to Director (CPPS). Approximately 500 or more images to be captured for each disease and centre Labeling and classification of symptoms</p>	<p>Timely monitoring of disease epidemics and fore-warning of farmers and line departments.</p>

**Action Plan 2: Optimization of artificial inoculation of *Ustilaginoidea virens* and management of false smut**

Theme Leader	Dr. C. Goplakrishnan, Professor, Dept. of Rice, TNAU, Cbe		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<p>1. Standardization of artificial inoculation methodologies Sequential inoculation of <i>U. virens</i> @ <math>10^8</math> spores / ml starting from initiation of flowering to completion of flowering.</p>	<p>Dr. C. Goplakrishnan, Prof., Dept. of Rice, TNAU, Coimbatore</p>	<p>Per cent disease incidence</p>	<ul style="list-style-type: none"> <li>• An artificial inoculation method will be available</li> </ul>
<p>2. Management of false smut</p> <p>i. Foliar spray of propiconazole @ 200 ml/ac at initiation of flowering and at 50% flowering ii. Foliar spray of effective bacterial entophyte @ 1kg/ac at initiation of flowering and at 50% flowering (supplied by Coimbatore centre)</p>	<p>1. Dr. K. Rajappan, TRRI, Aduthurai 2. Dr. N. Revathy, AC &amp;RI, Madurai 3. Dr. V.K. Sathya, AEC&amp;RI, Kumulur 4. Dr. N. Rajinimala, RRS, ASD 5. Dr. S. Mathiyazhahan, AC &amp;RI, ECK</p>	<ul style="list-style-type: none"> <li>• Per cent disease incidence</li> <li>• Yield (kg/ ha)</li> <li>• C:B ratio</li> </ul>	<ul style="list-style-type: none"> <li>• Management technology for false smut</li> </ul>

iii. Control			
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### Action Plan 3: Management of sheath blight with chemicals and bio-agents

Theme Leader	Dr. N. Rajinimala, RRS, Ambasamudram		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<b>Management of sheath blight</b> T <sub>1</sub> – Seed treatment @ 10g/kg and soil application @ 2.5kg/ha of <i>Bacillus subtilis</i> (Bbv57) T <sub>2</sub> - Foliar spraying of propiconazole 25% EC @ 500 ml/ha. T <sub>3</sub> - Control	1. Dr. K. Rajappan, TRRI, Aduthurai 2. Dr. A. Ramanathan, ARS, Thanjavur 3. Dr. M. Rajesh, ADAC&RI, TRY 4. Dr. N. Revathy, Prof., AC & RI, MDU	1. PDI at 15 and 30 days after application 2. Yield (kg/ ha) 3. C:B ratio	To develop suitable method for rice sheath blight management

### Action Plan 4: Management of Bacterial Leaf Blight of rice

Theme Leader	Dr. N. Revathy, Professor, AC & RI, Madurai		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<b>Management of BLB</b> T <sub>1</sub> - Foliar spraying of bactrinashak @ 500 ppm T <sub>2</sub> - Foliar spraying of copper hydroxide @ 500g/ac T <sub>3</sub> - Foliar spraying of <i>Bacillus subtilis</i> (Bbv57) @ 1 kg/ac. T <sub>4</sub> -Control	1. Dr. K. Rajappan, TRRI, Aduthurai 2. Dr. C. Gopalakrishnan, TNAU, Cbe 3. Dr. N. Rajinimala, RRS, ASD 4. Dr. V.K. Sathya, AEC&RI, Kumulur	1. PDI 2. Yield (kg/ ha) 3. C:B ratio	Management strategy for sheath blight

### C. Remarks on the ongoing URP/AICRIP/EFP/UCP *etc.*

Crop	Agri. Entomology (Nos.)	Plant Pathology (Nos.)
University Research Projects	7	7
AICRP Projects	2	2
Externally Funded Projects	-	1
<b>Total</b>	<b>9</b>	<b>10</b>

### 1. AGRICULTURAL ENTOMOLOGY

S. No.	Project No. and Title	Remarks
1.	AEC&RI/CBE/RIC/2023/001: Efficacy of ultrasonic sound on repellence of rice weevil ( <i>Sitophilus oryzae</i> ) in stored food grains (Rice and pulses) Dr. Devaraj Soundarajan Asst. Professor (Physics), AEC&RI, TNAU, Coimbatore Dr. Sheela Venugopal, Asst. Professor (Ento.), Dept. of Agri. Ento., TNAU, CBE (Mar 2023-Feb 2025)	New project
2.	CPPS/CBE/ENT/2021/001: Impact of post-harvest processing techniques on thiamethoxam and chlorantraniliprole residues in paddy (September, 2020 – August 2022) Dr. A. Suganthi, Asst. Professor (Agri. Entomology) (September, 2020 – August 2022)	The project may be closed and another URP may be proposed.
3.	CPPS/CBE/ENT/2021/005: Analysis of residues of insecticides applied through unmanned aerial vehicles in paddy, coconut and maize. Dr. A. Suganthi, Asst. Professor (Agri. Entomology) (Feb, 2021 – Jan 2023)	The project may be closed and another URP may be proposed.
4.	CPPS/TRY/CPS/RIC/2021/001: Bio- ecology and management of Pink Stem Borer, <i>Sesamia inferens</i> Walker (Lepidoptera: Noctuidae) in rice Dr. Sheeba Joyce Rosleen, AP (Ento.) August 2021- July 2024	The Project may be continued
5.	URP/Rice/CBE/2021/010: Population dynamics, yield loss assessment and management of rice gall midge, <i>Orseolia oryzae</i> 1. Dr. Sheela Venugopal, AP, (Agri. Ento.), Dept. of Rice, TNAU, Cbe 2. Dr. P. Anandhi, AP., (Agri. Ento.), TRRI, Aduthurai 3. Dr. P. Govindan, AP (Agri. Ento.), RRS, Paiyur 4. Dr. Vijaya Shanthi, AP, (Agri. Ento.), RRS, Tirur May 2021-April 2023	The project may be closed and another URP may be proposed.
6.	CPPS/CBE/ENT/2021/004: Novel delivery of exogenous products for the management of major pests of rice Dr. E. Sumathi, Associate Professor (Entomology) Dr. R. Kumaraperumal, Asst. Professor (SS&AC), Dept. of RS & GIS, TNAU, Cbe. January, 2021 - December, 2022	The project may be closed and another URP may be proposed.
7.	No. CPPS/CBE/ENT/2021/009 Occupational exposure of insecticides sprayed through UAV in rice, maize and coconut ecosystem Dr. B. Vinothkumar; 01.01.2021 to 31.12.2022	Project may be closed and another URP may be proposed.
8.	AICRP/PBG/CBE/RIC/003: All India Co-ordinated Rice Improvement Project –	Project may be continued

	Entomology Part, (Coimbatore) Dr. Sheela Venugopal, Assistant Professor (Agrl. Ento.)	
9.	AICRP/PBG/ADT/RIC/002 All India Co-ordinated Rice Improvement Project – Entomology Part (Aduthurai) Dr. P. Anandhi, Assoc. Professor (Ento.)	Project may be continued

## 2. PLANT PATHOLOGY

S. No.	Project No. and Title	Remarks
<b>University Research Projects</b>		
1.	<b>CPPS/TRY/PAT/RIC/2020/001:</b> Bio-intensive management of blast and bacterial leaf blight in paddy using <i>Streptomyces</i> spp. under salt affected soils. (September 2020- August 2023) <b>Dr. V.K. Satya</b>	To be continued
2.	<b>CPPS/KKM/PAT/RIC/2020/001:</b> Biocontrol potential of spermosphere microbiomes on rice brown spot pathogen <i>Bipolaris oryzae</i> . (April 2020-March2023) <b>Dr. J. Sheela</b>	To be closed and a new project may be proposed in rice
3.	<b>CPPS/KKM/PAT/RIC/2020/002:</b> Management of Bacterial Leaf Blight of Rice caused by <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> using plant products and essential oils. (July 2020- June 2023) <b>Dr. N. Rajinimala</b>	To be closed and a new project may be proposed in rice
4.	<b>CPPS/TRY/PP/RIC/2002/002</b> - Efficacy of Panchakavya on the Management of Foliar diseases of paddy in saline soil eco system. (June 2022 - December 2025) <b>Dr. K. Sethuraman</b>	To be continued
5.	<b>CPPS/TRY/PP/RIC/2022/001:</b> Studies on effect of weather parameters on the false smut [ <i>Ustilaginoidea virens</i> (Cooke) Takahashi] disease incidence in rice ( <i>Oryza sativa</i> L.) for developing forewarning model. (February 2022 - January 2025) <b>Dr. M. Rajesh</b>	To be continued
6.	CPPS/TRY/PATH/RIC/2023/001: Management of rice sheath blight incited by <i>Rhizoctonia solani</i> khun using seaweeds and bio-agents. (March 2023 – February 2026) <b>Dr. A. Sangeetha</b>	To be continued
7.	<b>CPPS/ECK/PAT/RIC/2021/001:</b> Studies on epidemiology and management of false smut disease of rice caused by <i>Ustilaginoidea virens</i> . (August 2021- July 2024) <b>Dr. S. Mathiyazhagan</b>	To be continued
8.	<b>New:</b> Development of disease predictive model based on epidemiological factors for management of bacterial leaf blight of rice. (June 2022 – May 2025) <b>Dr. N. Revathy</b>	To be continued
9.	<b>CPPS/CBE/PAT/RIC/2019/001:</b> Management of aflatoxin contamination in rice through botanicals (July 2019 – June 2023) <b>Dr. C. Gopalakrishnan</b>	To be continued
<b>AICRIP Projects</b>		
1.	<b>AICRP/PBG/CBE/RIC/003:</b> All India Co-ordinated Rice Improvement Project- Pathology part (Coimbatore) <b>Dr. C. Gopalakrishnan</b>	The research work may be continued as per the technical programme of AICRP.
2.	<b>AICRP/PBG/ADT/RIC/002:</b> All India Co-ordinated Rice Improvement Project- Pathology part (Aduthurai) <b>Dr. K. Rajappan</b>	The research work may be continued as per the technical programme of AICRP.

Externally Funded Scheme		
1.	DST-Climate change mediated aerobiological studies of air borne pathogens of rice and their management. (2022-24) <b>Dr. A. Kamalakannan</b>	To be continued as per the objectives of the project

## V. REMARKS

### a. General recommendations

- The spread and impact of TNAU released rice varieties may be studied and documented with Geo-referencing data (**Action:** DCARDS).
- Seed production of newly released and popular rice varieties may be strengthened (**Action:** Director, Seed Centre).
- Theme based research/action plans in rice may be formulated (**Action:** All Directorates).
- Scientists may be encouraged to publish their research findings in the peer reviewed journals having NAAS rating more than 7 (**Action:** All Scientists).
- Efforts may be made to obtain more externally sponsored schemes (**Action:** All Scientists).

### b. Crop Improvement

- More number of rice entries may be nominated for testing under MLTs/ARTs (**Action:** DCPBG)
- Optimization of protocol for Speed breeding in rice may be intensified (**Action:** DCPBG/DCM/DCPPS).
- Action plan may be formulated for the development of rice for DSR (**Action:** DCPMB&B/DCPBG/DCM)
- Efforts may be taken on Chemo-profiling of landraces (**Action:** DCPMB&B)
- Research may be intensified to develop multiple stress tolerant rice genotypes (**Action:** DCPMB&B)
- Efforts may be made to improve the cooking qualities of landraces (**Action:** DCPBG/Dean, CSC, MDU)
- Efforts may be made to collect seeds of landraces from farmers' fields and deposited in Ramiah gene bank for further utilization (**Action:** DCPBG)

### c. Crop Management

- Seed rate for drone seeding in rice may be fine-tuned to get optimum yield as well as for labour saving (**Action:** DNRM/DCWGS/DCM)
- Efforts may be taken to address the problems of Fe deficiency and weed in aerobic rice cultivation (**Action:** DNRM/DCM)
- Research may be initiated to increase the yield potential of rice under DSR cultivation (**Action:** DNRM/DCM)
- Research may be initiated on the optimization of nano urea (**Action:** DNRM/DCM)

#### d. Crop Protection

- Mechanism of resistance for BPH/Blast may be studied including occurrence of major biotypes in different zones of Tamil Nadu (**Action:** DCPPS).
- Resistant sources from TNAU/AICRP entries, landraces for major pests of rice may be explored (**Action:** DCPPS).
- Artificial screening methodologies and facilities for major pests and diseases may be strengthened (**Action:** DCPPS).
- Laboratory protocol for artificial screening of false smut may be developed. The resistant reaction of 'Mapillai samba' for false smut may be validated and utilized (**Action:** DCPPS).
- The basic studies on race / diversity analysis of blast and false smut pathogens may be taken up (**Action:** DCPPS).
- Map on major pests and diseases of rice in Tamil Nadu may be prepared and presented in the ensuing 87<sup>th</sup> ASEOC (**Action:** DCPPS/DCARDS).
- The resistant donors identified at IRRI for nematode problem in aerobic rice may be collected and utilized (**Action:** DCPPS).

#### VI. List of Participants (Offline)

S. No.	Name	Designation and Department
1.	Dr. M. Raveendaran	Director of Research, TNAU, Coimbatore
2.	Dr. R. Ravikesavan	Director, CPBG, TNAU, Coimbatore
3.	Dr. M. Shanthy	Director, CPPS, TNAU, Coimbatore
4.	Dr. M.K. Kalarani	Director, DCM, TNAU, Coimbatore
5.	Dr. P. Balasubramaniam	Director, NRM, TNAU, Coimbatore
6.	Dr. R. Umarani	Director, Seed Centre, TNAU, Coimbatore
7.	Dr. A. Raviraj	Dean, Agrl. Engg., AEC&RI, TNAU, Coimbatore
8.	Dr. S. Pazhanivelan	Director, CWGS, TNAU, Coimbatore
9.	Dr. S. Manonmani	Professor and Head, Dept. of Rice, Coimbatore
10.	Dr. P. Parasuraman	Professor and Head, Agronomy, TNAU, Coimbatore
11.	Dr. G. Karthikeyan	Professor and Head, Dept. of Pl. Pathology, Coimbatore
12.	Dr. S. Jeyarajan Nelson	Professor and Head, Dept. of Agrl. Ento. Coimbatore
13.	Dr. A. Shanthy	Professor and Head, Dept. of Nematology, Coimbatore
14.	Dr. R. Krishnan	Professor and Head, NOFRC, TNAU, Coimbatore
15.	Dr. A. Senthil	Professor and Head, Dept. of CRP, TNAU, Coimbatore
16.	Dr. P. Jeyaprakash	Professor and Head, ADAC&RI, Trichy
17.	Dr. C. Babu	Professor (PBG), Directorate of Research, TNAU, Coimbatore
18.	Dr. D. Kumaresan	Professor (PBG), Dept. of Rice, TNAU, Coimbatore
19.	Dr. N.K. Sathyamoorthy	Professor (Agron.), ACRC, TNAU, Coimbatore
20.	Dr. R. Pushpam	Professor (PBG), Dept. of Rice, TNAU, Coimbatore
21.	Dr. R. Suresh	Assoc. Professor (PBG), Dept. of Rice, TNAU, Coimbatore

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