

83rd SCIENTIFIC WORKERS' CONFERENCE

(AGRICULTURE, HORTICULTURE, AGRICULTURAL ENGINEERING,
FORESTRY AND SOCIAL SCIENCES)

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SUBJECT FOR DISCUSSION



QUERIES AND ANSWERS

**DIRECTORATE OF RESEARCH
TAMIL NADU AGRICULTURAL UNIVERSITY
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QUERIES AND ANSWERS 2017

PADDY

ADT 49 crop failed in the field due to its uneven growth and maturity. Foundation seed production also failed due to staggered flowering. Requesting an alternate variety to ADT 49 - Cuddalore

- Two rice varieties TKM 13 and CO 52 in the medium duration category with fine grain quality may be cultivated. Also, a medium duration culture AD 09493 maturing in 130-135 days has completed two years of Adaptive Research Trials and is under On-farm testing. This variety has good cooking quality besides high yield with more number of grains per panicle and uniform maturity.
- TKM 13: This variety has a 1000 grain weight of 13.8 g, matures in 125-130 days and is capable of giving an average grain yield of 6.0 t/ha. It is notified and gaining momentum.
- CO 52: Released in 2017, matures in 135 days giving an average grain yield of 6.2t/ha. The 1000 grains weigh 14.1g. It has moderate resistance to plant hoppers, blast, sheath rot, brown spot. It has high milling (68.6%) and head rice yield (62.3%).

Blast, Brown Planthopper, Stem borer resistant, high yielding paddy varieties suitable to Samba and Thaladi seasons may be suggested – Dindigul

- The following medium duration varieties are suitable to Samba/Thaladi seasons with a duration of 130-140 days
- Rice CO 52- Moderately resistant to plant hoppers, blast, sheath rot, brown spot
- Rice TKM 13- Moderately resistant to leaf folder, stem borer, GLH, blast, RTD, brown spot and sheath rot.
- TNAU Rice TRY 3 – Moderately resistant to BPH, stem borer, Leaf folder, Blast, Brown spot, Sheath rot and Sheath blight
- CO (R) 50 – Moderately resistant to blast, sheath blight

Kancheepuram District is like a miniature delta district by its area, production and productivity under paddy crop, as high yielding varieties are used here. Promising paddy hybrid may be introduced to contribute more in food grain production – Kancheepuram

- Presently, short duration hybrid CORH 3 and medium duration hybrid CORH 4 have been released by the University. Joint efforts are required for large scale seed production and cultivation of the hybrids in a particular District.
- Research on identification of new hybrids is also underway.

Alternate medium duration variety resistant to stem borer with high tillering and short bold grain type to replace the existing variety TPS 3 may be evolved – Kanyakumari

- At present, there is no released variety in the medium duration group with short bold grains available. But, TNAU Rice TRY 3 has medium bold grains which can be presently tried.
- Breeding is under progress by different centres and a short bold rice culture ACK 13010 maturing in 125 days is under first year of testing in Multi-location trial this year. Besides, six more cultures are under yield evaluation in station trials at Coimbatore.

Akchaya, a private improved fine rice variety with high market preference is cultivated in Madurai District especially in Usilampatti and Madurai North taluks. Even though this variety is highly susceptible to blast and sheath blight, farmers cultivate it for its high price. A separate study may be evolved for refinement of Akchaya for disease resistance, processing, marketing and branding for export – Madurai

- Akshaya (BPT 4358/IR 64) otherwise named as BPT 2231 was released in 2010 from Bapatla, Andhra Pradesh. BPT 2231 is a fine grain type with slender shafts and its average grain yield was 20-25 per cent more than BPT 5204 It has a duration of 145 – 150 days.
- At TNAU, one fine grain variety in the short duration *viz.*, CO 51 and two fine grain varieties in the medium duration *viz.*, TKM 13 and CO 52 were recently released which have good market preference also. These varieties can be tried.

Management practices to overcome lodging in CO 51 variety and availability of TKM 13 rice seeds may be ensured – Madurai

- Required quantity of breeder seeds of TKM 13 for the indents received from the Director of Agriculture will be supplied.
- Truthfully seeds to the tune of 4.5 tonnes of TKM 13 paddy are available at three stations of TNAU *viz.* Regional Research Station, Paiyur, Rice Research Station, Tirur and Agricultural Research Station, Pattukottai.

Contingent crop plan for command area during late release of water with the possibility of including minor millets prior to rice may be explored – Madurai

- Maize crop may be raised in command area during late release of water provided underground water is available, minor millets like Kudiraivali, Thenai may be raised.

A medium duration high yielding paddy variety that can come up well in rainfed hilly tracts as in Yercaud block may be evolved to improve the productivity and production of Salem District farmers – Salem

- A medium duration high yielding paddy variety CO(R)50 was tested at Hybrid Rice Evaluation Centre, Gudalur, Nilgiris Dt. and is spreading to the farmers for the past four years because of the grain preference and also blast resistance. Hence, this variety may be tried in Yercaud block also.

Improvement study of IR 20 Paddy variety suitable for Samba season of Mettur Canal system area may be taken up to release it as Improved IR 20 – Namakkal

- IR 20 is an old variety and subsequently many varieties of almost same duration have been released. The recent ones are TNAU Rice TRY 3 and CO (R) 50 which may be cultivated.

New paddy variety with high productivity suitable to Kolli hills region may be evolved to replace the variety Wyanad II having long duration, low yield, non-lodging, less tillering, bold grains and red rice variety – Namakkal

- At TNAU, four short duration (115 days) short bold varieties viz., ADT 37, TKM 9, ASD 16 and TPS (R) 5 have been released. Of these, TKM 9 is having red rice. In the medium duration category, TNAU Rice TRY 3 is having medium bold grains. Except ADT 37 and ASD 16, all are in seed production chain which may be tried.

Non lodging and non-shattering variety may be suggested as alternative to CO 51 Paddy variety. Suitable fine varieties may be suggested as an alternate to Goraknath 509 Paddy variety as it is preferred by Millers – Theni

- Goraknath 509 is a non-lodging and non-shattering rice variety with medium maturity (120-125 days). It has wider adaptability and tolerant to major pests and diseases. It is with good tillering (6-8) and high yield potential (6-7 tons/ha). The grains are medium-slender and non-aromatic with very good cooking quality. Very popular product in Eastern UP, Gujarat and Bihar.
- Rice CO 51 has been released during 2013 only as an alternate to ADT 43 which is of lodging nature. Hence it can be cultivated. It is also having fine grains and market preference. Another fine grain variety TKM 13 maturing in 125-130 days has also been released. These may be tried.

Variety with ratoon nature may be evolved – Theni

- Ratooning for paddy is not recommended.

ADT 43 is a better performing variety in Kuruvai. Since it is more than 10 year old, an alternate variety to replace the ADT43 may be suggested – Thirupur

- Rice CO 51 was released during 2013 as an alternate to ADT 43. It matures in 110 days with an average grain yield of 6600 kg/ha. It has moderate resistance to blast, BPH and GLH.

New variety as an alternate for IR 20 with short duration suitable for both idly and boiled rice may be suggested to cater to the needs of farmers of Lower Bhavani Project area of Kangayam and Vellakoil block – Thirupur

- A variety Rice TPS 5 with bold grains maturing in less than 120 days is suggested. Its average grain yield is 6300 kg/ha and has moderate resistance to BPH and GLH.

Biological weed control measures are required for problematic weeds such as *Cyperus*, Hariyali etc in Paddy fields – Thirupur

- There is no biological weed control measures developed for problematic weeds in Paddy fields in TNAU.

In Tirunelveli District, farmers are slowly shifting over from bold to super fine varieties since super fine varieties fetches higher price in the market. The private varieties are being cultivated in larger area in Tirunelveli District. Suitable super fine varieties to replace private varieties Komal, Atchaya, Komal king, Amman ponni may be evolved – Tirunelveli

- Two fine varieties viz., TKM 13 and CO 52 have been recently released by TNAU for cultivation.

Suitable short duration blast and tungro resistant short bold paddy variety to substitute ASD 16 may be evolved – Tirunelveli

- A short duration bold grain variety Rice TPS 5 has been released as a substitute for ASD 16.

A suitable stem borer resistant paddy variety with high yield may be evolved - Tirunelveli

- Though complete resistance to stem borer is difficult, the varieties like CO (R) 50 and TKM 13 have moderate resistance.

Alternate varieties for ADT 43 and ADT 45 are needed since the vigour and yield potential is coming down – Thiruvarur

- Rice CO 51 with medium slender grains is suggested as an alternative to ADT 43 and ADT(R) 45.

Suitable saline resistant variety may be evolved as borewell water is more saline in Kudavasal, Tiruvarur, and Valangaiman blocks – Thiruvarur

- TNAU Rice variety TRY 3 is saline tolerant and it may be cultivated.

A suitable alternate variety with same varietal characters as that of Seeragasamba with high yield potential may be evolved – Trichy

- A rice culture VG 09006 of medium duration and grains like Jeeragasamba is

being tested in Adaptive Research Trials. Its average grain yield is 4.7t/ha and is non-lodging in nature.

Fine grain variety suitable for Saline and alkali Soils needs to be developed – Trichy

- Research is in progress and three fine grain cultures viz., TR 09027, TR 13069 and TR 13083 are being tested in Multi location trials.

Effective weed control technology is needed in machine transplanted rice, as row spacing is more in machine transplanted rice. Crop is not fully covered in initial stage and Power weeder is not effectively used to control all weeds in the field - Cuddalore

- Wetland power weeder is amenable for change of spacing by altering the blade type and position on axle.

Suitable paddy varieties with high yield and good cooking quality to replace the ruling varieties like ADT43, ADT(R) 45 and ADT37 may be evolved - Thiruvannamalai

- The variety CO 51 is an alternative to ADT43, ADT(R) 45 with high yield and good quality.

Alternative Paddy variety may be evolved to replace BPT 5204 and I.W.Ponni – Krishnagiri

- The varieties TKM 13 and CO 52 are alternate varieties to BPT 5204.

Short duration paddy variety with suitable for direct sowing in saline and alkaline soil may be evolved – Nagapattinam

- The variety TRY 2 with shorter duration and suitable for saline/alkaline soils may be cultivated. Three short duration cultures viz., TR 09027, TR 13069 and TR 13083 are being tested in Multi location trials.

Ultra short duration paddy varieties with (80-90 days) may be evolved – Nagapattinam

- The variety ADT (R) 48 is having a duration of 95 days under direct seeded condition. Research is in progress to develop extra early rice cultures.

Varieties with tolerance to water stress (drought) and short duration in nature may be evolved – Nagapattinam

- The variety Anna (R) 4 is suitable for water stress situations.

Submergence tolerant rice varieties with adequate seeds required – Nagapattinam

- The variety CR 1009 *Sub1* is having submergence tolerance and it was released in 2015. Breeder seed production is taken up as per the indents received. CO 43 with *Sub 1* gene developed through Marker Assisted Breeding is also available for testing

Measures / technologies to save the Kuruvai paddy that are harvested during rainy season may be suggested – Nagapattinam

- To reduce seed moisture content of paddy seeds harvested during rainy season, foliar spray with dehydrants like paraquat @ 2.16 lit / ha or glufosinate @ 1.35 lit / ha or NaCl 2 % may be given at 48 hrs before harvest.
- Storage of high moist seeds under cold storage condition (5⁰C and 40 % RH) maintains the seed quality upto 15 days.

Value addition techniques may be suggested for Rice and Pulses – Nagapattinam

- Lots of value addition techniques are available such as puffing, flaking, candy, etc.

Suitable short duration variety for late Samba season may be suggested – Pudukottai

- Rice TKM 13 with a duration of 125-130 days and CO 51 with 110 days may be tried.

Varieties equivalent to improved white ponni may be evolved with shorter duration such as MDU-5 – Pudukottai

- MDU 5 is an extra –early variety with medium slender grains. Rice CO 51 is also having medium slender grains. Another rice culture AD 07073 with fine rice and good cooking quality is in advanced stage of testing.

Farmers of Vellore District need a suitable “Scented paddy variety” for Samba (July-September) sowing season with high yield potential – Pudukottai

- A variety ADT 41 was released long back with long slender grains and scented nature.
- Another culture CB MAS 14142 maturing in 120 days with an average grain yield of 4.6t/ha and having mild aroma is being tested in Adaptive Research trials.

Replacement of CR 1009 variety to withstand drought, flood and water logging condition may be evolved – Ariyalur

- The variety CR 1009 *sub1* is having submergence tolerance for 14 days during its vegetative phase and it was released in 2015 as an alternate to CR 1009.

Low cost technology at farm level to produce Pink Pigmented Facultative Methylo Bacterium (PPFM) to mitigate drought conditions may be suggested – Ariyalur

- The production of PPFM involves laboratory scale production techniques. Hence the production at farm level is not possible for any bio-fertilizer using any low cost technology. Already necessary facilities are created in all the state bio-fertilizer production centers in addition to TNAU production units. Dept. of Agrl. Microbiology, TNAU, Coimbatore may be contacted for immediate supply.

Algal growth hinders establishment of paddy in early stages and crop growth is completely arrested and stunted. Suitable remedial measures are required for Kuruvai and Summer Paddy - Cuddalore

- Application of 1% copper sulphate was already in recommendation wherever the problem was noticed. A demonstration trial was also conducted by TRRI, Aduthurai for the same in the problem areas.

MILLETS

Maize

Integrated package of practices (both preventive as well as curative) for the control of root grub in maize crop in Rabi seasons may be suggested – Dindigul

- Large scale mechanical collection of beetles that congregate on neem leaves on the night of emergence immediately after first showers during May-June reduces beetles population progressively over a few years.
- Application of chlorpyrifos 20EC @2ml/litre of water on small neem trees immediately after the first summer rain to kill the adult beetles that congregate on these trees the following day. Attracting the adults to big branches of the neem trees sprayed with insecticides by placing in the fields.
- Spot application of phorate 10G @ 200 gms/cent (20 kg/acre) mixed with 1 kg of sand in the affected area and also surrounding area with healthy plants and irrigating immediately for dissolving the granules and repeating the application after 20 days for better control. Spot drenching of chlorpyrifos 20 EC @ 2 ml/litre in the affected clumps and also nearby surrounding healthy clumps @ 5 litres of insecticide solution per clump under severe incidence.

Maize hybrids tolerant to temperature stress suitable for summer season may be suggested – Dindigul

- The hybrid COH (M) 6 and COH (M) 8 are suited to grow under summer irrigated conditions. The sowing for summer season should be done before first week of February irrespective of the hybrids.

Availability of Maize CO 6 hybrid may be ensured for next year MSDA programme – Madurai

- Efforts were already initiated to take up hybrid seed production of maize at selected SSF's from *khari* 16 and being continued during this season also. Based on the hybrid seed requirement, breeder seed indent may be placed for the parents in advance for taking up seed production in the SSF's.
- For demonstration and other programmes, an advance indent may be placed to Special Officer (Seeds), Seed Centre, TNAU, Coimbatore to produce and supply the required quantity of maize CO 6 hybrid.

Manually operated seed drill may be suggested to maintain plant population (10 plants / Sq.m) - Perambalur

- Manually operated dibblers are already available.

Combined Harvester may be suggested - Salem

- Maize harvesters are commercially available.

High yielding and potential maize hybrids suitable to this district may be evolved – Namakkal

- The hybrids COH (M) 6 and COH (M) 8 are suited well for Namakkal district.

Drought tolerant maize hybrids with better yield than COH (M) 6 may be evolved for cultivating in rainfed areas - Thirupur

- COH (M) 6 is the best hybrid available at national level suited for rainfed situations.

New drought tolerant variety with high yield potential replacing CO 1 variety suitable for grain cum fodder may be released – Coimbatore

- Two maize composites TNFM 132-4 and TNFM 131-9 with high fodder yield were developed and are being tested under MLT.

Suitable measures may be suggested for permanent control of post flowering stalk rot disease in Maize – Pudukottai

- Crop rotation
- Seed treatment with *Trichoderma viride* @ 4g/kg of seed or *Pseudomonas fluorescens* @10g/kg of seed.
- Spot drenching with carbendazim @ 0.1%.

Suitable TNAU Maize hybrids as an alternative to private hybrids like NK-6240, CP 808, CP818 may be evolved – Erode

- The hybrids COH (M) 6 and COH (M) 8 are high yielders than private hybrids and suited well for Erode district. These hybrids are also being used as national checks.

SORGHUM

Dual purpose short duration sorghum varieties with good grain and fodder yield for both rainfed and irrigated conditions may be suggested – Thirupur

Suitable sorghum hybrids with high yield potential without reduction in nutrient quality for confectionery purpose may be suggested – Madurai

- TNAU sorghum hybrid CO 5 released during 2010 is a medium tall, non-lodging and tan plant type hybrid which matures in 95-100 days and remains green even at maturity. The grains are creamy white in colour, suitable for all food

preparation with good cooking qualities. The grain is rich in protein (9.79 %) and fiber (1.6%).

In Namakkal District, Cholan is cultivated in about 70,000 ha. both in irrigated and rainfed conditions. Co 4 Cholan variety is highly preferred by farmers both in rainfed and irrigated seasons due to its palatability, red colour grains, shorter duration (95 days) and compact earhead. This variety is fodder cum grain variety. Red seeded variety as that of CO 4 with palatability, shorter duration and compact earhead may be evolved – Namakkal

- High yielding red grain sorghum variety Paiyur 2 may be promoted. Besides, a high yielding dual purpose red grain sorghum culture TNS 660 is being evaluated in MLT.

Machinery for harvesting and bundling of sorghum may be suggested – Thirupur

- Reaper binders are commercially available for the purpose. (Eg. BCS Reaper binder)

In Tirunelveli District, rainfed Cholan is being cultivated in about 3000 ha. in Sankarankoil, Tenkasi and Shencottai taluks. In Tirunelveli, farmers prefer sorghum variety with white and small sized grains as that of K tall. It is a very old variety. A short duration cholam variety may be evolved for September - October sowing in black soils to replace K Tall - Tirunelveli

- A dual purpose high yielding sorghum variety K12 released during 2014 is suitable for southern districts under rainfed and irrigated situation. It is white grain variety with medium size grain.

High yielding variety suitable for rainfed condition in cholam to replace Co(S) 30 may be evolved – Coimbatore

- The culture TNS 648 (100 days duration) is being tested under ART which is high yielding than CO(S) 30.

Development of Red grain dual purpose variety alternate to local Thalaivirichan open earhead type may be evolved – Dharmapuri

- High yielding red grain sorghum variety Paiyur 2 may be promoted. Besides, a high yielding dual purpose red grain sorghum culture TNS 660 is being evaluated in MLT.

RAGI

Breeder seed availability of CO 14 & CO 15 to replace the GPU-67 occupied area may be ensured – Salem

- Sufficient quantity of breeder seeds of CO 14 and CO 15 ragi variety can be

produced and supplied in time if the indent for the required quantity of breeder seed is placed in advance.

In Vellore District, farmers are widely cultivating GPU 28 and Co(Ra)14. A suitable Ragi variety for irrigated condition for November - December sowing better than GPU 28 may be evolved – Vellore

- High yielding and drought tolerant ragi variety CO 15 is suitable for irrigated condition and is high yielding than CO (Ra) 14 and GPU 28.

SMALL MILLETS

SAMAI

Low cost mini seed drill may be evolved – Thiruvannamalai

- Seed drills of different types matching with animal / power tiller and tractor are available.

New drought tolerant, high yielding Samai variety suitable for *Kharif* season may be evolved – Dharmapuri

- CO (Sa) 4 is drought tolerant, high yielding and suitable for *Kharif* season.

THENAI, SAMAI AND PANIVARAGU

Availability of breeder seeds of notified Varieties of TNAU for Thenai, Samai and Panivaragu crops may be ensured – Salem

- Sufficient quantity of breeder seeds of CO(Te)7 (Thenai), CO(Sa) 4 (Samai) and CO(Pv) 5 (Panivaragu) varieties can be produced and supplied in time if the indent for the required quantity of breeder seed is placed in advance.

Eco friendly IPM for smut disease in Kuthiraivali may be suggested - Madurai.

- The varieties CO(KV)2 and MDU 1 are resistant to smut disease.
- The seeds may be soaked in 10% common salt solution to remove infected grains.
- Rouging of infected plants will be helpful in reducing the spread of disease.

Barnyard Millet Seed availability may be ensured during *Kharif* season for seed multiplication programme - Madurai.

- The seeds of CO(Kv)2 and MDU 1 barnyard millet varieties can be produced and supplied in time if the indent for the required quantity of breeder seed is placed in advance. MDU 1 barnyard millet is under seed production. However, for barnyard millet CO (Kv) 2, TFL seeds around 300 kg are available at Centre of Excellence in Millets, Athiyandal, Thiruvannamalai Dt.

In Tiruvarur District, Minor millet cultivation was not recommended in Rice fallow. Suggestions and recommendations on cultivation of Minor millets in Rice fallow may be ensured – Thiruvarur

- Ragi (CO 15) and barnyard millet varieties CO(Kv)2 and MDU 1 are recommended.

Suitable high yielding improved Varieties in Varagu, Panivaraghu, Thenai for cultivation in hill areas of Elagiri and Alangayam block may be evolved – Vellore

- The varieties CO 3 in varagu, CO(Pv)5 in panivaragu and CO(Te)7 in thenai are the latest high yielding improved varieties suited for cultivation in hill areas of Elagiri and Alangayam block.

OILSEEDS

GROUNDNUT

Groundnut variety to replace of TMV13 and K6 may be suggested – Madurai

- New promising high yielding bunch varieties viz., VRI 6, VRI 8, ALG 06-320 and ICGV 07240 may be recommended.

Suitable intercropping to reduce sucking pest like leaf minor may be suggested – Madurai

- Border cropping of groundnut with sorghum, pearl millet and maize reduce the population of thrips, leafhopper and also leafminer *Aproaerema modicella*
- Intercropping of groundnut with pearl millet 6:1 ratio reduces the leafminer incidence by encouraging the parasitoid wasp *Goniosus* sp.

Variety resistant for leaf minor in Rainfed sowing may also be suggested – Madurai

- VRI 6 is a moderately resistant variety.

High yielding variety like western 44 may be evolved. Sulphur application to increase the oil content in Groundnut may be promoted – Perambalur

A highly suitable groundnut variety having better performance than TMV-7 may be evolved – Salem

A variety equivalent to TMV-7 may be developed since TMV 13 is not suitable to this district – Ramnad

In Pudukkottai District, western 44 Groundnut (Gujarat variety) is getting popular among farmers of Gandarvakottai, Karambakudi, Thiruvarankulam blocks. A new variety to overcome the Gujarat Variety western 44 may be suggested – Pudukkottai

- New bunch high yielding potential varieties viz., CO 7, VRI 8 and ICGV 07240 may be recommended. Promising cultures viz., ICGV 07222, TVG 0856 and BSG 0912 are under ART evaluation.

Although many Groundnut semi-spreading and bunch varieties have been released, rainfed groundnut area of Tiruchengode, Elachipalayam and part of Paramathi blocks farmers are interested in growing TMV 1 variety (Spreading type) because of its rejuvenating character during prolonged drought season and giving minimum guarantee yield during moisture stress. Suitable Semispreading variety to this district may be evolved – Namakkal

Suitable variety with long shelf-life, without affecting germination capacity in groundnut may be evolved – Coimbatore

- Drought tolerant semi spreading varieties viz., CO 6, VRI (Gn) 7 and ICGV 00348 may be recommended for rainfed condition.

In certain circumstances, groundnut seeds are germinating in the pod itself during harvest due to rainfall. Technologies to prevent germination of seeds before harvesting may be suggested – Thiruvarur

- Foliar application of Malic hydrazide @ 1250 ppm at 60 days after sowing to induce dormancy and to inhibit *in situ* germination in groundnut be tried.

Suitable shade tolerant and drought variety in groundnut under the Intercropping system with Redgram may be evolved – Vellore

- Drought tolerant semi spreading varieties viz., CO 6 and VRI(Gn)7 may be recommended.

GINGELLY

Rice fallow gingelly variety and cultivation technologies may be suggested like rice fallow pulses crop in delta area – Cuddalore

- VRI 1 is suitable for rice fallow condition.

Popularising white seed gingelly for its export quality, high price, low FFA through FLD may be taken up – Madurai

A suitable high yielding variety to replace SVPR-I may be evolved – Salem

- White seeded variety VRI 3 released during 2017 may be recommended.

Technologies for cultivation of Gingelly through Transplantation method may be suggested – Thiruvarur

- Research trial on sesame transplanting was tried at Regional Research Station, Virudhachalam and found that the technology is not feasible.

OILSEEDS

Improved seed drill for minimising seed damage may be suggested – Trichy

- Seed damage in existing designs is very less at 1-2 percent.

Power operated earthing up machine may be suggested – Trichy

- Earthing ridgers are already available.

Suitable technology for Hybrid seed Storage may be evolved – Trichy**Sunflower**

- In sunflower hybrid TCSH 1 and KBSH 1, for both hybrid and parental lines, drying the seeds to 7 % moisture content followed by seed treatment with halogen mixture @ 3 g / kg and packed in 300 gauge polythene bag maintained the seed viability with 70 % germination upto 12 months of storage. Halogen mixture : Calcium oxychloride : Calcium carbonate : Arappu (5:4:1)

Castor

- Drying the seeds to 7 % moisture content followed by slurry treatment with carbendazim @ 2 g / kg and storage in 700 gauge polythene bags maintained the seed quality upto 18 months with 87 % germination of parental line and hybrids of TMVCH 1.
- Dry halogen treatment with calcium oxychloride @ 3 g / kg of seed and stored in 700 gauge polythene bag stored under cold storage (5°C and 40 % RH) maintained the seed storability upto 12 months of storage with 80 % germination in YRCH 1 castor hybrid.

The oilseeds crops in majority are grown under rainfed condition resulting in poor yield. The cultivars used now are very obsolete and have lost their yield potential. Most of the oilseed crops have very short life and it is difficult to stock till the market improves. Moreover, the rain water harvesting structures which were once abundant in rural horizons have vanished and frequent occurrence of midterm and terminal drought and consequent crop failures, partial or total are making oilseed cultivation an uneconomical one. Besides, the crop management techniques are not cost effective as far as rainfed oilseed cultivation is concerned. Furthermore, limited avenues are existing for value addition in oilseed products and the low MSP fixed by GOI without factoring in the cost of cultivation have made the farmers wean away from oilseed cultivation. During 2017-18, the state has programmed to attain a SRR of 8% in Oilseeds and programmed to Procure and Distribute 8000 Mt of Oilseeds. However, less than 10 years old varieties are eligible for availing the production assistance under NMOOP-MMI & NADP for the year 2017-18. Moreover, less than 15 years old varieties are eligible for distribution of certified seeds under NMOOP-MMI & NADP for the year 2017-18. In these circumstances, the farmers in the state preferred to grow Groundnut varieties – TMV 7, VRI 5, CO 5, TMV 13, K6 and Gingelly varieties – VRI 2 which are more than 10 years old and hence these varieties are not eligible for availing the production assistance under NADP& NMOOP-MMI. Hence, Every year Department is facing biggest hurdle in extending subsidy for the certified seeds for more than 10/15 years old varieties as Government of India insists

on the pattern of assistance only for the stipulated age of varieties. In this regard, TNAU may make necessary arrangements to release more number of farmer preferred varieties under Oilseeds for successful implementation of schemes thereby increasing area and production.

- In Groundnut, TNAU released high yielding bunch varieties viz., VRI (Gn) 6 (2006), VRI 8 (2016), CO7 (2013) & ALG 06 320 (2017) and semi spreading varieties viz., CO6 (2010), VRI 7 (2008) for cultivation in Tamil Nadu.
- Apart from these varieties, promising cultures viz., ICGV 07222, TVG 0856 and BSG 0912 are under Adoptive Research Trial during the year 2017-18.
- In Gingelly, brown seeded variety TMV 7 was released during 2010 & VRI 3 (White seeded) was also released during 2016.
- Two Castor hybrids YRCH 1 (2009) with yield potential of 1788 kg/ha & YRCH 2 (2017) with a yield of 2089 kg/ha were released for cultivation in Tamil Nadu.
- In Sunflower, one high yielding variety COSF5 & one hybrid CO 2 with high yield and oil content were released. The Hybrid CO 2 has a potential yield of 1950 kg/ha under rainfed and 2230 kg/ha under irrigated conditions. It has high oil content (39.8%).
- Another promising Sunflower hybrid culture CSFH 12205 is being evaluated under Adaptive Research Trial during 2017-18. This culture has a potential yield of 2010 kg/ha.

COCONUT

Coconut Root Wilt resistant Variety may be evolved – Kanyakumari

- Growing root (wilt) disease tolerant coconut varieties viz., Kalpasree (Chowghat green dwarf) and Kalparaksha (Malayan Green Dwarf) in root (wilt) disease endemic areas is suggested.

Effective IPM measures for the management of root wilt disease may be suggested – Coimbatore

Cultural methods

- FYM @ 50 kg/palm/year is recommended.
- Green manure crops like cowpea, sunhemp, sesbania and *Calapagonium* may be sown in coconut basins during April-May and incorporated *in situ* during September-October.
- Inter cropping with banana, pepper, cocoa, turmeric, ginger, pineapple, nutmeg will be helpful to reduce disease pressure.
- If disease is in advanced stage, uneconomical palms yielding less than 10 nuts per palm per year should be removed.

Resistant variety

- Root (wilt) disease resistant coconut varieties viz., Kalpasree (Chowghat green dwarf) and Kalparaksha (Malayan Green Dwarf) can be grown in endemic areas.

Chemical method

- Fertilizers at the rate of 1.30 kg urea, 2.00 kg super phosphate, 3.50 kg potash (MOP) and 500 g of magnesium sulphate / palm / year is recommended.
- To manage the insect vectors, application of neem kernel powder 250 g around the base of the spindle leaf or spraying with dimethoate 1.5 ml + 1ml sticking agent dissolved in 1 litre of water for two times at monthly interval.

Root (wilt) associated leaf rot disease management

- The rotten portions of the spindle leaf and the adjacent two leaves should be removed.
- Hexaconazole 5 EC @ 2ml in 300 ml of water should be drenched around the spindle leaf.

Moisture conservation techniques and suitable agronomic practices for dryland coconut may be developed - Madurai

- Shade may be provided with coconut fronds to protect coconut seedlings from intense sunlight during summer.
- **Husk burial** - Basin may be opened to a radius of 1.0 to 1.5 m from the bole and coconut husks @ 100 numbers may be placed closely with convex surface facing upwards so as to prevent evaporation losses from the soil.
- **Composted coirpith** may be applied in the basin @ 50 kg /palm so as to conserve moisture.
- **Mulching** - Farm wastes (weeds) and green manures (twigs of glyricidia) may be applied in the basin @ 25 kg per palm so as to improve soil physical properties and water holding capacity.
- **Dried coconut fronds @ 15 -20 numbers** may be spread over the basin to prevent evaporation losses.
- **Potassium chloride @ 3.5 kg/palm** may be applied to induce drought tolerance ability in the palm. Avoid excessive application of chemical fertilizers in the event of moisture stress. Senile leaves of the lowermost whorls in the crown of the palm may be cut and removed so as to minimize transpiration losses from the leaves. Even in the event of surplus water availability, need based controlled irrigation may be practiced so as to harden the palm for drought events.

DXT coconut is widely used by farmers nowadays. It is a hybrid. The success rate of DXT coconut is less. Suitable technology to enhance the success rate of DXT coconut may be evolved – Thirunelveli

- The farmers are advised to procure the quality hybrid seedlings from authorized seedling production centres viz., State Agricultural Universities, Regional and Central Research Stations, State Agricultural farms or Coconut development board approved coconut nurseries. Moreover, the coconut farmers are recommended to follow the package of practices given by the Tamil Nadu

Agricultural University as given in the crop production manual.

During 2017 in Pollachi Taluk, incidence of Spiraling white fly was noticed and coconut trees were affected. Effective IPM measures for the management of Spiraling white fly in Coconut may be suggested – Coimbatore

- Erection of yellow polyethene sheets (3'x1') smeared with grease or castor oil at a height of 5 to 6' from the ground level to trap adult flies.
- Forcible water spray on the under surface of the leaves
- Spraying maida flour paste @ 25g/l to flake out the sooty mould
- Inoculative release of *Chrysoperla zastrowii sillemi* @1000 eggs / ha.
- Conservation of parasitoids like *Encarsia* sp. and the predators like *Mallada*, *Chrysoperla* and *Nephaspis* by avoiding chemical pesticide sprays.
- Need based botanical pesticide sprays with azadirachtin 1% 2ml/l

Cause of the unknown disease in Coconut palms reported in Anavayal Village of Thiruvankulam block with severe shedding of nuts resulting in reduction of the vigour of the palm, wilting, brown to black discoloration in trunk, nuts and roots mostly during the months of February to April may be identified – Pudukottai

- Investigations on the identification or cause of the disease are in progress. The samples were also sent to Central Plantation Crops Research Institute (ICAR), Kasaragod for analysis.

Alternate management measures for para wilt disease may be suggested-Perambalur

- Prolonged drought followed by heavy rains predisposes the disease.
- Adequate drainage should be ensured to avoid water logging.
- Recommended dose of fertilizers alone should be followed.
- Under irrigated condition, proper scheduling is to be followed to keep soil moisture around 50 per cent.

PULSES

Suitable variety and Technology for intercropping of pulses in sugarcane may be suggested – Cuddalore

- In areas of adequate irrigation, sowing one row of soybean or blackgram or greengram along the centre of the ridge on the 3rd day of planting gives additional yield without any adverse effect on cane yield. Intercropping of daincha or sunhemp along ridges and incorporation of the same on the 45th day during partial earthing up helps to increase the soil fertility and also the cane yield.
- The blackgram varieties viz., CO 6, VBN 6 and VBN 8 are recommended.

Salt water tolerant pulse varieties may be evolved – Ramnad

- The greengram variety VBN (Gg) 2 is salinity tolerant and hence may be adopted.

Varieties with non shattering (Grains) properties in greengram and blackgram with synchronized maturity in all seasons may be evolved – Theni

- The greengram variety CO 8 is having synchronized maturity and is recommended.
- The blackgram varieties *viz.*, CO 6, VBN 6, VBN 8 and MDU 1 are having synchronized maturity and may be adopted.

Suitable recommendations for foliar spray of water soluble fertilizers in paddy, pulses and cotton crops may be evolved – Thirunelveli

Paddy

- Foliar spray of 1 % urea + 2 % DAP + 1 % KCl at panicle initiation and 10 days later for all varieties.

Pulses

- Foliar spray of 1% urea on 30 and 45 days after sowing is recommended. In redgram, 0.5% MAP is recommended at 50% flowering and 15 days thereafter.

Study on basal application of fertilizers to Rice fallow Pulses may be taken up and suitable recommendations may be suggested – Thiruvarur

- Application of recommended dose of P (50 kg P₂O₅) to thaladi rice as 50% water soluble P fertilizer (SSP) and 50% as rock phosphate as basal will supply phosphorus to rice fallow pulses.
- As the rice fallow pulse is grown with residual moisture and residual nutrients only, application of DAP @ 50 kg ha⁻¹ before the last irrigation to paddy recorded an increased yield of Black gram under rice fallow condition.
- Application of 1% KCl + 2% DAP + 40 ppm NAA (Planofix) at 25 and 45 days after sowing is recommended.

A suitable variety with seed dormancy may be evolved – Trichy

- Varieties with seed dormancy may not be required for Tamil Nadu condition.

Ideal technologies to improve source-sink relation in Pulses crop may be evolved – Krishnagiri

- Studies on source-sink relations conducted concluded that foliar spray of brassinosteroid @ 0.1 ppm at 30 and 65 days after sowing increased the growth and bio-physiological parameters in red gram.

The normal area coverage under pulse crop in the state is 7.5.L.ha. Black gram and green gram are the major pulse crops cultivated in Tamil Nadu covering about 6 L. ha every year in which 30 to 35% of area comes from the rice fallow area in the delta districts of Thiruvarur, Nagapattinam, Thanjavur, Trichy and parts of Cuddalore. Rice fallow pulses are cultivated mostly as relay crop utilizing the residual moisture of

rice crop harvested in Dec- January.

ADT 3 and ADT 5 black gram and ADT3 green gram are the popular varieties cultivated in delta districts that covers about 90% of the rice fallow pulses area. These varieties grow well utilizing available moisture & dew and yields on par with other new varieties cultivated in the non-delta districts. Hence, farmers of delta districts prefer to go for only ADT 3 and 5 varieties though it was released 30 years ago.

However, Government of India has strictly informed that the subsidy for production and distribution of seeds cannot be extended for more than 15 years old varieties from current year. VBN 8 Black gram which is released during 2016 is said to be suitable for all regions but the notification is yet to be done to multiply it further. It is also informed that an alternate variety for ADT 3 Green gram is still awaited.

Hence, the subsidy for production, distribution or for demonstration under major schemes such as NFSM , NADP could not be extended to Delta district farmers who contributes about 30% of total pulses production.

Hence, TNAU may take action to notify the newly released blackgram varieties ADT 6 and KKM 1 and ensure that required quantity of seeds is available for further multiplication. Further, action may be initiated to replace the ADT3 green gram variety at the earliest to extend subsidy for delta district farmers.

- ADGG 13009 (Mutant of CO (GG) 7) is an identified greengram culture for rice fallow condition which matures in 65-70 days with an average yield of 613 kg/ha (Station trials) which is 16.3% yield advantage over ADT 3 and is under MLT. Under special OFT (8 locations) in the CDZ, the culture had recorded 508 kg/ha with 6.5% yield increase over the check ADT 3.
- ADGG 13034 (625 kg/ha) is another culture in the advanced stage having 16 per cent higher yield over ADT 3 in station trials under rice fallow condition.
- Among the released varieties, the performance of LGG 460 (743 kg/ha), TM 96-2 (694 kg/ha), VBN 3 (686 kg/ha) and CO 7 (674 kg/ha) were found to be comparable with ADT 3 (710 kg/ha) under rice fallow conditions. However, LGG 460 and VBN 3 were found to mature in 85-90 days.

REGRAM

High yielding short duration Redgram varieties suitable for transplantation may be suggested – Cuddalore

- The redgram variety CO (Rg) 7 is a short duration variety and is suited for transplanted condition.

Short duration redgram variety (120 days) with high yield suitable to inter cropping and bund cropping may be suggested – Dindigul

- The redgram varieties viz., CO (Rg) 7 and VBN (Rg) 3 are the short duration varieties with a duration of 120-130 days and suitable for bund and intercropping situations.

Redgram varieties with reduced anti nutritional factors like chymotrypsin inhibitors, lectins, polyphenols and flatulence factors to increase the bioavailability of nutrients may be developed – Madurai

- The high yielding varieties released by TNAU are having reduced quantity of anti-nutritional factors which are also being removed during the processing of dhal and hence are not posing any health issues upon consumption.

Red gram Varieties well suited for transplanting technique for both vegetable and grain purpose like Bangalore Redgram-1 may be evolved – Salem

- The recently released long duration redgram variety CO 8 is suitable for transplanting.

Suitable Redgram variety with 90 days duration suited for January-February sowing season may be suggested – Thiruvavur

- The short duration redgram varieties CO (Rg) 7 and VBN (Rg) 3 are suited for Jan – Feb sowing as sole crop under irrigated situation.

BLACKGRAM

Yellow mosaic virus resistant variety in Black gram for summer cultivation may be evolved – Dindigul

- The black gram varieties VBN 6 and VBN 8 are resistant to YMV and suited for summer irrigated condition.

Suitable variety to withstand high temperature during summer and adopting to Micro irrigation (Raingun and sprinkler) may be evolved – Vellore

- The black gram varieties VBN 6 and VBN 8 are recommended for summer season with micro irrigation.

Rice Fallow Pulses cultivation is done in Yela conditions and heavy summer rains received during April, May severely damages the crops and leads to crop loss or heavy reduction in yield as water stagnation persists for more than 24 hours. Varieties suitable for Rice fallow pulses cultivation tolerant to water stagnation may be evolved – Kanyakumari

- The recently released blackgram variety KKM 1 is recommended for rice fallow cultivation in Kanyakumari and also for Thamirabarani delta.

Availability of Breeder and Foundation seeds may be ensured as MDU I is preferred by millers for its high arabinose content – Madurai

- The breeder seed of the blackgram variety MDU 1 is being produced and will be supplied based on indent.

- Foundation seed production in blackgram var. MDU 1 will be taken up at KVK, Madurai, Sandhiyur, Sirugamani under seed hub programme during July 2017.

Short duration variety in blackgram with uniform maturity, similar to CO 8 in greengram may be evolved – Thirupur

- The blackgram varieties namely CO 6, VBN 6 and VBN 8 are having uniform maturity and non shattering pods and suited for single and or mechanical harvest.

Alternate new variety for ADT-3 may be evolved – Thiruvarur

- The recently released blackgram variety ADT 6 is recommended.

YMV resistant variety to replace Vamban 5 may be evolved – Thirunelveli

- The YMV resistant varieties viz., VBN 6 and VBN 8 are recommended.

Alternate new variety for ADT-3 and ADT-5 with YMV resistance may be evolved – Thirupur

- The recently released blackgram variety ADT 6 to replace ADT 3 and VBN 6 to replace ADT 5 are recommended.

GREENGRAM

Varieties replacing Greengram CO 8 with bold and lustre seeds may be suggested – Madurai

- The greengram variety CO 7 is having bold and shiny seeds.

Greengram is cultivated in around 6000 to 8000 Ha in Puduchatram, Elachipalayam and Rasipuram blocks during kharif season. VBN 2 and CO GG 912 performs better in yield but are susceptible to yellow mosaic virus. Yellow mosaic virus resistant, high yielding, varieties with synchronous maturity may be evolved – Namakkal

- The greengram variety VBN (Gg) 2 is moderately resistant to YMV and hence may be adopted.

COWPEA

Suitable alternate to Co (CP)- 7 with short duration and drought resistance may be suggested – Thirupur

- A new cowpea culture VCP 09-013 is identified as an alternate to CO (Cp)7 and is in advanced stage of evaluation.

Local variety (Konakai) may be improved for release as new variety – Dharmapuri

- The local culture konakai was evaluated along with Paiyur 1 and the yield

performance of konakai was found to be low. Hence, the Paiyur 1 is recommended for cultivation.

HORSEGRAM

New variety with same characteristics of Paiyur -2 may be evolved – Thirupur

- High yielding cultures to replace Paiyur 2 are in advanced stages of evaluation.

Suitable research may be carried out to evolve and release a new variety for Horse gram for Krishnagiri District as area is coming down due to changing monsoon and rainfall pattern and lack of new high yielding varieties – Krishnagiri

- High yielding cultures are in advanced stages of evaluation.

BENGALGRAM

Suitable alternate variety for CO -4 may be suggested – Thirupur

- The varieties viz., Jaki 9218 and JG 11 may be recommended.

COTTON

A seed drill cum intercultural package for rainfed cotton may be suggested – Madurai

- Broad bed seeder is already available for rainfed cotton.

Defoliant for matured leaves for synchronized harvest may be evolved – Madurai

- Foliar spray of paraquat exhibited complete drying of leaves within a day of spray but defoliation was not noticed. Hence, the study will be conducted.

Variety having sympodial branch only may be suggested – Madurai

Variety with single picking character may be identified – Dharmapuri

- Two pre-release compact cultures TCH 1819 (seed cotton yield: 2310 kg/ha) and TCH 1822 (seed cotton yield: 2331 kg/ha) are identified for High Density Planting system (HDPS) which are having zero monopodia and < 130 days duration. Now these two entries are in ART.

Bt infused cotton varieties to reduce the over dependence on Bt Hybrid Cotton Seeds may be evolved. A suitable extra-long staple Bt cotton variety may be evolved - Ariyalur

- A total of 22 Bt entries were evaluated by ICAR CICR-Regional station, Coimbatore during 2016-17 which were sponsored by public and private sectors. Central Variety Identification Committee has identified three entries (CICR Bt-6, CICR Bt-7 and PAU Bt1) for north zone for this year. Bt entries suitable for south zone is to be disclosed by CICR shortly.

- Bt cotton entries to be identified by CICR-RS may be under ELS category.
- Newly released cotton CO 14 is an extra-long staple cotton variety suitable for winter irrigated condition.

**New high yielding variety to replace Surabi may be recommended - Namakkal
A suitable extra long staple cotton variety to replace MCU5 may be evolved - Thirunelveli**

- Cotton CO 14 is a new variety which was released during 2016. It is an extra-long staple cotton variety (> 35.0 mm) with high yield. It will replace MCU 5 & Surabhi.

Suitable measures / techniques to manage Eriophyid mite at the time of cotton kapas storage may be suggested – Perambalur

- Cotton kapas while storing may be contaminated with house dust mite but not eriophyid mite. Kapas is to be stored only after proper drying in sun as the wet kapas favours mite incidence. It is not advisable to go for any chemical pesticides.

Suitable Machinery to pluck the kapas with moisture and pest attack along with well dried Kapas may be developed - Trichy.

- Pneumatic picking machinery has been developed already. But trash inclusion is excessive.

Suitable resistant varieties and bio-control measures may be evolved to control mealy bug – Ramnad

- Application of neem seed kernel extract (NSKE 5%) 50ml/l + neem oil 5ml/l + detergent powder 1gm/l as spot application on infested stalks.
- Spraying fish oil resin liquid 10ml mixed with neem 10ml/l or Karanj oil 10ml/l
- Releasing *Cryptolaemus montrouzieri* adults /grub @ 10 per infested plants wherever available.
- Application of biopesticides viz., *Verticillium lecanii* (2×10^8 CFU /gm) 10gm/l and *Beauveria bassiana* (10^8 spores/ml) 10ml/l.

SUGARCANE

Studies to adopt the system of permanent sprinkler/raingun for sugarcane with low cost and high WUE based on water quality and wind velocity may be taken up – Madurai

- The sprinkler/raingun method of irrigation is usually recommended for vegetables, fruit crops and millets etc. In sugarcane cultivation, the wider spacing of 4 and 5 feet is mostly recommended at present. In these types of irrigation systems, sugarcane being a widely spaced crop, the irrigation water might have

- drenched the entire land soil surface which facilitates excessive growth of weed species. It would also decline cane yield considerably. In addition, the excess drenching of sugarcane inter-row spacing's would lead to wastage of irrigation water with lesser WUE. Hence, the need for evolution of sprinkler rain gun for sugarcane may not arise at present.
- Based on the evaluation of different type of pressurized irrigation systems, it was found that the drip system of irrigation was more suitable to sugarcane. With the introduction of advanced technology like SSI, establishment of raingun / sprinkler system of irrigation involves more cost and difficult to operate under water scarce condition. Further, the wider row adoption for tiller promotion and mechanized cultivation of cane is highly suitable with drip system of irrigation to increase the productivity of cane and reduce the investment cost on drip by making reuse of laterals.

A detailed trial to remove the scum from jaggery using dried bhendi powder in Alanganallur block may be conducted by KVK in coordination with Sugar mill – Madurai

Juice clarificant from wild bhendi (Kattuvendai)

- Many phyto - clarificant have been reported during the last 60 years from Sugarcane Research Station, Tamil Nadu Agricultural University, Melalathur. Among the phyto – clarificants, extract from wild bhendi / bhendi (lady finger) was found to be quite effective juice clarificant for organic jaggery making. Since wild bhendi is not available during peak period of jaggery manufacturing, there is a need to prepare phyto – clarificants as ready to use form for supply during jaggery manufacturing. Keeping this in view, a ready – to - use clarificant powder has been prepared from wild bhendi stem.

Preparation of ready to use vegetative clarificant powder

- The clarificant powder is prepared from the shade dried wild bhendi stems collected at seed formation and maturity stages of the plant. Wild bhendi stem is thoroughly washed with tap water. After drying, stem and branches are separated out and then scrapped by using motorized cane preparator. The scrapped sample material is kept for drying under shade. The dried stem is subjected to grinding for preparation of powder. After grinding, powder (<1 mm light yellowish and greenish brown coloured particles) is sieved out from fibrous stem material. Powder thus obtained is kept in bottle / packed in polyethylene.
- **Method of Use:** 25g wild bhendi stem powder is suspended in 2 litres water and mixed thoroughly. After 1 hour, the mucilaginous extract is filtered. It is used for clarification of 100 litres of cane juice. Good quality of organic jaggery prepared from cane juice using ready to use wild bhendi stem powder (25g/100 lit juice) is similar to the jaggery prepared using fresh wild bhendi stem (aqueous extract of 40 g stem in 2 litres of water / 100 litre juice). Clarificant powder prepared from shade dried stem of wild bhendi plant harvested at seed

- formation and maturity stages can be used in place of the most commonly used hazardous chemical clarificant such as sodium hydrosulphite.
- Since, the technology procedure for utilization dried bhendi powder is already been formulated by SRS, Melalathur, a detailed trial to remove scum from jaggery may not be needed.
 - KVK can conduct a trial accordingly.

A suitable variety to replace CO 86032 with red rot and internode borer resistant character may be evolved - Namakkal

Suitable multi ratoon variety in sugarcane may be evolved – Theni

- The recently released early season sugarcane variety CoC 25 was found to be promising for both enhanced cane and sugar yield. This variety was also found to tolerate water stress situations. It is also moderately resistant to red rot disease with early vigour and suitable for multiratooning.

Special feature of CoC 25

Parentage : Co 85002 x HR 83-144
 Cane yield : 142.75 t/ha
 CCS : 12.77%
 Cane yield (ratoon) : 135.00 t/ha.

The pre-release culture C 29442 under ART may replace the variety Co 86032. Since, it has the following promising features

- High yield (141.50 t/ha)
- High quality (CCS-13.15%)
- Non-lodging and suitable for mechanical harvesting
- Moderately resistant to red rot and borers.

Technology to produce Single budded sugarcane seedling in farmers field not having shade net may be suggested – Theni

Chip bud seedling nursery

- Young seedlings are raised in the nursery. It is better to establish a shade net shed for the purpose of nursery management. It is a fully covered structure meant to provide shade and create favourable climatic conditions like warm and wind free environment. For raising the nursery, fill half of each cone in the protray with coco-pith. Place the buds flat or in a slightly slanting position in the cones of a tray. Do not press or push it hard. Ensure that the bud side faces up. Cover the bud chips in trays completely with coco-pith. After filling all the trays, place them one above the other and finally keep an empty tray upside down at the top. About 100 trays (4 sets, each consisting of 25 trays) are to be placed together and wrapped tightly with polythene sheets. Place small weights on the bundles and keep it for 5 to 8 days in the same position to create high

- temperature and humidity. Take measures to control termites around the trays by drenching the soil with Chlorpyrifos 50 EC (2 ml/l). Take care to select healthy buds while chipping, treatment and **placing** in trays.
- Bud treatment helps for about 90% of germination. For 1 acre plot, 5000 buds, 100 trays (each with 50 cones) and 150 kg coco-pith are sufficient from the nursery.
 - Step-wise guide for SSI practices be followed to ensure that there are no weeds in and around the nursery area. Care should be taken to avoid water, air or sunlight entering into the trays by tightly covering and keeping the bundles in shade net or preferably inside a room. Artificial warmth through electric bulbs if the climate is too cold can also be created. This is the most crucial phase of the nursery management. Under proper conditions (especially, warm temperature) within 3 – 5 days, white roots (primordia) will come out and shoots will also appear in next 2 to 3 days. Either on the 5th or 8th day (based on the climatic conditions), all the trays with sprouted buds are to be removed from the polythene sheet and kept side by side in bed on the ground to facilitate watering and other nursery management practices.
 - Based on the moisture content of coco-pith, watering to the trays (seedlings) has to be initiated in the evenings for the next 15 days using rose cans. After the appearance of two leaves, application of water can be increased gradually depending on moisture level in trays. During six leaf stage (about 20 days old seedling), grading of the plants has to be done. Watering can be stopped for a day to loosen the coco-pith in the trays which enable easy lifting up of the young seedlings. Plants of similar age (height) can be lifted up and placed in one tray. This way grading of plants according to their height is achieved and damaged or dead plants can be removed.

Single bud seedlings nursery

- Conventionally, single bud seedlings, chip bud seedlings, germinated setts and sprouted sugarcane stubbles are used for gap filling in the ratooned sugarcane. Among them, the single bud seedlings establishment in the main field is very limited, since the nutrient content of the single buds are at minimum. Although there are technologies to raise single bud seedlings in farmer's field, negative features are also acquainted with single bud seedlings.
- Since the nutrient content in single bud seedlings are very low, the crop faces initial setback in its establishment.
- Mostly, the seedlings are to be raised in raised plots as there is a chance of root competition and root entanglement which would affect seedlings harvest itself.
- Commercial production of single bud seedling nursery need to be reconsidered as it is an labour and time consuming and less remunerative technology. Moreover, the seedling mortality percentage is higher when it is transplanted in main field.
- Hence, for both chip bud and single bud seedlings, the installation of shade net is

essential so that healthier, uniform age group seedlings free from pests and diseases could be obtained.

- To have an optimum sprouting of the single bud seedling, the perfect environmental condition must be assured under shade net.

Effective eco-friendly white grub management strategies / resistant varieties may be development -Dharmapuri.

- Repeating deep ploughing at the time of land preparation to expose quiescent adults for desiccation and the vertebrate predation.
- Ploughing and flooding the field near neem trees will bring grubs to the surface which can be collected & destroyed.
- Manual collection of easily detectable third instar grubs in the fields showing yellowing and drying of clumps late in the season will reduce perpetuation of this pest.
- Large scale manual collection of beetles that congregate on neem leaves on the night of emergence, immediately after first showers during May-June reduces beetles population progressively for few years.
- Being the beetles are not attracted to light actively, the neem trees should be shaken vigorously to dislodge the beetles, which will then be attracted to light sources such as jeep or tractor head lights.
- The beetles thus collected can be immersed in insecticidal solution of chlorpyrifos 20EC @ 2ml/litre of water and destroyed. The collection has to be continued for a week.
- Soil application of *Metarhizium anisopliae* 4×10^9 cfu-5 kg is significantly effective in reducing white grub population. This formulation may be mixed with suitable quantity of FYM or well cured press mud and applied along furrows followed by irrigation.
- Repeated application over a few years may be needed to build up of the inoculum of fungus in the soil to enable it to act as a self perpetuating mortality factor.
- Under severe infestation, puddling and rotation with paddy will reduce grub population.
- Development of resistant varieties is long term process.

Private Variety certified seeds

Restrictions on Variety release by Private companies may be recommended - Madurai

- Crop variety notification is done by the Central Sub-committee on crop Standards, Notification and release of varieties in Agricultural crops as per the Seed Act, 1966. State Agricultural Universities cannot interfere with the functioning of that Government Agency.

Evolving suitable Daincha variety

Suitable Daincha varieties for green manure seed production may be evolved – Tirunelveli

Green manure Variety with high canopy and more vegetative growth may be evolved – Coimbatore

- Efforts are being taken to evolve high yielding varieties in sunhemp and daincha.

Weed control technology

Effective weed control technology in machine transplanted rice may be suggested – Cuddalore

- TNAU developed a two row power weeder with active cutting blades. This weeder is commercially manufactured. This weeder can cut and remove the weeds and hence is suitable for all types of weeds. Normally, machine transplanted rice has a row spacing of 300 mm. The TNAU Power weeder has a special weeding rotor of 200 mm width and extended shaft for use in such machine transplanted rice at 300 mm spacing.

Water saving technology

Sensor based irrigation method for Micro Irrigation may be evolved – Kancheepuram

- Modeling of water movement and availability are being carried out extensively using sensors. Based on this work, low cost sensors will be developed.

Direct Sowing Using Drum Seeder in Paddy

In direct sown paddy crop using drum seeder, the spacing between rows is maintained and not between the plants. Drum Seeder in Paddy to do sowing in a square manner and with provisions for proper adjustments may be designed - Kanyakumari

While planting using Paddy Transplanter, the row to row spacing of 25 cm is maintained and not the plant to plant spacing. Since the planting is not in a square type, the conoweeder can be operated only between the rows and not between the plants. Provisions in Paddy Transplanters to adjust to the spacing required may be suggested – Kanyakumari

- TNAU had taken up research to overcome the scatter of seeds along the row in case of drum seeded rice and to ensure accurate placement of the seeds in hills. This technology plants three seeds per hill unlike 8 to 12 seeds in drum seeded rice. In case of transplanter, the machine will be able to plant at spacing of 25 cm by 25cm. However, alignment of the plants across the row is not yet feasible.

**Suitable mechanical picking machine may be developed & suggested – Trichy
Combined pulses harvester to mitigate the problem of labour shortage may be evolved – Namakkal**

- Selective picking of green cowpea is not yet evolved. But combines can be used for harvesting cowpea after plant maturity in single sweep.
- Commercial pulse combines are already available. These harvesters may be used by suitably selecting the varieties that mature evenly.

Groundnut Harvester

Mechanized groundnut harvester may be evolved – Namakkal

- A self propelled combine harvester for pulling out the plants and separating the pods had been developed. This combine requires cultivation of groundnut in raised beds. Research is also taken up to develop a picker combine that can pickup groundnut dug by existing diggers and separate the pods under dry condition.

Sugarcane Harvester

Sugarcane harvester to harvest the crop at all row spacing in minimum land area and to overcome the labour problem may be evolved – Namakkal

- Sugarcane harvesters cut, detrash and collect the harvested crop in form of billets or wholecane. These machines are available at row spacing of 120 cm and 150 cm. The cultivation practice is to be changed to adopt these spacing for mechanized harvesting.

Power weeder for row crops

Power weeder suitable to row Crops to reduce the input cost may be evolved – Namakkal

A cost effective power weeder may be evolved - Karur

- TNAU had developed power weeders for row crops and many designs of power weeders suitable for different row spacing are available commercially. These weeders may be used according to the row spacing of the crop.
- Cost effective mechanical weed control will require proper planning of the plant geometry and provision of head lands to enable tractor mounted inter cultivators to be operated to remove the weeds.

Seed drill machines

Special seed drill machinery for dry sowing even in the absence of fine tilth in the field may be evolved – Ramnad

- For proper germination of seeds, a seed bed of fine tilth is required. Though seeds can be sown by seed drills at any tilth, the gemination will be poor especially for fine seeds.

Low cost Dhal Processor

Machinery for the value addition of Pulses Grains into Dhal by farmers in the normal power supply may be evolved – Ramnad

- For dehusking redgram and black gram, improved mini dhal mill of 30 kg / hour capacity run by 2hp electric motor developed by the Department of Food and Agrl. Process Engineering may be used. Also for dehusking black gram, emery roller type machine with 50 to 75 kg/h capacity is available for farm level processing.

Suitable technology for sowing of rice fallow pulses in paddy fields harvested by the combined harvester may be suggested – Thirunelveli

- TNAU had already developed and released a tractor drawn pulse seeder that is specially suited for sowing pulse. However, damage to the rice fallow pulse crop by subsequent operation of the rice combine cannot be avoided.

Evolving Wetland Laser Leveler

In Tiruvarur District wetland paddy is cultivated in about 180000 Ha in Kuruvai, Samba and Thaladi seasons. Most of the soil is clayey loam and leveling is not possible in wet condition. Laser Levelers in dry condition alone are available and wetland laser leveler may be evolved - Thiruvarur

- TNAU had developed a technology for controlled puddling using laser levelling system. This system can be adopted in rice cultivation.

Portable Pulses harvester

Suitable portable pulses harvester may be evolved – Thiruvarur

- Commercial pulse combines are already available. These harvesters may be used by suitably selecting the varieties that mature evenly. However, machinery for selective harvesting of pulse is not feasible.

Combined harvester cum thresher for ragi and other minor millets may be suggested – Erode

- Small millets like ragi may be harvested by reaper binders or vertical conveyer reapers and threshed by using the commercially available multicrop thresher.

Water saving technologies other than Sprinkler, drip and rain gauge may be developed for all crops – Erode

- Water conserving machineries are available for use. Techniques like residue mulching and plastic mulching are also available for use.

GENERAL

Remedial measures for salinity

Suitable remedial measures for salinity may be suggested – Cuddalore

- Saline soils are characterized by higher amount of water soluble salt due to which the crop growth is affected. For these soils with electrical conductivity of more than 4 dS m^{-1} , provision of lateral and main drainage channels of 60 cm deep and 45 cm wide and leaching of salts could reclaim the soils. Application of farm yard manure at 12.5 t ha^{-1} at 10 - 15 days before transplanting in the case of paddy crop and before sowing in the case of garden land crops can alleviate the problems of salinity or Green manure crop can be grown and incorporated in to the soil at appropriate stage.

Application of bio products

Quality evaluation parameters for the products viz., humic acid, seaweed extract and nitrobenzene may be developed – Madurai

- Standard analytical procedures that are adopted in TNAU can be followed.

Eligible Bio products to be included in Insecticide Act 1968 may be recommended – Madurai

- Already included in the insecticide act 1968.

Pradhan Manthri Fasal Bima Yojana (PMFBY) – Madurai

Individual farmer crop wise insurance – Madurai

- The crop insurance scheme, Prime Minister Fasal Bima Yojana (PMFBY) implemented in Tamil Nadu envisages the village as an insurance unit. TNAU – Department of Remote Sensing and GIS, supports the crop insurance scheme through RIICE satellite technology to identify areas under prevented / failed sowing and assesses yield loss at village level. The data has been generated using Sentinel 1-A from European Space Agency for 8106 villages of 16 districts of Tamil Nadu during Samba 2016 and shared with the Commissioner of Agriculture. However, if necessitated, the technology is capable of generating information at farm level through the use of high resolution (3–20 m) SAR satellite images with a revisit period of 6 – 20 days.

Those who raised crop may become eligible for enrollment without any restriction in all villages may be suggested – Madurai

- This is a policy issue, hence to be represented to the Government (Commissioner of Agriculture) and subsequently in the SLCCCI of the State.

Minimum 15 days required for conducting DLMC and declaration after the cutoff date of Prevented sowing – Madurai

- TNAU RIICE technology is capable of delineating villages under prevented sowing in PMFBY using SAR satellite data during the cropping season given the sowing window for declaration of prevented sowing. The sowing window and the cutoff date for invoking prevented sowing have to be fixed in the SLCCCI. Hence being a policy issue, representation has to be made to the Government (Commissioner of Agriculture) and subsequently in the SLCCCI of the State.

PPFM spray

Technology for PPFM spray with lesser quantity of water with normal sprayer may be developed – Perambalur

- The spray fluid recommended is already in correct quantity depending on crop canopy and coverage results. Hence, there is no need to reduce the spray fluid.

Bio Chemical

Specific chemical like Mukti, a bio-chemical weedicide to control Parthenium Weed may be suggested – Perambalur

- Parthenium weed can be controlled very well through herbicides and biocontrol method in non crop situations. The efficiency of Mukti weedicide has not been tested by Tamil Nadu Agricultural University.

Drip irrigation

Low cost chemical / acid for removal of salt deposits in drip irrigation emitters which is compatible with fertigation may be suggested – Perambalur

- If the water soluble fertilizers are used for fertigation, clogging problem could be avoided. Because the WSF themselves act as acid cleaners removing the salts periodically.
- Dilute Hydrochloric acid at 33 percent concentration mixed with 1:1 proportion with irrigation water may be used for cleaning the drip irrigation system once in three months. Around 5 litres of dil. HCl may be required for one ha.
- Phosphoric acid can also be used. Other acids like Nitric acid, Sulphuric acid should not be used for acid wash.

Management of Alkaline soil

Alternate management measures for Alkaline soil management with calcareousness for which Iron pyrites is recommended (not available in market) may be suggested – Perambalur

- Application of elemental sulphur @ 40 kg ha⁻¹ along with sulphur oxidising

bacteria (2 kg /ha) can be done in alkaline soil with calcareousness.

Automatic Weather Station

Maintenance measures for all the 20 Automatic Weather Stations (AWS) installed may be taken up – Salem

- Automatic Weather Stations in Salem district were installed during NADP phase I (2009 -11) and properly handed over to the concerned Additional Director of Agriculture during 2013-14 as per project mode of operations.
- In Salem district, out of 20 AWS, three blocks viz., Macdonaldchoultry, Macheri and Sankari are not working due to theft, One AWS at Idapadi is not working due to damage and one at Omalur was dismantled due to the request by Periyar University for want of land for building and agreed to provide new location for installation. During the AMC and warranty, the theft and damaged sites in all over Tamil Nadu were replaced with new one by the suppliers without any charges till 2016 which is not a commitment in AMC/Warranty. Still the damage and theft are continuing in both old and new locations, the suppliers have not done any replacement after 2016 and now demand funds for replacement.
- There will be a separate session for discussing the problems associated with ASWs across all the districts of Tamil Nadu.

IPM techniques for false smut may be evolved to increase the rice productivity – Namakkal

- This disease appears particularly during *samba / thaladi* seasons, hence growing of varieties CO 43, ADT 38, BPT 5204 and CR 1009 may be avoided during *samba / thaladi* seasons in disease prone areas.
- Avoid the use of seeds from disease affected field.
- Wet seed treatment with *Pseudomonas fluorescens* @ 10 ml/kg (or) Carbendazim @ 2 g/kg in 1 lit. of water may be adopted
- Optimum time of sowing should be followed
- Judicious application of nitrogenous fertilizers particularly at booting stage helps in containing the disease.
- Spraying Copper hydroxide 77 WP @ 2.5 g (or) Propiconazole 25 EC @ 1 ml/lit of water once at boot leaf stage and again at 50% flowering is recommended. This disease appears particularly during *samba / thaladi* seasons, hence growing of varieties CO 43, ADT 38, BPT 5204 and CR 1009 may be avoided during *samba / thaladi* seasons in disease prone areas.
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Crop specific and regional specific technological measures for pest and diseases management for paddy and Pulses in correlation with prevailing weather condition may be suggested – Nagapattinam

Rice Pest

August -September

Incidence of leaf mite, black bug and stem borer is expected, minor incidence of rice hispa, whorl maggot also may appear in the region.

October-December

- In samba and thaladi crops, stem borer and leaf folder incidence is expected to appear above ETL.
- In the later stage of crop of susceptible varieties like BPT 5204, BPH incidence may be expected.

Management

Black bug, rice hispa and whorl maggot	–	Chlorpyriphos 1250 ml/ha
Leaf folder and Stem borer	-	Cartap hydrochloride 1000 gm/ha or chlorantranilipole 150 ml/ha
Leaf mite	–	Dicofol 500 ml/ha or fenazaquin 200 ml/ha
BPH	–	Imidacloprid 150 ml /ha or Buprofezin 300 ml/ha

Rice Diseases

- Preferably grow disease resistant varieties ADT 36, 38, 39, 42 and CR1009 for blast, CO 45 for blast, BLB and RTV, moderately resistant hybrid CORH3 for RTV, which is also resistant to blast. Seed treatment must be followed during *samba / thaladi* seasons in Cauvery delta zone to eliminate the seed borne inoculum as the season is most conducive for the development of diseases in rice.
- Seed Treatment with TNAU Pf1 liquid formulation, 10 ml/kg of seeds
- Seedling root dipping with TNAU Pf 1 liquid formulation (500 ml for one hectare seedlings). Stagnate water to a depth of 2.5cm over an area of 25m² in the main field, mix with *Pseudomonas fluorescens* liquid formulation in the stagnated water. The seedlings pulled out from the nursery are to be soaked for 30 min in the stagnated water and transplant.
- Foliar spray with TNAU Pf 1 liquid formulation @ 5ml/lit of water with 2.5x10⁸ cfu/ml at 45 days after planting and based on disease severity, it can be repeated twice or thrice at 10 days interval.
- Excessive application of nitrogenous fertilizers should be avoided irrespective of the season.

- When disease intensifies, application of carbendazim @ 200 g /ac (Blast, Sheath rot, Sheath blight and brown spot) / propiconazole 200 ml/ac (false smut) / streptomycin sulphate + tetracycline combination 120 g + COC 500 g /ac (bacterial Leaf blight) may be practised.

Pulses Pest

- IPM module consisting of seed treatment with imidacloprid 17.8 SL @ 5ml/kg of seed + *Trichoderma viride* 4g/kg, growing 2 row of maize as barrier crop, installation of yellow sticky trap @ 50/ha and spraying neem oil soap @1% on appearance of whitefly on yellow sticky trap and applying acetamiprid 20 SP @ 20 g ai /ha specifically against whitefly in mungbean.
- Sequential application of chlorantraniliprole 18.5 SC 150 ml/ha >flubendiamide 480 SC 125 ml/ha >dimethoate 30 EC 1000ml/ha against pod borer complex in pigeonpea, while for other pulse podborers, either chlorantraniliprole 18.5 SC 150 ml/ha or flubendiamide 480 SC 125 ml/ha.

Pulses Disease

- Redgram wilt incidence will be more during summer season. To manage the wilt disease, seed treatment with carbendazim @ 2g/kg of seeds and soil drenching with carbendazim @ 1 g/lit. (or) seed treatment with *Trichoderma viride* @ 4g/kg of seeds and soil application @ 2.5 kg/ha (Mixed with 50 kg FYM and incubated for 15 days. This has to be mixed with the recommended dose of FYM and applied).

Suitable biological control measures by the release of Predators for the Slug Catterpillar may be suggested – Kanyakumari

- Naturally occurring pentatomid predator has to be conserved. No mass multiplication technique for the predator is available.

Low cost control measures to manage sucking pests in Pulses may be suggested – Thirupur

- Seed treatment with imidacloprid 5 ml/ kg seed followed by NSKE 5% at the early stage of pest occurrence assessed through yellow sticky trap @ 30/ ha or acetamiprid 20 SP @ 20 g ai /ha upon crossing ETL.

Bio control Agent

In Namakkal district, the Incidence of woolly aphid was seen. Suitable control measures were taken. The bio control agent *Dipha aphidivora* may be mass multiplied and supplied to affected areas. Adequate quantity of *Dipha aphidivora* to farmers during massive attack of woolly aphid may be ensured – Namakkal

- The biocontrol agent *Dipha aphidivora* is amenable only for *in situ* multiplication and cannot be mass multiplied in the laboratory condition. Field shade net cages are to be used to cover 5x5m area infested with woolly aphid and released with

Dipha larvae for multiplication as inoculative release. After 40 days, larvae and cocoons of the *Dipha* can be collected and released in the nearby infested pockets.

Weedicide

Suitable weedicide for rainfed Groundnut to reduce the labour consuming hand weeding may be evolved – Namakkal

- Pre-emergence application of pendimethalin @ 1.0 kg/ha followed by quizilafop ethyl @125g/ha and imazathapyr @37.5 g/ha as tank mixture at 2-3 leaf stages of weeds can be recommended.

Birds scaring and Animals

Suitable sound system equipment to overcome the problem of Peacock and monkey which often damage the crops in farmers field may be suggested – Pudukottai

Mechanical Methods to drive away birds using solar and wind energy may be evolved – Ramnad

Suitable technology to scare the birds by mechanical means or any other harmless meyhods may be evolved – Coimbatore

- The solar powered (74W) bird scarer with charge controller (12V, 6A), two parabolic reflectors (40 x 20 cm, 80 x 60 cm) and mirrored balls (3nos. – 17 cm dia) was developed at AEC&RI, Kumulur to drive away the birds. Field tests were conducted in teak and paddy fields at AEC&RI, Kumulur and Monfort farm at Manapparai. Birds scaring sounds were played for different play back and pause period using 60W Amplifiers with two horn speakers (15W). The sounds include gun, crackers, bomb, bird scary sounds, fearsome animals. The birds like sparrow, crane and parrot were scared to the distance of 60 m from the unit for a sound level of 70 – 80 decibels. But they get accustomed to these sounds and make them ineffective soon.

Suitable cropping programme for Noyyal river polluted areas

Suitable crops and varieties & inter crops for coconut gardens for effluent affected soils may be suggested – Thirupur

- Although specific studies on suitable crops and varieties as intercrops for coconut garden for effluent affected soils have not been done, the following may be adopted for maximizing the crop production.
- The soils affected due to dye effluent contain a high concentration of sodium and slowly become sodic soil. Reduction in salt concentration in soils could be accomplished through reclamative leaching.
- The technology package for reclamation of the soils includes, selection of salt tolerant crops, application of amendments (example gypsum) and use of biological amendments (compost/ green manures), leaching and drainage.
-

- The following salt tolerant crops may relatively withstand in the textile industry affected soils

Crop	Threshold salinity (dSm⁻¹)
Cotton	7.7
Sorghum	6.8
Soybean	5.0
Cowpea	4.9
Groundnut	3.2
Rice	3.0
Sugarcane	1.7
Mung bean	1.0
Cluster bean	8.8
Cucumber	2.5
Tomato	2.5

- **Flower crops:** Cockscomb, Crossandra, Marigold and Tuberose
- **Fodder Crops:** Cumbu Napier hybrid
- **Oil seed crop:** Sesamum
- The above mentioned crops are suggested as inter crops for effluent affected soils under coconut

Alternate Micro Irrigation methods

Suitable alternate micro irrigation methods for water saving in high EC areas may be suggested – Thirupur

- Normally, Micro Irrigation methods are suitable for irrigation water with EC<2. If it is high, frequent clogging of emitters will occur. Frequent acid cleaning is necessary. Fertilization to be made compulsory to reduce PH level.

Water conservation technology in Kozhukattai grass lands

Suitable water conservation technology without affecting the prevailing Kozhukattai grasslands may be suggested – Thirupur

- Addition of organic manures @ 5 t/ha will improve the water holding capacity of grasslands.
- Mulching with bio products may be done in early period of grass slip planting to reduce evaporative demand.

Suitable technology for foliar spray of micro nutrients

Suitable recommendations of foliar spray of micro nutrients in all crops may be evolved – Thirunelveli

- Similar to macronutrients, soil testing for available micronutrients need to be performed for micronutrient applications. When the soil test values go below the critical limit of the particular micronutrient, there is a need for micronutrient fertilization. Without soil testing, indiscriminate application of micronutrient fertilizers needs to be avoided. In addition to soil application, foliar sprays are found to correct nutrient disorders in plants during the crop growth period. The details of foliar spray recommendations are given below.

Micronutrient	Micronutrient Fertilizer	Concentration of foliar spray
Zinc	Zinc sulphate	0.5 %
Iron	Ferrous sulphate Citric acid	1.0% Ferrous sulphate + 0.10 % Citric acid
Manganese	Manganese sulphate	0.2 %
Copper	Copper sulphate	0.2 %
Boron	Boric acid	0.2 %
Molybdenum	Sodium molybdate or Ammonium molybdate	0.05 %

Technologies for reduction of salinity in borewell water

Technology to reduce salinity of borewell water during Summer and Kuruvai may be suggested – Thiruvarur

- Reducing the salinity of borewell water is not possible at low cost. However, salinity can be managed by growing suitable crop, cultural practices and suitable fertilizer management.

Crops	Threshold salinity (dS m ⁻¹)
Field crops	
Cotton	7.7
Sugarbeet	7.0
Sorghum	6.8
Wheat	6.0
Soybean	5.0
Groundnut	3.2
Rice	3.0
Maize	1.7
Sugarcane	1.7
Vegetables	
Tomato	2.5
Cabbage	1.8

Potato	1.7
Onion	1.2
Carrot	1.0
Fruits	
Citrus	1.7

Recommendation of *Pseudomonas*

The combined spray of 1 Litre *Pseudomonas* with 1 Litre curd to arrest the BLB and Bacterial leaf streak diseases in paddy may be studied and suitable recommendations may be given – Thiruvapur

- The results of combined application of 1 litre Pf1 + 1 litre curd under field condition during kharif 2016 showed grade 4.3 disease score for BLB with the yield of 5450 kg/ha compared to increased disease score (6.0 and 7.3 grade respectively) and reduced yield in individual application. However chemical spray (copper hydroxide) recorded grade 3.0 disease score with the yield of 5873 kg/ha. The trial will be repeated during ensuring season for the confirmation.

Control measures for eradication of *Ipomea* and Water Hyacinth

The biological control measures for eradication of *Ipomea* and Water Hyacinth may be evolved – Thiruvapur

- The biological organism for the control of *Ipomea* is not yet evaluated, where as, *Neochetina eichhorniae* weevil can be recommended for biological control of water hyacinth.

Solar power

The possibility of developing village level solar power grid by establishing solar panels at common points in each revenue village and generating solar electricity by Government or farmer groups and distributing electricity to bore well farmers at subsidized cost may be suggested – Nagapattinam

- Establishing solar power plant is possible in village level by installation of solar PV panels in a common place. The land to be selected may be a barren land or Government owned property which belongs to revenue village. One such type of solar power plant is working at Velliangadu, Karamadai Union, Coimbatore district. A group of 16 farmers are using solar power for irrigation purpose on time basis within 4.5 km surrounding area. The irrigation area coverage is about 28.34 ha with cost of solar power plant about Rs.14 lakhs. This is an off-grid AC powered solar pumps with Crystalline – Silicon solar modules. The area covered for the installation of solar modules is 143 m². The solar grid power can also be done by connecting generated solar power to common feeder in a village.

Remedial measure

Recommendation of remedial measures for Leather Tannery effluent affected areas may be suggested – Vellore

In tannery effluent discharged sites, soils have become saline and saline sodic.

For the soils with a pH more than 8.5 and ESP more than 15

- The soil should be ploughed at optimum soil moisture regime and then gypsum (50% requirement) should be broadcasted or incorporated uniformly in the surface soil (0 to 10 cm depth). The water should be impounded for a week and leached by providing drainage. Application of gypsum can be made either directly or by mixing it with standing water to facilitate leaching of reaction products to hasten reclamation. Proper levelling of fields is an important pre-requisite. Fields should be provided with 35 – 40 cm high strong bunds to retain rain water and also to prevent entry of water from outside.
- Organic manures and green manure application will improve biological activity of the affected soils. Green manure should be applied at a rate of 5 t/ha, 10 to 15 days before sowing or transplanting of crop.
- Selection of crops and varieties that are tolerant to alkalinity or sodicity is also important.

For the soils with a pH of less than 8.2 and the EC more than 4 dSm⁻¹

- Irrigation with good quality water and subsequent leaching is recommended. Provision of adequate drainage is a pre-requisite for leaching of salts. This requires that sufficient water must pass through the soil to leach salts from the soil and maintain proper salt and water balance in the soil to be reclaimed. Provision of lateral and main drainage channels of 60 cm deep and 45 cm wide and leaching of salts was found effective in reclaiming these soils.
- Applying farm yard manure at a rate of 12.5 t/ha or compost 5 t/ha, 10 to 15 days before sowing or transplanting of crops.
- Selection of crops and varieties that are tolerant to salts is important.

Conduction trial in farmers' fields

Cropping system (or) pattern with short duration variety for conducting on trial basis in the farmer's field before recommending as a package may be suggested - Vellore

- The question is not clear. However, before recommending a cropping system, it will be test verified in the farmer's field.

An alternate cropping strategy discouraging the cultivation of water loving crops like Paddy, Sugarcane and encouraging the cultivation of short duration crops with minimum water requirement like Pulses, Maize, Ragi, Groundnut and Gingelly may be suggested - Vellore

- In Vellore district, high water consuming crops like rice, sugarcane and banana are grown in different types of soils.
- In heavy soils, rice can be completely replaced with short duration crops like maize under ridges and furrow method during Kharif which consumes only 50 % of rice water requirement.
- In clay loam and Loamy soils, alternate crops *viz.*, pulses, groundnut, sesame, sunflower, ragi, vegetables, onion can be grown with less amount of water.
- The above crops can be fitted into the cropping system during rabi season. To avoid the ill effects of heavy downpour, raised bed system can be used.
- The cropping systems such as maize-onion-pulses, groundnut -maize – pulses, maize-vegetables *etc* could be adopted in Tirupur district for saving irrigation water.
- These crops when raised under micro-irrigation and fertigation will save up to 40% of irrigation water and enhance the crop productivity by 20-30%.

Crop Varieties for tannery effluent

Tannery effluent tolerant crop varieties may be suggested - Vellore

Tannery pollution tolerant paddy varieties may be suggested – Pudukottai

S.No	Crops	Varieties
1	Cereals	Rice (TRY 1, CO 43, Paiyur 1, ASD 16)
2	Millets	Ragi (CO 12, CO 13)
3	Oilseeds	Sunflower (CO 4, Morden)
4	Cash crops	Sugarcane (COG 94076, COG 88123, COC 771)
5	Vegetables	Brinjal, Bhendi, Chillies, Tomato(PKM 1)
6	Flowering crops	Jasmine, Neerium, Tuberose
7	Trees	<i>Eucalyptus</i> , Casuarinas and Acacia

However, because of the risk of chromium entry into the food chain, it is advised to grow non-food crops.

Application of Pesticide through irrigation water

New practice of using the Pesticide by dissolving them in Irrigation Channel water instead of spraying the Pesticide to control pests may be suggested and recommendation may also be evolved - Vellore

- The new practice of using the pesticide by dissolving them in irrigation channel is not recommended (also not advisable) since, it is harmful to human beings, animals, aquatic organisms *etc.*, besides causing environmental hazards. Further, necessary awareness may be created among farmers' not to adopt this practice.

- However, research work is in progress to standardize pestigation technique in sugarcane.
- Preliminary studies indicated that application of insecticide through drip irrigation was found promising against borer pests in sugarcane. Confirmation experiments are in progress to standardize the dosage, dilution factor and residue level in soil and sugarcane juice. Further, there is no pesticide has been registered for use by following this method. Hence, TNAU is interested to conduct research on this aspect, but the recommendation will be subject to CIB & RC registration / label claim of any pesticide.

Tobacco & indigo cultivation

Recommendations / suggestions for Tobacco & Indigo cultivation may be given - Vellore

Indigo:

- As per the agreement signed between TNAU and Arya Vaidya Pharmacy (AVP), Coimbatore, fresh leaves of *Indigofera tinctoria* is being procured (@ Rs.18/kg) by AVP which has committed to buy 2 ton of fresh leaves every month from farmers with assured market price. A market tie-up between the farmers of Villupuram and AVP was arranged for cultivation of *Indigofera tinctoria* on 29.6.2017 during the farmers meet held at TNAU, Coimbatore. The average yield of fresh leaves is 3 t/acre in 9 months (three harvests) and Rs.54,000 is the gross income that can be obtained in one acre. *Indigo* is a drought tolerant crop and can be promoted both as mono crop or intercrop.

Tobacco:

- Being narcotic crop, cultivation of tobacco is not encouraged in Tamil Nadu by Govt. of Tamil Nadu

List of medicinal plants for promotion in Tamil Nadu through AVP market support

S.No	Botanical name	Common name	Plant part and form	Requirement (ton/month)	Price offered to farmers (Rs./kg)
1.	<i>Adhatoda vasica</i>		Dry root (18 months old)	1.5	20.0
2.	<i>Asparagus racemosus</i>	Shatavri	Dry root	4.0	21.0
3.	<i>Barlaria prionitis</i>	Vjradhandhi	Whole plant dry	0.60	30.0
4.	<i>Boerhaevia diffusa</i>	Punarnava	Dry root with collar portion	3.0	60.0
5.	<i>Cinnamon tamala</i>	Cinnamon	Dry leaf	0.50	75.0

6.	<i>Curculigo orchiooides</i>	Kali musli	Dry root	0.5	180.0
7.	<i>Curcuma longa</i>	Turmeric	Fresh rhizome	2.5	Prevailing rate
			Dry rhizome	0.8	
8.	<i>Cyclea peltata (as intercrop)</i>	Patha Paadakizhangu	Root	0.70	370.0
9.	<i>Desmodium gangeticum</i>	Orila	Whole plant dry	2.0	60.0
10.	<i>Embelia ribes</i>	Vaividangam	Seed	0.50	800.0
11.	<i>Hemidesmus indicus</i>	Anantmool	Dry root	1.5	90.0
12.	<i>Indigofera tinctoria</i>	Indigo	Fresh leaves	2.0	18.0
13.	<i>Jasminum grandiflorum</i>	Pitchi	Fresh leaves	0.6	25.0
14.	<i>Oldenlandia diffusa</i>		Whole plant dry	2.5	
15.	<i>Operculina terpetum</i>	Nisoth	Mature dry stem	1.5	130.0
			Fresh fruit	5.0	12-15
16.	<i>Piper betel</i>	Betel	Fresh leaves	0.50	20.0
17.	<i>Phyllanthus emblica</i>	Aonla (wild)	Dry Fruit (deseeded)	2.0	52.0
18.	<i>Withania somnifera</i>	Aswagandha	Dry root with pencil girth	2.0	165.0
19.	<i>Rubia cordifolia</i>	Manjistha	Thick stem	1.0	130.0
20.	<i>Salacia reticulata</i>	Ponkorandhi	Dry root with stem (24 moths old)	0.40	130.0
21.	<i>Terminalia chebula</i>	Haritaki Kadukkai	Dry fruits deseeded	4-5	50.0
22.	<i>Terminalia bellirica</i>	Bibhitaki Thandrikkai		1.5	25.0
23.	<i>Tribulus terrestris</i>	Gokhshura	Dry fruit	2.5	60.0
24.	<i>Zingiber officinale</i>	Ginger	Dry rhizome	3.0	100.0

Fodder crop suitable for growing in coconut garden to increase the cropping efficiency of the land area and also to encourage the integrated farming system may be evolved – Karur

- Suitability of fodder crops under coconut garden was already been tested. Based on the experimental findings, guinea grass variety CO (CG) 3 is highly suitable for growing under coconut garden.

HORTICULTURE

Brinjal

Brinjal crop grown in Cuddalore district are susceptible to Root Knot nematode infection which lead to significant damage to brinjal crop and lead to yield loss. The existing tolerant varieties are not 100% tolerant at field level. Hence, a suitable Root Knot nematode tolerant variety may be recommended and (100%) field tolerant new variety may be evolved - Cuddalore

- Technology on grafting in brinjal has been standardized with *Solanum torvum* as root stock which are resistant to nematodes. Hence, nematode endemic areas may be planted with grafted brinjal.
- A new research programme on “Development of root knot nematode resistant brinjal varieties” has been initiated at Vegetable Research Station, Palur.

Bitterness in fruit especially in Hybrids - Madurai

- The bitterness in brinjal is specific to genotypes or varieties. Hybrids grown under drought situation will express more bitterness due to accumulation of more solasodine. Hence, proper irrigation schedule may be followed. Avoid recommending bitter fruited hybrids for cultivation.

Increasing the availability of grafted variety of local brinjal (Cat – Head - kathiri) at assessable centre’s are needed to extend the area of this variety at Namakkal district - Namakkal

- Department of Vegetable Crops, TNAU, Coimbatore is producing brinjal grafts using farmers choice varieties as scion and *Solanum torvum* as root stock. The grafts are supplied based on farmers indent.

Solution to overcome wilt (locally called as vadham disease) which has symptom of losing production totally from one side of the plant (just like paralysis) can be suggested.

- Check for the presence of nematode
- Treat the seeds with *Trichoderma viride* 4 g/kg or *Pseudomonas fluorescens* @ 10g /kg 24 hours before sowing. Apply *Pseudomonas fluorescens* as soil application @ 2.5 kg/ha mixed with 50 kg of FYM, further mixed with recommended dose of FYM (10-12 t/ha).
- Stagnation of water may be avoided.
- Drenching with Copper Oxy Chloride at 2.5 g/l at the rate of 4 l/plant (infected

and nearby plants only).

Control measures against Nematode attack in cultivation of vegetables in poly green house - Theni

Nursery

- Soil solarisation of nursery bed during summer months (transparent / white polythene sheet with 8 gauge thickness).
- Application of *Pseudomonas fluorescens* as seed treatment @ 10g/kg seed or seed treatment with *Trichoderma harzianum* or *Trichoderma asperellum* 4g/kg seed.
- Application of Arbuscular Mycorrhizal (AM) fungus @ 100g/m².

Main field

- Planting of healthy seedlings.
- Soil application of *Purpureocillium lilacinum* @ 50g/m² along with FYM three times at monthly intervals.
- Application of neem cake @ 400kg/ha.
- Avoiding monocropping.
- Application of *Purpureocillium lilacinum* as seed treatment @ 10g/kg seed followed by soil application @ 50g/m².
- Soil application of neem cake @ 400kg/ha.

Resistant variety for shoot and fruit borer - Dharmapuri

- As of now, no resistant variety is available for brinjal shoot and fruit borer. Research programmes are being conducted to achieve varieties with moderate resistance.

Alavayal Brinjal is a local variety predominantly grown in all parts of Pudukkottai district and fetches premium price than any other varieties. Consumer preference is also for this Alavayal brinjal - Pudukkottai

Problems : Local variety seeds are being used for years together from the same variety of the cultivated field. Due to this, quick wilt disease occurs approximately during the 45th & 50th day after planting and stem borer & fruit borer incidence is heavy in this variety. Hence, a new variety as selection from this local cultivar with pest and disease resistance with improved quality will boost up the brinjal production in this district.

- Action will be initiated to develop superior variety/ hybrid resembling Alavayal local brinjal with similar quality to meet the local demand by AC & RI, Kudumiyamalai.

Mycoplasma, shoot and fruit borer – Tirunelveli, Kanchipuram

Little Leaf:

- Removing the affected plants in the early stages and spraying dimethoate 30 EC @ 2.0 ml/lit to control the vector.

shoot and fruit borer

- Removing the affected terminal shoot and fruits showing boreholes and destroying them to avoid further multiplication.
- Spraying Neem Seed Kernel Extract 5 % or any one of the following chemicals whenever the damage level crosses 10 %
 - Dimethoate 30 % EC@7.0 ml/10 lit.
 - Flubendiamide 20 WDG@7.5 g/10 lit.
 - Thiodicarb 75 % WP@2.0 g/lit.
 - Azadirachtin 1.0% EC (10000 ppm) 3.0 ml/lit. Chlorpyrifos 20 % EC 1.0 ml/lit. or Triazophos 40 % EC 2.5 ml/lit.

Bhendi

Yellow vein Resistant variety - Madurai

Resistant variety for Yellow vein mosaic virus - Dharmapuri

Yellow vein mosaic virus resistant variety– Villupuram

Yellow vein Mosaic Disease Attack is more even though tried with different F1 Hybrids- Tiruvallur

- The hybrid released from TNAU, Bhendi Hybrid CO4 is YMV resistant variety. This hybrid can be recommended to all districts of Tamil Nadu except Nilgiris.
- Other varieties resistant to Yellow vein mosaic virus are Parbhani Kranti, Arka Abhay and Varsha Uphar.
- The virus is transmitted by the whitefly (*Bemisia tabaci*) and that can be managed by spraying systemic insecticides like methyl demeton or dimethoate @ 2ml/lit.

Chillies

Drought Tolerant, High yielding Chilli hybrid seeds required - Sivagangai

- TNAU Chilli hybrid CO1, a high yielding dual purpose hybrid can be recommended for irrigated chilli cultivation. The seeds are available at Dept. of Vegetable Crops, HC&RI, TNAU, Coimbatore.
- Research work on development chilli variety exclusively for drought tolerance is in progress in the Department of Vegetable Crops, TNAU, Coimbatore.

Control measures for Flower and Fruit Drop - Vellore

- Spraying of NAA @ 20 ppm at 65 and 75 days after transplanting prevent flower drop.

Leaf curl virus is a major limiting factor in chilli crop - Tirunelveli

- Raising 2-3 rows of maize or sorghum as border crop to restrict the spread of the whitefly vector.
- Collecting and destroying infected virus plants as soon as they are noticed.
- Controlling vector whitefly by spraying Imidacloprid 17.8 % SL 3.0 ml /10 lit. or Dimethoate 30 % EC 2.0 ml /lit.

Thrips& Aphids - Villupuram**Thrips**

- Growing Agathi as intercrop.
- Treating seeds with imidacloprid 70% WS @ 12 g /kg of seed.
- Spraying any one of the following insecticides:
Imidacloprid 17.8 % SL 3.0 ml /10 lit. or Dimethoate 30 % EC 2.0 ml /lit. or Fipronil 5 % SC 1.5 ml /lit. or Phosalone 35 % EC 2.0 ml /lit. or Spinosad 45 % SC 3.2 ml /10 lit. or Thiocloprid 21.7 % SC 6.0 ml /10 lit.

Aphids

- Treating seeds with imidacloprid 70% WS @12 g /kg of seed. Applying phorate 10 % G @ 10 kg/ha or spraying any one of the following insecticide.
- Carbosulfan 25 % EC 1.0 ml /lit. or Fipronil 5 % SC 1.0 ml /lit. or Imidacloprid 17.8 % SL 3.0 ml/10 lit. Phosalone 35% EC 2.0 ml/lit. or Quinalphos 25 % EC 1.0 ml /lit.

Ramanathapuram local Munduchillies is the unique identity to the district. The farmers continuously cultivate the traditional munduchillies type from the seeds available in their hand. The continuous cultivation of local type seeds leads to genetic and physiological changes. The farmers are using the local seeds repeatedly and the crop losses viability and originality in the long run. Hence new variety equal to local munduchillies type with high salt tolerant and suitable to Ramanathapuram district climate to be evolved to enhance the livelihood of the farmers.

- Research work on development of saline tolerant chilli variety/ hybrid is in progress in the Department of Vegetable Crops, TNAU, Coimbatore.

Cucumber**Varieties for poly green house cultivation - Theni**

- Arka Rakshak released from IIHR is recommended for poly green house cultivation.
- Research work on development of tomato hybrid suitable for polyhouse is in progress in the Department of Vegetable Crops, TNAU, Coimbatore
- Pant PC1 and Pant PC2 are suitable for poly green house condition.

Spotted wilt virus complex and Pin worm control measures - Dharmapuri

- Growing agathi as intercrop.
- Treating seeds with imidacloprid 70% WS @ 12 g /kg of seed.

Pin worm

- Collecting and destroying the pinworm affected plants and fruits
- Avoiding solanaceous crops after tomato
- Using healthy seedlings for transplanting
- Keeping pheromone traps @ 16 nos./ac to attract and kill the adult moths.
- If needed, spraying chlorantraniliprole 18.5% SC @ 60 ml or cyantraniliprole 10% OD @ 60 ml or flubendiamide 20% WG @ 60 ml or indoxacarb 14.5% SC @ 100ml or neem formulation (Azadirachtin 1% or 5%) @ 400 – 600 ml/ac.

Leaf edges drying, discolouration at shoulder of the fruits - Tirunelveli

- The problem is due to either leaf curl virus infection or due to micro nutrient deficiency and salt injury. To overcome this problem, recommended management practices may be followed.
- Planting of varieties like CO 3 Tomato having dense foliage can protect the fruits from discolouration due to sun burn.

Onion**Water Stream effects and use of MN mixture and Combination crops suited to udumalpet needs Investigation - Tiruppur**

- The canal and river water may not have adequate amount of micronutrients to meet the crop requirement. Based on the soil test value (Sufficient/deficient), recommendations of micronutrients for various crops have been given in the crop production guide. In addition, micronutrient mixtures for various field crops are available which can be adopted for increasing the yield of crops.

A new disease - twister disease is a major problem in onion, suitable remedy may please be recommended - Perambalur

- Seed treatment with carbendazim @ 2 g / kg seed
- Spraying mancozeb @ 2 g/l or carbendazim @ 1 g/l or chlorothalonil @ 2 g/l.

Watermelon**Watermelon is grown about 90 Ha in the district, a special technology to overcome immature ripening, lack of colour and sweetness of the fruit can be given to facilitate the marketable needs of the fruit - Namakkal**

- Adjusting the period of sowing from October 15 - November 15 can reduce the immature ripening of fruits, increase the sweetness and flesh colour.

Wilt & Micro Nutrient deficiency symptoms - Kanchipuram

- Treating the seeds with the talc formulation of *Trichoderma viride* @ 4 g/kg or *Pseudomonas fluorescens* @10 g /kg of seed 24 hours before sowing.

- Applying *Pseudomonas fluorescens* talc formulation as soil application @ 2.5 kg/ha mixed with 50 kg of FYM, further mixed with recommended dose of FYM (10-12 t/ha).
- Stagnation of water should be avoided. Drenching with Copper Oxy Chloride at 2.5 g/lit.

Boron deficiency

- These boron-deficient leaves show a light general chlorosis. Boron deficiency results in necrosis of meristematic tissues in the growing region leading to loss of apical dominance and the development of a rosette condition. These deficiency symptoms are similar to those caused by calcium deficiency. The leaves are unusually brittle and tend to break easily. Also, there is often a wilting of the younger leaves even under an adequate water supply, pointing to a disruption of water transport caused by boron deficiency.

Correction Measure: Foliar spray of borax @ 0.2%

Iron Deficiency

- The iron-deficient leaves show strong chlorosis at the base of the leaves with some green netting. The most common symptom for iron deficiency starts out as an interveinal chlorosis of the youngest leaves, evolves into an overall chlorosis and ends as a totally bleached leaf. Because iron has a low mobility, iron deficiency symptoms appear first on the youngest leaves. Iron deficiency is strongly associated with calcareous soils, anaerobic conditions and it is often induced by an excess of heavy metals.

Correction Measure: Foliar spray of FeSO₄ @ 0.5%.

Manganese deficiency

- Fine network of green veins as a light green background on young leaves. Leaf remains fairly green. Dark green irregular bands on mature leaves, along the midrib.

Management: Foliar spray of 0.5% MnSO₄.

Molybdenum deficiency

- The leaves show some mottled spotting along with some interveinal chlorosis. An early symptom for molybdenum deficiency is a general overall chlorosis, similar to the symptom for nitrogen deficiency but generally without the reddish coloration on the undersides of the leaves.

Correction Measure: Foliar spray of NaMO₄ 0.05% twice at weekly interval.

Organic cultivation practices in water melon - Erode

- These studies will be taken in the ensuing year in collaboration with Department of Vegetable Crops.

Wilt & Viral disease - Villupuram

- Growing maize as border crop

- Rouging out the infected plants.
- Installation of yellow sticky trap @ 12 nos/ac.
- Applying neem cake to the planting pits @ 5-10 g/pit.
- Applying *Pseudomonas fluorescens* (Pf1) talc formulation to planting pit @5g/pit.
- Spraying dimethoate 30 EC @ 2 ml/l or methyl demeton @ 25 EC 2 ml/l thrice at fortnightly intervals.

Gourds

Fruit flies & Leaf Miner - Kanchipuram

Fruit fly - Villupuram

- Collecting the damaged fruits and destroying them.
- The fly population is low in hot day conditions and it is peak in rainy season. Hence, the sowing time may be adjusted accordingly.
- Exposing the pupae by ploughing.
- Using 20 x 15 cm poly bags, fish meal traps with 5 g of fish meal + 1 ml of dichlorvos in cotton @ 50 traps/ha. Fish meal and cotton are to be removed once in 20 and 7 days respectively.
- Neem oil @ 3.0 % as foliar spray as need based.
- For management of aphid vector, spraying imidachloprid @ 0.5 ml/lit along with sufficient quantity of stickers like teepol, triton X100, apsa etc., for better adhesion and coverage.
- Do not use copper and sulphur dust. These are phytotoxic.
- Leaf miner: Spraying fipronil @ 1.5ml/l or dimethoate 1.5 ml/l

Resistant variety and technology for controlling cucurbit mosaic virus - Dharmapuri

Present varieties and hybrids may not have the resistance for cucurbit mosaic virus. However, through proper management of vectors, it can be reduced. The following measures are to be adopted to control the insect vectors

- Maize as border crop against movement of insect vectors
- Use of yellow sticky traps @12 nos/acre
- Periodical removal of virus infected plants.
- Spraying dimethoate 30 EC @ 2 ml/l or methyl demeton @ 25 EC @ 2 ml/l thrice at fortnightly intervals

Carrot

Nematode & root rot - Kodaikanal

- Seed treatment with *Purpureocillium lilacinum* @ 20g/kg seed followed by soil application @ 2.5kg /ha along with FYM.
- Soil application of neem cake @ 400 kg /ha at planting.
- Crop rotation with non-host crops.

Cyst Nematode - The Nilgiris

- Biofumigation with mustard followed by application of neem cake @ 625 kg/ha along with *Purpureocillium lilacinum* @ 5kg/ha.

Garlic**Rubbering & Thrips - Kodaikanal****For Rubbering**

- Application of 100kg of nitrogen in the form of Ammonium sulphate instead of urea.
- Providing optimum level of irrigation.
- Adopting correct spacing of 7.5 cm between plants and 10cm between rows .
- Foliar spray of 0.1% ZnSo₄ + 0.3% Mn Ammonium sulphate+ 0.1% MnSo₄ on 30th, 45th and 60th day of planting minimizes rubbering.
- Avoiding use of seed materials collected from already affected plants reduces rubbering.

For Thrips

- Ooty-1 garlic is resistant to thrips.
- ETL from sowing to 40 days-10 thrips / plant; After 40 days-20 thrips /plant.
- Spraying insecticides dimethoate @ 0.06% or profenofos @ 0.05%.
- Spraying dimethoate 0.2% (or) Acephate 0.2% (or) Fepronil 0.1%.

Beans**White Fly, Virus Disease - Kodaikanal**

- Growing maize as border crop against movement of insect vectors.
- Use of yellow sticky traps @12 nos/acre.
- Periodical removal of virus infected plants.
- Spraying dimethoate 30 EC @ 2 ml/l or methyl demeton @ 25 EC @ 2 ml/l thrice at fortnightly intervals.

Chow chow**White Fly, Virus Disease management in chow chow - Kodaikanal**

- Use of yellow sticky traps.
- Periodical removal of virus infected plants.
- Spraying systemic insecticides like methyl demeton or dimethoate @2 ml / lit. to kill the insect vector.
- Spray dimethoate 30 EC @ 2 ml/lit.

Measures to manage Immature fruit drops and flower drops - The Nilgiris

Adopting inter-cultural operations such as weeding, hoeing, training, pruning

periodically, maintaining optimum moisture level application of nutrients at the rate of 250 g of urea, 500 g of phosphorus and 500 g of potassium/ plant through fertigation reduces immature fruit and flower dropping.

Fruit fly normally attacks in harvesting stage similar to that of gourds.

- Collecting the damaged fruits and destroying them.
- The fly population is low in hot day condition and it is peak in rainy season. Hence, adjust the sowing time accordingly.
- Ploughing the field to expose the pupae.
- Using 20 x 15 cm polythene bags; fish meal trap with 5 g of wet fish meal + 1 ml. dichlorvos in cotton. 50 traps are required/ha, fish meal + dichlorvos soaked cotton are to be renewed once in 20 and 7 days respectively.
- Neem oil @ 3.0 % as foliar spray as need based.

Ginger

High Yielding Varieties resistant to Soft Rot in Ginger - The Nilgiris

Soft rot (*Pythium* sp.)

No resistant variety is available in Ginger for soft rot. However, the disease can be managed by

- Providing adequate drainage facilities
- Selecting healthy and disease-free seed rhizomes
- Treating the seed rhizomes with mancozeb or copper oxychloride @ 3 g/lit
- In the field, drenching the beds with 2.5 g/lit of copper oxychloride or 1% Bordeaux mixture or metalaxyl - mancozeb @ 4 g/lit

Tapioca

In Namakkal district, the tapioca crop is cultivated around 17000 Ha every year. The crop is mostly affected due to failure of monsoon and therefore drought resistant and short duration variety with high starch content may be developed - Namakkal

- Tapioca variety H 226 released from CTCRI, Trivandrum is rich in starch content (29%) and suitable for drought conditions. New research work has been initiated to develop a drought resistant, short duration variety/ hybrid with high starch content at TCRS, Yethapur.

Table variety of Tapioca to replace the Burma/Kunguma rose and suitable Post harvest techniques may be suggested to get good price during glut period - Salem

- CO 2 is a table variety which can replace the Burma / Kunguma rose
- Technology on processing of value added products viz., tapioca flour incorporated bakery products, extruded products and convenience foods are available in PHTC, TNAU, Coimbatore.

Micro Nutrient Mixture for Tapioca may be suggested - Dharmapuri

- Research work on Standardization of Micro Nutrient Mixture for Tapioca is in progress at Tapioca and Castor Research Station, Yethapur.

During summer, Tapioca is severely affected due to the incidence of mealy bugs resulting in great economic loss to the farming community. The practice of spraying profenophos 2ml/lit of water is not giving full achievement over controlling the pest attack. Therefore providing integrated and recent techniques for controlling the incidence will be more beneficial to the farmer - Thanjavur

- Monitoring the incidence of mealy bugs at regular intervals.
- Removal of alternate weed hosts like parthenium.
- Releasing *Acerophagus papayae* 100 nos as inoculative release and also Coccinellid predator *Cryptolaemus montrouzieri* 300 adults /acre
- If required, spraying of neem oil 2 % or fish oil rosin soap 25 g/l.
- On severe incidence, spraying of any one of the following chemicals is recommended.
 - Dimethoate (2 ml/l)
 - Imidacloprid (0.6 ml/l)
 - Thiamethoxam (0.6 g/l).

Mosaic and Mealy bug management in Tapioca may be suggested - Villupuram

- Selecting the planting materials from healthy plants.

For the control of white fly vectors, integrated pest management practices be followed:

- Removing alternate weed hosts viz., *Abutilon indicum*.
- Installing yellow sticky trap at 12 Nos/ac.
- Using nitrogenous fertilizers judiciously
- Avoiding excessive irrigation.
- Spraying neem oil 3 % or fish oil rosin soap 25 g/lit. or methyl demeton 25 EC 2 ml/lit. or phosalone 2 ml/lit; while using neem oil, teepol or sandovit has to be added at 1 ml/lit. for better contact with foliage.
- Applying methyl demeton in the early stage and phosalone in the later stages of crop growth.
- Avoiding extended crop growth beyond its duration.

In the early stage of the Tapioca crop, red spider mite incident is heavy and due to this yield reduction is up to 30%. Resistance Variety may be evolved or recommended - Perambalur

- Evolving variety for niche problem like red spider mite incident is not warranted at this period.

Potato

Late Blight and Nematode Problem management measures - The Nilgiris

- Growing resistant varieties viz., Kufri giridhari, Kufri swarna and Kufri neelima.
- Crop rotation with non-host crops.
- Altering the time of sowing (October – low soil temp).
- Soil application of *Purpureocillium lilacinum* @ 5kg/ha along with 100 kg of FYM.

Moringa

Bio control measures for managing shoot and flower webber in Moringa - Theni

- Applying Azadirachtin 1% - 500 ml/ha

Latest technologies for off season moringa production - Dharmapuri

- Pruning in the month of July with application of 0.5% KNO₃ twice @ 15 days interval during vegetative phase induce off season flowering.

Eco-friendly fruitfly control in Moringa may be suggested - Dindigul

- Placement of fermented tomato fruit trap @ 25 / ha and need based foliar spray of spinosad 45 SC @ 0.75 ml / lit.

Organic production technology for Moringa leaf production may be suggested - Dindigul

- Organic Moringa leaf production studies will be taken up by the Dept. of Sustainable Organic Agriculture in the ensuing year in collaboration with Department of Vegetable Crops.

Vegetables

Hybrid Vegetable Cultivation in Poly Green House

In Kanyakumari District, Hybrid vegetables Poly Green House cultivation is under taken in 5000sq.m area. The performance of these crops is not up to the expected level. Hence study on crops suitable for protected cultivation in Kanyakumari District with package of practice for obtaining optional yield is requested - Kanyakumari

- Due to high humidity, the fruit set may be affected. Hence, climate controlled green houses shall be advocated for Kanyakumari district
- Crops like tomato, cucumber can be grown in Kanyakumari District. The package of practices is available in Crop production guide.

Protected cultivation of vegetables under polyhouse and shade net are gaining momentum in Namakkal District. Hence, suitable crops and variety may be suggested for this cultivation method - Namakkal

Tomato	Cucumber	Capsicum
1. Arka Vardhan	1. Pant PC1	1. Arka
2. Arka Vishal	2. Pant PC 2	Basant
3. Arka Meghali	3. Cucumber	2. Arka
4. Arka Ananya	hybrid KPCH 1	Gaurav
5. Pusa hybrid 2		

Suitable hybrid varieties (Tomato & Capsicum) for Poly house cultivation in Trichy district may be suggested - Trichy

- Research work on development of tomato varieties/hybrids suitable for green house is in progress in the Department of Vegetable Crops, TNAU, Coimbatore.

Standardizing cold storage temperature and humidity for different vegetables may be suggested - Theni

- Normally potato is stored under cold storage. However, low value vegetables like brinjal, chilli, tomato etc., are not normally stored under cold storage condition because the cost of storage per unit volume of vegetables is high. Further, if the vegetables are stored under cold storage, it has to be used immediately.

Suggest suitable storage technology for Co-5 Small Onion may be suggested - Dindigul

- The improved Onion storage structure developed by the Directorate of Onion and Garlic, Pune is available and the technology may be adopted and popularized among the farmers to store onion.

Suggest suitable Pollinators inside poly houses to increase fruit set, apart from bumble bees - Dindigul

- To increase the pollination inside the poly house, power operated blowers may be used in the morning hours to improve fruit set under poly house condition.
- Spraying auxins at lower concentration (200 ppm) is also recommended to improve fruit set.

Packing techniques of fresh vegetables for retail marketing in polythene bag/polythene bag with holes/Air tight bags - Dindigul

- Technology on Pre packaging of vegetables with different percent of vents suitable for different products and minimal processing to extend the shelf life is available at PHTC, TNAU, Coimbatore.

Extending keeping quality of packed fresh vegetables may be suggested - Dindigul

- Shrink packaging is recommended for capsicums.
- Perforated polybags (150-200 gauge) can also be used for fresh vegetables for retail marketing. This will also extend the keeping quality of vegetable.

Dehydrated vegetables production in small scale using the Solar dryers – Scale for economic feasibility - Dindigul

- Technology for dehydration of vegetables like bittergourd and bhendi are available at Post Harvest Technology centre, TNAU, Coimbatore.
- Consultation can be given for production of dehydrated vegetable using solar drier.

Homestead Garden/ Roof top vegetable garden

Latest Organic Plant Protection techniques and simple Homemade Organic formulation to prevent and control pest and diseases in Kitchen garden - Chennai

- Neem oil 3% spray controls pest and diseases.
- Application of neem cake 10 kg/100 sq. m and azadirachtin 0.03% 2ml/ lit of water.

Pandal crops

Organic Package as well as value addition for Bitter gourd -Fruit fly control using many methods need to be evaluated for different pandal crops for efficacy - Tirupur

- Collecting the damaged fruits and destroy.
- The fly population is low in hot day conditions and it is peak in rainy season. Hence, the sowing time may be adjusted accordingly.
- Exposing the pupae by ploughing.
- Using 20 x 15 cm poly bags fish meal traps with 5 g of fish meal + 1 ml of dichlorvos in cotton @ 50 traps/ha. Fish meal and cotton are to be removed once in 20 and 7 days respectively.
- Neem oil @ 3.0 % as foliar spray as need based.

Capsicum

a. Management of Gall midge, Mites and Thrips in Capsicum – Krishnagiri

- **Gall midge:** Dimethoate 2 ml/ lit or Imidacloprid 17.8 SL -3 ml/ 10 lit of water or Thiamethoxam 25 WG – 0.5 g / lit
- **Mites:** Applying wettable sulphur 2 kg / ha or fenazaquin 10 EC @1.25 ml/l or propargite – 500 ml/ ha
- **Thrips:** Spraying with fipronil – 500 ml/ ha

b. Root knot Nematode management – Krishnagiri

Nursery

- Soil solarisation of nursery bed during summer months (transparent / white polythene sheet with 8 gauge thickness).
- Application of *Pseudomonas fluorescens* as seed treatment @ 10g/kg seed.

- Application of Arbuscular Mycorrhizal (AM) fungus @ 100g/m².

Main field

- Planting healthy seedlings.
- Soil application of *Purpureocillium lilacinum* @ 2.5kg /ha. along with 50 kg FYM three times at monthly interval.
- Application of neem cake @ 400kg/ha.

c. Fruit borer problem management – Krishnagiri

- Setting up pheromone traps for *Helicoverpa armigera* / *Spodoptera litura* @ 12 no. / ha.
- Collection and destruction of damaged fruits and grown up caterpillars.
- Spraying *Bacillus thuringiensis* @ 2 g / lit.
- Providing poison bait with carbaryl 1.25 kg, rice bran 12.5 kg, jaggery 1.25 kg and water 7.5 lit / ha or spraying Fipronil 5 % SC @ 2.0 ml /lit.

e. Nutrients deficiency management – Krishnagiri

- Apart from fertigation, right from 60th day after transplanting, spraying of water soluble fertilizers like Potassium Nitrate and Calcium Nitrate @ 3 g each /litre once in three weeks helps to overcome the deficiency in capsicum.

Mango

Pruning for Off Season Mango :

The recommended period of pruning during August is coinciding with flowering in off-season varieties in Kanniyakumari District. Hence, a suitable period of pruning may be recommended to enhance the yield in off-season varieties - Kanyakumari

- Pruning in March is ideal for off season fruiting during November- December.

Wilting in mango softwood grafts in propagation chamber – Sivagangai

- Wilting may be due to poor establishment or failure of graft union.
- Pre-harvest spray with mancozeb @ 2 g / lit or carbendazim @ 1 g / lit or thiophanate methyl @ 1g/lit or chlorothalonil @ 2g/lit, 3 times at 15days interval

Control measures for Die back - under dry land conditions as well as for - fruit rot and button drops. A study needed on yield reduction due to adverse weather. Prescription needed for use of Micro Nutrient sprays. Ripening technology needed for Dry land Mango using organic means. Export quality standard is required- Tiruppur

- It is not clear what is meant by adverse weather? If it is unseasonal rains, there is no remedy. If high temperature exists during flowering to fruit set, copious irrigation can reduce the yield loss. Adding to that, spraying of NAA @ 20 ppm will reduce the flower drop. Regarding micronutrient sprays, please refer to crop production manual or TNAU agri portal. Ethrel along with sodium hydroxide

- pellets can be used for small scale ripening.
- Export quality standards are available in APEDA Website.

Hopper management in mango may be suggested - Kanchipuram

- Removal of criss-cross branches, infested shoots, dense branches and proper training and pruning reduces the hopper infestation.
- Applying *Metarhizium anisopliae* @ 1×10^8 cfu/ml or *Beauveria bassiana* @ 10^8 cfu /ml on tree trunk once during off season and twice at 7 days interval during flowering season.
- Spraying any of the following insecticides first at the time of panicle emergence and the second two weeks after first spray. Neem oil @ 5 ml/lit of water can be mixed with any insecticides for the control of hopper.
- Buprofezin 25 % SC@1.5 ml/lit
- Dimethoate 30 % EC@1.6 ml/lit.
- Spray volume of 5-15 litres of water per tree is required.

Nutrient Management for mango may be suggested - Vellore

- Please refer to crop production manual or TNAU agri portal.

Low cost Storage Technology for Mango - Theni

- Zero energy cool chamber can be used for small quantities.

Latest technique for Inducing Half Season Bearing in mango - Dharmapuri

The following calendar of operations may be followed for off season fruiting.

Month	Phenology of mango	Intervention to be made for off season induction of flowering
January	Flowering	De-blossoming of regular season flowers
February	Flowering, Fruiting	
March	Fruit development stage	Pruning followed by application of fertilizers.
April	Fruit maturity stage	Application of paclobutrazol
May	Harvesting	Foliar spraying of chemicals as per the treatments.
June		Second time spaying of chemicals
July	End of fruiting season	Third time spraying of chemicals; initiation of flowering panicles
August	Pruning followed by application of fertilizers	Peak flowering
September		Fruit set
October	Fruit bud initiation and differentiation	Fruit development and maturity phase
November		Harvesting
December	Initiation of flowering	

Effective Fruit fly control methodology in ecological way in a vast mango zone and mango varieties resistant to fruit flies may be suggested - Dindigul

Fruit fly

- Ploughing the inter spaces to expose pupae.
- Preparing bait with methyl eugenol 1% solution mixed with malathion @ 2.0 ml/lit. Taking 10 ml of this mixture per trap and keeping them in 25 different places in one hectare between 6 am and 8 am. Collecting and destroying the fallen fruits.
- Spraying Neem oil @ 3.0 % as need based.
- No resistant variety is available for fruit fly

Mealy Bug and Stem Borer management in mango - Tiruvallur

Mealy bug

- Dissolving fish oil resin soap @ 25g /lit, initially in luke warm water, then in required quantity of spray fluid in the sprayer.
- Releasing Australian ladybird beetle, *Cryptolaemus montrouzieri* @ 10 beetles/ tree or 1500/ha.
- Banding the trees with 20 cm wide 400 gauge polythene sheets.
- Spraying chlorpyrifos 20 EC @ 2.5 ml/lit or dimethoate 30 % EC@1.6 ml/lit.

Stem borer

- Padding with monocrotophos 36 SL @10 ml in 25 cm² per tree soaked in absorbent cotton when the trees are not in bearing stage.
- Application of carbofuran 3 G @ 5g per bore hole and plugging with mud after mechanically removing or killing the grub by introducing a needle or wire.

New method to control stem borer in Mango instead of padding during October to December - Krishnagiri

- Healer cum sealer was test verified under FLD programme by KVKs as per IIHR recommendation.

Control of Thrips in off season Mango production - Krishnagiri

- Dimethoate or malathion 2ml/ lit. may be sprayed.

Control of Nut weevil and fruit fly in mango - Krishnagiri

- Collecting and destroying the fallen fruits.
- Application of acephate 75 SP 1.5 g/lit. or phosalone 35 EC 2 ml/lit. (first at marble stage of the fruit second at 15 days interval).

Control of mealy bugs in Neelam mango variety - Krishnagiri

- Removing the weeds like *Clerodendrum inflortunatum* and grasses by ploughing during June-July.
- Banding the trees with 20 cm wide alkathene of polythene (400 gauge) in the

middle of December (50 cm above the ground level and just below the junction of branching), securing with jute thread and applying a little mud of fruit tree grease on the lower edge of the band.

- If necessary, applying chlopyriphos 20EC 2.5 ml/l.
- Release of Australian ladybird beetle, *Cryptolaemus montrouzieri* @ 10/tree

High Density and Ultra High Density Mango and Guava

Water management - farmers field trial

Canopy Management - farmers field trial - Dindigul

- Technical guidance can be provided if arrangements are made for establishment of trials on HDP and UHDP in mango and guava in farmer's field.

Banana

Permanent Staking Technology to protect the Banana crop from flood damage that occurs regularly in Nagapattinam district - Nagapattinam

- Planting may be taken in such a way to avoid coincidence of fruiting phase with cyclone. Planting is advised to take after February- March to avoid cyclone damage.

In Kolli hills, the hill banana variety Namaran was predominantly grown and it is the variety of consumers choice. Right today, the area under the variety was pulled down due to bunchy top disease, so virus free T.C. Clone of Namaran may be developed to sustain the area under this variety - Namakkal

- For commercial propagation, protocol has to be standardized. After standardizing the protocol, efforts will be taken up for mass multiplication and distribution.

Feedback from farmers is that TC Banana is not performing well in this area - Kanchipuram

- Comparing to suckers, TC banana is performing very well. But the quality of TC bananas is to the ascertained before purchase.

Availability of Tissue Culture banana plants for varieties like Rasthali, Poovan and Neypoovan - Trichy

- Tissue culture plants in Rasthali, Poovan and Ney Poovan are produced by leading Tissue culture banana producing companies in Tamil Nadu on need basis. TNAU produces a small quantity in the above mentioned varieties.

Control measures for Erwinia Rot in banana - Vellore

- Planting of disease free suckers.

- Dipping suckers in copper oxychloride (40 g/10lit) + streptomycin (3g/ 10 lit) for 30 min before planting.
- Soil drenching with streptomycin (0.5g in 1 lit) 2 litres /plant at 1st month after planting.

Technology of protection against cyclonic wind damage for banana - Theni

- Planting may be taken in such a way to avoid coincidence of fruiting phase with cyclone. Planting is advised to take after February- March to avoid cyclone damage.
- Establishment of wind break by planting *Casuarina*

Management of bacterial and fungal wilt complex in banana - Dharmapuri

Management of fungal wilt

- Dipping of disease free suckers in carbendazim 2 g/lit. for 45 minutes before planting and soil drenching with carbendazim (2 g/lit.) solution (2nd, 4th and 6th month after planting) (or)
- Corm injection (hole to depth of 10 cm at 45^o angle) of 3 ml of 2% carbendazim (20g/lit.) or capsule application of carbendazim (60 mg/capsule) or *Pseudomonas fluorescens* (50 mg/capsule) at 5th, 7th and 9th month after planting.

Management of bacterial wilt

- Field sanitation and proper drainage.
- Removal of male buds when the hands begin to turn upwards.
- Soil drenching with Formalin diluted with water @ 1:3 ratio.

Banana is one of the important crops of this district covering an area of 3600 Ha. This crop is highly affected by bunchy top virus leads to complete crop loss to the farmers. Therefore providing integrated and recent techniques for controlling the incidence will be more beneficial to the farmer – Thanjavur

- Eradication of infected plants by inserting a gelatin capsule containing 200 mg of 2, 4-D in to corm or injecting 5 ml of 2,4-D in to the pseudostem.
- Vector management by injection of monocrotophos @ 1ml/plant (1:4) at 45 days interval from 3rd month till flowering with banana injector.

High cost involved in staking of Banana with poles. Hence, alternate new method for staking using plastic ropes is required to reduce the cost involved - Coimbatore

- Alternate methods for staking banana are available. Ropes can be used for tying banana plants with hooks fixed in the corner of the field. Please contact the Professor and Head, Department of Fruit Crops, TNAU, Coimbatore for further details.

Jack

Cuddalore is pioneer and major producer of Jack. Panruti is Heaven of Jack fruit. Eventhough the production is high, due to lack of knowledge on preliminary processing techniques and poor shelf life, 25 -30% of production loss is occurring every year. New Techniques for preliminary processing and for extending shell life may be suggested- Cuddalore

In Pudukkottai district, Jack is cultivated as border crop and also inter cultivated in fruit orchards. During the harvest season from March to June, there is a glut in the market. Farmers association request for value addition in Jack fruits and project is required by the farmer producer company to take up value addition in jack - Pudukkottai

- A scheme has been proposed to study the shelf life of jackfruit and to evolve techniques for its preliminary processing.

During summer, Jack is severely affected due to the incidence of mealy bugs resuling in great economic loss to the farming community. The practice of spraying profenophos 2ml/lit of water is not giving full achievement over controlling the pest attack. Therefore providing of integrated and recent techniques for controlling the incidence will be more beneficial to the farmer - Thanjavur

- Release of coccinellid beetles @ 10 nos./ tree
- Application of dimethoate 2ml/ lit of water

Guava

Suitable red flesh variety – Madurai

New Varieties introduction in guava - Kancheepuam

Introduction of red flesh Guava variety - Krishnagiri

- Red fleshed varieties like Arka Kiran and Arka Reshmi are available from Indian Institute of Horticulture Research, Bengaluru. Another red fleshed variety Lalit is available in Central Institute of sub tropical Horticulture, Lucknow.

Nutrient Management for guava - Vellore

- Please refer to Crop production manual or TNAU Agri portal.

During summer, Guava is severely affected due to the incidence of mealy bugs resulted in great economic loss to the farming community. The practice of spraying profenophos 2ml/lit of water is not giving full achievement over controlling the pest attack. Therefore providing of integrated and recent techniques for controlling the incidence will be more beneficial to the farmer – Thanjavur

- Monitoring the incidence of mealy bugs at regular intervals.
- Removal of alternate weed hosts like parthenium.
- Collection and destruction of infested plant parts before spraying.
- When the infestation is lesser: Spraying of neem oil 2% or fish oil rosin soap 25 g/l.
- On severe incidence, spraying of any one of the following chemicals is recommended.
 - Dimethoate (2 ml/l)
 - Chlorpyrifos (2 ml/l)
 - Imidacloprid (0.6 ml/l)
 - Thiamethoxam (0.6 g/l).
- Releasing coccinellid predator *Cryptolaemus montrouzieri* @ 10 nos/tree.

Wilt and Tea mosquito bug management for guava - Villupuram

Wilt management

- The bio-intensive IDM module comprising the components viz., soil application of neem cake (250 g / plant), AM fungi (100 g/ plant), Azophos (100 g/plant), *Pseudomonas fluorescens* (50g / plant), *Trichoderma viride* (50g/plant), *Punpureocillium lilacinum* (25g/plant) once in 6 months and marigold planting in tree basins.

Tea mosquito bug management

- Spraying malathion 50 EC @ 2ml/lit or Spraying Neem formulations @ 2ml/lit or monocrotophos 36 SL @ 2ml/lit or neem oil 3 %. Spraying should be done in early mornings or late evenings, at least four times at 21 days interval during fruiting season.

Organic Control method for Tea Mosquito bug - Virudhunagar

- Application of neem formulations @ 2ml/lit.

Corky growth in Guava fruits - Krishnagiri

- Spraying of ZnSO₄ (0.5%), MgSO₄ (0.5%), MnSO₄ (0.5%), CuSO₄ (0.25%), FeSO₄ (0.25%) during new flush emergence, first flowering, one month after flowering and fruit set will minimize the corky growth in guava fruits.

Papaya

Papaya Ring Spot Virus (PRSV) Resistant variety in papaya may be evolved - Salem

Management of Viral Infection and Mealy Bug - Kancheepuram

- Evolving resistant variety is a long term process. For the PRSV management, the following recommendations can be adopted
- Raising healthy papaya seedlings in insect proof net house
- Raising two rows of maize as border crop one month prior to planting

- Spraying acephate (1.5 g/lit) 15 days before planting
- Placing yellow sticky traps (12 nos. /acre)
- Swabbing with grease or castor oil to attract the aphids.
- Spraying neem oil 1% or acephate 1.5g/lit or imidacloprid 0.075% up to 4 months of planting.
- Spraying boron 0.1% (1g/lit.) and zinc sulphate 0.5 % (5 g/lit.) in 3rd and 7th month to sustain yield of infected plants.

Multiple uses of the fruit for commercial preparations needed for value addition.

Effective IPM Techniques for Mealy Bug infestation for papaya - Tirupur

- Value added products like RTS, Tutty fruity can be made
- Releasing 100 nos. of encyrtid parasitoid *Acerophagus papayae* for a small hamlet village area of 8-10 ha. Conserving the lycaenid predator.

Leaf curl virus control measures for papaya - Vellore

- For the vector management, foliar spray with dimethoate 1.5 ml / lit. or malathion 1.5 ml / lit is recommended.

Root rot disease control measures for papaya - Dharmapuri

Management of Root rot and wilt in papaya - Villupuram

- Providing proper drainage facilities
- Soil drenching with 1 % Bordeaux mixture or metalaxyl @ 0.1% at fortnightly interval based on diseases severity.

During summer, Papaya is severely affected due to the incidence of mealy bugs resulted in great economic loss to the farming community. The practice of spraying profenophos 2ml/lit of water is not giving full achievement over controlling the pest attack. Therefore providing of integrated and recent techniques for controlling the incidence will be more beneficial to the farmer - Thanjavur

- Monitoring the incidence of mealy bugs at regular intervals.
- Removal of alternate weed hosts like parthenium.
- Collection and destruction of infested plant parts before spraying.
- When the infestation is lesser: Spraying of neem oil 2 % or fish oil rosin soap 25 g/l.
- On severe incidence, spraying of any one of the following chemicals is recommended.
 - Dimethoate (2 ml/l)
 - Chlorpyrifos (2 ml/l)
 - Imidacloprid (0.6 ml/l)
 - Thiamethoxam (0.6 g/l).
- Release coccinellid predator *Cryptolaemus montrouzieri* @ 10 nos/tree.

Mealy Bug attack and Collar Rot Disease management - Thiruvallur

Mealy bug

- Monitoring the incidence of mealy bugs at regular intervals.
- Removal of alternate weed hosts like parthenium.
- Release *Acerophagus papayae* 100 nos as inoculative release and also coccinellid predator *Cryptolaemus montrouzieri* 300 adults /acre
- If required, spraying of neem oil 2 % or fish oil rosin soap 25 g/l.
- On severe incidence, spraying of any one of the following chemicals is recommended.
 - Dimethoate (2 ml/l)
 - Imidacloprid (0.6 ml/l)
 - Thiamethoxam (0.6 g/l).

Collar rot

- Provide proper drainage facilities
- Soil drenching with 1 % Bordeaux mixture or metalaxyl @ 0.2%

Mealy bug is major problem in Papaya Crop. The Parasite released by Tamil Nadu Agricultural University is not effective in controlling the pest. So Latest Technology (Mechanical, Chemical & Biological control measures) may be required in respect of Thiruvannamalai District for mealy bug in papaya Crops - Thiruvannamalai

- As far as the research and demonstrations carried out throughout Tamil Nadu, the encyrtid parasitoid was found to be effective as inoculative release. Other control measures are not cost effective.

Bio control agent to control of mealy bugs in papaya - Krishnagiri

- Releasing *Acerophagus papayae* 100 nos as inoculative release and also coccinellid predator *Cryptolaemus montrouzieri* 300 adults /acre.
- If required, spraying of neem oil 2 % or fish oil rosin soap 25 g/l.

Pomegranate

Suitable improved variety over Bhagwa can be suggested for the dry climate and low rainfall condition of Namakkal district as this variety fails to develop colour and sweetness, innovative practices can also be suggested to improve the needed trait - Namakkal

- Improved variety over Bhagwa is yet to be released from NRC, Pomegranate. Low relative humidity and high temperature prevailing in Namakkal district may not be conducive for good colour development and softness. Bahar treatment may be adopted so that fruit maturity coincides with summer for better quality fruits.

Research / Trial for growing Pomegranate in this area - Kancheepuram

- The available varieties like Bhagwa may be introduced in State Horticultural Farms for its suitability in consultation with Dean(Hort.), HC & RI(W), Trichy.

Biological control methodology needed for Pomegranate fruit sucking moth may be suggested - Erode

- Removing calyx to discourage egg laying wherever possible
- Covering fruits with neem oil dipped cloth bags during flowering period to prevent egg-laying when the fruits are up to 5 cm diameter.
- Spraying neem oil 3 % or NSKE 5% or spinosad @ 0.4 ml/lit at the time of butterfly activity. Repeating it if necessary twice at an interval of 15 days.
- Adopting ETL (5 eggs/plant with bearing capacity of 60 fruits)
- When the fruits are in marble stage, release *Trichogramma chilonis* @1 lakh/acre is suggested.

Fruit Borer and Fruit rot prevention means to adopt organic Farming. Evaluative study on fruit sucking moth pheromone for pomegranate - Tiruppur

Fruit rot

- As such, no organic method is now available.
- Pre-harvest spray with Copper Oxy Chloride @ 0.25 % at 10 days interval is recommended to prevent fruit rot.

Tamarind

Malformation in fruit, Crops suitable for polyhouse cultivation in plains and Crops suitable for polyhouse cultivation in plains - Madurai

- May be due to water shortage, improper nutrient management and high temperature. Proper nutrient and water management have to be taken up.
- Tomato, cucumber, capsicum are the crops suitable for polyhouse cultivation in plains.

Aonla

Poor Yield Performance :

All the NA Varieties of Aonla are unproductive and the BSR – 1 takes a long period for bearing. These are the problems of aonla cultivation in Kanyakumari District. Many farmers uprooted their crop due to these problems. A detailed study regarding performance of aonla in Kanniyakumari District is requested - Kanyakumari

- Aonla, basically an arid zone fruit crop prefers warm climate for successful cultivation. Generally, aonla propagated through budding. After planting in the main field, farmers must take care of young plants at least for first one year. Since it produces lot of new shoots after planting in the main field, we have to

pinch shoots which are arising from rootstocks below the bud union to facilitate better establishment of new buds. Otherwise, shoots arising below the bud union will smother the new buds emergence from the scion. In the later stage, farmers can't distinguish shoots arisen from the scion and rootstock. This is one of the reasons for low productivity in aonla. Adding to that, aonla have male and female flowers separately in the shoots. While taking bud, care should be taken to extract buds from the basal part of the shoots that produces more female flowers. In order to improve the fruit set, we have to mix 2 or 3 varieties in commercial plantations for better pollination.

Citrus

Technology to improve the yield and quality of Kamala Orange in Yercaud, Recommend suitable hybrid kamala Orange variety and Technology to produce quality planting materials for Yercaud - Salem

The following strategies may be adopted for successful cultivation of mandarin orange.

- Using certified planting material
- Proper micro and macro nutrient management
- Adequate irrigation during fruit set and developmental stages.
- Varieties like Nagpur Santra and Kinnow Mandarin are ideal.
- Certified bud woods of popular varieties should be used for budding on known rootstocks

Control measures for Die Back - Vellore

- Foliar spray with carbendazim @ 0.1 % (1 g /lit.) or zineb @ 0.2% (2 g/lit.) thrice at monthly intervals immediately after pruning of the dead twigs just before the onset of monsoon.

Stem borer attack, Honey secretion and Citrus canker in Acid lime.

Lesions are typically circular with yellow hollow appear on both sides of the leaf - Tirunelveli:

Citrus canker management

- Immediately after pruning, one spray with Copper Oxychloride (COC) 0.3% (3 g/l) followed by 4 sprayings with streptomycin 100 ppm + COC 0.3 % at monthly intervals.

Sudden wilt in Acid Lime. Control measures other than Chemical and *Pseudomonas* in Acid lime - Virudhunagar

- Studies on etiology of the disease and identifying causative agent are underway. Based on the cause of sudden wilt, the recommendation will be given.

Stem Borer and Fruit Fly management in Orange - Kodaikanal

Fruit fly

- Collection and destruction of fallen fruits.
- Setting up methyl eugenol trap 0.1% solution mixed with malathion 50 EC @ 1 ml/lit between 6 a.m. and 8 a.m.
- Using polythene bags fish meal trap with 5 gm of wet fish meal + 1 ml. dichlorvos in cotton. 50 traps are required/ha, fish meal + dichlorvos soaked cotton are to be renewed once in 20 and 7 days respectively
- Neem oil @ 3.0 % as foliar spray as need based.

Grapes

Control of fruit splitting that reduces market price during rainy season may be suggested - Theni

- Fruit splitting during rain is due to moisture imbalance in the berries after rain. It can be avoided if it is possible to protect from rain. Otherwise, rainy season fruiting should be avoided.
- Research work is under progress in GRS, Theni.
- Spraying of 0.2 % calcium chloride along with 0.1 % boric acid is recommended to control fruit splitting.

Ber and Dragon fruit introduction may be suggested - Kancheepuram

Ber

- Budded plants of popular varieties can be obtained from Central Institute for Arid Horticulture, Beechwal, Bikaner and introduced.

Dragon fruit

- Suitability for our region has to be studied. This will be considered in due course of time.

Avacado

Stem Borer, White Fly, Virus Disease management - Kodaikanal

- Padding with monocrotophos 36 SL @10 ml in 25 cm² per tree soaked in absorbent cotton when the trees are not in bearing stage. Application of carbofuran 3 G @ 5g per bore hole and plugging with mud after mechanically removing or killing the grub by introducing a needle or wire.
- White Fly- application of imidacloprid 3 ml/ 10 lit of water or dimethoate 2ml/lit

Virus disease

- Vector management: Foliar spray with dimethoate 2.0 ml / lit. or 0.1% methyl demeton (1 ml/lit)

Cashew

As we all know that cashew is drought area crop and majorly grown as Rainfed crop. Due to prevailing drought for the past two years, the yield has drastically reduced and farmers got only 5-10% yield under Rainfed condition and 30-35% yield under irrigated condition. Hence, suitable remedy measures may be suggested to overcome the drought effect - Cuddalore

- Inducing flushing and flowering by providing irrigation wherever possible.
- In rainfed conditions, monsoon rains will help new flush growth and flowering during the ensuing season.
- Creating micro climate by spraying water during early or late hours increase flowering and fruit set.
- Spraying of 1% Mono Ammonium Phosphate along with 0.1% Boron for enhancing the fruit set.
- Spraying of 3 % Panchagavya during fruit development stage for increasing the yield.
- Taking up plant protection measures –Spraying of chlorpyrifos or Profenophos @ 2ml/lit of water during flowering period for the management of Tea Mosquito Bug if necessary

Cocoa

The Cocoa cultivation in Thanjavur District is practiced as intercrop in coconut gardens. Because of the damage caused by squirrel and wood dog (An Asian Palm Civet) most of the farmers are in position of moving away from cocoa cultivation. Therefore providing integrated and recent techniques for controlling the incidence will be more beneficial to the farmer - Thanjavur

- The damage caused by squirrel and wood dog is less and it is being protected by wild life act – 1972.

Red ants in Cocoa - Cocoa is grown as a intercrop in coconut. So harvesting is a big problem both in cocoa and coconut due to red ants. Biological control measures needed to control red ants - Coimbatore

- As on now, no biological control measures are available against red ant.

Root Rot Disease - Thiruvallur

Deficiencies and remedy

- The causal organism for the Root rot disease is *Phytophthora palmivora*. Liquid formulation of *Pseudomonas fluorescens* (Pf₁) at 0.5% (soil and foliar application) 3 times/year during the month of June, October and February are recommended.

- Foliar spray with micronutrient combinations ZnSO₄ (0.5%) + Fe SO₄ (0.3%) + Borax (0.1%) should be done 3 times at monthly interval for correcting the deficiency symptoms and for the improvement of yield characteristics. First spray should be done during the peak flowering stage.

Pepper

Pepper is one of the leading crops of Kollihills with area coverage of 1035 Ha. Predominantly silver oak is used as live standard which takes 5 years to attain its maximum growth. Short duration economic alternative can be suggested to maximize the profitability of pepper cultivation.

Panniyur – I is a ruling variety of the area which can be alternated with suitable high yielding variety for the elevation of Kollihills (1200 msl) - Namakkal

- In black pepper, to improve the productivity of pepper, the non-living standards (cement post, eucalyptus poles, casuarina poles, dead palm woods) may be used. The non living standards may be planted at a spacing of 3 m x 3 m to increase the productivity per unit area and to reduce the cost of cultivation.
- The black pepper varieties viz., IISR Sakthi, IISR Thevam and IISR Malabar Excel released from IISR, Calicut may be introduced in Kolli hills. These varieties are tolerant to wilt disease also.

Suitable variety for water series coconut garden; Comparative study exclusively for wind damage exposed coconut garden of udumalpet; Traditional variety suited for Udumaplet. Bush Pepper - Package for Homestead gardens for Boosting yield - Thirupur

- Karimunda, Panniyur -6 varieties of pepper may be planted in coconut gardens. Border planting may be avoided to avoid sun scorching during summer seasons.
- For bush pepper, spraying of water during the summer season will improve the flowering. The package of practices for bush pepper has been standardized by IISR, Calicut and the technology is available in the IISR website.

Organic Practices to control Slow and Quick wilt - The Nilgiris

- The slow wilt disease of pepper is due to combined infection of fungal pathogen and nematode. The following practices have to be adopted to reduce the spread of the disease.
- Cultivation of banana has to be avoided in the areas where the incidence of wilt in pepper occurs.
- Cultivation of marigold can reduce the population of nematodes in hilly areas.
- Proper drainage facilities has to be provided
- Removing side branches up to 1 meter height
- Applying neem cake @ 0.5 to 1.0 kg/vine
- *Trichoderma viride* or *Pseudomonas fluorescens* @ 10g /vine at 3 months interval is recommended for the management of fungal infection in pepper.

Turmeric

Resistant variety for Turmeric rhizome rot may be released - Salem

- The turmeric variety CO 2 released during 2013 is resistant to Rhizome rot. This variety is suitable to Dharmapuri areas.

Rhizome rot disease resistant variety may be suggested to Dharmapuri district ; climate and Simple and latest Post harvest management packages - Dharmapuri

- Cleaning of rhizome (Finger rhizomes are separated from the mother rhizomes Boiling of turmeric (in steam boilers) followed by drying and polishing. The department of Food and Agricultural Processing Engineering, TNAU, Coimbatore has developed an improved turmeric boiler to boil the rhizome under hygienic condition using steam.

Rhizome rot and Colletotrichum leaf spot management in turmeric - Villupuram

- The turmeric variety CO2 released during 2013 is moderately resistant to leaf spot and resistant to rhizome rot.

Betelvine

Betel vine Wilt resistant variety required - Sivagangai

Drip fertigation dosage for Betel vine

- Pureline selection form Dindigul local SGM (BV) 2 is moderately resistant to wilt.

Arecanut

Control measure for white mites and foot rot in arecanut is required - Salem

Foot rot

- Affected palms have to be isolated by digging trenches all round.
- The severely affected palms should be cut and destroyed.
- Soil application of neem cake @2 kg/palm/year followed by root feeding with 125 ml of 1.5% (15ml/l of water) Tridemorph at 3 months interval
- Soil drenching of Bordeaux mixture (1.0%)
- Application of Dicofol 18.5 EC at 2.5 ml/lit of water.

Coffee

Area under Coffee in Yercaud is about 6500 ha. Due to poor price for coffee, a suitable alternate cropping system may be evolved to the farmers of shervarayan hills- Salem

- In the existing coffee plantations around the border or where ever the space is left over without coffee bushes, the fruit crops like litchi, avocado, rambutan can be grown.

- A part of the land may be allotted to high value fruit crops *viz.*, mangoosteen, passion fruit etc may be planted to get additional revenue.

Berry borer and coffee rust management is required - Kodaikanal

Coffee Rust

- Spraying 0.5% Bordeaux mixture or copper oxy chloride 0.25% or Triademefon 0.05% 2-3 times during monsoon season.

Berry borer

- Carrying out timely and thorough harvest.
- Avoiding gleanings as far as possible.
- Pick up and destroying the gleanings.
- Meticulously removing the leftover berries.
- Removing offseason berries to save main crop.
- Avoiding excessive shade.
- Pruning plants properly to facilitate better ventilation and illumination.
- Setting up traps with ethyl : methyl alcohol (1 : 1) to attract adults.
- While processing at the estate level, drying coffee berries to the prescribed moisture level: Arabica / robusta parchment 10 %, Arabica cherry 10.5 % and robusta cherry 11.0 %.

Suitability of introducing Nutmeg and Durian in coconut garden as intercrop- Thirupur

- Inter/mixed crops may be selected based on the climatic requirement of the inter/mixed crop, irrigation facilities and soil type. The canopy size, age and spacing of the coconut are also to be considered. Market suitability should be taken into consideration before selecting an intercrop. In garden with above 20 years of coconut, sunlight transmission is above 50% inside the canopy. In coconut based cropping system, nutmeg is proven as intercrop. It is widely grown as intercrop in Coimbatore district.

Coriander

Dry land Variety of coriander to give bumper yield under Black soil to be evaluated under udumalpet condition companion crop study needed - Thirupur

- Coriander variety CO (CR) 4 suitable for dry land with an average yield of 600 kg/ha can be grown in the black cotton soil.

Jasmine

ThovalaiVellai : ThovalaiVellai is a local Jasmine variety which is hardy and high yielding apart from local preference of flowers. A study of this local type under crop improvement programme is requested – Kanyakumari

- Study on *Jasminum grandiflorum* (White pitchi) has been included in action plan research programme (2016-19) to identify pure white types with high yield and concrete content at Floriculture Research Station, Thovalai.

Bud Worm management in Jasmin - Kanchipuram

- Spraying profenofos 50 EC @ 1 ml/lit or thiacloprid 240 SC @ 1 ml /lit.

High yielding Jasmine variety resistant to drought and Bud worm, - Tirupur

- The resistant variety to drought and bud worm is not available as of now. Research will be initiated to develop varieties with high yield suitable for drought condition and bud worm resistance.

Mite Control measures in Jasmine - Vellore

Recurring mite problem suggest management - Dharmapuri

- Spraying wettable sulphur 50 WP @ 2 g/lit. or propargite 57 % EC @ 2ml/lit.or fenazaquin 10 % EC @ 2 ml/lit.

Discolouration of flowers in Jasmine due to Bud worm management - Villupuram

- Spraying profenofos 50 EC @ 1 ml/lit. or thiacloprid 240 SC @ 1 ml /lit.

Management of Bud Worm Root Rot Disease in Jasmine - Thiruvallur

- Soil application of *Trichoderma asperellum* (*T.viride*) @ 2.5 kg/50 kg FYM
- Soil drenching with trifloxystrobin + tebuconazole @ 0.75 g/lit. or difenoconazole @ 0.5g/lit or copper oxychloride at 2.5 g/lit.

As Pest are having resistance to all chemical pesticides, Bio control measures for Jasmine bud borer - Erode

- Six releases of *Trichogramma chilonis* (1 lakh /ha) at 15 days interval from the bud initiation along with three sprays of *Beauveria bassiana* (5g/l) at 10 days interval.

Chrysanthemum

Suitable Chrysanthemum variety may be evolved with high yield and good shelf life - Salem

- Chrysanthemum varieties with yellow colour viz., CO-1, Indira, Punjab Anuradha have been performing well with high yield and shelf life under Coimbatore conditions. These can be recommended for field cultivation.

White rust problem in Chrysanthemum management - Krishnagiri

- Removal and destruction of infected leaves/plants helps to prevent the further

spread of the disease.

- Spraying tebuconazole (@0.5ml/lit. *Bacillus subtilis* consortia @0.5 ml/lit, or azoxystrobin @ 0.5ml/lit. or myclobutanil @ 0.5g / lit.
- For cut flowers: Spraying azoxystrobin @ 1ml/l or trifloxystrobin + tebuconazole @ 0.75 g/ lit.

Marigold

Flower borer - Villupuram

- Spraying spinosad @ 0.75 ml / lit.

Rose in Poly House with varieties

a. Powdery mildew management

- Collection and burning of fallen leaves.
- Spraying carbendazim @ 1 g/ lit. or azoxystrobin @ 1ml/lit.

b. Downey mildew management

- Spraying metalaxyl @ 0.25%

c. Red mites management - Krishnagiri

- Spraying abamectin 1.9 EC @ 0.4 ml/ lit. or propargite @ 1 ml/l for high volume sprayer

Gerbera

a. Leaf miner management

- Imidacloprid 17.8% SL @ 2.0 ml in 10 lit of water or Thiodicarb 75 WP @ 1g /lit. for high volume sprayer

b. Mites and Thrips management

- Spraying abamectin 1.9 EC @ 0.4 ml/ lit. or propargite @ 1 ml/l
- Spraying fipronil @ 2 ml/ lit. or dimethoate 30 EC @ 2 ml/lit. for high volume sprayer

c. Crown rot management - Krishnagiri

- Use of disease free soil for cultivation
- Affected flowers should be collected and destroyed.
- Excessive watering should be avoided.
- Drenching with copper Oxychloride @ 0.25% or Bordeaux mixture 1% or metalaxyl @ 0.2%

Carnation

a. *Fusarium* wilt management

- Diseased plants should be removed immediately after noticing the disease.

- Complete root system and surrounding soil should be dug out and disposed off carefully.
- Soil solarization using clear transparent polyethylene film (0.1 mm thick) for 30 days.
- Soil drenching with carbendazim @ 0.1 % or difenconazole @ 0.05 % or *Pseudomonas fluorescens* as soil application @ 25 g/sq.m and foliar application @ 0.5 % at monthly intervals or soil application of *Bacillus amyloliquefaciens* @ 0.5 % at monthly intervals.

b. Root knot Nematode management in Carnation - Krishnagiri

- Soil application of *Purpureocillium lilacinum* @ 50g/m² along with FYM three times at monthly interval.
- Application of *Arbuscular mycorrhiza* (AM) fungus @ 100g/m².
- Application of neem cake @ 400kg/ha (or)
- Biofumigation with mustard followed by application of neem cake @ 500 kg/ha along with *Purpureocillium lilacinum* @ 5kg/ha.

Gloriosa superba

Mechanical Pollination Methods - Karur

- Mechanised technique for pollination in Glory lily attempted in TNAU involves facilitation of wind to effect pollination. This is done by operating a low volume power blower across the planted rows between 7-10 am. The blower speed should be adjusted to low and directed towards the plants during peak flowering period.
- This should be followed by foliar spray of 0.5% Boron at weekly interval.
- This technique however has not been perfected. The limitation is that pollination can be successful only during peak flowering period when there is adequate pollen for pollination.

Ixora (Uchipoo)

Standardization of Cultivation Practices and evolution of new Variety in Ixora - Karur

- Micronutrient study in Ixora alone was standardized. Spraying of FeSO₄ (0.5%) + ZnSO₄ (0.5%) at fortnight intervals.
- Standardization of other cultivation practices being taken up

Hibiscus

During summer, Hibiscus is severely affected due to the incidence of mealy bugs resulted in great economic loss to the farming community. The practice of spraying profenophos 2ml/lit of water is not giving full achievement over controlling the pest attack. Therefore providing of integrated and recent techniques for controlling the incidence will be more beneficial to the farmer - Thanjavur

- Monitoring the incidence of mealy bugs at regular intervals.

- Collection and destruction of infested plant parts before spraying.
- When the infestation is lesser: Spraying of neem oil 2 % or fish oil rosin soap 25 g/lit.
- On severe incidence, spraying of any one of the following chemicals is recommended.
 - Dimethoate (2 ml/lit.)
 - Chlorpyrifos (2 ml/lit.)
- Release coccinellid predator *Cryptolaemus montrouzieri* @ 10 nos/tree.

MEDICINAL AND AROMATIC PLANTS

Scope for Tulasi marketing

Suitable crops and scope of aromatic crops cultivation in Dindigul plains

Medicinal plants suitable for Dindigul district apart from Coleus and Gloriosa - Dindigul

- Tulasi can be cultivated in Dindigul district as dual crop (for religious as well as essential oil). For ensuring economic returns to farmers, it is suggested to establish tie-up between the farmers and the buyers.
- Vetiver can be cultivated in the plains of Dindigul for its high value essential oil. The oil of vetiver commands good price and can be promoted on cluster approach by selecting improved varieties like CIM Dharini, CIM Vridhi which yields upto 1 per cent oil and the quality of the oil is good.
- The Department of Horticulture and Plantation crops can organise a meeting with the group of farmers for which TNAU would provide the technical support besides market facilitation.

Polyhouse Cultivation

Parthenocarpic vegetable varieties for poly house (Except Cucumber)

- Parthenocarpic vegetable varieties are not available at TNAU. Instead, capsicums can be cultivated under poly houses and Tomato, brinjal and bhendi hybrids are also available.

Scope of getting insurance for poly house and shade net structures - Dindigul

- Kindly contact State Dept. officials to get relevant information in this regard.

Crop based fertigation schedule and feasibilities for growing tropical Orchids in Dharmapuri.

- Fertigation schedule is available in crop production manual or TNAU agriportal .
- Tropical orchids can be cultivated under shade net house. The package of practices and the technologies are available in TNAU agriportal.

Control measure for nematodes in poly house - Erode

- Application of *Purpureocillium lilacinum* as seed treatment @ 10g/kg seed followed by soil application @ 50g/m².
- Application of *Arbuscular mycorrhiza* (AM) fungus @ 100g/m².

- Application of neem cake @ 400kg/ha.
- Avoiding monocropping.

Suitable structures and Technologies for protected cultivation - Kanchipuram

- Technologies for cultivation of horticulture crops under protected cultivation is described under Horticulture : Green house cultivation technology in TNAU agri.portal (agritech.tnau.ac.in/ta/horticulture/horti_greenhouse_cultivation_ta.html)

Shade net cultivation

Suitable crops for shade net cultivation other than pro tray seedlings production in plains

Scope of getting insurance for poly house and shade net structures - Dindigul

- Coriander can be cultivated throughout the year.
- The details are available in the State Department of Horticulture.

Grafting in SHF

Nursery Production Manual for State Horticultural Farms - Sivagangai

- Nursery production manual can be prepared if funds are provided by the State Department of Horticulture.

Organic farming

Complete package – Crop wise - Kancheepuram

- Package is available for banana. For other crops, it will be provided in due course.

Soil Health

Soil Based Bulk Organic Materials incorporation to enrich and increase the soil fertility - Nagapattinam

- Organic manure need to be applied once in a year at 25 tonnes /hectare for horticultural crops or 12.5 tonnes/ha for agricultural crops based on soil test. For wetland rice system, green manure or green leaf manure at 6.25 tonnes/ha can be applied.

Arid zone crop / new crop

One or two arid zone crop / crop that can withstand dry and heavy rain under nagapattinam coastal condition may be introduced and to be established into an exportable crop - Nagapattinam

- Crops like Jamun, Custard apple and Manila tamarind can be grown where improved varieties are available. For export market, overseas market survey should be made.

Bamboo

Specific Study on suitable species to withstand high speed wind damaging many crops in Udumalpet creating moisture stress

Efficacy of thornless Bamboo Species in protection as well as supporting other crops study on Allopathic effects of thornless Bamboo versus traditional Bamboo - Tirupur

- Casuarina MTP 2 is a suitable tree species to withstand high speed wind velocity and models are available at Mettupalayam. Casuarina MTP 2 can be planted as wind break and has been proven to be effective for protection of banana in and around Mettupalayam.
- Under *Bambusa vulgaris* (thornless bamboo) based agroforestry system, intercropping can be done up to 12 months after planting when bamboo is planted at a spacing of 7m x 4m.

Other Issues

Animal repellants study against wild Bear, Elephant to protect Mango and Coconut and menace reduction due to Peacock. Study needed for Poly house Packages for cucumber and rose - Tirupur

- Management of wild animals cannot be attempted without the purview of the Department of Forest.
- Polyhouse packages for cucumber and rose are available with Department of Vegetable crops and Flower crops, HC&RI, TNAU, Coimbatore respectively.

