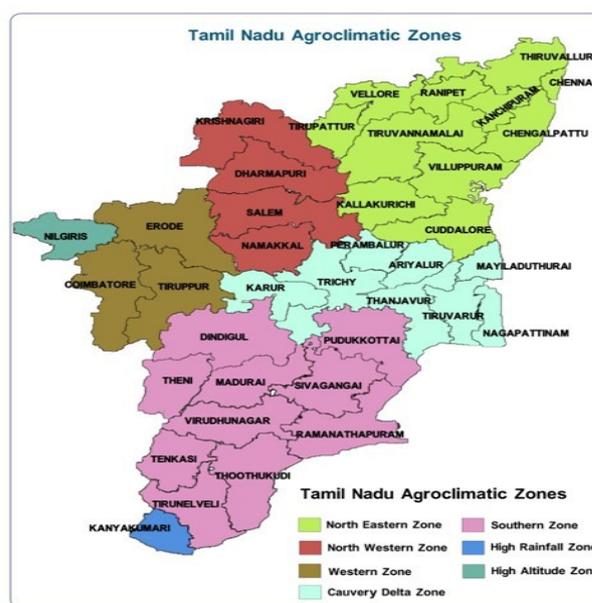


# Agricultural Briefs of Tamil Nadu

## Section1. Agroclimatic zone, Crop and livestock Scenario

- Tamil Nadu has 7 agro-climatic zones, supporting a wide range of crops, fruits, vegetables, spices, plantation crops, and flowers.
- Agriculture continues to be the most predominant sector of the State economy, around 60 percent of the population is engaged in Agriculture and allied activities for their livelihood.
- The State has 79.38 lakh landholders, cultivating gross cropped area of around 60 lakh ha in 2023-24.
- About 60% of cultivated land is irrigated, largely through groundwater (65%), canals (21%) and tanks (14%). In 2022-23, the irrigated area expanded to 38.33 lakh ha.
- As in other States, agriculture in Tamil Nadu is dominated by small and marginal farmers, with 93% of holdings below 2 ha.
- Agriculture and allied sector make up around 13% of State's GSDP.
- Between 2021-24, the sector enjoyed robust growth, averaging 5.66%, far above the previous decade's average of 1.36%. However, in 2024-25, this sector contracted slightly by -0.09% in real terms—marking the first dip in approximately eight years.
- The State receives an annual rainfall of 920 mm, roughly distributed of about 44-49 % during NW monsoon, 32-34% during SW monsoon, 13-19 % during summer, and 2-4% during winter



## Crop Sector Profile

- Tamil Nadu ranks first in the productivity of finger millet (ragi), sugarcane and guava, ranks second in maize, oilseeds, tamarind, tapioca, amla, nutmeg, clove, curry leaves and jasmine and ranks third in groundnut, minor millets, cocoa and marigold (Table 1 and 2).
- Traditional paddy varieties such as Ramanathapuram Chithiraikar, Mappillai Samba, Thooya malli, Kaatu yaanam, Kancheepuram idly rice, Karuppu Kavuni has growing demand both in domestic as well as in international markets (to Sri Lanka, Middle East, Malaysia).
- The State has sizeable area under **millet production**, especially in Varagu (Kodo millet), Kuthiraivali (Barnyard millet), Samai (Little millet) and Thinai (Foxtail millet) production.
- TN may be called as 'Horticultural State of India' because nearly 20% of gross cropped area is under horticulture (12 lakh ha).

- The State is the leading producer of banana, mango, guava, papaya and jackfruit
- Tamil Nadu ranks first in loose flowers production (Jasmine, Chrysanthemum, Marigold, Tuberose).
- Crops /varieties such as Thanjavur matti rice, Mappillai samba, Thooya malli, Ramanathapuram Chithiraikar, kanchipuram idly rice, Kodaikanal Malai Poondur, Elavambadi Mulla Kathirikai, Authoor Vetrilai, **Sholavandan Vetrilai**, Malai Malligai Ooty Lavender, Nanjanagud Banana, Salem Mango, Virupakshi Hill Banana, Sirumalai Hill Banana, Erode Turmeric, Panruti Cashew, Panruti Jack, Pollachi Coconut, Puliyankudi Acid Lime etc has got GI tags indicating special geographical significance of these crops and varieties in Tamil Nadu
- Tamil Nadu is a major exporter of banana, mango, papaya, loose flowers (jasmine, marigold), turmeric, and tamarind.

**Table 1. Field Crops Profile: Area, Production & Yield of major crops of TN in 2024-25 in comparison with All India**

<i>Area in Lakh Ha, Production in Lakh Tonnes &amp; Yield in Kg/Ha</i>					
<b>Crop</b>	<b>State</b>	<b>Season</b>	<b>Area (Rank)</b>	<b>Production</b>	<b>Yield</b>
<b>Rice</b>	<b>Tamil Nadu</b>	Kharif	6.64	22.41	3375
		Rabi	12.21	38.35	3141
		Summer	2.76	10.59	3839
		<b>Total Rank &amp;</b>	<b>21.61 (10<sup>th</sup>)</b>	<b>71.36 (10<sup>th</sup>)</b>	<b>3302 (5<sup>th</sup>)</b>
	<b>All India</b>	Kharif	434.13	1218.54	2807
		Rabi	44.74	156.72	3503
		Summer	35.36	115.48	3265
		<b>Total</b>	<b>514.23</b>	<b>1490.74</b>	<b>2899</b>
<b>Maize</b>	<b>Tamil Nadu</b>	Kharif	2.13	12.75	5999
		Rabi	2.49	12.67	5082
		Summer	0.21	1.07	5082
		<b>Total Rank &amp;</b>	<b>4.83 (8<sup>th</sup>)</b>	<b>26.49 (8<sup>th</sup>)</b>	<b>5486 (5<sup>th</sup>)</b>
	<b>All India</b>	Kharif	84.30	248.43	2947
		Rabi	27.24	136.16	4999
		Summer	8.64	38.22	4425
		<b>Total</b>	<b>120.17</b>	<b>422.81</b>	<b>3518</b>
<b>Jowar</b>	<b>Tamil Nadu</b>	Kharif	1.38	1.80	1309
		Rabi	1.89	1.89	998
		Summer	0.13	0.10	795
		<b>Total Rank &amp;</b>	<b>3.40 (4<sup>th</sup>)</b>	<b>3.80 (5<sup>th</sup>)</b>	<b>1116 (9<sup>th</sup>)</b>
	<b>All India</b>	Kharif	14.21	17.54	1234
		Rabi	25.14	30.86	1227
		Summer	0.48	0.40	830
		<b>Total</b>	<b>39.84</b>	<b>48.80</b>	<b>1225</b>

<b>Ragi</b>	<b>Tamil Nadu</b>	Kharif	0.64	2.41	3758
		<b>Total Rank</b>	<b>&amp; 0.64 (4<sup>th</sup>)</b>	<b>2.41 (2<sup>nd</sup>)</b>	<b>3758 (1<sup>st</sup>)</b>
	<b>All India</b>	Kharif	12.29	18.34	1492
		<b>Total</b>	<b>12.29</b>	<b>18.34</b>	<b>1492</b>
<b>Cereals</b>	<b>Tamil Nadu</b>	Kharif	11.36	40.66	3578
		Rabi	16.60	52.91	3188
		Summer	3.23	11.94	3701
		<b>Total Rank</b>	<b>&amp; 31.19 (14<sup>th</sup>)</b>	<b>105.51 (11<sup>th</sup>)</b>	<b>3383 (5<sup>th</sup>)</b>
	<b>All India</b>	Kharif	617.70	1605.71	2599
		Rabi	430.78	1517.25	3522
		Summer	48.22	164.25	3406
		<b>Total</b>	<b>1096.70</b>	<b>3287.21</b>	<b>2997</b>
<b>Total Pulses</b>	<b>Tamil Nadu</b>	Kharif	1.79	1.05	586
		Rabi	3.94	2.03	515
		Summer	1.77	0.62	351
		<b>Total Rank</b>	<b>&amp; 7.50 (9<sup>th</sup>)</b>	<b>3.70 (13<sup>th</sup>)</b>	<b>493 (21<sup>st</sup>)</b>
	<b>All India</b>	Kharif	113.72	74.95	659
		Rabi	139.02	154.91	1114
		Summer	23.50	22.52	958
		<b>Total</b>	<b>276.24</b>	<b>252.38</b>	<b>914</b>
<b>Total Food Grains</b>	<b>Tamil Nadu</b>	Kharif	13.16	41.71	3170
		Rabi	20.53	54.94	2675
		Summer	4.99	12.56	2516
		<b>Total Rank</b>	<b>&amp; 38.68 (14<sup>th</sup>)</b>	<b>109.21 (12<sup>th</sup>)</b>	<b>2823 (9<sup>th</sup>)</b>
	<b>All India</b>	Kharif	731.42	1680.66	2298
		Rabi	569.80	1672.16	2935
		Summer	71.72	186.77	2604
		<b>Total</b>	<b>1372.94</b>	<b>3539.59</b>	<b>2578</b>
<b>Ground nut</b>	<b>Tamil Nadu</b>	Kharif	2.01	3.94	1962
		Rabi	0.73	2.28	3136
		Summer	0.43	1.34	3136
		<b>Total Rank</b>	<b>&amp; 3.16 (7<sup>th</sup>)</b>	<b>7.56 (4<sup>th</sup>)</b>	<b>2390 (3<sup>rd</sup>)</b>
	<b>All India</b>	Kharif	49.95	103.68	2076
		Rabi	3.44	6.90	2005
		Summer	4.15	8.38	2019
		<b>Total</b>	<b>57.54</b>	<b>118.96</b>	<b>2067</b>

<b>Sunflower</b>	<b>Tamil Nadu</b>	Kharif	0.00	0.01	1825
		Rabi	0.05	0.04	880
		Summer	0.01	0.01	880
		<b>Total Rank &amp;</b>	<b>0.07 (5<sup>th</sup>)</b>	<b>0.06 (7<sup>th</sup>)</b>	<b>934 (11<sup>th</sup>)</b>
	<b>All India</b>	Kharif	0.79	0.71	906
		Rabi	0.73	0.99	1359
		Summer	0.22	0.26	1171
		<b>Total</b>	<b>1.74</b>	<b>1.96</b>	<b>1129</b>
<b>Total Oil Seeds</b>	<b>Tamil Nadu</b>	Kharif	2.24	4.07	1821
		Rabi	0.82	2.35	2853
		Summer	1.02	1.65	1610
		<b>Total Rank &amp;</b>	<b>4.08 (10<sup>th</sup>)</b>	<b>8.07 (9<sup>th</sup>)</b>	<b>1976 (2<sup>nd</sup>)</b>
	<b>All India</b>	Kharif	200.54	277.90	1386
		Rabi	93.24	135.74	1456
		Summer	8.88	12.44	1402
		<b>Total</b>	<b>302.65</b>	<b>426.09</b>	<b>1408</b>
<b>Sugarcane</b>	<b>Tamil Nadu</b>	Kharif	1.30	132.08	101435
		<b>Total Rank &amp;</b>	<b>1.30 (6<sup>th</sup>)</b>	<b>132.08 (5<sup>th</sup>)</b>	<b>101435 (1<sup>st</sup>)</b>
		<b>All India</b>	Kharif	53.58	4501.16
		<b>Total</b>	<b>53.58</b>	<b>4501.16</b>	<b>84006</b>
	<b>Cotton#</b>	<b>Tamil Nadu</b>	Kharif	1.03	2.10
<b>Total Rank &amp;</b>			<b>1.03 (11<sup>th</sup>)</b>	<b>2.10 (11<sup>th</sup>)</b>	<b>346 (13<sup>th</sup>)</b>
<b>All India</b>			Kharif	112.30	306.92
		<b>Total</b>	<b>112.30</b>	<b>306.92</b>	<b>465</b>

Data for the year 2024-25 is of 3<sup>rd</sup> Advance Estimates  
GoI

Source: DA&FW,

# Cotton Production in Lakh Bales, 1Bale=170 Kg

Value in parenthesis reflect the rank among the states

**Table 2a. Horticulture Crops Profile: Area, Production & Yield of major horti crops of TN**

#	Group	2023-24 (Second Advance Estimate)		
		Area (lakh Ha)	Production (lakh MT)	Productivity (MT/Ha)
1	Fruit crops	3.34	75.29	22.52
2	Vegetable crops	3.63	92.36	25.46
3	Plantation crops	7.59	56.28	7.41
4	Spices & Condiments	1.11	3.30	2.97
5	Medicinal and Aromatic	0.16	1.68	10.52
6	Flower crops	0.47	6.31	13.55
<b>Total</b>		<b>16.30</b>	<b>235.22</b>	

**Table 2b. Tamil Nadu's position at National Level w.r.t. acreage of various horticultural crops**

First	Second	Third
1. Tapioca	1. Banana	1. Coconut
2. Clove	2. Watermelon	2. Aonla
3. Tamarind	3. Cocoa	3. Elephant foot yam
4. Jasmine	4. Chrysanthemum	4. Black pepper
	5. Tuberose	

Source: *Final Estimates 2022-23, Horticulture Statistics Division, Dept. of A & FW, GoI*

**Table 2c. Tamil Nadu's position in National level w.r.t. production of various horticultural crops**

First	Second	Third
1. Clove	1. Cocoa	1. Coconut
2. Tamarind	2. Chrysanthemum	2. Aonla
3. Jasmine		3. Banana
4. Tuberose		4. Watermelon
5. Tapioca		5. Elephant foot yam

## Section 2. Farmers' Issue and Constraints in Tamil Nadu

### 1) General Issues

- **Cost of cultivation:** Rising input and labour costs is a major concern across all districts in the State. Technological interventions for reducing the cost of cultivation and increasing the profitability of farmers must be developed and implemented.
- **Unseasonal rainfall, erratic monsoon:** Heavy, untimely rains in delta areas disrupts harvest, delay paddy procurement or causes grain spoilage and economic losses particularly in Thanjavur, Nagapatinam, Cuddalore and Tiruvarur districts.
- **Shrinking water resources and declining irrigation water quality:** Deepening water table and salinization of irrigation water in the non-delta region are yet another concern. The State despite having 17 major river basins, is water-stressed, with per capita availability at only 740 m<sup>3</sup>/year as against the national average of 1,486 m<sup>3</sup>/year. Over-extraction of ground water resource is a rising concern for sustainability.
- **Shrinking crop acreage:** Reduction in area of major commercial crops like cotton and sugarcane in the State is an emerging concern. Sugarcane area in Tamil Nadu in 2014-15 was 2.63 lakh ha and it was reduced to 1.30 lakh ha in 2024-25, reflecting 40 per cent reduction in acreage. Similarly cotton area in the State has come down to 1.03 lakh ha in 2024-25 from 1.87 lakh ha in 2014-15, reflecting 44.91 per cent reduction.
- **Increasing menace and damage due to wild animals:** The menace of wild animals like wild boar, peacock, monkey, deer and recently the black legged heron is increasing at an alarming /uncontrolled rate in the State. As these animals are listed under the Wildlife Protection Act or recognized as national bird or due to religious sentiments culling out its overpopulated animal/birds could not be effectively implemented. Farmers are losing their valuable crops. Effective policy is required to periodically cull out excessive population of these wild animals.
- **Low productivity of dryland farming and suggestions for alternative income:** Dryland districts like Ramanathapuram, Sivagangai, Virudhunagar, Thoothukudi, Dharmapuri, Krishnagiri, Tiruvannamalai face frequent droughts. In these dry tracts, rainfed yields of millets, pulses, and oilseeds remain *far below the state average*. Farmers rely on monsoon rains hence their incomes are unstable. **Setting up solar energy units in these dryland districts can transform the rural economy.** The State receives ~5.5–6.0 kWh/m<sup>2</sup>/day solar radiation with 300+ sunny days/year. Dryland belts are less vegetated and have large stretches of uncultivated or fallow land, ideal for solar farms. Wherever, the cost of cultivation exceeds the profitability, in such zones farmers may be allowed (as a policy initiative) and encouraged to set up solar energy mill in their dry/unproductive/ marginal/ waste lands. Land that cannot generate high-value crops can be allowed for **solar parks**, which may give farmers steady annual rent (₹30,000 – ₹50,000/acre depending on the project). The Govts. may consider promoting **Agrivoltaics** *i.e.* combining solar panels with millet/pulses/fodder crop cultivations. The PM-KUSUM Scheme of GoI and Tamil Nadu Solar Policy 2019 promotes solar pumps and decentralized solar plants (up to 2 MW).

### 2) Issues related to Genetic improvement, Breeding and Seed Production

- **Demand for super fine paddy:** Paddy is a major food crop in the State, grown over an area of 21.61 lakh ha. Short bold, medium bold (matta rice) and fine grain (medium slender) paddy varieties are grown in large scale in the State. However, due to

urbanization and change of lifestyle of consumers, fine and super fine grain paddy varieties (long slender grains) traded in huge quantity than the matta or medium slender rice. TN has considerable area under fine rice varieties such as Samba Masuri or Bapatla variety (BPT 5204), White Ponni, Sona Masoori etc. ***These varieties are considered as outdated by millers and traders as demand for super fine varieties like RNR (Pragathi RNR-15048), Sowbhagya etc is increasing.*** Traders are getting the super fine rice from neighbouring States and selling it in the urban local markets at high price (> ₹ 65/kg of rice). ***Market driven paddy variety is the need of the hour.***

- **Demand for new paddy variety in the high rainfall zone:** In the high rainfall zone like Kanyakumari district, medium bold grain paddy varieties are grown. As the available varieties like CR 1009, TPS 3 etc., are old, new varieties may be introduced in the zone.
- **Demand for bold seeded groundnut:** Groundnut is a major oilseeds crop in TN, grown over an area of 3.16 lakh ha. Farmer prefers bold seed varieties like GG 20, which fetches ₹ 500-1000/q higher price than normal size local variety. Around 70,000 ha area during rabi season is planted with irrigated groundnut and huge seed demand for GG 20 exist in TN. Farmers are getting seeds of GG 20 from Gujarat through traders, often at higher cost. This variety was released from JAU, Gujarat and its seed production system in TN, particularly during rainfed kharif groundnut is limited or nil. The rabi season groundnut seed will not be suitable for next year rabi sowing due to poor germination. So, farmers are getting seeds for Rabi groundnut crop from Gujarat (from the Kharif seed production lot). ***Breeding bold seed groundnut variety which has market preference or export preference may be undertaken.***
- **Demand for native vegetables:** In Thanjavur and Trichy district markets, the light purple brinjal variety called Manaparai katharikkai fetches at ₹ 2-3/kg higher than other varieties. Likewise, Bhavani katharikkai, Sevanthampatti kathirikai Yelavambadi mullu katharikkai are traded at higher price in the respective local markets. These ***are traditional varieties and authentic seeds are not available in the production zone.*** Farmers are travelling long distance to get seedlings or seeds of these varieties.
- **Demand for short duration pulses:** Rice fallow pulses is an important cropping system in the delta area of TN. ***More number of short duration black gram and green gram varieties with bold seed is required for such cropping system.*** With regard to red gram, long duration varieties are generally higher yielder than short duration varieties. In TN, the subsidy is given for < 10 years new varieties. None of the existing varieties are eligible for promotion under the scheme as these are old varieties. Short duration variety with high yield as that of long duration varieties is preferred.
- **Improved sugarcane varieties for delta area and interior coastal zone:** The popular sugarcane variety Co 86032 has covered about 45% area in the State (2023-24), its performance *vis-à-vis* likeness in delta area and interior to Coastal zone is limited. Other new varieties have limited spread in these zones but the old variety, CoV 09356 is doing well (23% area coverage in TN) although it is susceptible to YLD and Pokkah boeng-Crown mealy bug complex. Kothari sugar factory in Ariyalur district ceased its crushing in 2024-25 season due to want of canes, mainly due to high incidence of Pokkah boeng- crown mealy bug complex. ***Cane variety suitable to the region and tolerant to the inherent and seasonal problems faced in the zones is required.*** The seed cane quality of CoV 09356 has deteriorated as no agency is involved in tissue culture / quality seed cane production of this variety.

### 3) Issues related to Soil, Irrigation Water quality and Crop Productivity

- **Increasing cotton productivity:** Tamil Nadu is a hub of spinning mills, having ~55% of the country's total spinning mills. The State is consuming more cotton than it produces. The mills in TN require around 120 lakh bales of cotton. Approximately, 95% of the cotton used in the state's textile mills are procured from Gujarat, Maharashtra, Telangana and Andhra Pradesh as local production is limited (4.60 lakh bales). ***A significant challenge faced by the cotton industry is the shifting trend among farmers to diversify from cotton to other crops like maize, tapioca, banana*** etc. A way to enhance cotton production in the State is to increase its productivity by following high density planting system (HDPS), reducing labour cost for Kapas picking by introducing small scale mechanization, etc. The spinning industry needs long stable cotton, which is generally comes from *Gossypium barbadense* varieties (American cotton). Millers prefer long staple (27-32 mm) and extra-long staple (ELS- >32 mm) cotton for spinning into fine count yarn (40s–120s). However, local production meets only ~30–35% of mill needs, forcing large imports from Gujarat, USA, Egypt. The ELS cotton hybrid Suvin is known as the finest cotton in the world. The ELS cotton do well in Southern India including TN than Northern India. Therefore, intensive efforts is needed to regain cotton area in irrigated cotton tracts and also to promote ELS cotton varieties like Suvin, MCU 5, and LRA 5166 in Southern districts (Madurai, Ramanathapuram, Virudhunagar, Thoothukudi, and Tirunelveli).
- **Monocropped paddy:** In the Cauvery delta and adjoining zones, if second crop of paddy is taken after first crop of paddy or in certain saline-alkaline zone or in areas affected by one weak flood, most of the fine grain paddy varieties shows 'clump degeneration' leading to gappy fields. Farmers not only lose their income but also losing one crop cycle as intervention after tillering phase is not feasible practically. The crop is not covered by insurance or other flood relief measures as half of the plant population remains in the field.
- **Effluent problem:** Multiple use of pond/tank water (for drinking, irrigation, fish farming, cattle drinking and washing, bathing, watering to nurseries etc) has been the lifestyle of our forefathers. This traditional good ethic of Tamil culture has been at risk particularly in the urban and peri-urban areas. Ponds and tanks situated in the peri-urban towns and corporations are led, often with untreated sewage water, thus making the water unfit for fish farming or pot watering for smaller nurseries, drinking. Tannery or textile effluent water problem in the districts of Karur, Tiruvallur, Vellore, Coimbatore is posing threat to the ecosystem in the region.
- **Improving the quality of water bodies:** The Govt. of TN has carried out de-silting and broadening of tanks/ ponds in the State. This effort will get better realization if the water ways to the tanks/ponds are cleared from individual illegal encroachment and cleaned on yearly-basis (*maramathu*- Govt or community-led tank restoration). In the urban area, there are tanks and ponds where the impounded ***water remains in the tank/pond for years together***, creating bad odour, high algal growth and BOD. The water in such ponds is unfit for animal wash and even for fish farming. The banks of few such ponds/tanks have been improved under the Smart City Project and people utilizing it for morning walk, ignoring the hazardous odour. One time letting-out of such stagnated water, followed by drying for few months, desilting and letting-in fresh water, stopping mixing of untreated sewage water will improve the quality as well as multiple use of such water.

- **Promoting green leaf manuring:** The practice of collecting green leaves from *Azadirachta* (neem), *Gliricidia* (sirupalai), *Thespesia* (poovarasu), *Tephrosia* (kolunji), *Pongamia* (pungam), *Calotropis* (eruku) etc and applying them as manure in puddled paddy fields become an obsolete practice. On the other hand, the practice of rising green manure crop like Dhaincha (*Sesbania*) and sunnhemp (*Crotalaria*), and *in situ* incorporation is increasing in the State. Bulk of the *Daincha* and Sunnhemp seeds comes from A.P., Karnataka and MH. **Hence its cost is higher** (₹ 100/kg). Often spurious seeds with poor germination are sold. **Participatory seed production of these green manures is suggested.** We have to increase green leaf production base in the rural areas, especially in paddy belt by growing trees such as neem, poovarasu, pungam, glyricidia etc in village wasteland, porampokku, social forest land etc. **Local farmers residing in the nearby villages may be involved in participatory tree planting in forest/panchayat land, watering and tree maintenance** etc. In return, the forest Dept or Panchayat may allow these farmers to collect leaves from these trees for feeding to goat and green manuring purpose.
- **Increasing incidence of itch grass weeds:** We have been noticing increasing incidence of the itch grass / sunaipul (*Rottboellia cochinchinensis*) in Coimbatore, Theni, Perambalur districts of Tamil Nadu in sugarcane, maize, sorghum fields. This grass initially reported in the Western Ghats and Karnataka, now spreading in Tamil Nadu, Maharashtra and Andhra Pradesh, mostly through implements used for ploughing / interculture and through seeds of green manures, maize, sorghum produced in the partially weeded fields. It produces spike-like cylindrical inflorescence within short time of about 45-60 days and flowers/seeds are often mimic the rolled leaves, hence farmers may not be noticing its seeds. It shatters seeds in the same field and spread quickly. Moreover, it is difficult to pull out the plants as it has bristly hairs causes itching to the labourers (so called sunaipul). It is not controlled by commonly used weedicide like Atrazine / Simazine. *Integrated weed managements, giving emphasis on early mechanical control will help to spread of this weed.*
- **High density planting system (HDPS)-Some challenges:** High density planting is the current concept by which productivity of the fruit crops can be enhanced per unit area. It is recommended fruit crops like mango, Sapota, banana and commercial crops like cotton. In cotton, the ICAR institutes and SAUs are vigorously recommending HDPS, as the HDPS is giving higher kapas yield (35-45 q/ha) in comparison to the conventional planting (20-25 q/ha). However, the HDPS warrants desired ideotypes / alteration in plant canopy such as **compact and early varieties, which are still limited in India or TN. Secondly, the nutrient and water stress under HDPS may reduce yields due to high population. Thirdly, pest and disease spread is faster in dense canopy and lastly farmers have to use growth regulators or manual pruning which is essential, else lodging occurs.** These challenges require attention of researchers and extension officials to tackle suitably.

#### 4) Specific Issues in Horticulture Sector

- **Low productivity of coconut plantation:** The crop is **not regularly manured**, both organic and chemical fertilizers which is needed to improve the productivity of existing plantation. The Horticulture Dept. in Tamil Nadu is implementing many development schemes with 100% subsidy. At many places, once planted it become a forgotten crop. An exclusive coconut manuring and supervision scheme may be developed to promote

application of manures and fertilizers once during monsoon and once during dry season. Secondly, a lot of organic wastes such as coconut leaf (fronts), inflorescence etc are generated in the coconut garden which need to be recycled in the garden itself. Farmers expect subsidy **for purchase of coconut shredder /pulverizer**. If at least one shredder for 9-10 villages is sanctioned, a considerable quantity of coconut waste can be converted into organic wealth. Thirdly, the incidence of rugose spiraling whitefly has spread to the whole TN. There are observations that this pest even attacking banana in Southern districts. Farmers, Dept and Research Institution tried several management measures but effective controlling has not happened till date. **Perhaps the IPM with much emphasis on identification and release of parasitoids / predators may give desired result.** More research is needed in this aspect. Fourthly, the root wilt is increasing in Kanyakumari, Nagercoil, Coimbatore, Tirupur districts. This require spread of awareness on IPM among farmers.

- **Poor quality of mango fruits and home-grown custard apple and pomegranate:** Many consumers who bought mango at high rate during this year (₹. 25/fruit) often disappointed by observing nut weevil or fruit decay. The practice of growing one or two pomegranates or custard apple in the homestead / home gardening is increasing in Tamil Nadu. These homes grown, often organically grown fruits are affected by mealy bug, squirrel etc, thus making the fruits unfit for marketing. These illustration shows that we are not producing better quality fruits hence we could not market it either in domestic or in export markets. This issue needs to be given focus during VKSA campaign. One of a **good agriculture practice** which is slowly picking in Salem, Dharmapuri and Krishnagiri districts of Tamil Nadu is **covering /bagging mango fruits** with different kind of bags (paper bags, polythene bags, biodegradable cover etc). These bags may cost around ₹. 1.50-2.50 per cover. The cost of bagging per acre may vary from ₹. 15,000 to 40,000 depending on number of fruits/tree (100–150 fruits per tree) and number of trees/acre (100 to 300 trees/acre). The bagging prevents fruit fly infestation (*Bactrocera* spp.), minimizes damage from mango hoppers, mealy bugs, thrips, reduces anthracnose and powdery mildew infection and produces pesticide-free, blemish-free mangoes with better skin colour. This practice helps in producing export quality mango. Definitely, the cost to bagging would be compensated by the **premium price**. It is especially beneficial for **export varieties like Alphonso, Banganapalli, Imam Pasand, and Totapuri**. **Awareness of this practice among mango growers is required. Awareness on IPM practices for managing mealy bug in home grown custard apple and bagging of fruits of pomegranate is required.**
- **Coffee and Tea plantation:** Coffee is usually grown along with Pepper. Alternative cropping system specific to each region in the state need to be explored. The use of banned or hazardous chemicals in coffee and team plantation limiting export opportunity of these crops. Awareness camp among plantation owners and small growers is required to address the issue.
- **Area expansion for clove in Kanyakumari district:** Tamil Nadu is the leader in clove production in the country. The Kanyakumari clove is known for its quality and it got GI tag. Due to increasing demand, the country is importing clove worth of 1953 crores in 2024-25. To curtain clove import, the Govt is promoting clove cultivation in the Country. The Nagercoil hills in the Kanyakumari Dist. is having ideal climate for clove cultivation. **There is possibility of increasing area in Kanyakumari Dist.** However, there is hurdle in area expansion **due to implementation of Tamil Nadu Forest Act, 1882 and TN Preservation of Private Forest Act, 1949** which interpret the 'patta

land' as private forest which prohibit agricultural activities in the private forest without special permission of the Forest Dept. Special permission from the Forest Dept/ Govt. of Tamil Nadu is required to expand clove area in the private forest patta Land of Kanyakumari District. Since clove, nutmeg etc live long (~60 years) and promote forest cover its cultivation in the private patta land may be treated as afforestation activity. The clove cultivation may be excluded from the list of non-forest activity and growers should not be penalized under the Forest Act.

- **Problem of plenty:** In certain region or crop tract where a particular crop is grown in large scale like jack fruit in Pudukottai, Dindugul, Panruti, Dharmapuri; Palmyra in Thoothukudi, Ramanathapuram, Tirunelveli; green chillies, brinjal and tomato in the major vegetable belts are facing the problem of plenty. Due to excess production/harvest, the produce fetches at low price in the production Centres, cases of un-harvest of produce in field/plant/tree itself have been frequently reported as cost of harvest is higher than the prevailing market price of that produce. Nonetheless, there are fairly good demand exists for these perishable commodities in the far-away domestic markets as well as in abroad. To illustrate specifically, during peak production period (Dec to Mar), palmyra nongu (ice apple) fetches low price in Thoothukudi, Ramanathapuram, Tirunelveli, often ₹ 2-3 in these production locations but fetches 5 times costlier (₹ 10/ice apple) at non-production Centres like Coimbatore town. Likewise, jack fruit fetches at low price (₹ 50/fruit) in the production Centre but in urban market a flesh is sold at ₹10. Initial season harvest of chilies, tomato etc fetches higher price but peak season and late season harvest fetches low price, not even sufficient to meet harvesting charges. These problem of plenty shall have to be addressed through establishing suitable cold storage facility, establishing facility for long distance market, creating strong marketing network including for export etc. In case of jackfruit, ~30% of jackfruit production in the India is wasted due to poor handling and lack of storage. Therefore, if a jack fruit processing Centre is established in Panruti and Pudukottai etc which has been a long-standing demand, can convert surplus produce into value-added products, thus reducing wastage. The Kerala Govt. has sett up few jackfruit processing plants. Panruti-famously known as the "jackfruit capital of India" and Panruti jackfruit has got GI-tag in 2025. The State Govt. in its 2024–25 budget announced plans to establish a **value addition Centre in Panruti. More such Centre is needed.** The PM-FME (Pradhan Mantri Formalisation of Micro Food Processing Enterprises) scheme support establishment of fruit-based processing clusters.
- **Conservation of fruit genetic resources - a new approach:** The '*Tamizh nilam*' is bestowed with fairly-rich genetic diversity with respect to food crops, fruits and vegetables. The chola rulers of Tamil Nadu had the habit of planting along road side (avenue tree) an array of mango and tamarind varieties- neelam, malgoa, senthooram, pulimanga, juicy mango, inippu puli, sirupuli, kottai puli, etc. These genetic repositories have partly been destroyed in the name of highway development. ***It is time to collect all the available varieties and variabilities in fruit crops (trees) and planting them as avenue tree along the rural roads, on the banks of ponds/lakes and on common lands-natham, porampokku as done by earlier rulers.*** This would be the genetic resource asset passing to our future generation. It has lot of values-economics, social and cultural, ecosystem and environmental values. Fund from the NBA, NGOs and manpower from the MNREGA may be explored for the purpose. The Dept of Highways, Horticulture, Irrigation, Panchayat offices may work together in this endeavor. This

approach is different from the on-going massive tree planting programme (like planting palmyra on the bank of ponds/tank), in which only one or available variety of tree is planted, whereas in the proposed plan as many as varieties of that crop shall be collected, multiplied and planted in the waste land, road side etc, so that in one road /one village many varieties of fruits can be seen (fruit crop's varietal cafeteria) and harnessed. If village youth is employed for collection of seeds and seedling/sapling/nursery rising, they will get gainful employment in the rural area itself. ***This will give international recognition*** as this approach mimic *in situ* gene bank conservation, without much spending.

- **GI tagged native spices need market promotion:** Tamil Nadu's **unique GI spices** such as Kanyakumari Clove, Ramnad Mundu Chillies, Viridanagar Sannam Chillies and Kodaikanal Hill Garlic requires focused promotion and value addition, by establishing linkage between FPOs and exporters, buyer-seller meet (BSM), rendering technical assistance on post-harvest handling and value addition, creating more awareness on CRES Certificate for export offered by the Spices Board (Certificate of Registration as Exporter of Spices) which is like RCMC (Registration-cum-Membership Certificates) in other crops. The European Union's Deforestation Regulation (EUDR) bans the sale or export of certain commodities like Coffee, Tea, Cocoa, Rubber etc. into European markets if they are linked to deforestation or forest degradation that occurred after Dec 2020. Since we are exporting coffee to European countries, awareness and compliance of this law among coffee growers is required for promoting exports. The Coffee Board has developed an App called India Coffee App to comply with EUDR. *Registration in this App is essential for confirming Indian Coffee is deforestation-free.* Awareness on these issues may be carried out during the campaign.
- **Promoting GI tagged lemon:** Puliyanakudi and surrounding blocks contribute a major share of acid lime (*Citrus aurantifolia*) production in Tamil Nadu, supplying lemons to Kerala, Karnataka, and northern States and even for Gulf countries. Puliyanakudi is popularly known as the 'lemon city' of Tamil Nadu and its lemon got GI tag in 2025. Development of drought-tolerant, disease-resistant lemon varieties, introduction of drip irrigation and fertigation for efficient water use, market promotion activities like establishment of community cold storage with training, formation FPOs to ensure collective marketing and better bargaining power, linking with e-NAM, contract farming, and direct retail chains, and assistance for export etc. will boost income of lemon growers.
- **Promotion of Palmyra sap (Pathaneer):** The Palmyra palm (**Borassus flabellifer**), also called the 'tree of life', has deep economic, ecological, social, and cultural significance in Tamil Nadu. Since antiquity, the tree has been serving multiple income sources for thousands of farmers living in the dry districts. It provides neera (sap-pathaneer), jaggery, palm candy (karkandu), toddy/kallu (fermented sap), fruit (nongu/ice apple), fibre, timber, and leaves. The State has about **5 crore** Palmyra trees, mostly found in Thoothukudi, Ramanathapuram, Tirunelveli, Kanyakumari and **Cauvery Delta districts** like Thanjavur, Tiruvarur, Mayiladuthurai, etc. Tapping, juice processing, leaf craft, rope making, mat weaving, etc. not only provided employment but also supported livelihood of lakhs of rural families. In TN, the Palmyra palm is considered not just a tree alone but a complete ecosystem. It is known as the Poor man's tree because every part is usable – leaves, wood, sap, fruit. In 1978 the Palmyra tree was declared as the **State Tree**, signifying symbol of Tamil identity. Palmyra is

revered in folklore, Sangam literature, and village life as “*karpaga maram*” and Palmyra leaf manuscripts helped our ancestors to preserve Tamil literature, knowledge on medicine, etc over centuries. It is a long-living trees (~100 years), sequester or store carbon and contribute to climate resilience. The tree thrives in dry, sandy soils without irrigation. Its roots bind soil, prevent erosion along bunds, tanks, and coastal belts. Over time, palmyra trees have been cut down for firewood, or felled when land-use changes happen. Further, the deepening or depleting groundwater levels affect survival of palmyra trees which depend on certain groundwater and rain patterns. Tapping neera (pathaneer) and harvesting fruits requires climbing tall trees. Younger people are moving out of this profession and the existing climbers are aged (old generation). Their living conditions are poor (remote groves, minimal public services) and requires Govt. support for their upliftment. The Govt. of TN has set up Palmyra Development Mission to promote cultivation, value addition, and welfare related to palmyra trees. The Govt has proposed establishing a Palmyra Research Station at Killikulam. Recently the Govt. has imposed restriction on felling of palmyra trees- For felling the permission of District Collector is required and for every palmyra tree felled under unavoidable circumstances, planting **10 saplings** is mandatory. Preparation of palmyra jaggery and candy (Karuppati and Karkandu) is a profitable business for the tappers, when intermediaries do not dominate the market.

Lack of value addition and infrastructure for palmyra sap (pathaneer) is the pressing issue in the sector besides poor awareness of neera’s health and nutritional benefits, both among consumers and producers. Raw sap / pathaneer is highly perishable and ferments quickly. Lack of hygienic collection, processing, and preservation facilities leads to losses. Though neera is non-alcoholic, it is ‘sap’ that ferments if not handled well; toddy bans have historically discouraged or conflated sap usage. Pathaneer / Neera is the fresh sap tapped from inflorescence of palmyra (or coconut / other palms). When collected hygienically and preserved properly (so that it does *not* ferment into toddy), it offers several health and nutritional benefits such as rich in water-soluble vitamins (like vitamin C), minerals (potassium, calcium, iron, magnesium) and phenols, neera sugar or neera-derived sweeteners are lower low glycemic index (GI) compared to table sugar, being sap / juice, it is watery, refreshing, helps with electrolyte balance, presence of phenols and other bioactive compounds (antioxidants) help fight oxidative stress, can help in iron deficiency / anemia due to its iron content and useful in general nourishment. Reviving palmyra through plantation drives, neera promotion, and value addition can strengthen farmers’ livelihoods, rural economy, nutrition security, and ecological resilience in Tamil Nadu.

- **Problems faced by loose flower growers:** In addition to the known problems such as flower cultivation, harvesting, and garland making are **labour-intensive**, flowers are **highly perishable**, losing freshness within hours of harvest, prices of flowers vary drastically **day-to-day and season-to-season** due to festivals, marriages, and exports, high dependency on **middlemen** in major flower markets like Madurai, Dindigul, and Salem which reduces farmers’ share, inadequate **cold storage**, pack houses, and refrigerated transport lead to 20–40% loss before reaching market, **loose flower growers** (Jasmine, Rose, Marigold, Chrysanthemum, Crossandra, Tuberose, etc.) in Tamil Nadu faces the following technical problems. 1) As there is limited availability of certified varieties from research stations (e.g., TNAU’s CO series

jasmine, rose cultivars), farmers often use vegetative propagation material from unverified sources, leading to yield and quality variation. 2) **Continuous monocropping of malligai, mullai** etc without adequate external supplements of organic manures leads to low soil fertility and productivity. 3) Lack of awareness about **IPM** and biological control options is a widespread among the growers. **Farmers often use inappropriate growth promoters and indiscriminate pesticide which cause resistance and residue problems besides affecting quality of flowers.** 4) Pests like bud worm (mokku puzhu), mites (sempane), blossom midge (kurudu) are the major problems in Trichy, Madurai, Pudukottai, Ramanathapuram districts especially in Malli and Mullai. The larvae of bud worm (*Hendecasis duplifascialis*) and the maggots of the blossom midge (*Contarinia maculipennis*) enter into the buds at the base of the corolla and causes rotting of **flower stalk (kaampu azhugal) and changes colour of bud into pinkish (unfit for tying and selling).** Leaves affected by Eriophyid mite (*Aceria jasmine*) produces velvet like hairy growth and blisters on the leaf surface (kurudu) and flower production is suppressed. The **Red spider mite/ sempane (*Tetranychus cinnabarinus*) adults** as well as their nymphs (red in colour) may be seen on the undersides of leaves with silken web or oily surface. It is spreading occasionally in the jasmine garden. In addition, by seeing large number of whitefly in the dawn farmers apply insecticides, often two insecticides which often affect flower quality and yield. All these reflects lack of awareness among farmers on the IPM or correct use of pesticides. It is time to conduct training programs for farmers on good agricultural practices, pruning, fertigation, and IPM, including neem oil sprays, bioagents (*Trichoderma, Beauveria, Metarhizium*), use of pheromone traps, etc.

In places like Trichy and Villupuram, farmers who grow Chrysanthemum are observing **blackening of the lower whorls of chrysanthemum petals.** This is a fungal infection-Botrytis blight caused by gray mold fungus. which thrives in damp conditions. Overwatering and poor air circulation can also create the ideal environment for fungal problems and lead to rot. Farmers may be advised not to use sprinkler, adopt wider spacing/ aeration, regulate watering and foliar application of Mancozeb @ 2.5g/l.

Another issue in loose flower cultivation is the inefficient irrigation methods: High water requirement crops like jasmine and rose suffer in drought-prone belts. **Inefficient irrigation** (flood or basin) and overuse of fertilizers affect both yield and soil health. Lack of adoption of **drip irrigation and fertigation** technologies in small holdings is common in the State. Adoption of **drip and fertigation systems** under TN Horticulture Mission / PMKSY may be encouraged.

**To support the farmers in post-harvest management,** marketing and value addition, establish Flower Collection Centres, Cold Storage, and Pre-cooling Units at block level under TN Horticulture Department. Encourage Value Addition Units for Jasmine oil extraction, Rose water and gulkand production, Dried / powder flowers for herbal and cosmetic use. Develop Direct Farmer Market Linkages *via* eNAM and cooperative models (e.g., Madurai Jasmine Producers Society). **Support export clusters with APEDA and TN Agri Export Board for fresh and processed flowers.**

**Promote Mechanized harvesting tools:** Jasmine flowers must be hand-plucked daily, usually early morning (3:30–8:00 AM) to preserve aroma and freshness. Earlier, school dropout, village youths etc. were engaged for plucking flowers often at nominal wages. Due to obvious reasons like urban migration, ageing rural workforce and young generation prefers non-agricultural jobs acute shortage of skilled labourers during peak flowering (March–October) are reported, especially in districts like Madurai, Dindigul, and Tirunelveli. Labour cost accounts for 40–50% of total production cost, making jasmine cultivation less profitable. As of now, harvesting of jasmine and rose is entirely manual. No efficient mechanical harvester exists due to small flower size, delicate buds, and plant height variability. Farmers face repetitive strain injuries and fatigue from daily bending and hand-plucking. **The TNAU, ICAR-CIAE, Bhopal/Coimbatore and ICAR-IIHR Bengaluru may intensify research on semi-mechanized jasmine harvesters.**

**Pruning and flowering management needs more research and farmers awareness:** In the case of Gundu Malli (*Jasminum sambac*), Jathi Malli (*Jasminum grandiflorum*) and Mullai (*Jasminum auriculatum*) the peak flowering season is the hot weather period (March to Oct). Flowering ceases with low temperature. Generally, after Deepawali less / no flowers are formed. November to December is the lean or non-flowering season in major growing districts like Madurai, Dindigul, Pudukottai, Thanjavur, Villupuram and Tirunelveli. Due to low temperature and shorter day length, Jasmine plants remain semi-dormant during the non-flowering period hence farmers adopt non-scientific pruning or local practices to manage the crop during the lean season such as grazing jasmine garden with sheep, tying and or wrapping whole plant with banana pseudostem sheaths. This local practices (ITK) of southern districts need to be validated in terms of flower production in comparison with standard pruning practice i.e. pruning the bushes at 45-50 cm height from ground level during last week of Nov (Malligai) or Jan (Mullai) every year. **Studies on the application of growth regulators** (GA<sub>3</sub> or CCC) which may synchronize flowering and improve harvest scheduling and alternate or **staggered pruning method such as** dividing the the field into 3-4 blocks and prune each block at 3-4 months intervals to ensure continuous flowering and reduce peak load may be investigated.

**Awareness on the use of foliar spray** of 1% urea + 0.5% ZnSO<sub>4</sub> or ZnSO<sub>4</sub> @ 0.25% + MgSO<sub>4</sub> @ 0.5% + FeSO<sub>4</sub> @ 0.5% or biostimulants such as TNAU Panchagavya 3% + humic acid 0.4% at monthly intervals to maintain uniform flowering may be intensified.

**Standardization of protected cultivation for year-round Jasmine production and increasing number of demo needed:** As mentioned earlier, low temperatures, short day length, high rainfall and dew deposit during November–February lead to flowering dormancy in Jasmine. Under the present situation especially as labour, climate, and price fluctuations make jasmine cultivation increasingly challenging in Tamil Nadu, research on protected cultivation of jasmine may be intensified. In polyhouse or shade net houses, temperature and humidity can be regulated to maintain optimal levels for flowering (25–35°C, 60–70% RH). Light transmission can be managed using shade nets (35–50%). We might have observed some of the Jasmine plants grown under shade or near household are flowering during winter. Therefore, by protecting Jasmine plants from heavy rain, cold stress and dew deposit especially

in the early morning hours and night it may be possible to get continuous vegetative and reproductive growth even in non-flowering months *i.e.* make the jasmine plants do not enter into dormancy, so flowering continues even in winter (Nov–Feb). Off-season flowers fetch 1.5–2 times higher price (Dec–Feb). ***More research efforts is needed in this direction.*** The Govt of TN is promoting polyhouse jasmine cultivation. The structure has been demonstrated in Madurai, Dindigul, Krishnagiri, and Tirunelveli under TNAU trials or subsidized under NHM or MIDH / State Horticulture Mission (SHM-TN). ***This promotion efforts need upscaling.***

## 5) Issues in Pest and Disease management

- **Minor pest becoming major pests:** Hitherto unnoticed or minor pests like Rugose spiraling whitefly in coconut (as well as in banana), stem borer in pulses, mealy bug in sugarcane is posing serious threats to the crops.
- **Increasing incidence of major pests and disease:** Increasing incidence of major pests like Tea Mosquito Bug (*Helopeltis antonii*) in cashew in Panruti, Pudukottai districts and White stem borer (*Xylotrechus quadripes*) in coffee in Nilgiris, Valparai and parts of Dindigul districts, Banana Pseudostem borer and rhizome weevil, in Southern districts and coconut root wilt in Southern and Western Tamil Nadu is a cause of concern.
- **Pesticide residues in food grains, fruits and vegetables:** Indiscriminate application (inappropriate dose and chemicals) of pesticides in food crops, fruits and vegetables based on the information farmers got from pesticide dealer, neighbours etc led to lot of health hazard. This is affecting not only the health of consumers but also increase the cost of cultivation. Therefore, proper awareness among farmers and statutory control of selling pesticides without advice of agri graduate or agril. Officer of the State is needed.
- **Red wood ant:** The red wood ant or horse ant (*Formica rufa*) builds large soil mounds at the base of trees in the orchards or build nests on the fruit trees. The ants are often attracted to fruit trees due to a symbiotic relationship with sucking pests like aphids, scale, and mealybugs present on the fruit trees. The ants eat the honeydew secreted by the sucking pests and in turn protect the sucking pests from natural predators. In fruit trees like mango, guava, sapota, citrus, etc. we may notice the red ant. They move actively on tree trunks and branches forming visible trails. Colonies contain thousands of ants, making control difficult once established. Ant trails disturb pollinators like bees and butterflies, lowering pollination and fruit set. Colonies may injure flower buds and young fruits while constructing shelters or collecting honeydew. Red wood ants are aggressive biters. Their bites on human cause pain, itching, and small pustules on human skin. Orchard workers and harvesters in Tamil Nadu face difficulty in pruning, spraying, or harvesting fruits, especially on infested trees. Therefore, controlling the sucking pest is a key step in controlling the ant and *vice versa*. ***Effective control measures and demo/awareness programmes are needed which should integrate preventing ants from accessing the tree by blocking trunk access, controlling aphid populations, and creating a less inviting environment for ants.***

## 6) Challenges in Post-harvest Handling, Storage and Value Addition

- **Cold storage godowns:** Vegetables like Bhendi, Tomato, Brinjal, Radish, Drumstick etc. need to be harvested periodically. Due to market glut, the produce is fetching low

price for a few weeks. If cold storage facility is established at village / block level, farmers may store their perishable items for few days. The Govt. is supporting establishment of **Cold storage /godowns** facility for keeping their perishable vegetables temporarily for few days, before sending to markets. ***Such cold storage godown are limited in number or not present in village or block level production cluster of important vegetables.***

- **Crop or produce specific standardization of cold storage facility:** The Dept of Agriculture marketing, has created a handful of cold storage vaults in Tamil Nadu. The Govt. of India is also promoting establishment of post-harvest processing infrastructure through AIF. Two types of cold storage vaults (+ and - cold storage vaults) are present in Tamil Nadu which can accommodate a wide range of crops / produce. ***Crop /produce specific standardization / protocol is lacking.*** In addition, the State has to create capacity building on the use of cold storage facility. Many of the technologies of cold storage are not open or not available in public domain/for businessman/entrepreneurs. Perhaps, ***the next generation capacity building / training programmes should focus on value addition, use of cold storage facility and export of processed products.*** To illustrate, the benefit of cold storage, one businessman in Dharmapuri district has procured mango at the end of season, at low price during this year and stored it in the cold storage godown of Govt. of Tamil Nadu. When the season was over and mango rate double in the markets he is selling the produce, thereby doubled his profit. This is the potential of cold storage facility. ***This success story may be spread*** to other entrepreneurs, so that more users will come forward to avail the facility.
- **Poor drying, winnowing and grading:** Decades ago, when labour was easily available in plenty in rural areas, farmers used to make threshing yards in their field, dry their harvested produce, properly winnowed and bagged after removing shriveled, light weight grains. Such produce fetches fair price in the DPC/RM/Mandis. However, ***due to labour shortage these post-harvest operations are carried out improperly.*** Even machine harvested produce are sent to DPC/RM/Mandis without proper drying and winnowing/grading. Such produces are bought at lower price. Farmers are paying extra price for de-bagging their produce in DPC/RM/Mandis. Spoilage in DPC/RM is high due to poor drying.
- **Promoting cultivation and marketing / export of traditional paddy varieties through cluster approach:** Traditional or **heritage or indigenous paddy varieties** such as Ramanathapuram Chithiraikar, Mappillai Samba, Thooya malli, Kaatu yaanam, Kancheepuram idly rice, Karuppu Kavuni, *Kitchili Samba, Mappillai Samba, Karuppu Kavuni, Seeraga Samba, Poongar, Kuzhiyadichan* has growing demand both in domestic as well as in international markets (to Sri Lanka, Middle East, Malaysia). The Govt of TN under the CMMKMKS scheme “முதலமைச்சரின் மண்ணுயிர் காத்து மண்ணுயிர் காப்போம் இட்டம்” is promoting cultivation of traditional paddy varieties. However, farmers who grow **traditional varieties** faces problems in the fields such as pests and disease (traditional varieties are often tall, with long crop duration (140–160 days), making them prone to pests like stem borer, leaf folder, BPH, and diseases like blast and sheath blight, its yields are relatively low (2–3 t/ha) compared to 5–6 t/ha in improved HYVs), during milling process (most of the rural or modern rice mills are designed for milling short- to medium-grain, high-polish varieties. Long or slender grain traditional varieties break easily during milling, resulting in **15–30% broken rice loss**. Husk to rice recovery is often <55% due to unsuitable machinery and outdated processing) and

during marketing (as few farmers in a village grow traditional variety, traders are not coming to villages to buy the products, as no local Dehusking/ milling units, the farmers often transport paddy far away places to process small quantities — increasing cost and reducing profit. ***If farmers wish to sell directly to the mills, the millers demand minimum supply of 400 bags (of 60 kg) from that particular variety as the minimum processing quantity per lot in the modern mill is 400 bags.***). These issues may be addressed through formation of traditional variety grower cluster in the selected villages to get better bargain during marketing.

## 7) Challenges in Agriculture Marketing

- **Procurement related issues:** According to the TN Planning Commission, 68% of agri households are unaware of the MSP (Minimum Support Price). More awareness is required. A second issue is that low procurement price offered for some commodities. For example, the Govt of TN has recently increased MSP for paddy to ₹ 2,500/q for general varieties and 2,545/q for fine varieties. Farmers feel that this rate is insufficient, especially given high input cost inflation. In contrast, other State (Chhattisgarh) offer up to ₹3,100/q. In case of sugarcane, the procurement cost including FRP+ State Govt. special incentive for the season 2025-26 is ₹3,500/ton. Farmers feel that this rate is lesser when compared to rising labour and input costs. State like Punjab is offering ₹ 3910 to 4010/ ton.

Certain crops do not have direct procurement centres (DPC). For example, coconut and arecanut, but for which there have been pressing demand from farmers' side to open DPC. The TANFED (Tamil Nadu Co-operative Marketing Federation Limited) has opened a copra procurement Centre in Vazhappadi (Salem Dt) in 2016 but it ceased its operation. The TN Govt, in June 2025 announced opening of a copra procurement centre in Dharmapuri. The NAFED (National Agricultural Cooperative Marketing Federation of India Ltd.) is the nodal agency of the Government of India for copra procurement under the Price Support Scheme (PSS or MSP). The NAFED is procuring milling copra and ball copra but **not the unhusked coconut. The NAFED centres are very limited in TN.** With regard to **arecanut, no DPC are operational** at present, though farmers are clearly demanding them, especially in region like Coimbatore.

- **Long distance vegetable marketing:** Vegetable and flower cultivation and sending the produce to urban markets (Koyambedu, Dharasuram, Coimbatore, Madurai, Trichy, Salem markets) is increasing among young generation farmers. However, the ***transport cost of long-distance marketing reduces their profit.***
- **Organic products:** Middle man takes huge share of price offered to the crop by the procurement agency /consumer, particularly for organic product.
- **Marketing desi chicken eggs:** Desi chicken eggs has increasing demand in the urban area. However, ***there is some issues in genuinity of the local chicken eggs and marketing.***
- **Regulated markets:** Few regulated markets (RM)/ Mandi set up by the Govt at Block level has been moved or merged with taluk level RM due to operational reasons. Now new production clusters are emerging in many blocks wherein crops new to the cluster are grown. ***Farmers in the new production area are facing marketing problem as RM/Mandis are not available.***
- **Value addition and marketing horse gram:** Horse gram (kollu) is a rabi crop & is cultivated in the hilly and tribal belts of Dharmapuri, Krishnagiri, Salem, Namakkal and

Virudhunagar as this crop is a climate-resilient for drought-prone areas. However, its acreage is limited in this State compared to red gram and black gram. The Govt. is promoting minor millets and pulses under National Food Security Mission (NFSM). This will become a forgotten crop in the future generation agriculture. However, kollu (kollu rasam/ kollu podi) is considered to have anti-obesity and diabetic-friendly properties, sprouted horse gram flour, ready-to-cook mixes, health powders have growing export potential in health food and nutraceutical sectors as well as in the health-conscious urban markets. ***There is scope for GI tagging and selling as Dharmपुरi, Krishnagiri Kollu in the super market/ export market.*** There is no new or popular horse gram variety other than Paiyur 2. Organized procurement, value-chain development and processing units to boost farmer returns and linking to urban markets may boost this crop.

- **Buy-back arrangement:** Buy back arrangement is getting popular in certain specific pockets of TN and for certain crops. For instance, In Ariyalur & Perambalur, farmers cultivate medicinal crops like Coleus, Gloriosa, and Senna under buy-back agreements with pharmaceutical companies. Namakkal poultry farms promote maize cultivation under buy-back. Food processing industries tie up with banana farmers (Nendran & Red Banana varieties) for chips and export markets, giving farmers direct assured purchase. Export firms in Dindigul region enter into buy-back contracts with farmers for moringa pods, used in UAE, Europe, and Singapore markets. Recently a Kerala Farm has made agreement to promote cultivation and marketing of jack fruit in Perambalur dist. Farmers are assured a local market and good price. More such buy back arrangement is needed for this State.

## 8) Challenges in Mechanization

- **Harvesting charges** in sugarcane and groundnut and **picking charges** in cotton has increased considerably in the State due to shortage of agriculture labours and increasing wages of migrant labourers. Mechanical harvest for cotton is not yet available. In the case of sugarcane, the mechanical harvesting charges went to ₹ 700 per ton from ₹ 550 / ton 7 years before, due to increasing diesel cost. In the case of paddy and maize, the almost 80 % of the crop is being harvested using combine harvester. The hiring charges is increasing year by year, due to increasing diesel cost and driver wages which in turn increase cost of cultivation. ***If the Govt. consider providing diesel subsidy for combine harvester it will not escalate cost of cultivation in the years to come and benefit a large number of farmers.***
- **Standardization of maize seed drill in clay soil:** Due to higher procurement price (> ₹ 2400/q), maize area in TN, particularly in Perambalur, Ariyalur districts are increasing. Most of the places, seed to seed mechanization is adopted with high success rate. In few places, ***farmers experiencing germination problem if seeds are sown using seed drill cum fertilizer applicator.***
- **Small scale mechanization for pulses and oilseeds:** Groundnut is being harvested using large machine in Gujarat as large stretch of land is planted with groundnut. But in TN groundnut area is scattered, machineries not available and hence manual harvesting increases cost of cultivation besides non-availability of labour. Therefore, small scale mechanical harvester needs to be evolved for ground nut and all pulses.
- **Retaining the talents of rural artisans:** In order the mold or reshape or sharpen or repair small farm tools such as spade, sickle, sprayer etc farmers are travelling long

distance which double the cost of repair, sometime exceeding the product original cost. The number of rural artisans like blacksmith, carpenter, sprayer/tractor workshop available in villages are diminishing as they migrate to urban areas. The talented artisans may be provided improved machineries and training as well as support to open modern workshop in the rural area itself which benefit both the artisan and rural farming community.

#### **9) Issues related to transfer of technologies, Capacity Building and Entrepreneurship Development**

- **High tech training:** There is an increased need to train farmers, businessman / entrepreneurs on export potential of competitive crops. The APEDA is displaying the export potential crop, however this information is partial or delayed. Often, we are surprised to know the demand by listening the export demand from friends involved in export of agriculture and processed commodities or after hearing lecture from expert. Taking our small-scale commercial agriculture one step ahead into value addition, post-harvest processing and marketing and exporting our own produce to international market will bring prosperity. Periodical publicity of demand, training, video clippings, you tube videos etc., will assist the new entrepreneurs greatly.
- **Opening of a dedicated Agri TV channel and Govt. Youtube Streaming Platform:** This is need of the day to disseminate all agriculture technologies including information on marketing, post-harvest processing, value addition will help to reshape our traditional agriculture marketing pattern into global competitor. Common people watching youtube channel which often carries unauthenticated / unverified claims/ information which confuses farmers. On the other hand, a Govt run or supervised or supervised by a team of Experts in the field of Agri/Hort/AH/Fisheries/Agri marketing/ Agri Engineering will provide authentic information to the end users.
- **IPM:** Indiscriminate use of pesticides are increasing. It is apparent that the use of weedicide in field crops has been increasing in India. To use weedicide many farmers, forego intercrops. Vegetable farmers often use high doses of pesticides to deliver pest-free product in the markets. During 1980s, IPM which place much emphasis on predators, parasitoids, intercropping etc. lost its sound in the 2000s. **It is time to re-emphasize IPM practices throughout the State.**
- **Awareness on BMPs among fishers:** Many farmers lack awareness of Best Management Practices (BMPs) such as pond preparation, optimal stocking density, feeding regimes, and disease monitoring. Training on BMPs can reduce mortality, improve yields, and lower production costs. Fishers have limited understanding of effluent discharge norms, site selection criteria, and sustainable harvesting practices. Campaign / Extension programs can help farmers adopt eco-friendly practices, comply with coastal regulations, and prevent habitat degradation.

### Section 3. ICAR and SAU's Role and Interventions

- The State has 3 State Agricultural Universities (TNAU, TANUVAS, TNJFU), 3 ICAR Institutes-Main (ICAR-SBI, ICAR-CIBA, ICAR-NRCB), 12 Research Station/ Centres of ICAR.
- The SAUs and ICAR institutes in the State supply the **scientific backbone**: crop/breed improvement, pest & disease management, post-harvest & processing technologies, fishery & livestock research, agri-engineering and policy/skills inputs. They develop varieties, IPM packages, seed technologies, storage/processing designs and large-scale training materials that are then adapted for local use by State agencies and KVKs.
- Krishi Vigyan Kendras (KVKs) are the **field arm of ICAR's Extension network**. Out of 38 districts in the State 31 districts have KVKs (hosted by SAUs and NGOs). Seven districts in the State namely, Chennai (fully urban district), Kancheepuram, Mayiladuthurai, Ranipet, Thanjavur, Tirunelveli and Tirupathur do not have KVK.
- ICAR Institutes and KVKs along with SAUs in Tamil Nadu play a pivotal role in solving farmers' problems through research, demonstration, and technology dissemination.
- The ICAR institutes in the State and SAUs have developed a number agro-technologies to address agrarian problems in the State. Recent technologies-266 technologies (released/recommended) from ICAR institutes and SAUs for the farming community are given below.

**Table 4. Recent Crop varieties, Animal Strains and Technologies of ICAR and SAUs recommended for farmers in Tamil Nadu**

Sl No	1: Recent Crop Varieties
1	Paddy Variety: ADT 55
2	Paddy Variety: ADT 56
3	Paddy Variety: ADT 57
4	Paddy Variety: ADT 58
5	Paddy Variety: ADT 60
6	Paddy Variety: ASD 21
7	Paddy Variety: CO 54
8	Paddy Variety: CO 55
9	Paddy Variety: CO 56
10	Paddy Variety: CO 57 (Improved Kavuni)
11	Paddy Variety: CO 58
12	Paddy Variety: CO 59
13	Paddy Hybrid: CORH 5
14	Paddy Variety: TKM 15
15	Paddy Variety: TRY 4
16	Paddy Variety: TRY 5
17	Maize Hybrid: COH(M) 11
18	Maize Hybrid: COH(M) 12
19	Sweet Sorghum Variety: CO(SS) 33
20	Sorghum hybrid Variety: CO 34
21	Sorghum Variety: K 13
22	Finger millet Variety ATL 1

23	Pearl millet Hybrid: COH 10
24	Kodo millet Variety: ATL 1
25	Foxtail millet Variety: ATL 2
26	Proso millet Variety: ATL 2
27	Barnyard millet Variety: ATL 1
28	Wheat Variety: HW 1098 (Nilgiri Khapli)
29	Bread wheat Variety: CoW(W)1 (HW 3094)
30	Bread Wheat Variety: HW 5207 (CoW 3)
31	Black gram Variety: ADT 7
32	Black gram Variety: CO 7
33	Black gram Variety: VBN 12
34	Green gram Variety: CO 9
35	Green gram Variety: VBN 5
36	Green gram Variety: VBN 6
37	Green gram Variety: VBN 7
38	Green gram Variety: VBN 8
39	Green gram Variety: VBN 9
40	Groundnut Variety: VRI 9
41	Groundnut Variety: VRI 10
42	Groundnut Variety: CTD 1
43	Sesamum Variety: VRI 5
44	Castor Hybrid: YRCH 3
45	Sunflower Hybrid: COH 4
46	Coconut Variety: ALR 4
47	Coconut Variety: VPM 6
48	Cotton Hybrid: Suraj
49	Cotton Hybrid: CCH 2623
50	Cotton Hybrid: Subiksha (CCH 4474)
51	Cotton Hybrid: Suchitra (CCH 12:2)
52	Cotton Hybrid: Sunantha (CCH 14:1)
53	Cotton Hybrid: CICR H Cotton 36 (Suraksha)
54	Cotton Hybrid: CICR H Cotton 54 (Nano)
55	Cotton Hybrid: Sumangala
56	Cotton Hybrid: CICR B Cotton 37 (CCB 51)
57	Cotton Hybrid: CICR B Cotton 45 (CCB 143B)
58	Cotton Hybrid: CICR B Cotton 55 (CCB 51:2)
59	Cotton Variety: VPT 2
60	Sugarcane Variety: Co 11015 (Atulya)
61	Sugarcane Variety: Co 18009 (Punnakai)
62	Sugarcane Variety: Co 14012 (Avani)
63	Sugarcane Variety: CoG 7
64	Tobacco Variety: Yasini
65	Daincha Variety: TRY 1
66	Sunhemp Variety: ADT 1
67	Amaranthus Variety: PLR 2
68	Amaranthus Variety: CO 6
69	Ashgourd Variety: PLR 1
70	Bhendi Hybrid: CO(H) 5

71	Brinjal Variety: CO 3
72	Brinjal Variety: VRM (Br) 2
73	Brinjal Variety: MDU 2
74	Chilli Variety CO 5
75	Coriander Variety: CO 6
76	Cluster bean Variety: MDU 2
77	Elephant Foot Yam Variety: CO 1
78	Lablab Beans Variety: CO 16
79	Lablab Beans Variety: CO 15
80	Moringa Variety: PKM 3
81	Ridge gourd Variety: MDU 1
82	Tomato Variety: CO 4
83	Avocado Variety: TKD 2
84	Banana Variety: Kaveri Kalki
85	Banana Variety: Kaveri Poovan
86	Banana Variety: Kaveri Kanchan (NCR - 17)
87	Banana Variety: Kaveri Vaaman (TBM - 9)
88	Banana Variety: CO 3
89	Acid lime Variety: SNKL 1
90	Grapes Variety: GRS (MH)1
91	Jackfruit Variety: PKM 1
92	Jackfruit Variety: PKM 2
93	Jackfruit Variety: PLR 3
94	Kodampuli Variety: PPI (K) 1
95	Nutmeg Variety: PPI 1
96	Turmeric Variety: BSR 3
97	Tamarind Variety: PKM 2
98	Jasmine Variety: CO 1
99	Casuarina Variety: MTP 3
100	Silk Cotton Variety: MTP 1
101	Oyster Mushroom Variety: KKM 1
	<b>2: Animal Breeds/ Strains</b>
1	Bharat Merino Sheep Breeding
2	Avikalin Sheep
3	Broiler Rabbit White Giant and Soviet Chinchilla
4	Nandanam Chicken I
5	Nandanam Chicken II
6	Nandanam Chicken-IV
7	Namakkal Chicken - 1
8	Nandanam Quail I
9	Nandanam Quail II
10	Nandanam Quail III
11	Namakkal Quail 1
12	Namakkal Gold Quail
13	Nandanam Turkey I
14	Nandanam Turkey II
	<b>3: Seed Production and Availability</b>

1	Tobacco
2	Sugarcane (Setts, settlings, TC plants, mother culture flask)
3	Seed availability of TNAU's Crop Varieties
	<b>4: Crop Production Technologies</b>
1	Terracing technologies developed/standardized for the hilly region
2	Suitable grasses for resource conservation
3	Cover crops and conservation tillage for vegetable crops in hilly region
4	Reduced tillage and cover crop (Buckwheat) during winter fallow for hilly region
5	Biological terraces to address soil erosion & fodder scarcity
6	Enriched spent mushroom compost for carbon-efficient vegetable farming
7	Nursery technology for banana
8	Banana Shakti: Micronutrient mixture
9	Kaveri Microbial Consortium (KMC)
10	Soil Moisture Indicator (SMI)
11	Sugarcane settling transplanting technology (STT)
12	Improved production technology for tobacco
13	Castor-based cropping system
14	IoT and sensor-based drip irrigation for seed cotton yield & water productivity
15	Poly-mulch plus drip fertigation technology for irrigated tracts
16	Package for HDPS in cotton
17	Cotton-based multi-tier intercropping systems
18	Productivity enhancement via plant density & canopy management in ELS cotton
19	Waterlogging management
20	Alley cropping of <i>Desmanthus virgatus</i> with cotton
21	Seed treatment for paddy
22	Biofertilizers application in paddy
23	Seed treatment for millets
24	Seed treatment for pulses
25	Seed treatment for oilseeds
26	Management of aged paddy seedlings
27	TNAU Panchagavya
28	Nutrient deficiency symptoms
29	Micronutrients for sorghum
30	Micronutrients for maize
31	Micronutrients for oilseeds
32	Foliar spray for pulses
33	Multi-bloom technology for pulses
34	Foliar spray for groundnut
35	STCR-based fertilizer application in cotton
36	Coconut root feeding technique
37	Manuring in coconut
38	Weedicides for important crops
39	Drought management in sugarcane
40	Drought management & soil moisture conservation in coconut
41	Drip irrigation in coconut
42	Drip irrigation and fertigation for sugarcane

43	Drip irrigation scheduling (example: maize)
44	Management of saline, sodic and acid soils
45	Integrated crop management (ICM) and SRI for rice
46	Technology for dry seeded rainfed un-puddled lowland rice
47	Red gram transplanting technique
48	Gap filling in Cotton, Sugarcane and Paddy
49	Acid de-linting of cotton seeds
50	Preparation of Neem treated urea and coal-tar treated urea
51	Sugarcane Trash Composting
52	Preparation of reinforced compost from sugarcane trash and press mud
53	High Density Planting System (HDPS) in Cotton
54	High Density Planting (HDP) in Fruit Crops
55	High Density Planting (HDP) for Mango
56	High Density Planting (HDP) for Sapota
57	Protected Cultivation for Capsicum / Bell Pepper / Sweet Pepper
58	Brinjal grafting technology
59	TNAU Zinc Citrate & Iron Citrate Formulations
	<b>5: Crop Protection Technologies</b>
1	Management of <i>Eumusae</i> leaf spot disease in banana
2	Banana Weevil Killer
3	Bio-formulation for management of Fusarium wilt (No. 2 wilt)
4	ICAR-SBI EPN biopesticide formulation
5	Integrated management of sugarcane red rot
6	Mass production of parasitoids ( <i>Cotesia flavipes</i> & <i>Telenomus dignus</i> ) for internode borer IPM
7	AI Smart Trap for monitoring pink bollworm
8	Talc-based <i>Lecanicillium lecanii</i> & <i>Metarhizium anisopliae</i> for sucking pests
9	Agroecology-specific IPM modules for cotton
10	Insecticide Resistance Management (IRM) in cotton
11	Preparation of 1% Bordeaux mixture (1:1:100)
12	Preparation of Bordeaux paste (1:1:10)
13	Management of rhinoceros beetle
14	Management of red palm weevil
15	Management of coconut eriophyid mite
16	Management of rugose spiraling whitefly
17	Management of basal Stem rot / <i>Ganoderma</i> (Thanjavur wilt)
18	Management of root (wilt) disease
19	Integrated pest & disease management (IPDM) technology for cotton
20	Mass multiplication of NPV virus in home
21	Mass Multiplication of <i>Bacillus thuringiensis</i> in home
22	Mass Multiplication of egg parasitoids <i>Trichogramma chilonis</i> in home
23	Mass Multiplication of fungal biocontrol agent <i>Trichoderma viride</i> in home
24	Mass Multiplication of bacterial biocontrol agent <i>Pseudomonas fluorescens</i> in home
25	Rat management (Paddy and Sugarcane)
26	IPM modules for Paddy
27	Technology Capsule for the management of Fall Army Worm ( <i>Spodoptera frugiperda</i> ) on Maize

	<b>6: Mechanization</b>
1	Sugarcane Settling Transplanter
2	Sugarcane Sett Treatment Device (STD)
3	Tractor-Operated Whole-Sugarcane Harvester
4	Mini Tractor-Operated EPN Applicator
5	Banana Pseudostem Injector
6	Tractor-Operated Raised Bed Former-cum-Onion Bulb Planter (Multiplier onion)
7	Tractor-Operated Cassava Harvester-cum-Lifter
8	Remote-Controlled System for Four-Wheel Paddy Transplanter
9	Unmanned Multi-Purpose Track-Type Vehicle for Agriculture
10	Continuous-Feed Banana Fibre Extractor
11	Multiple-Feed Banana Fibre Extraction Equipment
12	Power-Operated Baby Corn Dehusker
13	Grader for Chilli
14	Device to Monitor Stored Grain Insects in Bag Stacks
15	Device to Remove Insect Eggs from Stored Pulse Seeds
16	Seed Cube Making Machine
17	<i>Cocolife</i> : Coconut Fertilizer Briquette Embedded in Coir pith Hollow Briquette
18	Mango Bagger-cum-Harvester
19	Multipurpose Device for Insects and Rodents
20	Multi-Row Power Weeder for SRI (Paddy)
21	Improved Coconut Tree Climber
22	Palmyrah Tree Climbing Device
23	Improved TNAU Dhal Mill
24	Domestic Solar Dryer
25	Multi row weeder attachment to riding type rice transplanter
	<b>7: Post-harvest Management, Value Addition, Marketing and Storage</b>
1	Cane Jam production from sugarcane juice
2	Cane dietary fibre food products
3	Freeze preservation of sugarcane juice with natural additives
4	Flavoured and low-fat banana chips
5	Banana Grits (Banana Rava / Sooji)
6	Low-calorie Banana Central Core Stem RTS Beverage
7	Samai (Little Millet) Biscuits
8	Health Mix for Geriatrics
9	Coconut Powder
10	Mushroom Products
11	Probiotic enriched food products from fermented cassava flour
12	Banana Health Mix
	<b>8: Integrated Farming System</b>
1	Integrated Farming Systems suitable for Tamil Nadu zones
2	Vermicomposting: Process, phases, worms & management
3	Preparation of mother spawn (for mushroom cultivation)
4	Cultivation of Oyster mushroom
	<b>9: Animal Husbandry</b>
1	TANUVAS Mineral Mixture for small and large ruminants (General & SMART mixtures)

2	Foot & Mouth Disease (FMD) Vaccine: cattle
3	Brucellosis Vaccine: cattle
4	Bluetongue Vaccine: sheep
5	BQ (Black Quarter) & HS ( <i>Hemorrhagic septicemia</i> ) Vaccines: cattle & buffalo
6	Snuffles Vaccine: Rabbits
7	<i>Mannheimia haemolytica</i> Vaccine: Quails
8	KetoQuant Kit: Ketosis detection in cattle
9	TANUCHEK SCC Kit: mastitis / somatic cell count detection (with “Masti Guard” package)
10	Ethnoveterinary formulations for livestock & poultry diseases
	<b>10: Aquaculture and Fisheries</b>
1	Super-intensive shrimp farming technology
2	CIBA shrimp larval feed technology
3	Diagnostics, prophylactic and therapeutics for shrimp farming.
4	Nursery rearing and cage farming of finfishes.
5	Crop insurance guidelines for shrimp farming.
6	Fish culture in open sea cages.
7	Culture of silver pompano in ponds.
8	Seaweed farming using bamboo rafts and monoline culture methods.
9	Ornamental fish culture

### 3.1 Research and Development focus of ICAR Institutes in Tamil Nadu

#### ICAR–Sugarcane Breeding Institute (SBI), Coimbatore:

- It focuses on high-yielding & disease-resistant sugarcane varieties. SBI's Co cane varieties and breeding approaches have historically shaped sugarcane cultivation in south India.
- Seed cane production including tissue culture plantlets
- Agronomic packages for ratoon management and water-efficient sugarcane systems.
- Soil moisture innovation for drought resilience.

#### ICAR–National Research Centre for Banana (NRCB), Tiruchirappalli

- Banana varietal improvement and tissue culture.
- Post-harvest technologies like patented banana juice with basil seed.
- Integrated pest and disease management.
- Agri-business incubation and value addition for banana growers.

#### ICAR–Central Institute for Cotton Research (CICR), Regional Station, Coimbatore

- Cotton varietal improvement under AICCIP with focus on high-yielding, pest-resistant hybrids.
- Sustainable cotton production technologies including IPM and INM.
- Climate-resilient cotton farming for drought-prone areas.

#### ICAR–Central Potato Research Station, Research Station, Udhagamandalam

- Development of disease-free seed potatoes for Nilgiris and hill zones.
- Location-specific agronomic packages for high-altitude potato farming.
- Integrated pest and disease management for potato.

**ICAR–Indian Agricultural Research Institute (IARI), Regional Stations-Wellington & Aduthurai**

- Rice and wheat varietal development
- Wheat germplasm evaluation against biotic and abiotic stresses
- Off-season wheat breeding

**ICAR–Indian Institute of Soil & Water Conservation (IISWC), Regional Centre, Udhagamandalam**

- Watershed management models for high rainfall hilly regions.
- Soil erosion control and rainwater harvesting.

**ICAR–National Institute for Research on Commercial Agriculture (NIRCA), Regional Station, Vedsandur**

- Integrated agro-technologies for tobacco and other commercially important crops
- Crop diversification and commercial crop modules for dryland zones.
- Agro-enterprise models for smallholder commercialization.

**ICAR–Central Institute of Agricultural Engineering (CIAE), Regional Station, Coimbatore**

- Development of farm machinery for smallholder use in Tamil Nadu.
- Post-harvest engineering solutions for rice, millets, and horticultural crops.
- Mechanization modules for hill and dryland agriculture.

**ICAR–Central Sheep and Wool Research Institute (CSWRI), Southern Regional Research Centre, Mannavanur**

- Breeding of Angora, Chinchilla, and White Giant rabbits for wool and meat.
- Area-specific mineral mixtures for sheep productivity.
- Estrus synchronization and parasite control protocols.
- Wool-based non-woven textiles for medical applications.

**ICAR–Central Institute of Brackish water Aquaculture (CIBA), Chennai**

- Mud crab hatchery and farming protocols for coastal livelihoods.
- Brackishwater ornamental fish hatchery and finfish seed rearing.
- Nutrient recycling and biofloc systems for shrimp farming.

**ICAR–Central Marine Fisheries Research Institute (CMFRI), Regional Stations-Chennai, Mandapam, Tuticorin**

- Cage farming of cobia and pompano in Gulf of Mannar.
- Marine biodiversity conservation and reef restoration.
- Mariculture of molluscs and crustaceans.
- Nutritional profiling and feed development for marine species.

**3.2. On-going Activities of KVKs in Tamil Nadu**

- The **KVKs in Tamil Nadu** is focusing on: (i) Technology Assessment and Refinement (TAR), (ii) Frontline Demonstrations (FLDs), (iii) Capacity Building of Farmers and

Extension Personnel, (iv) On-Farm Testing (OFT) and (v) Advisory Services and ICT-based outreach.

- **Technology Dissemination Strategies of KVKs includes:** Farmer Field Schools (FFS) and on-campus training programmes, Mobile-based advisories and WhatsApp groups for real-time updates, Exhibitions, field days, and kisan melas to showcase technologies, YouTube channels and community radio for wider outreach and Collaborations with FPOs, SHGs, and NGOs for scaling innovations.
- **Demonstration:** The KVKs in Tamil Nadu are engaged in:
  - a. Climate-resilient agriculture: Demonstrations on drought-tolerant rice varieties, water-saving irrigation systems, and integrated farming systems.
  - b. Natural farming and organic practices: Promotion of bio-inputs, Jeevamrutham, and Panchagavya.
  - c. Precision farming: Use of sensors, mobile apps, and drone-based spraying in districts like Coimbatore and Theni.
  - d. Integrated Pest Management (IPM): Demonstrations on pheromone traps, neem-based biopesticides, and pest surveillance.
  - e. Livestock and fisheries: TANUVAS-led KVKs promote backyard poultry, goat rearing, and integrated aquaculture models.
  - f. Value addition and agri-entrepreneurship: Training on millet-based products, banana fiber extraction, and vermicomposting units.

### 3.3 Demonstration / Success stories

#### 1) Farmers' Success Stories and Innovations documented by KVKs

- Vellore KVK documented success of farmers adopting *National Pulses Mission* technologies, increasing yields by 30%.
- Theni district farmers innovated with *banana intercropping with vegetables*, improving income stability.
- Dharmapuri KVK supported tribal farmers in *millet cultivation and processing*, leading to market linkages and branding.
- Nagapattinam coastal farmers adopted *brackish water aquaculture* with KVK support, enhancing livelihoods.
- Women SHGs in Tirunelveli trained in *value-added jackfruit products*, now supplying to local markets and schools.
- *Direct-sown paddy through Drum Seeding-wide adoption:* KVK-Trichy documented large-scale adoption of direct sown paddy using drum seeders; farmers save labour, reduce transplanting costs, and maintain yields under recommended management.
- *SRI (System of Rice Intensification) adoption:* Several KVKs reported SRI adoption with improved water productivity and higher yields in paddy growing tracts-demonstrated through FLDs and farmer training.
- Blackgram variety adoption & improved pulses: Thiruvannamalai KVK documents large successes with specific black gram varieties (e.g., VBN series) and drum seeder technology for paddy; these have become locally recommended practices.

- *Small machinery & low-cost tools:* KVK Krishnagiri reported success stories include adoption of hand-operated groundnut decorticator, tractor-operated implements and other low-cost mechanization options that reduce drudgery and increase processing efficiency for smallholders.
- *Pandhal (polytunnel/pandhal) system for ridge gourd & improved banana farming:* KVK Thiruvannamalai KVK has documented greenhouse/pandhal adoption for high-value vegetable cultivation (e.g., ridge gourd) and improved banana management practices leading to higher returns.

## 2) Demonstration and Success Stories documented by ICAR Institutes and KVKs

### 1) ICAR–National Research Centre for Banana, Tiruchirappalli

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
Trichy	High-Density Planting (HDP) in Grand Naine banana	NRCB demonstrated HDP (1,900–2,000 plants/acre) with drip fertigation and tissue culture plants.	Farmer Mr. K. Rajendran, Thottiyam – achieved 25–30 % higher yield and better fruit uniformity; net income ₹ 1.8 lakh/acre.
Namakkal	Microbial Consortium for Banana (Biofertilizer technology)	Application of NRCB-developed microbial consortium (PGPR + Trichoderma + Phosphate solubilizers).	Farmer Mr. A. Ramasamy, Senthamangalam – reduced chemical fertilizer use by 25 %, improved bunch weight (up to 28 kg).
Tirunelveli	Banana Special Foliar Nutrition Spray	NRCB's foliar nutrient formulation applied during bunch development.	Farmer Ms. S. Meenakshi, Valliyur – increased fruit size and improved appearance; earned premium price in local market.
Erode	Tissue Culture Banana with Drip Fertigation	Adoption of tissue-cultured Grand Naine + drip fertigation based on NRCB guidelines.	Farmer Mr. V. Manivel, Kodumudi – yield rose from 30 t/acre to 45 t/acre; water saving ~40 %.
Coimbatore	Waste to Wealth: Banana Pseudostem Fibre Extraction	Training on pseudostem fibre extraction for value addition.	Women SHG – Vellalore Village, trained by NRCB; earning ₹ 10,000–15,000/month through fibre crafts.
Cuddalore	Integrated Management of Panama Wilt (Fusarium wilt)	Use of NRCB's bio-control + tolerant varieties + soil health management.	Farmer Mr. M. Saravanan, Panruti – saved 90 % of crop, shifted to wilt-tolerant hybrid NRCB Sel. 2.
Thoothukudi	Banana Micropropagation and Nursery Enterprise	Entrepreneurs trained on micropropagation and primary hardening techniques.	Agri-preneur Mrs. R. Devi, Ettayapuram – established small nursery, supplying 20,000 TC plants/year.

Dindigul	Banana Ripening Chamber (Ethylene-based)	Demonstration of eco-friendly banana ripening technology.	Farmer group at Palani – improved marketability and reduced post-harvest losses by 15 %.
Salem	Banana Intercropping with Vegetables (Okra, Cowpea)	NRCB's model for resource optimization in initial growth stage.	Farmer Mr. K. Senthil, Omalur – increased income by 20 % through intercropping returns.
Thanjavur	Banana-based Integrated Farming System (IFS)	NRCB integrated banana + fish + azolla + vermicompost system.	Progressive farmer Mr. S. Arul, Papanasam – income doubled; reduced external input cost significantly.

## 2) ICAR–Sugarcane Breeding Institute, Coimbatore

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
Coimbatore	SBI CO 11015 (Sugarcane Variety)	High-yielding, early maturing, drought-tolerant variety suited for irrigated and rainfed tracts.	Mr. P. Balasubramanian, Sulur – yield 140 t/ha vs 110 t/ha in old variety; early maturity benefited jaggery unit.
Erode	Sustainable Sugarcane Initiative (SSI)	Demonstration of single-bud chip sett nursery and drip fertigation.	Farmer group – Modakurichi Block, adopted SSI in 20 ha; reduced seed cost by 60 %, improved yield by 25 %.
Tiruppur	Microbial Consortium for Sugarcane	Use of SBI's PGPR + biofertilizer mixture for ratoon crop improvement.	Mr. K. Subramaniam, Kangeyam – improved cane girth and ratoon yield; reduced urea by 30 %.
Villupuram	Trash Mulching and Drip Fertigation	Demonstration under AICRP on Sugarcane; improved soil moisture conservation.	SHG Group – Mugaiyur, adopted drip + mulch; improved cane yield from 90 to 125 t/ha.

## 3) ICAR–CICR Regional Centre, Coimbatore

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
Coimbatore	High Density Planting System (HDPS) in Cotton	Demonstration of 44,000–66,000 plants/ha with short-duration Bt hybrids.	Farmer Mr. N. Manikandan, Sulur – yield increased from 18 q/ha to 28 q/ha; 20 % water saving.
Erode	Drip Fertigation and IPM Practices in Cotton	Integration of drip fertigation with pheromone traps and biocontrols.	Farmer group, Modakurichi Block – pesticide use reduced 35 %; profit margin up by ₹ 12,000/acre.
Salem	Frontline Demonstration on New Hybrid CCH 19-4	Introduced CICR's recent non-Bt hybrid; trained on agronomic package.	Mr. S. Muthusamy, Sankari – recorded 20 % higher lint yield and better boll retention.

Virudhunagar	Cotton-based Intercropping (Cotton + Redgram)	Demonstration of ICAR-CICR model for marginal rainfed farmers.	Farmer Mr. R. Senthil, Aruppukottai – stabilized income under erratic rainfall; intercrop added ₹ 8,000/acre.
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#### 4) ICAR-IARI Regional Station, Wellington

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
The Nilgiris	Introduction of HD 3118 and HD 3226 Wheat Varieties	Demonstrated improved hill wheat varieties tolerant to rust.	Farmer Mr. K. John, Kotagiri – yield rose from 25 q/ha to 37 q/ha; better chapati quality grain.
The Nilgiris	Integrated Nutrient Management in Hill Wheat	Soil-test-based nutrient application + biofertilizers.	Farmers of Ketti Valley cluster – N-use efficiency up 20 %, higher net returns.
Dindigul (Vedasanthur)	Temperate Vegetable Trials (Broccoli, Lettuce)	Adaptation trials under moderate hill environment.	Progressive farmer Mrs. L. Devi, Vedasanthur – successful diversification; fetched premium market price.

#### 5) ICAR-NIRCA, Research station, Vedasandur

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
Dindigul	Improved Tobacco Variety NRTM 118 with Reduced Nicotine	Field demonstration for quality improvement and export potential.	Mr. R. Murugan, Vedasandur – 15 % yield gain, better curing quality; accepted by private buyers.
Dindigul	CTCRI Banana + Tapioca Cropping Sequence	Cassava-banana sequence to improve soil fertility and income.	Farmers Club, Nilakkottai – soil fertility improved; 1.6 times income rise.
Theni	Tapioca Starch Processing and Value Addition Training	CTCRI-based post-harvest technology for small processors.	Women SHG, Bodinayakanur – started micro-enterprise earning ₹ 5 lakh/year.

#### 6) ICAR-Central Potato Research Institute, Ooty

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
The Nilgiris	Introduction of Kufri Himalini & Kufri Chipsona-3 Varieties	High-yielding, disease-tolerant potato varieties suited for South hills.	Farmer Mr. S. Rajan, Coonoor – yield up 25 %; better processing quality.
The Nilgiris	Micro-tuber Technology & Seed Potato Production	Demonstration of disease-free seed tuber generation.	Progressive farmer Mrs. A. Mary, Kothagiri – established mini seed unit; selling seed to local farmers.
Dindigul (Hill pockets)	Potato-Carrot Intercropping System	Trial on resource optimization for smallholders.	Farmer group, Batlagundu, 15 % more net returns over monocrop.

### 7) ICAR-IISWC, Research Centre, Ooty

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
The Nilgiris	Contour Bunding & Vegetative Barriers in Hill Slopes	Soil erosion control model with vetiver + contour bunding.	Farmer group, Lovedale, prevented 18 t/ha soil loss annually; crop yield up 22 %.
Dindigul	Rainwater Harvesting Farm Ponds for Vegetable Crops	On-farm water harvesting and micro-irrigation pilot.	Mr. P. Arul, Oddanchatram – maintained two cropping seasons; reduced water stress.
Erode	Soil Health Card-based Nutrient Management	Demonstrations under watershed project.	Farmer cluster, Gobichettipalayam, balanced fertilizer use; cost saving ₹ 4,500/ha.

### 8) ICAR-CIAE Regional Station, Coimbatore

District	Technology / Machinery / Intervention	Description / Intervention Details	Farmer / Beneficiary Details & Outcome
Coimbatore	Self-propelled Multi-crop Planter and Seeder	Demonstrated on maize, sunflower, and pulses to reduce labour and seed cost.	Farmer Mr. S. Ganesan, Pollachi – saved 70 % labour cost; achieved uniform plant spacing; yield up by 10 %.
Erode	Power Weeder and Mini Rotavator for Small Farms	Training and demo on small-engine weeder for banana and turmeric inter-row operations.	SHG “Thanga Bhoomi”, Modakurichi – reduced weeding time by 60 %, cost saving ₹ 4,000/acre.
Tiruppur	Direct Paddy Seeder for SRI Method	Demonstration of CIAE-designed lightweight paddy seeder under SRI practices.	Farmer group, Udumalpet block – saved 35 % seed and 50 % labour; crop stand more uniform.
Namakkal	Banana Harvesting and Handling Tools	Demonstrated banana bunch lifter and fruit cutter designed for safety and less damage.	Mr. K. Rajamani, Senthamangalam – reduced bunch injury and post-harvest losses by 20 %.
Dindigul	Groundnut Digger-cum-Lifter	Farm-level evaluation of CIAE groundnut digger in red soils.	Farmer Mrs. P. Anitha, Vedasandur – reduced harvest time from 3 to 1 day/acre; drudgery reduced.
Salem	Mini Dal Mill and Pulses Processing Unit	Technology demonstration for SHGs and FPOs on value addition.	Women FPO “Sakthi Farmers”, Omalur – started processing unit, earning ₹ 40,000/month collectively.
Thanjavur	Power Thresher and Combine Harvester for Paddy	Demonstration under AICRP on Farm Implements & Machinery.	Farmer Mr. R. Arul, Orathanadu – saved 50 % harvesting time; reduced grain loss by 3 %.
Madurai	Solar Dryer for Turmeric and Chillies	Demonstration of CIAE solar tunnel dryer for hygienic drying.	Entrepreneur Mrs. K. Devika, Melur – product quality improved, drying time cut by half; started local enterprise.
Virudhunagar	Tractor-operated Bed Maker and Mulching Unit	Used for cotton and vegetable raised-bed planting.	Mr. T. Velmurugan, Rajapalayam – reduced irrigation frequency; improved soil aeration; yield +18 %.

Tirunelveli	Post-harvest Value Chain for Millets (Dehusker + Grader)	Set up demo millet processing line in collaboration with TNAU KVK.	Farmers' Club, Nanguneri, now marketing cleaned millets under local brand; income doubled.
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### 9) ICAR-CMFRI Regional Centres (Mandapam, Thoothukudi, Chennai)

District / Centre	Technology / Intervention	Description / Intervention Details	Farmer / Outcome Details
Mandapam (Ramanathapuram)	Cage Culture of Sea Bass in Coastal Lagoons	Low-cost GI cage units demonstrated under CMFRI guidance.	Fisher group, Pamban, achieved 4 t/ha yield; additional ₹ 1 lakh income/family.
Thoothukudi	Seaweed Farming (Kappaphycus alvarezii)	Demonstration of seaweed cultivation and drying for women SHGs.	SHG "Pearl Women Group", Veerapandianpattinam - earned ₹ 2.5 lakh/year collectively.
Chennai	Mariculture of Cobia and Silver Pompano	Pilot cage culture using CIBA-CMFRI collaboration seed.	Entrepreneur Mr. R. Sekar, Ennore - 80 % survival; profitable harvest within 8 months.
Ramanathapuram	Community Hatchery for Green Mussel Seed Production	Training and demonstration under PMMSY.	Fishermen co-op, Mandapam, self-sustaining hatchery model; 2 million spat capacity.

### 10) ICAR-Central Institute of Brackish water Aquaculture, Chennai)

District	Technology / Intervention	Description / Intervention Details	Farmer Details / Outcome
Nagapattinam	SIBA Shrimp Feed (CIBA-Gen2)	Cost-effective, indigenous shrimp feed developed by CIBA.	Aqua farmer Mr. R. Dinesh, Sirkazhi - production 5.2 t/ha with 25 % cost saving vs commercial feed.
Thoothukudi	Asian Seabass Hatchery and Seed Production Technology	CIBA-trained farmer unit established under "lab to land" model.	Mrs. Latha Enterprises, Thoothukudi - produced 2 lakh seabass seeds annually; self-reliant hatchery model.
Cuddalore	Mud Crab ( <i>Scylla serrata</i> ) Fattening Technology	Demonstrated pen and cage fattening system in brackishwater creeks.	SHG Group - Killai Village, earned ₹ 1.5 lakh/cycle; women-led livelihood model.
Ramanathapuram	Biofloc-based Vannamei Shrimp Culture System	Low-water exchange, biosecure farming model for small farmers.	Mr. J. Rajesh, Rameswaram - achieved 12 t/ha yield; 40 % water saving and better disease control.
Chennai (Kancheepuram)	Integrated Multi-Trophic Aquaculture (IMTA)	Combining shrimp + seaweed + milkfish	Mr. R. Mani, Kelambakkam - achieved additional ₹

		culture in brackish ponds.	50,000/ha through seaweed and fish harvest.
Nagapattinam	CIBA-developed Diagnostic Kits (WSSV, EHP)	Early disease detection kits supplied to farmer groups.	Aqua cluster – Vedaranyam, reduced crop loss by 30 %; improved disease management efficiency.

### 3. Demonstration conducted by KVKs and SAUs

Table given below provides a district-wise overview of major technologies demonstration and notable farmer success stories documented by ICAR Institutes and KVKs.

District / Host Institution	Major Technologies / Demonstrations	Farmer Success Stories / Innovations
Coimbatore (ICAR-SBI)	High-yielding sugarcane varieties (CO series), micro-irrigation in sugarcane, intercropping models, trash mulching, mechanized harvesting trials.	Farmers adopted high-sucrose variety Co 86032 and drip irrigation, improving yields and reducing water use by 25%.
Tiruchirappalli (TNAU and ICAR-NRCB)	System of Rice Intensification (SRI), Drum seeder paddy, integrated nutrient management, mechanized paddy transplanting.	Large-scale adoption of drum-seeder sowing reduced labour costs by 40%; SRI increased yields by 18%.
Thiruvannamalai (TNAU)	Improved blackgram varieties (VBN series), pest management, pandhal system for vegetables, banana integrated farming.	Farmer Shri. S. Rajendran adopted VBN-8 blackgram and improved pest control; achieved 22% higher yield than local variety.
Krishnagiri (NGO Host - MYRADA)	Low-cost mechanization tools (groundnut decorticator, power weeder), precision farming in vegetables, micro irrigation.	Women SHG group adopted hand decorticator for groundnut, reducing drudgery and doubling daily income.
Ramanathapuram (TNAU)	Coastal saline tolerant pulses and fodder crops, raised-bed vegetable cultivation, integrated fish-crop systems.	Adoption of saline-tolerant blackgram varieties in 50 ha improved crop survival and farm income in coastal belts.
Nilgiris (TNAU)	High-altitude vegetable varieties, protected cultivation, organic farming in tea and spices.	Tribal farmers adopted protected cultivation of capsicum, earning 3× returns over open-field cultivation.
Erode (TNAU)	Drip fertigation in turmeric and banana, IPM in turmeric, mechanized weeding.	Farmers practicing drip fertigation in turmeric saved 30% water and recorded 20% yield increase.
Thanjavur (TNAU)	Paddy variety demonstrations (CO 51, ADT 45), SRI method, seed production training.	Adoption of CO 51 paddy led to early harvest and better market price realization.
Madurai (TNAU)	Integrated farming systems, backyard poultry, organic input production, small-scale farm mechanization.	Farmer group developed integrated model (crop + dairy + poultry) yielding ₹50,000 extra annual income.

Kanyakumari (TNAU)	Horticultural diversification, precision farming in banana and vegetables, floriculture promotion.	Farmers adopted tissue-cultured banana with fertigation achieving export-quality produce.
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#### 4) Location-Specific Practices Adopted by Farmers in TN

Region	Practice Adopted	Support Provided By
Delta region/ Irrigated paddy areas (Trichy, Thanjavur, parts of Tiruchirappalli & Tiruvarur)	SRI method in rice, laser levelling, direct drum seeder sowing, mechanized transplanting, water-saving agronomy and nutrient management practices. KVK-Trichy reports multiple large adoption cases	TNAU & ICAR-KVKs
Western TN	Precision farming in banana and turmeric	SBI & KVKs
Southern TN	Integrated farming with goats, poultry, crops	TANUVAS-KVKs
Water-scarce / dryland zones (e.g., parts of Tiruppur, Erode, Salem, Karur, Perambalur)	Drip irrigation and micro-sprinkler systems in horticulture and banana. Drought-tolerant crop varieties and short-duration pulses; integrated nutrient management; soil moisture conservation (mulching, tied ridges).	Validated via KVK OFTs and FLDs
Groundnut, banana & vegetable pockets (Coimbatore, Erode, Theni, Madurai, Kanyakumari)	Improved varieties, integrated pest management, mechanical harvesting/decorticating tools for groundnut, tissue culture/quality planting material for banana, and pandhal/protected cultivation for vegetables. KVK success stories document uptake	ICAR and SAUs
Coastal TN (Ramanathapuram, Nagapattinam, Tuticorin)	Mangrove-based fish farming, Salt-tolerant crops (rice/ certain pulses/forage), improved drainage and raised bed systems, specific nutrient management and integrated aquaculture-agriculture approaches promoted	ICAR-CIBA & KVKs
Hilly areas / high-altitude zones (Nilgiris, Kanyakumari hills)	Organic vegetable clusters, terrace farming, High-value temperate & subtropical vegetables, spice/horticulture packages, protected cultivation (polyhouses), mushroom cultivation and upstream value chains	NGO-led KVKs

## **Section 4. Specific Techniques developed by ICAR for addressing State and District specific Issues**

### **Part I. New Crop Varieties**

#### **1) Banana Variety: Kaveri Kalki**

- Developed by the ICAR-NRC for Banana
- Exotic introduction belonging to Karpuravalli type.
- Plant is dwarf statured with 2.0-2.4 m height
- Plant stature is robust and sturdy with short leaves and suitable for high density planting.
- It needs no propping, so the cultivation cost is reduced.

#### **2) Banana Variety: Kaveri Poovan**

- It is a high-yielding, virus-free clone selected in 2017.
- Compared to local Poovan clones, this improved variety has demonstrated a 22–28% increase in yield.
- The virus-free elite Poovan clone was officially named as Kaveri Poovan.

#### **3) Banana Variety: Kaveri Kanchan (NCR - 17)**

- It is a stable, high yielding dessert banana
- Highly Resistant to *Foc* race 1
- Twenty percent higher yield than cv. Nendran

#### **4) Banana Variety: Kaveri Vaaman (TBM - 9)**

- It is Grand Naine type mutant banana
- Bunch with 8-10 hands and weighing 18 to 25 Kg.
- Resistant to lodging
- Suitable for cyclone/wind prone and coastal areas
- Ideal for terrace gardening & high-density planting

#### **5) Sugarcane Variety: Co 11015 (Atulya)**

- Developed by the ICAR-SBI Coimbatore and released in 2020 for cultivation in Tamil Nadu and 2023 for cultivation in the entire Peninsular zone.
- Co 11015 is an early maturing / short duration variety and it can be harvested from 8<sup>th</sup> or 9<sup>th</sup> month onwards. Fits well for a cycle of three crops in two years.
- This variety will accumulate high sucrose at 8<sup>th</sup> (16.96 %) and 10<sup>th</sup> month (19.37 %).
- Co 11015 recorded a sugar yield of 16.22 t/ha at 360 days across the peninsular zone and recorded a cane yield of 108.30 t/ha.
- Tolerant to drought and moderately resistant to red rot. Proper fertilizer is recommended to get good yield in plant and in ratoon
- Produce A1 quality jaggery of golden yellow colour

#### **6) Sugarcane Variety: Co 18009 (Punnakai)**

- It is a high tonnage, midlate maturing sugarcane variety suitable for Tamil Nadu and Puducherry
- Released in 2023

- Co 18009 will give an average cane yield of 161.37 t/ha yield and sugar yield of 21.99 t/ha with good agronomic practices. The average sucrose content of Co 18009 at 12<sup>th</sup> month is 19.39 %.
- It is a good ratooner with excellent field stand, with erect and medium thick canes, suitable for mechanical harvesting.
- It is a climate resilient variety as it is tolerant to drought and resistance to red rot
- Co 18009 is a non-flowering variety.

#### **7) Sugarcane Variety: Co 14012 (Avani)**

- Released in 2022 for cultivation in the Peninsular Zone (Andhra Pradesh, Gujarat, Karnataka, Kerala, Maharashtra, Madhya Pradesh, Tamil Nadu and Telangana)
- Co 14012 is a quality, high tillering and midlate maturing sugarcane variety.
- It is a non-flowering variety with good ratooning potential.
- This variety recorded cane yield of 109.80 t/ha, with 20.63% of sucrose at 12<sup>th</sup> month which is one unit above that of the ruling standard, Co 86032, thus expected to give high sugar yield of 16.16t/ha.
- Co 14012 is R-MR (Resistant to moderately resistant) for red rot but R-HS (Resistant to highly susceptible) for smut. Therefore, proper prophylactic disease management is advised.
- Co14012 is tolerant to drought condition, the major yield limiting abiotic stress in peninsular zone.

#### **8) Tobacco Variety: Yasini**

- A new black shunk resistant chewing tobacco variety with high yield
- Seeds of this variety is available with ICAR-NIRCA Vedasanthur for commercial cultivation

#### **9) Cotton Hybrid: Suraj**

- It belongs to *G. hirsutum* group. Pedigree: LRA 5166 (CCH526612 × HLS 329).
- Duration: 150–165 days.
- Seed-cotton yield: 2,500–3,000 kg/ha.
- Season: Winter-irrigated (also used in summer irrigated situations).
- Recommended area: Tamil Nadu / similar irrigated zones
- Salient features: Developed as a compact/modern variety with good seed-cotton yield under irrigated conditions.

#### **10) Cotton Hybrid: CCH 2623**

- It belongs to *G. hirsutum* group. Pedigree: LRA 5166 × IGM 102
- Duration: 150 days.
- Seed-cotton yield: ~1,800 kg/ha
- Season: Winter-irrigated.
- Recommended area: Tamil Nadu and other central zone.
- Salient features: Medium-staple central cotton variety developed for irrigated cultivation; used as a zonal check in multi-location trials.

#### **11) Cotton Hybrid: Subiksha (CCH 4474)**

- Duration: 5 months
- Seed-cotton yield: 1,650 kg/ha

- Recommended area: Tamil Nadu and similar agro-climatic zones; promoted for HDPS (high-density planting systems).
- Salient features: Compact long-staple variety (staple up to ~30–34 mm), good spinnability (reported up to ~60s count), developed especially for high-density planting systems to increase harvestable yield per hectare.

#### **12) Cotton Hybrid: Suchitra (CCH 12-2)**

- Duration: ~150 days
- Recommended area: Gujarat, Maharashtra, Madhya Pradesh, Odisha and other central zone states and also TN

#### **13) Cotton Hybrid: Sunantha (CCH 14-1)**

- Resistance to Bacterial Leaf Blight
- Salient features: Good fibre properties: fibre length ~32.0 mm, fibre strength ~32.7 g/tex, ginning outturn ~34.2% and spinnability ~50s (useful for medium-staple processing).

#### **14) Cotton Hybrid: CICR-H Cotton 36 (Suraksha)**

- Duration: Mid-season / semi-compact plant type.
- Recommended area: Gujarat, Maharashtra, Madhya Pradesh, Odisha, Karnataka, Andhra Pradesh, Telangana, and Tamil Nadu.
- Recommended area: As above, multiple central and peninsular states per official release minutes.
- Salient features: Fibre length ~32.4 mm, fibre strength ~34.3 g/tex, ginning outturn ~34.0%, spinnability ~60s count; described as semi-compact and suitable for recommended zones.

#### **15) Cotton variety: CICR-H Cotton 54 (Nano)**

- Duration: Mid-season; designed as compact/HDPS plant type (maturity depends on crop management).
- Salient features: Fibre length ~30.8 mm, fibre strength ~30.8 g/tex, ginning outturn ~34.9%, described as an ideal plant type for High-Density Planting Systems (HDPS).

#### **16) Cotton Hybrid: Sumangala**

- Pedigree: CW 134 × Reba B.50 × Khandwa 2, it belongs to *G. hirsutum* group
- Season: Sept–Oct sowing (main season) and Jan–Feb harvest window; suitable for irrigated and rainfed tracts. Generally sown during Sept–Oct and harvested Jan–Feb.
- Seed-cotton yield: Typical reported values ~2,000 kg/ha (irrigated) and ~1,200 kg/ha (rainfed)
- Recommended area: Tamil Nadu- suitable for irrigated and rainfed tracts (used across several districts).
- Salient features: Medium-staple variety suited to rainfed tracts as well as irrigated situations; good adaptation in Tamil Nadu agro-ecologies.

#### **17) Cotton Hybrid: CICR B Cotton 37 (CCB 51)**

- Pedigree: Developed from ICAR-CICR *Gossypium barbadense* breeding lines
- Duration: Matures in about 150–160 days.
- Seed-cotton yield: ~12.37 q/ha under irrigated trial conditions
- Season: Recommended for irrigated (Kharif) cultivation / South Zone trials

- Recommended area: Andhra Pradesh / South Zone (Coimbatore/Coastal Andhra trial regions)
- Disease resistance: Show vulnerability to viral diseases such as Cotton Leaf Curl Virus (CLCuV)
- Salient features: Extra-long-staple (ELS) *barbadense* type — reported fibre properties include UHML 34.7 mm, fibre strength 3.4 g/tex, ginning outturn 36.6% and high spinnability.

#### **18) Cotton Hybrid: CICR B Cotton 45 (CCB 143B)**

- Pedigree: Developed from ICAR-CICR *Gossypium barbadense* breeding lines
- Matures in about 166–170 days.
- Seed-cotton yield: ~14.6 q/ha
- Season: Recommended for irrigated cultivation (South / peninsular states).
- Recommended area: Tamil Nadu, Andhra Pradesh and Karnataka
- Salient features: Extra-long-staple *G. barbadense* cotton.

#### **19) Cotton variety: CICR B Cotton 55 (CCB 51-2)**

- Duration: ~150–160 days
- Seed-cotton yield: ~19.0 q/ha
- Season: Recommended for irrigated conditions
- Recommended area: Andhra Pradesh, Telangana, Karnataka and Tamil Nadu
- Salient features: Extra-Long-Staple (ELS) *G. barbadense* cotton

#### **20) Wheat variety: HW 1098 (Nilgiri Khapli)**

- Pedigree: It is a mutant of NP 201, developed through Gamma irradiation.
- Duration: 110 days.
- Grain Yield: 40–50 q/ha with husk.
- Season: Suitable for sowing between 15<sup>th</sup> October and the 1<sup>st</sup> week of November (in hill or temperate area)
- Recommended Area: Grown in *T. dicoccum* wheat grown regions like Gujarat, Maharashtra, Karnataka, and Tamil Nadu. In TN it may be grown in places like The Nilgiris, Kodaikanal, Kolli Hills, Thalavadi, Servarayan Hills, Thiruvannamalai, Vellore, Salem, Kallakurichi, Dharmapuri, Krishnagiri, Erode, Coimbatore, Thiruppur, Namakkal, Dindigul, and Theni.
- Disease Resistance: Shows good resistance to rust diseases.
- Salient Features: It records a higher grain weight of 46.5 g, with 16.8% protein, a 29.0 ml sedimentation value, 3.39 ppm beta carotene, offering better grain quality than NP 201.

#### **21) Bread wheat Variety: CoW(W)1 (HW 3094)**

- Pedigree: Developed from the cross of HD2646/HW2002A/CPAN3057.
- Duration: 90–95 days.
- Grain Yield: 30–40 q/ha.
- Season: Suitable for sowing between 20<sup>th</sup> October and 30<sup>th</sup> November.
- Recommended Area: Well suited for Dharmapuri, Salem, Vellore, Thiruvannamalai, Coimbatore, Kanchipuram, Villupuram, Namakkal, Madurai, Theni and surrounding regions.
- Disease Resistance: Resistant to stem and leaf rusts.

- Salient Features: Ideal for both bread and chapatti making, and exhibits strong thermo-tolerance for hot conditions.

## **22) Bread wheat variety: HW 5207 (CoW 3)**

- Pedigree: Derived from the cross HW3029 x V763-2312 (Yr15).
- Duration: 100–102 days.
- Grain Yield: 35–45 q/ha.
- Season: Best suited for sowing between 20<sup>th</sup> October and 30<sup>th</sup> November.
- Recommended Area: Suitable for Dharmapuri, Salem, Vellore, Thiruvannamalai, Coimbatore, Theni and nearby regions.
- Disease Resistance: Resistant to stem, leaf, and stripe rusts.
- Salient Features: Produces lustrous grains, ideal for chapatti and bread making, and is resistant to all prevalent rust pathotypes in this region.

### **Note:**

- *Technology provider for SI No 1 to 4: ICAR- NRC for Banana*
- *Technology provider for SI No 5 to 7: ICAR- SBI*
- *Technology provider for SI No 8: ICAR- NIRCA*
- *Technology provider for SI No 9 to 19: ICAR- CICR/ ICAR-CICR Regional Centre*
- *Technology provider for SI No 20 to 22: ICAR- IARI Regional Station*

## **Part II: Animal Breeds / Strains evolved by ICAR Institutes**

### **1) Sheep Breeding: Bharat Merino Sheep Breeding**

- Bharat Merino, crossbred strain of fine apparel wool sheep is maintained on *inter se* mating at Sheep Section of SRRC, ICAR-CSWRI, Mannavanur.
- The pedigree of the breed comprises 75% exotic inheritance of Rambouillet/ Russian Merino, 12.5% carpet wool breeds *i.e.*, Nali/Chokla & 12.5% mutton breed Malpura/ Jaisalmeri.
- This improved superior germplasm is in heavy demand among farmers of Karnataka and Tamil Nadu and being used for improving the native non descriptive sheep thereby improving livelihood of sheep herders.
- Elite germplasm is being supplied to Karnataka and Tamil Nadu farmers for breed improvement
- The mean body weight of Bharat Merino sheep at birth, 3 months, 6 months and 12 months was 4.06±0.07, 21.34±0.32, 29.37±0.52 and 37.81 ±1.01 kg respectively. Average adult male and female BM sheep body weight is 58.29±1.20 and 41.78 ±1.14 kg respectively. In feedlot rearing BM sheep weighed 38.50±1.15 at six months of age.
- The average annual adult Greasy Fleece Yield (GFY) was 2.84 ±0.05 kg and GFY of hogget sheep at six months was 1.13±0.03 kg. The average staple length was 8.51±0.16 cm, fibre diameter was 19.52 ±0.27 micron and medullation percentage was 0.05.
- Over the period, genetic improvement for wool yield was 200 gm through selective breeding and reducing medullation level to less than 1 per cent level.
- The annual average tuppings among Bharat Merino sheep during both Spring and Autumn breeding season was 97.27%. The lambing on the basis of ewes bred was 98.01%. The survivability percentage between 0-3 months, 3-6 months, 6-12 months

and adults pooled over sexes was 95.22, 98.39, 100 and 97.16 % respectively. The pooled overall survivability and mortality was 96.45% and 3.55%, respectively.

## 2) Sheep Breed: Avikalin Sheep

- Avikalin strain of sheep was evolved at ICAR-CSWRI, Avikanagar, Rajasthan from Rambouillet x Malpura half-bred base through inter breeding and selection for greasy fleece weight, producing about 1.75 kg greasy wool having 27 microns diameter, 27% medullation and staple length of 4.75 cm in half yearly clip.
- This strain has been maintained in Southern Regional Research Centre of ICAR-CSWRI, Mannavanur, Kodaikanal since September 2015.
- This breed is quite suitable as a dual-purpose sheep for carpet wool and mutton production.
- The pooled body weight of Avikalin sheep at birth, 3 months, 6 months and 12 months was  $3.41 \pm 0.07$ ,  $21.57 \pm 0.46$ ,  $28.00 \pm 0.69$  and  $36.00 \pm 1.02$  kg respectively. Average adult male and female Avikalin sheep body weight is  $55.27 \pm 1.10$  and  $39.78 \pm 1.04$  kg respectively.
- The average male hogget Avikalin at six-month Greasy Fleece Yield (GFY) was  $0.97 \pm 0.022$  kg, and average female hogget GFY  $0.925 \pm 0.048$  kg, and overall average GFY was  $0.961 \pm 0.035$  kg. Average adult annual GFY was  $1.640 \pm 0.05$  kg. Average fiber diameter was  $34.39 \pm 8.65$  micron, medullation was  $51.35 \pm 15.62$  percent, and staple length was  $6.87 \pm 1.73$  cm.

## 3) Broiler Rabbit: White Giant and Soviet Chinchilla

- Broiler rabbit breeds, mainly White Giant and Soviet Chinchilla were studied for adaptation in sub-temperate agro-climate of Kodaikanal hills. Selective breeding and line breeding are followed to improve the performance of White Giant and Soviet Chinchilla.
- Rabbits produced from SRRC, ICAR-CSWRI, Mannavanur were distributed to the needy farmers in Tamil Nadu, Kerala, Pondicherry and Karnataka. As there was ban on breeding and sale of rabbits up to 2017, elite broiler rabbit germplasm numbering 6043 were distributed to over 319 clients between 2018 and March 2023.
- Cage rearing of rabbits is practiced by over 500 small and medium farmers in Tamil Nadu, Kerala and Pondicherry. Apart from this, a large number of farmers resort to backyard rabbitry and terrace rabbitry. The bottlenecks in marketing the rabbits were serious problem in Tamil Nadu as eating rabbit meat was not popular as that of chicken, fish and chevon. With the intervention of SRRC, rabbit meat has now got good demand in Tamil Nadu and Pondicherry.
- With regard to the weaning weight (g) of SC and WG before 2014,  $841.66 \pm 2.78$  and  $836.79 \pm 2.48$ , respectively; as on date, those parameters were  $0.925 \pm 0.01$  and  $0.922 \pm 0.2$ , respectively. With regard to litter size at weaning of SC was  $5.22 \pm 0.12$  and WG was  $5.76 \pm 0.13$  before 2014. But now it has been improved  $5.641 \pm 0.2$  and  $6.350 \pm 0.2$ . There was significant increase (100g) in adult weight as well.

### Note:

*Technology provider for SI No 1 to 3: ICAR- CSWRI, Mannavanur*

### **Part III: Seed Production and Availability**

#### **1) Sugarcane (Setts, settlings, TC plants, mother culture flask)**

- Breeder seeds (setts, settlings) of sugarcane varieties such as Co 86032, Co 18009, Co 14012 and Co 11015 are available for direct sales to farmers and sugar mills at ICAR-SBI Coimbatore.
- Tissue culture settlings and mother culture flasks of sugarcane varieties Co 86032, Co 18009, Co 14012 and Co 11015 are available for sales to sugar mills and private tissue culture entrepreneurs at ICAR-SBI Coimbatore.
- Contact The Director through Email: [directorsbiicar@gmail.com](mailto:directorsbiicar@gmail.com) or phone No. 0422-2472621, 9443698858.

#### **2) Banana (Sucker, TC plants)**

- Planting materials of banana varieties like Udhayam, Kavery Sugandham, Kaveri Saba, Kaveri Kalki, Kaveri Haritha, Kavery Kanya, Kavery Kanchan and Kavery Vaaman are available in ICAR-National Research Centre for Banana, Trichy.
- Contact The Director, ICAR-National Research Centre for Banana (ICAR-NRCB), Thogamalai Road, Thayanur Post, Tiruchirapalli- 620102, phone 0431-2618125, Email: [directornrcb@gmail.com](mailto:directornrcb@gmail.com).

#### **3) Cotton**

- Breeder Seeds of improved cotton hybrids/varieties like CICR-H Cotton 54 (Nano), CCH 19-4, CICR-B Cotton 55 are available in ICAR-CICR Regional Centre, Coimbatore
- Contact the Head, ICAR-Central Institute for Cotton Research, Regional Station, P.N. Pudur, Lawley Road PO, Coimbatore 641 003 Phone; 0422-2430045, Email: [prakashcicr@gmail.com](mailto:prakashcicr@gmail.com)

#### **4) Tobacco**

- High quality seeds of chewing tobacco varieties like Abirami, I 64 (Monnai), I 737 (Oosikappal), and Kamachi (hybrid) are available at ICAR-NIRCA Research Station, Vedesandur.
- Contact Dr. P. Manivel, Principal Scientist & Station in-charge through email: [manivelp@yahoo.com](mailto:manivelp@yahoo.com) or phone No. 0455-1290234, 9429543209.

## Part 4: Crop Production Technologies

### 1) Terracing technologies developed/standardized for the hilly region

- Inward slopping bench terraces
- Bench terrace riser stabilization with tea
- Puertorican terrace with *Tripsacum laxum*
- Mixed vegetative barrier with pineapple and Guatemala grass
- Contour staggered trenching (CST) with cover crops of beans technologies in new tea plantation.
- Hydrological studies in grass land and blue gum

### 2) Suitable grasses for resource conservation:

- Identified suitable grasses (Hybrid Napier, Guatemalan grass, Vetiver and Malabar grasses) for soil conservation (estimated soil loss prevention of about 24 t/ha) and fodder production in the hilly region.

### 3) Cover crops and Conservation Tillage for vegetable crops in hilly region

- Potato – carrot crop sequence systems generally use excess tillage and produce low levels of crop residues and both are detrimental to soil quality which has resulted in severe soil erosion and reduce productivity.
- Solution to address the problem include 1) Reduced Tillage: One pass of disc plough + one pass of cultivator + rotavator for potato and rotavator for carrot.
- The ideal crop sequence suggested: Potato (March to June) – carrot (July to November)- cover crop (November- January)
- After the harvest of carrot crop during October, any one of the cover crops, according to the choice of duration of cover crop can be broadcasted and cover the seed by one pass of cultivator
- At 50% flowering stage, these cover crops can be killed by weedicide or incorporated by disc harrow.
- Cover crops and reduced tillage recorded higher system productivity (6.8-11%) and resource use efficiency in southern hilly region

### 4) Reduced tillage and cover crop (Buck wheat) during winter fallow for hilly region

- Productivity: Increase in system productivity in the range of 4 to 24 % for different cover crop with the average increase in system productivity of 9.7%.
- Higher B:C ratio: 2.1
- Energy saving: 4050 MJ/ha
- Ecosystem services includes: Positive change in soil organic carbon (18.5 to 38.8 Mg/ha), addition of 50-71, 12.5 to 19, 10.5 to 28.5 t/ha N, P and K respectively, high residue cover (65%) during fallow and weed control efficiency of about 80-90%.

### 5) Biological terraces to address the twin problem of soil erosion and fodder scarcity in the hilly region

- Planting two rows of Bajra Napier hybrids CO (BN) 5 at a spacing of 50 cm as vegetative barrier on contour on sloppy land

- Vertical distance between grass barrier: 1.0 meter
- Vegetable cultivation to be taken up between the vegetative barriers with normal practices
- Bench terraces will be formed within two to three years as the eroded soil settled above the vegetative barriers
- Performance / Benefits: Formation of bench terraces naturally within two years in 29 % sloppy land without cutting and filling of soil as in the case of mechanical bench terrace, additional fodder yield of 46.7 t/ha/year and since the terrace was formed naturally, there was no yield reduction in the vegetable crop.
- Ecosystem services: Soil organic carbon stock after two years of establishment was higher in hybrid Napier (29.6 Mg/ha), environmental benefit, reduction of soil erosion & siltation of reservoir, etc.
- Economic benefit: It costs 1/6<sup>th</sup> of mechanical terraces and increased vegetable productivity (6-13%)

## **6) Enriched Spent mushroom compost for the carbon efficient vegetable farming**

### **7) Nursery Technology for Banana**

- This technology was developed at ICAR-NRC Banana and focus on selecting disease-free sword suckers and tissue culture plants, treating them for nematodes and fungal/bacterial diseases, and ensuring proper hardening for field planting.
- It is a low-cost farmer friendly technology which could be adopted at the farm or nursery level.
- Selection: Choose broad-corned, sword-like suckers, aged 3-5 months, from disease-free mother plants.
- Weight: Use 1-1.5 kg suckers for varieties like Nendran, Rasthali, and Poovan, and 1.5-2.0 kg for long-duration varieties.
- Treatment: Pare the corm to remove roots and surface tissue, then dip in 0.1% solution and treat the soil with Carbofuran to prevent nematode infestation and *Fusarium* wilt.
- Potential to produce 30 - 40 plants from a single sucker in a short span of 45 - 60 days.

### **8) Banana Shakti: Micro-nutrient mixture**

- The ICAR-NRCB has focused on micronutrient requirements of banana and formulated a micronutrient mixture named as 'Banana Shakti'.

### **9) Kaveri Microbial Consortium (KMC)**

- KMC a beneficial microbial mixture.
- It promotes plant growth, enhances nutrient availability (phosphorus and potash) to plants, improve plant health and yield up to 10-20%.
- Suitable for organic cultivation of banana.

### **10) Soil Moisture Indicator (SMI)**

- Designed as a farmer-friendly alternative to tensiometer, avoiding its problems like high cost, breakage, water refilling, and maintenance issues.
- Helps in soil moisture-based irrigation scheduling, reducing irrigations from 42 (conventional) to 36 per crop without yield loss.

- Saves about 30 lakh litres of water per hectare in sugarcane over one crop cycle.
- Adopted in government schemes to promote efficient irrigation water use.

### **11) Sugarcane settling transplanting technology (STT)**

- A sugarcane cultivation model combining nine improved sugarcane cultivation practices named as Sugarcane Settling Transplanting Technology (STT) was standardized at the ICAR-SBI, Coimbatore.
- The method comprises (i) high yielding, better quality varieties, (ii) raising and transplanting healthy settlings derived from treated single bud setts, (iii) transplanting settlings in paired row or wider row spacing using mechanical settling transplanter, (iv) intercropping, (v) sub-surface drip irrigation, (vi) fertigation, (vii) trash mulching and incorporation, (viii) multiple ratooning and (ix) mechanization – these operations are combined in STT.
- This method is proved to be reducing cultivation cost, improving productivity, increasing profitability and ensuring sustainability in sugarcane agriculture over conventional method.
- The planting area under STT will be reduced to 1/4th, i.e., about 12.5 lakh ha per annum, which will require about 18.75 lakh tonnes of sugarcane as seed @ 1.5 tonnes seed cane/ha in comparison with 93.75 lakh tonnes seed for normal sett planting. Hence there will be a saving of about 150.00 lakh tonnes of sugarcane, which will be available for crushing in mills to produce 16.10 lakh tonnes additional sugar (@ average sugar recovery of 10.73 per cent during 2017-18).
- STT as a package results in 80% saving in seed cane, 38% saving in planting cost, 50% saving in water, 90% labourer cost for irrigation and 50% power consumption over conventional furrow method.
- Intercropping in the STT results in 10-15% improvement in cane yield and provided interim and additional income over conventional method.
- Soil organic carbon content will also increase in the STT.

### **12) Improved Production Technology for Tobacco**

- Raising poly tray seedlings with FYM, sheep manure, vermicompost with 25:75 or 50:50 combinations with cocopeat increased the seedling growth, growth attributes, cured leaf yield and net returns.
- Tray seedlings with furrow irrigation and 100% recommended dose of fertilizer increased the chewing tobacco yield.
- Cropping system like chewing tobacco+ Aggregatum onion increased the net returns over the sole chewing tobacco.
- Planting annual moringa 100% population as an intercrop in chewing tobacco with 100% RDF increased the system productivity and net returns.
- Soil solarisation significantly controlled the weeds including Orabanche.
- Neem cake application at 30 DAP + hand removal of Orabanche reduced the parasitic weed population, increased the cured leaf yield and net returns.
- Drip fertigation with 100% recommended dose of nitrogen (RDN) significantly increased the first-grade leaf yield, total cured leaf yield, net returns and benefit: cost ratio. Nutrient uptake and residual soil nutrients were higher with drip fertigation at 80 or 100% RDN. Nicotine content increased and reducing sugars decreased with drip fertigation.

### **13) Castor based cropping system**

- Different *in situ* moisture conservation practices were tested in a castor + black gram intercropping system. Raising castor + black gram in ridges and furrows could be beneficial under rainfed conditions.

### **14) IoT and sensor-based irrigation through drip for enhancing the seed cotton yield and water productivity**

- Traditional method of irrigation results in wastage of water and the wastages could efficiently be minimized with the adoption of recent irrigation methods and ICT based technologies.
- IoT and Sensor based irrigation resulted in yield improvement, enhanced water use efficiency and water saving in cotton.

### **15) Poly-mulch plus drip fertigation technology for irrigated tracts**

- Poly-mulch + drip fertigation *i.e.*, laying plastic mulch over the cotton row (or bed) while delivering water and soluble nutrients directly to the root zone through subsurface or surface drip system.
- These two technologies together raise water-use efficiency, improve nutrient uptake, speed crop establishment and enhance weed control besides increase of yield and fibre quality while lowering input losses.

### **16) Package for HDPS in cotton**

The package for high density planting system (HDPS) in cotton includes:

- Mechanisation from sowing till boll development has been developed at ICAR-CICR, Coimbatore. Sowing by pneumatic planter (90 x15 cm).
- Post emergence weed control by using Quizalofop ethyl 50 g/ha and Pyriithiobac sodium 75 g/ ha at 30 days after sowing
- Fertilizer application @ 125% RDN
- Land configuration (ridges and furrow method)
- Need based application of growth regulator- Mepiquat chloride 60 ppm, maximum of three times control excessive vegetative growth, prevents lodging, promotes early flowering, boll setting, and uniform maturity and improves boll retention and yield.

### **17) Cotton based multi-tier intercropping systems**

- Multi-tier system of cotton + radish + cluster bean + beet root has registered the highest Relative Production Efficiency, Relative Economic Efficiency and Land Equivalent Ratio of 182.2%, 308.7 % and 2.2, respectively as compared to sole cotton.

### **18) Productivity enhancement through increased plant density and canopy management in ELS cotton**

- The combination of chisel ploughing + drip fertigation + foliar spraying of specialty fertilizer (19:19:19 @ 1% at 75 and 105 DAS and 13:0:46 @ 1% at 90 DAS) gives high yield and quality.
- Timely application of growth retardants for developing closed canopy and use of defoliant for inducing synchronous boll bursting.

### **19) Water logging management**

- Drone based foliar application of Salicylic acid @ 69 g dissolved in 300 ml of ethyl alcohol and then added into 20 litres of water for spraying of one acre by using a drone at 5 days after waterlogging followed by 400 g of KNO<sub>3</sub> dissolved in 20 litres of water three days after Salicylic acid spray by using a drone.
- Application of 18 kg of Urea and 14 kg of Muriate of potash/acre after drainage of excess moisture is recommended

### **20) Alley cropping of *Desmanthus virgatus* with cotton for improving soil organic carbon and sustainability**

- Alley cropping is a sustainable agroforestry system where agricultural crops are grown in alleys (inter-spaces) formed by rows of trees or shrubs planted at regular intervals.
- A novel method of introducing perennial legume such as *Desmanthus virgatus* as alley crop with cotton was standardized at ICAR-CICR, Coimbatore.
- The trees are pruned regularly to reduce shade and competition, while crop plants utilize the spaces (alleys) in between.
- Alley cropping in cotton resulted in yield improvement, enhanced carbon sequestration and sustainability.

#### **Note:**

- *Technology provider for SI No 1 to 6: ICAR- IISWC*
- *Technology provider for SI No 7 to 9: ICAR-NRCB*
- *Technology provider for SI No 10 to 11: ICAR-SBI*
- *Technology provider for SI No 12 to 13: ICAR-NIRCA*
- *Technology provider for SI No 14 to 20: ICAR-CICR*

## Part 5: Crop Protection Technologies

### 1) Management of Eumusae leaf spot disease in banana

- Consortia of native antagonistic microbes has been developed for the management of Eumusae leaf spot disease
- Foliar spray of banana with this talc-based formulation of endophytic fungi for 5 to 7 times immediately after the onset of the disease at 25 -30 days interval during the vegetative stage of the crop recorded a maximum of 84% reduction in disease severity, besides increasing the bunch weight up to 30% as compared to control plants.

### 2) Banana Weevil Killer

- Important biological control agent for banana weevil management.
- Controls banana pseudo stem weevil and corm weevil thereby reduces the yield loss.
- Eco-friendly and it can be used in organic farming.

### 3) Bio formulation for the management of *Fusarium* wilt in banana

- The formulation contains *Trichoderma* spp and *Bacillus* spp.
- It may be applied each @ 25 ml per plant for 4 times *i.e* i) at the time of planting ii) at second, iii) fourth and iv) sixth month after planting so as to manage the *Fusarium* wilt disease effectively.

### 4) ICAR-SBI EPN biopesticide formulation

- First-of-its-kind EPN powder formulation developed by ICAR-SBI, using *Heterorhabditis* and *Steinernema* spp. with a shelf life of 9–12 months at room temperature (30 ± 5°C).
- Suitable for crops like sugarcane, groundnut, brinjal, chickpea, potato, maize, cabbage, etc., and effective particularly against insect pests and white grubs.
- Environmentally safe biopesticide – non-toxic, eco-friendly, and cost-effective compared to chemical pesticides.
- Can be mass-produced economically using *Galleria* larvae, stored in simple aluminium-lined HDPE sachets, and scaled up commercially without costly equipment.
- Farmer-friendly application methods – broadcast, spot application, spraying with normal sprayers, or other water-based applications.

### 5) Integrated management of sugarcane red rot disease

- Selection of healthy disease-free planting material
- Mechanized sett treatment with Azoxystrobin 18.2% + Difenconazole 11.4% SC @0.05% + 0.5% *Paenibacillus alvei* before planting
- Soil drenching or drip delivery of TPM at 0.1% alone or TPM at 500 ppm + 0.5% *Paenibacillus alvei* between 60 to 90 DAP
- If needed, foliar spray with TPM at 0.1% 90 DAP
- Secondary application of fungicide could be continued further by drip delivery/ drone spray frequently during conducive conditions to avoid secondary spread of red rot.
- Soil application of *Trichoderma* will give additional protection and improve the growth of the crop

### 6) Mass Production Technology of parasitoids *Cotesia flavipes* and *Telenomus dignus* for the IPM of sugarcane internode borer

- Technology for the management of borer pests particularly for the sugarcane internode borer by employing parasitoids has been viewed as environment-friendly biological control method.

- A protocol for mass production of the egg parasitoid *Telenomus dignus* and the larval parasitoid *Cotesia flavipes* using target and alternative hosts have been standardized.
- The usefulness of these parasitoids in internode borer control as single tactic and also in combination through augmentative releases had been demonstrated in farmers' fields.
- Parasitoid releases enhanced parasitism rates and reduced internode borer attack.
- Multiplication technology standardized at ICAR-SBI will enable large-scale commercial production of candidate parasitoids.
- Long-term augmentative field releases will lead to enhanced parasitism and reduced borer incidence.

### 7) AI Smart Trap for monitoring pink bollworm in cotton

- The pink bollworm (PBW) infesting on cotton has concealed lifecycle which makes monitoring and control challenging, leading farmers to rely on frequent insecticide sprays, increasing costs and lowering profits.
- Pheromone traps help to track PBW populations and decide insecticide application, but the conventional traps have significant limitations.
- To address these challenges, ICAR - CICR has developed AI-enabled pheromone traps for real-time monitoring of PBW and to issue timely alerts to farmers.

### 8) Talc based formulation of *Lecanicillium lecanii* and *Metarhizium anisopliae* for the management of sucking pest in cotton

#### 8a) *Lecanicillium lecanii*

- Target pests: Aphids, whiteflies, thrips, mealybugs in cotton.
- Mode of action: Conidia attach to insect cuticle. Germinate and penetrate using enzymes (chitinase, protease). Fungus colonizes insect body, causing death within 5–7 days.
- Formulation: Talc powder used as carrier with additives like CMC (carboxymethyl cellulose). Spore load:  $1 \times 10^8$  cfu/g talc formulation.
- Application in cotton: Foliar spray @ 4 g/L of water (or 2.5 kg/ha). Spraying during evening hours ensures better survival of spores. Recommended 2–3 sprays at 10–15 days interval starting from early pest incidence.

#### 8b. *Metarhizium anisopliae*

- Target pests: Jassids, aphids, whiteflies, mealybugs, termites.
- Mode of action: Conidia adhere to insect cuticle, germinate, penetrate the cuticle, proliferate inside hemocoel. Produce toxins (destruxins) leading to paralysis and death.
- Formulation: Talc-based formulation with  $1 \times 10^8$  cfu/g viability.
- Application in cotton: Foliar spray @ 5 g/L of water (2.5 kg/ha). Add 0.05% Tween-80 as sticker/spreader. Repeat sprays at 10–12 days interval for effective control.

### 9) Integrated Pest Management (IPM) modules specific to Agroecology has been developed for Cotton.

The ICAR-CICR Regional Station, Coimbatore has developed an evolving systems approach to IPM that emphasizes:

- Ecological Balance: Managing interactions among beneficial, neutral, and pest organisms.
- Sustainability: Focusing on long-term pest management strategies.

- Integrated Strategies: Combining biological, cultural, physical, and chemical control methods.
- Monitoring: Regular assessment of pest populations to inform management decisions.
- This approach aims to reduce pesticide use and promote environmental sustainability.

The TNAU, Coimbatore has developed an IPM module for cotton cultivation in the Perambalur district, focusing on:

- Early Sowing: Utilizing early-maturing, rapid-fruiting hirsutum cotton hybrids.
- Judicious Input Use: Optimizing fertilizers and irrigation practices.
- Weed Management: Destroying alternate weed hosts to reduce pest habitats.
- Pest Monitoring: Weekly assessments of pest populations.
- Need-Based Pesticide Application: Spraying insecticides based on Economic Threshold Levels (ETL).
- Farmer Education: Training through a "Scout Model" for effective technology transfer.

### **10) Insecticide Resistance Management (IRM) in cotton**

- In cotton farming, Insecticide Resistance Management (IRM) is a set of strategies, including the use of non-Bt cotton refuges, to slow the development of insecticide resistance in pests, thus prolonging the effectiveness of *Bt* cotton and reducing overall insecticide use.
- IRM strategies specific to Tamil Nadu has been developed at ICAR-CICR, Coimbatore to protect the cotton ecosystem by promoting beneficial insects and supporting farmers' economic stability through reduced pest damage and higher yields.

**Note:**

- *Technology provider for SI No 1 to 3: ICAR-NRCB*
- *Technology provider for SI No 4 to 6: ICAR-SBI*
- *Technology provider for SI No 7 to 10: ICAR-CICR*

## **Part 6: Mechanization**

### **1) Sugarcane Settling Transplanter**

- Sugarcane settling planting is a new method of sugarcane planting and is gaining popularity.
- In this technique, settlings raised from single bud setts or bud chips are raised in protray/polybags filled with FYM or press mud, soil and sand at 1:1:1 proportion.
- Seed material required under this technique is only 1 to 1.5 t/ha and the remaining cane after taking bud chips can be sent for milling/jaggery.
- It also facilitates easier handling and transportation.
- A two-row tractor drawn mechanical planter for sugarcane bud chip settings raised in protrays has been developed by ICAR-CIAE in collaboration with ICAR-SBI.
- The implement consists of mainframe to be attached to standard three-point arrangement of a 40hp tractor with adjustable arrangement for altering row to row spacing 90, 120 and 150 cm.
- Bud chip settlings to be dropped through the metering mechanism by two operators who are seated behind the equipment with adjustable arrangements for altering plant to plant spacing of 30, 45 and 60 cm.
- Furrow openers open the furrow, in which the settlings with soil are to be planted with adjustable arrangement for altering depth of planting 2 to 6 cm. The same furrow is used for irrigation after the settlings have been planted for better establishment.
- The furrow closer which follows the soil opener closes the soil thereby giving stability to the settling plants. The field capacity of the equipment is 0.15 ha/h and the missing of 3 to 4 percent at a working speed of 1.4 km/h. the plant establishment was more than 95%. The yield and quality parameters are on par when compared with manual planting.

### **2) Sugarcane Sett Treatment Device (STD)**

- The sugarcane STD was developed at ICAR-SBI in collaboration with ICAR-CIAE.
- It works on the principle of negative pressure followed by absorption, improving over conventional sett soaking.
- Enables rapid, effective, and uniform treatment with less chemical use, suitable for large-scale farmer field conditions.
- Can deliver multiple agrochemicals, microbes, or endophytes simultaneously.
- Vacuum application (100–300 mmHg for 15–20 min) removes air, and slow release (5–10 min) ensures solution absorption inside sett tissues.
- Absorption equal to overnight soaking, solution reusable for multiple batches, and adaptable for other vegetatively propagated crops (tubers, stem cuttings, corms).

### **3) Tractor Operated Whole-Sugarcane Harvester**

- Can be used to harvest whole sugarcane in the field.
- It has base cutter unit, crop gathering unit, cane walker, de-topper and cane collection trolley.
- Field capacity and field efficiency of the unit is 0.11 ha/h and 72 %.
- The equipment saves 71% in cost when compared to manual harvesting.

### **4) Mini Tractor operated EPN applicator**

- Developed by the ICAR-SBI in collaboration with ICAR-CIAE.

- Used to inject the EPN solution near to the plant root zone to control white grub at sugarcane field.
- It consists of main frame, tank holding assembly, agitator, water pump, furrow opener and standard three-point hitch
- Field capacity is 0.18 ha/h.
- The cost of operation and cost saving are ₹ 2550/ha and 47 %.

#### **5) Banana Pseudo- stem injector**

- Used to inject insecticide like Monocrotophos for the management of pseudo stem weevil in banana.
- Coverage: 140-150 trees per hour
- Injection rate and Injection efficiency is 2-4 ml and 95%
- Cost saving: 70 % when compared with manual harvesting

#### **6) Tractor operated raised bed former-cum-onion bulb planter for multiplier onion.**

- Multiplier onion (aggregate onions) is the onion grown from *bulblets* rather than from seed/seedlings. It is widely grown in parts of Tamil Nadu, Andhra Pradesh, Kerala, South Karnataka, Odisha.
- This is a tractor-towed implement that forms raised beds and simultaneously meters & places onion bulbs/bulblets into the bed in one pass.
- The field capacity and field efficiency are 0.30 ha/h and 75%.
- The cost of operation and saving in cost are ₹ 2270/ha and 71 %.

#### **7) Tractor operated Cassava Harvester cum lifter**

- Used to dig and lift the cassava tubers
- Consists of digger assembly, lifting and conveying assembly, power transmission system and main frame with hitching system.
- Coverage: 2 ha/day
- Saving in cost was 82 per cent over manual harvester
- Cost of operation is ₹2265/ha

#### **8) Remote-Controlled System for Four-Wheel Paddy Transplanter**

- Remote system controls the direction, speed, transplanting operation up to maximum distance of 200 m (Open field).
- The system can be remotely operated by operator standing out of field.
- Field capacity is 0.24 ha/h.

#### **9) Unmanned Multi-Purpose Track-Type Vehicle for Agriculture**

- The UTV system is powered by an 8.9 kW petrol engine.
- Remote-controlled system controls all functions of track-type vehicle viz., direction, speed and brake control, implement attachment (Lifting/lowering), Rotary attachment (Engage/Disengage).

#### **10) Continuous Feed Banana Fiber Extractor**

- Extracts fiber from banana pseudo stem outer sheaths.
- Main frame assembly, Electric Motor, Fiber beating assembly, Feeding trough, Calendaring rollers and Fibre separator/Pith remover and conveyor belt
- Input capacity: 175–200 kg/h (pseudo stem outer sheath) or Output (dried fiber): 500–600 g/h

### **11) Multiple Feed Banana Fibre Extraction Equipment**

- The equipment comprises conveyer feed belt, beating roller assembly, gripper holder assembly and powered by 2 hp motor to operate beater roller and 1 hp motor to operate conveyer belt.
- The capacity of the multifeed banana fibre extraction equipment is  $23.2 \pm 2.05$  kg/on wet basis ( $3.65 \pm 0.32$  kg/h on dry weight basis)

### **12) Power operated baby corn dehusker**

- It is efficient in dehusking baby corn
- Time saving: 93% and cost saving: 84 %
- Labour saving: 85.7%

### **13) Grader for Chilli**

- Grades chilly according to size.
- The unit comprises feed hopper, grading trays, outlets and power transmission components
- It is powered by 0.5 hp electric motor
- Output capacity: 90 kg/h
- Grading efficiency: 88% for Sannam variety of chilli.

#### **Note:**

- *Technology provider for SI No 1 to 2: ICAR-SBI and ICAR-CIAE*
- *Technology provider for SI No 3 to 13: ICAR-CIAE*

## **Part 7: Post-harvest management, value addition, marketing and Storage**

### **1) Cane Jam production from sugarcane juice**

- The product has better shelf life due to low moisture (8.39%) and low water activity (0.8 aw) compared to commercial fruit jams.
- Unlike fruit jams, cane jam uses only sugarcane juice without added sugar, resulting in lower total sugar (46.5%) and slightly lower calorific value (262 kcal vs. 272 kcal).
- It is nutrient-rich, containing high potassium (747.7 mg/100 g, ten times higher than fruit jams), along with sodium, calcium, phosphorus, zinc, copper, vitamin B complex, and vitamin E.
- The technology is commercially viable, with the cost of a 200 g glass bottle estimated at about ₹60, ensuring good profit potential for producers.

### **2) Cane dietary fibre food products**

- ICAR-SBI developed a technology to produce fine, pre-treated bagasse powder that is soft, non-irritating, and suitable for fortifying food products (2–20% w/w) like bakery items.
- The fibre-rich bagasse powder has health benefits, supporting gut microbiota and helping manage inflammatory bowel diseases, offering strong commercialization potential in the food industry.

### **3) Freeze preservation of sugarcane juice with natural additives**

- Developed low-calorie sugarcane-based products using traditional chewing cane varieties, enriched with spices and herbal extracts (lemon, ginger, beetroot, vetiver, sarsaparilla, etc.) for added immunity.
- Product range includes juice blocks & sip-ups, spicy popsicles & juice sticks, and herbal popsicles, catering to different age groups.
- Provides good nutritive value with TSS 17%, sucrose 15.4%, energy 51.24 kcal/100g, along with calcium, iron, zinc, crude fiber, and very low fat.
- Specifically recommended: juice blocks for all ages, while sip-ups, popsicles, and juice sticks are more suitable for kids and youth.

### **4) Flavoured and low-fat banana chips**

- Deep frying with fat arresting methodologies can yield healthy and appetizing banana chips that will be well suited for calorie conscious population. Hybrid methods and use of vacuum or microwave will enhance the quality with minimal oil consumption
- Varieties: Nendran, Saba, Popoulu

### **5) Banana Grits**

- Complementary technology for ready to cook (RTC) breakfast cereal (*Sooji*) using banana.
- This product can be used for preparation of traditional breakfast food item like *Upma*
- The product – ‘Banana rava (*Sooji*) would be an ideal daily diet as a ready to cook item with nutritional benefits.

### **6) Low-calorie banana central core stem Ready-To-Serve (RTS) beverage**

- Low-calorie stem juice
- Contains high level of minerals and essential nutrients.
- Good for people with kidney stones.

- Banana central core stem juice prepared with the composition of Sucralose is an alternative for people with special caloric requirements.

**Note:**

- *Technology provider for SI No 1 to 3: ICAR-SBI*
- *Technology provider for SI No 4 to 6: ICAR-NRCB*

## Part 8: Aquaculture and Fisheries

- 1) Super-intensive shrimp farming technology which includes nursery rearing, feed and water quality management, shrimp health management including disease diagnostics, harvest, post-harvest handling, including risk free and climate-resilient practices.
- 2) CIBA shrimp larval feed technology for larval and nursery rearing of shrimps.
- 3) Diagnostics, prophylactic and therapeutics for shrimp farming.
- 4) Nursery rearing and cage farming of finfishes for livelihood development of coastal fisher families/weaker sections.
- 5) Crop insurance guidelines for shrimp farming.
- 6) Fish culture in open sea cages; for rearing fishes like Cobia (*Rachycentron canadum*) and seabass (*Lates calcarifer*) to marketable size.
- 7) Culture of silver pompano in ponds, particularly in medium and low-saline ponds.
- 8) Seaweed farming using bamboo rafts and monoline culture methods.
- 9) Ornamental fish culture - breeding, seed production and rearing of clown fishes to marketable size.

### Note:

- Technology provider for Sl.No. 1 to 5: CIBA
- Technology provider for Sl.No. 6 to 9: CMFRI

## Section 5. Infrastructure and Support systems for Agriculture in TN

### 1. An Overview of Agricultural Infrastructure and Support Systems in Tamil Nadu

Tamil Nadu, with its diverse agro-climatic zones and a significant dependence on monsoon and irrigated agriculture, has prioritized robust support systems to enhance farmer productivity and sustainability. As per the Agriculture Budget 2025-26, the state has allocated substantial funds for inputs, infrastructure, and technology adoption, aiming to double farmers' income through schemes like the Chief Minister's Farmers Service Centres and integration with national initiatives. The total outlay for agriculture in 2025-26 emphasizes climate-resilient farming, mechanization, and digital integration, building on a gross cropped area of around 60 lakh hectares and irrigation coverage of over 38 lakh hectares.

**1.1. Agro Inputs Production Agencies/Institutes:** The Tamil Nadu State Seed Development Agency (TANSEDA), established in 2015 is looking after planning, production and distribution of quality seeds of all crops in Tamil Nadu. TANSEDA operates 33 State Seed Farms, one State Pulses Multiplication Farm, six State Oilseed Farms, and 108 seed-processing units (SPUs) for certified seed production.

Fertilizer supply in the State is channelized through co-operative societies and private dealers under state monitoring.

Tamil Nadu hosts several key institutions focused on the production and quality control of seeds, led by the Tamil Nadu Agricultural University (TNAU), State Dept.

Institution/Agency	Key Role	Notable Activities (2025 Status)
TNAU Seed Centre, Coimbatore	Nucleus and breeder seed production for cereals, pulses, and oilseeds	Produced over 1,000 quintals of foundation/breeder seeds in 2024-25; ongoing research on oilseed productivity and vacuum-bagged groundnut kernels. Hosted 11th Annual Seed Workshop in March 2025 with National Seeds Corporation (NSC) for collaborative production.
Breeder Seed Unit, Centre for Plant Breeding & Genetics (CPBG), TNAU	Production and distribution of nucleus/breeder seeds for agricultural and horticultural crops	Nodal officer for statewide distribution; focuses on high-yield varieties like MGR 100 Rice through farmer participatory programs.
Krishi Vigyan Kendras (KVKs), TNAU	On-farm seed and planting material production	E.g., KVK Salem produced 500+ quintals of seeds in 2024, benefiting 200+ farmers; includes bio-fertilizers and crop boosters.
Department of Nano Science & Technology, TNAU	Water-soluble fertilizers (e.g., TNAU-WSF 19:19:19 NPK)	Synthesized eco-friendly fertilizers; distributed via TNAU AgriCart portal for direct farmer access.
Diploma in Agri-Inputs Programme, TNAU	Training for entrepreneurship in inputs production	Distance learning for 500+ participants annually, covering seed certification and bio-inputs.

### 2. Availability and Status of Seeds, Fertilizers, and Other Agro-Inputs Supply Chain

Tamil Nadu's supply chain for agro-inputs is well-distributed through 880 Agriculture Extension Centres and 1,000 new Chief Minister's Farmers Service Centres (allocated ₹

42 crore in 2025-26), ensuring real-time availability. A special monitoring cell was established in October 2025 to track fertilizer supplies ahead of the northeast monsoon.

**Seeds:** Certified seed availability in TN is about 178.64 lakh quintals against a requirement of 164.05 lakh quintals for Kharif 2025, exceeding demand by 9%. Seed replacement rate is enforced at 35-40% for major crops like paddy and millets. TNAU and State agencies procure seeds at revised prices (e.g., effective October 2025), with nucleus production up 15% YoY.

**Fertilizers:** Steady supply ensured via subsidized distribution; focus on balanced use through soil health cards. Water-soluble fertilizers promoted under TNAU initiatives to reduce overuse. No shortages reported in 2025, with stocks monitored via digital platforms.

**Other Inputs (Pesticides, Bio-fertilizers):** Over 5,000 plus outlets spread across the State; organic inputs are subsidized at 50% for organic farming. Supply chain logistics improved through farmer producer organizations (FPOs), with 1,200 FPOs supported under TNIAMP for bulk procurement.

### 3. Storage, Marketing, and Processing Infrastructure

Tamil Nadu is enhancing post-harvest infrastructure to minimize losses (estimated at 10-15% for perishables), integrating with national programs like the World's Largest Grain Storage Plan.

**Storage:** Under the Cooperative sector plan (rolled out July 2025), 9,750 MT additional capacity added at Primary Agricultural Credit Societies (PACS) level, including godowns in 500+ Societies. Agriculture Infrastructure Fund (AIF) sanctioned ₹ 71,650 crore nationally, with TN benefiting from 1,601 projects for warehouses. Statewide storage capacity is approximately 87% of live needs as of September 2025. New warehousing policy (launch October 2025) aims to integrate logistics for agri-exports.

**Marketing:** 56 regulated markets linked to e-NAM for transparent pricing. An amount of ₹ 10 crore was allocated to upgrade 50 farmers' markets (uzhavar sandies) in the State. Tamil Nadu State Agricultural Marketing Board (est. 1970) oversees 300+ markets, with FPOs empowered for direct sales.

**Processing:** 10 new Agro Processing Clusters planned with infrastructure in 10-acre hubs (₹ 50 crore allocation). Focus on millets and horticulture; cold chain projects approved for 1,217 units (₹8,698 crore total cost, 2017-2025). Reduces wastage to <5% for processed goods.

Infrastructure Type	Current Capacity/ Status (2025)	Key Initiatives
Godowns/Warehouses	9,750 MT new + existing 50 lakh MT	PACS-level storage; AIF funding
Regulated Markets	300+ outlets	e-NAM integration; 50 upgrades
Processing Units	200+ clusters	New hubs for value addition

### 4. Mechanization and Irrigation Facilities

Tamil Nadu has achieved nearly 45-50% farm mechanization level (aligned with national 47%), with emphasis on smallholder access.

**Mechanization:** ₹215.80 crore allocated in 2025-26 for custom hiring Centers and machinery banks. Subsidies up to 50% for drones, laser land levelers, and harvesters under SMAM scheme. 1,000+ village-level machinery banks established, covering 86% small/marginal farmers. Focus on hill areas via new development scheme for minor millets mechanization.

**Irrigation:** Coverage increased from 36.07 lakh ha (2020-21) to 38.33 lakh ha (2023-24), with 2025 target of 40 lakh ha. Micro-irrigation (drip/sprinkler) promoted over 2.5 lakh acres (₹45 crore outlay), achieving 30% efficiency gain.

Key projects: TNIAMP for climate-resilient systems; Mettur Dam enhancements. Water use efficiency at 60%, supported by 1,500+ recharge structures.

Facility	Coverage/Level (2025)	Support Schemes
Mechanization	45-50% overall; 70% for paddy	₹215.80 cr; Drone Didi (₹1,261 cr national)
Irrigation	38.33 lakh ha (irrigated); 67% net sown area	PMKSY; Micro-irrigation subsidies

## 5. Use of Digital Tools in Agriculture

The digital initiatives in agriculture sector in TN collectively aim for sustainable growth, with ongoing monitoring via the Department of Agriculture-Farmers Welfare. Digital adoption is accelerating, with ₹21 crore allocated for Digital Agriculture in 2025-26, integrating AI, IoT, and apps to reach 80% farmers by 2030.

### a) Digital Platforms related to Agriculture in TN

#### (i) TNAU AgriTech Portal

- The TNAU Agritech Portal is an online platform by Tamil Nadu Agricultural University (TNAU) launched to disseminate agricultural information and services to farmers, extension workers, and the general public.
- It provides resources on various topics, including crops, livestock, and farm machinery, and acts as a knowledge and extension tool with a goal of improving farmers' livelihoods.
- Key features include daily market prices, weather updates, information on government schemes, and technical details on agricultural technologies.

#### (ii) Tamil Mannvalam Portal

- This portal (<https://tnagriculture.in/mannvalam/soils/>) was developed exclusively for the farmers to know the survey number wise soil nutrient status, suitable fertilizer recommendation and the respective crop suitability for their land based on the soil test results.
- Farmers can register on the Website by providing details such as their district, block, village, survey number, and subdivision number.
- The portal provides soil fertility status for the registered land- survey number wise.
- Farmers can download their Soil Health Card in an electronic format through the portal.
- The portal can be accessed via computers or mobile phones, making the information readily available to farmers.
- Soil test results of 40 lakh survey number are available in the portal.

### **(iii) e-Vaadagai**

- e-Vaadagai Service is a feature /component in Uzhavar mobile app and or AED portal (<https://aed.tn.gov.in>).
- This app is helpful in facilitating farmers to book the required agricultural machinery and implements from anywhere and to pay advance hire charges online.
- It also contains details on farm machineries of state-owned and private machinery available for rent, rental rates and availability etc.

## **b) Mobile Apps related to Agriculture in TN**

### **(i) AAVIN Plus**

- The AAVIN Plus mobile app allows users to order Aavin dairy products like milk, curd, butter, and ghee, and schedule deliveries. It functions as a one-stop shop for dairy needs, allowing users to browse, select, and schedule orders for home delivery

### **(ii) Bharat Sanjeevani**

- The Bharat Sanjeevani mobile app was launched in collaboration with AAVIN and Tamil Nadu Co-operative Milk Producers' Federation Limited (TNCMPFL).
- The app is designed to provide essential veterinary services and animal husbandry information to livestock owners associated with AAVIN.
- A toll-free helpline (1800-425-2577) has also been introduced to assist dairy farmers across TN

### **(iii) e-NAM**

- The app is part of the larger e-NAM online platform, which aims to create a national market for agricultural produce by providing a common platform for farmers, traders, and other stakeholders.
- Many mandis in TN are integrated to e-NAM portal. Therefore, the mobile app can be used by regulated mandis for knowing price & arrival information and remote bidding.
- The mobile app has limited features compared to the web version. So, readers are requested to check the website for more details.

### **(iv) e-Thottam**

- E-Thottam is a mobile App released by the Tamil Nadu Horticulture Department (<https://ethottam.in/>)
- This App is designed to benefit the farmers, consumers and traders by connecting them in one platform.
- The App will also help farmers to grow horticultural crops such as vegetables, fruits and other. It contains a variety of information, especially for those who want to do gardening at the rooftop or at the backyard of their house
- This will be useful for farmers for sale of fruits/vegetables and kit to consumers and traders.
- Mobile phone users with Android and iOS operating systems can download and use this App from google play store or apple store.

### **(v) Meengal**

- The Meengal mobile app is a government-backed mobile application by the Tamil Nadu Fisheries Development Corporation (TNFDC) for ordering fresh seafood online.
- The app currently serves customers in Chennai but plans to expand across Tamil Nadu.
- Users can browse and purchase a variety of fish and seafood from both government-run stalls and mobile stalls.

### **(vi) Uzhavar**

1. The Uzhavar mobile app (formerly Uzhavan) developed by the Agriculture & Farmers Welfare Department, Government of Tamil Nadu.
2. The app is aimed at providing farmers with real-time and consolidated information on a variety of services, including government schemes, crop insurance status, seed and fertilizer availability, market prices, and weather forecasts.
3. This app will be useful to farmers to manage their activities more effectively and plan for potential issues like seasonal adversities and natural calamities.
4. This is available in android version (in google play store) and iOS (in Apple store). More details are available in <https://www.tnagrisnet.tn.gov.in/>.
5. It supports two languages- Tamil and English.
6. A Web interface that backs many Uzhavan services (farmer registry, scheme list, dashboard) are also available in the website <https://www.tnagrisnet.tn.gov.in/>
7. The following details are available in the mobile app:
  - *Government schemes*: Information on scheme components and subsidy patterns.
  - *Crop insurance*: Users can register for schemes and check their application status until compensation is received.
  - *Input availability*: Details on the stock of seeds and fertilizers at government, private, and cooperative outlets.
  - *Market prices*: Real-time information on prevailing market prices from various regulated markets.
  - *Farm machinery*: Information on available machinery at Customer Hiring Centers.
  - *Weather forecast*: Weather advisories and forecasts to help farmers plan their cultivation.
  - *Extension services*: Information on the visits of extension officers to their villages.
  - *Registration*: Farmers can register to avail benefits of government schemes.
  - *Other services*: Includes information on organic products, FPO products, pest/disease monitoring, and feedback options, among other things.

### **(vii) TNIAMP Decision Support System App**

- The "TNIAMP Decision Support System App" is a mobile application developed under the Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP) to help farmers make decisions regarding cropping patterns.

- Available on platforms like Google Play, the app assists in optimizing agricultural practices by providing decision support based on water availability and other factors
- Provides AI-based advisories for irrigated crops, climate resilience;
- Covers 10 districts in TN

**(viii) Thoondil**

- The Department of Fisheries and Fishermen Welfare, Tamil Nadu in association with the National Centre for Coastal Research (NCCR), Ministry of Earth Sciences (MoES) has created the mobile application
- THOONDIL is a WebGIS based Decision Support System for monitoring the movements of fishing vessels and registering the crews venturing for fishing.
- This app assists the fishermen by dispensing vital information on real time positioning, navigation to safe locations, facility to mark fishing grounds, Potential Fishing Zones (PFZ), weather forecast and fishing trip records etc.
- The app includes an SOS feature for emergencies, live boat tracking, and can be used to report incidents.
- This app may be downloaded from Google Play Store and see the details on the website <https://www.fisheries.tn.gov.in/Thoondil.html>

## Section 6. Animal Husbandry and Fisheries

### 1) Livestock, Poultry and Fisheries Sector Profile of Tamil Nadu

- The State ranks 11<sup>th</sup> in India in milk production (~10.3 million tonnes, in 2023) and contributes ~4.5% of national milk output (Table 3).
- The State has a dedicated Dairy Development Department since 1958 and focusing on cross-breeding (Jersey, HF with native cattle) to improve yield as well as preservation of native breeds like Kangayam, Bargur, and Umblachery
- The State is the largest producer of poultry and eggs in India, with 20.8 billion eggs annually, accounting for over 16% of national output (Table 3).
- Namakkal district is called the 'Egg City of India' due to its intensive layer farming.
- The livestock sector has seen a strong compound growth, with its share in agriculture allied GVA growing to over 30% by 2022-23, contributing roughly 5.5% to total GVA.
- State is a leading producer of broiler chicken, supplying both domestic and export markets.
- The State stands 6<sup>th</sup> in meat production with 7.68 LMT of meat.
- Tamil Nadu is a major Centre for poultry feed production (maize, soybean meal-based) and has many manufacturing units of poultry medicine, vaccine, and equipment etc.
- The State has a coastline of 1,076 km, and supports 10.48 lakh marine and 2.36 lakh inland fisherfolks. It has 3 major fishing harbours, 47 fish landing centres, and several minor jetties.
- The State is rich in marine, brackish water, and inland fisheries resources. It ranks 5<sup>th</sup> among Indian states in marine fish production.
- Fisheries exports earning nearly ₹ 7,000 crore per annum.
- Tamil Nadu is a leader in ornamental fish culture and seaweed cultivation.
- The per capita availability of milk in TN is 384 g /day against ICMR recommendations of 300 gms of milk/day and availability of egg is 291 Nos./year against ICMR recommendations of 180 Nos. of eggs/year.

**Table 3. Profile of TN w.r.t. animal husbandry sector**

Livestock	Tamil Nadu	India	Top three State
<b>As per 20<sup>th</sup> Livestock Census, GoI (2019)</b>			
Cattle (million)	9.52	192.52	WB, UP & MP TN ranks 13 <sup>th</sup> in Cattle population
Buffaloes (million)	0.519	109.85	UP, Rajasthan & Gujarat TN ranks 14 <sup>th</sup> in Buffalo population
Sheep (million)	4.50	74.26	Telangana, AP & Karnataka TN ranks 4 <sup>th</sup> in Sheep population
Goat (million)	9.89	148.88	Rajasthan, WB & UP
Pigs (million)	0.067	9.06	Assam, Jharkhand & Meghalaya
Poultry (million)	120.8	851.81	TN, AP & Telangana TN ranks 1 <sup>st</sup> in Poultry population

<b>For the year 2023-24</b>			
Milk production (million tons)	10.80 (4.5%)	239.30	UP, Rajasthan & MP TN stand 11 <sup>th</sup> in milk production
Egg production (billion eggs)	22.33 (15.6%)	142.77	AP, TN & Telangana TN is the 1 <sup>st</sup> or 2 <sup>nd</sup> largest egg producer
Meat production (million tons)	0.768 (7.5%)	10.25	WB, UP & MH TN is the 6 <sup>th</sup> largest meat producing state of India

Source: PIB, 26 Nov 2024, <https://cms.tn.gov.in>, [nddb.coop](https://nddb.coop)

## 2) Issues in Animal Husbandry and Fisheries Sector

- Setting up of Dairy unit and Rabbit farming:** Rearing one or two milch animal has been an integral part of livelihood in villages. The TN Govt is supporting purchase of cows through loan sanctioned to the Women SHG. Schemes such as Aavin or TABCEDCO's (Tamil Nadu Backward Classes Economic Development Corporation) Milch Animals Loan Scheme, District Cooperative Milk Producers Union Loan Scheme, Pradhan Mantri Mudra Yojana etc., offers loans up to ₹ 1.20 lakhs for purchase of **up to two milch** animals (including buffalo) with an interest rate of 6 or 7%. However, those who wish to purchase 5-10 cows **for setting up of a dairy unit in villages, limited financial support is available**. Lower interest rate will benefit the new entrepreneurs. Rabbit Farming in TN is profitable but need more promotional efforts.
- Rabbit farming** in backyard has several advantages like very little space and investment requirement compared to cattle, goats, or poultry, can be managed easily by women, youth, and small farmers. Rabbit meat is high in protein, low in fat and cholesterol hence can be marketed as a **healthy meat option**. Despite of these advantages, rabbit farming is not picking up in the State due to low **consumer preference** for rabbit meat compared to chicken, mutton, or fish and absence of processing, marketing chain for rabbit meat and by-products. Nonetheless, **it has potential in urban niche markets and hill stations and restaurants**. Perhaps, separate schemes under TN Animal Husbandry Dept like TN's support for goat & poultry and inclusion / promotion under the National Livestock Mission (NLM) could help.
- Fish farming in rural areas:** Fish farming in rural areas is picking up well in the State as local demand is increasing for live fishes. Faced with labour shortage and other problems, some paddy farmers are switching to fish farming in villages. However, **the initial cost of digging pond add burden to such entrepreneurs**. New entrepreneurs face difficulty in getting institutional loans, as fisheries is still treated as a "secondary activity" by banks. This State Govt.-backed loan supports **inland fishing activities**, including constructing or developing fish ponds is available. Under this central scheme, Pradhan Mantri Matsya Sampada Yojana (PMMSY)- Inland Fisheries Subsidies both the Central and State governments provide back-ended subsidies for fish pond construction and related inputs. The turnaround period has to be minimized. The State Govt is assisting them but **more awareness of about these schemes among rural entrepreneurs is required**. **Fish seeds are not available in nearby places** and fish farmers are depending on few suppliers, located far-away places. Many small farmers lack training in scientific aquaculture practices, feed management, water quality monitoring, and disease prevention.

- **Issues in seaweed farming: Ice-ice disease** is one of the most common and serious diseases affecting cultivated seaweeds, especially *Kappaphycus alvarezii*, the most preferred species for seaweed farming among the coastal fishers/farmers. Triggered by environmental stress such as changes in salinity, temperature, light intensity, and nutrient deficiency, the disease reduces growth rate and or carrageenan yield or ultimately causes economic losses in commercial seaweed farming.

**Grazing of seaweeds by herbivorous fishes** is a serious challenge in seaweed raft culture systems, especially in coastal waters of India and Southeast Asia. This reduces economic returns, increases maintenance cost as farmers need to frequently re-tie seedlings, and leads to uneven growth across the raft. Effective management is needed to address these two issues.

Fish productivity in pond is decreasing due to quick spread of water hyacinth (*Eichhornia crassipes*) weed. Effective management is needed.

- **Management of fish and poultry wastes:** Out-dining habit during holidays and large-scale slaughtering and processing of broilers and fishes especially during Sunday, festival times generates large quantity of poultry and fish wastes in the urban and peri-urban area. ***Often these wastes / carcasses/ litter are dumped on road sides, street corners and on the bank of water bodies, leading bad odour, environmental pollution, health hazards, increase in stray dog population vis-à-vis accident /dog bite.*** If these wastes are collected by an effective means, a large number of products such as fish meal, fish oils, silage, organic manure, biogas, poultry manure, blood meal, feather meal, etc may be generated. The ICAR-CMFRI (Central Marine Fisheries Research Institute, Cochin) and ICAR-CIFT (Central Institute of Fisheries Technology, Cochin) have developed technologies for fish waste utilization. Similarly, the ICAR-CARI (Central Avian Research Institute) and TANUVAS (Tamil Nadu Veterinary & Animal Sciences University) are working on waste utilization technologies. In Tamil Nadu, few fish meal plants operate in Nagapattinam, Thoothukudi, and Chennai. Still, **large proportion is discarded** in open particularly in towns. Poultry farms such as Suguna and Venky's have their own Rendering plants (Feed manufacturing units) which convert carcass and slaughter waste into by-products like fats and protein meals which can be fed as feed to poultry. ***Technologies to convert these wastes into wealth are available*** but **collection and logistics remain weak points.** The Swachh Bharat programmes place emphasis on Waste-to-Wealth but organized waste collection from town and town panchayats, decentralized processing, and farmer/entrepreneur awareness are the need of the hour.
- **Fish export standards:** Many fish export consignments face rejection due to **antibiotic residues, bacterial contamination**, or poor handling. International buyers demand strict **traceability**, which small farmers struggle to maintain. The lengthy procedures for getting MPEDA (Marine Products Export Development Authority) certification and EU/US approvals, frequent tightening of EU/US food safety standards creates compliance burden. Issues related to antibiotic residues, bacterial contamination and traceability gaps need to be addressed to promote exports and fish and fishery products.
- **Establishment of fodder seed nurseries in Taluk level:** After the introduction of cross-bred cows, the practice of allowing cattle for open field grazing is getting diminished in rural areas. Farmers are interested to rise fodder crops in their lands. However, they have to travel long in search of seeds/ slips of fodder. ***Therefore, it is***

*essential to establish fodder seed nursery at each taluk*, often utilizing the service of progressive farmers.

- **Problems in Marine fisheries:** Unsustainable fishing practices and over-exploitation threaten marine resources. Therefore, scientific resource management through ranching, craft and gear regulations, fishing ban periods, and expansion of mariculture need to be promoted to ensure conservation and optimal utilization. Traditional fishers face declining catches and limited access to high-value fisheries. It is necessary to protect the livelihoods of traditional fishermen while enabling species-specific, sustainable fishing (e.g., tuna, oceanic squids) by regulating fleet size, introducing modern technology, and providing training for long-distance voyages. Fishermen lack access to institutional credit, insurance, and organized support systems. Moreover, weak integration of fisheries with allied sectors limits socio-economic opportunities. Poor post-harvest handling and limited value addition reduce profitability and market potential. It is necessary to improve infrastructure for hygienic handling, cold chain, and processing, while promoting value-added fishery products for domestic and export markets. Expand credit, insurance, cooperatives, FFPOs, and entrepreneurship support. Link marine fisheries with coastal agriculture, coastal resource management, and ecotourism.
- **Problems in Brackish water aquaculture:** Some of the challenges faced in Brackish water/ coastal aquaculture are the limited area and species diversity, underutilization of State fisheries ponds and infrastructure, poor water exchange due to blocked creeks/estuaries which reduces productivity, inadequate financial support and weak marketing of shrimp/fishes, shrimp farming not recognized as an agricultural activity thereby limiting benefits, limited scope for inland and low-salinity farming etc. Some of the suggested solutions are the expansion of farming areas and promote species diversification by establishing finfish and mudcrab hatcheries and nursery units to ensure continuous seed supply, repurpose and strengthen existing government ponds/infrastructure for aquaculture and fisheries development, ensuring year-round opening of barmouths for uninterrupted water flow and efficient use of open water resources, facilitate institutional credit, crop insurance, promote domestic consumption, and develop organized marketing systems, granting farming status to aquaculture for subsidized electricity and disaster relief, promoting shrimp culture in inland low-saline waters and utilize saline soils effectively.
- **Problems in Inland capture and aquaculture:** Low productivity in reservoirs and weak governance of riverine fisheries, limited integration of aquaculture with farming systems, underutilization of community tanks for fish production, low domestic consumption of fish despite high nutritional value, etc. These issues may be addressed through adopting culture-based fisheries, strengthen reservoir governance, and involve inland fishermen in management, promoting integrated aquaculture–agriculture models to improve farmers’ income and nutritional security, enabling local bodies to manage and utilize tanks efficiently for fisheries development and conduct awareness campaigns and promoting fish as a healthy protein source to boost local consumption.
- **Low usage of roughages for urban milch animals:** The general feeding principle for milch animal recommends that the animal feed should contains 60-70% roughages (dry + green fodder) and 30-40% concentrates. For example, a 400 kg cow giving 10 litres milk per day require 14 kg dry matter per day or should fed with at least 10 kg

paddy straw or jowar straw per day. Milch animals reared in urban area are not fed adequate roughages (paddy straw, jowar straw etc), due to lack of availability of paddy straw in the peri-urban / urban area and problems associated long distance transport and storage of paddy straw. We have been seeing that cattle in urban area often consuming waste materials like plastics, papers, spoiled foods which leads to indigestion, impaction, toxicity and poor milk hygiene. The Govt. may suitably assist the urban cattle farmers to get adequate supply of paddy straw, jowar straw by assisting in transport of roughages from paddy / sorghum cultivation area and arranging storage of paddy / jowar straw in urban area.

### **3) Achievement, innovation and intervention made in animal husbandry and fisheries sector of TN by the ICAR institutes and KVKs**

#### **a) Animal Husbandry Sector**

##### **Achievements**

- KVK Namakkal under NICRA demonstrated improved livestock housing and disease management, resulting in higher survival rates and productivity for dairy, poultry, sheep, and goats, benefiting over 500 farmers in drought-prone areas.
- KVK Vellore developed and disseminated the Wild Boar Repellent technology, protecting crops and livestock for 1,200+ farmers, reducing losses by 40-50% as highlighted during the Union Minister's interaction in October 2025.
- KVK Nagapattinam established demonstration units for dairy, goat, poultry, and quail farming, producing and distributing 550,000 livestock strains; trained 10,208 farmers, leading to 30% income increase (e.g., milk production from 150 to 195 liters/day per unit).
- Across 15 KVKs in Tamil Nadu (under ATARI Zone VII, Coimbatore), frontline demonstrations (FLDs) on fodder cultivation and breed improvement covered 2,500+ farmers in 2023-24, enhancing milk and meat production by 20-25%.

##### **Innovations Made**

- Development of pellet-form vaccination technology for goats and poultry at KVK Nagapattinam, enabling easy oral administration and reducing labour costs by 60% for smallholder farmers.
- Incubation of enterprises like integrated dairy-goat-poultry units by KVK Nagapattinam, supporting 42 farmers with value addition (e.g., milk processing), generating additional income of ₹50,000-₹1 lakh annually per unit.
- Promotion of Azolla-based feed supplementation in KVK Namakkal, an innovative low-cost protein source (25-30% protein), reducing feed costs by 40% and increasing dairy yields by 15%.

##### **Technologies Developed**

- Improved sheds and shelters for livestock (dairy, poultry, sheep/goat) refined by KVKs like Namakkal and Nagapattinam, incorporating ventilation and waste management for 70% better animal health.

- COFS 29 and Napier grass hybrids for fodder production, developed and tested via on-farm trials (OFTs) in KVK Ariyalur and Nagapattinam, yielding 150-200 tons/ha annually.
- Kuroiler and native chicken breeds for backyard poultry, disseminated by KVK Namakkal, with technologies for low-input rearing achieving 180-200 eggs/bird/year.

### **Interventions Made**

- Disease management programs including vaccinations against PPR, HS, FMD, and BQ, conducted via KVK Namakkal and Nagapattinam, covering 1,000+ animals and reducing mortality by 25%.
- NABARD-supported skill development trainings on integrated farming systems (IFS) with livestock at KVK Nagapattinam, benefiting 290 rural youth and distributing 200+ goat kids.
- Exposure visits and animal health camps in collaboration with TANUVAS, organized by KVKs like Thiruvannamalai, reaching 500 farmers for breed improvement and feed management.

### **b) Fisheries Sector**

#### **Achievements**

- ICAR-CIBA developed and commercialized hatchery technology for Grey Mullet (*Mugil cephalus*), producing 50,000+ fingerlings annually, boosting brackish water aquaculture yields by 30% for TN farmers.
- KVK Nagapattinam's FLDs on fish cutlets preparation yielded 85 units/demonstration with net returns of ₹3,177 and BCR of 3.96, training 200+ farmers and creating micro-enterprises.
- ICAR-CIBA's Waste-to-Wealth initiative converted fish processing wastes into value-added products, adopted by Nambikkai Fish Farmers Group (Chennai), winning the 2020 National Fisheries Award and generating ₹2-3 lakh annual income.
- KVKs in coastal districts (e.g., Nagapattinam, Thiruvarur) under ATARI Hyderabad distributed 451,100 fingerlings in 2023-24, increasing fish production by 25% in integrated rice-fish systems.

#### **Innovations Made**

- Super-intensive tank-based shrimp farming system by ICAR-CIBA, integrating energy-efficient aeration and biofloc, transferred to 10+ TN farms in 2025, achieving 20-25 tons/ha/crop with 90% water recycling.
- Fish Amino Acid (FAA) production from fish waste at KVK Nagapattinam, an innovative bio-fertilizer (95% nitrogen), incubated for 51 farmers, reducing chemical inputs by 50% in allied crops.
- Seed production technology for Mangrove Red Snapper (*Lutjanus argentimaculatus*) by ICAR-CIBA, with first fingerlings distributed to 50 TN farmers, enabling diversified high-value farming (market price ₹400-500/kg).

### **Technologies Developed**

- Low-cost balanced farm-made fish feed by ICAR-CIBA and KVK Nagapattinam, using local ingredients (e.g., rice bran, oil cakes), demonstrated over 0.3 ha, improving fish growth by 40% and FCR to 1.5:1.
- Polyculture system integrating Murrel (10-20%) with Indian Major Carps, refined via OFTs at KVK Nagapattinam, yielding 751.5 kg/acre and net returns of ₹87,892/acre (BCR 2.42).
- Masmin preparation technology (TNJFU method) by KVK Nagapattinam, a smoked-dry fish product with 2-year shelf life, achieving BCR 3.60 and higher returns (₹195/unit) than traditional methods.

### **Interventions Made**

- Frontline demonstrations on recirculatory aquaculture and biofloc units by KVK Nagapattinam, covering 95 farmers and promoting zero-water exchange systems for sustainable shrimp farming.
- Trainings on ornamental fish culture and value addition (e.g., fish pickle, solar drying) under STRY and DMI schemes at KVK Nagapattinam, reaching 300+ participants and establishing 10 mini-processing units.
- ICAR-CIBA's low-cost feed and waste valorization technologies disseminated via farmer field schools in Chennai and Nagapattinam, benefiting 1,000+ brackish water farmers through subsidized inputs and extension camps.

## Section 7. Government schemes and Initiatives

**The list of Central Sector and Centrally Sponsored Schemes implemented in Tamil Nadu are listed below.**

1. Agri-Clinics & Agri-Business Centres (AC&ABC)
2. Agricultural Technology Management Agency (ATMA)
3. Agriculture Infrastructure Fund (AIF)
4. e-NAM
5. Farmers Producer Organisations (FPO)
6. Integrated Scheme for Agricultural Marketing (ISAM)
7. Kisan Credit Card
8. National Food Security and Nutrition Mission (NFSNM)
9. Pradhan Mantri Dhan Dhanya Krishi Yojana (PMDDKY)
10. Pradhan Mantri Fasal Bima Yojna (PM-FBY)
11. Pradhan Mantri Kisan Maandhan Yojna (PM-KMY)
12. Pradhan Mantri Kisan Samman Nidhi (PM -KISAN)
13. Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)
14. Rashtriya Krishi Vikas Yojana (RKVY)
15. Soil Health Card (SHC) Scheme
16. The National Beekeeping and Honey Mission (NBHM)
17. Schemes and Initiatives related to Natural Farming and Organic Farming
  - a) Jaivik Kheti Portal / Organic Product Marketing
  - b) National Mission on Natural Farming (NMNF)
  - c) National Programme for Organic Production (NPOP)
  - d) Paramparagat Krishi Vikas Yojana (PKVY)

**The list of State Govt Schemes and Centrally Sponsored Schemes in Tamil Nadu implemented in Tamil Nadu are listed below.**

1. Kalaignarin All Village Integrated Agricultural Development Programme (KAVI-ADP) / கலைஞரின் அனைத்துக் கிராம ஒருங்கிணைந்த வேளாண் வளர்ச்சித் திட்டம்
2. Chief Minister's Mannuyir Kaathu Mannuyir Kaappom Scheme (CM MK MKS) / முதலமைச்சரின் மண்ணூயிர் காத்து மண்ணூயிர் காப்போம் திட்டம்
3. Chief Minister's Uzhavar Pathukappu Thittam (CMUPT) / முதலமைச்சரின் உழவர் பாதுகாப்புத் திட்டம்
4. Special Package to increase crop Area and Food grain Production / பயிர் பரப்பளவு மற்றும் உணவு தானிய உற்பத்தியை அதிகரிப்பதற்கான சிறப்பு தொகுப்பு
5. Rashtriya Krishi Vikas Yojana (RKVY) Schemes in TN / தேசிய வேளாண் முன்னேற்றத் திட்டங்கள்
6. Food and Nutrition Security (FNS) Scheme / உணவு மற்றும் ஊட்டச்சத்து பாதுகாப்புத் திட்டம்
7. Important National Mission Schemes Implemented in TN
  - a) National Mission on Edible Oils (NMEO)- Oilseeds and Oil Palm / தேசிய சமையல் எண்ணெய் இயக்கம்-எண்ணெய் வித்துக்கள் & எண்ணெய்ப் பனை
  - b) National Mission on Organic Farming (NMOF) and Natural Farming (NMNF) / உயிர்ப் வேளாண்மை மற்றும் இயற்கை வேளாண்மைக்கான தேசிய இயக்கங்கள்
  - c) Paramapagarat Krishi Vikas Yojana (PKVY) / பாரம்பரிய வேளாண் வளர்ச்சி திட்டம்
  - d) Nutrition Farming Mission/ ஊட்டச்சத்து வேளாண்மை இயக்கம்

- e) National Horticulture Mission (NHM) / தேசிய தோட்டக்கலை இயக்கம்
  - f) Tamil Nadu Millet Mission / தமிழ்நாடு சிறுதானிய இயக்கம்
  - g) National Bamboo Mission / தேசிய மூங்கில் இயக்கம்
  - h) Palmyrah Development Mission (PDM) / பனை மேம்பாட்டு இயக்கம்
  - i) National Horticulture Mission (NHM) of the MIDH / தேசிய தோட்டக்கலை இயக்கம்
8. Integrated Coconut Development Scheme / ஒருங்கிணைந்த தென்னை வளர்ச்சித் திட்டம்
9. Schemes related to Agriculture Mechanization in Tamil Nadu
- a) Sub-Mission on Agricultural Mechanization (SMAM) / வேளாண் இயந்திரமயமாக்குதலுக்கான துணை இயக்கத் திட்டம்
  - b) End to End Mechanization / விதைப்பு முதல் அறுவடை வரை இயந்திரமயமாக்குதல்
  - c) Scheme on Electric Motor Pumpset / மின் மோட்டார் பம்பு செட்டுகள் திட்டம்
  - d) Maintenance and Creation of Water Harvesting Structures / பண்ணைக்குட்டைகள் உருவாக்குதல் மற்றும் பராமரிப்பு
  - e) Rehabilitation of Open Irrigation Wells / திறந்தவெளி பாசனக் கிணறுகளை புனரமைத்தல்
10. Schemes Promoting Solar Power for Agriculture in Tamil Nadu
- a) Chief Minister's Scheme of Solar Powered Pumpsets / முதலமைச்சரின் சூரிய சக்தி பம்புசெட்டுகள் திட்டம்
  - b) Solar Fencing System / சூரிய மின்வேலி அமைத்தல்
  - c) Solar Driers / சூரியஒளி கூடார உலர்த்தி
  - d) Agricultural Feeders Solarisation (Feeder Segregation) by TANGEDCO / வேளாண் பாசன மின்வழிகளுக்கான சூரிய ஆற்றல்மயமாக்கும் திட்டம்
11. Agriculture Extension Schemes / Programmes in Tamil Nadu
- a) Chief Minister's Farmers Service Centre / முதலமைச்சரின் உழவர்நல சேவை மையம்
  - b) Village Outreach Campaign / உழவரைத் தேடி வேளாண்மை-உழவர் நலத்துறை
  - c) Uzhavar Aluvalar Thodarbu Thittam (UATT 2.0) / உழவர் அலுவலர் தொடர்புத் திட்டம்
  - d) Sub-Mission on Agricultural Extension (SMAE) under NMAET / வேளாண்மை விரிவாக்கத் துணை இயக்கம்
  - e) One Village, One Crop Demonstration / ஒரு கிராமம் ஒரு செயல்விளக்கம்
12. Organic Certification under Organic Farming Promotion Scheme / உயிர்ப்ப வேளாண்மை ஊக்குவிப்பு திட்டத்தின் கீழ் அங்ககச சான்றிதழ்
13. Schemes related to Post Harvest Processing and Value Addition
- a) e-National Agriculture Market (e-NAM) / மின்னணு தேசிய சந்தை
  - b) National Agriculture Development Project (NADP) / தேசிய வேளாண் மேம்பாட்டுத் திட்டம்
  - c) National Horticulture Mission (NHM) of the MIDH / தேசிய தோட்டக்கலை இயக்கம்
  - d) Pradhan Mantri Kisan SAMPADA Yojana (PMKSY) / பிரதம மந்திரி விவசாயிகளின் செழிப்பு மேம்பாட்டுத் திட்டம்
  - e) Supply Chain Management Project (SCMP) / தமிழ்நாடு விநியோகத்தொடர் மேலாண்மைத் திட்டம்
  - f) Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP) / தமிழ்நாடு பாசன வேளாண்மை நவீனமயமாக்கல் திட்டம்
  - g) Uzhavar Sandhai / உழவர் சந்தை

- h) Value chain development of MSME / சிறு மற்றும் நடுத்தர நிறுவனங்களின் மதிப்பு கூட்டல் திட்டம்
14. Other Schemes of the Dept of Agri/ Horti/ Agri Engineering
- a) Agroforestry Scheme / வேளாண் காடுகள் திட்டம்
- b) Crop Diversification Programme (CDP) / மாற்றுப் பயிர் சாகுபடி திட்டம்
- c) Crop Insurance Scheme / பயிர் காப்பீட்டுத் திட்டம்
- d) Hill Farmers Development Scheme / மலைவாழ் உழவர் முன்னேற்றத் திட்டம்
- e) Kisan Credit Card / உழவர் கடன் அட்டை
- f) Pradhan Mantri Kisan Samman Nidhi (PM – KISAN) / பிரதம மந்திரி விவசாயிகள் கௌரவ நிதி திட்டம்
- g) Pradhan Mantri Krishi Sinchayee Yojana (PMKSY-HKKO & PDMC) / பிரதம மந்திரி வேளாண் பாசனத் திட்டம்- ஒவ்வொரு வயலுக்கும் நீர் & ஒரு துளிக்கு அதிக விளைச்சல்
- h) Production of Quality / Certified Seeds / தரமான மற்றும் சான்று விதைகள் உற்பத்தி திட்டம்
- i) Rainfed Area Development (RAD) / Dryland Development Schemes / மழை சார்ந்த பகுதி மேம்பாட்டு திட்டங்கள்
- j) Soil Health Card / மண் வள அட்டை
- k) State Horticulture Development Scheme (SHDS) / மாநில தோட்டக்கலை வளர்ச்சி திட்டங்கள்
- l) Sugarcane Development Scheme / கரும்பு மேம்பாட்டுத் திட்டங்கள்
- m) TN Cotton Production Enhancement Scheme / தமிழக பருத்தி உற்பத்தி மேம்பாட்டுத் திட்டம்
15. Animal Husbandry and Dairy Development Schemes
- a) Animal Husbandry Schemes / கால்நடை பராமரிப்பு திட்டங்கள்
- b) Mini Dairy Scheme / மினி பால் பண்ணைத் திட்டம்
- c) Mobile Veterinary Unit (MVU) / நடமாடும் கால்நடை மருத்துவப் பிரிவு
- d) National Livestock Mission / தேசிய கால்நடை இயக்கம்
- e) Peraringnar Anna Co-Operative Milk Producers' Welfare Fund / பேரறிஞர் அண்ணா கூட்டுறவு பால் உற்பத்தியாளர்கள் நல நிதி
- f) Rashtriya Gokul Mission (RGM) / தேசிய ஆ-இன மேம்பாட்டு இயக்கம்
- g) State Fodder Development Schemes (SFDS) / மாநில தீவன அபிவிருத்தி திட்டங்கள்
- h) The Rural Backyard Scheme / Backyard Poultry Development Scheme / புறக்கடை கோழி வளர்ப்பு அபிவிருத்தி திட்டம்
- i) Vallalar Palluyir Kappagangal / வள்ளலார் பல்லுயிர்க் காப்பகங்கள்
16. Fisheries Development and Fishermen Welfare Schemes
- a) Fishermen Welfare Schemes / மீனவர்களுக்கான நலத் திட்டங்கள்
- b) Pradhan Mantri Matsya Sampada Yojana (PMMSY) / பிரதம மந்திரி மீன்வளத் திட்டம்
- c) Schemes for Inland Fisheries & Aquaculture / உள்நாட்டு மீன்வளம் மற்றும் மீன்வளர்ப்புக்கான திட்டங்கள்
- d) Schemes for Marine Fisheries / கடல்சார் மீன்வளத் திட்டங்கள்
- e) Schemes for Reservoir Development / நீர்த்தேக்கங்களில் மீன்வளர்ப்பு திட்டங்கள்

• **Progress, achievements and best practices of Govt. schemes implemented in Tamil Nadu**

Scheme	Progress & Achievements (2024-2025)	Best Practices	Key Metrics
Agri-Clinics & Agri-Business Centres (AC&ABC)	Trained 1,200+ youth as agri-entrepreneurs; 150 new centres established, generating ₹50 crore in rural income. Linked to FPOs for input supply.	Digital platforms for advisory services; convergence with KVKs for training.	88 beneficiaries received ₹1 lakh grants; 100 more targeted.
Agricultural Technology Management Agency (ATMA)	Covered 38 districts with 1,500 farmer interest groups; 50,000+ demonstrations on climate-resilient crops.	Farmer-led extension via block-level committees; integration with TNAU for tech transfer.	75% adoption rate in millets/pulses; ₹10 crore outlay.
Agriculture Infrastructure Fund (AIF)	₹500 crore disbursed for 200 godowns/cold chains; reduced post-harvest losses by 15%.	Public-private partnerships for solar-powered storage; geo-tagging for monitoring.	10,000 farmers benefited; 30 projects under NABARD refinance.
e-NAM	Integrated 150 mandis; ₹2,000 crore turnover via online trading.	Mobile app for real-time pricing; training for 20,000 farmers on digital sales.	50% increase in interstate trade; linked to Uzhavar Sandhai.
Farmers Producer Organisations (FPO)	465 central FPOs sanctioned (125 NABARD-aided); equity to 283 groups, covering 88,000+ farmers. Turnover: ₹37 crore via NABKISAN.	Cluster-based formation with value addition (e.g., Anbalaya FFPO: ₹36.87 lakh turnover).	476 NABARD FPOs; 2.84 lakh members total.
Integrated Scheme for Agricultural Marketing (ISAM)	Developed 50 rural markets; ₹100 crore for infrastructure.	Convergence with e-NAM for unified platforms; GI tagging for 10 products (e.g., Kolli Hills Pepper).	15% rise in farmer incomes; ₹30 lakh for branding.
Kisan Credit Card (KCC)	16.19 lakh cards issued; ₹13,600 crore disbursed (2023-24), targeting ₹16,500 crore in 2024-25.	0% interest incentives via co-op banks; digital KCC linkage to PM-KISAN.	95% coverage of eligible farmers; ₹700 crore subsidy.
National Food Security and Nutrition Mission (NFSNM)	1 lakh acres under nutrition crops (millets, pulses); production up 10% to 14,694 MT.	Bio-fortified varieties demos; school nutrition integration.	₹65 crore allocation; 43,341 farmers benefited.
Pradhan Mantri Dhan Dhanya Krishi Yojana (PMDDKY)	Expanded to 100 clusters; converged 36 schemes across 11 depts for irrigation/insurance.	Holistic support via digital dashboards; climate-smart villages.	50,000 farmers covered; reduced input costs by 20%.
Pradhan Mantri Fasal Bima Yojana (PM-FBY)	₹1,775 crore claims settled; 9,988 farmers compensated (₹14.55 crore).	Weather-based indexing; app for claims.	80% enrollment in paddy/rice; convergence with crop loans.

Pradhan Mantri Kisan Maandhan Yojana (PM-KMY)	50,000 small farmers enrolled; ₹3,000/month pensions disbursed.	Awareness via KVKs; linkage to PM-KISAN database.	70% uptake in rainfed areas.
Pradhan Mantri Kisan Samman Nidhi (PM-KISAN)	₹2,000 instalments to 1.2 crore beneficiaries; ₹24,000 crore transferred (2021-2025).	DBT for transparency; expanded coverage via Union Minister's push.	100% Aadhaar seeding; integrated with KCC.
Pradhan Mantri Krishi Sinchayee Yojana (PMKSY)	2.22 lakh acres under micro-irrigation; 916 wells/1,759 ponds created.	Drip tech with 75% subsidy; automated pumps for 12,000 farmers.	₹773 crore outlay; +30% water efficiency.
Rashtriya Krishi Vikas Yojana (RKVY)	₹200 crore for village agri groups; watershed in 275 micro-watersheds (₹43 crore).	Strategic planning for diversification; NABARD refinance.	2,482 panchayats covered; 1.64 lakh ha treated.
Soil Health Card (SHC) Scheme	10 lakh cards issued; 725 organic clusters certified.	Mobile labs for testing; convergence with CM MK MKS for inputs.	₹206 crore for maintenance; 20% subsidy boost for SC/ST.
The National Beekeeping and Honey Mission (NBHM)	5,000 apiaries established; honey production up 25% to 1,000 MT.	Honey hubs in climate-smart villages; FPO linkages.	10,000 beekeepers trained via KVKs.
Kalaignarin All Village Integrated Agricultural Development Programme (KAVI-ADP)	Horticulture in 12,525 panchayats; ₹200 crore for 2,482 groups.	Village-level training; convergence with RKVY for seeds.	₹17.20 crore (2023-24); 2,482 development groups.
Chief Minister's Mannuyir Kaathu Mannuyir Kaappom Scheme (CM MK MKS)	725 organic clusters; model plots in 100 villages.	Green manure/vermicompost demos; Nammazhvar Awards (₹5 lakh to 3 farmers).	₹206 crore; IFS/agroforestry in 1,000 ha.
Chief Minister's Uzhavar Pathukappu Thittam (CMUPT)	₹1,775 crore insurance; flood protection for 50,000 ha.	Early warning apps; linkage to PM-FBY.	9,988 claims settled.
Special Package to Increase Crop Area and Food Grain Production	1 lakh acres alternative crops (millets/pulses); 14,694 MT production.	Subsidies for fallow conversion; geo-tagged demos.	₹12 crore; 43,341 farmers.
Food and Nutrition	Nutrition farming in 5 districts; bio-fortified millets to schools.	Convergence with NFSNM; millet zones in 25 districts.	₹65.30 crore; +10% production.

Security (FNS) Scheme			
Integrated Coconut Development Scheme	+10,000 acres; 7 lakh seedlings distributed.	Intercropping demos; organic inputs.	₹35 crore total; 26,540 rejuvenations.
Schemes Related to Agriculture Mechanization	- SMAM: 4,000 tillers; 207 custom centres. - End-to-End Mechanization: Drones in 100 villages. - Electric Motor Pumpset: 1,306 SC/ST units. - Water Harvesting: 5,731 desilted; 100 new ponds. - Open Well Rehab: 153 works (₹16.24 crore).	App-based hiring; TNIAMP convergence.	₹215.80 crore; 26,179 farmers.
Schemes Promoting Solar Power for Agriculture	- CM Solar Pumpsets: 12,000 automated. - Solar Fencing: 1,000 km for crop protection. - Solar Driers: 500 units for millets. - Agri Feeders Solarisation: Feeder segregation by TANGEDCO.	75% subsidy; energy audits.	₹25 crore; 30% energy savings.
Agriculture Extension Schemes	- CM Farmers Service Centre: 38 district hubs. - Village Outreach: 15,000 campaigns. - UATT 2.0: 20,000 officer-farmer meets. - SMAE under NMAET: 50,000 trainings. - One Village, One Crop: 5-10 acre demos.	Digital advisories; KVK-TNAU tie-ups.	1 lakh farmers reached.
Organic Certification under Organic Farming Promotion	725 clusters certified; ₹27 crore for inputs.	PGS-India groups; export linkages.	2,470 ha cashew organics.
Schemes Related to Post-Harvest Processing and Value Addition	- e-NAM: See central. - NADP: ₹100 crore infra. - NHM of MIDH: Jackfruit centre (₹16.13 crore). - PMKSY: 100 value-add centres. - SCMP: Supply chain for 50 crops. - TNIAMP: Modernization in 14 districts. - Uzhavar Sandhai: 150 markets. - MSME Value Chain: ₹10 crore startups.	GI branding; mobile dryers/polishers.	₹50 crore markets; 15% loss reduction.
Animal Husbandry and Dairy	- Animal Husbandry: 1,000 mini dairies. - Mini Dairy: ₹50 lakh units. - MVU: 200	Mobile vets; breed improvement via ICAR.	20% milk production rise.

Development Schemes	units for remote care. - National Livestock Mission: Fodder in 1,000 ha. - Anna Co-Op Milk Fund: ₹100 crore welfare. - RGM: Indigenous breed conservation. - SFDS: 500 ha fodder. - Rural Backyard: 10,000 poultry units. - Vallalar Palluyir: Biodiversity parks.		
Fisheries Development and Fishermen Welfare Schemes	- Fishermen Welfare: ₹200 crore subsidies. - PMMSY: Aquaculture in 500 ponds. - Inland Fisheries & Aquaculture: 1,000 ha reservoirs. - Marine Fisheries: Deep-sea gear subsidies. - Reservoir Development: 14 districts under KfW.	IMFFS for integrated mangroves/fish.	₹15.42 crore; 15,108 families.

### Convergence Efforts (Centre, State and Line Departments)

- RKVY converged with TN State Millet Mission for ₹ 65 crore.
- NABARD refinance (₹ 384 crore for PACS) links AIF/e-NAM to TNIAMP. Total: 11 depts involved, covering 1 crore farmers.
- Agriculture and Horticulture Departments converged in KAVI-ADP with technical inputs from TNAU
- Agriculture Engineering Dept converged with TANGEDCO for solar feeders (₹25 crore).
- Fisheries and AH Departments linked in Vallalar parks
- Horticulture and Rural Development Departments joined for watersheds (203 projects, 1.64 lakh ha).
- Best practice: Digital convergence via DBT (95% Aadhaar-linked) and JIVA pilots for eco-farming.

### ICAR's Role in Supporting Schemes Implementation in Tamil Nadu

- ICAR, through TNAU and its KVKs involved in assessing technologies impact and training farmers/ beneficiaries of various schemes.
- The KVKs in Tamil Nadu, during 2024-25 trained 30,000 farmers on NMNF/PKVY (e.g., organic nursery practices); conducted demos in 100 villages for PMKSY drip (75% subsidy uptake).
- TNAU is acting as Nodal Centre for ICAR-funded schemes (e.g., NATP); SC farmer trainings under schemes; JIVA upscaling (₹90 lakh, 4 districts) for natural farming. It also played role in policy making like as technical inputs for RKVY watersheds, breed improvement for RGM, etc.

## Section 8. Emerging and Priority Areas

### 1) Issues/ Challenge related to climate change, application of Frontier Technologies / Cutting edge Technologies in Agriculture Sector

- **Organic farming:** Organic farming and organic products are becoming talk of the town. This statement indirectly indicates growing consumer awareness for pesticides/ residue free products and also rises question on whether the products sold in TN as organic are really 'organic' by standard. A lot of promotion scheme is being implemented in the state but the number of products sold as truly organic and profit earned by organic farmers has to be taken into account to understand the impact of such schemes. Sikkim was the first state in India to be declared as organic state. Going by the experience gained from true organic states like Sikkim and other North Eastern States, one may confidently say that the ***success of organic farming or converting conventional agriculture fields into organic farm is high in remote areas or hilly areas or tribal dominated region*** where there is limited access and availability to chemical fertilizers, pesticides etc. The other logic behind choosing remote or hilly area is that it wouldn't affect food production capacity of the State drastically and even if organic farming does not improve the income of the hill farmers, non-use of pesticides and fertilizers minimize the risk of water contamination in the downstream villages. The people at the downstream region will continue to get good quality water. This is a great passive service of hill farmers to their plain land neighbours. Secondly, organic farmers' profitability will be more ***if the organic product is linked directly to super market / urban markets/ export markets.*** Thirdly, the choice of crops chosen for organic farming determine its market demand. In TN, organically grown or village grown or hill grown fruits, desi egg, milk of native cows and sprouted pulses which are food for children often bought by parents at high price. If the product is meant for export market, millets, traditional rice varieties such as Navara, Kitchili Samba, Mappillai Samba, Karuppu kavuni, turmeric and spices may be the right choice. In Tamil Nadu, initiatives such as the village cluster approach and model organic villages are being promoted in every district. However, not all districts are equally suitable for organic farming. Moreover, when families with few members have differences of opinion, the sustainability of the cluster approach becomes uncertain. Therefore, the long-term viability of this model needs to be carefully re-examined. ***Farmers who already practice organic farming and really interested farmers may be identified and promoted.*** Under organic farming pests are managed with bioproducts but effective disease management remain at infancy. These lessons may be incorporated suitably into the organic farming policy / action plan of this State.
- **Quality and safety of agricultural inputs and farm produces:** It is a well-established fact that consumption of safe and naturally produced food, fruits, and vegetables plays a vital role in ensuring the physical and mental well-being of the people. Hence, **ensuring the quality and safety of agricultural inputs and farm produce** is a shared responsibility between the **Government**, which regulates production and marketing, and the **stakeholders** involved in the production, processing, and distribution chain.

However, in recent years, there have been growing public concerns and **documented cases of adulteration and contamination in farm inputs and agricultural produce**

across India, including Tamil Nadu. Instances of spurious seeds, substandard fertilizers, adulterated pesticides, and misbranded micronutrients and bio-stimulants have been reported. According to data from the Dept. of Agriculture and Farmers Welfare, Govt. of India around 6 to 8% of fertilizer and pesticide samples tested annually across India fail to meet prescribed quality standards. In Tamil Nadu, the State Seed Certification and Quality Control Wing and the Agricultural Marketing and Agri Business Department have periodically detected cases of substandard farm inputs being sold to farmers. ***The VKSA campaign aims to spread awareness among farmers on the spurious/adulterated farm inputs and farm produce.***

Similarly, the **quality of irrigation water** used in agriculture has emerged as a major concern. In several districts of Tamil Nadu, particularly in Ramanathapuram, Sivagangai, and parts of Thoothukudi groundwater used for irrigation has shown high salinity and total dissolved solids (TDS), which affect soil health, crop yield, and long-term sustainability. The presence of industrial effluents and sewage contamination in peri-urban areas like Coimbatore, Vellore, Ranipet, Tirupathur and Tiruppur further deteriorates water quality.

The **quality of agricultural produce is another critical area of concern**. Studies by the Food Safety and Standards Authority of India (FSSAI) have revealed the presence of pesticide residues above permissible limits in vegetables and fruits in several markets. The National Residue Control Programme (NRCP) has identified excessive residues in commodities such as okra, chili, and curry leaves. The Tamil Nadu Agricultural University (TNAU) has also conducted studies indicating residual pesticide presence in selected market samples. These contaminants not only endanger consumer health but also affect the export potential of Indian produce, as importing countries have stringent residue limits.

With the **expansion of intensive agriculture, input markets, and processing chains**, the **risks of spurious and unsafe materials entering the production and food supply system are increasing**. Therefore, it is essential to strengthen quality control measures through:

1. Regular and periodical inspection of farm inputs such as fertilizers, pesticides, seeds, micronutrients, foliar sprays, bio-stimulants, growth regulators, and hormones available in local markets.
2. Systematic testing of agricultural produce—including food grains, fruits, and vegetables—for pesticide residues, heavy metals, and microbial contaminants under programs like FSSAI's State Surveillance Scheme.
3. Monitoring and testing of irrigation water quality used for agricultural purposes, with suitable advisories and remedial measures provided to farmers.

**It is also the right time to establish an extensive network of referral laboratories for:**

1. Quality testing of agricultural inputs,
2. Detection of pesticide residues and contaminants in food produce, and
3. Assessment of irrigation water quality.

These labs may be established under Public-Private Partnership (PPP) mode, involving agricultural universities, NABL-accredited private labs, and Krishi Vigyan Kendras (KVKs) for local sample collection and farmer awareness. ***Strengthening these***

***systems will ensure safe food production, environmental protection, and consumer confidence in agricultural markets.***

- **Crop Area Survey:** The TN Govt has recently initiated digital Crop Survey (DCS), aiming to digitize and modernize crop area reporting. Crop-sowing data is captured by field-level officers or farmers using a mobile App. Land parcels are verified using GIS and GPS mapping. Sometime remote sensing or Satellite data is integrated for validation of crop insurance claims. Lot of manual operations are involved in the DCS. **Digital crop survey using drone may be explored or standardized.** Awareness among field level staff on the use of digital devices is required.
- **Other areas:** The AI technology may be integrated with automated weather station (AWS) to predict or **forecast water requirement** of upland crops where well water / ground water is limited. The **cost of soil sample analysis**, especially micro nutrient is high and the Agril Dept is facing financial problem to analyse large number of samples. Low-cost equipment or Soil probe is required for analyzing micro nutrients. **Mobile Scanner** may be developed for identifying nutrient deficiency in plants like SPAD. **AI based mobile App to identify crop varieties** is needed. Mobile based irrigation **water quality testing kit (Sensor)** may be developed. It is time to develop driverless power tiller for puddling operation.

## **2) Promotion of Natural / Organic Farming, Precision agriculture, Millets, Pulses, Oilseeds, etc in Tamil Nadu**

In 2025-26 budget speech and demand for grant for Agriculture Dept, the Hon'ble Agriculture Minister of Tamil Nadu emphasized sustainable practices through missions and subsidies. The State integrates central schemes like PKVY, NMNF, and NFSM with local initiatives, targeting 5-10% annual growth in production. Key focus areas include climate-resilient crops, digital tools, and farmer training across 38 districts. Below highlighted are details on promotion efforts for natural/organic farming, precision agriculture, millets, pulses, and oilseeds, including schemes, progress, achievements, and budgets.

### **1. Natural and Organic Farming**

The Tamil Nadu government promotes organic and natural farming *via* the Chief Minister's Mannuyir Kaathu Mannuyir Kaappom Scheme (CM MK MKS) and convergence with central programs like Paramparagat Krishi Vikas Yojana (PKVY) and National Mission on Natural Farming (NMNF). The Govt. aims to reduce chemical inputs by 30% and certify 1,000+ clusters annually.

#### **Key Schemes and Initiatives**

*CM MK MKS Expansion:* ₹ 12 crore allocated for natural farming awareness and training in 37 districts; includes model organic plots and green manure seed distribution.

*PKVY Implementation:* ₹ 31,500/ha subsidy for 3 years (₹ 15,000/ha from center); supports PGS India certification for clusters.

*Organic Manure Production Promotion:* ₹ 24 crore outlay for vermicompost units and bio-inputs; targets 500 SHGs.

*Training Programmes:* 218 farmers trained in 3 clusters (Oct 2025); SHGs in 3 districts (e.g., Dharmapuri, Krishnagiri) receiving hands-on natural farming techniques.

*Progress and Achievements:* 725 organic clusters certified; 3,000 ha under PKVY with 15% yield stability in millets/pulses.

*Marketing push:* Organic products sold in Govt buildings like Poomalai Market; ₹ 50 crore sales via Jaivik Kheti Portal.

*Statewide awareness:* 1,000+ events conducted (Mar-Oct 2025), benefiting 50,000 farmers; 30% input cost reduction in pilot areas like Kolli Hills.

*Best Practices:* Blockchain traceability for exports; farmer-led PGS groups; convergence with SHGs for community seed banks.

## **2. Precision Agriculture**

Tamil Nadu integrates precision farming under the Tamil Nadu Irrigated Agriculture Modernization Project (TNIAMP) and digital initiatives, leveraging AI, IoT, and drones for resource optimization. The State's 2025-26 budget highlights "Precision Agriculture, Digital Agriculture, AI, and IoT" as core pillars.

### **Key Schemes and Initiatives**

*Tamil Nadu Precision Farming Project (TNPFP):* Drip/micro-irrigation with sensors; 75% subsidy for 2.22 lakh acres.

*Drone Subsidy and Training:* 100% free drone training for organic farmers; subsidies for spraying/monitoring in sugarcane/rice fields.

*Soil Health Integration:* 15.251 million Soil Health Cards distributed (as of Jun 2025); mobile labs for realtime nutrient mapping.

*NABARD Supported Strategies:* Prioritizing Western/ Northwestern zones (e.g., Coimbatore) for PA adoption via Analytic Hierarchy Process.

*Progress:* Yield increases: 30-200% in pilot crops (e.g., banana, cotton) under TNPFP. 50,000 farmers are using AI advisory platforms; satellite-based monitoring in 14 districts via TNIAMP.

*Innovations:* Blockchain for traceability and climate resilient apps, reducing water use by 30%.

*Best Practices:* Geo-tagging for subsidies; public-private partnerships (e.g., with Google Cloud analogs); farmer co-operatives for shared drone access.

## **3. Millet Promotion**

The Tamil Nadu Millet Mission (TNMM), launched in 2023-24, is a 5-year programmes (to 2027-28) in 25 districts, aligning with the International Year of Millets (extended impacts). It promotes climate-resilient varieties like ragi and jowar.

### **Key Schemes and Initiatives:**

*TNMM Core Components:* Subsidies for seeds/tools; value added product development (e.g., millet snacks); school midday meals integration.

*Convergence with NFSNM:* Biofortified millet demos; ₹ 55.44 crore allocation for area expansion.

*Climate Literacy Programmes:* Training for tribal farmers in 5 districts (e.g., Nilgiris) on diversification.

*MSP and Marketing:* Higher MSP for bajra/jowar/ragi; urban market campaigns.

Progress: Area: 50,463 acres (kuruvai alternatives); production went up 10%

*Beneficiaries:* 43,341 farmers; 15,280 villages under "One Village, One Crop" demos.

*Best Practices:* Shelf-life enhancement techniques; social marketing via SHGs; export linkages for GI-tagged millets (e.g., Kangayam Cumbu).

#### **4. Pulses promotion**

Promotion of Pulses in the State falls under National Food Security Mission- Pulses (NFSM-Pulses) and Targeting Rice Fallow Areas (TRFA), with State missions for nutritious pulses. TN targets 20% production hike via high yielding seeds.

##### **Key Schemes and Initiatives**

*NFSM-Pulses & TRFA:* ₹ 25.20 crore for 2024-25; focuses on black gram/green gram in rice fallow / fallow lands.

*Mission for Nutritious Pulses:* Launched Jul 2025; subsidies for vegetables /fruits integration; aligns with national Self-Reliance in Pulses Mission (2025-31, ₹ 11,000 crore central plan).

*Seed Multiplication Scheme:* Subsidies for certified seeds of pulses (under SMSOPM).

*PM Dhan Dhaanya Yojana:* Cluster-based support for area expansion.

*Progress and Achievements:* Production: 1 lakh acres under nutrition crops; +10% output via biofortified varieties.

*Beneficiaries:* Farmers: 43,000 benefited; income boost via procurement guarantees.

*Best Practices:* Intercropping with rice; NITI Aayog guided value chains; SHG-led processing units.

#### **5. Oilseeds promotion**

The Tamil Nadu Oilseed Mission under National Mission on Edible Oils- Oilseeds (NMEO-OS) targets self-sufficiency, focusing on groundnut, sesame, and sunflower.

##### **Key Schemes and Initiatives**

*TN Oil Seed Mission:* ₹ 108.06 crore for 2025-26; seed systems and area expansion.

*NMEO-OS:* Enhances production of 5 key crops; value chain clusters with ₹ 11,040 crore national outlay (TN share: ₹ 2,196 crore States).

*Oil Palm Expansion:* Additional 6.50 lakh ha targeted nationally by 2025-26; TN pilots in 5 districts.

*Atmanirbhar Oil Seeds Abhiyan:* MSP hikes and agroindustry promotion.

*Progress and Achievements:* Area: 5,795 acres (6,259 MT production)

*Best Practices:* Integrated farming with pulses; technologies for shelf-life; farmer co-operatives for processing.

## Section 9. Suggestions and Way Forward

Tamil Nadu remains one of India's strongest agrarian States—excelling in crop productivity, dairy, and fishery infrastructure. Yet, the slight downturn in 2024–25 highlights emerging vulnerabilities. Addressing MSP awareness gaps, improving procurement systems, enhancing climate-resilient infrastructure, and tackling input cost pressures are essential to sustain and protect rural livelihoods. This is possible through the coordination, convergence and implementation of programmes /schemes of Central and State Govt and disseminating technologies to the farmers and end users by the strong network of ICAR, SAUs, KVK, State line Depts, commodity Boards and financial institutions working in the State.

The current challenges faced by farmers may be grouped into three categories: (i) lack of awareness among farmers on latest technologies, Govt Schemes, etc, (ii) issues that need research, and (iii) issues that require the attention of policy-makers. Accordingly, we are suggesting two-pronged strategies to address part of the agrarian issues/constraints in the State, via (i) addressing local issues through district level planning and action, (ii) addressing common issues through State level planning and action.

### 1) District-wise awareness gap, challenges and action plan suggested

After preliminary discussions with farmers, State Departments of agriculture, horticulture, animal husbandry, fisheries, SAUs, ICAR institutes working in the States, commodity boards, FPOs, KVKs, State VKSA Coordination Committee, and referring to the earlier policy documents the following district-wise priority issues, challenges, technology awareness gap have been identified (Table 4). Some of these issues will be deliberated during VKSA and similar outreach campaigns.

**Table 4. District wise major issues/challenges identified in agricultural sector and possible solution to address the issue**

Dist. Agriculture Profile	Major Research/extension gaps	Solutions (short-term & Long term)
<b>1) Ariyalur District</b>		
Major agri crops: Dryland cereals (sorghum/millet), pulses, small area paddy under tank irrigation. Major horticulture crops: Casuarina, coconut pockets, minor fruits. Animal husbandry: Goat/sheep rearing, backyard poultry, dairy (small holders).	<ul style="list-style-type: none"> <li>• Agriculture is mainly rainfed, with crops like paddy, maize, cotton, groundnut, and millets.</li> <li>• Dairy and goat rearing are common, integrated with field crops.</li> <li>• Low awareness/use of drought-tolerant millet varieties.</li> <li>• Inadequate tank de-siltation or repair, lack of awareness on irrigation scheduling.</li> <li>• Limited fodder development programmes for livestock.</li> <li>• Lack of awareness on integrated pest management (IPM) for pulses.</li> </ul>	<ul style="list-style-type: none"> <li>• Promotion of tank modernization, farm ponds, and watershed management can ensure water security.</li> <li>• On-farm demonstrations of drought-tolerant cultivars</li> <li>• Farmer field schools for tank / water body management.</li> <li>• Promoting block-level fodder nurseries and organizing silage demo.</li> <li>• Issue of Pulse IPM leaflets + trainings</li> </ul>

	<ul style="list-style-type: none"> <li>• Weak farmer groups/ FPOs for input procurement.</li> <li>• Shrinking sugarcane area.</li> </ul>	<ul style="list-style-type: none"> <li>• Promoting formation of FPOs or farmers groups for timely seed &amp; input supply.</li> <li>• IPM for sugarcane- mealy bug and Pokkah boeng</li> </ul>
<b>2) Chengalpattu District</b>		
<p>Major agri crops: Paddy in irrigated tracts, peri-urban vegetable production; floriculture near Chennai suburbs.</p> <p>Major horticulture crops: Flowers (cut-flower units), vegetables and mango.</p> <p>Animal husbandry: Commercial poultry and dairy linked to urban markets.</p>	<ul style="list-style-type: none"> <li>• Peri-urban agriculture dominates, with paddy, vegetables, banana, and coconut as main crops. Dairy and small poultry units cater to Chennai's urban demand.</li> <li>• Urban encroachment and land fragmentation reducing farm holding size.</li> <li>• Post-harvest losses for high-value vegetables, cut flowers.</li> <li>• Inadequate cold chain and market linkages.</li> <li>• Limited awareness on protected cultivation (poly houses).</li> <li>• Water quality/ saline ground water affecting crops.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote urban-rural interface farming like hydroponics, protected vegetable cultivation, and rooftop farming.</li> <li>• Treated wastewater reuse for irrigation and linkages with Chennai's wholesale markets can sustain farming</li> <li>• Training on high-density vegetable farming, vertical farming and protected cultivation</li> <li>• Promoting Small cold-chain cooperatives and mobile chillers</li> <li>• Formation of urban farmer clusters for better marketability.</li> <li>• Extension modules on saline-tolerant varieties and drip fertigation.</li> </ul>
<b>3) Chennai</b>		
<p>Being fully urban district agriculture is very limited except roof/gutter farming and gardening, back yard poultry and small-scale dairy in suburbs.</p>	<ul style="list-style-type: none"> <li>• Highly urbanized district with limited farming activity; small peri-urban zones produce vegetables, flowers, and nurseries. Livestock is largely in commercial dairy and poultry belts near Tambaram and Red Hills.</li> <li>• The main challenges are land scarcity, high input costs, and waste disposal.</li> <li>• Pollution / contaminated soils (heavy metals) in some pockets.</li> <li>• Little awareness of organic/vertical farming profitable models.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote rooftop and kitchen gardening, vertical hydroponics, and community composting.</li> <li>• Encourage peri-urban farmers' clusters supplying fresh produce to city markets, supported by e-marketing and cold logistics.</li> <li>• Promote community cold-rooms and market stalls.</li> </ul>
<b>4) Coimbatore District</b>		
<p>Major agri crops: Paddy in low land, maize, cotton, seed production &amp;</p>	<ul style="list-style-type: none"> <li>• Known as the 'Manchester of South India', it's also a major agricultural district with banana,</li> </ul>	<ul style="list-style-type: none"> <li>• Promote precision farming, fertigation, and integrated</li> </ul>

<p>vegetable cultivation in some taluks. Major horticulture crops: Banana, mango, vegetables, ornamental plants &amp; horticulture nurseries for local supply &amp; export. Animal husbandry: Dairy co-ops, poultry, small ruminants</p>	<p>coconut, turmeric, sugarcane, maize, and vegetables.</p> <ul style="list-style-type: none"> <li>• Strong dairy and poultry sectors coexist with advanced agro-industries.</li> <li>• Groundwater depletion is the pressing problem.</li> <li>• Seed production and Certification system in this district need further improvement— farmers lack access to certified hybrid seeds.</li> <li>• Pest/disease management in banana and vegetables (lack of localized advisories).</li> <li>• Water management for irrigation (overuse, inefficient scheduling).</li> <li>• Post-harvest and market quality standards for export nursery material.</li> <li>• Low awareness on INM.</li> <li>• Low productivity of coconut due to spiraling whitefly and root wilt.</li> <li>• Low yield and poor marketing networks for arecanut</li> </ul>	<p>pest management (IPM) in banana and turmeric.</p> <ul style="list-style-type: none"> <li>• Strengthen seed certification &amp; distribution <i>via</i> Institutes and KVK tie-ups.</li> <li>• Local pest surveillance + SMS based advisories</li> <li>• Watershed and micro-irrigation subsidy drives with user training.</li> <li>• Quality control trainings for horticulture nursery exporters.</li> <li>• Soil test-based fertilizer recommendations at village level.</li> <li>• IPM for coconut pest and diseases.</li> <li>• Campaign on scientific cultivation of Arecanut, including INM, management for spindle bug, bud rot, yellow leaf disease etc.</li> </ul>
<p><b>5) Cuddalore District</b></p>		
<p>Major agri crops: Paddy, groundnut, pulses; coastal agriculture including cashew pockets. Major horticulture crops: Cashew, banana, vegetables, mango. Animal husbandry: Fisheries (coastal), backyard poultry, dairy</p>	<ul style="list-style-type: none"> <li>• Fertile deltaic region growing paddy, sugarcane, groundnut, pulses, and casuarina plantations. Farmers also rear cattle, goats, and poultry</li> <li>• Salinity intrusion in coastal agricultural soils &amp; lack of salinity management measures.</li> <li>• Limited adoption of cashew pruning and GAP for export market.</li> <li>• Weak cold chain for fish and vegetables.</li> <li>• Gaps in disaster-resilient cropping advisory (cyclone/ sea surge).</li> <li>• Low awareness on INM for paddy.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote Salt-tolerant varieties + raised bed methods, Coastal shelterbelts, and integrated rice-fish culture.</li> <li>• Cashew pruning &amp; intercropping demonstrations.</li> <li>• Community LT (low temp) storage for fish.</li> <li>• Local contingency cropping plans + early warning via KVKs and Dist Administration</li> <li>• Farmer training on INM and micro-nutrient use.</li> </ul>
<p><b>6) Dharmapuri District</b></p>		
<p>Major agri crops: Millets, maize, cotton, pulses; rainfed dryland agriculture.</p>	<ul style="list-style-type: none"> <li>• A dryland horticultural district known for mango orchards and millets.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote contour bunding, vegetative barriers, and mango-based IFS models.</li> <li>• Encourage millet value chain</li> </ul>

<p>Major horticulture crops: Mango, tapioca, minor fruits.</p> <p>Animal husbandry: Goat and sheep breeding and rural dairy rearing.</p>	<ul style="list-style-type: none"> <li>• Groundnut and maize are common field crops, while goats and sheep dominate livestock</li> <li>• Low mechanization for small holding dryland crops.</li> <li>• Limited varieties befit for low-input condition.</li> <li>• Weak linkages for mango grading and export compliance.</li> <li>• Fodder scarcity during summer.</li> <li>• Scarce pest surveillance for cotton (recent bollworm trends).</li> <li>• Poor quality of mango fruits and lack of awareness on the utilization of cold storage facility.</li> <li>• Lack of awareness on pruning mango trees, fruit cover bagging etc.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote custom hiring Centres for tractor &amp; other farm implements.</li> <li>• On-farm varietal trials for low-input cultivars.</li> <li>• Promoting fruit bagging to produce export quality mango fruits.</li> <li>• Mango grading training and tie-ups with cold storage units.</li> <li>• Organizing Block-level fodder development &amp; silage training.</li> <li>• Pheromone trap networks and extension alerts for cotton pests.</li> <li>• Hands on training on mango pruning and fruit protective covering.</li> </ul>
<b>7) Dindigul District</b>		
<p>Major agri crops: Millets, paddy, maize, pulses, cotton in parts; chilli &amp; onion in limited pockets.</p> <p>Major horticulture crops: Tomato and vegetable clusters; mango and banana</p> <p>Animal husbandry: Dairy and sheep/goat rearing; small scale poultry</p>	<ul style="list-style-type: none"> <li>• Agro-diverse district with paddy, cotton, chillies, pulses, vegetables, and banana.</li> <li>• Livestock (dairy, goats, poultry) forms a major livelihood.</li> <li>• Constraints include water scarcity in uplands, and poor market linkage for vegetables and spices.</li> <li>• Price volatility for high-value vegetables.</li> <li>• Irrigation scheduling for rainfed uplands.</li> <li>• Post-harvest losses for tomato/onion.</li> <li>• Low adaptation of drip / fertigation.</li> <li>• Lack of cold storage access for small holders.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote micro-irrigation and tank desilting.</li> <li>• Encourage contract farming for chillies, and spice processing centers near Oddanchatram</li> <li>• Formation of FPOs for aggregation and price bargaining.</li> <li>• Soil-moisture indicator demo and trainings.</li> <li>• Warehouse / dehydration units for onion or linkage with private processors.</li> <li>• Subsidy assistance for drip adoption + hands-on trainings on drip installation.</li> <li>• Shared cold storage and market linkages.</li> </ul>
<b>8) Erode District</b>		
<p>Major crops: Turmeric, coconut, sugarcane, paddy, banana, tapioca; strong seed and spice production, horticulture nurseries.</p> <p>Animal husbandry: Dairy, poultry, sheep.</p>	<ul style="list-style-type: none"> <li>• Turmeric capital of Tamil Nadu, also growing maize, banana, sugarcane, and paddy.</li> <li>• Livestock sector is strong, especially dairy cooperatives.</li> <li>• Quality control &amp; adulteration issues in turmeric value chain.</li> </ul>	<ul style="list-style-type: none"> <li>• Establish turmeric processing clusters, promote GI branding and export-oriented production.</li> <li>• Promote GAP certification for turmeric.</li> </ul>

	<ul style="list-style-type: none"> <li>• Soil fertility decline due to monocropping of turmeric.</li> <li>• Pests in banana and sugarcane.</li> <li>• Limited value-addition units for spices at village level.</li> <li>• Less awareness on integrated disease management.</li> <li>• Lack of awareness on organic and GI tagged turmeric</li> </ul>	<ul style="list-style-type: none"> <li>• Crop rotation and green manure demonstrations.</li> <li>• Timely pest advisories via KVK / Mobile SMS/WhatsApp groups</li> <li>• Small spice processing training and micro-credit.</li> <li>• Demo on IPM modules and field school.</li> <li>• Branding and promoting GI tagged Erode turmeric.</li> </ul>
<b>9) Kallakurichi District</b>		
<p>Major agri crops: Paddy, sugarcane in irrigated tracts; cotton and pulses.</p> <p>Major horticulture crops: Cashew, mango, banana in certain pockets</p> <p>Animal husbandry: Goat/poultry and dairy (small holder).</p>	<ul style="list-style-type: none"> <li>• Rainfed cropping with paddy, groundnut, sugarcane, tapioca, and maize. Goats and poultry are common.</li> <li>• Low ratoon yield in sugarcane.</li> <li>• Fragmented landholdings limit mechanization.</li> <li>• Weak access to quality planting material for cashew.</li> <li>• Scarcity of organized fodder supply.</li> <li>• Limited extension on micronutrient use.</li> <li>• Borewells are going dry / deeper during summer in some blocks and surplus water from tanks overflowing during monsoon affecting farm lands.</li> <li>• High cost of concentrates of animal feed, low conception rate in buffalo thus necessitating repeated breeding.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote farm ponds, drip irrigation, and tapioca-based starch industries.</li> <li>• Sugarcane ratoon management demos.</li> <li>• Promoting custom hiring Centres for agriculture machineries.</li> <li>• Promoting certified cashew sapling nurseries.</li> <li>• Community fodder production plots.</li> <li>• Micronutrient correction camps with soil testing.</li> <li>• Proper water management plan (long term strategy).</li> </ul>
<b>10) Kancheepuram Dist</b>		
<p>Major agri crops: Paddy (irrigated), millet &amp; pulses, peri-urban vegetables.</p> <p>Major horticulture crops: Flowers (near Chennai), mango, vegetables.</p> <p>Animal husbandry: Poultry and small dairies for urban markets.</p>	<ul style="list-style-type: none"> <li>• Mixed farming zone with paddy, groundnut, coconut, and vegetables, located near Chennai markets. Dairy is significant.</li> <li>• Increasing urbanization reduce cultivable land and increase pollution.</li> <li>• Post-harvest handling for cut-flowers.</li> <li>• Lack of extension for protected farming near urban centers.</li> <li>• Water pollution affecting vegetable quality.</li> </ul>	<ul style="list-style-type: none"> <li>• Encourage peri-urban horticulture clusters, tank rehabilitation, and collective marketing via farmer groups</li> <li>• Establishing cold storage units for flowers and grower training.</li> <li>• Incubators for protected cultivation</li> <li>• Water quality testing campaigns.</li> <li>• Formation of farmers group/ create platforms for peri-urban sales.</li> </ul>

	<ul style="list-style-type: none"> <li>• Weak formation of market linkages with peri-urban growers.</li> </ul>	<ul style="list-style-type: none"> <li>• Training on chemical residue management.</li> <li>• Promote integrated crop-livestock systems and organic farming for niche Chennai markets.</li> </ul>
<b>11) Kanniyakumari Dist</b>		
<p>Major crops: Coconut, banana, rice, tuber crops, coastal spices (pepper), medicinal plants</p> <p>Animal husbandry: Poultry, goat; inland &amp; coastal fisheries.</p>	<ul style="list-style-type: none"> <li>• High rainfall district, rich in paddy, banana, tapioca, coconut, and rubber.</li> <li>• Dairy and backyard poultry are key livelihoods</li> <li>• Salinity and coastal erosion impacting crop choices.</li> <li>• Post-harvest processing for coconut and banana is limited.</li> <li>• Limited local R&amp;D on spice/pepper cropping systems.</li> <li>• Small farm sizes reduce scale of operation.</li> <li>• Gaps in fodder diversification for small holders.</li> <li>• Spread of spiraling whitefly in coconut and banana.</li> <li>• Root wilt in coconut</li> </ul>	<ul style="list-style-type: none"> <li>• Introduce high-yielding banana and coconut hybrids,</li> <li>• Mechanization for smallholders, and spice value addition.</li> <li>• Integrate fisheries and horticulture with tourism for income diversification</li> <li>• Coastal-salt management and raised-bed cropping</li> <li>• Support coconut value-addition (copra/dessicated coconut) trainings.</li> <li>• Targeted spice agronomy trials by Universities /KVK</li> <li>• Promote coconut and spice producer cooperatives.</li> <li>• Fodder trials and demonstration plots.</li> <li>• IPM for coconut and banana</li> </ul>
<b>12) Karur District</b>		
<p>Major crops: Cotton, rice, millet, textile-linked cotton production historically prominent, banana and vegetable pockets.</p> <p>Animal husbandry: Dairy, small ruminants and backyard poultry</p>	<ul style="list-style-type: none"> <li>• Located in the Cauvery basin, cultivating banana, paddy, sugarcane, and cotton. Dairy and goat rearing supplement incomes.</li> <li>• Water depletion and textile pollution are major issues.</li> <li>• Cotton pest management (bollworm, whitefly) with limited localized advisories.</li> <li>• Water scarcity and inefficient irrigation.</li> <li>• Soil salinity/sodicity in parts from poor irrigation practices.</li> <li>• Weak linkage of cotton growers to seed certification.</li> <li>• Post-harvest handling for bananas.</li> <li>• Low coconut productivity due to poor manuring.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote drip irrigation, alternate wetting-drying in paddy, and pollution mitigation. Promote banana fibre and dairy product value addition. Introduce solar pumps for water efficiency</li> <li>• Local pest monitoring and IPM demos.</li> <li>• Micro-irrigation demo &amp; subsidies with farmer training.</li> <li>• Reclamation trainings for sodic soils (gypsum + organic matter).</li> <li>• Seed fairs and certified seed access.</li> <li>• Banana grading &amp; packing training.</li> </ul>

	<ul style="list-style-type: none"> <li>• Decline of water bodies (lakes, tanks) <i>vis-a-vis</i> reduction of irrigation sources for example, Panjapatti Lake was a major source of irrigation for 30,000 plus acres has gone dry over many years due to encroachment, invasion by <i>Prosopis juliflora</i>, reduced rainfall, lack of inflow, etc.</li> <li>• Groundwater contamination in Amaravathi river due to discharge from dyeing factories, impacting drinking water, irrigation water, and agricultural productivity</li> </ul>	<ul style="list-style-type: none"> <li>• INM for coconut.</li> <li>• Awareness camp on pollution.</li> </ul>
<b>13) Krishnagiri District</b>		
<p>Major crops: Mango (large producer of Alphonso and local variety), paddy, millets, tomato in some blocks, vegetables and flowers.</p> <p>Animal husbandry: Dairy, goat and poultry</p>	<ul style="list-style-type: none"> <li>• Mango belt of Tamil Nadu, producing Alphonso and Totapuri. Other crops include millets and groundnut. Sheep and goat rearing are common.</li> <li>• Problems include post-harvest mango loses. mango disease management (anthracnose).</li> <li>• Post-harvest grading and Cold chain limitations for export.</li> <li>• Lack of good quality grafted saplings in remote blocks.</li> <li>• Inadequate advisories for tomato pest management.</li> <li>• Limited integrated marketing for mango clusters.</li> <li>• Lack of awareness on use of mango protected cover.</li> </ul>	<ul style="list-style-type: none"> <li>• High level/ export oriented training on setting up of mango processing, pulp, and dehydration units, cold chains, grading, and export tie-ups.</li> <li>• Pre- and post-harvest disease management trainings.</li> <li>• Warehouse support and grading lines for mango clusters including training /awareness on the use of cold storage.</li> <li>• Facilitate FPOs and export linkages for mango.</li> <li>• Certified mango nurseries and sapling distribution</li> <li>• Pest advisory through SMS</li> <li>• Field school on mango fruit covering.</li> </ul>
<b>14) Madurai District</b>		
<p>Major agri crops: Paddy, cotton, maize, groundnut, millets.</p> <p>Major horticulture crops: Banana, mango, vegetables, flowers.</p> <p>Animal husbandry: Dairy, inland fisheries, sheep/goat.</p>	<ul style="list-style-type: none"> <li>• Cultivation of paddy, banana, onion, chillies, and cotton.</li> <li>• Dairy and poultry are widespread.</li> <li>• Problems include dependence on tank irrigation.</li> <li>• Water scarcity in peri-urban and rainfed areas.</li> <li>• Declining soil fertility in intensively cultivated plots.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote Tank modernization, community irrigation scheduling, and chilli dehydration units, Onion cold storage and grading facilities which may stabilize income.</li> <li>• Micro-irrigation and farm ponds.</li> <li>• Soil test-based nutrient recommendations and</li> </ul>

	<ul style="list-style-type: none"> <li>• Limited mechanization for harvest/processing of pulses.</li> <li>• Weak extension on climate-smart cropping.</li> <li>• Post-harvest losses in small vegetable supply chains.</li> </ul>	<ul style="list-style-type: none"> <li>• organic matter build-up programmes.</li> <li>• Promote custom hiring Centres.</li> <li>• KVK-led climate-smart training modules.</li> <li>• Small warehouses and cold storage for vegetables.</li> </ul>
<b>15) Mayiladuthurai Dist</b>		
<p>Major agri crops: Paddy (delta area), sugarcane in pockets, pulses</p> <p>Major horticulture crops: Banana, coconut, betel leaf in some areas.</p> <p>Animal husbandry: Dairy and small ruminants; inland fisheries</p>	<ul style="list-style-type: none"> <li>• A deltaic district growing paddy and coconut. Livestock rearing supports households.</li> <li>• Flooding and salinity are frequent near the coast.</li> <li>• Water-logging and poor drainage in delta tracts.</li> <li>• Rice blast and sheath blight management gaps.</li> <li>• Lack of mechanized drainage improvement approaches.</li> <li>• Weak farm-level seed replacement for paddy.</li> <li>• Lack of awareness on INM and IPM.</li> <li>• Poor crop diversification, from paddy.</li> </ul>	<ul style="list-style-type: none"> <li>• Village-level drainage programmes saline soil reclamation programme.</li> <li>• Disease forecasting advisories and seed treatment awareness programmes.</li> <li>• Participatory desilting/drainage maintenance via MGNREGA + Extension</li> <li>• Strengthen certified seed distribution.</li> <li>• IPM/INM trainings and demo plots.</li> <li>• Crop diversification in delta area.</li> </ul>
<b>16) Nagapattinam Dist</b>		
<p>Major crops: Paddy (coastal delta), coconut, casuarina, pulses, banana, mangroves for fisheries buffering</p> <p>Animal husbandry: Fisheries (major coastal), small ruminants, dairy</p>	<ul style="list-style-type: none"> <li>• Salinity and cyclone-related crop damage.</li> <li>• Need for coastal aquaculture best practices for promoting export.</li> <li>• Low access to salt-tolerant paddy varieties.</li> <li>• Post-disaster seed and input supply chain gaps.</li> <li>• Inadequate extension on cage culture, shoreline aquaculture and fish waste management</li> </ul>	<ul style="list-style-type: none"> <li>• Promote salt-tolerant varieties and raised beds.</li> <li>• Training in resilient aquaculture, hatchery and fish waste management.</li> <li>• Disaster preparedness seed banks.</li> <li>• Rapid extension response teams</li> <li>• Coastal buffer plantation programmes.</li> </ul>
<b>17) Namakkal District</b>		
<p>Major crops: Maize, pulses, millet, significant poultry feed/grain production, banana in certain pockets, small scale vegetable production.</p> <p>Animal husbandry: Major poultry hub (broiler farming), commercial layer units and dairy.</p>	<ul style="list-style-type: none"> <li>• Known as Tamil Nadu's Poultry Hub, with vast broiler and layer farms.</li> <li>• Maize and tapioca are key feed crops.</li> <li>• Biosecurity and disease management in dense poultry clusters.</li> <li>• Litter disposal and environmental compliance.</li> </ul>	<ul style="list-style-type: none"> <li>• Strengthen veterinary extension and biosecurity trainings</li> <li>• Model common treatment/disposal facilities</li> <li>• Local feed mill linkages and quality certification.</li> <li>• Vaccination drives with cold-chain monitoring</li> </ul>

	<ul style="list-style-type: none"> <li>• Feed quality and local feed raw material shortages.</li> <li>• Extension gap for poultry vaccination and management protocols among smallholders.</li> <li>• Limited diversification for small holders away from mono-poultry risk.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote integrated farming (poultry + fodder/horticulture) to diversify.</li> </ul>
<b>18) Nilgiris District</b>		
<p>Major crops Plantation crops (tea, coffee), temperate fruits &amp; vegetables, millets in higher altitudes, spices, vegetable nurseries.</p> <p>Animal husbandry: Sheep &amp; goat in higher altitudes; smallholder dairy; sericulture in parts.</p>	<ul style="list-style-type: none"> <li>• Hill district, famous for tea, coffee, vegetables, and floriculture.</li> <li>• Dairy is practiced on small farms.</li> <li>• Problems are soil erosion, cold injury, and poor farm roads.</li> <li>• Terrace &amp; slope agriculture-led erosion risks.</li> <li>• Pest/disease management in tea &amp; coffee with limited local trials.</li> <li>• Inadequate high-altitude vegetable cultivar trials.</li> <li>• Market access for peri-urban high-value produce.</li> <li>• Human-wildlife conflict impacting crops.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote terracing &amp; contour bunding demonstrations</li> <li>• IPM trials for Tea and coffee</li> <li>• Cold-tolerant vegetable variety trials</li> <li>• Market aggregation through cooperatives</li> <li>• Community wildlife mitigation plans + extension on crop protection.</li> <li>• Promote Tourism-linked agribusiness and eco-labelling can enhance value/ promote local crop's sales.</li> </ul>
<b>19) Perambalur District</b>		
<p>Major agri crops: Millet, maize, pulses, cotton in dry tracts.</p> <p>Major horti crops: Mango, casuarina, small fruit orchards.</p> <p>Animal husbandry: Goat, sheep, small dairy units.</p>	<ul style="list-style-type: none"> <li>• A mixed agro-ecosystem with paddy, groundnut, sugarcane, and millets.</li> <li>• Farmers depend on seasonal rainfall; goat and poultry rearing provide resilience.</li> <li>• Low soil organic carbon and nutrient mining.</li> <li>• Lack of mechanization for rainfed farm operations.</li> <li>• Weak access to certified seeds.</li> <li>• Inadequate fodder availability.</li> <li>• Few women-centered extension services.</li> <li>• Shrinking sugarcane area.</li> <li>• High cost of cultivation in cotton</li> </ul>	<ul style="list-style-type: none"> <li>• Expand micro-irrigation, promote drought-tolerant crops, and create village-level processing centers.</li> <li>• Promote green manuring and composting demonstrations.</li> <li>• Custom hiring services.</li> <li>• Seed distribution camps.</li> <li>• Community fodder plots and silage training</li> <li>• Gender-sensitive extension programs and self-help group (SHG) trainings.</li> <li>• IPM and ratoon management in sugarcane.</li> <li>• HDP for cotton and small scale mechanization for picking boll/kapas.</li> </ul>
<b>20) Pudukottai District</b>		
<p>Major agri crops: Paddy (low land &amp; irrigated), groundnut, millet, pulses</p>	<ul style="list-style-type: none"> <li>• Emerging Groundnut viral diseases and lack of awareness</li> </ul>	<ul style="list-style-type: none"> <li>• Demo / Trials with improved resistant groundnut cultivars and</li> </ul>

<p>Major horti crops: Banana, coconut, jack fruit, pomegranate in limited pockets.</p> <p>Animal husbandry: Dairy, sheep &amp; goat, poultry.</p>	<p>on resistant varieties (pulses and oilseeds).</p> <ul style="list-style-type: none"> <li>• Water management for mixed cropping systems.</li> <li>• Lack of empowerment of pulse growers into pulse seed producer with marketing networks (large demand for pulse seed in AP).</li> <li>• Limited access to value-addition for jack fruit, pomegranate etc.</li> <li>• Weak extension for soil health card utilization.</li> <li>• Post-harvest marketing inefficiencies for jack fruits.</li> <li>• Low coconut productivity due to poor fertilization.</li> </ul>	<p>ensuring its seed availability</p> <ul style="list-style-type: none"> <li>• Micro-irrigation + crop diversification advisories</li> <li>• Training in fruit grading/packing – Jack fruit, Pomegranate, banana.</li> <li>• Village-level soil test camps and SHG-run testing centers, promoting INM for coconut.</li> <li>• Tie-ups with processors for value-addition, establishing jack fruit processing centre.</li> <li>• Promoting organic cultivation of traditional paddy varieties for selling in urban market.</li> </ul>
<b>21) Ramanathapuram Dist</b>		
<p>Major crops: Rice (delta), pearl millet, pulses, Palmyra, coconut, banana</p> <p>Animal husbandry: Coastal fisheries, sheep and goat rearing, dairy. Salt Pan in Coastal area</p>	<ul style="list-style-type: none"> <li>• Driest district; crops include pearl millet, cotton, pulses, and castor. Goat and sheep rearing are vital; coastal fisheries thrive.</li> <li>• Low rainfall, Salinity / water scarcity hampering agriculture.</li> <li>• Fish drying/processing quality for market standards.</li> <li>• Low adoption of saline-tolerant crops.</li> <li>• Limited fodder availability for small ruminants.</li> <li>• Inadequate extension for disaster-resilient cropping.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote Salt-tolerant crop demonstration, saline soil reclamation.</li> <li>• Improved fish processing / hygiene training.</li> <li>• Micro-credit for salt pan dryers.</li> <li>• Promote salt-resilient fodder and silage</li> <li>• Disaster-resilient cropping advisories and seed banks.</li> </ul>
<b>21) Ranipet District</b>		
<p>Major crops: Paddy (irrigated), groundnut, vegetables (peri-urban), flowers near industrial towns.</p> <p>Animal husbandry: Dairy, small poultry units.</p>	<ul style="list-style-type: none"> <li>• This is an industrial district growing paddy and vegetables; dairy and poultry are common.</li> <li>• Industrial pollution from tannin industry affecting soil/irrigation water in some pockets.</li> <li>• Market linkages for peri-urban farmers disrupted by urban land use.</li> <li>• Extension gap for safe pesticide use in vegetables.</li> <li>• Lack of clean water for high-value crops.</li> <li>• Weak cold chain and aggregation.</li> </ul>	<ul style="list-style-type: none"> <li>• Enforce effluent treatment</li> <li>• Soil &amp; water testing drives.</li> <li>• Cluster marketing and contract farming ties to nearby industries.</li> <li>• Safe-use pesticide awareness and residue testing.</li> <li>• Rainwater harvesting and filtration units.</li> <li>• Promoting shared cold chain facilities.</li> </ul>
<b>23) Salem District</b>		

<p>Major crops: Mango (special varieties), tapioca for industrial use, coconut, millets, small millets, cashew in parts. Animal husbandry: Poultry and dairy; sheep &amp; goat</p>	<ul style="list-style-type: none"> <li>• Known for mango and turmeric cultivation, along with tapioca and maize.</li> <li>• Erosion in hills, water stress, and market volatility are the major issues.</li> <li>• Soil erosion and declining fertility in upland areas.</li> <li>• Mosaic virus, weak value addition and market linkages for tapioca.</li> <li>• Pest/disease issues in mango and coconut with limited local extension trials.</li> <li>• Limited irrigation infrastructure in uplands.</li> <li>• Branding and quality control for Salem specialty crops like mango.</li> <li>• Promoting scientific cultivation of arecanut along with PoP and seedling distribution, particularly in Pethanaickanpalayam, Yethapur, Vazhappady, Gengavalli, Attur.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote water harvesting structure and drip irrigation.</li> <li>• Extension on soil conservation &amp; watershed development schemes/measures.</li> <li>• Promote turmeric, tapioca and mango processing units and farmer linkages.</li> <li>• On-farm / KVK trials for pest control.</li> <li>• GI/brand development support and training for Salem mango.</li> <li>• Campaign on scientific cultivation of Arecanut, including management for spindle bug, bud rot, yellow leaf disease etc.</li> </ul>
<b>24) Sivaganga District</b>		
<p>Major crops: Paddy, groundnut, small millets, sugarcane pockets, mango, coconut, citrus in parts. Animal husbandry: Dairy, goat rearing.</p>	<ul style="list-style-type: none"> <li>• Paddy, pulses, and groundnut are major crops besides goat farming.</li> <li>• Water scarcity and unreliable rainfall.</li> <li>• Limited access to improved varieties and seed systems.</li> <li>• Poor post-harvest handling and market access.</li> <li>• Gaps in extension for INM and soil health improvement.</li> <li>• Weak youth engagement and farm enterprise models.</li> </ul>	<ul style="list-style-type: none"> <li>• Micro-irrigation &amp; farm pond promotion.</li> <li>• Seed fairs and village seed banks</li> <li>• Cold stores and collective marketing.</li> <li>• Soil health camps and INM training</li> <li>• Agri-entrepreneurship programmes for youth (value addition, FPO incubation).</li> </ul>
<b>25) Tenkasi District</b>		
<p>Major crops: Paddy in plains, millets, pulses in uplands, banana, spices (cardamom in nearby hills), coconut. Animal husbandry: Dairy, goat/sheep in hills, inland fisheries.</p>	<ul style="list-style-type: none"> <li>• A Foothill district with paddy, millets, banana, and spices.</li> <li>• Livestock and inland fishery are common.</li> <li>• Major Problems: soil erosion, poor roads, and erratic monsoons.</li> <li>• Hilly terrain limits mechanization and soil conservation is required.</li> </ul>	<ul style="list-style-type: none"> <li>• Contour farming &amp; agroforestry demonstrations</li> <li>• High-altitude variety trials by regional centers</li> <li>• Mobile cluster points &amp; digital marketplaces</li> <li>• Pheromone trap networks for spices</li> <li>• Hill-farming modules and extension camps.</li> </ul>

	<ul style="list-style-type: none"> <li>• Limited research on high-altitude crop / variety trials.</li> <li>• Marketing challenges for remote farmers.</li> <li>• Lack of integrated pest surveillance in spice crops.</li> <li>• Poor penetration of extension system in remote localities / promotion on sustainable hill farming.</li> <li>• Plastic waste dumping by tourists on cultivable land and more tourist visit to sunflower fields.</li> <li>• Lack of promotion for export of GI tagged lemon</li> </ul>	<ul style="list-style-type: none"> <li>• Awareness on plastic pollution among tourists.</li> <li>• Awareness of GI for Puliyan kudi lemon, drip irrigation , e-NAM and export market.</li> </ul>
<b>26) Thanjavur</b>		
<p>Major agri crops: Intensive paddy production (rice bowl), sugarcane &amp; pulses as rotation crops.</p> <p>Major horti crops: Banana, vegetables in the delta and uplands.</p> <p>Animal husbandry: Dairy, inland fisheries; large extent of aquaculture in adjoining tracts.</p>	<ul style="list-style-type: none"> <li>• Water management: balancing multiple crops and groundwater stress.</li> <li>• Rice monoculture leading to pest/disease pressure and soil fertility decline.</li> <li>• Low mechanized transplanting adoption for labor efficiency.</li> <li>• Need for mechanized harvester and threshers for small holdings pulses.</li> <li>• Limited diversification from paddy to higher value crops, thus limiting farm income.</li> <li>• Low coconut productivity due to poor fertilization.</li> </ul>	<ul style="list-style-type: none"> <li>• SRI and alternate rice management trials</li> <li>• Mechanized paddy transplanting demonstrations</li> <li>• Promoting rotational cropping and pulses intercropping</li> <li>• Water scheduling &amp; laser land leveling training</li> <li>• Incentives for crop diversification from paddy cultivation and marketing support.</li> <li>• INM for coconut.</li> </ul>
<b>27) Theni district</b>		
<p>Major crops: Cardamom &amp; spice cultivation in higher elevations, paddy and sugarcane in valleys, Cardamom, grapes, mango, banana and vegetables.</p> <p>Animal husbandry: Dairy, goat, and minor poultry; orchard integration.</p>	<ul style="list-style-type: none"> <li>• A horticulture-rich district growing banana, mango, cardamom, and sugarcane.</li> <li>• Dairy and goat farming integrate well.</li> <li>• Main challenges: post-harvest loss and water management.</li> <li>• Pest/disease management in cardamom and grape with limited extension reach.</li> <li>• Lack of cold chain for perishables (grapes/vegetables).</li> <li>• Soil erosion and slope management for orchards.</li> <li>• Post-harvest losses in small holder orchards.</li> </ul>	<ul style="list-style-type: none"> <li>• Establish fruit processing units, drip irrigation, and cold storage</li> <li>• Targeted IPM &amp; disease management programmes</li> <li>• Warehouse and cold store cooperatives.</li> <li>• Terracing &amp; mulching demonstrations.</li> <li>• Training on post-harvest handling and value addition.</li> <li>• Strengthen FPOs for cluster marketing.</li> <li>• Awareness on integrated disease management,</li> </ul>

	<ul style="list-style-type: none"> <li>• Fragmented producer groups limiting market bargaining power.</li> <li>• Theni is known for Muscat Hamburg variety (panneer thiratchai) grapes (GI-tagged). Due to mildew diseases, grey mould, heavy rains etc productivity dropped drastically.</li> </ul>	Chemical / pesticide residue and promoting good agriculture practices
<b>27) Thiruvarur district</b>		
<p>Major agri crops: Paddy-dominant delta; extensive irrigated agriculture.</p> <p>Major horti crops: Banana and vegetables in the delta and uplands.</p> <p>Animal husbandry: Dairy and inland fisheries.</p>	<ul style="list-style-type: none"> <li>• Over-dependence on paddy, leading to low cropping intensity and diversification.</li> <li>• Soil salinity in certain pockets due to improper drainage.</li> <li>• Limited extension for alternate livelihoods (horti &amp; fisheries integration).</li> <li>• Need for better post-harvest facilities for bananas and vegetables.</li> <li>• Pest pressure in continuous paddy cropping and increased use of pesticides in vegetables</li> </ul>	<ul style="list-style-type: none"> <li>• Promote crop rotation and pulse intercropping</li> <li>• Drainage maintenance programs</li> <li>• Integrated farming system demos (paddy + fish + vegetable)</li> <li>• Village level warehouses.</li> <li>• IPM dashboard and advisories for paddy and vegetables</li> </ul>
<b>29) Thoothukudi Dist</b>		
<p>Major crops: Banana, coconut, cashew in few pockets, cotton, millets, paddy in certain pockets.</p> <p>Animal husbandry: Fisheries (marine &amp; aquaculture), mainly coastal salt production and dairy in inland pockets.</p>	<ul style="list-style-type: none"> <li>• Saline water intrusion and land degradation.</li> <li>• Poor fish value-chain and processing hygiene.</li> <li>• Limited research on saline-agriculture systems.</li> <li>• Water scarcity for inland crops and fodder.</li> <li>• Weak extension on sustainable aquaculture practices.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote salt-tolerant crop trials.</li> <li>• Fish processing training &amp; HACCP compliance support.</li> <li>• Saline agriculture R&amp;D plots</li> <li>• Water harvesting and solar desalination pilot schemes</li> <li>• Extension for sustainable feed and aquaculture disease management.</li> </ul>
<b>30) Tirunelveli District</b>		
<p>Major crops: Paddy, tuber crops, millets, horticulture in foothills, banana, mango, tuber crops and spices in some areas.</p> <p>Animal husbandry: Dairy, sheep, coastal &amp; inland fisheries.</p>	<ul style="list-style-type: none"> <li>• Mixed cropping with paddy, banana, and chillies. Dairy and inland fisheries are common</li> <li>• Water stress in rainfed tracts and Cyclone in all places.</li> <li>• Limited adoption of improved tuber crops and fruit varieties.</li> <li>• Marketing and grading for hill grown produce.</li> <li>• Fodder shortages in lean seasons.</li> <li>• Lack of integrated extension for hillside &amp; plains differences.</li> </ul>	<ul style="list-style-type: none"> <li>• Promoting Farm ponds &amp; micro-irrigation</li> <li>• Varietal trials and tree sapling distribution</li> <li>• Cold chain linkages and grading training</li> <li>• Community fodder banks</li> <li>• Tailored extension packages for hill and plain areas.</li> </ul>

<p><b>31) Tirupathur District</b></p> <p>Major agri crops: Paddy (irrigated), millet, pulses; groundnut &amp; cotton in drier pockets. Major horti crops: Mango, banana in irrigated pockets. Animal husbandry: Dairy and small ruminants.</p>	<ul style="list-style-type: none"> <li>• Dryland farming with maize, millet, and groundnut</li> <li>• Erratic rainfall and groundwater decline.</li> <li>• Limited certified seed availability.</li> <li>• Lack of value-addition for mango and other fruits.</li> <li>• Scarcity of fodder in dry months.</li> <li>• Extension reach to small fragmented holdings.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote millet clusters, tank desilting,</li> <li>• Ground water recharge structures &amp; micro-irrigation</li> <li>• Seed distribution via extension stalls, cooperative societies, rural outlets</li> <li>• Small fruit processing &amp; FPO support.</li> <li>• Fodder cultivation drives.</li> <li>• Mobile extension units and digital advisories.</li> </ul>
<p><b>32) Tiruppur District</b></p> <p>Major crops: Cotton belt, maize, pulses in dry tracts, Banana in certain pockets; vegetables for local markets. Animal husbandry: Small holder dairy and poultry.</p>	<ul style="list-style-type: none"> <li>• Industrial district with cotton, maize, and some paddy. Dairy is secondary.</li> <li>• Groundwater depletion, fueled by textile industry water demand pressures, pollution from textile effluents.</li> <li>• Cotton pest cycles and resistance issues.</li> <li>• Labor shortages for peak agricultural operations.</li> <li>• Limited circular economy initiatives for agro-textile waste.</li> <li>• Low coconut productivity due to spiraling aphid and root wilt.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote water-efficient cropping &amp; industrial-agriculture water audits</li> <li>• IPM programmes and refuge strategies for cotton</li> <li>• High density planting, mechanization / custom hiring for cotton cultivation</li> <li>• Recycling initiatives connecting agro-residue to industry.</li> <li>• Precision farming (irrigation) advisories.</li> <li>• IPM for coconut.</li> </ul>
<p><b>33) Tiruchirappalli Dist</b></p> <p>Major crops: Paddy, banana (major cluster), sugarcane, cotton in upland tracts, vegetables and flowers. Animal husbandry: Dairy, sheep/goat and poultry.</p>	<ul style="list-style-type: none"> <li>• Major crops include paddy, banana, maize, and sugarcane.</li> <li>• Drainage problems affecting banana cultivation</li> <li>• Inadequate pest and disease advisory for bananas.</li> <li>• Cold chain gaps for banana and vegetables.</li> <li>• Soil health decline in intensive cropped areas.</li> <li>• Limited fund for water body maintenance.</li> <li>• Shrinking sugarcane acreage</li> </ul>	<ul style="list-style-type: none"> <li>• Joint departmental desilting &amp; drainage planning</li> <li>• Banana IPM &amp; pre-harvest treatments</li> <li>• Community cold storage and banana ripening centers</li> <li>• Soil health programs and green manures</li> <li>• Proactive maintenance contracts for channel management.</li> <li>• IPM for sugarcane mealy bug and pokkah boeng</li> </ul>
<p><b>34) Thiruvallur Dist</b></p> <p>Major crops: Paddy, peri-urban vegetables,</p>	<ul style="list-style-type: none"> <li>• It is a peri-urban agriculture growing paddy, vegetables, and flowers</li> </ul>	<ul style="list-style-type: none"> <li>• Develop peri-urban horticulture hubs,</li> </ul>

<p>floriculture; coconut in few places. Animal husbandry: Dairy, poultry, peri-urban livestock rearing and trade.</p>	<ul style="list-style-type: none"> <li>• Urban expansion pressure led to faster land conversion.</li> <li>• Pollution of water sources from urban runoff.</li> <li>• Need for extension of protected cultivation best practices.</li> <li>• Market access competition with Chennai.</li> <li>• Weak collective marketing for peri-urban growers.</li> </ul>	<ul style="list-style-type: none"> <li>• Zoning advisory &amp; peri-urban farming support</li> <li>• Water filtration and testing programs</li> <li>• Protected cultivation demonstration plots</li> <li>• FPOs for peri-urban market access</li> <li>• Awareness programmes focused on high-value, low-space crops.</li> </ul>
<b>35) Tiruvannamalai Dist</b>		
<p>Major agri crops: Paddy, millets, groundnut; rainfed agriculture dominates. Major horti crops: Mango, cashew, minor fruits. Animal husbandry: Goat/sheep, poultry, dairy.</p>	<ul style="list-style-type: none"> <li>• Diverse farming with paddy, groundnut, sugarcane, and millets. Goats and cattle are common.</li> <li>• Challenges: low rainfall and input inefficiency. More dependence on monsoon.</li> <li>• Soil fertility decline and erosion.</li> <li>• Limited certified planting material for mango/cashew.</li> <li>• Poor market linkages for dryland produce.</li> <li>• Weak extension reach in remote villages.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote Agroforestry</li> <li>• Watershed &amp; farm pond programmes</li> <li>• Soil health card follow-ups and organic matter additions</li> <li>• Certified nursery promotion.</li> <li>• Market aggregation via FPOs and mobile markets.</li> <li>• Strengthen cluster-based extension and mobile Agri Dept/KVK /University camps.</li> </ul>
<b>36) Vellore District</b>		
<p>Major agri crops: Paddy, mango (special clusters), vegetables, flowers in peri-urban zones. Major horti crops: Mango (esp. Banganapalli), vegetables for urban markets. Animal husbandry: Dairy, backyard poultry and goat.</p>	<ul style="list-style-type: none"> <li>• Paddy, groundnut, and mango are major crops. Groundwater depletion and poultry disease are major problems.</li> <li>• Salinization of soil and water near industrial zones.</li> <li>• Need for mango grading, storage &amp; pest management.</li> <li>• Drastic drop in agricultural labour availability near urban centers.</li> <li>• Limited access to mechanized harvesting for horticulture.</li> <li>• Weak awareness programmes tailored to peri-urban growers.</li> </ul>	<ul style="list-style-type: none"> <li>• Create Artificial recharge structures,</li> <li>• Evolve micro-irrigation programmes</li> <li>• Mango Warehouse, cold storage &amp; IPM training.</li> <li>• Mechanization: promote custom hiring centres.</li> <li>• Extension modules for peri-urban cropping systems.</li> <li>• Market linkages via urban retail partnerships.</li> </ul>
<b>37) Villupuram District</b>		
<p>Major agri crops: Paddy in irrigated tracts, groundnut, pulses; cashew &amp; sugarcane in some zones. Major horti crops: Cashew, mango, banana in pockets.</p>	<ul style="list-style-type: none"> <li>• Largest district, cultivating paddy, groundnut, millets, and casuarina.</li> <li>• Low input usage (uncertified seeds), poor adoption of improved varieties for pulses and groundnut.</li> </ul>	<ul style="list-style-type: none"> <li>• Input demonstration plots, and seed replacement programs</li> <li>• Degraded soil restoration via FYM and green manures</li> </ul>

<p>Animal husbandry: Dairy, goat and poultry; inland fisheries in some blocks.</p>	<ul style="list-style-type: none"> <li>• Large tracts of degraded soils needing rehabilitation.</li> <li>• Seed system weakness for cashew and mango saplings.</li> <li>• Lack of cluster/ FPO/ aggregation and value-addition.</li> <li>• Inadequate extension outreach in remote blocks.</li> </ul>	<ul style="list-style-type: none"> <li>• Certified nursery support &amp; sapling subsidies for cashew and mango</li> <li>• FPO formation and small processing units</li> <li>• Mobile extension and KVK satellite clinics.</li> </ul>
<b>38) Virudhunagar District</b>		
<p>Major agri crops: Rainfed and semi-rainfed farming dominates in the district - groundnut, cotton, millets, maize, redgram &amp; chickpea.</p> <p>Major horti crops: Mango, guava, banana, aonla, sapota, vegetables, jasmine, &amp; tuberose</p> <p>Animal husbandry: Dairy, goat/sheep rearing and backyard poultry.</p>	<ul style="list-style-type: none"> <li>• Dry district with chillies, pulses, and cotton. Goat rearing is a major livelihood.</li> <li>• Water scarcity, groundwater stress and unreliable tank irrigation.</li> <li>• Low adoption of improved planting material &amp; certified seed (horti + field crops).</li> <li>• Pest &amp; disease pressure in mango, cotton and vegetables + lack of timely surveillance/advisory.</li> <li>• Fodder scarcity and weak linkages between crop and livestock interventions.</li> <li>• Post-harvest losses, inadequate cold chain &amp; market linkages for high-value horticulture (mango, banana, tomato, onion).</li> <li>• The district is called Cotton belt of TN but the cotton cultivation is diminishing due to labour shortage and high cost of cultivation.</li> </ul>	<ul style="list-style-type: none"> <li>• Promote contract farming for chillies.</li> <li>• Demo for drip fertigation /sprinkler for groundnut, banana, vegetables + drip installation &amp; maintenance.</li> <li>• Small farm waterbody recharge.</li> <li>• Establish/ scale-up certified mother-blocks and community nurseries (public-private tie-ups).</li> <li>• Establish a district pest-surveillance network (KVK + Dept. of Agri) with pheromone traps and weekly risk bulletins via SMS/WhatsApp.</li> <li>• Field schools for mango and vegetables focusing on IPM.</li> <li>• Block-level fodder plots, seed distribution of fast-growing forages.</li> <li>• Promote FPO-led ware houses, mobile cold storage and shared ripening / pre-cooling services.</li> <li>• Cotton promotion through HDP, IPM, INM- advisories,.</li> </ul>

Source: <https://des.tn.gov.in>; <https://agritech.tnau.ac.in>; <https://agriwelfare.gov.in>; <https://www.tn.gov.in/> and CARDS-TNAU (2009)

## 2) State-specific common issues and suggested action plan

A perusal of agrarian challenges, extension and technological awareness gap identified at districts level (see Table 4) indicated some of the issues are common, widespread across districts/agroclimatic zones therefore, necessitating larger planning and drives at State /Central Govt level are sorted out, prioritized and presented in this section

Some of these issues flagged here may requires the attention of policy makers/ planners and some issues shows gap in research hence requires more consultative deliberation with research institutions and stakeholders for addressing the challenges.

### 2.1. Addressing issues related to related to Policies, Subsidies etc.

The issues highlighted below may be flagged suitably, following code of conduct at appropriate forum and also during the visit of VIPs/administrator/policy makers visiting the VKSA campaign or similar outreach activities.

**Focus:** *Increasing the number of beneficiaries, reducing the turnaround time, interest subvention, improving livelihood of landless agricultural labourers, etc.*

#	Priority Issues or challenges	Action Plan to address the Issue
1	Greater demand for <b>power weeder</b> exists in TN as this small implement works well in 4 feet wider row crops and it is a labour saving implement.	
2	<b>Power-Driven Chaff Cutters</b> finds increasing adoption in the State. It is being distributed at 50% subsidy.	The number of beneficiaries under the respective schemes in TN may be increased.
3	The Central and State Govts are promoting <b>solar pumpset</b> in the State. <b>The demand for this item is high</b> as subsidy is given to this product but sanction is delayed and number of beneficiaries is limited, say <1000 /year.	Back-end subsidy will help to reduce waiting period or turnover time.
4	The Dept of Horticulture and Spices Board are providing <b>HDPE Tarpaulin sheets</b> at subsidized rate for drying of chillies, black pepper and clove. More spices crops such as garlic/ more beneficiary need to be included in the scheme.	To encourage scientific drying of spices, HDPE Tarpaulin sheets may be provided to many farmers including Garlic grower. GAP-Kit including boosters may be provided to all GI spices.
5	Ensuring income of dryland farmers by shifting to alternate professions	<b>Setting up of Solar parks to increase income of dryland farmers.</b> Retain low value crops like minor millets and pulses in the dryland. Land that cannot generate high-value crops can be allowed for <b>solar parks</b> , which may give farmers steady annual rent (₹30,000 – ₹50,000/acre depending on the project). Power transmission to National Power Grid from remote village may be a challenge but it is a solvable issue.

		<p>The Govt. may consider promoting <b>Agrivoltaics</b> i.e. combining solar panels with millet/pulses/fodder crop cultivations.</p> <p>The PM-KUSUM Scheme of GoI and Tamil Nadu Solar Policy 2019 promotes solar pumps and decentralized solar plants (up to 2 MW).</p>
6	<p><b>Tractor hiring:</b> The Agri. Engineering Dept, Govt of TN provides tractors, power tillers, and other farm machinery <b>on hire</b> at subsidized rates through Agricultural Machinery Hiring Centres (AMHCs) and Custom Hiring Centres (CHCs). This service has overwhelming response throughout Tamil Nadu. Remote areas need to be focussed.</p>	<p>Distribution of leaflets just before start of agriculture season <b>focusing remote area</b> and engagement of rural youth of remote village on daily-basis will address these limitations.</p> <p>More number of drivers may be engaged.</p>
7	<p>The Govt. is supporting establishment of <b>Cold storage /warehouse</b> facility for keeping their perishable vegetables temporarily for few days, before sending to markets. <i>Such cold storage godown are limited in number or not present in village or block level production cluster of important vegetables.</i></p>	<p>Govt. supports for <b>establishing small scale cold storage godowns</b> in major vegetable production clusters / block level may be doubled.</p>
8	<p><b>Long distance transport &amp; marketing:</b> Vegetable and flower cultivation and sending produce to urban markets (Koyambedu, Dharasuram, Coimbatore, Madurai, Trichy, Salem markets) is increasing among young generation farmers. The <b>transport cost of sending their produce to long distance market reduce their profit.</b></p>	<p><b>Financial support to bear the transport cost</b> would help the youth /young generation farmers in retaining their profession in agriculture.</p>
9	<p>Under the <b>PM KISAN scheme</b>, only farmers with agriculture landholding are covered. <b>Landless farmers are not included as beneficiary.</b></p>	<p>The scheme may include landless farmers or agriculture workers having permanent residence in villages.</p> <p>If not, <b>Goats</b> may be given at subsidized rate to the landless workers to start a new business.</p>
10	<p>The benefit offered under <b>Drone Didi</b> scheme is restricted to female.</p>	<p><b>Male engineering graduate</b> hailing from rural areas may be given the benefits, so that their income will be</p>

		ensured and at the same time more drone service providers will be available in rural areas.
11	Crop insurance under PM-FBY is being offered to paddy and few crops. <b>other major crops are not covered.</b> Sometime, cattle growers face problem like <b>death of their milch animals</b> during calving, snake bite, diseases, electricity shock etc. These losses are not covered in insurance scheme.	Sugarcane, banana, etc may be brought under PM-FBY insurance cover. Unexpected death of <b>milch animals</b> may be brought under suitable insurance scheme.
12	Considering huge import of <b>palm oil</b> into India, the National Oilseed mission was launched. Oil palm has been promoted in Tamil Nadu but <b>it's spread in the State is not appreciably high. Those who planted Oil palm are facing less productivity and processing problem.</b> A lot of unspent funds under oil palm mission is available.	The unspent budget available under Oil Palm Promotion Scheme may be diverted for promotion of other suitable oilseed crops in the State.
13	<b>Conservation of fruit genetic resources - a new approach</b>	Collect all the available varieties and variabilities in fruit crops and planting them as avenue tree <b>along the rural roads, on the banks of ponds/lakes and on common lands</b> - natham, porampokku as done by earlier rulers. Village youth may be employed for collection of seeds and seedling/sapling/nursery rising - they will get gainful employment in the rural area itself and at the same time helping them in nursery activities.
14	<b>Assistance for setting up Dairy units:</b> The Central and State Govt is supporting purchase of <b>milch animal</b> through for less than 2 cows/animals. However, those who wish to purchase 5-10 cows <b>for setting up a dairy unit in villages, limited financial support with low interest is available.</b>	Credit for setting up of dairy unit in villages with <b>interest subvention</b> or loan at 4% interest rate may be announced, especially to the new entrepreneurs. The Dept. may assist suitably for purchase and or transport of cows from other State or faraway places.
15	<b>Rabbit farming</b> is profitable as it requires very little space and investment,	Inclusion of Rabbit Farming in the National livestock Mission or a

	can be managed easily by women. It <b>requires more promotional activities.</b>	separate scheme under State Dept focusing on hill area could help.
16	<b>Area expansion for clove in Kanyakumari district:</b> Tamil Nadu is the leader in clove production in the country. The Kanyakumari clove is known for its quality and it got GI tag. Due to increasing demand, the country is importing clove worth of 1953 crores in 2024-25. To curtail clove import, the Govt is promoting clove cultivation in the Country. The Nagercoil hills in the Kanyakumari Dist is having ideal climate for clove cultivation. <b>There is possibility of increasing area in Kanyakumari Dist.</b> However, there is hurdle in area expansion <b>due to implementation of Tamil Nadu Forest Act, 1882 and TN Preservation of Private Forest Act, 1949</b> which interpret the 'patta land' as private forest which prohibit agricultural activities in the private forest without special permission of the Forest Dept.	Special permission from the Forest Dept/ Govt. of Tamil Nadu is required to expand clove area in the private forest Patta Land of Kanyakumari District. Since clove, nutmeg etc live long (~60 years) and promote forest cover its cultivation in the private patta land may be treated as afforestation activity.  The clove cultivation may be excluded from the list of non-forest activity and growers should not be penalized under the Forest Act.
17	The TNAU develops many innovative farm machinery, implements, and processing tools, but adoption at farm level depends on effective extension. The TN Agri Engineering Dept has field network, extension staff, and field demonstration platforms, ensuring technologies reach small and marginal farmers quickly. <b>The Dept seek sharing of Agricultural Engineering Technology developed by TNAU to the TN Agri Engineering Dept for extension purposes.</b>	This proposal is agreed subject to establishing a MoUs or formal technology transfer agreements for clear roles and timelines, will scaling adoption of the implements among farmers efficiently. Ensuring quality, safety, and standardization. Strengthening feedback loops for future innovation. Promoting sustainable and precision agriculture in Tamil Nadu
18	The ICAR-Central Institute of Post-Harvest Engineering and Technology (CIPHET)'s Post-Harvest Machinery and Equipment Testing Centre (PHMETC) Ludhiana conducts <b>tests to ensure the supply of quality agricultural machinery and equipment under government programmes.</b> The testing charges are determined based on the type and complexity of the machinery. The Farm Machinery Training and Testing Institutes (FMTTIs) across India, such as	Reduce testing charges for Agricultural machinery and implements tested by the Government of India approved Testing institutes.

	<p>those in Budni, Hisar, and Biswanath Chariali, offer testing services for agricultural machinery. The TNAU provides a schedule of test fees for various types of agricultural equipment. For instance, testing charges for tractors under different standards are as follows:  ICT Standard: ₹2,25,000  BT Standard: ₹2,15,000  OECD Standard: ₹1,75,000  <b>The charges are felt high by the Dept and new entrepreneurs.</b></p>	
19	<p><b>Goods and Services Tax (GST)</b> was implemented in India on 1<sup>st</sup> July 2017, replacing multiple indirect taxes such as excise duty, VAT, and service tax. To promote agriculture and reduce input costs for farmers, the Government of India provided GST exemptions on certain agricultural machinery and implements, recognizing them as essential for farm production. Later it was revoked and GST of 12 to 18% was charged. <b>The GST on agricultural machinery and implements has been reduced from 12%-18% to 5%</b>, effective from September 22, 2025. This is applicable for Tractors and power tillers, Tractor tyres, Ploughs, harrows, cultivators, seed drills, Threshers, combine harvesters, Sprayers, planters, irrigation pumps (including solar-powered), Milking machines, dairy equipment, poultry feeding &amp; watering equipment, Solar dryers for agricultural produce, Implements primarily used for harvesting, sowing, planting, or land preparation. The purpose of GST reduction is to reduce cost burden on farmers and agricultural entrepreneurs.</p>	<p>The State Dept and Farmers demands exemption of GST for agricultural machinery and implements.</p>
20	<p><b>Issues related quality of farm inputs, irrigation water and agricultural produce:</b> It is a fact that the people who eat natural foods, fruits, vegetables etc are healthy with good physics and mental well beings. There are cases that the some of the food grains/vegetables/fruits/insecticides/micronutrients/organic fertilizers sold in</p>	<p><b>Expand or intensify:</b>  (i) periodical inspection on the quality of agriculture inputs such as fertilizers, pesticides, seeds, micronutrients, foliar spray, bio-stimulants, growth regulators, hormones, etc sold in the local markets.</p>

<p>the market are furious/adulterated/ contain pesticide residues/residues of chemicals used in the processing chain. If such materials are consumed by the people/utilized in the foodgrains/vegetable/fruit production processes it may affect the health of consumers/ health of soils, ecosystem etc.</p> <p>Instances of <b>spurious seeds, substandard fertilizers, adulterated pesticides, and misbranded micronutrients and bio-stimulants have been reported.</b> According to DA&amp;FW around 6–8% of fertilizer and pesticide samples tested annually across India fail to meet prescribed quality standards.</p> <p>The quality of <b>agricultural produce</b> is another critical area of concern. Studies by the <b>FSSAI have revealed the presence of pesticide residues above permissible limits</b> in vegetables and fruits in several markets.</p> <p>The presence of <b>industrial effluents and sewage contamination</b> in peri-urban areas like Coimbatore, Vellore, Ranipet and Tiruppur further <b>deteriorates irrigation water quality.</b></p>	<p>(ii) periodical inspection on the quality of farm produces particularly pesticide residue/ poisonous substances/ designated disease content in food grains, vegetables, fruits etc sold in local markets.</p> <p>(iii) periodical testing on irrigation quality used for agriculture purpose and giving suitable alerts/remedies/ advisories for improvement to the growers/ dealers/manufacturer etc.</p> <p><b>Establishment of as many as possible referral lab for</b></p> <p>(i) testing the quality of fertilizers, pesticides, seeds, micronutrients, foliar spray, bio-stimulants, growth regulators, hormones, etc sold in the local markets,</p> <p>(ii) for testing the quality or pesticide residues /poisonous substances in foodgrains, vegetables, fruits etc sold in local markets,</p> <p>(iii) testing the irrigation water quality, preferably in PPP mode.</p>
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## 2.2. Addressing issues related to research / technological gap

Some of the prioritized issues which require considerable time and investment to find out possible solution are presented here under 7 themes. The concerned ICAR institutions, SAUs and other agencies may take up these issues for working out possible solution, individually or jointly with Central and State Govt.

### Theme 1

#### Issues related to Genetic improvement of crop varieties and Seed Production

**Focus / Intervention:** *Market driven or demand driven breeding / crop varieties is the need of the hour. Seeds of improved varieties shall reach farmers before sowing time by expanding seed production capabilities, exploring PPP mode and coordinating seed marketing network.*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	<b>Regaining Cotton area</b> and productivity in the State by <b>developing suitable varieties/hybrids</b> .	Development of <b>HDPS</b> (high density planting system) <b>ideotypes</b> (compact architecture, synchronous bolling) for mechanical picking.  Dissemination of knowledge on varieties/ hybrids best suited for TN microclimates.
2	The demand for <b>fine and super fine paddy varieties</b> is increasing in the State traded in huge quantity than general or matta rice. Traders and consumer demand varieties like RNR (Pragathi RNR-15048), Sowbhagya etc.	Development of super fine rice varieties based on market need has many fold advantages: i) It satisfies consumer need. ii) Export potential of these varieties are high iii) As these varieties are traded at three-fold higher price than matta rice, farmers will get more profit. iv) Indirectly, it reduces procurement burden at DPC Centres operating in the Centre as most of the super fine varieties are immediately bought by the millers directly from the farmers.
3	Farmers prefer <b>bold seeded Groundnut</b> varieties like GG 20, which fetches Rs. 500-1000/q higher rate than normal size variety. Farmers are getting seeds from Gujarat through traders at high cost. Seed production of this variety in TN is suggested.	Bold seeded groundnut as good as that of GG 20 is required for domestic market as well as for boosting export.  The GG 20 variety may be tested along with TNAU varieties, if outyielded its seed production during kharif season may be approved / taken up the concerned institutes/Dept.

4	<p><b>Rice fallow pulses</b> is an important cropping system in the delta area of TN. <b>More number of short duration varieties with bold seed is required for such cropping system.</b></p>	<p>Identification of short duration <b>black gram</b> with bold seed for rice fallow cropping system is required.</p> <p>Short duration <b>red gram</b> variety with high yield as that of long duration varieties may be developed.</p>
5	<p><b>Improved sugarcane varieties</b> with high yield, high sucrose% combined with tolerant to Pokkah-boeng-crown mealy bug for <b>delta area and interior coastal zone</b> is required.</p>	<p>Cane variety suitable to the region and tolerant to the inherent and seasonal problems faced in the zones may be evolved in collaboration with sugar industry.</p>

## Theme 2 Addressing Issues related to crop Productivity through ICM, INM, IPM etc

**Focus/Intervention:** *Ensuring site-specific crop planning (right crop, right season, right practices), promoting efficient nutrient, water management, and integrates soil, crop, pest, and nutrient management aiming high productivity and farmers' profitability and the same time reduce input cost and encourages diversification and crop rotation to maintain soil health.*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	Increasing area under <b>cotton</b> by <b>improving cotton productivity</b> , farmers profitability and reducing cost of cultivation	<p><b>Standardizing &amp; Popularizing Improved production technologies</b> which has increased resource use efficiency such as:</p> <ul style="list-style-type: none"> <li>• <b>Drip-fertigation schedules</b> for HDPS vs conventional; split-N trials guided by RS and leaf tissue indices.</li> <li>• Deficit irrigation protocols with IoT soil moisture + weather cues for western belt.</li> <li>• Soil carbon restoration trials: cotton-legume rotations, compost, biochar amendments.</li> </ul> <p><b>Integrated pest and disease management</b></p> <ul style="list-style-type: none"> <li>• AI enabled surveillance and timely interventions to control insect pests including control Area-wide PBW (pink bollworm) management trials: pheromone trapping density, mating disruption, and sowing window experiments.</li> <li>• Compatibility studies for biocontrol agents and key botanicals with locally used insecticides.</li> </ul>
2	Tannery or textile effluent problem in districts like Karur, Tiruvallur, Vellore, Coimbatore is increasing.	Bio-products like Effective Microbes (EM) Solution for reclamation of industrial effluent is required
3	Application of green leaf manuring in paddy field is getting reduced. It is time to increase green leaf production base in the rural areas, especially in paddy belt by growing trees such as neem, poovarasu, pungam, glyricidia etc in	Local farmers residing in the nearby villages may be involved in participatory tree planting in forest/panchayat land, watering and tree maintenance etc. In return, the forest Dept or Panchayat may allow these farmers to collect leaves from

	village wasteland, porampokku, social forest land etc.	these trees for feeding to goat and green manuring purpose.
4	Hitherto unnoticed or <b>minor pests</b> like <b>Rugose spiraling whitefly in coconut</b> , stem borer in pulses, <b>mealy bug in sugarcane</b> is posing serious threats to the crops.	Effective integrated management practices (IPM) with greater focus on parasitoids and predators may be taken up on war footing basis
5	Problems anticipated in High density cotton planting system. The HDPS warrants desired ideotypes / alteration in plant canopy such as <b>compact and early varieties, which are still limited in India or TN. Secondly, the nutrient and water stress under HDPS may reduce yields due to high population. Thirdly, pest and disease spread is faster in dense canopy and lastly farmers have to use growth regulators or manual pruning which is essential, else lodging occurs.</b>	These challenges require attention of researchers and extension officials.
6	<b>Improving the quality of water bodies:</b> In the urban area, there are tanks and ponds where the impounded <b>water remains in the tank/pond for years together</b> , creating bad odour, high algal growth and BOD. The water in such ponds is unfit for animal wash and even for fish farming. The banks of few such ponds/tanks have been improved under the Smart City Project and people utilizing it for morning walk, ignoring the hazardous odour.	One time letting-out of such stagnated water, followed by drying for few months, desilting and letting-in fresh water, stopping mixing of untreated sewage water will improve the quality as well as multiple use of such water.
7	<b>Indiscriminate application of Pesticides in agriculture continues in TN.</b> Farmers using pesticides 5-10 times more than the permissible level in vegetables in some TN districts. Use of long residual pesticides like methyl parathione, furadan, monocrotophos which remain in crops long after spraying are also reported in TN. Some of the pesticides are banned (or restricted) for food grains/vegetable/fruit crops, yet still in use. For example in Tiruppur, Pudukottai, Salem etc. Monocrotophos (one among the six	Below the list of few pesticides that are banned or restricted in Tamil Nadu / India. Monocrotophos – banned in TN for use on vegetables; Profenofos – banned under the TN ban on six hazardous pesticides. Acephate – same group - banned under TN order. Chlorpyrifos, Cypermethrin, mixtures with these – involved in recent bans / restrictions.

	<p>banned pesticides) is still being used (e.g. on coconut farms, etc.) via online and informal channels. Overuse of pesticides wastes money on extra pesticides / fungicides, damage to beneficial insects, pollutes environments, residues in foodgrains/vegetables/fruits exceeding Maximum Residue Limits (MRLs) creates consumer health risk and loss of faith on the products. Also these products are liable for rejections in export markets.</p>	<p>Yellow Phosphorus (3% paste) – for rodenticide/insecticidal use, permanently banned.</p> <p><i>More broadly, India's PPQS / DPPQS list includes many banned / refused registration / restricted pesticides: e.g. Alachlor, Aldicarb, Aldrin, BHC (Benzene Hexachloride), Carbaryl, Diazinon, etc.</i></p> <p>Regulation &amp; Enforcement: Strict monitoring of banned or restricted pesticides. Surprise raids / checks on sales outlets. Control online sale of banned or unsafe pesticides.</p> <p>Farmer Awareness &amp; Training: Training on safe usage: doses, timing, proper protective equipment. Extension services showing examples of misuse and risk. Information campaigns via local languages, through radio/TV / farmer groups. Demonstrations in fields with integrated pest management (IPM).</p> <p>Alternatives &amp; Integrated Pest Management (IPM)/Sustainable Practices: Use of biopesticides, botanical extracts. Cultural practices: crop rotation, trap crops, resistant varieties. Use pest forecasting / traps to avoid prophylactic spraying. Promote organic / low residue production.</p> <p>Certification &amp; Market Incentives: Certify low-residue or pesticide-safe produce; this can fetch premium prices. Link produce to markets / exporters that demand residue compliance. Government procurement / public distribution of safe produce to encourage demand.</p> <p>Policy Measures: Inclusion of safe pesticide use in agricultural policy &amp; subsidies. Ban permanently dangerous chemicals. Support for safer alternatives and research. Rewarding best practices and penalizing violations.</p>
8	<p><b>Integrated Farming System (IFS):</b> IFS refers to combining several agricultural and allied enterprises — crops + livestock + fish + agroforestry + beekeeping etc. — in the same farm in a complementary way so that wastes from one component become inputs for</p>	<p>Demonstration farms or model IFS units in each block so farmers can see, learn and adapt.</p> <p>Regular training programs (technical skills for animal husbandry, fish farming,</p>

<p>another, risks are spread, and overall productivity &amp; income are improved. IFS modules like “crop + dairy” or “crop + dairy + goat + backyard poultry” under IFS improved net income by ~ 49-54% over baseline (no intervention) years. By using manure from livestock, compost, crop residues, etc., input cost (fertilizer, organic methods) lowers. Having more than one component (e.g. dairy + poultry + fish + crops) means if one fails (say crop failure due to drought or pest), other components can help cushion the loss. Producing diverse food (vegetables + animal protein + fruits) improves household nutrition and reduces dependency on single crops. Organic inputs reduce chemical exposure, etc. Recently, the Govt of TN Tamil Nadu announced establishment of <b>14,000 IFS units</b> (crop + dairy + goat + honey bee rearing etc.) with funding, to diversify and ensure self-sustaining livelihoods.</p> <p>Nonetheless, many farmers in TN are small or marginal, with small parcels. It can be hard to allocate space for multiple enterprises. Land fragmentation results in inefficiencies: travel, infrastructure etc. Farmers may not have experience with integrating different components (e.g. managing fish + crop + livestock together). Setting up livestock units, ponds, boundary fencing, shelter for animals, initial breed or fingerlings etc. needs investment. Many small farmers have limited capital or liquidity. Lack of good extension services, demonstration units, skill training.</p>	<p>composting, pest management, etc.). ICAR/KVKs can be used.</p> <p>Use of ICT / mobile apps to give advisory services. Subsidies for setting up livestock, fish ponds, poultry etc.</p> <p>Low-interest credit tailored to IFS, with insurance and risk coverage that considers integrated enterprises.</p> <p>Grant assistance for input supply infrastructure (fodder banks, feed mills).</p> <p>Insurance products tailored for integrated farms (for e.g. when one component fails).</p> <p>Encourage group approach or cooperatives so that infrastructure (ponds, cold storage, feed mills) can be shared.</p> <p>Create Peer learning groups.</p> <p>Use of women SHGs, youth groups for allied components (e.g. poultry, beekeeping).</p>
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<p>9</p>	<p>Technologies that can make chemically contaminated water safe for recharge (used alone or in series, depending on contaminant type) are available in India, such as Soil-Aquifer Treatment (SAT) / Managed Aquifer Recharge (MAR), Constructed (engineered) wetlands / subsurface flow systems, Permeable Reactive Barriers (PRBs), Advanced engineered treatment (tertiary polishing/ membrane filtration /ultrafiltration/RO), and hybrid systems etc. Are these adopted in Tamil Nadu? Partly Yes for treating municipal wastewater, stormwater and rainwater reuse / recharge (pond restoration, sponge parks, recharge wells in Chennai/Coimbatore) but not for the routine recharge of industrially polluted water without stringent treatment. The Tamil Nadu policy supports wastewater reuse for industrial/agriculture uses, and local ULB projects have implemented recharge infrastructures and polishing. For examples: Chennai pond/ sponging restoration with recharge wells; Coimbatore rainwater reuse pilot, Research pilots (e.g., check-dam recharge studies in Krishnagiri) have analysed quality impacts. However full-scale MAR of chemically contaminated effluents remains limited because of contaminant risks and regulatory safeguards.</p>	<p>Develop suitable technologies that can make chemically contaminated water safe for recharge.</p> <p><b>Contaminant mapping: inventory of industrial discharges and priority contaminants near candidate recharge zones.</b></p> <p><b>Site screening tools: rapid protocols to assess soil, vadose zone, and aquifer vulnerability in TN's diverse geology.</b></p> <p><b>Segregate &amp; treat at source:</b> industries must pre-treat to remove priority contaminants (source control is cheaper &amp; safer).</p> <p><b>Fit-for-purpose treatment trains:</b> design treatment to contaminant type: e.g., biological + wetlands for nutrients/ organics; AOP + activated carbon/RO for recalcitrant organics; PRBs for plumes of specific chemicals. Use SAT/constructed wetlands as <i>polishing</i> before infiltration.</p> <p><b>Pilot MAR sites with strong monitoring</b> : choose low-risk pilot basins (municipal treated wastewater, stormwater, or agricultural drainage) to demonstrate SAT + aquifer response, include upstream lab analyses and borehole monitoring networks.</p>
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10	<p>There <i>are</i> certain technologies that can reduce salinity in borewell (ground) water such as Reverse Osmosis (RO), Electrodialysis, Electrodialysis Reversal (EDR), Forward Osmosis (FO), Dilution+artificial recharge, Ion exchange, Capacitive Deionization (CDI), Flow-electrode CDI etc. Some of these technologies have been tried or trialled in TN such as <b>Solar-powered distillation in ECR (East Coast Road, Chennai), Forward Osmosis (FO) system in Narippaiyur, Ramanathapuram, Seawater and brackish water desalination plants in Nemmeli.</b> All these are adoption stage, especially for coastal drinking water supply, but less so for farm-scale or borewell salinity treatment for irrigation. <i>Small villages or farms need small-scale systems that are low cost and low maintenance. Most technology is for municipal scale. Need modular plants</i></p>	<p>Yes, there are technologies available in TN to reduce salinity, and some have been adopted especially for drinking water in coastal areas. But for <b>borewell-saline water used in agriculture or domestic uses in non-coastal inland areas, adoption is more limited. Technology that can be adopted at individual farmers field such as Gypsum bed desalination technique</b> may works to some extent for small farmers, especially for sodic water (Na-dominant). But it is not effective for highly saline water, so better combine with blending or low-cost reverse osmosis.</p> <p>The reason for low adoption of this technologies are: Many RO and distillation processes require constant power. Perhaps the use of solar / hybrid (solar + backup grid) solutions can reduce running costs. High capex is needed for installing desalination plants; frequent replacement of membranes; need for skilled operation are the other bottlenecks. For irrigation, water with some salinity may be acceptable; full purity not needed. Designing systems that produce "fit-for-purpose" water (for irrigation / livestock / domestic) rather than full potable quality can save cost.</p>
11	<p><b>Red wood ant and Sucking pests in fruit trees:</b> The red wood ant or horse ant (<i>Formica rufa</i>) builds large soil mounds at the base of trees in the orchards or build nests on the fruit trees. Colonies contain thousands of ants, making control difficult once established. Ant trails disturb pollinators like bees and butterflies, lowering pollination and fruit set. Colonies may injure flower buds and young fruits while constructing shelters or collecting honeydew. Red wood ants are aggressive biters. Their bites on human cause pain, itching, and small pustules on human skin. Orchard workers and harvesters in Tamil Nadu face difficulty in pruning, spraying, or harvesting fruits, especially on infested</p>	<p>Create demo/ awareness programme on: Control measures like removal of ant nests near tree bases, wrapping waterproof sticky barrier around the trunk (tree banding) and application of sticky bands such as Tanglefoot or castor oil + grease around the trunk to prevent ants from climbing, use of natural deterrents such as sprinkling food-grade diatomaceous earth around the base of the tree which will damage the exoskeletons of ants that walk over it or sprinkling coffee seeds grounds, Neem-based sprays (5% neem seed kernel extract or 0.5-1% neem oil + soap solution), chilli-garlic extract spray (10 ml chilli extract + 10 ml garlic extract per litre water), Chlorpyrifos drenching around mound or use of bait such as boric acid (1</p>

<p>trees. Therefore, controlling the sucking pest is a key step in controlling the ant and vice versa. <b><i>Effective control measures and demo/awareness programmes are needed which should integrate preventing ants from accessing the tree by blocking trunk access, controlling aphid populations, and creating a less inviting environment for ants.</i></b></p>	<p>part) + sugar (10 parts) + water (enough to make a paste).  <i>Develop an integrated ant-sucking pests control capsule as a long-term measure.</i></p>
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### Theme 3 Addressing Issues related to Mechanization

**Focus /Intervention:** *Light weight or small machine with low cost of operation befit to smaller landholdings (small scale mechanization) shall be given priority to assist over 60% of smallholders practicing agriculture in the State.*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	<p><b>Mechanization in cotton</b>, from sowing to harvest is still a distant dream. Unless the issue is addressed cotton area in TN will not increase, as labour shortage and cost of cultivation keeps on increasing.</p>	<p>Development of Cotton Harvester to suit local varieties may be taken up as priority issue.</p> <p>In addition, standardization of Geometry × variety × PGR packages for synchronized boll opening and machine harvest.</p> <p>On-farm demonstrations comparing picker vs hand harvest: lint quality, trash %, losses and net returns.</p> <p>Pre-cleaning and ginning optimization trials for machine-picked HDPS cotton to reduce foreign matter and maintain fibre length.</p>
2	<p><b>Harvesting charges in sugarcane</b> has increased considerably due to shortage of agriculture labours and increasing wages of migrant labours.</p> <p>Sugarcane strippers / leaf removers / peeling / detopping equipments developed in India such as by Unicus India / IISR-Lucknow / OUAT Bhubaneswar/ Gaarwa (Pune)/ Penguin Engineering etc are available. But many are rudimentary, semi-manual, or imported, and there is substantial scope for improvement.</p>	<p>Small-size-All field harvester (which harvest lodged canes, small fields) for sugarcane need to be designed and evaluated.</p> <p>There is a need design or improve the existing sugarcane stripper machine that can strip large lots of cane quickly (e.g. multi-tons per hour) with minimal labour and minimum damage to buds.</p>
3	<p>The <b>cost of soil sample analysis</b>, especially micro nutrient is high and the Agri. Dept is facing financial problem to analyse large number of samples</p>	<p>Low-cost equipment or Soil probe is required for analyzing micro nutrients</p>
4	<p><b>Retaining the talents of rural artisans:</b> The number of rural artisans like blacksmith, carpenter, sprayer/tractor workshop available in villages are diminishing as they migrate to urban areas.</p>	<p>The talented artisans may be provided <b>improved machineries and training as well as support to open modern workshop</b> in the rural area itself which benefit both the artisan and rural farming community.</p>

5	<p><b>Machines that dehull / decorticate (deseed) freshly harvested gingelly (sesame/gingili) are available in India</b>, from small “mini-decorticators” and peelers to full hulled-sesame plants (e.g., Rising Machinery, Devika/mini-decorticators, Swastik Technology, Tinytech etc). However, current machines often need improvements in field-friendliness, seed quality retention, and affordability for small farmers. Many machines are <b>designed for post-cleaned, dried seed</b> (processing lines expect seed already threshed/cleaned). Some are wet/soak + peel systems. Farmers harvest sesamum at high moisture and want to process immediately (fresh); most machines assume dry, cleaned seed and are stationary. Many small machines cause high split rates (low whole-seed yield), lowering value for table seeds and press performance.</p>	<p>Develop <b>portable, low-power decorticators</b> or tractor/van-mounted units to deseed <b>the freshly harvested gingelly</b> and that can be used at farm/village level immediately after harvest to reduce transport losses and drying time.</p>
6	<p><b>Harvesting charges in groundnut</b> has increased considerably in TN due to shortage of agriculture labours and increasing wages of migrant labours.</p>	<p>Groundnut is being harvested using large machine in Gujarat as large stretch of area is planted with groundnut. But in TN groundnut area is scattered and manual harvesting increase the cost besides non-availability of labour. So small scale mechanical harvester is needed for groundnut harvest.</p>
7	<p><b>End-to-end mechanization for cultivation of vegetables</b> like brinjal, onion, tomato and chilli <b>and Jasmine</b> in Tamil Nadu, covering cultivation phases such as Land preparation, Nursery &amp; seedling handling, Planting / transplanting / direct seeding, Irrigation &amp; fertigation, Inter-cultural operations (weeding, mulching, staking), IPM / spraying / foliar feeds (mist/blower sprayers, drone options), Harvesting &amp; collection (manual, semi-mechanized, specialized), On-farm handling &amp; primary processing (grading, sorting, drying, curing) and Storage/ cold chain /</p>	<p>Promote and scale hub-and-spoke custom hiring (SMAM &amp; state schemes) so smallholders can access transplanters, harvesters, dryers and pack-house equipment without buying units. Policy support exists and should be tapped.</p> <p>Focus on modular systems (start with planter or lifter module that can be added onto) and tractor-PTO driven or battery variants for rural electrification constraints.</p> <p>Many Indian prototypes exist (transplanters, small harvesters) but needs supports for rapid prototyping,</p>

	value-addition (packing, cold rooms, processing lines)	pilot trials in TN agroecologies and industrial partnerships to commercialize.
8	<p><b>Onion de-topper:</b> Detopping is the process of removing the foliage (leaves, stems / tops) from freshly harvested onions, after curing, before storage or sale. This is usually done manually with sickles and is labour-intensive, time-consuming, and drudgery. A detopper machine is designed to shear or cut off foliage efficiently, while preserving the onion bulbs/clusters, reducing labour cost &amp; time, and improving hygiene/marketability. The <b>ICAR-IIHR, Bengaluru</b> has developed an onion detopping machine. It has capacity is 370 kg/h with 98% detopping efficiency. This compares favourably to 30 kg/h by manual works. The State TN does produce a lot of “multiplier onion” (small onion) which would benefit from detopping. There are onion processing units in Perambalur that do peeling, paste, flakes etc. But detopping is perhaps still largely manual there. <b>So there is certainly a market for the machine but no machine suitable for small scale detopping is available.</b></p>	<p>Machines need to be adapted to local onion varieties (size, cluster type, neck length etc.), power supply (single phase, three phase), local repair parts. Local fabricators could make simpler cheaper versions.</p> <p>Not all farmers in TN requires 300-370 kg/h detopping machines.</p> <p>Smaller scale detoppers (say 50-100 kg/h) would be useful for smaller farms.</p> <p>Lighter, portable versions, maybe tractor-PTO or small motor powered.</p>
9	<p>Farmers need efficient ways to collect crop residues (straw, stubble, sugarcane trash, sorghum/napier, rice straw) for fodder, mulching, compost, or bioenergy rather than burning. Smallholders and dairy units need chopped fodder/silage; small forage harvesters produce chopped material for animals directly. Harvesting/collecting biomass is labour-intensive and seasonal- <b>small biomass harvester machines speed operations and cut labour costs.</b> Sompanies like Shaktiman and several regional manufactures offer small forage harvesters suitable for napier, maize and other fodder. But the actual <i>on-farm presence</i> of small biomass harvesters is uneven. Some progressive FPOs/co-ops</p>	<p><b>Smaller capacity Biomass Harvester</b> such as tractor-mounted PTO or mini-tractor self-propelled (HP 20–50) to suit common power in TN, cutting width 1–2 m (single/dual row) for narrow fields; chopping knife drum with adjustable cut length (10–50 mm), often with integrated collection / small baler module (optional) or trailer to collect chopped mass; mini baler making 10–25 kg bales for easy manual handling and capable of robust feed &amp; anti-clogging design (for wet rice straw or sticky trash) need to be designed and evaluated.</p>

	and contractors have these machines, while many smallholders do not.	
10	<p><b>Solar energy</b> provides a <b>renewable, decentralized and cost-effective</b> source of power for farm operations, especially in tropical areas with unreliable grid electricity or high diesel costs. Tamil Nadu, with high solar radiation (5–6 kWh/m<sup>2</sup>/day), has strong potential for agricultural solar applications. <b>Cold storage units</b> (for fruits, vegetables, flowers, milk, fish, etc.) consume high power; solar energy drastically cuts recurring electricity costs. Solar-powered cold rooms developed under TNAU and IIT-M incubation projects are being adopted in Krishnagiri and Dindigul districts for storing jasmine, tomato, and grapes. <b>This successful model may be replicated.</b></p> <p>With <b>solar powered batteries farmers can operate small pumps, sprayers, threshers, weeders, and dryers</b> without relying on grid power or diesel. Once installed, solar power provides free energy — reduces recurring fuel and electricity bills significantly. Solar knapsack sprayers and solar-powered brush cutters by TNAU, Coimbatore. Solar-powered mini-milking machines, seed graders, and paddy threshers has been demonstrated by the Dept Agri. Engineering, TN in Villupuram and Thanjavur. More such demos are needed.</p>	<p>1) Need to develop Cost effective Solar Powered Cold Storage System.</p> <p>2) Need to develop smaller agricultural machinery with the power generated by the solar panels of Solar Pumping system using Universal Solar Pump Controller (USPC).</p>
11	<p><b>Development of Electric Powered Agriculture Machinery.</b> Developing electric-powered agricultural machinery in Tamil Nadu offers numerous advantages (zero emission, reduce noise pollution, lower operation costs etc), particularly given the state's strong agricultural base and commitment to sustainable development.</p> <p>Electric Tractors like the Sonalika Tiger Electric and e-tractors from John Deere and AgCo offer features like instant</p>	<p>Developing electric-powered agricultural machinery in Tamil Nadu aligns with the state's agricultural needs, environmental goals, and policy initiatives. By investing in electric machinery, Tamil Nadu can enhance farm productivity, reduce environmental impact, and improve the livelihoods of its farmers</p>

	<p>torque delivery and precision control. Electric Feed Mixers (used in livestock forming) provide homogeneous blends of animal feed, enhancing nutrition quality. Electric Straddle Tractors: Ideal for tasks like soil tilling and phytosanitary treatments in vineyards, these tractors offer high performance with low emissions. <b>More research and investment is needed in this area.</b></p>	
12	<p>Development of machinery for separating Jackfruit bulbs from Jackfruit.</p>	<p>Machineries such as Pneumatic-Based Jackfruit Corer Cum Splitter, Semi-Automated Jackfruit Cutting and Splitting Tools, <b>Jackfruit Peeling and Cutting Machines are available.</b> Manufacturers like JMS Industries in Coimbatore offer jackfruit peeling and cutting machines. These machines are suitable for various applications, including jackfruit powder production. <b>Demo may be organized in major jack fruit growing districts.</b></p>

## Theme 4 Addressing Issues in Horticulture Sector

**Focus /Intervention:** *Promote eco-friendly cultivation through ICM, INM, IPM etc, shift from production-centric to market-driven horticulture by linking farmers to organized markets, e-NAM, and export channel, encourage processing, branding, and promotion of value-added products to stabilize farmer income and promote high-density planting, protected cultivation, precision farming, micro-irrigation, and mechanization*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	<b>Low productivity of coconut plantation</b> 12,000–14,000 nuts/ha which is close to national average but lower than states like Andhra Pradesh where productivity exceeds 15,000 nuts/ha, due to (i) poor manuring, (ii) increasing incidence of rugose spiraling whitefly, (iii) root wilt and other causes	Integrated approach: ICM, IPM, INM, organic recycling to sustain productivity. Concentration of manuring during monsoon season Distribution of coconut shredder /pulverizer at subsidized rate, at least one shredder for 9-10 villages
2	Coffee is usually grown along with Pepper. Alternative cropping system specific to each region in the state is required	Identification of location specific coffee cropping system with allied crops (other than pepper) and management of white stem borer in Coffee is required
3	<b>Banana:</b> Despite of having high productivity (40 t/acre), rising cost of cultivation in the State is a great concern Continuous monocropping has led to nutrient imbalance and declining soil health. Banana is labour- intensive (planting, propping, harvesting, packing), but rising wages and scarcity increase cost of cultivation. Added to these, Tissue culture plants, fertilizers, drip systems, and plant protection measures have also increased cultivation cost.	Innovative low-input, climate smart cultivation practices, and cultivation methods to promote carbon sensitive farming, organic and natural farming in <b>banana need to be developed</b>
4	<b>Addressing problem of plenty:</b> Due to excess production/ harvest, the produce fetches at low price in the production Centres, but there is demand or high price in far-away markets. e.g. jackfruit, palmira, green chillies, brinjal and tomato	Establishing suitable <b>cold storage facility</b> in the major production Centres. Establishing facility or support for long distance market. Establishing marketing network including promotion for export, e-marketing for reaching more traders.
5	<b>Banana:</b> Greater role of genome editing technologies	Development of high-yielding, climate-resilient varieties adaptable to diverse agro-climatic zones through accelerated breeding strategies, genome editing tools,

	Since banana is a clonally propagated, sterile and triploid crop with narrow genetic diversity, conventional breeding is slow and difficult. Hence, genome editing and molecular breeding can play a role in banana improvement, particularly identification and knock down or modification of resistant genes against <i>Fusarium</i> wilt, <i>Sigatoka</i> , and nematodes.	marker-assisted selection complementing conventional breeding will address the issue.
6	Greater demand for <b>native vegetables</b> -traditional varieties in the local market exists but authentic seeds are not available in the production belts. Farmers are travelling long distance to get the seedlings or seeds of these varieties.	Strengthening seed production mechanism of traditional / native vegetables, preferably at their major cultivation belt is required. Seeds / seedlings shall be made available to farmers well before season.
7	<b>Promoting GI tagged lemon:</b> Puliyankudi is popularly known as the 'lemon city' of Tamil Nadu and its lemon got GI tag in 2025. The popular lemon needs further promotion.	Development of drought-tolerant, disease-resistant lemon varieties, introduction of drip irrigation and fertigation for efficient water use, market promotion activities like establishment of community cold storage with training, formation FPOs to ensure collective marketing and better bargaining power, linking with e-NAM, contract farming, and direct retail chains, and assistance for export etc. will boost income of lemon growers.
8	<b>Utilizing cashes apple:</b> Cuddalore, Ariyalur and part of Tirunelveli, Thoothukudi districts are producing cashew in large scale. The fruits (apple) are often wasted, due to increasing cost of collection, poor storage and marketability. Effective means of utilizing the cashew apple may be deliberated.	The Govt of TN has recently announced establishment of Cashew Board in Cuddalore. The presence of tannins makes fresh cashew apple unpalatable (astringent). Unless treated (by steaming, enzymatic treatment, salt soak etc.), this limits acceptance. Cashew apple deteriorates very fast after harvest. These areas need to be addressed through research.
9	Lack of value addition and infrastructure for <b>Palmyra sap (pathaneer)</b> is the pressing issue in the sector besides poor awareness of neera's health and nutritional benefits, both among consumers and producers. Raw sap / pathaneer is highly perishable and ferments quickly. Lack of hygienic	1) Improving collection, preservation & quality control such as develop / subsidize clean tapping tools and hygienic collection vessels to avoid contamination, use anti-fermentation/preservative solutions, cold storage (ice / chillers) right at source, make packaging attractive and safe (sterilized bottles, cans, pouches) to preserve

<p>collection, processing, and preservation facilities leads to losses. Though neera is non-alcoholic, it is 'sap' that ferments if not handled well; toddy bans have historically discouraged or conflated sap usage. Promote <b>Palmyra sap</b> (Pathaneer) as healthy, organic and nutrient supplement.</p>	<p>freshness and extend shelf life, standardize processing protocols to ensure consistent taste, safety, purity.</p> <p>2) Branding &amp; Certification such as promoting Geographical Indications (GI) for local palmyra sap / palm sugar from regions like Ramanathapuram. This improves market recognition and price. Promote pathaneer as 100% organic, natural non-fermented fresh sap claims with certifications (food safety, hygiene etc.).</p> <p>3) Produce value-added variants: flavored neera, carbonated versions, blended with herbs / fruits. Process into neera honey / sugar / jaggery / syrup / concentrate so that shelf life is longer and shipping easier, create powdered forms (as has been done in some states) to enable dry storage and longer market reach.</p> <p>4) Market Channels &amp; Access: This area requires Govt interventions and supports. Link neera producers with retail chains, local supermarkets, cafes, health food stores. Provide subsidy for transport of Pathaneer from production Centre to urban markets. Use mobile vendors / kiosks in urban areas, morning markets. Use online platforms / e-commerce to ship packaged pathaneer / neera-products.</p> <p>5) Create public awareness &amp; demand creation in social media, health influencers, doctor recommendations, demonstrations, free tastings in public places, fairs. promote during summer / heat seasons as natural coolant / hydration drink, promote selling Neera in higher secondary schools and colleges. Minimum Support Price (MSP) for Neera and jaggery or guaranteed purchase, so farmers are not exploited by middlemen. Training programs for climbers, young people to make sap tapping an attractive livelihood. Subsidies or financial support for setting up cold storage, processing units near groves. Ensuring that palm tapper</p>
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		families have access to basic amenities like healthcare, schooling, etc.
10	<p><b>Problems faced by loose flower growers:</b> Farmers often use vegetative propagation material from unverified sources, leading to yield and quality variation. <b>Continuous monocropping of malligai, mullai</b> etc without adequate external supplements of organic manures leads to low soil fertility and productivity. 3) Lack of awareness about <b>IPM</b> and biological control options is a widespread among the growers. <b>Farmers often use inappropriate growth promoters and indiscriminate pesticide which cause resistance and residue problems besides affecting quality of flowers.</b> 4) Pests like bud worm (mokku puzhu), mites (sempane), blossom midge (kurudu) are the major problems in Trichy, Madurai, Pudukottai, Ramanathapuram districts especially in Malli and Mullai. The larvae of bud worm and the maggots of the blossom midge enter into the buds at the base of the corolla and causes rotting of <b>flower stalk (kaampu azhugal) and changes colour of bud into pinkish (unfit for tying and selling).</b></p> <p>In places like Trichy and Villupuram, farmers who grow Chrysanthemum are observing <b>blackening of the lower whorls of chrysanthemum petals.</b></p> <p>Another issue in loose flower cultivation is the inefficient irrigation methods</p> <p>Labour cost accounts for 40–50% of total production cost, making jasmine cultivation less profitable. As of now, harvesting of jasmine and rose is entirely manual. No efficient mechanical harvester exists due to small flower size, delicate buds, and plant height variability</p> <p>Pruning and flowering management needs more research and farmers awareness. Farmers adopt non-scientific</p>	<p>Conduct training programs for farmers on good agricultural practices, pruning, fertigation, and IPM, including neem oil sprays, bioagents (<i>Trichoderma</i>, <i>Beauveria</i>, <i>Metarhizium</i>), use of pheromone traps, etc.</p> <p>This is a fungal infection. Farmers may be advised not to use sprinkler, adopt wider spacing/ aeration, regulate watering and foliar application of Mancozeb @ 2.5g/l. Adoption of <b>drip and fertigation systems</b> under TN Horticulture Mission / PMKSY. The TNAU, ICAR-CIAE, Bhopal/Coimbatore and ICAR-IIHR Bengaluru may intensify research on semi-mechanized jasmine harvesters.</p> <p>This local practices (ITK) of southern districts need to be validated in terms of flower production in comparison with standard pruning practice i.e. pruning the bushes at 45-50 cm height from ground level during last week of Nov (Malligai) or Jan (Mullai) every year.</p>

	<p>pruning or local practices to manage the crop during the lean season such as grazing jasmine garden with sheep, tying and or wrapping whole plant with banana pseudostem sheaths.</p> <p>Standardization of protected cultivation for year round Jasmine production and increasing number of demos.</p>	<p>By protecting Jasmine plants from heavy rain, cold stress and dew deposit especially in the early morning hours and night it may be possible to get continuous vegetative and reproductive growth even in non-flowering months <i>i.e.</i> make the jasmine plants do not enter into dormancy, so flowering continues even in winter (Nov-Feb). <b><i>More research efforts is needed in this direction.</i></b></p> <p>The Govt of TN is promoting polyhouse jasmine cultivation. The structure has been demonstrated in Madurai, Dindigul, Krishnagiri, and Tirunelveli under TNAU trials or subsidized under NHM or MIDH / State Horticulture Mission (SHM-TN). <b><i>This promotion efforts need upscaling.</i></b></p>
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## Theme 5 Addressing Issues related to post-harvest processing, value addition and agriculture marketing

**Focus / intervention:** *Align cropping pattern with market demand, exports, and processing industries, ensure fair price realization for farmers through transparent, efficient, and inclusive marketing systems, strengthen e-NAM, online platforms, grading, and standardization to reduce middlemen exploitation, Create modern markets, cold chain, and logistics facilities for perishable commodities, strengthen farm-to-fork (urban market) linkages through contract farming, FPOs, and buy-back arrangements and promote processing, branding, and GI-linked marketing to enhance farmer income.*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	<p><b>Poor drying, winnowing and grading:</b> To address labour shortage, introduction of <b>complete mechanization in these post-harvest operations</b> like drying, winnowing, grading and bagging thereby reducing spoilage, improving quality of produce and ensuring better price for the produce</p>	<p>Time has come to think of automated dryer cum-winnower-cum-grading and bagging multi-grain machine as detailed below.</p> <p>i) Diesel operated mobile machine for small scale operation suited to individual household may be developed.</p> <p>ii) Large scale dryer cum winnower - bagging machine with Silo Bin suitable for large scale handling as available in Western Countries is required which may be permanently kept in each DPC/RM/Mandis.</p> <p>(ii) The <b>Agriculture Infrastructure Fund (AIF)</b> to provide financing facility for creating post-harvest management infrastructure and creation of viable community Farming Assets <b>need more promotion efforts in rural area.</b></p>
2	<p><b>Effective utilization of already established cold storage plants is lacking</b></p>	<p>Crop /produce specific <b>standardization / protocol</b> may be developed.</p> <p>Create <b>capacity building</b> on the use of cold storage facility – Art of training on the use of cold storage facility as well as promoting export of processed / value added products.</p> <p><b>Success story</b> of cold storage utility, export etc may be spread to other entrepreneurs.</p>
3	<p><b>Banana:</b> Tamil Nadu is contributing around <b>12%</b> of India’s total banana production. The state cultivates over</p>	<p>Formation of export-oriented clusters with quality certification, guiding residue-free production, educating farmers and</p>

	18 banana varieties, including GI-tagged ones like Virupakshi Hill Banana and Kanyakumari Matti Banana, providing distinct branding and marketing opportunities. Uniform finger size, bunch weight, and maturity stage are not maintained by all farmers. Poor post-harvest handling and long transit times causes high (25–40%) losses. Currently, the State exports around <b>200–250 containers</b> , equating to a modest volume—yet there are scope for increasing export by addressing challenges in post-harvest processing.	entrepreneurs on greener ripening methods, storage systems, and traceability systems to boost global competitiveness need to be perfected.  Development of value addition technologies, support to entrepreneurs, and making of value added products.
4	Middle man takes huge share of price offered to the crop by the procurement agency/consumer, particularly for <b>organic product</b>	<b>e-marketing App</b> , which connect farmers directly to consumer/end user for organic products need popularization. Exploring foreign markets for organic products.
5	Digital marketing App which links producer to the spinning miller and guide growers to earn better price for quality cotton need to be developed	Plot traceability and quality-based payment systems with a spinning mill partner and ELS (extra-long staple) producing FPOs/ ELS farmers.
6	Desi chicken egg has increasing demand in the urban area. However, <b>there is some issues in genuinity of the local chicken eggs and marketing.</b>	The Govt. through suitable arrangement with private partners may facilitate purchase of desi chicken eggs, establishing cold storage facility near peri-urban /urban markets and aid in certification to promote marketing of desi eggs.
7	Few regulated markets (RM)/ Mandi set up by the Govt at Block level has been moved or merged with taluk level RM due to operational reasons. Now new production clusters are emerging in many blocks wherein crops new to the cluster or grown. <b>Farmers in the new production area are facing marketing problem as RM/Mandis are not available.</b>	It is suggested to establish demand-driven RM/ Mandi at Block level or Crop production Centre. May be an <i>ad hoc</i> or seasonal RM will serve the purpose.
8	<b>Export promotion of GI tagged crop/ varieties/ produce:</b>	(i) <b>Crops for which GI has already been given:</b> Value addition with focus on GI tagged spices like Kannyakumari clove, Kodaikanal Malai Poondu, Erode Manjal,

	<p>Promoting branding and marketing of GI tagged crop / varieties particularly in the export market.</p>	<p>Ramnad Mundu Chilli, Virudhunagar Sambha Vathal etc may be taken up.</p> <p>ii) <b>Crops which has no. GI:</b> promoting branding and selling under the brand is suggested e.g. Dharpuri, Krishakiri Kollu rasam, kollu podi in the super market/ export market.</p>
<p>9</p>	<p><b>Promoting cultivation and marketing / export of traditional paddy varieties through cluster approach:</b> Farmers who grow traditional varieties faces problems in the fields such as pests and disease (traditional varieties are often tall, with long crop duration (140–160 days), making them prone to pests like stem borer, leaf folder, BPH, and diseases like blast and sheath blight, its yields are relatively low (2–3 t/ha) compared to 5–6 t/ha in improved HYVs), during milling process (most of the rural or modern rice mills are designed for milling short- to medium-grain, high-polish varieties. Long or slender grain traditional varieties break easily during milling, resulting in <b>15–30% broken rice loss</b>. Husk to rice recovery is often &lt;55% due to unsuitable machinery and outdated processing) and during marketing (as only few farmers grow these varieties scattered across villages; hence, traders don't find it economical to procure small lots, as no local Dehusking/ milling units, the farmers often transport paddy far away places to process small quantities- increasing cost and reducing profit. <i>If farmers wish to sell directly to the mills, the millers demand minimum supply of 400 bags (of 60 kg) from that particular variety as the minimum processing quantity per lot in the modern mill is 400 bags.</i>). These issues may be addressed through formation of traditional variety</p>	<p>Form Farmers clusters or FPOs in each district cultivating specific traditional varieties e.g. Mappillai Samba Cluster – Pudukkottai, Karuppu Kavuni Cluster in Thanjavur, Karunkuruvai grower cluster in Ariyalur etc. Each cluster (25–50 ha) ensures uniform production, collective input purchase, pest management, and marketing. The TN Dept. of Agriculture, Organic Certification Department (TNOCD), NABARD and TNFDC may supported FPO programmes / cluster formation while the TNAU &amp; ICAR institutes and KVKs may render for technical supports.</p> <p>Organize training and awareness programme on ICM and IPM for traditional varieties. Promote <b>TNAU's</b> Traditional Rice Health Management Kit (Trichoderma + Neem + <i>Pseudomonas</i> + NPV).</p> <p>Set up Mini Rice Mills or Rubber Roll Hullers suitable for long-grain, low-polish milling. Promote TNAU Paddy Dehusker, CFTRI Mini Rice Mill, or village-level hulling units (0.5–1 ton/hour). Promote brown rice, hand-pounded rice, semi-polished rice production to retain nutritional value.</p> <p>Funding through PM-FME Scheme, ODOP (One District One Product), or TNSRLM may be explored and FPOs can jointly own and operate the mill.</p> <p>Aim for export markets, Develop distinct branding like Thanjavur Heritage Rice, Madurai Mappillai Samba. Obtain Geographical Indication (GI) or Organic Certification where possible. Use e-commerce &amp; direct marketing: TNAU's</p>

	grower cluster in the selected villages to get better bargain during marketing.	Uzhavan App, Tamil Nadu Agrimark, or private portals like Namma Marachekku, BioBasics, etc.																																																
<b>10</b>	<b>There is lack of awareness on ready reckoner chart for optimum solar drying</b> conditions of common agricultural produce. It should covers temperature, relative humidity, drying time, and method suggestions suitable for small-scale solar dryers in Tamil Nadu conditions.	<p>Create hands on training and awareness programme. Use the chart given below as guidance.</p> <table border="1"> <thead> <tr> <th>Produce</th> <th>Ideal Drying Temp (°C)</th> <th>Relative Humidity (%)</th> <th>Drying Time (hours)</th> </tr> </thead> <tbody> <tr> <td>Tomato</td> <td>55-65</td> <td>20-25</td> <td>6-12</td> </tr> <tr> <td>Onion</td> <td>50-60</td> <td>20-25</td> <td>12-24</td> </tr> <tr> <td>Chili (Red)</td> <td>55-60</td> <td>20-25</td> <td>8-15</td> </tr> <tr> <td>Mango</td> <td>55-60</td> <td>15-20</td> <td>10-15</td> </tr> <tr> <td>Banana</td> <td>55-60</td> <td>15-20</td> <td>12-18</td> </tr> <tr> <td>Pineapple</td> <td>55-60</td> <td>15-20</td> <td>12-18</td> </tr> <tr> <td>Ginger (Rhizome)</td> <td>50-60</td> <td>20-25</td> <td>18-24</td> </tr> <tr> <td>Turmeric (Rhizome)</td> <td>50-60</td> <td>20-25</td> <td>18-24</td> </tr> <tr> <td>Coriander Leaves</td> <td>40-50</td> <td>30-35</td> <td>4-6</td> </tr> <tr> <td>Green Chilies</td> <td>50-55</td> <td>20-25</td> <td>12-18</td> </tr> <tr> <td>Areca Nut</td> <td>50-55</td> <td>15-20</td> <td>24-36</td> </tr> </tbody> </table>	Produce	Ideal Drying Temp (°C)	Relative Humidity (%)	Drying Time (hours)	Tomato	55-65	20-25	6-12	Onion	50-60	20-25	12-24	Chili (Red)	55-60	20-25	8-15	Mango	55-60	15-20	10-15	Banana	55-60	15-20	12-18	Pineapple	55-60	15-20	12-18	Ginger (Rhizome)	50-60	20-25	18-24	Turmeric (Rhizome)	50-60	20-25	18-24	Coriander Leaves	40-50	30-35	4-6	Green Chilies	50-55	20-25	12-18	Areca Nut	50-55	15-20	24-36
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## Theme 6 Addressing Issues related to Animal Husbandry and Fisheries Sector

**Focus / Intervention:** *Ensure livelihood security for small, marginal, and landless livestock farmers/fisherman, improve productivity of native breeds while conserving indigenous germplasm, sustainable, technology-driven, and market-oriented livestock/fisheries development.*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	<b>Ice-ice disease</b> is a common and serious diseases affecting cultivated seaweeds, especially <i>Kappaphycus alverizii</i> , the most preferred species for seaweed farming among the coastal fishers/farmers. It causes economic losses.	Management practices such as site selection with good water flow and stable salinity/temperature, regular thinning and cleaning of farms to prevent stress, use of healthy, resistant seedlings, application of probiotics or beneficial bacteria to suppress pathogens, crop rotation etc need to be standardized.
2	Fish farming in rural areas is picking up well in the State as local demand is increasing for live fishes. Faced with labour shortage and other problems, some paddy farmers are switching to fish farming in villages. However, <b><i>the initial cost of digging pond add burden of such entrepreneurs.</i></b> The Central and State Govt are assisting them but more awareness of such schemes among rural entrepreneurs is required.	<b>Awareness</b> on Govt. Schemes related to fisheries sector may be taken up, particularly in the rural areas. The turnaround period of issuing subsidy/ benefits may be minimized.
3	<b>Management of fish and poultry wastes:</b> Often these wastes / carcasses/ litter are dumped on road sides, street corner and on the bank of water bodies, leading bad odour, to environmental pollution, health hazards, increase in stray dog population.	Technologies to convert these wastes into wealth are available but <b>collection and logistics remain weak points.</b> The Swachh Bharat programmes place emphasis on Waste-to-Wealth but organized waste collection from town and town panchayats, decentralized processing, and farmer/entrepreneur awareness are the need of the hour.
4	<b>Establishment of fodder seed nurseries in villages</b>	<b>It is suggested to establish fodder seed nursery at each taluk,</b> often utilizing the service of progressive farmers.
5	<b><i>Fish fingerlings are not available in rural areas</i></b> and farmers depending on few fingerling suppliers, located far-away places.	Capacity building on fish fingerling production may be taken up on massive scale, to create more entrepreneurship.
6	<b>Export standards:</b> Many fish export consignments face rejection due to	Issues related to antibiotic residues, bacterial contamination and traceability

	<b>antibiotic residues, bacterial contamination,</b> or poor handling. International buyers demand strict <b>traceability,</b> which small farmers struggle to maintain.	gaps need to be addressed to promote exports and fish and fishery products.
7	<b>Grazing of seaweeds by herbivorous fishes</b> is a serious challenge in seaweed raft culture systems. This reduces economic returns.	Effective management is needed to address this issue.
8	<b>Stock assessment &amp; data gaps in small-scale fisheries:</b> Many marine fish stocks are overexploited or poorly monitored. Small-scale fishers are the backbone of TN fisheries, yet data on their catches, seasonal patterns, and effort is scarce.	Gear-wise stock assessment, digital logbooks, participatory monitoring is suggested
9	<b>Pollution &amp; contaminant impacts on seafood safety:</b> Heavy metals, persistent organic pollutants, and microplastics threaten both ecosystem health and human consumers. Communities near industrial zones or urban rivers are at risk.	Mapping pollutants in fish, seagrass, and sentinel species; risk assessment for human consumption may be undertaken as long-term project works.
10	<b>Low usage of roughages for urban milch animals:</b> Milch animals reared in urban area are not fed adequate roughages (paddy straw, jowar straw etc), due to lack of availability of paddy straw in the peri-urban / urban area and problems associated long distance transport and storage of paddy straw.	The Govt. may suitably assist the urban cattle farmers to get adequate supply of paddy straw, jowar straw by assisting in transport of roughages from paddy / sorghum cultivation area and arranging storage of paddy / jowar straw in urban area.
11	<b>Silage making need further promotion:</b> Green fodder like maize, sorghum, bajra, napier-grass are available abundant in rainy season but scarce during summer. The silage helps conserve surplus fodder during lean period. Under NABARD, NHB, State Horticulture Schemes support is given for fodder cultivation and silage making machines. The demand for silage bags/bales is rising rainfed areas.	Creating more awareness camp on silage in rainfed tracts particularly in Thalaivasal, Attur, Perambalur, Karur, Namakkal, Dharmapuri, Krishnagiri along with credit support for silage making machine is suggested.

## Theme 7 Addressing Issues related to Frontier technologies / Cutting edge technologies

**Focus:** *Harnessing the advances in science or cutting edge technologies in agri sector*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	The TN Govt is making digital Crop survey of crops. Lot of manual operation is involved and it may be reduced by using cutting edge technologies.	Digital crop survey using drone may be standardized. More awareness on the use of digital devices is required
2	New and emerging opportunity for using AI technologies in agricultural Sector	The AI technology may be integrated with AWS to predict or forecast water requirement of upland crops where well water / ground water is limited. Mobile Scanner may be developed for identifying nutrient deficiency in plants like SPAD. AI based mobile App to identify crop varieties is needed. Mobile based irrigation water quality testing kit (Sensor) may be developed. AI based pests and disease diagnosis and management.
3	Adoption of <b>digital farming tools like AI</b> , sensors, and IoT to optimize resource use (water and nutrient use efficiency/precise fertigation, etc.) and crop monitoring, harvest optimization to ensure quality and transparency in the banana value chain is the need of the hour.	The ICAR-NRCB in collaboration with subject matter experts may formulate suitable programme to address the issue.
4	<b>Drones usage for foliar spray and pesticide application:</b> Drones (Unmanned Aerial Vehicles – UAVs) are emerging as a game-changer in precision agriculture, especially for foliar application of micronutrients and pesticides in crops like paddy, cotton, maize, sugarcane, banana, and horticultural crops. Drone has advantages like uniform spray coverage on both upper and lower leaf surfaces, Reduced water use — only 10–15 L/acre (vs. 150–200 L in manual spraying), Reduced labour and drudgery — 5–10	<b>Policy &amp; Subsidy Support available:</b> <ul style="list-style-type: none"> <li>• Under the Namo Drone Didi Scheme of the Govt of India, Women's SHGs receive 80% of the drone and accessory costs, as subsidy up to a maximum of Rs. 8.0 lakhs</li> <li>• For Farmer Producer Organizations (FPOs), and Custom hiring Centres grants up to 75% of the cost of drones for demonstrations on farmers' fields is given</li> <li>• Under SMAM (Sub-Mission on Agricultural Mechanization) and Kisan</li> </ul>

	<p>acres can be covered per hour, Minimized exposure of humans to chemicals, Timely application during critical crop stages, Ideal for waterlogged, tall, or dense crops where manual entry is difficult (paddy, maize, cotton) and Precise dosage and GPS-based mapping ensure no under- or over-application. However, the widespread application of drone has some limitations / Challenges such as High initial cost (₹8–10 lakh per drone), need for trained, DGCA-certified operators, calibration for each crop and chemical is essential, limited payload restricts very large field coverage at once and difficulty in adjusting flight height of drones in undulating canopy like coconut garden with different heights as in slope, inefficient control especially when used for weed control etc.</p> <p><b>Drone Specifications</b>  Tank Capacity: Small drones 5-6 L and Medium spray drone 8-12 L  Spray volume: 10–12 L/acre  Droplet size: 80–120 µm  Flight speed: 4–6 m/s  Height above crop: 2–3 m  Swath width: 3–5 m  Cost of drone: 3.0 lakhs to 20,000 depending of spray tank size and battery capacity.</p>	<p>Drone Scheme 50% subsidy to individual farmers.</p> <ul style="list-style-type: none"> <li>• Custom Hiring Centres (CHCs) can rent drones to farmers at ₹300–₹500/acre.</li> <li>• TNAU and ICAR institutes (like ICAR-CIAE, ICAR-IARI) have standardized drone spray protocols for different crops.</li> </ul> <p><b>Drone use for Foliar spray of micronutrients</b>  Paddy: ZnSO<sub>4</sub> (0.5%), FeSO<sub>4</sub> (0.5%), MgSO<sub>4</sub> (1%), Borax (0.2%)  Maize / Sorghum: ZnSO<sub>4</sub> (0.5%), Urea (2%) + FeSO<sub>4</sub> (0.5%)  Cotton: Micronutrient mixture (TNAU Mix) @ 0.5%  Banana / Coconut: ZnSO<sub>4</sub> (0.5%) + MgSO<sub>4</sub> (1%)</p> <p><b>Drone Use for Pesticide application</b>  Paddy: BPH, leaf folder, sheath blight  Cotton: Sucking pests (aphids, jassids, whitefly), bollworms  Maize: Fall Armyworm  Sugarcane: Early shoot borer, mealybug  Banana: Sigatoka, rust thrips</p> <p>Success story: For paddy – Foliar spray of ZnSO<sub>4</sub> 0.5% using drone at <b>30 and 60 DAT</b> to correct zinc deficiency. One 10L tank covers ~1 acre in 7–8 minutes.</p> <p>At Thanjavur and Salem, drones used for foliar spray of ZnSO<sub>4</sub> and bio-pesticides in paddy and cotton (under TN Pilot Scheme, 2024).</p>
5	<p><b>Development of AI-Based Laser Weeder Using Solar Energy:</b> An AI-based laser weeder is an advanced machine that uses artificial intelligence to detect weeds and eliminate them using a focused laser beam, without harming crops. When powered by solar energy, it becomes sustainable and cost-effective for farmers.</p>	<p><b>The Blue River’s “See &amp; Spray”</b> technology in the USA uses AI + targeted herbicide. Similar concept can be adapted with laser + solar in India. The ICAR and IITs are exploring AI-based weeding robots suitable for paddy, maize, and vegetables. But it may take years to become reality.</p>
6	<p><b>Development of Unmanned Tractors and Power Tillers:</b> Unmanned tractors and power tillers are autonomous or semi-autonomous machines for</p>	<p><b>The TAFE / Mahindra in India are undertaking testing autonomous tractors.</b></p>

<p>ploughing, and other field operations. They can be solar-assisted or electric to reduce fossil fuel use. This may be developed in future.</p>	<p><b>John Deere is working on the Electric autonomous tractor concept.</b></p> <p><b>The ICAR and TNAU are developing small unmanned tractors for rice and vegetable farming in South India.</b></p>
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## Theme 8 Addressing Issues related to Agril. Extension, Capacity building and Awareness

**Focus/ Intervention:** *Providing training /demo on cutting edge technologies, value chain management, cold storage maintenance, export market for value added, GI tagged, native crops*

#	Priority Issues or challenges	Possible Solution to address the Issue
1	<b>High tech training</b>	There is increased need to train farmers/ businessman / <b>entrepreneurs on value chain management, utilization/standardization of cold storage modules, export potential</b> of competitive crops/ GI Spices/ traditional varieties/ Organic products.
2	Farmers relying upon Youtube channel which often carries <b>unauthenticated / unverified claims/</b> information. Farmers get confused or adopt irrelevant technologies.	<b>Opening of a dedicated Agri TV channel and Govt. Youtube Streaming Platform.</b> This is need of the day to disseminate all agriculture technologies including information on marketing, post-harvest processing, value addition will help to reshape our traditional agriculture marketing pattern into global competitor.
3	Indiscriminate use of pesticides are increasing. Vegetable farmers often use high doses of pesticides to deliver pest-free product in the markets.	<b>It is time to re-emphasize IPM practices throughout the State.</b>
4	Many small farmers or new entrepreneurs in rural areas who wish to enter into inland fish farming lack training in scientific aquaculture practices, feed management, water quality monitoring, and disease prevention.	Training in scientific aquaculture practices, feed management, water quality monitoring, and disease prevention to farmers is to be provided.

### 3. Specific areas where ICAR may extend further support or partnership with the State.

#### 3.1 Suggested Action Plan to address Awareness-related Issues -Joined action of KVKs, ICAR, SAUs and State line Depts.

Issue	Action Plan	Implementing Organization	Time frame (5 Years)	Expected Outcome
Low awareness on MSP, procurement & schemes	Campaigns via KVKs, Digital apps (Tamil), Agri kiosks at Uzhavar Sandhai & PACSs	SAUs + Dept. of Agriculture + NABARD + CDB	Year 1-5 (scaling up coverage yearly)	50% farmer awareness of MSP and crop insurance
Poor adoption of IPM & organic methods	Farmer Field Schools (FFS), on-farm demos (biopesticides, NPV, Bt, <i>Trichogramma</i> )	ICAR (NBAIR) + TNAU + KVKs	Year 1-3	10% reduction in chemical pesticide use
Lack of market knowledge (GI Crops, exports)	Awareness on GI branding (Puliyankudi Lemon, Erode Turmeric), FPO buyer-seller meets	Spices Board + APEDA + SAUs	Year 2-4	More GI crops linked to export markets
Climate advisories not reaching farmers	Mobile alerts (SMS, WhatsApp), AI-based agro-advisory	IMD + ICAR (CRIDA) + TNAU ICT	Year 3-5	Real-time advisories to 2.5 lakh farmers
Create complete system from production to processing to marketing for traditional paddy varieties through cluster-based farmer empowerment	Mobilize growers into FPOs/Clusters; register under FPC Act, Identify 10-15 popular varieties; establish community seed banks, conduct training through KVKs/TNAU on IPM, varietal purity maintenance, post-harvest care, Promote SRI / semi-dry rice techniques for traditional varieties, Establish <b>Custom Mini Rice Mills &amp; Processing Units</b> through FPOs, Organize <b>cluster-level aggregation &amp; collective marketing</b> through FPOs	KVKs, Dept. of Agri. Marketing, NABARD, TNAU, DoA,		5 FPOs/Clusters formed across major traditional rice districts 500 farmers trained in traditional rice management and 1,000 MT of traditional rice marketed collectively

### 3.2 Suggested Action Plan to address Researchable Issues - Joined actions of ICAR and SAUs

Researchable Issue	Expected Action by the ICAR-SAUs through Project mode	Implementing Organization	Time frame	Deliverables
<b>Pest &amp; disease outbreaks</b> (Rugose spiralling whitefly, mealybugs, crown mealy bug in sugarcane, tea mosquito bug in cashew)	Screening and breeding resistant/tolerant varieties + biological control packages	ICAR + TNAU + TANUVAS	Yr 1-5	<ul style="list-style-type: none"> <li>• One resistant variety in each will be identified</li> <li>• One biocontrol package for managing the pests</li> </ul>
<b>Climate-resilient crops</b> (drought-tolerant millets, short-duration pulses, flood-tolerant rice)	Multilocational trials, participatory varietal selection	ICAR + TNAU	Yr 1-5	<ul style="list-style-type: none"> <li>• One climate-smart varieties in pipeline</li> </ul>
<b>Cotton productivity gap</b> (ELS cotton, early compact variety for HDPS)	Develop & test high-density planting + mechanization modules	ICAR-CICR + TNAU Cotton Research Stations	Yr 2-5	<ul style="list-style-type: none"> <li>• Two new HDPS models/genotypes in pipeline.</li> <li>• One mechanized picking prototype</li> </ul>
<b>Soil &amp; water quality issues</b> (salinity, effluents)	Bio-remediation, microbe-based solutions, precision fertigation trials	ICAR + TNAU + SWC Dept.	Yr 2-5	<ul style="list-style-type: none"> <li>• Protocols for safe reuse of effluent water</li> </ul>
<b>Post-harvest losses</b> (jackfruit, banana, vegetables)	Storage protocols, processing clusters, new value-added products	ICAR + TNAU Horticulture Dept.	Yr 2-5	<ul style="list-style-type: none"> <li>• Three product clusters (Jackfruit Panruti, Banana Trichy, Lemon Puliyanakudi)</li> </ul>

#### **4. Policy or Programmatic suggestions to enhance ICAR's visibility and impact in the State.**

The Indian Council of Agricultural Research (ICAR) has established 3 main research institutes (ICAR-SBI, ICAR-CIBA and ICAR-NRCB) and 12 regional Centres / Stations across Tamil Nadu covering diverse disciplines such as crop sciences, fisheries, mechanization, soil and water conservation, livestock, and post-harvest management. In addition, the State has three State Agricultural Universities (TNAU, TANUVAS, TNJFU) actively involved in agricultural education, research, and extension. To enhance the visibility of ICAR Institutes in Tamil Nadu, a multi-pronged strategy combining outreach, innovation, collaboration, and use of digital tools are essential. Below are actionable and futuristic suggestions tailored to the State's agricultural conditions.

##### **1. Strengthening Research Visibility & Impact**

- **Focus on translational research & local problem solving:** The ICAR Institutes in the State may take up 25% of their research projects focusing on district-level agro-ecological challenges (**Problem-solving research**) and another 25% of the research projects shall focus on meeting industry, export needs (**consumer-oriented research**). The remaining 50% of the projects may focus on basic research, applied /strategic research.
- Each ICAR institute **convene a stakeholder meeting**, especially with small, marginal farmer representatives, industrialists, exporters, traders, SAUs and State Line Dept Officials to assess their need/ district or state level issues formulate the projects to solve the issues. Some issue identified may be translated into research mode with defined time-frame to give solutions to the problems.
- Agriculture being a State subject, a **strong collaboration with SAUs and State Agriculture Dept** is suggested. Promote "**Problem-to-Solution Projects**" where each ICAR institute may partners with **2-3 KVKs and or SAUs** to solve one identified local problem in a span of 1 to 2 years.
- Establish an '**ICAR-Tamil Nadu Research Consortium**' linking all ICAR Institutes and Regional Centres for joint research planning, data sharing, and showcasing collective achievements.
- **TN Agri Policy Think Tank:** Establish a **State level TN Agri-Research Advisory Body** (instead of Regional Committee), with technical and administrative members of ICAR HQ, Mo A&FW, Directors of State Agricultural Depts., VC and DR of SAUs, Director/ Head of all ICAR Institutes in the State. This Body may identify priority area of research, advice on research funding and develop 3 or 4 year research targets for each NARS institutes in the State.
- The State level TN Agri-Research Advisory Body with support from ICAR HQ / Mo A&FW may organize an '**Annual TN Agri Research Conclave**' wherein all ICAR Institutes and State Agricultural Universities **may present their annual research outcomes**. The Best technologies, identified in the meet may be passed on to the State Agricultural Dept and KVKs for validation, demo and wider dissemination among farmers.
- Successful/ validated technologies identified by the above mentioned procedures, may be uploaded in **TNAU Agritech Portal** or in a Common '**TN Agri Innovation**

**Portal'**. This portal may highlight ICAR-SAU validated technologies, patents, publications, and success stories.

- Institute “**ICAR Agri Innovators Awards / Fellowship (Tamil Nadu)**” for PG/PhD scholars to work on applied regional problems and Scientists of ICAR/SAU who contributed in regional or local agrarian problems in the State.
- Conduct **Hackathons & Ideathons** with farmers, village youths, engineering colleges on agricultural problems. They may throw light ideas for research.

## **2) Strong Collaborative Programmes with SAUs, State line Depts, Industry, Trade Agency/ Exporters and KVKs**

By leveraging synergies with TNAU, TANUVAS, TNJFU, KVKs, Industry, Trade Agency/ exporters, State Department of Agriculture, Commodity Boards, APEDA, MPEDA, DMI and agro-input-machineries manufactures/ dealers the initiatives suggested below aim to amplify research impact, farmer adoption, and public awareness.

- Develop **joint projects with TNAU/TANUVAS/TNJFU/ State line Depts/ Industry/ Trade Agency/ Exporters/ KVKs** for integrated crop-livestock-fish systems or addressing emerging challenges or common issues identified by State line Depts.
- Develop a SOP/guideline **promoting 10% of ICAR Scientists** working in the State are engaged in **Joint research/extension/development` projects** with SAUs, KVKs, State line Dept, commodity Boards etc working in the State.
- **Joint Training / Capacity Building Programmes:** Collaborate with TNAU, TANUVAS, TNJFU, Commodity Boards to offer short-term training or certificate courses. For example training on Sugarcane micro-irrigation / biocontrol agent production / disease management led by ICAR-SBI with TNAU Cuddalore/ Sirugamanai Centres; Brackish Water Aquaculture Management led by ICAR-CIBA Chennai in collaboration with TNJFU; Climate resilient cotton breeding led by TNAU in collaboration ICAR-CICR. Promote these training/capacity building programmes *via* University Websites, ICAR Institute Website and State Dept Agri-portals to attract farmers, entrepreneurs, and students.
- **Industry-Institute Linkages:** Establish "ICAR Innovation Hubs" at key locations like Coimbatore (hosting ICAR-CICR, CIAE, and SBI), partnering with agri-tech start-ups for co-developing products. For instance, joint programmes with drone companies for precision farming demos at ICAR-CIAE, Coimbatore.
- Look for **National linkage with APEDA/ MPEDA/ Processing and Export industries** for taking up export or value chain oriented research as well as **international linkages** with ASEAN and Indian Ocean Rim countries for coastal and tropical agriculture technologies
- **Joint Melas/ Farmer Field Schools:** Co-run melas/ FLDs/Demos/ FFS with TNAU, TANUVAS, and TNJFU as well as State Agricultural Dept.
- **Shared Research Incubators:** Promote **Bio-entrepreneurship in value-added products** (banana fiber, cotton by-products, sugarcane bagasse based polymers, bioplastics, brackish water aquaculture feed, etc.). Establish thematic incubators (e.g., Brackish Water Aquaculture, Banana Value Chain) **jointly managed by ICAR and SAUs.**

### 3) Outreach activities and Public participation

- **Modernized outreach programmes:** Partner with KVKs, TN State Line Depts, SAUs, Commodity Boards, Banking Institutions like PACS, NABARD, input supply agencies (Seeds, Pesticide, Fertilizer etc), and village Panchayats to organize "**ICAR on Wheels**" **mobile units—vans** equipped with digital banners, posters, videos of latest ICAR technologies. These could visit rural areas monthly, providing hands-on training.
- **Fixing flexi banners/ banners** in places where farmers assemble (like village Sandhai/mandis, taluk/panchayat office, etc) about improved agro-technologies will **give wider publicity. Also news on training/ demo/ new technologies may be broadcasted in local TV/Radio/FM channels, periodically.**
- **Financial support for farmers-scientists interactive meeting:** Adequate financial support may be provided to ICAR Institutes to organize meeting with farmers and other stake holders at village or block level, at least one meeting in one district in one month. Now-a-days, due to freebies given by the political parties to the farmers/public attending their party meeting, farmers are expecting monetary benefits to attend meeting organized by research institutions (even if the meeting indent to benefit them). This trend-change may be taken into account while deciding budget for outreach programmes.
- **Demand driven research:** The feedback received from farmers, consumers or end user of agro-technologies and general farmers problem through extension functionaries – KVKs and ICAR outreach programmes shall be translated into action or to refine research programmes.
- **Effective mera gaon mera gaurav programme:** Th MGMG programme may be undertaken in true sprit with **adequate financial support**. Similar to MLA or MP local constituency development fund, each ICAR Scientists or group of Scientists may be given MGMG fund to develop his own village. The Scientists may be allowed choose village(s) of his choice (either in his/her native or some backward areas) and asked to look adopt the village for overall agriculture development. He/she, in collaboration with SAUs, State Line Dept/ banking Institutions/NGos etc will develop that village as **ICAR's model village**. Every three or five year, third party assessment of model village may be made for accountability. Adequate financial and logistic support and suitable recognition to the Scientist may be given.
- In a similar manner, ICAR Institutes *per se* may **develop model ICAR technology villages (one per agro-climatic zone or district in a span of 3 year)** demonstrating integrated packages from multiple ICAR institutes. This target is for the ICAR Institute (combined efforts of all Scientists, in collaboration with SAUs, State Dept, KVKs and other stakeholder).
- **Scientist responsibility in transferring his technology or input distribution to farmers - new role:** Group of Scientists of ICAR Institutes in the State may be assigned to look after/ coordinate production, distribution/ dissemination of any one agro-inputs/ technology in one or two blocks/ districts. He/she will be guiding or coordinating production or distribution of inputs in the assigned village/blocks for a specified-years. The inputs/technology may be of his/her institutes or other ICAR institutes. He/she may take production of the inputs (e.g. biocontrol agents/seeds) at

his/her institutes or overseas the production by third-party or participatory production.

- **Promote short tour of farmers to see demos in progressive farmers field:** For effective learning and to promote seeing is believing concept progressive farmers from each districts in the State may be encouraged by ICAR for short tour within and neighbouring states to see technology demos, conducted by KVKs/ICAR/SAUs in progressive farmers field/ research Station etc.

#### **4) Promote Scientific publications in mother tongue / regional language, Dissemination of research outputs in local language**

- To increase the visibility of ICAR Institutes' activities among farmers, publics, politicians, and policy makers in the State **prepare and publish Institutes' Annual Report in local languages.**
- All the **13 ICAR Institutes** (including Research Stations) in the State, may prepare a **combined Annual Report** of less than 25 pages in local language and copy may be circulated to State Agriculture Dept, SAUs and others. The same may be posted in the Website of ICAR Institutes, SAUs and State Agriculture Dept, KVKs for wider publicity. The Annual Report should focuss only deliverables (technology/products/ salient research outcome).
- The ICAR Institutes are preparing and publishing **Newsletter**, usually in English. It **should be in the local and regional language.** For example, ICAR-SBI may prepare bi-monthly or quarterly Newsletter in Tamil, Telugu, Kannada, Marathi and Hindi where its varieties and technologies percolates.
- Every institute should have a '**Language cell**' responsible for publication of institutes research outcomes in all the local and regional languages.
- **Research publications (need not be in journal format) /Package of Practices/Success Stories/ Technology Validation/ Seed Production and distribution and related services duly vetted or approved by Institutes' PME Cell or SAU or Similar official body and published in local or regional languages may be treated as valid publication as important as that of NAAS rated publications.** The Scientists/contributors should be recognized suitably.

#### **5) Digital Extension: Media Amplification for Research Outputs**

- **Unified Digital Platform:** Develop a centralized "**Tamil Nadu Agri Hub**" portal or app (in collaboration with TNAU, TANUVAS, TNJFU and KVKs) that aggregates research outputs from all ICAR and SAU institutes (i.e. expansion of TNAU Agritech portal). Include latest technologies, interactive dashboards for real-time metrics on crop yields, soil health data, and publications. As a novel idea, Integrate the web portal with AR/VR features for **virtual tours** of facilities like the ICAR-CMFRI Stations in Chennai, Mandapam, and Tuticorin, allowing global access to marine research demos, ICAR-SBI's varietal development Process, allowing cane researchers across the globe to understand sugarcane breeding etc.
- **Social Media Campaigns:** Launch targeted campaigns on platforms like X, Instagram, and YouTube, with institute-specific handles (e.g., @ICARSugarcaneCoimbatore) sharing short videos on breakthroughs, such as brackish water aquaculture innovations from ICAR-CIBA Chennai, banana processing/ value addition for export markets innovation of ICAR-NRCB. Use hashtags like #ICARTNResearch and

collaborate with influencers or farmer vloggers for wider reach. Track engagement via analytics to refine content.

- **AI and cutting-edge Technology Integration:** Develop AI-powered chatbox (built on models like Grok) for institutes like ICAR-CICR (Cotton) to provide instant advice on cotton genetics or pest management, accessible via WhatsApp. Use AI-based chatbot (Tamil-enabled) for farmers to get instant advice from ICAR experts. As a new or futuristic thought Use blockchain for traceability in supply chains, piloted at ICAR-CMFRI for marine products, ensuring transparent research-to-market journeys and publicizing via case studies.
- **Create WhatsApp Group or join with mKisan App:** Linking progressive farmers with ICAR /SAU Experts to get instant expert advice by farmers
- Create a 24x7 dedicated “**Tamil Nadu Agri TVChannel** as well as ‘**TN Agri YouTube**’ which may be managed by Experts from ICAR/SAUs/ State Agriculture Dept for public visibility.
- Also **partner with Doordarshan, Private TV channels, All India Radio, and FM** channels for ICAR technology talk shows, expert Q&A, and farmer success stories.
- Conduct **Kisan Mela/ Fair etc periodically**, in collaboration with all ICAR Institutes, SAUs, State Depts, giving wide publicity in local print and visual media.

#### 6) Innovative & Futuristic Research Initiatives

- **Network Projects on TN Agro-biodiversity conservation and native germplasm mapping:** Linking all ICAR Institutes in the State, SAUs and International Organizations.
- **Integrated Climate-Smart Villages:** Multi-institutional demonstration on suitable IFS model involving water-saving irrigation (IISWC), crop diversification (TNAU), and renewable energy use (CIAE).
- **Blue Economy Initiatives:** Joint CMFRI–CIBA–TNJFU projects on sustainable mariculture, ornamental fisheries, and coastal ecosystem health.
- **Addressing End to End mechanization:** To be initiated with a single crop by joint collaboration of ICAR-CIAE, TNAU and private farm machinery manufacturers.
- **Innovative Sweet villages (model sugarcane seed production):** Through farmers participatory approach in major cane growing blocks/districts, -cm-technology demo integrating possible improved technologies. Progressive farmers may be invited and see the success of seed production / adoption of improved technologies.

**Conclusion:** *The measures proposed above aimed to enhance the research visibility, stakeholder engagement, and socio-economic impact of ICAR institutions operating in Tamil Nadu may be fine-tuned by stakeholder consultation. The integration of cutting-edge research, digital tools, collaborative programmes, and community-based outreach will contribute significantly towards achieving the goals of sustainable, climate-resilient, and technology-driven agriculture in the State.*

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