

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

41st Rice Scientists Meet 2022 (April 8-9, 2022)

Lead Centre

Tamil Nadu Rice Research Institute
Aduthurai – 612 101

Directorate of Research

Tamil Nadu Agricultural University
Coimbatore 641 003

2022

PROCEEDINGS

41st Rice Scientists' Meet 2022 (9th April, 2022)

The 41st Rice Scientists Meet was held on 9th April, 2022, through virtual mode in Anna Auditorium at the Tamil Nadu Agricultural University, Coimbatore. A total number of 30 scientists in person and 120 numbers through online participated in the meeting. **Dr. V.Geethalakshmi**, Vice Chancellor in her inaugural address highlighted the demand of rice in 2025 will be 130 million tones and this can be achieved by maintaining steady increase in production over the years.

Introducing and creating awareness among farmers on machineries viz., rice transplanter and harvester was appreciated by the vice chancellor and the period of paddy harvest in Cauvery Delta Zone for the past few years had narrowed down within 1 - 1 ½ month because of introduction of machineries.

Vice chancellor stressed the need of addressing all means of research priorities and strategies by coordinating multidisciplinary approach for evolving improved cultures, weather ased crop advisories, crop management and protection technologies across diverse eco-system. She indicated the IRRI findings on Climate change that, the rise of 10 C in minimum temperature reduces rice yield by 10 q/ha. Also, VC insisted the tailoring of future varieties adapted to rising level of CO₂ and temperature and development of production technology giving emphasis to fertilizer and water use efficiency. Also, she addressed the nutritional security of rice through gene engineering concept. Vice chancellor speech focused on Sustaining soil health for rice cultivation from the research projects viz., long term fertilizer experiments which revealed that dependence on chemical inputs alone was not good in the long term and addition of organic manures (5-10t/ha) was needed to sustain the productivity. She stressed that, much attention is to be given through biotechnological approaches for evolving traits with resistance to diseases like BLB, blast, smut etc and insects like Gall midge, BPH, GLH, Black bug besides taking care of a biotic stress.

Dr. K.S. Subramanian, Director of Research, welcomed the gathering and briefly presented the achievements and research outcomes made during 2021-22 from crop improvement, management and protection. He highlighted some of the salient achievements such as tapping market potential of the aromatic special variety VGD 1 *Jeeraga samba* by the organic farmers, Notification of recently released rice varieties by the breeders, popularization of CO 53, ADT 54, TKM 13 by the University, Observation of flood tolerant reaction of TKM 13 a replacement for BPT 5204 during the last year flood in the state. He also emphasized the need for giving top priorities for improved kavuni and other traditional rice varieties in terms of purification and to assess their unique nutrient and therapeutic values.

The action taken reports of 40th Rice Scientists Meet 2021, Research Highlights and Action plan for 2022-23 was presented by Dr. Geetha, DCPBG, Dr.R.Santhi,DNRM, Dr.C.Cinnamuthu, DCM, Dr. Prabakaran, DCPPS, Dr. Sundareshwaran, Director, seed centre, for Crop Improvement, Natural management, Crop Management, plant Protection and Seed centre activities respectively. Technical Directors **Dr. S. Geetha**, Director (CPBG), Dr.R.Santhi,Director, (NRM), Dr.C.Cinnamuthu, Director (Crop Management i/c,) and **Dr. K. Prabakar**, Director (CPPS). **Dr. V. Ambethgar**, Director, TRRI, Aduthurai, proposed a formal vote of thanks.

The proceedings 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 (2021 – 2022)
- C. Project-wise Remarks

III. CROP PROTECTION

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

IV. REMARKS

V. LIST OF PARTICIPANTS

I. CROP IMPROVEMENT

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

I. Cultures recommended for submission of variety release proposal to UVTRSC during 2022

1. AD 17152 – Early – Irrigated

- Parentage : IET 22075/ADT 48
Duration : 115 days
Average yield : MLT (22): 6358 kg/ha which is 15.7 % > ASD 16
OFT (18) : 7108 kg/ha which is 13.0% higher than ASD 16
Salient Features :
 - Very Sturdy, Profuse tillering plant type
 - Short Bold grain type similar to ASD 16
 - Moderate resistance to Yellow Stem borer, BLB and Sheath blight

2. AS 15024 – Mid Early – Irrigated

- Parentage : ASD 16/ Manjalsaradai
Duration : 125 days
Average yield : MLT (22): 6306 kg/ha which is 14.5 % > CO 51
ART (25) : 5833 kg/ha which is 6.7% higher than TPS 5 and 6.2% over TKM 13
Salient Features :
 - Semi dwarf, erect, non-lodging plant type
 - White medium size grain type with good milling and cooking properties
 - Moderate resistance to stem borer, leaf folder, blast and sheath blight

3. AD 12132 – Mid Early - Irrigated

- Parentage : ADT 39 / Konark
Duration : 125 days
Average yield : MLT (15): 5608kg/ha (19.4 per cent higher than ADT 39)
ART (105) : 5903 kg/ha (3.5 % Higher than ADT 39)
OFT (42): 6112 kg/ha (13.0 % > ADT 39)
Salient Features :
 - Resistant to Brown spot and MR to Blast under field condition.
 - Semi dwarf plant type with medium slender grains.
 - HRR 63.44 %, LER (1.7), greater volume expansion (VER: 4.1), intermediate amylose (23.9%) and soft gel

4. CB 12132 – Medium – Irrigated

- Parentage : CO (R) 50 / CB 05501

Duration : 135 days
 Average yield : Overall: 6358 kg/ha (12.8, 20.5, 10.1, 10.0 % > TKM 13, BPT 5204, CO 52 and ADT 54)
 MLT (17): 5480 kg/ha (15.2% > BPT 5204 and 10.5 % > ADT 49).
 ART (168): 5966 kg/ha (2.7 % > TKM 13 & 1.4 % > CO 52).

Salient Features : • MR to blast, BLB, sheath rot, sheath blight, brown spot, RTD, gall midge
 • Non- Lodging, Medium slender white rice with high HRR (64.1%) and VER (4.3 ml)
 • The LER is 1.7 with good volume expansion (4.3 ml) & Soft GC

II. Cultures identified for submission of release proposal to CVRC 2022

1. AD 16028–Early - Irrigated

Parentage : WGL 14377 / MDU 5
 Duration : 118 days
 Average yield : On over all weighted mean basis in Zone III and V, ADT 56 recorded 5220 kg/ha which is 23.96, 38.89 and 30.99 per cent higher than National (CO 51), Zonal (Shabthagidhan) and Local check varieties respectively.

Salient Features : • Moderately resistant to BPH, Grain discolouration, Sheath Rot, Blast and Stemborer
 • HRR - 63.8 %, Amylose – 23.8 %

III. Cultures identified for On Farm Trials (2022-23)

1. TNTRH 55 – Mid Early Hybrid - Irrigated

Parentage : TGMS hybrid (TNAU 60S /CB SN 405)
 Duration : 125 days
 Average yield : MLT (15): 5414 kg/ha which is 15.3% increase over ADT 39
 ART (90): 5815 kg/ha which is on parwith ADT 39.

Salient Features : Long slender grain type with good linear elongation upon cooking (LER: 1.76).Resistant to RTD & GLH and Moderately resistant to blast and brown spot

III. Cultures identified for Second Year ART&OFT (2022-23)

Cultures with Parentage and Checks	Yield and Duration	Special Attributes	Locations
Rice 5/2022-23: Special Transplanted Medium (September- October Sowing)			
AD 13253 (AD	5830 kg/ha in	Moderate Resistance to BLB	All Districts

01246 / CO(R) 49) Checks : ADT 54 and CO 52	132 days which is 9.65 per cent higher than CO 52.	under Artificial condition, Medium Slender grain with good cooking properties	except Virudhunagar, Ramnad, Sivagangai and The Nilgiris
CK 145-3 (CO(R)50 /Kavuni) Check: Karuppukavuni	5077kg/ha in 140 days which is 58.26 per cent higher than Kavuni	High protein(10.6%),Zinc content(25.6mg/kg),phenolic content(612.1 mg/100g) and resistant starch (3.06%)	
Rice 3/2022-23: Transplanted Early (May-June Sowing) – Promoted through Fast track mode			
AD 17152 (IET 22075 / ADT (R) 48) Checks: ADT 37 and ASD 16	6163 kg/ha in 111 days (24.7 % higher than ADT 37 and 20 % than ASD 16)	Sturdy & Profuse tillering Short Bold grains type similar to ASD 16 Moderate resistance to Yellow Stem borer, BLB and Sheath blight	All Districts except Virudhunagar, Ramnad, SivagangaiandThe Nilgiris

IV. Cultures identified for First Year ART&OFT (2022-23)

Rice 4/2022-23: Transplanted Mid Early (Oct.25th –Nov 10th, Sowing)			
ACK 12024 (Mutant of IW. Ponni) Check: TKM 13	5616 kg/ha in 125 days (10.5 % higher than TKM 13 & 8.0 % than ADT 39)	Medium Slender, HRR – 60 %, Intermediate amylose Moderately resistant to BLB, Sheath blight & RTD	All Districts except Virudhunagar, Ramnad, SivagangaiandThe Nilgiris
Rice 12/2022-23: 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

V. Cultures identified for ART & OFT under fast track mode (2022-23)

Cultures with Parentage and Checks	Yield and Duration	Special Attributes	Locations
Medium Duration - Super Fine (2022-23)			
AD 18559 (Kalajoha / IW.Ponni) Checks: RNR 15048, 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

VI. Multilocation Trials (2022-23)

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

S.No	Designation	Cross Combination	Maturity	Rice Grade	Yield (Kg/ha)	Nominating Centres
Repeat						
1.	AD 18028	AD 08010/AD 07073	115	MS	6420	ADT
New						
2.	AD 19123	IR 72/FBR 1-15	115	MS	6369	ADT
3.	AD 17001	Turandhan/IET 22075	110	MS	6204	ADT
4.	AD 19005	ADT 37/WGL 32100	116	SB	6163	ADT
5.	ACM 15016	JGL 1798/CB 05501	115	MS	6512	MDU
6.	CB 17627	CB 06550/CB 11609	114	MS	6977	CBE
7.	CB 18527	CO 51 /IET 23750	115	MS	6742	CBE
8.	CB 18611	CB 08504/CB 10554	115	MS	6824	CBE
9.	CB 17529	CO 51/WGL 536	110	MS	6896	CBE
10.	AS 19103	ASD 16/ADT 45	115	MS	6583	ASD
11.	TM 13367	IET 19577/BPT 5204	113	MS	6477	TKM
12.	TM 13327	WGL 305/Rasi	118	MS	6598	TKM
13.	ACM 18234	CB 14002/Tetep	115	MS	5777	CPMB
14.	TNRH 297	COMS 23A/CBSN 73	118	MS	6366	CBE
15.	Improved Karungkuruvai	Selection from land race	115	MB	3000	ADT

		karungkuvai				
Checks	:	ADT 53, ADT 57, CO 51, CORH 3, TPS 5 and Karungkuvai				
Replications	:	Three				
Plot size	:	9 m ²				
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 10.05.2022				

Table 2. MLT- II (121 – 130 days maturity; Septemeber-October Sowing)

S.No	Designation	Cross Combination	Maturity	Rice Grade	Yield (Kg/ha)	Nominating Centres
New						
1.	AD 19168	ADT 37/AS 10023	120	SB	6546	ADT
2.	AD 19243	ADT 37/JGL 17004	122	MS	6640	ADT
3.	AD 19136	ADT 47/ADT 37	125	MS	6098	ADT
4.	AD 19601	AD07302/CO50	120	MS	6115	ADT
5.	ACM 19003	Mutant of ADT (R) 45	128	MS	6663	MDU
6.	CB 18586	CO 51/ CO 52	121	MS	6851	CBE
7.	CB 17504	CO 51/ CB 08538	122	MS	6624	CBE
8.	CB 19127*	CR 1009/BG 358	125	SS	6829	CBE
9.	AS 19125	ASD 16/ ASD19	122	MS	7108	ASD
10	AS 19048*	IR 50/AS 12050	125	MS	6736	ASD
11.	CB MAS 13056	ADT 47/Imp. Samba Mahsuri	125	MS	5961	CPMB
12.	TNRH 301	COMS23A/CBSN 386	128	LS	6530	CBE
Checks	:	TKM 13, *RNR 15048 (for SS cultures), US 312				
Replications	:	Three				
Plot size	:	9 m ²				
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 31.05.2022				

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

S.No	Designation	Cross Combination	Maturity	Rice Grade	Yield (Kg/ha)	Nominating Centres
Repeat						
1.	AD 18559	AD 01246/CO(R) 49	132	MS	5830	ADT
New						
2.	ACK 20002	Gamma ray mutant of CR 1009	131	SB	6707	KKM
3.	ACK 14052	BPT5204 /JGL3884	132	MS	6066	KKM
4.	CB 19107	Swarna <i>Sub 1/Kavuni</i>	131	MS	6808	CBE
5.	CB 19136	CB 05022/CB 04044	132	SB	6771	CBE
6.	AD 18545	ADT46/AD09391	132	SB	8000	ADT
7.	AD 19647	CO50/AD 07302	135	MS	6117	ADT
8.	AD 19684	AD07302/ADT54	132	MS	6687	ADT
9.	Imp. <i>Thooyamalli</i>	Selection from <i>Thooyamalli</i>	135	MS	4485	ADT
10.	Imp. <i>KaruppuKavuni</i>	Selection from <i>Karuppukavuni</i>	135	MS	4200	ADT
Checks	:	ADT 54, CO 52, TPS 3, <i>Thooyamalli</i> , <i>Karuppukavuni</i>				
Replications	:	Three				
Plot size	:	9 m ²				
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 31.05.2022				

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

S.No	Designation	Cross Combination	Maturity	Rice Grade	Yield (Kg/ha)	Nominating Centres
Repeat						
1.	AD 18145	CR 1009/MTU 1075	150	SB	6350	ADT
New						
2.	AD 18146	CR 1009/MTU 1075	155	SB	6502	ADT
3.	AD 18154	CR 1009/MTU 1075	150	SB	6145	ADT
4.	AD 18084	CR 1009/BPT 2270	148	SB	6190	ADT
5.	AD 18158	CR 1009/IET 23130	155	SB	6227	ADT
6.	ACK 20001	Gamma ray mutant of	162	MS	6852	KKM

		CR 1009				
7.	Imp. <i>Mappillai Samba</i>	Selection from <i>Mappillai Samba</i>	145	MS	4900	ADT
Checks	:	ADT 51, CR 1009 <i>Sub 1, Mappillai Samba</i>				
Replications	:	Three				
Plot size	:	9 m ²				
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 31.05.2022				

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

S.No	Designation	Cross Combination	Maturity	Rice Grade	Yield (Kg/ha)	Nominating Centres
1.	PM 17009	ADT 43/PMK 3	110	MS	4565	PMK
2.	PM 17011	ASD 16/Chandikar	104	MS	4638	PMK
3.	PM 18001	PM 02204/PM 09001	110	MS	4463	PMK
4.	PM 18017	BPT 5204/TKM 12	114	MS	4538	PMK
5.	TM 14066	Vandana/ IET 23218	116	MS	3502	TKM
6.	TM 15021	ADT 43 / Senthuram	114	MS	3514	TKM
7.	ACM 20003	Mutant of Anna (R) 4	129	SS	5122	MDU
8.	ACM 20005	Mutant of Anna (R) 4	110	MS	4991	MDU
9.	AD 20277	ADT 45/CT 9993	110	MS	4225	ADT
10.	AD 20135	ADT 43/CT 9993	108	MS	3900	ADT
11.	CB MAS 14110	I.W.Ponni/Appo	110	MS	5500	CPMB
Checks	:	TKM 15& CO 53				
Replications	:	Three				
Plot size	:	9 m ² (Direct seeding Natural Environment) 6 m ² (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 31.05.2022				

**Table 6. MLT- VII (Bio-fortification)
Both *Kuruvai* (June Sowing) and *Thaladi* (October Sowing)**

S.No	Designation	Cross Combination	Maturity	Rice Grade	Yield (Kg/ha)	Nominating Centres
1.	AD 21160	RPHP 48/IR36	125	MS	4033	ADT
2.	AD 21205	Kodai /IR36	128	MS	4000	ADT
3.	AD 21243	IG39/CO 51	128	MS	4833	ADT
4.	AD 21270	Kodai/CO51	128	MS	4833	ADT
Checks	:	DRR Dhan 45 as micronutrient (Zn) and yield checks				
Replications	:	Three				
Plot size	:	9 m ²				
Spacing	:	20 x 10 cm				
Locations (4)	:	Aduthurai, Coimbatore, Tirur, Madurai				
Seed despatch	:	3.5 kg to be sent before 31.05.2022				

Special MLT on PLS landraces

S.NO	Entry	Parentage
1	ADMS 20032-1	Improved Mappillai samba
2	ADMS 20032-2	Improved Mappillai samba
3	ADMS 20007-2	Improved Mappillai samba
4	ADMS 20035-1	Improved Mappillai samba
5	ADMS 20018-2	Improved Mappillai samba
6	ADMS 20014-2	Improved Mappillai samba
7	ADKKV20001	Improved Karuppukavuni,
8	ADKKV 20002	Improved Karuppukavuni
9	ADTM-20001	Improved Thuyamalli
10	ADKV-20001	Improved Karunkuruvai
Checks	:	Karuppukavuni, Thuyamalli, Mappillai samba, Karunkuruvai
Replications	:	Two
Plot size	:	6 m ²
Spacing	:	20 x 10 cm
Locations (6)	:	Aduthurai, Coimbatore, Madurai, Killikulam, Thirupathisaram, Ambasamudram

VI. Rice MultiLocation Trials Monitoring Team 2021-22

Sl.No	MLT Stations	Monitoring Team
1.	Aduthurai, Thanjavur	Dr.S. Manonmani, Prof & Head, Dept. of Rice, TNAU, CBE Dr. N. Aananthi, Asst. Prof. (PBG), AC&RI, Madurai
2.	Coimbatore	Dr.R. P. Gyanamalar, Prof (PBG), AC & RI, Madurai Dr. M. Shanmuganathan, Asst. Prof (PBG), AC & RI, Trichy
3.	Ambasamudram, Killikulam, Thirupathisaram	Dr. P. Jeyaprakash, Prof (PBG), AD AC & RI Trichy Dr. A. Sheeba, Asst. Prof. (PBG), AC&RI, Madurai
4.	Madurai and Vaigaidam	Dr. M. Arumugam Pillai, Prof (PBG), AC&RI, Killikulam Dr. R. Suresh, Asst. Prof. (PBG), Dept of Rice, TNAU CBE
5.	Paramakudi, Ramanathapuram	Dr. R. Pushpam, Prof (PBG), Dept. of Rice, TNAU, CBE Dr. R. Pushpa, Asst. Prof (PBG), TRRI, Aduthurai
6.	Tirur	Dr.K. Geetha, Professor (PBG), RRS, Paiyur Dr. R. Arulmozhi, Asst. Prof (PBG), TRRI, Aduthurai
7.	Cuddalore, Palur	Dr. S. Banumathy, Prof (PB&G) RRS, Tirur Dr. S. Saravanan, Asst. Prof (PBG), AC&RI, Killikulam
8.	Trichy, Sirugamani	Dr. S. Arumugachamy, Prof & Head, RRS, Ambasamudram Dr.D. Shoba, Asst. Prof (PBG), RRS, Thirupathisaram
9.	Paiyur	Dr. K. Thangaraj, Assoc. Prof & Head, ARS, Paramakudi Dr. M. Dhandapani, Asst. Prof (PBG), TRRI, Aduthurai

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 2022-23

THEME I. DEVELOPING CLIMATE SMART VARIETIES BY GENE PYRAMIDING

S.No	Activity	Action Plan 2022-23
Pyramiding of biotic stress resistance genes		
1.	<p>Development of Biotic stress tolerant rice through pyramiding of genes for BLB, Blast and BPH resistance</p> <p><u>Centres</u> Aduthurai: Dr.M. Dhandapani, AP (PB&G) Coimbatore: Dr. R. Suresh, AP (PB&G) Dr. C. Gopalakrishnan, Prof. (Pathology)</p>	<p><u>Aduthurai:</u></p> <ol style="list-style-type: none"> 1. Effecting crosses between selected F₂ plants of the cross TKM13/ADT55//CO52/RP206818-3- (<i>Xa4+xa5+xa13+Pi54</i>) and ADT52/RG170 2. Phenotypic screening of F₂ of the cross TKM13/ADT55//CO52/RP206818-3-5 (<i>Xa4+xa5+xa13+Pi54</i>) at HREC, Gudalur (Hotspot location) for blast <p><u>Coimbatore:</u></p> <ol style="list-style-type: none"> 1. Phenotypic screening of intermated F₂ of the cross APD 19026 / RG 170 / (TKM 13 / AD (Bio) 09518)// (CO52 / PTB 33) (<i>Bph 2 + Bph3 + Xa13</i>) at HREC, Gudalur for False Smut and Blast
Double trouble (drought + salinity) tolerant rice		
2.	<p>Development of rice genotypes tolerant to drought and salinity stress through marker aided selection</p> <p><u>Centres</u> Coimbatore: Dr. R. Pushpam, Prof. (PB&G) Trichy: Dr. M. Shanmuganathan, AP (PB&G)</p>	<p><u>Coimbatore:</u></p> <ol style="list-style-type: none"> 1. Raising of BC₂F₁ of CO 52 / 3-11-11-2 and selection of introgressed lines (IL's) through Foreground & background selection and selfing to generate BC₂F₂ 2. Phenotypic screening of BC₂F₂ for salinity (seedling stage) and drought under ROS at Coimbatore <p><u>Trichy & Coimbatore:</u></p> <ol style="list-style-type: none"> 1. Salinity tolerant F₂ plants identified at Trichy will be screened for the presence of drought (qDTY1.1, qDTY2.1) and salinity QTL's (<i>Saltol</i>)

THEME II. BREAKING THE YIELD BARRIERS IN RICE

S.No	Activity	Action Plan 2022-23			
CREATION OF TNAU 'MAGIC' PLATFORM					
1.	<p>Synthesis of TNAU 'MAGIC' population.</p> <p><u>Centres:</u> Aduthurai: Dr. R. Pushpa, AP (PB&G) Dr. M. Dhandapani, AP(PB&G) Coimbatore: Dr.R.Suresh AP (PB&G) Dr.R. Pushpam, AP (PB&G) Tirur: Dr.S.Banumathy, P&H(PB&G)</p>	<p><u>Aduthurai, Coimbatore and Tirur:</u></p> <p>a. Effecting two double crosses involving the following eight parents at Aduthurai, Coimbatore and Tirur.</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td style="padding: 2px;">ADT 39/GEB 24 // TKM 13/AC 38471 // Numoli / Imp.SambaMahsurai //TPS 5/CB 13132</td> </tr> <tr> <td style="padding: 2px;">IR 20/TRY 3 // CR 1009/Thooyamalli// CB 16533 / Kranthi // NLR 3449 / Norungan</td> </tr> <tr> <td style="padding: 2px;">I.W.Ponni /RNR 15048 // Erramalli/IR 64 Drt// CB 14514 / VGD 1 // Swarna / Poongar</td> </tr> </table> <p><u>Aduthurai & Coimbatore:</u></p> <p>b. Synthesis of novel crosses involving tropical japonica, Wild Rice Magic lines and lines from IRRI's One Rice Breeding strategy</p> <ul style="list-style-type: none"> • Single crosses – Azucena/CO 52 and Palawan/CB 174R • WRM lines – WRM 21-24 and WRM 50-48 • IRRI lines - Two to four • F₃ of <i>indica</i>/WRM lines – Four families 	ADT 39/GEB 24 // TKM 13/AC 38471 // Numoli / Imp.SambaMahsurai //TPS 5/CB 13132	IR 20/TRY 3 // CR 1009/Thooyamalli// CB 16533 / Kranthi // NLR 3449 / Norungan	I.W.Ponni /RNR 15048 // Erramalli/IR 64 Drt// CB 14514 / VGD 1 // Swarna / Poongar
ADT 39/GEB 24 // TKM 13/AC 38471 // Numoli / Imp.SambaMahsurai //TPS 5/CB 13132					
IR 20/TRY 3 // CR 1009/Thooyamalli// CB 16533 / Kranthi // NLR 3449 / Norungan					
I.W.Ponni /RNR 15048 // Erramalli/IR 64 Drt// CB 14514 / VGD 1 // Swarna / Poongar					
UTILIZATION OF TROPICAL JAPONICA LINES IN VARIETAL PROGRAM					
1.	<p>Development of breeding lines from inter sub specific crosses with high yield potential</p> <p><u>Centres</u> Coimbatore: Dr. S. Manonmani P & H, Dept. of Rice</p>	<p>a. Evaluation of F₄ families of CB 174R/Iguapecateto, F₅ families of CB 174R/Azucena (17) and CB 174R/Iguapecateto (21) and selection of superior plants for forwarding to IYT</p> <p>b. Evaluation of F₁₅ of seven crosses attempted between high yielding varieties and TJ lines.</p>			
CREATION OF HETEROTIC POOLS IN HYBRID BREEDING					
1.	<p>Pre-Breeding lines using restorers and Wild Rice Magic lines</p> <p><u>Centres</u> Coimbatore:</p>	<p>Evaluation of F₄ generation of the following four crosses and forwarding to F₅ generation:</p> <ol style="list-style-type: none"> 1. CBSN 25/WRM 21-24 2. CBSN 25/WRM 93-20 3. CBSN 25/WRM 23-25 4. CBSN 25/WRM 50-48 			

	Dr. S. Manonmani P & H, Dept. of Rice	
2.	Recombinant lines using <i>indica/tropical japonica</i>	<p>a. Evaluation of F₅ families of <i>indica/ tropical japonica</i> crosses (nine) and advancement to F₆ generation. Based on family uniformity, selectively attempting the test crosses with CMS lines for assessing the heterotic potential.</p> <ol style="list-style-type: none"> 1. CB 87R/Nira 2. Blue Bonnet/CB 87R 3. Nira/CB 87R 4. Pato/ CB 15120 5. Azucena/CB 87R 6. CB 174R / Nira 7. Azucena/CB 15138 8. CB 174R/ Iguapecateto 9. CB 174R/AC 38479 <p>b. Phenotypic assessment of BC₁F₄s of <i>indica/ tropical japonica</i> crosses and advancement to BC₁F₅.</p> <ol style="list-style-type: none"> 1. Azucena/CB87R// CB87R 2. CB 87R/Nira// CB 87R 3. AC 38479/ CB16166 //CB 16166 4. Palawan/CB 16144// CB 16144

THEME III. NUTRITIONALLY ENHANCED RICE VARIETIES

S.No	Activity	Action Plan 2022-23
A.	Identification of bio-fortified rice cultures for release <u>Centres:</u> Aduthurai: Dr. R. Pushpa, AP (PB&G)	Simultaneous evaluation of identified bio-fortified cultures <i>viz.</i> , AD 21160 , AD 21205 , AD21243 and AD21299 in MLT (Kuruvai / Thaladi) and ART trials.

THEME IV. LAND RACES IMPROVEMENT

S.No	Activity	Action Plan 2022-23
A.	Release of improved traditional varieties Coimbatore: Dr. S. Manonmani, P & H, Dept. of Rice Dr. R. Suresh, AP, (PB&G)	<p>a. Conducting MLT/ART/OFT Kuruvai & Late Samba: Karunkuruvai (Aduthurai, Coimbatore, Tirur, Madurai)</p> <p>b. Samba/Thaladi: Karuppukavuni, Thuyamalli, Mappillai samba (Aduthurai, Coimbatore, Madurai,</p>

Aduthurai: Dr.M. Dhandapani, AP, (PB&G) Dr. R. Pushpa, AP, (PB&G)	Killikulam, Thirupathisaram, Ambasamudram)
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THEME V. DEVELOPMENT OF RICE VARIETIES FOR SUBMERGENCE TOLERANCE, ANAEROBIC AND *INSITU* GERMINATION

S.No	Activity	Action Plan 2022-23
A.	Evolving breeding lines for submergence tolerance, anaerobic and <i>In situ</i> germination Aduthurai: Dr. R. Pushpa, AP (PB&G)	a. Screening of F ₂ population of ADT52/T 198 and ADT51/T 198 for submergence b. Identified submergence tolerant F ₂ plants will be crossed with donors for anaerobic (Iravaipandi, Gandasala) and <i>In situ</i> germination (Senthooram, Thillainayagam)

C. Project Wise Remarks

S. No	Project Number & Title	Remarks
I. Projects on Germplasm Maintenance		
Coimbatore		
1.	CPBG/CBE/RICE/RIC/2021/002 Germplasm collection, evaluation and conservation in rice (June 2021 – May 2024) Dr. K. Amudha, Asst. Professor (PB&G)	<ul style="list-style-type: none"> Pure line selections (PLS) made from landraces has to be screened for important biotic and abiotic stresses The data on morphological & bio-chemical traits may be compiled into a book
II. Project on Evolution		
Aduthurai		
1.	CPBG/ADT/PBG/RIC/2020/001: Development of medium duration rice with high yield potential, preferential grain quality and resistance to BLB suitable for irrigated ecosystem of Tamil Nadu (August 2019- July 2022) Dr.D.Sassikumar Associate Professor (PB&G) Dr. M. Dhandapani Assistant Professor (PB&G) Dr.A.Ramanathan Professor (Plant Pathology)	<ul style="list-style-type: none"> The project may be closed and work to be continued in new project More attention may be given to evolve breeding materials with fine/super fine and short bold grain qualities. New donors for biotic stresses (BLB, Blast & BPH) may be involved in the crossing programme
2.	CPBG/ADT/PBG/RIC/2017/001: Evolving short duration rice varieties/culture with fine grain and resistance to blast, brown plant hopper and	<ul style="list-style-type: none"> The project may be closed and work to be continued in new project

	<p>bacterial leaf blight. (June 2017 to May 2022) R. Suresh, Asst. Professor (PBG)</p>	<ul style="list-style-type: none"> • More no. of OFTs and demonstrations has to be laid to release the short bold culture AD 17152 • Short bold segregating materials may be shared with Thirupathisaram • Attention should be given to select only the medium slender, short slender and short bold types
3.	<p>CPBG/ADT/PBG/RIC/2017/05: Evolution of extra early rice varieties (<100 days) suitable for direct seeding in water limited areas of CDZ (June 2017 to May 2022) R. Arulmozhi, Asst. Professor (PBG)</p>	<ul style="list-style-type: none"> • The project may be closed • More attention should be given exclusively to develop extra early material • Objective oriented crosses should be taken up in the new project • Rapid generation advancement under direct seeding (at least 3 generations/year) should be followed to achieve the results
4.	<p>CPBG/ADT/PBG/RIC/2021/001: Development of high yielding, non-lodging, long duration (> 140 days) rice varieties with tolerance to submergence and major biotic stresses (August 2020 to July 2025) Dr. R. Suresh, Asst. Professor (PBG) Dr. K. Rajappan, Professor (Pl.Pathology) Dr. P. Anandhi, Assistant Professor (Ento)</p>	<ul style="list-style-type: none"> • Good progress has been made in this project. • Short bold non-lodging cultures AD 18145 and AD 18073 should be focused and advanced to next stage of testing • More focus should be given to develop non-lodging, submergence tolerant varieties • Land races may be involved in the crossing programme to incorporate anaerobic germination and dormancy
5.	<p>CPBG/ADT/PBG/RIC/2021/001: Development of breeding stocks in rice with preferable nutritional properties (Nov 2017- Oct 2022) Dr. R. Pushpa, Assistant Professor (PBG)</p>	<ul style="list-style-type: none"> • The project may be closed and merged with germplasm characterization project • Cultures from AICRIP Bio-fortification trial should be involved in hybridization • Cultures with high Fe and Zn has to be nominated to MLT

		& AICRIP trials
6.	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"> • Wild crosses and crosses with land races has to be taken up to widen the genetic base • Some of the purified land races such as Karungkuruvai, Karuppukavuni and Thooyamalli should be tested in MLT • Focus should be given to release improved land races • Quickly advance the purified land races to yield trials
Coimbatore		
7.	CPBG/CBE/PBG/RIC/2017/001: Development of two - line hybrids and TGMS lines in rice (January 2017 – December 2021 January 2022 – December 2026) Dr. R. Saraswathi, Professor (PB&G) – Upto December 2021 Dr. V. Thiruvengadam&Dr. R. Saraswathi (from January 2022)	<ul style="list-style-type: none"> • Good progress was made and the work may be continued in the new project • Superior heterotic combinations identified in station trials should be seed multiplied and tested in MLT
8.	CPBG/CBE/RICE/RIC/2021/003 Evolution of medium duration rice varieties resistance to blast and false smut (June 2021 – May 2026) Dr. K. Amudha Assistant Professor (PB&G)	<ul style="list-style-type: none"> • Exclusive station trials for testing super fine and medium slender cultures may be planned • Pre-release cultures CB 12132 has to tested in delta region during Samba/Thaladi 2022 under OFT
9.	CPBG/CBE/RICE/RIC/2021/004: Development of CMS based rice hybrids with appreciable heterosis for grain yield and acceptable quality (June 2021 – May 2026) Dr. R. Saraswathi, Professor (PB&G)	-
10.	CPBG/CBE/ RICE/RIC/2021/ 005 Development of parental lines for three –line hybrid breeding in rice (June 2021 – May 2026) Dr. R. Saraswathi, Professor (PB&G)	<ul style="list-style-type: none"> • Both hybrid development and line development projects can be merged and work may be continued under single project for Three-line breeding.
11.	CPBG/CBE/RICE/RIC/2021/006 Developing early maturing (105-115 days) rice varieties resistant /tolerant to BPH and blast (June 2021 – May 2026)	<ul style="list-style-type: none"> • Crossed involving wild rice accession should be attempted • Entries from AICRIP trials may also be included in

	Dr.R.Pushpam, Professor (PB&G)	hybridization programme to widen the genetic base <ul style="list-style-type: none"> • CO 55 should be popularized aggressively
Ambasamudhram		
12.	CPBG/ASD/PBG/RIC/2019/001: Evolving high yielding short duration rice variety suitable for Kar and latePishanam seasons of Thamirabarani tract (April 2019 – March 2024) Dr. S. Arumugachamy, Professor (PB&G)	<ul style="list-style-type: none"> • Cultures with 110 days maturity and short bold grain types has to be identified as a exact alternate to ASD 16 • Donor parents for major biotic stressed should be used in crossing programme
13.	CPBG/ASD/PBG/RIC/2019/002: Evolution of medium duration rice (<i>Oryza sativa</i> L.) varieties with higher yield and grain quality suitable for <i>Pishanam</i> season (April 2019 to March 2022) Dr.R.Thangapandian, Professor (PB&G)	<ul style="list-style-type: none"> • Project may be closed and work to be continued in new project • Selection intensity in segregating generation is found to be very less. The population size of not less than 1000 plants should be maintained in F₂ generation and more no. of single plant should be selected
Thirupathisaram		
14.	CPBG/TPS/PBG/RIC/2016/001: Evolving early duration rice variety suitable for <i>Kannipoo</i> season of Kanyakumari district (December 2016 – November 2021). Dr. R.Latha, Assistant Professor (PB&G),	<ul style="list-style-type: none"> • The project may be closed. Promising entries from this project may be nominated to MLT. • F₁ seeds of CO 47/Boothakaligaruppan may be shared with Aduthurai for inclusion in MAGIC cross • Seeds of Karungkuruvai (Kanyakumari Dt, Type) may be shared with Aduthurai for testing the Fe and Zn content
15.	CPBG/TPS/PBG/RIC/2020/001: Introgression of nonlodging traits in traditional rice varieties Mottakuruva and Kattisamba by mutation breeding (Decemeber 2020 to November 2025) Dr. R.Latha, Assistant Professor (PB&G) and Dr.D.Shoba Asst. Prof (PB&G)	<ul style="list-style-type: none"> • Name of the project leader should be changed • Purity of land races <i>Motta kuruva</i> and Katti samba has to be maintained • Efforts should be made to develop short bold, nonlodging stem borer resistant long/medium duration cultures

Tirur		
16.	CPBG/TKM/PBG/RIC/2020/002: Developing Multi-Parental Advanced Generation Intercross (MAGIC) population in Rice (December, 2019 – November, 2024) 1. Dr. A. Sheeba, Assistant Professor (PB&G) 2. Dr. S. Banumathy, Professor (PBG)	<ul style="list-style-type: none"> The materials generated under this project may be transferred to another ongoing project CPBG/TIR/PBG/RIC/2021/001 with revised objectives
17.	CPBG/TIR/PBG/RIC/2021/001: Evolving high yielding rice varieties with good grain quality suitable for semidry/irrigated conditions (September 2021-August 2026) Dr. S. Banumathy, Professor (PB&G)	<ul style="list-style-type: none"> TRY 4 can be used as check entry for mid early station trials Promising cultures from AICRIP and MLT trials may be included in crossing programme
Madurai		
18.	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, Assistant Professor (PB&G) Dr.G.Sreenivasan, Assoc. Professor (Agrl.Ento.)	<ul style="list-style-type: none"> Fine grain cultures derived from RNR 15048 may be shared with Aduthurai, Coimbatore and Ambasamudhram. Efforts should be made to attempt diversified crossed involving fine grain parents other than RNR 15048
19.	CPBG/MDU/PBG/ RIC/2019/002: Development of high yielding short duration variety suitable for PVP area (June,2019 to May, 2022) Dr.S. JulietHepziba, Professor (PB&G) Dr.M.Ilamaran, Assistant Professor (FSN)	<ul style="list-style-type: none"> Promising cultures identified in this project may be tested under semi condition at Madurai itself TKM 15 should be included as check for Semi dry trials Promising cultures may be identified to replace MDU 5 and MDU 6 Segregating materials may be obtained from Aduthurai
Killikulam		
20.	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 upto March 2022) Dr. M. Arumugam Pillai, Professor (PBG)	<ul style="list-style-type: none"> Donors for diseases prevailing at Tirunelveli, Tuticorin districts may be included in crossing programme Director, CPBG should be informed while using the private varieties/germplasm Seeds of unique germplasm lines available at Killikulam

		may be shared with Aduthurai and Director, CPBG.
21.	CPBG/KKM/PBG/RIC/2017/001: Development of high yielding medium duration rice variety with desirable cooking quality traits suited for Pishanam season in Southern districts of Tamil Nadu (April 2017 to March 2022) Dr. S. Saravanan, Assistant Professor (PBG)	<ul style="list-style-type: none"> • Crosses involving land races may be restricted or one round of back crossing with high yielding parents is recommended to get promising segregants • Duration specific crosses should be attempted involving medium and mid early parents
Trichy		
22.	CPBG/TRY/PBG/RIC/2020/003 Evolution of high yielding medium duration rice genotypes tolerant to sodicity (October 2019 to September 2022) Dr. T. Thirumurugan, Asst. Professor (PB&G) (01.10.2019 to 08.09.2021) Dr.M. Shanmuganathan, Asst Professor (PB&G) (09.09.2021 to till date)	<ul style="list-style-type: none"> • Limited no. of crosses involving appropriate parents should be attempted • 15 series cultures should be multiplied and nominated to AICRIP and MLT trials • TRY 4 & TRY 5 cultures may be included as local check in AICRIP trials
23.	CPBG/TRY/ PBG/ RIC/2020/002 Development of short duration sodicity tolerant rice varieties (April 2020 – March 2025) Dr. P. Jeyaprakash Professor (PB&G)	<ul style="list-style-type: none"> • Genetic purity of TRY 4 should be maintained with utmost care • CSR 30 or some other National checks should be included as check in station trials • Salinity tolerant entries has to be registered with NPBG and should be given top priority
Gudalur		
24.	CPBG/GDR/PBG/Rice/2020/001. Development and Evaluation of TGMS lines in rice (September 2020 - August 2025) Dr. D. Kumaresan Associate Professor (PBG)	<ul style="list-style-type: none"> •
Paramakudi		
25.	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 (September, 2020 – August, 2025) 1. Dr. K. Thangaraj, Associate Professor (PB&G),	<ul style="list-style-type: none"> • Fine grain short duration cultures PMK 17009, PMK 17013 should be concentrated and advanced further • Priority should be given to conduct station trials and evaluation of breeding

	2. Dr.S.Muthuramu, Assistant Professor (PB&G), ARS, Paramakudi.	materials originated from Paramkudi centre
Thanjavur		
26.	CPBG/TNJ/PBG/RICE/2018/NEW: Development of extra early duration rice cultures suitable for direct sown paddy areas in Cauvery Delta Zone of Tamil Nadu (April 2018 to March 2021) Dr.L.Subha, Assistant Professor (PBG)	<ul style="list-style-type: none"> The progress of work is not satisfactory. No cultures or promising breeding materials have been synthesized Even after the completion of the project period appropriate project number was not obtained
Miscellaneous Projects		
Aduthurai		
27.	CPBG/ADT/PBG/RIC/2019/New:Maintenance and production of nucleus seeds of TRRI released short duration varieties in seed chain (May 2019 to April 2022)	<ul style="list-style-type: none"> Project may be continued More attention and priority should be given to produce genetically pure nucleus seeds
28.	CPBG/ADT/PBG/RIC/2017/002: Nucleus seed production of medium and long duration rice varieties of TRRI, Aduthurai (September 2017 to August 2022) Dr. R. Suresh, Asst. Professor (PBG)	<ul style="list-style-type: none"> New project may be proposed and utmost care should be given to maintain the genetic purity of Nucleus seed
Coimbatore		
29.	CPBG/CBE/RICE/RIC/2021/001: Maintenance breeding of "CO" rice varieties and breeder seed multiplication (June 2021 – May 2024) Dr. K. Ganesamurthy Professor (PB&G) and Head (Up to 31.12.2021) Dr.K.Amudha Assistant Professor(PB&G)	<ul style="list-style-type: none"> The Project may be continued Genetic purity of CO 52 has to be maintained CO 55 may quickly introduce in to seed chain by producing sufficient quantity of nucleus and breeder seeds
30.	CPBG/CBE/PBG//RIC/2017/ 002: Maintenance breeding of parents, seed multiplication of advanced hybrids and released hybrids in rice (June 2017 to May 2022) Dr. R. Saraswathi, Professor (PB&G)	<ul style="list-style-type: none"> The project may be closed and continued in the new project
Ambasamudhram		
31.	CPBG/ASD/PBG/RIC/2020/001 Breeder Seed Production of rice varieties ASD 16 and ASD 19 (June 2019 – May 2022) Dr. R. Thangapandian, Assoc. Prof. (PB&G)	<ul style="list-style-type: none"> Good progress made, the project may be closed and continued in the new project

Madurai		
32.	CPBG/MDU/PBG/ BSP /2020/001: Nucleus and breeder seed production of MDU varieties of rice, barnyard millet and black gram (September,2019 to August, 2022) Dr. A. Sheeba, Assistant Professor (PB&G) Dr. R. Chandirakala Associate Professor (PB&G), Dr. S. Muthuramu Assistant Professor (PB&G)	<ul style="list-style-type: none"> • The project may be continued • Breeder seed production work should be shared among the breeders based on the crop in which they are working
Trichy		
33.	CPBG/TRY/PBG/RIC/2020/001 Nucleus seed production in rice varieties developed at ADAC & RI, Trichy (Sep 2019 to Aug 2022) Dr.T. Thirumurugan Assistant Professor (PB&G) (01.09.2019 to 08.09.2021) Dr. M. Shanmuganathan, 244 Assistant Professor (PB&G) (09.09.2021 to till date)	<ul style="list-style-type: none"> • The project may be continued up to August and new project is to be proposed from September 2022 • Sufficient quantity of nucleus seeds of newly released varieties should be produced • Purification of TRY 4 should be carried
34	CPBG / CBE / TRY / RIC / 2021 / 001 Breeder seed production and distribution in Rice (June 2021 to May 2024) Dr. S. Chithra, Asst.Professor (PB&G) (01.06.2021 to 08.09.2021) Dr. M. Shanmuganathan, Asst.Professor (PB&G) (09.9.2021 to till date)	<ul style="list-style-type: none"> • Work should be continued in new project • Sufficient quantity of breeder seeds of all Trichy varieties should be produced for quick popularization • Soil characters may be shared with Director, CPBG from the field where in TRY 5 was raised during previous season
Vaigaidam		
35.	CPBG/VGD/PBG/RIC/2020/001.Nucleus and Breeder Seed Production of VGD 1 paddy variety (September 2019 to August 2021) Dr. M. Jayaramachandran Assistant professor (PB& G) ARS, Vaigai Dam (From 3.8.2020 onwards) Dr. S. JulietHepziba, Professor & Head, ARS, Vaigai Dam (From Sep 2019 to 3.8.2020)	<ul style="list-style-type: none"> • Year to year and field to field breeder seed production difference may be documented and published • All the breeder seed production projects related to rice should be merged and may be handled under one project including VGD 1 • Completion reports should be submitted for the closed projects
36.	CPBG/VGD/PBG/RIC/2018/001: Breeder Seed Production in Paddy (Oct 2018 to Sep 2021) Dr. M. Jayaramachandran Assistant Professor (PBG),	

37.	CPBG/VGM/PBG/RIC/2022/001: Breeder Seed Production of Rice VGD 1 and ADT 37 (November 2021 to October 2024) Dr.M.Madhan Mohan, Associate Professor (PBG) & Head	
38.	CPBG/VGM/PBG/RIC/2022/002: Breeder Seed Production of paddy varieties ADT (R) 45 and ADT 51 (November 2021 to October 2024) Dr.M.Jayaramachandran Assistant Professor (PBG)	
Tirur		
39.	CPBG/TKM/PBG/RIC/2020/001: Nucleus / Breeder seed production of TKM rice varieties (Dec, 2019 – Nov, 2022) Dr. A. Sheeba, Assistant Professor (PB&G) December, 2019 to July,2020 2. Dr.S.Banumathy, Professor (PBG) August, 2020 to till date	<ul style="list-style-type: none"> • The project may be continued • Nucleus seeds of Tirur varieties should be maintained with 100 % genetic purity
Paramakudi		
40.	CPBG/PMK/PBG/RIC/2020/001: Nucleus and Breeder seed production of rice varieties released from ARS, Paramakudi (September, 2020 – August, 2025) Dr. K. Thangaraj, Associate Professor (PB&G)	<ul style="list-style-type: none"> • The project may be continued • Breeder seed production of CO 53 may be tried along with Anna (R) 4
Thanjavur		
41.	CPBG/TNJ/PBG/SPN/2019/001: Breeder seed production in paddy and pulses (April 2018 to March 2021) Dr.L.Subha, Assistant Professor (PB &G)	<ul style="list-style-type: none"> • The project has to be closed and work to be continued in new project • Breeders seed production of short duration varieties may be tried in both <i>Kuruvai and Navarai</i> seasons • New sub project is to be proposed with the same objective. Care must be taken to ensure genetic purity, timely supply of breeder seed and no short fall in supply
Pattukkottai		
42.	CPBG/PKT/PBG/2018/001: Breeder seed production in Rice (April 2018 to March 2021) Dr. A. Bharathi, Asst. Professor (PBG)	<ul style="list-style-type: none"> • The project has to be closed and work to be continued in new project • AC & RI Echengkottai may be explored for production of breeder seeds

II. CROP MANAGEMENT

A. For Adoption

1. Development of crop geometry for cost effective drip irrigation system in rice

Combination of direct seeded rice in drip irrigation system by using ADT 54 under pair row(20x40x10cm) method of sowing is the optimum crop geometry along with weed management(Pretilachlor@0.45 kg/ha+ one hand weeding) and nutrient management practices (150:60:60 NPK Kg/ha)for achieving higher productivity under dry condition.

2. Feasibility of growing intercropping in aerobic rice

Rice + greengram and Rice + black gram intercropping at 2:1 ratio may be recommended for increasing the system productivity without any competition in aerobic rice.

3. Development of foliar formulations for yield enhancement in rice under water deficit and high temperature conditions

Foliar application of rice formulation during booting and 10 days after first spray improved the relative water content, gas exchange parameters, water use efficiency, chlorophyll stability index, membrane integrity and reduced the leaf and panicle temperature under drought and high temperature conditions. Lower reduction of spikelet fertility (9.6 % and 11.0 %) and increased grain yield (25.3 % and 27.8 %) compared to unsprayed plants with higher BCR of 2.01 under drought and high temperature condition

4. Foliar spray of fermented egg extract for rice

Foliar application of 2% fermented egg extract during tillering, panicle initiation and flowering stages of rice could be recommended for organic rice cultivation for enhancing the higher growth, yield parameters, grain and straw yields and also higher BCR of rice.

ON FARM TRIALS (OFT)

OFT 1. Evaluation of slot modifications in paddy drum seeder for wet seeded Rice

Objective: To identify suitable drum seeder slot modifications for seeding 2-3 seeds per hill with increase in productivity of direct sown rice.

Treatment details: Slots*

- T1: Oval slot
- T2: Oval slot with guiding strip
- T3: Round slot with guiding strip
- T4: Round slot (Control)

Particulars

Crop & Variety

Location

Plot Size

Coordinating centre

Crop & Enterprises

Rice – ADT (R) 55

Coimbatore, Aduthurai, Killikulam and Madurai

7.0 m × 3.2 m

Department of Agronomy, AC&RI, Madurai

* Material will be supplied by the Professor and Head (Agronomy), AC & RI, Madurai on cost basis

Co-ordinating centre & Scientist in-charge:	AC & RI, Madurai	Dr. R. Durai Singh Professor and Head, Agronomy
Centres & Scientist in-charge:	TNAU, Coimbatore	Dr. P. Kathirvelan Asst. Professor (Agronomy)
	TRRI, Aduthurai	Dr. S. Anandha Krishnaveni Assistant Professor (Agronomy)
	AC&RI, Killikulam	Dr. D. Raja Kumar Asst. Professor (Agronomy)

OFT 2: Increasing water and nutrient use efficiency in wet seeded rice

Objective: To evaluate suitable irrigation and nutrient management practices for wet seeded rice.

Treatment details:

T₁ - Irrigation at 10 cm depletion of FWT (from surface level) from 21 DAS to 10 days prior to harvest + 125% RDF of NPK

T₂ - Irrigation at 10 cm depletion of FWT (from surface level) from 21 DAS to 10 days prior to harvest + 100% RDF of NPK

T₃ - Conventional practice (continuous submergence + RDF)

Observations to be recorded:

1. Growth, yield attributes and yield
2. Water saving percentage
3. Water use efficiency
4. Economics

Co-ordinating centre & Scientist In-charge:	AC&RI, Killikulam	Dr. E. Subramanian, Asst. Prof. (AGR)
Centres & Scientist in-charge:	ARS, Ambasamudram	Dr. S.R. Shri Rangasami, Asst. Professor (Agronomy)
	AC&RI, Madurai	Dr. T. Sampathkumar, Asst. Professor (Agronomy)

OFT 3: Evaluation of the performance of pre-release culture CB 05022 under organic farming

Objective: To evaluate the performance of pre-release culture CB-05022 under organic farming in different locations.

Treatment details:

- T₁ - CO (R) 48
- T₂ - CB 05022 (Seeds will be supplied by Dept. of SOA, TNAU, Coimbatore)
- T₃ - Standard check (Best performing variety of the region)

Package of practices for organic rice cultivation as given in adoption need to be followed.

Observations to be recorded:

In Green manures: Plant height, Fresh weight, dry weight, nutrient uptake and N added to the soil.

In Rice crop:

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.

Quality characters: Head rice recovery, hulling per cent, milling per cent, kernel length and breadth before cooking (mm), kernel length and breadth after cooking (mm), LER, Volume expansion ratio, breadth wise expansion ratio, gel consistency, alkali spreading value, aroma, Glycemic Index and organoleptic characters.

Economics: Cost of cultivation, Net returns with and without premium (20%) and BCR

Co-ordinating centre & Scientist in-charge:	Dept. of Sustainable Organic Agriculture, TNAU, Coimbatore	Dr. R. Krishnan, Prof & Head Dr. M. Suganthy, Professor (Agrl. Entomology) Dr. G. Senthil Kumar Asst. Professor(Agronomy), Dept. of Rice
Centres & Scientist in-charge:	TRRI, Aduthurai	Dr. S. Elamathi Assistant Professor (Agronomy)
	RRS, Ambasamudram	Dr. S.R. Shri Rangasami Assistant Professor (Agronomy)
	RRS, Tirur	Dr. K. Sivagami Assistant Professor (Agronomy)
	AC&RI, Madurai	Dr. T. Sampathkumar, Asst. Professor (Agronomy)

	AC&RI, Killikulam	Dr. J. Bhuvanewari Assistant Professor (Agronomy)
	ARS, Bhavanisagar	Dr. N. Sakthivel Professor and Head (Agronomy)

Package of practices followed for organic rice cultivation

Nursery practices

Seed treatment (g/kg)

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

Soil application (per m²)

- Well decomposed 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 aculeata*

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 stage
- Panicle initiation stage

Growth promotion	: Panchagavya @ 3 % at 30 and 45 DAT as foliar spray
Disease management	: <i>Bacillus subtilis</i> (0.5 %)
Insect pest management	: NSKE @ 5 % / Neem oil @ 3 % / <i>Beauveria bassiana</i> @ 2 g/l

For Information

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

- The rice genotypes Pokkali, TRY 3, CO 43 identified as tolerant; CO 51 as moderately tolerant; ADT 37, ADT 53, ASD 16 as susceptible and IR 64 as highly susceptible based on visual salt injury score, seedling growth traits,

sodium and potassium ratio in hydroponics experiment under different level of salt stress.

2. Identifying climate resilient rice genotypes for anaerobic stress tolerance

- Mud tumblers filled with soil and germinated seeds, dipped in plastic trays having 13 cm water was identified as reliable, rapid and reproducible protocol to screen rice based on the the coleoptile growth traits (coleoptile length, coleoptile area, diameter and volume) are associated with the germination and early vigor under anaerobic stress in rice.
- Landraces recorded higher coleoptile growth traits compared to varieties under anaerobic stress condition.

3. Multi- site monitoring network of canopy micrometeorology and heat stresses in rice for evaluating the adaptation strategies under climate change

- IR 64 EMF showed heat escape by recording its first spikelet opening time before 7.00 AM.
- Panicles act are the sensing organs for Heat Induced Spikelet Sterility. Higher the panicle temperatures, higher was the sterility percentage.
- Spikelet fertility was greatly affected by canopy temperatures above 33.5°C and panicle temperatures above 30°C.

4. Standardization of crop geometry and fertilizer dose for newly released rice variety ADT 54

- Among the crop geometry square geometry 20 x 20 cm recorded higher yield parameter yield ,Net income and B:C ratio at both centre.
- ADT 54 recorded increased yield upto 150 kg N/ ha and statistically at par with 125 kg N and STCR approach (120:20:60), Higher Net Income of Rs. 46755 and 41789/ha and B:C Ratio of 1.91 and 1.88 was recorded in STCR and 125 kg N at Thanjavur and Aduthurai centre. Nitrogen 125 Kg N may be recommended for ADT 54 Rice Medium duration rice variety

5. Production of sturdy rice seedlings for machine transplanting

- Seed fortification with FeSO₄ @ 0.025% + ZnSO₄ @ 0.025% + Vermiwash spray @ 0.75% on 10 DAS recorded higher grain (6302 and 6473kg/ha), straw yield (7612 and 7698 kg/ha) net return (Rs. 74541/ha and Rs. 74079/ha) and B:C ratio (2.74 and 2.56).

6. Standardization of seed rate of VGD 1 Rice

- The seed rate of 15 kg/ha (BSR & VGD) & 20 kg/ha (ADT) with 20 x 15 cm recorded higher grain yield (6180 kg), Net income (Rs. 83,756) and BC ratio (2.18).
- Recently Cauvery delta farmers are preferring for VGD1 for Thaladi season.

7. Response of different landraces of rice for organic farming

- Kuzhiadichan recorded the highest grain yield (4534 kg ha⁻¹). followed by Milagu samba (4099 kg ha⁻¹), Sorna masuri (4055 kg ha⁻¹), Anaikomban (3980 kg ha⁻¹) and Kullakar (3972 kg ha⁻¹).

8. Evaluation of organic farming practices followed at Singampatti, Ambasamudram for standardizing location specific organic rice cultivation

- Package of practices developed by DSOA registered the highest grain yield of 4272 and 5382 kg ha⁻¹ at Ambasamudram and Coimbatore, respectively.
- The highest benefit cost ratio of 2.44 and 2.41 was recorded with package of practices developed by DSOA at RRS, Ambasamudram and DSOA, Coimbatore.

9. Reducing methane emission from rice ecosystem

- Modified SRI produced lesser methane (3.89 to 8.23 mg m⁻² h⁻¹) compared to Normal package of practices
- Reduction in methane emission under Modified SRI: 8 – 15%
- Grain yield higher by 11 to 18% under Modified SRI

10. Estimation of regional- global methane emission and refinement of its estimate by GOSAT- 2 and surface observations

- Maximum methane flux of 0.95 g C m⁻² d⁻¹ was recorded in October.
- The soil Oxidation Reduction Potential decreased after irrigation to a maximum of –300 mV in October which triggers the microbial CH₄ production.
- Atmospheric CH₄ mixing ratio increased from June to November and decreased thereafter.
- Compared to conventional method, SRI, MSRI and AWD methods Reduce CH₄ emission by 40, 49 and 52%, respectively.
- Save irrigation water by 26, 27 and 28%, respectively without affecting rice grain yield.

11. Climate smart organic farming in rice

- Among the organic practices, Green manure / Green leaf manure application @ 6.25 t/ha+ Vermicompost @ 1 t/ha + Neem cake @ 250 kg/ha + 3% Panchakavya as foliar spray twice (15 days before and flowering) + AWD using FWT was found to be enhanced microbial population and B:C ratio (1.39 -3.06), 15 to 17 % higher economic yield.
- Methane emission was on par among the organic practices
- Higher emission was found with org practices due to increased microbial action + temp more than 30°C

12. Evaluating the Agronomic efficiency of Marine Gypsum in sodic soil amelioration in irrigated lowland rice

- Application of 100 % GR through Marine gypsum recorded higher grain yield.
- 50% marine gypsum application with organic amendments recorded higher net return and BCR.

13. Evaluation of biofertilizers in mitigating Greenhouse Gas emissions in puddled rice

- Higher growth, yield parameters and yield was registered in SRI method of rice cultivation with inorganic farming + Azolla @ 250 kg/ha and lower methane emission of (50.5 – 95.7 mg/m²/day compared to SRI under organic farming (76.8 -123.1 mg/m²/day).
- Emission of methane less during vegetative stage (56.2 -90 mg/m²/day) compared to the flowering stage (97-134 mg/m²/day).

B. Action Plan (2022-2023)

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

Rationale

Due to low light intensity coupled with high rainfall, the yellowing symptom in rice was observed in the vast area of southern districts of Tamil Nadu particularly in ASD 16 and ADT 39 rice varieties and its resulted in considerable yield reduction. Hence the action plan is proposed.

Objective

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

Treatments

T ₁	Conventional method – RDF in 4 equal split (N&K - basal, AT, PI and flowering) + ZnSO ₄ @ 25 kg ha ⁻¹
T ₂	T ₁ + Foliar application of Rice foliar formulation 1* at critical stages.
T ₃	T ₁ + foliar application of 0.5 % Zn SO ₄ + 1% urea +1% MOP + Cono weeding at 15 & 25 DAT
T ₄	T ₁ + 25 % extra K at AT and PI stages

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

Note – Foliar spray will be given at appearance of yellowing symptom and subsequent 2nd and 3rd spray will be given at weekly interval

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

Co-ordinating centre & Scientist in-charge:	AC&RI, Killikulam	Dr. E. Subramanian, Asst. Prof. (AGR) Dr. S. Srinivasan, (Assoc. Prof., Crop Physiology)
Centres & Scientist In-charge:	ARS, Ambasamudram	Dr. S.R. Shri Rangasami, Asst. Prof. (Agronomy)

Action Plan 2: Innovative labour saving technique in Direct seeded Rice

Preamble:

- Direct seeding rice has limitation such as un-even crop stand and difficulty in thinning and unmanageable weed growth.
- These problems can be alleviated by direct planting system in which desired plant geometry is maintained by thinning mechanical ways.

Objectives

- Evaluation of direct seeding methods under puddled condition

Treatments:

Main plot: Crop Establishment methods

M₁ - Drum seeding (Wet DSR)

M₂ - Drone seeding + Crop geometry tailoring by weeder at 15 & 25 DAS

M₃ - Broadcasting by manual method + Crop geometry tailoring by weeder at 15 & 25 DAS

Sub plot: Weed Control Measures

S₁ - Control

S₂ - Pre-emergence herbicide (Pretilachlor 0.45 Kg / ha) (Use of Drones) + Hand weeding (35 DAT).

S₃ -Pre-emergence herbicide (Pretilachlor 0.45 Kg/ ha) + Early Post emergence herbicide (Bispyripac sodium 50 g/ ha) (Use of Drones)

S₄ -Pre-emergence herbicide (Pretilachlor 0.45 Kg/ ha) + Early Post emergence herbicide (Bispyripac sodium 50 g/ ha) (Use of hand sprayer)

Design: Strip plot Replication: Three

Duration: 2022-2024

Variety and Season: *Kharif* season

Co-ordinating centre & Scientist In-charge:	Dept of Agronomy AC & RI, Coimbatore* (*Trial at ARS, Bhvanisagar)	Dr. P. Murali Arthanari Associate Prof. (AGR)
	Dept of Rice*	Dr. G. Senthil Kumar Asst. Professor (Agron.)
	Dept of RS & GIS	Dr. R. Kumaraperumal Asst. Prof. (SS&AC)
Centres & Scientist In-charge:	TRRI, Aduthurai	Dr. S. Elamathi, Asst. Prof. (AGR)
	KVK, Vamban	Dr. T. Ramesh, Asst. Prof. (AGR)
	AC&RI, Killikulam	Dr. E. Subramanian, Asst. Prof. (AGR)

Action Plan 3: Soil Weed Seed Bank, Weed Dynamics, Pests Load, Soil Fertility and Productivity as Influenced by Rice-Duck Farming

Rationale:

- Manual weeding is tiresome, laborious, cumbersome and uneconomical.
- Herbicide causes weed shift, ecological imbalances with environmental risks
- Duck farming in rice greatly decreases weed density, species richness and diversity and increases the evenness of weed communities.

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 of rice-duck.

Treatments Details:

- T₁ - Control (absence of ducks with chemical farming)
- T₂ - Rice-Duck farming alone
- T₃ - Rice-Duck farming + 100 % RDF (NPK)
- T₄ - GMI with Daincha fb Rice-Duck farming
- T₅ - GMI with Daincha fb Rice-Duck farming + 75 % RDF
- T₆ - GMI with Daincha fb Rice-Duck farming + 100 % RDF

Centre : Department of Agronomy, Wetlands, Coimbatore

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

Design : RBD

Replication : Four

Stock load : 4 ducks/100m² for 3 hours daily from 20 DAT to flowering 2 month old ducklings -15 DAT & Grownup Ducks - 25 DAT

Centre:	Dr. P. Kathirvelan, Asst. Professor (Agron.), TNAU, Coimbatore.
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Action plan 4: Influence of Leaf anatomical traits on Photosynthetic efficiency and yield of rice

Objectives

- To understand the relationship between the leaf vein characters to photosynthesis and yield of rice

Rice genotypes:

SWARNA, CR1009 SUB1, IW PONNI, CO 43, SWARNA SUB1, CO (R) 50, GEB 24, CO 43 SUB 19 -24, CO (R) 54, BPT 5204, CR 1009, DRR DHAN40

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

Observation to be recorded:

Vein density, total number of veins, interveinal distances between major and minor vein, vein width, photosynthetic efficiency and other gas exchange parameters, and yield.

Outcome

To identify the donors for high leaf vein density with increased photosynthetic efficiency and yield in rice

Co-ordinating centre & Scientist In-charge	Dept. of Crop Physiology, Coimbatore	Dr. M. K. Kalarani, Director (Crop Management) Dr. A. Senthil, Professor and Head (Crop Physiology)
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Action plan 5: Standardization of drip fertigation for short duration paddy

Preamble:

Adoption of drip irrigation reached paddy cultivation also, but cost involved is high through water soluble fertilizers and number of splits and quantity is not finalised and standardized.

Objective:

To standardise drip fertigation for paddy

Treatments

Design: RBD

Replication: Five

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

Treatments: Source of nutrient

S₁ : Water soluble fertilizer (Basal 100% of P+ N& K 4splits: Basal +3 top dressing through fertigation once in 3 days (alternatively with and without nutrient and water)

S₂ : Straight fertilizers : blanket recommendation

S₃ : Straight fertilizer through 100% STCR based fertilizer application

S₄ : Straight fertilizer through 75% STCR based fertilizer application

Co-ordinating centres and Scientists:	Dr. S. Vallalkannan, Asst. Professor (Agronomy), KVK, Madurai
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Action Plan 6: Response of different landraces of rice for organic farming Objectives

- To evaluate the response of land races of rice to organic production system
- To study the yield and economics of rice land races grown organically
- To study the quality parameters of rice land races in response to organic management practices

Treatments:

Season	Crop	Land races
<i>Kharif</i>	Green manure (Dhaincha)	Green manure (Dhaincha)
<i>Rabi</i>	Rice	Any 10 out of 12 traditional land races listed: Arupatham kuruvai, Athur Kitchili samba, Garudan samba, Kala namak, Kothamalli samba, Kullakar, Kuzhiadichan, Iluppaipoo samba, Milagu samba, Poonkar, Sorna masuri, Thanga samba, Thuaiya malli, Kudavazhlai, Rathasali, Anaikomban

Duration : Two years (2021 to 2024)

Package of practices for organic rice cultivation

Nursery practices

- Seeds soaking with *Pseudomonas fluorescens* @ 10g/kg + *Azospirillum* @ 30g/kg + *Phosphobacteria* @ 30g /kg.
- Basal application of well decomposed FYM @ 1.25kg/m² + Neem cake @ 50 gm / m² + *Trichoderma viride* @ 4g/m²
- Gypsum application @ 100gm / m² at 10 days after sowing to prevent root snapping.

Main field practices

- Neem cake @ 250 kg/ha as basal
- Gypsum @ 500 kg /ha (source of Ca and S nutrients) at last ploughing.

- Seedling root dip with *Azospirillum* (1kg/ha) + *Phosphobacteria* (1kg/ha) in 40 lit. of water for 15 - 30 minutes before transplanting.
- Soil application of *Azospirillum* @ 2.5 kg/ha + *Phosphobacteria* 2.5 kg /ha mixed with 25 kg of well decomposed FYM and applied before transplanting.
- Vermicompost @ 1ton / ha each at active tillering, panicle initiation and heading stages.
- *Panchagavya* @ 30ml/lit. of water twice at 30 and 45 DAT as growth promoter
- Need based application of Neem Seed Kernal Extract @ 5% / Neem oil @ 2% / *Beauveria bassiana* @ 2% for the management of insect pests.
- Need based application of liquid *Pseudomonas fluorescens* @ 2ml/lit for foliar diseases.

Observations to be recorded

Green manures: Plant height, no. of plants / m², fresh weight, dry weight, nutrient uptake and N added to the soil.

Rice:

- **Growth characters:** Plant height at harvest, DMP at harvest
- **Physiological parameters:** Photosynthetic rate/Chlorophyll index, CGR, SLW
- **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
- **Quantification of Irrigation Water:** Water Use Efficiency and water productivity
- **Quality characters:** Head rice recovery, hulling per cent, milling per cent, kernel length and breadth before cooking (mm), kernel length and breadth after cooking (mm), LER, Volume expansion ratio, breadth wise expansion ratio, gel consistency, alkali spreading value, aroma, Glycemic Index and organoleptic characters.
- **Economics:** Cost of cultivation, Net returns with and without premium (20%) and BCR
- **Soil Biological properties**

Co-ordinating centre & Scientist In-charge:	Department of Sustainable Organic Agriculture, TNAU, Coimbatore	Dr. R. Krishnan, Professor and Head Dr. M.Suganthy, Professor (Entomology)
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Action Plan 7: Evaluating the Agronomic efficiency of Marine Gypsum in sodic soil amelioration in Irrigated lowland rice

Rationale:

- Reclamation of sodic soils: Removal of Na⁺ from the colloid's cation exchange sites and leaching of the replaced Na⁺ out of the root zone in percolating water.

- Mined gypsum: (CaSO₄·2H₂O), by product recovered from salt pan, most common chemical amendment for saline-sodic and sodic soil reclamation because it is comparatively cheap, generally available, and easy to apply: But the supply is very much limited or Nil for Agricultural use.

Objectives:

- To study the effect of Marine Gypsum application alone / with green manure on crop growth and development of rice under sodic soil.
- Improvement of physical and chemical properties of Sodic soil.
- To study the economics of rice production under varied sodic soil amelioration methods.

Treatment details:

Factor A: Levels of Marine Gypsum application

- T₁: 25 % Gypsum requirement
- T₂: 50 % Gypsum requirement
- T₃: 75 % Gypsum requirement
- T₄: 100 % Gypsum requirement

Factor B: Organic Amendments

- S₁: No organic amendments (Control)
- S₂: Green Manuring

Duration: Two Years (2020-21 to 2022-23)

Co-ordinating centre & Scientist In-charge:	Dr. A. Alagesan, Assistant Professor (Agronomy) & AC & RI, Keezhvelur,Nagapatnam
	Dr.P. Janaki, Professor (SS&AC),AC & RI, Coimbatore
	Dr.S.Nithila, Assistant Professor (Crop Physiology) SRS, Sirugamani
	Dr.J.Ejilane. Assistant Professor (Agrl. Microbiology) AC & RI, Madurai

Action Plan 8: Evaluation of biofertilizers in mitigating Greenhouse Gas emissions in puddled rice

Rationale

- Rice cultivation is the second largest contributor of global agricultural methane emission after enteric fermentation.
- In order to mitigate climate change, there is a need to identify cost effective ways to avoid emissions of GHGs.

- In the global methane cycle, biological processes consume substantial amount of methane.
- The photosynthetic systems such as BGA and Azolla are known to minimise the GWP in flooded rice by enhancing dissolved oxygen content in the soil water interface which ultimately suppress the activity of methanogens.

Objectives

- To quantify the GHG emission in puddled rice
- To study the mitigation potential of BGA (Cyanobacteria) and Azolla in minimizing the GHG emission in rice

Treatment details

- T₁ - SRI method of rice cultivation with organic farming SOP
- T₂ - SRI method of rice cultivation with inorganic farming SOP
- T₃ - T₁+BGA application @ 10 kg/ha
- T₄ - T₂+ BGA application @ 10 kg/ha
- T₅ -T₁+Azolla application @ 250 kg/ ha
- T₆ -T₂+ Azolla application @ 250 kg/ ha

Variety: CO 52; **Season:** Samba 2021-22 and 2022-23; **Design:** RBD;

Replications: Four

Period: Sept. 2021- March 2023

Observations to be recorded:

- Soil Physical characteristics
- Soil Microbial load
- Soil Temp at frequent intervals
- Water Temp at frequent intervals
- GHG emission at Seedling, Tillering, PI, Booting, Flowering and Maturity
- Growth and Yield Parameters
- Physiological attributes *viz.*, LAI, SPAD etc.,

Co-ordinating centre & Scientist in-charge:	ACRC, TNAU, Coimbatore	Dr. N. K. Sathyamoorthy, Assoc. Professor (Agron) Dr. S. Kokilavani, Asst. Professor (Agrl.meteorology)
Centres & Scientist In-charge:	TRRI, Aduthurai	Dr. S. Anandha Krishnaveni, Assistant Professor (Agronomy)
	AC & RI, Madurai	Dr. T, Sampathkumar, Asst. Prof(Agron) Dr. P. Kannan, Asst. Prof(SS&AC)

Action Plan 9: Standardization of crop geometry and fertilizer dose for newly released rice variety ADT 54.

Rationale

- Fertilizer is one of the costliest inputs in agriculture and the use of right amount of fertilizer is fundamental for farm profitability and environmental protection.
- Managing the location specific variability in nutrient supply is a key strategy to overcome the current mismatch of fertilizer rates and crop nutrient demand in irrigated rice environment.
- Location specific fertilizer recommendations are possible for soils of varying fertility, resource conditions of farmers and levels of targeted yield for similar soil classes and environment.
- ADT 54 is a medium duration rice variety recommended during Thaladi (Rabi) season of Cauvery Delta Zone and blanket recommendation of 150:50:50 kg NPK/ha is invariably recommended whereas 75:50:50 Kg NPK/ha is recommended for Improved White Ponni variety. Improved White Ponni is the one of the parents of ADT 54 variety. Therefore, it is important to find out optimum fertilizer dose for ADT 54.

Objectives

- To find out optimum crop geometry and fertilizer dose for newly released rice variety ADT 54.

Period: 2021-23

Treatments details:					
Main plot (Spacing)					
M ₁ -	20 cm x 15 cm	M ₂ -	20 cm x 20 cm	M ₃ -	25 cm x 25 cm
Sub plot (Fertilizer dose) N kg/ha					
S ₁ -	Control	S ₂ -	50	S ₃ -	75
S ₄ -	100	S ₅ -	125	S ₆ -	150
S ₇ -	STCR				

Co-ordinating centre & Scientist In-charge:	TRRI, Aduthurai	Dr. S. Elamathi Assistant Professor (Agronomy) Dr. K. Manikandan Assistant Professor (SS&AC)
Centre & Scientist In-charge:	ARS, Thanjavur	Dr. S. Porpavai Professor and Head

Observations to be recorded:

- Growth characters: Population/m² , Plant height at harvest, DMP at harvest
- Yield characters: No. of productive tillers/hill, No. of filled grains/panicle, test weight, grain yield, straw yield and HI.

Soil characters: Initial and final NPK Status, Uptake of nutrient studies

Economics: Cost of cultivation, Net returns and BCR

Action plan 10: Standardization of seed rate of VGD-1 Rice

Objectives

- As the VGD 1 is a newly released variety, the seed rate needs to be optimized for increased productivity.

Treatment details

Factor 1: Seed rate

T₁ - Seed rate @ 25 kg/ha

T₂ - Seed rate @ 20 kg/ha

T₃ - Seed rate @ 15 kg/ha

T₄ - Seed rate @ 10 kg/ha

Factor 2: Spacing

S₁ - 20 x 10 cm

S₂ - 20 x 15 cm

Co-ordinating centre & Scientist In-charge	ARS, Vaigai Dam	Dr. R. Jeyasrinivas Assistant professor (Agronomy)
Centres & Scientist In-charge	TRRI, Aduthurai	Dr. S. Elamathi Asst professor (Agronomy)
	ARS, Bhavanisagar	Dr. N. Sakthivel Professor and Head

Observations to be recorded

Growth characters: Population/m², Plant height at harvest, DMP at harvest

Yield characters: No. of productive tillers / hill, No. of grains / panicle, Test weight, Grain yield, Straw yield and HI.

Economics: Cost of cultivation, Net returns and BCR

Action plan 11: Generation of Genetic Coefficients for rice var CO-54 for simulation modeling

Objective:

- Developing Genetic coefficients for newly released rice variety CO-54.
- To undertake simulation studies with CO 54 for varied nutrient, water and temperature environments.

Rationale:

- Since climate change is ever dynamic, the global average temperature has increased by more than 0.65°C during the period 1986 - 2016 compared to 1901 - 2016, which is about 1.8°C.
- In addition to the temperature rise, global warming may lead to increased variability of monsoon patterns, poor rainfall distribution and subsequent decline in soil moisture. It may lead to a combination of one or more abiotic stresses, and in such conditions, the decline in agricultural production will be inevitable.

Treatment details:**Factor 1: Time of sowing**

- T₁ - Ist fortnight of June
- T₂ - IInd fortnight of June
- T₃ - Ist fortnight of July

Factor 2: Nutrient levels

- N₁ – 75% Recommended dose of NPK (112.5:37.5:37.5 kg/ha)
- N₂ – 100% Recommended dose of NPK (150:50:50 kg/ha)
- N₃ – 125% Recommended dose of NPK (187.5:62.5:62.5 kg/ha)

Period: 2021-23**Replication: Four****Observations to be recorded:**

Growth attributes: Plant height, LAI, DMP at regular interval

Yield attributes: No. of productive tillers / hill, No. of grains/panicle, Grain yield and Straw yield.

Co-ordinating centre & Scientist In-charge:	ACRC, TNAU, Coimbatore	Dr. N. K. Sathyamoorthy, Associate Professor (Agronomy)
	Department of Rice, TNAU, Coimbatore	Dr. G. Senthil Kumar Assistant Professor (Agronomy)

C. Project-wise Remarks

I. Action Plan

Sl. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
1.	Development of crop geometry for cost effective drip irrigation system in rice	Dr. S. Vallal Kannan, Assistant Professor (Agronomy) AEC&RI, Kumulur (KVK, Madurai)	2021-22	To be closed
2.	Feasibility of intercropping in aerobic rice	AC&RI, Madurai / Killikulam Dr. E. Subramanian, Asst. Prof.,(AGR), ARS, Thanjavur Dr. S. Porpavai, Professor and Head, KVK, Madurai Dr. S. Vallalkannan, Asst. Prof., (AGR),	2020-22	To be closed
3.	Response of different rice varieties suitable for organic farming	Dr. R. Krishnan, Professor and Head Dr. M.Suganthi, Professor (Entomology)	2013-23	To be Continued.
4.	Evaluating the Agronomic efficiency of Marine Gypsum in sodic soil amelioration in Irrigated lowland rice	ADAC & RI, Trichy Dr. A. Alagesan, Asst. Professor (AGR), Dr. P. Janaki, Assoc.Prof.(SS&AC), Dr. S. Nithila, Asst. Prof.,(CRP), Dr. J. Ejilane, Asst. Prof., (AGM),	2020-22	To be Continued. Post harvest Soil analysis have to be carried out. Given for Information
5.	Evaluation of biofertilizers in mitigating Greenhouse Gas emissions in puddled rice	ACRC, TNAU, Coimbatore Dr. N. K. Sathyamoorthy, Assoc. Professor (Agron) Dr. S. Kokilavani, Asst. Prof. (Ag.meteorology) TRRI, Aduthurai Dr. C. Uma Maheswari, Assoc. Prof(Agron) AC & RI, Madurai	2021-23	To be Continued.

		Dr. Chelvi Ramessh, Asst. Prof(Agron) Dr. P. Kannan, Asst. Prof(SS&AC)		
6.	Standardization of crop geometry and fertilizer dose for newly released rice variety ADT 54	TRRI, Aduthurai Dr. S. Elamathi, Assistant Professor (Agronomy) Dr. K. Sathiyabama, Associate Professor (SS&AC) ARS, Thanjavur Dr. S. Porpavai, Professor and Head	2021-2023	To be Continued.
7	Photoperiodic flower induction in rice for speed Breeding	Department of Crop Physiology, TNAU, Coimbatore-3 Dr. M.K.Kalarani, Director, Crop management Dr. V. Ravichandran, Associate Professor (Crop Physiology) Department of Rice, TNAU, Coimbatore-3 Dr. N.Sritharan, Asst. Prof. (Crop Physiology)	2021-2023	To be Continued under NADP project which is operating at CPBG, TNAU, Coimbatore.
8	Standardization of seed rate of VGD-1 Rice	ARS, Vaigai Dam Dr. R. Jeyasrinivas Assistant professor (Agronomy) TRRI, Aduthurai Dr. S. Elamathi, Asst professor (Agronomy) ARS, Bhavanisagar Dr. N. Sakthivel, Professor and Head	2021 - 2023	To be Continued.
9	Generation of Genetic Coefficients for rice var CO-54 for simulation modeling	ACRC, TNAU, Coimbatore Dr. N. K. Sathyamoorthy, Associate Professor (Agronomy) Dept. of Rice, TNAU, Coimbatore Dr. G. Senthil Kumar Assistant Professor (Agronomy)	2020-2023	To be Continued.
10	Evaluation of organic farming practices followed at	Dept. of SOA, TNAU, Coimbatore Dr. R. Krishnan, Prof & Head	2021-2022	To be closed

	Singampatti, Ambasamudram for standardizing location specific organic rice cultivation	Dr. M. Suganthy, Prof (Ento.) RRS, Ambasamudram Dr. S.R. Shri Rangasami Assistant Professor (Agronomy)		
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II. ON FARM TRIAL

Sl. No.	TITLE	Scientist involved / Lead scientist	Duration	Remarks
1	Reducing methane emission from rice ecosystem	TRRI, Aduthurai Dr. C. Umamageswari, Assoc. Prof., (AGR) Dr. Chelvi Ramesh, Asst. Prof. (AGR), AC& RI, Madurai Dr. Banumathi, Professor (AGR), RRS, Tirur Dr. S. R. Shri Rangasamy, Asst. Prof., (AGR), RRS, Ambasamudram	2020-22	To be closed
2	Enhancing the productivity of rice through foliar application of fermented egg extract	ADAC & RI, Trichy Dr. T.Ramesh, Asst. Professor (AGR) Dr.S. Radhika, Asst. Professor (AGR) Dept. of SOA, TNAU, Coimbatore Dr. S. Manickam, Professor and Head AC&RI, Madurai Dr. E. Subramanian, Asst Prof.(AGR) TRRI, Aduthurai Dr. M. Raju, Professor (Agronomy)	2021	To be closed
3	Evaluation of the performance of pre-release culture CB 05022 under organic farming	Dept. of SOA, TNAU, Coimbatore Dr. S. Manickam, Prof & Head Dr. M. Suganthy, Prof (Agrl. Entomology) Dept. of Rice, TNAU, Coimbatore Dr.G.Senthil Kumar, Asst. Professor(Agronomy), TRRI, Aduthurai Dr. S. Elamathi, Assistant Professor (Agronomy)	2021-2022	To be continued

		<p>RRS, Ambasamudram Dr. S.R. Shri Rangasami, Asst. Prof. (Agronomy)</p> <p>RRS, Tirur Dr. K. Sivagami, Assistant Professor (Agronomy)</p> <p>AC&RI, Madurai Dr. T. Sampathkumar, Asst. Prof. (Agronomy)</p> <p>AC&RI, Killikulam Dr. J. Bhuvanewari, Asst. Prof. (Agronomy)</p> <p>ARS, Bhavanisagar Dr. N. Sakthivel, Professor and Head</p>		
4	Development of foliar formulations for yield enhancement in rice under water deficit and high temperature conditions	<p>Dr. V. Ravichandran, Assoc Prof. (Crop Physiology)</p> <p>Dr. D.Vijayalakshmi, Assoc Prof. (Crop Physiology)</p> <p>Dr.P.Jeyakumar, Professor (Crop Physiology) Department of Crop Physiology, TNAU, Coimbatore</p> <p>Dr. T. Sivakumar, Professor (Crop Physiology)</p> <p>Dr. K. Krishana Surendar, Assistant Professor (Crop Physiology), AC& RI, Madurai</p>	2021	Recommended for Adoption

III. University Research Projects

Sl. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
1	DCM/CBE/AMT/RIC/2019/001 Climate smart organic farming in rice	Dr. SP. Ramanathan, Professor(Agron) & Head Dr. S. Kokilavani, Asst. Prof (Agmet), Agro Climate Research Centre Dr. S. Manickam Prof (Agron) & Head Dr. M. Suganthy Dr. Assoc. Prof (Ento) Dept. of Sustainable Organic Agriculture, TNAU, Coimbatore Dr. S. R. Shri Rangasami, Asst.Prof (Agron) Dr. K. G. Sabarinathan, Asst. Prof (Agrl. Micro) Rice Research Station, Ambasamudram Dr. Banumathi, Professor(PBG), Rice Research Station, Tirur Dr. Dr.S.Vallal Kannan Assistant Professor (Agronomy) Dr. P. Kannan, Asst. Prof(Soil Science) Agricultural College and Research Institute, Madurai Dr. M. Raju, Prof (Agron) Dr. C. Uma Maheswari, Assoc. Prof(Agron) Tamil Nadu Rice Research Institute, Aduthurai	2019 - 22	To be closed. Completion report may be submitted
2	DCM/KKM/ AGR/RIC/2020/001 Increasing water and nutrient use efficiency in wet seeded rice under Tamiraparani command area	M. Joseph, Assoc. Prof., (AGR), AC&RI, Killikulam Dr. S. Jothimani, Professor (SS&AC), AC&RI, Killikulam	2020 - 22	To be closed. Completion report may be submitted

3	DCM/KKM/AGR/RIC/2020/002 Effect of rice husk ash as carrier of silica and its levels on growth and yield of direct sown rice	Dr. D. Rajakumar, Asst. Prof., (AGR), AC&RI, Killikulam Dr. M. Gomathy, Asst. Prof., (Microbiology), AC&RI, Killikulam	2020 - 22	To be Continued. Given for Information
4	DCM/KKM/AGR/RIC/2020/003 Production of sturdy rice seedlings for machine transplanting	M. Hemalatha, Prof., (AGR), AC&RI, Killikulam Dr. S. Jothimani, Professor (SS&AC) Department of SS&AC, AC&RI, Killikulam	2020 - 21	To be continued with modification in the treatment structure
5	DCM/ CBE/ CRP/RIC/2021/001 Identifying Climate Resilient Rice Genotypes for Anaerobic Stress Tolerance	Dr. D. Vijayalakshmi, Assoc. Prof., (CRP) TNAU, Coimbatore	2021 - 22	To be Continued. Given for Information
6	DCM/ CBE/ CRP/RIC/2021/002 Study on Silicon mediated changes in anatomy and physiology of rice genotypes under salt stress condition	Dr. V. Ravichandran, Assoc. Prof., (CRP), TNAU, Coimbatore	2021 - 22	To be Continued. Given for Information
7	DCM/MDU/AGR/RIC/2021/001 Slot modifications in paddy drum seeder in conjugation with seed priming in wet seeded rice	Dr. Durai Singh, Prof & Head, Dept. of Agronomy, AC&RI, Madurai Dr. R. Geetha, Professor and Head, Dept. of SST, AC&RI, Madurai Dr. Syed Abul Hassan Hussainy Teaching Assistant, Department of Agronomy AC&RI, Madurai	2020 - 22	To be closed. Completion report may be submitted

8	DCM/TRRI/AGR/RICE/2021/001 Standardization of crop geometry and fertilizer dose for newly released rice variety ADT 54	Dr. S. Elamathi, Asst. Prof. (AGR), TRRI. Aduthurai Dr. K. Sathiyabama, Assoc. Prof. (SS&AC), TRRI. Aduthurai Dr. S. Porpavai, Professor and Head, ARS, Thanjavur	2021-2023	To be Continued.
9	DCM/CBE/CRP/RIC/2021/003 Physiological characterization of traditional rice varieties for yield improvement	Dr. K. Vanitha, Assistant Professor (Crop Physiology) Dept. of Crop Physiology, TNAU, Coimbatore. Dr. N. Thavaprakash, Assoc. Professor (Agronomy), Dept. of Agronomy, TNAU, Coimbatore.	2021-2024	To be Continued.
10	DCM / CBE / AGR / RIC / 2021 / 002 Influence of lunar phases at flowering stage on the productivity and quality of rice varieties.	1. Dr. N. Maragatham, Professor (Agronomy) ACRC, TNAU, Coimbatore 2. Dr. Ga. Dheebakaran., Asst. Professor ACRC, TNAU, Coimbatore.	2021-2023	To be Continued.

IV. AICRIP Projects

Sl. No.	TITLE	Scientist involved / Lead scientist	Duration	Remarks
1	AICRP /PBG /ADT / RIC/ 002 Nutrient response trials on selected AVT 2 rice cultures under high and low input management.	Dr. S.Elamathi, Asst. Prof., (AGR), TRRI, Aduthurai	2020-21	To be Continued.
2.	AICRP /PBG /ADT / RIC/ 002. Cultural Management Trial (CMT 1) Development of package of practices for mechanized transplanting	Dr. S.Elamathi, Asst. Prof., (AGR), TRRI, Aduthurai	2020-23	To be Continued.
3.	AICRP /PBG /ADT / RIC/ 002	Dr. S.Elamathi, Asst. Prof., (AGR), TRRI,	2020-23	To be Continued.

	Cultural Management Trial (CMT 3) Developing suitable package of practices for wet DSR	Aduthurai		
4.	AICRP /PBG /ADT / RIC/ 002 Cultural Management Trial (WMT 2) Long term trial on weed dynamics in mono or double cropped rice system under different establishment methods	Dr. S.Elamathi, Asst. Prof., (AGR), TRRI, Aduthurai	2020-24	To be Continued.
5.	AICRP /PBG /ADT / RIC/ 002 Cultural Management Trial (WMT 2) Evaluation of promising cultivars for late planting and management for higher productivity and mitigate the effect climate change	Dr. S.Elamathi, Asst. Prof., (AGR), TRRI, Aduthurai	2021-23	To be Continued.
6.	AICRP /PBG /CBE / RIC/ 003 Nutrient Management Trials – AVT 2 – IM (TP) Nutrient response trials on selected AVT 2 rice cultures under high and low input management.	Dr. G. Senthil Kumar, Asst. Prof., (AGR), TNAU, Coimbatore	2021-22	To be Continued.
7.	AICRP / DCM / CBE / AGR / RIC / 2020 / 002: Cultural Management Trial (CMT 3) Developing a suitable package of practices for wet direct seeded rice (Wet DSR)	Dr. G. Senthil Kumar, Asst. Prof., (AGR), TNAU, Coimbatore	2021-22	To be Continued.

8.	AICRP /PBG /CBE / RIC/ 003 Weed Management Trial (WMT 4) Sustainable weed management in aerobic rice system	Dr. G. Senthil Kumar, Asst. Prof., (AGR), TNAU, Coimbatore	2021-22	To be Continued.
9.	AICRP/DCM/CBE/AGR/001 Identification of cropping systems module for different farming systems	Dr. S. Porpavai, Professor & Head (AGR), ARS, Thanjavur	2019-22	To be Continued.
10.	AICRP/NRM/TRY/SAC/005: Evaluating the reclamation efficiency of different sources of Gypsum for Sodic Soil Management.	Dr. A. Alagesan, Asst. Prof., (AGR), ADAC&RI, Trichy	2019-22	To be Continued.
11.	AICRP/PBG/CBE/RIC/003 Influence of silicon on improving abiotic stress tolerance in rice genotypes	Dr. N. Sritharan Assistant Professor (Crop Physiology) Department of Rice, Centre for Plant Breeding and Genetics, TNAU, Coimbatore	2021-22	To be Continued.
12.	AICRP/PBG/CBE/RIC/003 Screening for submergence tolerance in rice genotypes	Dr. N. Sritharan Assistant Professor (Crop Physiology) Department of Rice, Centre for Plant Breeding and Genetics, TNAU, Coimbatore	2021-22	To be Continued.
13.	AICRP/PBG/CBE/RIC/003 Physiological characterization of selected rice genotypes for multiple abiotic stress tolerance	Dr. N. Sritharan Assistant Professor (Crop Physiology) Department of Rice, Centre for Plant Breeding and Genetics, TNAU, Coimbatore	2021-22	To be Continued.

IV. Externally Funded Projects

Sl. No.	Title	Scientist involved / Lead scientist	Duration	Remarks
1	JAPAN/ DCM/ ADT/ AGR/ 2016/ R006 Estimation of Regional- Global Methane Emissions and Refinement of its Estimate by GOSAT-2 and Surface Observations (Phase I & II)	PI: Dr. V. Ambethgar, Director, TRRI, Aduthurai Co PIs: Dr. M. Raju, Prof. (Agron.) Dr. C. Umamageswari, Assoc. Prof. (Agron.) Dr. K. Sathiya Bama, Assoc. Prof. (SS & AC)	2016-2022	To be Closed.
2.	NIAES/DCM/CBE/CRP/2019/R010 No. DR/P7/ DCM/CRP/NIAES, Japan/ASO/2021 dt.8.9.2021. Multi- site monitoring network of canopy micrometeorology and heat stresses in rice for evaluating the adaptation strategies under climate change (HOA: F38IB)	Dr.D.Vijayalakshmi, Associate Professor (Crop Physiology) Dept. of Crop Physiology, TNAU, Coimbatore.	2019-2023	To be Continued. Given for information

Directorate of Natural Resource Management

Rice Scientists Meet, 2022 was held during 8-9, April, 2022 and Director (NRM) reviewed the projects on Rice representing Action Plan, OFT, University Research Projects, AICRPs and Externally Funded Projects. About 18 projects comprising 4 action plans, 10 URPs, 1 AICRP, 1 OFT/demonstration and 2 student thesis on rice were reviewed. Twenty five scientists attended the review and presented the salient findings of the project on online mode. The following findings are forwarded for adoption/information/OFT.

Research Projects on Rice

Projects	SS&AC	AGM	Total
Action Plan	02	02	04
University Research Project	08	02	10
AICRP	01	-	01
OFT	-	01	01
Student Thesis	01	01	02
Total	12	06	18

a). For adoption

1. Bacillus altitudinis FD48 for moisture stress tolerance, crop growth and yield in rice

Seed treatment of 125 mL ha⁻¹ and Foliar spray 500mL ha⁻¹ of FD48 cells (10⁸ cfu mL⁻¹) at 30 & 50 DAS showed enhanced plant growth and yield increase in rice plants under irrigated and induced drought stress condition (55 DAS). Under Normal irrigated condition, FD48 recorded the maximum yield of 4851 kg ha⁻¹ with the B:C ratio of 2.41 which is 16% increase over T3 (75% RDF; 4156 kg ha⁻¹) and 8.8 % increase over PPFM (4456 kg ha⁻¹). Under drought induced condition, both FD48 & PPFM recorded grain yield of 4261 and 4255 kg ha⁻¹ respectively (on par with each other) and showed 8.5% increase over 75% RDF with the B:C ratio of 2.20.

2. Microbial consortium for the enhancement of Rice Productivity under varying methods of establishment

Seed treatment of *Azotobacter vinelandii* MAZO 36 + PSB + AMF (@ 25 g each/ha) and soil application (@25g each/ha) with 25 kg of FYM + 75% N&P (as per STCR) is recommended for direct sown low land rice. For Machine Transplanted rice,

seed treatment of *Azospirillum* + PSB (25 g each/ha) and Soil application (@ 25g each/ha) with 25 kg FYM +75% N&P (as per STCR) is recommended.

Under Semidry conditions, Seed treatment of *Azotobacter vinelandii* MAZO 36 + PSB+AMF (@ 25 g each/ha) and soil application (@25g each/ha) with 25 kg of FYM + 75% N&P (as per STCR) is recommended for both Direct sown rice and Machine Transplanted Rice.

b). OFTs for the year 2022-2023

1. Management of water logging associated soil problem in rice ecosystem of Cauvery Delta Zone of Tamil Nadu

In Delta region rice growth and yield are affected due to stagnation of water.

Objective

To validate the technology / amendments to alleviate the water logging associated soil problem in rice ecosystem

Work plan

Selecting water logging prone field and imposing the treatments.

Treatment Details

T1 : RDF as per STCR

T2: RDF (as per STCR) + Gypsum @500 kg ha⁻¹ + Cono weeding twice + AWDI + Microbial consortia @ 500 ml ha⁻¹

T3 : Farmers' Fertilisation Practice

- All the treatments received recommended NPK fertilizers
- Treatments will be imposed after observing the symptoms (20-30 DAP)
- Microbial consortia: 500 ml ha⁻¹ mixed with 25 kg Sand or Manure
- AWDI -Alternate Wetting & Drying Irrigation

Season: Summer / Kuruvai /Thaladi

Variety: Short & Medium duration varieties

Observations to be recorded

- Algal population; Soil properties, Biometric observations & Grain Yield

Coordinating scientist

Dr.K.Sathiya Bama, ASP(SS&AC),TNAU,Coimbatore

Location & Scientists

Dr.K.Manikandan, TRRI, Aduthurai

Dr.T.Sivasankari Devi, TRRI, Aduthurai

Dr.A.Anuratha, AC&RI, Keezhvelur, Nagappatinam

2. Validation of STCR-IPNS based Fertilizer Prescriptions for Rice in North Eastern Zone of Tamil Nadu

Objectives:

- To validate STCR – IPNS technology for Rice in North Eastern Zone of Tamil Nadu

Treatments

- T₁ : STCR-NPK alone for yield target 7 t ha⁻¹
- T₂ : STCR-IPNS for yield target 7 t ha⁻¹
- T₃ : Blanket recommendation +12.5 t FYM ha⁻¹
- T₄ : Farmers' fertilization practice

Observations to be recorded :Grain Yield / Initial and post-harvest soil fertility status

Computed parameters: Percent achievement, Response Ratio & BCR

Location: Tiruvallur&TiruvannamalaiDt.

Soil Type: Kadambady&Mathur soil series

Season: Samba, 2022 Number of OFTs: 4

Lead centre& Scientists In-charge:

Coordination: Dr. R. Santhi, Professor (SS&AC)

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

Co-ordinatingcentres& Scientists In-charge:

TNAU-I&TC, Chennai : Dr. S. Suganya, Asst. Professor (SS&AC)

AC&RI, Vazhavachanur :Dr. V. Arunkumar, Asst. Professor (SS&AC)

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

Objective

To validate the boron fertilization for enhanced yield and quality of rice

Treatments:

- T₁ : STCR-NPK alone
- T₂ : STCR-NPK + 10 kg borax ha⁻¹
- T₃ : STCR-IPNS + 10 kg borax ha⁻¹
- T₄ :Farmers'Fertilisation Practice

Observations to be recorded

- Grain & Straw yield
- Hot water soluble boron in soil
- Boron uptake
- Amylose content and chaffiness (%)
- BCR

Lead centre& Scientists In-charge

Department of SS&AC, AC&RI, Killikulam: Dr.S.Suresh, Professor and Head (SS&AC)

Co-ordinating centres& Scientists In-charge

TNAU, Coimbatore : Dr. T. Chitdeshwari, Professor (SS&AC)
ARS, Thirupathisaram :Dr. D.Leninraja, Asst. Prof. (SS&AC)
TRRI, Aduthurai : Dr. K. Manikandan, Asst. Prof (SS&AC)
AC&RI, Madurai : Dr. B.BhakiyathuSaliha, Assoc.Prof. (SS&AC)

c). For Information

1. Demonstration of STCR-IPNS based fertiliser Prescription for rice in Cauvery Delta Zone (Phase II)

STCR-IPNS based fertilizer prescription recorded the highest grain yield of 6420 kg ha⁻¹ and 6780 kg ha⁻¹ during Kuruvai and Thaladi seasons of 2021, respectively, besides the maintenance of soil fertility. Yield increase in STCR-IPNS over blanket fertilizer recommendation and farmer's fertilization practice was 7.8 and 34.8% & 10.4 and 37.8%, respectively for Kuruvai and Thaladi.

2. Optimization of Boron Fertilization for Rice

Application of STCR-IPNS based NPK + 10 kg borax ha⁻¹ recorded the highest grain yield of 5925 kg ha⁻¹ & 5985 kg ha⁻¹ during Kharif and Rabi seasons of 2021, respectively. The yield increase was 6.5% higher than the application of STCR-IPNS without borax in sandy clay loam soils in Killikulam and clay soils of Tirupathisaram.

3. Harpin (HpaG) a protein-based smart formulations for defense priming and health in rice

HpaG priming (6 micromolar) enhanced the germination (13.7%), vigor index (19.8) and other plant growth traits in rice. The growth hormones such as IAA (64%) & Salicylic acid (23.6%) was also up-regulated over control. The root exudates of HpaG primed seedling compounds was reported to initiate defense response in plants.

4. Management of water logging associated soil problem in the rice ecosystem of Cauvery delta zone of TamilNadu

To rectify the water logging associated problem in the clay soils of delta region of Tamil Nadu, application of gypsum @500 kg ha⁻¹ + cono-weeding (twice) +AWDI (10.37%) and microbial consortia @ 500mlha⁻¹ is recommended. This treatment increased the yield upto 20.6 % than individual treatments *i.e* application of gypsum @500 kg ha⁻¹ alone.

5. Permanent manurial experiment in rice based cropping system

In Aduthura centre, after 30 years of continuous rice cropping (60 crops) showed positive balance of available NPK & higher OC (13.84 g kg⁻¹) in INM plots. Higher soil carbon pools (Labile & Water soluble C) and Dehydrogenase enzyme activity along with higher yield (6285 kg ha⁻¹) was registered with the application of 125:50:50 kg NPK + GM @ 6.25 t + 500 kg Gypsum ha⁻¹ in Kuruvai while in Thaladi,

addition of 150:60:60 kg NPK +12.5 t FYM + 500 kg Gypsum ha⁻¹ recorded the higher grain yield (6632 kg ha⁻¹).

6. Fertilizer Prescription Equations (FPEs) for Kadambady soil series in Tiruvallur Dt.

The validity of the fertilizer prescriptions were confirmed from the study. STCR-IPNS for an yield target of 7 t ha⁻¹ recorded the highest grain yield (6.74 t ha⁻¹), Response Ratio (11.82 kg kg⁻¹) and BCR (2.33). Increase in yield due to STCR-IPNS for a target of 7 t ha⁻¹ was 24.8% over blanket + FYM @ 12.5 t ha⁻¹ and 56.7% over farmer's practice.

7. Long term STCR-IPNS experiment on rice-rice sequence

After 24 years of cropping with STCR-IPNS technology, maintenance of available N (280 to 269 kg ha⁻¹), built up in SOC (4.6 to 8.6 g kg⁻¹) and available P (20.2 to 28.9 kg ha⁻¹) and Lesser magnitude of decline in available K (670 to 585 kg ha⁻¹) were observed. An increase in yield by 26 % (6.85t ha⁻¹) and 24 % (6.05 t ha⁻¹) in *kharif* and *rabi* seasons, respectively over blanket was recorded.

8. Permanent Manurial Experiment on Rice

The permanent manurial experiment on rice for 37 years at Madurai showed that, integrated application of GLM @ 6.25 t ha⁻¹ in conjunction with recommended dose of N, P₂O₅ and K₂O @ 150: 50: 50 kg ha⁻¹ recorded the highest grain yield of rice (5675 kg ha⁻¹). A positive balance of available P has been observed irrespective of the treatments except control (+1.6 to 29.8 kg ha⁻¹).

9. Enhancing phytolith and phytolith occluded carbon on carbon sequestration in rice ecosystems.

The rice variety CO 50 recorded the highest grain yield (6342 kg ha⁻¹), phytolith (19.12 & 1.44%), PhytoC (2.44 & 1.04%) in stem and grain, respectively. Application of 150: 50:50 kg NPK + 200 kg Silicon as 2 t Calcium silicate ha⁻¹ (6089 kg ha⁻¹) increased the yield by 18.99 % over RDF and carbon sequestration rate (213.57 kg e-CO₂ ha⁻¹).

10. Zn Lysinate for Semidry rice in Coastal soils of Ramanathapuram Dt.

STCR based NPK @ 75:19:37.5 kg ha⁻¹ + 2.5 kg zinc lysinate ha⁻¹ as soil application + 0.20% foliar spraying twice (AT & PI stage) has recorded the highest grain yield (3592 kg ha⁻¹), BCR (2.37) and Nutrient uptake. And Sowing at first fortnight of October has recorded the highest grain yield of 3410 kg ha⁻¹.

11. Bioinoculants consortium for developing coated Rice seeds

NPK consortium: Azospirillum (N), Phosphobacteria (P) and K-bacteria (K)

NPKZn consortium: Azospirillum (N), Phosphobacteria (P) and K-bacteria (K)+ Zn solubilizing bacteria (Zn). Both consortia maintained an average of 108 cells /ml of individual strains up to 15 months under refrigerated conditions. Maintenance of

microbial population on seed upto 10^4 per seed was achieved and higher germination (14%) and vigor index (25%) over un-inoculated control was recorded.

d). **Action Plans proposed for 2022-23**

1. Action Plan 1: Demonstration of STCR-IPNS based fertilizer Prescription for Rice in Southern Zone of Tamil Nadu (Phase III)

Rationale

- Avoids over or under usage of fertiliser inputs
- Ensures site specific & balanced nutrient supply
- Nutrient requirement of the crop, nutrient contribution from soil, fertilizer and organic manure are taken care of.
- Efficient fertilizer use and sustained soil health and productivity

Objective

To demonstrate the benefits of STCR-IPNS technology

Period: 2022-23

Treatments

- T1: Blanket recommendation
- T2: STCR – IPNS based fertilization prescription
- T3: Farmer's Fertilization Practice

Soil Type :Manakkarai soil series (AC&RI, Killikulam)
Madukkur Soil series (AC&RI, Madurai)

Observations to be recorded

Grain Yield & Initial and post-harvest soil fertility status

Computed parameters

Percent achievement, Response Ratio & BCR
Duration : 1 Year (2022-2023)

Locations and Scientists involved

Team Leader : Dr. R. Santhi, Professor (SS&AC)

Lead centre :

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

Co-ordinating centres

AC&RI, Madurai :Dr.S. Sheeba, Prof (SS&AC)
AC&RI, Killikulam: Dr.D.Leninraja, AP(SS&AC)

Action Plan 2: Evaluation of Skipping of Phosphorus on rice productivity in High P status soil

Rationale

- Continuous application of P and built up of available P
- Skipping of P results in grain yield reduction to the tune of 3.0-3.5%
- Test verification under high P status soils

Objective

- To assess the impact of skipping of fertiliser P on rice yield

Treatments

- T1 : Absolute control
- T2 : Blanket NPK + GLM @ 6.25 t ha⁻¹
- T3 : Blanket NPK + FYM @ 12.5 t ha⁻¹
- T4 : Blanket N and K₂O + GLM @ 6.25 t ha⁻¹
- T5 : Blanket N and K₂O + FYM @ 12.5 t ha⁻¹
- T6 : STCR- IPNS N, P₂O₅ and K₂O
- T7 : STCR-IPNS N, P₂O₅ and K₂O (Maintenance dose of P₂O₅)

Note : Second crop : Only N and K₂O (T2 to T7) / Soil P status : 30 - 40 kg ha⁻¹

Duration : 2 Years (2022 - 2024)

Design : RBD Replications : 3

Observations to be recorded

Grain and Straw yield

Lab analysis: Initial EC, pH, available NPK, Micronutrients, NPK uptake at harvest stage and

Post harvest soil available NPK

Locations and scientists involved

Lead centre : Dept. of Soils and Environment, AC&RI, Madurai

Dr. P. Saravana Pandian, Professor & Head (S&E)

Co-ordinating centres

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

AC&RI, Killikulam: Dr.D.Leninraja Asst.Prof (SS&AC)

Action Plan 3: Management of multi-nutrient disorder in Rice

Rationale

- Continuous application under water logging especially in the pishanam season induced yellowing in rice and yield reduction.
- Changes in the redox status induced the reduction in available nutrients besides imbalance nutrient ratios

Objectives

- To demonstrate/ elucidate the management technology for mitigating multi-nutrient disorder (pishanam season) due to continuous cultivation of wetland rice

Treatments:

T1 : STCR-NPK alone

T2 : STCR-NP + 125 % K as per STCR

T3 : STCR-IPNS

T4 : T1 + Foliar 0.25 % CuSO₄ + 0.5 % ZnSO₄

T5 : T2 + Foliar 0.25 % CuSO₄ + 0.5 % ZnSO₄

T6 : T3 + Foliar 0.25 % CuSO₄ + 0.5 % ZnSO₄

T7 : T1 + Foliar 1% MgSO₄ + 0.25 % CuSO₄ + 0.5 % ZnSO₄

Duration : 2 Year (2022-2024)

Soil Type :Clay and Sandy Clay Loam

Observations to be recorded

Grain and Straw Yield &

Initial and post-harvest soil fertility status

Locations and Scientists involved

Lead Centre :Dr.S.Jothimani, Professor (SS&AC),
Department of SS&AC, AC&RI, Killikulam

Co-ordinating centres

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

ADAC&RI, Trichy :Dr. D. Janaki, Assistant Professor (SS&AC)

ARS, Thirupathisaram :Dr.M. Paramasivan, Asst. Prof.(SS&AC)

Project wise remarks

LIST OF PROJECTS - RICE

S. No.	Title of the Project	Period	Name and designation of the Project leaders	Remarks
OFT for Adoption– Microbiology - Madurai				
1.	OFT 1. - Evaluation of Functional Microbial consortium for the enhancement of Rice Productivity under varying methods of establishment	2021-2022	Lead centre : Dr. K. Kumutha Professor and Head Dept. of Agrl. Microbiology Co-ordinatingcentres MADURAI :Dr.K.Kumutha&Dr.M.Jeya bharathi ADUTHURAI : Dr. T.Sivasankari Devi CSRC, RAMNAD: Dr.J.Prabakaran AC & RI, KILLIKULAM: Dr.B.JeberlinPrabina	<ul style="list-style-type: none"> • Results may be given for adoption • Dosage and method of application may be included • Justification for nutrient balance may be added • Centre wise data may be pooled and analysed
a. Action Plan Projects				
Soil Science &Agrl. Chemistry				
1.	Coimbatore Demonstration of STCR-IPNS based fertiliser Prescription for rice in Cauvery Delta Zone (Phase II)	One year (2021-2022)	Team Leader: Dr. R. Santhi , Director (DNRM) & Professor (SS&AC) Lead centre: Department of SS&AC, TNAU, Coimbatore (coordinating the demonstrations) Dr.S.Maragatham,	<ul style="list-style-type: none"> • Provide reclamation detail andsodic soil characteristics of Trichy location • Location wise percentage achievement may be given

S. No.	Title of the Project	Period	Name and designation of the Project leaders	Remarks
			Professor (SS&AC) & STCR scheme in-charge; Co-ordinating centres Dr.K.Sathiyabama , Assoc. Professor (SS&AC), TRRI, Aduthurai, Dr.D.Janaki , Assistant Professor (SS&AC) ADAC&RI, Trichy	<ul style="list-style-type: none"> Action plan in similar mode may be proposed for southern zone
2	Killikulam Optimization of Boron Fertilization for Rice	2021-2022	Dr. S. Suresh Professor and Head (SS&AC) Department of Soil Science and Agricultural Chemistry Dr. D. Lenin Raja Asst. Professor (SS&AC) Department of Soil Science and Agricultural Chemistry	<ul style="list-style-type: none"> May be given for information OFT may be Proposed in Boron deficit soil and Second season may be preferred
Agri.Microbiology				
1.	Coimbatore Action plan no.7 Field evaluation of <i>Bacillus altitudinis</i> FD48 for moisture stress tolerance, crop growth and yield in rice.	2020-2021	Implementing centre Dr.U.Sivakumar Professor (Agri.Microbiology), AGM, TNAU,Cbe. Dr.M.Gnanachitra ,	<ul style="list-style-type: none"> Results may be given for adoption Centre wise data on soil type, variety and yield may be given

S. No.	Title of the Project	Period	Name and designation of the Project leaders	Remarks
			Professor (AGM), TNAU, Cbe. Coordinating centres Dr.T.SivasankariDevi ,Asst. Professor (AGM), TRRI, Aduthurai Dr.M.Jayabharathi , Asst.Professor (AGM), AC & RI, Madurai. Dr.S. Muthuram , Asst.Professor (PBG), ARS,Paramakudi..	<ul style="list-style-type: none"> • Time and dose of application and survival and activeness of inoculum may be given
2.	Action plan no. 3 :Harpin, a protein-based smart formulations for defense priming and health in rice.	2021-2023	Dr.U.Sivakumar Professor (Agrl. Microbiology), AGM, TNAU,,Cbe. Dr.R.Arul Professor (Biotechnology), CPMB, TNAU, Cbe. Dr. Gopalakrishnan Professor of Plant Pathology, TNAU, Coimbatore	<ul style="list-style-type: none"> • Results may be given for information • Project may be continued

S.No	Title of the project	Scientist involved	Duration	Remarks
	b. University Research Projects			
	Soil Science & Agrl. Chemistry			
	Aduthurai			
1	NRM/ADT/SAC/RIC/2017/001: Permanent Manurial experiment in rice based cropping system.	Dr. K. Sathiyabama Associate Professor (SS&AC) TRRI, Aduthurai	Apr. 2017 to Mar.2022	<ul style="list-style-type: none"> • Interim completion report and continuation proposal for obtaining new project number to be submitted • RDF may be followed as per Crop production guide • Action plan may be proposed for skipping P in the fertilizer recommendation in coordination with Dept. of soils and Environment, AC&RI, Madurai • May be given for information
2	NRM/ADT/SAC/RIC/2020/001 : Management of water logging associated soil problem in the rice ecosystem of Cauvery delta zone of Tamil Nadu	Dr. K. Sathiyabama, Assoc. Professor (SS&AC) Dr. S. Elamathi, Asst. Professor (Agronomy) Dr. T. Sivasankari Devi, Asst. Professor (AGM) Dr. A. Anuratha, Asst. Professor (SS&AC),	July 2020 to June 2022	<ul style="list-style-type: none"> • As objectives are fulfilled completion report may be submitted • Results may be proposed for on farm trial (OFT)

S.No	Title of the project	Scientist involved	Duration	Remarks
		KVK,Needamangalam		
Coimbatore				
3.	NRM/ CBE/ SAC/ RIC/ 2020/ 001: Refinement of Existing STCR based IPNS fertilizer prescription for desired yield target of Rice in North Eastern Zone of Tamil Nadu	Dr. S. Maragatham Assoc. Prof. (SS&AC), Dr. S. Suganya AP (SS&AC), TNAU- I&TC, Chennai Dr. V. Arunkumar AP (SS&AC), AC&RI, VVNR Overall Coordination Dr. R. Santhi Director (NRM) & Prof. (SS&AC)	Aug, 2020 to July, 2022	<ul style="list-style-type: none"> Experiments in all the centres are completed May be proposed for OFT
Madurai				
4	NRM/MDU/SAC/RIC/2020/001:Permanent Manurial Experiment on Rice	Dr. P. SaravanaPandian Professor (SS&AC), AC&RI, Madurai	Oct 2020 to Sep 2025	<ul style="list-style-type: none"> Action plan may be proposed for skipping P in the fertilizer recommendation on high P soils A Compendium on PME may be prepared at the earliest
5	NRM/MDU/SAC/RIC/2017/001Optimization 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 Professor and Head Department of Soils and Environment AC&RI, Madurai-104	2017-2019 Dec 2021to March 2023 (Extension Period)	<ul style="list-style-type: none"> Project may be continued as per the technical programme
6	NRM/MDU/SAC/RIC/2018/001: Enhancing phytolith and phytolith	Dr. P. Christy Nirmala Mary	August 2018 –	<ul style="list-style-type: none"> Given for information The project may be closed and

S.No	Title of the project	Scientist involved	Duration	Remarks
	occluded carbon on carbon sequestration in rice ecosystems.	Associate Professor (SS&AC), AC&RI, Madurai	December 2021	completion report to be submitted
	Killikulam			
7	NRM/KKM/SAC/RIC/2021/001: Development of critical level based nutrient management for Rice in Tamiraparani command area	Dr.S.Jothimani Professor (SS & AC)	November, 2020 to October, 2023	<ul style="list-style-type: none"> Project may be continued as per the objectives for brining out valid information
8	NRM/ RMD/SSAC/ RIC/ 2021/001 Alleviation of zinc deficiency under abiotic stress conditions with aminoacid encapsulated Zn fertiliser in Semidry rice for the Coastal soils of Ramanathapuram district	Dr. J. Prabhakaran Asst. Professor(SS&AC) Dr. K. Senthil Asst. Prof.(Agrl. Chem.) Dr. T. Ragavan Professor and Head CSRC, Ramanathapuram	January 2021 to March 2023	<ul style="list-style-type: none"> The findings may be given for information Project may be continued
	Agri. Microbiology			
	Coimbatore			
9.	NRM/CBE/AGM/RIC/2020/001 Exploring bioinoculants for developing coated seeds for enhanced nutrient uptake in Rice	PI: Dr.M.Gnanachitra Professor (Microbiology) Co-PI: Dr.D.Balachandar Professor (Microbiology)	November 2019 to October'20 21	<ul style="list-style-type: none"> The findings may be given for information The project may be closed and completion report to be submitted
	Killikulam			
10.	NRM/KKM/AGM/RIC/2021/001 Microbial synthesis of Zinc nanospheres to enhance Zinc use	Dr. M. Gomathy Asst. Prof. (Agrl. Microbiology)	August 2021 to July 2023	<ul style="list-style-type: none"> The findings may be given for information The ZSB culture may be included as

S.No	Title of the project	Scientist involved	Duration	Remarks
	efficiency in rice	Dept. of SS & AC, AC & RI, Killikulam		one of the treatments • Project may be continued
	c. AICRP Projects			
1	AICRP/NRM/CBE/SAC/002 AICRP on Soil Test Crop Response: Long term STCR-IPNS Experiment on rice-rice sequence.	Dr. S.Maragatham Associate Professor (SS&AC) Dr. M.Gopalakrishnan Asst. Professor (SS&AC) Dr. R.Rajeswari Asst. Professor (SS&AC)	• Continuous project	• To be continued as per the programme
d. Students' Thesis work				
Agri. Microbiology - Coimbatore				
1.	Development of AMF -based microbial inoculant package for aerobic/semi dry rice: Understanding the mechanism of action by metabolomic, proteomic and transcriptomic analyses	Dr. U. Sivakumar Professor(AGM) Dept. of Agri Microbiology, Coimbatore Dr. Akihiko Kamoshita Associate Professor Asian Research Centre for Bioresources and Environmental Sciences The University of Tokyo	2021-2023	• May be given for information

Directorate of Seed Centre

I. Plan of work for Action plan project 2022-23

Sl. No.	Work plan 2022-23	Scientist in-charge	Remarks
Action Plan Project			
1	Assessment on morphological characters and seed storage potential of traditional rice varieties (2019-20 to 2021-22)	<p>Coimbatore centre Dr. K. Raja Professor (SST) Dr.D.ThirusenduraSelvi Asst. Prof. (SST) DSST, Seed Centre TNAU, Coimbatore</p> <p>Dr. K. Amutha Asst. Prof. (PBG) Dept. of Rice CPBG, TNAU, Coimbatore (2020-22)</p> <p>Madurai centre Dr. R. Geetha Professor (SST) DSST, AC & RI, Madurai (2020-22)</p> <p>Trichy centre Dr. T. Eevera Asst. Prof. (SST) ADAC & RI, Trichy</p> <p>Aduthurai centre Dr.N.Punithavathi Assoc. Prof. (SST) HC&RI (W), Trichy</p>	<ul style="list-style-type: none"> • The project may be completed. • The findings of the project may be given for information.
University Research Project			
1	SEC/TKM/SST/RIC/2019/001 Estimating effects of high temperature on yield and seed quality traits in rice (November 2019 to October 2022)	Dr. M. Bhaskaran Professor & Head Dr. S. Banumathi Assoc. Prof.(CPBG) RRS, Tirur	<ul style="list-style-type: none"> • The project may be completed. • Publication may be made in NAAS rated journals.

2	SEC/BSR/SST/RIC/2019/002 Assessment of storage potential of TNAU rice varieties under seed chain (February 2020 to April 2023)	Dr.V.Vakeswaran Asst. Prof. (SST)	<ul style="list-style-type: none"> • The project may be continued. • Publication may be made in NAAS rated journals.
Externally Funded Scheme			
1	Implementation of PVP Legislation through DUS testing under ICAR and SAU Systems (April 2003 to till date)	Dr.R.Jerlin Professor & Head Dr.R.Vigneshwari Asst. Prof. (SST)	<ul style="list-style-type: none"> • The project may be continued. • Publication may be made in NAAS rated journals.
AICRP			
	AICRP/STR/CBE/SEP/001 AICRP on NSP Crops Seed Technology Research, Seed Centre, Coimbatore Evaluation of effect of revalidation on seed vigour and performance in rice (July 2021 to June 2023)	Dr. C. Vanitha Asst. Prof. (SST)	<ul style="list-style-type: none"> • The project may be continued. • Publication may be made in NAAS rated journals.

III. CROP PROTECTION

The review of the University Research Projects pertaining to crop protection in rice was conducted at the Seminar Hall of the Department of Agricultural Entomology on 08.04.2022.

PRESENT:

1. Dr. K. Prabakar, Director, CPPS & RPAC Chairman
2. Dr. S.V. Krishnamoorthy, Prof. & Head, Dept. of Agrl. Entomology & RPAC Member
3. Dr. V. Ambethgar, Director, TRRI, Aduthurai
4. Dr. G. Karthikeyan, Professor and Head, Department of Plant Pathology & RPAC Member
5. Dr. A. Shanthi, Professor and Head, Department of Nematology & RPAC Member

The following University Officers attended the review online.

1. Dr. N. Muthukrishnan, Dean-in-charge, AC&RI, Vazhavachanur
2. Dr. S. Palpandi, Dean, AC&RI, Madurai
3. Dr. I. EraivanArutkani Ayyanathan, Dean, AC&RI, Killikulam
4. Dr. A. Velayutham, Dean-in-charge, AC&RI, Eachankottai

The list of Scientists who have attended the review is given below.

AGRICULTURAL ENTOMOLOGY

In person
1. Dr. S. Jeyarani, Professor (Ento.) & RC, Dept. of Entomology, TNAU, CBE
2. Dr. P. Anandhi, Asst. Professor (Ento), Lead Scientist, TRRI, Aduthurai
3. Dr. S. Jeyarajan Nelson, Professor (Ento.), Dept. of Entomology, TNAU, CBE
4. Dr. K. Bhuvanewari, Professor (Ento.), Dept. of Ento. TNAU, Coimbatore
5. Dr. E. Sumathi, Assoc. Professor (Ento.), Dept. of Entomology, TNAU, CBE
6. Dr. R. P. Soundararajan, Assoc. Prof. (Ento.), Dept. of Ento, TNAU, CBE
7. Dr. SheelaVenugopal, Asst. Pro. (Ento.), Dept. of Rice, TNAU, CBE
8. Dr. A. Suganthi, Asst. Professor (Ento.), Dept. of Ento, TNAU, CBE
Online (Campus/Station/KVK)
1. Dr. M. Shanthi, Professor and Head, Dept. of Entomology, AC &RI, Madurai
2. Dr. C.Gailce Leo Justin, Prof.& Head, Dept. of Crop Prot, ADAC&RI, Trichy
3. Dr. V. Ravi, Professor and Head, Dept. of Entomology, AC&RI, Killikulam
4. Dr. Abdul Razak, Professor(Entomology), AC&RI, Killikulam
5. Dr. G. Srinivasan, Professor (Entomology), AC&RI, Madurai
6. Dr. A. KalyanaSundarm, Professor (Entomology), ADAC&RI, Trichy
7. Dr. Y.S. Johnson Edward, Professor (Entomology), AC&RI, VVNR
8. Dr. N. Balakrishnan, Assoc. Professor(Entomology), AC&RI, Killikulam
9. Dr. K. Ganesan, Asst. Professor, ARS, Bhavanisagar
10. Dr. B. Usharani, Asst. Professor (Entomology), KVK, Madurai
11. Dr. Sheeba Jasmine, Asst. Professor (Entomology), KVK, Sirugamani
12. Dr. M. Ravi, Asst. Professor (Entomology), AC&RI, Killikulam
13. Dr. V. A. Vijayashanthi, Asst. Professor (Entomology), KVK, Tirur
14. Dr. Sheeba Joyce Rosleen, Asst. Professor (Entomology), KVK, SRS, Trichy

Plant Pathology

In person
1. Dr. Dr. C. Gopalakrishnan, Professor, Dept. of Plant Pathology, TNAU, Coimbatore
2. Dr. A. Kamalakannan, Professor, Dept. of Plant Pathology, TNAU, Coimbatore
3. Dr. A. Ramanathan, Dept. of Plant Pathology, TNAU, Coimbatore
4. Dr. K. Rajappan, Professor, Tamil Nadu Rice Research Institute, Aduthurai
5. Dr. R. Ramjagathesh, Asst. Prof., Rice Research Station, Ambasamudram
Online (Campus/Station/KVK)
1. Dr. N. Revathy, Professor, AC & RI, Madurai
2. Dr. M. Deivamani, Asst. Prof., AC &RI, Vazhavachanur
3. Dr. N. Rajinimala, Asst. Prof., Dept. Plant Pathology, AC&RI, Killikulam
4. Dr. K. Kalpana, Asst. Prof., Dept. of Plant Pathology, AC&RI, Madurai
5. Dr. V. K. Satya, Asst. Prof. Dept. Plant Pathology, ADAC&RI, Trichy
6. Dr. S. Mathizhahan, AsstProf. AC & RI, Eachankottai
7. Dr. S. Kavitha, Asst Prof , KVK, Thirupathisaram

CROP PROTECTION

A. RESULTS FOR ADOPTION, OFT AND INFORMATION

I. Technology for Adoption

- **Sequential application of insecticides alone** viz., Chlorantraniliprole 0.4G @ 10 kg/ha at 25 DAT, cartap hydrochloride 50 SP @ 1.0 kg/ ha at 50 DAT and Fipronil 5 SC @ 1000 ml/ha at 60 DAT (or) **Combined application of botanicals and Insecticide** viz., Azadirachtin 10,000 ppm @ 1000ml/ha at 25 DAT, Chlorantraniliprole 0.4G @ 10 kg/ha at 45 DAT and Neem oil 1% @ 10 lit/ha at 60 DAT effectively suppressed the major pests of rice with the highest cost benefit ratio of 2.35 and 2.07.

Plant Pathology

A. Technologies for Adoption/OFT/Information

I. Technology for Adoption

- **1. Newer molecules for the management of false smut disease in rice**
- Foliar spraying of Azoxystrobin 7.1% + Propiconazole 11.9 % W/W SE @ 500 ml/ha at tillering and early booting stages was found to be significantly effective in reducing false smut disease and increasing the grain yield significantly with a C:B ratio of 1:2.01.
- **Recommendation:** Foliar spraying of Azoxystrobin + Propiconazole @ 500 ml/ha at tillering and early booting stages is recommended for the management of false smut in rice.

II. Technology for OFT

OFT 1: IPM capsule for Rice Gall Midge

Treatment:

1. T1- IPM capsule
 - Early sowing –July
 - Nursery Application of Fipronil 0.3 G @ 2 kg/ 8 cent 5 days before transplanting
 - Azadirachtin 300 ppm at 2500 ml/ha on 25 DAT and Fipronil 0.3 G @ 20 kg/ha on need basis
2. T2- Farmers' practice
3. T3-Untreated check

Plot size : 1500 sqm (divide each plot in 500 sq.m area into 10 sub-plots of 50 sq.m)
Design : RBD
Treatments : Three
Replication : 10
Season : *Samba* season

Centers to be involved:

TRRI, ADT : Dr. P. Anandhi, Asst. Professor (Entomology)
TNAU, CBE : Dr. SheelaVenugopal, Asst. Professor (Entomology)
AC & RI, ECK : Dr. V.G. Mathirajan, Assoc. Professor (Entomology)
AC & RI, MDU : Dr. B. Usharani, Asst. Professor (Entomology)

Observations

- In each sub-plot, mark 5 hills at random and record observations on no. of tillers, no. of silver shoots, no. of parasitized silver shoots starting from 15 DAT at weekly intervals upto grain formation stage
- Yield/plot

Plant Pathology

OFT 1: Eco - friendly management of blast and sheath blight diseases of rice (Contd.)

Treatments

1. T₁ - Seed treatment with *B. subtilis*(Bbv57) @ 10 g/kg + 75 % RDF + Soil incorporation of Daincha @ 6.25 t/ha and SA of *B. subtilis*(Bbv57) @ 2.5 kg/ha + Need based spraying of Zineb + Hexaconazole @ 0.25 %
2. T₂ - Soil incorporation (*in situ*) of Daincha 6.25 t/ha + ST @ 10 g/kg and SA of *B. subtilis* (Bbv57) @ 2.5 kg/ha + spraying of Neem oil 3.0 %
3. T₃ - Farmer's practice

Design : RBD
Replications : 7
Season : Rabi

Centres to be involved:

RRS, Ambasamudram [MS]* : Dr. N. Rajinimala, Asst. Professor (Plant Pathology)

TNAU, Coimbatore : Dr. C. Gopalakrishnan, Professor (Plant Pathology)

AC&RI, Killikulam : Dr. M. Paramasivan, Asst. Professor (Plant Pathology)

RRS, Tirur : Dr. S. Malathi, Asst. Professor (Plant Pathology)

KVK, Thirupathisaram : Dr.S. Kavitha, Asst. Professor (Plant Pathology)

* MS-Monitoring Scientist

Observations: Severity of blast and sheath blight, yield, residue analysis (CBE Centre alone) and CB ratio

OFT 2: Management of bacterial leaf blight (BLB) of rice

Treatments

T₁ - Foliar spraying of Copper hydroxide 77 WP (1.25 kg/ha) (two sprays at 15 days interval)

T₂ - Seed treatment with *Bacillus subtilis* (Bbv57) (10 g/kg) + foliar spray 0.5 % (two sprays at 15 days interval)

T₃ - Farmer's practice

Design : RBD

Replications : 7

Season : Rabi

Centres to be involved:

AC&RI, Madurai [MS]* : Dr. N. Revathy, Professor (Plant Pathology)

TRRI, Aduthurai : Dr. K. Rajappan, Professor (Plant Pathology)

ADAC&RI, Trichy : Dr. M. Rajesh, Asst. Professor (Plant Pathology)

AC&RI, Killikulam : Dr. J. Sheela Professor (Plant Pathology)

RRS, Tirur : Dr. S. Malathi, Asst. Professor (Plant Pathology)

RRS, Ambasamudram : Dr. N. Rajinimala, Asst. Professor (Plant Pathology)

* MS-Monitoring Scientist

Treatment spraying: Immediately after observing the initial symptoms

Observations: Bacterial leaf blight severity, yield, residue analysis (TRY Centre alone) and CB ratio

OFT 3: Management of Blast and Brown spot diseases through newer molecules

Treatments

T₁ - Foliar spraying of Azoxystrobin 18.2% W/W + Difenoconazole 11.4% W/W SC @ 1 ml/lit at the time of symptom appearance

T₂ - Foliar spraying of Zineb 0.25 % + Hexaconazole @ 0.25 % at the time of symptom appearance

T₃ - Farmer's practice

Design : RBD

Replications : 7

Season : Rabi

Centres to be involved:

TNAU, Coimbatore [MS]* : Dr. A. Ramanathan, Professor (Plant Pathology)

ADAC&RI, Trichy : Dr. V. K. Sathya, Asst. Professor (Plant Pathology)

RRS, Tirur : Dr. S. Malathi, Asst. Professor (Plant Pathology)

AC&RI, Eachankottai : Dr. K. Mathiazhahan, Asst. Professor (Plant Pathology)

RRS, Ambasamudram : Dr. N. Rajinimala, Asst. Professor (Plant Pathology)

* MS-Monitoring Scientist

Treatment spraying: At initial appearance of the symptoms and 15 days later

Observations: Blast and brown spot severity, yield, residue analysis (CBE Centre alone) and CB ratio

III. For Information

1. Yellow stem borer (YSB) was maximum during February and March (Aduthurai and Coimbatore), September (Bhavanisagar) and October (Tirur). Maximum catch of YSB males in the pheromone trap coincided with maximum catch of females in the light trap (AC & RI, VVNR).
2. Leaf folder was maximum during March (Coimbatore) and January (Aduthurai). Brown plant hopper was maximum during January (Aduthurai), August and September (Bhavanisagar). GLH was maximum during December-February (Bhavanisagar) and in August (Aduthurai). Mite population was high in summer and low in Rabi at Aduthurai and Coimbatore.
3. Stem borer incidence was positively correlated with minimum temperature and relative humidity. Green leaf hopper and brown plant hopper were negatively correlated with minimum temperature and the former was positively correlated with rainfall while the latter was positively correlated with sunshine.
4. Out of 83 MLT entries artificially screened for BPH in two centres, two entries *viz.*, MLT 21- 502 (ACM 20003) and MLT 21-609 (TR 15045) showed resistance and MLT 21 – 103 (ACK 12026) and MLT 21-407 (AD 16135) showed moderate resistance for BPH.
5. Volatile and non-volatile compounds contributing resistance to Yellow stem borer was identified. Volatile compounds absent in the resistant entries were oxalyl chloride, acetyl chloride and those present in the resistant entries were pregnane- [4-methyl-3-oxo- diacetate, (Z)-Difluorodiazene, Heptasiloxane –tetradecamethyl.

6. Thiamethoxam was less persistent in paddy crop. Chlorantraniliprole was highly persistent (adhered to rice bran) and cooking removed chlorantraniliprole residues below quantifiable limits. In pre storage seed treatment with thiamethoxam 30 FS - residues persisted upto one year (above MRL of 0.02 mg /kg).
7. Out of 116 paddy samples from 24 districts analyzed , none of the samples had residues above MRL.
8. Application of Azolla @ 25 kg/ha in early stage of the crop, lemon grass as bund crop, Neem oil (3%) as foliar spray on 10, 30, 60 DAT and need based application of Chlorantraniliprole 18.5% SC @ 150 ml/ ha waseffective in managing Black bugs, Whorlmaggot and Hispa.

Plant.Pathology

1. Sheath rot, false smut and bacterial leaf blight were the re-emerging diseases during 2021-22 in Tamil Nadu.
2. Correlation of weather parameters with pest incidence showed that the intensity of blast, BLB and false smut were positively correlated with relative humidity and wind speed.
3. The MLT entries *viz.*, MLT 102, 203, 311 and 316 were resistant to leaf blast and MLT 603 was resistant to brown spot under artificial screening.
4. There was a significant increase in the leaf thickness and silica content. Presence of small scattered and ladder like structure of silica bodies in silicol @ 0.6 per cent (2 sprays at 7 days interval treated rice (CB 15714) plants.
5. A rapid highly sensitive and specific LAMP assay was developed for early detection of rice seed borne pathogens *viz.*, brown spot, sheath rot and bacterial leaf blight pathogens and air borne pathogens *viz.*, blast, and brown spot and false smut pathogens.
6. Solar operated impaction and suction spore traps were designed for sampling of air borne inocula of blast, brown spot and false smut pathogens.
7. Using suction spore traps, presence of even 10 pg of rice brown spot pathogen and 1 pg of blast pathogen airborne inoculums were detected.
8. Inoculums' based foliar spraying with Azoxystrobin @1 ml/lit + Tricyclazole @ 1 ml/lit at 41st and 43rdstd weeks recorded the lowest intensity of blast and brown spot diseases and 48th and 50th std week for false smut disease.
9. Artificial inoculation technique was optimized for false smut disease by spraying and injection of fungus spore suspension.
10. Spraying of *Phyllanthusniruri* aqueous extract @ 10% has recorded the lowest per cent disease index (8.55) of bacterial leaf blight with the yield of 5800 kg/ha against untreated control (32.57 PDI, 3500 kg/ha).

11. Spherosphere bacterial antagonists viz., SPKKM 4 (Navara), SPKKM 2 (Mappillaisamba isolate 1), SPKKM 5 (Navara black), SPKKM 18 (Kavuni), SPKKM 9 (Mallikar) and SPKKM 32 (ADT 44) were effective against *Bipolaris oryzae* in vitro.
12. IDM package (Selection of variety – ADT 45, seed treatment (10 g/kg) + seedling dip (500 g/ha) + soil application (2.5 kg/ha) of *Bacillus subtilis* (Bbv57), cultural practices (Cleaning of weeds in bunds), Nutrient management- soil application of daincha @ 6.25 t/ha + recommended dose of fertilizers with split application and need based spraying of Picoxystrobin 6.78% + Tricyclazole 20.33% SC @ 1 ml/lit) reduced rice blast disease intensity.
13. Foliar spraying of copper hydroxide 77 WP @ 25 g/lit along with streptomycin sulphate @ 150 ppm and foliar spraying of copper hydroxide 77 WP @ 25 g/lit along with potassium nitrate @ 5 g/lit at initial appearance of the disease symptom and second spray at 15 days later recorded the lowest intensity of bacterial leaf blight and increased grain yield.

B. Action plan (2022-2023)

1. Agricultural Entomology

Theme Areas:

1. Prediction of changing insect pest scenario in rice ecosystems
2. Exploring insect resistance mechanisms
3. Efficacy of bio-products for management of earheadbug of rice (new)
4. Species complex, population dynamics and yield loss due to stem borer in rice

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

Theme leader	Dr. N.Chitra, Professor (Entomology) <u>Coordination at State level-TNAU, CBE*</u>			
Activity	Name of the Scientist and Centre		Observations to be recorded	Deliverables/ expected outcome
<ul style="list-style-type: none"> • Monitoring pest status and keeping vigilance on emerging pests • Assessment of 	Zone	Roving survey	Fixed plot survey	<ul style="list-style-type: none"> • Fixed and roving survey on pest incidence. • Recording Forewarning on emerging pests and pest management decisions
	North			
	<u>KVK, Tirur</u>	√		

<p>insect pest, mites and natural enemies population <i>in situ</i>.</p> <ul style="list-style-type: none"> • Impact of light trap on non-target arthropods wherever available • Fixed plot survey at weekly interval in all the identified centres • Roving survey at fortnightly interval in all the identified districts during the district specific crop seasons • Uploading of data in Google forms 	<p>Dr.R.A.Vijayashanthi, Asst. Professor (Ento.)</p> <table border="1"> <tr> <td><u>RRS, Paiyur</u></td> <td></td> <td>√</td> </tr> </table>	<u>RRS, Paiyur</u>		√	<p>of weather parameters</p> <ul style="list-style-type: none"> • Multiple correlation and regression analysis with previous years weather data and pests damage and population data * will consolidate the monthly data, make assessment of the pest scenario and submit state report o/b 25th of the month to the Department. 	<p>Intervention with suitable IPM package</p> <p>Monthly documentation of pest status in the major tracts</p>				
	<u>RRS, Paiyur</u>		√							
	<p>Dr. K. Govindan, Asst. Professor (Ento.)</p> <p>West</p> <table border="1"> <tr> <td><u>TNAU, CBE</u></td> <td></td> <td>√</td> </tr> </table>	<u>TNAU, CBE</u>		√			<p>Dr.SheelaVenugopal, Asst. Professor (Ento.)</p> <table border="1"> <tr> <td><u>ARS, BSR</u></td> <td>√</td> <td>√</td> </tr> </table>	<u>ARS, BSR</u>	√	√
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	<p>Dr. K. Ganesan, Asst. Prof. (Ento.)</p> <p>Cauvery Delta/East</p> <table border="1"> <tr> <td><u>TRRI, ADT</u></td> <td></td> <td>√</td> </tr> </table>	<u>TRRI, ADT</u>		√			<p>Dr. P. Anandhi, Asst. Prof (Ento.)</p> <table border="1"> <tr> <td><u>KVK, Sirugamani</u></td> <td>√</td> <td></td> </tr> </table>	<u>KVK, Sirugamani</u>	√	
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	<p>Dr.Sheeba Jasmine, Asst. Prof(Ento.)</p> <table border="1"> <tr> <td><u>AC&RI, ECK</u></td> <td></td> <td>√</td> </tr> </table>	<u>AC&RI, ECK</u>		√						
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	<p>Dr. V.G. Mathirajan, Assoc.Professor(Ento.)</p> <p>South</p> <table border="1"> <tr> <td><u>KVK, MDU</u></td> <td>√</td> <td>√</td> </tr> </table>	<u>KVK, MDU</u>	√	√			<p>B. Usharani, Asst. Professor (Ento.)</p> <table border="1"> <tr> <td><u>AC&RI, KKM</u></td> <td></td> <td>√</td> </tr> </table>	<u>AC&RI, KKM</u>		√
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	<p>Dr. L. Allwin, Asst. Professor(Ento.)</p> <table border="1"> <tr> <td><u>KVK, Ramnad</u></td> <td>√</td> <td></td> </tr> </table>	<u>KVK, Ramnad</u>	√							
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	<p>Dr. K. Elanchezhyian, Asst. Professor(Ento.)</p>									

Action Plan 2. Identification of resistant sources and exploring insect resistance mechanisms

Theme Leader	Dr. SheelaVenugopal, Asst. Professor (Entomology), TNAU, Coimbatore		
Activity	Name of the Scientist(s) and Centre(s)	Observations to be recorded	Deliverables
<p>1. Identification of resistance sources to major insect pests.</p> <p>a. Screening of TNAU (MLT/ART) entries</p> <p>b. Screening of local germplasms</p> <ul style="list-style-type: none"> • Artificial screening for sucking pests: Standard Seedling Box Method of screening to be followed (CBE & ADT) • Field screening for stem borer & leaf folder (to be planned coinciding with peak pest incidence period of the respective centre or to be inoculated with insects or egg masses in case of low incidence). <p>2. Investigation of resistance mechanisms- Attributes contributing antixenosis& antibiosis have to be evaluated for the best entries selected for Stemborer, Leaf folder and Sucking pests (CBE & ADT). (Protocol will be sent by the Theme Leader to the participating Scientists)</p>	<p><u>TNAU, CBE</u> Dr. SheelaVenugopal, Asst. Prof. (Ento.) SB, BPH, WBPH (Field & Artificial Screening & Mechanism of resistance) <u>TRRI, ADT</u> Dr. P. Anandhi, Asst. Professor (Entomology) SB, LF, BPH, GM (Field & Artificial Screening & Mechanism of resistance) <u>AC&RI, MDU</u> Dr. P. Chandramani, Professor, (Entomology) SB, LF (Field Screening) <u>ARS, BSR</u> Dr. K. Ganesan, Asst. Professor (Entomology) SB, LF, BPH (Field Screening) <u>ARS, TPS & RRS, ASD (Hot spot)</u> Dr. Abdul Razak Professor (Entomology), AC & RI, KKM SB, LF (Field Screening)</p>	<p>Levels of resistance in field screening/artificial as per standard procedure. Biophysical and biochemical characters of best pipeline entries only.</p>	<p>Resistant sources for BPH/WBPH /GLH/ Stemborer/ Leaf folder. Underlying mechanism</p>

Action Plan 3. Efficacy of bio-products for the management of Earhead bug of rice

Theme Leader	Dr. P. Anandhi, Asst. Professor (Entomology), TRRI, Aduthurai		
Activity	Name of the Scientist(s) and Centre(s)	Observations to be recorded	Deliverables
Foliar spray of T1 - <i>Beauveria bassiana</i> @ 2.5 kg/ha T2 - <i>Metarhiziumanisopliae</i> @ 2.5 kg/ha T3 - <i>Verticilliumlecanii</i> @ 2.5 kg/ha T4 - <i>Paecilomyceslilacinus</i> @ 2.5 kg/ha T5 - Azadirachtin 0.3% @ 2l/ha T6 - Malathion 5 % DP @ 10kg/ha T7 - Acephate 75 SP @ 1kg/ha T8 - Untreated check At the time of pest incidence twice at fortnight interval Design : RBD Treatments: 8 Replication: 2 Plot size : 50 sq.m	<u>TRRI, ADT</u> Dr. P. Anandhi, Asst. Professor (Entomology) Note: Both EHB & Black bug incidence should be observed <u>TNAU, CBE</u> Dr. SheelaVenugopal, Asst. Professor (Agrl. Ento.) <u>AC&RI, MDU</u> P. Chandramani, Professor (Entomology) <u>ARS, BSR</u> Dr. K. Ganesan, Asst. Professor (Entomology)	1. Population of EHB at fortnight intervals/10 random hills/replication from flowering stage 2. Sweep net collection at fortnight intervals (5 sweeps/replication) (1 sweep is a semicircular sweep for 180° to and fro) 3. No. of dead cadavers or mycosed insects/m ² / replication 4. Yield – kg/plot	Management of earhead bug using bio-products.

Action Plan 4. Species complex, population dynamics and yield loss due to stem borer in rice

Theme Leader	Dr. S. Sheeba Joyce Roseleen, Asst. Professor (Ento.), SRS, Sirugamani		
Activity	Name of the Scientist(s) and Centre(s) - Proposed	Observations to be recorded	Deliverables
<p>Activity 1: 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>SRS, Sirugamani Dr. S. Sheeba Joyce Roseleen, Asst. Professor (Ento.) <u>TRRI, ADT</u> Dr. P. Anandhi, Asst. Professor (Entomology) <u>TNAU, CBE</u> Dr. Sheela Venugopal Asst. Professor (Entomology) <u>KVK, Needamangalam</u> Dr. V. Radhakrishnan, Asst. Professor (Entomology)</p>	<ul style="list-style-type: none"> • Weekly observation on the species trapped • Destructive sampling @ 10 tiller/40m² • Relative abundance = Total number of each species/total number of individuals of all species x100 	<p>Stemborer complex in Tamil Nadu Yield loss due to the stemborer complex Natural enemy complex</p>
<p>Activity 2: Population dynamics and distribution pattern of stem borer complex in rice in different seasons</p>		<ul style="list-style-type: none"> • Stem borer catches/counts to be correlated with weather data and season • Natural enemies population • Larval parasitoids of the SBs 	<p>Seasonal incidence of stem borer species could be determined</p>
<p>Activity 3: Yield loss assessment due to stem borer complex in different seasons T1 – Protected (Need based application of chlorantraniliprole 18.5 SC @ 150 ml ha or flubendiamide @ 39. 35 M/M @ 50 g /ha) T2- Unprotected</p>		<ul style="list-style-type: none"> • Dead heart at vegetative stage and white ear at reproductive stage at fortnightly interval • Per cent dead heart and per 	<p>Yield loss due to stemborer complex will be assessed</p>

Design: Exploded Block & paired T test		cent white ear • Natural enemies (if any) should be recorded • Yield to be recorded at harvest	
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Action plan (2022-2023)

2. Plant Pathology

Theme Area

1. Disease monitoring, surveillance, epidemiological studies on rice diseases and forewarning
2. Developing diagnostic kits for detection of seed borne pathogens of rice
3. Characterization of *Ustilaginoideavirens* and management of false smut disease in rice
4. Management of bacterial leaf blight of rice
5. Artificial Intelligence based diagnosis of major rice diseases

Action Plan 1: Disease monitoring, surveillance, epidemiological studies on rice diseases and forewarning (Cont.)

Theme Leader	Dr. K. Rajappan, TRRI, Aduthurai		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables/ out come
I. Monitoring of pest and diseases under irrigated and direct sown rice (blast, sheath blight, sheath rot, bacterial blight, brown spot, grain discoloration and false smut) diseases 1. Fixed plot survey 2. Roving survey 3. Correlation with weather factors. (All centers)	1. Dr. K. Rajappan, TRRI, Aduthurai 2. Dr. C. Gopalakrishnan Dept. of Rice, Coimbatore 3. Dr. N. Revathy AC&RI, Madurai 4. Dr. M. Rajesh ADAC&RI, TRY	Per cent disease incidence / PDI as per standard grades. Correlation and regression analysis of pest and disease progression during cropping periods in relation to weather parameters. Regular bulletins on pest and disease scenario in the particular zone should be given for the benefit of farmers through press and media marking a copy	Timely monitoring of disease epidemics and fore-warning of farmers and line departments.
II. Development of forecasting model for major diseases of using the available data in collaboration with ACRC.	5. Dr. M. Paramasivam AC&RI, Killikulam. 6. Dr. N. Rajinimala RRS, Ambasamudram		

	<p>7. Dr. S. Malathi RRS, Tirur and ACRC, Coimbatore.</p> <p>8. Dr.E. Kokilavani, AP, ACRC, TNAU, Coimbatore</p> <p>9. Dr. Santhosh Patil AP, Dept. of Physical Sciences, TNAU, Coimbatore</p>	to Director (CPPS).	
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Action Plan 2: Developing diagnostic kits for detection of seed borne pathogens of rice (Cont.)

Theme Leader	Dr. C. Goplakrishnan, Professor, Dept. of Rice, TNAU, Coimbatore		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
Developing LAMP based protocol for the detection of important seed borne pathogens of rice.	<p>1. Dr. C. Goplakrishnan Dept. of Rice, Coimbatore</p> <p>2. Dr. A. Kamalakannan, Dept. of Plant Pathology, TNAU, Coimbatore</p> <p>3. Dr. T. Anand Seed Centre, TNAU, Coimbatore</p>	<p>i. Isolation of DNA of <i>Magnaporthe grisea</i>, <i>Cochliobolus miyabeanus</i>, and <i>Sarocladium oryzae</i> from seeds.</p> <p>ii. Designing lamp primers for each pathogen</p> <p>iii. Validating sensitivity and specificity of LAMP primers</p> <p>iv. Developing LAMP based protocol for the detection of seed borne pathogens</p>	Development of diagnostic kit for the detection of important seed borne diseases in rice seeds which can be used in quarantine and seed certification.

Action Plan 3: Characterization of *Ustilagoideavirens* and management of false smut disease (Cont.)

Theme Leader:	Dr. K. Kalpana, Asst. Prof. (Pl. Path.) AC&RI, Madurai		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<ul style="list-style-type: none"> Isolation of <i>Ustilagoideavirens</i> from different locations and its characterization Diversity analysis and comparisons. Standardization of artificial inoculation methodologies 	<p>Dr. K. Rajappan, TRRI, Aduthurai</p> <p>Dr. V.K. Sathya ADAC&RI, Trichy</p> <p>Dr. K. Kalpana AC & RI, Madurai</p> <p>Dr. M. Paramasivan AC&RI, Killikulam</p> <p>Dr. N. Rajinimala, RRS, Ambasamudram</p> <p>Dr. M. Deivamani, AC & RI, Vazhavachanur</p> <p>Dr. S. Malathi RRS, Tirur</p>	<p>i. Morphological variability</p> <p>ii. Molecular variability (Molecular characterization should be carried out at Madurai and all the centres should send cultures to Dr. Kalpana, AC & RI, Madurai)</p> <p>iii. All the centres should send the endophytes to Dr. C. Gapalakrishanan, TNAU, Coimbatore for screening against <i>U. virens</i></p>	<ul style="list-style-type: none"> To have pathogenic diversity data An artificial inoculation method will be available

Action Plan 4: Management of bacterial leaf blight (BLB) of rice

Theme Leader:	Dr. N. Revathy, Prof. (Pl. Path.) AC&RI, Madurai		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<p>1. Exploitation of endophytes</p> <p>a. Isolation of endophytes against Xoo.</p> <p>b. <i>In vitro</i> and <i>in vivo</i> evaluation</p> <p>2. Management of BLB</p> <p>T₁ - Foliar spraying of Bionol @500 ppm</p> <p>T₂ - Foliar spraying of bactrinashak @500 ppm</p> <p>T₃ - Foliar spraying of <i>Phyllanthusniruri</i>@ 10 %</p> <p>T₄ - Foliar spraying of Copper hydroxide @ 5 ml/lit +Potassium nitrate @ 0.5 %</p> <p>T₅- Recommended practice</p> <p>T₆-Control</p>	<p>Dr. K. Rajappan, TRRI, Aduthurai</p> <p>Dr.A.Ramanathan TNAU, Coimbatore</p> <p>Dr. N. Revathy, AC&RI, Madurai</p> <p>Dr. M. Rajesh, ADAC&RI, TRY</p> <p>Dr.R.N.Rajinimala RRS, Ambasamudram</p> <p>Dr.S.Mathiazhahan AC&RI, Eachankottai</p> <p>Dr. S. Malathi RRS, Tirur</p> <p>Dr. J. Sheela AC&RI, Killikulam</p>	<p>1. PDI at 15 and 30 Days after application</p> <p>2. Yield (kg/ha)</p> <p>3. C:B ratio</p>	<p>To develop suitable method for rice BLB management</p>

Action Plan 5: Artificial Intelligence based diagnosis of major rice diseases

Theme Leader:	Dr. C. Gopalakrishnan, TNAU, Coimbatore		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<p>Artificial Intelligence for major diseases of rice</p> <ul style="list-style-type: none"> Collection of good quality images Machine learning algorithms <p>Blast -CBE/ASD/TKM</p> <p>Sheath blight -</p>	<p>1.Dr. K. Rajappan, TRRI, Aduthurai</p> <p>2.Dr.C.Gopalakrishnan TNAU, Coimbatore</p> <p>3. Dr. N. Revathy, AC&RI, Madurai</p>	<p>Approximately 3000 or more images to be captured for each disease and centre</p> <p>Labelling and classification</p>	<p>Development of mobile app through AI</p>

ADT/ASD/TKM False smut - MDU/TRY/TKM BLB - ADT/ASD/KKM Brown spot - CBE/ADT/TKM Sheath rot - TRY / KKM Tungro – TRY / ASD / ADT	4. Dr. V.K. Sathya, ADAC&RI, TRY 5. Dr. R. N. Rajinimala, RRS, Ambasamudram 6. Dr. M. Paramasivam AC&RI, Killikulam 7. Dr. S. Malathi RRS, Tirur 8. Dr. D. Muthumanickam, P&H, Dept. of Remote Sensing, TNAU, CBE	of symptoms	
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C. Project wise remarks

List of URP/AICRP/EPF/UCF

Discipline	URP	AICRIP	EPF	UCP	Total
Agricultural Entomology	7	2	-	-	9
Plant Pathology	10	2	1	-	13
Agricultural Nematology	-	-	-	-	-
Total	17	4	1	-	22

Remarks on the ongoing URP/AICRIP/EPF/UCP etc.

Crop	Agri. Ent.(No.)
University Research Projects	7
AICRP Projects	2
Externally Funded Projects	-
Core Projects	-
Total	9

1. AGRICULTURAL ENTOMOLOGY

Sl. No.	Project No. and Title	Remarks
University Research Project		
1.	<p>CPPS/CBE/ENT/2021/001 Impact of post-harvest processing techniques on thiamethoxam and chlorantraniliprole residues in paddy. Dr.A.Suganthi, Asst. Professor (Agrl. Entomology) (September, 2020 – August 2022) Other Scientists: Dr.R.Vigneshwari, Assistant Professor (SS&T) Dept. of Seed Science and Technology TNAU, Coimbatore</p>	Project may be continued
2.	<p>URP: 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 (Agrl. Entomology) (Feb, 2021 – Jan 2023)</p>	Project may be continued
3.	<p>CPPS/TRY/CPS/RIC/2021/001. Bioecology and management of Pink Stem Borer, <i>Sesamia inferens</i> Walker (Lepidoptera : Noctuidae) in rice Dr. S. Sheeba Joyce Roseleen, Asst. Professor (Agrl. Entomology) August 2021- July 2024</p>	Project may be continued
4.	<p>CPPS/ ADT/ ENT/ RIC/ 2020/ 001 : Determination of population dynamics and formulation strategies for the management of Rice hispa, black bug and whorl maggot P. Anandhi, Asst. Professor (Agrl. Entomology) April 2019- March 2022</p>	Project may be closed and Completion report must be submitted.
5.	<p>CPPS/CBE/ENT/2021/010 Population dynamics, yield loss assessment and management of rice gall midge, <i>Orseolia oryzae</i> 1. Dr. Sheela Venugopal, AP, (Agrl. Ento.), Dept. of Rice, TNAU, CBE 2. Dr. P. Anandhi, AP., (Agrl. Ento.), TRRI, Aduthurai 3. Dr. P. Govindan, AP (Agrl. Ento.), RRS, Paiyur 4. Dr. Vijaya Shanthi,</p>	Project may be continued

	AP, (Agrl. Ento.), RRS, Tirur May 2021-April 2023	
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	Project may be continued
7.	AICRP/CPPS/CBE/ENT/RIC/2020/001 Developing ergonomic methods for mass culturing of rice moth <i>Corcyra cephalonica</i> Stainton Dr. S.Jeyarajan Nelson, Professor (Ag. Entomology) July 2020 to June 2023	Project may be closed and Completion report must be submitted.
8.	AICRP/PBG/ADT/RIC/002: All India Co-ordinated Rice Improvement Project – Entomology Part Dr.P. Anandhi, Asst. Professor (Ento.)	Project may be continued
9.	AICRP/PBG/CBE/RIC/003 All India Co-ordinated Rice Improvement Project – Entomology Part Dr. SheelaVenugopal, Assistant Professor (Agrl. Ento.), Dept. of Rice, TNAU, CBE 2021-2022	Project may be continued

Plant Pathology

Remarks on the ongoing URP/AICRIP/EFP/UCP etc.

Crop	Agrl. Ent. (Nos.)	Pl. Path. (Nos.)
University Research Projects	7	10
AICRP Projects	2	2
Externally Funded Projects	-	1
Core Projects	-	-
Total	9	13

2. PLANT PATHOLOGY

S. No	Project No. and Title	Remarks
University Research Projects		
1	CPPS/ADT/PAT/RIC/2020/001. Studies on host plant resistance and management of Blast, Brown Spot and BLB in rice under artificial and field conditions. (September 2020 – August 2022) Dr. A. Ramanathan	The project may be continued.
2	CPPS/CBE/PAT/RIC/2019/001. Management of aflatoxin contamination in rice through botanicals. (July 2019 –June 2022) Dr. C. Gopalakrishnan,	The project may be closed in June and an another URP may be proposed.
3	CPPS/TRY/PAT/RIC/2020/001 Bio-intensive management of blast and bacterial leaf blight in paddy using <i>Streptomyces</i> spp. under salt affected soils (September 2020- August 2023) Dr. V.K. Satya	The project may be continued.
4	CPPS/ASD/PAT/RIC/2018/001. Eco - friendly management of blast and sheath blight diseases of rice. (May 2018 – April 2021) Dr. R. Ramjegathesh	Completion report may be submitted on or before 30 th June, 2022
5	CPPS/ASD/PAT/RIC/2018/002. Management of bacterial leaf blight disease in rice. (June 2018 – May 2021) Extended April 2022 Dr. R. Ramjegathesh	Completion report may be submitted immediately
6	CPPS/TKM/PAT/RIC/2020/001: Management of rice blast disease under irrigation and direct sown conditions (March 2020 – February 2023) Dr. S. Malathi	The project may be continued.
7.	CPPS/KKM/PAT/RIC/2020/001 Biocontrol potential of spermospheremicrobiomes on rice brown spot pathogen <i>Bipolarisoryzae</i> (April 2020-March2023) Dr. J. Sheela	The project may be continued.

8.	CPPS/KKM/PAT/RIC/2020/002 Management of Bacterial Leaf Blight of Rice caused by <i>Xanthomonas oryzae</i> pv. <i>oryzae</i> using products and essential oils. (July 2020- June 2023) Dr. N. Rajinimala	The project may be continued.
9.	CPPS/TKM/PAT/RIC/2021/001: Management of false smut disease of rice in North Eastern Zone of Tamil Nadu (Feb. 2021- Jan 2023) Dr. S. Malathi	The project may be continued.
10.	CPPS/EKT/PAT/RIC/2020/001 Nitric acid mediated disease management in paddy bacterial leaf blight (Feb 2020 - Jan 2023) Dr. S. Mathiazhahan	The project may be continued.
AICRIP Projects		
1.	AICRP/PBG/CBE/RIC/003 All India Co-ordinated Rice Improvement Project – Pathology Part (Coimbatore) Dr. C. Gopalakrishnan	The research work may be continued as per the technical programme of AICRIP.
2.	AICRP/PBG/ADT/RIC/002 All India Co-ordinated Rice Improvement Project – Pathology Part (Aduthurai) Dr. K. Rajappan	The research work may be continued as per the technical programme of AICRIP.
External funded Projects		
1.	DST/CPPS/CBE/PAT/2019/R020. External funded Project (DST) Climate change mediated aerobiological studies on air borne pathogens of rice (March 2019-February 2022) Dr. A. Kamalakannan	Completion report may be submitted

IV. REMARKS

a. General recommendations

- All the Research projects/ Action plans may be oriented towards developing a product/technology – Milestones are to be indicated (All Directorates).
- Seeds of newly released rice varieties have to be multiplied sufficiently for quick popularization and to ensure the seed supply to the department and farmers (Seed Centre).
- The spread and impact of TNAU released varieties may be studied and documented (CARDS).
- Product diversification using trait specific traditional rice varieties may be initiated (CSC&RI).
- Based on the government procurement policy, large scale seed multiplication of TKM 9 may be restricted (Seed Centre).
- HREC, Gudalur centre may be effectively utilized for screening of advanced breeding lines for blast and false smut diseases.
- Bio-chemical and nutritional properties of medicinal rice and other traditional rice varieties may be studied and documented (CPMB&B/CPBG)
- A technology capsule for mechanization in rice cultivation (seed to seed) may be evolved (AEC&RI).
- Beneficial microbial cultures may be deposited with the University Repository available at the Department of Plant Pathology, TNAU.
- Students to be motivated to publish their works in reputed journals.
- All scientists may be encouraged to submit proposal for external funding.

b. Crop Improvement

- Breeding programmes may be intensified towards developing rice hybrids/varieties yielding more than 10 t/ha.
- Importance may be given to evolve region specific rice varieties suiting local demands.
- More attention to be paid for developing rice varieties requiring less water
- Efforts should be made to maintain the genetic purity of all varieties in seed chain.
- Seed multiplication of identified stable TGMS lines may be taken up to speed up the development of Two line hybrids
- TNAU's Herbicide Tolerant rice cultures may be evaluated for chemical weed management and its cost benefit (CPMB&B, CPBG and DCM)
- Germplasm obtained from NBPGR through IRLR project may be evaluated for special traits and the identified lines may be exchanged with all rice breeding stations of TNAU.

- Improved *kavuni* culture may be tested under fast track mode for release as a special variety.
- Innovative breeding methods to evolve climate smart and multiple stress tolerant rice varieties may be attempted.
- Development of bio-fortified rice needs attention

c. Crop Management

- Action may be initiated to manage the yellowing symptom in rice observed in southern district of Tamil Nadu particularly Tirunelveli and Ambasamudram areas
- Use of drone application in rice may be intensified
- The technologies which are recommended for adoption may be documented like variety release proposal.
- Alternate method of rice cultivation requiring less water may be optimized
- Nutrient use efficiency research may be initiated

d. Crop Protection

- Seasonal incidence of rice mites to be recorded along with climate factors for developing a forecasting model.
- Insect monitoring tools *viz.*, light, pheromone and spore traps to be effectively utilized during initial phase of crop seasons and suitable forewarning advisory be given.
- Suitable integrated management practices for both pests and diseases to be evaluated and combined recommendations for both pest and diseases at critical stages of rice to be given for adoption.
- Technology capsule for emerging problems like false smut, gall midge *etc.*, to be evaluated and developed.
- Nematode problem in aerobic rice to be addressed
- All the scientists of CPPS may be instructed to monitor the insect pests and diseases of rice in their districts regularly. Any outbreak of existing pests, disease and nematodes or occurrence of new insect pests, diseases and nematodes of rice to be reported.
- Forecasting model may be developed for major diseases of rice using the available data.
- Bio-control measures to contain new pests and diseases may be evolved.

V. List of Participants

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1.	Dr. R. Manimaran, Assoc. Professor (PBG)	drmpbg@gmail.com
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