

# 86<sup>th</sup> Agricultural Scientists' and Extension Officers' Conference

## ACTION TAKEN REPORT



Tamil Nadu Agricultural University  
Coimbatore  
&  
Agriculture and Farmers Welfare Department  
Government of Tamil Nadu, Chennai



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

**86<sup>th</sup> Agricultural Scientists' and Extension Officers' Conference 2022**

**Action Taken Report for the Recommendations of 85<sup>th</sup> SWC**

S. No.	Recommendations	Dept. / TNAU Centre	Action Taken																														
1.	<p><b>Refresher Training for Officers:</b></p> <p>Refresher training program for the middle level officers is to be organized through online and offline mode during 2021-22 and its syllabus needs to be finalized in consultation with APC.</p> <p>The list of participants for the training programme should be finalized before the end of March 2021 to commence training programme during June 2021.</p> <p>Evaluation criteria may also be developed and evaluation of the training programme for the participants should be done to</p>	<p>DEE &amp; DR, TNAU</p>	<p><b>DEE</b></p> <ul style="list-style-type: none"> <li>Conducted online training for 791 ADAs and AOs of State Dept. of Agriculture in four batches during Nov. and Dec. 2021.</li> <li>Identified list of participants in consultation with State Department of Agriculture.</li> <li>Developed evaluation criteria and carried out evaluation by obtaining feedback from the participants.</li> </ul> <p><b>Details of Refresher Training 2.0 for Extension Officers of State Dept. of Agriculture through Virtual Mode</b></p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="text-align: center;">S. No.</th> <th style="text-align: center;">Batch</th> <th style="text-align: center;">Date</th> <th style="text-align: center;">No. of Trainees</th> <th style="text-align: center;">Budget</th> </tr> </thead> <tbody> <tr> <td style="text-align: center;">1.</td> <td>I Batch</td> <td style="text-align: center;">Nov. 8 -12, 2021</td> <td style="text-align: center;">210</td> <td style="text-align: right;">4,03,750.00</td> </tr> <tr> <td style="text-align: center;">2.</td> <td>II Batch</td> <td style="text-align: center;">Nov. 22 -26, 2021</td> <td style="text-align: center;">204</td> <td style="text-align: right;">92,500.00</td> </tr> <tr> <td style="text-align: center;">3.</td> <td>III Batch</td> <td style="text-align: center;">Dec. 6 -10, 2021</td> <td style="text-align: center;">210</td> <td style="text-align: right;">92,500.00</td> </tr> <tr> <td style="text-align: center;">4.</td> <td>IV Batch</td> <td style="text-align: center;">Dec. 13 -17, 2021</td> <td style="text-align: center;">167</td> <td style="text-align: right;">92,500.00</td> </tr> <tr> <td colspan="3" style="text-align: center;"><b>Total</b></td> <td style="text-align: center;"><b>791</b></td> <td style="text-align: right;"><b>6,81,250.00</b></td> </tr> </tbody> </table>	S. No.	Batch	Date	No. of Trainees	Budget	1.	I Batch	Nov. 8 -12, 2021	210	4,03,750.00	2.	II Batch	Nov. 22 -26, 2021	204	92,500.00	3.	III Batch	Dec. 6 -10, 2021	210	92,500.00	4.	IV Batch	Dec. 13 -17, 2021	167	92,500.00	<b>Total</b>			<b>791</b>	<b>6,81,250.00</b>
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		<p>HODs of DOA, DHPC, AED, SCOC, AM&amp;AB</p>	<p><b>HODs of DOA</b></p> <ul style="list-style-type: none"> <li>Refresher training 2.0 for the middle level officer conducted through virtual mode in 4</li> </ul>																														

	<p>identify the specific focused interest group for further career development of the officers.</p>		<p>batches for 220 officers/batch totally 839 officer (both ADA and AO) from 8<sup>th</sup> November 2021 to 17<sup>th</sup> December 2021</p> <ul style="list-style-type: none"> <li>Evaluation committee meeting held on 28.4.2021 and finalised the evaluation criteria to use for the evaluation of training programme.</li> </ul> <table border="1" data-bbox="1094 375 1782 529"> <tr> <td>Batch 1</td> <td>8<sup>th</sup> to 12<sup>th</sup> November 2021</td> </tr> <tr> <td>Batch 2</td> <td>22<sup>th</sup> -26<sup>th</sup> November 2021</td> </tr> <tr> <td>Batch 3</td> <td>6<sup>nd</sup> - 10<sup>th</sup> November 2021</td> </tr> <tr> <td>Batch 4</td> <td>13<sup>th</sup> - 17<sup>th</sup> December 2021</td> </tr> </table> <p>The above said number of officers completed the refresher training programme successfully.</p> <p><b>AM&amp;AB</b></p> <ul style="list-style-type: none"> <li>150 Middle Level officers attended training programmes on Post Harvest Management, Value Addition, Branding &amp; Packaging, Supply Chain Management, Export Policies &amp; Procedures, Farmer Producer Organizations in 5 Batches at Tamil Nadu Agricultural University, Coimbatore through SAMETI, Kudimiyamalai.</li> </ul>	Batch 1	8 <sup>th</sup> to 12 <sup>th</sup> November 2021	Batch 2	22 <sup>th</sup> -26 <sup>th</sup> November 2021	Batch 3	6 <sup>nd</sup> - 10 <sup>th</sup> November 2021	Batch 4	13 <sup>th</sup> - 17 <sup>th</sup> December 2021
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2.	<p><b>Publication on "Salient Statistics on Agriculture"</b> Every year, publication on "Salient Statistics on Agriculture" should be brought out during April and copy of the publication should be made available to all officers. Soft copy of the same should be made available in AGRISNET portal.</p>	SO, APC office	<ul style="list-style-type: none"> <li>Salient Statistics on Agriculture for the year 2021-22 was released on 19.04.2021.</li> <li>For 2022-23, Compilation of work is in progress.</li> </ul>								
3.	<p><b>Crop Production Guide (CPG)</b> The updation on the plant protection chemicals in the</p>	Director, CPPS & Director of Research	<ul style="list-style-type: none"> <li>The updating of CPG 2020 with latest pest and disease management strategies as approved in the previous SWC were incorporated and completed; and banned pesticides were replaced with suitable approved pesticides as per the insecticides registered under CIB&amp;RC were given then and there.</li> <li>The lists of pesticides for use/banned in agriculture are given as an Annexure I (a &amp; b).</li> </ul>								

	<p>CPG 2020 may be given as an addendum to the CPG indicating the list of chemicals that have been approved for use in agriculture. The updation of content in CPG has to be done by incorporating the latest information and the soft copy of the updated CPG both in English and Tamil may be communicated to all HoDs.</p>		
4.	<p><b>Varieties and Seeds</b>  <b>1. Rice</b>  1.1 Advisory on suitable Rice varieties in different regions of Tamil Nadu  <b>Long Duration Paddy Varieties:</b>  <b>i) ADT-51 (2018) &amp; ADT-52 (2018) (Long Duration varieties):</b>  These two long duration varieties are reported to be non-lodging during heavy rain received in January, 2021, when compared to CR1009-Sub1. As these two varieties are already in Seed chain, the district JDAs should study the non-lodging character of these two varieties and accordingly take efforts for production and distribution of more certified</p>	DOA	<p><b>TANSEDA</b>  <b>ADT 51</b>  <b>Breeder Seeds Utilization and Performance Study:</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, 1.5 MT of Breeder seed was received in Samba season and 107.60 MT of F1 seed has been produced.</li> <li>• The districts viz, Cuddalore, Villupuram, Mayiladuthurai, Thiruvarur, Sivaganga and Thoothukudi have reported that Non-lodging property is very good and the variety withstands water logging. The yield is also good around 5 to 6 MT per ha.</li> <li>• In 2022-23, 1.27 MT of Breeder seed has been indented and supplied.</li> </ul> <p><b>Production and Distribution of Certified Seeds:</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, 36 MT of F and 318 MT of C seeds, totalling 354 MT of seeds have been distributed.</li> <li>• During 2022-23, 73.5 MT of F and 789.4 MT of C seeds, totalling 862.9 MT of seeds have been distributed.</li> </ul> <p><b>ADT 52</b></p> <ul style="list-style-type: none"> <li>• <b>This variety is not notified for Tamil Nadu.</b> However, 100kg of Breeder seed was received during 2020-21 and cultivation was taken up in SSF, Sakkottai, Thanjavur and SSF, Kanchikudikadu, Thiruvarur district. 3.69 MT F1 seeds have been produced.</li> <li>• Non lodging was reported in SSFs of Thanjavur and Thiruvarur districts.</li> <li>• During 2021-22, 5.5 MT and in 2022-23, 1 MT of C seed have been distributed.</li> <li>• 100 Kgs Breeder Seed has been indented and received in 2022-23.</li> </ul>



	seeds in the next Samba season. DOA should place indent for breeder seeds of ADT 51 and ADT 52.		Recently, TNAU has released a submergence tolerant rice CO 43 Sub1 through CVRC. This can be popularized among the farmers																		
5.	<p><b>ii) Variety to replace long duration CR 1009 Sub 1 (2015)</b></p> <p>CR 1009 Sub 1 can be recommended only for tail end areas where submergence is experienced during early seedling stage. TNAU should recommend suitable Bold variety with long duration to replace CR 1009 Sub 1</p>	Director, CPBG	<ul style="list-style-type: none"> <li>Promising long duration cultures <i>viz.</i>, AD 18145, AD 18146, AD 18154, AD 18084 and AD 18158 with short bold grain type are under testing in Multi Location Trials.</li> <li>Breeding lines involving CR1009 sub1 as a parent are in early segregating generations. These cultures will be further evaluated and released as an alternate to CR 1009 <i>Sub 1</i>.</li> </ul>																		
6.	<p><b>Medium Duration Paddy Varieties:</b></p> <p><b>iii) CO 52 (MGR 100) (2017):</b></p> <p>TNAU has purified CO 52 nucleus seed. The performance of CO 52 has to be studied at field level on receipt of Breeder seeds from TNAU and informed in the next meeting. More indents should be placed with TNAU for supply of breeder seeds. The Director, CPBG, TNAU has to ensure the supply of Breeders seeds without any admixture.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>TNAU has purified CO 52 nucleus seed and breeder seed was supplied to Department of Agriculture.</li> <li>During Samba 2021, a total quantity of 500 kg was distributed to Bhavani, Inungur, Keelagudalur and Ramnad.</li> <li>In 2022, a total quantity of 550 kg was supplied to various SSFs as detailed below: <table border="1" data-bbox="1066 971 1812 1312"> <thead> <tr> <th>State Seed Farms</th> <th>Quantity supplied</th> </tr> </thead> <tbody> <tr> <td>AEC, Chengalpattu</td> <td>10kg</td> </tr> <tr> <td>AEC, Erode</td> <td>125 kg</td> </tr> <tr> <td>AEC, Ariyalur</td> <td>50 kg</td> </tr> <tr> <td>SSF, Inungur</td> <td>90 kg</td> </tr> <tr> <td>SSF, Vinayapuram</td> <td>10 kg</td> </tr> <tr> <td>AEC, Madurai</td> <td>15 kg</td> </tr> <tr> <td>SSF, Keezhagudalur</td> <td>150 kg</td> </tr> <tr> <td>AEC, Ramnad</td> <td>100 kg</td> </tr> </tbody> </table> </li> <li>Breeder seed production indent for 420 kg has been received from Dept. of Agriculture for 2022-23. It is programmed to take up the production during Rabi 2022-23 (Late <i>Samba/Thaladi</i>).</li> </ul>	State Seed Farms	Quantity supplied	AEC, Chengalpattu	10kg	AEC, Erode	125 kg	AEC, Ariyalur	50 kg	SSF, Inungur	90 kg	SSF, Vinayapuram	10 kg	AEC, Madurai	15 kg	SSF, Keezhagudalur	150 kg	AEC, Ramnad	100 kg
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		DOA	<p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>0.5 MT of Breeder seed was received for 2021-22 and 45.16 MT of F1 seeds have been produced.</li> </ul> <p><b>The performance of CO 52 is as below:</b></p> <table border="1" data-bbox="949 354 1927 1360"> <tr> <td>Seed viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>85</td> </tr> <tr> <td>Duration</td> <td>135-140 days</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Dark green colour wider leaf , Erect</td> </tr> <tr> <td>Disease Resistance</td> <td>Moderately resistant. Major Diseases not noticed</td> </tr> <tr> <td>Seasonal preference / adaptability</td> <td>Samba Season</td> </tr> <tr> <td>Pest Resistance</td> <td>Moderately Resistant to Stem borer, Brown plant hopper &amp; Leaf folder</td> </tr> <tr> <td>Tillering Capacity/ Branching Capacity</td> <td>36 to 40 Tillers/Plant</td> </tr> <tr> <td>No. of panicles per plant</td> <td>12 to 16 panicles</td> </tr> <tr> <td>No. of grains per panicle</td> <td>130-150 grains</td> </tr> <tr> <td>Withstanding Water Logging</td> <td>Good</td> </tr> <tr> <td>Yield(kg/Ha)</td> <td>5000</td> </tr> <tr> <td>Grain Preference by Farmers</td> <td>Good</td> </tr> <tr> <td>Grain Preference by Traders</td> <td>Good</td> </tr> <tr> <td>Cooking Preferability</td> <td>Medium</td> </tr> <tr> <td>Comparative performance to other similar/ ruling varieties</td> <td>Farmers preference is less when compared to BPT 5204 (Keeping quality of CO 52 is low as compared to BPT 5204)</td> </tr> </table> <ul style="list-style-type: none"> <li>0.55 MT of Breeder seeds have been indented in 2022-23 for samba season and supplied.</li> </ul>	Seed viability	Good	Germination %	85	Duration	135-140 days	Earlier Crop Stand	Good	Leaf canopy	Dark green colour wider leaf , Erect	Disease Resistance	Moderately resistant. Major Diseases not noticed	Seasonal preference / adaptability	Samba Season	Pest Resistance	Moderately Resistant to Stem borer, Brown plant hopper & Leaf folder	Tillering Capacity/ Branching Capacity	36 to 40 Tillers/Plant	No. of panicles per plant	12 to 16 panicles	No. of grains per panicle	130-150 grains	Withstanding Water Logging	Good	Yield(kg/Ha)	5000	Grain Preference by Farmers	Good	Grain Preference by Traders	Good	Cooking Preferability	Medium	Comparative performance to other similar/ ruling varieties	Farmers preference is less when compared to BPT 5204 (Keeping quality of CO 52 is low as compared to BPT 5204)
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7.	<p><b>iv) ADT 54 (2020):</b></p> <p>This variety is entering seed chain in 2021, TFL availability is 4 -5 tonnes. DOA to follow up its seed multiplication and usage at the field level.</p>	DOA	<p><b>TANSEDA ADT 54</b></p> <ul style="list-style-type: none"> <li>• 0.21 MT of Breeder seeds has been received and utilised in 2021-22. 12.82 MT of F1 seeds have been produced.</li> <li>• 1.7 MT of breeder seeds has been indented in 2022-23 for the samba season and 1.55 MT received.</li> <li>• During 2022-23, 11 MT of F seed has been distributed.</li> </ul>
8.	<p><b>v) TRY 3 (2010) &amp; TRY 4 (2021)</b></p> <p>These two varieties are recommended for saline tract. As TRY 3 variety which has been notified in 2012 is nearing 10 years of age, the Department should take steps to multiply TRY 4 after getting notification from Government of India and sincere efforts should be taken to bring TRY 4 into the Seed chain. TNAU &amp; DOA should take steps for early notification.</p>	Director, CPBG, Director (Seeds)	<ul style="list-style-type: none"> <li>• TRY 4 - a medium duration saline tolerant rice variety was released and notified during 2020 – 21. A total quantity of 750 kg breeder seeds of TRY 4 was produced during 2021-22.</li> </ul>
		DOA	<p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>• TRY 4 has been notified <i>vide</i> the reference S.O. 8(E)/24.12.2021</li> <li>• During the year 2022-23, 0.5 MT of TRY - 4 breeder seeds have been indented in Samba season and has been supplied.</li> </ul>
9.	<p><b>vi) VGD 1 (2019)</b> (With Fragrance and similar to <i>Seeraga samba</i>)</p> <p>This variety is reported to be performing well in western districts and has high demand among traders. There are reports of exhibition of Fragrance only in Cool weather</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• Based on the tests conducted in IICPT, Thanjavur during 2012, the aroma in VGD 1 has been attributed to the presence of tertiary alcohol 1,6,10,14-Hexadecatetraen-3-ol, 3,7,11,15-tetramethyl-, (E,E)- (synonym is Geranyl- linallol), Aromatic Phytosterol <i>i.e.</i>, <math>\beta</math>-Sitosterol and alkanes</li> <li>• In all aromatic rice, the aroma property is positively correlated with cool weather during flowering and the same applies to VGD 1 also. Hence this variety is recommended for late <i>samba/thaladi</i> seasons</li> <li>• VGD 1 is a photo- insensitive variety and has "Stay Green" property. It needs to be harvested at physiological maturity. The average duration of the crop from nursery sowing to harvest is around 127 days. Harvesting at the appropriate time can avoid the shattering of</li> </ul>



	<p>period and high shattering during maturity. These issues have to be sorted out and the variety should be promoted in the western belt in a larger scale by increasing the indent for VGDI for 2021-22. Suitability of this variety in Cauvery Delta Zone should be evaluated and the status has to be informed. TANSEDA should take speedy efforts to make certified seeds available to farmers in 2021-22.</p>		<p>grains at the late maturity stage.</p> <ul style="list-style-type: none"> <li>• During the period of 2021-22, 8679 kg of TFL seeds were supplied to the farmers in different parts of Tamil Nadu.</li> <li>• 500 kg of TFL seeds were supplied to the farmers in the Cauvery Delta Zone during 2021-22.</li> <li>• During 2022-23, 4662 kg of TFL seeds were produced and 1037 kg supplied. Out of which 290 kg of seeds were supplied to the farmers in Cauvery Delta Zone. The remaining quantity of 3625 kg of seed is kept ready for immediate despatch.</li> </ul>																										
		DOA	<p><b>TANSEDA</b> <b>VGD 1</b></p> <ul style="list-style-type: none"> <li>• 0.7 MT of Breeder seeds were received and utilised during 2021-22 in Samba season and 42.85 MT F1 seeds were produced.</li> <li>• During 2021-22, 17.9 MT of foundation seeds, and 2.6 MT of certified seeds have been distributed.</li> <li>• During 2022-23, 32.4 MT of foundation seeds and 6.4 MT of certified seeds have been distributed.</li> </ul> <p><b>The performance of the variety in Cauvery Delta Zone districts is as below:</b></p> <table border="1" data-bbox="974 818 1900 1421"> <tr> <td>Seed Viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>88%</td> </tr> <tr> <td>Duration</td> <td>125-130 days</td> </tr> <tr> <td>Early Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Erect</td> </tr> <tr> <td>Disease Resistance</td> <td>Moderately Resistant</td> </tr> <tr> <td>Seasonal preference/adaptability</td> <td>Early samba/ Samba/ Late Samba</td> </tr> <tr> <td>Performance with Biotic/ abiotic factors</td> <td>Good</td> </tr> <tr> <td>Pest Resistance</td> <td>Moderately Resistant</td> </tr> <tr> <td>Tillering Capacity/ Branching Capacity</td> <td>15 to 20 tillers per plant</td> </tr> <tr> <td>withstand Water Logging</td> <td>Cannot withstand</td> </tr> <tr> <td>Yield (kg/Ha)</td> <td>3300 to 3800 Kg/Ha</td> </tr> <tr> <td>Grain Preference by Farmers</td> <td>Good</td> </tr> </table>	Seed Viability	Good	Germination %	88%	Duration	125-130 days	Early Crop Stand	Good	Leaf canopy	Erect	Disease Resistance	Moderately Resistant	Seasonal preference/adaptability	Early samba/ Samba/ Late Samba	Performance with Biotic/ abiotic factors	Good	Pest Resistance	Moderately Resistant	Tillering Capacity/ Branching Capacity	15 to 20 tillers per plant	withstand Water Logging	Cannot withstand	Yield (kg/Ha)	3300 to 3800 Kg/Ha	Grain Preference by Farmers	Good
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10.	<p><b>vii) Variety to replace NLR 34449 (2010)</b></p> <p>Alternate variety to replace NLR 34449 with Medium duration and fine variety has to be evolved. CO 52 would be the alternate variety to NLR 34449 and to be promoted at the field level.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>Breeder seeds of CO 52 (550 kg) the alternate variety recommended for NLR 34449 was produced and distributed to various SSFs during 2022.</li> <li>Besides Breeder seeds, TNAU have produced 1925 kg of TFL seeds during 2021-22 and 3025 kg during 2022-23 for promoting this variety in place of NLR 34449.</li> </ul>																				
		DOA	<p><b>TANSEDA</b></p> <p><b>CO 52</b></p> <ul style="list-style-type: none"> <li>0.5 MT of Breeder seed utilised in Samba season during 2021-22 and 45.16MT of F1 seeds has been produced.</li> <li>0.55 MT of Breeder seeds have been indented in 2022-23 for samba season and seeds supplied. 3.9 MT Foundation seed has been distributed and 33.71 MT is as F1 stock in 2022-23.</li> <li>During 2022-23, 9.09 MT F seed has been distributed.</li> </ul>																				
11.	<p><b>Short Duration Paddy Varieties:</b></p> <p><b>viii) TPS-5 (2014)</b></p> <p>This variety is suitable for southern districts to replace ASD-16. 400 Kg of Breeder seeds have been received and cultivated in SSFs and farmers' fields. Till date, 16 MT of Foundation seeds have been procured. The required</p>	Director, CPBG	<p align="center"><b>Breeder seed production status of TPS 5</b></p> <table border="1"> <thead> <tr> <th>S. No.</th> <th>Indent period</th> <th>Supply period</th> <th>Quantity indented (kg)</th> <th>Supply (kg)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>2020-21</td> <td>2021-22</td> <td>500</td> <td>500</td> </tr> <tr> <td>2.</td> <td>2021-22</td> <td>2022-23</td> <td>1120</td> <td>1120</td> </tr> <tr> <td>3.</td> <td>2022-23</td> <td>2023-24</td> <td>1500</td> <td>Production in progress</td> </tr> </tbody> </table> <p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>0.86Mts of Breeder seeds was utilised in 2021-22 and 66.36Mts of F1 seeds were produced.(0.4 MT supplied to Southern districts)</li> <li>During 2021-22, 76 MT of F seed and 417 MT of C seed totalling 493 MT have been</li> </ul>	S. No.	Indent period	Supply period	Quantity indented (kg)	Supply (kg)	1.	2020-21	2021-22	500	500	2.	2021-22	2022-23	1120	1120	3.	2022-23	2023-24	1500	Production in progress
S. No.	Indent period	Supply period	Quantity indented (kg)	Supply (kg)																			
1.	2020-21	2021-22	500	500																			
2.	2021-22	2022-23	1120	1120																			
3.	2022-23	2023-24	1500	Production in progress																			

	quantity of TPS 5 breeder seed should be supplied to DOA and status of seed multiplication should be updated in next meeting.		<p>distributed.</p> <ul style="list-style-type: none"> <li>• During 2021-22 in Southern districts, Virudhunagar, Thirunelveli, Tenkasi, Thoothukudi and Kanyakumari 188 MT of C seeds have been distributed.</li> <li>• In 2022-23, 1.12 MT of TPS-5 Breeder seeds has been supplied.(0.33 MT supplied to Southern districts)</li> <li>• During 2022-23, 33 MT of F seed and 119 MT of C seed totalling 152 MT of seeds have been distributed.</li> <li>• During 2022-23 in Southern districts, Virudhunagar, Thirunelveli, Tenkasi, Thoothukudi and Kanyakumari 92 MT of C seeds have been distributed.</li> </ul>
12.	<p><b>ix) ADT 48 (2005) &amp; MDU 5 (1996) (Extra Early maturing varieties for Contingency)</b></p> <p>These two varieties have been notified before 10 years and recommended as a contingency measure for delayed release of water from the reservoirs. Milling issues have been reported. These varieties are least preferred by consumers and traders and need not be promoted in a larger scale.</p>	DOA	<p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>• As per the recommendation of TNAU, indent for Breeder seeds of ADT 48 and MDU 5 was not placed and Seed farms not raised.</li> </ul>
		Director, CPBG	<ul style="list-style-type: none"> <li>• Breeding research to evolve extra early rice varieties was initiated during 2017 at TRRI, Aduthurai.</li> <li>• Extra early maturing segregants have been identified in the cross ADT 37/ Turantdhan. These will be evaluated further for development of early maturing varieties suitable for contingency</li> </ul>
13.	<p><b>x) Variety to replace ASD 16 and ADT 37</b></p> <p>An equivalent variety to replace ASD 16 (1986) and ADT37 (1989) needs be developed as they are old varieties.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• Two short duration, short bold, rice cultures AS 15024 and AD 17152 have been developed to replace ASD 16 and ADT 37</li> <li>• These pipeline cultures have completed ART trials and will be proposed for release during 2022-23.</li> </ul>
		DOA	<p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>• Joint Director of Agriculture Thirunelveli has visited the Adaptive Research Trials (ARTs) in the fields at Cheranmahadevi, Mukkudal and Palayamkottai and the report sent to the Director, TRRI, Aduthurai.</li> </ul>



	One pre-release ART entry, AS15024, would be an alternative to ASD16 during the second season in Tirunelveli and Kanyakumari districts. As of now, the ARTs are in the fields at Cheranmahadevi, Mukkudal and Palayamkottai Dept Officials can visit the fields. Can be visited by concerned JDAs.		<p><b>Rice/SDSB Kharif 2021-22:</b></p> <p><b>Culture: SDSB 21-1, 21-2, 21-3, 21-4.</b></p> <ul style="list-style-type: none"> <li>Among the cultures SDSB 21-1 recorded the highest yield of 6657MT/ha followed by SDSB 21-2. No Pest and Disease incidence was noticed.</li> </ul>										
14.	xi) <b>CO 53 (2020):</b> CO 53 variety is drought tolerant paddy variety with 115 days duration and suitable for Sivaganga, Ramnad & Virudhunagar. Department should take steps for seed multiplication.	DOA	<p><b>TANSEDA</b></p> <p><b>CO 53</b></p> <p>During 2021-22, 50 Kgs of Breeder seeds were utilised in Pudukottai and Virudhunagar districts and 3.15 MT F1 seeds were produced.</p> <ul style="list-style-type: none"> <li>In Sivaganga and Ramnad indent was not placed as CO 53 is bold variety and farmer's preference was less.</li> <li>During 2022-23, 100 Kgs of CO 53 Breeder seeds have been indented and 55 Kgs supplied.</li> <li>During 2022-23, 0.2 MT F seed has been distributed.</li> </ul> <p><b>Breeder seeds of CO 53 was supplied to the following SSFs:</b></p> <table border="1"> <thead> <tr> <th>Districts/SSFs</th> <th>Quantity supplied (kg)</th> </tr> </thead> <tbody> <tr> <td>Pudukkottai</td> <td>25</td> </tr> <tr> <td>Dindigul</td> <td>10</td> </tr> <tr> <td>Theni</td> <td>15</td> </tr> <tr> <td>Devadanam</td> <td>5</td> </tr> </tbody> </table>	Districts/SSFs	Quantity supplied (kg)	Pudukkottai	25	Dindigul	10	Theni	15	Devadanam	5
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15.	xii) <b>Rice in general</b>  Suitable short duration (90-95 days), high yielding, drought tolerant varieties for Cauvery	Director, CPBG	<ul style="list-style-type: none"> <li>Several breeding lines with extra early maturity from the cross ADT 37/ Turantdhan have been identified and they are in F<sub>4</sub> generation.</li> <li>The promising lines with high yield and extra earliness will be advanced for further testing.</li> </ul>										

	<p>Delta Zone, Sivagangai and Ramnad districts need to be evolved.</p> <p>Saline water tolerant short duration varieties suitable for Kuruvai season has to be evolved.</p> <p>The proposal for notification of Traditional varieties (Ex. <i>Seeraga Samba, Karuppukavuni, Mappillai Samba etc.</i>) has to be submitted.</p>		<ul style="list-style-type: none"> <li>Saline tolerant short duration rice variety TRY 5 was released and notified during 2022-23.</li> <li>One improved <i>kavuni</i> culture CK 145-3 is in ART with photo insensitiveness and higher grain yield.</li> <li>Improved lines of landraces such as <i>Mappillai Samba, Thooyamalli, karunguruvai</i> have been evolved through pure line selection at Aduthurai and Coimbatore.</li> <li>These improved lines are under testing in Multi-location trials.</li> <li>After completion of required trials the improved cultures will be proposed for release and notification as improved varieties of <i>Mappillai Samba, Thooyamalli</i> and <i>karunguruvai</i>.</li> </ul>								
16.	<p><b>2. Pulses</b></p> <p><b>2.1. Black gram</b></p> <p>2.1.1 Advisory of suitable Black gram varieties under different ecosystems in Tamil Nadu</p>	Director, CPBG	<p><b>POS</b></p> <ul style="list-style-type: none"> <li>The following region / district and season wise recommendation for Blackgram varieties as advised by TNAU has been communicated to all blackgram growing districts.</li> </ul> <table border="1" data-bbox="919 889 1953 1321"> <thead> <tr> <th data-bbox="919 889 1234 964">Varieties</th> <th data-bbox="1234 889 1953 964">Suitable District/Season</th> </tr> </thead> <tbody> <tr> <td data-bbox="919 964 1234 1039">VBN 6, VBN 8</td> <td data-bbox="1234 964 1953 1039"><b>Adi pattam (June-August)</b> All districts except Kanyakumari and Nilgiris</td> </tr> <tr> <td data-bbox="919 1039 1234 1224">VBN 6, MDU 1, CO 6, VBN 8, VBN 10</td> <td data-bbox="1234 1039 1953 1224"><b>Puratasi pattam (September-November)</b> Vellore, Tiruvannamalai, Dharmapuri, Salem, Namakkal, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni, Pudukottai, Sivagangai, Ramanathapuram, Virudhunagar, Thoothukudi and Tirunelveli</td> </tr> <tr> <td data-bbox="919 1224 1234 1321">VBN 6, CO 6, VBN 8, VBN 10</td> <td data-bbox="1234 1224 1953 1321"><b>Markazhi – Thai pattam (Winter Irrigated)</b> All districts except Kanyakumari and Nilgiris</td> </tr> </tbody> </table>	Varieties	Suitable District/Season	VBN 6, VBN 8	<b>Adi pattam (June-August)</b> All districts except Kanyakumari and Nilgiris	VBN 6, MDU 1, CO 6, VBN 8, VBN 10	<b>Puratasi pattam (September-November)</b> Vellore, Tiruvannamalai, Dharmapuri, Salem, Namakkal, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni, Pudukottai, Sivagangai, Ramanathapuram, Virudhunagar, Thoothukudi and Tirunelveli	VBN 6, CO 6, VBN 8, VBN 10	<b>Markazhi – Thai pattam (Winter Irrigated)</b> All districts except Kanyakumari and Nilgiris
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			ADT 3, ADT 6, VBN 6, VBN 9	<b>Rice fallows (January)</b> Thanjavur, Thiruvarur, Nagapattinam, Cuddalore, Villupuram and Kanchipuram
			ADT 5, VBN 8	<b>Chithirai pattam (Summer Irrigated)</b> Thanjavur, Thiruvarur, Nagapattinam, Cuddalore, Villupuram, Tiruchirappalli, Perambalur, Thiruvallur, Kancheepuram
			KKM 1	<b>Rice fallow</b> Thoothukudi
17.	<b>2.1.2 Individual Issues to be followed in Blackgram:</b>  <b>a. VBN 6 (2011)</b> DOA to take action to grow this variety as intercrop in Sugarcane during early growth period	DOA	<b>Sugarcane</b>	<ul style="list-style-type: none"> <li>Under NFSM-Sugarcane, Budchip Seedling planting with Intercropping of pulses in Sugarcane demonstrations are being laid out by major sugarcane growing districts. Joint Directors of Agriculture are requested to take special efforts to recommend VBN 6 Blackgram variety as intercrop in Sugarcane under NFSM-Sugarcane demonstrations due to its short duration nature during 2021-22 and 12 % of the demonstration area is covered with VBN 6 variety.</li> </ul>
18.	<b>b. VBN 8 (2016):</b>  Synchronized maturity is not observed in Erode districts. Out of 1,076 Kg of Breeder seeds received, 50% alone has been utilized. TANSEDA should effectively utilize the balance breeder seeds and raise the Seed farm within the cropping season.	DOA	<b>TANSEDA</b>  <b>VBN 8</b>	<ul style="list-style-type: none"> <li>Synchronised maturity of VBN-8 was observed in the districts Villupuram, Kallakurichi, Theni, Karur, Krishnagiri, Tiruvannamalai, Namakkal, Virudhunagar and Vellore.</li> <li>In Cuddalore, it was reported that VBN-8 was having indeterminate flowering in irrigated conditions. 2 to 3 pickings were done for a single season crop. In Kancheepuram district synchronized maturity not observed</li> <li>During 2020-21, 1.43 MT of Breeder seeds were received and 100% was utilized. 40.81 MT of F1 seeds were produced.</li> <li>During 2021-22, 2.58Mts of Breeder seeds has been received, 100% utilised on season and 60 MT of F1 seeds produced.</li> <li>During 2021-22, 6.8 MT of F seed and 6.2 MT of C seed totalling to 13 MT of seeds has been distributed.</li> <li>During 2022-23, 54.8 MT of F seed and 261 Mt of C seed totalling to 315.8 MT of seeds has</li> </ul>



			<p>been distributed.</p> <ul style="list-style-type: none"> <li>Breeder Seed Indent of 1.58 MT has been placed for 2022-23 and <i>Kharif</i> supply of 0.51 MT made by TNAU.</li> </ul>																										
19.	<p><b>c. VBN 9 (2019):</b></p> <p>TNAU supplied 210 Kg of Breeder seeds in 14 districts. Feedback on the performance of VBN 9 should be given. As VBN 9 black gram variety has been released by Central Seed Release Committee, Seed multiplication may be taken up if found suitable in Tamil Nadu. Performance of VBN 9 and its suitability to grow in rice fallow condition may be discussed in the next meeting.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>A quantity of 208 kg of breeder seed was supplied during 2019-20, and 272 kg of breeder seed was supplied during 2020-21. A quantity of 517 kg of breeder seed was supplied during 2021-22. Thus so far a total of 997 kg of VBN 9 Breeder seed has been supplied against state indent to Rice fallow condition.</li> </ul>																										
		DOA	<p><b>TANSEDA</b></p> <p><b>VBN 9</b></p> <ul style="list-style-type: none"> <li>During 2020-21, 210 kg of Breeder seeds were received and 100% has been utilized.</li> <li>During 2021-22, 514 Kg of Breeder seeds has been received and 100% utilised and 10.71 MT F1 seeds has been produced.</li> <li>During 2021-22, 73MT of F seeds and 216 MT C seeds totalling 289 MT of seeds have been distributed.</li> <li>During 2022-23, 4.9 MT of F seeds and 2.2 MT C seeds totalling 7.1 MT of seeds have been distributed.</li> </ul> <p>The performance report is as below.</p> <table border="1"> <tr> <td>Seed Viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>90</td> </tr> <tr> <td>Duration</td> <td>75-85</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Elongated</td> </tr> <tr> <td>Seasonal preference/adaptability</td> <td>Rabi</td> </tr> <tr> <td>Pest Resistance</td> <td>Moderately resistant</td> </tr> <tr> <td>Disease Resistance</td> <td>Moderately resistant</td> </tr> <tr> <td>Tillering Capacity/ Branching Capacity</td> <td>Good</td> </tr> <tr> <td>No. of Branches per plant</td> <td>9 to 11 branches</td> </tr> <tr> <td>No. of Pods per plant</td> <td>20 to 23 pods</td> </tr> <tr> <td>No. of Grains per pod</td> <td>6 to 7 grains</td> </tr> <tr> <td>Yield(kg/Ha)</td> <td>1000 to 1650 Kg per Ha</td> </tr> </table>	Seed Viability	Good	Germination %	90	Duration	75-85	Earlier Crop Stand	Good	Leaf canopy	Elongated	Seasonal preference/adaptability	Rabi	Pest Resistance	Moderately resistant	Disease Resistance	Moderately resistant	Tillering Capacity/ Branching Capacity	Good	No. of Branches per plant	9 to 11 branches	No. of Pods per plant	20 to 23 pods	No. of Grains per pod	6 to 7 grains	Yield(kg/Ha)	1000 to 1650 Kg per Ha
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			<ul style="list-style-type: none"> <li>It is suitable for rice fallow conditions and the yield obtained in rice fallow is around 700 to 800 Kg per Ha.</li> </ul>								
20.	<b>d. CO 7 (2021)</b>	Director, CPBG	<ul style="list-style-type: none"> <li>Blackgram variety CO 7 has been notified. (3-81/2021-SD.IV-24th December, 2021)</li> </ul>								
	TNAU & DOA should take steps for early notification of this newly released variety CO 7 for bringing into the Seed chain.	DOA	<p><b>TANSEDA</b></p> <p><b>CO 7 (2021)</b></p> <ul style="list-style-type: none"> <li>CO 7 has been notified <i>vide</i> the reference S.O. 8(E)/24.12.2021</li> <li>50 kgs indent has been placed in 2022-23 in <i>Rabi</i> season.</li> </ul>								

21.	<p><b>e. ADT 6 (2017)</b></p> <p>TNAU supplied 400 Kg of Breeder seeds and seed farms have been raised in Miralur and Vandurayanpattu SSFs. Feedback on the performance of ADT 6 should be studied and informed.</p>	DOA	<p><b>TANSEDA</b> <b>ADT 6</b></p> <ul style="list-style-type: none"> <li>• During 2020-21, out of 400 kg, 150 kg utilized in SSF Vandurayanpattu &amp; 50 kg utilized in SSF, Miralur. Balance 200 kg utilized at Farmer's field of Keerapalayam, Vridhachalam &amp; Bhuvanagiri blocks of Cuddalore district.</li> <li>• 7.7 MT of F1 seed was produced.</li> </ul> <p style="text-align: center;"><b>Varietal Performance</b></p> <table border="1" style="margin-left: auto; margin-right: auto;"> <thead> <tr> <th style="text-align: center;">Varietal Performance</th> <th style="text-align: center;">ADT 6</th> </tr> </thead> <tbody> <tr> <td>Seed Viability</td> <td>Good</td> </tr> <tr> <td>Germination</td> <td>87%</td> </tr> <tr> <td>Duration</td> <td>70-75 Days</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>No Specific Incidence of Pest and Disease</td> </tr> <tr> <td>Disease Resistance</td> <td>Moderately Resistance to Yellow mosaic virus</td> </tr> <tr> <td>Leaf Canopy</td> <td>More Canopy</td> </tr> <tr> <td>Tillering Capacity/ Branching Capacity</td> <td>8 to 10 Branches per plant, and 12-22 pods per plant</td> </tr> <tr> <td>Water Logging with Stand</td> <td>Crop withstand water logged condition up to 3-4 days</td> </tr> <tr> <td>Yield (kg/Ha)</td> <td>More Picking due to Infinite Flowering (930 Kg/Ha)</td> </tr> <tr> <td>Grain preference by the Farmer</td> <td>Good, High Flour Content</td> </tr> <tr> <td>Grain preference by the Trader</td> <td>Good, High Flour Content</td> </tr> <tr> <td>Cooking preferability</td> <td>Good</td> </tr> <tr> <td>Farmers General Preference</td> <td>Very Good</td> </tr> </tbody> </table>	Varietal Performance	ADT 6	Seed Viability	Good	Germination	87%	Duration	70-75 Days	Earlier Crop Stand	No Specific Incidence of Pest and Disease	Disease Resistance	Moderately Resistance to Yellow mosaic virus	Leaf Canopy	More Canopy	Tillering Capacity/ Branching Capacity	8 to 10 Branches per plant, and 12-22 pods per plant	Water Logging with Stand	Crop withstand water logged condition up to 3-4 days	Yield (kg/Ha)	More Picking due to Infinite Flowering (930 Kg/Ha)	Grain preference by the Farmer	Good, High Flour Content	Grain preference by the Trader	Good, High Flour Content	Cooking preferability	Good	Farmers General Preference	Very Good
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22.	<p><b>f. KKM 1 (2017):</b></p> <p>This variety is suitable for Thoothukudi district under rainfed situation. Therefore indent of KKM 1 blackgram may be placed for Thoothukudi District alone</p>	DOA	<p><b>TANSEDA</b> <b>KKM 1 Blackgram</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, 0.22 MT Breeder seeds have been utilized and 3.06Mts of F1 seeds have been produced.</li> <li>• During 2022-23, 50 Kgs indent has been placed for Thoothukudi district in <i>Rabi</i> season.</li> </ul>																												

23.	<p><b>g. Blackgram in general</b></p> <p>To have a clear vision on focused pulses varieties, TNAU should map Blackgram varieties for region / district and season wise recommendation should be communicated after having consultation with Department Officials.</p>	Director, CPBG		<p style="text-align: center;"><b>District/ Season</b></p>	<p style="text-align: center;"><b>Varieties</b></p>
				<p><b>Adi pattam (June-August)</b> All districts except Kanyakumari and Nilgiris</p>	<p>VBN (Bg) 4, VBN (Bg) 5, VBN 6, VBN (Bg) 7, VBN 8, VBN 11, CO 7</p>
				<p><b>Puratasi pattam (September-November)</b> Vellore, Tiruvannamalai Dharmapuri, Salem, Namakkal, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni, Pudukottai, Sivagangai, Ramanathapuram, Virudhunagar, Thoothukudi and Tirunelveli</p>	<p>VBN (Bg) 4, VBN (Bg) 5, VBN 6, MDU 1, CO 6, VBN 8, VBN 11, CO 7</p>
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				<p><b>Chithirai pattam (Summer Irrigated)</b> Thanjavur, Tiruvarur, Nagapattinam, Cuddalore, Villupuram, Tiruchirappalli, Perambalur, Thiruvallur, Kancheepuram,</p>	<p>ADT 5, VBN 8 and VBN 11</p>
24.	<p>As the <b>VBN 9 and VBN 10 blackgram</b> varieties have already been approved by the <b>CVRC</b>, the Director of Research should bring a list of crop varieties which are recommended by CVRC and suitable for Tamil Nadu for discussion in <b>SVRC for promotion among farmers.</b></p>	<p>Director of Research DOA Director, CPBG</p>	<ul style="list-style-type: none"> <li>Blackgram varieties VBN 9 and VBN 10 are identified for release under CVRC in south zone including Tamil Nadu. The list of varieties to be released through CVRC will be informed to Dept. of Agriculture.</li> </ul>		
		Director Seeds	<ul style="list-style-type: none"> <li>All the varieties that are approved by CVRC and notified by the Government of India can be grown in all the recommended states. Hence, the VBN 9 and VBN 10 blackgram varieties can be promoted for cultivation by Tamil Nadu farmers.</li> <li>During 2020-21, about 1.0 q VBN 9 and 28.81 q VBN 10 blackgram seeds were produced and distributed to the farmers. About 1.44 q VBN 9 and 8.94 q VBN 10 seeds were produced and supplied so for during 2021-22.</li> </ul>		
25.	<p><b>2.2. Greengram</b></p> <p>2.2.1 Advisory of suitable Green gram varieties under</p>	Director, CPBG	<ul style="list-style-type: none"> <li>COGG 13-19 is a cross derivative of CO 6 x COGG 912 and matures in 60-65 days. It recorded an average yield of 785 kg/ha which is 7.2 and 8.3 percent increased yield over the check varieties CO 8 and VBN 3. It is resistant to MYMV. It is being evaluated under OFT.</li> </ul>		

	different ecosystems in Tamil Nadu		<p><b>POS</b></p> <ul style="list-style-type: none"> <li>The following region / district and season wise recommendation for Greengram varieties as advised by TNAU has been communicated to all Greengram growing districts.</li> </ul> <table border="1" data-bbox="940 337 1934 1049"> <thead> <tr> <th>Varieties</th> <th>Suitable for District/Season</th> </tr> </thead> <tbody> <tr> <td>CO (Gg) 7, VBN (Gg) 2, VBN (Gg) 3, CO 8, VBN 4</td> <td><b>Adi pattam (June-July)</b> All districts except Kanyakumari and Nilgiris</td> </tr> <tr> <td>CO (Gg) 7, VBN (Gg) 2, VBN (Gg) 3, CO 8, VBN 4</td> <td><b>Puratasi pattam (September-October)</b> Kanchipuram, Thiruvallur, Dharmapuri, Vellore, Tiruvannamalai, Salem, Namakkal, Cuddalore, Villupuram, Thiruchirapalli, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni, Pudukottai, Sivagangi, Ramanthapuram, Virudhunagar, Thoothukudi and Thirunelveli.</td> </tr> <tr> <td>VBN (Gg)3, CO (Gg) 7, CO 8</td> <td><b>Margazhi-Thai Pattam (December - January)</b> All districts except Kanyakumari and Nilgiris</td> </tr> <tr> <td>ADT 3</td> <td><b>Rice fallows (January-February)</b> Thanjavur, Thiruvarur, Nagapattinam, Cuddalore</td> </tr> <tr> <td>VBN (Gg) 3, CO (Gg) 7, CO 8, VBN 4</td> <td><b>Summer (February - March)</b> Thanjavur, Thiruvarur, Nagapattinam, Cuddalore, Villupuram, Tiruchirapalli, Perambalur, Thiruvallur, Kanchipuram</td> </tr> </tbody> </table>	Varieties	Suitable for District/Season	CO (Gg) 7, VBN (Gg) 2, VBN (Gg) 3, CO 8, VBN 4	<b>Adi pattam (June-July)</b> All districts except Kanyakumari and Nilgiris	CO (Gg) 7, VBN (Gg) 2, VBN (Gg) 3, CO 8, VBN 4	<b>Puratasi pattam (September-October)</b> Kanchipuram, Thiruvallur, Dharmapuri, Vellore, Tiruvannamalai, Salem, Namakkal, Cuddalore, Villupuram, Thiruchirapalli, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni, Pudukottai, Sivagangi, Ramanthapuram, Virudhunagar, Thoothukudi and Thirunelveli.	VBN (Gg)3, CO (Gg) 7, CO 8	<b>Margazhi-Thai Pattam (December - January)</b> All districts except Kanyakumari and Nilgiris	ADT 3	<b>Rice fallows (January-February)</b> Thanjavur, Thiruvarur, Nagapattinam, Cuddalore	VBN (Gg) 3, CO (Gg) 7, CO 8, VBN 4	<b>Summer (February - March)</b> Thanjavur, Thiruvarur, Nagapattinam, Cuddalore, Villupuram, Tiruchirapalli, Perambalur, Thiruvallur, Kanchipuram
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26.	<p><b>2-2.2 Individual Issues to be followed in Greengram:</b></p> <p>a) New variety for replacing CO 7 in Western districts to be evolved as it is a 16 year Old variety.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>COGG 13-19 is a cross derivative of CO 6 x COGG 912 and matures in 60-65 days. It recorded an average yield of 785 kg/ha which is 7.2 and 8.3 percent increased yield over the check varieties CO 8 and VBN 3. It is resistant to MYMV. It is being evaluated under OFT.</li> </ul>												



	b) New variety alternate to replace ADT 3 (1988) has to be evolved for Rice fallow in Tiruvarur district to withstand excessive moisture during germination.		<ul style="list-style-type: none"> <li>COGG 13-39 is a cross derivative of CO 6 x SML 668 and matures in 60-65 days. It recorded an average yield of 744 kg/ha which is 31.1 percent increased yield over the check varieties ADT 3. It is being evaluated in ART (Rice – Fallow)</li> </ul>												
27.	<p><b>2.3. Red gram</b></p> <p>2.3.1 Advisory on suitable Red gram varieties under different ecosystems in Tamil Nadu</p>		<p><b>POS</b></p> <ul style="list-style-type: none"> <li>The region / district and season wise recommendation for Redgram varieties as advised by TNAU has been communicated to all Redgram growing districts.</li> </ul> <table border="1"> <thead> <tr> <th>Varieties</th> <th>District/Season</th> </tr> </thead> <tbody> <tr> <td>CO (Rg) 7, CO 8 and CO 9</td> <td><b>Vaigasi Pattam (May-June)</b> Krishnagiri, Dharmapuri. Salem, Erode, Coimbatore Dindigul, Theni and Madurai</td> </tr> <tr> <td>CO 8, CO 9</td> <td><b>Adil Avani pattam (June-August)</b> Vellore, Thiruvannamalai, Salem, Namakkal, Perumbalur, Ariyalur, Madurai, Dindigul, Theni, Pudukkottai and Sivagangai</td> </tr> <tr> <td>CO (Rg) 7 and VBN (Rg) 3</td> <td><b>Purattasi pattam (September-October)</b> Vellore, Tiruvannamalai, Dharmapuri, Salem, Namakkal, Erode, Coimbatore, Madurai, Dindigul, Theni Pudukkottai, Sivagangai, Perambalur, Ariyalur</td> </tr> <tr> <td>CO (Rg) 7 and VBN (Rg) 3</td> <td><b>Margazhi pattam (Winter Irrigated)</b> All districts except The Nilgiris and Kanyakumari</td> </tr> <tr> <td>CO (Rg) 7 and VBN (Rg) 3 BSR 1</td> <td><b>Chithirai pattam (Summer Irrigated)</b> All districts except The Nilgiris and Kanyakumari Wetland bunds</td> </tr> </tbody> </table>	Varieties	District/Season	CO (Rg) 7, CO 8 and CO 9	<b>Vaigasi Pattam (May-June)</b> Krishnagiri, Dharmapuri. Salem, Erode, Coimbatore Dindigul, Theni and Madurai	CO 8, CO 9	<b>Adil Avani pattam (June-August)</b> Vellore, Thiruvannamalai, Salem, Namakkal, Perumbalur, Ariyalur, Madurai, Dindigul, Theni, Pudukkottai and Sivagangai	CO (Rg) 7 and VBN (Rg) 3	<b>Purattasi pattam (September-October)</b> Vellore, Tiruvannamalai, Dharmapuri, Salem, Namakkal, Erode, Coimbatore, Madurai, Dindigul, Theni Pudukkottai, Sivagangai, Perambalur, Ariyalur	CO (Rg) 7 and VBN (Rg) 3	<b>Margazhi pattam (Winter Irrigated)</b> All districts except The Nilgiris and Kanyakumari	CO (Rg) 7 and VBN (Rg) 3 BSR 1	<b>Chithirai pattam (Summer Irrigated)</b> All districts except The Nilgiris and Kanyakumari Wetland bunds
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28.	<p><b>a. CO 8 (2017)</b></p> <p>CO 8 Redgram is reported to be performing well with moderate resistance to pest</p>	Director, CPBG	<ul style="list-style-type: none"> <li>The variety is recommended for Thiruvannamalai, Kallakuruchi, Vellore, Krishnagiri, Dharmapuri, Salem, Namakkal and Coimbatore districts</li> <li>A total of 320 kg of CO 8 redgram breeder seed was supplied to the Department of Agriculture during 2021-2022 for the following districts viz., Thiruppathur, Thiruvallur, Vellore, Dharmapuri, Krishnagiri, Perambalur, Karur, Pudukkottai and Dindugul.</li> </ul>												

	and diseases and hence, necessary action plan should be taken for increasing the area under this variety CO 8, for increasing the Redgram production in Tamil Nadu. TNAU should give district wise advisory on suitability of Redgram variety & management practices for augmenting the redgram production in Tamil Nadu.		<ul style="list-style-type: none"> <li>• A total of 900 kg of FS I was produced during 2021-2022 and supplied to the farmers of Tamil Nadu under GOI-NFSM-seed hub scheme. Under NADP programme, training was imparted on "Quality seed production in Redgram" to the farmers of Coimbatore, Virudunagar and Karur districts.</li> <li>• To popularize the redgram variety CO 8, Front Line Demonstration was conducted in 15 ha in Karupur block of Karur district under AICRP Pigeon pea scheme during 2021-2022.</li> </ul>
		DOA	<p><b>TANSEDA/POS</b></p> <p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, 3.20 Mts Breeder seeds were utilised and 12.76 Mts of F1 seeds was produced.</li> <li>• During 2021-22, 10 MT of F seeds and 81.9 MT of C seeds totalling to 91.9 MT of seeds have been distributed.</li> <li>• During 2022-23, 0.4 Mts of Breeder seed indent has been placed and seeds have been received.</li> <li>• During 2022-23, 3.6 MT of F seeds and 4 MT of C seeds totalling 7.6 MT of seeds have been distributed.</li> </ul> <p><b>POS</b></p> <ul style="list-style-type: none"> <li>• The CO 8 Redgram variety is less than 10 year old, it has been recommended to distribute under NFSM and NADP – Productivity enhancement in Redgram during 2022-23 in the implementing districts.</li> </ul>
29.	<b>b. BSR 1 (Perennial)</b>  As BSR 1 is not notified, TNAU has to evolve a new perennial variety at the earliest for bringing into the seed chain for cultivation in the backyard. Further, a short duration, determinate and high yielding red gram variety needs to be developed.	Director, CPBG	<ul style="list-style-type: none"> <li>• Young beans of vegetable pigeon pea are nutritionally rich.</li> <li>• The pods from the vegetable pigeon pea fetches good price in the market. Keeping this in view, development of vegetable pigeon pea programme is being undertaken by utilizing the perennial redgram variety BSR 1 and vegetable type varieties BRG 1 and BRG 3.</li> </ul>

30.	<p><b>2.4. Cowpea</b></p> <p>2.4.1 Advisory of suitable cowpea varieties under different ecosystems in Tamil Nadu</p>	Director, CPBG	<p><b>POS</b></p> <ul style="list-style-type: none"> <li>Cowpea growing districts have been instructed to follow the advisory of suitable varieties under different eco system as advised by TNAU.</li> </ul> <table border="1" data-bbox="911 326 1965 769"> <thead> <tr> <th data-bbox="911 326 1188 396">Varieties</th> <th data-bbox="1188 326 1965 396">Suitable District/Season</th> </tr> </thead> <tbody> <tr> <td data-bbox="911 396 1188 475">CO 6, CO (CP) 7, Paiyur 1, VBN 1</td> <td data-bbox="1188 396 1965 475"><b>Adi pattam (June-August)</b> All districts except Kanyakumari and Nilgiris</td> </tr> <tr> <td data-bbox="911 475 1188 621">CO 6, CO (CP) 7, Paiyur 1</td> <td data-bbox="1188 475 1965 621"><b>Purattasi pattam (September-Nov)</b> Vellore, Tiruvannamalai, Dharmapuri, Salem, Namakkal, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni and Virudhunagar.</td> </tr> <tr> <td data-bbox="911 621 1188 769">CO 6, CO (CP) 7, VBN 2</td> <td data-bbox="1188 621 1965 769"><b>Margazhi – Thai pattam (Dec-Feb)</b> Kancheepuram, Thiruvallur, Vellore, Thiruvannamalai, Dharmapuri, Salem, Namakkal, Coimbatore, Erode, Madurai, Dindigul, Theni and Virudhunagar</td> </tr> </tbody> </table>	Varieties	Suitable District/Season	CO 6, CO (CP) 7, Paiyur 1, VBN 1	<b>Adi pattam (June-August)</b> All districts except Kanyakumari and Nilgiris	CO 6, CO (CP) 7, Paiyur 1	<b>Purattasi pattam (September-Nov)</b> Vellore, Tiruvannamalai, Dharmapuri, Salem, Namakkal, Perambalur, Erode, Coimbatore, Madurai, Dindigul, Theni and Virudhunagar.	CO 6, CO (CP) 7, VBN 2	<b>Margazhi – Thai pattam (Dec-Feb)</b> Kancheepuram, Thiruvallur, Vellore, Thiruvannamalai, Dharmapuri, Salem, Namakkal, Coimbatore, Erode, Madurai, Dindigul, Theni and Virudhunagar
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31.	<p><b>2.5. Horsegram</b></p> <p>TNAU has to evolve new variety of Horse Gram since the existing varieties of PY 1 (1988) &amp; PY 2 (1998) are more than 10 years old.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>Research work to develop short duration horsegram has been initiated. A high yielding short duration culture PYR 21-07 is being evaluated under MLT during 2022-2023</li> </ul>								
32.	<p><b>2.6. Bengalgram</b></p> <p>Suitable protein rich and root rot resistant variety to replace CO 4 (1999) to be evolved</p>	Director, CPBG	<ul style="list-style-type: none"> <li>High yielding Chickpea culture ICGV 18164 is under evaluation of ART and OFT during 2022 for the following districts viz., Coimbatore, Thirupur, Dharmapuri, Perambalur and Tuticurin.</li> </ul>								

33.	<p><b>3. Oilseeds</b>  <b>3.1. Groundnut</b></p> <p>3.1.1 Advisory on suitable Groundnut varieties under different ecosystems in Tamil Nadu</p>	Director, CPBG	<p><b>POS</b></p> <table border="1" data-bbox="932 250 1940 565"> <thead> <tr> <th>Variety</th> <th>Season</th> <th>Districts</th> </tr> </thead> <tbody> <tr> <td>VRI 8 (2016)</td> <td><i>Rabi</i> / Summer</td> <td>Tiruvannamalai, Villupuram, Kallakurichi, Cuddalore, Vellore, kancheepuram, Pudukottai, Sivagangai, Madurai, Virudhunagar, Karur, Ariyalur &amp; Trichy</td> </tr> <tr> <td>TMV 14 (2018)</td> <td>Early <i>Kharif</i></td> <td>Namakkal, Salem, Vellore, Ranipet, Thiruppathur, Thiruvannamalai, Villupuram, Kallakurichi, Dharmapuri, Erode, Karur and Cuddalore with scanty rainfall where TMV-7 were grown.</td> </tr> </tbody> </table>	Variety	Season	Districts	VRI 8 (2016)	<i>Rabi</i> / Summer	Tiruvannamalai, Villupuram, Kallakurichi, Cuddalore, Vellore, kancheepuram, Pudukottai, Sivagangai, Madurai, Virudhunagar, Karur, Ariyalur & Trichy	TMV 14 (2018)	Early <i>Kharif</i>	Namakkal, Salem, Vellore, Ranipet, Thiruppathur, Thiruvannamalai, Villupuram, Kallakurichi, Dharmapuri, Erode, Karur and Cuddalore with scanty rainfall where TMV-7 were grown.
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34.	<p><b>3.1.2 Individual Issues to be followed in Groundnut:</b>  <b>a. VRI 8 (2016)</b></p> <p>This variety is recommended for High input condition and suitable for Rabi Summer season. There was a field observation indicating Poor germination, big sized pod with small, shriveled kernels and <i>in-situ</i> germination of seeds of VRI 8 variety Groundnut during <i>Kharif</i> season in Cuddalore and Villupuram districts. TNAU should study these issues and inform in the next meeting. Till then, no indent for Breeder seed for VRI-8 shall be made and <b>suitable advisory may be given to the farmers to</b></p>	Director, CPBG	<ul style="list-style-type: none"> <li>• Studies on VRI 8 Groundnut variety under high input and proper manuring revealed that the crop produces big sized pod with bold kernels</li> <li>• VRI 8 is suitable for <i>Rabi</i> /summer season</li> <li>• For avoiding <i>in situ</i> germination in <i>kharif</i> season sowing must to be taken within second fortnight of June.</li> <li>• Timely harvest should be done (at 110-115 days)</li> <li>• Avoid late harvest above 120 days</li> </ul>									
		DOA	<p><b>TANSEDA</b></p> <ul style="list-style-type: none"> <li>• Advance Breeder seed indent was placed for 2022-23 in 2020-21 and also as farmer's preference was there, 580 Kgs indent (reduced indent was placed in 2022-23 whereas in 2020-21,19,470 Kgs was received) has been placed and district JDAs were insisted to take up sowing in <i>Rabi</i> season to avoid <i>in situ</i> germination.</li> <li>• VRI 8 Breeder seed indent has not been placed for the financial year 2023-24.</li> </ul>									

	<b>cultivate VRI 8 Groundnut in <i>Rabi-Summer</i> season only.</b>																														
35.	<p><b>b. TMV-14 (2018):</b></p> <p>TMV-14 is suitable for rainfed condition and therefore, Department may study the field performance and include in the Seed chain if found high yielding compared to 1&lt;6, K9 &amp; GG7 Groundnut varieties</p>	DOA	<p><b>TANSEDA</b></p> <p><b>TMV 14</b></p> <ul style="list-style-type: none"> <li>During 2021-22, 6.54 MT of Breeder seed was utilized and 221 MT of F1 seeds have been produced.</li> </ul> <p>The Field performance of TMV-14 is as below:</p> <table border="1"> <tr> <td>Seed viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>78</td> </tr> <tr> <td>Duration</td> <td>105-110</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Medium size leaf canopy</td> </tr> <tr> <td>Seasonal preference/ adaptability</td> <td>Suitable for <i>Chithirai</i> &amp; <i>Karthigai pattam</i></td> </tr> <tr> <td>Pest Resistance</td> <td>Moderately resistance.</td> </tr> <tr> <td>Disease Resistance</td> <td>Late Leaf Blight Noticed. Moderately resistance to Late leaf spot and rust</td> </tr> <tr> <td>Tillering Capacity/ Branching Capacity</td> <td>6-7 Branches per plant, 25 to 30 pods per plant</td> </tr> <tr> <td>Yield(kg/Ha)</td> <td>1850 to 2153 Kg/ ha</td> </tr> <tr> <td>Grain Preference by Farmers</td> <td>Good</td> </tr> <tr> <td>Grain Preference by Traders</td> <td>Traders prefer this variety because of high Oil content</td> </tr> <tr> <td>Comparative performance to other similar/ruling varieties</td> <td>TMV-14 performance is comparatively good with other similar/ ruling varieties.</td> </tr> <tr> <td>Yield Performance when compared to K6, K9 and GG 7</td> <td>Yield performance is more or less similar to K-9. (K9-2.07 to 2.18 MT/ ha)</td> </tr> </table>	Seed viability	Good	Germination %	78	Duration	105-110	Earlier Crop Stand	Good	Leaf canopy	Medium size leaf canopy	Seasonal preference/ adaptability	Suitable for <i>Chithirai</i> & <i>Karthigai pattam</i>	Pest Resistance	Moderately resistance.	Disease Resistance	Late Leaf Blight Noticed. Moderately resistance to Late leaf spot and rust	Tillering Capacity/ Branching Capacity	6-7 Branches per plant, 25 to 30 pods per plant	Yield(kg/Ha)	1850 to 2153 Kg/ ha	Grain Preference by Farmers	Good	Grain Preference by Traders	Traders prefer this variety because of high Oil content	Comparative performance to other similar/ruling varieties	TMV-14 performance is comparatively good with other similar/ ruling varieties.	Yield Performance when compared to K6, K9 and GG 7	Yield performance is more or less similar to K-9. (K9-2.07 to 2.18 MT/ ha)
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Yield Performance when compared to K6, K9 and GG 7	Yield performance is more or less similar to K-9. (K9-2.07 to 2.18 MT/ ha)																														

			<ul style="list-style-type: none"> <li>• During 2022-23, around 20.32 MT indent has been placed and 8.77 MT has been received in <i>Kharif</i>.</li> <li>• During 2021-22, 68.3 MT of F seed and 272.5 MT of C seed distributed.</li> <li>• During 2022-23, 26.8 MT of F seed and 147 MT of C seed distributed.</li> </ul>
36.	<p><b>c. Evolving alternate variety to K6, K7 and GG7:</b></p> <p>Suitable alternate variety should be developed for replacing K6, K9, Dharani, GG7 and other state varieties evolved in Gujarat &amp; Andhra Pradesh.</p>	Director, CPBG	<p>Two groundnut varieties namely VRI 9 and VRI 10 were released during 2022.</p> <p><b>Groundnut VRI 9</b></p> <ul style="list-style-type: none"> <li>• Parentage: VG 0420 x VRI Gn 6</li> <li>• Duration: 110-115 days</li> <li>• Season: <i>Kharif</i> and <i>Rabi</i>.</li> <li>• Dry pod yield : 2526 kg/ha (<i>Kharif</i>) 2921 kg/ha (<i>Rabi</i>)</li> </ul> <p>Special features: Absence of pod beak &amp; Shallow pod constriction; Oil content is 48-50%.</p> <p><b>Groundnut VRI 10</b></p> <ul style="list-style-type: none"> <li>• Parentage: VRI 2 x NRCG CS 349</li> <li>• Duration: 90-95 days</li> <li>• Season: <i>Kharif</i> and <i>Rabi</i>.</li> <li>• Dry pod yield : 2535 kg/ha (<i>Kharif</i>) 2448 kg/ha (<i>Rabi</i>)</li> </ul> <p>Special features: Spanish bunch, early maturity, Medium pod constriction, prominent pod beak and Rose colour testa. Oil content is 46-48%.</p>
37.	<p><b>3.2. Sunflower- CoH 3 (2018):</b></p> <p>CoH 3 Sunflower hybrid was tested in Thoothukudi, Virudhunagar, Karur and Trichy. It is reported to be good but extensive damage up to 10-40% was observed. TNAU may evolve a high yielding and drought tolerant sunflower variety.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• A new sunflower hybrid CSFH 15020 with the parentage of COSF 12A x IR 6 has been identified to be high yielding and stable. It matures in 85-90 days, with a mean seed yield of 2450 kg /ha, which is 11.3 % yield increase over COH 3 and 37 % yield increase over GK 2002, respectively.</li> <li>• It possesses high oil content of 42% and high-volume weight (46g/100 ml).</li> <li>• Growing sunflower over a large area can reduce the incidence/risk of bird's damage.</li> </ul>



38.	<p><b>3.3. Castor - YRCH-I (2009), P-1 (2019) &amp; YRCH 2 (2017):</b></p> <p>Breeder seeds of these YRCHI &amp; YTP1 Castor have been supplied in 2020-21 and found to be good in farmers field Another YRCH 2 also has been released in 2017 which is lengthy spikes, non-shattering and suitable for intercropping.</p> <p><b>TANSEDA should take up Seed production of castor YRCH 1 and 2 in SSFs to ensure timely supply of seeds</b> to the farmers for which TNAU may give training on hybrid seed production. The performance of YTP 1 &amp; YRCH 2 may also be assessed and informed in the next meeting.</p>	DOA	<p><b>TANSEDA</b></p> <p><b>YRCH 1</b></p> <ul style="list-style-type: none"> <li>• 2.03 MT of C seed was produced in 2020-21.</li> <li>• During 2021-22, 0.9 MT has been distributed</li> <li>• YRCH-1 indent has not been placed in 2021-22, 2022-23.</li> </ul> <p><b>YRCH 2:</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, 4 Kgs R line was supplied in Salem during July; whereas 8 Kgs A line was supplied in October and hence hybrid seed production could not be taken up.</li> <li>• In Ariyalur, 2 Kgs: 1 Kg seeds (A line: R line) was received. The season was September and due to late receipt of A line (in October), Seed farm was raised in October 2021 in 1 acre. Due to heavy rain, crop growth and flowering was affected which led to withdrawal of seed farm</li> <li>• During 2022-23, indent has been placed for YRCH 2 and supplied. (A line: 10 Kgs; R line- 5 Kgs)</li> </ul> <p>The performance of YRCH-2 will be studied and reported next year.</p> <p style="text-align: center;"><b>The performance of YTP-1 is as below:</b></p> <table border="1" data-bbox="932 781 1940 1338"> <tr> <td>Seed Viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>82</td> </tr> <tr> <td>Duration</td> <td>145</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Flat and wider leaf</td> </tr> <tr> <td>Disease Resistance</td> <td>Resistance to wilt</td> </tr> <tr> <td>Seasonal preference/adaptability</td> <td>Suitable for <i>Chithirai pattam</i></td> </tr> <tr> <td>Pest Resistance</td> <td>Resistance to semilooper and capsule borer</td> </tr> <tr> <td>Branching Capacity</td> <td>2 to 3 Basal branches/ Plant</td> </tr> <tr> <td>Yield(kg/Ha)</td> <td>750 to 950 Kg/Ha</td> </tr> <tr> <td>Comparative performance to other similar/ruling varieties</td> <td>Yield is more when compared to TMV-6 (TMV-6- 800 to 850 Kg/ha)</td> </tr> </table> <p><b>Castor hybrid YRCH 1:</b></p> <ul style="list-style-type: none"> <li>• Parental seed supplied to the SSF, Danishpet, Salem and hybrid seed production training</li> </ul>	Seed Viability	Good	Germination %	82	Duration	145	Earlier Crop Stand	Good	Leaf canopy	Flat and wider leaf	Disease Resistance	Resistance to wilt	Seasonal preference/adaptability	Suitable for <i>Chithirai pattam</i>	Pest Resistance	Resistance to semilooper and capsule borer	Branching Capacity	2 to 3 Basal branches/ Plant	Yield(kg/Ha)	750 to 950 Kg/Ha	Comparative performance to other similar/ruling varieties	Yield is more when compared to TMV-6 (TMV-6- 800 to 850 Kg/ha)
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			<p>was given to 20 officials of Dept. of Agriculture and 30 farmers at Lakkampatti village, Kolathur block, Salem district on 27.01.2022</p> <p><b>Castor hybrid YRCH 2:</b></p> <ul style="list-style-type: none"> <li>• Parental seed of M 619-1 (pistillate line -10 kg) and Monoecious line (SKI 215 -5 kg) have been supplied to the AEC, Salem for hybrid seed production. Training will be conducted at the time of sowing.</li> </ul> <p><b>Performance of YTP 1:</b></p> <ul style="list-style-type: none"> <li>• A total of 50 kg of YTP 1 breeder seed has been supplied to the five districts viz., Salem, Namakkal, Ariyalur, Perambalur and Dindigul. It is perennial in nature and performance is good.</li> </ul> <p><b>Performance of YRCH 2:</b></p> <ul style="list-style-type: none"> <li>• It is performing extremely well in the farmers' field and gives higher yield than YRCH 1 and wilt resistant. The duration is 30- 35 days longer than YRCH 1</li> </ul>
39.	<p><b>3.4. Oil palm</b></p> <p>Suitability of Oil palm cultivation in Tamil Nadu to be studied by TNAU and the results may be informed.</p>	Dean, Horti	<ul style="list-style-type: none"> <li>• Evaluation of Tenera Oil Palm hybrids are being taken up at Agricultural Research Station, Pattukkottai and one Tenera hybrid in the name of 'Godavari Gold' has been recommended for the cultivation in Cauvery delta regions of Tamil Nadu.</li> </ul>
40.	<p><b>4. Sugarcane</b></p> <p><b>a. CoC 13339 (2020)</b></p> <p>Director, CPBG reported that this variety performs on par with "Atulya" variety in the yield and sugar recovery. It was reported that there is an issue on flowering for which Director, CPBG has informed that those are off-types. This flowering issue of CoC 13339 and other comparative performances need to be ascertained and the possibility</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• Co 11015 (<i>Atulya</i>) is an early maturing variety with moderate cane yield.</li> <li>• High sugar recovery could be obtained only with harvest from 8th to 10th month of age.</li> <li>• CoC 13339, a selection from Co 86032 GC is a high yielding mid-late maturing variety.</li> <li>• The average cane yield CoC 13339 is 140 tonnes/ha with CCS % equivalent to Co 11015 (around 13 %) at early period.</li> <li>• The cane yield is higher than <i>Atulya</i> at all periods and the sugar yield is comparatively better than <i>Atulya</i> even if harvested beyond 10th month.</li> <li>• During 2021-22 due to favourable climate for flowering, most of the clones planted at SRS, Cuddalore have flowered, but CoC 13339 did not flower. So far, flowering in CoC 13339 has not been reported any where</li> </ul>
		CS DOA	<p><b>Sugarcane</b></p> <ul style="list-style-type: none"> <li>• The new sugarcane variety CoC 13339 is better both in quality and yield compared to the existing prominent sugarcane varieties.</li> <li>• Considering the performance of the said variety, the Commissioner of Sugar has placed an</li> </ul>

	of increasing area under this variety may be explored, if preferred by sugarcane farmers.		<p>indent of 210 MT for the supply of breeder seed cane from TNAU.</p> <ul style="list-style-type: none"> <li>• The breeder seed material will be distributed to all Co-operative/ Public, private Sector Sugar Mills for multiplication through three-tier nursery programme.</li> <li>• At present, the variety is cultivated in an area of 323 ha in Co-operative/ Public Sector Sugar Mills and 77 ha in private sector sugar mills with a total of 400 ha.</li> <li>• The sugarcane farmers are willing to multiply the said variety considering its individual cane weight and good yield.</li> <li>• All the sugar mills have been instructed to multiply the said variety in more area during the ensuing planting season.</li> <li>• The quality of the said variety will be analysed through small mill tests and big mill tests in due course.</li> </ul> <p><b>Field performance of CoC 13339 variety:</b></p> <ul style="list-style-type: none"> <li>• Good tillering</li> <li>• Thick Cane with good individual cane weight.</li> <li>• Good ratooning.</li> <li>• High yielder.</li> </ul>
41.	<p><b>b. CoC 25 (2018) &amp; CoG 6 (2018):</b></p> <p>The status on the progress of small mill test to be informed in the next meeting. Their performance should be closely followed by Department of Sugars and informed in the next meeting. Suitable plan of action for the promotion of all these varieties should be developed.</p>	CS DOA	<p><b>Sugarcane</b></p> <p><b>CoC 25:</b></p> <p>Considering the following poor characters of CoC 25 variety, all the sugar mills have been suggested not to multiply the said variety in due course.</p> <ul style="list-style-type: none"> <li>• Thin Cane with poor yield.</li> <li>• Poor tillering</li> <li>• Susceptible to Wilt, Red Rot and Internode borer.</li> <li>• Poor cane quality result in poor sugar recovery.</li> </ul> <p><b>CoG 6:</b></p> <ul style="list-style-type: none"> <li>• The new sugarcane variety CoG 6 is better both in quality and yield and also suitable for problematic soils including saline, alkaline and tannery effluent areas.</li> <li>• At present, the said variety is cultivated in an area of 367 ha in Private Sector Sugar Mills and 136 ha in Co-operative/ Public Sector Sugar Mills with a total of 503 ha.</li> <li>• Further, considering the better performance of the said variety, the Commissioner of Sugar</li> </ul>

has placed an indent of 80 MT for the supply of breeder seed cane from TNAU.

- The breeder seed material will be distributed to all Co-operative/ Public Sector Sugar Mills for multiplication through three-tier nursery programme.

**Field performance of CoG 6 variety:**

- Thick cane with longer internodes.
- Good yielder with thick cane.
- Suitable for saline, alkaline, tannery effluent areas and problematic soils.
- Non-flowering.

<b>SMT REPORT CoG 6</b>			
<b>Ambur CSM</b>	<b>Dhanalakshmi Srnivasan Perembalur</b>	<b>Rajshree Sugars, Mundiampakkam</b>	<b>Rajshree Sugars. Varadharaj nagar</b>
Brix %- 16.19	Brix %- 18.30	Brix %- 15.64	Brix %- 17.84
Pol % - 14.15%	Pol % - 15.12	Pol % - 13.61	Pol % - 15.07
Purity % - 87.40%	Purity % - 82.62	Purity % - 87.03	Purity % - 84.47

**BMT Report of Ambur CSM**

On date recovery – 7.29 %

BMT Recovery – 8.84 %

Difference – 1.55 %

		Director, CPBG	<p align="center"><b>Performance of COG 6 in small mill test</b></p> <table border="1"> <thead> <tr> <th rowspan="2">Mill</th> <th colspan="4">CoG 6</th> <th colspan="4">Co 86032</th> </tr> <tr> <th>Brix (%)</th> <th>Pol (%)</th> <th>Purity (%)</th> <th>CCS (%)</th> <th>Brix (%)</th> <th>Pol (%)</th> <th>Purity (%)</th> <th>CCS (%)</th> </tr> </thead> <tbody> <tr> <td>Subramaniya Siva, Harur</td> <td>20.49</td> <td>18.23</td> <td>88.97</td> <td>13.17</td> <td>20.60</td> <td>18.00</td> <td>87.31</td> <td>12.36</td> </tr> <tr> <td>Dharani Sugars, Polur</td> <td>21.10</td> <td>19.51</td> <td>92.46</td> <td>14.16</td> <td>21.30</td> <td>19.01</td> <td>89.20</td> <td>13.18</td> </tr> <tr> <td>Dharmapuri Co-op Sugar, Palacode</td> <td>21.76</td> <td>18.63</td> <td>91.62</td> <td>13.03</td> <td>21.50</td> <td>18.62</td> <td>86.60</td> <td>13.10</td> </tr> <tr> <td>Ambur Co-op, Vadapudupet</td> <td>20.35</td> <td>18.18</td> <td>90.85</td> <td>12.99</td> <td>20.60</td> <td>18.23</td> <td>88.50</td> <td>12.96</td> </tr> <tr> <td><b>Mean</b></td> <td>20.92</td> <td>18.63</td> <td>90.98</td> <td>13.34</td> <td>21.00</td> <td>18.47</td> <td>87.90</td> <td>12.90</td> </tr> </tbody> </table> <ul style="list-style-type: none"> <li>The latest sugarcane variety CoC 13339 performs better than CoC 25 in terms of cane yield and CCS recovery %, and has additional desirable features <i>viz.</i>, self detaching, erect canes highly suitable for machine harvest, the variety CoC 13339 may be promoted for increasing area under sugarcane cultivation.</li> <li>A total of 114 metric tons of sugarcane variety CoG6 seed cane were supplied to various sugar mills for popularization.</li> </ul>	Mill	CoG 6				Co 86032				Brix (%)	Pol (%)	Purity (%)	CCS (%)	Brix (%)	Pol (%)	Purity (%)	CCS (%)	Subramaniya Siva, Harur	20.49	18.23	88.97	13.17	20.60	18.00	87.31	12.36	Dharani Sugars, Polur	21.10	19.51	92.46	14.16	21.30	19.01	89.20	13.18	Dharmapuri Co-op Sugar, Palacode	21.76	18.63	91.62	13.03	21.50	18.62	86.60	13.10	Ambur Co-op, Vadapudupet	20.35	18.18	90.85	12.99	20.60	18.23	88.50	12.96	<b>Mean</b>	20.92	18.63	90.98	13.34	21.00	18.47	87.90	12.90
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42.	<p><b>5. COTTON</b></p> <p><b>a. CO 17 (2020)</b> (Synchronized maturity enables single harvesting) Non-synchronized maturity has been observed in CO 17</p>	DOA	<p><b>Cotton</b></p> <p><b>TANSEDA</b></p> <p><b>CO 17</b></p> <ul style="list-style-type: none"> <li>30 Kgs Breeder seed was utilized and 0.73 MT of F1 seeds were realized.</li> <li>Synchronised maturity was not observed in allocated districts <i>viz.</i>, Tenkasi, Virudhunagar, Salem, Madurai and Namakkal.</li> </ul>																																																														

	<p>Cotton variety in some places in Namakkal district. Therefore, further feedback may be obtained and reported.</p>		<ul style="list-style-type: none"> <li>• 2-3 pickings were done when compared to 6 to 7 pickings in other varieties.</li> <li>• As reported by the districts picking was easier in CO 17 variety compared to other varieties and hence time is saved.</li> </ul>
		<p>Director (CPBG)</p>	<ul style="list-style-type: none"> <li>• Due to heavy rains, there is a possibility for secondary flushes to come in cotton crop, which leads to further vegetative growth. Hence, there is a possibility of non- synchronized maturity in Cotton variety CO 17.</li> <li>• Thiru. Kandasamy, farmer from Namakkal district raised CO 17 cotton during 2021. The performance of Cotton CO 17 in his field is compact with synchronized maturity and got good yield (1800 kg/ha).</li> <li>• 5 kg of cotton variety CO 17 Breeder seed was supplied to Agricultural Extension Centre, Namakkal by Dept of Cotton, Coimbatore during 2022-23.</li> </ul>
<p>43.</p>	<p><b>6. Maize</b>  <b>a. Evolving FAW resistant variety</b></p> <p>TNAU should evolve suitable variety / hybrid resistant to Fall Armyworm. It was reported that that none of the hybrids could be declared as resistant to FAW. TNAU should initiate research efforts by involving domestic and exotic germplasm sources.</p>	<p>Director, CPBG</p>	<ul style="list-style-type: none"> <li>• Genetic introgression of selected parental line with wild species <i>viz., Zea mays sub sp parviglumis, Zea mexicana</i> and <i>Zea luxurians</i> has been effected and the subsequent evaluations and crossing was completed. The work is in progress and requires further 4-5 seasons.</li> </ul>

44.	<p><b>b. COH (M) 8 (2018)</b></p> <p>COH (M) 8 maize hybrid seed production is to be promoted. CO (MH) 8 seed production could be extended to additional SSFs.</p>	DOA	<p><b>TANSEDA</b></p> <p><b>COH(M) 8</b></p> <ul style="list-style-type: none"> <li>During 2021-22, COH (M) 8 seed production was taken up in Satyamangalam and Bhavani SSFs. 60 Kgs of R line and 30 Kgs of A line was utilized and 9.52 MT of hybrid seeds was produced.</li> </ul> <p><b>Adoption of season by Districts:</b>  Coimbatore-June-July  Dindigul - Aug-Sep  Erode - June-July  Salem- July to Aug  Tiruppur-Aug-Sep</p> <p>The performance of the COH (M) 8 Hybrid is as below:</p> <table border="1" data-bbox="982 656 1892 1094"> <tr> <td>Seed viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>81 to 98%</td> </tr> <tr> <td>Duration</td> <td>100 to 110 days</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Medium</td> </tr> <tr> <td>Seasonal preference /adaptability</td> <td><i>Kharif</i></td> </tr> <tr> <td>Pest Resistance</td> <td>Affected by Fall Army worm</td> </tr> <tr> <td>Yield(kg/Ha)</td> <td>1000 to 1300 per ha</td> </tr> <tr> <td>Others</td> <td>Problem in seed setting is observed. Used for Poultry feed</td> </tr> </table> <ul style="list-style-type: none"> <li>During 2022-23, COH (M) 8 seed production is taken up in SSF, Bhavani and SSF, Sathyamangalam. (R line-36 Kgs &amp; A line- 18 Kgs).</li> <li>The certified seeds 1.6 MT and 3.2 MT were distributed in 2021-22 and 2022-23 respectively.</li> </ul>	Seed viability	Good	Germination %	81 to 98%	Duration	100 to 110 days	Earlier Crop Stand	Good	Leaf canopy	Medium	Seasonal preference /adaptability	<i>Kharif</i>	Pest Resistance	Affected by Fall Army worm	Yield(kg/Ha)	1000 to 1300 per ha	Others	Problem in seed setting is observed. Used for Poultry feed
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45.	<p><b>c. Evolving hybrids / varieties to replace private Maize hybrids:</b></p> <p>TNAU should come with equivalent hybrid / varieties to replace private hybrid / varieties <i>i.e.</i>, NK 6240, CP 808, CP 818.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• A new high yielding hybrid CMH 12-686 with a maturity of 110 days has been identified for released during 2022-23 under SVRC.</li> <li>• It has yielded 8200kg/ha which is a minimum of 10 % yield increase of over CO (HM) 6, COH (M) 8 and NK 6240. Besides one more hybrid CMH 15-005 is in pipe line for next release.</li> </ul>																		
	<p>It is reported that COH (M) 6 (2012) and COH(M) 8 have been confirmed to yield better than the private hybrids.</p> <p>For taking hybrid maize seed production, TNAU has recommended ideal Seed Production Zones as detailed below:</p> <p>June-July and Dec-Jan : Coimbatore, Dindigul          June-July : Erode, Salem and Tiruppur          DOA may verify their performance and inform in the next meeting.</p>	DOA	<p><b>COH(M) 6</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, COH (M) 6 Breeder seed indent was not placed and in 2022-23, Breeder seed R line- 40 Kgs &amp; A line-20 Kgs have been indented and supplied.</li> <li>• The certified seeds 0.4 MT and 0.1 MT were distributed in 2021-22 and 2022-23 respectively.</li> </ul> <p>The performance of COH (M) 6 is as below:</p> <table border="1" data-bbox="995 769 1879 1138"> <tr> <td>Seed viability</td> <td>Good</td> </tr> <tr> <td>Germination %</td> <td>70%</td> </tr> <tr> <td>Duration</td> <td>105 to 110 days</td> </tr> <tr> <td>Earlier Crop Stand</td> <td>Good</td> </tr> <tr> <td>Leaf canopy</td> <td>Medium</td> </tr> <tr> <td>Seasonal preference/ adaptability</td> <td><i>Rabi</i></td> </tr> <tr> <td>Pest Resistance</td> <td>Affected by Fall Army worm</td> </tr> <tr> <td>Yield (kg/Ha)</td> <td>1000 to 1250 per ha</td> </tr> <tr> <td>Others</td> <td>Used for Poultry feed.</td> </tr> </table> <p><b>COH (M) 6 &amp; COH (M) 8 Yield Performance when compared to Private Hybrids:</b></p> <ul style="list-style-type: none"> <li>• Less grain coverage per cob than private Hybrids and Yield recorded is around 1 to 1.3 tonnes per ha whereas in private hybrids the yield realized is around 2.0 to 2.5 tonnes per ha.</li> </ul>	Seed viability	Good	Germination %	70%	Duration	105 to 110 days	Earlier Crop Stand	Good	Leaf canopy	Medium	Seasonal preference/ adaptability	<i>Rabi</i>	Pest Resistance	Affected by Fall Army worm	Yield (kg/Ha)	1000 to 1250 per ha	Others	Used for Poultry feed.
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46.	<p><b>7. Cumbu</b></p> <p>Bio-fortified high yielding varieties for millets (like Dhansakthi variety in Cumbu) need to be evolved for nutritional security.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>Breeding lines screened for Iron (Fe) and Zinc (Zn) content for utilization. The Fe content ranged between 22 ppm and 114 ppm and Zinc content from 19 ppm to 80 ppm.</li> <li>Source lines such as PT 6676, PT 6706 and PT 6708 were found to be promising and utilized in the crossing with adoptable lines.</li> <li>The progenies obtained in the initial breeding population are promising and work is progressing.</li> </ul>
	<p>A pre-release Fe and Zn bio-fortified cumbu hybrid 1619 would be proposed for release during 2021.</p>		<ul style="list-style-type: none"> <li>Pearl millet pre-release hybrid TNBH 1619 has been evaluated in different trials and it had recorded an average yield of 3030 kg/ha which is 12.5 increase over hybrid CO 9 and 7.0 per cent over private hybrid 86M38.</li> <li>The new hybrid possesses bold seeds with semi compact ear head and 59 ppm Fe and 37 ppm Zn. It is resistant to downy mildew and rust. It will be proposed for release 2023</li> </ul>
47.	<p><b>8. Sorghum</b></p> <p>A dual purpose variety suitable for both grain and fodder type should be evolved. The Competitive varieties/hybrids for millet crops have to be evaluated</p>	Director, CPBG	<ul style="list-style-type: none"> <li>Sorghum variety CO 32 is a dual purpose-grain and fodder variety with 105 - 110 days duration. It is suitable for rainfed condition, recorded grain yield of 2450 kg/ha as well as irrigated recorded grain yield of 2910 kg/ha. It has high protein (11.31-14.66%) and fibre content (5.8%) along with better cooking quality traits.</li> <li>It gives the dry fodder yield of 6490 kg/ha under rainfed condition and 11710 kg/ha in irrigated condition.</li> <li>Besides, promising grain sorghum culture, TNS 661 with a grain yield potential of 3000 kg/ha and another culture TKS 1036 suited only for black soils of southern districts with grain yield potential of 2600 kg/ha with higher fodder yield are in pipe line for release.</li> <li>Sorghum cultures TNS 695, TNS 698 from Dept. of Millets and TKS 1707, TKS 1801 from ARS, Kovilpatti are promising for promotion to ART.</li> </ul>
	<p>More awareness should be created about the benefits of the dual-purpose sorghum varieties, CO 30, CO 32 and K12 by Department of Agriculture.</p>	DOA	<ul style="list-style-type: none"> <li>Under NFSM – Nutri Cereals, 1600 Cluster Demonstrations for Sorghum, 300 cropping system-based training, 500 awareness programmes and 490 Nos. Road shows are programmed to be organised to create more awareness on seeds, varieties, cultivation and nutritional aspects.</li> <li>Also, CO 30, CO 32 and K 12 are being utilised for demonstrations and distributed through the scheme. It is programmed to distribute 1000 quintal of Sorghum of less than 10 year varieties. The scheme is under implementation.</li> </ul>

48.	<p><b>9. Green Manure</b> For taking seed production in green manure crops, TNAU has to recommend ideal Seed Production Zones.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• Cauvery delta zones of Tamil Nadu (Districts: Thanjavur, Thiruvarur, Nagapattinam, Trichy, Nagapattinam and Pudukkottai) and Madurai districts</li> </ul>
49.	<p><b>Specific Instruction to monitor the new cultures evolved by TNAU:</b> District JDAs, DDAs and ADAs should give their personal attention to monitor the performance of newly released cultivars in Adaptive Research Trial plots. The field level performance of those cultures should be closely monitored by extension officials and scientists from local research stations and KVK. DOA &amp; DHPC should issue suitable instructions to all districts. TNAU should communicate the list of new cultures sent to districts to DOA, with all necessary information. The crop sections concerned in the offices of DOA and DHPC should personally monitor the laying of ART plots from sowing to harvesting and Complete database should be maintained about the outcome of ART.</p>	Director, CPBG	<ul style="list-style-type: none"> <li>• The field level performance of proposed cultures to ART is monitored by the scientists from local research stations/ colleges/ KVKs.</li> </ul>
		DOA DHPC	<ul style="list-style-type: none"> <li>• All the crop sections are monitoring the Adaptive research Trial plots.</li> <li>• For the year 2022-23, the list of ARTs proposed to be conducted was received from TNAU. Instructions have been sent to districts to closely monitor the ART and to send the performance report.</li> </ul>

50.	<p><b>10. Tree Crops</b></p> <p><b>1. KADAM (MTP 1) and MELIA (MTP 1)</b></p> <p>As the Agroforestry is being given importance, these tree species have to be promoted in a large extent under TN MSDD and IFS schemes for which sufficient number of seedlings should be made available in all the districts</p>	<p>Dean, FC&amp;RI</p> <hr/> <p>DOA DHPC PCCF</p>	<ul style="list-style-type: none"> <li>• Forest College and Research Institute has established Consortium of Industrial Agroforestry (CIAF) and through this institute 13 decentralized nurseries have already enrolled as Consortium members. These nurseries are amenable for supply of Kadam (MTP1) and Melia (MTP1) seedlings in decentralized manner across different districts.</li> <li>• Forest College and Research Institute in association with Sharon Plywood has implemented contract plywood farming in which Kadam (MTP1) and Melia (MTP1) are mandatory species. Through this contract farming also availability of seedlings of both the species are ensured and is available for any stakeholder across different districts.</li> <li>• Above all, Forest College and Research Institute has established an exclusive clonal nursery through which the required number of seedlings can be multiplied and supplied to any district based on indent.</li> </ul> <hr/> <ul style="list-style-type: none"> <li>• “Tamil Nadu Mission for Sustainable Green cover in Farmland” (Phase-II) will be implemented in the state during 2022-23 at a total outlay of Rs. 11.55 crores in which 77 lakh tree saplings will be distributed to farmers.</li> <li>• Tree species like Kadam (MTP 1), <i>Melia dubia</i> are included and necessary action will be taken to produce and distribute to farmers under this scheme based on the farmers’ preference.</li> </ul>
51.	<p><b>11. Crop Management</b></p> <p><b>A. Rice</b></p> <p>1. The region specific management technologies for paddy cultivation under Terminal Drought / Flood Condition should be recommended by TNAU.</p>	<p>Director, DCM</p>	<p><b>System of Rice Cultivation</b></p> <ul style="list-style-type: none"> <li>• Application of Pink Pigmented Facultative Methylo troph (<i>Methylobacterium</i> sp.) as seed treatment (@ 200 g / 10 kg seeds), soil application (@ 2 kg / ha) and foliar spray (@ 500 ml / ha) at panicle initiation and flag leaf stages for alleviation of water stress effects in both SRI and transplanted system of rice cultivation.</li> </ul> <p><b>Rainfed rice / Semi dry rice</b></p> <ul style="list-style-type: none"> <li>• Seed hardening with 1% KCl for 16 hours (seed and KCl solution 1:1) and shade dried to bring to storable moisture. This will enable the crop to withstand early moisture stress.</li> <li>• On the day of sowing, treat the hardened seeds first with <i>Pseudomonas fluorescens</i> 10 g/kg of seed and then with <i>Azophos</i> 1 kg or <i>Azospirillum</i> and <i>Phosphobacteria</i> @ 1 kg each per ha area of seed, whichever is available.</li> <li>• Foliar spray of KCl 1% to overcome moisture stress at different physiological stages of rice.</li> </ul> <p><b>Dry seeded upland rice</b></p> <ul style="list-style-type: none"> <li>• Use of PPFM-Pink Pigmented Facultative Microbes (seed treatment @ 0.2 kg / 5 kg seeds, soil application basal @ 2.0 kg/ha and foliar spray@ 500 ml/ha at PI &amp; flag leaf stages) for mitigation of terminal drought is recommended.</li> <li>• For flood management- variety CR 1009 <i>Sub 1</i> is recommended for submerged condition</li> </ul>

	<p>2. New innovative technology for transplanted paddy cultivation like SRI to be evolved.</p>		<ul style="list-style-type: none"> <li>• A large scale demonstration of transplanted rice cultivation without puddling was done at the Tamil Nadu Rice Research Institute, Aduthurai. The main objective of this trial was to conserve the water during rice cultivation.</li> <li>• The traditionally followed transplanted rice cultivation requires 1200-1400 mm water, of which puddling consumes 250 mm water.</li> <li>• In the proposed technology puddling is replaced with dry ploughing (using cultivator and rotator), followed by laser levelling and wetting. The soil is allowed to settle for 12- 24 hours and before transplanting very light irrigation is given again to maintain a uniform depth of 1 cm of standing water.</li> <li>• Machine transplanting was adopted in the wetted rice soil. Nutrient and weed management methods were similar to that of puddled transplanted rice. Alternative wetting and drying method was followed for water management.</li> <li>• Though there was a yield reduction ranging from 0.9 % at Aduthurai to 31% at Thanjavur, under non-puddled transplanting, there was considerable water saving, <i>i.e.</i> from 120 to 245 mm. No significant influence in the crop establishment was observed under non-puddled transplanting.</li> <li>• Higher level of water use efficiency (WUE) ranging from 3.74 –4.70 kg ha<sup>-1</sup> mm<sup>-1</sup> was observed across locations, under non-puddled transplanting during <i>kuruvai</i> season.</li> </ul> <div data-bbox="976 893 1900 1372" style="display: flex; flex-wrap: wrap; justify-content: space-around;">     </div>
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	3. TNAU to assess the feasibility of drip irrigation in Paddy cultivation to be studied.		<ul style="list-style-type: none"> <li>• A field experiment was conducted to study the development of crop geometry for cost effective drip irrigation system in rice. The results revealed that combination of direct seeded rice in drip irrigation system by using ADT 54 under pair row (20x40x10cm) method of sowing is the optimum crop geometry along with weed management(Pretilachlor@0.45 kg/ha+ one hand weeding) and nutrient management practices (150:50:50 NPK Kg/ha ) for achieving higher productivity under dry condition.</li> <li>• Grain yield obtained was 6900 kg/ha (27% yield increase) against the grain yield of 5400 kg/ha in surface irrigation</li> <li>• Water use efficiency was 7.5 kg/ha.mm and water productivity Rs. 12.62/ha.mm.</li> </ul>
52.	<b>B. Pulses</b>  1. Suitable mechanism needs to be evolved to combat damage of Rice fallow Pulses sowing due to mechanical harvesting of Paddy in Delta region.	Director, DCM	<ul style="list-style-type: none"> <li>• Sowing of rice fallow blackgram 4-6 days before paddy harvest with the seed rate of 30 kg ha<sup>-1</sup> and machine harvesting using Chain / Belt type harvester could be adopted as an alternative to farmers' practice (sowing 7-10 days before paddy harvest with the seed rate of 30 ha<sup>-1</sup> and manual harvesting).</li> </ul>
		Dean (Agrl. Eng.,)	<ul style="list-style-type: none"> <li>• In wetland rice ecosystem, sowing of pulse either blackgram or greengram is generally performed by broadcasting seeds manually in standing crop of rice fields at 7 to 10 days before harvest. Now a days, due to shortage of man power the harvesting operations are carried out by commercially available combine harvesters, which weighing approximately more than 4 tonnes both track type and wheel type. When these combine harvesters are used, soil compaction is created at the time of harvest and pulse seeds which are already in the field are pressed by the combine wheels/tracks to a depth of more than 10 cm. Damage of pulse seeds occurred due to the movement of combine harvester's wheels/tracks. For one hectare of land, approximately 25 % of pulse seed damaged by wheels.</li> <li>• For effective utilization of residual moisture besides other resources like light, space and nutrients, placing seeds at proper spacing and at optimum depth is a must for better growth of crop. Zero till drill seeder may be utilized for sowing pulses after harvesting rice.</li> </ul>
53.	2. Management technologies need to be recommended to overcome terminal moisture stress.	Director, DCM	<ul style="list-style-type: none"> <li>• Foliar spray of TNAU Pulse Wonder @ 2 kg/acre in 200 litres of water at flower initiation stage decreases flower shedding, increases yield and offers terminal moisture stress tolerance</li> <li>• Foliar spray of 2% KCl + 0.3% Boric acid as mid-season management practice in black gram during <i>Rabi</i> season is recommended to increase the yield for moisture stress tolerance.</li> </ul>

54.	<b>C. Gingelly</b>  A new improved technology (MnSO <sub>4</sub> /Thinning) needs to be developed by TNAU to realize more yield.	Director, DCM	<ul style="list-style-type: none"> <li>Foliar spray of 200 ppm Mepiquat Chloride at 30 DAS followed by 0.5% Manganese sulphate at flower initiation and capsule formation stage can increase the yield in gingelly.</li> <li>Sowing of pelleted seeds using seed drill can maintain optimum population and reduce the cost of thinning operation.</li> </ul>
		Director, NRM	<ul style="list-style-type: none"> <li>A new improved technology on MnSO<sub>4</sub> for improving the seed and oil yield of gingelly was developed.</li> <li>Field experiment conducted with various sources (MnSO<sub>4</sub>&amp; MnCl<sub>2</sub>) and levels of MnSO<sub>4</sub> (0, 5.0, 10 &amp; 15 kg ha<sup>-1</sup>) to improve the seed and oil yield of gingelly revealed that, application of recommended NPKS + 10 kg MnSO<sub>4</sub> ha<sup>-1</sup> increased the seed yield by 12.5% (740 kg ha<sup>-1</sup>). It also increased the oil yield (369 kg ha<sup>-1</sup>) and oil content (49.17%).</li> </ul>
55.	<b>D. Cotton</b>  New technologies are to be evolved for synchronized maturity in existing varieties (SVPR and MCU varieties).	Director, DCM	<ul style="list-style-type: none"> <li>With respect to synchronized maturity, our TNAU has developed a new cotton variety CO 17 with duration of 125-130 days which produces synchronized maturity under high density planting of 100 cm x 10 cm spacing.</li> <li>As per the discussion held with cotton breeders, existing SVPR and MCU varieties are highly sympodial nature and these varieties consists inheritant genetic nature of sympodial development. Due to genetic makeup of SVPR and MCU varieties, it is not possible to develop synchronized maturity.</li> <li>Instead newly developed CO 17 variety may be recommended.</li> </ul>
56.	<b>E. Sugarcane</b>  Mini kit hand refractometer should be developed for diagnosing micronutrient deficiency symptoms.	Director, NRM	<ul style="list-style-type: none"> <li>The Visual Diagnostic Kit (VDK), software developed already by the TNAU may be used to identify the micronutrients deficiencies since it has the assemblage of various plant nutrient deficiencies and their management strategies. The field level symptoms may be compared with the images for confirming the specific nutrient deficiencies so as to provide timely remedial measures.</li> <li>However, laboratory testing of plant samples for various micronutrients is essential to confirm the specific nutrient deficiency so as to provide appropriate management strategies.</li> </ul>
57.	<b>F. Automatic Weather Station</b>  1. Automatic Weather Stations (AWS) in 285 blocks should be maintained in working	Director, DCM	<ul style="list-style-type: none"> <li>Out of 285 AWS proposed for rectification, 250 nos. have been made functional and the weather data is being received. The remaining 35 AWS need to be relocated for which the alternate sites are to be provided by the Dept. of Agriculture. Proposal for the AMC was submitted to the Government.</li> </ul>

	condition. Proposal may be submitted for the maintenance of AWS. The rectification and re-location of AWS should be speeded up and completed before June 2021.		
	2. The places of relocation of 285 AWS should be finalized and installed in concurrence with CRA. The places of installation shall be detailed with a copy to Director of Agriculture for further follow up.		<ul style="list-style-type: none"> <li>The list of AWS to be relocated has been shared to the Director of Agriculture through Email on 19.01.2022.</li> </ul>
	3. A new proposal for the annual maintenance of 285 AWS should be submitted for onward transmission to CRA within a month.		<ul style="list-style-type: none"> <li>A new proposal for the AMC of 285 AWS has been submitted by the Registrar to the Agricultural Production Commissioner &amp; Secretary to the Government <i>Vide</i> Lr. No. DCM/ACRC/proposal on AMC for AWS/2021 dt. 05.10.2021.</li> </ul>
	4. TNAU should inform the places of TNAU installed AWS so that repetition of installation of AWS by CRA in the same location could be avoided.		<ul style="list-style-type: none"> <li>Location details <i>viz.</i>, Latitude, Longitude and address of 285 AWS revived by TNAU and list of location for 100 AWS to be installed newly have been shared to the Director of Agriculture through Email on 19.01.2022.</li> </ul>
58.	<p><b>Red gram Transplantation:</b></p> <p>TNAU should circulate the ideal technique evolved for red gram transplantation to</p>	Director, DCM	<p>TNAU had communicated the details of ideals technologies for redgram transplantation to the Director of Agriculture.</p> <p><b><u>Ideal technologies for redgram transplantation</u></b></p> <ul style="list-style-type: none"> <li>Suited for long duration redgram varieties (CO 8, CO 9, LRG 51)</li> <li>Transplantation: In the month of August under irrigated condition</li> </ul>

	<p>Director of Agriculture for effective TOT.</p>		<ul style="list-style-type: none"> <li>• Fill the pro tray with native soil: Coir pith @ 1:1</li> <li>• Treat the seeds with <i>Trichoderma viride</i> @ 4g/kg and 30 gm of <i>Rhizobium</i> and <i>Phosphobacteria</i> each</li> <li>• Sow the seed @ one/ cavity at 1 cm depth</li> <li>• Spray Imidachloprid @ 2ml /lit to control sucking pest</li> <li>• After 25 days seedlings are to be transplanted in main field at 120 x 30 cm spacing</li> <li>• Apply inorganic fertilizers @ 25:50:25: 20 kg NPKS/ha at time of transplanting in main field</li> <li>• Apply Pre emergence herbicide (Pendimethalin @ 1.0 kg ai/ha) on 3 DAT followed by one hand weeding on 30 DAT.</li> <li>• During flower initiation stage, pulse wonder @ 5 kg /ha to be given as foliar spray</li> </ul>
59.	<p><b>G. Soil Test Crop Response based Fertilizer Recommendations through Integrated Plant Nutrition System (STCR-IPNS):</b></p> <p>1. To mitigate the soil health issues viz, declining soil organic matter, emerging multi nutrient deficiencies, indiscriminate use of fertilizers etc. and to meet the nutrient requirement of high yielding crop varieties and hybrids, STCR - IPNS based fertilizer recommendations for various crops and soils developed by T NAU is to be implemented in all the Static and Mobile Soil Testing Laboratories of State Department of Agriculture, Tamil Nadu.</p>	Director, NRM	<ul style="list-style-type: none"> <li>• As per the recommendation of the 85<sup>th</sup> SWC 2021, a detailed technical note on STCR-IPNS concept was prepared and sent to Hon'ble Agricultural Production Commissioner and Principal Secretary to Government, Agriculture Department, Government of Tamil Nadu and Director of Agriculture, Chennai (Lr. No. A (III item H-STCR-IPNS) &amp; B (1) dt. 17.3.2021 of the Hon'ble Vice-Chancellor, TNAU, Coimbatore).</li> <li>• In this regard, based on the communication received from the Director of Agriculture, Chennai (Lr.No ALS2/62623/2018 dated 09.08.2021 of the DoA, Chennai), an online interaction meeting on Adoption of STCR-IPNS recommendations along with secondary and micronutrients by all the Soil Testing and Mobile Soil Testing Laboratories of Tamil Nadu was held on 22.9.2021 involving Officials of TNAU and Department of Agriculture. During the meeting, presentation on the reply for the important clarifications requested by the Department of Agriculture was made and various modalities for adopting the STCR-IPNS recommendations along with secondary and micronutrients were discussed.</li> <li>• Based on the discussion, it has been decided to prepare the ready reckoner for prescribing STCR-IPNS fertilizer recommendations for 36 crops and for the rest of the crops, CCL recommendations developed by the Department of Agriculture will be followed. Accordingly reply and recommendations by TNAU has been sent to the Special Secretary to the Government, Tamil Nadu requesting to issue official proceedings for the implementation of STCR-IPNS recommendations along with secondary and micronutrients.</li> <li>• As a follow up action, a request has been sent to the Director of Agriculture, Chennai (No.TNAU/DNRM/SS&amp;AC/STCR-IPNS Adoption / Implementation/ 2022 dt 1.7.2022) to provide details on the similar/allied soil series for specific series occurring in various districts</li> </ul>




	<p>2. The STCR-IPNS approach will rationalize the fertilizer use while ensuring crop productivity besides maintenance of soil health. A detailed technical note on STCR IPNS concept should be submitted to the Government by clearly indicating the role of Soil Testing Labs, other supervisory officers and TNAU.</p>		<p>and the yield target of various crops for which the STCR-IPNS fertilizer recommendations.</p>
60.	<p><b>H. Development of liquid micronutrient mixture for all Agricultural crops</b></p> <p>Micronutrient mixture may be developed in Liquid formulation for all agricultural crops (except Cotton and Sugarcane) and communicated to the Director Agriculture and Director Horticulture</p>	Director, NRM	<ul style="list-style-type: none"> <li>Liquid Multi Micronutrient (Liquid MMN) formulation comprising of Zn, Fe, Cu, B, Mn and Mo with suitable stabilizing agent was developed and their quality and Micronutrient contents were analysed. Field evaluation with various crops through drip fertigation and foliar application were conducted.</li> <li><b><u>i. Fertigation</u></b> <ul style="list-style-type: none"> <li>Field evaluation recorded a yield increase of 14.0 to 19.7 per cent due to fertigation of NPK (19:19:19) + Liquid MMN (2%) over fertigation of NPK (19:19:19) alone with hybrid tomato, hybrid chillies and cotton.</li> </ul> </li> <li><b><u>ii. Foliar application</u></b> <ul style="list-style-type: none"> <li>Field evaluation with greengram, hybrid bhendi and rice recorded an yield increase of 10.8 to 14.3 per cent was recorded due to 100% RDF + foliar application of NPK (19:19:19 @2%) + Liquid MMN (1%) over 100% RDF + foliar application of NPK (19:19:19 @2%).</li> <li>Large scale distribution of Liquid MMN to conduct OFT in TNAU-KVK (Madurai, Virinjipuram) ICAR-KVK (Karamadai and Namakkal) during kharif season 2022 was carried out.</li> <li>Proposal for FCO approval has been submitted to the Director of Agriculture, Chennai (Ref. Lr.No.DNRM-84<sup>th</sup> SWC 2019-2<sup>nd</sup> Interim Review Meeting/ FCO approval/2020 dt. 08.07.2020). Based on the suggestions from DoA, field evaluation has been conducted with Liquid MMN for various crops and with the data base, a proposal will be submitted for FCO approval.</li> </ul> </li> </ul>
61.	<p><b>Production of Water soluble fertilizers:</b></p>	Director, NRM	<p><b>1.TNAU,Coimbatore</b></p> <ul style="list-style-type: none"> <li>Establishment of water soluble production unit has been completed.</li> <li>Production of TNAU - WSF (All 19) has been commenced.</li> </ul>













	Production of Water soluble fertilizer should be commenced in all three places viz., Coimbatore, Madurai & Killikulam centres and possibility of linking into the schemes and commercial marketing of Water Soluble fertilizers may be explored.		<ul style="list-style-type: none"> <li>• Through Venture Capital scheme TNAU-WSF is being supplied to various campuses/ Research Stations / KVKs of TNAU on cost basis. Through KVKs of TNAU, WSF has been distributed to the farmers through ICAR schemes.</li> <li>• Commercial marketing will be initiated shortly through the ongoing Venture Capital scheme.</li> </ul> <p><b>II &amp; III. AC&amp;RI, Madurai &amp; Killikulam</b></p> <ul style="list-style-type: none"> <li>• Installation of Chemical dilution unit has been completed.</li> <li>• Installation of spray dryer unit is in progress.</li> <li>• Proposal on Venture Capital Scheme in the respective centres have been initiated and will be submitted to University for approval for commercial distribution of water soluble fertilisers.</li> </ul>
62.	<p><b>I. Development of liquid consortia / liquid bio-fertilizer</b></p> <p>1. In the development of liquid consortia [combination of Bio-fertilizers <i>Azospirillum</i> (N), <i>Phosphobacteria</i> (P), Potash Mobilizing Bacteria (K) and Zinc Solubilizing Bacteria], measures to overcome acidic pH in Liquid Bio-fertilizer Production should be studied and recommended. (As per FCO 1985, pH should be 6.5 - 7.5, whereas pH of Liquid Bio-fertilizers produced by Department is 4.5 - 5).</p>	Director, NRM	<p>a) <b>Liquid biofertilizer consortium:</b> Development of NPK and NPKZn consortia as liquid biofertilizer is in progress at Department of Agricultural Microbiology, TNAU, Coimbatore. The minimal media optimization, strains proportions, shelf life and quality standards of NPK Consortia are in progress.</p> <p>b) <b>pH reduction issue:</b> The State Biofertilizer production units of Tamil Nadu experiences a drastic pH reduction (less than 5 after 15 days). The main reasons for pH drop in the liquid biofertilizers identified were as (1). Use of high percent of cell preservatives like glycerol (5%) and PVP (5%); (2) Use of mixed osmo-protectants like xanthan gum, tween80 and gingily oil.</p> <p>To standardize the optimum osmo-protectants without dropping the pH, experiments were initiated at five State Biofertilizer production units [Palani, Cuddalore, Salem, Kudumiyamalai and Trichy]. The experiments are now in progress and two state-level meetings were organized by the state Department of Agriculture on 10-2-2022 and 19-4-2022. The consolidated results and recommendations will be communicated on completion of the investigation.</p>
63.	2. Regular indent / purchase of liquid bio-fertilizers such as PPFM & Zinc Solubilizing Bacteria are to be made from TNAU for better utilization of the facilities available at TNAU.	DOA DHPC	<ul style="list-style-type: none"> <li>• On receipt of production technology of Pink Pigmented Facultative Methylo-trophs (PPFM) from TNAU, production will be carried out in the 22 Bio-Fertilizer Production Units functioning under State Government. 800 lts of Zinc solubilising bacteria was produced in 2 Bio-Fertilizer Production Units (Palani and Cuddalore) and distributed to all State Seed Farms.</li> </ul>



		Director, NRM	<ul style="list-style-type: none"> <li>Zinc solubilizing bacteria has been introduced as new Biofertilizer in April, 2022. To popularize the use of Zinc solubilizing bacteria among the farmers, communications were made to O/O the Joint Director of Agriculture of all the Districts of Tamil Nadu with a request to place indent for this biofertilizer (April, 2022).</li> <li>Apart from this, proposals were also made to Agriculture Department to place the biofertilizer indent to TNAU-Biofertilizer units for the supply of PPFM, <i>Azotobacter</i>, <i>Azospirillum</i>, potash releasing bacteria (KRB) and Phosphobacteria.</li> </ul>
64.	<b>J. Nano Agri inputs</b>  1. Development of Nano based Agri- Inputs should be done and passed on to the officials.	Director, NRM	<p>There are <b>ten nano-agri inputs</b> (<b>1.</b> Enhanced freshness formulation, <b>2.</b> nano-sticker and <b>3.</b> nano-pellets for fruit preservation, <b>4.</b> nano-vigor for improved germination, <b>5.</b> nano-revive for drought tolerance, <b>6.</b> copra guard as S free copra preservative, <b>7.</b> Nano-bia against tea mosquito bug, <b>8.</b> Nano- Scilure to monitor rice stem borer, <b>9.</b> Nano-digest to remove foul odour and <b>10.</b> Rhizoboost to promote root growth) have been designed, fabricated and studied extensively and recommended for <b>adoption and commercialization</b> during the 9<sup>th</sup> Non Crop Specific Scientist Meet 2021 held 1.7.2021.</p> <ul style="list-style-type: none"> <li>The Centre for Agricultural Nanotechnology (CANT) supplies nano-products as per intend and <b>Rs. 3 lakhs</b> worth of products have been sold out. Several companies bestowed interest to undertake large scale production through ABD</li> <li>TNAU established a commercial <b>nano-product production unit</b> and it will be operational in a couple of weeks</li> </ul>
	2. In house production of 500 stickers may be taken up and supplied to the needy farmers on a small scale.		<ul style="list-style-type: none"> <li>The CANT has two electrospinning machine to produce nano-stickers (5 cm<sup>2</sup>). The machine has the capability to produce <b>200 stickers</b> in a day. The nano-stickers are supplied based on indent from farmers or industries</li> <li>As suggested by previous 84<sup>th</sup> SWC, nano-stickers were supplied @ 100 per District to Department officials (<b>22 AOs &amp; HOs</b>) in Krishnagiri, Dharmapuri, Vellore, Salem, Theni, Trichi and Kanyakumari Districts. One day training program organized in TNAU during Feb. 6 2020.</li> </ul>
65.	<b>K. Use of Drones</b>  TNAU has to provide crop specific advisory on cost	Director, NRM	<ul style="list-style-type: none"> <li>Comprehensive standard operating protocols were developed for smart delivery of inputs like herbicides, nutrients, crop boosters and plat protection chemicals at appropriate stages using drones for the crops viz., Rice, Maize, Cotton, Groundnut, Blackgram and Greengram.</li> </ul>
		Director, CPPS	<ul style="list-style-type: none"> <li>No Phytotoxicity was observed with the use of drones on maize and rice. Trials are in</li> </ul>

	effective usage of drones for crop insurance and plant protection measures.	DOA	progress in cotton and coconut.
66.	<p><b>L. Herbolive - Wild Animal Repellent</b></p> <p>1. Measures for Permanent control of damages caused by Parrot, Peacock, Monkey, Wild boar <i>etc.</i>, may be evolved by TNAU</p> <p>2. TNAU needs to submit a note to DOA&amp; DHPC for further promotion among farmers by all the field officials.</p>	DR & DOA DHPC CE AED	<ul style="list-style-type: none"> <li>• Efficacy of Herbolive + against crop damage by wild boar was evaluated through on farm trials at 7 locations in farmers' fields in Erode and Coimbatore districts where severe menace of wild boar was experienced in crops <i>viz.</i>, Beans, banana, juvenile coconut, Chrysanthemum and Arecanut. Herbivore+ @ 1:9 dosage with 7 days interval was working against wild boar with 85% efficacy, intrusion of animal occurred in a few places of test fields but caused minimal crop damage only. The product was found less effective in rainy period.</li> <li>• Total foliar coverage with spray of Herbolive + is mandatory for higher efficacy of the product.</li> </ul>
67.	<p><b>IV. Horticulture</b></p> <p><b>A. General issues to be followed:</b></p> <p>1. Notification proposal should be sent for all newly released varieties under Horticultural crops and followed up for early notification by GOI.</p> <p>2. As suggested by VC, TNAU, the DHPC officials who can be involved in <b>seed production are to be trained for vegetable hybrid seed production</b> in TNAU.</p>	Dean, Hort.	<ul style="list-style-type: none"> <li>• Notification proposals for the recently released varieties <i>viz.</i>, Banana CO 3, Jack PKM1, Jamun PKM1, Pole Bean CO 15 and Brinjal MDU 2 have been prepared and sent for approval.</li> <li>• Notification proposal of Turmeric BSR 3 has been prepared</li> <li>• Notification proposal of Elephant foot yam CO 1 and Coriander CO 5 is under progress and will be submitted</li> </ul> <ul style="list-style-type: none"> <li>• Online training on seed production of vegetable crops was provided by Dean (Horticulture) to the newly recruited ADH/HO/AHO's of DHPC during 21.04.22, 28.04.22, 12.05.22 and 19.05.22</li> </ul>


<p>3. Co-ordination meeting for monitoring the supply of Breeder seeds of Vegetables: Dean (Horticulture) and DHPC should have a coordination meeting once in every two months and work out centre-wise plan of action for breeder seed production of different vegetables based on requirement for the year 2021-22 and review the progress to meet out the State demand.</p>	<ul style="list-style-type: none"> <li>• Co-ordination meeting for Breeder seed Production of vegetables was conducted on 09.06.2022 &amp; 05.08.2022 and BSP seed indent was discussed.</li> </ul>
<p>4. Effective <b>plant protection measures under polyhouse</b> system of cultivation of various horticultural crops are to be recommended by TNAU.</p>	<ul style="list-style-type: none"> <li>• Plant protection recommendations under polyhouse cultivation of flower crops <i>viz.</i>, Cut Rose, Cut <i>Chrysanthemum</i>, <i>Carnation</i>, <i>Anthurium</i>, <i>Dendrobium</i> orchid, <i>Lilium</i> and <i>Gerbera</i> are available in the 'Crop Production Guide (2020) of Horticultural Crops' published by the Directorate of Horticulture and Plantation Crops, Tamil Nadu &amp; TNAU.</li> </ul>
<p>5. <b>SOPs for Organic cultivation</b> practices (seed to harvest) including Exotic vegetables need to be recommended by TNAU for adoption.</p>	<ul style="list-style-type: none"> <li>• A project on "Standardization of organic farming practices in Exotic vegetables" has been completed and the results are awaited. Simultaneously confirmatory trials in farmers field is in progress.</li> </ul>
<p>6. <b>SOP for the hydroponic system</b> of cultivation for raising green leafy vegetables and high value tropical vegetables is to be communicated to the field officials for better dissemination.</p>	<p><b>HC &amp; RI , Coimbatore</b></p> <ul style="list-style-type: none"> <li>• Demonstration on Hydroponic System was conducted on May 19.05.2022 during Flower Show, at Ooty by HRS. Department staff and extension officials visited the model of hydroponic system and benefited.</li> <li>• Short duration vegetables <i>viz.</i>, <i>Amaranthus</i>, Palak, Lettuce and Mint have been identified for growing under "A" Frame or Multi Desk (Hydroponics) and Tower system at Department of Vegetable Science, HC&amp;RI, TNAU, Coimbatore.</li> </ul>


			<div style="display: flex; flex-wrap: wrap;">  </div> <p><b>HC &amp; RI , Trichy</b></p> <ul style="list-style-type: none"> <li>• A demonstration / instructional unit on hydroponics system have been established at HC &amp; RI (W), Trichy. Evaluation on the performance of green leafy vegetables under NFT is under progress. The leafy vegetables like Iceberg, Lettuce, and Green lettuce, Bokchoy and capsicum are grown and one crop is harvested. This was demonstrated to the extension functionaries through a training programme on Hydroponics and Vertical gardening on 11.08.2022 block level extension officials of Department of Horticulture, Tiruchirapalli.</li> </ul>
68.	<p><b>B. Fruits:</b> TNAU should give standardization of propagation techniques for rooting of cuttings in Guava.</p>	Dean, Horticulture	<p><b>HC&amp;RI, TNAU, Coimbatore</b></p> <ul style="list-style-type: none"> <li>• Studies on guava leaf propagation were attempted in varieties Lucknow- 49, Arka Kiran and Allahabad Safeda. Guava leaves treated with 1,500 ppm IBA for 2 minutes produced roots in the variety Lucknow-49. Leaf propagated plants are ready for transplanting in the field.</li> <li>• Semi hardwood cuttings of Lucknow- 49, Arka Kiran and Allahabad treated with IBA 4000 ppm rooted successfully.</li> </ul>






			<p><b>HC&amp;RI, TNAU, Periyakulam</b></p> <ul style="list-style-type: none"> <li>Double nodal cuttings of Guava treated with IBA 500 ppm recorded least number of days for bud sprouting maximum number of leaves (21.54) and highest number of roots (30.25).</li> </ul> <p><b>HC&amp;RI (W), Trichy</b></p> <ul style="list-style-type: none"> <li>Hardwood cuttings of guava of eight genotypes viz., TRY (G1), Allahabad Safed, Arka Kiran, Lucknow 49, Bapatla, Lucknow – 46, KG guava, Mirzapur Seedling) were treated with 2000, 3000, and 4000 ppm of IBA. A success of 5 % was observed in Mirzapur Seedling and 2.5 % success was observed in TRY (G) 1 hardwood cuttings with 3000ppm of IBA treatment.</li> </ul>						
	<ul style="list-style-type: none"> <li><b>Tissue culture protocol techniques</b> for all the local varieties of Banana are to be standardized by TNAU for rapid multiplication.</li> </ul>		<ul style="list-style-type: none"> <li><i>In vitro</i> propagation protocol for the banana varieties viz., Grand Naine, Red banana, Neypoovan and Karpooravalli has been standardized</li> </ul> <table border="1" data-bbox="865 673 2026 1269"> <tr> <td data-bbox="865 673 1050 1006"></td> <td data-bbox="1050 673 1495 1006">  <p><b>Red banana</b></p> </td> <td data-bbox="1495 673 2026 1006">  <p><b>Neypoovan</b></p> </td> </tr> <tr> <td data-bbox="865 1006 1050 1269"></td> <td data-bbox="1050 1006 1495 1269">  <p><b>Karpooravalli</b></p> </td> <td data-bbox="1495 1006 2026 1269">  <p><b>Grand Naine</b></p> </td> </tr> </table>		 <p><b>Red banana</b></p>	 <p><b>Neypoovan</b></p>		 <p><b>Karpooravalli</b></p>	 <p><b>Grand Naine</b></p>
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	 <p><b>Karpooravalli</b></p>	 <p><b>Grand Naine</b></p>							

<p>A hermaphrodite variety of Papaya similar to Red Lady is to be developed by TNAU.</p>		<ul style="list-style-type: none"> <li>Promising gynodioecious culture C1-33 developed at HC&amp;RI with red pulp has been recommended for MLT during - 2022-23</li> </ul> 
<ul style="list-style-type: none"> <li>Identification of Medium sized Jamun fruit with rudimentary seeds is to be evolved.</li> </ul>		<ul style="list-style-type: none"> <li>Horticultural College and Research Institute, Periyakulam has recently released variety Jamun PKM1, in which fruit size is medium, High flesh content (86.27 %), Small seeded, rich in anthocyanins (157.56 mg/100g) TSS (16.50° Brix).</li> </ul> 



	<ul style="list-style-type: none"> <li>TNAU should standardize technology in enhancing fruit set in Avocado.</li> </ul>		<ul style="list-style-type: none"> <li>Foliar Application of boron (Borax) and zinc (Zinc Sulphate) @ 1g/litre each at the beginning of flower bud induction (October), bud burst (January) and at anthesis (April) stage produced 19.33 per cent more fruit set during 2022 against non treated trees during 2021.</li> </ul> 																								
69.	<p><b>C. Vegetables</b></p> <ul style="list-style-type: none"> <li><b>Hybrid seed production</b> of core vegetable crops viz., Gourds, Tomato, Chilli, Bhendi should be concentrated.</li> </ul>	Dean, Horticulture	<p align="center"><b>Details of Hybrid Seed production from 05.03.2021- 30.08.2022</b></p> <table border="1" data-bbox="936 704 1938 971"> <thead> <tr> <th>S. No.</th> <th>Crops</th> <th>Production (Kg)</th> <th>Anticipated Production(Kg)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Tomato Hybrid CO 4</td> <td>1.75</td> <td>5.00</td> </tr> <tr> <td>2.</td> <td>Chilli Hybrid CO 1</td> <td>34.00</td> <td>7.00</td> </tr> <tr> <td>3.</td> <td>Bhendi Hybrid CO 4</td> <td>1762.00</td> <td>2116.50</td> </tr> <tr> <td>4.</td> <td>Bottle gourd Hybrid CO1</td> <td>245.00</td> <td>200.00</td> </tr> <tr> <td>5.</td> <td>Ridge gourd Hybrid COH 1</td> <td>350.50</td> <td>100.00</td> </tr> </tbody> </table> <p><b>HC&amp;RI, TNAU, Trichy</b></p> <ul style="list-style-type: none"> <li>Hybrid seed production in Bhendi is taken up under contractual seed production besides in the farmers field and 350 kg of Bhendi hybrid CO (Bh) 4 has been produced and distributed to the Department of Horticulture and Plantation crops.</li> </ul>	S. No.	Crops	Production (Kg)	Anticipated Production(Kg)	1.	Tomato Hybrid CO 4	1.75	5.00	2.	Chilli Hybrid CO 1	34.00	7.00	3.	Bhendi Hybrid CO 4	1762.00	2116.50	4.	Bottle gourd Hybrid CO1	245.00	200.00	5.	Ridge gourd Hybrid COH 1	350.50	100.00
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	<p><b>Grafting on Vegetable crops:</b> Horticulture Department officials should be trained on the grafting technology. The State Horticulture Farms may be involved in grafting and multiplication of grafted brinjal</p>		<ul style="list-style-type: none"> <li>In grafting of Brinjal, the local ruling varieties of brinjal viz., Karamadai local, Bhavani local, Thirukkatalai local, Thiruchencode local, Manapparai local, Mullukathari local, Poonathalai kathiri, Andarkulam local etc. are being used as scion and supplied to the farmers, under TANI II Scheme operated in the Department of Vegetable Sciences, TNAU, Coimbatore</li> <li>About 2,11,010 numbers of brinjal grafts were supplied to the needy farmers of Tamil Nadu through the TN-IAMP (Irrigated Agriculture Modernization Project) scheme of WTC, TNAU.</li> </ul>																								



<p>seedlings. The scions of local ruling brinjal varieties could be utilized for grafting with specific root stocks obtained from TNAU. DHPC should give indent to Dean (Horticulture) for root stock required for the grafting.</p>		
<p>• <b>Purification process for <i>mundu</i> chillies</b> should be followed to obtain quality seeds. TNAU needs to develop Chilli variety with high capsaicin content.</p>		<p><b>HC&amp;RI, TNAU, Coimbatore</b></p> <ul style="list-style-type: none"> <li>• About 41 accessions collected from Ramnad district were selfed during first season. In each accession single plants were identified based on morphological characters of fruits. Further selfing and isolation of homozygous lines is in progress.</li> <li>• Evaluation of chilli genotypes with high capsaicin content for industrial purpose is under progress</li> </ul>  <p><b>HC&amp;RI, TNAU, Periyakulam</b></p> <ul style="list-style-type: none"> <li>• Purified <i>mundu</i> chilli genotype and identified two high yielding accessions, PKM CA08 (Chatti Mundu Type), CA32-09-04 (Oosi Mundu Type).</li> <li>• <b>PKM CA 08</b> is a purified type from the high yielding Mundu chilli type collected from Kathalampatti, Virudhunagar Dt. The individual ripe fruit weighs 11.0g. Fruit length is 1.90 cm and the fruit girth is 2.65 cm. Number of fruits per plant is 98.3, dry fruit weight is 1.98g, dry fruit yield 187.5 g/plant and dry recovery 26.4 %. Capsaicin content is 2973 SHU (286.2 ASTA).</li> <li>• <b>A32-09-04</b> is a high yielding Mundu chilli type collected from Valanthavarai,</li> </ul>

			Ramanathapuram Dt. Dry fruit yield is 215.3 g/plant. Dry recovery is 25.4 %. Capsaicin content is 2284 SHU (198.7 ASTA).
70.	<b>Technology for solar based drying system</b> for red chillies needs to be developed by TNAU.	Dean, Horticulture Dean (Agrl. Eng.)	<ul style="list-style-type: none"> <li>Solar tunnel dryer was popularized in Tamil Nadu region for drying of various agro-industrial products since 2003 by TNAU through ICAR-AICRP on Renewable Energy Sources for Agriculture and Allied Industries scheme. The following studies have been conducted on red chillies drying.</li> <li>Two units of solar tunnel dryers are installed at Farmers' Association, Singarayapuram Village, Kaalaiyur Panchayat, Paramakkudi (2006-07)</li> <li>Agricultural Engineering Department, Government of Tamil Nadu has promoted this technology to farming community with 50 % subsidy and 8 units were installed for chilli drying at Kaalayarkoil, Sivaganga District (2012-13 and 2013-14).</li> <li>Based on the study results of polycarbonate solar tunnel dryer at the Department of Renewable Energy Engineering, two solar tunnel dryers were installed at Sathyamangalam, Erode district for drying coconut, chillies, turmeric and moringa leaves (2018-19).</li> <li>Studies on drying of red chillies from a farmer's field were carried out in the solar tunnel dryer at the Department of Renewable Energy Engineering (2020-21).</li> </ul>
			 
			<p><b>Farmers' Association at Singarayapuram, Paramakud</b></p> <p><b>Polycarbonate Solar tunnel dryer at Sathyamangalam</b></p>
			   <p>Fresh chillies</p> <p>Solar dried</p>

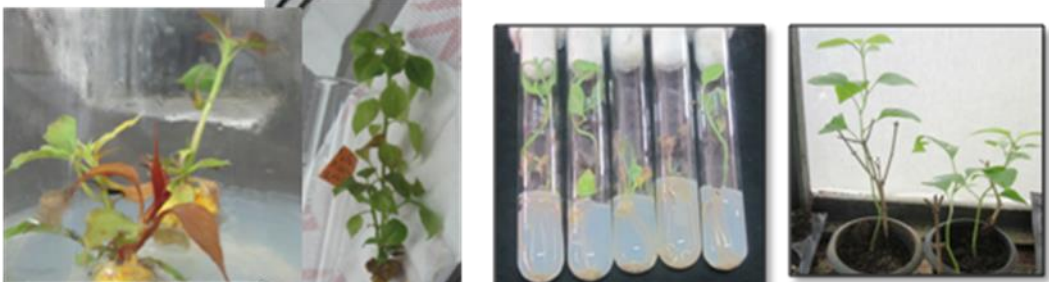
			<p><b>Drying studies of chillies in polycarbonate solar tunnel dryer at the Department of Renewable Energy Engineering, AEC &amp; RI, TNAU, Coimbatore</b></p> <ul style="list-style-type: none"> <li>The moisture content of chillies was reduced from 70-80% to about 8-10%. The drying time of chillies was reduced by 40-60% by solar tunnel drying (4-5 days) than conventional open sun drying (7-9 days). The quality of the dried chillies were tested and resulted in better colour and 5-10% increase in phenols and antioxidant content of the solar dried chillies than open sun dried chillies, which helps in fetching better market price of about Rs.2-3 per kg. Labour cost saving of Rs.400 per tonne of chilli drying was observed compared to traditional practice and payback period of solar tunnel dryer is about 5 years.</li> </ul>
71.	<p><b>Standardization of Seed production techniques for Bellary onion and Small Onion:</b></p> <p>Season wise Seed production methods should be evolved and communicated by Dean (Horticulture) to DHPC for propagation in field before 31.032021.</p>	Dean, Horticulture	<ul style="list-style-type: none"> <li>Seed production techniques for aggregatum onion varieties CO On 5 and CO 6 were standardized.</li> <li>Onion seed production is done by two methods/ seasons viz., seed to bulb method (June-Sep) and bulb to seed method (December – March)</li> </ul>

72.	<p><b>Suitable variety for Bellary onion</b> shall be evaluated and recommended by TNAU for popularization.</p>	Dean, Horticulture DHPC	<p><b>HC&amp;RI, TNAU, Coimbatore</b></p> <ul style="list-style-type: none"> <li>Evaluation of Bellary onion varieties was carried out during 2021 at the Dept. of Vegetables Science, HC&amp;RI, TNAU, Coimbatore. Results revealed that, <i>kharif</i> season variety Sandeep recorded the highest yield of 186.8 q/ha, for late <i>kharif</i> season Bhima Shakthi performed well with the highest yield of 179.80 q/ha and in rabi season JRO 14-14 (Junagadh) recorded 219.00 q/ha.</li> </ul> <p><b>HC&amp;RI (W), TNAU, Trichy</b></p> <ul style="list-style-type: none"> <li>Fourteen common Bellary Onion varieties were evaluated for yield and quality at HC &amp; RI (W), Trichy. Among the varieties evaluated, the following varieties performed well in terms of bulb weight and yield per plot.</li> </ul> <table border="1" data-bbox="1031 634 1843 824"> <thead> <tr> <th>S. No.</th> <th>Variety</th> <th>Yield / m<sup>2</sup> (kg)</th> </tr> </thead> <tbody> <tr> <td>1.</td> <td>Bhima safed (white)</td> <td>1.30</td> </tr> <tr> <td>2.</td> <td>Bhima shweta (white)</td> <td>1.15</td> </tr> <tr> <td>3.</td> <td>Arka kirthiman (red)</td> <td>1.10</td> </tr> <tr> <td>4.</td> <td>Arka kalyan(red)</td> <td>1.10</td> </tr> </tbody> </table>	S. No.	Variety	Yield / m <sup>2</sup> (kg)	1.	Bhima safed (white)	1.30	2.	Bhima shweta (white)	1.15	3.	Arka kirthiman (red)	1.10	4.	Arka kalyan(red)	1.10
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73.	<p>Improved variety (Transplanted) in Onion with good keeping quality may be evolved.</p>	Dean, Horticulture	<p><b>HC&amp;RI, TNAU, Coimbatore</b></p> <ul style="list-style-type: none"> <li>Seeding type aggregatum onion CO 6 was released during 2020 and it is being popularized. About 3200 kg seed was distributed to the farmers of Perambalur, Ariyalur, Kallakurichi, Vizhupuram, Salem, Namakkal and Coimbatore districts.</li> </ul> <p><b>HC&amp;RI (W), Trichy</b></p> <ul style="list-style-type: none"> <li>Study on volatile organic compounds in postharvest storage of Aggregatum onion <i>viz.</i>, CO (on) 5, CO (on) 6, Perambalur, Tirupur local were evaluated at ADAC &amp; RI, Trichy. Among them CO (on) 6, recorded highest Ascorbic Acid content (8.93mg/100 g). The quercetin content was high in CO (on) 6 followed by Perambalur local (75.05mg/kg) and (11.11mg/kg respectively). The total phenol content (768.35 mg/kg), total flavonoid content (665.50 mg/kg) Fresh weight) and Pyruvic acid content (2.9 μ mole/g) were highest in Perambalur Local. The Pyruvic acid, Ascorbic acid and Total Phenol content decreased with increase in storage period while flavonoid content is increased with increase in storage period till 60<sup>th</sup> day.</li> </ul>															

74.	<b>Power operated De-topping</b> machine for Onion at field level may be developed.	Dean, Horticulture Dean (Agrl. Eng.)	<ul style="list-style-type: none"> <li>In the cultivation practice of onion crop, harvesting of onion crop along with detopping of onion leaves is more tedious, labour and time consuming operation. In the traditional practice of harvesting onions hand shovel is used for digging the bulbs manually and thread cutter scissors and sickle are used for detopping the onion leaves manually. For reducing the time consumption and labour consumption an attempt was made to develop a mini tractor operated onion harvester along with detopping unit.</li> <li>The onion harvester along with detopping unit was developed based on the optimized values of the agronomical, crop and machine parameters.</li> <li>The machine consists of the following units for performing the harvesting operation. <table border="1" data-bbox="873 522 1999 748"> <tr> <td>i. Detopping unit</td> <td>For detopping the onion leaves with rotary impact force.</td> </tr> <tr> <td>ii. Digging unit</td> <td>For digging the onion bulbs after detopping.</td> </tr> <tr> <td>iii. Shaker cum conveying unit</td> <td>The lifted and conveyed bulbs from the digging unit were shaken for removing the soil attached to the onions and to windrow the onion bulbs in furrows between the beds in the direction of travel for easy collection.</td> </tr> </table> </li> </ul> <p style="text-align: center;"><b>Specification of onion harvester with detopping unit</b></p> <table border="1" data-bbox="873 831 2049 1060"> <tr> <td>No of rows covered</td> <td>4</td> <td></td> </tr> <tr> <td>Width of operation</td> <td>600 mm</td> <td></td> </tr> <tr> <td>Tractor, HP</td> <td>22</td> <td></td> </tr> <tr> <td>Distance between inner edge of the front wheel</td> <td>680 mm</td> <td></td> </tr> <tr> <td>Distance between inner edge of the rear wheel</td> <td>710 mm</td> <td></td> </tr> <tr> <td>Track width of tractor</td> <td>1140 mm</td> <td></td> </tr> </table> <ul style="list-style-type: none"> <li>The Onion harvester along with detopping unit was modified based on the optimized values of the agronomical crop and machine parameters. Modifications in the harvester were carried out <i>viz.</i>, hitching adjustment and onion shaker. On-farm testing of harvester will be carried out at a farmer's field, Musiri during the ensuing season.</li> </ul>	i. Detopping unit	For detopping the onion leaves with rotary impact force.	ii. Digging unit	For digging the onion bulbs after detopping.	iii. Shaker cum conveying unit	The lifted and conveyed bulbs from the digging unit were shaken for removing the soil attached to the onions and to windrow the onion bulbs in furrows between the beds in the direction of travel for easy collection.	No of rows covered	4		Width of operation	600 mm		Tractor, HP	22		Distance between inner edge of the front wheel	680 mm		Distance between inner edge of the rear wheel	710 mm		Track width of tractor	1140 mm	
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75.	<p><b>D. Spices</b></p> <p>Suitable standards for pepper cultivation should be focused and recommended to extension officials for adoption.</p>	Dean, Horticulture	<p><b>HRS, Pechiparai</b></p> <ul style="list-style-type: none"> <li>• The commonly used standard for pepper in Kanyakumari region is <i>Erythrina</i>.</li> <li>• These standards were infested with gall wasps and led to the breaking of the standards and the vines trained on those standards were totally lost. Thus the gall wasps devastated the pepper plantations.</li> <li>• Study was conducted to address this issue and the performance of Panniyur- 1 black pepper was assessed on different standards. The highest dry berry yield of 1.230 kg/vine was recorded in pepper trained on <i>Simaruba glauca</i> standard followed by <i>Glyricidia maculata</i> standard.</li> </ul> 



76.	<p><b>E. Flowers</b></p> <p>SOP for tissue culture production of Ornamental plants (<i>Anthurium</i>, <i>Gerbera</i>, <i>Bougainvillea</i>, <i>cordyline etc.</i>), indigenous medicinal plants and Bamboo may be evolved and recommended.</p>	Dean, Horticulture	<ul style="list-style-type: none"> <li>Micropropagation protocols have been standardized for <b>Bougainvillea</b> and <b>Anthurium</b></li> </ul> <table border="1" data-bbox="873 228 2001 540"> <thead> <tr> <th colspan="3"><b>Protocol for <i>Anthurium</i> :</b></th> </tr> </thead> <tbody> <tr> <td>Explants</td> <td>:</td> <td>Shoot tips</td> </tr> <tr> <td>Initial establishment &amp; shoot proliferation</td> <td>:</td> <td>MS medium + BAP (1 mg<sup>l</sup><sup>-1</sup>)</td> </tr> <tr> <td>Shoot elongation</td> <td>:</td> <td>MS medium + GA3 (0.5 mg<sup>l</sup><sup>-1</sup>)</td> </tr> <tr> <td>Rooting</td> <td>:</td> <td>Half MS medium + IBA (1.0 mg<sup>l</sup><sup>-1</sup>)</td> </tr> <tr> <td>Hardening</td> <td>:</td> <td>Sand : vermiculite : pot mixture (1:1:1) under mist chamber</td> </tr> </tbody> </table> <table border="1" data-bbox="873 581 2001 849"> <thead> <tr> <th colspan="3"><b>Protocol for <i>Bougainvillea</i>:</b></th> </tr> </thead> <tbody> <tr> <td>Explants</td> <td>:</td> <td>Shoot tips</td> </tr> <tr> <td>Initial establishment, shoot proliferation and elongation</td> <td>:</td> <td>MS media + BAP 1 mg/lit</td> </tr> <tr> <td>Rooting</td> <td>:</td> <td>½ MS + IBA 0.5 mg/lit</td> </tr> <tr> <td>Hardening</td> <td>:</td> <td>Sand : pot mixture (1:1) under mist chamber</td> </tr> </tbody> </table> <div data-bbox="911 857 1953 1214" style="text-align: center;">  <p><b>Multiple shoots</b>                      <b>In-vitro rooting</b>                      <b>Hardened TC plants</b></p> </div>	<b>Protocol for <i>Anthurium</i> :</b>			Explants	:	Shoot tips	Initial establishment & shoot proliferation	:	MS medium + BAP (1 mg <sup>l</sup> <sup>-1</sup> )	Shoot elongation	:	MS medium + GA3 (0.5 mg <sup>l</sup> <sup>-1</sup> )	Rooting	:	Half MS medium + IBA (1.0 mg <sup>l</sup> <sup>-1</sup> )	Hardening	:	Sand : vermiculite : pot mixture (1:1:1) under mist chamber	<b>Protocol for <i>Bougainvillea</i>:</b>			Explants	:	Shoot tips	Initial establishment, shoot proliferation and elongation	:	MS media + BAP 1 mg/lit	Rooting	:	½ MS + IBA 0.5 mg/lit	Hardening	:	Sand : pot mixture (1:1) under mist chamber
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	Standardization of technologies for uniform spike production in tuberose is to be developed.		<ul style="list-style-type: none"> <li>The issue is being addressed through a research trial under ICAR-AICRP on Floriculture Suitable recommendations will be made after completion of the trial.</li> </ul>																																	





77.	<p><b>V. Crop Protection</b></p> <p><b>1. Strengthening the research on the management of Fall Armyworm (FAW) TNAU Plant protection wing</b></p> <p>The progress in research on management of FAW may be given in the forthcoming meetings. The research findings evolved under this project have to be periodically communicated to DOA for the adoption of farmers. APC &amp; Principal Secretary has instructed to develop resistant genotype against FAW for</p>	Director, CPPS DCPBG	<ul style="list-style-type: none"> <li>• Periodical information related to refined FAW management capsule developed by the University was communicated to the Department of Agriculture authorities for adoption by farmers.</li> <li>• State (1 No.) and Regional (4 Nos.) Mela were conducted in Coimbatore, Madurai, Trichy &amp; Tirunelveli zones. Awareness campaigns for farmers (157 Nos.), input dealers (27 Nos.) and extension functionaries (927 Nos.) were conducted through which 8336, 1468 and 2506 beneficiaries received the updates of FAW management strategies respectively.</li> <li>• Genetic materials from International (CIMMYT) and National (NBPGR) were utilized for resistance screening against FAW.</li> <li>• Thirteen inbreds viz., G41 (BOX.NO 1253-8), G12 (UMI 1131-1), G16 (BOX.NO 1048-7), G4 (UMI 504), G13 (UMI 298-2-2), G15 (UMI 1003-2-3), G25 (BOX.NO 1076-5-2-2), G11 (UMI 692-2), G9 (UMI 29-2), G8 (UMI 406), G14 (UMI 1153), G20 (BOX.NO 72173-2-1-1) and G23 (BOX.NO 1131-5) registered damage rating of <math>\leq 4.0</math> (1-9 score system) and were identified as moderately resistant to FAW.</li> <li>• Morphological characters like trichome density &amp; number of leaves had a negative correlation, while the leaf area, cob length and cob height showed a positive correlation with FAW infestation. Among biochemical factors studied, soluble protein had a positive correlation, while aminoacids, total sugars and peroxidase activity showed a negative correlation.</li> </ul>
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	<p>which inbred lines from International / National Centers can be linked.</p>	<p>DOA DHPC</p>	<ul style="list-style-type: none"> <li>• Training on Fall Army Worm Management with latest research finding was given to all the extension officials on 7.6.2022 through virtual mode and the following refined capsule for Fall Army Worm Management have been communicated to all the districts for adoption.</li> <li>• Application of neem cake @ 250 kg/ha at the time of last ploughing to increase the plant and soil health.</li> <li>• Seed treatment with Cyantraniliprole 19.8% +thiamethoxam 19.8% FS @ 4 ml/kg seed.</li> <li>• Border cropping with cowpea, gingelly or sunflower in garden land conditions and fodder sorghum in dry land conditions @ three rows of selected crop.</li> <li>• Monitoring of FAW adults using pheromone traps @ 12/ha.</li> </ul> <p><b>Application of:</b></p> <ul style="list-style-type: none"> <li>• Chlorantraniliprole 18.5 SC @ 0.4 ml/ lit (or) Flubendiamide 480 SC @ 0.5 ml/lit at early stage (15 - 20 DAE) followed by Azadirachtin 1500 ppm @ 5 ml/lit on need basis.</li> <li>• <i>Metarhizium anisopliae</i> (TNAU-MA-GDU isolate) @ 2.5 kg/ha (1.6 x 10<sup>11</sup> spores / ml) at 35-40 DAE.</li> <li>• Emamectin benzoate 5 SG @ 0.4 g/lit or Novaluron 10 EC @ 1.5 ml/lit or Spinetoram 11.7 SC @ 0.5 ml/lit at late whorl stage (35 - 40 DAE) on need basis.</li> <li>• Spinetoram 11.7 SC @ 0.5 ml/lit (or) Emamectin benzoate 5 SG @ 0.4 g/lit (which is not sprayed at late whorl stage) at tasseling and cob formation stage (60 DAE), if required.</li> </ul>
<p>78.</p>	<p><b>2. IPM module for the management of FAW</b> may be suited with GOI guidelines for inclusion under Centrally sponsored schemes.</p>	<p>Director, CPPS</p>	<ul style="list-style-type: none"> <li>• The IPM module for the management of FAW was communicated to State Department of Agriculture and KVKs for uniform adoption by farmers. Further, an advisory on FAW management was communicated to ICAR – IIMR for national reference. Suiting the local needs of the State and farmers’ satisfaction, FAW capsule was tailored in line with GOI guidelines.</li> </ul>
	<p><b>3.</b> Detailed study may be conducted on <b>effectiveness of <i>Trichogramma pretiosum</i></b> on control of Fall Armyworm and Mass production technology in the Biocontrol labs.</p>		<ul style="list-style-type: none"> <li>• <i>Trichogramma pretiosum</i> did not parasitize fall armyworm eggs.</li> <li>• <i>Telenomus remus</i> was evaluated against FAW under laboratory and field conditions:</li> <li>• Under laboratory conditions <i>T. remus</i> could parasitize 98.2 per cent of fall armyworm eggs</li> <li>• <i>T. remus</i> @ 50000 / acre recorded a mean damage- and per cent damage-scores of 2.98 and 32.81 % damage respectively, whereas in control they were 3.68 and 60.74% respectively. The efficiency of <i>T. remus</i> was validated through FLDs.</li> </ul>

	<p><b>4. Predators for Tapioca mealy bug</b> (<i>Phenacoccus manihoti</i>) to be made available by TNAU.</p>		<ul style="list-style-type: none"> <li>• <i>Anagyrus lopezi</i> (parasitoid) from International Institute of Tropical Agriculture, Benin was imported through ICAR-NBAIR, Bengaluru and released in Tapioca and Castor Research Station, Yethapur on 07.03.2022. Mass multiplication and distribution of parasitoids from TCRS, Yethapur and mass multiplication of the same at ICAR-KVK Sandhiyur, ICAR-KVK Pappaparapatti and ARS Bhavanisagar are under progress.</li> </ul>
	<p><b>5. Protocol for the multiplication of <i>Encarsia</i></b> parasitoid may be communicated to DOA for adoption.</p>		<ul style="list-style-type: none"> <li>• Communicated for adoption</li> </ul>
	<p><b>6.</b> Suitable biological control measures for major horticultural crops to be standardized for adoption</p>		<ul style="list-style-type: none"> <li>• <i>Trichogramma pretiosum</i> for the management of brinjal fruit and shoot borer has been standardized and recommended @ 2 cc/ acre (8-10 releases).</li> <li>• <i>Apertochrysa astur</i> for the management of Rugose spiraling whitefly and Bondar's nesting whitefly complex in coconut has been standardized and recommended @ 400 eggs/ acre.</li> <li>• <i>Anagyrus lopezi</i> for the management of cassava mealy bug has been standardized and recommended @ 100 Nos/ acre</li> </ul>
	<p><b>7. Standard testing Procedure</b> for recent Bio-fungicides, Bio-Pesticides to be updated by TNAU.</p>		<ul style="list-style-type: none"> <li>• The standard serial dilution method is recommended as a testing procedure for the bio-fungicides and bio-pesticides.</li> </ul>
	<p><b>8. Residual analysis kit /SOP</b> to be recommended for Horticulture crops and to be popularized.</p>		<ul style="list-style-type: none"> <li>• Research on <i>in-situ</i> detection of residues of organo phosphorous and neonicotinoid insecticides is in progress. The developed kit will be recommended after validating the performance on market and farm gate vegetables.</li> </ul>
79.	<p><b>VI. Farm Mechanization</b> 1. Prototypes for Pelletized paddy seed drill to be evolved and evaluated under field conditions. DOA to obtain feedback on the performance report.</p>	Dean, (Agrl. Eng.)	<ul style="list-style-type: none"> <li>• A four row seeder for direct sowing of rice pellets in field was developed. The seeder was developed as an electrically propelled sowing machine. The seeder consists of two 800 mm long and 120mm wide skids. Propulsion is achieved by a 30 W DC geared motor. Steering of the seeder is effected by a linear DC actuator, capable of providing a thrust of 500N and a stroke of 100mm. The lugged traction wheel has a outer diameter of 400mm.</li> <li>• The seed metering device is a vertical rotor type, having cavities projected out from the surface of the rotor and scoops out the seed pellets in to the funnel the seed pellets are</li> </ul>

			<p>delivered directly in to the soil. The control of the propulsion, steering and seed metering were done by three separate motors. The control of all the three motors is done through multi channel telemetry control. The ground speed is measured by an encoder wheel and the seed disc is driven at proportional speed. The complete system of controller and drives are powered by a 12V 2.5Ah Battery. Field trials in different soil conditions showed that the seeder can work in puddle soil with a hard pan at a depth of 150 to 200 mm, to support the drive wheel. The adhesion of mud on the drive lugs is minimum when there is a thin layer of water on the surface.</p> <ul style="list-style-type: none"> <li>• Trials will be conducted during the ensuing season and feedback will be obtained from Director of Agriculture.</li> </ul>
	<p>2. AED to get feedback on the performance of Parabolic solar dryer.</p>		<ul style="list-style-type: none"> <li>• Parabolic solar dryers were installed by AED at Boluvampatti, Coimbatore and Periyakulam. The farmers found it very useful for drying coconut</li> <li>• The drying time was reduced to 50 % as compared to conventional drying. The copra collected from solar drying was free from fungal contamination.</li> </ul>
	<p>3. Transplanter and harvester for Millets have to be developed</p>		<ul style="list-style-type: none"> <li>• Self propelled reaper cum binder is operated by 10.2 hp air cooled diesel engine. Reaper cum binder used to harvest grain, forage and millet crops up to height of 85 to 110 cm. Field capacity and fuel consumption are 0.4 ha per hour and One litre per hour respectively. Width of cut is 120 cm and height of cut above the ground level is 3 to 5 cm. overall weight of the machine is 400 kg. The reaper binder can be used for harvesting and binding of millets.</li> <li>• Research will be undertaken for the design and development of transplanter for millets</li> </ul>



			
	<p>4 Combined pulse harvester needs to be developed to mitigate the labour problem.</p>		<p>The existing Paddy combine is being used for harvesting pulse crop by</p> <ul style="list-style-type: none"> <li>• Adjusting the clearance between the threshing drum and concave</li> <li>• Changing the sieves</li> </ul>
	<p>5. Farmer friendly, Groundnut Combined Harvester (both for harvest &amp; pod separation) needs to be developed</p>		<ul style="list-style-type: none"> <li>• Development of small groundnut combine harvester has been initiated with digging, conveying, stripping and pod collection systems. A mini tractor groundnut harvester has been modified to incorporate stripper and pod collection units. The 'V' shape digging blades were replaced with straight blade and also the inclination of the entire unit has been raised to 30 degree to increase the ground clearance at the rear so as to accommodate the stripping drums and pods collection box. Further, the three point hitch system has been modified to suit both tractor and mini tractor.</li> <li>• The stripping unit consists of two rotating drums which are rotating in opposite direction. The stripping unit was mounted on the main frame of the prototype below the chain conveyor to strips the groundnut pods from the plant while moving in the conveyor. A collection box was provided below the stripping unit to collect the stripped groundnut pods. Initial field trial was conducted to assess the performance of the combine harvester in ARS, Bhavanisagar and farmers field at Elur village. Based on the field trials, development of new prototype groundnut combine harvester is in progress.</li> </ul> 

6. Setts and seedling planter machineries to be developed.

- Tractor mounted sugarcane sett cutter planter developed by Indian Institute of Sugarcane Research and CIAE model Sugarcane seedling planters are available for direct planting of sugarcane setts and also transplanting of sugarcane seedlings, respectively.

#### **IISR sugarcane cutter planter**

The sugarcane cutter planter can do five operations simultaneously.

- i. Open a deep furrow of 1 feet depth in two rows.
- ii. Cut the whole cane in to two bud or three bud setts and planting in two rows.
- iii. Application of basal dose
- iv. Application of fungicide
- v. Application of herbicide




- The planter is a drop type planter where whole cane is cut into two or three bud setts and dropped into deep furrows formed by the furrow opener. The canes are fed manually in two rows and the rest of the operations, such as opening of furrows, application of fertilizer, herbicide and fungicide, giving a soil cover over the setts and compaction of the soil cover, are carried out simultaneously. The average length of setts is about 30 - 40 cm. while The length of setts will remain uniform provided the forward speed of tractor is less than 3 km/h. Thus, there is smooth sharp cut through shearing. Two Liquid tanks, made of horizontal PVC pipes of 15 cm diameter have been provided to spray fungicide or herbicide. Nozzles are fitted near the cane dropping end. Liquid is directly applied over the setts. The row to row spacing can be adjusted from 3 to 5 feet. Two rollers are provided for compaction of soil above the sugarcane setts.

#### **ICAR CIAE - SBI Two row tractor drawn mechanical planter for sugarcane bud chip settlings raised in protrays**

- The equipment consists of main frame to be attached to standard three point hitch arrangement of a 40 hp tractor with adjustable arrangement for altering row to row spacing 90, 120 and 150 cm. Bud chip settlings to be dropped through the metering mechanism by two operators who are seated behind the equipment with adjustable arrangements for altering plant to plant spacing of 30, 45 and 60 cm. Furrow openers open the furrow, in which the settlings



			<p>with soil are to be planted with adjustable arrangement for altering depth of planting 2 to 6 cm. The same furrow is used for irrigation after the settlings have been planted for better establishment. The furrow closer which follows the soil opener closes the soil thereby giving stability to the settlings.</p> <ul style="list-style-type: none"> <li>• Demonstration fields were established at the Eastern Block, TNAU, Coimbatore and AC&amp;RI, Vazhavachanur, Thiruvannamalai. Large scale demonstrations were carried out in collaboration with M/s. Kothari Sugars, Lalgudi. The field capacity of both the machines has 0.3 ha/h at a working speed of 1.4 km/h. Missing of 3 to 4 per cent was observed in SSI transplanting.</li> </ul>
	<p>7. Efficiency on the locally made sugarcane detrashing machine has to be analyzed and improved.</p>		<ul style="list-style-type: none"> <li>• A field trial was conducted with the commercially available mini tractor PTO operated sugarcane detrasher at TNAU Research farm, Coimbatore. The small tractor operated sugarcane detrashing machine comprises of 4 high speed rotating rubber rollers with nylon ropes, fixed at two different heights in a frame with 2 feet height difference. The rollers are positioned on the main frame irrespective of crop condition and crop height. The horizontal distance between the rollers is 70 cm. The power is transmitted from the PTO to the rollers through belt and pulley.</li> <li>• During the field trial, it was observed that detrashing has been completely carried out in the plants having the height above the top rollers approximately, 100 cm whereas the young tillers got damaged by the bottom rollers. Adjustable rollers with individual drives and controls are to be provided so as to adjust the position of the rollers according to the height of the plants to avoid the crop damage.</li> </ul> <div data-bbox="903 971 1974 1281">  </div>



8. Tractor operated biomass harvester for sugarcane needs to be developed since the existing ones are imported and expensive.

- Indian make sugarcane balers are available with three different pick up widths viz., 80 cm, 100 cm and 120 cm for collection and bundling of sugarcane trashes left over the field after harvesting of canes. The bale weight ranges from 24 to 36 kg with diameter of 60 cm and length vary from 90 to 104 cm. The field capacity of the baler is about 60-70 bales per hour. The same machine can be utilized for other crops for collecting paddy straw, and cotton stalk.

**IISR model *In-situ* Shredder**

- A tractor operated *in-situ* shredding machine developed by Indian Institute of Sugarcane Research (IISR), Lucknow is specially designed for shredding of sugarcane trashes from the field in to small pieces and also to apply the chemical for rapid decomposition. The machine consists of four horizontal high speed rotating blades and sintex chemical tank. The simultaneous operation of shredding of trashes and also chemical application on shredded trashes will enhance the decomposition of the trashes quickly.



**IISR model *in-situ* Shredder**





















**Square baler**






**Square baler**


- The tractor PTO operated square balers can also be used for collecting the sugarcane residues in the field. It collects the sugarcane residues from the field and compact in to bales. It consists of pick up assembly, compressing unit and knotting system. It uses a polypropylene twine or steel wire for making knot for heavy and dense bales. The working width of the balers is ranged from 150 to 165 cm. The length of the bale is varying from 40 to 110 cm with cross section of 46 x 36 cm. The field capacity of the baler is about 300 bales per hour (6 tonnes). The same machine can be utilized for other crops for collecting paddy straw, and cotton stalk.



80.	<p><b>VII. Soil And Water Conservation</b></p> <p>1. Impact Evaluation of Farm ponds created under NABARD-RIDF shall be taken up.</p>	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>The impact evaluation of farm pond created under NABARD-RIDF assistance is initiated jointly with Directorate of Centre for Agricultural and Rural Development Studies, Tamil Nadu Agricultural University, Coimbatore.</li> </ul>
		Director, CARDS	<ul style="list-style-type: none"> <li>A detailed study was taken up in five districts (Coimbatore, Cuddalore, Ramanathapuram, Salem and Tiruvarur districts) across agro- climatic zones of Tamil Nadu to assess the impact of farm ponds created under NABARD-RIDF assistance.</li> <li>In order to assess the impact of farm ponds, a sample 195 farmers without farm pond were selected and studied.</li> <li>The impact of farm pond was examined with various indicators <i>viz.</i>, raise in water level in the open wells, changes in cropping pattern, increase in yield, income level of farmers, and increase in net profit.</li> </ul> <p><b>Key findings</b></p> <ul style="list-style-type: none"> <li>Water level in wells raised</li> <li>Yield increase is found to be 307.13 kg/ha in maize, 176.35 kg/ha in black gram and 37.82 kg/ha in chilies due to farm pond.</li> <li>The average annual household income has increased by 11.54 per cent after formation of farm ponds.</li> <li>Farm ponds are found very useful to save the crops during critical stages as life irrigation</li> <li>Fallow lands are brought under cultivation</li> <li>Additional income generated from fish culture</li> <li>Utilized for livestock drinking</li> </ul>
81.	<p><b>2. Green Energy Initiatives</b></p> <p>a. Mobile Solar pumping system for irrigation Mobile solar pumps shall be explored to enable easy transport using tractor trailer from one field to another field without damaging the solar panels in transit.</p>	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>Mobile solar pumping system consists of PV modules, DC pump, pump controller and mounting structure. A 3 hp mobile solar pumping system was designed with mounting and tilting facilities in a trailer. Fabrication of the mobile solar pumping system is completed. Arrays with sliding type module arrangements were provided in a trolley system. Tilt angle of the PV array can be adjusted. Arrangements were made for stretching (sliding) of PV modules (9 Nos. of 330 Wp each). Preliminary field performance assessment was carried out in river stream at Mundanthurai, Coimbatore district. Water discharge of 7920 lph was measured using V-notch in the irrigation channel.</li> </ul>

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<p>82.</p>	<p><b>b. Solar drying units</b></p> <p>The perforated trays to be used are of food grade SS 304 material. The use of alternate material for trays which is easy for handling and production <i>viz.</i>, HDPE food grade nestable trays shall be studied for safely drying the agricultural produce in the solar drying units, as the temperature inside these polycarbonate sheet covered greenhouse driers will be up to 65 degree Celsius.</p>	<p>Dean, Agrl. Eng.</p>	<ul style="list-style-type: none"> <li>A study on use of alternate material has been carried out, by using food grade HDPE (#2) nestable trays (760 mm x 330 mm x 80 mm) for drying agro-produce. The compound parabolic solar dryer with vertical drying chamber was installed with the HDPE trays (60 Nos) during June 2019. The trays have been used for more than two years for drying various agro-products like jackfruit, sapota, ground nut, carrot, beet root, bitter guard, cluster beans and bhendi. The HDPE trays were continuously exposed to shortwave radiation (temperature @ 65°C) inside the transparent polycarbonate chamber. It was observed that, the trays are free from any deformation and quality deterioration for the past 2 years.</li> </ul>												

			<div style="display: flex; justify-content: space-around;">   </div> <p style="text-align: center;"><b>Vertical Solar Drying Chamber      Food grade HDPE (#2) tray</b></p>
83.	<p><b>c. Mobile solar drying units</b></p> <p>Mobile solar drying unit of similar type which could be mounted on the tractor trailer may be established, for hiring out to the farmers. The drying unit shall be planned with collapsible door and superstructure for easy transportation, if possible.</p>	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>Mobile solar drying unit is designed to mount in a trailer. The base and the foldable side frames of the trailer were used as drying floor. The drying floor is coated with special black to absorb the maximum heat inside the super structure. The dryer super structure designed to dismantle as individual polycarbonate sheets (1.21 x 6.14 m, 1.4 mm) and reassembled. A polycarbonate solar tunnel dryer of size 3.63 m x 3.75 m was designed so as to use as a mobile drying system. The fabrication of the mobile solar dryer is completed. The performance assessment will be carried out for drying agro products in the farmers field.</li> </ul> <div style="display: flex; justify-content: space-around;">    </div> <p style="text-align: center;"><b>Developed mobile solar dryer</b></p>
84.	<p><b>d.</b> The problem experienced in <b>Solar pump linked with Micro irrigation</b> may be studied and various measures for overcoming the problem in the field shall be suggested.</p>	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>The pressure developed in the drip irrigation system powered by 5 hp solar pump was observed in two farmers field namely, Mr Sanjay from Thodamuthur and Mr. Nataraj from Mathampatti. The pressure observed was 0.3 kPa which is insufficient for operation of micro irrigation system. However a separate study will be taken to monitor the pressure variation within a day and over the season to study the solar pumps with micro irrigation system</li> </ul>



			
85.	<p><b>3. Soil and Water Conservation</b></p> <p>a. Reclamation of Problem Soils</p> <p>Alternate engineering measures, combined with agronomic measures need to be suggested for reclamation of problem soils.</p>	<p>Director, NRM</p> <hr/> <p>Dean, Agrl. Eng.</p>	<p>The agronomic measures for reclamation of problem soil includes</p> <p><b>Alkali soils</b> Gypsum application and leaching Organic manure application and green manuring.</p> <p><b>Saline soils</b> Leaching with good quality water Providing surface / subsurface drainage Following Ridges and furrow, Raised bed method of planting to minimize direct salt injury and facilitating natural drainage.</p> <ul style="list-style-type: none"> <li>• Implementation of various need based land improvement interventions like, peripheral/marginal bunds, check bunds, hydraulic sluice gate, surface and subsurface drainage systems, farm ponds/water harvesting structures, on farm development,</li> </ul>




			<p>prevention of water logging by construction of bioengineering measures for prevention of ingress of sea water</p> <ul style="list-style-type: none"> <li>• Application of soil amendments, leaching of salt by allowing water impounding with conserved rain water and ensuring sustainability of reclaimed areas by continuous cultivation of recommended salt tolerant crop varieties</li> <li>• Capacity building of farmers for continuous cultivation of salt tolerant crops/horticultural crops along with soil test based judicious application of fertilizers and micro nutrients to prevent reoccurrence of such problem soils</li> </ul>
86.	<p><b>b. Reuse of Sewage waste water</b></p> <p>A study may be taken for any low-cost technology to reuse the sewage waste water for irrigation purpose.</p>	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>• A Lab scale model was constructed at Tamil Nadu Agricultural University to evaluate the usage of aquatic plants in treatment of sewage water. Plant species like, <i>Canna indica</i>, <i>Xanthosomas agittifolium</i> and <i>Typha angustifolia</i> were selected for the study. The sewage water is collected from the TNAU campus for conducting the trial. The above mentioned plants were grown under the lab scale model in order to standardize the hydraulic retention time and hydraulic loading rate. As a result of the experiment pH, EC, TDS, TSS, BOD, COD, Total nitrogen and total phosphorus of the sewage water were significantly reduced by the aquatic plants throughout the retention time. Among the three plant species, <i>Canna indica</i> showed significant result. The BOD, COD, TDS, TSS levels were declined. In other two plants species showed on par results.</li> <li>• In radial oxygen loss study, <i>Canna indica</i> performed better which indicates the release of oxygen from the plants might be a reason for reduction in parameters like BOD, COD and heavy metal content.</li> </ul> <div data-bbox="1129 966 1789 1351" data-label="Image"> </div> <p>Model Constructed wetland system set up- Compost Yard, Dept. of Environmental Sciences</p>

		Director, NRM	<ul style="list-style-type: none"> <li>For reuse of sewage wastewater, constructed Wetland System with aquatic reed plants is recommended. This method is a low cost and eco-friendly sewage treatment with no chemical addition. For treating 1000 litres of sewage water, an area of 50 m<sup>2</sup> is required.</li> <li>Constructed wetland system with aquatic plants viz., <i>Canna indica</i> and <i>Typha anqustifolia</i> reduced the BOD and COD (37 to 44 %), TDS (59 to 63%) and TSS (89 to 91%) at a retention time of 7 days.</li> <li>Construction cost will be around Rs. 2.5 lakhs with an operational cost of Rs. 17/-.</li> </ul>
87.	<p><b>c. Saline water for irrigation</b></p> <p>Efficiency of commercially available "Structured water device" may be studied in detail for enhancing the growth and yield of the agricultural crops. TNAU may come with a cost effective "Structured water device" to be fitted in the conveyance system for irrigation to reduce the impact of salinity on soil.</p>	Director, NRM	<p><b>Gypsum bed treatment for treating Sodict water</b></p> <ul style="list-style-type: none"> <li>Gypsum bed can be designed using RCC rings of 0.9 m diameter and 0.3 m height to treat alkali water using gypsum. Totally four RCC rings can be used to achieve the structural dimension of 1.2 m height and 0.9 m diameter which should be closed at the bottom with inlet (50mm size) in the bottom ring and other in the upper most ring, so as to enable the water coming from the PVC conveyance pipes in the farmers holdings to pass through the gypsum beds. The phospho –gypsum can be placed in cloth bags over the iron mesh provided in between the third and fourth ring. The cost of one such structure is estimated at Rs. 8,000/- and therefore it should it is possible for the farmer to construct the same at their fields. 90 kg of gypsum is required to neutralise one unit of RSC in 7.5 ha cm of water</li> </ul>
		Dean, Agri. Eng.	<ul style="list-style-type: none"> <li>The study on "structured water device" fabricated by M/s. VWF Industries PVT Ltd., Mysore was carried out at Water Technology Centre, Tamil Nadu Agricultural University. The device was fitted in the drip irrigation system and irrigated for cotton crop. No changes in physical and chemical characteristic of irrigation water were observed but 10 % yield enhancement was observed. However, further investigation is required.</li> </ul>
88.	<p><b>4. Evaluation study for Special Area Development Programme</b></p> <p>TNAU may take up an evaluation study for the outcomes of the project.</p>	Dean, Agri. Eng.	<ul style="list-style-type: none"> <li>Evaluation study for Special Area Development Programme will be initiated in collaboration with the State Agricultural Engineering Department, Tamil Nadu.</li> </ul>
89.	<p><b>VIII. Post Harvest Management Technologies</b></p>	Director, NRM	<ul style="list-style-type: none"> <li>TNAU has a facility to produce Nano-Stickers that can be used for the preservation of fruits during storage. One sticker is required for each box of 2-3 kgs of fruits (mango or banana). The cost of the Nano-Stickers Rs. 7 per unit.</li> <li>The Center continues to produce and supply Nano-Stickers to needy farmers.</li> </ul>

	<p><b>1. Nano stickers</b> Nano technologies for delaying the maturity and ripening may be developed and communicated. In-house production of Nano stickers should be made available and supplied to the needy farmers in smaller scale.</p>		
90.	<p><b>2. Bio-safety issues</b> to be addressed for enhancement in seed groundnut shelf life.</p>	Director, NRM	<ul style="list-style-type: none"> <li>Nano-ZnO is found to be useful in invigorating seeds (millets, pulses, oilseeds) @ 1g/kg seed. Since the product is very effective it is recommended and practiced in all ICAR – AICRP experiments. Only at very high concentrations (5 times above the recommended dose), it causes toxicity. The product has been evaluated as per the biosafety guidelines stipulated by DBT in which TNAU is one of the members in Regulatory authorities.</li> </ul>
91.	<p><b>IX. Agricultural Marketing Technologies</b> 1. Cost-effective cold storage technologies have to be evolved. Cold storage with controlled atmospheric storage validation may be developed.</p>	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>Cold storage technologies are presently not cost effective primarily because the technology used is outdated and many of them have been designed for single commodity. While Tamil Nadu has around 200 cold storages with about 4 lakh metric tonnes of storage capacity, it is still not adequate to address the requirement of cold handling of fresh produce.</li> <li>Already, the department of FPE has conducted the Controlled Atmosphere storage for pulses and found the extension of shelf life of pulses. The use of controlled atmosphere storage (70% CO<sub>2</sub>) increased the mortality of the insect <i>C. maculatus</i> at all developmental stages. Controlled atmosphere storage of grains does not affect the quality of the pulses. The moisture content of the grains was also not affected due to exposure to CO<sub>2</sub> concentrations. Overall comparison of grains stored in controlled atmosphere storage bin over gunny bag storage showed better grain quality, retained moisture content and also reduced the weight loss by preventing the insect infestation compared to grains stored in gunny bags. Controlled atmosphere storage was found to be the best method for storing pulses with the following salient points. <ul style="list-style-type: none"> <li>The initial mean moisture content of black gram was measured 11.85 % (w.b.) and it was reduced to 10.92% and 10.69% in silo and gunny bags after 90 days of storage.</li> <li>Grain stored in the silo showed 100% mortality of egg after 90 days of storage.</li> </ul> </li> </ul>

			
		Dean, Horticulture	<ul style="list-style-type: none"> <li>At the Department of Postharvest technology, Horticultural College and Research Institute, Periyakulam, Cold storage facility with 10 tonnes capacity has been established for undertaking research on postharvest packaging and storage studies in horticultural crops.</li> </ul> 
92.	<b>2. Mechanical drying technology</b> for tamarind may be developed.	Dean, Agrl. Eng.	<ul style="list-style-type: none"> <li>The stickiness of the tamarind fruit is a major problem during deseeding. The pre heating of the tamarind fruit for optimizing the moisture content reduces the stickiness to some extent. During deseeding, the tamarind fruits absorb moisture and make it sticky, which hinders the deseeding operation often.</li> <li>To overcome this problem, development of a mechanical dryer coupled with dehumidifier is in progress. The main purpose of dehumidified dryer is to reduce moisture content from the process inlet air and to increase its temperature to further usage in drying. The low humidity air has maximum capacity to gain moisture when it is forced through food product</li> </ul>



			<p>leads to absorption of moisture from wet food product. Also, the dehumidified cool air has the ability to make brittleness in the dried tamarind fruits. This condition will be highly suitable for deseeding without stickiness problem. A mechanical dryer with dehumidification has been developed.</p> 
93.	<p><b>X. Forestry</b></p> <p>1. Network of Extension centre to be done.</p> <p>2. Linkage between farmers and Industry has to be developed.</p> <p>3. Linkage with Forest department has to be developed for formulation of FPOS.</p>	Dean, Forestry	<ul style="list-style-type: none"> <li>• Essential networking has been established with Extension centres of State Forest Department and KVKs.</li> <li>• Accordingly, five capacity building programmes were conducted during the period from 09.02.21 till 31.08.22 and 166 forest range officers and foresters of Tamil Nadu Forest Department were trained on innovative technologies and facilitated technology transfer.</li> </ul> <p>Yes, linkage with farmers and industries has been established through the following institutional mechanisms:</p> <ul style="list-style-type: none"> <li>• Consortium of Industrial Agroforestry (CIAF)</li> <li>• Mettupalayam Agroforestry Business Incubation Forum (MAFBIF)</li> <li>• Through these institutions, technology transfer, validation, commercialization and market linkage has been created for 12 different species namely Teak, <i>Mahogany</i> (timber), <i>Melia</i>, <i>Kadam</i>, <i>Toona</i> (Plywood), <i>Casurina</i>, <i>Eucalyptus</i>, <i>Acacia</i> hybrid (Pulpwood), <i>Subabul</i>, <i>Acacia</i> (Energy), <i>Ailanthus</i> (Matchwood) and <i>Neem</i> (Oil)</li> </ul> <ul style="list-style-type: none"> <li>• Yes, linkage has been created with Forest department and an FPO named Coimbatore Agroforestry Farmer Producer Company has been established at Coimbatore. This FPO takes care of activities from the entire Production to Consumption system in Agroforestry.</li> <li>• Linkage has also been created with Forest Department to create user specific FPOs for which a facilitation Centre proposal has been submitted to NABARD.</li> <li>• Capacity building programme for FPOs and farmers (30 participants) was organized in collaboration with APEDA on 26.09.21</li> <li>• Training on Agroforestry based business opportunities for FPOs was organized on 06.05.22 which was attended by 55 farmers belonging to FPOs.</li> </ul>

	<p>4. Contract farming to be promoted in Forestry.</p>		<ul style="list-style-type: none"> <li>The following contract farming models have been designed and implemented in association with respective industries.</li> </ul> <table border="1" data-bbox="940 289 1936 669"> <thead> <tr> <th data-bbox="940 289 1327 328">Farmers</th> <th data-bbox="1327 289 1936 328">Linking Wood based Industry</th> </tr> </thead> <tbody> <tr> <td data-bbox="940 328 1327 402">Pulpwood tree growers</td> <td data-bbox="1327 328 1936 402">TNPL, Karur SPB, Erode</td> </tr> <tr> <td data-bbox="940 402 1327 477">Plywood tree growers</td> <td data-bbox="1327 402 1936 477">Ambiply, Mettupalayam Centuryply, Chennai</td> </tr> <tr> <td data-bbox="940 477 1327 516">Timber tree growers</td> <td data-bbox="1327 477 1936 516">Suresh Timbers, Madurai</td> </tr> <tr> <td data-bbox="940 516 1327 555">Matchwood</td> <td data-bbox="1327 516 1936 555">Ideal Matches, Annur</td> </tr> <tr> <td data-bbox="940 555 1327 630">Energy</td> <td data-bbox="1327 555 1936 630">ITC Paper Boards &amp; Specialty Papers Division, Coimbatore</td> </tr> <tr> <td data-bbox="940 630 1327 669">Neem</td> <td data-bbox="1327 630 1936 669">Coromandel International Ltd., Chennai</td> </tr> </tbody> </table>	Farmers	Linking Wood based Industry	Pulpwood tree growers	TNPL, Karur SPB, Erode	Plywood tree growers	Ambiply, Mettupalayam Centuryply, Chennai	Timber tree growers	Suresh Timbers, Madurai	Matchwood	Ideal Matches, Annur	Energy	ITC Paper Boards & Specialty Papers Division, Coimbatore	Neem	Coromandel International Ltd., Chennai
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	<p>5. Suitable tree species may be suggested under Agroforestry system of the State.</p>		<ul style="list-style-type: none"> <li>Tree species most suitable for cultivation in various agroclimatic zones of Tamil Nadu was prepared and sent to the Government of Tamil Nadu. (List enclosed in Annexure – II)</li> </ul>														
	<p>6. Dean (Forestry) may submit a draft proposal to APC for Tamil Nadu under Sub Mission on Agro-Forestry under NMSA scheme.</p>		<ul style="list-style-type: none"> <li>A proposal on Multifunctional Agroforestry Model amenable for dry lands with a budget outlay of Rs. 200 lakhs has been submitted to the Government of Tamil Nadu for implementation through Agroforestry Sub-mission.</li> </ul>														
94.	<p><b>X. Sericulture</b></p> <p>1. Fortification of Mulberry leaves with nutrients may be evolved.</p> <p>2. Composting technologies for Silkworm extract/excreta needs to be studied and communicated.</p>	Dean, Forestry	<ul style="list-style-type: none"> <li>Administration of amino acid mixture reduced the larval duration by 6.06 hrs, increased the silk filament length by 79 m (7.37 %) and cocoon yield by 7.99 kgs/100 dfls (10.18 %)</li> <li>Amino acids also significantly enhanced the silk proteins viz., fibroin and sericin by 10.17 and 11.44 per cent respectively.</li> <li>Benefit Cost Ratio was 2.02:1 against 1.91:1 in farmers' practice</li> <li>Composting technology for silkworm excreta was standardized - superphosphate @ one kg/tonne of silkworm excreta was added to enrich the compost.</li> <li>Augmented with <i>Trichoderma asperellum</i> @ one kg/ tonne of silkworm excreta one month before field application.</li> <li>Application of silkworm excreta compost enhanced the N (20.7; 11.5 kg ha<sup>-1</sup> harvest), P</li> </ul>														

			<p>(5.2; 2.6 kg ha<sup>-1</sup> harvest), K (11.1; 5.7 (kg ha<sup>-1</sup> harvest), Zn (249.5; 82 249.5 g ha<sup>-1</sup> harvest), Fe (2113.8; 1073.9 g ha<sup>-1</sup> harvest), Bo (36.2; 17.5 g ha<sup>-1</sup> harvest) and Mn (612.2; 300.0 g ha<sup>-1</sup> harvest) uptake in mulberry compared to control.</p> <ul style="list-style-type: none"> <li>• Application of silkworm excreta compost twice @ 8t/ac/year enhanced the growth and yield parameters of mulberry and silkworm economic parameters compared to control <i>viz.</i>, No. of branches/plant (10.4, 9.1), No. of leaves/branch (25.5, 22.3), and leaf yield (4393 kgs/acre/harvest, 3620 kgs/acre/harvest). It also enhanced economic parameters of silkworm compared to control <i>viz.</i>, cocoon weight (2.02, 1.68 gm) and shell weight (0.26, 0.18 gm).</li> <li>• Cocoon yield was increased by 21.68%</li> <li>• B: C ratio was 1.82 against control (1.33).</li> </ul>
95.	<p><b>XI. Trend Analysis</b></p> <p>Final report on the trend analysis in area, production and productivity of horticultural crops in selected districts and recommendation for bridging the gap should be submitted within a month.</p>	Director, CARDS	<p>The report was submitted and approved Area, production and productivity of tomato, brinjal and bhendi were collected for the period from 2009 to 2018-19 for all districts in Tamil Nadu. Compound growth rates were worked out to examine the trend. The major findings are</p> <ul style="list-style-type: none"> <li>• Area, production and productivity of tomato registered positive trend in Tamil Nadu</li> <li>• The average yield of tomato under Micro Irrigation System (34 tonnes/ha) is 25 per cent higher than open cultivation (27 tonnes/ha) and under Protected Cultivation (72 tonnes/ha), it is 166 per cent higher than open cultivation.</li> <li>• Area and production of brinjal registered positive trend while productivity registered negative trend in Tamil Nadu</li> <li>• The average yield of brinjal under Micro Irrigation System (33 tonnes/ha) is 43 per cent higher than open cultivation(23 tonnes/ha)</li> <li>• Area and production of bhendi registered positive trend while productivity registered negative trend in Tamil Nadu</li> <li>• The average yield of bhendi under Micro Irrigation System is 15.75 ton/ha which is 36.5 per cent higher than yield under open cultivation (11.53 tonnes/ha).</li> </ul>

96.	<p><b>Centre of Excellence (COE)</b></p> <p>1. Suitable strategy should be worked out to include the dry land agriculture technologies under TN Mission on Sustainable Dry land Development.</p> <p>2. TNAU should send a note on All CoE's developed for crop / varieties / technologies / machineries / innovations for implementation by Extension officials before April, 2021. This note should be given to APC, DOA and DHPC thereafter.</p>	Director of Research, TNAU	<p><b>CoE in Innovations, AC &amp; RI, Madurai</b></p> <ul style="list-style-type: none"> <li>Centre of Excellence in Innovations has laid special emphasis on millets. Germplasm of barnyard millet has been screened and lines with high iron and zinc content have been identified. Work is in progress to develop therapeutic barnyard millet with high iron, zinc and riboflavin. These will be further analysed and will be recommended for trials.</li> </ul> <p><b>CoE in Molecular Breeding, CPBG, TNAU, Coimbatore</b></p> <ul style="list-style-type: none"> <li>A total of six blackgram genotypes <i>viz.</i>, VBG 20-077, VBG 20-079, VBG 20-082, VBG 20-084, VBG 20-086 and VBG 20-090 were developed by incorporating Mungbean Yellow Mosaic Virus Disease (MYMD) resistance through marker assisted backcross breeding under a Ph.D. programme. These genotypes have high level of resistance and yield potential than the susceptible variety MDU 1. These entries are in AYT trial at National Pulses Research Centre (NPRC), Vamban during <i>kharif</i> 2022. Sufficient seeds will be multiplied during <i>kharif</i> and <i>rabi</i> 2022-23 seasons at NPRC, Vamban. These genotypes will be test verified at the farmer's field as Farmers Participatory Trial both under rainfed and irrigated areas.</li> </ul> <p><b>CoE in Oil Palm, Pattukkottai</b></p> <ul style="list-style-type: none"> <li>Evaluation of Tenera oil Palm hybrids are being taken up at Agricultural Research Station, Pattukkottai.</li> <li>One Tenera hybrid in the name of 'Godavari Gold' has been recommended for the cultivation in Cauvery delta regions of Tamil Nadu.</li> </ul> <p><b>CoE in SSH, ADAC &amp; RI, Trichy</b></p> <ul style="list-style-type: none"> <li>With the high end instruments, Centre of Excellence in Sustaining Soil Health regularly takes up analysis of soils, water and plant samples brought by the farmers and farm entrepreneurs, researchers, students (TNAU and other academic institutes) through its venture Capital Scheme on Soil Health Analytical Laboratory.</li> <li>Soil (904), plant (1062), manure (217) and water (24) samples have been analysed and suitable recommendations based on the need were given.</li> </ul>
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			<p><b>Salient findings generated with the high end instruments (GCMS-MS, LCMS-MS, FTIR)</b></p> <ul style="list-style-type: none"> <li>• Identification using the functional groups in pesticides using FTIR is rapid, cost effective technique can be used for quality control purposes.</li> <li>• Studies with various levels of nitrogen in finger millet showed that terminal residues of the applied herbicides <i>viz.</i>, Pendimethalin, Oxyfluorfen and Bispyribac-sodium analysed using the HPLC-DAD and LC-MS/MS and were found below detection limit in soil (0.01 mg/kg) and below the MRL (0.05 mg/kg) in finger millet grain as suggested by FSSAI. Oxyfluorfen + Bispyribac-sodium with 125% N can be used to control the weeds effectively in finger millet under sodic soil.</li> </ul> <p><b>CoE in Millets, Athiyandal</b></p> <ul style="list-style-type: none"> <li>• CoE in Millets, Athiyandal has so far released ATL 1 Panivaragu, ATL1 Samai, ATL 1 Ragi, ATL 1 Tenai, ATL 1, ATL 2 and ATL 3 Varagu varieties. During 2021-22, a total quantity of 8316 kg TFL seeds of TNAU released small millet varieties were produced and 10023 kgs were distributed. And also breeder seeds of 8955 kgs were produced and 2965 kgs were distributed for the spread and popularization of these varieties.</li> </ul>
97.	<p><b>B. Product released for commercialization</b></p> <p>With a constant support and encouragement of the APC &amp; Principal Secretary and Vice chancellor, the following products have been launched.</p> <ol style="list-style-type: none"> <li>1. DSSIFER</li> <li>2. SOILDOC</li> <li>3. Nano Sticker</li> <li>4. TNAU Neera</li> </ol> <p>These products have commercial value and the status of the technology spread may be reported in the</p>	<p>Director, NRM Dean, Horticulture</p>	<p><b>DSSIFER:</b></p> <ul style="list-style-type: none"> <li>• To ease the adoption of STCR-IPNS based fertilizer recommendations, the Computer software - Decision Support System for Integrated Fertilizer Recommendation (DSSIFER) has been developed.</li> <li>• It is being used in Soil Testing and Technology Advisory Centre (SOTAC), Dept. of Soil Science &amp; Agrl. Chemistry, DNRM, TNAU and STLs of KVKs of TNAU for providing analytical and advisory services in the form of Soil and Water Health Cards to the farmers of various districts of Tamil Nadu.</li> <li>• In addition, DSSIFER software is being sold to progressive farmers, entrepreneurs, academic Institutions, Research Stations, KVKs, <i>etc.</i></li> <li>• Farmers from different districts of Tamil Nadu during the visit under ATMA programme, AGRI INTEX of CODDISIA <i>etc.</i> are being exposed to the usage of DSSIFER software.</li> <li>• Through these activities STCR-IPNS and other soil and irrigation water quality management technologies of TNAU have been popularized among the farmers.</li> </ul>

	next SWC.		<p><b>TN Soil Doc:</b></p> <ul style="list-style-type: none"> <li>• The link for the Mobile app 'TNAU Soil Doc', a bilingual soil information system for Tamil Nadu, has been developed and hosted in Google Play Store. In addition, the link for downloading the mobile app was shared with all the Colleges, Research stations, KVKs and DoA for wider publicity with scientists, officials, students, research scholars and farmers.</li> <li>• Training (Six Nos.) on utilizing the TNAU Soil Doc app was organized for the 1070 officials of the state department of agriculture, Revenue department &amp; Rural Development department.</li> <li>• TNAU soil app will be updated with crop suitability classification at the farm level in association with the Directorate of Agriculture and web portal on 'தமிழ்மண்வளம்' will be developed and linked through <i>Uzhavan</i> app as per TN Agriculture Budget announcement 2022.</li> </ul> <p><b>Nano-Sticker:</b></p> <ul style="list-style-type: none"> <li>• The Nano-Sticker technology was officially launched on 8.2.2021 during 85<sup>th</sup> SWC. The TNAU has two electro spinning machines to produce Nano-Stickers.</li> <li>• Nano-Stickers (&gt; 500) have been produced and supplied to Dept. officials and farmers.</li> <li>• The patent for Nano-Sticker was filed in 2018 and now it is in the process of issue. There are many companies including Coromandel &amp; Rajshree Chemicals bestowing interest to take up the technology.</li> </ul>
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### Annexure I-a

#### List of insecticides/pesticides Registered under section 9(3) of the Insecticides Act, 1968 for use in the Country

(As on 01.07.2022)

S. No.	Name of the Pesticide
1.	1-MethylCyclopropene
2.	2,4-D Amine salt
3.	2,4-Dichlorophenoxy Acetic Acid
4.	Abamectin
5.	Acephate
6.	Acetamiprid
7.	Afidopyropen
8.	Allethrin
9.	Alphacypermethrin
10.	Alphanaphthyl Acetic Acid
11.	Aluminium Phosphide
12.	Ametroctradin
13.	Ametryn
14.	Amisulbrom (FI-WRT)
15.	<i>Ampelomyces quisqualis</i>
16.	Anilophos
17.	Atrazine
18.	Aureofungin
19.	<i>Azadirachtin</i> (Neem Products)
20.	Azimsulfuron
21.	Azoxystrobin
22.	<i>Bacillus sphaericus</i>
23.	<i>Bacillus subtillus</i>
24.	<i>Bacillus thuringiensis</i> var. <i>galleriae</i>
25.	<i>Bacillus thuringiensis</i> var. <i>israelensis</i>
26.	<i>Bacillus thuringiensis</i> var. <i>kurstaki</i>

27.	Barium Carbonate
28.	<i>Beauveria bassiana</i>
29.	Benalaxyl
30.	Benalaxyl M
31.	Bendiocarb
32.	Benfuracarb
33.	Bensulfuron Methyl
34.	Bentazone
35.	Benzpyrimoxam
36.	Beta Cyfluthrin
37.	Bifenazate
38.	Bifenthrin
39.	Bispyribac Sodium
40.	Bitertanol
41.	Boscalid
42.	Brodifacoum
43.	Broflanilide
44.	Bromadiolone
45.	Buprimate
46.	Buprofezin
47.	Butachlor
48.	Captan
49.	Carbendazim
50.	Carbofuran
51.	Carbosulfan
52.	Carboxin
53.	Carfentrazone Ethyl
54.	Carpropamid
55.	Cartap Hydrochloride
56.	Chlorantraniliprole
57.	Chlorfenopyr
58.	Chlorfluazuron



59.	Chlorimuron ethyl
60.	Chlormequat Chloride (CCC)
61.	Chlorothalonil
62.	Chlorpropham
63.	Chlorpyrifos
64.	Chlorpyrifos Methyl
65.	Chromafenozide
66.	Cinmethylen
67.	Clethodim
68.	Clodinafop-propargyl
69.	Clomazone
70.	Clothianidin
71.	Copper Hydroxide
72.	Copper Oxychloride
73.	Copper Sulphate
74.	Coumachlor
75.	Coumatetralyl
76.	Cuprous Oxide
77.	Cyantraniliprole
78.	Cyazofamid
79.	Cyclanilide
80.	Cyenopyrafen
81.	Cyflufenamide
82.	Cyflumetofen
83.	Cyfluthrin
84.	Cyhalofop-butyl
85.	Cymoxanil
86.	Cypermethrin
87.	Cyphenothrin
88.	Cyproconazole
89.	Dazomet
90.	Deltamethrin (Decamethrin)

91.	Diafenthiuron
92.	Dichloro Diphenyl Trichloroethane (DDT)
93.	Dichloropropene and Dichloropropane mixture (DD mixture)
94.	Diclofop-Methyl
95.	Diclosulam
96.	Dicofol
97.	Difenoconazole
98.	Diflubenzuron
99.	Dimethoate
100.	Dimethomorph
101.	Dinocap
102.	Dinotefuron
103.	Dithianon
104.	Diuron
105.	Dodine
106.	D-trans Allethrin
107.	Edifenphos
108.	Emamectin Benzoate
109.	Epoxyconazole
110.	Ethephon
111.	Ethion
112.	Ethiprole
113.	Ethofenprox (Etofenprox)
114.	Ethoxysulfuron
115.	Ethylene Dichloride and Carbon Tetrachloride mixture
116.	Etoxazole
117.	Famoxadone
118.	Fenamidone
119.	Fenazaquin
120.	Fenitrothion
121.	Fenobucarb (BPMC)
122.	Fenoxanil

123.	Fenoxaprop-p-ethyl
124.	Fenpropathrin
125.	Fenpyroximate
126.	Fenvalerate
127.	Fipronil
128.	Flocoumafen
129.	Flonicamid
130.	Florasulam
131.	Fluazifop-p-butyl
132.	Flubendiamide
133.	Flucetosulfuron
134.	Fluchloralin
135.	Fluensulfone
136.	Flufenacet
137.	Flufenoxuron
138.	Flufenzine
139.	Flumioxazin
140.	Fluopicolide
141.	Fluopyram
142.	Flupyradifurone
143.	Flupyrimin
144.	Fluroxypyr meptyl
145.	Flusilazole
146.	Fluthiacet methyl
147.	Fluvalinate
148.	Fluxametamide
149.	Fluxapyroxad
150.	Fomesafen
151.	Forchlorfenuron
152.	Fosetyl-Al
153.	Gibberellic Acid
154.	Glufosinate Ammonium

155.	Glyphosate
156.	Gossypure
157.	Haloxifen-methyl
158.	Haloxifop-R-methyl
159.	Helosulfuron methyl
160.	Hexaconazole
161.	Hexazinone
162.	Hexythiazox
163.	Hydrogen Cyanamide
164.	Imazamox
165.	Imazethapyr
166.	Imidacloprid
167.	Imiprothrin
168.	Indaziflam
169.	Indoxacarb
170.	Iprobenfos (Kitazin)
171.	Iprodione
172.	Iprovalicarb
173.	Isoprothiolane
174.	Isoproturon
175.	Kasugamycin
176.	Kresoxim Methyl
177.	Lambdacyhalothrin
178.	Lime Sulphur
179.	Lufenuron
180.	Magnesium Phosphide Plates
181.	Malathion
182.	Mancozeb
183.	Mandipropamid
184.	Mefentrifluconazole
185.	Mepiquate Chloride
186.	Meptyldiinocop

187.	Mesosulfuron Methyl
188.	Metaflumizone
189.	Metalaxyl
190.	Metalaxyl-M
191.	Metaldehyde
192.	Metamifop
193.	Metamitron
194.	<i>Metarhizium anisopliae</i>
195.	Methabenzthiazuron
196.	Methomyl
197.	Methoxyfenazide
198.	Methyl Bromide
199.	Methyl Chlorophenoxy Acetic Acid (MCPA)
200.	Metiram
201.	Metofluthrin
202.	Metolachlor
203.	Metrafenone
204.	Metribuzin
205.	Metsulfuron Methyl
206.	Milbemectin
207.	Monocrotophos
208.	Myclobutanil
209.	Novaluron
210.	Nuclear polyhydrosis virus of <i>Helicoverpa armigera</i>
211.	Nuclear polyhydrosis virus of <i>Spodoptera litura</i>
212.	Orthosulfamuron
213.	Oxadiargyl
214.	Oxadiazon
215.	Oxathiapipron
216.	Oxycarboxin
217.	Oxydemeton-Methyl
218.	Oxyfluorfen

219.	Paclobutrazol
220.	Paraquat dichloride
221.	Penconazole
222.	Pencycuron
223.	Pendimethalin
224.	Penflufen*
225.	Penoxsulam
226.	Permethrin
227.	Phenthoate
228.	Phosalone
229.	Picoxystrobin
230.	Pinoxaden
231.	Polyoxin D Zinc salt
232.	Prallethrin
233.	Pretilachlor
234.	Primiphos-methyl
235.	Prochloraz
236.	Profenophos
237.	Prohexadione Calcium
238.	Propamocarb hydrochloride
239.	Propanil
240.	Propaquizafop
241.	Propergite
242.	Propetamphos
243.	Propiconazole
244.	Propineb
245.	Propoxur
246.	<i>Pseudomonas fluorescens</i>
247.	Pymetrozin
248.	Pyraclostrobin
249.	Pyrazosulfuron ethyl
250.	Pyrethrin (pyrethrum)

251.	Pyridaben
252.	Pyridalyl
253.	Pyrifluquinazon
254.	Pyriftalid
255.	Pyriproxyfen
256.	Pyrithiobac sodium
257.	Pyroxasulfon
258.	Quinalphos
259.	Quizalofop ethyl
260.	Quizalofop-P-tefuryl
261.	Saflufenacil
262.	S-bioallethrin
263.	Sodium acifluorfen
264.	Sodium paranitrophenolate
265.	Spinetoram
266.	Spinosad
267.	Spiromesifen
268.	Spirotetramat
269.	Streptomycin
270.	Sulfentrazone
271.	Sulfosulfuron
272.	Sulfoxaflor
273.	Sulphur
274.	Tebuconazole
275.	Tembotrione
276.	Temephos
277.	Tetraconazole
278.	Tetracycline
279.	Tetraniliprole
280.	Thiacloprid
281.	Thifluzamide
282.	Thiobencarb (Benthiocarb)

283.	Thiocyclam Hydrogen oxalate
284.	Thiodicarb
285.	Thiomethoxam
286.	Thiophanate-Methyl
287.	Thiram
288.	Tolfenpyrad
289.	Topramezone
290.	Transfluthrin
291.	Triaccontanol
292.	Triadimefon
293.	Triafamone
294.	Triallate
295.	Triasulfuron
296.	<i>Trichoderma harzianum</i>
297.	<i>Trichoderma viride</i>
298.	Tricyclazole
299.	Trifloxistrobin
300.	Triflumezopyrim
301.	Triflumizole
302.	Trifluralin {The registration, import, manufacture, formulation, transport, sell and its all uses except use in wheat shall prohibited and completely banned vide S.O.3951(E) dated 8th August 2018}
303.	Validamycin
304.	<i>Verticillium lecanii</i>
305.	Zinc Phosphide
306.	Zineb
307.	Ziram



**Annexure I-b**

**LIST OF PESTICIDES WHICH ARE BANNED, REFUSED REGISTRATION AND RESTRICTED IN USE  
(As on 01.07.2022)**

**I. PESTICIDES / FORMULATIONS BANNED IN INDIA**

<b>Pesticides Banned for manufacture, import and use</b>	
1.	Alachlor (Vide S.O. 3951 (E), dated 08.08.2018)
2.	Aldicarb (vide S.O. 682 (E) dated 17 <sup>th</sup> July 2001)
3.	Aldrin
4.	Benzene Hexachloride
5.	Benomyl (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
6.	Calcium Cyanide
7.	Carbaryl (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
8.	Chlorbenzilate (vide S.O. 682 (E) dated 17 <sup>th</sup> July 2001)
9.	Chlordane
10.	Chlorofenvinphos
11.	Copper Acetoarsenite
12.	Diazinon (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
13.	Dibromochloropropane (DBCP) (vide S.O. 569 (E) dated 25 <sup>th</sup> July 1989)
14.	Dichlorovos (Vide S.O. 3951 (E), dated 08.08.2018)
15.	Dieldrin (vide S.O. 682 (E) dated 17 <sup>th</sup> July 2001)
16.	Endosulfron (vide ad-Interim order of the Supreme Court of India in the Writ Petition (Civil) No. 213 of 2011 dated 13 <sup>th</sup> May, 2011 and finally disposed of dated 10 <sup>th</sup> January, 2017)
17.	Endrin
18.	Ethyl Mercury Chloride
19.	Ethyl Parathion
20.	Ethylene Dibromide (EDB) (vide S.O. 682 (E) dated 17 <sup>th</sup> July 2001)
21.	Fenarimol (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
22.	Fenthion (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
23.	Heptachlor

24.	Lindane (Gamma-HCH)
25.	Linuron (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
26.	Maleic Hydrazide (vide S.O. 682 (E) dated 17 <sup>th</sup> July 2001)
27.	Menazon
28.	Methoxy Ethyl Mercury Chloride (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
29.	Methyl Parathion (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
30.	Metoxuron
31.	Nitrofen
32.	Paraquat Dimethyl Sulphate
33.	Pentachloro Nitrobenzene (PCNB) (vide S.O. 569 (E) dated 25 <sup>th</sup> July 1989)
34.	Pentachlorophenol
35.	Phenyl Mercury Acetate
36.	Phorate (Vide S.O. 3951 (E), dated 08.08.2018)
37.	Phosphamidon (Vide S.O. 3951 (E), dated 08.08.2018)
38.	Sodium Cyanide (banned for Insecticidal purpose only vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)*
39.	Sodium Methane Arsonate
40.	Tetradifon
41.	Thiometon (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
42.	Toxaphene (Camphechlor) (vide S.O. 569 (E) dated 25 <sup>th</sup> July 1989)
43.	Triazophos (Vide S.O. 3951 (E), dated 08.08.2018)
44.	Tridemorph (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)
45.	Trichloro acetic acid (TCA) (vide S.O. 682 (E) dated 17 <sup>th</sup> July 2001)
46.	Trichlorfon (Vide S.O. 3951 (E), dated 08.08.2018)
<b>B.</b>	<b>Pesticide formulations banned for import, manufacture and use</b>
	1. Carbofuron 50% SP (vide S.O. 678 (E) dated 17 <sup>th</sup> July 2001)
	2. Methomyl 12.5% L
	3. Methomyl 24% formulation
	4. Phosphamidon 85% SL
	<b>Pesticide / Pesticide formulations banned for use but continued to manufacture forexport</b>
1.	Captafol 80% Powder (vide S.O. 679 (E) dated 17 <sup>th</sup> July 2001)

<b>C.</b>	2.	Dichlorvos (vide S.O. 1196 (E) dated 20 <sup>th</sup> March 2020)
	3.	Nicotin Sulfate (vide S.O. 325 (E) dated 11 <sup>th</sup> May 1992)
	4.	Phorate (vide S.O. 1196 (E) dated 20 <sup>th</sup> March 2020)
	5.	Triazophos (vide S.O. 1196 (E) dated 20 <sup>th</sup> March 2020)
<b>D.</b>	<b>Pesticides Withdrawn</b> <b>(Withdrawal may become inoperative as soon as required complete data as per the guidelines is generated and submitted by the Pesticides Industry to the Government and accepted by the Registration Committee. (S.O 915(E) dated 15<sup>th</sup> Jun,2006)</b>	
	1.	Dalapon
	2.	Ferbam
	3.	Formothion
	4.	Nickel Chloride
	5.	Paradichlorobenzene (PDCB)
	6.	Simazine
	7.	Sirmate (S.O. 2485 (E) dated 24 <sup>th</sup> September 2014)
8.	Warfarin (vide S.O. 915 (E) dated 15 <sup>th</sup> June 2006)	

\* Regulation to be continued in the extant manner for non-insecticidal uses.

## II. PESTICIDES REFUSED REGISTRATION

<b>S. No.</b>	<b>Name of Pesticides</b>
1.	2,4, 5-T
2.	Ammonium Sulphamate
3.	Azinphos Ethyl
4.	Azinphos Methyl
5.	Binapacryl
6.	Calcium Arsenate
7.	Carbophenothion
8.	Chinomethionate (Morestan)
9.	Dicrotophos
10.	EPN

11.	Fentin Acetate
12.	Fentin Hydroxide
13.	Lead Arsenate
14.	Leptophos (Phosvel)
15.	Mephosfolan
16.	Mevinphos (Phosdrin)
17.	Thiodemeton / Disulfoton
18.	Vamidotion

### III. PESTICIDES RESTRICTED FOR USE IN THE COUNTRY

S. No.	Name of Pesticides	Details of Restrictions
1.	Aluminium Phosphide	<p>The Pest Control Operations with Aluminium Phosphide may be undertaken only by Govt./Govt. undertakings / Govt. Organizations / pest control operators under the strict supervision of Govt. Experts or experts whose expertise is approved by the Plant Protection Advisor to Govt. of India except <sup>1</sup>Aluminium Phosphide 15 % 12 g tablet and <sup>2</sup>Aluminum Phosphide 6 % tablet. [RC decision circular F No. 14-11(2)-CIR-II (Vol. II) dated 21-09-1984 and G.S.R. 371(E) dated 20th may 1999]. <sup>1</sup>Decision of 282<sup>nd</sup> RC held on 02-11-2007 and, <sup>2</sup>Decision of 326<sup>th</sup> RC held on 15-02-2012.</p> <p>The production, marketing and use of Aluminium Phosphide tube packs with a capacity of 10 and 20 tablets of 3 g each of Aluminium Phosphide are banned completely. (S.O.677 (E) dated 17<sup>th</sup>July, 2001)</p>
2.	Captafol	<p>The use of Captafol as foliar spray is banned. Captafol shall be used only a seed dresser. (S.O.569 (E) dated 25<sup>th</sup>July, 1989)</p> <p>The manufacture of Captafol 80 % powder for dry seed treatment (DS) is banned for use in the country except manufacture for export. (S.O.679 (E) dated 17<sup>th</sup>July, 2001)</p>

3.	Cypermethrin	Cypermethrin 3 % Smoke Generator is to be used only through Pest Control Operators and not allowed to be used by the General Public. [Order of Hon,ble High Court of Delhi in WP(C) 10052 of 2009 dated 14-07-2009 and LPA-429/2009 dated 08-09-2009]
4.	Dazomet	The use of Dazomet is not permitted on Tea. (S.O.3006 (E) dated 31 <sup>st</sup> Dec, 2008)
5.	Dichloro Diphenyl Trichloroethane (DDT)	The use of DDT for the domestic Public Health Programme is restricted up to 10,000 Metric Tonnes per annum, except in case of any major outbreak of epidemic. M/s Hindustan Insecticides Ltd., the sole manufacturer of DDT in the country may manufacture DDT for export to other countries for use in vector control for public health purpose. The export of DDT to Parties and State non- Parties shall be strictly in accordance with the paragraph 2(b) article 3 of the Stockholm Convention on Persistent Organic Pollutants (POPs). (S.O.295 (E) dated 8 <sup>th</sup> March, 2006)
		Use of DDT in Agriculture is withdrawn. In very special circumstances warranting the use of DDT for plant protection work, the state or central Govt. may purchase it directly from M/s Hindustan Insecticides Ltd. to be used under expert Governmental supervision. (S.O.378 (E) dated 26 <sup>th</sup> May, 1989)
6.	Fenitrothion	The use of Fenitrothion is banned in Agriculture except for locust control in scheduled desert area and public health. (S.O.706 (E) dated 03 <sup>rd</sup> May, 2007)
7.	Methyl Bromide	Methyl Bromide may be used only by Govt./Govt. undertakings/Govt. Organizations / Pest control operators under the strict supervision of Govt. Experts or Experts whose expertise is approved by the Plant Protection Advisor. [G.S.R.371 (E) dated 20 <sup>th</sup> May, 1999 and earlier RC decision]
8.	Monocrotophos	Monocrotophos is banned for use on vegetables. (S.O.1482 (E) dated 10 <sup>th</sup> Oct, 2005)
9.	Trifluralin	(i) The Registration, import, manufacture, formulation, transport, sell and its all uses except use in wheat shall be prohibited and completely banned from 8 <sup>th</sup> August, 2018. (ii) (ii) A cautionary statement has to be incorporated in the label and leaflet that it is toxic to aquatic organism, hence should not be used near water bodies, aquaculture or pisciculture area. (vide S.O 3951(E) dated 8 <sup>th</sup> August, 2018)

**Annexure – II**

**1. Tree species most suitable for different agroclimatic zones of Tamil Nadu**

<b>S. No.</b>	<b>Agro Climatic Zones</b>	<b>Suitable Tree species</b>	<b>Recommended High Yielding Short Rotation (HYSR) clones/ progenies</b>	<b>Districts</b>
1	North Eastern Zone	<i>Tectona grandis</i> (Teak)	MTPTK07 (Syyaburry) MTPTK21 (Nilampur) MTPTK07 (Chandrapur)	Kancheepuram, Tiruvallur, Cuddalore, Vellore, Villupuram Tiruvannamalai and Chennai
		<i>Melia dubia</i> (Malaivembu)	MTP 1, MTP 2, MTP 3	
		<i>Neolamarckia cadamba</i> (Vellai kadambu)	MTP 1	
		<i>Casuarina</i> spp. (Savukku)	MTP 1, MTP 2, CJ 01	
		<i>Pterocarpus santalinus</i> (Red sanders)	TNRS01	
		Eucalyptus spp (Thailamaram)	MTP 1, EC01, EC02	
		<i>Santalum album</i> (Sandal)		
		<i>Dalbergia sissoo</i> (Thothkatti)	MTPDS18	
		<u>Tree Borne oil Seeds</u> <i>Azadirachta indica</i> (Neem)	TNMTP 34, TNMTP 54	
		<i>Pongamia pinnata</i> (Pungan)		
		<i>Madhuca longifolia</i> (Illupai)	FC&RI Clone	
		<i>Jatropha curcas</i> (Jatropha)	CJ5, CJ9, CJ13	
		<u>Fodder Trees</u> <i>Ficus religiosa</i> (Arasamaram)		
		<i>Hibiscus tiliaceus</i> (Malai poovarasu)		
		<i>Terminalia arjuna</i> (Neer maruthu)		
		<i>Sesbania grandiflora</i> (Agathi)		
<i>Inga dulce</i> (Manilla tamarind)				

		<i>Bauhinia variegata</i> (Mantharai)		
		<i>Gliricidia sepium</i>		
		<i>Leucaena leucocephala</i> (Subapul)	LL15	
		<i>Leucaena diversifolia</i>		
		<i>Morus alba</i>	ME 0247, MI0300, MI0029, MI0477	
		<i>Morus indica</i>		
2	North Western Zone	<i>Pterocarpus santalinus</i> (Red sanders)	TNRS01	Dharmapuri, Krishnagiri, Salem and Namakkal (Part)
		<i>Tectona grandis</i> (Teak)	MTPTK07 (Syyaburry) MTPTK21 (Nilampur) MTPTK07 (Chandrapur)	
		<i>Melia dubia</i> (Malaivembu)	MTP 1, MTP 2, MTP 3	
		<i>Santalum album</i> (Sandal)		
		<i>Ailanthus excelsa</i> (Perumaram)		
		<i>Albizia lebeck</i> (Vagai)		
		<i>Tamarindus indica</i> (Tamarind)	Hasanur and Mullampatty selection	
		Tree Borne oil Seeds <i>Azadirachta indica</i> (Neem)	TNMTP 34, TNMTP 54	
		<i>Pongamia pinnata</i> (Pungan)		
		<i>Madhuca longifolia</i> (Illupai)		
		<i>Jatropha curcas</i> (Kattamanaku)	CJ5, CJ9, CJ13	
		<b>Fodder Trees</b>		
		<i>Terminalia arjuna</i> (Neer maruthu)		
		<i>Sesbania grandiflora</i> (Agathi)		
		<i>Inga dulce</i> (Manilla tamarind)		
		<i>Leucaena leucocephala</i> (Subapul)	LL15	

		<i>Morus alba</i> (Mulberry)		
		<i>Morus indica</i>		
3	Western Zone	<i>Dalbergia sissoo</i> (Thothakatti)	MTPDS18	Erode, Coimbatore, Tiruppur, Theni, Karur (part), Namakkal (part), Dindigul, Perambalur and Ariyalur (part)
		<i>Swietenia macrophylla</i> (Peru elai Mahogani)	FCRISM20	
		<i>Tectona grandis</i> (Teak)	MTPTK07 (Syyaburry) MTPTK21 (Nilampur) MTPTK07 (Chandrapur)	
		<i>Santalum album</i> (Sandal)		
		<i>Melia dubia</i> (Malavembu)	MTP 1, MTP 2, MTP 3	
		<i>Dalbergia latifolia</i> (Rose wood)		
		<i>Toona ciliata</i> (Santhana vembu)	TC02	
		<i>Ceiba pentandra</i> (Kapok)	MTPCP 18, ICP-01	
		<i>Sterculia alata</i> (Butha coconut tree)		
		<i>Eucalyptus urograndis</i>	EG01, EG02, EG03	
		<i>Neolamarckia cadamba</i>	MTP1	
		<i>Albizia lebbek</i>		
		<i>Ailanthus excelsa</i> (Peru maram)		
		<i>Khaya senegalensis</i> (African teak)	KS 01	
		Mulberry		
		<b>Tree Borne oil Seeds</b>		
		<i>Azadirachta indica</i> (Neem)	TNMTP 34, TNMTP 54	
		<i>Pongamia pinnata</i> (Pungan)		
		<i>Madhuca longifolia</i> (Illupai)		
		<i>Jatropha curcas</i> (Jatropha)	CJ5, CJ9, CJ13	



		<b>Fodder Trees</b>			
		<i>Ficus religiosa</i> (Arasa maram)			
		<i>Hibiscus tiliaceus</i> (Malai poovarasu)			
		<i>Terminalia arjuna</i> (Neer maruthu)			
		<i>Sesbania grandiflora</i> (Agathi)			
		<i>Moringa oleifera</i> (Murungai)			
		<i>Inga dulce</i> (Kodukkapuli)			
		<i>Bauhinia variegata</i> (Mantharai)			
		<i>Gliricidia sepium</i> (seema vagai)			
		<i>Leucaena leucocephala</i> (Subapul)			
		<i>Leucaena diversifolia</i>			
		<i>Morus alba</i> (Mulberry)			
4	Cauvery Delta Zone	<i>Bambusa vulgaris</i> (Green Bamboo)		Thanjavur, Nagapattinam, Tiruvarur, Trichy and parts of - Karur, Ariyalur, Pudukkottai and Cuddalore	
		<i>Bambusa balcooa</i> (Beema bamboo)			
		<i>Bambusa bambos</i> (Thorny bamboo)			
		<i>Tectona grandis</i> (Teak)	MTPTK07 (Syyaburry) MTPTK21(Nilampur) (Chandrapur) MTPDS18		MTPTK07
		<i>Dalbergia sisoo</i> (Thothkatti)			
		<i>Terminalia tomentosa</i> (Karumaruthu)			
		<i>Ailanthus excels</i> (Peru maram)			
		<i>Casuarina</i>	MTP 1, MTP 2, CJ01		
		<i>Eucalyptus</i>	MTP1		
		<i>Pterocarpus marsupium</i> (Vengai)			
		<i>Lannea coromandalica</i> (Uthia maram)			

		<i>Gmelina arborea</i> (Kumil)	FCRIGA 08	
5	Southern Zone	<i>Gmelina arborea</i>	FCRIGA 08	Madurai, Sivagangai, Ramanathapuram, Virudhunagar, Tirunelveli and Thoothukudi
		<i>Casuarina spp</i>	MTP1, MTP2	
		<i>Tamarindus indica,</i>		
		<i>Eucalyptus</i>	MTP1	
		<i>Ailanthus excelsa</i>		
		<i>Ceiba pentandra</i>	MTPCP 18, ICP-01	
		<i>Inga dulce</i>		
		<i>Albizia lebeck</i>		
		<b>Tree Borne oil Seeds</b>		
		<i>Azadirachta indica</i> (Neem)	TNMTP34, TNMTP54	
		<i>Pongamia pinnata</i> (Pungan)		
		<i>Madhuca longifolia</i> (Illupai)		
		<i>Jatropha curcas</i> (Jatropha)		
		<b>Fodder Trees</b>		
		<i>Ficus religiosa</i> (Arasamaram)		
		<i>Terminalia arjuna</i> (Neer maruthu)		
		<i>Sesbania grandiflora</i> (Agathi)		
		<i>Moringa oleifera</i> (Murungai)		
		<i>Inga dulce</i> (Manilla tamarind)		
		<i>Bauhinia variegata</i> (Mantharai)		
<i>Gliricidia sepium</i>				
<i>Leucaena leucocephala</i> (Subabul)				
<i>Leucaena diversifolia</i>				
<i>Morus alba</i> (Mulberry)				
6	High Rainfall Zone	<i>Albizia falcataria</i> (White vagai)		Kanyakumari
		<i>Tectona grandis</i>	MTPTK07 (Syyaburry) MTPTK21(Nilampur) MTPTK07 (Chandrapur)	
		<i>Melia dubia</i> (Malaivembu)	MTP1, MTP2, MTP3	

		<i>Artocarpus heterophyllus</i> (Jack)		
		<i>Toona cilita</i>	TC 02	
		<i>Callophyllum inophyllum</i> (Punnai)		
		<i>Mangifera indica</i> (Mango)		
		<i>Chukarasia tabularis</i>		
		<i>Acrocarpus fraxinifolius</i>		

### 86<sup>th</sup> SWC-Queries raised by Department Officials

<b>CROP IMPROVEMENT</b>			
<b>RICE</b>			
<b>S. No.</b>	<b>Important Problems faced by Extension officials</b>	<b>Justification</b>	<b>Replies</b>
1.	Alternate variety may be developed for IR 20 with medium duration	New variety as an alternate for IR 20 with medium duration and suitable for both idly and boiled rice is required the needs of farmers of Lower Bhavani Project area of Kangeyam & Vellokoil block.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>A promising new two line hybrid TNTRH 55 is under OFT/ART. It is similar in grain type to IR 20.</li> <li>One medium duration culture AD 12132 with a grain type of IR 20 will be proposed for release during 2022-23.</li> </ul>
2.	Variety similar to CO 51 with lodging resistance may be developed.  Short duration fine grain varieties with qualities resembling ASD 16, TPS 5, ADT 37, ADT 43 and ADT 45 may be evolved.	Farmers preference for cultivation of CO 51 in <i>sornavari</i> season is reducing year by year due to lodging during harvest time even though it is a good yielding variety.  Direct procurement centres are expecting fine grain varieties.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>Non - lodging rice varieties <i>viz.</i>, CO 54, CO 55 and ADT 57 can be recommended.</li> <li>One early maturing short bold and non-lodging culture AD 17152 similar to ASD 16 and TPS 5 will be released during 2022-23.</li> <li>New rice varieties <i>viz.</i>, CO 51, CO 54, CO 55 ADT 53, ADT 56 and ADT 57 can be recommended in place of ADT 43 and ADT 45</li> </ul>
3.	Purified true to type traditional paddy seeds ( <i>Poongkar, Kullakar, Aathur Kitchili samba, Karuppu Kavuni etc</i> ) may be made available	To overcome varietal admixtures in traditional paddy seeds.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>Purification and improvement are made in <i>karuppu kavuni, mappillai samba, karungkuruvai</i> and <i>Thooyamalli</i>. These lines are in advanced stage of evaluation.</li> <li>Improved versions of <i>Kavuni</i> developed; MLT, ART and OFT results revealed the superior performance of improved versions (&gt;50% yield advantage in addition to photo-insensitivity)</li> </ul>
4.	Flood Tolerant, Non lodging Fine Variety may be developed	TNAU has developed two submergence tolerant varieties <i>viz.</i> , CR1009 Sub 1 and CO 43 Sub1. Since being a coarse variety, many farmers are not preferring it. So flood tolerant fine variety may be developed.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>Fine grain varieties <i>viz.</i>, ADT 51, ADT 52, CO 51, ADT 39 were crossed with Sub 1 donors and their progenies are under early segregating generations.</li> <li>Submergence tolerant version of CO 51 and White Ponni are at advanced stage of development/evaluation</li> </ul>

5.	Early dormancy variety like ADT 39 (Culture Ponni) may be developed with water logging resistance	At the time of harvesting, ADT 39 will not germinate even after lodging due to early dormancy but the variety is more than 10 years old.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>New rice variety ADT 51 has been released with a dormancy period of one month.</li> </ul>
6.	Sheath Blight resistant varieties may be developed	Sheath Blight caused by <i>Rhizoctonia solani</i> soil borne fungus which was reduced paddy yield from 15-20 percentage, when favorable condition prevalence to the fungus which may cause heavy yield loss to paddy cultivation areas. Hence a new high yielding and Sheath blight resistant variety to be evolved for meeting out the paddy production.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>Work has been initiated to identify sheath blight resistant donors. <i>Karuppu kavuni</i> has been identified with moderate tolerance to sheath blight resistance.</li> <li>Genome editing work was also started to develop ASD 16 with sheath blight resistance.</li> </ul>
7.	Paddy variety suitable for hill tract of Yercaud, Kalvarayan hills may be developed	Variety similar to <i>Puzhuthikar</i> local variety is being cultivated in 500 ha of Yercaud.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>The variety CO 50 is highly suitable for hill tract. It was tested at Nilgris district. The yield potential was more than seven tonnes/ha</li> </ul>
8.	Alternate variety may be developed for MTU - 1262 medium duration	Area coverage of Andhra varieties which are more than 60% of the total area.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>The newly released fine grain rice varieties with medium duration viz., CO 52, ADT 54, can be recommended. New fine grain cultures viz., CB 12132 &amp; AD12132 will be proposed for release to provide more number of choice varieties for samba season.</li> </ul>
9.	More red rice observed in CO 51. New breeder seed may be supplied to avoid red rice issue	-	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>New breeder seed source was developed and supplied.</li> </ul>
10.	Currently there is a demand for ADT 54 Paddy variety. For large scale production supply of Breeder seeds to be ensured	-	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>Production of breeder seeds to the tune of seven tonnes is planned during the year 2022-23 for supply during 2023-24.</li> </ul>

11.	High yielding medium duration varieties with yield potential of more than 3000 kg per acre needs to be developed which would be highly remunerative to the farmers	-	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>One medium duration culture CB12152 is under advanced stage of evaluation. This medium slender grain type culture has yield potential of more than 4000 kg/ac.</li> </ul>
<b>MAIZE</b>			
1.	Maize hybrids may be developed on par with the ruling hybrids like NK 7328, NK 6540 and NK 6668	Suitable Maize hybrids may be evolved that competent enough with the private ones are needed.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>A new high yielding hybrid CMH 12-686 with medium maturity has been developed and identified for release in the year 2022-23 through SVRC.</li> <li>It has recorded an average yield of 7760 kg/ha in <i>Kharif</i> 2021 OFT and ART trials which are 8.60 % yield increase of over NK 6668.</li> <li>Besides, it performed well over private hybrids namely NK 6240 and P3401 with more than 10 % yield increase in OFT trials conducted in <i>Kharif</i> 2019-21 and <i>Kharif</i> 2021 ART trial.</li> </ul>
2.	Drought resistant high yielding variety may be developed	Improper Grain Filling in Rainfed Maize. To evolve new hybrids may be evolved under long dry spell situation to mitigate the mid-season drought.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>A new hybrid from Coimbatore centre CMH 15-005 is a drought tolerant hybrid and recorded yield of 8000 kg which is 12.9 % over NK 6240 and 10.2 % over P3502 in OFT under rainfed condition during <i>kharif</i> 2021.</li> <li>One more hybrid from MRS Vagarai, VaMH 12013 recorded 6351 kg/ha in OFT trial 2019-20 under rainfed condition which is 16.7 increase over NK 6240.</li> </ul>
3.	Improved high yielding variety with nutritional quality of sweet corn may be developed	Sweet corn is more preferable in all the districts.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>A promising sweet corn hybrid CSCH 17021 is nominated for evaluation in MLT during 2022. Further, other hybrids like CSCH 16034 and CSCH 19010 are under different stages of evaluation.</li> <li>These test hybrids suit to <i>kharif</i> and <i>rabi</i> seasons. The green cob yield is 15-17 tonnes/ha, which is slightly lesser than Private sweet corn hybrid 'Misthi'. However, intensive hybrid breeding work is in progress.</li> </ul>

<b>CUMBU</b>			
1.	Hybrid cumbu may be developed	Development of TNAU hybrid is on par with the private hybrid seeds in the market.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>• Pearl millet pre-release hybrid TNBH 1619 has recorded an average yield of 3072 kg/ha which is 12.72% increase over hybrid CO 9 and 5.0 per cent over private hybrid 86M38.</li> <li>• The new hybrid possesses bold seeds with semi compact ear head and more than 59 ppm Fe and 37 ppm Zn. It is resistant to downy mildew and rust. It will be proposed for release during 2023</li> </ul>
2.	High yielding dual purpose variety with Ergot and Head mold resistance may be developed	During Ear head development, maturity stage diseases like Ergot, head mold are affecting cumbu, which reduces the yield drastically. Hence, dual purpose, high yielding disease resistant variety is needed.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>• A high yielding medium duration variety CO 10 possessing compact ear head and non-lodging type was released from TNAU. The composite variety had higher grain yield and it is tolerant to downy mildew.</li> <li>• Efforts are being made to develop variety tolerant to ergot and head mold diseases. Screening is under progress. Heavy rain during flowering and heading stage favours ergot and head mould disease, respectively. Both the fungal diseases can be managed with chemical intervention.</li> </ul>
<b>SORGHUM</b>			
1.	New variety on par with <i>Yellow cholam</i> ( <i>Periyamanjal cholam</i> , <i>Thalaivirichan cholam</i> ) may be developed	<i>Periyamanjal cholam</i> , <i>Yellow cholam</i> is drought tolerant and dual purpose variety. Yield is also higher. So alternate varieties are required.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>• Research work has been taken up at Department of Millets, Coimbatore and crosses were made with <i>periyamanjal cholam</i> to develop genotypes similar to <i>periyamanjal cholam</i> with photo insensitive types suitable for all seasons. Similarly, development of cultures with characteristic of <i>Thalaivirichan cholam</i> was also taken up at Agricultural Research Station, Virinjipuram and breeding work is under progress.</li> </ul>
2.	Promising competitive notified varieties / hybrids for millet and oil seed crops are needed	-	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>• The promising high yielding hybrids <i>viz.</i>, CO 6 and COH (M) 8 in maize; varieties like CO 32 and K12 in sorghum and CO 10 in</li> </ul>

			pearl millet were released for general cultivation in Tamil Nadu and all of them have been notified and it is in the seed chain. Regular breeder seed and other classes of seeds are being produced and distributed to the intenders
<b>PULSES</b>			
1.	Development of Yellow mosaic virus resistant variety which is suitable for summer and <i>kharif</i> season	Highly susceptible to yellow mosaic virus. Even though tolerant varieties like Vamban 8, 9 and 10 are released also susceptible to yellow mosaic virus. Hence highly resistant varieties are needed.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>Seeding interval may be useful to escape the MYMV symptoms. During <i>Kharif</i> season, in first fortnight of June sowing, the crop is free from MYMV.</li> <li>The high yielding resistant varieties, VBN10, VBN11 are highly suitable for summer and <i>Kharif</i> season.</li> </ul>
2.	YMV resistant high yielding pulses varieties to be developed		<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>New MYMV resistant cultures in blackgram and green gram are under evaluation in MLT/ART.</li> </ul>
<b>RED GRAM</b>			
1.	High yielding short duration variety suitable for <i>Rabi</i> season to be evolved	New and high yielding short duration, drought resistant variety suitable for <i>Rabi</i> season for North western Districts to be developed.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>One short duration high yielding genotype, CRG 16001 is being evaluated under ART / OFT</li> </ul>
2.	Long duration (perennial) Red gram variety may be evolved	BSR 1 is the only existing perennial variety which is more than 10 year variety.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>The genetic purification of BSR 1 is being undertaken at ARS, Bavanisagar. Breeding efforts are underway to develop perennial types</li> </ul>
<b>HORSEGRAM</b>			
1.	New high yielding variety may be developed	Horse gram Paiyur 2 is the only variety available for cultivation in Vellore, Dharmapuri and Krishnagiri.	<b>Director (CPBG)</b> <ul style="list-style-type: none"> <li>One promising entry PY R21-07 is being evaluated under MLT for further evaluation which could replace Paiyur 2</li> </ul>



<b>COWPEA</b>			
1.	High yielding and disease resistant variety alternate to CO (cp) 7	VBN 3 is suitable for <i>Rabi</i> season. A new variety with high yielding potential may be evolved to replace the CO (cp) 7 for cultivation during <i>Kharif</i> season.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>A short duration, high yielding, disease resistant cowpea culture, VCP 14-001 is suitable for <i>Kharif</i> and <i>Rabi</i> season. It was evaluated in ART and results are being analyzed for possible release during ensuing years, to replace CO (Cp) 7</li> </ul>
<b>BENGALGRAM</b>			
1.	Development of suitable alternate variety for NBeG 47, NBeG 49 may be evolved.	NBeG 47 & NBeG 49 are a high yielding varieties preferred by the farmers. Suitable alternate variety for NBeG 47, NBeG 49 is required.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>One entry ICCV 181674 is being evaluated under ART from 2021 and would be proposed for release after obtaining the ART results</li> </ul>
<b>OIL SEEDS - GROUNDNUT</b>			
1.	Bold variety on par with GG 7, GG 32 may be developed	Bold Groundnut varieties suitable for table purpose shall be evolved.	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>New bold seeded bunch varieties <i>viz.</i>, VRI 8 and VRI 10 may be recommended. Groundnut variety VRI 10 is a Bold kernel variety and matures in 90-95 days and suitable for cultivation in <i>Kharif</i> and <i>Rabi</i> seasons.</li> <li>It registered an overall mean dry pod yield of 2535 kg/ha during <i>Kharif</i> and 2448 kg/ha during <i>Rabi</i> with oil content of 46-48%. The groundnut variety VRI 8 is a medium bold groundnut variety which matures in 105-110 days and suitable for cultivation in <i>Kharif</i> and <i>Rabi</i> seasons.</li> <li>VRI 8 registered an overall mean dry pod yield of 2700 kg/ha with oil content of 49%.</li> </ul>
2.	Evolving high yielding variety to replace ruling age old TMV-7	TMV-7 is most preferred for its oil content, longevity and uniform two seeded pod with rose colour kernel. But this is an age old variety. Though the newly released TMV 13 is more yield than TMV 7, its longevity is very poor and it is very difficult to provide	<p><b>Director (CPBG)</b></p> <p>New promising high yielding bunch varieties <i>viz.</i>, VRI 9 and BSR 2 may be recommended.</p> <ul style="list-style-type: none"> <li><b>Groundnut VRI 9:</b> It matures in 110-115 days and suitable for cultivation in <i>Kharif</i> and <i>Rabi</i> seasons. It registered an overall mean dry pod yield of 2526 kg/ha during <i>Kharif</i> and</li> </ul>

		<p>enough seed source for further multiplication.</p> <p>Hence, a highly suitable groundnut variety having better performance than TMV 7 may be evolved to replace it.</p>	<p>2921 kg/ha during Rabi with oil content of 49-50%.</p> <ul style="list-style-type: none"> <li>• <b>Groundnut BSR 2:</b> It matures in 105-110 days and suitable for cultivation in <i>Kharif</i> and <i>Rabi</i> seasons. BSR 2 registered an overall mean dry pod yield of 2222 kg/ha during <i>Kharif</i> and 2360 kg/ha during <i>Rabi</i> with oil content of 47%.</li> </ul>
<b>GINGELLY</b>			
1.	Varieties resistant to <i>phyllody</i> and high yielding may be developed	Suitable varieties for <i>Masi Pattam</i> (Feb-Mar) with resistant to <i>Phyllody</i> .	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>• New high yielding varieties VRI 3 and VRI 4 may be recommended. Both the varieties are moderately resistant to <i>Phyllody</i> and <i>Macrophomina</i> root rot.</li> <li>• VRI 3 is a white seeded variety which recorded seed yield of 995 kg/ha during <i>Rabi</i> and 1055 kg/ha during Summer with oil content of 51%.</li> <li>• Brown seeded VRI 4 sesame variety recorded average seed yield of 957 kg/ha during <i>Rabi</i>/Summer with oil content of 48%.</li> </ul>
<b>COTTON</b>			
1.	New varieties may be developed for irrigated condition	Existing Bt varieties CICR 23 and 25 are suitable for rainfed condition only. The suitability of the same in irrigated condition may be studied. Similar technology may be adopted to develop improved varieties of CO 14, CO 17 and SVPR 6	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>• Seeds of cotton variety CICR 23 Bt were received from CICR, Regional Station, Coimbatore.</li> <li>• Study of suitability of this variety under irrigated conditions is in progress at Department of Cotton, Coimbatore</li> </ul>
2.	Extra Long Staple Cotton variety with sucking pest resistance may be developed.	ELS Cotton seeds are available in varieties and in the form of Non-BT, with Fuzzy seeds. So farmers are not interested to cultivate Non Bt ELS	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>• Extra long staple cotton variety CO 14 was released during 2016 from Department of Cotton, Coimbatore.</li> <li>• Its duration is 150 days and suitable for winter irrigated tracts of Tamil Nadu <i>viz.</i>, Coimbatore, Erode, Salem, Dharmapuri, Namakkal, Dindigul and Theni. It recorded UHML of 35.00 mm and 27.7 g/tex of bundle strength and it is moderately resistant to leafhopper.</li> </ul>

3.	High density planting may be developed for rainfed condition	Since present method is available only for irrigated condition	<p><b>Director (CPBG)</b></p> <ul style="list-style-type: none"> <li>• Cotton compact culture TVH 002 suitable for high density planting system under rainfed conditions is under ART testing. It matures in 120-130 days and recorded an average seed cotton yield of 1138kg/ha (17.6 per cent increase over CO 15) under rainfed condition and 1508kg/ha (31.0 &amp; 32.0 per cent increase over CO 15 &amp; CO 17) under rice fallow condition. It comes under the long staple fibre length category (30.5 mm) with fibre strength of 28.2 g/tex</li> </ul>
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**SUGARCANE**

1.	High yielding varieties to replace Co 86032 with high sugar recovery need to be evolved.	Co 86032 is a ruling variety with high sugar recovery but susceptible to pest and disease. So similar variety with tolerant to pest and disease may be developed.	<p><b>Director (CPBG)</b></p> <p>Two superior varieties of sugarcane are released recently.</p> <ul style="list-style-type: none"> <li>• <b>CoC 13339</b> was released during 2020 which is a general cross derivative of Co 86032. It is a mid-late maturing (300 - 360 days) cane with yield of 141.84 t/ha. Its CCS is 12.86 % (equivalent to Co 86032). It is a self de-trashing cane and is suitable for machine harvesting. It is resistant to smut and red rot and is highly suitable for clay soils. Now the clone is gradually replacing the predominant varieties in Tamil Nadu.</li> <li>• <b>CoG 7</b> was released in 2022. Its parentage is 89 V74 GC and duration is 300 - 330 days. It is a early season (December-January) variety with yield potential of 157.5 t/ha in normal soil and 138.84 t/ha in salt affected soils. Its CCS is 13.03 %. It is suitable for Vellore, Thirupathur &amp; Ranipet. It has high juice purity (90%), jaggery recovery (10.92%) and performs better under salt affected soils. Moderately resistant to red rot</li> </ul>
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**CROP MANAGEMENT**

**PADDY**

<b>S. No.</b>	<b>Important Problems faced by Extension officials</b>	<b>Justification</b>	<b>Replies</b>
1.	In Kadayam block of Tenkasi yellowing of leaves in large areas was noticed. Potassium deficiency was identified. Foliar application and split application of K was recommended.	After coleus ( <i>Siru kizhangu</i> ) cultivation, <i>Kar</i> paddy crop (CR 1009) was affected with Potassium deficiency. Many farmers are not satisfied with the Technology. Some farmers have complained that even after applying K, the symptoms could not be controlled.	<p><b>Director (NRM)</b></p> <ul style="list-style-type: none"> <li>• During 2021-22, yellowing in paddy was reported from Kadayam block of Tenkasi district</li> <li>• The soil samples collected from Kadayam block (3 Numbers) was found to be acidic in reaction (5.20, 6.17 and 5.56) and EC was within the safer limit (&lt;1 dS/m) (0.12, 0.08 and 0.03 dS/m). The available Nitrogen (234, 259 and 250 kg/ha); available Phosphorus (15, 19 and 16 kg/ha) and available Potassium (50,110 and 102 kg/ha) were found to be low. The DTPA- Zn (0.55, 0.80 and 0.51 mg /kg) was found to be below the critical limit for deficiency.</li> <li>• The package of foliar spray of 1% Urea + 1% KCl + 0.5 % ZnSO4 + 0.5 % MgSO4 + 0.5 % MnSO4 and thereafter 15 days of first spray was found to mitigate the yellowing symptom. The experiment was conducted at Rice Research Station, Ambasamudram during 2021-22.</li> </ul>
2.	Parasitic weed - <i>Cuscuta</i> -integrated weed management practices may be suggested	In delta blocks of Cuddalore district, <i>Cuscuta</i> has become a major weed in rice fallow pulses	<p><b>Director (CM)</b></p> <ul style="list-style-type: none"> <li>• <i>Cuscuta</i> is a obligate parasite and cannot live without a host plant</li> <li>• Crop seeds free from weed seeds.</li> <li>• Machinery and animals should not be allowed in infested fields</li> <li>• Hand pulling and destruction of <i>Cuscuta</i></li> <li>• Crop rotation avoiding host plants</li> <li>• <i>Cuscuta</i> control can be extended by delaying irrigation</li> <li>• Contract herbicide such as paragnat and Diquat and translocated herbicides such as Glyphosate will kill <i>Cuscuta</i> effectively under non cropped situation</li> </ul>
3.	Recommendation for foliar spray of water soluble fertilizer to be evolved.	Availability of water soluble fertilizer and usage is increased. Farmer observed good growth and better yield	<p><b>Director (NRM)</b></p> <ul style="list-style-type: none"> <li>• Foliar nutrition of water soluble fertilizer (19:19:19) @ 2% is recommended for adoption.</li> </ul>

**MAIZE**

1.	Standardization of application dosage for Nano urea in different crop stages along with its compatibility with pesticide chemicals.	Research studies need to evaluate the Nano urea dosage, application at different crop stages and its compatibility with pesticide chemicals.	<b>Director (NRM)</b> <ul style="list-style-type: none"><li>• The IFFCO Nano Urea dose was standardized for maize for the past three years based on the field experiments conducted both in TNAU farms in Coimbatore and Agricultural Research Station (ARS), Bhavanisagar.</li><li>• The data have shown that foliar spray of liquid Nano Urea @ 500 ml per acre (dissolved in 125 litres of water) sprayed at 20 and 40 days after sowing. These two sprays are found equivalent to one top dressing of conventional urea (25% of the total N dose recommended for maize).</li><li>• Based on the data of TNAU and other ICAR &amp; SAUs it is revealed that the Nano Urea is compatible with crop boosters or any bioformulations and not with pesticides. Therefore, mixing of nano urea with any chemical pesticides is not recommended.</li></ul>
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<b>CROP PROTECTION</b>			
<b>S. No.</b>	<b>Important Problems faced by Extension officials</b>	<b>Justification</b>	<b>Replies</b>
<b>PADDY</b>			
1.	Suitable measures may be suggested for Gall midge infestation in paddy.	Gall midge infestation is noticed in Delta districts	<p><b>Director (CPPS)</b></p> <p>In rice belts where gall midge outbreak often occurs:</p> <p><b>Nursery:</b></p> <ul style="list-style-type: none"> <li>• Application of Fipronil 0.3 G granules @ 1.3- 2.0 kg/20 cents 5 days before pulling of seedlings for transplanting</li> <li>• Apply or Spray any one of the following insecticides per ha on 10-25 DAT based on the appearance of silver shoot symptom. Fipronil 5% SC @ 1000-1500 g; Fipronil 0.3% GR @ 16.67 - 25 kg; Thiamethoxam 25% WG @ 100 g; Chlorantraniliprole 0.4 G @ 10 kg</li> <li>• When natural parasitisation of <i>Platygaster oryzae</i> (black maggot visible through silver shoot in sunlight) is noticed avoid spraying pesticides instead apply granules in soil.</li> </ul>
<b>MAIZE</b>			
1.	New Innovative Management technologies for control of White grub and Fall Army Worm (FAW).	IPM technologies to control FAW are in need of the farmers at this juncture to save the maize growing farmers with the usage of drones for spraying.	<p><b>Director (CPPS)</b></p> <p>IPM technologies for the FAW management developed as part of Government of Tamil Nadu Sponsored Fall Armyworm Management project.</p> <p>The components of the IPM are</p> <ul style="list-style-type: none"> <li>• Application of neem cake @ 250 kg/ha at the time of last ploughing to increase the plant and soil health.</li> <li>• Seed treatment with Cyantraniliprole 19.8% + thiamethoxam 19.8% FS @ 4 ml/kg of seed.</li> <li>• Border cropping with cowpea or gingelly or redgram or sunflower in garden land conditions and fodder sorghum in dry land conditions @ three rows of selected crop.</li> </ul>

			<ul style="list-style-type: none"> <li>Monitoring of FAW adults using pheromone traps @ 12/ha. Window based application of insecticides as follows:</li> </ul> <p><b>Early whorl stage (15 – 20 DAE)</b></p> <ul style="list-style-type: none"> <li>Chlorantraniliprole 18.5 SC @ 0.4 ml/ lit (or) Flubendiamide 480 SC @ 0.5 ml/lit at early stage (15 - 20 DAE) followed by <i>Azadirachtin</i> 1500 ppm @ 5 ml/lit on need basis.</li> </ul> <p><b>Late whorl stages (35-40 DAE)</b></p> <ul style="list-style-type: none"> <li><i>Metarhizium anisopliae</i> (TNAU-MA-GDU isolate) @ 2.5 kg/ha (1.6 x 10<sup>11</sup> spores / ml) at 35-40 DAE</li> <li>Emamectin benzoate 5% SG @ 0.4 g/lit or Novaluron 10% EC @ 1.5 ml /lit or Spinetoram 11.7% SC @ 0.5 ml/lit</li> </ul> <p><b>Tasseling and cob formation stage</b> (only if required)</p> <ul style="list-style-type: none"> <li>Spinetoram 11.7% SC @ 0.5 ml/lit (or) Emamectin benzoate 5% SG @ 0.4 g/lit (which was not sprayed at late whorl stage).</li> <li>Based on the multilocation field experiments, drone spraying has been standardized. The recommended dose of active ingredient of insecticide per acre has to be applied without any deviation.</li> </ul>
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**COCONUT**

1.	Need of Alternate Pesticide for Monochrotophos in root feeding for the management of Black Headed Caterpillar (BHC)	Development of Alternate Pesticide for Monochrotophos in root feeding for the management of Black Headed Caterpillar (BHC).	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Pesticide is not recommended in coconut ecosystem in general to conserve the natural enemies.</li> </ul>
2.	Suitable remedial measures for bud rot disease may be recommended	Suitable remedial measures for bud rot disease may be recommended	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Infected tissues from the crown region should be removed and protected with Bordeaux paste.</li> <li>Two sprays with 1% Bordeaux mixture (or) Copper oxychloride 50%WP @ 0.25% on crown region, one as pre-monsoon spray and second after the onset of monsoon.</li> </ul>

3.	For control of Rugose Spiralling Whitefly (RSW) <i>Chrysoperla carnea</i> is being distributed to farmers, Chemical method of control may also be evolved.	The major bottleneck is during transit hatching of majority of eggs occur. Hence suitable alternates like pathogenic fungus <i>Isaria fumosorosea</i> which can be transported easily can be developed against Rugose Spiralling Whitefly (RSW) in coconut.	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>• The entomopathogenic pathogen, <i>Isaria fumosorosea</i> is found not effective against coconut RSW. Now <i>Apertochrysa astur</i> a potential predator identified in the Department of Agricultural Entomology and mass multiplied and distributed to the coconut farmers.</li> <li>• The recommended rate is 1000 eggs/ha</li> </ul>
4.	Suitable remedial measures and identification techniques for Kerala root wilt may be recommended	Finding out of an easy and decisive method of identification of Kerala wilt disease. Symptoms of Kerala root wilt disease coincides with symptoms of Micro Nutrient deficiency and becomes difficult to confirm.	<p><b>Director (CPPS)</b></p> <p><b>Diagnostic symptoms</b></p> <ul style="list-style-type: none"> <li>• Flaccidity- downward curling (ribbing) of leaves.</li> <li>• Yellowing and necrosis of leaves from margin.</li> <li>• Leaf rotting from tip.</li> <li>• In advanced stage, rotting of crown.</li> </ul> <p><b>Root wilt management</b></p> <ul style="list-style-type: none"> <li>• Provision of proper drainage facilities</li> <li>• Eradication of severely diseased palms.</li> <li>• Application of 50 kg farm yard manure, 5 kg neem cake; 1.3 kg urea, 2 kg super phosphate and 3.5 kg of muriate of potash per tree per year in two equal splits at six month intervals.</li> <li>• Growing of green manure crop (legumes) around the coconut trees and ploughing <i>in situ</i>.</li> <li>• Soil application of 100 g <i>Trichoderma asperellum</i> and 100 g <i>Bacillus subtilis</i> by mixing with 5 kg farm yard manure per tree at three month intervals.</li> <li>• Soil application of 100 g <i>Azospirillum</i>, 100 g <i>Phospho bacteria</i> and 50 g VAM fungus per tree by mixing with 5 kg farm yard manure at six month intervals (yearly 2 times).</li> <li>• Root feeding of TNAU coconut tonic @ 40 ml per tree mixed with 160 ml of water at six month intervals (yearly two times).</li> <li>• Pour hexaconazole 5% EC (2.0 ml + 300 ml water)</li> </ul>



			<p>suspension at the crown region at 45 day intervals for managing leaf rot.</p> <ul style="list-style-type: none"> <li>Apply mass multiplied 'TNAU' - Cococon around root zone @ 2 litres per tree mixed with 8 litres of water at 3 months intervals.</li> </ul>
5.	Multiplication technology for Bethylid, Braconid and Ichneumonid may be given	Release the larval (Bethylid, Braconid and Ichneumonid) and pupal (Eulophid) on (chalcid) parasitoids and predators effectively controls the damage	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Standard multiplication technologies are available for three Parasitoids. The parasitoids are multiplied in parasite breeding centres of Dept. of Agriculture, Tamil Nadu.</li> </ul>
<b>COTTON</b>			
1.	Bio control measures like pheromone trap, CREMIT - [Controlled Release of Mating Interruption] product may be recommended for Pink Boll worm	Pink boll worm is emerging as a major pest for cotton. Hence cost effective Biocontrol measures may be recommended	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Use pheromone traps (Pectino lure) to monitor the adult moth activity @ 12 / ha</li> <li>Inundative release of egg parasitoid <i>Trichogrammatoidea bactrae</i> @ 1,50,000 / ha at 15 days interval 3 times from 45 days after sowing coinciding with the incidence of the pest.</li> </ul>
<b>SUGARCANE</b>			
1.	Mealy bug pest and pokka boeng fungal disease management	Preventing measures to control the pest in early stage or Resistant Variety	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Sett treatment with carbendazim 50 WP @ 2gm/lit. for 30 minutes and imidacloprid 70 WS @1.5 ml/lit. for 5 minutes before planting.</li> <li>Monitor ant movement in the border rows at regular intervals.</li> <li>As a prophylactic measure, in endemic area, field borders (three rows) should be sprayed with imidacloprid 17.8% SL @ 3 ml/10 lit. (or) chlorantraniliprole 18.5% SC @ 4 ml/10 lit. (or) Clothianidin 50 WDG @ 5g/10 lit (or) Spirotetramet 150% OD @ 12.5 ml/10 lit (or) Flonicamid 50 % WG @ 3 g/10 lit.</li> <li>If the mealy bug infestation crosses ETL (10%), the insecticide application should be repeated at 20 days interval with rotation of above insecticides.</li> </ul>

			<ul style="list-style-type: none"> <li>• Before spraying ensure de-trashing and it should be done at 5 months after planting.</li> <li>• If <i>Pokkah boeng</i> disease is noticed, spray either Carbendazim 50% WP @ 2 gm/lit or Propiconazole 25% EC @ 2ml/lit along with sticking agent @ 1 ml/lit, three times at 20 days interval. Spray should be directed towards central whorl for better control.</li> <li>• Ratoon cropping should be discouraged after two rationing in the endemic areas.</li> <li>• Spraying of TNAU Sugarcane Booster @ 1, 1.5 &amp; 2 kg per acre at 45, 60 &amp; 75 days after planting respectively along with sticking agent.</li> </ul>
2.	Wild boar management measures may be suggested	Need more effective control measures and change of crops for wild boar management, since its causing huge loss to farmers	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>• Agricultural Research Station, Virinjipuram has developed wild boar repellent and is available for sale at ARS, Virinjipuram</li> </ul>
	Liquid rat repellent and wild boar repellent may be developed	Existing rat repellent is in cake form for which the rat shows resistance	<p><b>Director (NRM)</b></p> <ul style="list-style-type: none"> <li>• Strategic use of Trap Barrier System (TBS) during the rice season with the most rodent damage.</li> <li>• Keep area around fields, homes, villages clean no piles of wood or brush, no garbage heaps, no weedy areas.</li> <li>• Keep grain stores and surrounding area clean.</li> <li>• Erecting small wooden tree clumps in the fields for birds like owl perch.</li> <li>• TNAU bio repellent which dissolves in air and fumigates to give a pungent smell and it helps in keeping the wild boar away. It is available at KVK, Virinjipuram (Phone 0416-2273331 or email to kvkvrinjipuram@tnau.ac.in)</li> </ul> <p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>• Rats are bait shy and hence pre-baiting without poison should be practiced for 2 or 3days.</li> </ul>

		<ul style="list-style-type: none"><li>• Poison bait at 1 part Zinc phosphide with 19 parts popped corn /rice/dry fish or bromodialone 0.25 w/w (1:49) at 0.005%.</li><li>• Mechanical collection and destruction</li><li>• Narrow bund maintenance (45 x 30 cms)</li><li>• Setting up of bird perches</li><li>• Setting up of Thanjavur bow trap @ 100/ha</li></ul>
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**FARM MACHINERY**

**Dean (Agricultural Engineering), Coimbatore**

<b>S. No.</b>	<b>Important Problems faced by Extension officials</b>	<b>Justification</b>	<b>Replies</b>
1.	Method for processing of unpolished rice like <i>Kaikuthal</i> rice may be given.	Unpolished rice is having more nutrient content and medicinal value	<ul style="list-style-type: none"> <li>The major steps involved in processing of paddy to unpolished rice are Pre-cleaning, destining, parboiling, dehusking, husk aspiration, paddy separation, grading, colour sorting and bagging</li> </ul>
2.	Optimum weeder for machine transplanted paddy.	Suitable weeder to perform operation in machine transplanted paddy	<ul style="list-style-type: none"> <li>A multi row weeder attachment to the ride on type transplanter has been developed for weeding in 6 rows. The machine can be operated in the paddy field planted with a row spacing of 30cm either by machine or manual transplanting method.</li> </ul>
3.	No. of seedlings per hill not uniform, plant to plant spacing is not maintained in Paddy machine planting.	Machinery has to be designed in such a way it will provide uniform number of seedling per hill and uniform spacing between plants.	<ul style="list-style-type: none"> <li>The mat nursery should be uniform density so as to pick uniform number of seedlings and place them in the field. Generally in all the transplanters, plant to plant and row to row spacing will be maintained perfectly.</li> </ul>
4.	Machinery for harvesting and bundling of sorghum may be developed.	Machinery has to be designed in such a way it will provide uniform number of seedling per hill and uniform spacing between plants.	<ul style="list-style-type: none"> <li>Tractor operated front mounted reaper binder can be used for harvesting and bundling.</li> </ul>
5.	Combined harvester for Groundnut, Gingelly may be developed	Improved harvester cum pod and shell separator	<ul style="list-style-type: none"> <li>Development of combine harvester for groundnut is under progress. Reaper binder can be used for Gingelly harvesting and bundling.</li> </ul>
6.	Seed drill may be developed for pulses	Mechanized multi row seed drill with uniform spacing is required	<ul style="list-style-type: none"> <li>Tractor operated Inclined plate planter can be used for sowing pulses.</li> </ul>
7.	Kapas Plucking machine may be developed	Available machinery plucks only the well dried kapas and it plucks some bracts too. The machinery to be developed to pluck the kapas with moisture and pest attack.	<ul style="list-style-type: none"> <li>While plucking there is always possibility of plucking bracts. Suitable machinery will be developed after assessing the possibility.</li> </ul>
8.	Coconut/Palm tree climbing machine may be developed	An easy operatable climber is required.	<ul style="list-style-type: none"> <li>Coconut/Palm tree climbing machines are already available.</li> </ul>

GENERAL			
S. No.	Important Problems faced by Extension officials	Justification	Replies
1.	To provide technology to enumerate the presence of beneficial microbes in soil	The microbial analysis also enabling the farmers to understand the soil health and soil microflora may be incorporated in the Soil Health Card. To identify and enumerate the beneficial microorganisms in the soil with viable cell count. To provide suitable methods and procedures for estimation.	<p><b>Director (NRM)</b></p> <ul style="list-style-type: none"> <li>Enumeration of microorganisms does not provide soil health information. The indicators of soil microbial activity include microbial biomass carbon, labile carbon, respiration indices and soil enzymes. However, TNAU is developing a color-changing gel-probe to monitor the microbial activity and soil health. This device shall be available under the development process and upon evaluation; product shall be available for farmers use.</li> </ul>

HORTICULTURE			
S. No.	Crop	Queries	Replies
1.	Tapioca	Requisition of Mealy Bug Resistant Varieties	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Screening for resistant / moderately resistant varieties is in progress.</li> </ul>
2.	Turmeric	Processing technologies to produce pesticide residue free produce	<p><b>Dean (Agrl. Engineering)</b></p> <ul style="list-style-type: none"> <li>After harvesting of turmeric rhizomes, washing of turmeric using water spray and brushes will remove soil particles adhering the rhizomes as well as pesticide residue.</li> <li>Rotary washer developed by the Department of Food Process Engineering, TNAU will be effective to produce pesticide residue free turmeric rhizomes</li> </ul>
3.	Avocado	Wilt	<p><b>Director (CPPS)</b></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>Enriching the soil with organic manure @ 50kg/tree</li> <li>Soil drenching with Aliette 80% WP @ 2g/litre or Metalaxyl 4% w/w + Mancozeb w/w 64%@ 1.5g/litre or 1% Bordeaux mixture @ 20 litres /tree</li> <li>Soil application of <i>Trichoderma asperellum</i> @ 50g/tree or <i>Bacillus subtilis</i> @ 50g/tree along with AM fungi @ 100g/tree at quarterly interval</li> </ul>

4.	Avocado	Giant Caterpillar	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Spray Azadirachtin 1500 ppm @ 3ml/lit</li> </ul>
5.	Tube Rose	Methods to improve uniform spike production	<p><b>Dean (Horticulture)</b></p> <ul style="list-style-type: none"> <li>Uniform spike production in tuberose can be achieved by planting uniform sized healthy bulbs. Optimum bulb size recommended is bulb weight of 25-30 g or bulb diameter of 1.5-2.5 cm</li> </ul>
6.	Jasmine	Crop specific micronutrient mixture	<p><b>Director (NRM)</b></p> <ul style="list-style-type: none"> <li>Specific Micronutrient mixture for Jasmine is not available currently. On need basis, it will be developed in future and validated.</li> <li>However to address the single nutrient deficiencies like Zn and Fe in Jasmine, the following soil and foliar spraying technologies can be followed.</li> <li>Soil application: 25 g FeSO<sub>4</sub> and 4.0 g ZnSO<sub>4</sub> / plant</li> <li>Foliar spraying: 0.5% FeSO<sub>4</sub> + 0.1% citric acid spray at monthly intervals</li> </ul>
7.	Betel vine	Integrated pest management for Aphids & Wilt during rainy season	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Grow <i>agathi</i> as border crop to enhance the natural enemy activities.</li> <li><i>Azadirachtin</i> 1% @ 2.0 ml/litre water to manage aphids in betel vine crop.</li> <li>Avoid water stagnation.</li> <li>Apply <i>Trichoderma asperellum</i> and <i>Bacillus subtilis</i> each @ 5 gram/vine, 2-3 times in a year by mixing with farm yard manure.</li> <li>Drench 0.25% Copper oxychloride 50 WP (or) Drench 1% Bordeaux mixture (in basin formed around the vine) at monthly intervals starting from October-January.</li> <li>To prevent the air-borne inoculum, spray Copper oxychloride @ 0.25% (or) Bordeaux mixture @ 1% (or) Metalaxyl 4% w/w + Mancozeb 64% w/w @ 0.1% at 10-15 days interval during rainy season.</li> <li>Remove and destroy affected vines from the garden.</li> </ul>
8.	Tapioca	IPM for mealy bugs during summer	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Release of parasitoids <i>Anagyrus lopezi</i> will manage the mealy bug incidence in tapioca.</li> </ul>

9.	Chillies	IPM for thrips and aphids during summer	<p><b>Director (CPPS)</b></p> <p><b>Thrips &amp; Aphids</b></p> <ul style="list-style-type: none"> <li>• Grow <i>Agathi</i> as intercrop.</li> <li>• Treat seeds with Imidacloprid 70 WS @ 12g /kg of seed or Thiamethoxam 30FS @ 5ml / kg of seed.</li> <li>• Spray any one of the following insecticides.</li> <li>• Imidacloprid 17.8 SL 3.0 ml /10 lit. or Dimethoate 30 EC 1.0 ml /lit. or Emamectin benzoate 5 % SG 4 g /10 lit. or Fipronil 5 % SC 1.5 ml /lit. or Methyl demeton 25 % EC 1.0 ml /lit. or Spinosad 45 % SC 3.2 ml /10 lit. or Thiocloprid 21.7 SC 6.0 ml /10 lit. or Acetamiprid 20 SP 1.0g/10lit.</li> </ul>
		Management for mites	<p><b>Mites :</b></p> <ul style="list-style-type: none"> <li>• Spray any one of the acaricides: Fenazaquin 10 EC 2.0 ml /lit. or Fenpyroximate 5 EC 1.0 ml /lit. or Hexythiazox 5.45 EC 1.0 ml /lit. or Milbemectin 1 EC 6.5 ml /10 lit. or Methyl demeton 25 EC 2.0 ml /lit. or Propargite 57 EC 2.5 ml /lit. or Quinalphos 25 EC 1.5 ml /lit. or Spiromesifen 22.9 SC 5.0 ml /10 lit. or Chlorfenapyr 10SC 2.0ml/lit.</li> </ul>
10	Tapioca	Iron deficiency combined with mosaic virus and mealy bug infestation	<p><b>Director (CPPS)</b></p> <p><b>Management of Iron deficiency combined with mosaic virus</b></p> <ul style="list-style-type: none"> <li>• Growing resistant variety YTP 2</li> <li>• Selection of disease free planting materials</li> <li>• Spraying of cassava booster 2<sup>nd</sup>, 3<sup>rd</sup> and 4<sup>th</sup> months after planting</li> </ul> <p><b>Management of cassava mealybug:</b></p> <ul style="list-style-type: none"> <li>• Release of parasitoid <i>Anagyrus lopezi</i> @ 100 per acre</li> <li>• If needed, spraying of Thiamethoxam 25WG @ 0.5 g or flonicamid 50 WG @ 0.5 g or spirotetramet 150 OD 1.25 ml/lit</li> </ul>
11.	Tomato	Leaf curl virus and bacterial wilt is a major problem and it is common in all regions during the month of Oct-Nov. Required hybrid varieties that could tolerate to overcome this problem	<p><b>Director (CPPS)</b></p> <p><b>Integrated disease management strategies</b></p> <p><b>Leaf curl</b></p> <ul style="list-style-type: none"> <li>• Keep yellow sticky traps @ 12/ha to monitor the whitefly.</li> <li>• Raise barrier crops like maize or pearl millet around the field.</li> <li>• Removal of weed hosts.</li> </ul>

			<ul style="list-style-type: none"> <li>Protected nursery in net house or green house.</li> <li>Spray Imidacloprid 17.8% SL @ 0.05 % or Dimethoate 30 EC @ 0.05% at 15, 25, 45 days after transplanting to manage insect vector.</li> </ul> <p><b>Bacterial wilt</b></p> <ul style="list-style-type: none"> <li>Crop rotations, viz., cowpea-maize-cabbage, okra-cowpea-maize; maize-cowpea-maize and finger millet-egg plant reduce bacterial wilt incidence.</li> <li>Avoid damage to seedlings while transplanting</li> <li>Apply bleaching powder @ 10 kg/ha and irrigate</li> </ul>
12.	Onion	Propagation is done by bulbs which is prone to diseases like bulb rot and leaf curl/ twister disease (Especially it happens during the month of Nov-Dec in winter period followed by rainy days). Farmers are refusing to sow seeds since it takes along duration and after harvest also seed sown bulbs couldn't able to store for longer period due to its high moisture content which leads to bulb rot	<p><b>Director (CPPS)</b></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>Field sanitation</li> <li>Proper drainage.</li> <li>Seed treatment with Thiram (2g/kg of seeds) and soil application of Carbendazim 50 WP or Thiophanate methyl 70% WP @ 0.1%</li> <li>Seedlings dip in Carbendazim 50WP @ 0.1% or <i>Bacillus subtilis</i> (0.1%).</li> <li>Destruction of infected plant materials.</li> <li>Soil drenching with Copper oxy chloride 50 WP @ 0.25%</li> </ul>
13.	Turmeric	Leaf spot combined with drought condition leads to crop failure and poor yield. Drought tolerant varieties and disease free planting material is required	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Leaf spot is not a seed-borne disease and drought does not favour the leaf spot disease as it requires atmospheric moisture for spread.</li> <li>Disease free seed rhizomes can be obtained from Agricultural Research Station, Bhavanisagar.</li> </ul> <p><b>Dean (Horticulture)</b></p> <ul style="list-style-type: none"> <li>TNAU released CO 1 turmeric variety will be used to take up screening studies to confirm the suitability for drought tolerance.</li> <li>Leaf spot is not a seed borne disease and drought do not favour the leaf spot disease as it requires atmospheric moisture for spread.</li> <li>Disease free seed rhizomes can be obtained from the Professor and Head, Agricultural Research Station, Bhavanisagar by prior booking.</li> </ul>



14.	Chillies	Farmers are in need of saline and drought tolerant variety/hybrid in <i>mundu</i> type of chillies	<p><b>Dean (Horticulture)</b></p> <ul style="list-style-type: none"> <li>Purified <i>mundu</i> chilli genotype and identified two high yielding accessions, PKM CA08 (<i>Chatti Mundu</i> Type), CA32-09-04 (Oosi <i>Mundu</i> Type) and their suitability for saline and drought tolerance is under progress</li> </ul> <p><b>Dean (Horticulture), HC&amp;RI (W), Trichy</b></p> <ul style="list-style-type: none"> <li><i>Mundu</i> chillies cultures developed at HC &amp;RI (PKM) will be tested at saline and drought prone condition.</li> </ul>
15.	Jasmine	Root rot	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Soil application of <i>Trichoderma viride</i> @ 2.5 kg/ha with 250 kg of FYM</li> <li>Removal and burning of infected plants</li> <li>Soil drenching with Trifloxystrobin 25% + Tebuconazole 50% W/W @ 0.75 g/litre or Difenconazole 25 EC @ 0.5ml/l around the infected plant</li> </ul>
16.	Mango and Guava	Rugose spiraling white fly	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Foliar spray with Azadirachtin 1% @ 2.0 ml per litre recommended for the management of spiralling whitefly in guava.</li> </ul>
17.	Mango	Hopper	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Remove criss-cross branches, infested shoots and dense branches.</li> <li>Apply <i>Metarhizium anisopliae</i> or <i>Beauveria bassiana</i> @ 10<sup>8</sup>cfu /ml on tree trunk once during off season and twice at 7 days interval during flowering season.</li> <li>Neem oil @ 3%</li> <li>Spray any of the following insecticides first at the time of inflorescence emergence and the second two weeks after first spray. Buprofezin 25SC 1.0 ml/lit. or Dimethoate 30EC 1.5 ml/lit. or Imidacloprid 17.8 SL 2.0 ml/10 lit or Thiamethoxam 25WG 1.0 g/10 lit. or Malathion 50 EC 1.5 ml/lit. or Methyl demeton 25 EC 1.0 ml/lit. or Monocrotophos 36 SL 1.0ml/lit.</li> </ul>
18.	Papaya	Mealy bug	<ul style="list-style-type: none"> <li>Release of <i>Acerophagous papayae</i> @100/ garden</li> </ul>

19.	Banana	Panama wilt, Fusarium wilt	<p><b>Director (CPPS)</b></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Select disease free suckers from disease free areas</li> <li>• Dip the suckers in Carbendazim 50%WP (2g/lit) for 30 min or <i>Bacillus subtilis</i> @ 10g/sucker while planting</li> <li>• Sucker treatment with Carbofuran granules @ 40g/sucker before planting</li> <li>• Drench the infected plants and surrounding plants with 0.1% Carbendazim 50%WP (1g/lit) @ 2 lit / plant</li> <li>• Remove severely affected plants and apply lime @ 1-2 kg in the pits.</li> </ul>
20.	Chillies	Thrips, Mites	<p><b>Director (CPPS)</b></p> <p><b>Thrips &amp; Aphids</b></p> <ul style="list-style-type: none"> <li>• Grow <i>Agathi</i> as intercrop.</li> <li>• Treat seeds with Imidacloprid 70 WS @ 12g /kg of seed or Thiamethoxam 30FS @ 5ml / kg of seed.</li> <li>• Apply or spray any one of the following insecticides.</li> <li>• Imidacloprid 17.8 SL 3.0 ml /10 lit. or Dimethoate 30 EC 1.0 ml /lit. or Emamectin benzoate 5 % SG 4 g /10 lit. or Fipronil 5 % SC 1.5 ml /lit. or Methyl demeton 25 % EC 1.0 ml /lit. or Spinosad 45 % SC 3.2 ml /10 lit. or Spinetoram 11.7 SC 1.0ml/lit. or Thiacloprid 21.7 SC 6.0 ml /10 lit. or Acetamiprid 20 SP 1.0g/10lit.</li> </ul> <p><b>Mites</b></p> <ul style="list-style-type: none"> <li>• Spray any one of the acaricides Fenazaquin 10 EC 2.0 ml /lit. or Fenpyroximate 5 EC 1.0 ml /lit. or Hexythiazox 5.45 EC 1.0 ml /lit. or Milbemectin 1 EC 6.5 ml /10 lit. or Methyl demeton 25 EC 2.0 ml /lit. or Propargite 57 EC 2.5 ml /lit. or Quinalphos 25 EC 1.5 ml /lit. or Spiromesifen 22.9 SC 5.0 ml /10 lit. or Chlorfenapyr 10SC 2.0ml/lit.</li> </ul>
21.	Brinjal	Fruit and shoot borer	<p><b>Director (CPPS)</b></p> <p><b>Brinjal SFB</b></p> <ul style="list-style-type: none"> <li>• Remove the affected terminal shoot showing boreholes.</li> <li>• Remove the affected fruits and destroy.</li> <li>• Avoid using synthetic pyrethroids.</li> <li>• Spray Neem Seed Kernel Extract 5 % or any one of the following chemicals starting from one month after planting at 15 days interval.</li> </ul>

			<ul style="list-style-type: none"> <li>Spray Emamectin benzoate 5 % SG 4 g/10 lit. or Flubendiamide 20 WDG 7.5 g/10 lit. or Phosalone 35 % EC 1.5 ml/lit or Quinalphos 20 % AF 1.7ml/ lit. or Quinalphos 25 % EC 1.5 ml/lit. or Thiodicarb 75 % WP 2.0 g/lit.</li> </ul>
22.	Bhendi	Fruit and shoot borer	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Soil application with neem cake @ 250 kg/ha.</li> <li>Maize as border crop against movement of whiteflies and <i>Liriomyza</i>.</li> <li>Use of yellow sticky traps @ 12/ha.</li> <li>Periodical removal of yellow vein mosaic virus infected plants</li> <li><i>Helicoverpa</i> and <i>Earias</i> adult monitoring with pheromone traps</li> <li><i>Trichogramma</i> release after each brood emergence of <i>Helicoverpa</i> and <i>Earias</i>. Application of Azadirachtin 1% @ 2 ml/lit or Neem seed kernel extract (5%)</li> </ul>
23.	Coconut	Rugose spiraling whitefly	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Conservation of natural parasitoid <i>Encarsia guadeloupae</i>. Coconut fronds or leaflets containing parasitized puparia to be distributed in newer areas of infestation as an inoculative release @100 parasitoids/plantation.</li> <li>Release of <i>Chrysopid</i> predator <i>Apertochrysa aster</i> @1000 eggs/ha.</li> <li>Installation of yellow sticky traps / sheets of dimension 5 ft. x 1.5 ft. smeared with castor oil @ 5 / acre for monitoring as well as mass trapping of the adult RSW population.</li> <li>Spraying water forcibly on the under surface of the leaves to inhibit the growth and development of RSW or neem oil @ 0.5 %</li> <li>Spraying of maida flour paste @ 25 g/lit to dislodge the sooty mould. (Boil 5 kg maida in 20 litre water / acre)</li> </ul>
24.	Turmeric	Yellowing of leaves	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Recommendation can be given after diagnosis as yellowing is due to several causes.</li> </ul>
25.	Guava	Secondary infection like sooty mould occur in Guava crop due to coconut spirilling whitefly	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>Spray Azadirachtin 1% EC @ 1000 ml/ha</li> </ul>

26.	Tapioca	Mealy bug infestation leads to yield reduction in Tapioca	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>• Release of <i>Anagyrus lopezi</i> parasitoids @ 100 Nos. per acre</li> <li>• Spray of Thiamethoxam 25WG @ 200 g/ha</li> </ul>
27.	Silkworm	Scientific comparison between silkworm rearing conducted with bush – type mulberry and silkworm rearing conducted with tree mulberry	<p><b>Dean (Forestry)</b></p> <ul style="list-style-type: none"> <li>• Research work has not been done so far on rearing silkworm with tree mulberry. However, for results, the project can be formulated with funding and material support (already established mulberry tree garden) from State Department of Sericulture, Tamil Nadu.</li> </ul>
28.	Mulberry	Proper schedule for fertilizer application of mulberry bush type and tree mulberry	<p><b>Dean (Forestry)</b></p> <p><b>Bush type mulberry</b>  FYM: 20 MT/ha/yr  V1: 375: 140:140 NPK kg/ha/yr  Other varieties: 300: 120: 120 NPK kg/ha/yr</p> <p><b>Tree type mulberry</b>  FYM: 15 kg / tree  NPK complex: 75 g/plant</p>
29.	Mulberry	Mechanization in Mulberry cultivation	<p><b>Dean (Forestry)</b></p> <ul style="list-style-type: none"> <li>• Power tiller can be utilized for intercultural operations in mulberry under paired row system of cultivation.</li> </ul>
30.	Mulberry	Development of Possible Organic Farming / Zero Budget Natural Farming methods for Mulberry Tree Cultivation	<p><b>Dean (Forestry)</b></p> <p>Since, mulberry tree is cultivated as border crop for mulberry, zero budget/natural farming methods for tree cultivation is not feasible.</p> <p><b>Fertilizer management for main crop (bush mulberry )</b></p> <ul style="list-style-type: none"> <li>• Farm Yard Manure is applied as basal application @ 20 MT /ha/year</li> <li>• Application of <i>Azotobacter</i> @ 20-23 kgs/ha/yr in five split doses.</li> <li>• Application of Phosphorus solubilizing biofertilizer@ 5 kg/ha/yr in two to five equal split doses</li> <li>• Application of 375:140:140 NPK kg/ha/yr (N in five equal splits and P and K in two splits).</li> </ul>

31.	Mulberry	Possible value additions in Mulberry, Promoting seri-based entrepreneurships	<b>Dean (Forestry)</b> <ul style="list-style-type: none"> <li>• Silkworm excreta compost for better growth of mulberry and enhanced silk production.</li> <li>• Fruits and its high value added products (Dried fruits, squash, Jam, Jelly, Pickles and RTS)</li> </ul>
32.	Silkworm	Clear-cut solution for silkworm diseases and management	<b>Dean (Forestry)</b> <ul style="list-style-type: none"> <li>• No clear cut solution for silkworm disease management can be given and it is normally need based and situation based.</li> <li>• Proper disinfection, maintenance of temperature and relative humidity, feeding of nutrient rich leaves, prevention of starvation, optimum spacing and ventilation should be followed as prophylactic measures.</li> </ul>
33.	Mulberry	Formulation of new technology in mulberry cultivation and silkworm rearing	<b>Dean (Forestry)</b> <b>Mulberry cultivation</b> Mini clonal technology for mulberry saplings production. <ul style="list-style-type: none"> <li>• Mulberry saplings can be produced in 60 days against 90 days in conventional method and also requires less space in addition to higher yield.</li> </ul> <b>Silkworm Rearing</b> <ul style="list-style-type: none"> <li>• Humidity maintenance is the problem encountered during spinning for which heaters can be recommended.</li> <li>• Operation of foggers for maintenance of temperature and relative humidity during summer.</li> </ul>
34.	Organic Crops	Promising varieties/hybrids in crops like Chillies, tomato, onion, brinjal, greens, bhendi, gourds <i>etc.</i> , may be developed and notified to compete with private hybrids	<b>Dean (Horticulture)</b> <b>Tomato</b> <ul style="list-style-type: none"> <li>• Tomato hybrid derivative suitable for flat Round segment (CBE-SL-19-14-34) is approved for Multi Location Trial</li> <li>• Tomato hybrid (SL 133 × SL 169) with TLCV and nematode resistant is approved for Multi Location Trial</li> </ul> <b>Onion</b> <ul style="list-style-type: none"> <li>• Seed propagated small onion CO 6 is released during 2020 and through ICAR-RF - seed production scheme about 2000 kg seeds were distributed to the farmers and it covered 2000 acres thereby 30 tonnes of bulbs was saved and utilized for food consumption</li> </ul>

			<p><b>Brinjal</b></p> <ul style="list-style-type: none"> <li>• Brinjal Hybrid derivative (CBE –SM- 03-17-21) with cluster bearing nature, light purple fruits with white stripes is under ART</li> </ul> <p><b>Bhendi</b></p> <ul style="list-style-type: none"> <li>• Bhendi F<sub>1</sub> Hybrid (AE-CBE-02-CO5) with resistance to Yellow Vein mosaic and Enation Leaf Curl Virus is under ART</li> </ul> <p><b>Dean (Horticulture), HC&amp;RI (W), Trichy</b></p> <ul style="list-style-type: none"> <li>• Evaluation of genotypes in brinjal, gourds for high yield is under progress. Promising lines in brinjal and bitter gourd have been identified. Further breeding work will be carried out</li> </ul>
35.	Organic Crop	Organic Crop Production Packages are required for Cereals, Millets, Pulses, Oilseeds and vegetable crops exclusively focus on Organic Pest and disease management and Organic Nutrient Management	<p><b>Director (CM)</b></p> <p>NIL</p>
36.	Jasmine	Off-season flower inducing system in Jasmine under Shade Net Cultivation	<p><b>Dean (Horticulture)</b></p> <ul style="list-style-type: none"> <li>• Research is in progress. After confirmation of the findings, suitable recommendations will be given</li> </ul>
37.	Jasmine	Control remedies for Jasmine leaf malformation	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>• Spraying of Pyriproxyfen 10 EC 500ml/ha.</li> </ul>
38.	Guava	Control measures for Guava nematode infestation problem	<p><b>Director (CPPS)</b></p> <ul style="list-style-type: none"> <li>• Application of <i>Purpureocillium lilacinum</i> @ 75 g mixed with FYM @ 2.5 kg, Pressmud @ 2.5 kg, Neem cake @ 125 g/tree</li> <li>• Growing marigold around tree basin after pruning.</li> </ul>
39.	Vegetables	Recommendation of vegetable crops resistant / Tolerant to grow in saline and alkaline soils	<p><b>Director (NRM)</b></p> <ul style="list-style-type: none"> <li>• Beet root, Brinjal, Bhendi and Chillies</li> </ul>

40.	Onion	Control measures for Small Onion Collar rot disease during rainy season	<p><b>Director (CPPS)</b></p> <p><b>Management</b></p> <ul style="list-style-type: none"> <li>• Field sanitation.</li> <li>• Proper drainage.</li> <li>• Seed treatment with Thiram (2g/kg of sees) and soil application of Carbendazim 50 WP or Thiophenate methyl 70%WP @ 0.1 %</li> <li>• Seedlings dip in Carbendazim 50 WP @ 0.1% or <i>Bacillus subtilis</i> (0.1%)</li> <li>• Destruction of infected plant materials</li> <li>• Drench with Copper oxychloride 50% WP @ 0.25%.</li> </ul>
41.		Cane cutting labours problems	<ul style="list-style-type: none"> <li>• Whole cane harvester and billet cane harvester is available in every sugar mill. The rate of cutting charges/tonne price may be subsidized rate. Creating awareness and demonstration can be done. This reduces the cane cutting labour problems, cane growers and miller's problem</li> </ul>
42.	Mango	IPM for Mango hopper & Nut weevil, Recommend growth regulator to induce off-season cultivation practices and to control flower drop	<p><b>Director (CPPS)</b></p> <p>Mango hopper</p> <ul style="list-style-type: none"> <li>• Remove criss-cross branches, infested shoots and dense branches.</li> <li>• Apply <i>Metarhizium anisopliae</i> or <i>Beauveria bassiana</i> @ 10<sup>8</sup>cfu /ml on tree trunk once during off season and twice at 7 days interval during flowering season.</li> <li>• Spray Neem oil 3%</li> <li>• Spray any of the following insecticides first at the time of inflorescence emergence and the second two weeks after first spray. Buprofezin 25SC 1.0 ml/lit. or Dimethoate 30EC 1.5 ml/lit. or Imidacloprid 17.8 SL 2.0 ml/10 lit or Thiamethoxam 25WG 1.0 g/10 lit. or Malathion 50 EC 1.5 ml/lit. or Methyl demeton 25 EC 1.0 ml/lit. or Monocrotophos 36 SL 1.0ml/lit.</li> </ul> <p><b>Nut weevil</b></p> <ul style="list-style-type: none"> <li>• Spray Azadirachtin 1500 ppm @ 3ml/lit at the button stage</li> </ul>
43.	Banana	Methods to improve uniform fruit size in bunch	<p><b>Dean (Horticulture)</b></p> <p><b>Technology</b></p> <ul style="list-style-type: none"> <li>• Use 150 gauge thick transparent polythene or polypropylene sleeves with 2-4% vent holes</li> </ul>

			<ul style="list-style-type: none"> <li>• Cover the bunches immediately after the emergence of last hand</li> <li>• Tie the top of the cover with thread and leave the bottom open</li> <li>• Protection against diseases, sucking pests, sun burn and wind damage</li> <li>• Blemish free and attractive bunch appearance</li> <li>• Uniform maturity of fingers</li> <li>• Early maturity</li> <li>• Better bunch grade and export quality</li> </ul> <p><b>Foliar nutrition</b></p> <ul style="list-style-type: none"> <li>• Reported that foliar application of ZnSO<sub>4</sub> (0.5%) + FeSO<sub>4</sub> (0.2%) + CuSO<sub>4</sub> (0.2%) + H<sub>3</sub> BO<sub>3</sub> (0.1%) during 3rd, 5th and 7th month after planting, in addition to the recommended dose of NPK @ 110:35:330g/plant/year, improved bunch weight, besides enhancing fruit quality.</li> <li>• Foliar spray of sulphate of potash (1.5%) along with recommended dose of fertilizer had a positive impact on bunch weight and fruit quality.</li> </ul> <p><b>Dean (Horticulture), HC&amp;RI (W), Trichy</b></p> <ul style="list-style-type: none"> <li>• Research work is in progress at HC &amp; RI- W on testing of tissue cultured banana against conventional suckers for higher yield and productivity.</li> <li>• A work on foliar stimuli is initiated in <i>Ney poovan</i> for greater bunch size at HC &amp; RI-W, Trichy</li> </ul>
44.	Tomato	IPM for pinworm, Serpentine leaf miner	<p><b>Director (CPPS)</b></p> <p><b>IPM for pinworm</b></p> <ul style="list-style-type: none"> <li>• Adopt BIPM module against tomato pin worm (Pheromone trap @ 40 / ha + <i>Trichogramma achaeae</i> @ 5 cc / ha + Spinetoram 11.7 % SC @ 500 ml /ha + Cyantraniliprole 10.26 OD @ 150 ml / ha)</li> </ul> <p><b>Serpentine leaf miner</b></p> <ul style="list-style-type: none"> <li>• Spray Neem Seed Kernel Extract 5 % or Cyantraniliprole 10.26 OD 1.8ml /lit.</li> </ul>
45.	Brinjal	IPM for shoot borer and improved cultural practices	<p><b>Director (CPPS)</b></p> <p><b>Brinjal</b></p> <ul style="list-style-type: none"> <li>• Remove the affected terminal shoot showing boreholes.</li> <li>• Remove the affected fruits and destroy.</li> <li>• Avoid using synthetic pyrethroids.</li> <li>• Spray Neem Seed Kernel Extract 5 % or any one of the following chemicals</li> </ul>



			<p>starting from one month after planting at 15 days interval</p> <ul style="list-style-type: none"> <li>• Spray Emamectin benzoate 5 % SG 4 g/10 lit./ Flubendiamide 20 WDG 7.5 g/10 lit. Phosalone 35 % EC 1.5 ml/lit./ Quinalphos 20 % AF 1.7ml/ lit./ Quinalphos 25 % EC 1.5 ml/lit./ Thiodicarb 75 % WP 2.0 g/lit.</li> </ul>
46.	Coconut	IPM for rugose whitefly, <i>Rhinoceros</i> beetle	<p><b>Director (CPPS)</b></p> <p><b><i>Rhinoceros</i> beetle</b></p> <ul style="list-style-type: none"> <li>• Remove and burn all dead coconut trees in the garden to maintain good sanitation.</li> <li>• Collect and destroy various bio-stages of the beetle from the manure pits (breeding ground of the pest) whenever manure is lifted from the pits.</li> <li>• Incorporate the entomopathogenic fungus, <i>Metarhizium anisopliae</i> in manure pits to check the perpetuation of the pest.</li> <li>• Soak castor cake at 1 kg in 5 l of water in small mud pots and keep them in the coconut gardens to attract and kill the adults.</li> <li>• Examine the crowns of tree at every harvest and hook out and kill the adults.</li> <li>• For seedlings, apply 3 naphthalene balls/palm weighing 3.5 g each at the base of inter space in leaf sheath in the 3 inner most leaves of the crown once in 45 days.</li> <li>• Set up light traps following the first rains in summer and monsoon season to attract and kill the adult beetles.</li> <li>• Field release of <i>Baculo</i> virus inoculated adult rhinoceros beetle @ 15/ha reduces the leaf and crown damage caused by this beetle.</li> <li>• Apply mixture of either neem seed powder + sand (1:2) @ 150 g per palm or neem seed kernel powder + sand (1:2) @150 g per palm in the base of the 3 inner most leaves in the crown</li> <li>• Set up Rhinolure pheromone trap @ one/ ha to trap and kill the beetles.</li> </ul>
47.	Turmeric	Methods to control Rhizome rot and leaf spot	<p><b>Director (CPPS)</b></p> <p><b>Rhizome rot management</b></p> <ul style="list-style-type: none"> <li>• Dip seed rhizomes in 0.25% copper oxychloride 50% WP for 30 minutes (or) treat rhizomes with <i>Bacillus subtilis</i> @ 10 g/kg and <i>Trichoderma asperellum</i> @ 4 g/kg of rhizome before planting.</li> <li>• Soil application of 2.5 kg/ha each of <i>B. subtilis</i> and <i>T. asperellum</i> mixed</li> </ul>

			<p>with 250 kg of FYM as basal and again at 150 days after planting.</p> <ul style="list-style-type: none"> <li>In severe cases, spot application of 1% Bordeaux mixture (or) 0.25% Copper oxychloride (or) 0.1% Metalaxyl 4% Mancozeb 64% WP.</li> </ul> <p><b>Leaf spot management</b></p> <ul style="list-style-type: none"> <li>Two to three sprays with 0.1% Carbendazim 50% WP (or) 0.25% Mancozeb 75 WP (or) 0.3% Copper oxychloride 50%WP (or) 0.1% Propiconazole 25 EC at 10-15 days intervals (Add sticker to the spray fluid @ 1 ml/litre).</li> </ul>
48.	Tapioca	Mealy bug and Red mite	<p><b>Director (CPPS)</b></p> <p><b>Mealy bug</b></p> <p>Release of <i>Anagyrus lopezi</i> @ 100- 200 per acre</p> <p><b>Mite</b></p> <ul style="list-style-type: none"> <li>Copious irrigation of tapioca fields.</li> <li>Adoption of clean cultivation as the weeds serves as alternate hosts for mites.</li> <li>Spraying of acaropathogenic fungi viz., <i>Beauveria bassiana</i> (1x10<sup>8</sup> cfus/ml) @ 3 ml/lit. or <i>Metarhizium anisopliae</i> (1x10<sup>8</sup> cfus/ml) @ 3 ml/lit.</li> <li>Spraying of propargite 57 EC @ 2 ml./lit or fenazaquin 10 EC @ 2 ml./lit or spiromesifen 240 SC @ 0.8 ml/lit. as need based and 15 days later.</li> <li>Apply spray fluid on the lower surface of the leaves too.</li> </ul>
49.	Brinjal	White fly and Aphids were prevalent in organically grown Brinjal crop. Neem oil 1% spray or NSKE 5% spray did not give effective result.	<ul style="list-style-type: none"> <li>Since neem oil 1% is sub lethal dose, neem oil 3% is recommended.</li> <li>TNAU 3G extract 5% or Azadiractin 10,000 ppm @ 2ml per lit is recommended.</li> </ul>
50.	Brinjal	Shoot and Fruit borer were prevalent in organically grown Brinjal crop. Neem oil 1% spray or NSKE 5% spray did not give effective result.	<ul style="list-style-type: none"> <li>Since neem oil 1% is sub lethal dose, neem oil 3% is recommended.</li> <li>IPM module comprising erection of pheromone trap 5 per acre and release of <i>Trichogramma chilonis</i> 2 cc per acre is effective. In severe case, use TNAU 3G extract 5% or Azadiractin 10,000 ppm @ 2ml per lit.</li> </ul>

51.	Muskmelon	Viral disease in Muskmelon led to complete crop failure. The disease incidence was found in almost all the Hybrids of Muskmelon.	<ul style="list-style-type: none"> <li>• Clean cultivation</li> <li>• Vector management</li> </ul>
52.	Muskmelon	Wilt disease in Muskmelon was found to be very serious. Soil drenching with <i>Trichoderma viride</i> @ 10 gm/lit of water did not control the disease. Ridomil Gold spray @ 2.5 gm/lit also could not control effectively.	<ul style="list-style-type: none"> <li>• Soil drenching of carbendazim 50% WP @ 2gm/lit</li> </ul>
53.	Turmeric	Leaf spot disease in Turmeric was found to be very serious. Cabiro Top spray @ 3 gm/lit also could not control effectively.	<ul style="list-style-type: none"> <li>• Spraying of Propiconazole 25% SC @ 500 ml/ha is recommended</li> </ul>

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