

TAMIL NADU AGRICULTURAL UNIVERSITY

PROCEEDINGS

40th Pulses Scientists Meet 2022 (19th May, 2022)

Lead Centre

National Pulses Research Centre
Vamban – 622 303, Pudukottai District

Directorate of Research

Tamil Nadu Agricultural University
Coimbatore – 641 003

2022

PROCEEDINGS
40th Pulses Scientists Meet 2022
(19th May, 2022)

The 40th Pulses Scientists Meet was held on May 19, 2022 through virtual mode in Anna Auditorium of Tamil Nadu Agricultural University, Coimbatore.

Dr. V. Geethalakshmi, Respected Vice Chancellor delivered the opening remarks in which madam emphasized that pulses are the major component of food and nutritional security for both the rich and poor alike and impressed upon the need to reinvent and reinvigorate the momentum in pulses research based on the recommendations made during the presentations in addition to the focus on bio-inoculants and smart delivery of inputs. The need for increasing the productivity of pulses through adopting high yielding varieties, improved crop management practices and plant protection measures was stressed upon. The introduction of new and traditional pulses for sustaining the yield and quality of pulses, development of synchronized maturing varieties and resistance to MYMV disease and bruchids were also discussed. The use of 'pulse wonder', control measures for yellow mosaic virus including development of resistant varieties and management technologies for changing climate were highlighted by the Vice Chancellor.

Dr. M. Raveendran, Director of Research, TNAU, Coimbatore welcomed the gathering. He had presented the area under pulses and their productivity status and the level of penetration of the varieties under seed chain. He had insisted to adapt viable technologies for maximizing the yield of pulses. The significance of plant genetic resources and their effective utilization in the crop improvement programme was highlighted. It was insisted to involve the social scientists in doing impact analysis for varietal spread and research prioritization. New technologies and issues viz., micro-irrigation in Tamil Nadu, drone technology for pulses, crop management technologies including crop boosters, and the threats posed by minor pests turning major pests were also discussed critically.

A total of 11externally funded research projects at a budget outlay of Rs.759.53 lakhs, 55 ongoing University Research Projects, 26 Action Plan Projects and 8 AICRP projects implemented at a total budget of Rs.396 lakhs were reviewed critically by the Director of Research and the Vice Chancellor.

Dr. R. Ravikesavan, Director (CPBG) presented the action taken on the recommendations of the previous pulses scientists meet and action plan for ensuing year for crop improvement.

Dr. M.K. Kalarani, Director (DCM), **Dr. P. Balasubramaniam**, Director (NRM) and **Dr.K.Umarani**, Director (Seed Centre) made a presentation on the research highlights and action plan for the 2022-23 pertaining to Crop Management and Resource Management respectively.

Dr. M. Shanthi, Director (CPPS) has delivered the research highlights and proposed action plan for the year 2022-2023.

The meeting was concluded with the formal vote of thanks by **Dr. D. Sassikumar**, Prof. and Head, NPRC, Vamban.

The proceedings of the meet are as below:

I. CROP IMPROVEMENT

- A. Decisions made on the entries for Variety Release Proposal/ART/OFT/MLT evaluation
- B. Research projects on Pulses
- C. Remarks on the ongoing University Research Projects/AICRP/Externally funded projects
- D. Action Plan 2022-2023

II. CROP MANAGEMENT

- A. Decisions made on OFT
- B. Research projects on Pulses
- C. Remarks on the ongoing University Research Projects/AICRP/ Externally funded projects
- D. Action plan 2022-2023

III. CROP PROTECTION

- A. Decisions made on OFT
- B. Research projects on Pulses
- C. Remarks on the ongoing University Research Projects/AICRP/ Externally funded projects
- D. Action plan 2022-2023

IV. REMARKS

V. LIST OF PARTICIPANTS

I. CROP IMPROVEMENT

A. DECISIONS MADE ON THE ENTRIES FOR VARIETY RELEASE PROPOSAL/ART/OFT/MLT EVALUATION

I. Cultures identified for variety release (2022-23)

a) Blackgram (Kharif / Rabi)

Sl. No	Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over		Special features
					VBN 6	VBN 8	
1.	COBG 13-04	T9 x ADT 5	60-65	801	10.9	10.6	• Resistant to MYMV disease.

b) Blackgram (Rice Fallow)

Sl. No	Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over		Special features
					ADT 6	VBN 9	
1.	VBG 13-003	KU 216 x VBN 3	65-70	712	4.0	5.8	• Resistant to MYMV disease. • More basal branches

c) Greengram (Kharif, Rabi & Summer)

Sl. No	Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Percentage increase over checks		Special features
					CO 8	VBN 4	
1.	VGG 18 - 002	EC 496839 x IPM 409-4	65-70	896	13.0	13.6	• Early duration, synchronized maturity, amenable for single harvest • Determinate plant type • Bold seeded (100 grain weight of 5.8 to 6.0 grams) and highly suitable for sprouted grains
2.	CO GG 13-19	CO 6 x CO GG912	60-65	785	7.2	8.3	• Resistant to MYMV disease.

Greengram (Rice fallow)

Sl. No	Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over	Special features
					ADT 3	
1.	VGG 15-030	VBN (Gg)2 x IPM 409-4	65-70	718	9.2	<ul style="list-style-type: none"> • Suitable for Rice fallow condition • Resistant to MYMV disease • Shiny seeds
2.	COGG 13-039	CO 6 X SML 668	60-65 days	641	-	<ul style="list-style-type: none"> • Suitable for Rice fallow condition

d) Cowpea

Sl. No	Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over	Special features
					VBN 3	
1.	VCP 14-001	VBN1 x VCP10001	70-75	998	10.7	<ul style="list-style-type: none"> • High Yield • Determinate plant type • Synchronized maturity

II. Cultures identified for the evaluation under OFT/ ART - (2022-23)**a) Redgram (Short duration - Fast track programme)**

Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over			Special features
				APK 1	VBN (Rg) 3	CO(Rg) 7	
CRG16 -01	CO(Rg) 7 x AL 1738	115-120	1018	15.52	8.8	4.1	<ul style="list-style-type: none"> • Short duration • Resistant to SMD
Check	CO (Rg) 7						
Season	Rabi						
Districts	Dharmapuri, Krishnagiri, Vellore, Salem, Madurai, Thiruvannamalai (5 trials per district)						
KVK	Vellore, Madurai, Salem, Dharmapuri, Krishnagiri (5 trials per KVK)						
OFT	Dharmapuri, Krishnagiri, Vellore, Salem, Madurai						

b) Redgram (Long duration)

Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over		Special features
				CO8	CO 9	
CRG 17-008	CO 6 x ICP 11003	180	1458	10.2	23.14	<ul style="list-style-type: none"> • High yield • Resistant to SMD
Checks	CO 8					

Locations:

Season	Kharif
Districts	Dharmapuri, Krishnagiri, Vellore, Salem, Madurai, Thiruvannamalai (5 trials per districts)
KVK	Vellore, Madurai, Salem, Dharmapuri, Krishnagiri (5 trials per KVK)

c) Chickpea (Summer irrigated)

Culture	Pedigree	Duration (Days)	Seed yield (kg/ha)	Per cent increase over		Special features
				CO4	JG11	
ICCV181674	(Genesis836/GG2)x (ICC4958TM /JG 11)	78 days	1363	10.5	12.0	<ul style="list-style-type: none"> • Bold seeds- 100 seed weight: 33.1g • Tolerant to dry root rot
Checks	CO 4, JG 11					

Locations:

Districts	Coimbatore, Thirupur, Dharmapuri, Salem, Erode, Virudhunagar, Perambalur and Thoothukudi (40 Trials – five trials in each district)
KVK	Thirupur, Dharmapuri, Salem, Virudhunagar (20 trials - Five trials in each KVK)

III. Cultures identified for the evaluation under Multi location trial – 2022-23**1. Multilocation Trial****a. Redgram (Short duration)**

Design	: Replicated	No. of replications	: 3
Plot size	: 6 rows - 4 × 5.4 m ²	Seed Quantity	: 150 g/entry/location
Spacing	: 90 x 30 cm	Season	: Summer

S. No.	Culture	Parentage	Duration (days)	Seed yield (kg/ha)	Special features
1.	CRG 18-02	CO(Rg) 7 x BDN 2	118-122	1436	<ul style="list-style-type: none"> High yield Resistant to SMD
2.	VMRG 15-006	AL2025 x ICP15598	135	1186	<ul style="list-style-type: none"> High yield
Checks		CO (Rg)7, APK1, VBN (Rg)3			
Season		Kharif			
Locations (07)		Vamban, Coimbatore, Paiyur, Virinjipuram, Athiyanthal, Yethapur, Bhavanisagar,			

b. Redgram (Long duration)

Design : RBD	No. of replications	:	Four
Plot size : 6 rows- 4 × 7.2 m ²	Seed Quantity	:	150 g/entry/location
Spacing : 120 x30 cm	Season	:	Kharif

S. No.	Culture	Parentage	Duration (days)	Seed yield (kg/ha)	Special features
1.	VMRG 16-001(R)	APK1 X Yelagiri local	180	1422	<ul style="list-style-type: none"> High yielding
2.	CRG 19-007 (N)	CO 6 x MA 6	180	1519	<ul style="list-style-type: none"> High yield Resistant to SMD
Checks		CO 8, CO9			
Season		Kharif			
Locations (06)		Vamban, Coimbatore, Paiyur, Yethapur, Virinjipuram, and Vazhavachanur			

Note: Field/ Artificial screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and ARS, Virinjipuram.

Name of the centre	Pests	Diseases
NPRC, Vamban	Pod borer complex	SMD and Wilt
Dept of Pulses, Coimbatore	Pod borer complex	SMD and Wilt
ARS, Virinjipuram	Pod borer complex	SMD and Wilt

c. Redgram (Hybrid)

Design : Unreplicated trial			
Plot size : 20m ²	Seed Quantity	:	100 g/entry/location
Spacing : 90 x30 cm	Season	:	Kharif

S. No.	Culture	Parentage	Duration (days)	Seed yield (kg/ha)	Special features
1.	ICPH 2438	ICPA 2039 x IPCPR 2438	120	1280	<ul style="list-style-type: none"> Resistant to SMD Short duration High yield
Season		Kharif			
Locations (05)		Coimbatore, Bhavanisagar, Vamban, Athiyanthal and Paiyur			

Multilocation Trial – Blackgram

Design : RBD	No. of replications : Three
Plot size :6 rows- 4 × 1.8 m ²	Seed Quantity : 200 g/entry/location
Spacing : 30 × 10 cm	Season: Kharif and Rabi

Features of the proposed culture

Sl. No	Culture	Parentage	Duration (days)	Seed yield (kg/ha)	Special features
1.	VBG 18 - 099	Gamma ray mutant of ADT 5	70 days	1123	High yield multiblooming
2.	VBG 19-010	BDR-1 X V.mungo var. sylvestris	70-75	1250	High yield Resistant to MYMV
3.	KKB 19-003	VBN 8 x MASH 1008	65-70	1018	High yield Resistant to MYMV
4.	KKB 19-005	CO 6 x MASH 1008	65-70	925	High yield Resistant to MYMV
5.	COBG 21-04	Gamma ray mutant of CO 6	60-65	915	High yield, moderately resistant to powdery mildew and MYMV

Checks	VBN 11, VBN 10 (Rabi) , CO 7
Kharif (Jun-Jul)	Vamban, Coimbatore, Paiyur, Madurai, Tindivanam, Melalathur and PalurVirinjipuram,
Rabi (Sep-Oct)	Vamban,Coimbatore, Aruppukkotai, Kovilpatti, Madurai, Tindivanam and Kudumiyamalai. Killikulam and Veppanthattai

Note: Artificial / Field screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and CPMB, Coimbatore.

4. Multilocation Trial – Greengram

Design : RBD	No. of replications : Three
Plot size : 6 rows-4 × 1.8 m ²	Seed Quantity : 200 g/entry/location
Spacing : 30 × 10 cm	Season: Kharif and Rabi

Features of the proposed cultures

Sl. No	Culture	Parentage	Duration (days)	Seed yield (kg/ha)	Special features
1.	VGG 20-229	VBN 4 X IPM 2-14	65 - 70	1364	<ul style="list-style-type: none"> • High yield • MYMV Resistant
2.	VGG 20-234	VBN 4 X VGG 17-015	65 - 70	1356	<ul style="list-style-type: none"> • High yield • MYMV Resistant

Checks	CO8, VBN 4
Kharif (Jun-Jul)	Vamban, Coimbatore, Paiyur, Madurai, Virinjipuram, Eachangkottai and Tirur
Rabi (Sep-Oct)	Vamban, Coimbatore, Aruppukkotai, Kovilpatti, Madurai, Tindivanam, Tirur and Kudumiyamalai

Note: Field / Artificial screening for the following pests and diseases will be carried out by NPRC, Vamban, Dept. of Pulses, Coimbatore and CPMB, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
Dept of Pulses, Coimbatore	Pod borer and white	MYMV, ULCV, Powdery mildew, root rot
CPMB, Coimbatore	-	MYMV through agro inoculation technique

5. Multilocation Trial – Cowpea

Design : RBD	No. of replications : Four
Plot size : 6 rows-4 × 2.7 m ²	Seed Quantity : 250 g/entry/location
Spacing : 45 × 15 cm	Season: Kharif, Rabi

Features of the proposed culture

S. No	Cultures	Parentage	Duration (days)	Seed yield (kg/ha)	Special features
1.	VCP 21-001	P152 X TC 901	70-75	1335	High yield, resistance to rust
2.	VCP 21-023	VBN 1 X GC 3	70-75	1172	High yield, resistance to rust

Checks	VBN 3 and CO(CP)7	
	The culture VCP 15-006 to be evaluated in Coimbatore, Vamban and Madurai along with the check VBN 3 to confirm its performance to decide for promoting to ART.	
Locations	Kharif (Jul-Aug)	Vamban, Coimbatore, Paiyur, Madurai, Killikulam and Virinjipuram
	Rabi (Sep-Oct)	Vamban, Coimbatore, Aruppukottai, Kovilpatti, Madurai, Perambalur and Trichy

Field / Artificial screening for the following pests and diseases will be carried out by NPRC, Vamban and Dept. of Pulses, Coimbatore.

Name of the centre	Pests	Diseases
NPRC, Vamban	Aphids, pod borer	BCMV, root rot and rust
Dept of Pulses, Coimbatore	Aphids, pod borer	BCMV, root rot and rust

6. Multilocation Trial – Mochai

Design : RBD	No. of replications : Four
Plot size : 6 rows-4 × 2.7 m ²	Seed Quantity : 250g /entry/location
Spacing : 60 × 30 cm	Season: Rabi

Features of the proposed culture

S. No	Cultures	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	PYR 21-05	HA 4 X Coll 29	82	850	Short duration photo-insensitive High yield

Checks	CO 2
Locations	Coimbatore, Paiyur, Yethapur, Virinjipuram

Note: Artificial screening for the following pests and diseases will be carried out by Dept. of Pulses, Coimbatore.

Name of the centre	Pests	Diseases
Dept of Pulses, Coimbatore	Aphids, pod borer	Root rot

7. Multilocation Trial – Horse gram0

Design : RBD	No. of replications : Three
Plot size : 4 x 1.5 m ²	Seed Quantity : 100g /entry/location
Spacing :30 x 10 cm	Season: Rabi

S. No	Cultures	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	PYR 21-07	Mutant from Paiyur 2	100	1328	Short duration High yielding
Checks		Chattisgarh Kufri, paiyur 2			
Locations		Coimbatore, Paiyur, Yethappur, Virinjipuram			

Multilocation Trial – Chickpea

Design : RBD	No. of replications : Four
Plot size : 4 x 1.8 m ²	Seed Quantity : 250g /entry/location
Spacing :30 x 10 cm	Season: Rabi

S. No	Cultures	Parentage	Duration (Days)	Seed yield (kg/ha)	Special features
1.	COC 19 01	NBeG 49 x ICCV 09106	80	1328	Bold seed-35.3g (100 seed weight)
2.	COC 19 02	ICC 133124 x JG 14	78	1334	Bold seed-36.2g (100 seed weight),
Checks		CO 4, JG 11			
Locations		Coimbatore, Paiyur, Papparapatti, Veppanthattai, Kovilpatti			

Features of the proposed culture

Note: Screening for the following pests and diseases will be carried out by Dept. of Pulses, TNAU, Coimbatore .

Name of the centre	Pests	Diseases
Department of Pulses	Sucking pests, stem fly, Maruca, bruchid	YMD, Leaf crinkle, Powdery mildew

Important Dates in conduction of MLT and ART

Activities	Season	Last date for receipts	Date of Despatch
Seed material of the proposed ART entries at Vamban	Kharif	30.06.2022	15.07.2022
	Rabi	16.08.2022	05.09.2022
Seed material of the proposed MLT entries at Vamban	Kharif	30.06.2022	15.07.2022
	Rabi	15.08.2022	05.09.2022

	Rice fallow	30.11.2022	05.12.2023
	Summer	30.12.2022	05.02.2023
Sowing report at Vamban	Kharif	30.07.2022	-
	Rabi	30.10.2022	
	Rice fallow	31.01.2023	
	Summer	31.03.2023	
Visit of MLT/monitoring teams	Kharif	Sep. 2022	-
	Rabi	Dec. 2022	
	Rice fallow	Feb. 2023	
	Summer	May. 2023	
	Rabi	Dec. 2022	
Date for receiving the trials results at Vamban for compilation	Kharif	15.12.2022	-
	Rabi	28.02.2023	
	Rice fallow	15.04.2023	
	Summer	30.06.2023	

Monitoring team to visit MLT 2022-23

Scientists	Centres
Dr. R. Thangapandian, (P&H), Vamban Dr. P.Shanthi, Asst. Prof. (PBG), Vamban Dr. R.Ramjagathesh, Asst. Professor (Pl. Path.), Vamban	Coimbatore, Aduthurai, Kudumiyamalai, Eachangkottai
Dr. S. Geetha, (P&H), Pulses Coimbatore Dr. L.Karthiba, AP (Plant Path.) Pulses, Coimbatore Dr P. S.Shanmugam, AP (Agrl.Ento), Pulses, Coimbatore	Paiyur, Dharmapuri
Dr. P. Jayamani, Professor (PBG), Pulses Coimbatore Dr. G.Senthilraja, AP (Plant Path.) Pulses, Coimbatore Dr. P.S.Shanmugam, Asst Prof. (Agrl.Ento), Pulses Coimbatore	Yethapur, Bhavanisagar
Dr. A.Thanga Hemavathy, AP (PBG) Coimbatore Dr. G.Senthilraja, AP (Plant Path.) Pulses, Coimbatore Dr. P.S.Shanmugam, Asst Prof. (Agrl.Ento), Pulses Coimbatore	Vamban, Trichy, Athiyanthal
Dr. K.Anandhi, AP (PBG) Coimbatore Dr. G.Senthilraja, AP (Plant Path.) Pulses, Coimbatore Dr. P.S.Shanmugam, Asst Prof. (Agrl.Ento), Pulses Coimbatore	Madurai, Aruppukkottai, Kovilpatti,
Dr. K. Geetha, Professor (PBG), Paiyur	Virinjipuram, Tindivanam
Dr. K.Manimaran, Asso. Prof. (PBG) Aduthurai Dr. P. Anandhi, Asst. Prof. (Agrl. Ento.)	Tirur, Palur, Thanjavur
Dr. A. Gopikrishnan, Asst. Prof. (PBG), Virinjipuram Dr. K. Thirumurugan, Prof. (Agrl. Ento.)	Veppanthattai, Valavachanur, Melalathur

Dr. S. Muthuramu, Asst. Prof. (PBG), AC & RI, Madurai Dr. Zadda Kavitha Asst. Prof. (Agrl. Ento.), AC & RI, Madurai	Killikulam Ambasumudram
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B. RESEARCH PROJECTS ON PULSES

Crop	Centre	URP	AICRP	EFP	Total	No. of Scientists
Crop Improvement						
Redgram	NPRC, Vamban	-	-	-	-	-
	Pulses, Coimbatore	3	1	-	4	2
	ARS, Virinjipuram	1	1	-	2	1
Blackgram	NPRC, Vamban	1	1		2	2
	Pulses, Coimbatore	1	1*	1	2	1
	TRRI, Aduthurai	1	1	--	2	1
	AC&RI, Killikulam	1	-	-	1	1
	RRS, Aruppukkottai	1	-	-	1	1
	ARS, Pattukkottai	1	-	-	1	-
	AC&RI, Echankottai	1	-	-	1	1
Greengram	NPRC, Vamban	1	-	-	1	1
	Pulses, Coimbatore	1	-	-	1	-
	TRRI, Aduthurai	1	-	-	1	-
	ARS, Bhavanisagar	-	-	1	1	1
Cowpea	NPRC, Vamban	1	1*	-	1	1
	Pulses, Coimbatore	1	1*	-	1	-
	RRS, Aruppukkottai	1	-	-	1	1
Chickpea	Pulses, Coimbatore	1	1	-	2	1
Mochai	RRS, Paiyur	1	-	-	1	1
Soyabean	Pulses, Coimbatore	1	-	-	1	-
Ricebean	Pulses, Coimbatore	1	-	-	1	-
Horsegram	SRS, Melalathur	-	-	1	1	-
	RRS, Paiyur	1	1*	-	1	-
Mothbean	ARS, Bhavanisagar	1	-	-	1	1
Daincha	ADAC&RI, Trichy	1	-	-	1	1
Cluster bean	AC&RI, Madurai	1	-	-	1	1
	Total	25	5	3	33	18

URP: University Research Project, AICRP: ICAR funded AICRP projects, *AICRP - Voluntary centre, EFP: Externally funded projects.

C. REMARKS ON THE ONGOING UNIVERSITY RESEARCH PROJECTS/ AICRP/ EXTERNALLY FUNDED PROJECTS

S.No.	Project No. and Title	Project leaders	Duration	Remarks
UNIVERSITY RESEARCH SUB PROJECTS				
REDGRAM				
1.	CPBG/CBE/PBG/RGR/2018/01 Evolution of high yielding short duration photo-insensitive redgram varieties	Dr.R.P.Gnanamalar Professor(PBG) & Head	May 2018-April 2023	The project may be continued
2.	CPBG/CBE/PBG/RGR/2018/02 Evolution of high yielding grain and dual purpose long duration varieties in redgram	Dr.A.Thanga Hemavathy Assistant Professor (PBG)	May 2018-April 2023	The project may be continued
3.	CPBG/CBE/PUL/PUL/2021/003 Development of CGMS based short duration hybrids in redgram (Cajanus cajan)	Dr. P. Jayamani Professor (PBG)	Sep 2021-Aug 2026	More number of restorers may be identified
4.	New project Developing vegetable type pigeon pea for high nutritional and organoleptic qualities	Dr. A. Gopikrishnan Assistant Professor	Jan 2021-Dec 2023	The cultivated vegetable types available in Dharmapuri and Krishnagiri may be collected and evaluated along with our entries
Blackgram				
5.	CPBG/VMB/PBG/BGR/2016/001 Evolution of high yielding MYMV resistant blackgram (Vignamungo(L.) Wilczek) genotypes and maintenance of germplasm.	Dr. D. Sassikumar Professor (PB&G) & Head	Jul 2016 to Jun 2021	The completion report should be submitted and new project proposal may be sent for RPAC approval. The genetic materials from the previous research project should be carried over the new project.

6.	CPBG/CBE/PBG/BGR/2016/001 Evolution of blackgram varieties with yellow mosaic disease resistance.	Dr. A. Muthuswamy Assistant Professor (PB&G)	October 2016 to November 2021	The completion report should be submitted and new project proposal may be sent for RPAC approval. The genetic materials from the previous research project should be carried over the new project.
7.	CPBG/ADT/PBG/PUL:/2021/003 Evolution of Blackgram varieties (Vigna mungo (L.) Hepper) varieties suitable for rice fallow/summer irrigated conditions of CDZ'	Dr. R. Manimaran Associate Professor (PB&G)	Dec 2021 to Dec 2024	The project may be continued
8.	CPBG/KKM/PBG/BGR/2020/001 Evolving high yielding YMV resistant black gram (Vignamungo (L.) Hepper) genotypes suitable for Thamirabarani and delta zones	Dr. R. Latha Asst. Professor (PBG) Dr. N. Rajinimala, Asst. Professor (PI.Pat.)	July 2019 to June 2022	The completion report should be submitted and new project proposal may be sent for RPAC approval. The genetic materials from the previous research project should be carried over the new project.
9.	CPBG/PKT/PBG/PGR/2019/001: Development of high yielding black gram variety with resistance to MYMD suitable for summer irrigated condition of Cauvery Delta region.	Dr. A. Bharathi, Asst. Professor (PBG)	June 2019 to May 2023	The project may be continued
10.	CPBG/TNJ/PBG/BGR/2020/New Evolution of high yielding Blackgram varieties suitable for rice fallow	Dr. L. Subha Asst. Professor (PBG)	September 2021 to October 2024	The project may be continued

	condition of Cauvery Delta Zone			
11.	CPBG/APK/PBG/BGR/2020/001 Evolution of high yielding drought tolerant blackgram genotypes suitable for rainfed areas of southern districts	Dr. M. Gnanasekaran, Asst. Professor (PBG)	September 2020 to August 2025	The project may be continued
Greengram				
12.	CPBG/VMB/PBG/GGR/2016/001 Evolution of high yielding and MYMV resistant greengram (<i>Vigna radiata</i> (L.) Wilczek) genotypes with synchronized maturity and maintenance of its germplasm	Dr. D. Sassikumar, Professor & Head Dr.P.Shanthi Asst. Prof. (PBG)	July 2016 to June 2021	Project may be closed and new project may be proposed by transferring the materials from the closed projects. VGG 15-013 may be checked for MYMV resistance through agro infection studies More number of related wild spp should be used in hybridization programme. The greengram x black gram segregants should critically be evaluated
13.	CPBG/CBE/PBG/GGR/2016/001 Evolution of greengram varieties with synchronized maturity and resistant to yellow mosaic disease	Dr. A. Muthuswamy Assistant Professor (PBG)	October 2016 – November 2021	The latest variety VBN 4 may be included as check in all the trials
14.	CPBG/ADT/PBG/GGR/2017/001 Evolution of high yielding MYMV resistant Greengram varieties suitable for rice fallow/summer irrigated conditions in CDZ	Dr.R.Manimaran, Assoc. Professor (PBG)	October 2017-September 2022	ADT 3 and powdery mildew donor should be included in crossing programme

Cowpea				
15.	CPBG/VBN/PBG/COP/2020/001 Evolution of high yielding determinate cowpea genotypes (Vigna unguiculata (L.)) suitable for Tamil Nadu and maintenance of germplasm.	Dr.P.Shanthi Asst. Prof. (PBG)	September 2020 – August 2025	Genotypes may be screened for Aphid resistance. Project may be continued
16.	CPBG/CBE/PUL/PUL/2021/005 Evolving high yielding cowpea variety better than CO (CP) 7	Dr. K. Anandhi Asst. Prof. (PBG)	Nov 2021 to Oct. 2026	The project may be continued.
17.	CPBG/MDU/PBG/COP/2019 / 001 Development of short duration, determinate cowpea (Vigna unguiculata L.) variety suitable for southern districts of Tamil Nadu	Dr. M. Gunasekaran, Prof. (PBG)	Sept. 2019- Aug. 2022	Project may be continued. Selection should be done with long pod and bold seed types to increase the yield.
Horsegram				
18.	CPBG/PAI/PBG/PUL/2021 /001 Development of high yielding medium duration photo insensitive horsegram genotypes suited to rainfed tracts of North Western Zone through EMS induced mutagenesis	Dr. K. Geetha Professor (PBG)	Feb. 2021 to Jan 2026	The project may be continued
Chickpea				
19.	CPBG/CBE/PBG/PUL/2021/006 Evolving high yielding dry root rot resistant variety in chickpea	Dr. K. Anandhi Asst.Prof.(PB&G) Dr.G.Senthilraja, AP	Nov. 2021 to Oct. 2026	The project may be continued
Mochai				
20.	CPBG/PAI/PBG/MOC /2017/001 Development of short	Dr. K.Geetha, Professor (PBG)	August 2017 to July	Rapid advancement of genetic materials is required. Station

	duration high yielding photoinsensitive dual types of mochai (Lablab purpureus var lignosus L.)		2022	trials may be critically evaluated and best performing entries may be nominated for MLT
Soyabean				
21.	CPBG/CBE/PUL/2021/007 Development of high yielding soyabean (Glycine max) variety suitable for Tamil Nadu	Dr. K. Anandhi Assistant Professor (PBG)	Nov. 2021 to Oct. 2024	High protein lines may be included in the crossing programme
Ricebean				
22.	Development of YMD resistant varieties in greengram through introgression of genes from ricebean (V. umbellata)	Dr. P. Jayamani Professor (PBG)	Sept. 2021 to Aug. 2026	The project may be continued
Mothbean				
23.	CPBG/BSR/PBG/PUL/2020/001 Evolution of high yielding moth bean ((Vigna aconitifolia (Jacq.) Marecha) variety suitable for Tamil Nadu	Dr. S. Utharasu Assistant Professor (PBG)	November 2020 to October 2025	AICRP - IVT voluntary trials may be obtained. The variety TMV -1 may be mutated and evaluated
Daincha				
24.	CPBG / TRY / PBG / GMC / 2020 / 001 Evolution of high yielding daincha (Sesbania aculeata) genotypes	Dr. S. Chitra Asst. Professor (PBG)	June 2020 to May 2023	Cages may be used for selfing The total biomass production and Nitrogen fixation in soil may be estimated

Clusterbean				
25.	No. P&H, PBG/AC&RI/MDU-New "Evaluation and development of new "Guar" gum – Clusterbean (Cyamopsis tetragonoloba(L.)Taub.) variety suitable for southern districts of Tamil Nadu.	Dr. E. Murugan Professor (PBG)	December 2020 to March 2023	Include Aruppukkottai as one of the station for evaluation of entires in advanced stages
Plant Genetic Resources				
26.	CPBG-CBE-PGR-2019-001 Collection, conservation, documentation, viability monitoring and exchange of germplasm in the Ramiah Gene Bank (RGB)	Dr. V. Thiruvengadam Assistant Professor (PBG) Dr.S. Manonmani Professor and Head (PGR)	July 2019 - June 2022	The project may be continued
AICRP				
Redgram				
27.	AICRP/PBG/CBE/PIP/010 AICRP on Pigeonpea-Evaluation of redgram genotypes under All India Co-ordinated Crop Improvement Project	Dr.R.P.Gnanamalar Professor (PBG) & Head	Continuous	The project may be continued
28.	AICRP/PBG/VRM/PIP/011 All India Co-ordinated Research Project on Pigeonpea	Dr. A.Gopikrishnan, Assistant professor (PBG)	Continuous	The trials may be conducted in correct season. Germplasm may be deposited in Ramaiah gene bank
Blackgram and Greengram				
29.	AICRP/PBG/VBN/MUL/013 All India Coordinated Research Project on MULLaRP	Dr. D. Sassikumar Professor (PBG) and Head	Continuous	Project may be continued
30.	AICRP/PBG/ADT/MUL/015 All India Coordinated Research Project on	Dr.R.Manimaran Assoc. Professor (PBG)	Continuous	New cultures may be nominated for AICRP

	MULLaRP			
Chickpea				
31.	AICRP / PBG / CHB / 012 AICRP on Chickpea - Breeding	Dr.K. Anandhi Asst.Prof.(PB&G)	Continu ous	Project may be continued
AICRP MULLaRP Voluntary Centre				
32.	AICRP-VC/ CBE/PUL/001 Evaluation of mungbean and urdbean coordinated trials on breeding	Dr. A. Muthuswamy Assistant Professor (PBG)	2021- 22	Project may be continued
AINRP Arid Legumes (Vountary centres)				
33	AINRP- VC/PBG/VBN/PUL/001 Voluntary centre under AINRP on Arid Legumes 2020-21	Dr. D. Sassikumar Professor (PBG) and Head Dr.P.Shanthi, Asst.Prof. (PB&G)	2021- 22	Project may be continued
34.	AINRP- VC/PBG/CBE/PUL/001 Voluntary centre under AINRP on Arid Legumes 2019-20	Dr. K. Anandhi Asst.Prof. (PB&G)	2021- 22	Project may be continued
35.	AINRP on horsegram Voluntary centre under AINRP on Arid Legumes 2019-2020	Dr. K.Geetha Professor (PBG)	2021- 22	Project may be continued
External Funded Schemes				
36.	BRNS/PBG/CBE/PUL/201 8/R003 Isolation and characterization of mutants for durable resistance to powdery mildew in blackgram (Vigna mungo L. Hepper)	Dr.D.Kumaraesan Asso. Professor (PBG)	April 2018 to March 2022	Publication may be made at the earliest
37.	DBT/CPBG/BSR/PBG/201 7/R004 "Introgression of Bruchid Resistant Gene(s) from Vigna genotypes into popular Mung bean (Vigna radiata L.) variety through Marker Assisted Backcross Breeding".	Dr.D.Malarvizhi, Assoc. Prof. (PBG), DCPBG, TNAU, Dr.A.Thanga Hemavathy, Assistant Professor (PBG), Dept. of Pulses, CPBG, TNAU	Jul. 2017 to Jun 2022	May be continued

38.	DST-SERB/TRRI/MEL/2022/R 001 Molecular genetic dissection of growth habit, phenology and yield traits in horsegram (<i>Macrotyloma uniflorum</i>) Lam. Verde.	Dr. R. Sudhagar Assistant Professor (PBG) Dr. C.Vanniarajan Professor and Head	Dec. 2021 to Nov. 2024	May be continued
Breeder Seed Production				
39	Maintenance breeding and breeder seed production in greengram, blackgram, redgram and Cowpea varieties	Dr. P.Shanthi Asst. Prof. (PBG)	April 2020 – March 2025	The project may be continued
40	CPBG/PKT/PBG/BGR/2016/001: Breeder Seed Production in Pulses and Groundnut	Dr. A. Bharathi Asst. Professor (PBG)	From April 2016 to March 2021	Project may be closed and new project may be proposed
41	CPBG/CBE/PUL/PUL/2021/001 Maintenance of breeding in redgram varieties released from TNAU, Coimbatore	Dr. A. Thanga Hemavathy Asst. Professor (PBG)	Aug 2021 to Jul 2024	The project may be continued
42	CPBG/BSR/PUL/2021/001 Breeder seed production of newly released crop varieties in pulses	Dr. P. S. Devanand Asst. Prof. (PBG)	June 2021 to May 2024	The project may be continued
43	CPBG/BSR/PBG/RGR/2020/001. Maintenance Breeding in Redgram variety BSR 1	Dr. P. S. Devanand Asst. Prof. (PBG) Dr. S. Utharasu Asst. Professor (PBG)	June 2020 to May 2025	Project may be continued
52.	CPBG/ PLR/ PBG/ BSP/ 2016/ 001 Breeder Seed Production in Blackgram	Dr. S. Ganapathy Asst. Professor (PBG)	Jan. 2016 to Dec. 2021	Project may be closed and new project may be proposed
53.	CPBG/TNJ/PBG/SPN/2019/001 Breeder seed Production in paddy and Pulses	Dr. L. Subha Asst. Professor (PBG)	April 2018- March 2021	Project may be closed and new project may be proposed

D. ACTION PLAN 2022-23

The Action plan will be continued for the second year with identified scientists towards achieving the deliverables in Crop Improvement.

Sl.No.	Theme	Proposed plan of work for 2022-23
1.	Theme No 1. Fast track release of short duration (120 – 130 days) redgram variety (Dr. S. Geetha, Coimbatore, Dr. R. Thangapandian, Vamban Dr. A. Thanga Hemavathy, Coimbatore)	Conducting of ART/OFT
2.	Theme No 4. Fast track release of new chickpea variety (Dr. K. Anandhi, Coimbatore)	Seed multiplication and Quality analysis of the culture ICCV 181674
3.	Theme No. 5. Pyramiding of resistant genes for viral diseases (MYMV, ULCV), powdery mildew diseases and bruchid resistance in blackgram (Dr. R. Thangapandian, Vamban Dr. P.Shanthi, Vamban, Dr. A. Thanga Hemavathy, Coimbatore)	Evaluation of elite and promising lines at NPRC, Vamban Joint screening for disease may be taken up by scientists of Vamban and Coimbatore centres
4.	Theme No. 6. Identification of genotypes for salinity tolerance in greengram and blackgram (Dr. R. Thangapandian, Vamban Dr. P.Shanthi, Vamban)	Evaluation of promising genotypes at targeted locations from Salem and Nagapattinam Districts
5.	Theme No 7. Development of pre breeding population in blackgram and greengram (Dr. R. Thangapandian, Vamban, Dr. P.Shanthi, Vamban Dr. A. Thanga Hemavathy, Coimbatore)	Fresh crosses may be attempted with <i>Vigna umbellata</i> to develop pre breeding lines
6.	Theme No. 8. Evaluation and Introduction of ricebean in Tamil Nadu (Dr. P. Jayamani, Professor (PBG), Department of Pulses)	Introduction of ricebean Locations : 25 - Javadhu hills
7.	Theme No. 9. Evolving high yielding blackgram genotypes with higher test weight (more than 6.0 grams)	Evaluation of segregating populations

	(Dr. R. Thangapandian, Vamban, Dr. P. Shanthi, Vamban)	
8.	Theme No. 10 Evolving high yielding greengram genotypes with long pod (More than 10 cm) Dr.S.Geetha, Prof. & Head, Dept of Pulses	Evaluation of segregating populations

II. CROP MANAGEMENT

A. Decisions made on OFTA1. For Adoption

A1. Foliar spray of fermented fish waste extract for Greengram

Centers: ADAC&RI -Trichy, NPRC -Vamban, ARS –Kovilpatti and AC&RI - Madurai

Foliar application of 2% fermented fish waste extract during flowering stage and 15 days after spray registered higher number of pods per plant (37.4), grain yield (918 kg/ha), yield increment (20.1%), net returns (Rs. 32832/ ha) and BCR (2.47) in greengram.

A2. Augmentation of greengram productivity in problem soils through suitable variety and phosphorus fertilization

Centers: NPRC - Vamban, ADAC&RI -Trichy and ARS - Kovilpatti.

Under acidic and sodic soil conditions, basal application of 125% P + PSB 2 kg ha⁻¹+ VAM 50 kg ha⁻¹ increased the yield of 26 and 22% respectively and greengram variety VBN 4 is suitable for all types of soil.

A3. Agro technologies for rice fallow pulses

Centres: TRRI - Aduthurai, ARS -Thanjavur and AC & RI -Killikulam

Recommended package of practices for rice fallow pulses

Crop & Varieties	:	Blackgram: ADT 6 , VBN 9, ADT 7 Greengram : ADT 3
Time of sowing	:	4-6 days before mechanical rice harvest or 7-8 days prior to manual harvest in waxy soil moisture condition
Seed rate	:	30 kg ha ⁻¹
Seed treatment	:	Imidacloprid (1.5 ml kg ⁻¹) + Bacillus subtilis (10 g kg ⁻¹) + Rhizobium and Phosphobacteria (30 g kg ⁻¹)
Herbicide	:	If weeds found POE tank mix application of Quizalofop-ethyl 50 g ha ⁻¹ and Imazethapyr 50 g ha ⁻¹ at 15- 20 DAS
Foliar spray	:	TNAU Pulse Wonder @ 5 kg ha ⁻¹ at flower initiation
Stress mitigation	:	Mobile sprinkler irrigation at critical stages using harvested rain water from farm pond.

		PPFM 1% spray to mitigate the drought
Plant protection measures	:	Monitoring of pests and diseases throughout the crop period and practicing need based IPM

The above recommended package of technology recorded 32 per cent yield enhancement in rice fallow pulses.

A4. Evaluation of nursery technique for transplanted redgram

Centre: Dept. of Agronomy, Dept. of Pulses, TNAU, Coimbatore and RRS, Paiyur

Redgram seedling should be raised during the second fortnight of July to first fortnight of August. Seedlings are raised in poly bag (6' x 4' size). Native soil and vermicompost (1:1) is used as a filling media for polybag.

Transplanting of 25 days old seedling raised in poly bags is a viable option for getting higher yield (1388 kg/ha), net income (Rs.32870/ha) and BCR 2.23 in redgram as compared to direct sowing. Transplanting of seedling raised in poly bags at 25 DAS recorded 32 per cent higher yield than direct sowing.

A5. Impact of TNAU Horsegram Wonder on yield improvement in horsegram under rainfed condition

Centers: RRS-Paiyur, TCRS -Yethapur, Dept. of Agronomy - TNAU, Coimbatore

Foliar application TNAU Horsegram Wonder @ 5 kg / ha at flowering stage registered highest grain yield of 728 kg ha⁻¹ with 10% and 22.2% yield increased compared to TNAU Pulse Wonder and DAP spray, respectively with highest BC ratio of 2.17.

A6. Response of different genotypes of greengram for organic farming

Centre: Nammazhvar Organic Farming Research Centre, TNAU, Coimbatore

Packages of practices for organic greengram cultivation

- Basal application of well decomposed FYM @ 12.5 t /ha.
- Seed treatment with Bacillus subtilis @10 g/ kg + Trichoderma viride @ 4g / kg + Rhizobium @ 30 g/kg + Phosphobacteria @ 30 g /kg + Potash bacteria @ 30 g /kg
- Soil application of Rhizobium @ 2.5 kg + Phosphobacteria @ 2.5 kg + Potash bacteria @ 2.5 kg / ha mixed with each of 25 kg of FYM and applied before sowing
- Application of panchagavya 3% thrice at 25, 40 and 50 DAS as foliar nutrition
- Need based application of azadirachtin 10,000 ppm @ 2 ml/litre or Neem Seed Kernel Extract 5% or neem oil 3% / Beauveria bassiana @ 2 g/litre as foliar spray for the management of insect pests.

- Need based application of liquid *Bacillus subtilis*@ 5ml /litre to ward off foliar diseases.

Among 12 greengram genotypes tested with the above packages of practices for organic cultivation, greengram variety CO 8 recorded the highest yield (981 kg/ha), net return (Rs. 22,262 / ha) and BC ratio (1.61). Hence, CO 8 greengram is recommended as variety suitable for organic production system.

NATURAL RESOURCE MANAGEMENT

A I. For Adoption

1. Soil Test Crop Response Correlation Studies through IPNS for Rainfed Bengalgram

- Targeting of 2.0 t ha⁻¹ grain yield of Bengalgram under STCR-IPNS is ideal in terms of yield (1942 kg ha⁻¹), Response Ratio (17.5 kg kg⁻¹), BCR (2.42) and soil fertility maintenance on mixed black calcareous soils of Tamil Nadu. An increase of 14 % grain yield has been recorded due to STCR-IPNS over blanket + FYM

STCR – IPNS (NPK + FYM) FPEs for Bengalgram (Rainfed Crop)

FN	=	7.02 T – 0.72 SN – 0.43 ON
FP ₂ O ₅	=	5.05 T – 4.32 SP – 0.54 OP
FK ₂ O	=	1.81 – 0.16 SK – 0.27 OK

A II F.or Information

1. Quality assessment of TNAU pulse varieties

- Among the different crops and varieties tested high crude protein, Fe, Zn and methionine contents were observed in Greengram (CO 8), Blackgram (VBN 11), Bengalgram (CO 4) & Redgram (CO 9). And Low in phytic acid was observed in Green gram (CO 7), Blackgram (VBN 9), Bengalgram (CO 4), Redgram (CO 7).

2. Zinc Nutrition of Blackgram in alkaline Soil

- Application of Soil test based NPK with ZnSO₄ @ 25 kg ha⁻¹ and ZSB at 500 ml ha⁻¹ recorded higher seed yield (851 kg ha⁻¹) which was 16.5 % higher than NPK alone applied plots. The Zn use efficiency was higher with the application of ZSB along with ZnSO₄ at 18.75 kg ha⁻¹.

3. Rhizobium isolate - VUC on growth and yield of blackgram

- Application of new Rhizobium isolate VUC along with PSB + KRB + 75% RDF recorded higher number of nodules per plant (40/plant) which is 14% increase over the standard strain BMBS 47. This has resulted 19% increase in nodule dry weight over the standard strain BMBS 47. The yield increase was 6% (951 kg/ha) over the standard strain BMBS 47 (899 kg/ha).

4. Rhizobium isolate-VMF on growth and yield of greengram

- Application of new Rhizobium isolate VMF along with PSB + KRB + 75% RDF recorded higher number of nodules/plant (42) and this is 7% increase over the standard strain BMBS 47. This has also recorded higher grain yield of 1005 kg ha⁻¹ which was 8% increase over the standard strain BMBS 47 (934 kg/ha).

5. Rhizobium strain for greengram suitable for sodic soils

- In sodic soil, application of Rhizobium TRY3 recorded maximum green gram yield (644 kg ha⁻¹) followed by Rhizobium standard strain (BMBS 47) (626 kg ha⁻¹) treatment.

6. Bio- fortification of Zn in Greengram and Blackgram

- Application of soil test based NPK + 12.5 kg ZnSO₄ ha⁻¹ as basal + foliar spraying of 0.50% ZnSO₄ twice at 30 and 45 DAS was found optimal for increasing grain Zn content and seed yield (1156 kg ha⁻¹, 28.4% increase). The Zn enrichment was Haulm > Seed > Seed coat.

7. Bio- fortification of Fe in Greengram and Blackgram

- Application of soil test based NPK + 25 kg FeSO₄ ha⁻¹ as basal + foliar spraying of 0.50% FeSO₄ twice at 30 and 45 DAS was optimal for increasing grain Fe content and seed yield (1239 kg ha⁻¹, 27%). The Fe enrichment was Haulm > Seed > Seed coat.

8. Bio-fortification of Sulphur to improve quality of pulses

- Bio-fortification of sulphur was registered due to the application of S @ 40 kg ha⁻¹ as FeSO₄ (or) ZnSO₄ in calcareous soils and the efficient S utilizing blackgram genotypes were VBN 11 and CO 6.

9. Effect of organo- mineral biochar phosphorus fertilizer on phosphorus availability, utility and yield of Blackgram (VBN 8) in low pH Alfisol

- Application of superphosphate enriched organo biochar @ 750 kg ha⁻¹ with phosphobacteria @ 2 kg ha⁻¹ recorded higher blackgram seed yield of 1094 kg ha⁻¹ which was 19 and 27 % higher than SSP and rock phosphate, respectively with higher BCR of 2.0.
- This treatment resulted in higher soil P availability (21.7 kg ha⁻¹) and phosphorus uptake (15.1 kg ha⁻¹), which was 13 & 15 and 23 & 27% higher than SSP and rock phosphate, respectively.

10. Effect of organo- mineral biochar phosphorus fertilizer on phosphorus availability, utility and yield of Redgram (VBN 3) in low pH Alfisol

- Application of rock phosphate enriched organo biochar @ 750 kg ha⁻¹ with phosphobacteria @ 2 kg ha⁻¹ recorded higher redgram seed yield of 1498 kg ha⁻¹ which was 22 & 20 % higher than SSP and rock phosphate, respectively with higher BCR of 2.1.
- This treatment resulted in higher soil P availability (21.2 kg ha⁻¹) and phosphorous uptake (19.2 kg ha⁻¹), which was 25 & 20 and 21 & 31 per cent higher than SSP and rock phosphate, respectively.

11. Bio-organo mineral nutri-pellet for enhancing Redgram (VBN 3) productivity

- Application of Controlled-release fertilizer I (50% biochar + 25% FYM + 25% vermicompost) and Controlled release fertilizer III (25% biochar + 25% FYM + 50% vermicompost) with 100 % NPK recorded higher redgram seed yield of 1507 and 1485 kg ha⁻¹, respectively which was 18 & 17 % higher than 100% NPK (BCR of 2.1). These treatments resulted in per cent increase of soil available NPK of 8, 29, and 18, respectively over 100% NPK alone.

12. Crop Specific Nutrient Mixture for Yield Maximization and Quality Improvement in Redgram

- Application of soil test based fertilizers (25:50:30 kg ha⁻¹) viz., CAN + DAP + SOP recorded the highest growth attributes at 30, 60, 90 and 120 DAS in redgram (CO Rg 7). The treatment CAN + DAP + SOP registered high yield of 825 kg ha⁻¹ over standard check treatment (Urea + SSP + MOP) (710 kg ha⁻¹) with highest BCR.

13. Gamma irradiated mutants of Bacillus spp. and Actinobacteria consortium to control the wilt and root rot diseases of Pulses

- Bacillus siamensis BRBac21-1 + Streptomyces cavourensis BRAcB10-1 recorded minimum root rot incidence of 16 % and 21% in blackgram and greengram; whereas the fungicide Thiram recorded 13% and 15% root rot incidence in blackgram & greengram. Maximum wilt incidence (84%) was observed in control and minimum incidence in Thiram (20%) and Bacillus sp. (21%) in Redgram.

14. Validating the stability of Rhizobium mutant VM -1

- Rhizobium mutant (VM1) survived both under in-vitro & in-vivo. Survival of Rhizobium Mutant (VM1) was observed better under pot culture (7.5×10^4 cfu/g soil) than field condition (5×10^3 cfu/g soil). Both Rhizobium mutant (VM1) & wild (VW) performed on par in terms of nodulation and yield & recorded 12.8 % more yield than standard (BMBS 47). Molecular analysis viz., ERIC PCR & RAPD marker confirmed the significant variability between mutant Rhizobium (VM1) and wild Rhizobium (VW).

15. Nodule Associated Microbes (NAM) for enhanced nodulation and crop productivity in Horsegram

- Nodule Associated Potential Microbes include Rhizobium sp. HGR1; Pseudomonas indoloxydans HGB2; HGY1: Morphotype of yeast
- Plant growth promoting traits: IAA- HGR1 (39.12 µg ml⁻¹); Nutrient solubilisation Index- HGR1 (Phosphorus-2.6, Zinc-3.96, Potassium-1.21); Drought tolerance - HGR1 (ACC Deaminase=541.2 nmole α-Ketobutyrate mg protein⁻¹ h⁻¹) and Siderophore- HGB2 (93.681 µg ml⁻¹). Strains produced organic acids such as citric acid, maleic acid and malonic acid for solubilisation of nutrients

A III. For OFT

1. Zinc Nutrition of Blackgram in alkaline Soils

Objective

- To improve the zinc availability in alkaline soil and yield enhancement in blackgram

Treatments

T₁: Soil test based NPK

T₂: Soil test based NPK + ZnSO₄ @ 25 kg ha⁻¹

T₃: Soil test based NPK + ZnSO₄ @ 18.75 kg ha⁻¹ + 500 ml ZSB ha⁻¹

Period: 1 year (2022-2023)

Observations and Analysis

- Seed yield
- Growth and yield attributes
- DTPA zinc in soil
- Zinc content & uptake; Zn use efficiency in plants

Lead centre & Scientist In-charge

Soils and Environment, AC&RI, Madurai

Dr. R. Indirani, Associate Professor (SS&AC)

Dr.K. Kumutha, Professor and Head (AGM), AC&RI, Madurai

Co-ordinating centres & Scientists In-charge

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

CSRC, Ramanathapura : Dr. J. Prabhakaran, Asst. Professor (SS&AC)

AC&RI, Killikulam : Dr.K.Manikandan, Asst. Professor (SS&AC)

2. Effect of organo- mineral biochar phosphorus fertilizer on phosphorous availability, utility and yield of pulse crop in low pH Alfisol

Objective

- To study the effect of organo-mineral biochar P fertilizer on phosphorous availability, utility growth and yield of blackgram and redgram

Treatments

Blackgram

T₁- STCR based Phosphorous as Single super phosphate (SSP)

T₂- STCR based Phosphorous as SSP enriched organo-mineral biochar @ 750 kg ha⁻¹ + Bacillus megaterium (2 kg ha⁻¹ as soil application)

T₃- STCR based Phosphorous as RP enriched organo mineral biochar @ 750 kg ha⁻¹ + Bacillus megaterium (2 kg ha⁻¹)

Redgram

T₁- STCR based Phosphorous as Rock Phosphate (RP)

T₂- STCR based Phosphorous as RP enriched organo-mineral biochar @ 750 kg ha⁻¹
¹+ Bacillus megaterium (2 kg ha⁻¹)

T₃- STCR based Phosphorous as SSP enriched organo-mineral biochar @ 750 kg ha⁻¹
¹+Bacillus megaterium (2 kg ha⁻¹)

Period: 1 year (2022-2023)**Observations and Analysis**

Biometric & yield parameters:

Plant height, Root length, Root Nodules, DMP, No. of pods, Test weight & Seed yield

Soil properties:

Soil available P, Biomass P, WSP, SOC, SMBC& Labile carbon

Quality parameters:

Plant P content, seed P content, P uptake in plant and seed

Lead centre & Scientist In-charge:

Soils and Environment, AC&RI, Madurai:

Dr. P. Kannan, Assistant Professor (SS&AC)

Dr. K. Kumutha, Professor and Head (Agrl. Microbiology)

Co-ordinating centres & Scientists In-charge:

NPRC, Vamban : Dr. S. Marimuthu, Assistant Professor (Agronomy)

AC&RI, Kudimiyanmalai: Dr. M. Vijayakumar, Assistant Professor (SS&AC)

3. Validating the bio-fortification technologies for Zn and Fe in Pulses**Objective:**

To fortify the grains with Zn and Fe for improving the quality of Pulses

Treatments:

T₁ : Soil test based fertilizer recommendation

T₂: T₁ +12.5 kg ZnSO₄ ha⁻¹ as basal+0.50% ZnSO₄ foliar spraying twice at 30 and 45 DAS

T₃: T₁+25 kg FeSO₄ ha⁻¹ as basal + 0.50% FeSO₄ foliar spraying twice at 30 and 45 DAS

Crops : Greengram & Blackgram

Soils : FLDs on Normal and Deficient soils will be conducted by the lead centre

Observations to be recorded:

- Grain and Haulm yield
- Zn/Fe availability in soil and uptake in plants
- Zn/Fe distribution in grains
- Quality of seeds (protein and aminoacids)

Lead Centre & Scientists:

Department of SS&AC, TNAU, Coimbatore: Dr. T. Chitdeshwari, Professor (SS&AC)

Centre & Scientists incharge:

Coimbatore: Dr. T. Chitdeshwari, Professor (SS&AC), TNAU, Coimbatore

Paiyur: Dr.M.Gopalakrishnan, Asst. Professor (SS&AC), HC&RI, Jeenur

Pudukottai: Dr.M.Vijayakumar, Asst. Professor (SS&AC), AC&RI, Kudumiyanmalai

B. Research Projects on Pulses

Crop	Centre	Action plan	URP	AICRP	Externally funded	OFT	Total
Agronomy							
Blackgram	NPRC, Vamban	2	1	1		-	4
	Pulses, Coimbatore	2	-	-			2
	TRRI, Aduthurai	-	-	1		1	2
	SOA, Coimbatore	1	-	-			1
	AEC&RI, Kumulur	1	-	-		-	1
	AC & RI, Killikulam	1					
Greengram	NPRC, Vamban	-	1	-			1
	TRRI, Aduthurai	-	-	1			1
	ADAC&RI, Trichy		1	-		1	2
	ARS, Kovilpatti		1	-			1
Redgram	Department of Pulses, Coimbatore	1	-	1		-	2
Rice bean	Department of Pulses, Coimbatore	1	-	-		-	1
Crop Physiology							
Greengram	Dept. of CRP, TNAU, Coimbatore	-	1	-		-	1
Redgram	Dept. of CRP, TNAU, Coimbatore	1	-	-		-	1

Horsegram	RRS, Paiyur	-	-	-		1	1
Soil Science and Agricultural Chemistry							
		3	1	1	1	(Student thesis 1)	7
Agricultural Microbiology							
		3	5	2	1	(Student thesis 2)	13

C.Remarks on the ongoing Action Plans/URPs/Core/AICRPs / ExternallyFunded Projects

CROP MANAGEMENT

AGRONOMY

Sl. No.	Project No. and Title	Name and Designation of the Project leader	Remarks
1	OFT on Developing Agro technologies for rice fallow pulses	Co-ordinating centre: TRRI, Aduthurai. Dr. C. Uma Mageswari Assoc. Prof. (Agronomy) AC &RI, Killikulam - Dr. E.Subramanian, Asst. Prof. (Agronomy) ARS, Kattuthottam- Dr. S. Porpavai Prof.& Head.	The technology to be recommended for adoption.
2.	OFT on Enhancing productivity of greengram through foliar spray of fermented fish waste extract	Co-ordinating centre& Scientist In-charge: ADAC&RI, Trichy: Dr.T.Ramesh, Asst. Prof. (Agronomy) NPRC, Vamban: Dr. S. Marimuthu, Asst. Prof. (Agronomy) ARS, Kovilpatti: Dr. S. Manoharan, Asst. Prof. (Agronomy) AC&RI, Madurai: Dr. R. Vijayalakshmi Assoc. Prof. (Agronomy)	The technology to be recommended for adoption.
ACTION PLAN			
1	Agronomic evaluation of spacing and fertilizer requirement of rice bean (2021 - Action plan 2)	Dr. S. Anitta Fanish Asst. Prof. (Agronomy) Dept. of Pulses, TNAU, Coimbatore	The findings to be given for general recommendation.

	(June 2021 to March 2022)		
2.	Evolving System of Pulses Intensification on blackgram (June 2021 to March 2023)(2021 - Action plan 3)	<p>Co-ordinators: Director - WTC Director (Crop Management)</p> <p>Implementing Centres: Dept. of Pulses, TNAU, CBE: Dr. S. Anitta Fanish, Asst. Prof. (Agronomy)</p> <p>NPRC, Vamban: Dr. S. Marimuthu Asst. Prof. (Agronomy)</p> <p>AEC &RI, Kumulur: Dr. S. Anandha Krishnaveni, Asst. Prof. (Agronomy)</p> <p>AC & RI, Killikulam: Dr. J. Bhuvaneswari, Asst. Prof. (Agronomy)</p>	The research findings given for information and action plan to be continued.
3.	Evaluation of nursery technique for transplanted redgram(June 2020-21 to March 2021-22) (2020 - Action plan 1)	<p>Co-ordinatingcentre: Department of Agronomy, TNAU, Coimbatore Dr. S. Anitta Fanish, Asst. Prof. (Agronomy)</p> <p>Department of Agronomy, AC & RI, Madurai Dr. R. Vijayalakshmi, Assoc. Prof. (Agronomy) RRS, Paiyur Dr.P.Parasuraman, Professor and Head</p>	The technology to be recommended for adoption.
4.	Response of different genotypes of greengram for organic farming(June 2020-21 to March 2021-22) (2020 - Action plan 2)	<p>NOFRC, TNAU, Coimbatore Dr.S. Manickam Professor and Head Dr. M. Suganthy, Assoc. Prof. (Agrl. Ento.)</p>	The technology to be recommended for adoption.
UNIVERSITY RESEARCH PROJECTS : BLACKGRAM			
1	DCM/TRRI/VBN/2021/001 Water saving and cost effective irrigation technology for blackgram cultivation(June 2021 to March 2023)	<p>Theme Leader: Director (WTC), TNAU, Coimbatore Implementing Centre & Scientist In-charge: NPRC -Vamban</p>	The research findings given for information and project to be continued.

		Dr.S.Marimuthu, Asst. Prof. (Agronomy) AEC & RI - Kumulur Dr.S.Vallalkannan, Asst. Prof. (Agronomy)	
UNIVERSITY RESEARCH PROJECTS : GREENGRAM			
1	DCM/VBN/AGR/GGR/2020/001 (2020 Action plan 3) Augmentation of green gram productivity in problem soils through suitable variety and phosphorus fertilization (June 2020-21 to March 2022-23)	Co-ordinatingcentre: NPRC, Vamban NPRC, Vamban (Acid soil) Dr. S.Marimuthu Asst. Prof. (Agronomy) NPRC, Vamban Dr.P.Kannan Asst. Prof. (SS&AC) AC&RI, Madurai ADAC&RI, Trichy (Sodic soil) Dr. T. Ramesh Asst. Prof. (Agronomy) Dr.J.Ejilane Asst. Prof. (Microbiology) ARS, Kovilpatti (Saline soil) Dr.S.Manoharan Asst. Prof. (Agronomy) Dr.V.Sanjivkumar, Asst. Prof. (SS&AC)	The technology recommended for adoption and project to be closed.
AICRP PROJECT: BLACKGRAM			
1	AICRP/PBG/VBN/MUL/017 U1 : Agronomic evaluation of AVT2 rabiurdbean genotypes under varied data of sowing (2021)(June 2021 to May 2022)	Dr. S.Marimuthu Asst. Prof. (Agronomy) AICRP – MULLaRP NPRC, Vamban	The project to be closed.
2	AICRP/PBG/VBN/MUL/018 Evaluation of post-emergence herbicides in urdbean (June 2019 to May 2021)	Dr. S.Marimuthu Asst. Prof. (Agronomy) AICRP – MULLaRP NPRC, Vamban	The research findings may submitted for information and project to be closed.
3	AICRP/ PBG/ ADT/ MUL/ 015 Effect of seed inoculation, weed management and foliar nutrition on summer urdbean for higher productivity (April 2020 to March 2022)	Dr. C. Umamageswari, Assoc. Prof. (Agronomy), TRRI, Aduthurai	The project to be continued.

4	AICRP/ PBG/ ADT/ MUL/ 015 Agronomic evaluation of AVT-2 Rabi urdbean genotypes under varied time of sowing (June 2021 to May 2022)	Dr. C. Umamageswari, Assoc. Prof. (Agronomy), TRRI, Aduthurai	The project to be closed.
5	AICRP/ PBG/ ADT/ MUL/ 015 Yield maximization in rice fallow blackgram through agronomic management (April 2019 to March 2022)	Dr. C. Umamageswari, Assoc. Prof. (Agronomy), TRRI, Aduthurai	The project to be closed.
6.	AICRP/DCM/KPT/AGR/003 Effect of weather conditions on powdery mildew disease in blackgram (September 2015 to March 2021)	Dr.G.Sudhakar Assistant Professor (Agronomy), ARS, Kovilpatti	The project to be closed.
AICRP PROJECT: GREENGRAM			
8.	AICRP/ PBG/ ADT/ MUL/ 015 Effect of foliar spray of nutrients for yield maximization of mungbean (June 2021 to March 2022)	Dr. C. Umamageswari, Assoc. Prof. (Agronomy), TRRI, Aduthurai	The project to be continued.
AICRP PROJECT : REDGRAM			
9.	AICRP / PBG / CBE /PIP / 010 Agronomic evaluation of AVT –II entry (June 2021 to March 2022)	Dr. S. Anitta Fanish Asst. Prof. (Agronomy) AICRP – Pigeonpea Dept. of Pulses, TNAU, Coimbatore	The project to be continued.
10.	AICRP/PBG/CBE/PIP/010 Evaluation of post emergence herbicides in pigeonpea (June 2019 to March 2022)	Dr. S. Anitta Fanish Asst. Prof. (Agronomy) AICRP – Pigeonpea Dept. of Pulses, TNAU, Coimbatore	The project to be closed.
11.	AICRP/PBG/CBE/PIP/010 Evaluation of pigeonpea + specialty corn and parching sorghum intercropping system (June 2021 to March2024)	Dr. S. Anitta Fanish Asst. Prof. (Agronomy) AICRP – Pigeonpea Dept. of Pulses, TNAU, Coimbatore	The project to be continued.
12.	AICRP/PBG/CBE/PIP/010 Agronomic fortification of pigeonpea with Zn and Fe (June 2021 to March2024)	Dr. S. Anitta Fanish Asst. Prof. (Agronomy) AICRP – Pigeonpea Dept. of Pulses, TNAU, Coimbatore	The project to be continued.

13.	AICRP/DCM/KPT/004 Intercropping of nutria-cereals and pulses with medium duration pigeon under alfisols condition (June 2019 to May 2022)	Dr. S. Manoharan Asst.Prof. (Agronomy) AICRP for Dryland Agriculture ARS, Kovilpatti	The project to be continued.
14	AICRP/DCM/KPT/004 Intercropping of nutria-cereals with medium duration pigeonpea under vertisols condition (June 2019 to May 2022)	Dr. S. Manoharan Asst.Prof. (Agronomy) AICRP for Dryland Agriculture ARS, Kovilpatti	The project to be continued.

CROP PHYSIOLOGY

Sl. No.	Project No. and Title	Project leaders	Remarks
OFT			
OFT 3	Impact of TNAU Horsegram Wonder on yield improvement in horsegram under rainfed condition	Coordinating Centre & Scientist in-charge: RRS, Paiyur- Dr. R. Sivakumar Assoc. Prof. (Crop Physiology) Other Centres & Scientists In-Charge Dr. S. Sanbagavalli Professor (Agronomy), Dept. of Agronomy, TNAU, Coimbatore Dr. R. Nageswari Asst. Prof. (Agronomy), TCRS, Yethapur	The technology may be recommended for adoption.
Action Plan			
1.	Development of foliar formulations for yield enhancement in redgram under normal and water deficit environments(2019 to 2022)	Dr. P. Jeyakumar Prof. (Crop Physiology) TNAU, Coimbatore Dr. V.BabuRajendra Prasad, Asst. Prof. (CRP) Dept. of Crop Physiology TNAU, Coimbatore	The project to be closed.

University Research Projects			
1.	DCM/CBE/CRP/GGR/2021/001 Study on melatonin induced changes in physiology and metabolome of greengram (VignaradiataL.) under drought and high temperature stresses (Nov. 2020 to Oct. 2022)	Dr. M.K. Kalarani Director (Crop Management) TNAU, Coimbatore	The research findings may be submitted for information and project to be continued.

SOIL SCIENCE AND AGRICULTURAL CHEMISTRY

S. No.	Project Number and Title	Remarks
Action plan - Blackgram		
1.	<p>Action Plan 5. Zinc nutrition of black gram in alkaline soil</p> <p>Lead Centre and Scientists Dr. R. Indirani, Assoc. Professor (SS&AC) Dept. of S&E, AC&RI, Madurai Dr.K.Kumutha, P&H (AGM), Dept. of Agrl. Microbiology, AC&RI, Madurai</p> <p>Co-ordinating centres & Scientist In-charge ADAC&RI, Trichy: Dr. D. Janaki, Asst. Prof. (SS&AC) CSRC, Ramanathapuram: Dr. J. Prabhakaran, Asst. Prof. (SS&AC)</p>	<ul style="list-style-type: none"> • Results of all the centres may be pooled and give it for information. • Findings may be proposed for OFT
University Research Project		
Blackgram		
2.	<p>DNRM/CBE/SSAC/PUL/2021/001 (2021-Action plan 4): Assessment of quality parameters of TNAU pulse varieties (August 2021 - July 2022)</p> <p>Dr.R.K.Kaleeswari, Professor (SS&AC) Dr.D.Uma, Professor&Head , Dept.of Biochemistry, TNAU, Coimbatore</p>	<ul style="list-style-type: none"> • Varieties may be categorized based on quality parameters • Analysis may be completed for the remaining parameters and completion report may be submitted for approval.

AICRP		
3.	AICRP/NRM/CBE/SAC/002: Soil Test Crop Response Correlation Studies through IPNS for Bengalgram (Sept. 2020 to August 2023) PI: Dr. M. Gopalakrishnan Asst. Professor (SS&AC) Co-PI: 1. Dr. S.Maragatham Professor (SS&AC) 2. Dr. R.Rajeswari Asst. Prof. (SS&AC) Dept. of SS& AC, DNRM, TNAU, Coimbatore	<ul style="list-style-type: none"> • Findings may be proposed for adoption • Blanket yield may be equated to fit in the model as per STCR approach. • Important quality parameters for seed may be analyzed and include in the report.
4.	AICRP/NRM/CBE/SAC/004 - Programme 5: Screening pulses genotypes for Zn and Fe efficiency and Bio-fortification (April, 2020 to March, 2022) Dr.T.Chitdeshwari, Professor (SS&AC)	<ul style="list-style-type: none"> • Zinc/iron bio-fortification may be given for information. • Findings may be proposed for OFT.
Externally Funded Projects		
5.	DST/ACRI/MDU/DSE/2020/R010 Effect of organo - mineral biochar phosphorus fertilizer on phosphorous availability, utility and yield of pulse crop in low pH Alfisol (February 2020 to January 2023) Dr. P. Kannan, Asst Professor (SS&AC) Dept. of Soils &Environment, AC&RI, Madurai	<ul style="list-style-type: none"> • Findings may be given for information and proposed for OFT. • Include one microbiologist from AC&RI, MDU while proposing for OFT. • Biochar with alkaline pH may be chosen for acidic soils.
7.	SDPC-ACRI-MDU-DSE-2021-R013: Developing bio-organo mineral nutri pellet for enhancing red gram productivity (March 2021 to March 2022) Dr. P. Kannan, Asst. Prof. (SS&AC) Dept of Soils and Environment, AC&RI, Madurai and Dr. K. Kumutha, Professor and Head, Dept of Agricultural Microbiology, AC&RI, Madurai	<ul style="list-style-type: none"> • Validation of the product may be carried out by proposing URP. • Extension can be obtained upto July, 2022. • Findings may be given for information • Possibility for mechanization may be assessed after consulting with Agrl. Engineering Department.

AGRICULTURAL MICROBIOLOGY

S. No.	Project Number and Title	Remarks
Action plan:		
1.	Action plan 8: Evaluation of Rhizobium strain for greengram suitable for sodic soils (2019-2022) Cordinating Centre: Dr. M. Sundar, Prof. (Agrl. Micro.), ADAC&RI, Trich. Sub centres: Dr. E. Jamuna, Asst. Prof. (Agrl. Micro.), ORS, Tindivanam Dr. K.G. Sabarinathan, Asst. Prof. (Agrl. Micro.), AC&RI, Killikulam	<ul style="list-style-type: none"> • Findings may be given for information. • Soil characterization may be carried out and may be reported. • Molecular characterization of the proposed culture may be done. • Survival studies on Rhizobium in soil may be carried out
University Research Project		
Blackgram		
2.	NRM/TRRI/VBN/BGR/2021/001 (2021-Action plan 6) Study on the effect of Rhizobium isolate-VUC on growth and yield of blackgram (July, 2021 to June, 2023) Dr. R. Parimala devi, Asst. Prof. (AGM), NPRC, Vamban Dr. K. Kumutha, P&H, Dept. of Agrl Microbiology AC&RI, Madurai Dr. M. Gnanachitra, Assoc. Prof. (AGM), Dept. of Agrl. Micro, Cbe Dr. E. Jamuna, Asst. Prof. (Agrl. Micro.) ORS, Tindivanam Dr. T. Sivasankari Devi. Asst. Prof. (Agrl. Micro.), TRRI, Aduthurai	<ul style="list-style-type: none"> • The project is to be continued. • Findings may be given for information. • Molecular characterization of the Rhizobium cultures may be done
3.	NRM/VBN/AGM/BGR/2012/001 Response of bacterial and fungal bioinoculants on nodulation, seedyield and enhancing the qualitative parameters in blackgram (Aug'2018 to July'2020) Dr.R. Parimala devi, Asst. Professor (Agrl. Microbiology), NPRC, Vamban.	<ul style="list-style-type: none"> • The project may be closed and completion report may be submitted. • Findings may be given for information.
4.	NRM/CBE/AGM/BGR/2019/001 Validating the stability of Rhizobium mutant VM1suitable for blackgram under acid soil condition. (October' 2019 to September'2020)	<ul style="list-style-type: none"> • Findings may be given for information

	Dr.M.Gnanachitra, Professor (Microbiology), Dept. of Agrl. Microbiology, TNAU, Cbe-3.	
5.	NRM/MDU/AGM/PUL/2020/001 Development of efficient indigenous Rhizobium strains for yield maximization of pulses in Madurai district (September 2020 to October 2023) Dr. M. Jeya Bharathi, Asst. Prof. (Agrl. Microbiology) Dr. E. Subramani, Assist. Professor (Agronomy)	<ul style="list-style-type: none"> • The project may be continued • Interim report should be submitted to the Director, NRM after completing molecular characterization of the cultures.
6.	NRM/ADT/AGM/PUL/2020/001: Development of salt tolerant Rhizobium for enhancing productivity of rice fallow pulses under salinity stress (August' 2020 to August' 2022) Dr. T. Sivasankari Devi, Asst. Professor, (Agrl. Microbiology)	<ul style="list-style-type: none"> • The project may be continued • Extension proposal may be submitted for one more year. • Molecular characterization may be completed. • On time initiation of the field trial (Rice fallow pulses) may be taken care of.
GREENGRAM		
7.	NRM/TRRI/VBN/GGR/2021/001 (2021-Action plan 7) Performance evaluation of Rhizobium isolate-VMF in Greengram under different locations Dr. R. Parimala devi, Asst. Prof. (AGM), NPRC, Vamban Dr. K. Kumutha, P&H, Dept. of Agrl Microbiology AC&RI, Madurai Dr. M. Gnanachitra, Assoc. Prof. (AGM), Dept. of Agrl. Micro, Cbe Dr. E. Jamuna, Asst. Prof. (Agrl. Micro.) ORS, Tindivanam Dr. T. Sivasankari Devi. Asst. Prof. (Agrl. Micro.), TRRI, Aduthurai	<ul style="list-style-type: none"> • The project is to be continued. • Findings may be given for information. • Molecular characterization of the Rhizobium cultures may be done
REDGRAM		
8.	NRM/TVM/AGM/PUL/2022/001. Development of liquid bioinoculant consortium and its effect on growth and productivity of Redgram (January 2022- December 2024)Dr. R. Brindavathy, Associate Professor (Ag.Microbiology) Oil Seeds Research Station, Tindivanam 604 002.	<ul style="list-style-type: none"> • The project is to be continued.

AICRP		
Blackgram		
9.	AICRP/PBG/VBN/MUL/013 Study on the effect of bio-inoculants on blackgram (April,2019-March,2022) Dr. R. Parimala devi Assistant Professor, NPRC, Vamban.	<ul style="list-style-type: none"> The project is to be continued.
Greengram		
10.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP (Mung bean) (April,2019-March,2022) Dr. R. Parimala devi Assistant Professor, NPRC, Vamban.	<ul style="list-style-type: none"> The project is to be continued.
Externally Funded Project		
12.	BRNS/NRM/CBE/AGM/2018/R024 Gamma irradiated mutants of Bacillus spp. and Actinobacteria consortium to control the wilt and root rot diseases of pulses. (April 2018- March 2021) Dr. R. Anandham,Assistant Professor, Department of Agrl. Microbiology, TNAU, Coimbatore-641003.	<ul style="list-style-type: none"> The project is to be continued. Findings may be given for information.

D. Action Plan for 2022 - 2023

Action plan 1: Standardization of drip bio-fortification of Zinc for nutritional security in blackgram (2022- 2023)

Objective: To enhance the Zn content in blackgram for nutritional security

- T₁. Control
- T₂. Soil application of ZnSO₄ @ 25 kg ha⁻¹
- T₃. Soil application of ZnSO₄ @ 25 kg ha⁻¹ + seed treatment with Zn solubilizing bacteria @125ml ha⁻¹
- T₄. Fertigation of ZnSO₄ @ 0.5% at first irrigation and 30DAS
- T₅. Fertigation @ 0.5% ZnSO₄ at first irrigation and 30 DAS + seed treatment with Zn solubilizing bacteria @125ml ha⁻¹
- T₆. Fertigation @ 0.5% ZnSO₄ at first irrigation and 30DAS + seed treatment with Zn solubilizing bacteria @125ml ha⁻¹ + bio-fertigation of Zn solubilizing bacteria @ 500 ml ha⁻¹ at 30DAS

Design: RBD

Replications: Three

Season: Kharif

Observations to be recorded

Initial and post soil Zn content, plant growth parameters, yield parameters, yield, Zn content in grain, Zn use efficiency and economics.

Theme leader: Professor & Head, Department of Agronomy, TNAU, Coimbatore

Co-ordinating centres & Scientist In-charge:

NPRC, Vamban : Dr. S. Marimuthu, Asst. Professor (Agronomy)
 Dr. M. Uma Sangareswari, Asst. Professor (Agrl. Microbiology)
 AC & RI, Madurai : Dr.P.Kannan (Asst.Professor (SS&AC))
 Dept. of Pulses, TNAU, CBE: Dr. S. Anitta Fanish, Asst. Professor (Agronomy)
 Dr. M. Gnanachitra, Professor (Agrl. Microbiology)
 AC & RI, Madurai : Dr. T. Sampath kumar, Asst. Professor (Agronomy)
 Dr. M. Jayabharathi, Asst. Professor (Agrl. microbiology)

Action plan 2: Weed management with new generation herbicides through Drones in Black gram

Objective: To standardize spray fluid requirement for early post emergence herbicides through drones

Treatment details		Mode of application	Time of application
T ₁	EPOE Propaquizafop + Imazethapyr @ 125 g a.i. ha ⁻¹ (Spray volume - 25 litres/ha)	Drone application	2-3 leaves stage of weeds
T ₂	EPOE Propaquizafop + Imazethapyr @ 125 g a.i. ha ⁻¹ (Spray volume - 40 litres/ha)		
T ₃	EPOE Propaquizafop + Imazethapyr @ 125 g a.i. ha ⁻¹ (Spray volume – 60 litres/ha)		
T ₄	EPOE Propaquizafop + Imazethapyr @ 125 g a.i. ha ⁻¹ (Spray volume - 500 litres/ha)	Hand operated sprayer	

Season: Kharif

Observations to be recorded

Weed observation, plant growth parameters, yield parameters, yield and economics.

Theme leader: Dr. P. Murali Arthanari, Assoc. Professor (Agronomy),
 Dept. of Agronomy, TNAU, Coimbatore

Co ordinating centre & Scientist in-charge:

Department of Pulses, TNAU, Coimbatore: Dr. S. Anitta Fanish, Asst. Professor (Agronomy)

Action Plan 3: Drone application of TNAU Pulse Wonder for Yield enhancement in Redgram (2022- 2024)

Objective: Arial spray of TNAU Pulse Wonder by drone to boost the yield in redgram

Treatment details		Mode of application	Time of application
T ₁	1% TNAU Pulses Wonder (300g / 30 litre)	Drone application	Two sprays during peak flowering and 15 days thereafter
T ₂	2% TNAU Pulses Wonder (600g / 30 litre)		
T ₃	3% TNAU Pulses Wonder (900g / 30 litre)		
T ₄	TNAU Pulses Wonder @ 2 Kg / acre	Hand operated sprayer	

Observations to be recorded:

Chlorophyll index, Photosynthetic activity, Stomatal conductance, Transpiration rate, fertility coefficient (Flower to pod conversion), No. of pods per plant, No. of seeds per pod, filled grain percentage, 100 seed weight and yield per plant

Theme leader : Dr. A. Senthil, Prof. and Head, Dept. of Crop Physiology, TNAU, Coimbatore

Co – ordinating centre & Scientists – In charge

Dept. of Crop Physiology, TNAU Coimbatore : Dr. V. BabuRajendra Prasad, Asst. Prof. (CRP), Dr. Kumaraperumal Asst. Prof. (RS&GIS), ARS, Bhavanisagar :
Dr. N. Sakthivel Prof. &Head ,

SEED CENTRE

A. Research Projects on Pulses

Crop	Centre	Action plan	URP	AICRP	Externally funded	OFT	Total
Greengram	Seed Centre, Coimbatore	-	1	-	-	-	1
Redgram	Seed Centre, Coimbatore	-	1	-	-	-	1
Other pulses	Seed Centre, Coimbatore	1	1	-	-	-	2
	Total	1	3				4

B. Technologies for Adoption/OFT/Information

OFT

1	Mitigation of water stress by hydrophilic polymer Seed coating in blackgram	Dr.V.Vijayalakshmi Asst. Prof. (SST) AC&RI, Kudumiyanmalai	<ul style="list-style-type: none"> OFT was conducted for two years. Hence, salient finding of the project is
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	(2021 to 2022)	<p>Dr.K.Malarkodi Assoc. Prof. (SST) ARS, Bhavanisagar</p> <p>Dr.K.Sujatha Professor and Head DSST, AC&RI, Madurai</p> <p>Dr.R.Jeyasrinivas Asst. Prof. (Agron.) ARS, Vaigaidam</p>	<p>recommended for adoption.</p> <ul style="list-style-type: none"> Findings may be included in crop production guide for adoption.
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C. Remarks on the ongoing University Research Project

1	<p>SEC/CBE/SST/PUL/2019/001 Studying the impact of hard seeds on normal seedling production and vigour status in blackgram, greengram and horsegram varieties (September 2019 to April 2022) Dr.G.Sasthri Assoc. Prof. (SST)</p>	<ul style="list-style-type: none"> The project may be completed and closure proposal be submitted. Publication may be made in NAAS rated journals.
2	<p>SEC/CBE/SST/RGR/2020/001 Standardization of early seed harvesting method for speed breeding in pigeonpea (April 2020 to March 2022) Dr.S.Lakshmi Assoc. Prof. (SST)</p>	<ul style="list-style-type: none"> The project may be extended for one more year and the extension proposal be submitted.
3	<p>SEC/CBE/SST/PUL/2019/002 Documentation of seed quality status of farm saved seeds of pulses in major pulse growing districts in Tamil Nadu (September 2019 to July 2021) Dr.M.Kathiravan Asst. Prof. (SST)</p>	<ul style="list-style-type: none"> The project may be closed and completion report may be submitted. Publication may be made in NAAS rated journals.

D. Action plan for 2022-23

Sl. No.	Work plan 2022-23	Scientist in-charge	Remarks
Action Plan Project			
1	<p>SEC/CBE/SST/PUL/2022/001 Seed encapsulation for mechanized sowing of greengram (July 2019 to June 2022)</p>	<p>Coimbatore centre Dr. K. Raja Professor (SST) DSST, Seed Centre, TNAU, Coimbatore Dr. P. Mohan Kumar Asst. Prof. (Farm Mach.) AEC & RI, TNAU, Coimbatore</p> <p>Dr. G. Sasthri Assoc. Prof. (SST) O/o. the Controller of Examinations</p>	<ul style="list-style-type: none"> The project may be closed and the final report to be submitted. The outcome of the project is recommended for adoption as a technology.

	<p>TNAU, Coimbatore (2019-20)</p> <p>Trichy centre Dr. V. Alex Albert Asst. Prof. (SST) KVK, Sirugamani</p> <p>Aruppukottai centre Dr. B. Venudevan Asst. Prof. (SST) KVK, Aruppukottai</p>	
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III. CROP PROTECTION

A. Technologies for Adoption/OFT/Information

I. Technology for Adoption:

1. Management of podbugs and pod fly in redgram

Application of thiamethoxam 25 WG at 100g/ha in flowering followed by novaluron 10 EC @ 750ml/ha in early pod formation and flubendiamide 39.35% m/m SC 100 ml/ha in pod maturity stage recorded the lowest pod damage (11.67%) with higher yield (971kg/ha) and BCR (2.10) in redgram.

2. Newer fungicides for management of foliar diseases of blackgram

Foliar spraying of tebuconazole 50% + trifloxystrobin 25% WG @ 1 g/lit or tebuconazole 25 EC @ 1 ml/lit immediately after observation of symptoms and second spray at 15 days later is recommended for the management of powdery mildew and Cercospora leaf spot diseases in blackgram.

3. Newer fungicides for management of foliar diseases of greengram

Foliar spraying of tebuconazole 50% + trifloxystrobin 25% WG @ 1 g/lit or tebuconazole 25EC @ 1 ml/lit immediately after observation of symptoms and second spray at 15 days later is recommended for the management of powdery mildew and Cercospora leaf spot diseases in greengram.

II. Technology for OFT

OFT 1: Development of management strategies for Maruca vitrata in lablab Treatments

- T1 : Novaluron 10 % EC 750 ml/ha in flowering – flubendiamide 39.35% m/m SC 100 ml/ha during early pod formation and emamectin benzoate 5% SG at 220 g/ha during pod maturity.
- T2 : Farmers practice
- T3 : Untreated Control

Design: RBD; Replications: 7; Variety: Ruling variety; Season: September-October

Observations to be recorded

- Observations on the incidence of spotted borer damage, larval population, natural enemies during flower, pod formation and pod maturation stages (entomophages and parasitoids in different biostages of the pest)
- Residue in the pods
- Yield & CB Ratio

Centres to be involved:

NPRC, Vamban [TL]	Dr. R. Ramesh, Assistant Professor (Entomology) NPRC, Vamban (TL)
TNAU, Coimbatore	Dr. P.S. Shanmugam, Assistant Professor (Entomology) Dept. of Pulses, TNAU, Coimbatore Dr. A. Suganthi, Assistant Professor (Entomology) – Residue analysis
ARS, Virinjipuram AC&RI, Madurai	Dr. Zadda Kavitha, Assistant Professor (Entomology) AC & RI, Madurai

*TL - Team Leader

**OFT 2: Management of Pigeonpea Sterility Mosaic disease in redgram
Treatments**

- T1 : Seed treatment with Imidacloprid 600 FS@ 5 g/kg seed+ spraying of fenazaquin 10 EC@ 1ml/lit at 35 DAS
- T2 : Seed treatment Imidacloprid 600 FS@ 5 g/kg seed+ Spraying of fenpyroximate 5 EC @ 1ml/lit at 35 DAS
- T3 : Untreated Check

Design: RBD; Replications: 7; Season: Kharif; Variety: ICP 8863

Observation to be recorded

- ❖ Percent disease index (PDI)
- ❖ Vector population and other pest population
- ❖ Correlation with weather data and yield

Centres to be involved:	
TNAU, Coimbatore [TL]*	: Dr. L. Karthiba, Asst. Professor (Plant Pathology) Dr. P.S. Shanmugam, Assistant Professor (Entomology)
ARS, Yethapur	: Dr. V. Ravichandran, Assistant Professor (Plant Pathology) Dr. P.A. Saravanan, Assistant Professor (Entomology)
AC&RI, Madurai	: Dr. K. Kalpana, Assistant Professor (Plant Pathology) Dr. Zadda Kavitha, Assistant Professor (Entomology)
NPRC, Vamban	: Dr. R. Ramjegathesh, Assistant Professor (Plant Pathology) Dr. R. Ramesh, Assistant Professor (Entomology)

* TL -Team Leader

III. For Information

- In redgram, the incidence of gram podborer was observed between 40th standard week and 4th Standard week. The maximum incidence of spotted podborer was observed from 49 – 52 standard week. Rainfall was negatively correlated with the incidence of borers.
- The infestation of flea beetle was observed from 1st week of sowing (32 Std Week) and continued till 8th week (39 Std Week) in blackgram at NPRC, Vamban. Blue butterfly infestation and Blister beetle population was observed between 5th and 11th weeks after sowing (WAS). Maruca was recorded during 5th WAS and continued till 10th WAS. Helicoverpa was observed from 6th WAS to 10th WAS.
- In greengram infestation of flea beetle was observed from 2nd WAS (33 Std Week) and continued till 8th WAS (39 Std Week). The whitefly population was started their infestation at 2nd WAS and continued till 10th WAS. Aphids infestation started from 3rd and observed till 10th WAS. Pod bugs infestation was observed from 6th WAS till harvest of the crop.
- The aphid incidence in blackgram and greengram was positively correlated with minimum temperature. The blue butterfly and pod fly incidence in redgram was positively correlated with minimum temperature. Both maximum and minimum temperatures were positively correlated with the incidence of whiteflies in blackgram and greengram.
- In redgram, the spotted pod borer and gram pod borer incidence was positively correlated with maximum temperature and podbug incidence was negatively correlated with rainfall.
- One blackgram entry (K 21-04), two greengram entries (K 21-05, K 21-08) and two cowpea entries (K 21-05, K 21-02) recorded multiple resistance against whitefly and poborer complex.
- At Vamban, the blackgram entries K 21- 01, K 21- 04, K 21- 07 and K 21-09 and greengram entries viz., K 21- 01, K 21- 03, K 21- 05, K 21-08 and K 21-09 were resistant to Maruca and pod bugs with Pest Severity Index (PSI) 2
- In redgram, the medium entries were moderately susceptible and cumulative pod damage ranged between 82 and 90 per cent at Coimbatore.
- Cowpea entries, CP K 21-08 (1.80 web/plant) and CP K 21-05 (2.50 web/plant) recorded the lowest incidence of *M. vitrata* in both kharif and rabi at Coimbatore and the entries, K 21- 02, K 21- 04, K 21- 05, K 21-06 and K 21-08 were resistant to Maruca with PSI 2; entries viz., K 21- 02, K 21- 05, K 21-06 and K 21-08 were resistant to pod bugs at Vamban.
- Intercropping with groundnut (5:1), spraying of *Bacillus thuringiensis* var *kurstaki* (2.0 g / litre) at 50 % flowering stage followed by spinosad 48 SC @ 0.5 ml/ha at early pod formation stage recorded the lowest spotted pod borer (0.80 larva /plant) and gram pod borer (0.68 larva /plant) population with higher yield (930 kg/ha) and BCR (1.39) in short duration redgram.
- Application of Azadirachtin 1% at 1000 ml/ha in flowering followed by chlorantraniliprole 18.5% SC @ 150 ml/ha in early pod formation recorded the lowest infestation (1.58 %), highest yield (888 kg/ha) and BCR (2.26) in Cowpea.
- Phyllody and rust were the re-emerging diseases in pulses during 2021-22 in Tamil Nadu.
- Correlation of weather parameters with Blackgram greengram, redgram and chickpea disease incidences showed that the intensity of YMV, stem necrosis, powdery mildew, leaf crinkle, sterility mosaic virus (SMD), phyllody and rust were positively correlated with minimum temperature and maximum RH.

- The MLT redgram entries viz., CRG 16-01 (early), CRG 16-002 (M) and CRG 17-008(M) were resistant to SMD and wilt diseases.
- The MLT entries viz., VGG 17-004, VGG 17-036 in greengram and VBN 8, VGG 18-052 in blackgram were resistant to YMV; VGG 17-106 in green gram and CO7, VBN11, CBG 18-05 in blackgram were resistant to leaf crinkle during Kharif season under field and artificial screening.
- Field and artificial screening during rabi season, the MLT entries of greengram viz., VBN 4, CO GG 18-18, TM GG 11-42 and black gram entries viz., CO7, VBN 8 and VBN11 were resistant to YMV. In leaf crinkle the following entries of greengram entries viz., CO8, VGG 17-004, VGG 17-036, VGG 18-021, VBN 4, VGG 17-106 and blackgram entries viz., VBN 8 and VBN 11 in blackgram entries were resistant to leaf crinkle.
- NGS study on the leaf crinkle infected blackgram field samples and further PCR analysis revealed that they exhibited 100 % matching with primers of SYMMV replicase fragment which showed 87 % similarity with SYMMV whole genome of mungbean and soybean.
- Transmission of leaf crinkle disease in blackgram and greengram were studied through on seed transmission (71.64%), syringe inoculation (66.67), mechanical transmission by sap inoculation (53%), root inoculation (26.60%) under field and glass house conditions, graft transmission (25%) and dodder transmission (not established).
- The bioagents like bacteria strains (55), fungal (30) and actinobacteria (20) isolates were isolated from healthy blackgram rhizosphere soil. Among these, three actinomycetes isolates viz., ENA4 (49.45%), ENA8 (48.34 %) and ENA5 (46.12 %) were found effective against dry root rot pathogen *Macrophomina phaseolina* under in vitro condition. Extrusion of cytoplasmic contents, distortion of lateral growth of hyphae, lysis and irregular size of hyphae were found during antagonistic assay observed under SEM.
- Both the *Bacillus subtilis* and *B. amyloliquefaciens* were compatible under in vitro condition. This consortium (*B. subtilis* and *B. amyloliquefaciens*) treated with blackgram seeds showed the highest germination (88%), shoot (18.32 cm) and root (20.38 cm) length.
- YMV was detected by PCR from the infected seeds of blackgram and greengram portions viz., seed coat, embryo and even whole seed except in cotyledon. The result showed that virus also transmitted through seeds.
- Seed treatment with *Clonostachys rosaea* fungal biocontrol agent (CR4) @ 4 g / kg seed + soil application of *C. rosaea* (CR4) @ 2.5 kg / ha recorded minimum incidences of root rot disease with higher yield of 833.7 kg/ha with BC ratio of 2.13.

B. Research projects on Pulses

Total Number of Projects in Crop Protection

Type of project	AEN	PAT	Total
University sub projects	4	7	11
AICRP projects	3	4	7
Student thesis	-	-	-
Externally funded project	-	1	1
Total	7	12	19

C. Remarks on the ongoing URP/AICRIP/EPF/UCF

1. AGRICULTURAL ENTOMOLOGY

S. No.	Project Number and Title	Scientist In charge	Duration	Remarks
UNIVERSITY RESEARCH PROJECTS				
1.	CPPS/VRM/ENT/RGR/2020/001 Development of Bio-rational	Dr. P. Thilagam Assistant	October 2019	The project may be closed and the
	approaches for the management of spotted podborer, <i>Maruca vitrata</i> in pigeonpea	Professor (Agrl. Entomology)	to September 2022	completion report may be submitted
2.	CPPS/VRM/ENT/RGR/2020/002 Identification of resistance and its associated traits against podborer complex in Pigeonpea	Dr. P. Thilagam Assistant Professor (Agrl. Entomology)	October 2019 to September 2022	The project may be closed and the completion report may be submitted
3.	CPPS/KKM/ENT/PUL/2020/001 Molecular characterization of indigenous Bt isolates and their toxicity analysis against <i>Maruca vitrata</i> and <i>Leucinodes orbonalis</i>	Dr. N. Balakrishnan Associate Professor (Agrl. Entomology)	July 2020 to June 2022	The project may be closed and the completion report may be submitted
4.	CPPS/VAM/PUL/2022/001 Population dynamics of pod bugs in major pulse crops and its management	Dr. R. Ramesh Assistant Professor (Agrl. Entomology)	September 2021 to August 2024	Project may be continued
AICRP				
REDGRAM				
5.	AICRP / PBG - Cbe / PIP / 010 AICRP on Pigeonpea (Agrl. Entomology)	Dr. P.S Shanmugam Assistant Professor (Agrl. Entomology)	2022-23	Project may be continued
6.	AICRP/PBG/VRM/PIP/01 AICRP on Pigeonpea		2022-23	Project may be continued
BLACKGRAM AND GREENGRAM				
7.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP (Agrl. Entomology)	Dr. R. Ramesh Assistant Professor (Agrl. Entomology)	2022-23	Project may be continued

II. PLANT PATHOLOGY

S. No	Project Number and Title	Name and Designation of the Project leader	Duration	Remarks
UNIVERSITY RESEARCH PROJECTS				
BLACKGRAM				
1.	CPPS/CBE/PAT/BGR/2019/001 : Exploring <i>Clonostachys</i> fungal	Dr. L. Karthiba Assistant Professor	July 2019 to June	project may closed by June

	biocontrol agents against root rot disease of blackgram.	(Plant Pathology)	2022	2022 A new URP may be proposed
2.	CPPS/VBN/PAT/BGR/2020/001 Mycoparasitic potential of <i>Ampelomyces</i> sp for the management of powdery mildew disease in blackgram	Dr. P. Ahiladevi Assistant Professor (Plant Pathology)	July 2020 to March 2023	The project may be continued
3.	CPPS / CBE / PAT / PUL / 2021 / 001 Development of a consortium using bacterial bio-agents for the management of dry root rot of black gram [<i>Vigna mungo</i> (L.)] caused by <i>Macrophomina phaseolina</i> (Tassi) Goid	Dr. M. Muthamilan, Professor (Plant Pathology) Dr. L. Rajendran, Asst. Professor (Plant Pathology)	September 2021 to August 2024	The project may be continued
4.	CPPS/CBE/PAT/SOR/2021/001 Development of actinobacteria consortia for the effective biological management of <i>Macrophomina phaseolina</i> (Tassi.) Goid.	Dr. K. Angappan Professor (Plant Pathology)	April 2021 to March 2024	The project may be continued
5.	CPPS/CBE/PAT/PUL/2021/002 Evaluation of microbial enriched spent mushroom compost against root rot diseases of black gram.	Dr. Thiribhuvanamala Associate Professor (Plant Pathology)	September 2021 to August 2023	The project may be continued
GREENGRAM				
6.	CPPS/TRY/PAT/CGR/2019/001 Management of root rot of green gram using salt tolerant biocontrol agents	Dr. P.T. Saravanan Assistant Professor (Plant Pathology) ADAC&RI, Trichy	November 2019 to October 2022	The project may be continued
CHICKPEA				
7.	CPPS/CBE/PAT/CHP/2019/001 Characterization of viruses associated with the newly emerging chlorotic dwarf disease of chickpea in Tamil Nadu	Dr. T.K.S.Latha Assistant Professor (Plant Pathology)	July 2019 to May 2022	The project may be closed and the completion report may be submitted immediately.
AICRP				
REDGRAM				
8.	AICRP/PBG/CBE/PIP/010 AICRP on Pigeonpea (Plant Pathology)	Dr. L.Karthiba Assistant Professor (Plant Pathology)	January 2017 to December 2022	The project may be continued as per the technical programme of AICRP

BLACKGRAM & GREENGRAM				
9.	AICRP/PBG/VBN/MUL/013 AICRP on MULLaRP (Plant Pathology)	Dr. R. Ramjegathesh Assistant Professor (Plant Pathology)	January 2018 to December 2022	The project may be continued as per the technical programme of AICRP
10.	AICRP/STR/CBE/SEP/001 AICRP on NSP (Crops) - Seed Technology Research. Impact of different storage conditions and longevity on seed associated mycoflora of greengram / blackgram	Dr.T.Anand Assistant Professor (Plant Pathology)	January 2016 to December20 22	The project may be continued as per the technical programme of AICRP
CHICKPEA				
11.	AICRP / PBG / CHP / 012 AICRP on Chickpea (Plant Pathology)	Dr. G. Senthilraja Assistant Professor (Plant Pathology)	April 2017 to March 2022	The project may be continued as per the technical programme of AICRP
Externally Funded Project				
Blackgram				
12.	DBT/CPPS/PAT/2018/R019 Unraveling etiology of leaf crinkle disease in urdbean and development of diagnostics	Dr. T.K.S. Latha Assistant Professor (Plant Pathology)	2018-2021 (Extended upto September 2022)	The project to be continued as per the technical programme of the DBT project.

D. Action plan (2022-2023)

1. Agricultural Entomology

1.	Theme areas
	<ol style="list-style-type: none"> 1. Changing pest scenario in relation to weather parameters 2. Identification of resistant sources and mechanism of resistance 3. Management modules for emerging pests of pulses

Action Plan 1: Monitoring of insect pests of pulses

Theme Leader	: Dr. N. Chitra, Professor (Entomology), Dept. of Agrl. Entomology, TNAU, Coimbatore		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
1. Monitoring the pests of pulses 2. Keeping vigilance on emerging pests either through introduction or shift in pest status. 3. Assessment of insect pests and natural enemies population in situ 4. Fixed and roving survey in the district identified during specific crop season <ul style="list-style-type: none"> • Roving plot study at fortnightly interval by all the participating Scientists in the identified Centres 	<p><u>Fixed Plot Survey</u></p> <ol style="list-style-type: none"> 1. Dr. P. S. Shanmugam, TNAU, Coimbatore 2. Dr. R. Ramesh, NPRC, Vamban 3. ARS, Virinjipuram <p><u>Roving Survey</u></p> <ol style="list-style-type: none"> 1. Dr. M. Ravi, KVK, Salem 2. Dr. S. Sheeba Jasmine, KVK, Sirugamani 3. Dr. K. Sasikumar, KVK, Virinjipuram 4. Dr. B. Usharani, KVK, Madurai 5. Dr. J. Ramkumar, KVK, Aruppukottai 6. Dr. V. Radhakrishnan, KVK, Needamangalam 	<ul style="list-style-type: none"> • Incidence of stem fly, sucking pests, pod bugs, pod borers, pod fly and natural enemies once in a week through in situ, observation and pheromone traps catches in fixed plot and fortnightly observations in roving plot survey • Identification of natural enemies for stemfly, podfly and podborers and specimens to be sent to DAE, TNAU, Coimbatore for identification • Correlation and regression analysis with weather parameters 	<ul style="list-style-type: none"> • Forewarning on emerging pests.

Action Plan 2: Identification of resistant sources for major insect pests in pulses

Theme Leader	: Dr. P.S. Shanmugam, Assistant Professor (Agrl. Entomology),		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
<p>Identification of resistance sources by field screening and artificial screening as per standard protocol</p> <p>a. Screening of TNAU (MLT/ART) entries</p> <p>b. Screening of local germplasms</p> <p>Field screening: Stemfly, whitefly, aphids, podbugs, defoliators, podfly, podborers etc.</p> <p>Artificial screening: Whitefly, podborer under free choice and no choice test</p>	<p>1. Dr. P. S. Shanmugam, TNAU, Coimbatore</p> <p>2. Dr. R. Ramesh, NPRC, Vamban</p> <p>3. ARS, Virinjipuram</p>	<ul style="list-style-type: none"> • Incidence of stem fly, sucking pests, pod bugs, pod borers and pod fly once in a week following standard procedure in field screening • Artificial screening for expression of resistance against whitefly and podborers in pulse crops following standard procedures • Mechanism of resistance only for identified resistant entries against whiteflies & pod borers of pulses 	<ul style="list-style-type: none"> • Promising resistance entries with known resistance mechanisms against major insect pests will be available for further breeding purpose

Action Plan 3: Species diversity and management of blister beetle in redgram

Theme Leader	: Dr. R. Ramesh, Asst. Professor (Entomology), NPRC, Vamban		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverables
Documenting the species diversity of blister beetles in redgram and weed hosts Blister beetle management in redgram T1 : Azadirachtin 1500ppm @ 2500 ml / ha T2: Spinosad 48 SC @ 56 g ai/ha T3: Indoxacarb 14.5 SC@ 50 g ai/ha T4. Soil Application of Fipronil 0.3GR@ 75g ai/ha T5: Control Design: RBD Replications: 4	1. Dr. P. S. Shanmugam, TNAU, Coimbatore 2. Dr. R.Ramesh, NPRC, Vamban 3. ARS, Virinjipuram <u>Taxonomic identification</u> Dr. N. Chitra, Professor, DAE, Coimbatore	<ul style="list-style-type: none"> • Incidence of blister beetle in redgram and other weed hosts • Documentation of alternate weed host • Taxonomic identification of blister beetles collected from different locations • Effect of different treatments on the incidence of blister beetle in redgram 	<ul style="list-style-type: none"> • Species diversity of blister beetle • Suitable management technology • Identification of alternate host to break the lifecycle.

Action Plan 4: Species diversity of pod fly in pulses

Theme Leader	: Dr. P.S Shanmugam, Assistant Professor		
Treatments	Name of the Scientist(s) and Centre(s)	Observations to be recorded	Deliverables
1. Studying species diversity of podfly across the major pulse growing regions of Tamil Nadu	1. Dr. P. S. Shanmugam, TNAU, CBE 2. Dr. R.Ramesh, NPRC, Vamban 3. ARS, Virinjipuram	Taxonomic characterization of pod fly samples collected across major pulse growing regions of Tamil Nadu	Information about the pod fly diversity across the major pulse growing districts

2. Plant Pathology

1I. Theme areas
<ol style="list-style-type: none"> 1. Changing disease scenario in relation to weather parameters 2. Development of management strategy for major diseases in pulses

Action Plan 1: Disease monitoring, surveillance, epidemiological studies on pulses diseases and forewarning

Theme Leader	Dr. R. Ramjegathesh, Assistant Professor (Plant Pathology), NPRC, Vamban		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverable / expected out come
Monitoring the incidence of important diseases of pulses through Roving and fixed plot surveys	<ol style="list-style-type: none"> 1. Dr. R.Ramjegathesh NPRC, Vamban (Blackgram, Greengram, Redgram) 2. Dr. L.Karthiba TNAU,Coimbatore (Redgram, Greengram,Blackgram) 3. Dr.P. Mahalakshmi AC & RI, Madurai (Redgram) 4. Dr.K.Chitra TRRI, Aduthurai (Blackgram,Greengram) 5. Dr. N. Rajinimala RRS, Ambasamudram (Blackgram, Greengram) 6. Dr. M. Deivamani 	<ul style="list-style-type: none"> • Incidence of diseases, viz., yellow mosaic, wilt, sterility mosaic disease, powdery mildew, rust, anthracnose, root rot have to be monitored throughout the crop period • The severity of emerging disease symptoms like little leaf and phyllody. 	<ul style="list-style-type: none"> • Forewarning models • Correlation of weather data with disease severity

	<p>KVK, Papparettipatti (Redgram, Blackgram,Greengram)</p> <p>7. Dr. S. Mathizhahan AC&RI, Echankottai (Blackgram, Greengram)</p> <p>8. Dr. V. Ravichandran TCRS, Yethapur (Redgram)</p>		
	<p>Dr. S. Kokilavani, Agrl. Meteorology ACRC, Coimbatore</p>	<ul style="list-style-type: none"> • Incidence of disease has to be correlated with the weather parameters 	
	<p>10 years data collection for SMD in Redgram (Dr. L. Karthiba) YMV in Blackgram and greengram (Dr. R.Ramjegathesh, NPRC,Vamban)</p>	<p>Forewarning model development Dr. S. Kokilavani, Agrl. Meteorology ACRC, Coimbatore</p>	

Action Plan 2: Bio-management strategy for powdery mildew diseases of Pulses (New)

Theme leader	Dr. R. Ramjegathesh, Assistant Professor (Plant Pathology), NPRC, Vamban		
Activity	Name of the Scientist(s) and Centre(s) - Proposed	Proposed Activities for 2021-2022	Deliverables/ expected outcome
<p>Biological management of powdery mildew in pulses using <i>Ampelomyces</i> spp.</p> <p>T1- FS of 1% <i>Ampelomyces</i>spp. as liquid formulation</p> <p>T2- FS of 2% <i>Ampelomyces</i>spp.</p>	<p>1. Dr. R. Ramjegathesh NPRC, Vamban</p> <p>2. Dr. L. Karthiba TNAU, Coimbatore</p> <p>3. Dr. K. Chitra TRRI, Aduthurai</p>	<p>Field evaluation of <i>Ampelomyces</i> spp.</p> <ul style="list-style-type: none"> • Per cent disease incidence • Weather data • Yield <p>(once disease appear,</p>	<p>Eco-friendly management strategy will be evolved for powdery mildew in pulses</p>

<p>as liquid formulation T3- FS of 3% Ampelomyces spp. as liquid formulation T4- foliar spray of Propiconazole 25 EC @1 ml/lit T5-Untreated Control</p> <p>Ampelomyces formulation will be supplied by Dr. L. Rajendran, Asst. Professor (Pl.Path), TNAU, Coimbatore</p>		<p>the bioagents are to be sprayed)</p>	
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Action Plan 3: Management of sterility mosaic disease / phytoplasma and vector transmission in Pigeonpea

Theme Leader	Dr. L. Karthiba, Assistant Professor (Plant Pathology), TNAU, Coimbatore		
Activity	Name of the Scientist and Centre	Observations to be recorded	Deliverable / expected out come
<p>Documenting the symptoms yield loss and vector transmission studies</p> <p>Management Studies</p> <p>T1- IPM Package (SMD / Phytoplasma)</p> <ul style="list-style-type: none"> • ST with Bacillus subtilis (Bbv 57) 10g/kg and Rhizobium 25g/kg of seed followed by imidacloprid 600FS @ 5g/kg • Intercropping with disease repellent plants (sorghum/marigold) • Rogue out virus infected plants upto 45 DAS • Foliar spray of Bacillus subtilis @ 1% at 30DAS 	<ol style="list-style-type: none"> 1. Dr. L. Karthiba, (PAT) 2. Dr. P.S. Shanmugam,(AEN) TNAU, Coimbatore 3. Dr.R.Ramjegathesh (PAT), 4. Dr. R. Ramesh (AEN) NPRC Vamban 5. Dr. V. Ravichandran (PAT) 6. Dr. P. A.Sarvanan (ENT) ARS, Yethapur 	<ul style="list-style-type: none"> • Vector collected from all center should be sent to Coimbatore • Confirmation studies are to be done at Coimbatore 	<ul style="list-style-type: none"> • Diagnostics studies will be concentrate by TNAU, Coimbatore and NPRC Vamban • Management trials will be conducted by all the centres.

<ul style="list-style-type: none"> • Need based spraying of fenazaquin 10 EC @ 1 ml/lit for mites & thiamethoxam 25% WG 0.25g/lit for hoppers <p>T2 - Untreated control</p>			
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Action Plan 4: Development of management strategy for rust disease of Chickpea (New)

Theme leader	Dr. G. Senthilraja, Assistant Professor (Plant Pathology), TNAU, Coimbatore		
Activity	Name of the scientist and centre	Observations to be recorded	Deliverables/ expected outcome
<p>Develop suitable management strategy for rust disease of chickpea (Treatment should be imposed at the time of disease appearance and second spray at 15 days later)</p> <ol style="list-style-type: none"> 1. Bacillus subtilis @ 1% 2. Spaelloopsis @ 1% 3. Propiconazole @ 25 EC 1 ml/lit 4. Picoxystrobin @ 22.5 SC 0.5ml/lit 5. Hexazonazole @5 SC 1ml/lit 6. Mancozeb @75 WP 2 ml/lit 7. Control <p>Design: RBD; Replications: 3; Variety - CO 4</p>	1. Dr. G. Senthilraja TNAU, Coimbatore	Record the incidence of rust and yield parameters	Effective management strategy will be developed for the management of rust

IV. REMARKS

a. General recommendations

- Impact analysis of popular pulses varieties in Tamil Nadu may be carried out (Action: CARDS)
- Improving supply of seeds of TNAU released pulses varieties (Action: Seed Centre).
- Popularization of rice fallow pulse varieties in Cauvery delta zone (Action: TRRI)
- Bio-fortification research to improve Iron and Zinc in major pulses may be initiated (Action: CPMB&B & CPBG)
- Post-harvest processing and value addition in pulses may be strengthened (Action: AEC&RI & CSC&RI)
- Scientists may be encouraged to submit proposals on pulses for external funding (All Directorates).
- Multidisciplinary approaches to increase the yield potential in major pulses may be intensified (Action: CPBG, CPMB&B, DCM, NRM, CPPS & AEC&RI)

b. Crop Improvement

- Purification of BSR 1 redgram variety may be expedited (Action: ARS, Bhavanisagar)
- Research may be intensified to develop short duration redgram varieties (90-100 days) (Action: Dept. of Pulses, CBE & ARS, Bhavanisagar)
- Breeding for resistance to virus and storage pests in major pulses may be intensified (Action: CPBG & CPMB&B).
- Research on genetic improvement of minor pulses including horse gram may be intensified (Action: RRS, Paiyur)
- Germplasm screening and breeding for novel traits viz., herbicide tolerance, reduced inhibitor content, enhanced vitamin & mineral etc., in major pulses may be initiated (Action: Dept. of Pulses, CBE)
- Development of salinity tolerant varieties in greengram and blackgram may be initiated (Action: Dept. of Pulses, CBE & Dept of Crop Physiology, CBE)

c. Crop Management

- Transplanting in redgram: Available results may be consolidated, documented and circulated to all for evaluation/adoption (Action: Dept. of Agronomy, TNAU).
- Mechanization packages should be standardized for rice fallow pulses in CDZ (Action: TRRI, Aduthurai).
- Organic farming research may be taken up in blackgram (Action: NOFRC, TNAU, Coimbatore)
- Drought mitigation using PGR may be explored (Action: Dept. of Crop Physiology, TNAU).
- Large scale demonstration on 'pulse wonder' may be undertaken (Action: Dept. of Crop Physiology, TNAU, Coimbatore)

- Efforts may be made to arrest the pre-harvest sprouting in major pulses (Action: Dept. of Crop Physiology and Dept. of SS&T, TNAU)
- Micro-irrigation in pulses needs promotion (Action: Dept. of Agronomy, TNAU, Coimbatore & NPRC, Vamban)

d. Crop Protection

- Suitable package of practices may be formulated to contain the storage pests and other new pests and diseases of major pulses (Action: Dept. of Pulses, CBE & CPPS)
- Pesticide residue analysis in pulses may be initiated (Action: Dept. of Pulses, CBE & CPPS)
- A pilot study on Patho-genomics may be intensified (Action: CPPS & CPMB&B)
- Forecasting model may be developed for pod borer complex of pulses using the available data (Action: CPPS).
- The pod fly incidence in major pulses should be documented in the major pulse growing districts of Tamil Nadu and studies to document the pod fly species diversity have to be initiated (Action: CPPS).
- Emphasis should be given to monitor the emerging insect pests in pulses and basic and applied research for their effective management (Action: CPPS).
- All the scientists of CPPS may be instructed to monitor the insect pests and diseases of pulses in their districts regularly. Any outbreak of existing pests, disease and nematodes or occurrence of new insect pests, diseases and nematodes of pulses to be reported.

V. List of Participants

S. No.	Name of the Scientist	Designation & Department	Contact Email ID & Mobile no.
1.	Dr. R. Ravikesavan	Director (CPBG)	chithuragul@gmail.com 9952817211
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