State Agriculture Infrastructure Development Programme

(National Agricultural Development Programme)

Tamil Nadu

Centre for Agricultural and Rural Development Studies
Tamil Nadu Agricultural University
Coimbatore - 641 003

NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP / RKVY)

NADP

STATE AGRICULTURAL INFRASTRUCTURE DEVELOPMENT PROGRAMME

TAMIL NADU

CENTRE FOR AGRICULTURAL AND RURAL DEVELOPMENT STUDIES
TAMIL NADU AGRICULTURAL UNIVERSITY
COIMBATORE - 641 003

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The experiences in the development of agriculture and allied sectors calls for setting up policy framework towards robust supporting infrastructure for planning, production, processing, storage, distribution, marketing and sales of agricultural produce.

Tamil Nadu as one among the states has also received Central Assistance under NADP during 11th Plan period onwards and already prepared the comprehensive District and State agriculture plans for 11th Plan and 12th Plan. The District Agriculture Plans (DAPs), State Agriculture Plan (SAP) and State Agricultural Infrastructure Development Program (SAIDP) have been updated appropriately for implementing RKVY beyond 12thPlan period. Keeping in view the modification proposed for the plan period and emerging needs of the State considering the 14th Finance Commission period.

Preparation/revision of the DAPs is an elaborate, exhaustive and iterative process and care need be taken by the State nodal department and district agriculture department in ensuring that these plans cover the entire gamut of agriculture and allied sectors. SAIDP is the consolidation of the requirement of infrastructure identified in DAPs and SAP considering the current challenges in the agriculture and allied sectors.

To execute the developmental activities as detailed in the plan, the State Agriculture Infrastructure Development Programme proposed a budget of Rs. **9011656.39 lakh** (including district irrigation plan) with sectoral allocation and it is furnished in the Table below. Thus, about 80.87 per cent of the budget is allocated to water resource irrigation and irrigation, Horticulture (6.58 per cent), Dairy Development (4.11 per cent),Agricultural Engineering (3.39 per cent), Agriculture including research (1.16 per cent), Animal Husbandry (1.00 per cent) and Agriculture Marketing (0.95 per cent).

Sector wise fund Requirement for Infrastructure

(Rs. in Lakh)

Sl. No	Department	2017-18	2018-19	2019-20	2020-21	2021-22	Total	Per cent
1	Agriculture	21115.51	22467.62	11203.32	11488.11	7672.16	73946.7	0.82
2	Agricultural Research	6672.00	7518.30	7089.00	5076.00	3925.00	30280.30	0.34
3	Horticulture	157657.18	98607.62	110541.06	109601.04	116794.97	593201.88	6.58
4	Agricultural Engineering	67654.48	61546.01	59180.47	58722.83	57986.30	305090.07	3.39
5	Agricultural Marketing	30214.99	16919.16	13497.63	11940.27	13447.88	86019.93	0.95
6	Seed Certification	699.98	522.79	455.81	513.36	375.00	2566.94	0.03
7	Animal Husbandry	24526.12	25297.17	15960.32	11763.37	12645.18	90192.16	1.00
8	Dairy Development	31364.00	95430.00	126508.00	61680.50	54980.50	369963.00	4.11
9	Animal Science Research	14645.30	14890.76	15016.48	4587.80	4529.40	53669.74	0.60
10	Fisheries	8595.83	5860.08	3844.85	2131.08	1045.95	21477.78	0.24
11	Fisheries Research	17922.50	9601.40	5156.00	2523.50	1743.00	36946.40	0.41
12	PWD (WRD)	465733.80	334496.08	326675.78	185549.75	58698.82	1371154.23	15.22
13	Cooperation & Civil Supplies	22975.50	12994.56	10904.93	8767.72	5703.03	61345.74	0.68
	Total	**869777.19**	**706151.55**	**706033.65**	**474345.33**	**339547.19**	**3095854.87**	**34.35**
14	**District Irrigation Plan**							
	AIBP						385000.47	
	Har Khet Ko Pani Component-Extension, Renovation and Modernisation						2123600.30	
	Drop more crop component						1272800.50	
	Watershed Development Component						221800.05	
	MGNREGS						1912600.20	
	Total (DIP)						**5915801.52**	**65.65**
	Grand Total						**9011656.39**	**100.00**

CHAPTER 1

INTRODUCTION

Performance of the agricultural sector plays a critical role in the economic development of the state. Tamil Nadu contributes approximately 3.0 per cent of the food grain production, 7.0 per cent of vegetable production, 12 per cent of fruit production and 24 per cent of flower production of India. The Vision 2023 also reiterated that agriculture and allied sectors in Tamil Nadu State need to achieve annual growth of minimum 5.0 per cent to bring more prosperity to farming community.

In the State, the net sown area had declined from 61.69 lakh hectares in 1970-71 to 49.19 lakh hectares in 2015-16. The availability of land for agricultural purpose was found declining gradually resulting in increased pressure on the limited land resources. The increasing area under fallow lands (cultivable waste, current fallows and other fallows) is also of great concern and are mainly due to conversion of cultivable land to other purposes to meet the requirement of urbanization, inadequate water availability for cultivation arising out of failure of monsoon rains, uncertainty in release of water in Cauvery and from other major reservoirs and depletion of ground water. The cropping intensity has been hovering around 115-119 per cent in the last five decades in the State as compared to the All India average of 133 per cent. The net irrigated area is about 27 Lakh Ha which covers only 59 per cent of the net area sown and the irrigation intensity is about 119 per cent.

Policies, so far, have been concentrated towards irrigated agriculture to increase agricultural production. Now the concern is that the gains from the green revolution areas have been plateauing out due to many factors and evidences suggest that the productivity and returns to investment have substantial trickle-down benefits for poor not only in irrigated areas but also those residing in less favored areas. Hence, it is inevitable that rainfed area should also be promoted through application of technology, inputs and investment in order to convert these grey areas into green. The major strategies to achieve higher growth could be

- Productivity Improvement by bridging the present yield gap
- Diversifying the cultivation in favor of high value horticulture and commercial crops
- Supply of quality inputs in time through Special Purpose Vehicle (SPV)
- Bringing the fallow land under cultivation through cost-effective technology transfer
- Promoting Integrated Farming System (IFS) on whole district saturation approach
- Promoting agri-business venture duly with farmer’s participation

- Inviting more public investment and through PPP mode in creating agri infrastructure to act as growth drivers rather mere hardwares and
- Improving Knowledge Transfer to farmers through ICT enabled extension and market led agriculture

The approaches to achieve these growth parameters should be location specific and need to be drawn on felt need basis. The formulation of bottom- up plans would speed up the process of growth as they primarily address the concern of location specific and need based

National Agricultural Development Program (NADP)

Rashtriya Krishi Vikas Yojana (RKVY) vis-à-vis National Agricultural Development Program (NADP) was initiated in 2007 as an umbrella scheme for ensuring holistic development of agriculture and allied sectors by allowing states to choose their own agriculture and allied sector development activities. The scheme has come a long way since its inception and has been implemented across two plan periods i.e. during 11th and 12th plan periods. Based on feedback received from States, experiences garnered and inputs provided by various stakeholders, schemes eligible for funding under RKVY have undergone modificationsto enhance efficiency, efficacy and inclusiveness of the program

It is of the view that action-oriented plans would reflect the various felt needs of the farmers and other stakeholders. Hence District Agriculture Plans aim at moving towards projecting the requirements for development of Agriculture and allied sectors of the district including animal husbandry, fishery, minor irrigation projects, rural development works, agricultural marketing schemes, schemes for water harvesting and conservation, etc. keeping in view of the natural resources and technological possibilities in each district. These plans thus, would present the vision for Agriculture and allied sectors within the overall development perspective of the district apart from the financial requirement and the sources of financing the agriculture development plans in a comprehensive way.

Preparation of District Agriculture Plan for individual district in turn follows the formulation of State Agriculture Plan (SAP) and then State Agricultural Infrastructural Development Programme (SAIDP). The State Agriculture Plan integrates multiple programs that are in operation in the district and State, including the resources and activities indicated by the State and combines the resources available from the other programs also and the SAIDP highlights the needed infrastructure to achieve a higher growth trajectory.

District, State Agriculture Plan and State Agricultural Infrastructure Development Programme

As per the recent guidelines issued by the Government of India under Remunerative Approaches for Agriculture andAllied sector Rejuvenation (RAFTAAR), the new projects proposed and to be implemented under NADP/RKVY must be in consonant with District Agricultural Plans (DAP), State Agriculture Plans (SAP) and State Agriculture Infrastructure Development Program (SAIDP) prepared by the individual States. Thus, these action-oriented plan documents will remain as cornerstone of planning and implementation of the NADP/RKVY and other schemes. The overall guidelines suggested by the Government of India to be followed for preparation of District Agriculture Plans (DAP) and State Agricultural under NADP/RKVY are as follows:

- The several states have already prepared Comprehensive District and State Agriculture plans for 12th Plan period. These plans have to be revised and updated appropriately for implementing RKVY-RAFTAAR during 14th Finance Commission keeping in view modification proposed for the plan period and emerging needs of the State.
- The District Agriculture Plan (DAP) shall not be however the usual aggregation of existing schemes but would aim at moving towards projecting the requirements for development of Agriculture and allied sectors of the district and for the State a whole.
- These plans would also present the vision for Agriculture and allied sectors within the overall development perspective of the district and further State as a whole.
- The District Agriculture Plans and the State level plan would also present their financial requirements in addition to sources of financing the agriculture development plans in a comprehensive way.
- The District Agriculture Planwill include animal husbandry and fishery development, minor irrigation projects, rural development works, agricultural marketing schemes and etc. keeping in view the natural resources and technological possibilities in each district.
- District level potential linked credit plans (PLP) already prepared by the National Bank for Agriculture and Rural Development (NABARD) and Strategic Research and Extension Plans (SREP) developed under the Agricultural Technology Management Agency (ATMA) etc. may be referred for revision of DAPs.

- It should also be ensured that the strategies for convergences with other programs as well as the role assigned to the Panchayati Raj Institutions (PRIs) are appropriately incorporated in DAPs.

Therefore, each State will also have a comprehensive State Agricultural Plan (SAP) for the remaining period of the Fourteenth Finance Commission by integrating the District Plans. SAPs will invariably have to indicate resources that can flow from the State to thedistricts.

Revision and Updation of SAIDP in Tamil Nadu

Tamil Nadu, as one among the States, has also received Central Assistance under NADP since 2007 and prepared District, State Agriculture and State Agricultural Infrastructure Development Programme (SAIDP) plans during 11th and 12th Plan periods. Each State thereafter has to prepare SAIDP in a similar manner to that of DAPs and SAP for identifying shelf of projects for RKVY (Infrastructure and Assets) stream. SAIDP should ideally be consolidation of requirement of infrastructure identified in DAPs and SAP. Hence the plans are now revised and updated appropriately for implementing RKVY beyond 12th Plan period (2017-22) keeping in view of the modifications proposed for the plan period and emerging needs of the State and to coincide with the 14th Finance Commission period. The current exercise is thus the continuation of the 12th plan period which covers two years of the 14th Finance Commission period (2015-16 and 2016-17) and the remaining period i.e. from 2017-18 to 2021-22.

Thus preparation/revision of the SAIDPs is an elaborate, exhaustive and iterative process and care need to be taken by the State nodal department and district agriculture department in ensuring that these plans cover the entire gamut of agriculture and allied sectors. State Planning Department provides revised/updated SAP and SAIDP to Department of Agriculture (DAC) and Planning Commission as part of State's annual State Plan exercise.

Major Areas of Focus

As per the recent guidelines issued by the Government of India, different infrastructure has been suggested that could be considered eligible for funding under RKVY-RAFTAAR (Infrastructure & Assets). The infrastructure and assets that are covered in SAIDP are shown in Table 1.1

Table 1.1 Infrastructure and Assets covered in SAIDP

Sl. No.	Sector	Type of Infrastructure
A	Agriculture and Horticulture	Soil & Water conservation activities (Terracing, Gully Control Measures, Spill Ways, Check Dams, Spurs, Diversion Drains, Protection Walls etc.), Nurseries, Tissue Culture Labs, Community tanks / Farm ponds / on farm water resources with plastic / RCC lining, Green House / Poly house / Shade net House structures, Sanitary and phytosanitary infrastructure, INM / IPM infrastructure Primary / minimal processing units, Terminal / wholesale / Rural market, Functional infrastructure for collection, sorting, grading etc. Infrastructure related to Agricultural produce processing Labs for production of bio-control agents, State Pesticide Residue Testing Labs, State Pesticide Testing Labs, Bio-Pesticide Testing Labs, Seed Treatment drums & chemicals, Setting up of new soil testing laboratories, Strengthening of existing soil test laboratories with micro-nutrient testing facilities, Setting up of new fertilizer Quality control Laboratories/. Strengthening of existing FQCLs, Bio fertilizer Production Units, Fruit / Vegetables waste, compost production units
	Horticulture	Protected structures (Green house, glass house, shade net), mushroom production unit, vermicompost unit, supporting structures for vegetable production, post-harvest machinery, farms, nurseries, parks, farm machineries, irrigation structures
	Agriculture Research	Laboratories, Green Globe Centre, Processing Units, Research Stations, Strengthening of Laboratories, Market Complex
	Agricultural Engineering	Custom Hiring Centers for Agricultural Equipment, Agriculture Machines Testing Centers, tractor hiring scheme, solar driers, information technology related infrastructure, agricultural engineering extension centres, water conservation structures, soil conservation structures
	Seed certification	Seed Testing Labs, Seed Processing Facilities, Seed Storage Godowns including Dehumidified Refrigerated Seed Storage Godowns, Seed Certification Agencies and Certification Infrastructure Seed Multiplication Farms, strengthening of laboratory facilities, communication and networking facilities
	Agricultural Research and Extension	Research Infrastructure, Strengthening of Krishi Vigyan Kendras (KVKs) Kisan Call Centers, ATMA Infrastructure, Knowledge / Technology Resource Centres, Funding for organization of Skill Development workshops, bringing out of short films/ media publicity for promotion of skill development, carrying out of skill gap analysis study, impact analysis study and handholding supportetc
B	Animal Husbandry and Dairy Development	Surgical theatres at veterinary institution, feed mixing / feed block units, disposal pits for poultry unit, native chicken farms, modern dairy/bull shed, piggery shed, IVF lab, embryo transfer lab, semen processing lab, mobile disease diagnostics lab, fooder development, vermicompost unit, slaughter house infrastructure,

Sl. No.	Sector	Type of Infrastructure
		farmers training centre. Milk Collection Centres and Infrastructure, cattle feed plants, construction of dairy, ice cream parlour, dairy development buildings, cow shed, bulk milk cooloing centres, ware house for dairy products, milk powder plant, cow shed.
C	Fisheries	Fish Ponds / Reservoirs, seed rearing farms, GIFT farms, modern fish KIOSK, mini lab facilities, District Extension and Training Centres, modern mobile fish marketing vehicles, aqua eco tourism centre, seed rearing units, modern fish market, seed weed culture, Ornamental fish culture unit, artificial reefs, renovation of government fish farms
D	Minor / Micro Irrigation	Shallow Wells & Dug Wells, Tube Wells (except in dark / grey / critical zone identified by Central Ground Water Board), Percolation & Minor Irrigation Tanks, Farm Ponds, Drip & Sprinkler Irrigation System, Field Channels and Piped Water Conveyance System
E	Credit and Insurance	Use of Aerial Vehicle (UAV/DRONE) for assessment of cropped area, crop losses, crop health monitoring etc.

Methodology followed for the Preparation of SAIDP

The task of preparing District Agriculture Plans, State Agricultural Plan and SAIDP is assigned to Tamil Nadu Agricultural University, Coimbatore. In cooperation with Scientists from Tamil Nadu Veterinary and Animal Sciences University (TANUVAS), Tamil Nadu Fisheries University (TNFU) and officials from Department of Agriculture, Horticulture, Agricultural Engineering, Marketing, Animal Husbandry and Fisheries, Seed certification, PWD etc. the major interventions and action plans for each intervention are suggested. The infrastructure that are essential, based on the felt needs, are incorporated in the State Agricultural Plan along with production enhancing and growth-oriented projects. These infrastructure along with the physical and financial implications are compiled from the respective District Agricultural Plan and State Agriculture Plan to prepare SAIDP.

CHAPTER 2

Resource Base and Infrastructure

2.1 Land

Land use statistics in general indicate the way in which the land area is put under various uses. Land as a scarce resource is to be managed effectively. The land use pattern in the different districts and Tamil Nadu State as a whole are furnished in Tables 2.1 and 2.2 respectively. The total geographical area in the State is about 13 million hectares. Among the districts, Erode has the maximum geographical area of 5.77 lakh hectares and Thiruvarur has the minimum geographical area of 2.10 lakh hectares. The area under forest in Tamil Nadu is around 21 lakh hectares accounting for 16 per cent of the geographical area. Erode district has the maximum area (2.27 lakh ha.) and Cuddalore has the minimum area under forest (1,415 ha.) Over years, the area under forest had increased very marginally by about 1.01 lakh hectares (1979-80 to 2014-15). This is a good sign. However, it is pointed out that for a natural / environmental balance to receive good rains there must be 33 per cent of the geographical area under forest cover. This indicates that afforestation must be taken up on war-footing. Since, the scope for bringing more area under natural forest cover is limited, the development efforts must be dovetailed for intensification of green cover in forest area as well as on hills and hillocks and planting tree crops in shrub-jungles, village wastelands and farms in almost all the districts in the State.

The area under barren and uncultivable land is around 4.88 lakh hectares in 2014-15 as compared to that of 6.10 lakh hectares in 1979-80. Thus, a reduction of 1.22 lakh hectare over the period of 25 years could be witnessed. This down-trend is a good sign and might be due to increase in area under forest, waste land development programme etc. However, still there exist scopes to reduce the extent of the barren land through wasteland development efforts. Among the districts, the barren land area is more pronounced in the districts of Villupuram, Theni, Salem, Dindigul and Nagapattinam. The area under cultivable wastelands was 3.25 lakh hectares in 2014-15, while it was 3.51 lakh hectares in triennium ending 1979-80. Thus, a very marginal increase of about 0.26 lakh hectare could be observed during the period under consideration. Among the districts, the maximum area under culturable waste was found in Karur district, with 65,536 hectares followed by Thoothukudi (45,242 ha) and Tirunelveli (35272 ha) districts.

Table 2.1 District wise Land Use Classification in Tamil Nadu (2014-15)

(Hectares)

Sl. No.	Districts	Geographical Area	%	Forest Area	%	Barren and Unculturable Lands	%	LPNA Use	%	Culturable Waste	%	PP and Other Grazing Lands	%
1	Chennai	17098.0	0.1	300.0	0.0	0.0	0.0	16798.0	0.8	0.0	0.0	0.0	0.0
2	Kancheepuram	443210.0	3.4	23856.0	1.1	10948.0	2.2	151650.0	6.9	11477.0	3.5	18286.0	16.9
3	Thiruvallur	342243.0	2.6	19736.0	0.9	13569.0	2.8	109848.0	5.0	6983.0	2.2	8143.0	7.6
4	Cuddalore	367781.0	2.8	1415.0	0.1	14623.0	3.0	58942.0	2.7	6034.0	1.9	604.0	0.6
5	Villupuram	722203.0	5.5	71697.0	3.4	56651.0	11.6	136115.0	6.2	9590.0	3.0	4170.0	3.9
6	Vellore	592018.0	4.5	162286.0	7.6	20445.0	4.2	80706.0	3.7	5751.0	1.8	4037.0	3.7
7	Thiruvannamalai	631205.0	4.8	152810.0	7.2	20586.0	4.2	96481.0	4.4	8314.0	2.6	2931.0	2.7
8	Salem	520530.0	4.0	125682.0	5.9	38198.0	7.8	36792.0	2.9	5416.0	1.7	4200.0	3.9
9	Namakkal	336719.0	2.6	43909.0	2.1	24539.0	5.0	38755.0	1.8	4760.0	1.5	6664.0	6.2
10	Dharmapuri	449777.0	3.5	164177.0	7.7	15804.0	3.2	51724.0	2.4	2792.0	0.9	6210.0	5.8
11	Krishnagiri	514326.0	4.0	203964.0	9.6	23937.0	4.9	41923.0	1.9	4345.0	1.3	7855.0	7.3
12	Coimbatore	472322.0	3.6	111871.0	5.3	4793.0	1.0	76343.0	3.5	8463.0	2.6	77.0	0.1
13	Tiruppur	519559.0	4.0	48168.0	2.3	2541.0	0.5	68835.0	3.1	3926.0	1.2	126.0	0.1
14	Erode	572264.0	4.4	227511.0	10.7	6270.0	1.3	53341.0	2.4	1731.0	0.5	101.0	0.1
15	Tiruchirapalli	440383.0	3.4	36773.0	1.7	12598.0	2.6	85230.0	3.9	10785.0	3.3	667.0	0.6
16	Karur	289557.0	2.2	6187.0	0.3	2785.0	0.6	37536.0	1.7	65536.0	20.2	10801.0	10.0
17	Perambalur	175739.0	1.4	16281.0	0.8	2786.0	0.6	28538.0	1.3	4543.0	1.4	152.0	0.1
18	Ariyalur	193398.0	1.5	739.0	0.0	8523.0	1.7	32382.0	1.5	3213.0	1.0	1291.0	1.2
19	Pudukottai	466329.0	3.6	23535.0	1.1	9863.0	2.0	137114.0	6.2	9776.0	3.0	3471.0	3.2
20	Thanjavur	339657.0	2.6	3390.0	0.2	2149.0	0.4	81737.0	3.7	12097.0	3.7	1218.0	1.1
21	Thiruvarur	209709.0	1.6	2452.0	0.1	113.0	0.0	37308.0	1.7	1156.0	0.4	786.0	0.7
22	Nagapattinam	271583.0	2.1	4633.0	0.2	33418.0	6.8	47738.0	2.2	2094.0	0.6	846.0	0.8
23	Madurai	374173.0	2.9	48473.0	2.3	13031.0	2.7	75537.0	3.4	14446.0	4.4	233.0	0.2

Table 2.1 District wise Land Use Classification in Tamil Nadu - 2014-15 (Contd.,)

Sl. No.	Districts	Geographical Area	%	Forest Area	%	Barren and Unculturable Lands	%	LPNA Use	%	Culturable Waste	%	PP and Other Grazing Lands	%
24	Theni	324230.0	2.5	103718.0	4.9	43319.0	8.9	24616.0	1.1	2864.0	0.9	315.0	0.3
25	Dindigul	626664.0	4.8	138923.0	6.5	36210.0	7.4	67218.0	3.1	5610.0	1.7	6946.0	6.4
26	Ramanathapuram	408957.0	3.1	4488.0	0.2	4524.0	0.9	87045.0	4.0	3533.0	1.1	154.0	0.1
27	Virudhunagar	424323.0	3.3	26466.0	1.3	4525.0	0.9	70510.0	3.2	9535.0	2.9	804.0	0.7
28	Sivagangai	418900.0	3.2	16533.0	0.8	4710.0	1.0	122586.0	5.6	18316.0	5.6	1367.0	1.3
29	Tirunelveli	675850.0	5.2	127758.0	6.0	30027.0	6.1	103169.0	4.7	35272.0	10.9	5156.0	4.8
30	Thoothukudi	470724.0	3.6	11012.0	0.5	19878.0	4.1	76480.0	3.5	45242.0	13.9	5132.0	4.8
31	The Nilgiris	254485.0	2.0	142577.0	6.7	3375.0	0.7	9977.0	0.5	1420.0	0.4	5078.0	4.7
32	Kanyakumari	167200.0	1.3	54155.0	2.6	4001.0	0.8	29183.0	1.3	176.0	0.1	104.0	0.1
	State	**13033116.0**	**100.0**	**2125475.0**	**100.0**	**488739.0**	**100.0**	**2199157.0**	**100.0**	**325196.0**	**100.0**	**107925.0**	**100.0**
	% to State Total	**100**		**16.3**		**3.75**		**16.87**		**2.5**		**0.83**	

Source: Tamil Nadu – An Economic Appraisal, 2005-06 and 2011-12 to 2014-15 Evaluation and Research Department, Government of Tamil Nadu

Table 2.1 District wise Land Use Classification in Tamil Nadu - 2014-15 (Contd.,)

Sl. No	Districts	Land Under Misc. Tree Crops and Groves	%	Current Fallows	%	Other Fallow Lands	%	Net area Sown	%	Area Sown more than once	%	Gross Cropped Area	%	Cropping intensity
1	Chennai	0	0	0	0	0	0	0	0	0	0	0	0	0
2	Kancheepuram	11745	5	56341	5.6	73626	4.2	85281	1.8	11249	1	96530	1.6	125.33
3	Thiruvallur	7027	3	29691	3	44478	2.6	102768	2.1	46473	4	149241	2.5	140.86
4	Cuddalore	13601	5.8	27198	2.7	25605	1.5	219759	4.6	112543	9.6	332302	5.5	123.77
5	Villupuram	6297	2.7	84064	8.4	16013	0.9	337606	7	137647	11.7	475253	7.9	117.74
6	Vellore	3003	1.3	71094	7.1	74174	4.3	170522	3.5	31829	2.7	202351	3.4	113.31
7	Thiruvannamalai	2033	0.9	135497	13.6	25983	1.5	186570	3.9	68747	5.9	255317	4.3	125.8
8	Salem	2880	1.2	45701	4.6	16213	0.9	218448	4.5	86706	7.4	305154	5.1	115.23
9	Namakkal	3769	1.6	46029	4.6	9293	0.5	159001	3.3	65895	5.6	224896	3.8	116.5
10	Dharmapuri	2896	1.2	47370	4.7	7863	0.5	150941	3.1	59498	5.1	210439	3.5	120.6
11	Krishnagiri	8344	3.5	28909	2.9	14147	0.8	180902	3.8	43871	3.7	224773	3.8	112.41
12	Coimbatore	3446	1.5	28986	2.9	64906	3.7	173437	3.6	3059	0.3	176496	2.9	105.83
13	Tiruppur	1982	0.8	85508	8.6	120953	7	187520	3.9	2383	0.2	189903	3.2	
14	Erode	1004	0.4	60269	6	43350	2.5	178687	3.7	20661	1.8	199348	3.3	107.88
15	Tiruchirapalli	3114	1.3	20731	2.1	108259	6.2	162226	3.4	16384	1.4	178610	3	106.73
16	Karur	1865	0.8	26482	2.7	50459	2.9	87906	1.8	5704	0.5	93610	1.6	102.53
17	Perambalur	1251	0.5	6126	0.6	10521	0.6	105541	2.2	7176	0.6	112717	1.9	107.94
18	Ariyalur	23572	10	7687	0.8	16879	1	99112	2.1	12765	1.1	111877	1.9	
19	Pudukottai	19449	8.3	21195	2.1	126505	7.3	115421	2.4	3253	0.3	118674	2	101.15
20	Thanjavur	5768	2.5	13542	1.4	28158	1.6	191598	4	79201	6.7	270799	4.5	125.65
21	Thiruvarur	2017	0.9	1399	0.1	7313	0.4	157165	3.3	170078	14.5	327243	5.5	155.13
22	Nagapattinam	6307	2.7	9831	1	17029	1	149687	3.1	119005	10.1	268692	4.5	162.43
23	Madurai	2737	1.2	6354	0.6	88866	5.1	124496	2.6	5804	0.5	130300	2.2	105.05

Table 2.1 District wise Land Use Classification in Tamil Nadu - 2014-15 (Contd.,)

Sl. No	Districts	Land Under Misc. Tree Crops and Groves	%	Current Fallows	%	Other Fallow Lands	%	Net area Sown	%	Area Sown more than once	%	Gross Cropped Area	%	Cropping intensity
24	Theni	1250	0.5	9881	1	25712	1.5	112555	2.3	14841	1.3	127396	2.1	107.59
25	Dindigul	7809	3.3	20986	2.1	113479	6.5	229483	4.8	7863	0.7	237346	4	103.25
26	Ramanathapuram	30941	13.1	38299	3.8	41155	2.4	198818	4.1	0	0	198818	3.3	100
27	Virudhunagar	5470	2.3	7663	0.8	175519	10.1	123831	2.6	3790	0.3	127621	2.1	104.17
28	Sivagangai	6554	2.8	24773	2.5	128131	7.4	95930	2	86	0	96016	1.6	100
29	Tirunelveli	8511	3.6	19254	1.9	180950	10.4	165753	3.4	28176	2.4	193929	3.2	120.45
30	Thoothukudi	36597	15.5	10260	1	68428	3.9	197695	4.1	3128	0.3	200823	3.4	104.21
31	The Nilgiris	3820	1.6	5430	0.5	8337	0.5	74471	1.6	0	0	74471	1.2	100.09
32	Kanyakumari	637	0.3	1771	0.2	1285	0.1	75888	1.6	7668	0.7	83556	1.4	115.73
	State	**235696**	100	**998321**	100	**1733589**	100	**4819018**	100	**1175483**	100	**5994501**	100	
	% to State Total	**1.81**		**7.66**		**13.3**		**36.98**						**-**

Table 2.2 Land Utilization Pattern in Tamil Nadu State

(Area in lakh hectares)

Sl. No.	Classification	Average area TE 1979-1980		Average area TE 2005-2006		2014-2015	
		Area	%	Area	%	Area	%
1.	Forests	20.25	15.58	21.18	16.27	21.25	16.30
2.	Barren and Uncultivable land	6.10	4.69	5.07	3.89	4.88	3.70
3.	Land put to non-agrl uses	16.82	12.94	21.26	16.33	21.99	16.90
4.	Cultivable waste	3.51	2.70	3.74	2.87	3.25	2.50
5.	Permanent pastures and other grazing lands	1.65	1.27	1.12	0.85	1.07	0.84
6.	Land under misc crops and groves not included in net area sown	1.95	1.50	2.82	2.16	2.35	1.80
7.	Current fallow	12.57	9.67	8.03	6.16	9.98	7.70
8.	Other fallow lands	4.56	3.50	16.95	13.01	17.33	13.40
9.	Net area sown	62.56	48.15	50.10	38.49	48.19	37.00
10.	Total geographical area	130.01	100.00	130.15	100.00	130.33	100.00
11.	Area sown more than once	13.52	-	7.51	-	11.75	-
12.	Gross cropped area (9+11)	76.11	-	51.45	-	59.94	-
13.	Cropping intensity (12÷9)	121.60	-	114.67	-	124.38	-

Source: Tamil Nadu – An Economic Appraisal, 2005-06 and 2011-12 to 2014-15 Evaluation and Research Department, Government of Tamil Nadu, Chennai. TE: Triennium.

Other fallow lands, which are also otherwise considered as wastelands have shown an alarming uptrend. While it was 4.56 lakh hectares in TE 1979-80, the same was 17.33 lakh hectares in 2014-15. This upsurge is a serious concern that needs immediate attention of the policy makers and planners. The districts of Tirunelveli, Virudhunagar, Sivagangai and Pudukottai had more than 1.0 lakh ha under other fallow lands. The area under current fallows was quite high in TE 1979-80 with 12.57 lakh hectares and it had reduced by about 2.59 lakh hectares and 9.99 hectares in 2014-15. This is a good sign of development and might be due to tapping more of ground water and stabilization of ayacuts under irrigation systems in some areas. Further, reduction of current fallows is quite possible by the modernization of irrigation systems and adoption of water harvesting techniques, in addition to other

moisture conservation measures. Erode, Villupuram, Coimbatore, Thiruvannamalai, Ramanathapuram and Thoothukudi districts had sizeable area under current fallows.

The net sown area had reduced considerably from 62.56 lakh hectares in TE 1979-80 to 48.19 lakh hectares in 2014-15. This is rather a disturbing trend and might be due to factors like marked increase in lands put into non-agricultural uses, rapid industrialization and urbanization. Among districts, Villupuram had more than 3.00 lakh ha. of net sown area and it was the lowest in Kanyakumari district with 0.76 lakh ha.

Area sown more than once had shown a drastic down-trend over the periods under consideration. This is rather an astonishing fact and quite contradictory to the normal expectations. In spite of modernization of existing irrigation systems and more tapping of ground water, the steep fall in area sown more than once during the planned period so far, is a serious issue that needs an in depth analysis. There exists scope to arrest this down-trend and to either increase or at least stabilize the area sown more than once through rehabilitation of the existing irrigation systems and structures and energization of pump sets and motors at a faster rate through pumping more of public investments. The districts of Nagapattinam, Thiruvarur and Thanjavur had sizable area under area sown more than once and this might be due to the Cauvery ayacut. Villupuram, Cuddalore, Salem and Tiruvannamalai districts also had sizeable area under area sown more than once.

The cropping intensity for the State as a whole, as could be visualized, had decreased from 121.60 per cent in TE 1979-80 to TE 2005-06 114.67 per cent and increased to 124.38 per cent in 2014-15. This trend must be maintained and augmented to keep agriculture growing at a faster rate.

Thus, the preceding discussion on the land use pattern of Tamil Nadu State clearly showed that there exist scopes for

1. Arresting the down-trend in the net sown area and its stabilization
2. Putting into use the area under current fallows and cultivable waste
3. Developing the wastelands like barren and uncultivable land as well as other fallow lands

4. Intensive fodder development activities under permanent pasture to augment its economic utility and
5. Regulations of preventing diversion of lands to non-agricultural use.

2.2 Operational Holdings

Operational holdings often determine agricultural production and productivity. The operational holdings as per Agricultural census are furnished in Table 2.3. The results of successive agricultural census confirmed the growing imbalance and asymmetry in the distribution of size of holdings. The number of marginal farmers in the State had increased from71.34 per cent of the total holdings operated in 1985-86 to 77.19 per cent of total holdings operated in 2010-11. However, the marginal farmers have operated only 25.88 and 35.33 per cent of total area in 1985-86 and 2010-11 respectively. Semi-medium, medium and large farmers accounted for a small proportion of 8.26 per cent of holdings and they have operated a higher proportion of 39.34 per cent of total area in 2010-11.

Thus, the number of marginal farmers has been increasing over years which imply that the process of marginalization of farmers is continuing and they tend to subsist on low income levels.

Table 2.3 Operational Holdings as per Agricultural Census

(Area in hectares)

Sl. No.	Category	1985-86		1990-91		1995-96		2005-06		2010-11	
		No	Area	No	Area	No	Area	No	Area	No	Area
1	Marginal	5497735 (71.34)	2017615 (25.88)	5848096 (73.11)	2117826 (28.34)	5951104 (74.28)	2210341 (30.27)	6227705 (76.01)	2286370 (33.51)	6266372 (77.19)	2292031 (35.33)
2	Small	1260306 (16.35)	1771545 (22.72)	1274515 (15.93)	1794471 (24.01)	1233836 (15.40)	1721286 (23.57)	1234054 (15.06)	1720819 (25.22)	1181797 (14.55)	1643841 (25.33)
3	Semi-Medium	648822 (8.42)	1778376 (22.81)	617605 (7.72)	1686514 (22.57)	600833 (7.50)	1622811 (22.22)	542025 (6.62)	1467697 (21.51)	502332 (6.19)	1355476 (20.89)
4	Medium	260645 (3.38)	1507987 (19.34)	227594 (2.85)	1301124 (17.41)	199791 (2.49)	1134853 (15.54)	169599 (2.07)	957721 (14.03)	150570 (1.85)	847372 (13.06)
5	Large	39215 (0.51)	720418 (9.24)	31122 (0.39)	573742 (7.68)	26268 (0.33)	613910 (8.41)	19590 (0.24)	391339 (5.73)	17365 (0.22)	349517 (5.39)
Total		**7706723 (100.00)**	**7795941 (100.00)**	**7998932 (100.00)**	**7473577 (100.00)**	**8011832 (100.00)**	**7303201 (100.00)**	**8192973 (100.00)**	**6823946 (100.00)**	**8118436 (100.00)**	**6488237 (100.00)**

Figures in parentheses indicate percentage to total

Note: Marginal- Below 1 ha., Small - 1.0 to 2.0 ha., Semi-Medium - 2.0 to 4.0 ha, Medium - 4.0 to 10.0 ha and Large - 10.0 ha and above

Source: Tamil Nadu and Economic Appraisal 2005-06 and 2011-12 to 2013-14 Evaluation and Research Department, Government of Tamil Nadu, Chennai.

2.3 Size of Holdings

The distribution of size of holdings in Tamil Nadu is furnished in Table 2.4. It could be seen from the table that the average size of marginal holdings had declined from 0.41 ha in 1976-77 to 0.37 ha in 2000-01 and 0.37 ha in2010-11. However, there had been no marked differences in the size of small, semi-medium and medium holdings over years. The size of large holdings had increased from 17.28 hectares in 1976-77 to 19.48 hectares in 2000-01and 20.13 hectares in 2010-11. Thus, the average size of holdings in Tamil Nadu State had decreased from 1.25 ha in 1976-77 to 0.89 ha in 2000-01 and 0.80 ha in 2010-11.

Table 2.4 Size of Holdings in Tamil Nadu State

(Area in hectare)

Sl. No.	Categories	1976-77	1979-80	1985-86	1990-91	1995-96	2000-01	2005-06	2010-11
1.	Marginal	0.41	0.38	0.37	0.36	0.38	0.37	0.37	0.37
2.	Small	1.41	1.41	1.41	1.41	1.40	1.39	1.39	1.39
3.	Semi-medium	2.75	2.76	2.74	2.73	2.73	2.72	2.71	2.70
4.	Medium	5.77	5.78	5.78	5.72	5.60	5.68	5.65	5.63
5.	Large	17.28	17.96	18.78	18.44	21.68	19.48	19.98	20.13
	Average	**1.25**	**1.07**	**1.01**	**0.93**	**0.95**	**0.89**	**0.83**	**0.80**

Source: Tamil Nadu – An Economic Appraisal, 2005-06 and 2011-12 to 2013-14, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

2.4. Water

All river systems of the State flow eastward from the Western Ghats and are rainfed. Palar, Pennaiyar and Cheyyar are the three important river systems in the North. None is perennial. Cutting across the centre of the state is the Cauvery fed by both the monsoons; it is practically perennial, although in recent years, this has become drier mainly to the impounding of water in the dams of Karnataka. Yet, along with its tributaries *viz*. Bhavani and Amaravathi, it is the most important source of canal irrigation. South of Cauvery is three important rivers, namely Vaippar, Vaigai and Tamiravaruni. Of these, Tamiravaruni is perennial and a source of canal irrigation. Besides these, there are several other smaller and less important rivers in the State. The rivers naturally, graded almost to their heads with only slight interruptions of

profiles when they pass through the Eastern Ghats. Though these rivers are not long, the deltas present extremely distinctive features and the power and irrigation developments are outstanding.

Tamil Nadu with 7.0 per cent of population in the country is endowed with only 3.0per cent of the water resources of India. The State's water resources are dependent on rainfall. The Tamil Nadu Water Policy, 1994 was formulated based on the National Water Policy, 1987. Taking into account of the National Water Policy, 2002, the State Water Policy has been redrafted emphasizing the need for utmost efficiency in water utilization and public awareness of the importance of its conservation.

2.4.1. Irrigation Potential

The total water potential of the State including groundwater is 46,540 million cubic meters (MCM). The total surface water potential of the State is 24,160 MCM, including the contribution from neighbouring states of Andhra, Karnataka and Kerala. Of the total water potential, the surface water potential of about 2.4 million hectares has almost been fully (more than 95 per cent) tapped since the late sixties. Ground water is, therefore, the only alternative source available for further development. The change in availability of ground water in Tamil Nadu is furnished in Table 2.5.

Table 2.5 Change in Availability of Groundwater in Tamil Nadu

Sl. No.	Years of Assessment	Category of blocks					Total
		Safe blocks	Semi critical blocks	Critical blocks	Over exploited blocks	Saline	
1	1987	251 (66.40)	86 (22.75)	41 (10.84)	-	-	**378**
2	1992	209 (54.42)	86 (22.39)	89 (23.17)	-	-	**384**
3	1998	137 (35.5)	70 (18.18)	35 (9.09)	135 (35.06)	8 (2.07)	**385**
4	2003	97 (25.20)	105 (27.27)	37 (9.61)	138 (35.84)	8 (2.08)	**385**
5	2011	136 (35.23)	67 (17.35)	33 (8.54)	139 (36.01)	11 (2.84)	**386**

Source: Report on Dynamic Ground Water Resources of Tamil Nadu Tamil Nadu, State and Ground water Year book on 2011-12.

The ground water potential for future development has been estimated at 3142.27 MCM as of January 2003. This balance potential is mostly distributed in 239 blocks compressing safe, semi- critical and critical categories. The ground water availability is found to be in safe condition only in 136 blocks (35.23 per cent) of Tamil Nadu State.

2.4.2. Sources of Irrigation

The major irrigation sources of the State are canals, tanks and wells. The per capita availability of water in the State stood at 900 cubic meters only as against the All - India level of 2200 cubic meters. The sources of irrigation and percentage of net and gross area irrigated are indicated in Table 2.6.

It could be seen that the percentage of canal area irrigated has come down from 42.00 in 1950-51 to 24.54 in 2014-15. Similarly, the percentage of area irrigated by tanks declined from 30.00 in 1950-51 to 13.50 in 2014-15. On the contrary, wells have shown a constant rise from 24.00 percent in 1950-51 to 61.80 per cent in 2014-15. The other sources of irrigation had shown a constant declining trend. The percentage of net area irrigated to net area sown had shown an upward trend with a fall in 1990-91, 2005-06. The same phenomenon was observed in the case of gross area irrigated to total gross cropped area. The percentage of gross area-irrigated to total gross area sown had improved by 46.30 and 56.62 per cent respectively during 2005-06 over 2014-15. The area under canal, tank and other source of irrigation had witnessed a downward shift between 2005-06 and 2014-15.

The district wise area irrigated over years is furnished in Table 2.7. The net area irrigated was more pronounced in the districts of Villupuram, Thanjavur, Cuddalore and Thiruvarur in 2014-15. Area irrigated more than once was found to be more in the districts of Thiruvannamalai, Thiruvarur, Villupuram, Thiruvallur, Thanjavur, Nagapattinam, Cuddalore and Erode. The gross area irrigated in 2014-15 ranged from 565 hectares in the Nilgiris district to 3,50, 913 hectares in Villupuram district.

Table 2.6 Source-wise Net Area Irrigated and Percentage to Total Irrigated Area

(in lakh hectares)

Sources of Irrigation	1950-51	1960-61	1970-71	1980-81	1990-91	2000-2001	2005-06	2011-12	2014-15
Canal	7.88 (42.0)	8.82 (36.0)	8.84 (34.0)	8.89 (35.0)	7.69 (32.4)	8.33 (28.8)	8.00 (27.4)	7.46 (25.17)	6.69 (24.54)
Tanks	5.65 (30.0)	9.36 (38.0)	8.98 (35.0)	5.90 (22.0)	5.31 (22.3)	5.88 (20.4)	5.75 (19.7)	5.28 (17.81)	3.68 (13.50)
Wells	4.26 (24.0)	5.98 (24.0)	7.75 (30.0)	10.67 (42.0)	10.59 (44.6)	14.49 (50.2)	15.36 (52.6)	16.83 (56.78)	16.84 (61.80)
Other sources	0.76 (4.0)	0.46 (2.0)	0.35 (1.0%)	0.24 (1.0)	0.14 (0.7)	0.16 (0.6)	0.72 (0.3)	0.07 (0.24)	0.04 (0.16)
Total	**18.55**	**24.62**	**25.92**	**25.70**	**23.73**	**28.87**	**36.33**	**29.64**	**27.25**
% of net area irrigated to net area sown	36.00	41.10	42.00	48.00	42.50	54.10	40.3	59.46	56.56
Gross area irrigated	21.89	32.35	34.10	32.94	28.94	34.90	33.97	35.19	33.94
% of gross area irrigate to total gross area sown	37.10	44.20	46.20	50.90	43.60	55.10	46.3	59.75	56.62

Figures in parenthesis indicate per cent to total

Source: Tamil Nadu – An Economic Appraisal, (various issues), Evaluation and Research Department, Government of Tamil Nadu, Chennai.

Table 2.7 District – wise Details of Net Area and Gross Area Irrigated in Tamil Nadu

(in hectares)

Sl. No.	District	Net Area Irrigated						Area irrigated more than once						Gross Area Irrigated					
		2004-05	2005-06	2011-12	2012-13	2013-14	2014-15	2004-05	2005-06	2011-12	2012-13	2013-14	2014-15	2004-05	2005-06	2011-12	2012-13	2013-14	2014-15
1	Kancheepuram	105478	120700	101052	**97920**	**94732**	**76613**	32884	32605	13948	7807	17756	10375	153305	153305	115000	**105727**	**112488**	**86988**
2	Thiruvallur	83954	92498	85744	**90433**	**36165**	**92525**	19839	37138	26086	25422	39078	40406	129636	129636	111830	**115855**	**135243**	**132931**
3	Cuddalore	146355	155013	148549	**138336**	**143440**	**140004**	28503	25779	31796	28219	44083	56911	180792	180792	180345	**166555**	**187523**	**196915**
4	Villupuram	222021	243141	235645	**227674**	**238870**	**243829**	41021	38044	17744	15760	120111	107084	281185	281185	253389	**243434**	**358981**	**350913**
5	Vellore	70294	103345	90501	**84342**	**86077**	**81528**	26814	21983	16272	16409	20337	20264	125328	125328	106773	**100751**	**106414**	**101792**
6	Thiruvannamalai	144156	160639	148528	**139621**	**132655**	**128461**	44325	58511	46912	45952	45647	59455	219150	219150	195440	**185573**	**178302**	**187916**
7	Salem	80199	97973	116985	**107242**	**98448**	**95705**	17556	21707	51830	31170	38710	32455	119680	119680	168815	**138412**	**137158**	**128160**
8	Namakkal	47420	74318	75200	**64165**	**66492**	**71235**	13739	13828	19160	16560	21452	28644	88146	88146	94360	**80725**	**87944**	**99879**
9	Dharmapuri	51447	66690	83206	**53114**	**52089**	**48992**	5814	11691	38684	16371	34901	21843	78381	78381	121890	**69485**	**86990**	**70835**
10	Krishnagiri	44075	49002	52120	**50527**	**58305**	**57329**	4367	9248	7997	12586	26343	15717	58250	58250	60117	**63113**	**84648**	**73046**
11	Coimbatore	160261	170511	114399	**114723**	**114994**	**113690**	13313	10960	3142	3256	1855	1975	181471	181471	117541	**117979**	**116849**	**115665**
12	Tiruppur	-	-	122959	**96982**	**112059**	**116842**	-	-	4165	194	1608	2042	-	-	127124	**97176**	**113667**	**118884**
13	Erode	149713	161217	126169	**110473**	**1210847**	**123416**	28668	23687	15217	3422	7936	19995	184904	184904	141386	**113895**	**129020**	**143411**
14	Tiruchirapalli	91549	110054	98523	**78132**	**78651**	**76181**	12243	11798	9866	6465	10885	11649	121852	121852	108389	**84597**	**89536**	**87830**
15	Karur	42880	54709	60478	**45384**	**45084**	**49586**	2046	2681	6680	504	2855	4885	57390	57390	67158	**45888**	**47939**	**54471**
16	Perambalur	63987	66855	33728	**26591**	**24997**	**26185**	12049	9726	3881	2153	4267	6459	-	-	37609	**28744**	**29264**	**32644**
17	Ariyalur	-	-	35590	27095	37420	35098	-	-	3664	3064	9403	10040	-	-	39254	30159	46823	45138
18	Pudukkotai	102713	109827	116037	103626	96415	90224	1242	1486	4735	2496	4837	2738	111182	111182	120772	106122	101252	92962
19	Thanjavur	160889	165679	174746	167120	165942	182321	25570	35814	67613	39743	55776	59588	193670	193670	242359	206863	221718	241909
20	Thiruvarur	141206	147564	148602	144985	146666	151750	10568	15320	57590	25774	45745	63333	165362	165362	206192	170759	192411	215083
21	Nagapattinam	118174	125014	123108	118854	122960	120503	21834	27925	41075	15449	26372	32642	152127	152127	164183	134303	149332	153145
22	Madurai	77206	92245	88555	45224	62581	75276	1141	8284	8341	713	2370	5388	99408	99408	96896	45937	64951	80664
23	Theni	52657	55718	64354	64926	61689	59950	6029	8009	13942	8011	11545	13271	63630	63630	78296	72937	73234	73221
24	Dindigul	92955	104672	120894	111481	100299	97966	4502	7156	4551	2432	1137	5943	112071	112071	125445	113913	101436	103909
25	Ramanathapuram	72718	68547	66896	6445	36679	67033	-	-	-	0	1	0	68547	68547	66896	64045	63680	67033

Sl. No.	District	Net Area Irrigated						Area irrigated more than once						Gross Area Irrigated					
		2004-05	2005-06	2011-12	2012-13	2013-14	2014-15	2004-05	2005-06	2011-12	2012-13	2013-14	2014-15	2004-05	2005-06	2011-12	2012-13	2013-14	2014-15
26	Virudhunagar	52596	55365	55079	47005	43099	48285	5390	5118	3933	3440	1762	3200	59909	59909	59012	50445	44861	51485
27	Sivagangai	83160	88999	89788	75575	65944	72806	-	-	127	31	219	21	88999	88999	89915	75606	66163	72827
28	Tirunelveli	110389	111132	117485	87888	85535	116575	10454	25541	23662	8304	25673	23661	139778	139778	141147	96192	111208	140236
29	Thoothukudi	40038	39674	40618	29729	32363	37274	1555	1131	3793	1161	2872	2216	46331	46331	44411	30890	35235	39490
30	Nilgiris	736	750	383	385	328	565	-	-	-	0	0	0	750	750	383	385	328	565
31	Kanyakumari	27972	27694	28106	29103	30034	27894	6935	10945	8389	5891	6245	6454	38885	38885	36495	34994	36279	34348
	Total	**2637198**	**2919545**	**2964027**	**2585100**	**3681859**	**2725641**	**398401**	**476115**	**554795**	**348759**	**631781**	**668654**	**3320119**	**3320119**	**3518822**	**2991459**	**3310877**	**3394295**

Source: Tamil Nadu – An Economic Appraisal, 2005-06 and 2011-12 to2012-13 Evaluation and Research Department, Government of Tamil Nadu, Chennai.

2.4.3. Irrigation Intensity

The district wise details of net area and gross area irrigated along with the irrigation intensity for the period from 2003-04 to 2014-15 are furnished in Table 2.8. It could be seen that the irrigation intensity at the State level varied from 115.41 per cent in 2003-04 to 125.00 per cent in 2014-15. The irrigation intensity was found to be higher than the State level in the districts of Thiruvallur, Cuddalore, Thiruvannamalai, Salem, Namakkal, Dharmapuri, Thanjavur and Thiruvarur in 2014-15. Further, there had been increase in the irrigation intensity continuously from 2003-04 to 2014-15, only in the districts of Tiruvallur, Cuddalore, Dharmapuri, Karur and Thiruvarur

Table 2.8 District wise Irrigation Intensity

(Area in hectares)

Sl. No.	District	Irrigation Intensity (in percentage)				
		2003-04	2004-05	2005-06	2011-12	2014-15
1	Kancheepuram	129.25	131.18	127.01	113.80	114.00
2	Thiruvallur	124.34	123.63	140.15	130.42	144.00
3	Cuddalore	118.29	119.48	116.63	121.40	141.00
4	Villupuram	133.87	118.48	115.65	121.40	144.00
5	Vellore	119.49	138.15	121.27	107.53	125.00
6	Thiruvannamalai	143.29	130.75	136.42	117.98	146.00
7	Salem	118.37	121.89	122.16	144.30	134.00
8	Namakkal	121.24	128.97	118.61	125.48	140.00
9	Dharmapuri	105.06	111.30	117.53	146.49	145.00
10	Krishnagiri	115.01	109.91	118.87	115.34	127.00
11	Coimbatore	104.76	108.31	106.43	102.75	102.00
12	Tiruppur	N.A	N.A	N.A	103.39	102.00
13	Erode	105.47	119.15	114.69	112.06	116.00
14	Tiruchirapalli	113.15	113.37	110.72	110.01	115.00
15	Karur	103.74	104.77	104.90	111.05	110.00

Table 2.8 District wise Irrigation Intensity (Contd.,)

Sl. No.	District	Irrigation Intensity (in percentage)				
		2003-04	2004-05	2005-06	2011-12	2014-15
16	Perambalur	115.53	118.83	114.55	111.51	125.00
17	Ariyalur	N.A	N.A	N.A	110.30	129.00
18	Pudukkottai	101.50	101.45	101.23	104.08	103.00
19	Thanjavur	120.14	122.26	116.89	138.69	133.00
20	Thiruvarur	108.94	110.85	112.06	138.75	142.00
21	Nagapattinam	120.88	123.63	121.69	133.37	127.00
22	Madurai	102.35	110.73	107.77	109.42	107.00
23	Theni	112.06	115.21	114.20	121.66	122.00
24	Dindigul	106.49	107.70	107.07	103.76	106.00
25	Ramanathapuram	100.00	100.00	100.00	100.00	100.00
26	Virudhunagar	109.84	109.73	108.21	107.14	107.00
27	Sivagangai	100.00	100.00	100.00	100.14	100.00
28	Tirunelveli	112.22	123.14	125.78	120.14	120.00
29	Thoothukudi	104.19	102.82	116.78	109.34	106.00
30	Nilgiris	100.00	100.00	100.00	100.00	100.00
31	Kanyakumari	125.83	139.13	140.41	129.85	123.00
	Total	**115.41**	**117.06**	**116.34**	**118.72**	**125.00**

Source: *Tamil Nadu – An Economic Appraisal – 2005-06 and 2011-12 to2012-13 Evaluation and Research Department, Government of Tamil Nadu Chennai*.

Following are the infrastructure identified to meet out the various challenges emerging from land and water resource management

- Excavation of *Prosopis* (Karuvelam trees which are pollutants) in ooranies, in order to reclaim the land for agricultural purposes.
- Implementation of watershed projects which would improve groundwater recharge and increase the irrigation potential.
- Construction of series of check dams across rivers and Panchayat water bodies, which would enhance irrigation facilities and increase cropping intensity, stop

drying of wells on account of groundwater recharge and solve drinking water problems of adjacent villages.

- Rehabilitation, modernization renovation and desilting of ooranies, anaicuts and reservoirs, water harnessing bodies and tanks and improve/restore/concretize canals and lining of channels which would bring additional command area under irrigation, up to tail-end areas.
- Lining the bed and sides of canals as also construction of grade walls, in order to improve the irrigation potential and arrest seepage.
- Laying pipelines which would arrest water loss and benefit target areas.
- Restoration and rejuvenation of water bodies/anaicuts and improvements to sluices in the river systems for better conveyance efficiency.
- Strengthening of the supply channels to water bodies, etc.
- Provision of lift irrigation in water starved areas/farm ponds which would aid in transforming the agricultural practices.
- Desalination by water implementing agencies like TWAD Board would help reduce salinity of water and facilitate potable water; both for agricultural and drinking purposes.
- Augment groundwater resources with groundwater recharge shaft where depletion of water is faster.
- Permanent restoration and flood protection works to the surplus water courses.
- Construction of grade wall across rivers which would stagnate the water for greater depths. Due to impounding of water up to influence point, water table in the open wells and bore wells would rise.
- Construction of barrages across rivers, which apart from facilitating generation of electricity, would also recharge tanks and wells to considerable extent.
- Construction of community wells in semi-critical, critical and over-exploited blocks as against wells dug by individuals.
- Flood protection works in order to save standing crop and alleviate the distress of farmers in hamlets around.

2.6. Agricultural Inputs - Seeds

Among the major inputs, production and supply of quality seeds is the most important one. The improved seeds have more genetic vigour for high yield potential and the fertilizers and the balanced nutrient management trigger the potentials for increasing the yield levels. Therefore, the timely and adequate availability of seeds along with other inputs like fertilizers and pesticides are the essentials to keep agriculture growing. The details of the quantities of seeds distributed from 2002-03 to 2011-12 are presented in Table 2.9

Table 2.9 Distribution of improved Seeds by Crops

(in tonnes)

Sl. No.	Crops	2002-03	2005-06	2011-12	2014-15
I FOOD GRAINS					
a.	Paddy	15483	16681	75250	63179
b.	Millet	363	489	6693	5514
c.	Pulses	941	1424	4800	4367
	Total (I)	**16787**	**18594**	**86743**	**73061**
II.NON – FOOD GRAINS					
a.	Oilseeds	4269	4171	12092	4234
b.	Cotton	124	235	555	624
	Total (II)	**4393**	**4406**	**12647**	**4859**
	Grand Total (I + II)	**21180**	**23000**	**99390**	**77920**

Source: Statistical Hand book of Tamilnadu,(various issues)Department of Economics and Statistics Government of Tamil Nadu, Chennai.

It could be seen from the table that 61086 tonnes of paddy seeds were distributed to the farmers during 2013-14 and it was fairly higher than that distributed in the previous three years. About 5918 tonnes of millets were distributed in 2013-14 and it is the maximum as compared to earlier years. Further, 3934 tonnes of pulses were distributed to the farmers in 2013-14 and it was higher as compared to earlier three years. Thus, a total of 77256 tonnes of food grain seeds were distributed to the farmers in 2013-14 and it was higher than that of previous three years. As regards, non-food

grains, oilseeds and cotton seeds were distributed to the tune of 6318 tonnes of which oilseeds accounted for 5747 tonnes and cotton accounted for 571 tonnes. The production as well as distribution of seeds was almost on par, with minor variations in all the five years under question. The minor variations in the quantities of seeds produced and distributed among the five years, might be mainly due to the variations in the behaviour of the monsoons. Perusal of the details on seed replacement rates achieved in 2003-04 and 2013-14 are given in Table 2.10 indicate that the targets in paddy, varietal cholam, ragi, pulses and oilseeds could not be achieved.

Table 2.10 Seed Replacement by Crops - Percentage to Total Cropped Area

	Crop	2003-04	2013-14
A.	**FOOD CROPS**		
1.	Paddy	13.00	68.00
2.	Varietal cholam	1.50	51.00
3.	Cumbu	7.49	51.00
4.	Ragi	10.57	37.00
5.	Maize	2.40	82.00
6.	Pulses	8.60	22.00
B.	**NON-FOOD CROPS**		
1.	Oilseeds		
a.	Groundnut	9.00	8.00
b.	Gingelly	12.00	32.40
c.	Sunflower	5.00	35.00
e.	Castor	15.00 (Irri)	2.00
2.	Cotton	10.00 (RF)	100 (BT)

Source: Statistical Handbook of Tamil Nadu, (various issues)

The shortfalls indicate the need for increasing seed production particularly in State seed farms. Moreover, in the recent years, the farmers buying behaviour with reference to seeds have changed towards the use of more and more purchased seeds. This trend again reinforces the need for production and distribution of more quality seeds each year. Creation of adequate seed processing and storage godowns to ensure supply of certified seeds in right quantity at the appropriate time to the farmers to avoid crop loss, and godowns (depots) for fertilizer, pesticide and bio-fertilizer would ensure better distribution of inputs to farmers.

2.7. Mechanization

Farm Mechanization has been an important element of modernization of agriculture. Productivity of the farm depends considerably on the availability of farm power coupled with efficient farm implements and their judicious utilization. Agricultural equipments enable efficient utilization of various inputs such as seeds, fertilizers, plant protection chemicals and water for irrigation in addition to alleviation of drudgery associated with various farm operations and making farming an attractive enterprise.

Availability of adequate farm power is very crucial for timely farm operations for increasing production and productivity. There has been close correlation between farm power availability and productivity. Productivity of the farm depends considerably on the availability of farm power coupled with efficient farm implements and their judicious utilization. The power productivity relationship shows that those States having higher farm power availability/ha have higher productivity. It is reported that the additional requirement of food grains in future will be met, to a great extent, where in the demand for tractors, power tillers and other machinery will continue to increase in future also.

The farm power availability during the year 2007-08 was 1.23 kW/Ha. Currently, the farm power availability in Tamil Nadu is 1.83 kW/Ha against the requirement of 2.00 kW/Ha. Farm mechanization has been helpful to bring about significant improvement in agricultural productivity. Thus there is strong need for mechanization of agricultural operations.

It is inevitable to use machinery and multiple use attachments to tractors, for compensating the non-availability of labour during peak seasons, and do the cultivation practices in time.

The demonstration of Self Propelled Paddy Transplanter, Rotovators, Disc Plough, Offset Disc Harrow, Sub-Soiler, Post Hole digger, attracted the farmers and received well by the farming community due to less labour Intensive operations and cost of cultivation. The planting and harvesting are “season” oriented, time bound and the demand of labour during “Peak agricultural seasons” will be more and farmers are finding it difficult to cope up with the situations. Further the Zero till seed drill, Raised

bed Planter, Rotovators, Paddy transplanter, Rice tray nursery preparation machine, laser leveler, sugarcane machinery and turmeric harvester are also to be popularized in Tamil Nadu among the farming community and make them purchase to use in the farming operations.

The mechanization thus ensures reduction of drudgery associated with various farm operations as also to economize the utilization of inputs and thereby harnessing the potential of available resources. The priorities for mechanization are decided as per the actual requirement of various agro-climatic zones and involve land preparation equipment and crop production techniques for cereal crops, cash crops, oil seeds, pulses, horticultural crops etc.

The constraints in the promotion of mechanization include the varied requirement of equipments for each agro-climate zone, small and fragmented land holdings, low investment capacity of the farmers, inadequate irrigation facilities, know how status of the farmers, repairs and maintenance facilities etc.

Tractors sales in Tamil Nadu along with the states like Maharashtra, Karnataka and Andrapradhesh have been showing consistent growth since mid 2004-2007. The details of agricultural machinery and implements in Tamil Nadu State are furnished in Table 2.11.

Table 2.11 Details of Agricultural Machinery and Implements

(in Nos.)

Sl. No.	Item	2004	2007
1	Ploughs		
	a)Wooden	755183	321598
	b) Iron	330147	239653
	Total	1085330	561251
2	Bullock Carts	155857	88784
3	Sugarcane Crushers	1407	4293
	a) Worked by Power	6550	-
	b) Worked by Bullocks	7957	-
4	Tractors (Crawlers Tractors, Hand Tractors and Four wheeled Tractors)	69391	-
5	Oil Engines (Used for Irrigation and other Agricultural purposes)	237031	-
6	Oil Ghanis	1794	2906
7	Plant Production Equipments	124241	-
	a) Sprayer – dusters operated manually	79172	
	b) Sprayers – duster by Power	42685	
	c) Sprayers –dusters operated by Tractor	2384	

Source: 17th Livestock Census – 2004 and 18th Livestock Census – 2007.Department of Animal Husbandry and Veterinary Services, Chennai-6.

The use of other farm equipments has also increased tremendously. Farmers have understood the role of farm machinery and implements in augmenting the agricultural productivity. However, providing efficient and improved implements to the farmers is the need of the time. In order to achieve the maximum returns, these modern gadgets need to be designed and developed efficiently and tested thoroughly to ascertain their field performance before they reach the farmers. The Government is giving subsidy to farm machines which are tested at the five farm machinery training and testing institutes established by Govt. of India at Budni, Hisar, Anatapur Biswanath and Chariali. But it is not possible for the institutes to test all the tractors and farm machines in short duration with the result the manufactures have to wait for longer duration to get their machines tested by the above said institutes.

The establishment of testing facility to farm machinery will help in testing of more agricultural equipment that are favourable for the state of Tamil Nadu and other parts of the country.

2.8. AGRICULTURAL MARKETING

The entire thrust and efficiency of Agriculture sector is dependent on marketing support that minimizes the farmer's risk and facilitates in getting assured and fair returns. An efficient marketing system holds the key to the success of diversification of agricultural production. Market intelligence has a vital role to play. Tamil Nadu Agricultural University has a market intelligence unit which provides vital information to framers on marketing.

At present 21 market committees are functioning in Tamil Nadu at the district level. Under these market committees, 273 regulated markets, 15 check posts, 108 rural godowns and 108 grading centers are functioning. Nearly 42 agricultural commodities, *viz.,* cereals, oilseeds, pulses, cotton, turmeric etc. were notified. The total value of agricultural produce transacted through agricultural marketing cooperatives had improved and more than doubled from Rs. 307.25 Crore in 2004-05 to Rs. 674.61

Crorein 2013-14. In 2013-14, with the exception of food grains, the value of transaction has increased in all the crops. The details are furnished in Table 2.12.

Table 2.12 Value of Agricultural Produce sold by Marketing Co-operatives

(Rs. in Crore)

S.No	Crops	2003-04	2004-05	2005-06	2012-13	2013-14
1	Food grains	38.73	35.97	32.60	20.14	16.859
2	Cotton	90.43	94.59	69.81	241.95	300.97
3	Chillies	2.81	2.80	2.18	4.49	4.33
4	Sugarcane	92.72	79.74	466.72	N.A.	-
5	Spices	0.11	44.84	28.79	91.19	70.206
6	Oilseeds	16.09	13.05	18.07	73.78	-
7	Others	99.99	36.24	56.08	120.35	112.00
Total		**340.88**	**307.25**	**674.26**	**551.90**	**674.61**

Source: The Registrar of Cooperatives, Chennai.

To provide a higher share of consumer prices to the farmers, there is a need to reduce the multiple layers of intermediaries by providing alternative marketing channels and creation of scientific storages nearer to the farms. The major infrastructure constraints faced by most of the farmers' markets include the non availability of scientific storage facilities and inadequate number of stalls, canteens, rest room facilities and drinking water. Even though waste disposal is not a problem, the utilization of waste for productive purposes remains elusive in most of the farmers markets.

Besides, storage godowns in Primary Agricultural Cooperative Societies and in Cooperative Marketing Societies, additional marketing godowns for storing food grains and pulses, drying yards for use of farmers of food grains and pulses which would prevent loss resulting from cleaning, grading, longer period of drying on roads, cold storage and market complex for fruits and flowers, Coconut Market/Processing complex with trader input shops, drying yard, solar drier, rural godown and value addition incubation centre, common facility centres for vegetable sorting and packaging and direct sale units, establishment of modern market complex for flowers, construction of

godown, drying yard, warehousing and transaction shed in Regulated Markets and Agri. Marketing Committees, Installation of silos for storing grains, Direct purchase centres for procurement of agri. Commodities, establishment of solar coconut drying yards etc. would help in effective post-harvest management and value addition in agricultural and horticultural crops.

2.9. ANIMAL HUSBANDRY AND DAIRY DEVELOPMENT

Activities allied to agriculture namely animal husbandry have the potential for providing significant employment opportunities to rural and urban population. Allied activities provide supplementary occupation to the people besides contributing to Gross State Domestic Product. The dependence on the agricultural sector for supporting livelihood is well known while the allied sectors offer scope for absorbing surplus labour from the agriculture sector.

The total livestock population of the State which stood at 227.35 Lakh in 2012 had declined by 26.08 per cent over that of 2007 livestock census. The bovine (cattle and buffalo) population in the State had witnessed steady decline between 1982 and 2012. While Sheep population showed sign of decline, the goat population had steadily increased during the reference period. The details of livestock particulars are furnished in Table 2.13

Table 2.13 Livestock Census of Tamil Nadu

(in Lakh)

Year	Cattle	Buffalo	Sheep	Goats	Others	Total	Poultry
1982	103.66 (-4.03)	32.12 (4.35)	55.37 (4.69)	52.46 (24.85)	18.26 (135.31)	261.87 (8.45)	182.84 (27.88)
1989	93.53 (-9.77)	31.28 (-2.62)	58.81 (6.21)	59.20 (12.85)	20.85 (14.18)	263.66 (0.68)	215.70 (17.97)
1994	90.96 (-2.75)	29.31 (-6.30)	56.12 (-4.57)	58.65 (-0.93)	21.75 (4.32)	256.79 (-2.61)	238.52 (10.59)
1997	90.47 (-0.54)	27.41 (-6.48)	52.59 (-6.29)	64.16 (9.39)	24.76 (13.84)	259.39 (1.01)	365.11 (53.06)
2004	91.41 (1.03)	16.58 (-39.51)	56.00 (6.48)	81.77 (27.45)	3.73 (-84.94)	249.42 (-3.85)	865.90 (137.16)
2007	111.89 (22.40)	20.09 (21.17)	79.91 (42.70)	92.75 (13.43)	2.96 (-20.64)	307.59 (23.32)	1304.84 (50.69)
2012	88.14 (-21.22)	7.8 (-61.17)	47.86 (-40.10)	81.43 (-12.20)	2.12 (-28.37)	227.35 (-26.08)	1173.48 (10.06)

Figures in parentheses indicate the per cent of growth over previous censuses.
Source: Commissioner and Director of Animal Husbandry and Veterinary Services, Chennai – 6.

The district wise details of livestock particulars as per livestock census of 2012 are furnished in Table 2.14. Cattle accounted for 38.79 per cent of the total livestock population. Next to cattle, goats accounted for 35.84 per cent of the total livestock population. Sheep accounted for 21.06 per cent of livestock population. Buffaloes, pigs and others accounted for 3.43, 0.80 and 0.05 per cent of the total livestock population respectively.

Table 2.14 District wise Livestock Census – 2012

(in Numbers)

Sl. No.	District	Cattle	Buffaloes	Sheep	Goats	Pigs	Others	Total
1	Ariyalur	151238	5898	41285	224958	6801	60	430240
2	Chennai	6254	1277	104	4607	0	4	12246
3	Coimbatore	259056	5848	109358	198574	2922	582	576340
4	Cuddalore	334203	14428	59345	328824	15469	430	752699
5	Dharmapuri	307558	49406	95484	188366	1880	401	643095
6	Dindigul	73528	16291	56534	54453	1463	1945	204214
7	Erode	276584	102840	165277	309202	3452	1420	858775
8	Kancheepuram	347372	57457	119646	192242	2509	330	719556
9	Kanniyakumari	61268	2952	731	110858	1551	30	177390
10	Karur	158286	43490	247415	185875	5329	46	640441
11	Krishnagiri	323602	10822	230527	126517	N.A	N.A	691468
12	Madurai	214961	5549	184433	297052	1258	97	703350
13	Nagapattinam	266267	12080	7335	435039	1153	17	721891
14	Namakkal	220700	107830	95484	365326	11756	138	801234
15	Nilgiris	50768	4271	4643	37393	393	24	97492
16	Perambalur	137427	1203	37006	136020	5145	22	316823
17	Pudukottai	528147	17656	217465	383434	2720	109	1149531
18	Ramanathapuram	85843	1291	242956	224388	2426	75	556979
19	Salem	552717	78262	334048	440036	20321	1198	1426582
20	Sivagangai	246413	5088	216577	345071	3499	69	816717
21	Thanjavur	387008	11689	40004	393915	1313	191	834120
22	Theni	106319	2434	56636	94625	4044	637	264695
23	Tiruchirappalli	354444	21836	150111	465832	6889	83	999195
24	Thiruvallur	210828	56397	74780	187984	2418	719	533126
25	Thiruvannamalai	676629	15523	258111	272823	10611	177	1233874
26	Thiruvarur	195743	2070	4591	286879	1209	186	490678
27	Thoothukudi	110147	7220	178825	288684	7039	1296	593211
28	Tirunelveli	504332	28125	303105	330230	9391	19	1175202
29	Vellore	527080	16308	275160	262659	18865	399	1100471
30	Villupuram	812035	17714	255610	449125	17031	444	1551959
31	Virudhunagar	223363	9436	321443	363246	7750	238	925476
32	Tiruppur	287141	47740	367557	205687	3340	0	911465
	Total	**8814042**	**780431**	**4786680**	**8143341**	**183983**	**11386**	**22719863**

Source: 1. Tamil Nadu – An Economic Appraisal 2011-12 to 2013-14,
2. Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.
3. Department of Animal Husbandry and Veterinary Services, Chennai – 600 006

About 75 per cent of the cattle population is concentrated in 15 districts. Of these districts, Thoothukudi district topped the list and had 8.57 per cent of the total cattle population followed by Villupuram (7.74 per cent) and Thiruvannamalai (6.41 per cent) in that order. Buffalo's population was found to be higher in the districts of Thoothukudi, Erode, and Namakkal accounting for about 40 per cent of the total buffalo population of the state. Sheep and goat population was found to be higher in the districts of Tirunelveli, Pudukkottai, Erode and Madurai accounting for 30 per cent of the sheet and goat population of the state.

Tamil Nadu Livestock Agency has brought all breeding activities under a single umbrella and artificial insemination programme is being carried out effectively. As per livestock census of 2004, a decline in breedable population was noticed from 47.12 Lakh in 2001 to 41.17 Lakh in 2004 in respect of cattle and from 15.15 Lakh to 9.01 Lakh in buffaloes. The share of exotic and crossbreed cattle accounted for 62.9 per cent and that of indigenous and native pure worked out to 37.1 per cent of the total breedable cattle population. Among the buffalo population, the share of Murrah was 32.08 per cent while indigenous buffaloes accounted for the remaining 67.92 per cent in 2004. The details are furnished in Table 2.15

Table 2.15 Breedable Cattle Population

(in Lakh)

Category	1997	2001	2004	2007
Cattle				
Exotic and Cross	12.61	18.78	25.89	33.77
Indigenous and Native Pure	32.02	28.34	15.28	14.31
Total	**44.63**	**47.12**	**41.17**	**48.09**
Buffaloes				
Murrah and Graded	3.74	4.97	2.89	3.22
Indigenous	13.64	10.18	6.12	5.78
Total	**17.38**	**15.15**	**9.01**	**9.00**

Source: Commissioner and Director/ of Animal Husbandry and Veterinary Services and Tamil Nadu – An Economic Appraisal 2011-12 to 2013-14, Evaluation and Applied Research Department, Government of Tamil Nadu Chennai – 6.

2.9.1 Milk Production

Milk Production in Tamil Nadu rose from 47.53 lakh tonnes in 2003-04 to 47.84 lakh tonnes in 2004-05 and to 54.74 lakh tonnes in 2005-06 and to 68.31 lakh tonnes in 2010-11 and to 71.32 lakh tonnes in 2014-15. The state's share in total milk production at All India level was 5.40 per cent in 2003-04 and 4.87 per cent in 2014-15.

The percapita availability of milk per day which witnessed a marginal increase from 198 gm in 2003-04 to 231 gm in 2005-06 to 278 gm in 2010 -11 to 282 gm in 2014-15. The details are furnished in Table 2.16.

Table 2.16 Milk Production and Availability

Year	Tamil Nadu	All India	Percentage Share of Tamil Nadu	Percapita availability (gms.per day)	
	(Lakh tonnes)			Tamil Nadu	All India
2000-2001	-	800.60	-	219	225
2003-2004	47.53	881.00	5.40	198	231
2004-2005	47.84	907.00	5.30	204	232
2005-2006	54.74	971.00	5.64	231	241
2010-2011	68.31	1218.47	5.60	278	281
2013-2014	70.49	1376.90	5.11	280	307
2014-2015	71.32	1463.00	4.87	282	322

(Figures in brackets indicates percentage change over the previous year) Source:

1. *Commissioner and Director of Animal Husbandry and Veterinary Services, Chennai–6.*
2. *Tamil Nadu an Economic Appraisal 2011-12 to 2013-14, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.*
3. *Agricultural Statistics as a Glance 2012.*
4. *Statistical Hand Book of Tamil Nadu 2013, Department of Economics and Statistics Government of Tamil Nadu Chennai – 600 006.*
5. *Department of Animal Husbandry, Dairying & Fisheries, Ministry of Agriculture and Farmers' Welfare, GoI*

The details of district wise milk production are furnished in Table 2.17. It could be seen from the table that milk production was found to be the highest in the districts of Salem (8.67 per cent), Villupuram (7.53 per cent), Vellore (5.52 per cent), Tiruppur (4.86 per cent) and Erode (4.76 per cent) and they put together accounted for 31.34 per cent of total milk production of Tamil Nadu State in 2014-15.

Table 2.17 District wise Milk Production

(000' Tonnes)

Sl.No.	District	2004-05	2005-06	2011-12	2014-15
1.	Ariyalur	N.A	N.A	N.A	95.03
2.	Chennai	27.3	4.3	8.8	0
3.	Coimbatore	247.8	332	191.7	294.08
4.	Cuddalore	211.7	197.5	189.6	233.65
5.	Dharmapuri #	155.3	208.9	179.4	295.54
6.	Dindigul	191.7	178.2	235.4	238.03
7.	Erode	287.2	325.8	359.5	339.32
8.	Kancheepuram	231.2	141.7	275.8	196.17
9.	Kanniyakumari	66.7	102.1	101.7	60.91
10.	Karur	93.3	99.2	121.8	145.94
11.	Krishnagiri	92	178.4	199.9	288.38
12.	Madurai	153.2	170.8	211.5	174.42
13.	Nagapattinam	120.1	140.6	211.3	146.02
14.	Namakkal	205.4	268.5	286.6	263.41
15.	Nilgiris	60.3	45.6	89.6	59.49
16.	Perambalur	129.4	149.1	192	114.34
17.	Pudukkottai	146.8	115.7	256.9	250.75
18.	Ramanathapuram	72.4	64.2	60.1	51.23
19.	Salem	248.1	434.5	483.6	618.44
20.	Sivagangai	80.2	94	127.4	108.84
21.	Thanjavur	131.1	188.9	239.3	226.69
22.	Theni	121.2	92.1	133.6	112.28
23.	Tiruchirappalli	163.3	222.6	247.2	269.49
24.	Tiruppur	N.A	N.A	261.1	346.42
25.	Tiruvallur	202	169.8	188.7	151.72
26.	Tiruvannamalai	269.1	248.4	424.1	511.71
27.	Thiruvarur	111.7	166.8	146.4	117.17
28.	Thoothukudi	105.9	99.8	221	77.39
29.	Tirunelveli	160.9	283.9	316	252.24
30.	Vellore	320.4	364.5	422.5	393.88
31.	Villupuram	275.6	211.2	389.7	536.84
32.	Virudhunagar	102.3	174.7	195.8	162.7
	State	**1547.9**	**1719.1**	**6967.9**	**7132.52**

 # Composite Dharmapuri district

Source: Commissioner and Director of Animal Husbandry and Veterinary Services, Chennai-6 and Tamil Nadu–An Economic Appraisal 2011-12 to 2013-14, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

The average milk yield of indigenous cow per day was 2.58 kgs in 2011-12 as against 2.27 kg at All India level. However, with respect to exotic and cross bred cows, the State yield was only 6.41kg as against 6.97 kg at All India level. Though the State has a sizable population of buffaloes the average milk yield was only 4.09 kg as compared to 4.71 kg at All India level.

The current milk production in the State is though sufficient, to keep pace with the growing population and changing consumption pattern owing to increase in income, there is a need to improve the milk production and availability in the State. Lot of potentials are observed to increase the milk production and convert the liquid milk into many value added products. Necessary infrastructure is need to be provided to harness the potentials in the milk production and availability by creating, semen stations, animal disease intelligent laboratory, establishment of modern abattoirs, cold rooms for vaccine storage with generator backup and regional drug warehouses, upgrading infrastructure in rural veterinary dispensaries, strengthening of sheep/goat shandies with basic amenities, veterinary buildings with OP sheds (for Veterinary clinics) in areas concentrated with animal population, more insulated vehicles for carrying milk, establishing bulk milk cooling units, pre-packaging machines for packing milk products, reconstruction and renovation of existing sub-centres for treatment of animals and block-level mobile units for provision of veterinary services/carrying medicines at the doorstep of farmers.

2.9.2 Poultry and Egg Production

Poultry farming provides livelihood support besides contributing to nutritional requirements of the population. Poultry activity creates employment opportunities and provides income. The State ranks second in egg production in the country and accounts for 17.70 per cent of the total poultry population in India. The poultry population based on different livestock census is furnished in Table 2.18.

Table 2.18 Poultry Population of Tamil Nadu

(in Lakh)

Sl.No	Year	Poultry	% increase over previous time period
1	1982	182.84	27.44
2	1989	215.70	17.97
3	1994	238.54	10.59
4	1997	365.11	53.6
5	2004	865.9	137.16
6	2007	1304.83	50.69
7	2012	1173.48	10.06

Source: Commissioner and Director of Animal Husbandry and Veterinary Service Chennai Tamil Nadu – An Economic Appraisal 2005-06 and 2011-12 to 2013-14.

The poultry population had increased from 182.84 Lakh in 1982 to 865.9 Lakh in 2004 and 1173.48 Lakh in 2012. In 2004, poultry population had recorded an increase of 137.16 per cent over 1997 time period and during 2012 the increase was 10.06 per cent over 2007 census. Poultry rearing has become a commercial activity in the districts of Namakkal, Erode and Coimbatore. The district-wise poultry population along with population of Horses, Donkeys and Dogs as per 2012 census is furnished in Table 2.19.

Table 2.19 District-wise Poultry and other Animals Population

(in numbers)

District	Poultry	Donkeys	Dogs	Fowls	Horses and ponies
Chennai	33345	7	39878	24276	27
Coimbatore	42028686	3437	153685	41968683	2277
Cuddalore	333043	54	41264	323491	1219
Dharmapuri	1549232	4040	90855	1546253	134
Dindigul	2037985	569	86561	2030614	4321
Erode	5270334	3074	152827	5180399	827
Kancheepuram	353844	1178	106369	328516	422
Kanyakumari	463824	13	697175	451529	2
Karur	498470	123	31746	493883	432
Krishnagiri	1293388	7323	47348	4289526	161
Madurai	685529	1046	58658	675968	477
Nagapattinam	402045	9	83108	385633	864
Namakkal	19275185	146	84913	19267146	1354
Nilgiris	75599	83	120592	74932	586
Perambalur	262330	477	34520	260483	89
Pudukottai	476110	1102	46994	472311	362
Ramanathapuram	330309	230	15855	324317	396
Salem	2678324	478	165716	2674079	1208
Sivagangai	720831	45	47169	715907	1800
Thanjavur	634546	9	88402	626018	142
Theni	517155	1213	18095	514278	894
Tirunelveli	1218583	961	67877	1205376	245
Thiruvallur	654317	735	120628	608673	1336
Thiruvannamalai	252314	153	36575	246160	142
Thiruvarur	339253	6	43076	336659	746
Thoothukudi	450229	2257	35400	447566	1011
Tiruchirapalli	940619	5406	37699	932418	1309
Vellore	1155183	806	99894	1100428	353
Villupuram	732090	680	144690	732743	1671
Virudhunagar	890571	346	46520	881664	181
State	**86591273**	**25779**	**2716631**	**86119929**	**24988**

Source: Tamil Nadu – An Economic Appraisal, 2005-06 and 2011-12 to2012-13 Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

From the table, it could be seen that poultry population was found to be high in the districts of Coimbatore, Namakkal, Erode, Salem, Dindigul and Dharmapuri in that

order and they put together accounted for 84.11 per cent of total poultry population of the State. Poultry population was found to be the least in the Nilgiris district.

Tamil Nadu is one of the leading states in egg production and export. The eco-friendly backyard poultry rearing is practiced along with commercial poultry farming in the State. The egg production in the State increased from 3,784 million numbers in 2003-04 to 6,395 million numbers in 2004-05 but declined marginally to 6,223 million numbers in 2005-06 and increased to 1592 million numbers in 2014 -15. The district-wise egg production details over years are furnished in Table 2.20

Table 2.20 Egg Production

(in lakh numbers)

Sl. No.	District	2004-05	2005-06	2011-12	2014-15
1.	Ariyalur	N.A	N.A	N.A	67.36
2.	Chennai	50.8	7.2	4	0
3.	Coimbatore	697	816.8	1150	2407.95
4.	Cuddalore	153.1	109.8	165.1	165.63
5.	Dharmapuri and Krishnagiri	2041.2	1769.4	1092.6	4446.63
6.	Dindigul	233.6	188.9	133.1	1336.85
7.	Erode	10345.4	10924.7	11295.5	12275
8.	Kancheepuram	402.8	292.6	371.8	317.38
9.	Kanyakumari	198	93.6	106.7	254.12
10.	Karur	680.3	2110.5	3682.5	3643.27
11.	Madurai	167.1	125	241.2	263.56
12.	Nagapattinam	146.7	87.9	144.3	137.12
13.	Namakkal	40177.1	39828.9	87059.3	125105.51
14.	Nilgiris	15.9	18.7	17.9	34.16
15.	Perambalur	93.3	136.7	232.6	22.95
16.	Pudukottai	504.1	111.6	223.3	297.47
17.	Ramanathapuram	80.7	80.1	162.5	95.83
18.	Salem	3316.3	2513.9	4247.3	3728
19.	Sivagangai	155.8	119.6	215.3	309.10
20.	Thanjavur	455.8	440.2	233.3	247.63
21.	Theni	271.5	67.8	93	78.07
22.	Tirunelveli	149.1	155.2	23.9	226.34
23.	Tiruppur	N.A	N.A	2516.3	342.38
24.	Thiruvallur	509.2	170.2	1505.5	367.56
25.	Thiruvannamalai	146.5	100.4	61	85.58
26.	Thiruvarur	176.1	123.3	112.4	106.89
27.	Thoothukudi	285.6	313.9	14.3	126.56
28.	Tiruchirapalli	1508.5	663	2930.5	1756.58
29.	Vellore	278.9	250.8	165.4	661.62
30.	Villupuram	451.8	246.2	95.2	199.74
31.	Virudhunagar	255.5	358.7	222.9	146.49
	State	**63947.70**	**62225.4**	**118518.3**	**159253.3**

Source: 1. Tamil Nadu – An Economic Appraisal, 2005-06 and 2011-12 to 2012-13. Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

2. Department of Animal Husbandry and Veterinary Services, Chennai-600 006

During 2014-15, Namakkal district became an “egg basket” and accounted for 78.56 per cent of total egg production in the State. Next to Namakkal district, Erode district accounted for 7.71 per cent of total egg production in the State. These two districts shared nearly 86.27 per cent of the total egg production of the State.

2.9.3 Infrastructure for Veterinary Care

In order to provide health care to animals, promote scientific breeding of cattle and control of cattle diseases, the State has created and maintains the animal care institutions as detailed in Table 2.21.

Livestock health care prevents loss of lives and helps to improve the productivity of livestock. Development Programmes like “Kalnadai Padhukappu Thittam” is being implemented in the State. The number of animals treated in the State rose by 42.62 per cent from 202.44 Lakh in 2005-06 to 288.71 Lakh in 2013-14. Deworming and artificial insemination were the other major animal health care activities undertaken in the State.

Table 2.21 Details of animal health care activities

(in Lakh Numbers)

S.No	Items of Activities	2005-06	2013-14	% increase
1	Animals Treated	202.44	288.71	42.62
2	Deworming done	186.01	329.30	77.03
3	Castration done	6.44	10.31	60.09
4	Artificial Incrimination Performed	32.87	47.62	44.87

Source: Policy Note 2014-15 Animal Husbandry, Dairying and Fisheries Department, Government of Tamil Nadu.

In order to reduce morbidity and mortality, efforts are being made through six poly clinics, 139 veterinary hospitals, 22 clinician centres, 2256 veterinary dispensaries, 56 mobile veterinary units and 950 sub-centres.

Creation of infrastructure and provision of equipments to the veterinary health centres is necessary for the timely diagnosis and treatment of animal diseases. Emphasis has to be given to strengthen mobile veterinary services to ensure better access to farm households. Vaccine storage facilities in every health care institution would pave way for better animal health management.

2.10. Fisheries

Tamil Nadu has a coastal line of 1,076 kms sharing 13.30 per cent of the nation's coast line of 8118 kms. The State possesses 0.19 million sq.km of Exclusive Economic Zone (EEZ) accounting for 9.70 per cent of the country's Exclusive Economic Zone of 2.02 million sq.kms. The sector provides employment to 10.02 lakh persons and contributes Rs.1, 99,572 Lakh to foreign exchange. The inland fisheries sector in the State spread over 3.71 lakh hectares of water spread area comprising of reservoirs, major irrigation and long seasonal tanks, short seasonal tanks and ponds, estuaries and backwaters.

2.10.1. Fish Production

The total fishermen population in the State was 11.03 Lakh which formed a share of 1.5 per cent of the State's total population. The fishermen population comprising those engaged in marine and inland fishing was in the ratio of 70:30.The total marine fishermen population of 9.25 Lakh is spread over 608 coastal villages in 13 districts. The three districts *viz.,* Nagapattinam, Ramanathapuram and Kanyakumari put together accounted for 57 per cent of the total marine fishermen population in the State.

Overall fish production during 2014-15 was estimated at 6.97 lakh tonnes which accounted for an increase of 7.07 per cent over the production in 2011-12. Marine fish accounted for about 66 per cent of total fish production. The details are furnished in Table 2.22.

Table 2.22 Fish Production in Tamil Nadu

(in Lakh Tonnes)

Sl.No.	Years	Inland	Marine	Total
1.	2004-05	0.87	3.08	3.95 (-13.76)
2.	2005-06	1.56	3.90	5.46 (38.23)
3	2011-12	2.24	4.27	6.51 (19.23)
4	2014-15	2.40	4.57	6.97 (7.07)

Source: Commissioner of Fisheries, Chennai-6 and Tamil Nadu–An Economic Appraisal 2011-12 to 2013-14, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.
Figures in parentheses denote percentage change over previous year

Currently the demand for fish increased due to changes in consumption pattern of growing population in the State. The fish resources in the inshore area had been over

exploited. Further, there is a decline in fish catches in inshore areas due to depleted fish stock. The growing demand could be met from the exploitation of offshore resources to a optimum level by technological up gradation, skill up gradation and adoption of sustainable practices by creating adequate infrastructure.

In the case of marine fish market chains, these activities suffer from unhygienic conditions, poor handling of the fish and wastages. Small-scale fisheries are unable to gain access to more efficient marketing systems and supporting infrastructure (ice, cold storageetc.) that would lead to better quality and prices. Besides, adequate process infrastructure facility in marine sector has to be created.

Inland fish catches are conditioned by aberrations of rainfall, less retention of water in the water bodies, inadequate fish seed and feed and absence of proper marketing. Efforts need to be directed towards the development of scientific storages and marketing of inland fisheries. To augment inland fisheries, the shortfall in fish seed and feed has to be rectified. Inland fishery cooperative societies need to be promoted and strengthened and provided with necessary infrastructure and financial support to take up culture and capture fisheries with the active role of fisherwomen. Fresh water fish culture needs to be promoted in seasonal tanks/ponds owned by Panchayats.

2.10.2. Fish Export

Fish and fish products are exported from the State. There are 57 approved modern sea food processing plants and 64 approved dried fish production exporting centres functioning in the State. Over 4,000 persons are directly and 12,000 persons are indirectly employed in the export processing industry in the State. However, there was a fluctuating trend in the total quantity of fish and fishery products export in the State (Table. 2.23).

Of the total quantity exported, the export of shrimp alone accounted for as much as 63 per cent. Contrary to this trend, the value of earnings from fish and fishery products exports gradually improved from Rs. 2,800 Crore in 2010-11 to Rs.5,038 Crore in 2014-15 (5.9%). Likewise the average earnings per tonnes increased from Rs. 3.31 Lakh in 2010-11 to Rs.5.38 Lakh in 2014-15. The State’s share in total quantity of fish products exports at the all India level was 15.06 per cent in 2014-15.

The State has rich potential for fish culture and Tamil Nadu is one of the major fish exporting States in India. The quantity of fish and fish products exported was 0.86 lakh tonnes in 2010-11 which improved to 0.96 lakh tonnes in 2013-14 and declined to 0.93Lakh tonnes in 2014-15. The share in fish export accounted for 8.89 per cent of the total export of the country in 2014-15.

Table 2.23 Export of Fish and Fish Products

Year	Tamil Nadu		All India	
	Quantity (tonnes)	Value (Rs. Crore)	Quantity (tonnes)	Value (Rs. Crore)
2010-11	86,182	2,860	8,13,091	12,901
2011-12	80,738	3,029	8,62,021	16,597
2012-13	86,585	3,332	9,28,215	18,856
2013-14	96,429	5,316	9,83,756	30,213
2014-15	93,477	5,038	10,51,243	33,441

Source: Tamil Nadu–An Economic Appraisal 2011-12 to 2013-14, The Marine Products Export Development Authority –Annual report 2011-12 to 2014-15

The following are the infrastructure requirements identified in this sector:

- Infrastructure for fishermen community to enable scientific fish farming with backward and forward linkages and common facility centers. Further, by conducting sensitization workshops, providing training on different types of fish farming, and supplying refrigerated vans for transportation of fish
- Ice plants for fish storage by Fisheries Department
- Inland Fish farms
- Marie Fish Landing Centres

2.11. SERICULTURE

India has the unique distinction of being the only country producing all the five kinds of silk namely Mulberry, Eri, Muga, Tropical Tasar and Temperate Tasar. In Tamil Nadu mulberry silk is produced predominantly. Cultivation of mulberry plants (Moriculture) is an agricultural activity. In Tamil Nadu, mulberry cultivation is mainly taken up in irrigated condition. The silkworm seed production centers named as grainages are also present in the state. The silkworm seed known as Disease Free Layings (DFLs) are prepared in the grainages and supplied to the farmers for rearing. Both Government and private sector grainages are involved in this activity. There are 11

state government run grainages, three run by Central Silk Board and six by private grainages.

Silkworm rearing is considered to be an agro based cottage industry since it involves mulberry cultivation. Silkworms are reared for the production of “cocoons” which is the raw material for silk production. The farmers rear silkworms and produce cocoons and marketed to silk reelers through 19 cocoon markets. The raw silks produced by the silk reelers are marketed directly to the weavers or through Silk Exchanges.

Mulberry cultivation in the State has declined from 11,060 hectares in 2000-01 to 6613.93 hectares as on 1.4.2006. An additional area of 10960.37 hectares has been brought under mulberry cultivation. The production of the cocoon in the State had increased from 524.90 metric tonnes in 2005-06 to 1898 MT in 2015-16. The value of raw silk stood at Rs.8577.47 Lakh in Tamil Nadu State during 2005-06. There are about 23,873 farmers engaged in Sericulture activity in Tamil Nadu, Tamil Nadu occupies fourth position in the country in silk production and the state is aiming to occupy third position. The annual silk production in Tamil Nadu is around 1200 MT. The weaving sector of Tamil Nadu comprises mostly of Handlooms. Kancheepuram, Arni, Kumbakonam, Salem, Coimbatore, Madurai and Tirunelveli are important weaving centers in Tamil Nadu.

Tamil Nadu stands first in cocoon productivity with an average of 69.69 Kg per 100 dfls, whereas the National average is only 58.20 Kg. per 100 dfls. Further, Tamil Nadu stands first in the production of chawki worms with 27 per cent laying are distributed as chawki worms to the farmers, which is the highest at National level.

Though majority of the farmers aware of the economic benefit of mulberry cultivation and silkworm rearing and the associated production technologies, the cultivation of mulberry is highly localized in the districts of Kanyakumari, Erode, Dharmapuri and Coimbatore that too with less than 1500 acres each and in all other districts; the area under mulberry is very minimum. The rearing units are limited in numbers. Hence there is need to create additional facilities to bring more area under

mulberry cultivation, encourage silk worm rearing and reeling. Efforts have to be taken for providing support to plant mulberry, rearing shed, rearing appliances, capacity building of mulberry farmers, provision of mobile vans to transport cocoons, resorting to integrated nutrient management and integrated pest management and promotion and installation of drip irrigation system in mulberry cultivation.

2.12 Vision 2023

In Vision 2023, the State Government has also proposed to undertake various infrastructure projects. Infrastructure developments in agriculture are targeted at the three initiatives of improving the productivity in agriculture, assurance of year-round irrigation, and marketing extension. An estimated investment of Rs 40,000 Crore (Table 2.24) is anticipated towards development of agricultural infrastructure across the State. The key projects are:

a. Irrigation projects involving connectivity of farms with canals and dams, and cleaning of water resources such as tanks, wells and dams.

b. Micro irrigation for 100% of crops under horticulture, vegetables and fruits and spices.

c. Horticultural parks for fruits, vegetables and spices would be developed across the state

d. Chain of storage facilities including cold storage and associated logistics facilities

e. Packing houses and gamma irradiation facilities are to be developed in each district

f. Grain storage facilities

g. Three terminal market complexes to serve the local and export market

h. Strengthening R&D capacity

The State Government also identified various infrastructure projects to be implemented and the budget requirement is shown in Table 2.25

Table 2.24 Infrastructure Investment

(Rs. In crore)

Sl. No.	Name of the Project	Amount
1	Cleaning of well, tanks and canals	16,000
2	Horticulture Parks	6,600
3	100% Micro Irrigation for horticulture crops	6,400
4	Grain Storage Godowns	2,700
5	Strengthening of R&D Capacity of Agricultural Universities	2,000
6	Food Processing Centres	1,500
7	Cold Storage Projects, Terminal Market Complex	2,000
8	Support to Mechanization	1,000
9	Packing houses, Gamma Irradiation Facility, Agro Food Parks & Export Zones, Perishable air cargo complex, ICT tools for agriculture extension etc	1,800
	Total	**40,000**

Source: Vision Tamil Nadu 2023, Strategic Plan forInfrastructure Development in Tamil NaduVisionVolume 1, Government of Tamil Nadu.

Table 2.25 Infrastructure projects identified by State Government

(Rs. In crore)

Sl. No.	Name of the Project	Amount
1	Infrastructure set-up for seed supply chain	2,000
2	Programme for Soil Quality Improvement and Wasteland Rehabilitation	2,000
3	Strengthening of Seed Farms, Horticultural Farms and establishment as demonstration farms	2,000
4	Horticulture Development Programme	400
5	Propagation of Micro Irrigation	20,000
6	Agricultural mechanization	20,000
7	Integrated Market Development and Post Harvest Supply Chain	20,000
8	Infrastructure support for Agro Food Processing Industry	5,000
9	Infrastructure for diary processing	5,250
10	Infrastructure for poultry processing	2,000
11	Integrated fish processing centres and fish landing stations / fishing harbours	1,500
	Sub-total for Agriculture and allied sectors	**80,150**

Sl. No.	Name of the Project	Amount
12	Rehabilitation of tanks and wells	22,500
13	Infrastructure development to conserve North East Monsoon drainage water, Coastal zone and Cauvery Delta Irrigation Development Plan	3,000
14	Lining of major canals in Tamil Nadu	5,000
15	Dam Rehabilitation and Improvement Project	750
16	Interlinking of Rivers	10,000
	Sub-total for Irrigation	**41,250**
	Total	**1,21,400**

Source: Vision Tamil Nadu 2023, Strategic Plan forInfrastructure Development in Tamil NaduVision Tamil Nadu Phase 2, Government of Tamil Nadu, page 248, 2014.

Considering the aforesaid scenario of developments, the overall infrastructure requirement was assessed in consultation with the line departments of the State Government at the district level and State level and also based on the feedback obtained from the farmers at various levels. The type of infrastructure and budget requirement is presented in the next chapter.

CHAPTER III

INFRASTRUCTURE AND BUDGET

3.1 AGRICULTURE

3.1.1 Facilities for seed processing

Seed is the most basic input in agriculture. Therefore, the sustained supply of the quality seeds will continue to be a key factor for augmenting agricultural growth. The importance of seed has been recognized from the time immemorial that good seed in good field would yield abundantly. Seed multiplication/production is a two-tier system, *i.e.,* pre-harvest and post-harvest. Each phase is important over the other. If due attention is not paid during the first phase, there is no way left for getting good quality seed. The same is true with second phase as hard earned produce may be destroyed by various agents during post-harvest period. Each operation such as cleaning, grading, drying and chemical treatment should be judiciously taken up to get quality seed with maximum recovery. Therefore seed processing is a vital part of the seed production activities and the State Government has accorded high priority. In view of above, efforts have to be taken with the objective of production of quality seeds of agricultural crops through scientific methods and adopting appropriate processing techniques through establishment and modernization of State seed processing plants to be established.

3.1.2 Facilities for seed quality maintenance

After harvesting, cleaning, drying, processing, and packaging, the representative samples of seed lot are required to be taken and sent to the laboratory for quality testing. From the test results, genetic, physical, physiological, and health qualities of seeds are determined. Different countries have set their own standards to find out these qualities in the seed lot. The National Seed Board, for instance, has approved maximum amount of moisture content, minimum germination potential, and minimum physical purity in foundation, certified and truthfully labeled seeds of different crops as basic seed standards. The test results must conform the approved seed standards to send the seeds in the market for commercial transaction. The details of seed testing laboratories proposed specifically in Nagapattinam and Krishnagiri districts are shown in Table 3.1.

3.1.3 Establishment/Strengthening of Laboratories

Quality control is the process of checking the quality of the material against the standard set by the organizations and if the material does not match with the standards, then such material is said to be substandard. Quality control laboratories are being established by the Government with an intention to supply quality inputs viz., seed, fertilizers and pesticide and services like soil testing to the farmers. To have effective quality control of inputs, quality inspectors are to be appointed. The Seed Testing Laboratory at Cuddalore, Krishnagiri, Nagapattinam, Tiruvallur, Tiruvannamalai and Vellore districts; Organic Fertilizer Testing laboratories at Tiruvannamalai district; Establishment of Pesticide Residual Laboratory at Nagapattinam district; Mobile Soil Testing Laboratory at Karur, Krishnagiri, Nagapattinam, Tiruvallur and Tiruvannamalai districts and the proposed budget is indicated in the Table 3.1. The following laboratories are proposed to strengthen with additional analytical instruments, equipments and machineries.

- Establishment of Organic Fertilizer Testing Lab
- Strengthening of Fertilizer Control Laboratory
- Strengthening of Seed Testing Laboratory
- Strengthening of Biofertilizer and Quality Control Lab
- Strengthening of Mobile Soil Testing Laboratory
- Strengthening of Pesticide Testing Laboratory

3.1.4 Strengthening of Extension activities

Agriculture extension is an informal educational process directed towards the farmers. Extension also aims to increase the efficiency in farm production. The objective is to change farmers' outlook towards the challenges they are facing. It is concerned not just with physical and economic achievements but also with the development of the farmers themselves. Agriculture extension workers, therefore, discuss issues with the farmers; help them to gain a clearer insight into their problems and also to decide how to overcome these limitations. Therefore the infrastructure for strengthening extension

activities is essential and it is proposed for establishment of Integrated Agricultural Extension Centres (IAEC) and sub IAEC centres at Karur, Nagapattinam, Tiruvannamalai, Perambalur, Salem, Tiruvallur, Tiruvannamalai, Thiruvarur, Tiruppur, Vellore, Villupuram and Virudhunagar districts. An overall budget requirement for establishment of extension centres is presented in the Table 3.1.

3.1.5 Infrastructure for post-harvest management

Increasing emphasis on higher value farm products to meet the changing diets of urban consumers has focused renewed attention on post-harvest systems, while unacceptably high losses due to poor handling and lack of appropriate infrastructure have reduced economic benefits to small producers. Post-harvest activities are an integral part of the food production system, and the aim is to promote best practices for post-harvest handling and management along the entire food supply chain, focusing on a broad spectrum of operations and stakeholders in traditional and modern marketing systems. The ultimate goal of the system is to deliver high quality, safe food to consumers.

- Establishment of Thrashing floor / drying yard
- Construction of lignite storage / storage godowns
- Strengthening of Seed processing unit with dunnage, moisture meter, bag closures, weighing balance, seed rack, tarpaulin, office furnishings etc.

3.1.6 Establishment of additional seed godown

Seeds undergo deterioration due to aging in storage. This is accelerated by climatic factors and external biotic factors like insects and pathogen. In addition to seed borne pathogen and storage insects, seeds are damaged by birds and rats for their feed. Clean and hygienic godowns protect the seed from external insects and preserve the seed. Hence the construction of godowns gains importance in different parts of the state. It is proposed to establish seed godowns in Dharmapuri, Dindigul, Erode, Kanchipuram, Karur, Nagapattinam, Pudukkottai, Theni, Tiruvannamalai, Thoothukudi,

Trichy and Virudhunagar district. The established seed godown should adhere the following conditions for effective utilization.

- Seed godown should be in a place where transport facilities are easily available.
- Seed godowns should not be constructed in areas near seashore. Since the high RH of atmospheric air accelerate the deterioration of seed.
- Seed godown should not be constructed in low lying water stagnating areas.
- Seed godown should be constructed in places where atmospheric RH is low, free circulation of air is possible; sunlight is adequate and elevated in nature.
- The ventilators should be at bottom for free air circulation.
- Ground moisture should not reach the floor.
- Should be rat proof with wire mesh
- Should not be near industries as smoke is injurious

3.1.7 Infrastructure for Strengthening of State farm

Seed production chain is being strengthened by producing various classes of seed i.e. Breeder seed, Foundation seed and certified seed by different Government and Private Institutions. The certified/quality and improved seed thus produced is being distributed to the farmers through the various Central and State schemes. This is one of the most effective way of increasing the production and productivity at the field level. Supply of seed to average farmers are able to purchase the most critical input in agriculture i.e. seed at affordable price which will help in achieving desirable increase in production and productivity. In order to establish/strengthen infrastructure facilities for production and distribution of quality seeds for the State Seeds farms, assistance for creating facilities of seed cleaning, grading, processing, packing and seed storage godowns are also be provided. Assistance for strengthening of the existing seed farms with respect to above mentioned infrastructure facilities is also be provided for increasing production of seeds in state. Therefore, the infrastructure facilities at the SSFs like levelled land, more area, assured irrigation, thrashing floor, drying yard, processing units, storage etc., are essential to produce, process and pack quality seeds. Therefore, the strengthening of state seed farms is aimed for quality seed

production districts like Cuddalore, Dharmapuri, Kanchipuram, Krishnagiri, Madurai, Pudukkottai, Theni, Tiruvannamalai, Thiruvarur, Tiruppur and Tiruchirappalli.

3.1.8 Infrastructure for strengthening of irrigation management

Water, as an input to agriculture, is critical for sustaining the food security. India faces the daunting task of increasing its food grain production by over 50 per cent in the next two decades. Increasing competition for water in agriculture, industry, domestic and environment uses is already manifested in inter- and intra-sector, basin, state, district and village level conflicts.Many of the world's irrigated regions face the problem of aging infrastructure and declining revenues to maintain and repair irrigation structures. Policy debates over climate change, population growth, food security, and impacts of irrigation on ecological assets compound the problem, raising the urgency to invest in irrigation infrastructure. Meanwhile, a global call for full-cost recovery for water infrastructure investments increases the need to identify the economic value of sustaining irrigation infrastructure. Despite the growing debates, little comprehensive research has been conducted summarizing factors affecting irrigation investments or policy options available for sustaining irrigation infrastructure. These will escalate further as State's annual per capita water availability goes below water scarce threshold level of 1700 cubic meter within the next two decades. Supply expansion, to meet expanding needs, is constrained by availability and rising economic and environmental costs associated with its development and use. The status of irrigation infrastructure and prospects for its sustainability, both physical and financial, for future water-food security is the issue under focus. More importantly, existing and expanding irrigation infrastructure has to be physically and financially sustained for improving their efficiency. Yet concerns are emerging on the physical condition of the irrigation infrastructure created so far.

This requires systematic maintenance and monitoring of the physical assets of the irrigation system and their current status on a continuous basis. Water user groups need to be empowered with the management responsibilities as well. Several states are indeed in the process of finalizing state water plans, institutionalizing farmer

organizations in irrigation management and periodic review of water charges, improving assessment and collection procedures and prioritizing irrigation expenditures. Low water rates, under assessment of irrigated area and water rate demand, and poor collection rate continue to deprive the irrigation sector from realizing potential revenue, critical for system's financial sustainability. Sustained efforts are needed for rehabilitating the irrigation infrastructure and initiating institutional reforms in water sector. Only then irrigation management transfer will become effective with system wide impacts to provide water security needed for sustainable food security. The different components include

- Distribution of solar pump sets
- Laying of pipelines
- Distribution of rain guns, mobile sprinklers
- Deepening of bore wells
- Laying of drip
- Construction of farm ponds

3.1.9 Infrastructure development for Farm Mechanization

Agricultural mechanization is the need of the hour to meet out the growing shortage of labour workforce in Agriculture. It has been identified as one of the critical inputs for increasing production in time. The labour intensive crops need high man power requirement, which is fast depleting and posing a big challenge to crop productivity. Agricultural labour wages are increasing at an alarming rate in Tamil Nadu resulting in shifting from labour intensive to mechanization intensive techniques. The farm machinery for land preparations, land development, seeding, planting, transplanting, weeding and intercultural operations, harvesting and threshing which are predominantly used in other parts of the country / other countries are proposed for introduction in the farmers field. Distribution of farm machinery / implements to farmers will increase the farm power. All the proposed agricultural machinery / implements will be put into use by the farmers. The acute agricultural labour scarcity will be reduced. The benefit of agricultural mechanization is to be extended to all categories of farmers

with due consideration to small, marginal, scheduled caste, scheduled tribes and women farmers. The distribution of machineries such as dunnage, seed grading machine, paddy transplanter, Rotovators, tractor, power tiller, tarpaulin and generators are proposed in the plan for the development of agriculture sector and the budget requirement for implementation is presented in the Table 3.1.

3.1.10 Civil infrastructure requirement for agriculture development

Contrary as it seems, increased urban migration should turn the focus more towards the agriculture and horticulture sector. Apart from the fact that a vast majority of the country's population still depends on agriculture for their livelihood, efficiencies in agrarian methods are the only way that the burgeoning non-agricultural population can be fed. The different components include establishment of farm protection structure, threshing floor, seed godowns, strengthening of farm offices, culverts, renovation of farm officer, farm connectivity and other accessories are proposed in the plan.

3.1.11 Infrastructure for information technology in agriculture development

Agriculture is a major sector which is vital for the survival of modern man. The produce from agriculture drives trade from one country to another, brings income for farmers, makes productive use of otherwise idle land, and brings food on the table. It is such an important part of everyone's daily life, although it may not be seen as a direct factor since the produce goes a long way before reaching the hands of everyone who benefits from it. Because of its importance to society, it's must to evolve with the times and adjust to meet the needs of modern people. By adapting and making use of IT to help improve agricultural progress, everyone benefits from the union of these sectors.

3.1.12 Information Technology in Agriculture

In the context of agriculture, the potential of information technology (IT) can be assessed broadly under two heads: (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted. The indirect benefits of IT in empowering farmer are significant

and remain to be exploited. The farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable. The changing environment faced by farmers makes information not merely useful, but necessary to remain competitive.

Components

a. Input devices: Radical improvements are witnessed with respect to the means of communication by human beings with computers such as key boards, mouse devices and scanners. The advent of touch screen monitors that allow users to give input to computers by touching on the appropriate location of the monitor has made it possible to develop user-friendly interface for farmers which is easy, intuitive, circumvents language barrier and at the same time provides a relaxed environment to the users. The present day digital cameras make it possible to capture and store good quality graphics and large video clips. The small size and low weight of these digital cameras, which are increasingly becoming affordable, open up the possibilities of providing computer based demonstration clips to educate the farmers. The digital cameras can also be used to upload plant stress related images, movie clips which can facilitate an expert residing at a far of location to quickly recommend a solution.

b. Output devices: Monitor screens, printers & plotters, data projectors support high resolution and good quality output. The quality of these output devices has the potential of generating renewed interest in the farmers in using IT based services. The light weight portable data projectors can be easily carried by the agricultural extension personnel for serving larger audience. Similarly, speakers can also be attached to the computers to incorporate voice based trainings for farmers.

c.Processors: The processing speeds of computers have gone up. At present, Intel P-IV based processors @ 1.5 GHz are available in the PC range which makes it possible to undertake substantial processing of data at the client side.

d. Storage Devices: 40GB and even higher hard disk drives have become common in PC range of computers. This makes it possible to store substantial information at the local level which facilitates faster access. Similarly, high capacity floppy disk drives, CDs make it possible to transfer large volumes of data to locations which cannot be connected to networks immediately. These storage devices are also used for backup of crucial data. As a precaution, many corporates store their backups at locations away from the place of work.

e. Software: Various operating systems are available which act as interface between the user and the machine. The graphic user interface (GUI) has become an accepted prerequisite for end users. Development environment itself is simplified with tools that quicken the pace of software specialists. Project management and monitoring software are available that facilitate efficient execution of large and complex applications that are required for rural India

f. Networking devices: The capacity of modems, used to convert the data from digital to analog and vice versa, which are popularly employed to use telephone lines have increased. Internal modems are available integrated into the computer so that they are not exposed to outside environment. The capacities of other networking devices such as routers have also gone up which makes it possible to create large networks with smooth data transmission.

g. Transmission Media: The media through which the data transfer takes place has also undergone revolutionary change. Telephone lines are still the popular source in India although the reliability and low bandwidth are still major issues. High capacity cables, optical fibre, radio, wireless local loops, satellite transmission and various solutions based on a combination of these are already being used in many parts of the country.The consolidated budget for strengthening infrastructure for agriculture development is presented in Table 3.1

Table 3.1 Budget for infrastructure requirement of Agriculture Development

(₹ in Lakh)

S. No	Components	Unit	Unit Cost (in Rs.)	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Seed Godown (300 MT)	Nos.	2500000	All districts except D14	9	225.00	13	325.00	4	100.00	2	50.00	2	50.00	30	750.00
2	Seed Processing Unit Machineries	Nos.	2650000	All districts except D14	2	53.00	9	238.50	3	79.50	1	26.50	1	26.50	16	424.00
3	Additional Seed Godown	Nos.	1250000	All districts except D14	11	137.50	65	813.75	5	65.13	5	66.64	6	80.80	93	1163.81
4	Construction of Integrated Agricultural Extension Centre with vehicle shed and compound wall	Nos.	25000000	All districts except D14	39	9750.00	36	9000.00	7	1750.00	4	1000.00	4	1000.00	90	22500.00
5	Construction of Sub-Agricultural Extension Centre	Nos.	3000000	All districts except D14	64	1920.00	86	2583.00	23	696.30	3	99.93	3	103.92	180	5403.15
6	Strengthening of Soil Testing Laboratory	Nos.	6000000	All districts except D14	7	420.00	20	1200.00	1	60.00	0	0.00	0	0.00	28	1680.00
7	Strengthening of Mobile Soil Testing Laboratory	Nos.	3000000	All districts except D14	4	120.00	0	0.00	1	30.00	0	0.00	0	0.00	5	150.00
8	Strengthening of Fertilizer Control Lab	Nos.	6000000	All districts except D14	4	240.00	2	120.00	0	0.00	0	0.00	0	0.00	6	360.00
9	Strengthening of Bio-fertilizer production unit	Nos.	6000000	All districts except D14	0	0.00	2	120.00	0	0.00	0	0.00	0	0.00	2	120.00
10	Strengthening	Nos.	3000000	All districts except D14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

S. No	Components	Unit	Unit Cost (in Rs.)	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	of Biofertilizer Quality Control Laboratory															
11	Strengthening of Pesticide Testing Laboratory	Nos.	6000000	All districts except D14	1	60.00	0	0.00	0	0.00	0	0.00	0	0.00	1	60.00
12	Construction of Uzhavar Maiyam (Farmers Hub)	Nos.	15000000	All districts except D14	23	3450.00	7	1050.00	13	1950.00	11	1665.00	12	1831.50	66	9946.50
13	Construction of Lignite Storage/ Liquid bio fertilizer storage godown	Nos.	5000000	All districts except D14	1	50.00	1	50.00	0	0.00	0	0.00	0	0.00	2	100.00
14	Construction of Organic Fertilizer Testing Lab.	Nos.	6000000	All districts except D14	0	0.00	0	0.00	0	0.00	1	60.00	0	0.00	1	60.00
15	Establishment of Threshing floor/drying yard	Nos.	500000	All districts except D14	66	330.00	306	1530.50	262	1311.05	281	1406.66	325	1627.32	1241	6205.53
16	Dunnage	Nos.	7500	All districts except D14	4473	335.48	5261	394.54	4631	347.31	3541	265.56	5005	375.38	22910	1718.26
17	Moisture meter	Nos.	25000	All districts except D14	260	65.00	128	32.09	19	4.80	10	2.58	55	13.87	473	118.34
18	Bag closure	Nos.	10000	All districts except D14	347	34.70	338	33.82	219	21.92	186	18.63	251	25.15	1342	134.22
19	Electronic platform balance	Nos.	150000	All districts except D14	202	303.00	163	243.90	62	93.32	19	29.00	88	132.40	534	801.61
20	Seed rack	Nos.	30000	All districts except D14	467	140.10	465	139.35	216	64.73	150	44.95	410	123.00	1707	512.12
21	Tarpaulin	Nos.	25000	All districts except D14	772	193.00	1246	311.60	1037	259.21	1006	251.58	1073	268.26	5135	1283.66
22	Office Furnishings	Nos.	200000	All districts except D14	189	378.00	248	495.00	148	296.10	148	295.31	165	329.04	897	1793.45

S. No	Components	Unit	Unit Cost (in Rs.)	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	and other amenities															
23	Strengthening of Central Control Lab	Nos.	3000000	All districts except D14	1	30.00	0	0.00	0	0.00	0	0.00	0	0.00	1	30.00
24	Establishment of Agricultural Training Institutes	Nos.	25000000	D22	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
25	Establishing state seed seed farm as model farm and technology demonstratin centres	Nos.	10000000	D20, D23, D3, D4	2	200.00	1	100.00	0	0.00	1	100.00	0	0.00	4	400.00
26	Strengthening of training institute / nursery / FTC / KVK	Nos.	50000000	D20, D23, D3, D4	2	1000.00	5	2500.00	8	4000.00	12	6000.00	2	1000.00	28	14500.00
27	Infrastructure for empowerment of coconut nurseries	Nos.	5000000	All districts	1	50.00	7	350.00	11	550.00	6	300.00	5	250.00	29	1500.00
28	Information technology	Nos		All districts		**1430.73**		**1186.57**		**73.97**		**105.77**		**685.02**		**3482.05**
	Grand total					**21115.51**		**22467.62**		**11203.32**		**11488.11**		**7672.16**		**73946.7**

D1-Ariyalur, D2-Coimbatore,D3-cuddalore, D4-Dharmapuri, D5-Dindigul, D6-Erode, D7-Kancheepuram, D8-Kanyakumari, D9-Karur, D10-Krishnagiri,D11-Madurai, D12-Nagapattinam, D13-Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukottai,D17-Ramnathapuram, D18-Salem,D19-Sivagangai,D20-Thanjavur,D21-Theni,D22-Thiruvallur,D23-Thiruvannamalai,D24-Thiruvarur,D25-Thoothukudi, D26-Tirunelveli,D27-Tirupur,D28-Trichy,D29-Vellore,D30-Villupuram, D31-Virudhunagar

3.2 RESEARCH INFRASTRUCTURE REQUIREMENT FOR AGRICULTURAL RESEARCH AND DEVELOPMENT

Seed is the most basic input in agriculture. Therefore, the sustained supply of the quality seeds will continue to be a key factor for augmenting agricultural growth. The seed processing is a vital part of the seed production activities and the State Government has accorded high priority. In view of above, efforts have to be taken with the objective of production of quality seeds of agricultural crops through scientific methods and adopting appropriate processing techniques through establishment and modernization of State seed processing plants.

After harvesting, cleaning, drying, processing, and packaging, the representative samples of seed lot are required to be taken and sent to the laboratory for quality testing. From the test results, genetic, physical, physiological, and health qualities of seeds are determined. Different countries have set their own standards to find out these qualities in the seed lot. The National Seed Board, for instance, has approved maximum amount of moisture content, minimum germination potential, and minimum physical purity in foundation, certified and truthfully labeled seeds of different crops as basic seed standards. The test results must conform the approved seed standards to send the seeds in the market for commercial transaction.

Quality control is the process of checking the quality of the material against the standard set by the organizations and if the material does not match with the standards, then such material is said to be substandard. Quality control laboratories are being established by the Government with an intention to supply quality inputs viz., seed, fertilizers and pesticide and services like soil testing to the farmers. To have effective quality control of inputs, quality inspectors are to be appointed. The Agricultural Research - NABL Accreditation lab, Organic Fertilizer Testing laboratory, Bio-Fertilizer Quality Control Laboratory, Pesticide Residual Laboratory and laboratory for leaf analysis for selective nutrient application, Soil Testing Laboratory and Fertilizer Control Laboratory, Strengthening of Mobile Soil Testing Laboratory for Ensuring Soil Health were proposed**.**

Infrastructure for Strengthening Research Capacity

Agricultural Research Station (ARS) and Krishi Vigyan Kendras (KVKs) operating in the State are doing yeomen services to the farming community and public by providing technical advices and expertise for the holistic development of the farmers. These institutions also prioritize their actions so as to ensuring food and nutritional security. However, they are not endeavored with adequate infrastructure, which is absolutely essential for growth and development. Strengthening the existing and creating new assets/amenities would bring profound influence on the constructive and technical services effectively. They also need support for establishing/Strengthening of Research stations/Centre of Excellence; Establishment of Mango Research Station; Establishment of Horticultural College & Research Institute in Hosur; Construction of 1st Floor in SAMETI New Hostel, Kudumiyanmalai; and Strengthening of Four Soil Survey and Land Use Organization Units for catering to the needs of farming community. The details of budget requirement (Rs. **30280.3** Lakh) for the various Agricultural research and development activities representing different districts are furnished in Table 3.2.

Establishment of advanced grain quality analysis laboratory

The Grain laboratory provides instrumental analyses of chemical and physical properties of grain and other agricultural products. The services are intended to support high-throughput genetic evaluations, surveys of grain quality and other large-scale monitoring operations. The facility also calibrates various types of instruments for manufacturers and users. Chemical composition is measured with a non-destructive, near-infrared (NIRS) analyzer. For best accuracy, this test requires 400 grams or more of product. Sample sizes down to 150 grams will work with corresponding reductions in accuracy. General test like Seed weight and size, Test weight, Thins (corn), Specific gravity (measure of hardness) by nitrogen displacement, other contracted services and crop specific tests also analyzed. The lab has an in-house quality management system to verify accuracy and reproducibility of data. Advice and set-up of quality control programs for analytical data can be provided.

Establishment of Pesticide Residue Laboratory

The term ‘pesticide’ is used for all toxic chemicals used as pest control agents. They have become very popular with progressive farmers interesting in obtaining high yields of crop. Large number of pesticides has been developed in recent years for the chemical control of diseases and pests which destroy crops and stored grain food grains worth Million of rupees every year. Some pesticides leave little or no residues, and others leave residues for weeks, months or even years. Depending upon on manner and place pesticides are used, each pesticide will vary in duration it remains on the crop or on the surface. It is important to establish what residues, if any, remain on the crop after a given period of time. As different types of pesticides have to handle by a pesticide testing laboratory the organization and working of the laboratory have to be very carefully planned such that each one of the analysis is carried out in the minimum possible time at maximum efficiency, and also without any clash with other analyses.

Establishment of bio control laboratory

Pesticide constitutes the key control tactics for management of pests and diseases and the productivity of crops on their effective control. The area under plant production has been continuously increasing in Tamil Nadu. Excessive and indiscriminate use of pesticides not only increases the cost of production but also results in many human health problems and environmental pollution. The most damaging ecological disturbance of injudicious use of pesticides in the existence of high concentration of pesticide residues in food chain including vegetables and other crops. India is the second largest producer in the world and shares about 13 percent of the world output of vegetables from about 2 percent of the cropped area in the country. To produce pesticide free vegetables, it is highly necessary to introduce bio control as one of the major tools for pest management in vegetable crops.

Construction of soil science lab, post-harvest laboratory and biofertilizer laboratory

The causes for low productivity in agriculture are decline in soil organic matter, soil fertility status, land degradation and use of poor quality water apart from lack of awareness on balanced fertilization among farmers and insufficient soil analytical timely advisory services. Soil and water sampling and analysis will help to monitor the changes in soil fertility, water quality and support in planning for crop and location specific balanced fertilization based on soil test value to enhance crop productivity by construction of soil science lab, post-harvest laboratory and biofertilizer laboratory etc.

Construction of vermicompost unit

It is also imperative to establish vermicompost production laboratories. Organic inputs like Vermi compost arenow a days in high demand by most of the farmers and house owners especially by the city dwellers.

Construction of poly house, glass house, garden & farms and shade net house

Infrastructure like protected cultivation (poly green house and shade net) and protected nursery raising, proper spacing, Fertigation and timely plant protection give higher yield than the conventional system of crop husbandry. It isalso thecase with the production of flowers and hybrid vegetables especially tomato under net house structures which are useful for the control of humidity, temperature pest and disease management. Based on its recent introduction, high cost involved and presence of more number of small and marginal farmers we suggest to make the protected structure into small units.

Production of elite planting materials in flowers and spices by establishment of modern nurseries

Mass propagation through innovative techniques and supply of elite planting materials of jasmine, tuberose and other ornamentals through improved technologies will help to meet the demand from flower growers for quality planting materials. The rhizomatous crops viz., turmeric and ginger are propagated through rhizomes. There is

scarcity for better quality seed rhizomes. Production of turmeric and ginger transplants and distribution to the farmers for planting will mitigate these problems. Recently a rapid propagation method through protray system using single node bud has been standardized for turmeric and ginger in TNAU, which brings down the cost of planting materials. Apart from supply of quality planting materials to meet the demand-gap in these crops, training offered on hi-tech production and propagation practices will definitely pave way for upliftment of the farming community, in turn, increasing national economy.

Strengthening of TNAU Botanical garden

The TNAU botanical garden, with more than 800 species of flora, draws a lot of school children, college students and also public. The garden is almost 40 years old with variety of plants. A lot of children play in the park daily, and schoolchildren from across the city visit the botanical garden for excursions." Species conservation is mentioned in the mission statements of most major botanical gardens, yet the actual conservation value of existing ex situ tree collections is low. The garden has to be face lifted with different types of slides, butterfly swings, spring ducks and new park benches. With these objectives, the project is proposed to strengthen the Botanical garden with plant and non-plant components.

Establishment of DATA Centre

A data center is a facility used to house computer systems and associated components, such as telecommunications and storage systems. It generally includes redundant or backup power supplies, redundant data communications connections, environmental controls (e.g., air conditioning, fire suppression) and various security devices. Large data centers are industrial scale operations using as much electricity as a small town. Collection, processing and interpretation of market data will help in assessing the market price and to decide the price of the commodities.

Rice Technology Complex: Establishment of Pilot Plant for Rice Milling, processing and Value Addition at Tamil Nadu Agricultural University, Coimbatore

A pilot plant with a processing capacity of 0.5 tonnes/ha for milling, processing andvalue addition of paddy is proposed to be set up in Tamil Nadu Agricultural University, Coimbatore. It will have milling and processing components. The milling unit will consist of cleaner, grader, rubber roll sheller, gravity separator, whitener, polisher, and packaging machine all of which are inter-connected by elevators and chutes for seamless travel of grain from end to end. The processing unit is aimed at producing a range of value added products such as brown rice, puffed rice, flaked rice and rice flour. Accordingly, the processing unit will be made of puff making machine, flaking machine, pounding machine, twin screw extruders and pulverizes and packaging machines. Such a modern rice processing facility will be a valuable aid in disseminating the latest postharvest technologies among the various stake-holders including students.

Establishment of Pilot Water Soluble Fertilizer Production Units

Currently, adoption to different precision micro irrigation methods and high yielding varieties more importantly require water soluble fertilizer's for efficient and balanced use of fertilizer nutrients. Hence, demand for the water soluble fertilizers is increasing as the area under micro-irrigation is on the increase. This has focused attention on water soluble fertilizers. At present most of water soluble fertilizers are imported and supplied to farmers at high cost. Nutrient wise when compared to conventional straight fertilizers the cost of nutrients in water soluble fertilizers is 10 to 20 times high. Under these circumstances, it is necessary to adopt chemical technologies that can demonstrate production of water soluble fertilizers using low cost materials in low investment industrial units. In this back ground, Tamil Nadu Agricultural University proposes to establish such a low cost pilot water soluble production units, so that its design and process can be taken up as a model for establishing similar units in the marketing organizations of the State as well us by the entrepreneurs.

Establishment of Microbial Type Culture Collection Facility and Mycological Museum

The main objectives of Microbial Type Culture Collection Facility are to act as a repository, to supply authentic fungal cultures and identification of fungi as well as to provide related services to farmers, technocrats and scientists working in research Institutions, Universities and Industries for teaching, demonstration and investigational purposes to mycologists and plant pathologists throughout the country.

Activities

1. Conservation, Preservation and maintenance
2. Identification services of fungal cultures
3. Supply and deposition of authentic fungal cultures
4. Taxonomic Investigations
5. Documentation of the fungal cultures.

Services

1. Identification of fungal and bacterial cultures
2. Supply of fungal cultures
3. Deposition of cultures

Facilities for identification of all groups of pure fungal cultures and plant pathogenic bacteria will be created in Microbial Type Culture Collection Facility. In this, different groups of fungi viz., Oomycetes, Zygomycetes, Ascomycetes and Deuteromycetes and plant pathogenic bacteria will be identified for the cultures received from researchers and students of different parts of the country.

Strengthening of Mango Research Centre

Mango is originated from Indo Burma region and it is reported that it has been grown in this continent for nearly 4000 years. Among the three prime fruits reported in Tamil literature (Mango, Banana and Jackfruit), the first and foremost important fruit crop is mango. Mango is what apple is to Western countries and Indian mangoes

deserve to be focused at global level. It is cultivated in an area of 1,61,580 hectare in Tamil Nadu and in Krishnagiri and Dharmapuri districts which are the hot spot of mango production, it is cultivated in an area of 40,000 & 14,000 hectares respectively (NHB, 2013 - 14). Comparing the national productivity (7.3 t /ha), the state productivity is very low (4.9 t/ha). In Tamil Nadu, there are about 75 processing units functioning in total whereas in Krishnagiri and Dharmapuri districts alone, around 45 units are functioning. In this context, mango research centre may be strengthened at Kaveripattinam.

The project is proposed to provide good quality planting materials, to offer scientific training in production and post-harvest technologies and export management to the needy people

Establishment of tissue culture facility for supplying quality planting material in coconut to the farmers

Coconut is one of the remunerative crops in the tropics. Increased consumption of tender coconuts, increased use of coconut oil for culinary purposes and development of other industrial products from various parts of coconut tree/fruits necessitates significant increase in coconut production. Among the various strategies proposed for increasing coconut production in the country, supply of quality seedlings stands first towards establishment of elite gardens and thereby to increase the coconut productivity and production. As of now, only 30% of the seedling requirement by the farmers is met due to low rate of multiplication of seedlings (1:1) from coconuts. Coconut is propagated mainly by seed which is highly variable and quite slow since one plant is obtained from one seed. Hence, any further increase in seedling supply depends on development of new technologies to increase in the rate of multiplication which is possible through micro-propagation/tissue culture. Studies at University of Philippines, Las Banos demonstrated the feasibility of using micro-propagation technique in rapid multiplication of elite cultivars in coconut. This proposal is aimed at establishing infrastructure for a dedicated infrastructure and tissue culture facility at Tamil Nadu Agricultural University, Coimbatore for developing a reproducible and cost effective technology for mass

multiplication of elite coconut genotypes and thereby to reduce the gap between coconut seedling demand by the farmers and supply.

Automated nematode extraction units

Much progress has been made in developing efficient procedures for extracting nematodes from soil, but investigations of nematode numbers as related to crop damage and other studies dealing with population dynamics are frequently of limited value because of unmanageable variation in sampling and extraction**.** A major problem with all extraction procedures is obtaining a representative sub sample of larger soil samples collected from plots or fields.

Establishment of bioinoculant production units for enhancing productivity of pulses in Northern and Southern districts of Tamil Nadu

Microbial inoculants including bio fertilizers and bio control agents are cheap and potential inputs that would increase the yield of pulse crop especially in dry land regions.Coating the seeds with bio inoculants is a novel approach to achieve seedlings with high vigour. The application of bio fertilizers like *Rhizobium* and Pink Pigmented Facultative Methylotrophs (PPFM) and use of bio control agents like *Trichoderma spp* and *Pseudomonas fluorescens* can be effectively used for controlling soil borne pathogens in pulse crops through seed treatment and soil application. It was already demonstrated through various field studies that seed inoculation of bioinoculants and biocontrol agents can improve the yield to a tune of 20% with an additional saving of 25 per cent of fertilizer and fungicide inputs. However, farmers are found to have low adoption levels in the use of these bio inputs due to the inadequate availability. Hence, the establishment of new bio fertilizer and bio control production unit is essential to popularize and meet out the demand of these bio inputs in Northern and Southern districts of Tamil Nadu. Pulse crops especially black gram and green gram grown in dry areas will be targeted.

Strengthening Research Infrastructure Faculties at the Research Stations of TNAU

Capacity building in an Institute like in TNAU needs guidance and support to those who are associated with the process. There is no doubt that TNAU remains as one of the leading State Agricultural Universities (SAU) in India, its growth is continuous due to the support it receives from the Tamil Nadu Government. Having the goal of "doubling the yield and trebling the income" of Tamil Nadu farmers, Tamil Nadu Government is supporting TNAU in all possible ways for the capacity and capability building by improving infrastructure facilities across TNAU. The establishment of Horticulture College and Research Institute for Women at Navalur Kuttappattu of Srirangam Constituency, Trichy, three more agricultural colleges at Vazhavachanur, Thiruvannamalai District, Eachangkottai, Thanjavur District and Kudumiyanmalai, Pudukottai District and two research stations viz. Grapes Research Station at Mallingapuram, Theni district and Citrus Research Station at and Sankarankoil, Tirunelveli. However, some of the Research Stations of TNAU need strengthening of their research infrastructure to accommodate students from the teaching campuses to do their thesis research in sub-stations after completing their course work. The major infrastructural improvements required at the research stations include: 1) Field cum laboratory facilities, 2) Accommodation facilities for scientists and students and 3) Facilities for storing experimental materials.The proposed budget outlay is presented in the Table 3.2.

Other research infrastructure proposed

- Advanced photosynthetic analytic laboratory in Dindigul, Sivagangai and Thanjavur districts
- Coconut Processing Facility in Thanjavur district
- Construction of Farmer Trainees centre with hostel facilities Hostel in Salem, Cuddalore, Dindigul, Sivagangai, Theni, Tiruchirappalli, Tiruvalur, Villupuram, Pattukkottai, Thanjavur and Thoothukudi.

- Construction of poly house, glass house, garden & farms and shade net house at Krishnagiri
- Construction of Storage godowns and seed processing unit at Thoothukudi and Dindigul
- Construction of Technology Park at Cuddalore,Coimbatore and Thanjavur
- Construction of Communication lab at T10 teaching campuses of TNAU
- Creation of automated spawn production unit at Coimbatore and Thoothukudi district
- Creation of Millet Processing and Value Addition Facility in Thiruvannamalai
- Creation of nursery infrastructures (Mist chambers, shade net house & Environment controlled chamber) in Coimbatore district.
- Creation of Oil palm Processing unit at Thanjavur
- Creation of Video conferencing lab (2) and seed storage and processing godown (1) in Coimbatore.
- Development of Farm Women Development Centre in Tiruchirappalliand Madurai district
- Development of Model mechanized farm.
- Developing crop specific nutrient mixture and establishment of modern industrial fertilizer mixing unit for distribution to farmers at Coimbatore.
- Development of animal husbandry unit at Thoothukudi district
- Development of nursery with sales out let in Tiruvannamalai.
- Development of poultry unit at Ten teaching campuses of TNAU
- Establishment of Green Globe Centre in Chennai
- Establishment of Fruit and Vegetable Processing unit in Trichy,Thoothukudi, Madurai and Krishnagiri district
- Establishment of Communication & Video Conferencing laboratory at Chennai.
- Establishment of Department laboratories at Villupuram, Coimbatore, Dindigul, Cuddalore, Krishnagiri, Pudukkottai, Tirunelveli, Salem, Tiruvallur and Thanjavur and Thoothukudi district.

- Establishment of Model Lime Processing Unit at Thoothukudi district.
- Establishment and demonstration of precision farming under protected cultivation of model for quality production of Capsicum, cucumber, greens, Vegetables flower Tiruchirappalli, Theni, Krishnagiri, Thiruvannamalai, Dindigul and Madurai.
- Establishment of Automated nematode extraction units, animal clinic, seed storage & processing godowns, mist chamber, Department laboratories in Theni, Coimbatore,Thanjavur, Pudukkottai, Thiruvannamali, Madurai and Tiruchirappalli.
- Establishment of Entrepreneurial Development Centre, Agribusiness incubator and accelerator units at teaching campuses of TNAU.
- Establishment of advanced grain quality analysis laboratory at Thoothukudi, Villuppuram, Thanjavur, Theni, Pudukkottai, Cuddalore, Coimbatore, Dindigul, Krishnagiri and Maurai
- Establishment of Microbiological laboratory at Theni.
- Establishment of automated mushroom spawn production unit in Coimbatore.
- Establishment of bio inoculants production units for enhancing productivity of pulses in Northern and Southern Districts of Tamil Nadu in Coimbatore, Thoothukudi and Tiruvannamalai.
- Establishment of biofertilizer laboratory in Thanjavur district.
- Establishment of castor seed processing unit at Salem
- Establishment of Cattle Breeding Farm at Coimbatore.
- Establishment of Centre for Plant molecular biological laboratory at Thoothukudi.
- Establishment of Chewing Cane – Production and Processing Unit at Cuddalore
- Establishment of Cold storage at Coimbatore.
- Establishment of Concrete Extraction Unit at Theni and Tiruchirappalli district
- Establishment of Dhal mill for pulses at Vamban, Pudukkottai district
- Establishment of Dry flower processing unit at Trichy district.
- Establishment of Farm Women Knowledge Centre at Tiruchirappalli district.
- Establishment of Food Processing Laboratory Thiruvannamalai, Tiruchirappalli and Madurai district.

- Establishment of Botanical Gardens and farms at Tiruchirappalli, Thanjavur, Pudukkottai, Salem, Coimbatore, Cuddalore and Thootukudi district.
- Establishment of Incubation Centre and Farm Women Training at Trichy.
- Establishment of Information Training Centre at Chennai
- Establishment of Jack Cluster and processing facilities in Pudukkottai district.
- Establishment of Microanalytical laboratory at Tiruvannamalai.
- Establishment of mother block plant nursery at Coimbatoreand Theni district.
- Establishment of Mushroom research laboratory at Tiruchirappalli district.
- Establishment of NABL Accredited laboratory at Tiruchirappalli,Thiruvannamalai, Madurai, Madurai, Thoothukudi, and Tiruvallur district
- Establishment of Organic Jaggery Processing Unit at Cuddalore and Vellore district.
- Establishment of Palmyrah and jack fruit processing pilot plant for demonstration cum training on value added products for rural empowerment at Sivagangai.
- Establishment of phytochemisry, soil carbon sequestration and soil health improvement laboratory and cryoconservation unit at Coimbatore district.
- Establishment of Plant Molecular Biological Laboratory at Thoothukudi and Theni district
- Establishment of plant tissue culture laboratory at Tiruchirappalli and Theni district
- Establishment of vegetable seed production unit at Cuddalore
- Establishment of Post Harvest Technology Centre at Thanjavur, Pudukkottai, Tiruvallur, Theni and Thiruvannamalai districts.
- Establishment of research facilities for improving photosynthesis in rice, pulses and oilseeds in Coimbatore.
- Establishment of seed storage godowns inTirunelveli, Dindigul and Thootukudi.
- Establishment of remote sensing, surveying & land leveling lab at Tiruchirappalli district
- Establishment of Tapioca minimal Processing Unit at Salem.

- Establishment of tissue culture facility for supplying quality planting material in coconut to the farmers at Coimbatore district.
- Establishment of Training Institutes at Citrus Research Station, Sankarankoil and Floriculture research station,Thovalai and Mango research station, Paiur
- Establishment of Training Institutes at Grape Research Station, Theni
- Establishment of video conferencing lab in Madurai.
- Establishment of Bio control laboratory in all teaching campuses of TNAU
- Establishment of laboratories at horticultural college for women at Trichy.
- Establishment of Mango Research Centre
- Establishment of Food Processing unit (Bakery) at Chennai.
- Formulation of Controlled Release Bio-Matrix Fertilizer in Madurai.
- Strengthening of glass house and polyhouseinThoothukudi.
- Strengthening of infrastructuralfacilities at Vegetable Research Station, Palur
- Strengthening of Plant Tissue Culture Laboratory in Theni district.
- Strengthening of Research infrastructure in Research stations including Centre of Excellence and KVKs of TNAU in all districts except Ariyalur and Chennai district

Budget

It is proposed to incur Rs. **30280.3** Lakh over a period of five years (Table 3.2)

Expected outcome

It will improve the productivity and income of the farmers.

Implementing agency

Tamil Nadu Agricultural University will be implementing the project. The progress of the scheme will be monitored by the Vice-Chancellor and Nodal Officer from the University.

Table 3.2 Research Infrastructure requirement for Agricultural Research

(Rs. in Lakh)

Research Infrastructure	District Covered	Unit Cost in lakhs	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Infrastructure for promotion of agribusiness development														
Entrepreneurial Development Centre, Agribusiness Incubator and Accelarator	Theni, Coimbatore, Tiruchirappalli, Madurai, Thoothukudi, Thanjavur, Tiruvannamalai, Pudukkottai,	90	1	90	2	180	2	180	2	180	2	180	9	810.00
Infrastructure for animal health mangement		0	0	0		0	0	0	0	0	0	0	0	0.00
Animal husbandry unit	Thoothukudi	10	10	100	0	0	0	0	0	0	0	0	10	100.00
Cattle Breeding Farm	Coimbatore	10	10	100	0	0	0	0	0	0	0	0	10	100.00
Poultry unit	Thoothukudi	5	4	20	0	0	0	0	0	0	0	0	4	20.00
Infrastructure for biodiversity conservation													0	0.00
Establishment and strengthening of Botanical Garden in Teaching campus of TNAU	Theni, Coimbatore, Tiruchirappalli, Madurai, Thoothukudi, Thanjavur, Tiruvannamalai, Pudukkottai,	30	2	60	2	60	2	60	2	60	2	60	10	300.00
Infrastructure facilites for communication													0	0.00
Communication lab in Teaching campus of TNAU	Theni, Coimbatore, Tiruchirappalli, Madurai, Thoothukudi, Thanjavur, Tiruvannamalai, Pudukkottai,	10	2	20	2	20	2	20	2	20	2	20	10	100.00
Infrastructure for DATA managemet													0	0.00
DATA Centre	Coimbatore, Tiruchirappalli	50	1	50	0	0	1	50	0	0	0	0	2	100.00
Infrastructure for demonstration of agricultural technologies													0	0.00

Research Infrastructure	District Covered	Unit Cost in lakhs	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Model Mechanized Research Farm	Cuddalore, Krishangiri, Thanjavur and Theni	250	0	0	1	250	1	250	1	250	1	250	4	1000.00
Infrastructure for fertilizer/manure production													0	0.00
Modern industrial fertilizer mixing unit	Coimbatore	610	1	610	0	0	0	0	0	0	0	0	1	610.00
Controlled Release Bio-Matrix Fertilizer production unit	Madurai	21.298	0	200	1	21.298	0	0	0	0	0	0	1	221.30
Water soluble fertilizer production unit	Coimbatore, Madurai, Thoothukudi	100	1	100	1	100	1	100	0	0	0	0	3	300.00
Vermicompost unit	Krishnagiri, Tiruchirappalli, Thanjavur	5	1	5	1	5.00	1	5.00	1	5.00	0	0.00	4	20.00
Infrastructure for research and development													0	0.00
Photosynthetic analytic laboratory	Dindigul, Sivagangai, Thanjavur	300	1	300	1	300	1	300	0	0	1	300	4	1200.00
Soil science lab, post harvest laboratory and biofertilizer laboratory	Krishnagiri	100	1	100	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
Strengthening of department laboratories in Teaching campus of TNAU	Thoothukudi, Villupuram, Coimbatore, Dindigul, Cuddalore, Krishnagiri, Pudukkottai, Tirunelveli, Salem, Tiruchirappalli and Thanjavur	200	10	2000	10	2000	10	2000	10	2000	10	2000	50	10000.00
Microbiological laboratory	Theni	50	0	0	0	0.00	0	0.00	5	250.00	0	0.00	5	250.00
Automated nematode extraction units	Coimbatore, Thanjavur, Pudukkottai, Thiruvannamalai, Tiruchirapalli and Theni	25	1	25	2	50	1	25	1	25	1	25	6	150.00
Bio inoculants production units	Coimbatore, Thoothukudi and Tiruvannamalai	100	1	100	1	100	1	100	0	0	0	0	3	300.00
Biocontrol laboratory	Coimbatore, Cuddalore, Dindigul, Krishnagiur, Salem, Thanjavur, Theni, Thiruvannamalai and Thoothukudi	80	2	160	2	160	2	160	2	160	2	160	10	800.00

Research Infrastructure	District Covered	Unit Cost in lakhs	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Biofertilizer laboratory	Thanjavur	90	0	0	1	90	0	0	0	0	0	0	1	90.00
Centre for Plant molecular biological laboratory	Thoothukudi, Theni	200	1	200	1	200	0	0	0	0	0	0	2	400.00
Microanalytical laboratory	Thiruvannamalai	50	0	0	0	0	1	50	0	0	0	0	1	50.00
Microbial Type Culture Collection Facility and Mycological Museum	Coimbatore	330	0	0	0	0	0	0	1	330	0	0	1	330.00
NABL Accredited laboratory	Tiruchirappalli, Madurai, Thoothukudi, Tiruvallur and Tiruvannamalai	40	1	40	1	40	1	40	1	40	1	40	5	200.00
Phytochemisry, soil carbon sequestration and soil health improvement laboratory and cryoconservation unit	Coimbatore	50	1	50	1	50	1	50	1	50	1	50	5	250.00
Plant tissue culture laboratory	Tiruchirappalli, Theni	250	0	0	1	250	1	250	0	0	0	0	2	500.00
Research facilities for improving photosynthesis in rice, pulses and oilseeds	Coimbatore	655	0	0	0	0	1	655	0	0	0	0	1	655.00
Surveying & land levelling lab, Remote sensing & GIS lab	Tiruchirappalli	10	1	200	1	10	1	10	1	10	1	10	5	240.00
Pesticide Residue Laboratory	Krishnagiri	50	0	0	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
Mango Research Centre	Krishnagiri	100	0	0	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
Strengthening research infrastructure in research stations of Tamil Nadu Agricultural University	All districts except Ariyalur and Chennai	30	6	180	6	180	6	180	6	180	6	180	30	900.00
Infrastructure for mushroom and spawn production													0	0.00
Automated mushroom spawn production unit	Thoothukudi, Coimbatore	225	1	225	1	225	0	0	0	0	0	0	2	450.00
Mushroom Research laboratory	Coimbatore, Tiruchirappalli	15	1	15	0	0	1	15	0	0	0	0	2	30.00
Infrastructure for good qualtiy seedling production													0	0.00
Creation of nursery infrastructures (Mist	Coimbatore	50	1	50	0	0	0	0	0	0	0	0	1	50.00

Research Infrastructure	District Covered	Unit Cost in lakhs	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
chambers, shadenet house & Environment controlled chamber)														
Development of gardens and farms, glass house, polyhouse, shadenet house	Tiruchirappalli, Thanjavur, Pudukkottai, Salem, Coimbatore, Tirunelveli, Cuddalore, Thoothukudi	30	2	60	3	90	2	60	3	90	2	60	12	360.00
Modern hi-tech nurseries	Coimbatore	155	0	0	1	155	0	0	0	0	0	0	1	155.00
Mother block plant nursery	Theni, Coimbatore	10	0	0	1	10.00	1	10.00	0	0.00	0	0.00	2	20.00
Nursery with sales outlet	Salem, Thanjavur, Pudukkottai, Dindigul, Theni, Thoothukudi, Tiruvannamalai, Tiruvallur	25	3	75	2	50	2	50	1	25	2	50	10	250.00
Infrastructure for Post harvest management													0	0.00
Cold storage	Coimbatore	25	0	0	1	25	0	0	0	0	0	0	1	25.00
Concrete Extraction Unit	Theni, Tiruchirappalli	25	1	25	1	25	0	0	0	0	0	0	2	50.00
Dry flower processing unit	Tiruchirappalli, Kanyakumari	5	1	5	1	5	0	0	0	0	0	0	2	10.00
Post Harvest Technology Centre	Thanjavur, Pudukkottai, Tiruvallur, Theni, Tiruvannamalai	40	1	40	1	40	1	40	1	40	1	40	5	200.00
Advanced grain quality analysis laboratory	Thoothukudi, Villupuram, Coimbatore, Dindigul, Cuddalore, Krishnagiri, Pudukkottai, Theni, Thanjavur	50	4	200	6	300	1	50	2	100	1	50	14	700.00
Coconut Processing Facility	Thanjavur	50	1	50	0	0	0	0	0	0	0	0	1	50.00
Millet Processing and Value Addition Facility	Thiruvannamalai	100	0	0	1	100	0	0	0	0	0	0	1	100.00
Oil palm Processing unit	Thanjavur	50	1	50	0	0	0	0	0	0	0	0	1	50.00
Fruit and Vegetable Processing unit	Tiruchirappalli, Madurai, Thoothukudi	50	1	50	1	50	0	0	0	0	0	0	2	100.00
Model Lime Processing Unit	Thoothukudi	100	0	0	1	100	0	0	0	0	0	0	1	100.00
Castor seed processing unit	Salem	20	0	0	1	20	0	0	0	0	0	0	1	20.00

Research Infrastructure	District Covered	Unit Cost in lakhs	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Chewing Cane – Production and Processing Unit	Cuddalore	50	0	0	1	50	0	0	0	0	0	0	1	50.00
Dhal mill for pulses	Pudukkottai	100	0	0	0	0	1	100	0	0	0	0	1	100.00
Food processing Laboratory	Thiruvannamalai, Tiruchirappalli, Madurai	50	2	100	2	100	0	0	0	0	0	0	4	200.00
Organic Jaggery Processing Unit	Cuddalore, Vellore	75	0	0	1	75	1	75	0	0	0	0	2	150.00
Palmyrah processing pilot plant	Sivagangai	75	0	0	1	75	0	0	0	0	0	0	1	75.00
Tapioca minimal processing Unit	Salem	100	1	200	0	0	0	0	0	0	0	0	1	200.00
Flower processing and Training Institute	Kanyakumari	225	0	0	1	225	0	0	0	0	0	0	1	225.00
Fruit Processing and Training Institute	Krishnagiri	225	0	0	0	0	1	225	0	0	0	0	1	225.00
Jack fruit Cluster and Jack Processing Unit	Pudukkottai, Cuddalore, Coimbatore	100	1	100	1	100	1	100	0	0	0	0	3	300.00
Rice Technology Park Complex	Coimbatore	250	0	0	1	250	0	0	0	0	0	0	1	250.00
Infrastructure for protected cultivation													0	0.00
Poly house, glass house, garden & farms and shade net house	Krishnagiri	6	1	6	1	6.00	1	6.00	1	6.00	0	0.00	4	24.00
Infrastructure facilities like glass house, poly house and cattle shed	Thiruvannamalai, Madurai	10	2	20	1	10	1	10	0	0	0	0	4	40.00
Model protected growing model	Tiruchirappalli	170	1	170	0	0	0	0	0	0	0	0	1	170.00
Polyhouse	Dindigul	6	1	6	1	6	1	6	0	0	0	0	3	18.00
Protected model precision farming systems	Theni	155	1	155	0	0.00	0	0.00	0	0.00	0	0.00	1	155.00
Infrastructure for seed production/processing													0	0.00
Vegetable seed production / Processing unit	Cuddalore	652	0	0	0	0	1	652	0	0	0	0	1	652.00
Infrastructure for storage													0	0.00

Research Infrastructure	District Covered	Unit Cost in lakhs	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
			Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
Storage godowns	Dindigul, Tirunelveli, Thoothukudi	10	1	10	1	10	1	10	1	10	0	0	4	40.00
Infrastrucutre for technology transfer													0	0.00
Technology Park	Cuddalore, Thanjavur	100	0	0	1	100	0	0	0	0	1	100	2	200.00
Farm Women Development Centre	Tiruchirappalli, Madurai	100	0	0	0	0	1	100	0	0	1	100	2	200.00
Green Globe Centre	Tiruvallur	1500	0	0	1	500	0	0	0	500	0	0	1	1000.00
Farmers Training Centre	Salem, Thanjavur, Theni, Tiruvallur	200	1	200	1	200	1	200	1	200	1	200	5	1000.00
Information Training Centre	Tiruvallur	500	0	0	0	0	0	0	1	500	0	0	1	500.00
Training Institutes	Tirunelveli, Theni	100	1	100	0	0	1	200	0	0	0	0	2	300.00
Farmer Trainees Hostel	Salem, Cuddalore, Dindigul, Sivagangai, Theni, Villupuram, Pattukkottai, Thanjavur, Thoothukudi, Tiruchirappalli	200	1	200	3	600	4	800	1	200	1	200	10	2000.00
Total				**6672**		**7518.298**		**7089**		**5076**		**3925**		**30280.3**

3.3 INFRASTRUCTURE REQUIREMENT FOR HORTICULTURE DEPARTMENT

Promotion of protection cultivation in horticultural crops

Looking into the increasing population, climate change, decreasing land holdings, increasing pressure on natural resources i.e. land and water and high demand of quality horticultural fresh produce, there exist pressure to shift towards modern technologies of crop production like protected cultivation. Promotion of protected cultivation will certainly help in creation of huge self-employments for youth and will also raise the national economy by sale of high quality produce in domestic and international markets. Under the new era of WTO (World Trade Organization), these kinds of models possess high potential for enhancing the income of farmers opting for quality and off-season vegetable and cut flower cultivation under protected conditions. Production of vegetable and cut flower crops under protected conditions not only provides high water and nutrient use efficiency but also increases the productivity of crops by 3-5 folds over any open field cultivation practiced under varied agro climatic conditions. This technology/practice has very good potential especially in urban areas adjoining to the major cities as there is a fast growing market for fresh produce of the country. Shade net houses, green houses and naturally ventilated system are proposed interventions for promotion of protection cultivation with budget outlay of Rs.360609.38 lakh (Table 3.3).

Establishment of Mushroom unit

Mushrooms have been valued throughout the world as both food and medicine for thousands of years. They are a rich source of nutrition and form a major chunk of health foods. Earlier mushroom eating was restricted to specific regions and areas of the world but due to globalization, interaction between different cultures, growing consumerism has ensured the accessibility of mushrooms in all areas. Mushrooms are increasingly gaining acceptance in different Cuisines and in everyday consumption. They have created a space in a common man’s kitchen. Also, current trend of consumption conveys the opportunity that lies in the area of mushroom exports. Commercial production of edible Mushrooms converts the

agricultural, industrial, forestry and household wastes into nutritious food (Mushroom). Indoor cultivation of oyster mushrooms utilizes the vertical space and is regarded as the highest protein producer per unit area and time – almost 100 times more than the conventional agriculture and animal husbandry. Hence for establishment of mushroom unit in the state, it is proposed with budget outlay of Rs. 1525.32 lakh (Table 3.3).

Establishment of Vermicompost unit

Though soil is the most vital input for food production, it is generally in a degraded condition due to many reasons and indiscriminate use of chemical fertilizers is the prime reason among them. Since improving the soil health by adding organic manure is a priority, the Department of Agriculture has taken up this mission earnestly. High quality organic manure can be prepared by the agriculturists themselves in their farms by establishing vermicompost unit using biodegradable farm waste available in their farms such as dried leaves, vegetable and fruit waste and crop remains, which is burned otherwise. To enhance the soil health, the establishment of vermicompost is proposed with a budget outlay of Rs. 3484.68 lakh.

Supporting structures for vegetable production

Vegetables are excellent source of vitamins and minerals such as calcium, iron besides proteins and carbohydrates. Vegetables combat under nourishment and are known to be a cheapest source of natural protective tools.

a. Staking, trellis and propping

Though most vegetables grow on their own, plants with vining and sprawling growth or with brittle stems and heavy fruits need support. Peas, cucumbers, pole beans, tomatoes, squash, eggplants and peppers benefit from trellising, caging or staking. The trick to heavy harvests knows which vegetable support system works best for each plant. Trellising, which involves tying plant stems to vertical structures with garden twine or plant ties, allows you to fit more plants in the garden. It is the

preferred support method for peas, indeterminate vine-type tomatoes, pole and runner beans, cucumbers and smaller squash varieties.

b. Pandal structure

Pandal vegetables, being short duration crops, fit very well in the intensive cropping system. It offers viable option for the growers to get increased income per unit area. It includes number of vegetables viz. bitter gourd, snake gourd, ribbed gourd, pandal avarai etc. These vegetables are grown on commercial scale and are capable of giving high yields and high economic returns to the growers. It has tremendous market potential. The cultivation of vegetables is constrained due to high initial investment cost. With the objective of enhancing area under pandal vegetables and encouraging farmers to obtain increased income, it is proposed to implement the project on “Encouraging Cultivation of Pandal Vegetables. In this situation, financial support for the establishment of pandal structures for the vegetables will increase in the area and production of pandal vegetables. Along with which the support on supply of high yielding / hybrid seed materials for cultivation will be additional assistance among the farmers to get enhanced yield per unit area. The establishment of supporting structures are promoted with a budget outlay of Rs. 35450.42 lakh.

Establishment of District Horticulture information and training centre

The information center also houses a training center where all the training programmes are being conducted. This includes training under various schemes like Mission for Integrated Development of Horticulture, Micro Irrigation, Medicinal plants, Perimetro vegetable cluster development Scheme, ATMA (SSEPERS) etc. The Centre would not only provide employment, but also training to agriculturists in batches on raising vegetable and horticultural crops and conduct orientation programme for Department officials.

Additionally, to augment the promotion of cut flowers and other horticulture crops cold storage facilities can also be made in the horticulture complex. The other facilities like glass house, green house for production and multiplication of

ornamental plants will also be established in the training centre for demonstration purpose. The District Horticulture Information and Training Centre will be established with a budget outlay of Rs. 375.00 lakh (Table 3.3).

Post harvest management

In agriculture, postharvest handling is the stage of crop production immediately following harvest, including cooling, cleaning, sorting and packing. Postharvest treatment largely determines final quality, whether a crop is sold for fresh consumption, or used as an ingredient in a processed food product. The most important goals of post-harvest handling is to avoid moisture loss and slow down undesirable chemical changes, and avoiding physical damage such as bruising, to delay spoilage. Sanitation is also an important factor, to reduce the possibility of pathogens that could be carried by fresh produce, for example, as residue from contaminated washing water. To manage post harvest loss, the infrastructure requirement is proposed with a budget outlay of Rs. 23095.10 lakh.

Community Seed Bank

Community seed banks usually store seed from a wide range of individuals, informal groups and NGOs who share seed among themselves. Seed is primarily retained from participants' own production with no formal quality control, but individual selection process and handling skills are involved. More recently, some community seed banks have been set up in partnership with the formal sector - chiefly plant breeding research institutes. Seed banks are a form of storage and diversification, and they enhance farmers' ability to buffer environmental and economic stress by planting several crop varieties adapted to a range of environmental conditions. At the same time, seed banks facilitate farmers' access to markets and give farmers more choice over what they grow. Seed banks enable rural tribal villages to become less dependent on engineered high-yield varieties and on expensive inputs such as fertilizers and pesticides. Much of the seed stored in community seed banks is generative, but vegetative seed such as potato tubers, sweet potato vines, yam stets and cassava stakes are also found. Transferring seed between individuals, households and the seed bank entails a variety of exchange

mechanisms. These are mainly informal mechanisms such as seed fairs, in-kind seed loans, barter and transfers based on social obligations, but also through cash sales and purchases. With these objectives, community seed banks are proposedwith a budget out lay of Rs. 201.60 Lakh (Table 3.3).

Roof Top Gardening

Roof gardens are most often found in urban environments. Plants have the ability to reduce the overall heat absorption of the building which then reduces energy consumption. Besides providing resistance to thermal radiation, rooftop gardens are also beneficial in reducing rain runoff. A roof garden can delay run off; reduce the rate and volume of runoff.Promotion of roof garden will helps them to meet out the own requirement of fruits and vegetables. The roof top gardens are established with a budget outlay of Rs. 2221.16 Lakh**.**

Development of farms, nurseries and parks

Tamil Nadu is endowed with wide range of agro-climatic conditions and has good potential for growing a wide range of horticultural crops such as fruits, vegetables, potato, tropical tuber crops and mushrooms, ornamental crops; medicinal and aromatic plants, spices and plantation crops like coconut, cashew nut, cocoa, etc. The Government identified horticulture crops as a means of diversification for making horticulture more profitable through efficient land use, optimum utilization of natural resources and creating skilled employment for rural masses, especially women folk is rewarding. Changes in food habits increase in per capita income and quality life style has accelerated the demand for diversified horticultural commodities. The single dominant factor which would contribute to rise in production of horticulture crop is availability of quality planting material of improved cultivars. Plant propagation techniques and practices to be followed arethe core of horticulture nurseries. The planting materials for horticultural plantations are raised from seeds and vegetative parts. Thus, establishment of nursery is proposed for production of planting materials with a budget outlay of Rs. 10232.50 Lakh in the

State. The district wise physical and financial requirement for quality planting material is presented in Table 3.3.

Infrastructure for water / irrigation management

It is a form of irrigation that saves water and fertilizer by allowing water to drip slowly to the roots of many different plants, either onto the soil surface or directly onto the root zone, through a network of valves, pipes, tubing, and emitters. It is done through narrow tubes that deliver water directly to the base of the plant. Micro irrigation system is the best for watering plants in a greenhouse. Micro sprinklers or drip irrigation equipments can be used. Basically, the watering system should ensure that water does not fall on the leaves or flowers as it leads to disease and scorching problems. In micro sprinkler system, water under high pressure is forced through nozzles arranged on a supporting stand at about one foot height. This facilitates watering at the base level of the plants. Drip and sprinkler irrigation are proposed interventions with total budget outlay of Rs. 156006.72 Lakh. The physical and financial budget requirement of micro irrigation is presented in Table 3.3

The total budget requirement for horticulture infrastructure requirement is **Rs. 593201.88 Lakh.**

Table 3.3 Budget requirement for Infrastructure Development in Horticulture

(₹ in Lakh)

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
I	**Protected cultivation**															
1	Poly Green House	1000 Sq.m	9.35	All districts	780	7288.33	906	8470.17	1027	9603.10	1130	10562.01	1265	11831.39	5107	47755.00
2	Shade net	1000 Sq.m	7.1	All districts except D2,D8,D9,D17,D25	15259	108338.90	6283	44609.30	7821	55526.9	7344	52143.03	7357	52236.25	44064	312854.38
	Mushroom production															
3	Mushroom production and compost making unit	1 No.	20	D5,D8,D14, D18,D20,D21,D27, D28,D29, D31	11	220.00	11	220.00	11	220.00	14	280.00	11	220.00	58	1160.00
4	Spawn Production unit	1 No.	15	D17, D27, D28, D29, D31	3	45.00	1	15.00	0	0.00	1	15.00	1	15.00	6	90.00
5	Cottage mushroom unit	1 No.	1	All districts except D19	43	43.00	57	57.30	58	57.63	61	60.99	56	56.39	275	275.32
	Vermicompost unit															
6	Permanent Vermicompost Unit	600 cu.ft	1	All districts except D17	586	586.00	642	642.40	691	691.34	743	742.87	822	822.06	3485	3484.68
	Supporting structures for Horticulture crop production															
7	Staking/ Trellis/ Propping	Ha	1	D1,D3,D9,D12,D14, D17,D25, D26	2379	2379.00	2661	2661.00	2905	2904.5	3212	3212.45	3462	3462.35	14619	14619.30
8	Permanent Pandal structure	Ha	4	All districts except D3,D8	788	3152.00	922	3686.00	1033	4130.2	1170	4680.82	1296	5182.10	5208	20831.12
V	**District Horticulture information and training**	No	75	D2,D13, D20,D22	5	375.00	0	0.00	0	0.00	0	0.00	0	0.00	5	375.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	centre															
VI	**Community seed bank**	No	9.6	D5,D6,D13, D30,D31	5	48.00	3	28.80	5	48.00	4	38.40	4	38.40	21	201.60
	Roof Top Garden															
9	Promotion of Roof top Garden/ Potager garden Kit	No	0.005	All districts	41035	205.18	34860	174.30	36535	182.68	38806	194.03	40657	203.29	191893	959.46
10	Promotion of Roof top Garden/ Potager garden Kit with shade net	No	0.0735	All districts except D4,D7,D8,D10,D15, D17,D23, D25,D27	2822	207.42	3120	229.32	3436	252.55	3786	278.27	4002	294.15	17166	1261.70
	Post-Harvest Management															
11	Pack house (9m X 6m)	1 No	4	All districts except D7,D9,D12, D13,D17,D22,D23,D24, D25	296	1184.00	311	1244.00	343	1372.0	355	1420.00	371	1484.00	1676	6704.00
12	Low cost onion structure 25 mt	1 No	1.75	All districts except D4,D7,D8,D9,D10, D11,D13, D14,D16, D22,D23, D24,D29	410	717.50	426	745.50	490	857.50	503	880.25	519	908.25	2348	4109.00
13	Drying yard	1 No	5	D2,D5,D6,D11,D14, D18,D20, D21,D28,	66	330.00	70	350.00	74	370.00	69	345.00	76	380.00	355	1775.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
				D30,D31												
14	Pre cooling unit 6 mt	1 No	25	D3,D10, D16,D22, D30,D31	7	175.00	5	125.00	7	175.00	6	150.00	8	200.00	33	825.00
15	Integrated pack house (9m X 18 m)	1 No	50	D21,D30	1	50.00	7	350.00	1	50.00	1	50.00	1	50.00	11	550.00
16	Mobile pre cooling unit	1 No	25	D3,D30	1	25.00	2	50.00	1	25.00	2	50.00	1	25.00	7	175.00
17	Cold storage unit 3000 mt	1 No	400	D21,D22, D30	2	800.00	4	1600.00	1	400.00	1	400.00	1	400.00	9	3600.00
18	Cold storage unit 5000 mt	1 No	500	D21,D30	1	500.00	2	1000.00	1	500.00	1	500.00	1	500.00	6	3000.00
19	Collection centre	1 No	15	D5,D18, D22,D26, D28,D29, D30	15	225.00	2	30.00	5	75.00	2	30.00	5	75.00	29	435.00
20	Retail outlet	1 No	15	D3,D5,D26, D30	6	90.00	5	75.00	4	60.00	5	75.00	5	75.00	25	375.00
21	Market intervention - Mobile vending cart	1 No	0.3	D5,D11, D18,D20, D28,D29, D30	232	69.60	231	69.30	229	68.70	230	69.00	235	70.50	1157	347.10
22	Banana Ripening chamber (300 mt)	1 No	300	D9,D21	1	300.00	2	600.00	1	300.00	0	0.00	0	0.00	4	1200.00
	Development of Farms, Nurseries and Parks															
23	Orchard development	No	100	D13,D27	0	25.00	1	125.00	0	25.00	0	25.00	0	0.00	2	200.00
24	Development of eco park / Rose garden	No	600	D4,D13	0	0.00	0	0.00	1	600.00	0	0.00	1	600.00	2	1200.00
25	Developmental activities in new/ existing state Horticultural	No	25	All districts except D2,D11, D12,D20, D23,D24,	34	850.00	26	650.00	32	800.00	31	775.00	30	750.00	153	3825.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	farm, Keelapalur			D27,D30												
26	Development of small nurseries	No	7.5	D5	1	7.50	0	0.00	0	0.00	0	0.00	0	0.00	1	7.50
27	Development of Hi Tech Nursery	No	40		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
28	Centre of Excellence for different crops	No	1000	D11,D13, D28,D30	1	1000.00	1	1000.00	0	0.00	0	0.00	3	3000.00	5	5000.00
	Water / Irrigation Management															
29	Micro Irrigation - Drip	Ha	1.12	All districts except D14,D17	22636	25352.32	23760	26610.64	24883	27868.85	25984	29102.12	26977	30213.91	124239	139147.84
30	Rain gun	Ha	0.34	All districts except D7,D8,D10, D14,D17,D21,D22, D25,D27	4738	1610.92	4739	1611.33	5009	1702.91	5183	1762.12	5460	1856.43	25129	8543.70
31	Sprinkler	No	0.195	All districts except D1,D7,D8,D9,D11, D21,D25	6039	1177.53	6042	1178.27	6329	1234.21	6562	1279.67	6900	1345.51	31873	6215.18
32	Community Tank / On Farm Pond	No	20	D14,D21, D27,D30	14	280.00	20	400.00	22	440.00	24	480.00	25	500.00	105	2100.00
	Grand Total					**157657.18**		**98607.62**		**110541.06**		**109601.04**		**116794.97**		**593201.88**

3.4 INFRASTRUCTURE REQUIREMENT FOR AGRICULTURAL ENGINEERING DEPARTMENT

3.4.1 Procurement and Distribution of Agricultural Machinery and Equipment

Agricultural Mechanization is the need of the hour to meet out the growing shortage of labour workforce in Agriculture. It has been identified as one of the critical inputs for increasing production in time. Cost of cultivation data shows that labour accounts for more than 40 percentage of the variable cost in many of the crops. The labour intensive crops need high man power requirement, which is fast depleting and posing a big challenge to crop productivity. Agricultural labour wages are increasing at an alarming rate in some parts of Tamil Nadu resulting in shifting from labour intensive to mechanization intensive techniques.

As the improved agricultural implements and machinerycompared to the traditional ones, result in increased agricultural production and at the same time reduce drudgery, different size and shapes of machineries and equipment have been popularized for efficient and expeditious operations under varying conditions. The farm machinery for land preparations, land development, seeding, planting, transplanting, weeding and intercultural operations, harvesting and threshing which are predominantly used in other parts of the country/other countries are proposed for introduction in the farmers field in Tamil Nadu.

Distribution of farm machinery / implements to farmers with subsidy pattern assistance will increase the farm power. All the proposed agricultural machinery / implements will be put into use by the farmers. The acute agricultural labour scarcity will be reduced. The benefit of agricultural mechanization is to be extended to all categories of farmers with due consideration to small, marginal, scheduled caste, scheduled tribes and women farmers.

The proposed Farm Implements / Equipment and Machinery will be distributed according to demand of the farmers with 40% subsidy or the eligible subsidy prescribed by the Government in the Sub Mission on Agricultural Mechanization guidelines whichever is less and for other beneficiary farmers at 50% subsidy or the eligible subsidy prescribed by the Government under scheduled caste, scheduled tribes, small, marginal and women farmers for cultivating major crops like paddy, pulses and oil seeds, horticultural crops, sugarcane etc. To achieve the maximum profit by the farmers, the interventions are proposed based on the necessity of the existing farmers and those who are in nursery stage, the plan is proposed with a budget outlay of **Rs.157000.70 Lakh** (Table 3.4)

Table 3.4 Procurement and distribution of Agricultural Machinery and Equipment

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Financial assistance for Post Harvest Equipment	All Districts Except D1, D5, D7, D8, D14,D17, D19,D22, D20, D23, D25	No's/Ha	4	116	464	89	356	116	464	119	476	111	444	551	2204
Financial assistance for Procurement of Agricultural Machinery and Equipment															
Tractors															
Tractor (8-15 PTO HP)	D1, D2, D4, D6, D7, D9, D10, D11, D20, D21, D23, D26 and D28.	No's/Ha	3	123	369	112	336	106	318	108	324	107	321	556	1668
Tractor (15-20 PTO HP)	All Districts	No's/Ha	4	925	3700	931	3724	911	3644	913	3652	924	3696	4604	18416
Tractor (Above 20-40 PTO HP)	All Districts expect D3, D9,D14, D15,D22 and D29	No's/Ha	6	466	2796	452	2712	452	2712	446	2676	448	2688	2264	13584
Tractor (40-70 PTO HP)	All Districts except D8	No's/Ha	8.5	815	6927.5	809	6876.5	813	6910.5	798	6783	817	6944.5	4052	34442
Power Tillers															
Power Tiller (below 8 BHP)	D2,D4,D6,D7,D9, D11, D13,D18,D23,D25 , D26,D30 and D31.	No's/Ha	1	328	328	298	298	295	295	295	295	296	296	1512	1512
Power Tiller (8 BHP & above)	All Districts	No's/Ha	1.75	4730	8277.5	3796	6643	3744	6552	3780	6615	3833	6707.75	19883	34795.25

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Rice Transplanter															
Self Propelled Rice Transplanter (4 rows)	All Districts Except D2,D5,D8,D9,D13 ,D14,D15,D16, D17, D18,D21,D24 and D29	No's/Ha	2.5	260	650	268	670	258	645	243	607.5	236	590	1265	3162.5
Self Propelled Rice Transplanter (Above 4-8 rows)	All Districts Except D1, D2,D5,D13,D14, D15,D17, D18,D22 and D30	No's/Ha	16	90	1440	86	1376	88	1408	89	1424	91	1456	444	7104
Self Propelled Machinery															
Reaper cum Binder	D2,D4,D6,D7,D10 , D13,D16,D22,D24 ,D25, D26,D28 and D29	No's/Ha	3	116	348	125	375	105	315	116	348	116	348	578	1734
Specialized Self Propelled Machinery															
Reaper	D2, D4,D6,D7,D13,16, D17,D22,D24,D25 ,D28 and D29	No's/Ha	1.1	85	93.5	79	86.9	82	90.2	79	86.9	79	86.9	404	444.4
Post Hole Digger / Augur	All districts except D1,D3,D9,D11,D1 2,D14,D15,D19 and D24	No's/Ha	0.63	116	73.08	113	71.19	104	65.52	102	64.26	116	73.08	551	347.13
Tractor/Power Tiller (below 20 BHP) driven equipments															
a. Land Development, tillage and seed bed preparation equipments															
MB Plow	D6,D7,D10,D18,D 26 and D31	No's/Ha	0.3	26	7.8	26	7.8	25	7.5	25	7.5	25	7.5	127	38.1
Disc Plow	D6,D7,D10,D18,D 26,D30 and D31	No's/Ha	0.3	38	11.4	37	11.1	37	11.1	37	11.1	37	11.1	186	55.8

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cultivator	D2,D4,D5,D6,D7, D10,D13,D14,D16 ,D18,D26,D29,D3 0 and D31.	No's/Ha	0.2	137	27.4	137	27.4	138	27.6	136	27.2	138	27.6	686	137.2
Harrow	D6,D7,D26 and D31	No's/Ha	0.6	10	6	10	6	10	6	10	6	9	5.4	49	29.4
Leveler Blade	D6,D7,D18,D26,D 27 and D31	No's/Ha	0.15	18	2.7	18	2.7	18	2.7	17	2.55	16	2.4	87	13.05
Ridger	D4,D6,D7,D18 and D26	No's/Ha	0.25	19	4.75	19	4.75	19	4.75	19	4.75	19	4.75	95	23.75
Laser Land Leveler	D7 and D25	No's/Ha	3.4	6	20.4	6	20.4	6	20.4	6	20.4	6	20.4	30	102
Reversible Mechanical plough	D7 and D26	No's/Ha	0.5	5	2.5	5	2.5	5	2.5	5	2.5	5	2.5	25	12.5
Rotovators	All Districts except D3,D5,D8,D9,D10 ,D12,D15,D17,D1 9,D22,D24 and D28	No's/Ha	0.35	407	142.45	389	136.15	385	134.75	385	134.75	395	138.25	1961	686.35
Rotopuddler	D4,D7 and D10	No's/Ha	1	21	21	21	21	19	19	19	19	19	19	99	99
Reversible Hydraulic plough	D7 and D26	No's/Ha	0.45	8	3.6	8	3.6	8	3.6	8	3.6	8	3.6	40	18
b. Sowing Planting, Reaping and Digging Equipments:															
Post Hole Digger	D1,D4,D7, D10,D14, D18, D26 and D31.	No's/Ha	0.8	41	32.8	37	29.6	37	29.6	37	29.6	37	29.6	189	151.2
Tractor drawn reaper	D4,D7,D10,D13 and D26	No's/Ha	0.95	31	29.45	31	29.45	31	29.45	31	29.45	31	29.45	155	147.25
Zero till seed cum fertilizer drill	D7, D13,D25,D26 and D31	No's/Ha	0.5	41	20.5	41	20.5	41	20.5	41	20.5	41	20.5	205	102.5
Seed drill	D7,D21,D26 and D30	No's/Ha	0.4	16	6.4	16	6.4	16	6.4	14	5.6	14	5.6	76	30.4

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
c. Intercultivation Equipments															
Power Weeder (engine operated below 2 BHP)	All Districts except D3,D8,D9,D12,D16,D17,D19,D20,D27,D29 and D30	No's/Ha	0.25	206	51.5	204	51	198	49.5	197	49.25	205	51.25	1010	252.5
d. Equipment for residue management / hay and forage equipments															
Sugarcane trash Cutter	D6,D7,D26 and D31	No's/Ha	1.5	16	24	16	24	16	24	15	22.5	15	22.5	78	117
Coconut Frond chopper	D2,D6,D7,D18,D21 and D26	No's/Ha	0.8	20	16	20	16	21	16.8	21	16.8	21	16.8	103	82.4
Balers	D1,D7,D18,D21 and D26	No's/Ha	2.9	17	49.3	15	43.5	19	55.1	18	52.2	19	55.1	88	255.2
e. Harvesting and Threshing equipments															
Multi crop Threshers	D7,D26 and D31	No's/Ha	2.5	14	35	14	35	14	35	14	35	14	35	70	175
Paddy Thresher	D7 and D26	No's/Ha	1.6	6	9.6	6	9.6	6	9.6	6	9.6	6	9.6	30	48
Brush Cutter	All Districts except D3,D4,D8,D10, D12,D15,D17,D20,D23,D28,D29 and D30	No's/Ha	0.25	377	94.25	380	95	385	96.25	382	95.5	393	98.25	1917	479.25
f. Chaff Cutter (Operated by engine / electric motor below 3 hp and by power tiller and tractor of below 20 BHP tractor)	All Districts except D3, D8,D12,D14, D15,D16,D17,D20, D22,D26 and D29	No's/Ha	0.25	1247	311.75	1177	294.25	1216	304	1076	269	1071	267.75	5787	1446.75
Tractor (above 20-35 BHP) driven equipments															
a. Land Development, tillage and seed bed preparation equipments															
MB Plow	D6, D7 and D31	No's/Ha	0.8	10	8	10	8	9	7.2	9	7.2	9	7.2	47	37.6

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Disc Plow	D2, D6, D7,D10, D11,D16,D19,D23 and D31	No's/Ha	0.4	56	22.4	54	21.6	54	21.6	54	21.6	53	21.2	271	108.4
Cultivator	All Districts except D3,D8,D9,D12, D14, D15, D17, D22,D24,D28, D29 and D30	No's/Ha	0.25	262	65.5	253	63.25	270	67.5	258	64.5	272	68	1315	328.75
Harrow	D6,D7 and D26	No's/Ha	0.9	6	5.4	5	4.5	6	5.4	5	4.5	5	4.5	27	24.3
Leveler Blade	D6,D7 and D19	No's/Ha	0.25	6	1.5	5	1.25	6	1.5	6	1.5	6	1.5	29	7.25
Ridger	D6,D7 and D26	No's/Ha	0.3	6	1.8	6	1.8	5	1.5	6	1.8	5	1.5	28	8.4
Laser Land Leveler	D7	No's/Ha	3.6	3	10.8	3	10.8	3	10.8	3	10.8	3	10.8	15	54
Reversible Mechanical plough	D7 and D19	No's/Ha	0.65	5	3.25	5	3.25	5	3.25	5	3.25	5	3.25	25	16.25
Rotovators	All Districts except D3,D8,D9,D12,D14, D15,D17,D20,D23,D22, D24,D27, D29 and D30	No's/Ha	0.8	554	443.2	567	453.6	554	443.2	584	467.2	583	466.4	2842	2273.6
Rotopuddler	D6, D7 and D19	No's/Ha	1.2	5	6	5	6	6	7.2	5	6	5	6	26	31.2
Reversible Hydraulic plough	D2,D6, D7 and D13	No's/Ha	1.9	28	53.2	29	55.1	29	55.1	29	55.1	29	55.1	144	273.6
b**. Sowing, Planting, Reaping and Digging Equipments**															
Post Hole digger	D5, D7, D10, D11, D18, D19, D25, D26 and D31	No's/Ha	0.9	32	28.8	33	29.7	35	31.5	33	29.7	31	27.9	164	147.6
Tractor drawn reaper	D7, D13, D25 and D26	No's/Ha	1.1	30	33	30	33	30	33	30	33	30	33	150	165
Zero till seed cum fertilizer drill	D2,D7,D13, D26 and D31	No's/Ha	0.6	33	19.8	28	16.8	24	14.4	24	14.4	25	15	134	80.4
Seed drill	D2,D4,D7,D16,D17,D19,D26 and D31	No's/Ha	0.5	43	21.5	38	19	37	18.5	37	18.5	37	18.5	192	96

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
c.Inter Cultivation Equipments															
Power Weeder (engine operated above 2 BHP)	All Districts except D3, D7, D9, D13, D14, D16, D23, D24, D28, D29 and D30	No's/Ha	0.7	248	173.6	246	172.2	254	177.8	255	178.5	263	184.1	1266	886.2
d**. Equipments for Residue management/Hay and Forage Equipments**															
Sugarcane trash Cutter	D7, D26 and D31	No's/Ha	1.75	6	10.5	6	10.5	6	10.5	6	10.5	6	10.5	30	52.5
Coconut Frond chopper	D2, D6, D7 and D26	No's/Ha	0.9	27	24.3	28	25.2	28	25.2	28	25.2	28	25.2	139	125.1
Balers	D6, D7, D18, D26 and D25	No's/Ha	3	18	54	18	54	18	54	18	54	18	54	90	270
e.Harvesting & Threshing Equipments															
Multi crop Threshers	D4, D6, D7, D10, D11, D26 and D31	No's/Ha	3	21	63	21	63	21	63	21	63	21	63	105	315
Paddy Thresher	D4, D7, D10 and D31	No's/Ha	1.9	15	28.5	15	28.5	15	28.5	15	28.5	15	28.5	75	142.5
Brush Cutter	D1, D2, D5, D7, D8, D12, D13, D18, D19, D21, D23, D25, D26, D27 and D31	No's/Ha	0.3	160	48	163	48.9	165	49.5	165	49.5	166	49.8	819	245.7
f.Chaff Cutter (Operated by engine / electric motor above 3-5 hp and by power tiller and tractor of below 35 BHP tractor)	D1, D6, D7, D10, D11, D18, D21, D22, D23, D25 and D31	No's/Ha	0.4	45	18	45	18	45	18	45	18	43	17.2	223	89.2
Tractor (above 35 BHP) driven equipments															
a. **Land Development, tillage and seed bed preparation equipments**															
MB Plow	D6, D7, D10, D16, D22, D23 and D31	No's/Ha	1	123	123	119	119	118	118	116	116	116	116	592	592

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Disc Plow	All Districts except D3, D9, D12, D13, D14, D18, D20, D25 and B9	No's/Ha	0.6	242	145.2	231	138.6	227	136.2	225	135	225	135	1150	690
Cultivator	All Districts except D17	No's/Ha	0.3	648	194.4	632	189.6	623	186.9	617	185.1	619	185.7	3139	941.7
Harrow	D6, D7, D11, D21 and D31	No's/Ha	1	20	20	20	20	21	21	20	20	20	20	101	101
Leveler Blade	D4, D6, D7, D9, D16, D19, D21, D23 and D31	No's/Ha	0.3	32	9.6	32	9.6	32	9.6	29	8.7	32	9.6	157	47.1
Ridger	D4, D6, D7, D9 and D21	No's/Ha	0.4	20	8	20	8	20	8	18	7.2	18	7.2	96	38.4
Reversible Mechanical plough	D4, D6, D7 and D13	No's/Ha	0.8	28	22.4	28	22.4	28	22.4	28	22.4	28	22.4	140	112
Laser Land Leveler	D7, D17 and D20	No's/Ha	3.8	6	22.8	6	22.8	6	22.8	6	22.8	6	22.8	30	114
Rotovators	All Districts	No's/Ha	0.95	2505	2379.75	2430	2308.5	2348	2230.6	2358	2240.1	2385	2265.75	12026	11424.7
Rotopuddler	D3, D6 and D7	No's/Ha	1.4	154	215.6	154	215.6	154	215.6	154	215.6	154	215.6	770	1078
Reversible Hydraulic plough	D2, D4, D6, D7, D29 and D31	No's/Ha	2	39	78	37	74	37	74	37	74	37	74	187	374
b. Sowing Planting, Reaping and Digging Equipments:															
Zero till seed cum fertilizer drill	D4, D7, D9, D10, D13, D15, D16, D17, D20, D21, D22, D23, D28, D29, D26, D30 and D31	No's/Ha	0.7	182	127.4	180	126	180	126	175	122.5	172	120.4	889	622.3
Tractor drawn reaper	D4, D6, D7, D13, D24, D26, D25	No's/Ha	1.25	52	65	52	65	51	63.75	51	63.75	51	63.75	257	321.25

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Post Hole digger	D1, D4, D5, D6, D7, D10, D13, D18, D24, D25, D26, D27, D28, D29 and D31.	No's/Ha	1.05	66	69.3	66	69.3	67	70.35	65	68.25	64	67.2	328	344.4
Automatic Rice Nursery Sowing Machine	D6, D7, D13, D16, D21, D25 and D26	No's/Ha	2.5	39	97.5	39	97.5	40	100	41	102.5	40	100	199	497.5
e.Harvesting& Threshing Equipments															
Thresher/Multi Crop threshers	D1, D4, D6, D7, D9, D10, D11, D13, D15, D16, D18, D19, D21, D22, D26, D28, D29, D30 and D31	No's/Ha	4	188	752	177	708	178	712	174	696	176	704	893	3572
Paddy Thresher	D4, D7, D11, D13 and D22	No's/Ha	2.2	47	103.4	49	107.8	48	105.6	46	101.2	48	105.6	238	523.6
e.Equipments for Residue management/Hay and Forage Equipments															
Sugarcane thrash Cutter	D6, D7, D9, D13, D26 and D30	No's/Ha	2	36	72	34	68	33	66	33	66	33	66	169	338
Coconut Frond chopper	D2, D6, D7, D9, D10, D19, D20, D23, D24, D26, D28 and D31	No's/Ha	1.05	67	70.35	63	66.15	58	60.9	61	64.05	60	63	309	324.45
Balers (Round)	All Districts except D2, D9, D10, D14, D21, D23 and D31	No's/Ha	3.5	157	549.5	149	521.5	152	532	151	528.5	180	630	789	2761.5
Baler (Rectangular)	D6, D7, D13, D15, D19 and D31	No's/Ha	8	22	176	23	184	24	192	24	192	24	192	117	936
Sugarcane ratoon manager	D6,D7,D9,D13,D16 and D30	No's/Ha	1	23	23	20	20	21	21	20	20	20	20	104	104
All Manual/animal drawn equipment/implements / Tools															
Drum Seeder (Below 4 Row)	D4, D7, D13, D16, D22, D25, D26, D29, D30 and D31	No's/Ha	0.1	119	11.9	121	12.1	121	12.1	121	12.1	121	12.1	603	60.3

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Drum Seeder (Above 4 Row)	D3, D4, D7, D10, D13, D16, D23, D24, D25, D26, D29, D30 and D31	No's/Ha	0.15	145	21.75	105	15.75	105	15.75	110	16.5	110	16.5	575	86.25
Tree Climber	All Districts except D1, D3, D11, D12, D14, D15, D17, D19, D23, D25, D24, D27, D28 and D29	No's/Ha	0.07	190	13.3	177	12.39	179	12.53	177	12.39	179	12.53	902	63.14
Plant protection equipments															
Manual sprayer: Knapsack/foot operated sprayer	All Districts except D8,D21 and D24	No's/Ha	0.015	2147	32.205	2111	31.665	2085	31.275	2119	31.785	2062	30.93	10524	157.86
Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity 8-12 lts)	All Districts except D8, D17, D19, D20 and D29	No's/Ha	0.06	1270	76.2	1109	66.54	1104	66.24	1090	65.4	1102	66.12	5675	340.5
Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 12-16 lts)	All Districts except D3, D12, D17, D24 and D27	No's/Ha	0.08	952	76.16	923	73.84	950	76	896	71.68	930	74.4	4651	372.08
Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 16 lts)	All Districts except D3,D11,D12,D15, D19,D23,D24 and D27	No's/Ha	0.1	726	72.6	734	73.4	732	73.2	744	74.4	746	74.6	3682	368.2
Total					**33169.5**		**31017.28**		**30865.27**		**30748.17**		**31200.46**		**157000.7**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.2 Establishment of Farm Machinery Banks for Custom Hiring Centre

Custom Hiring Centres are basically a unit comprising a set of farm machinery, implements and equipment meant for custom hiring by farmers. Though certain implements and equipment are crop specific, the traction units like tractors, power tillers etc., and self-propelled machinery like combine harvesters etc., are used in common. Therefore, an ideal model envisaged in this project comprise farm machinery that are commonly used for tillage operations for all crops, multi crop equipment and a minimum of crop specific machinery.

The farm operations are needed to be performed at appropriate time and any delay would reduce the yield and farm income considerably. The quality and precision of the farming operations are equally significant for realizing higher yields. Farming operations like land leveling, irrigation, sowing/planting, fertilizer application, plant protection, harvesting, threshing and post-harvest operations require precision to increase the efficiency of the inputs and reduce the losses. For example, sowing of the required quantity of seed at proper depth and uniform application of given dose of fertilizer can only be possible with the use of proper mechanical devices. When such operations are performed through traditional methods, their efficiency is reduced. Higher productivity of land and labour is another factor, highlighting the need of farm mechanization. Not only the output per hour is more, the total labour requirement is also reduced by means of Agricultural Mechanization.

The Sub Mission on Agricultural Machinery (SMAM) is one such initiative towards the objective. Subsidy schemes are also being formulated to encourage entrepreneurs and agri graduates to set up custom hiring centres. Ideally, the hiring centres will be located in a place where by and large small land holdings are located within a radius of 5 to 7 kms. This will reduce the transport cost and time of transport of agricultural machinery. The emphasis of agricultural farm machinery and the need for taking the of farm machinery within the reach of small/marginal farmers, institutional credit needs to be made available for Custom Hiring Centre's. Therefore there is a need to encourage individuals like progressive farmers, rural unemployed youth, agri graduates etc., and also village level institutions like Water Users Association, Watershed Committee, SHG Federations etc., to set up CHCs. The overall budget to undertake the above programmes are laid out with a budget outlay of Rs.23044.00 Lakh (Table 3.5)

Table 3.5 Budget requirement for establishment of Farm Machinery Banks for Custom Hiring Centre

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Establishment of Farm Machinery Banks for Custom Hiring	All Districts except D8 and D25	No's/Ha	28	193	5404	167	4676	156	4368	154	4312	153	4284	823	23044
Total					**5404**		**4676**		**4368**		**4312**		**4284**		**23044**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.3 Establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring

Agricultural mechanization leads to increase in labour productivity through labour savings. It is also useful for mitigating drudgery and increasing the level of farming so as to improve the life and work environment of farmers. Mechanization will facilitate to take up timely harvesting of crops and increase the agricultural production by reducing the wastage.

Agricultural operation in Tamil Nadu is spread over in 385 Blocks covering 31 districts. The agricultural machinery used predominantly in other parts of the country or in foreign countries will be utilized for farm cultivation in Tamil Nadu that could save the labour to a considerable extent. Besides the above, the newly developed agricultural machinery / implements/ equipment's are to be popularized among the farming community. High productive and high tech implements such as Multi crop thresher, paddy transplanter, nursery media filling machine, post hole digger, planters, tree pruners, tractor and power tiller driven equipment's etc., are made available to the individual farmers by establishing a separate hub custom hiring of high-tech implements which are fetching higher price. To utilize the potential of the educated youth in the localized area, these types of custom hiring hubs can be used so that the livelihood of the youngster may be improved. With these objectives, the establishment of high value custom hiring hub is proposed with a budget outlay of Rs.8400.00 Lakh (Table 3.6)

3.4.4 Promotion of Farm Mechanization in Selected Villages

Due to shortage in farm workers, farmers are not in a position to undertake various field operations in time. Hence, modernization of agriculture through Agricultural Mechanization is inevitable. The purpose is to increase the output per human, animal and tractor unit thereby ensuring timeliness and the cost of operations, minimizing the energy requirement per unit of crop production, losses, making agricultural production less laborious, reducing pollution, meeting peak labour requirements such as seeding, weeding and harvesting, permitting an additional crop to increase cropping intensity, bringing additional area into production, maximizing the efficiency of inputs thereby increasing the overall agricultural production of the country. It involves implementation of the schemes for Promoting Rural Youth group in Farm Mechanization in different districts for the supply and distribution of agricultural machinery and implements to the groups. Under this scheme, the capacity building component could be also included. The rural youth group will in turn hire out their agricultural machinery to the needy farmers on nominal hire charge basis. The budget for implementation of establishment of custom hiring hub is presented in the Table 3.7 (Rs.13018 Lakh)

Table 3.6 Budget requirement for establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring	D2, D3, D12, D18, D25, D26, D30 and D31	No's/Ha	112	16	1792	15	1680	15	1680	14	1568	15	1680	75	8400
Total					**1792**		**1680**		**1680**		**1568**		**1680**		**8400**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

Table 3.7 Promotion of Farm Mechanization in Selected Villages

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Promotion of Farm Mechanization in Selected Villages	All Districts except D1, D3, D5, D8, D17, D18, D19, D20, D22 and D23	No's/Ha	11.5	260	2990	226	2599	213	2449.5	217	2495.5	216	2484	1132	13018
Total					**2990**		**2599**		**2449.5**		**2495.5**		**2484**		**13018**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.5 Promotion of Mechanized Farming operations

Farm machines have revolutionized agriculture and continue to do so today. Agricultural Mechanization is thus well placed to address many of the most fundamental farming challenges in Tamil Nadu in a profound and comprehensive manner. Provided that suitable technology solutions are employed, Agricultural Mechanization "removes the drudgery associated with agricultural labour, overcomes time and labour bottlenecks to perform tasks within optimum time windows and can influence the environmental footprint of agriculture leading to sustainable outcomes." In light of the persistently low mechanization levels in many developing countries and the tremendous progress and benefits that can be achieved with the help of Agricultural Mechanization there is widespread consensus that international actors and governments should "continue to encourage farmers to use agricultural machinery through development programmes and through the provision of incentives."

Availability of farm power coupled with efficient and judicious use of farm implements/ machinery enable efficient utilization of various inputs such as seeds, fertilizers, plant protection chemicals and water for irrigation besides eliminating the drudgery in various farm operations from land preparation to post harvest technology and value addition. In order to be successful, agricultural mechanization needs to be pursued together with broader strategies that address key barriers which have been found to hold back the development of agricultural production in developing countries.

To promote the farmers on agricultural mechanization, an incentive on of Rs 2000 per hectare per year will help them to utilize the benefits through mechanized farming. The infrastructure plans are proposed in such a way to meet the demands of the farmer. The budget for implementation of the programmes for each district is presented in the Table 3.28over an out lay of Rs. 1671.52 Lakh.

Table 3.8 Promotion of Mechanized Farming operations

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Financial assistance for promotion of mechanized farming operations	D2, D4, D6, D7, D9, D10, D11, D12, D13, D14, D16, D21, D26, D27, D28, D29, D30 and D31.	No's/Ha	0.04	6776	271.04	8763	350.52	8756	350.24	8740	349.6	8753	350.12	41788	1671.52
Total					**271.04**		**350.52**		**350.24**		**349.6**		**350.12**		**1671.52**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.6 Tractor Hiring Scheme

Government tractor hire service schemes are proposed to persuade small-scale farmers to mechanize their farms. A review of the evidence, drawing largely on the experience, indicates that farmers as well as government hire units face various types of problems in tractorization. Farmers face a problem of untimeliness of services which may be due to a shortage of tractor operators, irregular supply of diesel oil in the rural areas, the frequent breakdown of tractors and equipment coupled with a shortage of spare parts. Management of government hire units is also defective as decision-making processes are cumbersome and policies not effectively pursued.

Nevertheless, private hire operators are found to be more economically efficient in running their units than are government officials since the former operate at a lower cost, handle more work per year than government units, make efficient use of tractor operators and make prompt management decisions.

To improve the performance of government tractor hire units in Tamil Nadu, may require the governments to reorganize their schemes with a view to bringing their management closer to farmers. It is also suggested that an ‘economic rent’ be charged for services rendered by hire units but a graduated type of rebate, and not an all-embracing subsidy approach currently used, should be introduced to reduce farmers' production costs. To improve the service to the farmers and stake holders, the programmes are programmed with a budget outlay of Rs.14353.00 Lakh and it is presented in the Table 3.9.

Table 3.9 Budget requirement for Tractor Hiring Scheme

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Purchase of Tractors for AED	All Districts except D1, D5, D8, D14, D17 and D23	No's/Ha	8	164	1312	41	328	33	264	64	512	35	280	337	2696
Purchase of Tractor drawn implements for AED	All Districts except D1, D5, D8, D10, D14 and D23	No's/Ha	0.5	278	139	104	52	91	45.5	104	52	115	57.5	692	346
Purchase of Bull Dozers for AED	All Districts except D1, D3, D4, D5, D6, D8, D14, D15, D17, D19, D20, D21, D24 and D23	No's/Ha	80	30	2400	10	800	8	640	14	1120	9	720	71	5680
Purchase of Paddy Transplanter for AED	D2, D7, Nagapattinam, D20, D21, D22, D26, D27, D29, D30 and D31	No's/Ha	18	39	702	13	234	16	288	20	360	14	252	102	1836
Purchase of Paddy combine Harvester for AED	D7, D12, D16, D20, D21, D22, D25, D26, D27, D29, D30 and D31	No's/Ha	17	88	1496	16	272	17	289	36	612	15	255	172	2924
Purchase of Balers for AED	D2, D3, D7, D12, D11, D15, D16, D17, D20, D21, D26, D27, D28,	No's/Ha	4.5	72	324	20	90	17	76.5	14	63	6	27	129	580.5

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	D29, D30 and D31														
Purchase of Multi Crop Thresher for AED	D2, D7, D10, D12, D11, D15, D17, D20, D21, D26, D27, D28, D29, D30 and D31	No's/Ha	3.5	27	94.5	14	49	14	49	14	49	14	49	83	290.5
Total					**6467.5**	**218**	**1825**	**196**	**1652**	**266**	**2768**	**208**	**1640.5**	**1586**	**14353**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.7 Propagation of drip / minor irrigation

Water conservation measures are taken to improve the soil moisture regime, to recharge the ground water aquifer and to increase the availability of water for cultivation. Rain water harvesting in paved and unpaved areas and water bodies, are some of the measures of water conservation. Construction of recharge pits, trenches, dug wells, recharge wells and recharge shafts are some the water conservation measures. Proper maintenance of *Kanmois* and *Ooranis i*n villages is also essential to conserve the water.

Minor irrigation schemes are implemented by the State to locate suitable site through Geo-physical survey for sinking open wells and tube wells. The scheme also aims at bringing new areas under irrigation by creation of additional irrigation facilities and promotes conjunctive use of surface and ground water. With this objective, the plans are proposed with a budget Rs.3118.50 Lakh (Table 3.10).

Table 3.10 Propagation of Drip / Minor Irrigation

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Purchase of Rotary Drill for AED	D2, D3, D7, D12, D16, D19, D20, D26 and D27	No's/Ha	72	19	1368	5	360	2	144	3	216	0	0	29	2088
Hammer cum Rotary Drill for AED	D7 and D11	No's/Ha	150	3	450	1	150	0	0	0	0	0	0	4	600
Purchase of Air Compressor 750 cfm for AED	D2, D3, D7, D12, D18, D20, D26 and D27	No's/Ha	25	10	250	1	25	0	0	0	0	1	25	12	300
Purchase of ResistivityMeters for AED	D7, D10, D11, D12, D16, D18, D19, D24, D26, D27, D28 and D31	No's/Ha	3	13	39	2	6	2	6	2	6	2	6	21	63
Purchase of Electrical Loggers for AED	D10, D12, D16, D18, D27 and D31	No's/Ha	7.5	5	37.5	2	15	1	7.5	1	7.5	0	0	9	67.5
Total					**2144.5**		**556**		**157.5**		**229.5**		**31**		**3118.50**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.8 Utilization of solar energy and promotion of solar pump sets

Renewable energy is gaining a major role in India's energy planning process. The policy thrust, through specific schemes, needs to be proposed to accelerate the use of such renewable energy. Among the various sources of renewable energy, the use of solar energy is gaining momentum. Solar energy is available for more than 300 days a year in India with about 6-8 hours effective day light hours. Most parts of India receive very high solar radiation intensities about 5 KWh/ Sq. m/day. In the present scenario, when the demand for electricity is very high and fuel prices are increasing exponentially, a solar water pump provides a viable solution for irrigation. Moreover, Government is heavily subsidizing electric tariff for agriculture putting additional burden on State exchequer which is to be brought down, for which providing solar pumping system to the farmers is the right choice. A 5HP solar water pump set saves approximately 25 units of power every day.

Pumps that use PV (Photo Voltaic) systems are normally powered by DC (Direct Current) motors. These motors use the DC output from the PV panels directly. However, by using an inverter this can be converted to AC (Alternating current) output and AC motor operated system is the preferable system for the farmers in our State, as it is compatible for grid power also.

It is proposed to provide a comprehensive package of Solar PV pumping system with subsidy, linked with suitable Micro irrigation system as per the existing norms along with forward linkage of precision farming / front-end technologies, crop specific improved cultivation methods etc. to the progressive farmers of the state on a pilot basis. It is proposed to provide solar driers for drying various agricultural produce in a phased manner with the financial assistance under NADP. The district wise financial requirement utilization of solar energy and provision of solar pump sets is presented in the Table 3.11.

Table 3.11 Utilization of solar energy and promotion of solar pump sets

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Solar Powered Pumping System with automatic tracking facility															
5 hp	All Districts except D3 and D20	No's/ Ha	3.75	939	3521.25	892	3345	910	3412.5	871	3266.25	900	3375	4512	16920
7.5 hp	All Districts except D8, D11, D14, D21, D22 and D23	No's/ Ha	5.3	567	3005.1	659	3492.7	559	2962.7	553	2930.9	571	3026.3	2909	15417.7
10 hp	All Districts except D3, D8, D9, D11, D12, D14, D15, D17, D21, D22, D23, D25, D26 and D27	No's/ Ha	6.75	300	2025	301	2031.75	306	2065.5	310	2092.5	311	2099.25	1528	10314
Solar Driers to farmers / farmers' groups for drying agricultural produce															
up to 200sq.ft	D24 and D31	No's/ Ha	2	16	32	14	28	13	26	12	24	30	60	85	170
up to 400sq.ft	D2, D5, D6, D8, D10, D11, D12, D13, D16, D17, D18, D19, D20, D22, D23, D24, D25, D29 and D31	No's/ Ha	4.25	59	250.75	54	229.5	55	233.75	54	229.5	54	229.5	276	1173

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
400-600sq.ft	D2, D5, D6, D7, D10, D13, D17, D18, D19, D20, D24, D28, D29, D30 and D31	No's/ Ha	6.5	34	221	33	214.5	34	221	33	214.5	33	214.5	167	1085.5
Total					**9055.1**		**9341.45**		**8921.45**		**8757.65**		**9004.55**		**45080.2**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.9 Water conservation measures

Water is a finite resource, and in many areas, future water supplies are uncertain. Individuals are usually aware when there is a drought; however, because water is inexpensive, there are often few incentives to reduce water loss. Water has no viable substitutes, and its depletion bodes profound economic and social impacts. Citizens and utilities need to consider water conservation programs.

Degraded areas, denuded gullies, and steep slopes contribute greatly to the sedimentation and siltation of stream channels. Huge amount of soil particles that are washed away settle in farm areas in the lowlands through surface runoff thereby destroying agricultural crops. Some are discharged to the coastal areas which create pollution and damage to the ecosystem. Most of the fish resources die due to suffocation. Coral reefs and sea grasses are rendered useless and spawning grounds are damaged. This condition generally results in the decrease in production of agricultural farms and coastal zones.

To address this problem, rehabilitation measures should be undertaken to provide immediate ecological stability to the areas. Structural rehabilitation measures such as check dams, riprap or stone walls, bench terracing, and gabions are considered very effective as rehabilitation measures. Farm ponds have a significant role in rainfed farming system where annual rainfall is more than 500 mm. It helps in mitigating the ill effects of rainfall variability as it stores water from excess rainfall and provides for utilization during prolonged dry spells by means of supplemental/protective irrigation. It also helps in pre-sowing irrigation of rabbi crop. In high rainfall semi-arid regions of India, farm pond can be used for multiple uses such as protective/supplemental irrigation, fish culture, duck farming integrated with poultry.

Stone check dams are commonly used in gully control and are generally constructed as dry stone wall. Gully control is an important conservative measure in uncultivable land reform programmes. It controls soil erosion from being caused in watershed areas.The main objective of constructing such a check dam is to filter the flow of river water after controlling the eroding power of water so that silt deposits in it, and the water moves ahead after being filtered. The construction of water harvesting structures involves huge cost. Thus, keeping in view of this importance, various programmes on soil conservations structures and cost involved are proposed with a budget outlay of Rs. 10504.45 Lakh (Table 3.12).

Table 3.12 Budget requirement for Water Conservation Measures

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Rehabilitation of Irrigation Network in Chittar Sub Basin under NABARD assistance															
On Farm Development works	D22	No's/ Ha	0.35	250	87.5	500	175	587	205.45	0	0	0	0	1337	467.95
Extension, Renovation and Modernisation of Field Channels	D22	No's/ Ha	0.15	800	120	1600	240	1600	240	0	0	0	0	4000	600
Gravity flow Pipeline System	D22	No's/ Ha	0.5	0	0	250	125	250	125	0	0	0	0	500	250
Construction of farm pond	D22	No's /Ha	1	20	20	40	40	40	40	0	0	0	0	100	100
Construction of Water Harvesting Structures		No's/ Ha		0	0	0	0	0	0	0	0	0	0	0	0
I. Check dams	D22	No's/ Ha	5	25	125	20	100	15	75	0	0	0	0	60	300
II.Percolation Pond	D22	No's/ Ha	15	0	0	2	30	3	45	0	0	0	0	5	75
III. Recharge shafts	D22	No's/ Ha	0.6	15	9	45	27	10	6	0	0	0	0	70	42
Micro Irrigation System	D22	No's/ Ha	0.8	45	36	50	40	50	40	0	0	0	0	145	116
Provision of solar pumping system	D22	No's/ Ha	5	10	50	25	125	25	125	0	0	0	0	60	300
Promotion of fodder bank for cattle	D22	No's/ Ha	0.1	60	6	40	4	40	4	0	0	0	0	140	14
Prevention of sea water intrusion		No's/ Ha		0	0	0	0	0	0	0	0	0	0	0	0
Subsurface dyke	D3, D12, D17, D20, D22 and D27	No's/ Ha	15	0	0	36	540	37	555	39	585	46	690	158	2370

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Village pond/community pond	D3, D17, D20, D22 and D27	No's/ Ha	5.5	0	0	62	341	77	423.5	85	467.5	100	550	324	1782
Farm Pond	D3, D12, D16, D17, D22 and D27	No's/ Ha	1	0	0	420	420	520	520	640	640	730	730	2310	2310
Recharge shaft	D12 and D22	No's/ Ha	1.5	0	0	70	105	125	187.5	200	300	150	225	545	817.5
Weir/ Bed Dam	D3, D12, D16, D17, D20, D22 and D27	No's/ Ha	30	27	810	2	60	2	60	1	30	0	0	32	960
Total					**1263.5**		**2372**		**2651.45**		**2022.5**		**2195**		**10504.45**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.10 Soil conservation measures

Soil erosion is one of the major agricultural problems in the highlands. Deforestation, Overgrazing, and cultivation inslopes not suited to agriculture together with the farming practice that do not include conservation measures are the major causes for soil erosion. Degraded soils are also the major constraints to agricultural production and food security.

Soil conservation in the catchment area of river valley projects through natural resource management activities like Gabion check dams, water harvesting structures and silt detention tanks with people involvement. The groundwater level has been lowered in most of the districts of Tamil Nadu. Out of 385 blocks in Tamil Nadu, groundwater depletion in 142 blocks are classified as over exploited, 33 as critical, 57 as semi critical and only 153 blocks are safe. The rationale of the project is to demonstrate ground water recharge by harnessing surplus run off during monsoon period. The strategy of the project is to pump water from well available in river bed, conveyance of pumped water to a tank through pipes and enabling stabilization of agriculture in the zone of influence. To undertake the construction of soil conservation structures, the plans are proposed at anoutlay of Rs.3300.00 Lakh (Table 3.13)

Table 3.13 Budget requirement for Soil Conservation Measures

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Reclamation of Problem (Alkaline & Saline) soils	D3, D7, D17, D22, D23 and D30	No's /Ha	0.6	2850	1710	950	570	500	300	500	300	700	420	5500	3300
Total					**1710**		**570**		**300**		**300**		**420**		**3300**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.11 Agricultural Engineering Extension centres

To undertake the construction of Agricultural Engineering Extension Centres, the plans are proposed at anoutlay of Rs.**6450.00** lakh (Table 3.14)

Table 3.14 Construction of Agricultural Engineering Extension centres (AEECs)

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Construction of Agricultural Engineering Extension centres (AEECs)	D10, D22, D26 and D27	No's/ Ha	75	9	675	30	2250	22	1650	12	900	13	975	86	6450
Total					**675**		**2250**		**1650**		**900**		**975**		**6450**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.12 Infrastructure requirement for Information Technology (IT) tools

Information and communication technology in agriculture is developing and applying innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. It is seen as an emerging field focusing on the enhancement of agricultural and rural development through improved information and communication processes. In this context, ICT is used as in all information and communication technologies including devices, networks, mobiles, services and applications; these range from innovative Internet-era technologies and sensors to other pre-existing aids such as fixed telephones, televisions, radios and satellites. E-agriculture continues to evolve in scope as new ICT applications continue to be harnessed in the agriculture sector. More specifically, e-agriculture involves the conceptualization, design, development, evaluation and application of innovative ways to use ICTs in the rural domain, with a primary focus on agriculture. Provisions of standards, norms, methodologies, and tools as well as development of individual and institutional capacities, and policy support are all key components of e-agriculture. To improve the infrastructure related to information technology, the plans are proposed with a budget outlay of Rs 479.40 lakh (Table 3.15).

Table 3.15 Infrastructure requirement for Information Technology (IT) tools

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Computer & its accessories	All Districts except D23	No's/Ha	0.8	31	24.8	59	47.2	48	38.4	39	31.2	31	24.8	208	166.4
Tablet (Tab)	All Districts except D5, D19, D20, D23 and D30	No's/Ha	0.25	48	12	103	25.75	91	22.75	53	13.25	33	8.25	328	82
Xerox machine	All Districts except D5 and D23	No's/Ha	1.5	18	27	45	67.5	25	37.5	28	42	18	27	134	201
Server and software development	D7	No's/Ha	30	0	0	1	30	0	0	0	0	0	0	1	30
Total					**63.8**		**170.45**		**98.65**		**86.45**		**60.05**		**479.40**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

3.4.13 Modernisation of Tractor workshops of AED

The problems encountered in manufacture and maintenance of the rolling stock is largely due to obsolescence of machinery and plant, diverse product mix and layout deficiencies. The situation in respect of machinery and plant is a source of major concern. To undertake the modernization of tractor workshops of AED, the plans are proposed at the outlay of **Rs.1500.00 lakh** (Table 3.16)

Table 3.16 Modernisation of Tractor workshops of AED

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Modernisation of Tractor workshops of AED	D2, D11, D23, D27, D28 and D29	No's/ Ha	50	6	300	6	300	6	300	6	300	6	300	30	1500
Total					**300**		**300**		**300**		**300**		**300**		**1500**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

Table 3.17 Post Harvest Technology and Management machinery (PHTM)

The post harvest machineries are established with a budget outlay of Rs. 8294.77 lakh (Table 3.17)

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Post Harvest Technology and Management machinery (PHTM)															
Self propelled / other power driven Horticultural Machinery															
Chain saw/ Wheel barrow/ Mango grader/ planter and other suitable self propelled machineries and equipments for horticulture Crops	All Districts expect D4,D15,D22 and B9	No's/ Ha	1	77	77	784	784	702	702	1006	1006	507	507	3076	3076
Manual Horticultural Equipments															
Aluminium Ladder/ Ladder	All Districts except D1, D4, D7, D22, D23, D27, D28 and D30	No's/ Ha	0.2	258	51.6	666	133.2	674	134.8	710	142	620	124	2928	585.6
Aluminium pole	D2, D3, D6, D11, D12, D14, D16, D18, D19, D20, D21, D24, D25 and D31	No's/ Ha	0.03	167	5.01	194	5.82	185	5.55	177	5.31	182	5.46	905	27.15

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Plucker	D2, D3, D5, D6, D8, D9, D10, D11, D12, D13, D14, D16, D18, D19, D20, D21, D24, D25 and D31	No's/ Ha	0.02	266	5.32	294	5.88	306	6.12	309	6.18	301	6.02	1476	29.52
Post Harvest Equipments for food grains, oil seeds and Horticultural Equipment															
Establishment of PHT units for transfer of primary processing technology, value addition, low cost scientific storage, packaging units and technologies for by- product management in the production catchments															
Mini Rice Mill	D1, D3, D7, D11, D12, D13, D16, D18, D19, D21, D25 and D28	No's /Ha	1.5	5	7.5	20	30	23	34.5	23	34.5	19	28.5	90	135
Mini Dal Mill	D2, D3, D5, D7, D9, D11, D12, D13, D16, D18, D20, D22, D24, D25, D27, D28, D30 and D31	No's/ Ha	1.7	9	15.3	57	96.9	39	66.3	40	68	45	76.5	190	323
Millet Mill	All Districts except D6, D7, D8, D10, D12, D14, D15 and D23	No's/ Ha	1.5	2	3	51	76.5	47	70.5	45	67.5	49	73.5	194	291

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Oil mill with filter press (for all type of Horticulture / Food grain / Oil seeds crop)	All districts except D5, D7, D10, D11, D14, D17 and D23	No's/ Ha	1.2	23	27.6	81	97.2	81	97.2	71	85.2	70	84	326	391.2
Extractor (for all type of Horticulture / Food grain / Oil seeds crop)	D1, D3, D4, D8, D9, D12, D13, D15, D16, D18, D19, D21, D22 and D31	No's/ Ha	1	1	1	20	20	23	23	22	22	22	22	88	88
Pomegranate Aril Extractor	D16	No's/ Ha	1.5	0	0	1	1.5	1	1.5	1	1.5	1	1.5	4	6
Custard Apple Pulper (for all type of Horticulture / Food grain / Oil seeds crop)	D16	No's/ Ha	1	0	0	1	1	1	1	1	1	1	1	4	4
Dehydration unit/ Pricking Machine/ Humidifier (for all type of Horticulture / Food grain / Oil seeds crop)	D9, D10, D16, D18 and D20	No's/ Ha	1	0	0	3	3	5	5	3	3	7	7	18	18
Packing Machines (for all types of Horticulture / Food grain / Oil seeds crop)	All Districts except D5, D6, D14, D15, D17,D23 and D24	No's/ Ha	3	27	81	151	453	152	456	125	375	121	363	576	1728

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
All types of Power driven Dehusker/ sheller/ Threshers/ Harvesters/ De-spiking/ Deconing Machine/ Peeler/ Splitter/ Stripper (for all type of Horticulture / Food grain	All Districts except D14, D17, D23, D24, D26, D27 and D29	No's/ Ha	1.2	26	31.2	108	129.6	92	110.4	92	110.4	98	117.6	416	499.2
All types of Boiler/ Steamer/ Dryer solar (for all type of Horticulture / Food grain / Oil seeds crop)	All Districts except D1, D3, D4, D5, D14, D20, D22, D26, D27, D29 and D31	No's/ Ha	2	22	44	60	120	67	134	44	88	66	132	259	518
All types of Washing Machines (for all type of Horticulture / Food grain / Oil seed crop)	D1, D3, D6, D14, D16, D18, D21, D22, D23, D25, D30 and D31	No's/ Ha	1.5	8	12	34	51	46	69	56	84	44	66	188	282
All types of Grinder/ Pulveriser/ Polisher (for all type of Horticulture / Food grain / Oil seed crop)	All Districts except D1, D5, D7, D8, D9, D10, D14, D15, D17, D19, D21, D24, D26 and D29	No's/ Ha	0.3	29	8.7	78	23.4	67	20.1	57	17.1	73	21.9	304	91.2

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
All types of Cleaner cum grader/ Gradient separator/ Specific gravity separator (for all types of Horticulture / Food grain / Oil seed crop)	D1, D3, D4, D12, D13, D16, D18, D20, D22, D23, D25, D28 and D30	No's/ Ha	0.75	18	13.5	66	49.5	59	44.25	59	44.25	56	42	258	193.5
Bio- mass gasifier	D2,D18 and D25	No's/ Ha	1.2	0	0	3	3.6	0	0	0	0	4	4.8	7	8.4
Total					**383.73**		**2085.1**		**1981.22**		**2160.94**		**1683.78**		**8294.77**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10-Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

Table 3.18 Other Infrastructure requirement for Agricultural Engineering

(₹ in Lakh)

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Any other innovative schemes of AED with Components & its unit cost															
High-tech Earth excavator															
Poly Green House with Fogging facility	D29	No's/ Ha	50	5	250	5	250	5	250	5	250	5	250	25	1250
Vermi Compost unit with packing accessories	D29	No's/ Ha	7.5	5	37.5	5	37.5	5	37.5	5	37.5	5	37.5	25	187.5
Farm pond / Fish pond	D29	No's/ Ha	1	20	20	20	20	20	20	20	20	20	20	100	100
Farmers kit (Crow bar, Hand hoe, rose can, pruning secateur,coconut dehusker, trolley etc.,)	D29	No's/ Ha	0.05	200	10	200	10	200	10	200	10	200	10	1000	50
Land levelling,Pipe laying	D4	No's/ Ha	0.07	290	20.3	290	20.3	290	20.3	290	20.3	290	20.3	1450	101.5
Stening wall	D4	No's/ Ha	0.25	125	31.25	125	31.25	125	31.25	125	31.25	125	31.25	625	156.25
Well deepening	D4	No's/ Ha	0.5	125	62.5	125	62.5	120	60	120	60	120	60	610	305
Replacement of old Pump sets	D4	No's/ Ha	0.2	300	60	285	57	200	40	200	40	200	40	1185	237
Infrastructure like packing unit,godown,cattle shed and Threshing floor	D4	No's/ Ha	1	108	108	105	105	125	125	120	120	120	120	578	578
Publicity and propaganda for farm	D9	No's/ Ha	0.5	4	2	4	2	4	2	4	2	4	2	20	10

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
mechanization in AED															
Special Training for Coconut Growers. Special Training for Coconut Tree Climbing	D2	No's/ Ha	0.45	100	45	75	33.75	75	33.75	50	22.5	50	22.5	350	157.5
J C B	D31	No's/ Ha	28	7	196	1	28	1	28	1	28	1	28	11	308
Mini Drill (Chain Type) with 14 HP slow speed engine	D17	No's/ Ha	4	2	8	0	0	0	0	0	0	0	0	2	8
Compartmental Bund Formation	D16	No's/ Ha	0.05	600	30	600	30	600	30	600	30	600	30	3000	150
Farm Ponds (NEW)	D16	No's/ Ha	0.75	130	97.5	130	97.5	130	97.5	120	90	120	90	630	472.5
Community Bore wells	D16	No's/ Ha	5	10	50	10	50	10	50	9	45	8	40	47	235
Deepening of Open Wells	D16	No's/ Ha	5	60	300	60	300	60	300	60	300	52	260	292	1460
Renovation of MI Tanks	D16	No's/ Ha	4	60	240	60	240	60	240	60	240	60	240	300	1200
Check Dam	D16	No's/ Ha	1.8	12	21.6	12	21.6	12	21.6	12	21.6	12	21.6	60	108
Percolation Pond	D16	No's/ Ha	5	1	5	1	5	1	5	1	5	1	5	5	25
Recharge Shaft	D16	No's/ Ha	1.7	40	68	40	68	40	68	40	68	40	68	200	340
Summer Ploughing	D16	No's/ Ha	0.0136	1000	13.6	1000	13.6	1000	13.6	1000	13.6	1000	13.6	5000	68
PVP pipe laying	D13	No's/ Ha	0.2	600	120	600	120	600	120	600	120	600	120	3000	600
Replacement of Submersible Motors pump sets with pipe and	D13	No's/ Ha	0.5	150	75	150	75	150	75	150	75	150	75	750	375

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
electrical arrangement for Bore well , 5HP&7.5HP															
Other machineries															
Telescopic Pruner	D8	No's/ Ha	0.6	1	0.6	1	0.6	0	0	1	0.6	1	0.6	4	2.4
Motorized Rubber Roller	D8	No's/ Ha	0.6	2	1.2	1	0.6	2	1.2	1	0.6	2	1.2	8	4.8
Trays for Paddy Nursery Raising	D8	No's/ Ha	0.0008	1600	1.28	1600	1.28	1600	1.28	1600	1.28	1600	1.28	8000	6.4
Combine Harvester	D8	No's/ Ha	17	0	0	1	17	1	17	1	17	1	17	4	68
Diesel Pump	D8	No's/ Ha	0.4	1	0.4	1	0.4	1	0.4	1	0.4	1	0.4	5	2
Rotary Tiller	D8	No's/ Ha	0.75	1	0.75	0	0	0	0	0	0	0	0	1	0.75
Smoke House	D8	No's/ Ha	0.7	1	0.7	1	0.7	1	0.7	1	0.7	1	0.7	5	3.5
Mist Blower	D8	No's/ Ha	0.4	1	0.4	0	0	0	0	0	0	0	0	1	0.4
TEA HARVESTER	D14	No's/ Ha	0.25	35	8.75	35	8.75	35	8.75	35	8.75	35	8.75	175	43.75
Construction of LD & MI Repair Shed	D30	No's/ Ha	20	1	20	0	0	0	0	0	0	0	0	1	20
Construction of Training Centre for farmers with furniture and accessories	D30	No's/ Ha	50	1	50	0	0	0	0	0	0	0	0	1	50
Sugarcane Infielder	D3, D16, D18 and D19	No's/ Ha	7	1	7	3	21	3	21	3	21	2	14	12	84
Bird Scarer	D2, D16, D18 and D19,	No's/ Ha	0.4	0	0	51	20.4	53	21.2	50	20	63	25.2	217	86.8

Interventions	Districts Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Mechanized row crop cultivation-Pilot mechanization Demonstration	D1, D2, D8, D10, D11, D12, D13, D16, D18, D28, D30 and D31	No's/ Ha	0.04	41	1.64	62	2.48	75	3	64	2.56	53	2.12	295	11.8
Training of AED Engineers on " Agricultural Processing" and " Bio- Energy"	All Districts except D4, D5, D9, D15, D17, D20, D22, D26, D27 and D29	No's/ Ha	0.04	21	0.84	50	2	54	2.16	47	1.88	46	1.84	218	8.72
Total					**1964.81**		**1753.21**		**1755.19**		**1724.52**		**1677.84**		**8875.57**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

Table 3.19 Consolidated budget Requirement in Agricultural Engineering

(₹ inLakh)

Sl.No	Interventions	2017-18	2018-19	2019-20	2020-21	2021-22	Total
		Fin	Fin	Fin	Fin	Fin	Fin
1	Procurement and distribution of Agricultural Machinery and Equipment	33169.495	31017.275	30865.265	30748.165	31200.46	157000.66
2	Establishment of Farm Machinery Banks for Custom Hiring	5404	4676	4368	4312	4284	23044
3	Establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring	1792	1680	1680	1568	1680	8400
4	Promotion of Farm Mechanization in Selected Villages	2990	2599	2449.5	2495.5	2484	13018
5	Promotion of Mechanized Farming operations	271.04	350.52	350.24	349.6	350.12	1671.52
6	Tractor Hiring Scheme	6467.5	1825	1652	2768	1640.5	14353
7	Minor Irrigation Scheme	2144.5	556	157.5	229.5	31	3118.5
8	Solar Energy	9055.1	9341.45	8921.45	8757.65	9004.55	45080.2
9	Information Technology (IT) related items	63.8	170.45	98.65	86.45	60.05	479.4
10	Modernization of Tractor workshops of AED	300	300	300	300	300	1500
11	Post Harvest Technology and Management machinery (PHTM)	383.73	2085.1	1981.22	2160.94	1683.78	8294.77
12	Construction of Agricultural Engineering Extension centres (AEECs)	675	2250	1650	900	975	6450
13	Water Conservation	1263.5	2372	2651.45	2022.5	2195	10504.45
14	Soil conservation	1710	570	300	300	420	3300
15	Other	1964.81	1753.21	1755.19	1724.52	1677.84	8875.57
	Total	**67654.475**	**61546.005**	**59180.465**	**58722.825**	**57986.3**	**305090.07**

The total budget requirement for agricultural engineering is **Rs.305090.07 Lakh.** The components wise financial requirement for five years is presented in Table 3.19

3.5 INFRASTRUCTURE REQUIREMENT IN AGRICULTURAL MARKETING

3.5.1 Promotion of commodity groups and market information of Marketing Institutions

Improving efficiency of market institution at all levels including grass root level market outlets will facilitate price discovery, minimize costs and pave way for introduction of market innovations. There are 277 Regulated Markets, 108 Rural Godowns and 108 grading centres functioning under the Market Committees, competitive and remunerative prices are ensured for the produce sold by the farmers through closed tender system in the Regulated Markets. Free grading facilities for agricultural commodities and issuing pledge loan during distress sale are also available in the Regulated Markets. 1 to 2 % of the value of the produce is collected as market fees from the traders who procure the produce from the farmers. 103 Uzhavar Sandhais are functioning in the state for direct selling of fruits and vegetables by farmers to consumers without any hindrance of middlemen. The main object of Uzhavar Sandhai is to ensure farmers to get a better price for their produce and to enable the consumers to get fresh fruits and vegetables at a lesser price than the retail market price. Agmark grading is undertaken to protect the consumers from the ill effects of consuming adulterated food commodities and to ensure quality food products. Construction of regulated market, strengthening of market institutions, strengthening of AGMARK Lab, strengthening of Uzhavar Sandhai, Transaction Shed, cold storage are the proposed interventions for strengthening of market institutions. The physical and financial requirement for strengthening of market institutions is furnished in Table 3.20.

3.5.2 Strengthening of Uzhavar sandhais and Regulated markets

In post-harvest management of grains, maximum benefit can be achieved by following improved storage practices at optimum moisture content. About 5 to 10% of post harvest losses are occurring in cereals and pulses. In order to minimize the post harvest losses in grains, this Department has started construction of drying yards and storage godowns at village level since1997. Storage is an important marketing function, which involves holding and preserving goods from the time they

are produced until they are needed for consumption. The storage of goods, therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market. Storage protects the quality of perishable and semi-perishable products from deterioration; it helps in the stabilization of prices by adjusting demand and supply; Storage is necessary for some period for performance of other marketing functions and it provides employment and income through price advantages**.**

Storage Godown (2000 MT), Storage Godown (1000 MT), Construction of 100 Mt Storage with equipments, Drying yard, Storage shed, Construction of Threshing Floor, Establishment of Uzhavar Sandhai, Market Complex with cold storage for vegetables and fruits, Tender Coconut market complex, Establishing Shade Net, Perishable Market Improvement through collection centre, NABL Accredited Lab, Pesticide residue testing Lab, Degree / Diploma course in Food Technology in RRS Campus, Creation of Banana Facilitation centre with cement floor and open shed at Uzhavar Santhai, Creation of Jack fruit Facilitation Centre at R.M. Complex, Panruti, Flower Market complex at Thovalai, Spice market complex at Thovalai, Additional shops for spice market complex at Thovalai, Integrated market complex, Establishment of Specialized Market complex for Coconut, Establishment of Specialized Market complex for Banana, Weigh Bridge at Virudhachalam, Establishment of supply chain Management of fruits and vegetables, Integrated Commodity Management through Aggregation, Traders shop, Establishment of Silo, Establishment and Strengthening of AMI & BPC by DAM & TNAU, Traditional Onion storage unit are proposed interventions for establishment of market structures. The physical and financial requirement of establishment of market structures are presented in Table 3.20.

3.5.3 Provision of market accessories

Market accessories and infrastructure facilities are said to be the blood vessels for the smooth and effective functioning of market institution at all levels. Provision of market accessories like weighing electronic balance, tarpaulin, dunnage, plastic crates etc and market Infrastructure like thrashing floor, drying

yard, storage shed, grain silts, provision of computers, solar dryers would go long way in upgrading market institution and both buyers and sellers would be benefitted mutually. Plastic crates, Tarpaulin, Dunnage, Provision of Cashew Processing Machineries at Village level for Cashew Growers cum Mini Processors, Provision of Machineries & Technical Building for the Manufacture of Organic Country Sugar, Provision of Traditional Oil Expeller Unit, Quality testing Equipment- Cotton fibre tester, IRRI super gunny bags, Electronic balance, Turmeric boiler, Turmeric grader, Turmeric polisher, Turmeric powder making machine, Solar dryer, Tapioca chips cutter, Grading sieve, Power operated Groundnut decorticator, Pulses grading machine, Pepper berry separator, Distribution of multilayered low density polyethylene sheet, Banana Vacuum Packaging machine, Poly Carbonate Solar Hybrid Tunnel Dryer to FPC are proposed interventions for market accessories. The details of physical and financial budget requirement of market accessories are presented in Table 3.20.

3.5.4 Establishment of Processing Units

Processing is a set of techno economic activities carried out for conservation and handling of agricultural produce and to make it usable as food, feed, fibre, fuel or industrial raw material. Hence, the scope of the agro-processing industry encompasses all operations from the stage of harvest till the material reaches the end users in the desired form, packaging, quantity, quality and price. Agro-processing is now regarded as the sunrise sector of the Indian economy in view of its large potential for growth and likely socio economic impact specifically on employment and income generation. Some estimates suggest that in developed countries, up to 14 per cent of the total work force is engaged in agro-processing sector directly or indirectly. However, in India, only about 3 per cent of the work force finds employment in this sector revealing its underdeveloped state and vast untapped potential for employment. Properly developed, agro-processing sector can make India a major player at the global level for marketing and supply of processed food, feed and a wide range of other plant and animal products. The physical and financial budget requirement for establishment of processing unit is presented in Table 3.20.

Table 3.20 Infrastructure Requirement in Marketing Sector

(₹ in lakh)

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Promotion of Commodity Groups and Market Information															
Agri Marketing Information Centre at District level	Nos.	30-100	D16, D23	0	0.00	0	0.00	1	100.00	1	30.00	0	0.00	2	130.00
e-learning Centre	Nos.	25-75	D8, D9, D11, D12, D15, D18, D21, D22, D24, D25, D27	12	571.55	3	80.00	17	140.00	0	0.00	0	0.00	32	791.55
Construction of Marketing Centre	Nos.	10	D9	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00
Establishment of block level market information & advisory centres for farmers and entrepreneurs at newly created Integrated Agricultural Extension Centres(IAEC)	Nos.	1.5-4	D12, D16	7	21.00	3	15.00	6	19.50	3	15.00	3	15.00	22	85.50
Establishment of Training Centre in Neyveli	Nos.	320	D3	0	0.00	1	320.00	0	0.00	0	0.00	0	0.00	1	320.00
Farmers Information cum Training Centre	Nos.	50	D2	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
Integrated Commodity Management through Aggregation	Nos.	8-Oct	D11, D24, D29	21	750.54	21	250.54	20	0.54	20	0.54	20	0.54	102	1002.70
Own building for AGMARK Lab	Nos.	25	D1, D2, D30	2	50.00	0	0.00	0	0.00	0	0.00	0	0.00	2	50.00
Distillation unit	Nos.	0.4	D2	0	0.00	1	0.40	0	0.00	0	0.00	0	0.00	1	0.40
Provision of Agmark	Nos.	0.5-1	D3, D4,	42	80.60	65	20.82	13	9.60	6	6.57	5	6.36	131	123.95

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Lab equipments			D6, D8, D11, D12, D25, D30												
Strengthening of Market Information Centre with Computers & Accessories, digital camera (at district level)	Nos.	3	D12	1	3.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.00
Strengthening of Uzhavar Sandhai and Regulated Market															
Additional Shops	Nos.	0.6-1	D4, D14, D18, D20, D27, D29	152	71.60	58	45.40	33	20.40	20	16.50	18	15.90	281	169.80
Cold Storage	Nos.	25-40	D4, D11, D16, D17, D18, D19, D20, D22, D28, D29	13	750.50	11	452.00	3	50.00	3	55.00	5	70.00	35	1377.50
Strengthening of cold storage unit(Epoxy coated steel racks and plastic crates	Nos.	0.5-1	D18, D28	6	7.50	154	77.00	0	0.00	0	0.00	0	0.00	160	84.50
Compound walls	Nos.	15-20	D7, D20	3	0.15	0	0.00	0	0.00	2	80.00	0	0.00	5	80.15
Computers and other Accessories	Nos.	1-2	D12, D25	4	4.00	0	0.00	0	0.00	1	2.00	0	0.00	5	6.00
Drying Yard	Nos.	4-5	All districts except D2	561	2642.00	581	2640.30	547	2626.20	606	2786.40	625	2808.20	2920	13503.10
construction of regulated market	Nos.	6-7	D13, D16	35	201.50	37	372.50	35	201.50	36	211.50	36	211.50	179	1198.50
Storage godown	Nos.	5-7	All districts except D2, D3, D8, D9, D10, D30	1129	3131.00	162	1989.00	199	2953.50	170	1943.25	226	3061.25	1886	13078.00
Ticker Board and External Electrification	Nos.	0.1-0.2	D5, D16, D18, D20, D22, D27	643	60.99	165	45.87	165	42.75	180	42.90	154	39.90	1307	232.40

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Food Court (7.00 x 5.60 m)	Nos.	5	D20	2	10.00	0	0.00	0	0.00	0	0.00	0	0.00	2	10.00
office automation	Nos.	3-5	D3, D13	1	3.00	0	0.00	0	0.00	0	0.00	1	3.00	2	6.00
Platform Balance	Nos.	0.1-0.2	D22	9	1.08	0	0.00	0	0.00	0	0.00	0	0.00	9	1.08
Proposed Paver Block 3000 Sq.m	Nos.	0.03-0.04	D12, D29	1503	46.50	0	0.00	0	0.00	0	0.00	0	0.00	1503	46.50
Provision of Automatic seed vending machine in Uzhavar Sandhai	Nos.	1-2	D12, D29	4	5.00	0	0.00	0	0.00	0	0.00	0	0.00	4	5.00
Provision of modern roofing (galvanized zinc sheets) in Uzhavar Sandhai for shops and office	Nos.	5	D12	3	15.00	0	0.00	0	0.00	0	0.00	0	0.00	3	15.00
Price Display Board	Nos.	0.002 - 0.003	D22	246	0.62	0	0.00	0	0.00	0	0.00	0	0.00	246	0.62
Administrative Office Room (Vehicle shed ,waiting hall, washingRoom,Borewell with Motor, water Tank)	Nos.	7-10	D1, D3, D4, D11, D12, D14,D18, D20, D27, D29	47	484.04	10	31.75	0	0.00	0	0.00	0	0.00	57	515.79
Strengthening of RM	Nos.	5-10	D3, D11, D12, D16, D17, D18, D21, D22, D25, D26, D29	530	3200.34	506.15	225.75	502.15	35.75	503.15	45.75	502.15	45.75	2543.6	3553.34
Structures for Rural Market	Nos.	100-120	D22, D23	4	480.00	0	0.00	0	0.00	1	100.00	0	0.00	5	580.00
Traders shop	Nos.	18-20	D4, D17, D19, D22, D24	23	456.00	7	136.00	7	116.00	1	40.00	2	36.00	40	784.00

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Transaction Shed	Nos.	7-9	D1, D7, D17, D21, D24, D28	24	175.00	21	115.00	24	435.00	22	120.00	22	135.00	113	980.00
Up gradation of Uzhavar Sandhais	Nos.	0.2-0.6	D2, D3, D7, D11, D12, D15, D16, D17, D20, D21, D22, D24, D25, D26, D28, D30	12088	2603.20	1609	893.18	247	1625.35	187	1918.68	273	2390.85	14404	9431.25
Custom Hiring Centre to the existing FPOs/Commodity Groups with one tractor, one power tiller & one Rotovators	Nos.	10	D12	10	100.00	0	0.00	0	0.00	1	10.00	0	0.00	11	110.00
Environmentally controlled Mobile vending carts to the existing FPOs/Commodity Groups	Nos.	0.4	D12	8	3.20	2	0.80	3	1.20	1	0.40	6	2.40	20	8.00
Provision of "Improved Seed Onion storage sheds" to the existing FPOs/Commodity Groups	Nos.	1	D12	5	5.00	0	0.00	2	2.00	0	0.00	3	3.00	10	10.00
Provision of Market Access and Market Activities															
Secateurs for1000farmersper year	Nos.	0.003	D10	3000	10.50	3000	10.50	3000	10.50	3000	10.50	3000	10.50	15000	52.50
Aluminium tray	Nos.	0.2-0.3	D2, D15, D29	194	40.44	134	40.26	134	40.26	134	40.26	134	40.26	730	201.48
Bush cutter fo500 farmers per year	Nos.	0.1-0.2	D10	1500	202.50	1500	202.50	1500	202.50	1500	202.50	1500	202.50	7500	1012.50
Chaff cutter	Nos.	0.6	D5	26	15.60	26	15.60	23	13.80	23	13.80	23	13.80	121	72.60

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Collection Van	Nos.	10-50	D4	12	600.00	0	0.00	0	0.00	0	0.00	0	0.00	12	600.00
Computer with Accessories	Nos.	4	D4	9	36.00	0	0.00	0	0.00	0	0.00	0	0.00	9	36.00
Digital Moisture Meter	Nos.	0.1-0.2	D2, D26	1	0.15	1	0.40	1	0.15	0	0.00	1	0.15	4	0.85
Distribution of crowbars	Nos.	0.004 - 0.005	D15	130	0.59	130	0.59	130	0.59	130	0.59	130	0.59	650	2.93
Distribution of Multilayered low density polyethylene sheet at 75% subsidy Silpaulin) to commodity group farmers – 18'x30' size (120GSM) full cost Rs.3000/No subsidy Rs.3000/No	Nos.	0.002	D15, D20	1605	38.40	1490	35.70	1615	38.70	1570	37.35	1560	37.05	7840	187.20
Distribution of Mumbatty (Spade)	Nos.	0.001 - 0.002	D15	130	0.20	130	0.20	130	0.20	130	0.20	130	0.20	650	0.98
Controlled atmosphere with conventional bin storage (300 Kg/bin)	Nos.	2-3	D4, D15	133	431.50	130	6.50	130	6.50	130	6.50	130	6.50	653	457.50
Dunnage	Nos.	0.5	D4, D5, D7, D16, D17, D18, D19, D22, D24, D26, D28, D29	4919	142.59	4683	104.08	4714	109.40	4263	86.58	4378	91.18	22957	533.83
Weighing balance(300Kg)	Nos.	0.4-1	D14, D15, D22, D29	140	48.10	16.5	90.75	0	0.00	0	0.00	0	0.00	156.5	138.85
Electronic Digital Weighing Scale - 5 Kg	Nos.	0.01-0.05	D4, D7, D8, D16, D18, D20, D22	494	62.19	425	19.55	170	17.80	40	3.50	20	2.50	1149	105.54
Ghani (Wood)	Nos.	2	D26	14	28.00	15	30.00	14	28.00	15	30.00	15	30.00	73	146.00

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Hammer Mill	Nos.	0.04-1	D12, D26	6	0.24	5	10.00	3	6.00	3	6.00	0	0.00	17	22.24
Hand sprayer - to spray pesticide to control storage pest in Godowns	Nos.	0.35-0.4	D2, D12	6	0.24	1	0.35	0	0.00	0	0.00	0	0.00	7	0.59
Infrastructure Civil work	Nos.		D17	1	472.50	1	472.50	0	0.00	0	0.00	0	0.00	2	945.00
Lift for stocking of Exiting Cold Storage	Nos.	1	D4	2	2.00	0	0.00	0	0.00	0	0.00	0	0.00	2	2.00
Loading platform	Nos.	0.05-0.06	D4, D29	503	28.25	0	0.00	0	0.00	0	0.00	0	0.00	503	28.25
Machineries	Nos.	40-80	D2, D3, D17	2	125.00	0	45.00	0	0.00	0	0.00	0	0.00	2	170.00
Moisture meter	Nos.	0.05-0.06	D12, D29, D30	151	10.45	130	5.20	130	5.20	130	5.20	130	5.20	671	31.25
NIR Analyzer	Nos.	0.1	D30	4	0.40	0	0.00	0	0.00	0	0.00	0	0.00	4	0.40
Packing Machine	Nos.	4	D26	2	8.00	1	4.00	0	0.00	0	0.00	0	0.00	3	12.00
Petrol operated Intercultivator /Rotary weeder for FIG groups	Nos.	0.4	D10	150	60.00	150	60.00	150	60.00	150	60.00	150	60.00	750	300.00
Plastic crates	Nos.	0.01		67221	674.61	69082	680.55	72182	686.16	67567	636.02	67102	627.97	343154	3305.29
Power sprayer for 100 FIG groups(2 per FIG)	Nos.	0.06-0.08	D1, D3, D10	1251	79.18	1250	43.40	1251	111.90	150	39.00	150	39.00	4052	312.48
Productive Investments for Farmer Common service Center – FCSC	Nos.	0.15-1	D4,D8	17	2.55	15	2.25	16	70.75	15	2.25	15	2.25	78	80.05
Provision of Gunnies	Nos.	0.002 - 0.004	D8, D12, D18, D26, D29	25623	101.57	25298	41.34	25256	27.74	25256	27.74	25256	27.74	126689	226.13

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Pruning saw for 500 farmers(1 per farmer)per year	Nos.	1-3	D4, D10	4	15.02	1500	11.25	1500	11.25	1500	11.25	1500	11.25	6004	60.02
Reefer vehicle	Nos.	15-30	D4, D10	1	15.00	1	35.00	0	0.00	0	0.00	2	70.00	4	120.00
RURBAN	Nos.		D3, D25	0	27.40	0	32.90	0	0.00	0	0.00	0	0.00	0	60.30
Steel Ladder	Nos.	0.06-0.07	D1, D3, D4, D8, D11, D12	617	40.10	607	39.70	619	40.90	586	37.60	584	37.40	3013	195.70
Tarpaulin	Nos.	0.11-0.12	All districts except D20, D21, D22	10692	1252.91	10301	1089.29	10254	1087.95	10058	1077.50	10521	1109.74	51826	5617.39
Tinto Meter	Nos.	0.03	D30	110	3.30	165	4.95	220	6.60	220	6.60	275	8.25	990	29.70
Travelling Microscope.	Nos.	5	D3, D30	5	25.00	4	20.00	2	10.00	1	5.00	0	0.00	12	60.00
Trolleys	Nos.	0.3	D12, D18	49	12.45	9	2.70	7	2.30	0	0.00	0	0.00	65	17.45
Vending Cart	Nos.	8-10	D2, D10, D17, D18, D26	10	105.25	12	89.00	4	40.00	5	45.00	5	45.00	36	324.25
Post Harvest Infrastructure and Machineries															
Minimizing Post Harvest Losses & Value addition	Nos.	3	D3	8	24.00	8	24.00	3	9.00	2	6.00	2	6.00	23	69.00
Animal Feed Production Unit	Nos.	5-25	D3, D14	1	5.00	1	50.00	0	0.00	0	0.00	0	0.00	2	55.00
Banana chips making unit	Nos.	10	D21	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	1	10.00
Bhendi Plucker	Nos.	0.02	D22	300	4.50	350	5.25	350	5.25	300	4.50	300	4.50	1600	24.00
Branding,Packaging, Marketing	Nos.	7-10	D26	0	0.00	0	0.00	5	34.00	0	0.00	1	10.00	6	44.00
Coconut Ladder	Nos.	0.05-0.08	D3, D5, D8, D15, D16, D17, D18, D19,	2094	122.50	1891	126.33	1068	101.49	375	69.42	376	73.10	5804	492.83

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
			D29, D30												
Coffee Pulper	Nos.	0.05-0.65	D5	102	4.30	102	4.30	82	3.70	62	3.10	62	3.10	410	18.50
Color Sorter	Nos.	12	D26	1	12.00	0	0.00	0	0.00	0	0.00	0	0.00	1	12.00
Cotton Plucker	Nos.	0.05	D17	80	4.00	80	4.00	80	4.00	80	4.00	80	4.00	400	20.00
Cassava chipper	Nos.	0.15	D3	2	0.30	2	0.30	1	0.15	0	0.00	0	0.00	5	0.75
Destoner in millets	Nos.	2	D22	1	2.00	1	2.00	1	2.00	0	0.00	0	0.00	3	6.00
Coconut peeling Machine	Nos.	0.03-0.04	D3, D5	208	8.12	173	8.01	196	3.09	156	2.97	201	3.10	934	25.28
Dhal processing Unit	Nos.	1-3	D3, D7, D15, D16, D17, D18, D19, D22, D26	20	25.10	18	91.10	16	53.80	11	19.50	14	24.50	79	214.00
Construction of compound wall in Coconut Complex in Pattukkottai	Nos.	55	D20	1	55.00	0	0.00	0	0.00	0	0.00	0	0.00	1	55.00
Establishment of Coconut Powder Production unit in Coconut market complex, Rajendrapuram	Nos.	15	D15	1	15.00	0	0.00	0	0.00	0	0.00	0	0.00	1	15.00
Establishment of Coconut Sugar Production unit in Coconut market complex	Nos.	17-30	D15, D19, D20	0	0.00	2	34.00	1	50.00	0	0.00	0	0.00	3	84.00
Establishment of pulp industry	Nos.	400	D10, D15	3	1200.00	4	1275.00	3	1200.00	3	1200.00	3	1200.00	16	6075.00
Establishment of Virgin Coconut Oil Production unit in Coconut market	Nos.	30	D19	0	0.00	0	0.00	1	30.00	0	0.00	0	0.00	1	30.00

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
complex															
Garlic Iron Burner	Nos.	0.01	D5	25	0.25	25	0.25	50	0.50	25	0.25	50	0.50	175	1.75
Grading and Packing Hall(30X6 Mtr)	Nos.	15	D4, D22	3	45.00	1	40.00	0	0.00	1	40.00	0	0.00	5	125.00
Grapes - Harvest Kniff	Nos.	0.003	D5, D6	40	0.12	70	0.21	55	0.17	60	0.18	45	0.14	270	0.81
Groundnut decorticator (power)	Nos.	1.7-2	D3, D7, D119, D20, D22, D26	45	76.55	48	89.20	40	76.70	39	89.20	32	72.70	204	404.35
Groundnut Grader	Nos.	1	D26	0	0.00	1	1.00	0	0.00	1	1.00	0	0.00	2	2.00
Groundnut Harvester	Nos.	1-1.5	D3, D5, D7	17	15.75	17	16.50	14	11.25	13	10.50	14	11.25	75	65.25
Groundnut Stripper	Nos.	3.5	D19	5	17.50	7	24.50	5	17.50	5	17.50	4	14.00	26	91.00
Jack Fruit Pulvariser	Nos.	2	D3	1	2.00	1	2.00	0	0.00	0	0.00	0	0.00	2	4.00
Jam & Jelly making unit	Nos.	25	D21	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00	1	25.00
Maize - Combine harvester	Nos.	23	D5, D14	1	23.00	7	169.00	2	46.00	5	123.00	2	46.00	17	407.00
Maize Market Promotion Centre	Nos.	360	D3	1	360.00	0	0.00	0	0.00	0	0.00	0	0.00	1	360.00
Maize Sheller	Nos.	3	D20	0	0.00	1	3.00	0	0.00	1	3.00	0	0.00	2	6.00
Maize Thresher	Nos.	2.5	D16	0	0.00	2	5.00	1	2.50	0	0.00	1	2.50	4	10.00
Mango - bucket harvester	Nos.	0.0025	D5	80	0.20	170	0.43	110	0.28	125	0.31	115	0.29	600	1.50
Mango Harvest Net	Nos.	0.008 -0.01	D10, D12	835	6.75	835	6.75	835	6.75	835	6.75	835	6.75	4175	33.75
Millet Mini Mill	Nos.	16-20	D17, D19. D30	0	0.00	1	20.00	1	15.00	1	15.00	0	0.00	3	50.00
Millet processing unit	Nos.	5-8	D3, D7, D18, D26	8	59.00	3	6.00	1	1.00	0	0.00	0	0.00	12	66.00
Mini combine harvester for paddy	Nos.	0.15-0.35	D3, D7	5	0.75	8	3.75	0	0.00	0	0.00	0	0.00	13	4.50

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
SCM-PPC for Banana and Onion, Creating infrastructure, Ripening Chamber, Weigh Bridge, Grading and Packing hall, Onion Grading machine and other accessories	Nos.	320-327	D24, D25, D27	19	6125.00	3	1056.70	0	0.00	0	0.00	0	0.00	22	7181.70
SCM-Tiruchendurai banana market - Ripening Chamber-50MT	Nos.	0.5	D27	1	0.50	0	0.00	0	0.00	0	0.00	0	0.00	1	0.50
Onion peeling Machine	Nos.	25	D14	0	0.00	8	200.00	0	0.00	0	0.00	0	0.00	8	200.00
onion shed for individual Farmers	Nos.	1.5	D14	20	30.00	20	30.00	0	0.00	20	30.00	0	0.00	60	90.00
Pack House for cut flowers	Nos.	25-28	D19, D21	0	0.00	1	25.00	1	30.00	0	0.00	0	0.00	2	55.00
Paddy - Combine harvester	Nos.	23	D5	0	0.00	1	23.00	1	23.00	1	23.00	1	23.00	4	92.00
Paddy Winnower	Nos.	1	D26	2	2.00	3	3.00	3	3.00	3	3.00	3	3.00	14	14.00
Pop corn making machine	Nos.	0.05	D3	2	8.00	0	0.00	0	0.00	0	0.00	0	0.00	2	8.00
Portable rice milling machine for individual farmers	Nos.	2	D15	6	12.00	4	8.00	0	0.00	0	0.00	0	0.00	10	20.00
Potato harvester	Nos.	20	D21	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00	1	20.00
Processing and Value Addition centre for Tamarind	Nos.	50	D10	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
Provision of "Improved Seed Onion storage sheds" to the existing FPOs/Commodity Groups	Nos.	1	D12	5	5.00	0	0.00	2	2.00	0	0.00	3	3.00	10	10.00

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Provision of Neera tapping box to Pudukkottai Coconut Farmers Producer Company Ltd	Nos.	0.015 -0.2	D15	200	3.00	200	3.00	200	3.00	200	3.00	200	3.00	1000	15.00
Provision of Pack House	Nos.	300	D4	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
Provision of turmeric post harvest machineries	Nos.	25-26	D3	4	100.20	0	0.00	0	0.00	0	0.00	0	0.00	4	100.20
Seed Processing Unit to individual farmers @ Rs. 22.50 Lakh/Unit (75% subsidy)	Nos.	16-18	D15	1	16.88	0	0.00	0	0.00	0	0.00	0	0.00	1	16.88
Solar Dryer	Nos.	3-3.3	D3, D4, D10, D11, D15, D17, D18, D19, D20, D21, D26, D29	79	230.00	87	264.50	69	180.00	64	145.00	82	400.00	381	1219.50
Organic farming demo plots in Supply Chain Management farmers' field to encourage eco-friendly production technologies and value addition@RS.4000/demo	Nos.	0.04	D12	130	5.20	130	5.20	130	5.20	130	5.20	130	5.20	650	26.00
Solar tunnel dryer	Nos.	15	D20	0	0.00	0	0.00	15	225.00	0	0.00	0	0.00	15	225.00
Turmeric Solar dryer	Nos.	7-10	D3, D6	5	50.00	4	20.00	2	10.00	1	5.00	0	0.00	12	85.00
Sugar Cane crushing Machineries for Jaggery Preparation	Nos.	2-2.5	D15, D18	4	10.00	6	11.00	3	7.50	0	0.00	0	0.00	13	28.50

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Supply chain Management-Up gradation of existing regulated market(Ripening chamber, Controlled atmosphere with conventional bin storage, Pack house, Cold Storage,IQF,Collection van,E Auction Hall,Reefer van, Collection van}	Nos.	237-250	D3, D10	0	0.00	7	1827.70	1	68.50	0	0.00	0	0.00	8	1896.20
Tomato processing vending machine	Nos.	2.75, 27.5	D10, D12	1	2.75	2	80.00	0	0.00	0	0.00	0	0.00	3	82.75
Tree Fruit Picker	Nos.	.015-0.02	D22	100	1.50	100	1.50	100	1.50	0	0.00	0	0.00	300	4.50
Turmeric boiler	Nos.	0.5-0.3	D2, D3, D4, D18, D26	11	3.30	25	17.30	11	3.30	13	6.40	14	6.50	74	36.80
Turmeric grader	Nos.	1.7-2	D2, D28	2	3.75	1	1.75	1	1.75	1	1.75	1	1.75	6	10.75
Turmeric Polisher	Nos.	1.7-2	D2, D4, D16, D18, D26	11	19.20	27	51.20	11	19.20	12	22.20	12	22.20	73	134.00
Turmeric Pulvariser	Nos.	30-33	D2, D6, D11	3	98.46	2	65.64	3	69.64	2	65.64	2	65.64	12	365.02
Value addition of cashew apple	Nos.	100	D1	0	0.00	1	100.00	0	0.00	1	100.00	0	0.00	2	200.00
Vegetable Air Drying Unit	Nos.	300	D4	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
Steam Boiler for Aromatic Oil Extraction	Nos.	4	D26	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	5	20.00
Essential Oil extraction units	Nos.	2-3	D1, D26	2	4.00	5	18.00	3	6.00	5	10.00	6	12.00	21	50.00
country chekku (Power)	Nos.	6-8	D3, D12, D15, D22	12	73.50	10	68.50	8	63.50	8	63.50	10	68.50	48	337.50
Wooden Oil Expeller	Nos.	2	D3, D16	3	6.00	6	12.00	5	10.00	3	6.00	3	6.00	20	40.00

Intervention	Unit	Unit cost	Districts	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Cold Press gingelly oil unit	Nos.	3	D20	0	0.00	6	18.00	1	3.00	5	15.00	6	18.00	18	54.00
Total					**30214.99**		**16919.16**		**13497.63**		**11940.27**		**13447.88**		**86019.93**

D1-Ariyalur, D2-Coimbatore, D3-Cuddalore, D4-Dharmapuri, D5-Dindigul, D6-Erode, D7-Kancheepuram, D8-Kanyakumari,D9-Karur, D10-Krishnagiri, D11-Madurai, D12-Theni, D13-Nagapattinam, D14-Perambalur, D15-Pudukottai, D16-Namakkal, D17-Ramand, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-The Nilgiris, D22-Tiruvallur, D23-Thiruvarur, D24-Thoothukudi, D25-Tirunelveli, D26-Tiruvannamalai, D27-Trichy, D28-Vellore, D29-Villupuram, D30-Virudhunagar

The overall budget requirement for Agricultural Marketing sector is Rs.**86019.93** Lakh. The details of financial requirement for five years are presented in above Table 3.20.

3.6 INFRASTRUCTURE REQUIREMENT FOR SEED CERTIFICATION

3.6.1 Strengthening of Laboratory facilities

Timely availability of certified quality seeds with good yield potential continues to be the decisive factor in agricultural production in order to achieve the target of doubling the yield and hence should be given utmost importance. The Department of Seed Certification and Organic certification plays vital role in the enhancement of seed replacement rate by certifying quality seeds.

The seed certification wing is responsible for the production of certified seeds of notified varieties of crops. The seed quality control activities involve the inspection of seed selling point at regular intervals and drawing of seed sample for quality check from seed lots kept for sale. The samples are analyzed in the notified seed testing laboratories and based on the results of analytical reports actions are initiated against sub-standard seed lots.

Even as seeds are grains, not all grains are seeds because they possess certain qualities that enable them to grow. Establishment of seed testing lab will check those qualities like germination level, moisture content, physical purity and other distinguished variety (ODV), pest and disease infestation. If grains brought by farmers gratify minimum level of these qualities, they will be treated as seeds. Otherwise, they will be used as grains only. While germination test will ensure planting value of the seed, moisture content will determine quality of seed and seed purity decides quality and market value. The ODV test will help detect if there are any mixture of other varieties with one particular variety. Mixture of other varieties will decrease seed quality and create problems in developing into seedlings in the field. Thus to improve the seed quality, the seed processing units and seed testing laboratories are essentially need in the seed producing areas to achieve the goal.

Strengthening of the Directorate of Seed Certification and Organic Certification is essential to conduct the training programmes, review meetings, transfer of important techniques, seed certification procedure and legislation in

production. Strengthening of the Department by creating IT based infrastructure with computers and networking to the officials of the Department of Seed certification, Seed Inspection and Seed Testing wings, establishment of seed complex with seed testing laboratory, seed inspection office with technical support and modernization (updation) of seed certification procedure would enhance the production of certified seeds considerably in the State.

Besides modernizing the existing units, training seed growers for quality seed production, capacity building of extension functionaries, and provision of adequate infrastructure facilities would go long way for improving the activities of seed certification wing and seed testing laboratories in an effective manner.

3.6.2Strengthening of communication and networking facilities

Information and Communication Technology (ICT) is proved to be powerful tool to reach the downtrodden, neglected farming communities. The ICT tools could be used for dissemination of the agricultural technologies and seed production technologies in time with minimum budget. The Government of Tamil Nadu is equipping the State Agricultural Department with the State-of-the-art ICT Infrastructure under TNAUAGRITECH, which will facilitate agricultural related information access and advisory services to the farmers and all stakeholders of the supply-chain of the Agricultural system.

The seed moisture content (mc) is the amount of water in the seed. It is the most vital parameter, which influence the seed quality and storage life of the seed. Seed moisture content is closely associated with several aspects of physiological seed quality. For example, it is related to seed maturity, optimum harvest time, mechanical damage, economics of artificial seed drying, seed longevity and insect & pathogen infestation. Distribution of moisture meters to the certification institution can effectively monitor the seed moisture and seeds can be saved from infestation.

To achieve the above objectives, the infrastructure programmes are proposed with a budget outlay of Rs. **2566.94** Lakh (Table 3.21).

Table 3.21 Budget requirement for Infrastructure Development in Seed Certification

(Rs. in Lakh)

Interventions	Districts covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Strengthening of Seed Certification lab															
Blower, Conductivity meter, Dehuller/Scarifier, Dehumidifier Air Conditioner, Digital moisture meter, Dunnage, Fabricated display Racks ,Geaser, Generator, Heater,Hot air oven,Humidifier,Incubator,Induction stove,Microscope,Moisture meter,Packing machine,R.O system,Sample racks,Seed Grinder,Sieve,Thermohydro meter,Dunnage,Trolley for carriages,Working chair,Working table, Miscellaneous,	All districts except D1 and D14	Nos	13.36	23	307.28	18	240.48	7	93.52	1	13.36	0	0	49	654.64
Strengthening of communication and networking facilities															
Computer accessories	All District except D1 and D24	0.00	0.50	442	203.5	0	0	0	0	0	0	0	0	442	203.5
Infrastructure and assets															

Strengthening of office premises by constructing new buildings	D9, D10, D17, D20, D28 and D31	0.00	0.24	884.6	189.2	1200	282.3096	1400	362.28	2000	500	3000	375	8484.6	1708.798
Total					**699.98**		**522.79**		**455.81**		**513.36**		**375**		**2566.94**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4-Dharmapuri, D5-Dindugal, D6-Erode, D7-Kancheepuram, D8-Kannyakumari, D9-Karur, D10- Krishnagiri, D11-Madurai, D12-Nagapattinam, D13- Namakkal, D14-Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, D21-Theni, D22-Thoothukudi, D23-Tirunelveli, D24-Tiruppur, D25-Tiruvallur, D26-Tiruvannamalai, D27-Tiruvarur, D28-Trichy, D29-Vellore, D30-Villupuram and D31-Virudhunagar

The overall budget requirement for Seed Certification Sector is Rs.2556.94 lakh. The details of financial requirement for five years are presented in above Table 3.21.

3.7 INFRASTRUCTURE REQUIREMENT FOR ANIMAL HUSBANDRY DEPARTMENT

3.7.1 Establishment of Livestock Farms and Poultry Industry

Intensive animal farming or industrial livestock production, also called factory farming, is a modern form of intensive farming that refers to the keeping of livestock, such as cattle and poultry at higher stocking densities than is usually the case with other forms of animal agriculture. The main products of this industry are meat, milk and eggs for human consumption. Confinement at high stocking density is one part of a systematic effort to produce the highest output at the lowest cost by relying on economies of scale, modern machinery, biotechnology and global trade. Livestock industry continues to demonstrate a beneficial impact on rural people by improving their income, employment and consumption and thereby acting as a potential tool in alleviating rural poverty. The livestock population is expected to grow at the rate of 0.55 per cent in the coming years and the population is likely to be around 781 million by 2050. However, the productivity of animals is of 20-60 per cent lower than the global average due to improper nutrition, inadequate health care and management. Hence in Tamil Nadu State, the establishment of dairy farms; piggery units; buffalo dairy units; goattery unit; integrated farming units; model farms; mini dairy units; cattle shed; poultry shed; farm road and development of poultry broiler industry need to be intensified.

3.7.2 Establishment of Cattle Feed Production Units

Fodder scarcity and poor quality of available fodder are the major constraints in increasing livestock productivity. Enhancing the production of livestock is absolutely essential. The production cost of cattle feed coupled with erratic supply of green fodder due to frequent drought condition aggravate the situation. In order to achieve the projected demand for fodder, it is necessary to bring more area under high yielding fodder crops for which quality seeds of improved variety is the pre-requisite. Besides, emphasis has to be laid on optimum utilization of wasteland to grow fodder. Establishment of Azolla plots; Hydroponics fodder production unit; Fodder seed bank; Cattle feed manufacturing unit; Mineral mixture plant; silo; rural

herbal nursery units for SHG women; solar powered units; Seed Godown and Production of fodder seed testing unit - Chilling centres are suggested for enhancing the activities of animal husbandry sector in Tamil Nadu State . The number of units required for establishing the cattle feed production units in various districts are presented in Table 3.22.

3.7.3 Production of Organic Manure

The vision of organic agriculture in India has necessitated to recognize the need to change in farming system approach and initiated program to promote organic farming in a big way. The Network Project on Organic Farming (NPOF) for promotion of organic farming and the National Program for Organic Production (NPOP) to provide institutional mechanism for implementation of National Standards for organic cultivation and accreditation of certification agencies and inspecting agencies would pave way for the production and distribution of quality and safe food and also help in protecting the environmental degradation owing to indiscriminate use of chemicals in crop cultivation.

The diverse climatic region in Tamil Nadu favors cultivation of wide range of crops under the “organic” system of cultivation. The major focus is to improve the soil fertility and productivity by encouraging biological cycles within the farming systems by involving micro-organisms, soil flora and fauna, plants and animals etc.

3.7.4 Propagation of Drip / Micro Irrigation

With increasing demand on water from various sectors, the availability of water is under severe stress. Agriculture sector is the largest use of water. While irrigation projects (Major and medium) have contributed to the development of water resources, conventional methods of irrigation are inefficient and lead to wastage of water. It has been recognized that the use of modern irrigation methods like drip and sprinkler irrigation are the ways for the efficient use of surface as well as ground water resources. A scientific method of irrigation viz., Sinking of new Bore wells with submersible motor EB, Pump room and pipe line arrangements, Open wells (LS),

Providing surface level tank (200000 lit capacity) and Farm ponds in Pudukkottai district; and Sprinklers in Salem and Villupuram districts were targeted (Table 3.22).

3.7.5 Strengthening of Breeding Units

Artificial insemination (AI) has proven to be very effective for the improvement of the genetic potential of animals for higher production and there is no surprise why today AI is the back bone of all breeding programmes in India. In commercial dairy production, over 80% of all the cattle are now bred artificially. A large proportion of the success is due to improvement of the genetic potential of dairy cattle through use of outstanding sires by artificial insemination. The entire gamut of activities and processes involved in semen production, processing, storage and distribution will be modernized to improve the efficiency of the AI programme. Departmental Farms will also be strengthened to act as ET hubs to revamp the frozen semen production, processing, storage and distribution. Strengthening of breeding inputs (infra, instrument, equipment and vehicle) in Coimbatore, Thanjavur, Nagapattinam, Villupuram and Tiruppur districts; Establishment of Semen Bank in Salem; and establishment of Frozen Semen Bank at Veterinary College and Research Institute, and Bovine Infertility Diagnostic and Training Centre with special reference to Buffaloes in Namakkal were proposed. The details of district-wise budget split-up are shown in Table 3.22.

3.7.6 Provision of Facilities for Improved Delivery of Veterinary Services

Veterinary services need to be delivered following "Good Veterinary practices" and “Good Animal Husbandry Practices” for which, minimum infrastructure like proper building, necessary equipments, furniture, etc., should be available. The advances in the field of Veterinary profession can be disseminated more effectively in an efficient, user friendly environment for the ultimate benefit of the farmers. Improved infrastructure facilities will provide improved veterinary services contributing to reduction in the incidences of animal diseases thereby increasing the overall productivity of animal wealth.

The Rural Veterinary Dispensaries and Veterinary Institutions are either functioning from rented premises or in dilapidated buildings do not satisfy the requirement or with a restricted scope for further expansion, these are not ideal infrastructure. This necessitates strengthening the infrastructure of the veterinary institutions to offer better delivery of services and to reshape itself into knowledge resource centers where best practices are being disseminated to the farmers. By this the State's impressive cross bred cattle gene pool can be favorably exploited for increased egg, meat and milk production.

3.7.7 Strengthening Infrastructure Facilities in Veterinary Health Institutions and DairyUnits

Providing proper infrastructure and equipment to the veterinary health care institutions is necessary for the timely diagnosis and treatment of animal diseases. Further a strong program for the supply of sufficient veterinary vaccine is imperative. Each veterinary health care institution is to be provided with cold storage facilities to store vaccine. Sensitization of the general public and livestock farmers on various livestock diseases through information, education and communication campaign would help in educating the people about animal diseases. Similarly strengthening of veterinary institutions, livestock farms, and modernization of dairy units and conduct of health camps are suggested for enhancing the activities of animal husbandry sector. Buildings to veterinary institutions/Quality Assurance Labs; Modernization of Chilled Water System, Process Equipments and Expansion of Butter and SMP Godowns with Security Measures around the boundary of Dairy at Krishnagiri district; strengthening infrastructure for production of Ultra Heat Treatment (UHT) milk and related products; Creation of facilities at Vellore dairy for value addition of milk procured from farmers; Strengthening of Extension Services; Up gradation of Bacterial Vaccines Production Laboratory to GMP Standard at IVPM, Ranipet; Mobile medical ambulance; Mobile input units; Storage godown for liquid nitrogen at Cattle Breeding fodder Development, Provision of separate Post Mortem Room; and Construction of Dead bird Disposal pit are proposed in various districts .

3.7.8 Establishment of New Structures for Veterinary Services

Livestock productivity is dependent on effective health management. An all-encompassing approach covering vaccine production, sero-surveillance, vaccination, biosecurity, disease diagnosis and appropriate interventions will ensure better livestock health leading to sustained productivity. The infrastructure viz., starting new hospitals & dispensaries / sub-Centre etc.; establishment of Solar lighting panels at veterinary institutions, surgical theatres at veterinary institution, mobile disease diagnostic labs, ASV lab of GMP standards at IVPM, and Innovation and Instrumentation Centre to fabricate farm equipment/devices for sustainable livestock farming are proposed. The details of budget requirement in various districts are shown in Table 3.22.

3.7.9 Establishment of Disease Diagnostic Centers

Animal health care services and prevention of animal diseases is a priority for maintenance of a healthy livestock for optimum production. Protective and therapeutic activities of the Animal Husbandry Department are being conducted through various institutions such as Veterinary Polyclinics, Veterinary Hospitals, Veterinary Dispensaries, Mobile Veterinary Units and sub-centres. Livestock are economically important and are affected by many ailments. Delay in diagnosis of these conditions will lead to increase in loss of productive days, increase in the recovery period and consequent loss of production. Sometimes, due to inaccurate or delayed diagnosis, loss of life of the animals also results. In order to avoid these loses to the farmers and to save the life of the animals, it is essential to provide advanced diagnostic aids to the veterinary institutions. Modern diagnostic aids will enable the Veterinary Institutions function as “Referral centres” by providing them with cutting edge technologies/treatments, reduce loss of productivity due to delay in diagnosis and will significantly reduce infertility among dairy cattle and prevent loss of germplasm. Establishment of Bovine Infertility Diagnostic and Training Centre with special reference to Buffaloes; Veterinary Forensic Sciences Laboratory; Vaccination dispensaries in Erode; a “Centre for Poultry Products Certification for freedom from microbes for Export” and providing ultrasound scanners CR X ray unit in every district of Tamil Nadu are proposed.

3.7.10 Strengthening Extension Facilities

Impetus is being given for providing better need based extension services to the rural farmers. Latest extension methods with judicious use of audio-visual aids, online veterinary services with maximum utility of latest electronic aids are ensured. The concept of strengthening the extension services has to be undertaken. A separate extension wing needs to be formed at the block level and it will be on mobile, provided with extension inputs, chalk out a routine tour programme, villages visit, conduct field level meeting, regular follow up etc., and officers will be calibrated based on the level of adoption by the target villages and farmers. Establishment of "Farmers Resource Centre" at Cattle Breeding and Fodder Development; Mobile E-extension units for awareness campaign; Farmer Training Hall/Centre and Strengthening of University peripheral centers and developing training modules were proposed in various districts

Table 3.22 Budget for infrastructure development in Animal Husbandry

(₹ in Lakh)

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Infrastructure															
1	Establishment of Vermi composting unit (single bed)	Nos	0.05	All districts except D8, D16, D20, D27	4304	255.02	4214	250.42	4203	249.87	4203	249.87	4214	250.53	21138	1255.71
2	Fodder plot development	acre	0.05	All districts	12400	620.00	12400	620.00	12400	620.00	6200	310.00	6200	310.00	49600	2480.00
3	Meikkal land development (incl infrastructure development)	acre	6	All districts except D3, D5, D6, D11, D13, D15, D16, D17, D19, D20, D22, D23, D25, D27, D29, D30	222	1113.60	127	697.00	177	672.50	118	589.90	165	517.90	809	3590.90
4	Development of Seed Production plots	acre	0.25	D3, D9, D10, D11, D14, D15, D18, D23, D24, D25, D26, D28, D29, D30	514	628.25	464	116.00	488	122.00	503	125.75	503	125.75	2472	1117.75
5	Establishment of Vermi compost unit (10 beds) at Farms	Nos	4	D7, D10, D15, D18, D19, D22, D24, D29, D30, D31	54	216.00	53	212.00	54	216.00	53	212.00	54	216.00	268	1072.00
6	Establishment of Farm Protection Cover (Bio-security wall)	km	5	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30	30	130.00	165	805.00	10	30.00	10	30.00	10	30.00	225	1025.00
7	Establishment of Feed mixing/ feed	Nos	25	D10, D12, D15, D18, D19, D20, D22, D24, D29,	44	22.00	54	272.00	44	22.00	44	22.00	44	22.00	230	360.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	block units			D30												
8	Construction of silo Pit for livestock farm	Nos	1	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30	50	204.00	34	34.00	34	34.00	34	34.00	34	34.00	186	340.00
9	Construction of Over Head Tanks/ GLR / Pre-fabricated tanks in farm	Nos	20	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30	44	26.40	64	426.40	44	26.40	44	26.40	44	26.40	240	532.00
10	Bore well for livestock farms	Nos	8	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30	24	192.00	24	192.00	24	192.00	20	160.00	20	160.00	112	896.00
11	Establishment of Infrastructure facilities for sex-sorting facility	Nos	30	D7, D10, D20, D21	26	1320.00	22	880.00	19	570.00	20	1040.00	17	730.00	104	4540.00
12	Induction of new Genetic Pool	Nos	0.5	D10, D15, D18, D19, D20, D22, D24, D29, D30, D31	490	218.75	490	218.75	490	218.75	460	206.75	460	206.75	2390	1069.75
13	Establishment of IVF Lab	Nos	300	D10, D19, D20	1	300.00	2	600.00	0	0.00	0	0.00	0	0.00	3	900.00
14	Establishment of Liquid Nitrogen Plant	Nos	500	D10, D19, D20, D24	3	1500.00	3	1500.00	0	0.00	0	0.00	0	0.00	6	3000.00
15	Establishment of Embryo Transfer Lab	Nos	100	D10, D19, D20	1	100.00	2	200.00	0	0.00	0	0.00	0	0.00	3	300.00
16	Establishment/ Strengthening of Semen Processing Lab	Nos	25	D10, D19, D20, D25	3	75.00	4	275.00	3	75.00	2	50.00	2	50.00	14	525.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
17	Development of Native chicken farms	Farm	1	All districts	775	775.00	775	775.00	775	775.00	775	775.00	775	775.00	3875	3875.00
18	Establishment of disposal pits for poultry unit	Nos	1	All districts	1820	1820.00	1546	1560.00	1546	1560.00	1446	1460.00	1345	1345.00	7703	7745.00
19	Milking Machine	Nos	0.56	D2, D4, D10, D14, D15, D18, D19, D24, D29	485	154.10	425	125.50	520	173.90	425	125.50	525	176.70	2380	755.70
20	Establishment of Modern Poultry Shed	Nos	50	D7, D10, D18, D19, D22, D24, D29,	5	150.00	5	175.00	5	175.00	5	175.00	5	175.00	25	850.00
21	Establishment of Modern Hatchery Complex	Nos	300	D7, D10, D15, D18, D19, D22, D24,	1	300.00	0	0.00	5	1500.00	0	0.00	0	0.00	6	1800.00
22	Establishment of Rabbit Units	Nos	0.03	D8, D31	82	11.00	22	3.10	60	7.90	44	6.20	61	9.15	269	37.35
23	Establishment of Modern Dairy/ Bull Shed	Nos	150	D10, D15, D18, D19, D20, D22, D24, D29	8	1175.00	0	0.00	6	900.00	2	275.00	6	900.00	22	3250.00
24	Establishment of Modern Piggery Shed	Nos	150	D10, D15, D18, D24, D29	5	750.00	0	0.00	5	750.00	0	0.00	5	750.00	15	2250.00
25	Establishment of Modern Sheep/Goat Shed	Nos	50	D10, D15, D18, D24, D29, D30, D31	7	350.00	1	50.00	5	250.00	1	50.00	10	500.00	24	1200.00
26	Improvement of infrastructure facilities at PEC, Vaigai dam	Nos	50	D11, D21	0	0.00	0	0.00	1	50.00	0	0.00	1	35.00	2	85.00
27	Establishment of Infrastructure facilities for	Nos	30	All districts except D6, D7, D10, D12, D20, D23, D27	149	4460.00	95	2840.00	101	3020.00	76	2270.00	89	2660.00	510	15250.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Veterinary Institutions															
28	Establishment of Mobile Disease Diagnostic Labs	Nos	20	All districts	71	1420.00	42	840.00	43	860.00	37	740.00	34	680.00	227	4540.00
29	Establishment of Mobile Veterinary Units	Nos	10	All districts	113	1200.00	41	480.00	36	420.00	31	360.00	16	180.00	237	2640.00
30	Establishment of surgical theatres at veterinary institution	Nos	30	All districts	84	2520.00	81	2430.00	81	2430.00	81	2430.00	58	1740.00	385	11550.00
31	Establishment of Ambulance facility for animals	Nos	80	All districts	31	2480.00	31	2480.00	0	0.00	0	0.00	0	0.00	62	4960.00
32	Livestock Shandy improvement works	Nos	10	D16	2	20.00	2	20.00	2	20.00	2	20.00	2	20.00	10	100.00
33	Development of slaughter house infrastructure	Nos	20	D16	1	20.00	1	20.00	1	20.00	1	20.00	1	20.00	5	100.00
34	Establishment of Farmers training Centre	Nos	200	All districts	0	0.00	31	6200.00	0	0.00	0	0.00	0	0.00	31	6200.00
	Grand Total				**21849**	**24526.12**	**21220**	**25297.17**	**21182**	**15960.32**	**14637**	**11763.37**	**14700**	**12645.18**	**93588**	**90192.16**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11-Madurai, D12- Nagapattinam, D13- Namakkal, D14- Perambalur, D15- Pudukottai, D16- Ramanathapuram, D17- Salem, D18- Sivagangai, D19- Thanjavur, D20-The Nilgiris, D21- Theni, D22- Thiruvarur, D23- Thoothukudi, D24- Tirunelveli, D25- Tiruppur, D26- Tiruvallur, D27- Tiruvannamalai, D28- Trichy, D29- Vellore, D30- Villupuram, D31- Virudhunagar

3.8 INFRASTRUCTURE FOR DAIRY DEVELOPMENT

The importance of dairying in a country like India hardly needs to be emphasized. India has vast resources of livestock, which play an important role in the national economy and also in the socioeconomic development of millionsof rural households. India has one of the largest stocks of cattle and buffaloes: more than 50 percent of the world's buffaloes and 20 percent of its cattle. Dairy sector acts as an important source of income for rural families, plays a vital role in providing gainful employment and income generating opportunities in the district. Dairy industry in the country is expected to witness spectacular growth in 2017, according to experts.

During the last 10 years, the annual growth rate in Indian dairy industry is 4.6 per cent as compared to the global growth rate of 2.2 per cent. During this period, per capita consumption of milk in the country was 340 g a day as against 299 g globally. “India’s milk production has touched 155.4 metric tonnes during 2015-16. Consumption is increasing at a faster rate. However in the country more than 90 per cent of the dairying is at the subsistence level so the emerging trends have to increase the county’s milk production moreover. To fulfill the shortage in dairy sector the following interventions have been suggested.

3.8.1Strengthening of milk storages and processing units

Clean milk production is a concept being used everywhere, where quality of milk has become prime importance. It has to be maintained throughout the milk supply chain right from the dairy farm environment to cooling & storage to its packaging. The machinery and equipment required depends on the level of mechanization desired and the scale of operation. However, some machinery and equipment are essentially required such as storage tanks, washer, coolers, pumps and processing equipment’s. Except for this some electrical installation also required to provide proper storage facilities.

The major interventions are,

1. Milk storage tanks of various capacities
2. Milk tankers

3. Milk pumps
4. Processing equipment
5. Pasteurizers
6. Heaters and chillers
7. Washers and conveyors
8. Pipes and fittings
9. Cleaning equipment
10. Electrical installations (UPS, generators, stabilizers, control panel)

3.8.2 Enhancing milk production and milk processing units

The quality of animals is critical in determining its milk productivity and hence overall production. Currently, low productivity per animal hinders development of the dairy sector. Despite being the world's largest milk producer, India's productivity per animal is very low, at 987 kg per lactation, compared with the global average of 2038 kg per lactation.

The low productivity is a result of ineffective cattle and buffalo breeding programmes, limited extension and management on dairy enterprise development, traditional feeding practices that are not based on scientific feeding methods, and limited availability and affordability of quality feed and fodder. Animal health and breeding services provision, veterinary infrastructure development and vaccinations are the responsibility of the state government. These services have traditionally been provided for free or at a very subsidized rate but in the past few years it has been payable. state livestock development agencies are being set up as autonomous bodies to offer services in animal breeding in the form of procurement, production and distribution of breeding inputs (such as semen and liquid nitrogen), training and promotional activities. Despite these initiatives, the availability of services remains limited and extension activities in dairy management are woefully lacking. Let to get a better improvement in milk production than before the following inputs have been suggested.

1. Provision of veterinary medicine
2. Fodder development equipment and seed material
3. Milk testing equipment
4. Equipment for artificial insemination
5. Milk society buildings and cow shed
6. Cryogenic containers
7. Weighing machines
8. Computer accessories

3.8.3 Processing and value addition unit

While adding value to farm and livestock products before they reach the local and international market is one of the key aims of Vision 2030. Product diversification has become an important aspect of business strategy with reasons for this increased focus being increased profitability, reduction in risk, increasing competition, higher growth and more efficient resource allocation. Value addition in the dairy value chain is still a challenge in our country. Value addition has been hailed as one of the solutions to the perishability challenge of milk by converting it to a more durable form and hence reducing farm losses. But only few of them undertake the value addition In India. To maximize the value addition in rural areas the following interventions have been suggested

1. Skim milk powder plant,Construction of dairy
2. Dairy processing plants
3. Water and effluent treatment plants
4. Steam raising plant
5. Construction of warehouse for dairy products
6. Fat handling and other dairy equipment's

Budget allocation

The overall budget requirement for Dairy development Sector is Rs.**369963.00** lakh (Table 3.23).

Table 3.23 Infrastructure requirement for Dairy Development

(₹ in Lakh)

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Infrastructure															
1	Milk Storage Tanks of various capacities	1 unit	15	All districts except D1	40	600.00	54	810.00	48	720.00	61	915.00	43	645.00	246	3690.00
2	Milk Tankers of various capacities	1 unit	25	D2, D4, D6, D7, D10, D11, D13, D14, D17, D24, D27, D28, D29, D30, D31	20	500.00	30	750.00	34	850.00	30	750.00	22	550.00	136	3400.00
3	Bulk Milk coolers of Various capacities	1 unit	15	All districts except D8	136	2040.00	134	2010.00	138	2070.00	129	1935.00	139	2085.00	676	10140.00
4	Milking machine	1 unit	0.8	All districts	1105	884.00	1105	884.00	1205	964.00	1105	884.00	1205	964.00	5725	4580.00
5	Cow shed	1 unit	5	All districts	770	3850.00	720	3600.00	725	3625.00	725	3625.00	725	3625.00	3665	18325.00
6	Society Buildings	1 unit	20	All districts	471	9420.00	471	9420.00	471	9420.00	471	9420.00	496	9920.00	2380	47600.00
7	Parlour structures	1 unit	5	All districts except D1	805	4025.00	805	4025.00	810	4050.00	810	4050.00	820	4100.00	4050	20250.00
8	Milk product storage cabinets	1 unit	0.3	All districts except D2	4400	1320.00	4270	1281.00	4280	1284.00	4255	1276.50	4355	1306.50	21560	6468.00
9	Milk testing equipment and Laboratory.	1 unit	5	All districts except D24	37	185.00	43	215.00	39	195.00	35	175.00	42	210.00	196	980.00
10	Skim Milk powder Plants	1 unit	6000	D7, D11, D14, D17	0	0.00	3	18000.00	1	6000.00	0	0.00	0	0.00	4	24000.00
11	Dairy Processing Plants	1 unit	6000	D5, D6, D7, D10, D13, D19, D21,	0	0.00	1	6000.00	8	48000.00	3	18000.00	3	18000.00	15	90000.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D24, D25, D26, D28, D29, D30, D31												
12	Refrigeration Plants	1 unit	500	All districts except D1, D2, D3, D8, D9, D11, D12, D14, D15, D16, D22, D23, D27, D31	0	0.00	5	2500.00	6	3000.00	3	1500.00	3	1500.00	17	8500.00
13	Water Treatment Plants. Reverse Osmosis plant	1 unit	100	All districts except D1, D12, D16, D22, D23, D25	1	100.00	10	925.00	15	1425.00	7	700.00	6	600.00	39	3750.00
14	Effluent treatment plant	1 unit	100	All districts except D1, D2, D3, D31	0	0.00	9	900.00	8	800.00	17	1700.00	4	400.00	38	3800.00
15	Steam raising plant with accessories	1 unit	100	All districts except D1, D8, D9, D12, D16, D22, D23, D31	0	0.00	3	300.00	16	1600.00	5	500.00	3	300.00	27	2700.00
16	Construction of Dairy	1 unit	1500	D4, D5, D7, D10, D11, D13, D14, D15, D17, D18, D19, D21, D26, D27, D28, D29, D30	0	0.00	3	4500.00	14	21000.00	3	4500.00	2	3000.00	22	33000.00
17	Construction of Skim milk powder Plant	1 unit	1500	D11, D14, D17, D27	0	0.00	4	6000.00	0	0.00	0	0.00	0	0.00	4	6000.00

Sl. No	Interventions	Unit	Unit cost	Districts covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	BMC buildings	1 unit	15	All districts except D1, D2, D3, D8	136	2040.00	134	2010.00	127	1905.00	130	1950.00	125	1875.00	652	9780.00
19	Cattle feed Plants	1 unit	5000	D6, D11, D14, D17, D27, D31	1	5000.00	5	25000.00	0	0.00	0	0.00	0	0.00	6	30000.00
20	Ice cream and dairy product buildings	1 unit	2500	D11, D14, D17, D21, D25, D26, D27, D29, D30	0	0.00	1	2500.00	6	15000.00	2	5000.00	1	2500.00	10	25000.00
21	Ware house for Dairy products	1 unit	200	All districts except D1, D9, D24, D31	6	1200.00	15	3000.00	11	2200.00	14	2800.00	7	1400.00	53	10600.00
22	Ware house for Dairy consumables	1 unit	200	All districts except D1, D3, D12, D16, D21, D22, D23, D24	1	200.00	4	800.00	12	2400.00	10	2000.00	10	2000.00	37	7400.00
	Grand Total				**7929**	**31364.00**	**7829**	**95430.00**	**7974**	**126508.00**	**7815**	**61680.50**	**8011**	**54980.50**	**39558**	**369963.00**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11-Madurai, D12- Nagapattinam, D13- Namakkal, D14- Perambalur, D15- Pudukottai, D16- Ramanathapuram, D17- Salem, D18- Sivagangai, D19- Thanjavur, D20-The Nilgiris, D21- Theni, D22- Thiruvarur, D23- Thoothukudi, D24- Tirunelveli, D25- Tiruppur, D26- Tiruvallur, D27- Tiruvannamalai, D28- Trichy, D29- Vellore, D30- Villupuram, D31- Virudhunagar

3.9 ANIMAL SCIENCE RESEARCH

Animal production and the science that informs it are confronted by an emerging and globally complex set of conditions in the 21st century that generate new challenges for sustainable animal production, which in turn requires rethinking about the overall nature of animal science. These challenges include, but are not limited to, growing demand for animal products by an increasingly affluent, global population approaching 10 billion people; the globalization of food systems that cross continents with consequences for individual country and regional concerns about food security; the intensification of production systems in the context of societal and environmental impacts; the development and maintenance of sustainable animal production systems in the face of global environmental change; and the multidecadal stagnation in research funding for animal production. The plans are proposed with a budget outlay of Rs. **53669.74** lakh.

Conservation of genetic diversity between and within domestic animal breeds is an insurance for the future. A broad genetic base is crucial to deal with future changes in environment, markets for animal products and animal production systems. In addition, domestic animal breeds of Dutch origin are a valuable part of our cultural heritage.

CGN is giving advice to governmental and non-governmental organizations and the private sector on conservation and sustainable use of Animal Genetic Resources, both national and international. The following services will be carried out by the animal genetic resource centre

- Policy advice
- Establishment and management of gene bank collections
- Research (genetics and cryobiology)
- Advice on genetic management of small populations
- Monitoring and documentation

Table 3.24 Budget for infrastructure requirement of Animal Science Research

(₹ in Lakh)

Sl. No	Interventions	Districts Covered	Unit	Unit Cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Infrastructure and Assets**															
1	Breed Research Stations	Erode	No	650	0	0.00	0	0.00	1	650.00	0	0.00	0	0.00	1	650.00
2	Genetic Conservation Centres	Madurai, Sivagangai	No	168.25	1	168.25	2	336.50	2	336.50	2	336.50	2	336.50	9	1514.25
3	Animal Ambulance and referral hospitals for addressing rural veterinary care	Kanchipuram, Madurai, Thanjavur, Namakkal, Tiruchirappalli	No	125	5	705.00	5	705.00	5	705.00	0	0.00	0	0.00	15	2115.00
4	E-extension services	Tiruvallur	Nos	54.65	4	218.60	4	218.60	5	273.25	5	273.25	5	273.25	23	1256.95
5	Farm animal waste management	Kanchipuram, Tiruvallur and Sivagangai	No	50	6	300.00	7	350.00	6	300.00	5	250.00	3	150.00	27	1350.00
6	Centralized Molecular laboratories	Thanjavur, Namakkal and Tirunelveli	Nos	508	3	1524.00	3	1524.00	2	1016.00	0	0.00	1	508.00	9	4572.00
7	Solar energy models	Kanchipuram	No	50	1	50.00	0	0.00	1	50.00	0	0.00	1	50.00	3	150.00
8	Animal Feed and Fodder Technology Parks	Tirunelveli	Nos	150	0	0.00	1	150.00	1	150.00	0	0.00	0	0.00	2	300.00
9	Nutraceuticals Analytical Laboratory	Tiruvallur	Nos	100	0	0.00	1	100.00	1	100.00	1	100.00	0	0.00	3	300.00
10	Referral Water Testing Laboratories	Thanjavur and Tirunelveli	Nos	216.4	4	865.60	4	865.60	2	432.80	3	649.20	3	649.20	16	3462.40

Sl. No	Interventions	Districts Covered	Unit	Unit Cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Manufacturing units for production of agro - dairy products	Tiruvallur	Nos	291.4	0	0.00	1	291.40	1	291.40	1	291.40	0	0.00	3	874.20
12	Modernization of dairy operations	Kanchipuram and Tirunelveli	No	116.5	2	233.00	1	116.50	2	233.00	1	116.50	1	116.50	7	815.50
13	Methane mitigating strategies	Tiruvallur	Nos	81	2	162.00	2	162.00	2	162.00	2	162.00	2	162.00	10	810.00
14	Integrated farm operations	Kancheepuram and Erode	Nos	125	2	250.00	2	250.00	2	250.00	2	250.00	1	125.00	9	1125.00
15	Farm mechanization in livestock and poultry farms	Kancheepuram	Nos	58.25	2	116.50	2	116.50	1	58.25	2	116.50	2	116.50	9	524.25
16	Climate change mitigation strategies	Kancheepuram	Nos	8100	1	8100.00	1	8100.00	1	8100.00	0	0.00	0	0.00	3	24300.00
17	Socio economic empowerment of livestock farmers	Kancheepuram and Namakkal	Nos	51.39	4	205.56	3	154.17	4	205.56	4	205.56	4	205.56	19	976.41
18	Livestock conservation centre	Erode, Thanjavur and Sivagangai	Nos	105.93	3	317.79	3	317.79	4	423.72	3	317.79	3	317.79	16	1694.88
19	Products incubation centre	Tiruvallur	Nos	291.4	1	291.40	1	291.40	1	291.40	2	582.80	2	582.80	7	2039.80
20	Value added livestock products and development of food	Tiruvallur	Nos	245	1	245.00	1	245.00	1	245.00	2	490.00	2	490.00	7	1715.00

Sl. No	Interventions	Districts Covered	Unit	Unit Cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	novelties															
21	Development of vaccines	Tiruvallur	Nos	296.3	2	592.60	1	296.30	2	592.60	1	296.30	1	296.30	7	2074.10
22	Fodder bank for fodder seed/ slips	Tiruvallur	Nos	150	2	300.00	2	300.00	1	150.00	1	150.00	1	150.00	7	1050.00
	Total					**14645.30**		**14890.76**		**15016.48**		**4587.80**		**4529.40**		**53669.74**

3.10 INFRASTRUCTURE REQUIREMENT IN FISHERIES DEPARTMENT

3.10.1 Establishment of Fish Culture Ponds and Provision of Inputs

In Tamil Nadu, almost all the water bodies are dependent on the seasonal monsoons. Further, water retention period of most of the tanks ranges between four and six months only. Hence, planning of fish seed production and subsequent stocking in these tanks in the right time would lead to good fish production. Besides, farmers do not have storage ponds in their farms and scarcity of farm laborers in villages pose operational problems in day to day agriculture works. So farmers could be encouraged to do fish culture in multi-purpose ponds that help in water retention, ground water recharge and irrigating agriculture crops. The farmers are also showing greater acceptance and interest for carrying out fish culture in the multipurpose farm pond and they are benefitted additionally through the income from fisheries activity. Hence, the intervention is to encourage the farmers to create new ponds which could serve as a multi-purpose pond and also for fish culture simultaneously.

These multi-purpose farm ponds excavated in the land of small and marginal farms can be utilized for fish culture, conservation, critical Irrigation, horticulture and plantation to improve their livelihood status. The construction of Multi Purpose Farm Ponds can be taken up under MGNREGS. The suitable site for multi-purpose farm pond can be done and input subsidy assistance for fish seed, feed cost and harvesting material for fish seed rearing and fish culture in farm ponds to small and marginal farmers may also be provided. The selected beneficiaries will be given training on fish culture activity. The physical and financial requirement of establishment of fish culture ponds and provision of inputs in district wise are furnished in Table 3.25.

3.10.2 Establishment of GIFT farms and provision of inputs

Tilapia is named as the Food Fish of the 21st century and is popularly known as aquatic chicken. Tilapia occupies lower level food chain which makes the culture economical and eco friendly. Monosex culture of Tilapia is advantageous as they

grow fast and uniformity in size is generally obtained in a culture pond. The Genetically Improved Farmed Tilapia (GIFT) has enhanced the culture as well as market potential as it is scientifically proved to be superior to fresh water carps and would be an ideal candidate for fish culture. Moreover, GIFT fish has high export potential to USA, African countries and Japan. Domestic demand also needs to be tapped due to easiness to fillet the fish. Technical parameters of Tilapia culture includes site selection, pond development, pre and post stocking operations, stocking, fertilization, feeding, harvest and post harvest operations. The district wise physical and financial requirement of establishment of GIFT farms and provision of inputs are furnished in Table 3.25.

3.10.3 Ornamental Fish Culture

The ornamental fish keeping is a hobby which is gradually replacing outdoor leisure activities. The ornamental fish trade has a significant role both as a foreign exchange earner and as a source of employment. The low production cost and higher returns within a very short time span, involvement of a wide variety of ornamental organisms, ever growing demand for fishes both in the domestic and international markets and the scope for development of new products and accessories to cater to the dynamic needs of the sector are the major attractions as compared to any other sector.

The state possesses a remarkable history in ornamental fish breeding and can aptly be termed as the “Ornamental Fish Capital of India” due to its contribution to both domestic as well as export sector. The state is the prime contributor to the domestic ornamental fish marketing sector in India and caters ornamental fish right from low valued varieties to high valued varieties to almost all states in India round the year. Tamil Nadu occupies the second position in ornamental fish export from India.

Ornamental Fish Culture and Trade in Tamil Nadu especially at Kolathoor village on the outskirts of Chennai (Red hills, Devenampet etc.) is famous for ornamental fish culture by small-scale producers. Ornamental fish production, especially women SHGs have successfully taken up breeding and raising of

ornamental fishes so as to earn their livelihood. On the commercial front, the ornamental fish trade is a growing business with Chennai and Kolkata turning out to be major production and export centres. The domestic trade is a mix of medium and small ornamental fish farmers. Ornamental fish culture unit with Rs. 3.54 Croreand establishment of live feed culture unit for ornamental fishes and fish disease diagnostic Centre are proposed interventions for establishment of ornamental fish culture unit. The district wise physical and financial requirement of establishment of ornamental fish culture units are furnished in Table 3.25.

3.10.4 Marketing of Fishes

Fish is the cheapest animal protein available in Tamil Nadu, preferred by all categories of people irrespective of their economic standard of living. Since fish is a perishable commodity, its quality should be maintained right from its catch to its consumption. Otherwise this protein rich food will become unsuitable for consumption. Improvement in the field of fish marketing using cold chain and modern facilities has to go a long way. Due to the modernization in selling, the consumer commodities such as fresh vegetables, fruits, ready to eat foods, meat, chicken, etc., establishment of modern fish markets is also gaining importance now-a-days. As the required minimum investment in this area is quiet high, the traditional fish sellers are unable to adopt this modernization in their business.

TAFCOFED, a State level apex cooperative institution, has proposed to establish modern hygienic retail fish stalls in different places in Tamil Nadu in order to provide clean, fresh and ready to cook good quality fish with hygienic packaging to the consumers. The proposed modern hygienic retail fish stalls will be equipped to provide clean, fresh and ready to cook good quality fish handled in hygienic manner. The proposed modern hygienic retail fish stalls will have the facilities such as coolers, display cabin, deep freezer, cutting table, water facilities and facilities to sell ready to cook and value added fishery products etc.

Interventions needed for establishment of fish markets are establishing modern hygienic fish stall or fish kiosk, Establishment of Modern Mobile Sea Food Restaurant (TNFDC), establishment of modern mobile fish marketing vehicles and

establishing modern fish markets. The physical and financial requirements of establishment of fish markets or stall/ kiosk district wise are furnished in Table 3.25.

3.10.5 Strengthening of Infrastructure Facilities

Fish have different oxygen tolerance levels and signs exhibited by fish in water with low oxygen levels as well as remedial measures were provided in addition to the tools that the mini laboratory should have for measuring oxygen levels. The fish consequently become more stressed, stop eating and then stop growing. Subsequently, the FCR increases, diseases may ensue and mortalities occur. It is at this point, when the water quality of the pond becomes limiting that the pond's *carrying capacity* is said to be attained. Most of the farmers are not aware of this fact yet it has great economic implications. The staff of the mini laboratory will be trained on monitoring these parameters with the kits and equip the mini lab with capacity to monitor other parameters such as; carbon dioxide, conductivity, total phosphorus, chloride, potassium and others. Renovation/additional area creation of Government fish farms, Predator Fencing, Installation of Artificial Reefs in the Inshore Areas, establishment of mini lab facilities in Government fish farms, Establishing Flake Ice Plants, fishing Harbours and fish landing centers, integrated aquaculture unit and establishment of fish feed quality testing laboratory are proposed interventions. The physical and financial requirements for strengthening infrastructure facilities are presented in Table 3.25.

3.10.7 Strengthening Extension Facilities

Ornamental fish keeping and its propagation has been an interesting activity for many, which provide not only aesthetic pleasure but also financial openings. Indian waters possess a rich diversity of ornamental fish, with over 100 indigenous varieties, in addition to a similar number of exotic species that are bred in captivity. In Tamil Nadu, the Western Ghat region is home to many native varieties of fish.

The ornamental fish species can be grown in backyard type hatcheries which can provide income to farmers. The development of backyard hatchery units throughout the state would increase the ornamental fish production on a large scale, breeding and production of region specific ornamental fish varieties, which would

intern help in the growth of allied sectors in the ornamental fish industry. The earning potential of this sector has hardly been understood and the same is not being exploited in a technology driven manner. In Tamil Nadu, several ornamental fish farming has developed in cluster approach. But the farmers are still not aware of the recent developments in technology. The farmers need to be sensitized about the best management practices to be adopted in farming. Also they need proper marketing approach so as to get good economic return.

It is imperative to impart extension training in the fields of motivation, communication skills, leadership qualities, financial and management skills, fish marketing to complete equally with the existing network of middlemen and fish traders etc. Hence, it is proposed to develop this sector of people from bottom up participatory approach. Establishment of district extension and training centers, establishment of marine engine and sea safety training centre for the fisher folk, establishment of seafood knowledge highway, development of a modern fisheries village, establishment of Aqua Eco Tourism center are proposed interventions. The physical and financial requirement of strengthening of extension activities are furnished in Table 3.25.

3.10.8 Machineries and Implements for Fishing

It has been seen that the process of catching fish from river or pond and taking them to markets take a long time and it kills freshness of fish. This delay could be minimized with the help of mopeds vehicle. The transit would also provide them relief from carrying the basket of fish on their head and keep their catch fresh away from the impact of the sun. The objective behind making available moped to fishermen is to help them rush their fish in the market and also take them to doorsteps of the consumer.

Hence it is proposed that Government could provide mopeds to fishermen to help them rush fresh fish to consumers. The mopeds should be attached with other vending items like ice box, weighing machine, cutter, knives, torch light etc., as there is great need to promote the sale of fish in domestic markets. Moreover, infrastructural facilities, especially fish landing centres and wholesale and retail

markets, are inadequate and unhygienic, often posing serious threats to public health. Quality assurance programmes in the country are also inadequate to cope with the developments in the industry and the consumer requirements in the major seafood markets of the world.

Landing centres and fish markets play a vital role with regard to the standard and value of fisheries products. Yet, often they appear to be 'out of sight and out of mind' with poor facilities, little hygiene and inequitable access. Therefore, trainings on fish handling, hygienic practices and chilling techniques are essential along with basic equipments including ice boxes for improvement of hygienic fish handling. Fishers using the ice boxes reported considerable increases in the sales price of their catch as well as significant reductions in losses and could increase their income by around three times and that this equipment would quickly pay for itself. In order to increase the safety of the fishermen while moving to sea, life buoys and life jackets can be provided. It is proposed to upgrade the existing farms with bio Security arrangements and additional infrastructure facilities to undertake Specific Pathogen Free (SPF) Shrimp Culture – L *vannamei* in Eripurakarai in Thanjavur district. To create awareness about the various fish species and to promote fishing as an avocation, aqua eco- tourism may be established. The physical and financial requirement for machinery and implements are presented in Table 3.25.

Fisheries are one of the food producing enterprises contributing for the settlement of the mankind. The fisheries resources are of utmost importance for food security. Diseases out breaks in fish culture are associated with severe production and economic losses. Similarly, lack of diagnostic facilities is considered as a major problem to the development and success in aquaculture. This necessitates the establishment of lab facilities to undertake water and soil quality analysis in creating intensive aquaculture activities to improve the production in aqua farming and their exports.

Feed accounts for 50 – 60 per cent of running expenditure in aquaculture. It is imperative that fish diet should be scientifically formulated, prepared and made available. The relatively expensive commercial feed and its rising cost have high

impact on the profitability and thereby could affect the sustainability of small scale aquaculture. Besides, increasing limitations on drugs and non feasibility of treatment of individual fish urge the need to prevent the diseases through feed. This necessitates the establishment of fish feed quality testing laboratory and development of cost efficient feeds for enhancing the production of aquaculture.

There are plenty of opportunities available for culture of marine fisheries in the coastal region. However, the marine culture based activities are suffering due to limited seed availability and technical input. The standardized healthy and disease free seed supply will help to augment marine fish production through aquaculture. This necessitates strengthening of regional stations to demonstrate commercially viable marine fish farming in re-circulatory and sea cage culture systems and to conduct training programmes on improved finfish seed production culture and hatchery technologies.

The disposal of high strength waste water from different industries and aquaculture systems has always being a problem for environment. Similarly, dispensing of wastes generated in sea food processing plants has always been a problem for seed food processers. Hence, establishment eco-technologies centre for bioconversion of sea food processing plant waste and sludge through bio compost, bio gas production technology, oxidation and through effective microbial treatment technology and dissemination of developed indigenous technologies among target groups will go a long way in fish production.

There is also dearth of skilled workers to execute the work at lower and middle level of fish industries. Knowledge dissemination through hands on training of well developed technology available for low value fish utilization is the need of the hour. This would fetch additional income to fisher folk. This would be possible by establishing post-harvest technology centre for fish processing and value addition to carry out activities related to new product development utilizing underutilized fishes and to conduct skill development programmes for improving the livelihood of fisher folk. The Fisheries University would focus on increasing fish production by improving breeding technologies, developing cost effective and cost efficient feeds,

strengthening of regional research stations, establishing eco-friendly centre for conversion of wastages and establishment of post-harvest technology centres for augmenting the income and employment of fisher folk.

Table 3.25 Budget for infrastructure requirement of Fisheries Development

(₹ in Lakh)

Sl. No	Fisheries	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Creation of infrastructure & Assets													
1	Repair and renovation of Government fish farms (unit) 1.GOMUKHI, 2. THALANGADU	D30	2	700	0	0.00	0	0.00	0	0.00	0	0.00	2	**700.00**
2	Renovation / additional area creation govt. fish farm	D9,D15,D31	11	177	0	0.03	2	30.15	1	30.00	0	0.00	14	**236.68**
3	Increasing seed availability by establishing seed rearing units	D4,D8,D9,D15,D19,D28	5	25	21	79.00	10	42.00	4	16.00	2	10.00	42	**172.00**
4	Establishment of fish culture ponds and provision of inputs	D4,D6,D7,D9,D10,D11,D12,D18,D19,D25,D28,D31	31	65	36	77.50	31	60.75	33	68.63	32	63.00	162	**334.50**
5	Establishment of District Extension and Training centres	D5,D10,D11,D19,D24,D27,D29,D31	3	1150	3	100.00	1	50.00	15	201.10	0	0.00	22	**1501.10**
6	Establishment of Aqua Eco Tourism center	D8,D10,D24	3	615	0	0.00	0	0.00	0	0.00	0	0.00	3	**615.00**
7	Encouraging fish culture by establishment of fish culture ponds and provision of inputs	D1,D3,D14,D30	21	71	16	33.60	20	42.00	24	50.40	30	63.00	111	**259.50**
8	Construction of fish seed rearing centre at Agaram	D3	1	400	0	0.00	0	0.00	0	0.00	0	0.00	1	**400.00**
9	Construction of fish seed rearing centre at Lalpettai	D3	1	200	0	0.00	0	0.00	0	0.00	0	0.00	1	**200.00**
10	Establishment of Ornamental Fish Aquarium	D10	0	0	0	0.00	0	0.00	1	50.00	0	0.00	1	**50.00**
11	Establishment of Farm ponds	D23	15	4	15	3.75	15	3.75	15	3.75	15	3.75	75	**18.75**

Sl. No	Fisheries	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
12	Establishment of Marine fish seed production centre	D16	0	0	1	400.00	0	0.00	0	0.00	0	0.00	1	**400.00**
13	Establishment of marine engine and sea safety training centre for the fisher folk in Tamilnadu	D24	1	100	0	0.00	0	0.00	0	0.00	0	0.00	1	**100.00**
14	Establishment of mini lab facilities in Government fish farms	D3,D4,D5,D7,D9,D10,D11,D21,D26,D31	8	15	11	30.20	7	10.20	6	5.20	5	0.20	37	**61.00**
15	Establishment of marine fish seed rearing units	D16	0	0	1	50.00	1	50.00	0	0.00	0	0.00	2	**100.00**
16	Establishment of marine ornamental units	D16	0	0	2	6.00	2	6.00	2	6.00	2	6.00	8	**24.00**
17	Establishment of chemical residue monitoring laboratory for fish in Tamil Nadu	D26	0	0	1	30.00	0	0.00	0	0.00	0	0.00	1	**30.00**
18	Establishment of GIFT farms and provision of inputs	D1	5	**25**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**	**0**	**0.00**	**5**	**25.25**
19	Creation of Marine infrastructure facilities for the fisher-folk of coastal towns and villages to enhance Marine fish production, hygienic handling of catch and prevention of Post-harvest losses	D3,D7,D8,D12,D15,D16,D19,D22,D24,D25,D26,D30,Chennai	13	5050	13	5050	8	3550	4	1700	2	900	40	16250
	Total			**8595.83**		**5860.08**		**3844.85**		**2131.08**		**1045.95**		**21477.78**

D1-Ariyalur; D2-Coimbatore; D3-cuddalore; D4-Dharmapuri; D5-Dindigul; D6-Erode; D7 Kancheepuram; D8-Kanyakumari; D9-Karur; D10-Krishnagiri; D11-Madurai; D12-Nagapattinam; D13-Namakkal; D14 Perambalur; D15-Pudukottai; D16-Ramnathapuram; D17-Salem; D18-Sivagangai; D19-Thanjavur; D20-Nilgiris; D21-Theni; D22-Thiruvallur; D23-Thiruvannamalai; D24-Thiruvarur; D25-Thoothukudi; D26-Tirunelveli; D27-Tiruppur; D28-Trichy; D29-Vellore; D30-Villupuram; D31-Virudhunagar

3.11 FISHERIES RESEARCH AND DEVELOPMENT

3.11.1 AQUACULTURE

Natural resources are to be protected, nurtured and used meaningfully for the human welfare. Land and water resources are obviously and primarily to be used for the food production in order to prevent the human-animal conflicts for food. Indian fisheries sector has been playing an important role in the country's economy by its contributions to employment generation, income augmentation, foreign exchange earnings and providing food and nutritional security. The State of Tamil Nadu is geographically blessed with good natural resources like land and water. The fishery wealth of the State comprises of marine and inland fisheries that contribute remarkably for the supply of food Protein to the people of Tamil Nadu in addition to the export front. Like any other tropical province on the earth, Tamil Nadu too has conducive and supportive climate for the biological advantages of many aquatic organisms. The natural resources are bountiful with regard to fisheries development in the State and if meaningfully managed and maintained, it can yield a long term sustainable production for the benefit of the people of the State.

The State has a vast extent of freshwater and brackish water resources constituting the inland fishery resources in the State. Totally 3, 83,000 ha of inland water bodies are available made up of 78 reservoirs and short and long term seasonal ponds and tanks and brackish water areas. The inland fish production during the year 2015-16 has been reported as 2,42,000 (0.24 million) tonnes. This accounted to 0.63 ton per ha.

The present level of low productivity can be enhanced through creation of needed infrastructure at appropriate locations with introduction and adoption of improved technologies in inland aquaculture. The proven research data and strong research support system for drafting new policy or modification of existing policies can pave way for increasing the inland fisheries production. Introduction of alternate species and adoption of improved species, along with value addition on inland aquaculture can enhance fish production. Besides the above, channelizing the marketing procedure for increased income will attract more entrepreneurs. The intensification or expansion of aquaculture activity in the State may lead to a

demand of 700 million fingerlings every year. Therefore, creation of additional rearing area is a must to cater to the needs of the inland sector.

With this brief background idea, Tamil Nadu Fisheries University is submitting the following plans and proposals in the identified districts as Action Plan for the improvement of the inland aquaculture production.

Application of newer technologies

Following are the possible working models for the task:

1. Creation of modern fish farming facilities together with modernization of existing hatcheries and farms in the State.
2. Identification and application of improved fish farming technologies in the districts with specific technical alterations.
3. Improvement in the seed production sector through improved brood stock development, management and dissemination of technologies to the hatchery operators for adoption
4. Evaluation and certification of seeds for farming and certification of genetically improved varieties for biosecured production process
5. Troubleshooting with more technical personnel and recommendation for the safe and sustainable aquaculture in the identified water bodies
6. Training and capacity building at various levels through demonstration and hands on training
7. Data collection, documentation and forming a support system for the policy making for the inland fisheries development

Keeping the above in mind, it is proposed to have projects in the following lines

1. Planning for more advanced infrastructure with suitable operation protocol for different farming systems, seed production activities, value addition, feed production and feeding processes.

2. Evaluation of identified water bodies for their suitability in terms of nutrient availability and application of intensive farming practices like cage farming, raceway or running water farming systems, integrated farming, increased stocking with conventional and alternative species like GIF Tilapia, Jayanthi Rohu, Pangassius, Murrel, Loaches, etc.

3. Development of Pilot level farming systems for Recirculatory Aquaculture System (RAS), integrated farming, culture of multi-species and alternative species, nutrient controlled farming system, etc can be established in different districts based on the resources and available technical manpower. Technology can be demonstrated to the farmers and stake-holders.

4. Creation of regional water quality testing and disease diagnostics laboratories in different districts which can be established and manned for extending support services to the farmers and recommending the nutrient use in the aquaculture systems.

5. Major breeding Centres in the State can be equipped with the Sperm Bank for collection, storage and supply of cryopreserved spermatozoa for the breeding and production of genetically improved seeds. Characterization and spermatological features can be addressed by the University through the already established Cryopreservation Lab in the University. Technical inputs and needed training can be extended by the University as it was done earlier through NADP.

6. Cage culture of fast growing fishes in seasonal tanks: Open water bodies like tanks and lakes with large extend of water spread are reported to give a very

low fish production in the country due to various reasons. The low stocking and poor control over the stock due to the large extend of the water span are the major reasons behind such low production and this can be rectified by the adoption of cage farming in the open waters. Natural fertility in the open water bodies can be used for the successful growth of fishes by adoption suitable stocking density and culture practice so as to have high survival and better growth. This has been proved beyond doubt in many east Asian countries where the per unit production is around 50kg per sq. m. Such high productivity is also possible in Indian water bodies, if suitable cages are framed and erected in the open water bodies like natural tanks, lakes, pools and reservoirs where the control of the fish stock will be possible in the cages.

7. Formation of Certification Centre will help in the certification of quality of brood stock and seeds. The protocol and procedure are already available for the fishes and in practice in other countries. The same can be done for the inland fish species to avoid culture of unwanted species. Only quality seeds can be used for the culture that can increase the production many folds.

8. Similar to Sperm Bank, separate Brood Banks can be established in selected places in the Cauvery, Tamirabharani, and Bhavani river basins, through which the quality brooders can be identified, segregated, developed and supplied to the farmers continuously so as to improve the seed production status in the State. In this line, needed evaluation and identification can be done by the University for efficient functioning of the Brood Bank.

9. An analytical wing can be established to identify potential areas for aquaculture in the selected districts through GIS and nutrient mapping of the water bodies in order to suggest suitable species and culture methodology. Needed training for the extension workers / agencies and farmers can be done through this Unit.

10. Data recording and support system is an essential component for the development of inland aquaculture. Therefore, TNFU proposes to have a functional unit for the recording of fish production data in the inland water

bodies of the State including species composition, their biological data and the farmers' attitude and mind-set in the inland fish farming so as to redefine the inland fish production policies of the Govt.

In the national scenario, Tamil Nadu with its 0.383 million ha of potential freshwater area is standing at 9th place in inland fish production. States like Assam and Chhattisgarh which are having same extend of freshwater bodies (sometimes lesser than that made available for farming due to flooding and drought) stand at 7th and 6th place, respectively with above 25% more fish production than Tamil Nadu. In simpler estimation, if 50% of the potential water spread is considered useful for fish production purposes in the State, with 0.2kg per m^3 production per annum, there will be a production of 0.38 million tonnes instantly.

3.11.2 Coastal Aquaculture/ Mariculture

The marine fisheries wealth of Tamil Nadu is well known. Long coast line together with biodiversity that helps in the enrichment of marine fauna and flora and efficient fishermen population make the State to contribute more from marine sector. Besides the natural exploitation of resources, coastal areas can be more effectively used for the production of marine fishes and shellfishes through aquaculture. Although Andhra Pradesh stands first in the quantum of shrimp production, Tamil Nadu is standing first in terms of productivity (tons/ha area). This vouches the fact that the aquaculture is done on more scientific lines with due consideration for ecosystem protection.

The proposed Action Plan is to establish demonstration and training centres for the technology transfer and providing technical assistance to the people in the coastal region to identify the possible alternate livelihood options. The living zones of the people can be enriched with the activities like small scale fish farming and aquatic animal fattening farms. These are chosen because of the familiarity of the animals among the people and the easy understanding of the animals' behavior for better management of the farming. Therefore the major activities that can be taken in the Action Plan are,

1. Establishment of technology development Centres and demonstration units
2. Support system for the coastal farming through laboratory, technical assistance, marketing guidance, trouble shooting and adoption of newer technologies.

The following activities can be considered for the coastal aquaculture development in the Tamil Nadu coast:

1. Seaweed farming – raft and pole methods
2. Seaweed processing and packing for market
3. Cage farming – marine fin fishes & lobster
4. Marine ornamental fish farming
5. Marine ornamental fish breeding and seed supply
6. Marine live-feed production
7. Marine finfish farming
8. Marine fin fish seed collection and brood stock development
9. Marine crustacean seed collection and rearing
10. Production of genetically improved species for aquaculture
11. Shell fish fattening (Lobster & crab)
12. Fabrication of cages and support structures for the farming activities
13. Feed production and supply
14. Micro rearing units with minimal expenditure for the local fisher folk as an alternative employment
15. Marketing assistance for the grown fishes as well as seeds

3.11.13 Aquatic Animal Health

Disease outbreak is a major problem that affects the development and expansion of aquaculture sector. Diseases are caused due to imbalances in the interactions of the host, pathogen and the environment. Maintaining the health of the cultured organisms by providing adequate nutrition, optimum water quality parameters would help to avoid the disease outbreaks and associated production and economic losses due to diseases. Accurate and timely diagnosis of fish

diseases combined with suitable management measures greatly help in their control and prevent diseases in aquaculture.

The identified thrust areas for proposing on aquatic animal health are

1. Establishment of satellite laboratories across the state with well equipped facilities to extend services on disease diagnosis and water quality analyses
2. A disease surveillance network and monitoring system for continuous monitoring of existing and emerging diseases to develop strategies to prevent disease outbreaks in Aquaculture production system.

3.11.4 Harvest and Post-Harvest Technology

Fishing is one of the multi-million dollar industry provides huge foreign exchange and livelihood opportunities to millions of people in the country besides offering high quality protein rich food. Among the coastal state in India, Tamil Nadu is one of the major fish producing state, 5th in total fish production and contributing 0.7 percent of the total Gross State Domestic Product of the State. The state Tamil Nadu has a long coastline of about 1076 kms, accounting for about 17% of the Indian coastline. It has the EEZ area of 0.19million sq.km sharing 9.4% of the total EEZ of the country. The total fish production of the State during the year 2014-15 is 6.97 lakh tons (sector wise, from marine resources-4.57 lakh tons and freshwater and brackish water resources -2.40 lakh tons). A total of 5,395 traditional crafts 30,022motorized traditional crafts and 5,936 mechanized crafts are supports the coastal fish production (Tamil Nadu Fisheries Department report, 2017). Tamil Nadu is one of the leading exporter of the marine products, exported to the tune of 93,477 MT and earned a foreign exchange of Rs.5, 308.17 crore during 2014-15.

Scope for Deep sea fishing in Tamil Nadu

In earlier days, Fishing in the state was purely a traditional activity has now transformed to a commercial, market driven, multi-dollar enterprise owing to introduction of synthetic fishing gear materials and mechanization. But due to uncontrolled increment of fishing vessels and over exploitation of fishery resources in the inshore waters, 90% of the stock within 50mt depth was exploited, this lead to

reduction in livelihood income of the fishermen. Therefore the alternative livelihood option available with us is development of deep sea fishing for the upliftment of their socio-economic status.

Research and Extension gaps

Under the existing scenario, following are identified as the major research and extension gaps prevailing in the state,

1. Non adoption of Eco-friendly fishing gear Technologies as being followed in the Developed fishing Nations
2. Non availability of eco-friendly fishing technique like Trap fishing
3. Non availability of training services to the fishermen of Tamil Nadu on engine maintenance, sea safety and responsible fishing
4. Non availability shore based ship in campus of training facility to impart training on deep sea fishing technique to the fishermen of Tamil Nadu
5. Non availability of Laboratory facilities to conserve the forage fish stock depletion along the coast of Tamil Nadu due Long lining .

The proposed Action Plan is to establish demonstration and training centres for the technology transfer and providing technical assistance to the people in the coastal region to identify the possible alternate livelihood options. The major activities that can be taken in the Action Plan are,

1. Establishment of Technology Development Centres and Demonstration units
2. Support system for the coastal fishing communities through ship in campus facility to impart training on Deep Sea fishing technique.
3. Establishment of Artificial fish bait development Laboratory to support Long line fishing.

3.11.5 Fisheries Resource and Environmental Management

Tamil Nadu is one of the important states which are blessed with both freshwater and marine fisheries resources. Being part of tropical region it is blessed with rich aquatic diversity and fisheries in the state form one of the important sector which provides employment to millions of people and contributes to food security. It

has a coastline of over 1076 km and the continental shelf area of 41,412 sq.km. Tamil Nadu ranks second in marine capture production with the share of 7.07 lakh tonnes which is 20% of the total Indian Fisheries Landings during the year 2016. The marine fish landings has been a growing continuously growth.

The application of fish-aggregating devices, development of community-based resource management plans, and effective management of MPAs are much need activities.

- State Apex fisheries biodiversity reference centre for resource conservation
- Indigenous fisheries resource conservation
- Fish Genomic conservation centre
- GIS centre for fisheries resource management
- Blue growth initiative in fisheries resource conservation

3.11.6 Fisheries Engineering

Fisheries resources of Tamil Nadu are abundant. The State has about 1,076 km long coastline and 3.83 Lakh ha of freshwater spread in the inland; including lakes, tanks and 56,000 ha of brackish water spread which can form the base for the diverse fisheries industries in the State. There are about 848 registered aqua farmers and 346 European Union approved fish processing facilities which give sustenance to around million families in the country and in the State. Besides this, there are about 10 million people depending on this fisheries industries and allied activities in one way or other. The water ecosystems have been identified as a food production system for the people and offer livelihood to the rural people. Though this sector generates significant foreign exchange earnings, these biological activities are depending on many engineering structures and machineries. It is believed that engineering interventions in various fields of fisheries are very minimum as a today and needs to be given due considerations in order to make this sunrise sector flourish further.

The following are the thrust areas in Fisheries engineering that can be considered in the action plan

Aquacultural Engineering

- Farm implements for effective aquaculture practices
- e-interface gadgets for sustainable aquaculture practices
- Renewable energy power operated aerators/feeders for aquaculture
- Wireless sensor network/Remote monitoring system for aquaculture farms
- Mobile gadgets/apps for remote monitoring system for aquaculture farms
- Advanced aquaponics systems for dual income
- Nanocomposites for effective water recirculation in aquaculture farms
- Bionanosensors for water quality monitoring system
- Modified absorbents for wastewater treatment system

Navigation and Marine Engineering

- Cost effective fibre boat
- Weather station for effective fishing
- Cost effective gadgets for sustainable fishing

Fish Process Engineering

- Low cost handling devices/machines for fish processing
- Solar power operated fish processing machines / tricycle for fish vendors
- Cost effective packaging and storage technologies for fish and fish products
- Fisheries techno park cum fish processing technology business incubation centre

3.11.7 Fisheries Extension

A fishery, especially the areas of aquaculture and processing has already been globally acknowledged as important source of nutritional food and livelihood. Based on its continuous and enormous contribution in providing proteinaceous diet in recent years, fisheries is generally regarded as the most promising sub-sector in agriculture. However, food industry experts feel that the benefits from the sub-sector have not yet been optimally harvested on par with its actual potential. This can be understood, when we take the example of Tamil Nadu, one of the progressive States

of India especially in terms of fisheries development. The State, with the second longest coastline in the country has been blessed with vast and diverse fisheries resources. Despite the abundant natural wealth, the State's marine (4.72 lakh tons) and inland (1.97 lakh tons) fish production is comparatively low against the estimated production (Marine - 7.00 lakh tons and inland - 4.50 lakh tons) potential of the State. It clearly depicts that there is a gap between fish production and potential of the State. Subsequently, the gap extends in the form of recommended (13 kg) and actual (9.80 kg) annual percapita intake of the State.

Realizing the importance of research and human resource development activities of TNFU, Govt. of Tamil Nadu is constantly encouraging the University to strengthen its infrastructure by establishing new colleges, research and extension centres throughout Tamil Nadu. At present, the University in total has 34 constituent units across the State. For the past five years, the University has proved its calibre and has successfully emerged as the number one Fisheries University of India (ICAR SAU ranking 16-17). Using its State-of-the art research infrastructure and faculty, the University has developed many innovative fish production technologies in accordance with different resources of fisheries existing in the State. These technologies can be used for increasing the production, only by ensuring adoption of it in large numbers by farmers. It has to be also noted that lack of awareness about the scientific practices for obtaining optimum yields is often being cited as one of the major reasons for under-utilization of the available resources. Hence, considering the above difficulties and keeping in mind the fact that it is a newly established University; TNFU's extension wing has to be exclusively strengthened in terms of infrastructure and manpower. Overcoming the aforesaid difficulties through various "extension exclusive" establishments will help to strengthen the extension linkages not only with the field functionaries but also with the various types of stakeholders associated with the development of fisheries. In most of the well-established SAUs of the State, KVKs and exclusive communication centres has already been established to carry out and coordinate various multiple extension activities which is helping them to get wider reach in the technology dissemination activities. Therefore, this proposal has been made as an initial step for establishing a state of the art

infrastructure exclusively for extension activities of all the constituent units of the University.

Budget

The proposed interventions will be implemented with a budget outlayof **Rs. 36946.40 lakh** (Table 3.26).

Implementing Agency

The project will be implemented by the Fisheries University at Nagapattinam. The progress will be monitored by the Director of Research and State Nodal Agency.

Table 3.26 Budget for research Infrastructure requirement for Fisheries Research andDevelopment

(₹ in Lakh)

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	**Aquaculture**														
i	**Inland Aquaculture**														
a	Establishment of Advanced Hatchery Facility for Pangas, Pangasianodon hypophthalmus	214.6	Tiruvallur	1	214.60	0	0.00	0	0.00	0	0.00	0	0.00	1	214.60
b	Strengthening of farm infrastructure facilities in inland centres of TNFU	150	Thanjavur, Trichy, Kancheepuram	0	0.00	2	300.00	1	150.00	0	0.00	0	0.00	3	450.00
ii	**Mariculture**														
a	Strengthening of farm infrastructure facilities in marine centres of TNFU	150	Kanyakumari	0	0.00	1	150.00	0	0.00	0	0.00	0	0.00	1	150.00
iii	**Aquatic animal health and management**														
a	Establishment of regional labs for disease diagnosis, water quality and aquatic animal health management	150	Madurai, Thanjavur, Villupuram, Erode	1	150.00	0	0.00	1	150.00	1	150.00	0	0.00	3	450.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
b	Establishment of State aquatic animal health centre with regional satellite laboratories to improve the aquaculture production of Tamil Nadu	300	Tiruvallur	0	0.00	0	0.00	0	0.00	1	300.00	0	0.00	1	300.00
c	Establishment of accredited laboratory for fish/shrimp seed quality testing and certification	500	Tiruvallur	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
d	Establishment of disease surveillance network and dissemination centres for disease management in aquaculture	191	Tiruvallur	1	191.00	0	0.00	0	0.00	0	0.00	0	0.00	1	191.00
e	Mobile aqua clinics for water quality analysis and disease diagnosis	100	Thoothukudi, Ramnad, Thanjavur, Cuddalore, Trichy, Krishnagiri	1	100.00	3	300.00	2	200.00	0	0.00	0	0.00	6	600.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
2	**Harvest and Post harvest**														
i	**Branding of fish products and institutional marketing**														
	Creation of regional production centers for fishery products with state Brand	500	Tiruvallur, Nagapattinam, Thoothukudi	1	500.00	1	500.00	0	0.00	1	500.00	0	0.00	3	1500.00
	Creation of institutional fish retail outlets with the participation of stakeholders	100	Madurai, Trichy, Coimbatore	1	100.00	2	200.00	0	0.00	0	0.00	0	0.00	3	300.00
ii	**Enforcement of international quality standards in fishery products meant for domestic market**														
	Creation of laboratory facility at regional level for testing and certification of fish and fishery products	1000	Tiruvallur, Nagapattinam, Thoothukudi	2	2000.00	1	1000.00	0	0.00	0	0.00	0	0.00	3	3000.00
	Establishment of sea food forensic laboratory to ensure supply of quality products to domestic and international market	800	Tiruvallur, Nagapattinam, Thoothukudi	2	1600.00	0	0.00	1	800.00	0	0.00	0	0.00	3	2400.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Establishment of Aquatic Food Safety Analytical Center	500	Tiruvallur, Nagapattinam, Thoothukudi	2	1000.00	0	0.00	0	0.00	1	500.00	0	0.00	3	1500.00
	Accredited Microbial Quality Testing Laboratory for Certification of Aquatic Food Products in South Tamil Nadu	1000	Tiruvallur, Nagapattinam, Thoothukudi	3	3000.00	0	0.00	0	0.00	0	0.00	0	0.00	3	3000.00
i	**Utilization of fish processing waste and by catch**														
a	installation of waste rendering plant at selected fishing harbors and fish markets	130	All Maritime districts	1	130.00	11	1430.00	0	0.00	0	0.00	0	0.00	12	1560.00
b	Installation of unit for biogas from fish waste	161.5	All Maritime districts	0	0.00	11	1776.50	0	0.00	1	161.50	0	0.00	12	1938.00
ii	**Fishing technology**														
a	Establishment of ship in campus facility to impart training on deep sea fishing technique to the fishermen of Tamil Nadu	600	Thoothukudi	1	600.00	0	0.00	0	0.00	0	0.00	0	0.00	1	600.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
b	Establishment of artificial fish bait development laboratory to conserve forage fish stock along the coast of Tamil Nadu due to longlining	500	Thoothukudi	0	0.00	0	0.00	1	500.00	0	0.00	1	500.00	2	1000.00
c	Establishment of ecofriendly fishing gear technology unit to cater to the needs of fishermen of Tamil Nadu	350	Nagapattinam	1	350.00	0	0.00	0	0.00	0	0.00	1	350.00	2	700.00
d	Establishment of trap setting vessel to impart eco friendly fish trapping technology among the fishermen of Tamil Nadu	300	Ramnad	7	2100.00	0	0.00	0	0.00	0	0.00	0	0.00	7	2100.00
3	**Fish resource management and conservation**														
a	State Apex fisheries biodiversity reference centre for resource conservation	400	Thoothukudi	1	400.00	0	0.00	0	0.00	0	0.00	0	0.00	1	400.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
b	**Indigenous fisheries resource conservation centres**														
	Freshwater (River Tamirabharani and Cauvery)	200	Tirunelveli, Dharmapuri	0	0.00	2	400.00	0	0.00	0	0.00	0	0.00	2	400.00
	Brackish water (Pulicat lake and Kodiyakarai)	300	Tiruvallur, Nagapattinam	1	300.00	0	0.00	0	0.00	0	0.00	1	300.00	2	600.00
c	Stock enhancement and ranching center for indigenous fishes	300	Tirunelveli, Salem	0	0.00	0	0.00	1	300.00	0	0.00	1	300.00	2	600.00
d	GIS centre for aquatic resource and management	500	Thoothukudi	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
e	Fish Genomic conservation centre	400	Thoothukudi, Erode	1	400.00	0	0.00	1	400.00	0	0.00	0	0.00	2	800.00
4	**Fisheries Engineering**														
i	**Aquacultural engineering**														
a	Design and development of farm implements for effective aquaculture	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
b	Design and development of e interface gadgets for sustainable aquaculture	20	all maritime districts	0	0.00	11	220.00	1	20.00	0	0.00	0	0.00	12	240.00
c	Design and development of shrimp harvester	25	Thoothukudi, Nagapattinam and Tiruvallur	1	25.00	1	25.00	0	0.00	0	0.00	1	25.00	3	75.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
d	Design and development of synchronised harvester for freshwater aquaculture	30	Thiruvallur, Villupuram, Thiruvarur, Thanjavur, Tirunelveli	1	30.00	2	60.00	3	90.00	0	0.00	0	0.00	6	180.00
ii	**Renewable energy technologies**														
a	Design and development of renewable energy powered aerators for aquaculture	35	Thanjavur, Nagapattinam and Pudukottai	1	35.00	2	70.00	0	0.00	0	0.00	0	0.00	3	105.00
b	Design and development of renewable energy powered feeders for aquaculture	50	Thanjavur, Nagapattinam and Pudukottai	0	0.00	0	0.00	0	0.00	2	100.00	1	50.00	3	150.00
c	Design and development of renewable energy power backup for aquacultural farm	200	Nagapattinam	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
iii	**Automation technologies**														
a	Development of sensors for aquaculture practices	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
b	Development of wireless sensor network monitoring system for aquaculture farms	150	Nagapattinam	1	150.00	0	0.00	0	0.00	0	0.00	0	0.00	1	150.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
c	Development of mobile gadgets/apps for remote monitoring system for aquaculture farms	15	all maritime districts	0	0.00	1	15.00	10	150.00	1	15.00	0	0.00	12	180.00
iv	**Advanced aquaculture systems**														
a	Design and development of advanced aquaponics systems	50	Nagapattinam, Tiruvallur and Thoothukudi	1	50.00	0	0.00	0	0.00	1	50.00	0	0.00	2	100.00
b	Design and development of nanocomposites for water recirculation in aquaculture farms	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
c	Development of bionanosensor for water quality monitoring system	150	Nagapattinam	1	150.00	0	0.00	0	0.00	0	0.00	0	0.00	1	150.00
d	Development of modified absorbents for waste water treatment system	50	Nagapattinam	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
v	**Feeding technologies**														
a	Design and development of effective feeders for aquaculture	35	Nagapattinam, Tiruvallur and Thoothukudi	2	70.00	1	35.00	0	0.00	0	0.00	0	0.00	3	105.00
b	Design and construction of fibreboat	250	Nagapattinam	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
c	Establishment of weather station for effective fishing	300	Nagapattinam	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
d	Establishment of fisheries information technology centre	35	Nagapattinam	1	35.00	0	0.00	0	0.00	0	0.00	0	0.00	1	35.00
e	Development of cost effective gadgets for effective fishing	15	All Maritime districts	10	150.00	2	30.00	0	0.00	0	0.00	0	0.00	12	180.00
f	Development of mobile apps for effective fishing	8	All Maritime districts	1	8.00	0	0.00	1	8.00	1	8.00	9	72.00	12	96.00
vi	**Post-harvest fisheries engineering**														
a	Design and development of handling devices/machines for fish processing	50	Thiruvallur, Kancheepuram, Nagapattinam, Thanjavur	2	100.00	4	200.00	1	50.00	2	100.00	1	50.00	10	500.00
b	Design and development of solar powered tricycle for fish vendors	2	All Maritime districts	12	24.00	11	22.00	10	20.00	12	24.00	3	6.00	48	96.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
c	Design and development of cost effective packaging technologies for fish processing	6	Nagapattinam, Tiruvallur and Thoothukudi	1	6.00	2	12.00	0	0.00	0	0.00	0	0.00	3	18.00
vii	**Processing machines**														
a	Design and development of shrimp processing machines	15	Nagapattinam, Ponneri and Thoothukudi	2	30.00	2	30.00	3	45.00	2	30.00	2	30.00	11	165.00
b	Design and development of freshwater fish processing machines	20	Nagapattinam, Ponneri and Thoothukudi	3	60.00	2	40.00	2	40.00	2	40.00	2	40.00	11	220.00
c	Design and development of gadgets for fish processing	20	All Maritime districts	0	0.00	0	0.00	2	40.00	9	180.00	1	20.00	12	240.00
viii	**Waste utilization technologies**														
a	Design and development of waste utilization centre	85	Nagapattinam, Tiruvallur and Thoothukudi	1	85.00	1	85.00	1	85.00	0	0.00	0	0.00	3	255.00
5	**Fisheries technology transfer**														
a	Establishment of KVK	1000	Madurai, Cuddalore	1	1000.00	1	1000.00	0	0.00	0	0.00	0	0.00	2	2000.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
b	Establishment of Farmers Training Facilities at regional outstations of CeSA in TNFU	70	Trichy, Krishnagiri	2	140.00	0	0.00	0	0.00	0	0.00	0	0.00	2	140.00
c	Establishment of Communication Centre to Improve Production and Employment Opportunities in Fisheries Sector in the State through Propagation of Improved technologies	300.9	Nagapattinam, Tiruvallur	1	300.90	1	300.90	0	0.00	0	0.00	0	0.00	2	601.80
d	Establishment of Fisheries Knowledge Centres for farming and fishing community	500	Ramnad, Nagapattinam	1	500.00	0	0.00	1	500.00	0	0.00	0	0.00	2	1000.00
e	Establishment of Fisherfolk alternative livelihood complex at Mandapam unit of TNFU	100	Ramnad	1	100.00	0	0.00	0	0.00	1	100.00	0	0.00	2	200.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
f	Establishment of Fisheries Baseline Data Repository for the state at FC & RI, Ponneri	200	Tiruvallur	0	0.00	0	0.00	0	0.00	1	200.00	0	0.00	1	200.00
g	Capacity building for trainers, fishers, fish farmers and entrepreneurs in the adoption of advanced farming techniques	8	Tiruvallur, Nagapattinam	1	8.00	0	0.00	1	8.00	0	0.00	0	0.00	2	16.00
h	Establishment of Mobile training unit to cater the needs of fishermen on engine maintenance, sea safety and responsible fishing	300	Thoothukudi, Tiruvallur, Nagapattinam	1	300.00	1	300.00	0	0.00	0	0.00	0	0.00	2	600.00
6	**Incubation centres**														
a	Establishment of Fisheries techno park cum fish processing business incubation centre	50	Nagapattinam	1	50.00	0	0.00	1	50.00	0	0.00	0	0.00	2	100.00
b	Establishment of incubation centre for extruded products	65	Nagapattinam, Thoothukudi and Tiruvallur	2	130.00	0	0.00	0	0.00	1	65.00	0	0.00	3	195.00

Sl. No	Interventions	Unit cost	Districts Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
c	Establishment of incubation centre for value added product development	250	Thanjavur	0	0.00	1	250.00	1	250.00	0	0.00	0	0.00	2	500.00
d	Establishment of incubation centre for dried sea food products	150	Nagapattinam	1	150.00	1	150.00	0	0.00	0	0.00	0	0.00	2	300.00
e	Establishment of seafood pack house	300	Nagapattinam	0	0.00	1	300.00	1	300.00	0	0.00	0	0.00	2	600.00
f	Establishment of cold storage centre for sea foods	200	Nagapattinam	1	200.00	1	200.00	0	0.00	0	0.00	0	0.00	2	400.00
	Grand total				**17922.50**		**9601.40**		**5156.00**		**2523.50**		**1743.00**		**36946.40**

3.12 Water Resources Organisation (WRO) – PWD IRRIGATION)

3.12.1 Investment options for irrigation development in Tamil Nadu State

There are around 41127 tanks in Tamil Nadu State alone, with varying sizes and types. Out of the total of 41127 tanks in the State, 81 per cent are with command area less than 40 ha and 19 per cent have more than 40 ha of command area. The tanks are classified in to Panchayat Union (PU), and Public Works Department (PWD) based on the management activity. The PU tanks have a command area of less than 40 ha and are under the control of Panchayat Union. Tanks having a command area of more than 40 ha as well as all the system tanks are maintained by the PWD. Presently, a large number of tanks are turning out to be defunct due to various maintenance issues.

It is evident that the area under tank irrigation shows a negative growth rate of 1.34 per cent per annum. Consistent efforts that have been taken by the State in investment on tank modernization under different programmes and grants have helped a little to revive tank irrigation in the State. The important programmes like EEC, World Bank funded projects and TNIAMWARM are such important programmes contributed significantly for the modernization and revival of tank irrigation in the State. It is worth mentioning that most of these programmes have focused mainly on modernization and rehabilitation of the tanks maintained by the Water Resources Department (WRD) i.e tanks with ayacut area of more than 40 ha. The tanks under the control of Panchayat Unions are the most neglected tanks which need investment priorities. Considering the vulnerable conditions of these tanks, enough efforts have been taken to identify the investment options for these tanks.

Besides, the specific interventions to be carried out along with budget requirement to improve the water storage and management of water are: desilting of water channels, removal of encroachments, construction of check dams, anaicut, bed dam in Coimbatore, Erode, Namakkal, Pudukkottai, Salem, Sivagangai, Thanjavur, Thiruvarur, Tiruppur, Tirunelveli, Trichy, Vellore and Villupuram district,

construction of farm ponds, desilting of lakes and removal of encroachments in Thanjavur District, modernization and enhancing the existing capacity of tanks by desilting and creation of Island in Vellore District, construction of regulator across drain in Thiruvarur District, improvements to supply channel in Salem District and rehabilitation of Anaicut, Tanks, Supply Channel and its Infrastructure in Villupuram district.

The details of proposed activities in the respective districts and budget outlay are furnished in Table 3.27.

Table 3.27 Budget outlay for Water Resource Organisation (WRO) - PWD IRRIGATION

(Rs. in Lakh)

Intervention	Districts covered	Unit	Unit cost (Range)	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Constructions															
A. Check dam	All districts except D24, D26	Nos & Ha	0.05-11200.00	10513.71	51777.33	4075.84	33195.22	2077	30362.95	1794.59	22810.7	2220.31	17541.03	20803.87	155687.23
B. Bed dam	D11, D16, D18, D19	Ha	0.07-12.14	1509.22	1125	1051.27	5977	62.89	161	166.15	73.11	224.41	523	3013.94	7859.11
C. Dividing dam	D15, D18, D31	Ha	0.26-7.65	44.32	135	23	176	420.16	293.5	547	144	0	0	1034.48	748.5
D. Anicut	D1, D7, D10, D14, D15, D16, D17, D18, D23, D28, D30, D31	Nos & Ha	0.25-600.00	2501.11	8065.5	2423.76	5728	535.35	1751	2963.16	22373	1154.53	1774	9577.91	39691.5
E. Diaphragm and flood protection wall	D3, D20, D29	Nos & Ha	0.11-23.44	66	718	150	1300	104	498.46	320	7500	283.29	30	923.29	10046.46
F. Protection walls and river training works	D8, D27	Nos & Ha	0.32-1250.00	135.16	3750	71.16	3390	71.16	3595	70.16	3245	70.16	4350	417.8	18330
G. Grade wall	D12, D24	Ha	0.42-1.75	1631.7	932	1077.7	802	480.37	232	0	0	0	0	3189.77	1966
H. Percolation pond	D27, D29	Ha	2.98	41.25	123	0	0	5	14.9	0	0	0	0	46.25	137.9
I. Recharge structure	D13, D17, D30	Nos & Ha	1.15-218.00	90.05	844.1	164.75	1930	17	722	62.13	372	101.78	117	435.71	3985.1
J. Sub surface dyke	D7, D24, D28, D29	Nos & Ha	0.02-3600.00	3329.92	3340	375.33	4800	385.98	14275	3	8100	114	600	4208.23	31115
K. New tailend regulator	D12, D24, D25	Nos & Ha	0.14-1250.00	1290.15	2715	1	1250	1	1250	1	1250	0	0	1293.15	6465
L. Foot bridge and single lane bridge	D20, D27	Nos & Ha	0.49-400.00	2	430	1	30	0	0	0	0	81.94	60	84.94	520
Desilting and protection works	D8, D24	Ha	0.10-4.34	532.36	500	32	80	0	0	85	200	333	80	982.36	860
Diversion of surplus water	D10, D17, D25, D27	Nos & Ha	12.26-893.00	502.91	7566.33	2948.91	36673.33	1153.73	21608.33	0	0	0	0	4605.55	65848

Intervention	Districts covered	Unit	Unit cost (Range)	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Excavation of supply and link channel	D10, D23, D25, D28, D29	Nos & Ha	1.28-23.55	3409.51	71265	0	0	18857.67	60579	0	0	302.71	1663	22569.9	133507
Preliminary report for excavation of supply channal	D10	Ha	9.66-29.46	0	0	727.94	7030	0	0	134.41	3960	0	0	862.35	10990
Formations															
A. New branch canal	D18, D27	Nos & Ha	0.28-600.00	1	600	0	0	0	0	0	0	3973.64	1380	3974.64	1980
B. New reservoir	D29	Ha	2.94-14.22	0	0	204	600	225	3200	0	0	0	0	429	3800
C. New percolation pond	D21, D29	Ha	4.81	20.81	100	0	0	21.43	103.08	0	0	0	0	42.24	203.08
D. New tank	D10, D17, D22, D24	Nos & Ha	0.12-2100.00	6501.72	4650	215	95	0	0	32.46	334	176.86	735	6926.04	5814
Improvements to the old channel in river system	D3, D27, D28	Nos & Ha	0.36-2400.00	6490.36	19300	14925	70200	11600	4200	0	0	0	0	33015.36	93700
Lining and improvements to the supply channel	D20	Ha	0.06-0.58	364.23	50	0	0	849.86	275	0	0	121.41	70	1335.49	395
Micro irrigation facilities	D2, D27	Ha	0.08-1.48	72575.25	103863.4	12601.68	9327.4	5913.68	8767.4	5913.68	8767.4	5913.68	8767.4	102917.97	139493
Modernisation of tank anicut and supply channel	D5, D7, D21	Nos & Ha	0.93-900.00	0	0	5	2850	4	1500	1005.26	1200	2217.14	4650	3231.4	10200
Pumping scheme	D2, D19	Ha	0.04-5.62	2763.63	1549	4520.74	463.53	2931.21	307.35	0	0	0	0	10215.57	2319.88
Reconstruction of high level bridge, anicut and check dam	D28	Nos	0.52-1200.00	1	1200	1	1200	0	0	0	0	1388.02	961	1390.02	3361
Rehabilitation															
A. Check dam	D2, D6, D8	Nos & Ha	0.34-700.00	693.4	1082	1106.52	1175	1	600	541.48	1425	763.67	2460	3106.07	6742
B. Main channel and its allied	D2, D3, D5, D6, D8, D17,	Nos & Ha	0.03-750.00	32128.85	85861	34256.46	40886	26574.49	44265	15231.69	15615	7123.89	4000	115315.38	190627

Intervention	Districts covered	Unit	Unit cost (Range)	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
distributaries	D24, D27, D28														
C. Anicut and its system tank	D2, D5, D6, D8, D10, D17, D26, D27, D28	Nos & Ha	0.09-220.00	9246.96	10802.96	11259.71	10578.81	980.27	4238.9	1842.61	3058.74	562.31	887.23	23891.85	29566.64
D. Tanks	D2, D6, D8, D17, D27, D28	Nos & Ha	0.18-95.00	2738.27	2213	1275.77	1445	1454.44	880	1885.24	1330	3375.75	2070	10729.47	7938
E. Main distributaries	D2, D6, D13, D17, D27	Nos & Ha	0.07-133.33	39180.85	19708.27	30401.15	20233.18	30996.92	15843.75	26659	6719	752.55	325	127990.46	62829.19
F. Branch distributaries	D6	Ha	0.10-0.54	14877.86	3270	11336.84	3310	0	0	0	0	0	0	26214.7	6580
G. Tank bund, sluice and supply channel	D2, D6, D17, D26, D27	Nos & Ha	0.08-150.00	974.5	404.91	246.07	340.66	274.8	150.12	629.12	356.3	48.39	54.41	2172.88	1306.4
H. Main canal	D2, D5, D6, D9, D17, D27, D28	Nos & Ha	0.17-5000.00	22165.94	33746.67	37776.46	39981.67	44574.27	49289.67	15627.07	23874	967.46	1200	121111.19	148092
I. Branch, sub branch canal and distributaries	D2, D6, D27	Nos & Ha	0.06-2166.67	65703.48	15257.67	30366.98	14673.41	37804.41	10538.54	4895	393	0	0	138769.86	40862.62
J. Sluice	D26	Ha	0.25-1.31	7.98	2	59.19	41	23.56	20	19.07	18	14.42	9	124.22	90
K. Surplus weir	D26	Ha	0.98-2.42	7.98	10	7.21	15	0	0	0	0	19.65	30	34.84	55
L. Drainage structures	D8, D26, D28	Nos	0.80-28812.00	5	6707	1	6527	1	28812	1	28812	190.35	225	198.35	71083
M. Harnessing scheme	D6	Ha	0.07-4.93	0	0	3167.83	736	4523.06	1290	658.18	430	0	0	8349.07	2456
Restoration and rejuvenation of Noyyal river	D2, D27	Nos & Ha	0.35-3506.75	0	0	1	1800	4258.29	1479.68	0	0	1	3506.75	4260.29	6786.43
River training works at estuary	D8	Nos & Ha	230.00-240.00	0	0	0	0	0	0	1	240	1	230	2	470
Special repairs to check dams, channels, damaged	D20, D27	Nos & Ha	0.08-20.00	2	25	0	0	0	0	323.76	25	0	0	325.76	50

Intervention	Districts covered	Unit	Unit cost (Range)	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
parapet wall, chutes and reclamation of earth bund															
Strengthening and standardization of tanks	D2	Ha	0.79-1.12	71.86	66.67	5536.92	5255.88	16018.33	15172.15	0	0	0	0	21627.11	20494.69
Water shed development programme in command area	D2, D27	Ha	0.02-0.03	69636.25	1700	5913.68	200	5913.68	200	5913.68	200	5913.68	200	93290.97	2500
Others															
A. Construction and improvement of infrastructure facilities	D2	Ha	0.03	5913.68	200	5913.68	200	5913.68	200	5913.68	200	5913.68	200	29568.4	1000
B. Construction of barrage with head sluices across river	D12	Ha	3.56	0	0	0	0	0	0	6320	22500	0	0	6320	22500
C. Removal of silt and slipped earth in supply channel	D26	Ha	0.38	7.98	3	0	0	0	0	0	0	0	0	7.98	3
D. Supplementary source for regulator	D24	Ha	0.02	3344.26	75	0	0	0	0	0	0	0	0	3344.26	75
E. Supply of exclusive drinking water to Chembarambakkam tank	D7	Ha	0	0	0	0	0	0	0	0	0	0	0	0	0
F. Drainage scheme for submersion relief to irrigable ayacut	D19	Ha	0.04	0	0	0	0	0	0	570	24.5	0	0	570	24.5
Total				**381024.44**	**465733.8**	**224222.53**	**334496.08**	**225028.69**	**326675.78**	**100129.58**	**185549.75**	**44324.67**	**58698.82**	**974852.33**	**1371154.23**

3. 13 COOPERATION AND CIVIL SUPPLIES

Cooperation development extends support for procurement of agricultural produces. There is a need for strengthening the basic facilities available in the cooperative marketing societies, establishment of new direct purchase centres, winnowing machines for post harvest management, drying platform for procurement of grains at optimum moisture content and solar copra driers in cooperative societies are the major interventions suggested. The specific interventions are

- Strengthening of office building
- Construction of compound wall
- Establishment of coconut processing unit
- Construction of Godown
- Shopping complex for the society
- Establishment of Common Service Centre
- Construction of ration shop
- Establishment of Vegetable Collection Centre

The proposed strategies will be implemented in all the districts.

Budget

The budget requirement for implementing the proposed strategies is about **Rs. 61345.74 Lakh** (Table 3.28).

Implementing Agency

The projects will be implemented by the Department of Civil Supplies and Cooperation. The progress will be monitored by the Director of Civil Supplies and the State Nodal Agency.

Expected outcome

The establishment of vegetable collection centres will help the farmers to sell their produces directly in the market and obtain maximum prize. Supply chain management of vegetables can be improved.

Table 3.28 Budget outlay for Cooperation and Civil Supplies

(Rs. in Lakh)

S. No	Co-operation	Districts Covered	Units	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Agro Service Centre Shed	D4 and D10	Nos	0	0	2	6.5	18	33.75	4	10.77	2	2.8	26	53.82
2	Bio Fertilizer Manfacturing Unit	D29	Nos	0	0	1	20	0	0	0	0	0	0	1	20
3	Constructiom of building for farmers input sales center	D20 and D25	Nos	2	85.36	0	0	0	0	0	0	0	0	2	85.36
4	Construction of Cold Storage (100 MT)	D11 and D18	Nos	1	100	0	0	1	50	0	0	0	0	2	150
5	Construction of Community Hall	D5, D20	Nos	1	160	1	69.12	0	0	0	0	1	39	3	268.12
6	Construction of Complex Fertiliser Processing unit	D5, D22	Nos	0	0	1	77	1	90	0	0	0	0	2	167
7	Construction of Compound wall	All Districts except D9, D12	Nos	739	6917.82	480	4040.46	496	4237.63	306	2763.37	236	1995.16	2257	19954.44
8	Construction of Godown	All Districts except D1, D3, D4, D7, D9,D12, D14, D21, D27, D30 and D31	Nos	73	1228.67	73	1416.65	36	702.34	27	499.7	27	388.1	236	4235.46
9	Construction of Godown Keepers Office	D2, D10 and D23	Nos	0	0	0	0	0	0	3	24	0	0	3	24
10	Construction of Night watchman room	D4	Nos	1	8.5	1	1.4	1	3	0	0	0	0	3	12.9

S. No	Co-operation	Districts Covered	Units	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
11	Construction of Office Building	All Districts except D7, D12, D26, D29	Nos	198	3799.14	188	2487.11	148	1626.91	105	1297.75	91	934.93	730	10145.84
12	Construction of Ration Shop	D24	Nos	0	0	0	0	1	6.25	0	0	0	0	1	6.25
13	Construction of Road	D13, D17, D20, D24 and D31	Nos	16	98.62	3	27.05	1	60	2	75	1	60	23	320.67
14	Construction of room for Common Service Centre	D29	Nos	82	210.45	6	13.25	9	29	6	17.5	2	4	105	274.2
15	Construction of Ryots Vehicle Shed	D13	Nos	0	0	0	0	1	15	0	0	0	0	1	15
16	Construction of Seed selling center	D5	Nos	0	0	0	0	1	11	0	0	0	0	1	11
17	Construction of Shed for Banana Market Hall	D29	Nos	1	10	0	0	0	0	0	0	0	0	1	10
18	Construction of Shed for Farm Fresh Consumer Outlet Shop	D10	Nos	0	0	0	0	1	1.31	0	0	0	0	1	1.31
19	Construction of Tender Hall	D13 and D24	Nos	1	32.4	6	100.3	0	0	0	0	0	0	7	132.7
20	Constuctuion of Drying Yard	D10, D17, D20,D24, D25, D29 and D31	Nos	8	83.41	0	0	4	210	0	0	2	41.34	14	334.75
21	Constuctuion of Electronic Weigh bridge	D4, D15, D29	Nos	2	31.67	4	70	8	0	0	0	0	0	14	101.67
22	Constuctuion of Marketing Yard	D6	Nos	1	5	0	0	0	0	0	0	0	0	1	5
23	Establishment of Auction yard	D2, D6, D13, D17 and D25	Nos	6	363.8	1	7	1	25	2	100	1	25	11	520.8
24	Establishment of Processing unit	D2, D3, D4, D5,	Nos	36	427.39	13	198.31	1	250	2	335.6	5	104.45	57	1315.75

S. No	Co-operation	Districts Covered	Units	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
		D6, D10, D13, D14, D17, D18, D19, D24, D25, D27,D28, D29 and D31													
25	Establishment of Tractor Shed	D1, D5, D6, D11, D15,D22, D24 and D26	Nos	35	262.46	20	123.41	13	56.91	3	3.5	3	3.5	74	449.78
26	Procesing unit-Wooden Chekku Oil unit	D11	Nos	1	5	0	0	0	0	0	0	0	0	1	5
27	Processing unit-Dhal Colour Setter	D11	Nos	1	26.97	0	0	0	0	0	0	0	0	1	26.97
28	Renovation of Agricultural Inputs Testing Lab	D20	Nos	1	6.14	0	0	0	0	0	0	0	0	1	6.14
29	Renovation of Auction yard	D13 and D17	Nos	0	0	0	0	3	14.75	4	20	3	15	10	49.75
30	Renovation of compound wall	D13 and D17	Nos	0	0	1	15.6	1	20	1	20	1	20	4	75.6
31	Renovation of Fair Price Shop	D3, D20	Nos	12	20.16	71	273.92	45	168.57	56	218.11	34	110.45	218	791.21
32	Renovation of Godown	All Districts except D30	Nos	276	1917.51	122	826.01	105	600.8	97	631.05	69	437.89	669	4413.26
33	Renovation of Office Building	All Districts except D3, D8, D12, D16, D23	Nos	797	3257.73	314	1469.79	275	1255.13	340	1437.96	199	691.02	1925	8111.63
34	Renovation of Processing unit - Flour mill	D11 and D20	Nos	2	16.25	0	0	0	0	0	0	0	0	2	16.25

S. No	Co-operation	Districts Covered	Units	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
35	Renovation of Ryots Rest Hall	D13 and D20	Nos	1	22.53	1	7.2	0	0	0	0	0	0	2	29.73
36	Renovation of Staff Quarters	D20	Nos	1	97.92	2	3.84	0	0	1	2.56	0	0	4	104.32
37	Renovation of Tender Hall	D17	Nos	0	0	1	15	0	0	0	0	0	0	1	15
38	Shopping complex Construction	D6, D15, D20, D24 and D25	Nos	7	116.69	1	50	3	83.52	0	0	1	51.52	12	301.73
39	Strong Room construction	D28	Nos	8	45	6	27.52	5	30.5	2	7.48	2	8.48	23	118.98
40	Vegetable Collection Centre	D6, D7, D20, D22 and D24	Nos	0	0	0	0	1	11	0	0	0	0	1	11
41	Strengthening of Cooperation Centres (Furniture's, Solar panel, Modern counter, Xerox machine, Air Conditioner, CCTV Camera, Bore well, Generator, UPS Battery, Cash Counting Machine, Invertor, Jewel Weighing Machine, Packing Machine, Purchase of computer and peripherals, Hand Billing machine, LED Display for tender process, Purchase of Jewel Carat Meter, Smart Card Printing Machine, Burglary	All Districts	Nos	2131	2829.6	921	1441.14	808	1225.425	621	1267.53	338	690.86	4819	7454.555

S. No	Co-operation	Districts Covered	Units	2017-18		2018-19		2019-20		2020-21		2021-22		Total Amount	
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Alarm, Agricultural Equipments, Safety Locker, Purchase of Display racks, Defender Door, Purchase of Paddy drying machine, Automatic Printer machine, Conveyer, E-Tender process, Fork Lifter, Gunny Bag Stitching machine, Jewel tester, Pallets, Tarpaulin, Trolley and Printing Press machineries)														
42	Amenities for Cooperative Centres (RO Water unit, Sanitation, Vehicle Parking Shed, Construction and renovation of Marriage Hall, Construction and renovation of amenity centres)	All Districts	Nos	70	789.31	30	206.98	32	87.13	27	35.84	19	79.53	178	1198.79
	Total				**22975.5**		**12994.56**		**10904.93**		**8767.72**		**5703.03**		**61345.74**

Overall Budget for all the sectors

The overall budget requirement for five years is estimated at Rs **9011656.39** lakh. The above planned investment will help to achieve a four per cent growth in agriculture sector. The shift in the crop and allied sector activities will also ensure the nutritional securities. The strategies are focusing on solving the major problems faced by the farming community.

Table 3.29 Sector wise funds Requirements for Infrastructure

(Rs. in Lakh)

Sl. No	Department	2017-18	2018-19	2019-20	2020-21	2021-22	Total	Per cent
1	Agriculture	21115.51	22467.62	11203.32	11488.11	7672.16	73946.7	0.82
2	Agricultural Research	6672.00	7518.30	7089.00	5076.00	3925.00	30280.30	0.34
3	Horticulture	157657.18	98607.62	110541.06	109601.04	116794.97	593201.88	6.58
4	Agricultural Engineering	67654.48	61546.01	59180.47	58722.83	57986.30	305090.07	3.39
5	Agricultural Marketing	30214.99	16919.16	13497.63	11940.27	13447.88	86019.93	0.95
6	Seed Certification	699.98	522.79	455.81	513.36	375.00	2566.94	0.03
7	Animal Husbandry	24526.12	25297.17	15960.32	11763.37	12645.18	90192.16	1.00
8	Dairy Development	31364.00	95430.00	126508.00	61680.50	54980.50	369963.00	4.11
9	Animal Science Research	14645.30	14890.76	15016.48	4587.80	4529.40	53669.74	0.60
10	Fisheries	8595.83	5860.08	3844.85	2131.08	1045.95	21477.78	0.24
11	Fisheries Research	17922.50	9601.40	5156.00	2523.50	1743.00	36946.40	0.41
12	PWD (WRD)	465733.80	334496.08	326675.78	185549.75	58698.82	1371154.23	15.22
13	Cooperation & Civil Supplies	22975.50	12994.56	10904.93	8767.72	5703.03	61345.74	0.68
	Total	**869777.19**	**706151.55**	**706033.65**	**474345.33**	**339547.19**	**3095854.87**	**34.35**
14	**District Irrigation Plan**							
	AIBP						385000.47	
	Har Khet Ko Pani Component-Extension, Renovation and Modernisation						2123600.30	
	Drop more crop component						1272800.50	
	Watershed Development Component						221800.05	
	MGNREGS						1912600.20	
	Total (DIP)						**5915801.52**	**65.65**
	Grand Total						**9011656.39**	**100.00**

CHAPTER IV

SUMMARY

Policies, so far, have been diverted towards irrigated agriculture to increase agricultural production. Now the concern is that the gains from the green revolution areas have been plateauing out due to many factors and evidences suggest that the productivity and returns to investment have substantial trickle down benefits for poor not only in irrigated areas but also those residing in less favored areas. This calls for setting up policy framework towards robust supporting infrastructure for planning, production, processing, storage, distribution, marketing and sales of agricultural produce.

Tamil Nadu as one among the states has also received Central Assistance under NADP during 11th Plan period and already prepared comprehensive District and State agriculture plans for 11th Plan and 12th Plan. These should be revised and updated appropriately for implementing RKVY beyond 12thPlan period keeping in view the modification proposed for the plan period and emerging needs of the State considering the 14th Finance Commission period.

Revision and updation of SAPs could be a two-way process. Firstly, State nodal department (or Agriculture Department) could get DAPs revised in the first instance to ensure that priorities of the State are properly covered in the district plans. States should, at this stage of scrutiny, ensure that requirements of districts and priorities of the State are appropriately captured and aligned in DAPs. Alternately, State Nodal Agency could communicate to the districts regarding the State's priorities that ought to be reflected in the respective district plans and then the districts might incorporate these in their updated district plans.

Preparation/revision of the DAPs is an elaborate, exhaustive and iterative process and care need be taken by the State nodal department and district agriculture department in ensuring that these plans cover the entire gamut of agriculture and allied sectors.

Each State thereafter has to prepare SAIDP in a similar manner to that of DAPs and SAPs for identifying shelf of projects for RKVY (Infrastructure and Assets) stream. SAIDP should ideally be consolidation of requirement of infrastructure identified in DAPs and SAP.

State Planning Department provided revised/updated SAP and SAIDP to Department of Agriculture (DAC) and Planning Commission as part of State's annual State Plan exercise.

Farm Mechanization has been an important element of modernization of agriculture. Productivity of the farm depends considerably on the availability of farm power coupled with efficient farm implements and their judicious utilization. Agricultural equipment enable efficient utilization of various inputs such as seeds, fertilizers, plant protection chemicals and water for irrigation in addition to alleviation of drudgery associated with various farm operations and making farming an attractive enterprise.

Availability of adequate farm power is very crucial for timely farm operations for increasing production and productivity. There has been close correlation between farm power availability and productivity. Productivity of the farm depends considerably on the availability of farm power coupled with efficient farm implements and their judicious utilization. The power productivity relationship shows that those States having higher farm power availability/ha have higher productivity. It is reported that the additional requirement of food grains in future will be met, to a great extent, where the demand for tractors, power tillers and other machinery will continue to increase in future also.

To provide a higher share of consumer prices to the farmers there is a need to reduce the multiple layer of intermediaries by providing alternative marketing channels and creation of scientific storages nearer to the farms. The major infrastructure constraints faced by most of the farmers' markets include the non-availability of scientific storage facilities, adequate number of stalls, canteens, rest room facilities and drinking water. Even though waste disposal is not a problem, the utilization of waste for productive purposes remains elusive in most of the farmers markets.

Besides, storage godowns in Primary Agricultural Cooperative Societies and in Cooperative Marketing Societies, additional marketing godown for storing food grains and pulses, drying yards for use of farmers of food grains and pulses which would prevent loss resulting from cleaning, grading, longer period of drying on roads, cold storage and market complex for fruits and flowers, Coconut Market/Processing complex with trader input shops, drying yard, solar drier, rural godown and value addition incubation centre, common facility centres for vegetable sorting and packaging and direct sale units, establishment of modern market complex for flowers, construction of godown, drying yard, warehousing and

transaction shed in Regulated Markets and Agri. Marketing Committees, Installation of silos for storing grains, Direct purchase centres for procurement of agri. Commodities, establishment of solar coconut drying yards etc. would help in effective post-harvest management and value addition in agricultural and horticultural crops.

Creation of infrastructure and equipment to the veterinary health centres is necessary for the timely diagnosis and treatment of animal diseases. Emphasis has to be given to strengthen mobile veterinary services to ensure better access to farm households. Vaccine storage facilities in every health care institution would pave way for better animal health management.

Inland fish catches are conditioned by aberrations of rainfall, less retention of water in the water bodies, inadequate fish seed and feed and absence of proper marketing. Efforts need to be directed towards the development of scientific storages and marketing of inland fisheries. To augment inland fisheries, the shortfall in fish seed and feed has to be overcome. Inland fishery cooperative societies need to be promoted and strengthened and provided with necessary infrastructure and financial support to take up culture and capture fisheries with the active role of fisherwomen. Fresh water fish culture needs to be promoted in seasonal tanks/ponds owned by Panchayats.

Considering the above challenges, the State Agriculture Infrastructure Development Programme proposed the following interventions.

Agriculture

- Facilities for seed processing
- Facilities for seed quality maintenance
- Establishment of Laboratories
- Infrastructure for Strengthening Research Capacity
- Strengthening of Extension activities
- Infrastructure for post-harvest management
- Construction of IAEC
- Construction of Seed Godown

Horticulture

- Protected structures
- Establishment of Mushroom production unit
- Establishment Vermicompost unit
- Supporting structures for vegetable production
- Establishment of Horticulture information and training centre/ Community Seed Bank
- Post-Harvest machineries and equipments
- Development of Farms, Nurseries and Parks
- Farm Mechanization - Machineries, Equipments & Tools
- Water / Irrigation Management

Agricultural Engineering and Mechanization

- Procurement and distribution of Agricultural Machinery and Equipment
- Establishment of Farm Machinery Banks for Custom Hiring
- Establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring
- Promotion of Farm Mechanization in Selected Villages
- Promotion of Mechanized Farming operations
- Tractor Hiring Scheme
- Minor Irrigation Scheme
- Solar Energy
- Information Technology (IT) related items
- Modernization of Tractor workshops of AED
- Post-Harvest Technology and Management machinery (PHTM)
- Construction of Agricultural Engineering Extension centres (AEECs)
- Water Conservation measures
- Soil conservation measures

Agricultural Marketing and Agribusiness

- Promotion of Commodity Groups and Market Information
- Strengthening of Uzhavar Sandhai
- Strengthening of Regulated Markets

- Provision of Market Access and Market Activities
- Post-harvest management
- Provision of processing and value addition machineries to Agri entrepreneur /Individuals
- Supply chain Management

Seed certification and Organic Certification

- Strengthening of laboratory facilities
- Strengthening of communication and networking facilities
- Infrastructure and assets

Animal Husbandry and Dairy Development

- Establishment of Vermicomposting unit (single bed)
- Fodder plot development
- Meikkal land development (inclusive infrastructure development)
- Development of Seed Production plots
- Establishment of Vermicompost unit (10 beds) at Farms
- Establishment of Farm Protection Cover (Bio-security wall)
- Establishment of Feed mixing/ feed block units
- Construction of silo Pit for livestock farm
- Construction of Over Head Tanks/ GLR / Pre-fabricated tanks in farm
- Establishment of IVF Lab
- Establishment of Embryo Transfer Lab
- Establishment/ Strengthening of Semen Processing Lab
- Development of Native chicken farms
- Establishment of disposal pits for poultry unit
- Establishment of Modern Poultry Shed

- Establishment of Modern Hatchery Complex
- Establishment of Rabbit Units
- Establishment of Modern Dairy/ Bull Shed
- Establishment of Modern Piggery Shed
- Establishment of Modern Sheep/Goat Shed
- Improvement of infrastructure facilities at PEC, Vaigai dam
- Establishment of Infrastructure facilities for Veterinary Institutions
- Establishment of Mobile Disease Diagnostic Labs
- Establishment of surgical theatres at veterinary institution
- Development of slaughter house infrastructure
- Establishment of Farmers training Centre

Animal Science Research

- Breed Research Stations
- Genetic Conservation Centres
- Animal Ambulance
- Centralized Molecular laboratories
- Solar energy models
- Animal Feed and Fodder Technology Parks
- Nutraceuticals Analytical Laboratory
- Referral Water Testing Laboratories
- Manufacturing units for production of agro - dairy products
- Modernization of dairy operations

Fisheries

- Establishment of Fish Culture Ponds and Provision of Inputs
- Establishment of GIFT farms and provision of inputs
- Ornamental Fish Culture
- Marketing of Fishes
- Strengthening of Infrastructure Facilities

- Infrastructure for Fisheries Research and Development
- Strengthening Extension Facilities
- Machineries and Implements for Fishing

Public Works Department (WRD/IRRIGATION)

- Desilting of lakes / Irrigation canals and Strengthening of bunds
- Removals of encroachments
- Construction of check dams, anaicuts, bed dams
- Rehabilitation of Anaicuts, Tanks, Supply Channel and its Infrastructure
- Modernization and enhancing the existing capacity of tanks by desilting and creation of Island
- AIBP
- Har Khet Ko Pani Component-Extension, Renovation and Modernisation
- Per Drop More Crop component
- Watershed Development Component
- MGNREGS

Cooperation and Civil Supplies

- Strengthening of office building
- Construction of compound wall
- Establishment of coconut processing unit
- Construction of Godowns
- Shopping complex for the society

State Agriculture Infrastructure Development Programme

To execute the developmental activities as detailed in the plan, the State Agriculture Infrastructure Development Programme proposed a budget of Rs. **9011656.39 lakh** (including district irrigation plan) with sectoral allocation and it is furnished in the Table below. The above planned investment will help to achieve a four per cent growth in agriculture sector. Thus, about 80.87 per cent of the budget is allocated to water resource irrigation and irrigation, Horticulture (6.58 per cent), Dairy Development (4.11 per cent),Agricultural Engineering (3.39 per cent), Agriculture including research (1.16 per cent), Animal Husbandry (1.00 per cent) and Agriculture Marketing (0.95 per cent).

Table 4.1 Sector wise fund Requirement for Infrastructure

(Rs. in Lakh)

Sl. No	Department	2017-18	2018-19	2019-20	2020-21	2021-22	Total	Per cent
1	Agriculture	21115.51	22467.62	11203.32	11488.11	7672.16	73946.7	0.82
2	Agricultural Research	6672.00	7518.30	7089.00	5076.00	3925.00	30280.30	0.34
3	Horticulture	157657.18	98607.62	110541.06	109601.04	116794.97	593201.88	6.58
4	Agricultural Engineering	67654.48	61546.01	59180.47	58722.83	57986.30	305090.07	3.39
5	Agricultural Marketing	30214.99	16919.16	13497.63	11940.27	13447.88	86019.93	0.95
6	Seed Certification	699.98	522.79	455.81	513.36	375.00	2566.94	0.03
7	Animal Husbandry	24526.12	25297.17	15960.32	11763.37	12645.18	90192.16	1.00
8	Dairy Development	31364.00	95430.00	126508.00	61680.50	54980.50	369963.00	4.11
9	Animal Science Research	14645.30	14890.76	15016.48	4587.80	4529.40	53669.74	0.60
10	Fisheries	8595.83	5860.08	3844.85	2131.08	1045.95	21477.78	0.24
11	Fisheries Research	17922.50	9601.40	5156.00	2523.50	1743.00	36946.40	0.41
12	PWD (WRD)	465733.80	334496.08	326675.78	185549.75	58698.82	1371154.23	15.22
13	Cooperation & Civil Supplies	22975.50	12994.56	10904.93	8767.72	5703.03	61345.74	0.68
	Total	**869777.19**	**706151.55**	**706033.65**	**474345.33**	**339547.19**	**3095854.87**	**34.35**
14	**District Irrigation Plan**							
	AIBP						385000.47	
	Har Khet Ko Pani Component-Extension, Renovation and Modernisation						2123600.30	
	Drop more crop component						1272800.50	
	Watershed Development Component						221800.05	
	MGNREGS						1912600.20	
	Total (DIP)						**5915801.52**	**65.65**
	Grand Total						**9011656.39**	**100.00**