NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP)

STATE AGRICULTURE PLAN

TAMIL NADU

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

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2017

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EXECUTIVE SUMMARY

Agriculture is recognized as the most important sector for alleviating poverty and promoting rural development. Agriculture is one of the most powerful sectors of the economy for economic growth and Nation building. Hence, the Government of India launched the National Agriculture Development Programme (NADP) with special Additional Assistance Scheme since the beginning of 11th Five Year Plan to rejuvenate agriculture and allied sectors and to accelerate the growth process on project basis by bottom-up approach in formulation and implementation of the projects. Subsequently, during 12th Five Year Plan period, the respective State governments formulated different strategies for the development of agriculture and allied sectors through the preparation of District Agriculture Plans (DAPs), State Agriculture Plan (SAP) and State Agriculture Infrastructure Development Program (SAIDP).

In Tamil Nadu, District Agriculture Plans were prepared for 31 districts. The major thrust areas of development considered were raising the productivity of major field crops with the application of latest production technologies, crop diversification, farm mechanization, field soil and moisture conservation practices, rehabilitation of water bodies and up-keeping of irrigation systems, feeding, breeding and health management of livestock, increasing inland-fish production, farming systems development and related activities. Further, District Irrigation Plans (DIPs) and State Irrigation Plan (SIP) were also prepared under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY). Creation of new water sources; repair, restoration and renovation of defunct water sources; construction of water harvesting structures, secondary and micro storage, groundwater development, enhancing potentials of traditional water bodies at village level are the interventions suggested to be taken on priority.

Tamil Nadu is the 11th largest State in India by area and the 7th most populous State. Tamil Nadu has a total geographical area of about 130 lakh ha which is four per cent of the total land area of the country. The gross cropped area of the State is 59 lakh ha and the net area sown is 47 lakh ha, which is 36 per cent of the total geographical area of the State. The State has three per cent of water resources of the country, with which a gross area of 33.11 lakh ha brought under irrigated agriculture. In the State, paddy is cultivated in about 17.75 lakh ha (31 per cent of total cultivated area), while millets are cultivated in 6.99 lakh ha (12 per cent). The pulses are grown in 6.34 lakh ha (11 per cent), oilseeds in 4.38 lakh ha (8 per cent), sugarcane in 3.24 lakh ha (6 per cent), cotton in 1.29 lakh ha (2 per cent), coconut in 4.29 lakh ha (8 per cent) and horticultural crops in 12.22 lakh ha (22 per

cent). The animal husbandry sector contributed 2.50 per cent of Gross State Domestic Product (GSDP) and accounted for 24.80 per cent of agricultural and allied activities. The average annual production level of milk stood at 70.49 lakh tonnes and eggs at 14, 123 millions.

An upsurge in productivity is essential as decline in the growth rate in yield of most of the important crops was observed particularly in paddy, millets, pulses, cotton and sugarcane during the last three decades. Further, the seed availability and seed replacement rates for most of the crops remained inadequate. Hence, this calls for expanding the extension technology to a considerable extent to reach the vulnerable sections of the farming community. Besides, focus should be on second green revolution especially in the case of rainfed crops.

Hence, to usher in more and faster growth in agriculture and allied sector, many strategies are suggested viz. management of soil health, judicious use of water, supply of quality inputs, mechanization of farm, development of infrastructure, invigorating extension system, extensive use of ICT tools, capacity building and other developmental activities are focused on priority basis.

Budget Outlay

For carrying out the developmental activities as specified above in the form of interventions, the State Agriculture Plan proposed a sum of Rs. **11564983.83** lakh as detailed below.

(Rs.in lakhs)

S. No	Sectors	2017-18	2018-19	2019-20	2020-21	2021-22	Total	Percentage
1	Agriculture	342470.36	381633.02	373052.25	382500.87	404188.6	1883845.14	**16.25**
2	Agricultural Research (TNAU)	8412	11664.974	9136.02	5270.72	4695	39178.714	**0.34**
3	Horticulture	227674.56	172956.35	191823.64	196148.05	206181.2	994783.8	**8.58**
4	Agricultural Engineering	67821.28	61709.69	59349.91	58889.55	58154.02	305924.45	**2.64**
5	Agricultural Marketing	37027.74	22357.7	18810.01	16287.39	18457.33	112940.17	**0.97**
6	Seed Certification & Organic Certification	699.98	547.69	481.11	539.86	401.9	2670.54	**0.02**
7	Animal Husbandry	82445.32	68699.21	62379.07	54302.63	53092.13	320918.36	**2.77**
8	Animal Science Research (TANUVAS)	14645.3	14890.76	15016.48	4587.8	4529.4	53669.74	**0.46**
9	Dairy Development	41395.68	108083.68	140489.18	73070.8	65246.9	428286.24	**3.70**
10	Fisheries	12088.94	8467.34	7729.94	7598.01	3464.27	39348.49	**0.34**
11	Fishery Research	22052.82	17445.04	9140.74	6566.64	5461.64	60666.88	**0.52**

	(TNFU)							
12	Public Works Department	465733.8	334496.08	326675.78	185549.75	58698.82	1371154.23	**11.83**
13	Co-operation	22975.5	12994.56	10904.93	8767.72	5703.03	61345.74	**0.53**
	Total	**1345443.3**	**1215946.09**	**1224989.06**	**1000079.8**	**888274.3**	**5674732.49**	**48.96**
14	**District Irrigation Plan**							
	AIBP						385000.47	**3.32**
	Har Khet Ko Pani Component- Extension, Renovation and Modernisation						2123600.30	**18.32**
	Drop more crop component						1272800.50	**10.98**
	Watershed Development Component						221800.05	**1.91**
	MGNREGS						1912600.20	**16.50**
	Total (DIP)						**5915801.52**	**51.04**
	Grand Total						**11564983.83**	**100.00**

Thus, about 62.87 per cent of the total outlay is shared by Water Recourses Organization & District Irrigation Plan followed by Agricultural sector (16.25 per cent), Horticulture (8.58 per cent), Agricultural Engineering (2.64 per cent), Animal Husbandry & Dairy Development (6.93 per cent), Agricultural Marketing (0.97 per cent), Fisheries (0.86 per cent), Cooperation (0.53 per cent) and Seed Certification (0.02 per cent). In sum, an overall budget outlay of Rs. 11564983.83 lakh is required for implementing the various projects formulated under SAP and State Irrigation Plan (SIP) in Tamil Nadu State.

INTRODUCTION

CHAPTER I

Agricultural Sector continues to play a vital role in the economic development of Tamil Nadu State. Tamil Nadu covers 4 per cent of the geographical area and holds 5.96 per cent of the population of the country. Agriculture continues to be the mainstay for the livelihood of more than 50 per cent of the population in Tamil Nadu. In the recent years, agriculture in Tamil Nadu is confronting with new challenges like gradual decline in cultivable area, scarcity of labor, more predominance of small and marginal farmer households, risk prone due to instability and wide seasonal variations in receipt of monsoon etc. Nevertheless, agricultural development needs to achieve self-reliance in food grains. The estimated food requirement of various food crops by 2020 based on the projected population suggests that the area required in the next five years would be around 187 lakh ha for producing required food and this is poorly achieved with the existing geographical area of the State (130 lakh ha). Hence, enhancing the productivity of the agricultural land and farm-based activities is the only option available for the state to face the above challenges.

During the beginning of the 12th Five Year Plan, targets were set in terms of area coverage and production to be achieved by realizing a required rate of productivity levels for each crop. The Government plans to achieve more area coverage under each crop. Equally important here is that the productivity to be achieved during the above time period has also been scaled up. For instance, about 50 per cent increase in pulses and fruits; 25 per cent increase in sugarcane, vegetables, spices and plantation crops; 14-19 per cent increase in paddy, cotton and flowers, and less than 10 per cent in millets and total food grains were achieved through productivity increase.

1.1 Resource base

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.

1.2 Performance of crops

During the year 2015-16, rice is cultivated in an area of 20.37 lakh ha with the production and productivity of 86.98 lakh tonnes and 4.269 tonnes/ha respectively. Pulse crop was grown in an area of 9.27 lakh ha with production levels of 5.73 lakh tonnes. The yield obtained was 618 kg/ha. The performances with respect to yield levels of other crops were also indicated in the Table 1.1.

Table 1.1 Performance of Select Crops in Tamil Nadu

Crop	12th Plan Target			Achievement till 2015-16		
	A	P	Y	A	P	Y
Rice	22.00	100.01	4.546	20.37	86.98	4.269
Millets	15.00	60.00	4.000	9.01	37.92	4.209
Pulses	12.00	10.00	0.834	9.27	5.73	0.618
Total Food Grains	49.00	170.00	3.469	38.65	130.63	
Oil Seeds	7.21	16.74	2.322	4.12	9.19	2.231
Cotton (L. Bales)	1.65	5.36	0.552	1.43	3.69	0.439
Sugarcane (Cane)	3.73	54.50	146.00	2.57	264.97	103.00
Fruits	4.42	139.05	31.46	2.94	62.61	21.30
Vegetables	3.79	145.36	33.92	2.93	78.92	26.94
Plantation crops	3.67	19.19	5.23	7.06	13.48	1.91

Note: Area (A) in lakh ha, Production (P) in Lakh Ton and (Y) Yield in Ton/ha

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

1.3 Performance of livestock

Tamil Nadu is ranked at 2nd position in poultry population (117.3 million), 4th position in sheep (4.8 million), 13th position in Cattle (8.8 million) and 14th position in Buffalo (0.78 million) at National level. The milk production amounts to 72.44 lakh MT and the per capita availability is 283 gm during 2015-16, whereas, egg production is reaching as high as 16,125 million Nos. leading to per capita availability of 210 Nos. per annum. Similarly, in meat production including poultry meat about 5.44 lakh MT is produced. The state is equipped with 17 District Cooperative Milk Producers Union with a processing capacity of 24 lakh lit/day. However, there exist further growth potentials in this sector with more focus on value addition and distribution including the capacity utilization.

1.4 Performance of fisheries

Tamil Nadu has a coastal length of 1076 km with a fish folk population of about 9.7 lakhs. The marine fish catch is about 4.66 lakh tonnes and Tamil Nadu exports about 86,000 tonnes of fish to other countries. Similarly, in the inland fishery, the State is endowed with 3.83 lakh ha of water spread area resource and about 2.28 lakh people are directly engaged in inland fishing. The State is also able to harness the fish catch from the inland water annually about 2.42 lakh ton of fish.

Similar to agriculture sector, the livestock and fishery sector are facing new generation challenges and these challenges have to timely address for higher growth.

Policies and Approaches for Higher Growth

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 hard wares 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 program 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 modifications to enhance efficiency, efficacy and inclusiveness of the program.

District and State Agriculture Plans

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 the districts.

Revision and Updation of SAP in Tamil Nadu

Revision and updating 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 in the first instance, the State's priorities that ought to be reflected in the respective district plans and the districts may incorporate these in their updated districtplans. Preparation/revision of the DAPs need to be an elaborate, exhaustive and iterative process and care has to be taken by the State Nodal department and District Agriculture Department in ensuring that these plans cover the entire gamut of agriculture and alliedsectors.

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 (SAIDP) during 11th and 12th Plan. These DAP, SAP and SAIDP are revised and updated appropriately for implementing RKVY beyond 12th Plan (2017-22) keeping in view of the modifications proposed for the plan period and emerging needs of the State and coincide with the 14th Finance Commission period. The current exercise is 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 has been covered under this current revision. Considering the normal practice of preparing a plan for five years, the present revision is attempted for covering the period beyond 2016-17 i.e. from 2017-18 to 2021-22.

Thus preparation/revision of the DAPs 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.

Objectives and Major Areas of Focus

- Strengthening farmers' efforts through creation of required pre and post-harvest agri-infrastructure that increases access to quality inputs, storage, market facilities etc. and enables farmers to make informedchoices.
- Provision of autonomy, flexibility to States to plan and execute schemes as per local/ farmers'needs.
- Promotion of value chain addition linked production models that will help farmers increase their income as well as encourage production/productivity
- Mitigating risk of farmers with focus on additional income generation activities - like integrated farming, mushroom cultivation, bee keeping, aromatic plant cultivation, floriculture etc.
- Empowering youth through skill development, innovation and agri- entrepreneurship based agribusiness models that attract them toagriculture

Methodology followed for the Preparation of District and State Agriculture Plan

The task of preparing each District Agriculture Plans and the overall State Agricultural Plan 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 suggested interventions are discussed at two stages with the officials of the implementing agencies co-ordinated by the state level nodal agency (TAWDEVA) and finalised the places.

The State Agriculture Plan document thus integrates all these district level action plans and organized into different chapters *viz.,* a brief current status of the economy of the

State, interventions recommended by the Line Department Officials and the district-wise, sector-wise and year-wise budget required for the developmental activities to be carried out by the different sectors. Further, to enhance the growth in agriculture and allied sectors, emphasis is also given in this report to dovetailing/convergence of resources by integration at ground level.

District Irrigation Plans (DIPs) and State Irrigation Plans (SIPs) under PMKSY

During 2015-16, a new scheme namely Pradhan Mantri Krishi Sinchayee Yojana (PMKSY) scheme was introduced. The overreaching vision of PMKSY is to ensure access to some means of protective irrigation to all agricultural farms in the country (HarKhetkopaani) and to produce 'per drop more crop', thus bringing much desired rural prosperity. The scheme will ensure the completion of long pending irrigation projects on priority and harnessing rainwater to nurture water conservation and ground water recharge.Micro irrigation will be popularized to ensure 'Per drop-More crop'.Creation of new water sources; repair, restoration and renovation of defunct water sources; construction of water harvesting structures, secondary and micro storage, groundwater development, enhancing potentials of traditional water bodies at village level will be taken on priority.

Thus, District Irrigation Plans (DIPs) shall be the cornerstone for planning and implementation of PMKSY. DIPs will identify the gaps in irrigation infrastructure after taking consideration of the District Agriculture Plans (DAPs) prepared for Rashtriya Krishi Vikas Yojana (RKVY). DIPs will present holistic irrigation development perspective of the district outlining medium to long term development plans integrating three components viz. water sources, distribution network and water use applications incorporating all usage of water like drinking and domestic use, irrigation and industry. Similar to State Agriculture Plan, the State Irrigation Plan is the compendium of all the District Irrigation Plans. These plans are also included in the state agricultural plan to make it more comprehensive in all aspects.

Organization of the SAP plan document

The plan document consists of five chapters. After the introduction chapter, the second chapter discusses about the resource base and current status of the state economy followed by the third chapter which elaborately presents the development of agriculture and allied sectos in the State. The forth chapter brings out the specific interventions and financial implications across the different sectos and the sixth chapter summarizes.

RESOURCE BASE AND CURRENT STATUS OF THE ECONOMY

CHAPTER II

Tamil Nadu is located in the Northern hemisphere in the hot zone between 8° and 13° N latitude and between 78° and 80° E longitude. Tamil Nadu is the eleventh largest State in India by area (about the size of Greece) and the seventh most populous State. It is one of the 29 States of India and lies on the eastern coast of the southern Indian peninsula bordered by Pudhucherry, Kerala, Karnataka and Andhra Pradesh States. Tamil Nadu is bound by the Eastern Ghats in the North, the Nilgiris, the Anamalai Hills and Palakkad in the West, Bay of Bengal in the East, Gulf of Mannar and Palk Strait in the South east and Indian Ocean in the South. The eastern most point is formed by the Point Calimer and the Mudumalai wildlife sanctuary in the Western most point. The Pulicat Lake is situated in the northern extreme. The southernmost tip of Tamil Nadu is the Cape Comorin or Kanyakumari. West and north of the State has lofty hills while the East and South are Coastal plains.

Tamil Nadu is the fifth largest contributor to India's GDP and the most urbanized State in India. The State has the highest number (10.56 per cent) of business enterprises in India, compared to the population share of about six per cent. Tamil Nadu has a coastline of about 1,076 kilometres which is the country's third longest coastline. Tamil Nadu has a wide variety of minerals with the most lignite (almost 90 per cent of India's reserves), magnesite (45 per cent), and garnet (over 40 per cent) reserves in India, among others. Tamil Nadu contributes 15 per cent of the total salt production in the country. Forests cover over 17 per cent of the State's geographical area with several protected areas of Tamil Nadu including wildlife and bird sanctuaries.

2.1. Zonal Classifications

The entire State of Tamil Nadu can be divided into three zonal classifications namely Geomorphologic zones, Agro-climatic zones and Agro-ecological zones.

2.1.1. Geomorphologic Zones

Under Geomorohologic zones, Tamil Nadu State can be futher classified into four geomorphologic zones *viz.,* Coastal, Eastern Ghats, Central Plateau, and Western Ghats. The coastal plain stretches from Pulicat Lake in the North to Cape Comorin (Kanyakumari) in the South. A broken line of hills *viz.,* the Javadus, Shervaroys, Kalrayans, Pachamalais and Kolli hills is known as the Eastern Ghats. On the Western border occurs a group of high hills

between the Eastern and Western Ghats lays the Central plateau with elevation ranging from 152 to 610 meters above mean sea level. The general topography is undulating with an overall sloping from West to East.

The State can be divided broadly into two natural divisions (a) the coastal plains and (b) the hilly western areas. It can further be divided into Coromandal plains comprising of the districts of Kancheepuram, Cuddalore, Vellore, Thiruvannamalai, and alluvial plains of Cauvery delta extending over Thanjavur, Thiruvarur, Nagapattinam and part of Tiruchirapalli districts and dry southern plains in Madurai, Ramanathapuram, Sivagangai, Virudhunagar, Tuticorin and Tirunelveli districts. It also extends a little in Western Ghats in Kanyakumari district. The Western Ghats averaging 3,000 to 8,000 feet height runs along the Western part with the hill groups of the Nilgiris and Anamalai on either side of it. Palani hills, Varshanad and Andipatti ranges are the major off shoots of ghats. The other prominent hills comprise of Javadu, Shervarayan, Kalrayan and Pachamalais. These ranges continue even beyond south of river Cauvery. A plateau is found between these hills and Western Ghats with an average elevation of 1,000 feet rising westward. The highest peak of Doddabettah in the Nilgiris is 8,650 feet above the mean sea level.

Western Ghats form a complete watershed and no river passes through them. The main streams i.e., Paraliyar, Vattasery, Phazhayar etc. are of limited length and join the Arabian Sea. All other rivers are east flowing rivers. The Eastern Ghats are not a complete watershed and as a result the rivers pass through at various places, notable among them is the river Cauvery.

2.1.2. Agro – Climatic Zones

Based on the rainfall pattern, altitude and irrigation sources, Tamil Nadu is divided into seven agro-climatic zones.

1.	North Eastern Zone	5.	Southern Zone
2.	North Western Zone	6.	High Rainfall Zone and
3.	Western Zone	7.	Hilly Zone
4.	Cauvery Delta Zone		

The distribution of Agro climatic zones in Tamil Nadu is exhibited in Fig 1.

Fig 1. AGROCLIMATIC ZONES OF TAMIL NADU STATE

2.1.2.1. North Eastern Zone

The north eastern zone comprising the revenue districts of Chengalpet, Thiruvallur, Kancheepuram, Vellore, Thiruvannamalai, Villupuram, Cuddalore and Perambalur is located between 8°5' and 13°2' North latitude and 76°15'and 80°22' East longitude, covering an area of 31,065 Sq. km equivalent to 23.9 per cent of the State area.

The zone can be broadly divided into six geographical tracts. Coastal plain comprises of the northern plain (Kancheepuram district and parts of Vellore, Cuddalore and Tiruchirapalli districts) with 77 M above MSL; a considerable portion of hilly and mountainous area undulating with hillocks; the eastern ghats comprising of hills; and the Central plateau undulating between eastern and western ghats, 150 to 160 m in elevation. Western Ghats comprises the highest mountains of the Peninsula. There are some backwater, lagoons adjoining the coast, around Cuddalore, Marakkanam and Pichavaram.

2.1.2.2. North Western Zone

The north western zone comprising the revenue districts of Dharmapuri (excluding hilly areas), Salem and Namakkal is located between 11° and 12°55′ North latitude and 77°28′ and 78°50′ East longitude covering an area of 16,150 Sq. km equivalent to 12.4 per cent of the State area. Part of the tableland, an undulating plateau with hillocks is rising from 600 to 1000 m above MSL. Tracts below 350 m MSL comprise the watershed between the Cauvery and Vellar river systems. Besides, the zone has Shervarayan hills, Kalrayan hills and Kolli hills.

The climate in the zone ranges from semi-arid to sub-humid with frequent occurrence of drought. The hottest months are March, April and May. Excepting the hills, the annual rainfall ranges from 560 to 1080 mm and the hilly regions enjoy the rainfall of above 1300 mm.

Southwest monsoon, northeast monsoon, winter showers and summer rains contribute to the annual rainfall. The monthly distribution of rainfall shows a pronounced maximum in September-October with a secondary peak during May. The maximum temperature ranges from 23° to 42°C and the minimum from 10°to 14°C and being an interior region, the diurnal range of temperature is large particularly in summer.

2.1.2.3. Western Zone

The western zone comprises of Erode and Coimbatore districts, Thiruchengodu Taluk of Namakkal district, Karur Taluk of Karur district and northern part of Dindigul and Madurai districts. The zone is located between 9°10' and 12° North latitude and 70°30' to 78° East longitude. The altitude of the zone ranges from 160 to 450 m above MSL.

The zone has undulating topography sloping towards east. Western and northern parts of the zone are bound by the Western Ghats bordering Kerala and Karnataka States with peaks ranging from 1000 to 2750 m above MSL. On the east, the zone is bordered by Salem, Tiruchirapalli and Dindigul districts. The southern part of the zone lies in Madurai district with contours of varying altitudes.

The climate in the zone ranges from semi-arid to sub-humid with frequent occurrence of drought. Four distinct seasons are south-west monsoon (June-September), north-east monsoon (October-December), winter (January-February) and summer (March-May). The cool months of the year are November to January and the hot months are March, April and May. The annual rainfall of the zone varies from 524 to 1428 mm with an average of 780 mm. Of the total rainfall, 48.4 per cent is received during north-east monsoon and 32.2, 18.6 and 2.8 per cent during south west, summer and winter seasons respectively. The maximum temperature of the zone ranges from 26.9 to 42.1°C and the minimum from 16.2 to 24.5°C. The maximum temperature is experienced during the months of March, April and May, gets reduced gradually and reaches the minimum during the months of December and January. Being an interior region, the diurnal variation in temperature is large particularly in dry and hot seasons.

2.1.2.4. Cauvery Delta Zone

Cauvery Delta Zone lies in the eastern part of Tamil Nadu between 10°00′ and 11°30′ North latitude and 78°15′ and 79°45′ East longitude. It is bound by the Bay of Bengal on the east, the Palk Straight on the south, Tiruchirapalli and Perambalur districts on the west and north-west, Cuddalore district on the north and Pudukkottai district on the south-west. This zone comprises the entire revenue taluks of Thanjavur, Thiruvarur and Nagapattinam districts, Musiri, Kulithalai, Lalgudi and Tiruchi taluks of Tiruchirapalli district, Chidambaram and Kattumannarkovil taluks of Cuddalore district and Aranthangi taluk of Pudukkottai district.

It is a deltaic zone. Cauvery is the river traversing the delta. A fair width of sandy beach occurs including the sand bars on the sea surface of the river delta, stiff clay seashores and marshy tidal swamps with mangroves. The terrain is an open plain sloping gently towards east and devoid of any hills or hillocks. The altitude ranges from 6 to 250 m above MSL.

The Cauvery delta zone has diverse climatic conditions as the zone includes coastal belt as well as inland area. Cyclonic storms and high humidity occur in coastal belts. The coastal belt is favoured by high rainfall and when it proceeds to the interior, the rainfall intensity decreases. The mean annual rainfall is 1,192 mm. North-east monsoon alone contributes about 52.5 per cent of the total rainfall followed by south-west monsoon with 30.5 percent. Hot weather season accounts for 11.4 per cent while, the winter season has only 5.6 per cent. The mean maximum temperature reaches 38.6°C in the month of May and the minimum of 21.0°C in December. April to August are the hot months and November to February are the cool months.

2.1.2.5. Southern Zone

The Southern Zone is located between 8 and 10°.55' North latitude and 79° 50 East longitude. It is bound on the north by Tiruchirapalli and Thanjavur districts of Cauvery delta zone, on the south by Kanyakumari district of heavy rainfall zone and the Indian Ocean, on the east by Bay of Bengal and on the west by Kerala and parts of Madurai district of the western zone. The southern zone consists of Tirunelveli, Tuticorin, Virudhunagar, Ramanathapuram and Sivagangai districts, Thirumangalam, Madurai south, Madurai north and Melur taluks of Madurai district, Dindigul and northern taluks of Dindigul district and Pudukottai district with the exception of Aranthangi taluk.

This zone comprises of flat plains and intermittent hills at varying altitudes ranging up to 700 m high. The topography is undulating with the gradient sloping towards the east. The major river systems are Vaigai, Manimuthar, Sarguni, Gundar and Arjuna nadhi.

The climate of the southern zone is generally semi-arid and only a small portion comes under – sub-humid. Thus, frequent drought occurs. Summer is very hot. The zone comes under rain shadow area. The rainfall ranges from 700 to 1277 mm with a mean of 876.4 mm. North-east monsoon accounts for 54.9 per cent of total rainfall and forms the main cropping season. South-west monsoon accounts for 23.9 per cent of total rainfall of this zone. Winter rainfall is negligible and summer rainfall forms 13.0 per cent. The maximum

temperature ranges between 30.0° and 37.5°C, while the minimum temperature varies from 20.0° to 27.0°C.The temperature is more or less similar in most parts of this zone. However, along the Western Ghats, the minimum temperature tends to be low.

2.1.2.6. High Rainfall Zone

The High rainfall zone of Tamil Nadu consists of Kanyakumari district, located between 77°50′ and 77°36′ East longitude and 8°03′ and 8°35′ North latitude. It is bordered by Tirunelveli district in north-east, the Kerala State in the North West, Arabian Sea in the west and Indian Ocean in the south.

Kanyakumari district extends from the Arabian Sea to the Western Ghats up to an elevation of 600 m above MSL. Two distinct physiographic regions *viz.,* the hill and 'else' region and the plains are identifiable in this district. The climate is sub-humid influenced by both the south-west and north-east monsoons, because of the proximity of sea and the Western Ghats. There is not much variation in the mean monthly temperature, which varies from 23.9°C (minimum) to 36.7°C (maximum).

2.1.2.7. Hilly Zone

This zone comprises the Nilgiris, the Shervaroys, the Yelagiris, the Anamalais and the Palani hills. The rainfall varies from 1000 mm at the foot of the hills to 5000 mm at the peaks. The maximum temperature varies from 15°C to 24°C and that of minimum ranges from 7° to 13°C. The soil is mainly lateritic. The major crops are vegetables, potato and tropical and temperate fruit crops. At the foot of the hills, hill tribes raise minor millets. At higher altitudes, wheat cultivation is common during winter season.

2.1.3. Agro-Ecological Systems

Tamil Nadu can also be classified under four Agro-ecological systems. There are 16 zones showing distinct soil characteristics under Hill Ecosystem, Upland ecosystem, Plain Ecosystem and Coastal ecosystem.

2.1.3.1. Soils of Agro-Ecological Systems

i) Hill Ecosystem

- Deep to very deep, clayey and gravelly clay soils of the Nilgiris, hot humid to per humid (rainfall 1500- 2500 mm) ecosystem with Length of Growing Period (LGP) more than 210 days.

- Shallow to medium deep (with rocky phases), loamy to gravelly clay soils of south Sahayadris, hot humid / per humid transitional to moist semi-arid (rainfall 900 – 1700 mm) ecosystem with Length of Growing Period (LGP) of 210 days.
- Shallow to moderately deep, (with rock phases) red soils of Eastern Ghats, loamy to clayey with gravels, hot moist semi-arid to dry semi-arid transition (rainfall 750 – 1000 mm) with Length of Growing Period (LGP) between 150 – 180 days.

ii) Upland Eco-system

- Moderately deep to deep, gravelly loam to gravelly clay soils of upland, hot semi-arid dry ecosystem (rainfall 750 – 1000 mm) with Length of Growing Period (LGP) between 150 – 180 days.
- Moderately deep to deep, gravelly loam to gravelly clay soils, semi-arid to arid transitional ecosystem (rainfall 750 mm) with Length of Growing Period (LGP) between 90 – 120 days.
- Deep to moderately deep, clayey black soils in association with gravelly clay red hill soils of upland, hot semi-arid dry to arid transitional ecosystem (rainfall<750mm) with Length of Growing Period (LGP) between 90-120 days.

iii) Plain Eco-system

- Moderately deep to deep, gravelly loam and gravelly clay red lateritic soils of plains, moist semi-arid eco systems (rainfall 1000 – 1500 mm) with Length of Growing Period (LGP) between 180 – 210 days.
- Deep to very deep, clayey black soils of plains (riverine plain), hot moist to dry semi arid transitional ecosystem (rainfall 750 – 1500 mm) with Length of Growing Period (LGP) of 210 days.
- Deep to very deep, clayey black soils of Cauvery Delta, hot semi arid to moist eco system (rainfall 1000 – 1500 mm) with Length of Growing Period (LGP) of 210 days.
- Moderately deep to very deep, red and lateritic soils with gravelly texture, hot dry semi arid eco system (rainfall 750 – 1000 mm) with Length of Growing Period (LGP) between 150-180 days.
- Deep to moderately deep, clayey black soils (inland plain, hot semi arid dry to arid transitional ecosystem (rainfall less than, 750 – 1000 mm) with Length of Growing Period (LGP) between 100 - 120 days.

- Deep to moderately deep, gravelly clay to gravelly loam red soils, of plains, hot semi arid to moist transitional ecosystem (rainfall less than 750 – 1000 mm) with Length of Growing Period (LGP) between 120 - 150 days.
- Deep to moderately deep, mixed red and black soils, clay and gravelly loam and gravelly clay of plain (inland plain, hot semi arid dry to moist transitional ecosystem (rainfall 750 – 1200 mm) with Length of Growing Period (LGP) between 120 - 150 days.

iv) Coastal Eco-system

- Deep to moderately deep, sandy soils of narrow coastal plains, gravelly clay and gravelly loam soils of inland plain, hot moist semi arid to dry sub humid transitional eco system (rainfall 1000 – 1500 mm) with length of Growing period between 120 and 150 days.
- Deep sandy soils of coastal plain, sandy to sandy loam, hot moist to dry semi arid transitional eco system (rainfall <1000 mm) with Length of Growing Period (LGP) between 150 – 180 days.
- Deep, sandy soils of coastal plain, sandy to sandy loam, hot semi arid to arid transitional eco system (rainfall <750 mm) with Length of Growing Period (LGP) between 90 – 120 days.

2.2. Administrative Divisions

Currently, Tamil Nadu is divided into 32 districts. For reasons of administration, the districts of the State have been bi and tri-furcated over years giving rise to as many as 32 districts. For instance, Erode (1976) was carved out of Coimbatore, Dharmapuri (1965) and Namakkal districts (1997) were originated from Salem district and Pudukkottai (1974), Karur (1996), Nagapattinam (1991), Thiruvarur (1997) and Perambalur (1996) districts were delineated from the erstwhile Thanjavur and Tiruchirapalli districts. Sivagangai and Virudhunagar districts (1994) were carved out of Ramanathapuram, while Dindigul (1985) and Theni (1997) districts were originated from Madurai district. Tirunelveli district was bifurcated into Tirunelveli and Thoothukudi districts (1986), while North Arcot district was bifurcated into Thiruvannamalai district (1989) and Vellore district (1989) and South Arcot district into Cuddalore district and Villupuram district (1993). Chengalpattu district was bifurcated into Kancheepuram and Thiruvallur (1996) districts. Krishnagiri district (2003) came into existence from Dharmapuri district along with certain parts of Salem district.

The details of administrative division in Tamil Nadu State are furnished in Table 2.1. The State comprises of 32 districts, 233 taluks, 385 blocks, 590 town Panchayats, 174 municipalities and 10 municipal corporations and 12713 Village Panchayats for smooth functioning of the State.

Table 2.1 Details of Administrative Divisions in Tamil Nadu State

Sl. No.	Name of the District	Number of					
		Taluks	Blocks	Town Panchayat	Municipalities	Municipal Corporations	Village Panchayat
1	Ariyalur	3	6	2	2	0	201
2	Chennai (TN State HQ)	10	0	0	0	1	0
3	Coimbatore*	6	12	52	19	1	227
4	Cuddalore	7	13	16	5	0	682
5	Dharmapuri	5	8	10	1	0	251
6	Dindigul	8	14	24	3	0	306
7	Erode	6	14	53	10	1	343
8	Kancheepuram	10	13	24	10	0	648
9	Kanyakumari (HQ at Nagercoil)	4	9	56	4	0	99
10	Karur	5	8	11	4	0	158
11	Krishnagiri	5	10	7	2	0	337
12	Madurai	7	13	24	6	1	431
13	Nagapattinam	8	11	8	4	0	434
14	Namakkal	7	15	19	5	0	322
15	Perambalur	3	4	4	1	0	121
16	Pudukkottai	11	13	8	2	0	498
17	Ramanathapuram	7	11	7	4	0	443
18	Salem	11	20	33	4	1	385
19	Sivagangai	6	12	12	3	0	445
20	Thanjavur	8	14	22	3	0	589
21	The Nilgiris (HQ at Udagamandalam)	6	4	11	4	0	35
22	Theni	5	8	22	6	0	130
23	Thiruvallur	9	14	13	12	0	527
24	Thiruvarur	7	10	7	4	0	430
25	Thoothukudi	8	12	19	2	1	408

Sl. No.	Name of the District	Number of					
		Taluks	Blocks	Town Panchayat	Municipalities	Municipal Corporations	Village Panchayat
26	Tiruchirapalli	11	14	17	3	1	408
27	Tirunelveli	11	19	36	18	1	425
28	Tiruppur	7	13	17	6	1	273
29	Thiruvannamalai	7	18	10	4	0	860
30	Vellore	9	20	22	13	1	743
31	Villupuram	8	22	15	3	0	1104
32	Virudhunagar	8	11	9	7	0	450
	Total	**233**	**385**	**590**	**174**	**10**	**12713**

Source: "District Statistics of Tamil Nadu" Government of Tamil Nadu Retrieved 2011.12.

2.2.1. Demographic Details

Tamil Nadu is the seventh most populous State in India with a population of 7,21,47,030, as of 2011. It is the seventh most densely populated State in India. In 2011, its population density was 555 persons per square kilometer, having increased from 511 in 2008, significantly higher than the Indian average of 382 persons per square kilometer. About 38 per cent of the State's population lives in urban areas, the highest in India. Tamil Nadu's population grew by 15.6 per cent between 2001 and 2011. The salient features of population in Tamil Nadu State are given in Table 2.2. It could be seen that the population of Tamil Nadu State had increased from 30.12 million in 1951 to 72.14 million in 2011. The population had increased nearly 2.07 times over a period of six decades. The male population had increased from 22.79 million in 1951 to 36.16 million in 2011. Similarly, the female population had increased from 7.33 million in 1951 to 35.98 million in 2011. There had been a gradual increase in female population unlike that of male population which witnessed a decline in 1961.

Table 2.2 Salient Features of Population in Tamil Nadu

Year	Population (in million)			Literacy rate (Percentage)			Decennial growth rate (Percentage)
	Total	Male	Female	Persons	Male	Female	
1951	30.12	22.79	7.33	20.9	31.7	10.1	14.7
1961	33.69	16.91	16.78	31.4	44.5	18.2	11.9
1971	41.20	20.83	20.37	39.5	51.8	26.9	22.3
1981	48.41	24.49	23.92	46.8	58.3	35.0	17.5

1991	55.86	28.30	27.56	62.7	73.8	51.3	15.4
2001	62.41	31.40	31.01	73.5	82.3	64.4	11.7
2011	72.14	36.16	35.98	51.83	86.08	73.40	15.6

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

Tamil Nadu has long standing commitment to education and ranks third in terms of overall and female literacy rate due to the efforts made through various plans. The literacy rate had increased from 20.9 per cent in 1951 to 51.83 per cent in 2011. As regards the literacy rate of males, it had increased from 31.7 per cent in 1951 to 86.08 per cent in 2011. Similarly, the literacy rate of females had increased from 10.1 per cent in 1951 to 73.40 per cent in 2011. The district-wise analysis shows that literacy rate was the highest in Kanyakumari district (91.75 per cent) and the lowest in Dharmapuri district (68.54 per cent).

There is a wide disparity between male and female literacy rates. As per 2011 census, the literacy rate was 86.08 per cent and 73.40 per cent for females and males respectively in the State. There also existed a rural – urban gender divide in literacy rate in Tamil Nadu. The rate was 76 per cent for urban female whereas it was only 55 per cent for its rural counterparts. Compared to Urban female literacy rates, the rural rate was lower by 20.71 percentage points, whereas the percentage point difference among males in Urban and rural areas were only 11.82. The difference in the levels of literacy between males and females was significantly higher in rural areas than in urban areas. This indicates that specific interventions may be required for developing the literacy rates of the female population especially in rural areas.

A concomitant of economic development and growth has been Urbanization. As per 2011 census, Tamil Nadu was the most urbanized among larger States with 48.40 per cent of urban population and ranked first in Urbanization among the 15 major States in the country.

Tamil Nadu accounted for six per cent of country's total population and 9.6 per cent of Country's urban population. While the country's Urban population increased from 17.3 per cent to 27.8 per cent during 1951-2011, that of Tamil Nadu increased from 24.4 per cent to 44.0 per cent.

Sex ratio, i.e., (the number of females per thousand males) is a significant indicator of the status of women. In Tamil Nadu, the ratio has registered continuous decline with the exception of 2011. According to 2011 census, the sex ratio stood at 987 as against 974 in 1991 census. The rural sex ratio was relatively favourable at 992 as compared to 981 in

urban areas. It may also be noted that sex ratio in Tamil Nadu was consistently better than all India average.

2.2.2 District-wise Salient Features of Population

District-wise salient features of census are furnished in Table 2.3. With the exception of Chennai, the density ranged from 316 per sq. km. in Sivagangai district to 1111 in Kanyakumari district. Sex ratio was found to be the highest in the Nilgiris district (1042 females per 1000 males). The sex ratio was less than State average in the districts of Chennai, Kancheepuram, Thiruvallur, Cuddalore, Villupuram, Salem, Namakkal, Dharmapuri, Erode, Coimbatore, Madurai, Theni and Dindigul. The increase in population since 2001 was found to be at 15.6 per cent for the State as a whole and the increase in population was found to be varied from 8.1 per cent in Thiruvarur district to 39 per cent in Kancheepuram district. The increase in population in 2011 was found to be more than that of State level in the districts of Thiruvallur, Vellore, Salem, Namakkal, Dharmapuri, Coimbatore and Virudhunagar. Urban population in the State ranged from 11.10 per cent in Ariyalur district to 82.33 per cent in Kanyakumari district. In the districts of Cuddalore, Villupuram, Vellore, Thiruvannamalai, Salem, Namakkal, Dharmapuri, Karur, Perambalur, Ariyalur, Thanjavur, Nagapattinam, Thiruvarur, Pudukottai, Ramanathapuram, Sivagangai and Thoothukudi, the share of urban population to total population was less than the share of urban population to the total population at the State level. The literacy rate at the State level was found to be 80.09 per cent as per 2011 census and the same varied from 68.54 per cent in Dharmapuri district to 91.75 per cent in Kanyakumari district.

Table 2.3 District-wise Salient Demographic Features of Census 2011

Sl. No.	District / State	Density per Sq.Km	Females per 1000 Males	Increase in Population since 2001 (%)	Urban Population (%)	Literacy Rate (%)
Tamil Nadu		555	996	15.6	48.40	80.09
1	Chennai	26553	989	7.0	100.00	90.18
2	Kancheepuram	892	986	39.0	63.49	84.49
3	Thiruvallur	1098	987	35.3	65.14	84.03
4	Cuddalore	704	987	14.0	33.97	78.04
5	Villupuram	481	987	16.8	15.01	71.88
6	Vellore	648	1007	13.2	43.24	79.17
7	Thiruvannamalai	398	994	12.8	20.08	74.21
8	Salem	665	954	15.4	50.95	72.86
9	Namakkal	505	986	15.6	40.32	74.63

10	Dharmapuri	335	946	-47.2*	17.32	68.54
11	Krishnagiri	367	958	NA	22.79	71.46
12	Erode	391	993	-12.8*	51.43	72.58
13	Coimbatore	731	1000	-19.1*	75.73	83.98
14	Tiruppur	478	989	NA	61.36	78.68
15	The Nilgiris	287	1042	-3.5*	59.24	85.20
16	Tiruchirapalli	604	1013	12.6	49.15	83.23
17	Karur	367	1015	13.8	40.82	75.60
18	Perambalur	322	1003	14.5	17.19	74.32
19	Ariyalur	389	1015	NA	11.10	71.34
20	Thanjavur	705	1035	8.6	35.39	82.64
21	Nagapattinam	629	1025	8.6	22.56	83.59
22	Thiruvarur	556	1017	8.1	20.39	82.86
23	Pudukkottai	348	1015	10.9	19.55	77.19
24	Madurai	819	990	17.8	60.78	83.45
25	Theni	434	991	13.9	53.82	77.26
26	Dindigul	358	998	12.3	37.41	76.26
27	Ramanathapuram	330	983	14.0	30.34	80.72
28	Virudhunagar	458	1007	10.9	50.47	80.15
29	Sivagangai	316	1003	15.9	30.83	79.85
30	Tirunelveli	460	1023	13.0	49.40	82.50
31	Thoothukudi	369	1023	11.3	50.10	86.16
32	Kanyakumari	1111	1019	11.6	82.33	91.75

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

*NA = Not Applicable since the district were not formulated; * - Data related to composite district hence negative*

2.2.3 Decennial Growth of Population

The decennial growth of population of Tamil Nadu is furnished in Table 2.4. From the table, it could be seen that the percentage of variation of total population varied from 8.57 in 1911 to 15.61 in 2011. The percentage of variation of urban population in the State varied from 15.57 per cent in 1911 to 27.16 in 2011. A marked decline of rural population was observed in 2001.

Table 2.4 Population of Tamil Nadu- Decennial Growth

Period	Population			Percentage Variation since previous Census		
	Total	Rural	Urban	Total	Rural	Urban
1911	20902616	17753479	3149137	+8.57	+7.41	+15.57
1921	21628518	18200439	3248079	+3.47	+2.52	+8.86
1931	23472099	19241717	4230382	+8.52	+5.72	+23.40
1941	26267507	21093825	5173682	+11.91	+9.63	+22.30
1951	30119047	22785522	7333525	+41.75	+11.85	+8.39
1961	33686953	24696425	8990528	+11.85	+8.39	+22.59
1971	41199168	28734334	12464834	+22.30	+16.35	+38.64
1981	48408077	32456202	15951875	+17.54	+12.95	+27.98
1991	55858946	36781354	19077592	+15.39	+13.32	+19.59
2001	62405679	34921681	27483998	+11.72	-5.06	+44.06
2011	72147030	37229590	34917440	+15.61	+6.49	+27.16

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

According to 2011 Census, Tamil Nadu has the highest level of urbanization (43.86 per cent) in India, accounting for six per cent of India's total population and 9.6 per cent of the urban population and is the most urbanized State in India.

2.2.4 Population by Religion

The distribution of population by religion is furnished in Table 2.5. It could be seen that the population of Hindus accounted for 87.58 per cent in Tamil Nadu as compared to 79.80 per cent at country level. The population of Muslims in Tamil Nadu accounted for 5.86 per cent. Nearly 6.12 per cent of the population was Christians in Tamil Nadu State.

Table 2.5 Population by Religion 2011

Religion	Persons in Tamil Nadu (Nos.)	Percentage
Hindus	6,31,88,168	87.58
Christians	44,18,331	6.12
Muslims	42,29,479	5.86
Jains	89,265	0.12
Sikhs	14,601	0.02
Buddhists	11,186	0.02
Others	1,96,000	0.27

Total	7,21,47,030	100.00

Source: Tamil Nadu Population Census data 2011. Census2011 - Census of India.

2.2.5 Population by Industrial Categories

The distribution of population by broad industrial categories of workers is furnished in Table 2.6. It is evident from the table that the workers having economically gainful activity for the major part of the year classified as main workers numbered 279.42 lakh in Tamil Nadu as per 2011 census and it accounted for 85.0 per cent of the total workers. The marginal workers accounted for 15.00 per cent of the total workers in Tamil Nadu State. At all India level, the main workers and marginal workers accounted for 75.20 and 24.80 per cent of the total workers respectively. The cultivators, agricultural labourers, workers engaged in house hold industry and other workers accounted for 12.90, 29.20, 4.20 and 53.70 per cent respectively of the total workers in Tamil Nadu State.

Table 2.6 Population by Broad Industrial Categories of Workers-2011

S. No	Industrial Category	Tamil Nadu		All India	
		Persons	Percentage of Total workers	Persons	Percentage of Total workers
1	Main workers	27942181	85.00	362446420	75.20
2	Marginal Workers	4942500	15.00	119296891	24.80
	Total workers(1+2)	328846681	100.00	481743311	100.00
a	Cultivators	4248457	12.90	118692640	24.60
b	Agricultural Laborers	9606547	29.20	144329833	30.00
c	Household Industry, Manufacturing, Processing, Servicing and repairs	1364893	4.20	18336307	3.80
d	Other workers	17664784	53.70	200384531	41.60
Total Population		**32884681**	**100.00**	**481743311**	**100.00**

Source: *Tamil Nadu - An Economic Appraisal 2011-12, Evaluation and Applied Research Department, Government of Tamil Nadu Chennai.*

2.2.6 Poverty Level

There has been dramatic change in the level of poverty in the State during the last two decades due to implementation of various development programmes. During the period from 1973-74 to 2011-12, the proportion of rural population living below poverty line was higher in Tamil Nadu than the national average. Rural poverty which stood at 57.43 per cent in 1973-74, declined to 32.48 per cent in 1993-94 and further to 15.8 per cent in 2011-12. Similarly, the urban poverty declined from 49.40 per cent in 1973-74 to 6.50 per cent in 2011-12. Incidence of poverty is an important issue posing a challenge in terms of

interventions required and ensuring outcomes. The trend in incidence of poverty in Tamil Nadu and India is presented in Table 2.7

Table 2.7 Trend in Incidence of Poverty in Tamil Nadu and India

(in percent)

Year	Rural		Urban		Combined	
	Tamil Nadu	India	Tamil Nadu	India	Tamil Nadu	India
1973-1974	57.43	56.44	49.40	49.01	54.94	54.88
1977-1978	57.68	53.07	48.69	45.24	54.79	51.32
1983-1984	53.99	45.65	46.96	40.79	51.66	44.48
1987-1988	45.80	39.09	38.64	38.20	43.39	38.86
1993-1994	32.48	37.27	39.77	32.36	35.03	35.97
1999-2000	20.55	27.09	22.11	23.62	21.12	21.10
2004-2005	22.80	28.30	22.20	25.70	22.50	27.50
2011-2012	15.80	25.7	6.50	13.7	11.3	21.9

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

It could be seen from the table that the incidence of poverty in rural areas in India was less than that of the State level up to 1987-88 and thereafter it showed a increasing trend than that of the State level. Similar phenomenon was observed in the case of urban poverty also up to 1993-94. In sum, the level of poverty in India exhibited an increasing trend than that of Tamil Nadu from 1993-94 onwards.

2.2.7 Human Capital Formation and Human Development

Human development is considered as a vital component of economic development. The human development index and the relative ranks reflected that Tamil Nadu has made significant improvement in human development index over the years. Tamil Nadu was positioned in seventh place in 1991 with a human development index value of point 0.466. The value had enhanced to 0.661 in 2011-12 which ranked Tamil Nadu third among the major States. The details are furnished in Table 2.8.

Table 2.8 Human Development Index (HDI) of Major States 2011-12

States	HDI (1991)	Rank	HDI (2001)	Rank	HDI (2011-12)	Rank
Andhra Pradesh	0.377	9	0.416	10	0.542	14
Assam	0.348	10	0.386	14	0.478	17
Bihar	0.308	15	0.367	15	0.442	20
Gujarat	0.431	6	0.479	6	0.644	9
Haryana	0.443	5	0.509	5	0.702	4
Karnataka	0.412	7	0.478	7	0.634	10
Kerala	0.591	1	0.638	1	0.840	2
Madya Pradesh	0.328	13	0.394	12	0.452	19
Maharashtra	0.452	4	0.523	4	0.678	6
Orissa	0.345	12	0.414	11	0.436	21
Punjab	0.475	2	0.537	2	0.686	5
Rajasthan	0.347	11	0.424	9	0.529	15
Tamil Nadu	0.466	3	0.531	3	0.661	7
Uttar Pradesh	0.314	14	0.388	13	0.490	16
West Bengal	0.404	8	0.472	8	0.565	12
All India	**0.381**	**-**	**0.472**	**-**	**0.546**	**-**

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

2.3. Rainfall

The quantum and distribution of rainfall influence the pattern of cropping and crop growth in a locality. The agricultural production and productivity of crops mainly depends on the timely onset of South-West and North-East monsoons and the quantum and spread of rainfall. The details of normal annual rainfall pattern, district-wise, in Tamil Nadu are presented in Table 2.9.

Table 2.9 District-wise Distribution of Normal Rainfall (in mm)

Sl. No.	District	South-west	North-East	Winter	Hot weather	Total
		Jun - Sep	Oct - Dec	Jan - Feb	Mar - May	
1.	Chennai	439.1	789.9	36.7	58.5	1324.2
2.	Kancheepuram	490.8	641.8	29.1	66.0	1227.7
3.	Thiruvallur	451.6	589.3	31.5	67.2	1139.6
4.	Cuddalore	383.1	697.7	44.1	81.7	1206.5
5.	Villupuram	408.3	499.1	28.2	76.0	1011.6
6.	Vellore	466.1	348.7	14.9	106.5	936.1
7.	Thiruvannamalai	468.1	452.6	26.5	98.7	1045.9
8.	Salem	440.6	370.5	16.0	170.8	997.9
9.	Namakkal	339.3	291.6	13.9	148.6	793.4
10.	Dharmapuri	393.4	330.0	18.2	160.4	902.0
11.	Krishnagiri	399.0	289.4	10.7	151.6	850.7
12.	Tiruppur	154.8	377.6	14.0	135.1	681.5
13.	Coimbatore	189.8	328.9	20.3	150.3	689.3
14.	Erode	229.8	314.6	16.1	142.4	702.9
15.	Tiruchirapalli	293.8	391.5	22.7	109.4	817.5
16.	Karur	213.6	314.8	17.2	109.2	654.8
17.	Perambalur	290.7	545.5	32.5	101.8	1069.8
18.	Pudukkottai	392.0	440.9	21.4	108.9	861.9
19.	Thanjavur	350.6	406.2	33.1	97.5	887.4
20.	Thiruvarur	318.4	550.6	42.3	102.1	1013.4
21.	Nagapattinam	296.4	719.1	60.1	97.7	1173.3
22.	Madurai	286.1	941.0	85.7	80.5	1393.3
23.	Theni	335.9	419.1	28.1	144.8	927.9
24.	Dindigul	158.4	357.9	35.4	168.3	720.0
25.	Ramanathapuram	295.4	436.4	30.9	168.0	930.7
26.	Virudhunagar	149.3	491.7	51.3	115.5	807.8
27.	Sivagangai	196.8	419.0	42.8	161.7	820.3
28.	Tirunelveli	301.0	422.7	17.9	121.2	862.8
29.	Thoothukudi	142.4	467.2	69.3	166.2	845.1
30.	The Nilgiris	74.9	427.0	42.8	111.6	656.3
31.	Ariyalur	763.7	494.0	49.3	235.3	1542.3
32.	Kanyakumari	477.4	496.4	40.4	288.3	1302.5
	State average	**330.9**	**470.7**	**32.6**	**128.2**	**962.4**
Season-wise distribution (%)		34.85	47.32	3.96	13.87	100.00

Source: Tamil Nadu Economic Appraisal 2005-06 and 2011-12 to 2015-16, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai (various issues).

As could be seen from Table 2.9, the State received a normal rainfall of 962.4 mm per annum. About 47 per cent of the total rainfall is received during North-East monsoon and about 35 per cent is received during South-West monsoon. The balance of about 18 per cent of rainfall is received during winter as well as summer months. It is also pertinent to note that the districts of Salem, Namakkal and Dharmapuri received almost equal quantities of rainfall in both South-West and North-East monsoons. On the other hand, Krishnagiri and the Nilgiris are benefited more by the South-West monsoon. All other districts are benefited more by North-East monsoon.

As regards geographical distribution of rainfall in the State, the maximum normal rainfall of about 1542.3 mm is received in Ariyalur district, while the minimum of about 654.8 mm is received in Karur district. The table also reveals the fact that almost all the mid and northern coastal districts receive more than 1000 mm of normal rainfall. The mid-inland and southern districts, receive lesser than 1000 mm. Because of high rainfall and high elevation, the sub-tropical and temperate crops like coffee, tea, hill vegetables, peaches, plums, straw berries etc, are grown in the Nilgiris district. On the other hand, in the remaining plains of Tamil Nadu characterized by tropical climate, the field crops like paddy, cholam, cumbu, ground nut, sugar cane, banana, cotton, etc are cultivated.

Even among the districts in the plains, in mid and northern coastal districts, paddy is predominantly grown in wetlands in larger areas, while in the mid and northern in-land districts, garden land crops like cholam, cumbu, ragi, maize, groundnut, cotton etc are cultivated. Southern districts are characterized more by dryland agriculture due to low rainfall regime and hence cotton, pulses, cholam, cumbu etc are predominantly grown under rainfed conditions and in a few pockets where irrigation facilities are available, farmers resort to invariably for paddy cultivation. However, the southernmost district viz. Kanyakumari, comes under high rainfall zone and hence the paddy and plantation crops like rubber are grown. The season-wise temporal distribution of actual rainfall in the State is furnished in Table 2.10

Table 2.10 Season-wise Temporal Distribution of Rainfall in Tamil Nadu State

(in mm)

Sl. No.	Year	SWM	NEM	Winter	Hot weather	Total
1.	1993-94	305.2	709.9	35.5	121.3	1171.9
2.	1994-95	220.3	479.0	27.2	203.3	929.8
3.	1995-96	347.5	248.3	10.5	115.2	721.5
4.	1996-97	454.8	541.1	13	112.3	1121.2

Sl. No.	Year	SWM	NEM	Winter	Hot weather	Total
5.	1997-98	286.0	782.3	5.5	78.4	1152.2
6.	1998-99	340.1	602.4	21.5	116.4	1080.4
7.	1999-00	199.9	499.5	119.5	77.9	896.8
8.	2000-01	314.5	335.6	16.8	118.4	785.3
9.	2001-02	260.0	379.4	70	85.8	795.2
10.	2002-03	185.4	407.1	8.7	129.7	730.9
11.	2003-04	336.5	403.1	11.6	283.4	1034.6
12.	2004-05	360.7	472.1	14.3	23.70	870.8
13.	2005-06	380.5	828.8	15.9	150.9	1376.1
14.	2008-09	333.5	552.7	7.7	129.2	1023.1
15.	2009-10	317.0	482.6	11.5	126.7	937.8
16.	2010-11	383.6	605.2	36.3	140.0	1165.1
17.	2011-12	300.5	540.8	9.5	86.3	937.1
18.	2012-13	245.9	370.5	34.50	92.2	743.1
19.	2013-14	325.4	440.4	13.8	57.1	790.6
20.	2014-15	305.5	430.3	10.9	110.9	987.90

Source: Tamil Nadu an Economic Appraisal 2005-06 and 2011-12 to 2013-14, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai (various issues)

It could be seen from the Table 2.10 that the total rainfall received from South-West monsoon during 2014-15 was 305.5 mm. The rainfall received during North-East Monsoon was 430.3 mm. Thus about 987.90 mm of rainfall was received during the year 2014-15 against a normal rainfall of 962.4 mm per annum.

The month-wise distribution of rainfall for the period from 2008-09 to 2014-15 along with normal rainfall is furnished in Table 2.11.

Table 2.11 Month-wise Distribution of Rainfall - Tamil Nadu

(in mm)

Sl. No.	Month	Normal	2008-09	2009-10	2010-11	2011-12	2014-15
1.	June	46.5	46.3	34.0	72.6	34.4	46.4
2.	July	69.1	77.5	59.5	82.2	64.4	47.1
3.	August	88.7	139.4	96.2	109.7	115.1	115.5
4.	September	117.0	70.3	127.3	119.1	86.6	96.5
South West		**321.3**	**333.5**	**317.0**	**383.6**	**300.5**	**305.5**

Sl. No.	Month	Normal	2008-09	2009-10	2010-11	2011-12	2014-15
Monsoon							
5.	October	180.8	228.1	62.8	152.1	221.1	249.7
6.	November	170.9	274.8	313.7	325.2	254.7	113.2
7.	December	88.7	49.8	106.1	127.9	65.0	67.4
North East Monsoon		**440.4**	**552.7**	**482.6**	**605.2**	**540.8**	**430.3**
8.	January	17.7	7.7	11.4	7.4	7.3	8.5
9.	February	13.6	0.0	0.1	28.9	2.2	2.4
Winter Season		**31.3**	**7.7**	**11.5**	**36.3**	**9.5**	**10.9**
10.	March	18.1	29.5	2.1	8.6	4.6	21.7
11.	April	42.5	35.2	22.0	93.1	37.6	108.6
12.	May	67.4	64.5	102.6	38.3	44.1	110.9
Hot weather season		**128.0**	**129.2**	**126.7**	**140.0**	**86.3**	**241.2**
Total		**921.0**	**1023.1**	**937.8**	**1165.1**	**937.1**	**987.9**

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

From the table, it could be seen that comparatively high rainfall was received in the months of October, August, November, May and April and low rainfall was received in the months of February and January in all the years under question.

2.4. Soils of Tamil Nadu

Major portion in Tamil Nadu is covered by red sandy and red loam soils. Red sandy soils have developed from acidic parent material like granite, gneiss, quartzite, sandstone etc. Sand particles are coated with red coloured hematite or yellow coloured limonite, is responsible for the various shades of red and yellow soils, usually contain ferruginous gravel containing iron, aluminum and silica. These sandy, loamy sand and sandy loam soils are heavily leached and therefore poor in basic elements and plant nutrients. The red colour of soils is due to the coating of ferric oxides on soil particles. Calcium is the important exchangeable cation. They are neutral to slightly alkaline in reaction.

Black soils of Tamil Nadu which are either shallow (3 to 4 feet deep) or deeper, are of very heavy texture, with high moisture retention capacity. They are rich in lime and alkaline in reaction. They contain low amounts of nitrogen with sufficient quantities of phosphorus and potash.

Mixed red and black soils occur in Coimbatore, Madurai, Ramanathapuram and Tirunelveli districts. Black soils are dominated by beidellite, while red soils are dominated by kaolinite. The cation exchange capacity of the black soils is much higher than that of the red soils. However, the cation exchange capacity of red soils is high at an intermediate depth only. Black soils contain almost the same amount of nitrogen.

Laterite soils occur in the Chengalpet and Thanjavur districts, formed from varieties of parent materials in humid climate. Paddy is grown in lower elevation and tea, cinchona, rubber and coffee at the higher elevation. They are rich in humus and plant nutrients and strongly acidic in reaction. Soil acidity increases with elevation.

Deltaic alluvium occurs in Thanjavur district and a belt of coastal alluvium covers extends from Chennai to Kanyakumari. Alluvial soils are most extensive and most fertile, several feet deep at higher elevations. These soils consist of alternate layers of silt, clay and sand of varying thickness. The texture of the surface soils is usually loamy. The Cauvery alluvium is poor in humus, nitrogen and phosphorus, but rich in potash and lime. These soils possess a low cation exchange capacity and are alkaline in reaction.

Soils developed from Cuddalore sandstone are loamy in texture and deep to light red, yellow and light yellow and even grayish white in colour and deficient in humus, nitrogen, phosphorus and lime. These soils are low in cation exchange capacity and neutral to moderately alkaline in reaction. The soils, which have developed from Archean schist, are found only in a small area to the west of Budalur. The profile show brownish grey loam of clay at the top one-foot surface soil and brown sub-soil. Soils are usually sandy below three feet. Surface and sub-soils are usually very hard. They are poor in humus, nitrogen, phosphorus and lime but rich in potash. These soils are slightly alkaline, free from soluble salts and low cation exchange capacity.

The profile characteristics of coastal alluvial soils formed from recent marine deposits are similar to Cauvery alluvium in their alternate layers of clay, silt and sand, but exhibit the influence of sea as indicated by the presence of shells and bleached sand. They are poor in nitrogen and available phosphorus but rich in potash and lime. Some of them also contain salts. Peaty soils, which occur mainly in the south east coast of Tamil Nadu, are usually coloured blue due to the presence of ferrous iron. They contain varying amounts of organic matter. The types of soil and their availability in Tamil Nadu are furnished in Table 2.12.

Table 2.12 Types of Soil and area covered in Tamil Nadu

Types of soil	Areas in Tamil Nadu
Red Loam	Parts of Kancheepuram, Cuddalore, Salem, Dharmapuri, Coimbatore, Tiruchirapalli, Thanjavur, Ariyalur, Ramanathapuram, Madurai, Tirunelveli, Sivagangai, Thoothukudi, Virudhunagar,
Laterite soil	Parts of The Nilgiris District
Black soil	Parts of Kancheepuram, Cuddalore, Vellore, Thiruvannamalai, Salem, Dharmapuri, Madurai, Ramanathapuram, Tirunelveli, Sivagangai, Thoothukudi, The Nilgiris Districts, Virudhunagar and
Sandy Coastal alluvium	On the coasts in the districts of Ramanathapuram, Thanjavur, Nagapattinam, Cuddalore, Kancheepuram and Kanyakumari
Red sandy soil	Small patches in the districts of Coimbatore and The Nilgiris

Source: *Commissioner of Agriculture, Department of Agriculture, Chennai-600 005.*

2.4.1. Soil Taxonomy

As per the USDA system of the classification, the soils of Tamil Nadu are classified into six orders *viz.,* Entisols, Inceptisols, Alfisols, Mollisols, Ultisols and Vertisols. There are 12 sub-orders, 29 great groups, 44 sub - groups and 94 soil families. About 50 percent of the total area of State is occupied by Inceptisols, 30 percent by vertisols, six percent by entisols, one percent by Ultisols and very negligible area by mollisols.

Entisols include young river alluvium sandy and eroded red and laterite soils, moderately deep red, laterite and black soils are included under inceptisols. Deep red and laterite soils are grouped under alfisols. Ultisols consists of highly weathered laterite soils. Deep black cotton and old alluvial soils are classified under vertisols. The salient features of soils series of Tamil Nadu are furnished in Table 2.13.

Table 2.13 Salient Features of Soil Series of Tamil Nadu State

Sl.No	Soil series	Area (ha)	Taxonomy	Potentials	Brief description	Districts
1	Irugur	998960	Fine loamy, Kaolinitic, isomegathermic deep, Typic Ustorthents	Moderately deep to deep Fine loamy texture Gentle slope Moderately rapid permeability Low cation exchange capacity Neutral reaction Free from salinity Non-calcareousness	Red to dark red, deep, fine loamy, non calcareous, slightly acid to neutral soils	Coimbatore, Dindigul, Erode, Salem, Karur, Tiruchirapalli, Namakkal, Theni, Madurai
2	Vannapatti	488089	Coarse loamy, mixed, isomegathermic moderately deep, Typic Ustorthents	Coarse loamy textured Very gentle slope Well drained Neutral reaction Free from salinity Non-calcareousness	Reddish brown to red, moderately deep coarse loamy, non-calcareous, well drained, neutral soils	Dharmapuri, Erode, Kancheepuram, Vellore, Thiruvallur, Karur
3	Tulukkanur	422121	Fine loamy, mixed isomegathermic calcareous deep, Typic Haplustalfs	Deep to very deep Fine textured Gentle slope Moderate to rapid permeability High water holding capacity Medium cation exchange capacity High organic matter Neutral reaction Free from salinity	Reddish brown to dark greyish brown, moderately deep to very deep, fine loamy, calcareous, well drained soils	Namakkal, Erode, Karur, Salem, Tiruchirapalli, Theni, Madurai

Table 2.13 Salient Features of Soil Series of Tamil Nadu State (Contd.,)

Sl. No.	Soil series	Area (ha)	Taxonomy	Potentials	Brief description	Districts
4	Vayalogam	291778	Fine loamy, Kaolinitic, isomegathermic deep, Typic Rodustalfs	Deep Sandy clay loam in sub-surface Gentle slope Medium cation exchange capacity Free from salinity Non-calcareousness	Yellowish red to red, moderately deep to deep, fine loamy to fine, non-calcareous, with quartz mixed iron gravel present	Pudukottai, Madurai, Dindigul, Tiruchirapalli, Theni
5	Mangulathu-patti	287092		Non- calcareous	Upland undulating Well drained weathered genesis, Brown soil deep (50-100 cm) Fine loamy, moderately rapid	Vellore, Kancheepuram, Thiruvallur, Pudukottai
6	Madukkur	256810	Fine loamy, Kaolinitic, isomegathermic, very deep, Ultic Haplustalfs	Very deep Loamy textured in surface Very gentle slope Moderately rapid permeability High water holding capacity Neutral reaction Free from salinity Non-calcareousness	Yellowish brown, very deep fine loamy, moderately well drained soils	Thanjavur, Perambalur, Pudukkottai, Madurai, Tiruchirapalli
7	Peelamedu	244912	Fine, Montmorillonitic, isomegathermic, very deep, Typic Calciusterts	Very deep Clay loam to clay Very gentle slope High organic matter High cation exchange and water holding capacity Free from salinity	Dark brown to very dark greyish brown, deep to very deep, calcareous, moderately alkaline soils.	Madurai, Perambalur, Coimbatore, Namakkal, Salem, Tiruchirapalli, Dindigul, Karur, Theni, Erode

Table 2.13 Salient Features of Soil Series of Tamil Nadu State (Contd.,)

Sl. No.	Soil series	Area (ha)	Taxonomy	Potentials	Brief description	Districts
8	Palladam	217732	Fine montmorillonitic, isomegathermic, calcareous, very deep, Typic Halpusterts	Gentle slope Well drained High organic matter Free from salinity	Dark brown, shallow, coarse loamy, calcareous, mildly alkaline, well drained soils	Coimbatore, Erode, Karur, Namakkal, Dindigul
9	Palaviduthi	203662	Fine loamy, Kaolinitic isomegathermic deep, Typic Rodustalfs	Very deep Clay loam to clay in sub-surface Very Gentle slope Moderate permeability High cation exchange capacity Neutral reaction Free from salinity	Red to dark reddish brown, very deep fine loamy, slightly acidic to neutral, well drained soil.	Dindigul, Madurai, Tiruchirapalli, Theni, Karur
10	Mayamankurichi	197020		Crusting Medium water holding capacity Non saline Mild alkalinity (7.4 - 7.8)	Very Gentle slope lands, Moderately well drained, Cal gneiss brown soil very deep (*>100 cm), Sandy clay loam, Moderately slow*	Tirunelveli
11	Kalathur	180104	Fine montmorillonitic, isomegathermic, calcareous, very deep, Typic Halpusterts	Very deep Loamy textured Very gentle slope High water holding capacity High cation exchange capacity and organic matter	Brown to dark, Greyish brown, very deep, fine calcareous, moderately well drained, alkaline alluvial soils	Thiruvarur, Thanjavur, Nagapattinam, Perambalur, Tiruchirapalli, Madurai

Table 2.13 Salient Features of Soil Series of Tamil Nadu State (Contd.,)

Sl. No.	Soil series	Area (ha)	Taxonomy	Potentials	Brief description	Districts
12	Pattukkottai	162624	Fine loamy, Kaolinitic isomegathermic , very deep, Ultic Haplustalfs	Very deep Loamy sub-surface Level to gentle slope Rapid moderately rapid permeability Neutral reaction Free from salinity Non-calcareousness	Yellowish brown to reddish brown to reddish brown, deep to very deep, fine loamy to fine, slightly acidic, well drained soils	Pudukottai, Perambalur, Thanjavur, Thiruvarur, Tiruchirapalli
13	Nanguneri	146290		Non saline Neutral (6.6 - 7.3)	Very Gentle slope lands, Moderately well drained, weathered gneiss, Brown soil, moderately deep (25-50 cm), Sandy loam rapid	Tirunelveli
14	Palathurai	116878	Coarse loamy, Kaolinitic, Isomegathermic, calcareous, Deep Ultic Haplustalfs	Moderately deep Loamy textured Gentle slope Medium cation exchange capacity Slight erosion	Dark red to dark brown, moderately deep to deep, fine loamy soils occurring on very gentle slope lands	Coimbatore, Dindigul, Karur, Theni, Namakkal, Erode, Perambalur, Tiruchirapalli
15	Hosur	111317		Non saline Non-calcareousness High water holding capacity (>50%) Neutral (6.6 - 7.3)	Gently slope undulating well drained, Granitic gneiss with quartz veins red soil, very deep (> 100 cm) Fine moderately rapid	Dharmapuri

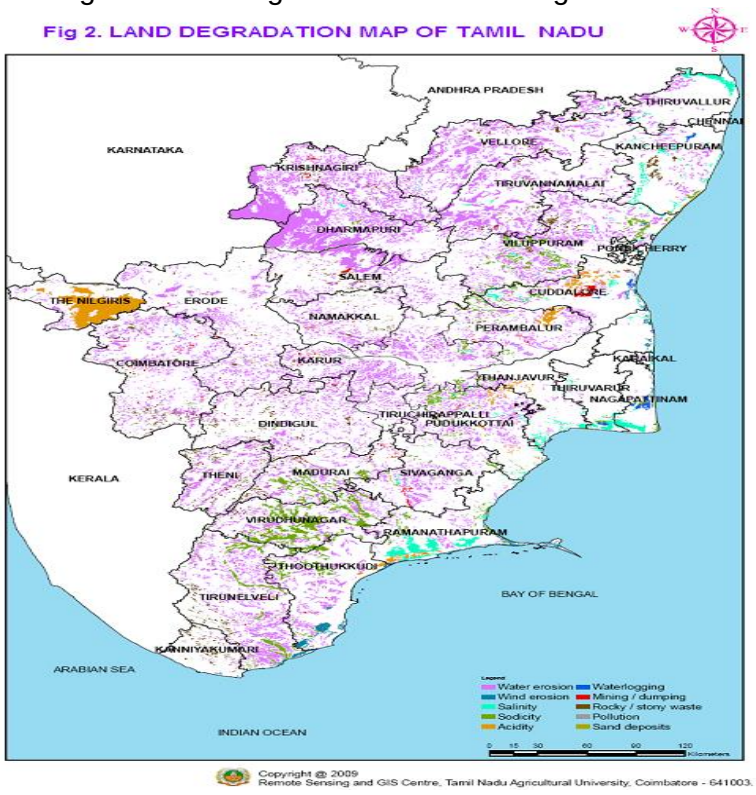
2.4.2. LAND DEGRADATION CATEGORIES

Land degradation, in general, implies temporary or permanent recession from a higher to a lower status of productivity through deterioration of physical, chemical and biological aspects. The physical processes, which contribute to land degradation, are mainly water and wind erosion, compaction, crusting and water logging. The chemical processes include salinization, alkalization, acidification, pollution and nutrient depletion. The biological processes, on the other hand are related to the reduction of organic matter content in the soil, degradation of vegetation and impairment of activities of micro-flora and fauna.

Water Erosion, Sheet erosion (Rills, Gullies and Ravines) Wind Erosion (Stabilized Dunes / Partially stabilized Dunes and Un-stabilized dunes), Water logging (Surface Ponding and Sub-surface Water logging), Salinization / Alkalization, Acidification, Glacial, Frost Heaving, Snow covered areas, Degradation due to anthropogenic factors (Industrial effluent affected areas, Mining and dump areas and Brick kiln areas) and Others are the land degradation categories. Some of the degraded lands, which could not be included in the above type of land degradation, are mass movement/ mass wastage, barren rocky / stony waste areas and Miscellaneous.

The different land degradation categories are shown in Fig 2.

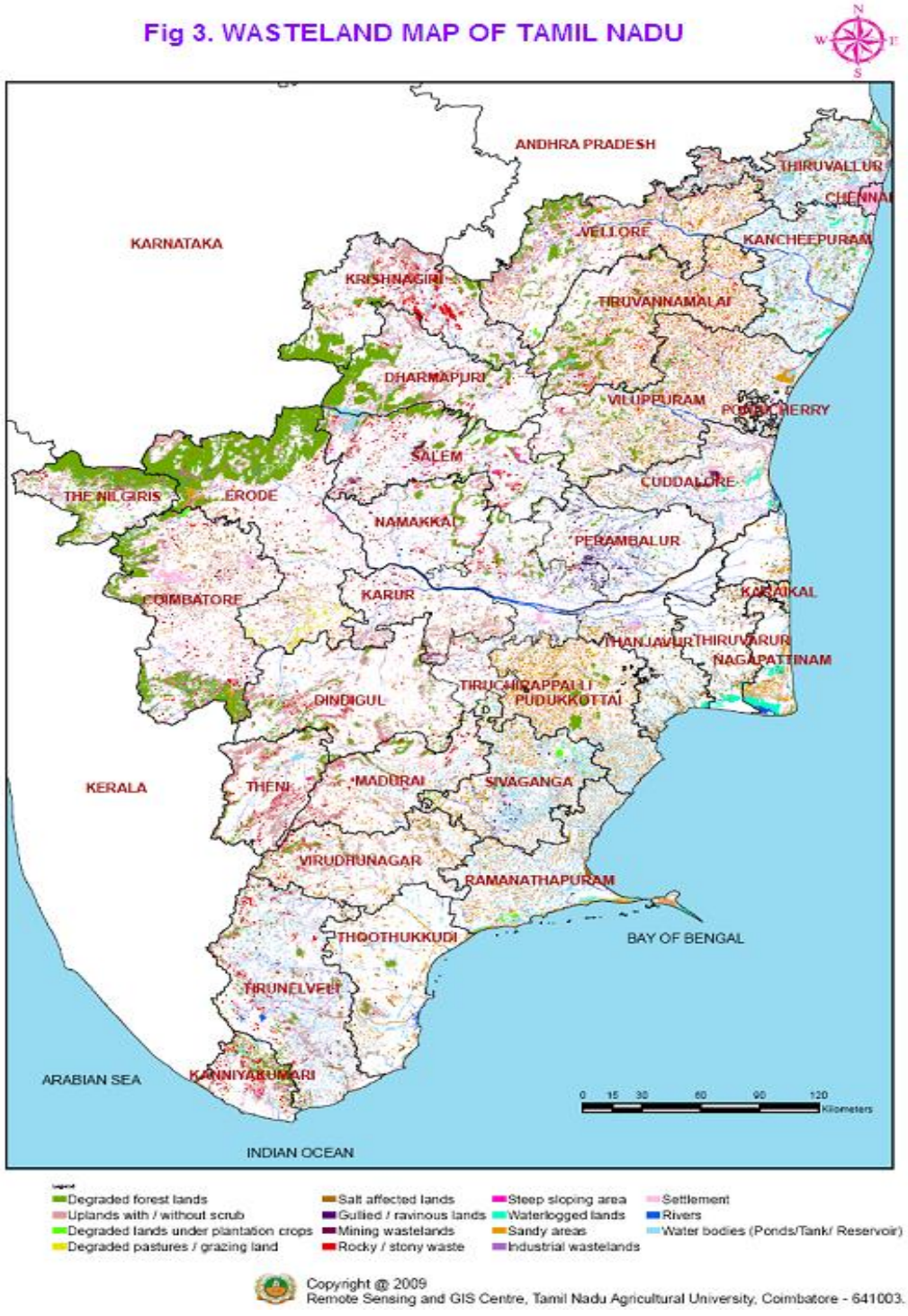
Fig 2. LAND DEGRADATION MAP OF TAMIL NADU



2.4.3. WASTELAND CLASSIFICATION

The waste land of Tamil Nadu is furnished below in Fig 3.

Fig 3. WASTELAND MAP OF TAMIL NADU



2.4.3.1. Culturable Wastelands

Land which is capable or has the potential for the development of vegetative cover and is not being used due to different constraints of varying degrees is termed as culturable wastelands. Culturable wastelands comprise the following categories.

i. **Agricultural Land inside notified forest:** Lands put under cultivation within the restricted forest areas.

ii. **Degraded forest – Scrub domination:** Lands as noticed under the Forest Act and those lands with various types of forest cover, in which vegetative cover is less than 20 per cent, are classified as degraded forest land. Among the vegetative types, scrubs and thorny bushes are dominated species.

iii. **Degraded land under plantation crops:** This includes degraded lands containing plantations inside and outside of the notified forest area.

iv. **Degraded pastures / grazing land**: All those grazing land in non-forest areas, whether or not they are permanent pastures or meadows, which have become degraded due to lack of proper soil conservation and drainage measures fall under this category.

v. **Gullied / ravenous land**: The gullies are formed as a result of localized surface run off affecting the friable unconsolidated material resulting in the formation of perceptible channels resulting in undulating terrain. The gullies are the first stage of excessive land dissection followed by their networking which leads to the development of ravinous land. The world 'ravine' is usually associated not with an isolated gully but a network of gullies formed generally in deep alluvium and entering nearby river flowing much lower than the surrounding table lands. The ravines then are extensive systems of gullies developed along river courses.

vi. **Land with or without scrub**: This is the land which is generally prone to degradation and may or may not have scrub over. Such land occupies topographically high locations in the respective systems. This excludes hilly and mountainous terrain.

vii. **Water-logged and marsh:** Surface water-logged land is that land where the water is near the surface and water stands for most of the year. Marsh is a land which permanently or periodically inundated by water and is characterized by vegetation which includes grasses and reeds.

viii. **Salt Affected Lands (Saline / Alkaline):** The salt affected land is generally characterized as the land that has adverse effects on the growth of most of the plants due to the action or presence of excess soluble salts or excess exchangeable sodium. The saline soils have more of soluble salts with electrical conductivity of more than 4 dSm^{-1}.Alkali land has an exchangeable sodium percentage (ESP) of above 15 which is generally considered as the limit between normal and alkali soils. The predominant salts are carbonates and bicarbonates of sodium.

ix. **Sands:** Sandy areas are those areas which have stabilized accumulation of sand, Insitu or transported, in tank / river bed, coastal, riverine or inland areas.

x. **Mining / industrial Waste lands**: These are lands where large-scale mining operations bring about the degradation of land and resultant mine dumps.

2.4.3.2. Unculturable Wastelands

Lands which cannot be developed for vegetative cover are defined as unculturable wastelands. Unculturable wastelands are divided into:

i. Barren rocky / stony wastes / sheet rock area.
ii. Steep sloping area - Land with very steep slopes (greater than 35 degrees); Prone to erosion and mass wasting (Landslides).

2.5. Land Use Pattern in Tamil Nadu State

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 to benefit the human race that depends on land for its livelihood. Therefore, the details on the land use pattern in Tamil Nadu State as a whole and for the individual district are furnished in Table 2.14. The changes in land use pattern in the State over a period of time are shown in Table 2.15

i) Geographical Area

It could be seen from Table 2.14, that the total geographical area in the State is 13 million hectares. Among the districts, Villupuram has the maximum geographical area of 7.22 lakh hectares and Perambalur has the minimum geographical area of 1.76 lakh hectares, as could be visualized from Table 2.14.

ii) Forest

Perusal of Table.2.14 further indicates that the area under forest is around 21 lakh hectares accounting for 16 percent of the geographical area. The district of Erode has the

maximum area of 2.27 lakh hectares and Ariyalur has the minimum area under forest with 739 hectares only. 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 percent 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 almost an impossible proposition, 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 almost in all the districts in the State.

iii) Barren land

The 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 about 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, (Table 2.14) the barren land area is more pronounced in the districts of Villupuram, Theni, Salem, Dindigul and Nagapattinam.

iv) Cultivable Waste

Table 2.15 indicates that 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 decrease of about 0.26 lakh hectares could be observed during the period under question. Among the districts, (Table 2.14) the maximum area under culturable waste is found in Karur district, with 65,536 hectares followed by Thoothukudi (45242 ha) and Tirunelveli (35272 ha) districts in that order.

v) Other Fallow Lands

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, it was almost 17 lakh hectares in 2014-15 (Table 2.15). This upsurge is a serious concern that needs immediate attention of the policy makers and planners. The districts of Tirunelveli, Virudhunagar, Sivagangai, Tiruppur, Dindigul and Tiruchirapalli have more than 1.00 lakh hectare under other fallow lands as could be noted from Tables 2.14.

vi) Current Fallows

The area under current fallows was quite high in TE 1979 with 12.57 lakh hectares and it had reduced by about 2.59 lakh hectares to 9.98 hectares in TE 2014-15. This is a good sign 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 have sizeable area under current fallows.

vii) Net Area Sown

Table 2.15 exhibits the fact that the net sown area was reducing considerably from 62.56 lakh hectares in TE 1979-80 to 48.19 lakh hectares in TE 2014-15. This is rather a disturbing trend that needs immediate attention of the policy makers and planners. This might be, of course, due to marked increase in lands put to non-agricultural uses, due to rapid industrialization and urbanization. The district of Villupuram has more than 3.37 lakh hectares of net sown area and it was the lowest in the Nilgiris district with 0.74 lakh ha (Table 2.14).

viii) Area Sown more than once

Area sown more than once had shown a drastic down-trend over the periods considered (Table 2.15). 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 exist scopes 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 Table 2.14 reveals that the districts of Nagapattinam, Thiruvarur and Thanjavur have sizable area under area sown more than once and this might be due to the Cauvery ayacut. Thiruvannamalai, Villupuram, Cuddalore and Kancheepuram districts also have sizeable area under area sown more than once.

The cropping intensity for the State as a whole, as could be visualized from Table 2.15, had decreased from 121.60 percent in TE 1979-80 to 114.67 per cent in TE 2005-06 and 124.38 per cent in 2014-15. This down-trend must be reversed and augmented to keep agriculture growing at a faster rate.

The district of Nagapattinam has the maximum cropping intensity of 162.43 percent followed by Thiruvarur (155.13 percent) and Thiruvallur (140.86 per cent) districts. The cropping intensity is around 125.33 percent in the districts of Kancheepuram, Thiruvannamalai and Thanjavur. It is around 120 percent in Cuddalore, Dharmapuri and Tirunelveli districts. The remaining districts have the intensity of less than 120 percent with the exception of Ramanathapuram, Sivagangai and the Nilgiris districts. Therefore, concerted efforts in increasing the area sown more than once, must be bestowed in the districts of Ramanathapuram, Sivagangai, The Nilgiris, Pudukottai, Karur, Perambalur, Coimbatore, Tiruchirapalli, Erode, Dindigul, Theni, Madurai, Thoothukudi etc.,

In sum, perusal of the land use statistics 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 pastures and
5. Regulations of preventing diversion of lands to non-agricultural use.

The study to find out the impact of urbanization and industrialization on Land Use Pattern in Tamil Nadu State revealed that the share of Agriculture sector in Net State Domestic Product, Per Capita Net State Domestic Product and Road Density were found to have a negative impact on the share of the land put to Non-agricultural uses. Thus, the study pointed out the need for strengthening the infrastructure facilities especially roads and also continued increase in the Net State Domestic Product of the State. Further, Road Density was found to have a negative impact on urbanization as it facilitates not only improved infrastructure and other amenities in the rural areas, but also helps the agricultural development by mitigating the mass exodus of the rural people to urban areas in search of livelihood.

Table 2.14 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 2.14 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, Chennai.

Table 2.14 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

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 2.15 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 missed crop and groves not included 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.

Shift in Land Use

The land use pattern of the State has undergone distinct changes over years. For example, net sown area which accounted for 48.15 per cent during 1979-1980 had declined to 37.00 per cent in 2014-2015. The other fallow lands had increased from 3.50 per cent in 1979-80 to 13.40 per cent during 2014-15. On the contrary, the share of current fallows had declined from 9.67 per cent to 7.70 per cent during the periods under question.

2.6 Operational Holdings

Operational holdings often determine agricultural production and productivity. The operational holdings as per Agricultural census are furnished in Table 2.16. The results of successive agricultural census confirm the growing imbalance and asymmetry in the distribution of size of holdings. The number of marginal farmers in the State had increased from 71.34 per cent of the total holdings operated in 1985-86 to 77.19 percent of total holdings operated in 2011-12. However, the marginal farmers have operated only 25.88 and 35.32 percent of total area in 1985-86 and 2011-12 respectively. Semi-medium, medium and large farmers accounted for a small proportion of 14.55 percent of holdings and they have operated a higher proportion of 25.33 percent of total area in 2011-12. In sum, the number of marginal farmers has been increasing over years which show that the process of marginalization of farmers is continuing and they tend to subsist on low income levels.

Table 2.16 Operational Holdings as per Agricultural Census

(Area in hectares)

Sl. No.	Category	1985-86		1990-91		1995-96		2005-06		2010-11		2011-12	
		No	Area	No	Area	No	Area	No	Area	No	Area	No	Area
1	Marginal (below 1.0 Ha)	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)	6266555 (77.19)	2291702 (35.32)
2	Small (1.0-2.0 Ha)	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)	1181344 (14.55)	1643697 (25.33)
3	Semi-Medium (2.0 to 4.0 Ha)	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)	502308 (6.19)	1355509 (20.89)
4	Medium (4.0 to 10.0 Ha)	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)	150646 (1.86)	847811 (13.07)
5	Large (10.0 Ha and above)	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)	17371 (0.21)	349652 (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)**	**8118224 (100.00)**	**6488370 (100.00)**

Figures in parentheses indicate percentage to total

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

Size of Holdings

The distribution of size of holdings in Tamil Nadu is furnished in Table 2.17. It could be seen from the table that the average size of marginal holdings had declined from 0.41 hectare in 1976-77 to 0.37 hectare in 2010-11. 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. In sum, the average size of holdings in Tamil Nadu State had decreased from 1.25 hectares in 1976-77 to 0.89 hectare in 2000-01 and 0.80 hectare in 2010-11.

Table 2.17 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
		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.

2.7. Rivers, Irrigation and Drainage Systems

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 are 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 seven percent of population of the country is endowed with only three percent 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.

2.7.1. 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 percent) tapped since the late sixties. Ground water is, therefore, the only alternative source available for further development. The ground water availability is found to be in safe condition only in 136 blocks (35.23 percent) out of 385 blocks of Tamil Nadu State. The change in availability of ground water in Tamil Nadu is furnished in Table 2.18.

Table 2.18 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 Dynamo Ground Water Resources of Tamil Nadu as on Tamil Nadu, State and Ground water year book on 2011-12.

2.7.2. 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 2.19.

Table 2.19 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**
Percentage 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
Percentage 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 percent to total

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

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 percent 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 2.20. 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, 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 2.20 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	Pudukkottai	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

Table 2.20 District – wise Details of Net Area and Gross Area Irrigated in Tamil Nadu (Contd.,)

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
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.

2.7.3. District-wise Details of Net Area and Gross Area Irrigated and 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 2.21. 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 2.21 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 2.21 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.

2.8. Agricultural Engineering

The mechanization 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 include 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, the 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 2.22.

Table 2.22 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.
Statistical Handbook of Tamil Nadu – 2008, Special Commissioner and Director, Department of Economics and Statistics, Chennai-6.

2.9. Animal Husbandry

Activities allied to agriculture *viz.,* Animal Husbandry, Fisheries and Poultry 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 percent 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 2.23.

Table 2.23 Livestock Census of Tamil Nadu

(in lakh)

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

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

About 75 per cent of the cattle population is concentrated in 16 districts. Of these districts, Villupuram district topped the list and shared 9.21 per cent of the total cattle population followed by Thiruvannamalai (7.68 per cent) and Salem (6.27 per cent) in that order. Buffalo's population was found to be higher in the districts of Namakkal, Erode and Salem accounting for about 37 per cent of the total buffalo population of the State. Sheep population was found to be higher in the districts of Tiruppur, Salem and Virudhunagar accounting for about 21 per cent of the total sheep population of the State. Goat population was found to be higher in the districts of Trichy, Villupuram and Salem accounting for about 17 per cent of the total Goat population of the State. Pig's population was found to be higher in the districts of Salem, Vellore and Villupuram accounting for 31 per cent of the total Pig's population of the State. The district wise details of livestock particulars as per livestock census of 2012 are furnished in Table 2.24.

Table 2.24 District wise Livestock Census – 2012

(in Numbers)

S.No.	District	Cattle	Buffaloes	Sheep	Goat	Pigs
1	Chennai	6254	1277	104	4607	0
2	Kancheepuram	347372	57457	119646	192242	2509
3	Thiruvallur	210828	56397	74780	187984	2418
4	Cuddalore	334203	14428	59345	328824	15469
5	Villupuram	812035	17714	255610	449125	17031
6	Vellore	527080	16308	275160	262659	18865
7	Thiruvannamalai	676629	15523	258111	226240	10611
8	Salem	552717	78262	334048	440036	20321
9	Namakkal	220700	107830	95484	365326	11756
10	Dharmapuri	307558	49406	130578	188366	1880
11	Krishnagiri	323602	10822	230527	126517	0
12	Erode	276584	102840	165277	309202	3452
13	Coimbatore	259056	5848	109358	198574	2922
14	Nilgiris	50768	4271	4643	37393	393
15	Tiruchirapalli	354444	21836	150111	465832	6889
16	Karur	158286	43490	247415	185875	5329
17	Perambalur	137427	1203	37006	136020	5145
18	Ariyalur	151238	5898	41285	224958	6801
19	Pudukottai	528147	17656	217465	383434	2720
20	Thanjavur	387008	11689	40004	393915	3131
21	Nagapattinam	266267	12080	7335	435039	1153
22	Thiruvarur	195743	2070	4591	286879	1209
23	Madurai	214961	5549	184433	297052	1258
24	Theni	106319	2434	56636	94625	4044
25	Dindigul	73528	16291	56534	54453	1463
26	Ramanathapuram	85843	1291	242956	224388	2426
27	Virudhunagar	223363	9436	321443	363246	7750
28	Sivagangai	246413	5088	216577	345071	3499
29	Tirunelveli	321113	28125	303105	330230	9391
30	Thoothukudi	110147	7220	178825	288684	7039
31	Kanyakumari	61268	2952	731	110858	1551
32	Tiruppur	287141	47740	367557	205687	3340
	Total	**8814042**	**780431**	**4786680**	**8143341**	**181765**

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

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 69.68 lakh tonnes in 2011-12 and to 72.44 lakh tones in 2015-16. The State's share in total milk production at the All India level was 5.4 per cent in 2003-04 and 4.66 per cent in 2015-16. The per capita availability of milk per day which witnessed a marginal increase from 209 gms in 2003-04 to 210 gms in 2004-05 to 234 gms in 2005 -06 to 278 gms in 2010-11 and further decreased to 262 gms in 2011-12. But the availability however increased to 283 gms in 2015-16. The details are furnished in Table 2.25

Table 2.25 Milk Production and Availability

Year	Tamil Nadu	All India	Percentage Share of Tamil Nadu	Per capita availability (gms. Per day)	
	(Lakh tonnes)			Tamil Nadu	All India
2000-2001	-	800.60	-	216	-
2003-2004	47.53	881.00	5.40	209	231
2004-2005	47.84	907.00	5.30	210	232
2005-2006	54.74	971.00	5.64	234	241
2010-2011	68.31	1218.00	5.61	278	281
2011-2012	69.68	1279.04	5.45	262	290
2012-2013	70.05	1324.31	5.29	260	299
2013-2014	70.49	1376.86	5.12	261	307
2014-2015	71.32	1463.14	4.87	282	322
2015-2016	72.44	1554.91	4.66	283	337

(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 2016.
4. Statistical Hand Book of Tamil Nadu 2013, Department of Economics and Statistics Government of Tamil Nadu Chennai – 600 006.

The details of district wise milk production are furnished in Table 2.26. It could be seen from the table that milk production was found to be the highest in the districts of Salem, Thiruvannamalai, Vellore, Villupuram, Erode and Tirunelveli in that order.

Table 2.26 District wise Milk Production

(000' Tonnes)

Sl.No.	District	2003-04	2004-05	2005-06	2011-12
1.	Chennai	34.3	27.3	4.3	8.8
2.	Kancheepuram	216.2	231.2	141.7	275.8
3.	Thiruvallur	223.6	202.0	169.8	188.7
4.	Cuddalore	243.7	211.7	197.5	189.6
5.	Villupuram	267.7	275.6	211.2	389.7
6.	Vellore	306.4	320.4	364.5	422.5
7.	Thiruvannamalai	259.0	269.1	248.4	424.1
8.	Salem	254.6	248.1	434.5	483.6
9.	Namakkal	195.3	205.4	268.5	286.6
10.	Dharmapuri	225.8	155.3	208.9	179.4
11.	Krishnagiri	N.A	92.0	178.4	199.9
12.	Coimbatore	255.8	247.8	332.0	191.7
13.	Erode	246.7	287.2	325.8	359.5
14.	Tiruchirapalli	172.5	163.3	222.6	247.2
15.	Karur	91.9	93.3	99.2	121.8
16.	Perambalur	136.9	129.4	149.1	192.0
17.	Pudukottai	121.1	146.8	115.7	256.9
18.	Thanjavur	129.7	131.1	188.9	239.3
19.	Thiruvarur	93.7	111.7	166.8	146.4
20.	Nagapattinam	134.2	120.1	140.6	211.3
21.	Madurai	167.9	153.2	170.8	211.5
22.	Theni	117.8	121.2	92.1	133.6
23.	Dindigul	216.4	191.7	178.2	235.4
24.	Ramanathapuram	74.1	72.4	64.2	60.1
25.	Virudhunagar	93.5	102.3	174.7	195.8
26.	Sivagangai	89.7	80.2	94.0	127.4
27.	Tiruppur	N.A	N.A	N.A	261.1
28.	Ariyalur	N.A	N.A	N.A	N.A
29.	Tirunelveli	153.5	160.9	283.9	316.0
30.	Thoothukudi	90.9	105.9	99.8	221.0
31.	Nilgiris	60.3	60.3	45.6	89.6
32.	Kanyakumari	79.5	66.7	102.1	101.7
	State	**4752.70**	**4783.8**	**5473.6**	**6967.9**

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.

2.9.2 Poultry

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 17.7 per cent of the total poultry population in India. The poultry population over different livestock census is furnished in Table 2.27.

Table 2.27 Poultry Population of Tamil Nadu

(in lakh)

S.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 and 10.06 per cent in 2012 over previous 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 Goats, Horses, Donkeys and Dogs as per 2012 census is furnished in Table 2.28.

Table 2.28 District-wise Poultry and other Animals Population

(in numbers)

District	Poultry	Donkeys	Dogs	Goats	Horses and ponies
Chennai	37889	9	33974	4607	620
Kancheepuram	808218	360	59913	192242	52
Thiruvallur	879712	586	61723	187984	454
Cuddalore	950457	192	43571	328824	188

Villupuram	2514332	256	48016	449125	73
Vellore	4315772	1845	58151	262659	904
Thiruvannamalai	455733	98	18876	226240	113
Salem	10631500	595	127089	440036	141
Namakkal	35193135	2	62499	365326	79
Dharmapuri	3789005	226	46398	188366	89
Krishnagiri	4499997	846	48788	126517	390
Erode	5976115	194	80650	309202	331
Coimbatore	11568835	714	108358	198574	652
Nilgiris	120560	216	14765	37393	108
Tiruchirapalli	2486815	446	50937	465832	112
Karur	3105144	145	40666	185875	35
Perambalur	448563	12	7645	136020	34
Ariyalur	191527	14	15424	224958	16
Pudukottai	1001354	71	69680	383434	38
Thanjavur	784623	11	63206	393915	129
Nagapattinam	288654	7	42928	435039	50
Thiruvarur	225143	7	28099	286879	12
Madurai	998396	200	40618	297052	47
Theni	484151	245	19038	94625	135
Dindigul	2229627	152	13840	54453	164
Ramanathapuram	360215	113	14308	224388	22
Virudhunagar	782473	38	30140	363246	11
Sivagangai	1011055	15	58356	345071	7
Tirunelveli	304885	252	52272	330230	27
Thoothukudi	512427	856	37687	288684	18
Kanyakumari	643845	285	68122	110858	3
Tiruppur	17005537	175	81501	205687	249
State	**117348894**	**9183**	**1547238**	**8143341**	**5303**

Source: Department of Economics and Statistics, Statistical Hand Book 2016

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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.

2.9.2.1 Egg Production

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 11852 million numbers in 2011-12. The district-wise egg production details over years are furnished in Table 2.29.

Table 2.29 Details of Egg Production

(in lakh numbers)

Sl. No.	District	2003-04	2004-05	2005-06	2011-12
1.	Chennai	55.4	50.8	7.2	4.0
2.	Kancheepuram	266.8	402.8	292.6	371.8
3.	Thiruvallur	633.3	509.2	170.2	1505.5
4.	Cuddalore	201.4	153.1	109.8	165.1
5.	Villupuram	239.7	451.8	246.2	95.2
6.	Vellore	440.5	278.9	250.8	165.4
7.	Thiruvannamalai	201.6	146.5	100.4	61.0
8.	Salem	720.4	3316.3	2513.9	4247.3
9.	Namakkal	24686.1	40177.1	39828.9	87059.3
10.	Dharmapuri and Krishnagiri	1919.9	2041.2	1769.4	1092.6
11.	Coimbatore	2517.2	697	816.8	1150.0
12.	Erode	2268.9	10345.4	10924.7	11295.5
13.	Tiruchirapalli	437.7	1508.5	663	2930.5
14.	Karur	525.5	680.3	2110.5	3682.5
15.	Perambalur	107	93.3	136.7	232.6
16.	Pudukottai	182.9	504.1	111.6	223.3
17.	Thanjavur	245.8	455.8	440.2	233.3
18.	Thiruvarur	187.9	176.1	123.3	112.4
19.	Nagapattinam	131.2	146.7	87.9	144.3
20.	Madurai	197.1	167.1	125	241.2
21.	Theni	183.2	271.5	67.8	93.0
22.	Dindigul	267.1	233.6	188.9	133.1
23.	Ramanathapuram	75.5	80.7	80.1	162.5
24.	Virudhunagar	168.2	255.5	358.7	222.9
25.	Sivagangai	219.5	155.8	119.6	215.3

26.	Tiruppur	N.A	N.A	N.A	2516.3
27.	Ariyalur	N.A	N.A	N.A	N.A
28.	Tirunelveli	156.3	149.1	155.2	23.9
29.	Thoothukudi	254.3	285.6	313.9	14.3
30.	Nilgiris	20.1	15.9	18.7	17.9
31.	Kanyakumari	326.3	198	93.6	106.7
	State	**37835.8**	**63947.70**	**62225.4**	**118518.3**

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

During 2011-12, Namakkal district has became an "egg basket" and accounted for 73 per cent of total egg production in the State. Next to Namakkal district, Erode district accounted for 9.53 per cent of total egg production in the State. These two districts shared nearly 82.53 per cent of the total egg production of the State.

2.9.3 Veterinary Care Infrastructure

In order to provide health care to animals, promote scientific breeding of cattle and control of diseases, the State has created and maintains the animal care institutions as detailed in Table 2.30.

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 percent 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 2.30 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.

2.10. Fisheries

Tamil Nadu has a coastal line of 1,076 kms sharing 13.3 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 9.7 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 reservoirs, major irrigation and long seasonal tanks, short seasonal tanks and ponds, estuaries and backwaters.

2.10.1. Fish Production

Overall fish production during 2014-15 was estimated at 6.97 lakh tonnes which accounted for an increase of 6.85 percent over the production in 2011-12. Marine fish accounted for about 65.56 per cent of total fish production. The details are furnished in Table 2.31.

Table 2.31 Fish Production in Tamil Nadu

(in Lakh Tonnes)

Sl.No.	Years	Inland	Marine	Total
1.	2003-04	0.77	3.81	4.58
2.	2004-05	0.87	3.08	3.95(13.76)
3.	2005-06	1.56	3.90	5.46(38.23)
4.	2011-12	2.24	4.27	6.51(19.23)
5.	2014-15	2.40	4.57	6.97(6.85)

Figures in parentheses indicate the percent of growth over previous censuses.
Source: Department of Animal Husbandry Dairying and Fisheries, Agricultural Statistic at a glance, 2016

2.10.2. Fish Export

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 0.77 lakh tonnes in 2003-04 which improved to 0.87 lakh tonnes in 2004-05 to 1.56 lakh tonnes in 2005-06 and 9.34 lakh tonnes in 2014-15. The share in fish export accounted for 19.23 percent of the total export of the country in 2014-15.

2.11. Agricultural Marketing

The entire thrust and efficiency of Agriculture sector is dependent on marketing support so that the farmer's risk is minimized besides 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 and 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. 674.26 crore in 2005-06. However, in 2012-13, barring a few commodities viz. food grains, the value of transaction has increased. The details are furnished in Table 2.32.

Table 2.32 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 (upto oct 2013)
1	Food grains	38.73	35.97	32.60	20.14	3.35
2	Cotton	90.43	94.59	69.81	241.95	30.01
3	Chillies	2.81	2.80	2.18	4.49	17.75
4	Sugarcane	92.72	79.74	466.72	N.A.	-
5	Spices	0.11	44.84	28.79	91.19	17.75
6	Oilseeds	16.09	13.05	18.07	73.78	11.34
7	Others	99.99	36.24	56.08	120.35	99.40
Total		**340.88**	**307.25**	**674.26**	**551.90**	**162.59**

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 layer of intermediaries by providing alternative marketing channels and creation of scientific storages nearer to the farms.

A detailed analysis of infrastructure, administrative and operation constraints in 23 farmers markets was taken up by the Centre for Agricultural Rural Development Studies. The results showed that there is continued patronage from farmers as well as consumers and most of these markets could with stand the test of time against many odds, such as reduced support

to the markets and political and official apathy towards the markets. The consumers are also benefited by good quality and freshness of the vegetables besides getting a wide variety of vegetables in a single place. The major infrastructure constraints faced by the farmers markets include the non- availability of scientific storage facilities, 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.

2.12. Agricultural Inputs

Among the improved agricultural technologies, seeds, fertilizers and pesticides are the most important ones. 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 these inputs, that too at affordable prices to farmers, are the essentials to keep agriculture growing. The details of agricultural inputs supplied to the farmers in the State over a period from 2002-03 to 2011-12 are briefly discussed in this section.

2.12.1 Seeds

The quantities of seeds distributed from 2002-03 to 2014-15 are presented in Table 2.33.

Table 2.33 Distribution of improved Seeds by Crops

(in tonnes)

Sl. No.	Crops	2002-03	2003-04	2004-05	2005-06	2011-12	2014-15
I.	**FOOD GRAINS**						
a.	Paddy	15483	12985	10738	16681	75250	63179
b.	Millet	363	351	363	489	6693	5514
c.	Pulses	941	1273	1340	1424	4800	4367
	Total (I)	**16787**	**14609**	**12441**	**18594**	**86743**	**73061**
II.	**NON – FOOD GRAINS**						
a.	Oilseeds	4269	3127	3261	4171	12092	4234
b.	Cotton	124	163	154	235	555	624
	Total (II)	**4393**	**3290**	**3415**	**4406**	**12647**	**4859**
Grand Total (I + II)		**21180**	**17899**	**15856**	**23000**	**99390**	**77920**

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

It could be discerned from the table that 75,250 tonnes of paddy seeds were distributed to the farmers during 2011-12 and it was fairly higher than that distributed in the previous three years. About 6690 tonnes of millets were distributed in 2011-12 and it is the maximum as compared to earlier years. Further 4,800 tonnes of pulses were distributed to the farmers in 2011-12 and it was higher as compared to earlier three years. Thus, a total of 86,743 tonnes of food grain seeds were distributed to the farmers in 2011-12 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 12,647 tonnes of which oilseeds accounted for 12,092 tonnes and cotton accounted for 555 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 2012-13 are given in Table 2.34 indicate that the targets in paddy, varietal cholam, maize, pulses and oilseeds could not be achieved.

Table 2.34 Seed Replacement by Crops - Percentage to Total Cropped Area

Sl. No.	Crop	2003-04	2012-13	2014-15
A.	**FOOD CROPS**			
1.	Paddy	13.00	76.00	69.00
2.	Varietal cholam	1.50	51.00	41.30
3.	Cumbu	7.49	94.00	35.00
4.	Ragi	10.57	55.00	55.00
5.	Maize	2.40	99.00	100.00
6.	Pulses	8.60	46.00	23.00
B.	**NON-FOOD CROPS**			
1.	Oilseeds			
a.	Groundnut	9.00	6.6	6.00
b.	Gingelly	12.00	47.00	50.00
c.	Sunflower	5.00	36.50	>100
e.	Castor	15.00 (Irri)	69.00	10.00
2.	Cotton	10.00 (RF)	100 (BT)	100.00

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.

2.12.2 Fertilizers

The details given in Table 2.35 indicate the trend in fertilizer distribution in the State in 2011-12.

Table 2.35 District wise distribution of Nitrogen, Phosphorus and Potash

(in thousand tonnes)

Sl. No	District	Nitrogen			Phosphorus			Potash		
		2005-06	2011-12	2014-15	2005-06	2011-12	2014-15	2005-06	2011-12	2014-15
1.	Kancheepuram	0.25	0.20	0.31	0.11	0.08	0.06	0.17	0.06	0.05
2.	Thiruvallur	0.20	0.19	0.36	0.09	0.10	0.06	0.07	0.04	0.05
3.	Cuddalore	0.30	0.35	0.67	0.12	0.15	0.14	0.14	0.10	0.17
4.	Villupuram	0.42	0.58	0.90	0.26	0.23	0.17	0.20	0.19	0.25
5.	Vellore	0.28	0.37	0.52	0.13	0.14	0.09	0.09	0.09	0.10
6.	Thiruvannamalai	0.26	0.40	0.53	0.11	0.18	0.12	0.09	0.12	0.10
7.	Salem	0.23	0.44	0.53	0.13	0.28	0.14	0.24	0.21	0.20
8.	Namakkal	0.05	0.07	0.11	0.03	0.04	0.03	0.02	0.02	0.05
9.	Dharmapuri	0.06	0.11	0.16	0.04	0.07	0.05	0.04	0.05	0.06
10.	Krishnagiri	-	0.09	0.17	-	0.05	0.07	-	0.02	0.02
11.	Tiruppur	-	-	0.55	-	-	0.16	-	-	0.19
12.	Coimbatore	0.28	0.34	0.40	0.08	0.20	0.13	0.24	0.26	0.28
13.	Erode	0.25	0.50	0.11	0.18	0.23	0.04	0.13	0.17	0.89
14.	Tiruchirapalli	0.39	0.47	0.04	0.22	0.26	0.00	0.29	0.27	0.04
15.	Karur	0.05	0.07	0.53	0.02	0.03	0.14	0.02	0.03	0.22
16.	Perambalur	0.09	0.09	0.10	0.05	0.05	0.01	0.02	0.03	0.04
17.	Ariyalur	-	0.10	0.12	-	0.04	0.02	-	0.02	0.04
18.	Pudukottai	0.33	0.21	0.17	0.20	0.08	0.04	0.14	0.07	0.05
19.	Thanjavur	0.40	0.39	0.30	0.12	0.15	0.05	0.15	0.14	0.09
20.	Thiruvarur	0.25	0.22	0.70	0.08	0.12	0.23	0.07	0.08	0.17
21.	Nagapattinam	0.21	0.22	0.40	0.07	0.08	0.11	0.08	0.05	0.07
22.	Madurai	0.20	0.31	0.48	0.09	0.15	0.13	0.13	0.14	0.12
23.	Theni	0.15	0.11	0.34	0.08	0.05	0.08	0.09	0.05	0.09
24.	Dindigul	0.17	0.23	0.15	0.08	0.10	0.03	0.06	0.09	0.06

Sl. No	District	Nitrogen			Phosphorus			Potash		
		2005-06	2011-12	2014-15	2005-06	2011-12	2014-15	2005-06	2011-12	2014-15
25.	Ramanathapuram	0.11	0.09	0.21	0.04	0.03	0.05	0.01	0.01	0.08
26.	Virudhunagar	0.09	0.10	0.14	0.03	0.04	0.03	0.06	0.04	0.02
27.	Sivagangai	0.29	0.10	0.13	0.11	0.03	0.03	0.14	0.02	0.03
28.	Tirunelveli	0.98	0.28	0.13	0.02	0.10	0.03	0.01	0.08	0.03
29.	Thoothukudi	0.09	0.10	0.41	0.03	0.05	0.09	0.03	0.07	0.09
30.	Nilgiris	0.14	0.04	0.17	0.01	0.02	0.05	0.04	0.03	0.03
31.	Kanyakumari	0.07	0.08	0.10	0.04	0.05	0.03	0.07	0.04	0.05
	State	**5.59**	**6.85**	**9.91**	**2.57**	**3.18**	**2.42**	**2.84**	**2.59**	**3.74**

Source: Tamil Nadu an Economic Appraisal – 2005-06 and 2014-15, Evaluation and AppliedResearch Department, Government of Tamil Nadu, Chennai

It could be seen from the table that the maximum of 0.90 lakh tonnes of 'N' was distributed in Villupuram district in 2014-15 followed by Thiruvarur, Cuddalore, karur, Tirupur and Tiruvannamalai in that order. However, in the districts of Tiruchirapalli, Kanyakumari, and Perambalur less than 0.10 lakh tonnes of Nitrogenous fertilizers were distributed.

Similarly, a maximum of 0.23 lakh tonnes of phosphatic fertilizers were distributed in Tiruvarur district in 2014-15, followed by the districts of Villupuram (0.17 lakh tonnes), Cuddalore (0.14 lakh tonnes), Salem (0.14 lakh tonnes) and Coimbatore (0.13 lakh tonnes). The usage was hovering in the remaining districts, the distribution of phosphatic fertilizers varied from 0.05 to 0.28 lakh tonnes.

With reference to K_2O usage, Erode had a record high of 0.89 lakh tonnes in 2014 -15 followed by Coimbatore (0.28 lakh tonnes), Villupuram (0.25 lakh tonnes), Salem (0.20 lakh tonnes) and Tiruppur (0.19 lakh tonnes) respectively. However, in the districts of Ramanathapuram, Sivagangai, Virudhunagar, Perambalur, Tiruchirapalli and the Nilgiris less than 0.05 lakh tonnes of K_2O fertilizers were distributed.

The disproportionate distribution of NPK among the districts in a way indicates the imbalanced application of fertilizers by the farmers. Therefore, the farmers have to be educated and trained in the application of proper proportions of NPK in the crop fields.

Introduction of bio-fertilizers is yet another recent land mark that adds to the increased crop productivity with the least cost. However, it is yet to gain momentum among farmers and hence a special thrust in the plan may be given for popularizing bio-fertilizers among the farmers of Tamil Nadu.

The research study carried out in the Department of Agricultural Economics, Tamil Nadu Agricultural University indicated that the Integrated Fertilizer Management (IFM) through the use of judicious mix of Organic Manure, Bio-fertilizers, Green Manures and Chemical Fertilizers require urgent attention for minimizing the adverse environmental effects in the long run. Similarly, the study called for effective implementation of Integrated Pest Management (IPM) to internalize the pesticides externalities at the farm level.

2.12.3 Pesticides

It could also be observed from the table 2.36 that the demand for pesticides in dust form is picking up as compared to that of liquid form. The important factors which influenced farmers' choice of chemicals were his previous experience with that chemical, recommendations of dealers, progressive farmers, department officials and field work of chemical companies. In crop cultivation, farmers' awareness on the different recommended practices ranged from 20-100 percent but adoption was relatively low and it varied from nil to 60 percent for different Integrated Pest Management (IPM) practices. Use of pesticides in Tamil Nadu State could be visualized from Table 2.36.

Table 2.36 Consumption of Pesticides in Tamil Nadu State

Sl. No.	District	Pesticides	
		Dust (in M.T.)	Liquid (in K.Lit)
1	Kancheepuram	390	65101
2	Thiruvallur	719	5502
3	Cuddalore	753	11351
4	Villupuram	24	17530
5	Vellore	99	9208
6	Thiruvannamalai	27	24400
7	Salem	68	50505
8	Namakkal	89	11435
9	Dharmapuri	11	15113
10	Krishnagiri	11.5	14745
11	Erode	85	30595
12	Coimbatore	68	17585
13	Tiruppur	58	13604
14	Nilgiris	0	0
15	Tiruchirapalli	39	18200
16	Karur	2.5	278

17	Perambalur	24	3920
18	Ariyalur	35	70210
19	Pudukottai	28	21550
20	Thanjavur	22	1546
21	Nagapattinam	58	1030
22	Thiruvarur	38	3075
23	Madurai	54.5	13515

Table 2.36 Consumption of Pesticides in Tamil Nadu State (Contd.,)

Sl. No.	District	Pesticides	
		Dust (in M.T.)	Liquid (in Lit)
24	Theni	19	16412
25	Dindigul	20	14813
26	Ramanathapuram	6.5	1870
27	Virudhunagar	16	6276
28	Sivagangai	11	14080
29	Tirunelveli	171	8535
30	Thoothukudi	50	1435
31	Kanyakumari	33	1581
	Total	**3030**	**485000**

2.14. Mineral Wealth

Tamil Nadu has significant amount of mineral reserves such as lignite (87 per cent), vermiculite (66 per cent) garnet (42 per cent), Zircon (38 per cent), graphite (33 per cent), limonite (28 per cent), rutile (27 per cent), monazite (25 per cent) and magnesite (17 per cent). India's leading steel producer SAK has a steel plant in Salem.

The rich and varied mineral resource of the Tamil Nadu has contributed handsomely towards the development and industrialization of the State. It is one of the leading States in the reserves of the following minerals: lignite, garnet, magnesite, quartz, feldspar, clay, limestone, baurite, graphite and granite. The mining in Tamil Nadu are industry–friendly and pro-active. The potential reserves of the various minerals offer good business opportunities for the investors.

Geographically, the hilly terrains and the middle level plain contain crystalline hard rocks such as charnokites, granite, gneiss, khondalites, leplynites, metamorphic gneisses with detached occurrence of crystalline limestone, iron quartz, feldspathic veins and basic intrusive such as doleintes and anorthosites.

Coastal zones contain sedimentary limestones, clay, laterites, heavy mineral sands and silica sands. The hill ranges are sporadically capped with laterites and bauxites of residual native.

Gypsum and phosphatic nodules occur as sedimentary veins in rocks of the creta age. Gypsum of secondary replacement occurs in some of the areas adjoining the foot hills of the Western Ghats. Lignite occurs as sedimentary beds of tertiary age. The black granite and other hard rocks are able for high polish. These granites occur in most of the districts except in the coastal area. Potential of gold deposits in Maharajakadai region of Dharmapuri district as southern extension of kolar gold fields and in the Gudalur –Devala region in the Nilgiris district exist.

2.14.1. Mineral Receipts

The diligent measures for mineral administration which have been taken by the Department of Logy and Mining find reflection in the generation of the sizeable revenue receipts for the State and the details are given in Table 2.37.

Table 2.37 Revenue Receipts of Mines

(Rs. in crore)

Year	Amount
1999 – 2000	124.86
2000 – 2001	163.12
2001 – 2002	254.26
2002 – 2003	317.20
2003 - 2004	474.81
2011- 2012	852.02

The Department has to take strict measures to increase mineral revenue by better enforcement, guidance and encouragement to mineral based industries and with various explorations.

2.15. State Income

Tamil Nadu's gross State domestic product for 2008 is estimated at Rs. 321,793 crore (70 billion USD) in current prices. The State experienced a GDP growth rate of 12.1 per cent for this period. Possessing the third largest economy (2007-2008) among States in India, Tamil Nadu is also the most industrialized State in India. The per capita income for the period

2007-2008 for the State was Rs.43,000, ranking second among the South Indian States. It ranks third in foreign direct investment approvals (cumulative 1991-2002) of Rs.225, 826 million ($5,000 million), next only to Maharashtra (Rs. 366,024 million ($8,100 million) and Delhi (Rs.303, 038 million ($6,700 million) and the State's FDI investment constitutes 9.12 per cent of the total FDI in the country.

The details of Gross State Domestic Product over years and contribution of agriculture sector are furnished in Table 2.38.

Table 2.38 Gross State Domestic Product

(Rs. in Crore)

Year	GSDP	Primary sector	Agriculture
2008-09	321793.36	30794.11	25093.30
2009-10	356631.86	32797.27	26738.38
2010-11	403415.73	35169.87	28794.60
2011-12 RE	433238.03	38727.67	31975.98
2012-13 QE	447943.62	34777.27	27807.64
2013-14 AE	480618.00	37297.00	30094.00

Source: Department of Economics and Statistics, Chennai

The share of primary sector to gross domestic product at factor cost in Tamil Nadu is furnished in Table 2.39.

Table 2.39 Contributions of Sub-sectors to Primary Sector at Constant Prices

(Rs. in Crore)

Subsector	2004-05		2005-06		2011-12		2013-14	
	Income	Growth (%)	Income	Growth (%)	Income	Growth (%)	Income	Growth (%)
Agriculture and Allied activities	19035	19.51	20521	7.81	36673	9.95	30094	8.22
Forestry and Logging	594	(-) 0.31	589	(-) 0.71	1949	2.49	2098	4.08
Fishing	1690	(-)14.76	2404	42.22	2748	3.40	2796	0.70
Mining and quarrying	1055	6.36	1102	4.45	2055	13.15	2309	6.01
Primary sector	22374	14.75	24616	10.02	38728	10.12	37297	7.24

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

It could be seen from the table above that within the four sub-groups of primary sector, agriculture and allied activities was the largest component which registered a growth of 8.22 percent. Among the other three sectors, forestry and logging registered a growth of 4.08 percent and mining and quarrying registered a growth of 6.01 percent. Though the income generation from fishing sub-sector was negative during the past few years; it turned positive and recorded an impressive growth of 0.70 per cent in 2014-15.

DEVELOPMENT OF AGRICULTURE AND ALLIED SECTORS

CHAPTER III

Achieving higher growth in agricultural production forms the core of agricultural development in the State. This policy assumes greater significance with the increasing population and to accelerate economic growth. A number of programmes have been launched by the State Government since independence for increasing agricultural production. At this juncture, it is appropriate to analyze the performance of agriculture by estimating the growth rate in area, production and productivity of crops over years district wise. It would also pave way for implementation of appropriate interventions in agriculture and allied sectors for further development.

3.1 Growth Rates of Area, Production and Productivity of major Crops

The growth rates of area, production and productivity of major crops of Tamil Nadu State are furnished in Table 3.1 and Fig. 3.1 to 3.9. To have a better perception of the performance of area, production and productivity, the total period considered were classified into four periods viz 1970-71 to 1979-80, 1980-81 to 1989-90, 1990-91 to 1999-2000 and 2000-01 to 2014-15.

It is evident from the table, that during the period from 1970-71 to 1979-80, the area under sorghum, total pulses, cotton and groundnut exhibited a negative growth rates. As regards the other crops under question, the growth rate of area ranged from 0.17 per cent per annum in paddy to 5.6 per cent per annum in groundnut. As regards the production, all the chosen crops showed a positive growth rate, with the exception of chilies. Similar phenomenon was observed in the productivity of chilies. The growth rates in the productivity of the remaining chosen crops varied from 0.55 per cent (banana) to 11.1 percent per annum (sorghum).

During the period from 1980-81 to 1989-90, the area under paddy, sorghum and chilies witnessed a negative growth rate and among the other chosen crops, the growth rate in area ranged from 0.22 per cent per annum in banana to 5.89 percent per annum in maize. As regards the growth rate in production, the rate of growth was found to be maximum (7.87 per cent per annum) in cotton and minimum (4.14 percent per annum) in groundnut. Sugarcane, chilies and banana exhibited a negative growth rate in production and the same varied from -0.98 to -2.69 percent per annum respectively.

All the chosen crops with the exception of sugarcane exhibited a positive growth rate in productivity. The rate of growth of productivity was found be the highest in paddy (7.52 per cent) followed by banana (6.94 percent), sorghum (5.86 percent), cotton (3.10 percent) and total pulses (2.90 percent) in that order.

A different phenomenon was observed in the growth rates of area, production and productivity of the crops under question during the period from 1990-91 to 1999-2000. It could be seen that sorghum, total pulses, chili and banana exhibited a negative growth rate in area. With regard to the production, sorghum and total pulses exhibited negative growth rate. As regards the growth rates of productivity it was found to be highest in sugarcane (6.11 per cent per annum) and lowest in cotton (0.77 percent per annum). Sorghum witnessed a negative growth rate in productivity. In maize and cotton, area contributed more for production while in sugarcane and groundnut productivity contributed much.

During the period 2000-01 to 2014-15 sorghum, total pulses, sugarcane, chillies and banana exhibited negative growth rate in area. Among the remaining crops under question, the growth rate in area ranged from 0.39 percent per annum in paddy to 11.93 percent per annum in maize. As regards growth rate in production with the exception of sorghum, sugarcane and banana all other crops under question exhibited positive growth rate. The growth rate in production was found to be maximum in maize (28.44 percent per annum) and minimum in total pulses (0.06 percent per annum). While sugarcane, cotton and groundnut witnessed a negative growth rate in productivity, all the other crops showed a positive growth rate in productivity.

Table 3.1 Growth Rates of Area, Production and Productivity of major Crops in Tamil Nadu State

(Percent per annum)

Crop	1970-1971 to 1979-1980			1980-1981 to 1989-1990			1990-1991 to 1999-2000			2000-2001 to 2014-2015		
	A	P	Y	A	P	Y	A	P	Y	A	P	Y
Paddy	0.17	0.77	0.60	-2.53	4.80	7.52	0.80	1.75	0.95	0.39	1.69	1.29
Cholam	-4.16	6.52	11.15	-0.99	4.81	5.86	-5.16	-6.34	-1.24	-4.52	-1.13	3.56
Maize	5.10	5.38	1.46	5.89	6.95	1.00	8.60	9.79	1.10	11.93	28.44	14.75
Total Pulses	-4.91	0.64	5.83	3.76	6.77	2.90	-4.02	-2.33	1.77	-0.43	0.06	0.50
Sugarcane	2.46	8.11	5.51	2.82	-0.98	-3.70	1.42	7.62	6.11	-2.63	-6.12	-3.59
Cotton	-2.89	2.79	5.85	4.62	7.87	3.10	3.72	4.52	0.77	1.98	1.63	-0.35
Groundnut	-5.61	0.10	6.05	2.33	4.14	1.77	1.38	6.10	4.66	3.86	1.51	-2.27
Chillies	2.00	-6.03	-7.87	-3.37	-2.69	0.70	-1.03	1.18	2.24	-1.07	4.40	5.53
Banana	3.40	3.96	0.55	0.22	-2.69	6.94	-3.18	0.91	2.27	-4.90	-1.33	3.75

Note: A - Area, P -Production and Y – Yield

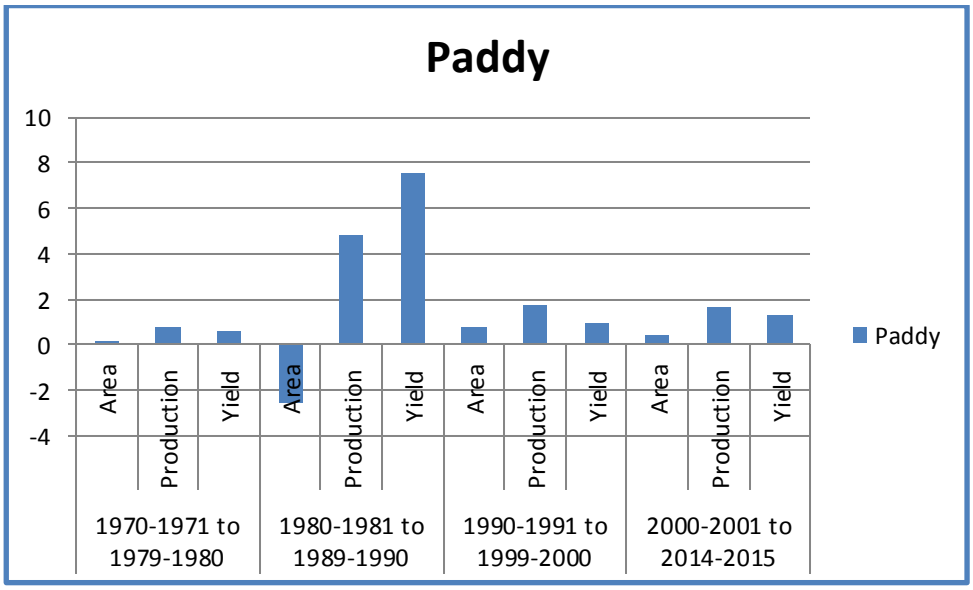

Fig. 3.1 Compound Growth Rate – Paddy

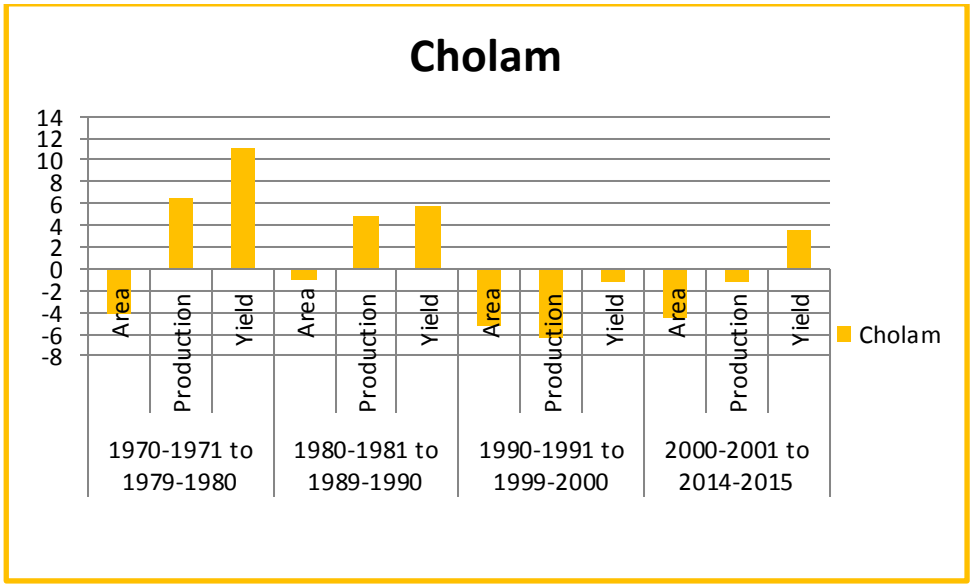

Fig. 3.2 Compound Growth Rate – Cholam

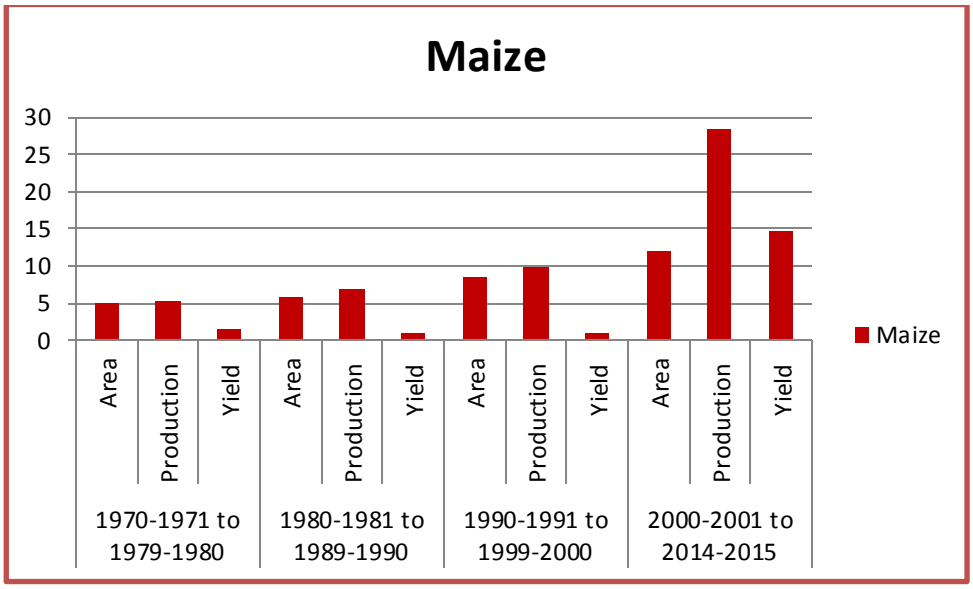

Fig. 3.3 Compound Growth Rate – Maize

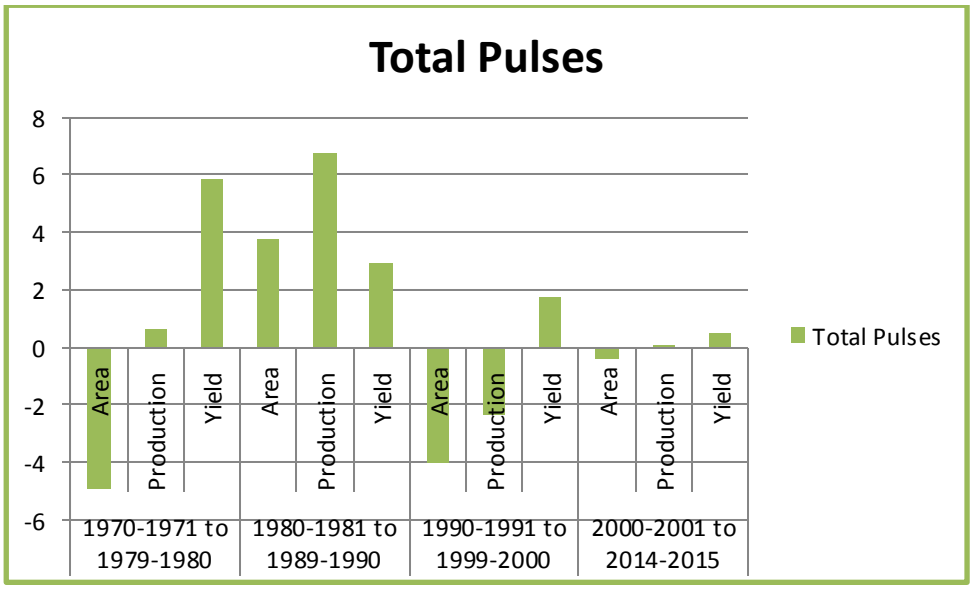

Fig. 3.4 Compound Growth Rate – Total Pulses

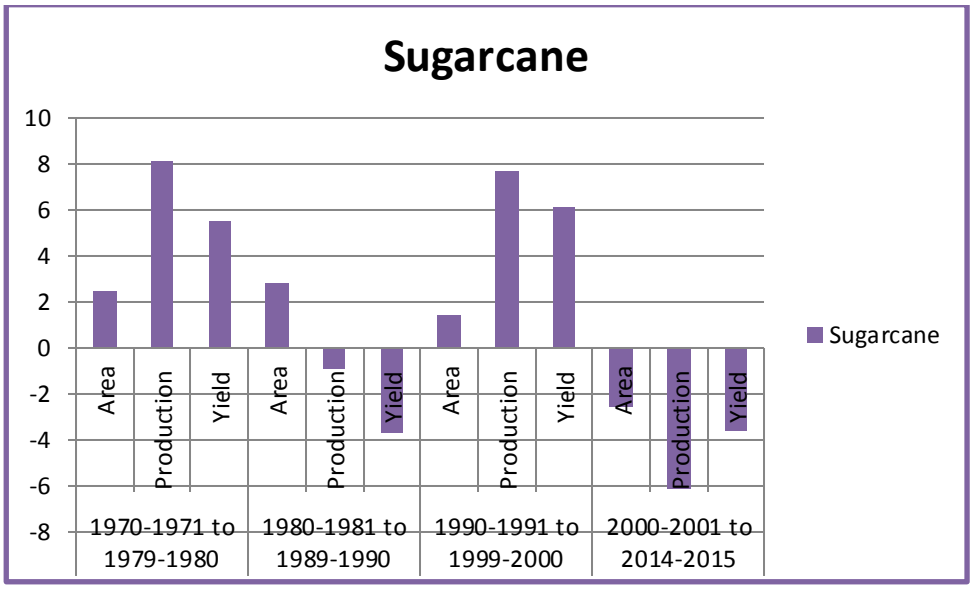

Fig. 3.5 Compound Growth Rate – Sugarcane

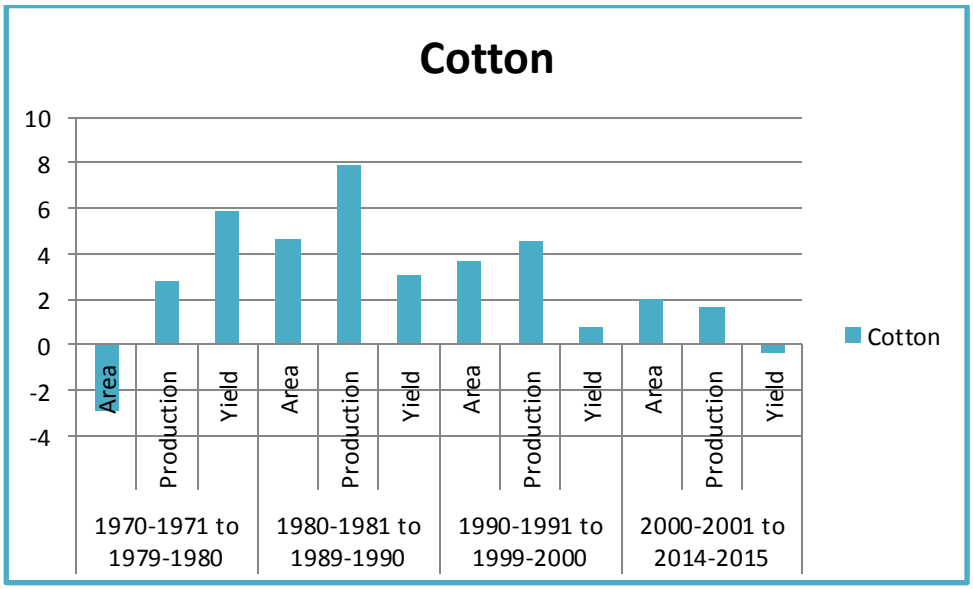

Fig. 3.6 Compound Growth Rate – Cotton

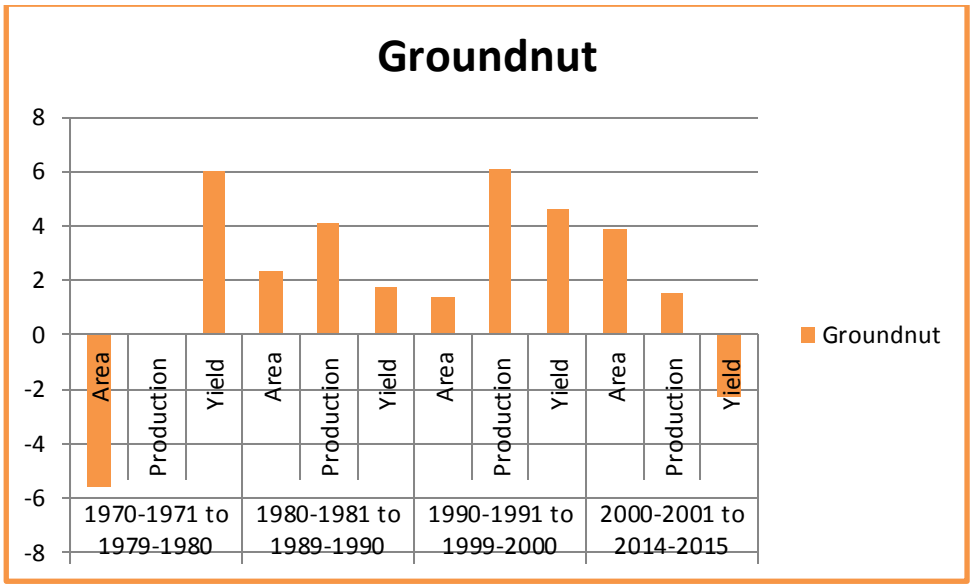

Fig. 3.7 Compound Growth Rate – Ground nut

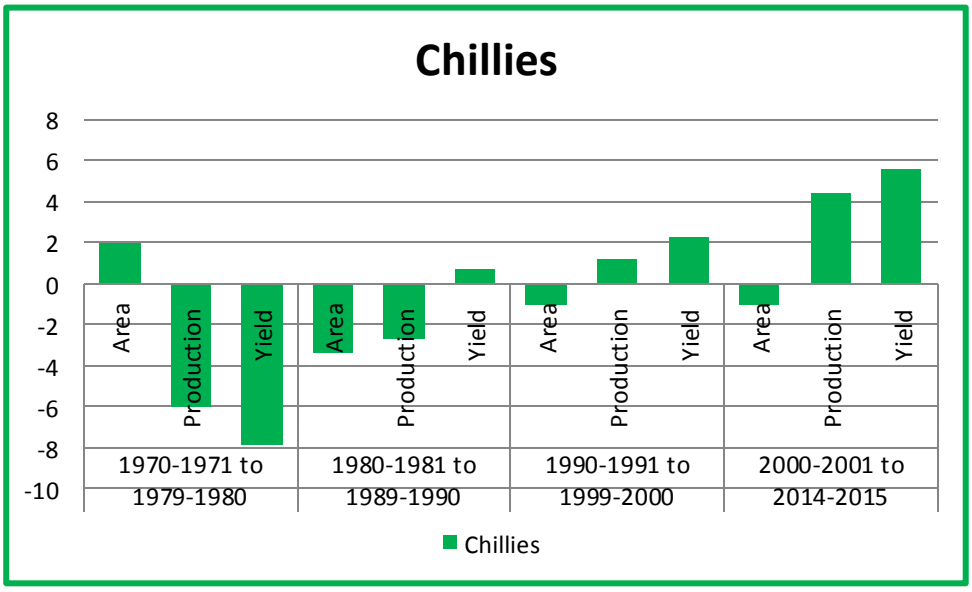

Fig. 3.8 Compound Growth Rate – Chillies

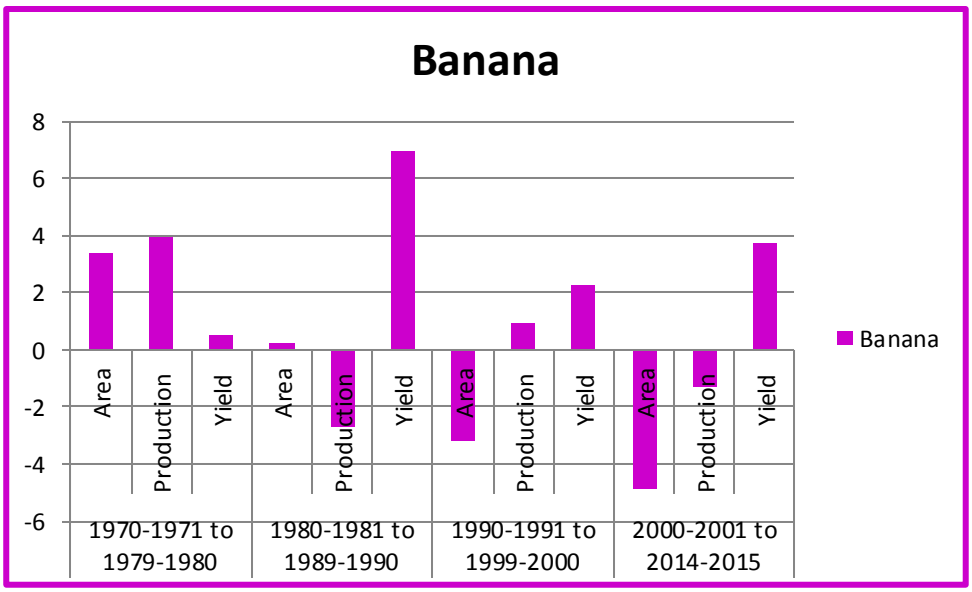

Fig. 3.9 Compound Growth Rate – Banana

In sum, it could be inferred that over the period of 44 years (from 1970-71 to 2014-15) among the nine major crops for which the growth rates were estimated, the growth rates were found to be positive with reference to area, productivity as well as production in maize only. Paddy witnessed a negative growth rate during 1980-81 to 1989-1990 only. Total pulses exhibited a negative growth rate in area in all the periods under consideration with the exception of 1980-81 to 1980-90. Cotton and groundnut exhibited a negative growth rate in area during the period 1970-71 to 1979-80 only. Positive growth in production was observed in all the periods under consideration in Paddy, maize, cotton and groundnut only. Similarly, positive growth rate in productivity was observed in all the periods under consideration in paddy, maize, total pulses and banana only. Sugarcane, cotton and groundnut exhibited a negative growth rate in productivity during the period 2000-01 to 2014-15.

The declining trend in productivity in recent period particularly in sugarcane, groundnut and cotton is causing a great concern and this has to be reversed. Similarly, the declining trend in the production in sugarcane and banana has to be arrested. Hence, appropriate strategy must be adopted for increasing the area under sugarcane and banana and productivity in sugarcane, cotton and groundnut.

The study carried out by the Department of Agricultural Economics, Tamil Nadu Agricultural University revealed that the production losses due to leaf folder in paddy were the maximum in the State accounting for 11.40 percent of the total losses. The Benefit Cost analysis and Net Present Value for leaf folder were worked out to be 26.72 and 21.49 for Bio-control/Bio-technology and conventional breeding respectively. The BCR and NPV revealed that the Bio-control/Bio-technology method is economically profitable for solving the top ten constraints namely lead folder, yellow Stem Borer, Drought/Water Scarcity, Rice blast, Ear head bug, Rice Tungro Virus(RTV), Sheath rot, Brown Plant Hopper (BPH) and Bacterial Lead Blight (BLB). The economic surplus for controlling leaf folder was the maximum which amounted to Rs.169.01 million. This is followed by stem borer (127.30 million), drought (117.90 million), rice blast (118.31 million) and ear head bug and BLB (57.28 million). The study also indicated that there exists greater scope for increasing the productivity level, thereby increasing the production of rice, by addressing these constraints.

3.2 Estimation of Growth rates of Area, production and Productivity of major Crops

Growth rates of Area, Production and Productivity of major crops in all the districts of Tamil Nadu with the exception of Chennai over the years were worked out. The year of estimation of such growth rates varied across the districts due to bifurcation and trifurcation of the districts over years. The details are shown in Table 3.2.

Table 3.2 Years of estimation of growth rates for major crops across the Districts

S.No.	Years of estimation	Districts
1	2000-01 to 2014-15	Kancheepuram, Cuddalore, Vellore, Salem, Dharmapuri, Coimbatore, Tiruchirapalli, Pudukkottai, Thanjavur, Madurai, Ramanathapuram, Tirunelveli, Kanyakumari, Dindigul, Erode, Karur, Nagapattinam, Namakkal, Perambalur, Sivagangai, Theni, The Nilgiris, Thiruvallur, Thiruvannamalai, Thiruvarur, Thoothukudi, Villupuram and Virudhunagar.
2	2008-09 to 2014-15	Tiruppur, Ariyalur
3	2003-04 to 2014-15	Krishnagiri

Accordingly, the growth rates of both agricultural crops and horticultural crops were estimated and the performance of these crops across the districts is discussed below.

3.2.1 Agricultural Crops

3.2.1.1 Rice

During 11th five year plan, the area under rice was on an average of 18.75 lakh ha with an production of 58.27 lakh tonnes and the productivity was 3105 kg/ha, covering almost all the districts of Tamil Nadu State. The growth rate of area was positive in 18 districts namely Cuddalore, Dindigul, Erode, Karur, Krishnagiri, Madurai, Nagapattinam, Pudukottai, Ramanathapuram, Sivagangai, Thanjavur, Thiruvannamalai, Thiruvarur, Thoothukudi, Tirunelveli, Trichy, Villupuram and Virudhunagar. In all the other 13 districts, the trend was negative. The growth rate of production was found to be positive in 21 districts and negative in other 10 districts viz., Coimbatore, Cuddalore, Dharmapuri, Kancheepuram, Kanyakumari, Namakkal, Perambalur, The Nilgiris, Tiruppur and Vellore. Similarly, the productivity trend was positive in 27 districts of Ariyalur, Coimbatore, Dharmapuri, Dindigul, Kancheepuram, Kanyakumari, Karur, Krishnagiri, Madurai, Nagapattinam, Namakkal, Perambalur, Ramanathapuram, Salem, Sivagangai, Thanjavur, The Nilgiris, Theni, Thiruvannamalai, Thiruvarur, Thoothukudi, Tirunelveli, Tiruppur, Tiruvallur, Trichy, Villupuram and Virudhunagar, while it was negative in all other four districts. This implied that the downward trend of growth rate in certain districts like Vellore must be arrested and stepped up in order to increase area, production and productivity under paddy.

In sum, the strategy must be to increase production through productivity increase in all the districts of Tamil Nadu by adopting modern technologies like System of Rice Intensification (SRI) and also by the distribution of quality seeds, farm machineries and other management practices. The compound growth rate of area, production and productivity under rice crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.3 and their district-wise distribution in Table 3.4.

Table 3.3 Compound Growth Rate (CGR) of Area, Production and Productivity under Rice Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	-0.88	9.94	14.16
2	Coimbatore	-12.77	-9.89	1.61
3	Cuddalore	0.56	-3.17	-3.30
4	Dharmapuri	-3.57	-1.88	3.94
5	Dindigul	0.57	3.00	2.42
6	Erode	3.77	3.60	-0.17
7	Kancheepuram	-2.95	-0.27	2.77
8	Kanyakumari	-4.58	-2.55	2.12
9	Karur	0.44	1.86	1.41
10	Krishnagiri	2.07	8.31	9.38
11	Madurai	1.51	3.75	2.20
12	Nagapattinam	0.58	2.82	2.23
13	Namakkal	-3.36	-2.67	0.72
14	Perambalur	-13.19	-6.87	7.28
15	Pudukkottai	1.05	0.23	-0.81
16	Ramanathapuram	0.55	6.47	5.89
17	Salem	-0.01	0.94	0.95
18	Sivagangai	0.24	2.53	2.28
19	Thanjavur	0.29	0.47	0.98
20	The Nilgiris	-15.13	-14.90	0.28
21	Theni	-0.95	1.17	2.15
22	Thiruvannamalai	3.71	4.90	1.15
23	Thiruvarur	1.31	3.77	2.41
24	Thoothukudi	4.39	5.47	1.04
25	Tirunelveli	2.44	3.63	1.17
26	Tiruppur	-1.37	-1.25	4.83
27	Thiruvallur	-0.90	0.07	0.99
28	Trichy	0.25	2.31	2.06
29	Vellore	-0.19	-0.38	-0.18
30	Villupuram	1.74	2.08	0.34
31	Virudhunagar	0.70	3.02	2.30

Table 3.4 District-wise Distribution of Growths in Rice

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Cuddalore	Ariyalur	Ariyalur	Coimbatore	Ariyalur	Cuddalore
Dindigul	Coimbatore	Dindigul	Cuddalore	Coimbatore	Erode
Erode	Dharmapuri	Erode	Dharmapuri	Dharmapuri	Pudukkottai
Karur	Kancheepuram	Karur	Kancheepuram	Dindigul	Vellore*
Krishnagiri	Kanyakumari	Krishnagiri	Kanyakumari	Kancheepuram	
Madurai	Namakkal	Madurai	Namakkal	Kanyakumari	
Nagapattinam	Perambalur	Nagapattinam	Perambalur	Karur	
Pudukkottai	Salem	Pudukkottai	The Nilgiris	Krishnagiri	
Ramanathapuram	The Nilgiris	Ramanathapuram	Tiruppur	Madurai	
Sivagangai	Theni	Salem	Vellore*	Nagapattinam	
Thanjavur	Tiruppur	Sivagangai		Namakkal	
Thiruvannamalai	Thiruvallur	Thanjavur		Perambalur	
Thiruvarur	Vellore*	Theni		Ramanathapuram	
Thoothukudi		Thiruvannamalai		Salem	
Tirunelveli		Thiruvarur		Sivagangai	
Trichy		Thoothukudi		Thanjavur	
Villupuram		Tirunelveli		The Nilgiris	
Virudhunagar		Thiruvallur		Theni	
		Trichy		Thiruvannamalai	
		Villupuram		Thiruvarur	
		Virudhunagar		Thoothukudi	
				Tirunelveli	
				Tiruppur	
				Thiruvallur	
				Trichy	
				Villupuram	
				Virudhunagar	

**Special attention required*

3.2.1.2 Maize

Maize crop is cultivated in 19 districts during the 11th year plan period with an average area of 2,53,069 ha with a production of 11,85,814 tonnes and productivity of 4,635 kg/ha. With reference to area, 16 districts of the State experienced positive growth, while three districts viz., Coimbatore, Tiruppur and Vellore have shown negative trend. Similarly, in production, all the 19 districts witnessed positive growth and none of the district had negative trend. The productivity witnessed uptrend in 18 districts and downtrend in Cuddalore district

alone. The growth rates in area, production and productivity are quite perceptible in majority of the districts where maize is cultivated. Maize is one of the important crops introduced for crop diversification in Tamil Nadu State. Moreover, the growing poultry feed industry keeps demanding maize, as it is an important ingredient in feed mix. So, the maize crop improvement should be concentrated mainly on interventions like quality seed supply, soil health enhancement, integrated pest and disease management, irrigation management, farm mechanization, infrastructure, extension and special programmes like millet mission. The area, production and productivity trend under maize crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.5 and their district-wise distribution in Table 3.6.

Table 3.5 Compound Growth Rate of Area, Production and Productivity under Maize Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	6.65	62.72	47.56
2	Coimbatore	-14.22	9.03	23.92
3	Cuddalore	79.32	77.25	-1.36
4	Dindigul	5.69	21.30	14.77
5	Erode	10.22	25.64	13.99
6	Madurai	33.36	43.85	7.87
7	Namakkal	36.02	57.90	16.08
8	Perambalur	23.11	37.72	11.87
9	Pudukkottai	39.04	62.97	17.21
10	Salem	16.98	31.57	12.47
11	Thanjavur	21.92	33.79	9.77
12	Theni	6.97	23.46	15.42
13	Thoothukudi	16.77	42.96	22.43
14	Tirunelveli	4.93	26.07	20.15
15	Tiruppur	-2.60	10.59	9.42
16	Trichy	39.58	61.34	15.58
17	Vellore	-5.30	10.16	16.33
18	Villupuram	43.25	68.69	17.81
19	Virudhunagar	8.45	22.12	12.61

Table 3.6 District-wise Distribution of Growths in Maize Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Ariyalur	Coimbatore	Ariyalur	-	Ariyalur	Cuddalore
Cuddalore	Tiruppur	Coimbatore		Coimbatore	
Dindigul	Vellore	Cuddalore		Dindigul	
Erode		Dindigul		Erode	
Madurai		Erode		Madurai	
Namakkal		Madurai		Namakkal	
Perambalur		Namakkal		Perambalur	
Pudukkottai		Perambalur		Pudukkottai	
Salem		Pudukkottai		Salem	
Thanjavur		Salem		Thanjavur	
Theni		Thanjavur		Theni	
Thoothukudi		Theni		Thoothukudi	
Tirunelveli		Thoothukudi		Tirunelveli	
Trichy		Tirunelveli		Tiruppur	
Villupuram		Tiruppur		Trichy	
Virudhunagar		Trichy		Vellore	
		Vellore		Villupuram	
		Villupuram		Virudhunagar	
		Virudhunagar			

3.2.1.3 Cholam

Cholam is grown in 22 districts in the State with an area of 2,44,408 ha, production of 2,36,547 tonnes and productivity of 984 kg/ha, during 11th five year plan. The growth rate of area was positive only in two districts viz., Thoothukudi and Virudhunagar. Similarly, the production was positive in seven districts viz., Karur, Krishnagiri, Ramanathapuram, Theni, Thoothukudi, Tiruppur and Virudhunagar, whereas the productivity recorded positive in almost all the districts with the exception of Ariyalur, Madurai, Namakkal, Salem, Thiruvallur, Trichy and Vellore districts. Thus, the negative trend in majority of the districts is a common phenomenon. Due to changing purchasing power and food habits, the consumption of cholam has drastically come down in majority of small farmer / labour households. One of the important crops that replaced cholam is maize. This indicates the need for development strategy for cholam to give full thrust on productivity through increased concentration on major interventions as discussed in maize crop. The compound growth rate of cholam crop in

major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.7 and their district-wise distribution in Table 3.8.

Table 3.7 Compound Growth Rate of Area, Production and Productivity under Cholam Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	-36.19	-44.93	-5.13
2	Coimbatore	-11.16	-3.85	7.16
3	Dharmapuri	-2.82	-0.58	3.16
4	Dindigul	-5.41	-4.02	1.47
5	Erode	-55.33	-47.65	17.18
6	Karur	-4.49	1.83	6.62
7	Krishnagiri	-6.32	22.95	23.46
8	Madurai	-1.33	-1.73	-0.41
9	Namakkal	-1.14	-7.06	-5.98
10	Perambalur	-22.96	-21.19	2.29
11	Pudukkottai	-7.80	-6.35	1.57
12	Ramanathapuram	-0.68	4.68	5.39
13	Salem	-1.64	-2.55	-0.92
14	Theni	-0.92	11.32	12.35
15	Thiruvannamalai	-14.27	-11.92	2.74
16	Thoothukudi	1.53	13.20	11.50
17	Tirunelveli	-1.85	-1.03	0.82
18	Tiruppur	-22.29	30.24	80.59
19	Thiruvallur	-5.39	-8.67	-0.64
20	Trichy	-3.99	-6.02	-2.11
21	Vellore	-4.79	-7.17	-2.49
22	Virudhunagar	2.49	8.48	5.84

Table 3.8 District-wise Distribution of Growths in Cholam Crop

Area		Production		Productivity		Special attention required
Positive	Negative	Positive	Negative	Positive	Negative	
Thoothukudi	Ariyalur	Karur	Ariyalur	Coimbatore	Ariyalur	Ariyalur
Virudhunagar	Coimbatore	Krishnagiri	Coimbatore	Dharmapuri	Madurai	Madurai
	Dharmapuri	Ramanathapuram	Dharmapuri	Dindigul	Namakkal	Namakkal
	Dindigul	Theni	Dindigul	Erode	Salem	Salem
	Erode	Thoothukudi	Erode	Karur	Thiruvallur	Thiruvallur
	Karur	Tiruppur	Madurai	Krishnagiri	Trichy	Trichy
	Krishnagiri	Virudhunagar	Namakkal	Perambalur	Vellore	Vellore
	Madurai		Perambalur	Pudukkottai		
	Namakkal		Pudukkottai	Ramanathapuram		
	Perambalur		Salem	Theni		
	Pudukkottai		Thiruvannamalai	Thiruvannamalai		
	Ramanathapuram		Tirunelveli	Thoothukudi		
	Salem		Thiruvallur	Tirunelveli		
	Theni		Trichy	Tiruppur		
	Thiruvannamalai		Vellore	Virudhunagar		
	Tirunelveli					
	Tiruppur					
	Thiruvallur					
	Trichy					
	Vellore					

3.2.1.4 Cumbu

Cumbu is an important millet crop grown in more than 10 districts in the State with an area of 53,409 ha, production of 88,866 tonnes and productivity of 1,691 kg/ha during last five year plan. Perusal of table, exhibits the fact that Madurai district alone witnessed positive growth in area. Similarly, Theni and Madurai districts had positive growth in production. In all other districts, negative trend could be observed for area and production. The productivity trend was positive in all the ten districts viz., Erode, Karur, Madurai, Perambalur, Theni, Thiruvannamalai, Thoothukudi, Thiruvallur, Villupuram and Virudhunagar. In sum, the development of cumbu crop in Tamil Nadu requires a thorough planning to increase area and production through input supplies, management practices, capacity building and special

programmes, as this crop has got food value in terms of nutrition. The compound growth rate of area, production and productivity under cumbu crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.9 and their district-wise distribution in Table 3.10.

Table 3.9 Compound Growth Rate of Area, Production and Productivity under Cumbu Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Erode	-20.42	-15.86	5.74
2	Karur	-15.22	-5.44	11.54
3	Madurai	8.40	14.33	5.47
4	Perambalur	-27.57	-19.87	10.63
5	Theni	-3.76	6.37	10.53
6	Thiruvannamalai	-13.53	-9.61	4.53
7	Thoothukudi	-7.82	-1.82	6.51
8	Thiruvallur	-16.03	-15.72	0.38
9	Villupuram	-13.32	-9.74	4.13
10	Virudhunagar	-10.42	-3.39	7.84

Table 3.10 District-wise Distribution of Growths in Cumbu Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Theni	Erode	Theni	Erode	Erode	-
	Karur	Madurai	Karur	Karur	
	Madurai		Perambalur	Madurai	
	Perambalur		Thiruvannamalai	Perambalur	
	Thiruvannamalai		Thoothukudi	Theni	
	Thoothukudi		Thiruvallur	Thiruvannamalai	
	Thiruvallur		Villupuram	Thoothukudi	
	Villupuram		Virudhunagar	Thiruvallur	
	Virudhunagar			Villupuram	
				Virudhunagar	

3.2.1.5 Ragi

Ragi is yet another agricultural crop that comes under minor millet cultivated as a major food staple crop and for its nutritive value mostly in Dharmapuri, Erode, Krishnagiri, Perambalur and Vellore districts with an average area of 84,914 ha, production of 1,80,557 tonnes and productivity of 2,140 kg/ha. All the five districts show negative growth regarding area and positive growth in productivity. The production is positive in Erode and Krishnagiri districts. Yet, Dharmapuri, Perambalur and Vellore districts show negative growth trend. Ragi is considered as a wholesome food especially for diabetics. Considering the increased demand of ragi for food purposes and decreasing area due to competing crops, there is an immediate need for enhancement of ragi productivity. The strategy, therefore, must keep increasing productivity and production of ragi in the State to meet the growing domestic demand. There exists scope for value addition also. The area, production and productivity trend under ragi crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.11 and their district-wise distribution in Table 3.12.

Table 3.11 Compound Growth Rate of Area, Production and Productivity under Ragi Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Dharmapuri	-14.01	-11.99	4.70
2	Erode	-5.72	0.69	6.80
3	Krishnagiri	-3.31	9.25	13.19
4	Perambalur	-24.60	-20.15	5.90
5	Vellore	-6.20	-6.29	0.48

Table 3.12 District-wise Distribution of Growths in Ragi Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
-	Dharmapuri	Erode	Dharmapuri	Dharmapuri	-
	Erode	Krishnagiri	Perambalur	Erode	
	Krishnagiri		Vellore	Krishnagiri	
	Perambalur			Perambalur	
	Vellore			Vellore	

3.2.1.6 Red Gram

Pulses are the major sources of cheap protein particularly for the vegetarians and poor. Therefore, there is a need to keep producing more and more pulses. Pulses are more sensitive to excessive moisture and the un-usual continuous rain and flooding also devastate the entire rice-fallow pulses once in 3 or 4 years thus reducing production drastically in the State. Therefore, the development strategy must focus not only on productivity increase, but also on the water management / flood management tactics.

Red gram is majorly grown in four districts of the Tamil Nadu State covering about 31,163 ha of area, 22,603 tonnes of production and 601 kg/ha of productivity during 11th five year plan. The growth rate of area was positive only in one district namely Krishnagiri. Similarly, the production was positive in three districts viz., Karur, Krishnagiri and Theni, whereas the productivity recorded positive in all the four districts viz., Karur, Krishnagiri, Theni and Vellore. Thus, there is a need to increase area, production and productivity of red gram to meet the growing demand through the development of strategic plans like adoption of Red gram Transplantation Technology and programmes like pulses mission, expansion of area under rainfed pulses etc. The compound growth rate of red gram crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.13 and their district-wise distribution in Table 3.14.

Table 3.13 Compound Growth Rate of Area, Production and Productivity under Red Gram Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Karur	-1.33	5.53	6.95
2	Krishnagiri	19.18	19.78	6.64
3	Theni	-6.44	0.83	7.78
4	Vellore	-4.93	-4.28	0.72

Table 3.14 District-wise Distribution of Growth in Redgram Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Krishnagiri	Karur	Karur	Vellore	Karur	-
	Theni	Krishnagiri		Krishnagiri	
	Vellore	Theni		Theni	
				Vellore	

3.2.1.7 Black Gram

Black gram is cultivated invariably in almost 19 districts viz., Cuddalore, Dharmapuri, Erode, Kanyakumari, Karur, Nagapattinam, Pudukkottai, Ramanathapuram, Sivagangai, Thanjavur, Thiruvannamalai, Thiruvarur, Thoothukudi, Tirunelveli, Tiruppur, Thiruvallur, Trichy, Vellore and Villupuram of Tamil Nadu State with an area of 2,88,721 ha, production of 1,12,700 tonnes and productivity of 388 kg/ha during 11th five year plan. Majority of the districts experienced positive growth trends regarding area and production except Dharmapuri, Erode, Kanyakumari, Thiruvannamalai, Thiruvallur and Vellore, in addition to Tirunelveli in area which recorded negative growth rate (Table 3.15). More than half of the districts in Tamil Nadu had positive productivity growth. However, the productivity of black gram is low in Kanyakumari, Nagapattinam, Ramanathapuram and Thiruvarur districts (Table 3.16). Therefore, the development strategy must focus not only on productivity increase, but also on the management tactics like distribution of integrated nutrient management kit etc.

Table 3.15 Compound Growth Rate of Area, Production and Productivity under Black Gram Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Cuddalore	4.63	6.49	2.02
2	Dharmapuri	-6.56	-6.10	1.10
3	Erode	-9.14	-6.26	3.17
4	Kanyakumari	-17.04	-17.09	-0.07
5	Karur	19.31	21.72	2.02
6	Nagapattinam	3.93	1.03	-2.79
7	Pudukkottai	1.10	2.70	1.59
8	Ramanathapuram	6.20	3.22	-2.81
9	Sivagangai	4.08	5.70	1.55
10	Thanjavur	10.29	11.77	1.23
11	Thiruvannamalai	-6.57	-1.87	5.03
12	Thiruvarur	4.38	3.97	-0.40
13	Thoothukudi	13.50	18.24	4.18
14	Tirunelveli	-0.74	2.84	3.62
15	Tiruppur	17.95	48.06	29.63
16	Thiruvallur	-11.49	-9.99	1.72
17	Trichy	9.66	14.47	4.40
18	Vellore	-15.60	-13.76	2.10
19	Villupuram	6.17	10.28	3.87

Table 3.16 District-wise Distribution of Growths in Black Gram Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Cuddalore	Dharmapuri	Cuddalore	Dharmapuri	Cuddalore	Kanyakumari*
Karur	Erode	Karur	Erode	Dharmapuri	Nagapattinam
Nagapattinam	Kanyakumari*	Nagapattinam	Kanyakumari*	Erode	Ramanathapur
Pudukkottai	Thiruvannama	Pudukkottai	Thiruvannama	Karur	Thiruvarur
Ramanathapur	Tirunelveli	Ramanathapur	Thiruvallur	Pudukkottai	
Sivagangai	Thiruvallur	Sivagangai	Vellore	Sivagangai	
Thanjavur	Vellore	Thanjavur		Thanjavur	
Thiruvarur		Thiruvarur		Thiruvannama	
Thoothukudi		Thoothukudi		Thoothukudi	
Tiruppur		Tirunelveli		Tirunelveli	
Trichy		Tiruppur		Tiruppur	
Villupuram		Trichy		Thiruvallur	
		Villupuram		Trichy	
				Vellore	
				Villupuram	

**Special attention required*

3.2.1.8 Green Gram

With an area of 1,54,232 ha, production of 53,605 tonnes and productivity of 343 kg/ha, green gram is grown in 12 districts of the Tamil Nadu State. The growth rate of area was positive only in eight districts namely Nagapattinam, Thanjavur, Theni, Thiruvarur, Thoothukudi, Tirunelveli, Tiruppur and Virudhunagar. Similarly, the production was positive in all the aforesaid districts with the exception of Thanjavur, whereas the productivity recorded positive in half of the districts viz., Coimbatore, Theni, Thoothukudi, Tirunelveli, Tiruppur and Virudhunagar. The remaining districts recorded negative growth trend in area, production and productivity, and there exists a necessity to increase growth rate of green gram to meet the growing needs of the population through special programmes like accelerated pulses production programmes. The area, production and productivity trend under green gram crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.17 and their district-wise distribution in Table 3.18.

Table 3.17 Compound Growth Rate of Area, Production and Productivity under Green Gram Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Coimbatore	-9.75	-5.47	5.54
2	Erode	-20.67	-20.78	-0.13
3	Nagapattinam	8.64	3.31	-4.90
4	Namakkal	-9.58	-12.12	-2.81
5	Thanjavur	0.53	-3.64	-4.17
6	Theni	16.32	15.66	0.57
7	Thiruvarur	9.52	6.07	-2.86
8	Thoothukudi	14.65	19.06	3.85
9	Tirunelveli	0.32	3.77	3.44
10	Tiruppur	7.48	36.73	23.07
11	Thiruvallur	-3.60	-4.95	-1.40
12	Virudhunagar	1.60	3.02	1.40

Table 3.18 District-wise Distribution of Growths in Green Gram Crop

Area		Production		Productivity		Special attention required
Positive	Negative	Positive	Negative	Positive	Negative	
Nagapattinam	Coimbatore	Nagapattinam	Coimbatore	Coimbatore	Erode	Erode
Thanjavur	Erode	Theni	Erode	Theni	Nagapattinam	Namakkal
Theni	Namakkal	Thiruvarur	Namakkal	Thoothukudi	Namakkal	Thiruvallur
Thiruvarur	Thiruvallur	Thoothukudi	Thanjavur	Tirunelveli	Thanjavur	
Thoothukudi		Tirunelveli	Thiruvallur	Tiruppur	Thiruvarur	
Tirunelveli		Tiruppur		Virudhunagar	Thiruvallur	
Tiruppur		Virudhunagar				
Virudhunagar						

3.2.1.9 Groundnut

During 11th five year plan, the average area under groundnut was 4,41,837 ha with a production of 9,74,873 tonnes and 2,238 kg/ha of productivity, covering almost 28 districts in Tamil Nadu State. Groundnut is yet another important food/oilseeds crop, and its area and production performance had shown negative growth in majority of the districts. A positive

trend in growth of productivity in groundnut was observed in all the 28 districts except Thiruvannamalai. This indicates the need for strategy to be formulated for groundnut to give more thrust on area and increasing productivity in all districts by implementing groundnut mission, integrated production improvement programme for oilseeds etc. The compound growth rate of area, production and productivity under groundnut crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.19 and their district-wise distribution in Table 3.20.

Table 3.19 Compound Growth Rate of Area, Production and Productivity under Groundnut Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	-4.57	41.23	45.75
2	Coimbatore	-10.38	-3.68	6.67
3	Cuddalore	-10.10	-8.12	2.68
4	Dharmapuri	-10.44	-7.19	5.32
5	Dindigul	-2.18	0.47	2.79
6	Erode	-7.51	-6.68	0.91
7	Kancheepuram	-5.09	-0.98	4.34
8	Kanyakumari	-15.36	-12.44	3.44
9	Karur	1.66	4.89	3.18
10	Krishnagiri	-0.53	7.86	11.37
11	Madurai	-7.54	-4.67	3.10
12	Nagapattinam	0.85	9.48	8.56
13	Namakkal	-7.84	-5.24	2.82
14	Perambalur	-27.67	-35.08	7.61
15	Pudukkottai	-3.58	-1.41	2.25
16	Ramanathapuram	-8.31	-5.41	3.17
17	Salem	-7.25	-3.77	3.75
18	Sivagangai	-3.03	-2.46	0.59
19	Thanjavur	4.25	10.16	5.67
20	Theni	-9.69	-3.66	6.67
21	Thiruvannamalai	1.34	0.21	-1.12
22	Thiruvarur	12.14	23.00	9.69
23	Tiruppur	-4.84	3.90	2.52
24	Thiruvallur	-6.75	-4.67	2.23
25	Trichy	-1.43	-0.24	1.21
26	Vellore	-2.36	1.29	3.74
27	Villupuram	-4.34	-0.30	4.23
28	Virudhunagar	-1.57	3.45	5.10

Table 3.20 District-wise Distribution of Growths in Ground nut Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Karur	Ariyalur	Ariyalur	Coimbatore	Ariyalur	Thiruvannamalai
Nagapattinam	Coimbatore	Dindigul	Cuddalore	Coimbatore	
Thanjavur	Cuddalore	Karur	Dharmapuri	Cuddalore	
Thiruvannamalai	Dharmapuri	Krishnagiri	Erode	Dharmapuri	
Thiruvarur	Dindigul	Nagapattinam	Kancheepuram	Dindigul	
	Erode	Thanjavur	Kanyakumari	Erode	
	Kancheepuram	Thiruvannamalai	Madurai	Kancheepuram	
	Kanyakumari	Thiruvarur	Namakkal	Kanyakumari	
	Krishnagiri	Tiruppur	Perambalur	Karur	
	Madurai	Vellore	Pudukkottai	Krishnagiri	
	Namakkal	Virudhunagar	Ramanathapuram	Madurai	
	Perambalur		Salem	Nagapattinam	
	Pudukkottai		Sivagangai	Namakkal	
	Ramanathapuram		Theni	Perambalur	
	Salem		Thiruvallur	Pudukkottai	
	Sivagangai		Trichy	Ramanathapuram	
	Theni		Villupuram	Salem	
	Tiruppur			Sivagangai	
	Thiruvallur			Thanjavur	
	Trichy			Theni	
	Vellore			Thiruvarur	
	Villupuram			Tiruppur	
	Virudhunagar			Thiruvallur	
				Trichy	
				Vellore	
				Villupuram	
				Virudhunagar	

3.2.1.10 Gingelly

Gingelly is an important oilseed crop next to groundnut with an area of 58,422 ha, 29,060 tonnes of production and 508 kg/ha of productivity, grown in more than 10 districts of Tamil Nadu State. The growth rate of area was positive only in two districts namely Pudukkottai and Thanjavur (Table 3.21). Similarly, the production was positive only in four districts viz., Ariyalur, Karur, Pudukkottai and Thanjavur, and productivity was positive in Ariyalur, Erode, Karur, Pudukkottai, Thanjavur and Thoothukudi districts. Thus, the negative trend in majority of the districts is a common phenomenon (Table 3.22). Therefore, before reaching an alarming situation of down trends, strategic planning must aim at increasing growth trend of area, production and productivity in gingelly by the implementation of oilseeds mission programme, especially in districts like Nagapattinam, Ramanathapuram, Salem and Thiruvarur.

Table 3.21 Compound Growth Rate of Area, Production and Productivity under Gingelly Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	-15.41	0.66	21.43
2	Erode	-2.69	-2.46	0.24
3	Karur	-1.96	2.21	4.25
4	Nagapattinam	-2.21	-6.09	-3.97
5	Pudukkottai	0.60	2.24	1.64
6	Ramanathapuram	-7.14	-10.49	-3.61
7	Salem	-6.67	-8.39	-1.84
8	Thanjavur	2.15	3.38	1.22
9	Thiruvarur	-10.41	-11.35	-1.00
10	Thoothukudi	-10.10	-5.37	5.27

Table 3.22 District-wise Distribution of Growths in Gingelly Crop

Area		Production		Productivity		Special attention required
Positive	Negative	Positive	Negative	Positive	Negative	
Pudukkottai	Ariyalur	Ariyalur	Erode	Ariyalur	Nagapattinam	Nagapattinam
Thanjavur	Erode	Karur	Nagapattinam	Erode	Ramnad	Ramnad
	Karur	Pudukkottai	Ramnad	Karur	Salem	Salem
	Nagapattinam	Thanjavur	Salem	Pudukkottai	Thiruvarur	Thiruvarur
	Ramnad		Thiruvarur	Thanjavur		
	Salem		Thoothukudi	Thoothukudi		
	Thiruvarur					
	Thoothukudi					

3.2.1.11 Coconut

Coconut is grown in 24 districts of the State with an area of 4,00,562 ha, production of 57,028 tonnes and productivity of 14,230 nuts/ha during 11th five year plan. The growth rate of area, production and productivity was positive in majority of the districts of Tamil Nadu. However, a negative trend in area was observed in districts like Coimbatore, Dharmapuri, Erode, Kancheepuram, Ramanathapuram and Thiruvallur. Similarly, the production was negative in six districts viz., Dharmapuri, Erode, Kancheepuram, Kanyakumari, Ramanathapuram and Tirunelveli, whereas Kanyakumari, Ramanathapuram and Tirunelveli districts recorded negative growth trend for productivity. Though a positive trend in majority of the districts is observed, the need for sustenance development strategy in coconut to give full thrust on improving the productivity in districts is essential and Ramanathapuram requires special attention. This crop has got also value addition potential in terms of oil, coir pith making etc. The compound growth rate of coconut crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.23 and their district-wise distribution in Table 3.24.

Table 3.23 Compound Growth Rate of Area, Production and Productivity under Coconut Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Coimbatore	-1.86	2.00	6.04
2	Dharmapuri	-9.42	-1.76	2.32
3	Dindigul	2.41	4.57	1.87

S.No.	District	CGR		
		Area	Production	Productivity
4	Erode	-3.88	-4.70	4.96
5	Kancheepuram	-3.04	-3.24	1.16
6	Kanyakumari	1.11	-4.57	-5.13
7	Karur	4.94	6.00	1.49
8	Krishnagiri	1.23	11.48	10.52
9	Madurai	1.24	5.87	2.82
10	Nagapattinam	1.67	6.06	5.41
11	Namakkal	13.22	13.57	4.67
12	Pudukkottai	5.68	17.31	10.64
13	Ramanathapuram	-0.01	-11.64	-11.62
14	Salem	2.59	5.09	2.35
15	Sivagangai	1.73	5.21	2.90
16	Thanjavur	3.60	8.69	4.02
17	Theni	3.63	3.97	0.13
18	Thiruvarur	0.95	7.17	7.50
19	Thoothukudi	0.81	10.29	10.71
20	Tirunelveli	0.54	-5.94	-5.91
21	Thiruvallur	-1.06	11.26	14.73
22	Trichy	1.30	9.47	8.84
23	Vellore	2.03	1.31	0.91
24	Virudhunagar	1.73	10.02	7.67

Table 3.24 District-wise Distribution of Growths in Coconut Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Dindigul	Coimbatore	Coimbatore	Dharmapuri	Coimbatore	Kanyakumari
Kanyakumari	Dharmapuri	Dindigul	Erode	Dindigul	Ramnad*
Karur	Erode	Karur	Kancheepuram	Karur	Tirunelveli
Krishnagiri	Kancheepuram	Krishnagiri	Kanyakumari	Krishnagiri	
Madurai	Ramnad*	Madurai	Ramnad*	Madurai	
Nagapattinam	Thiruvallur	Nagapattinam	Tirunelveli	Nagapattinam	
Namakkal		Namakkal		Namakkal	
Pudukkottai		Pudukkottai		Pudukkottai	
Salem		Salem		Salem	

Sivagangai		Sivagangai		Sivagangai	
Thanjavur		Thanjavur		Thanjavur	
Theni		Theni		Theni	
Thiruvarur		Thiruvarur		Thiruvarur	
Thoothukudi		Thoothukudi		Thoothukudi	
Tirunelveli		Thiruvallur		Tiruvallur	
Trichy		Trichy		Trichy	
Vellore		Vellore		Vellore	
Virudhunagar		Virudhunagar		Virudhunagar	
				Dharmapuri	
				Erode	
				Kancheepuram	

**Special attention required*

3.2.1.12 Sugarcane

Sugarcane is an important industrial crop grown in more than 25 districts in Tamil Nadu State covering an area of 3,23,692 ha with a production of 347,70,940 tonnes and productivity of 107 tonnes/ha. It forms the raw material for the sugar industry, which is the second largest manufacturing industry in the country. The growth in area, production and productivity of sugarcane was quite convincing with positive trend in more than 12 districts. The growth trend must be maintained to meet the growing demand for sugar. Therefore, the development strategy must focus on increasing sugarcane productivity as well as area increase in the years to come, so as to keep increasing production in almost all the districts especially in Madurai and Thiruvarur districts of Tamil Nadu State. However, the negative trend in area, production and productivity need to be reversed through proper strategy planning including the adoption of Sustainable Sugarcane Initiative (SSI), precision farming and production of other by-products like ethanol production etc. The area, production and productivity trend under sugarcane crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.25 and their district-wise distribution in Table 3.26.

Table 3.25 Compound Growth Rate of Area, Production and Productivity under Sugarcane Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	-1.58	4.25	-2.62
2	Coimbatore	-18.64	-16.69	0.60
3	Cuddalore	-2.24	-4.81	-2.59
4	Dharmapuri	2.12	2.93	1.25
5	Erode	3.03	1.52	-1.47
6	Kancheepuram	-16.08	-15.77	0.37
7	Karur	-0.12	1.68	1.80
8	Madurai	-3.15	-3.54	-0.40
9	Nagapattinam	1.48	-1.65	-3.09
10	Namakkal	11.37	5.78	-5.02
11	Perambalur	-8.33	-5.25	3.36
12	Pudukkottai	4.88	5.04	0.15
13	Salem	6.41	5.00	-1.33
14	Sivagangai	3.15	3.09	-0.05
15	Thanjavur	-0.96	-0.83	0.15
16	Theni	-5.57	-4.00	1.66
17	Thiruvannamalai	7.21	9.87	2.48
18	Thiruvarur	-6.98	-7.30	-0.16
19	Tirunelveli	3.88	1.75	-2.00
20	Tiruppur	5.81	11.55	4.54
21	Thiruvallur	1.24	1.68	0.46
22	Trichy	1.75	1.70	-0.04
23	Vellore	-3.35	-2.56	0.83
24	Villupuram	7.35	6.67	-0.61
25	Virudhunagar	0.14	-0.84	-0.98

Table 3.26 District-wise Distribution of Growths in Sugarcane Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Dharmapuri	Ariyalur	Ariyalur	Coimbatore	Coimbatore	Ariyalur
Erode	Coimbatore	Dharmapuri	Cuddalore	Dharmapuri	Cuddalore
Nagapattinam	Cuddalore	Erode	Kancheepuram	Kancheepuram	Erode
Namakkal	Kancheepuram	Karur	Madurai*	Karur	Madurai*
Pudukkottai	Karur	Namakkal	Nagapattinam	Perambalur	Nagapattinam
Salem	Madurai*	Pudukkottai	Perambalur	Pudukkottai	Namakkal
Sivagangai	Perambalur	Salem	Thanjavur	Thanjavur	Salem
Thiruvannamalai	Thanjavur*	Sivagangai	Theni	Theni	Sivagangai
Tirunelveli	Theni	Thiruvannamalai	Thiruvarur*	Thiruvannamalai	Thiruvarur*
Tiruppur	Thiruvarur	Tirunelveli	Vellore	Tiruppur	Tirunelveli
Thiruvallur	Vellore	Tiruppur	Virudhunagar	Thiruvallur	Trichy
Trichy		Thiruvallur		Vellore	Villupuram
Villupuram		Trichy			Virudhunagar
Virudhunagar		Villupuram			

**Special attention required*

3.2.1.13Cotton

During 11th five year plan, the area under cotton was on an average of 1,14,903 ha with a production of 2,48,699 tonnes and the productivity was 364 kg/ha, covering almost 16 districts of Tamil Nadu State. Cotton is the raw material for the textile industry, which is the largest manufacturing industry in the country. Traditionally cotton is cultivated more in the districts of Salem, Coimbatore, Erode, Madurai, Virudhunagar, Theni, Tirunelveli, etc. However, recently the area and production of cotton has been dwindling to the alarming level especially in Ramanathapuram, Theni, Thiruvannamalai, Thiruvarur, Thoothukudi and Virudhunagar districts (Table 3.27). The crop development strategy must aim at reversing the recent trend to that of the past, so as to keep increasing cotton production and feeding the cotton textile mills in the State. The pricing is an important factor that merit consideration in addition to assured market demand through contract farming. Promotion of precision farming along with drip irrigation, advocacy of integrated pest management practices may be followed to increase area, production and productivity of cotton crop. The district-wise distribution of cotton based on growth trends in Tamil Nadu is given in Table 3.28.

Table 3.27 Compound Growth Rate of Area, Production and Productivity under Cotton Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	30.80	82.12	31.55
2	Cuddalore	18.67	13.81	-5.45
3	Dharmapuri	0.53	8.77	9.07
4	Madurai	-5.34	4.74	10.64
5	Namakkal	-5.52	4.17	10.25
6	Perambalur	15.41	19.97	3.95
7	Ramanathapuram	-12.62	-9.40	3.68
8	Salem	3.72	8.84	4.94
9	Theni	-13.35	-3.14	11.78
10	Thiruvannamalai	-9.46	-0.60	9.79
11	Thiruvarur	-11.18	-8.94	2.00
12	Thoothukudi	-10.22	1.80	13.39
13	Tiruppur	5.00	87.07	80.31
14	Trichy	11.31	14.85	3.13
15	Villupuram	4.39	3.94	-0.37
16	Virudhunagar	-9.32	-4.07	5.79

Table 3.28 District-wise Distribution of Growths in Cotton Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Ariyalur	Madurai	Ariyalur	Ramanathapuram	Ariyalur	Cuddalore
Cuddalore	Namakkal	Cuddalore	Theni	Dharmapuri	Villupuram
Dharmapuri	Ramanathapuram	Dharmapuri	Thiruvannamalai	Madurai	
Perambalur	Theni	Madurai	Thiruvarur	Namakkal	
Salem	Thiruvannamalai	Namakkal	Virudhunagar	Perambalur	
Tiruppur	Thiruvarur	Perambalur		Ramanathapuram	
Trichy	Thoothukudi	Salem		Salem	
Villupuram	Virudhunagar	Thoothukudi		Theni	
		Tiruppur		Thiruvannamalai	
		Trichy		Thiruvarur	
		Villupuram		Thoothukudi	
				Tiruppur	
				Trichy	
				Virudhunagar	

3.2.2 Horticultural Crops

The allied sectors of agriculture including horticulture, sericulture, animal husbandry, etc.,would provide additional employment opportunities and additional income to the farm families. Thus the income of the farm families is supplemented by these allied sectors.

The State is endowed with agro-climatic conditions conducive for growing a wide range of horticulture crops such as fruits, vegetables, spices, plantation crops, flowers, medicinal and aromatic plants. Tamil Nadu shares 8.7 per cent of the production of these crops and 5.3 per cent of the area at All India level.

The area and productivity of major horticultural crops increased marginally by 5.8 and 0.28 per cent respectively during 2014-15. The total production of horticulture crops improved from 126.20 lakh tonnes in 2004-05 to 152.62 lakh tonnes in 2014-15.

The production of vegetables registered an increase of63.08 lakh tonnes (2004-05) to 68.00 lakh tonnes in 2005-06 and further 69.27 lakh tonnes in 2014-15. The production of spices and condiments registered an increase of 8.05 lakh tonnes (2004-05) to 8.68 lakh tonnes in 2005-06 and 10.05 lakh tonnes in 2014-15. The production of flowers registered an increase of 1.87 lakh tonnes in 2004-05 to 2.02 lakh tonnes in 2005-06 and further 2.74 lakh tonnes in 2014-15. Moreover, the production of plantation crops increased of 2.57 lakh tonnes in 2004-05 to 2.49 lakh tonnes in 2005-06 and tremendously to the volume of 10.50 lakh tonnes in 2014-15. The details of area, production and productivity of core groups in horticultural crops are furnished in Table 3.29.

Table 3.29 Area, Production and Productivity of Horticulture Crops

S. No.	Core Groups	2004-05			2005-06			2014-15		
		A	P	Y	A	P	Y	A	P	Y
1.	Fruits	2.36	44.98	19.07	2.55	48.56	19.07	2.87	58.77	20.48
2.	Vegetables	2.15	63.08	29.29	2.32	68.00	29.36	2.54	69.27	27.25
3.	Spices and condiments	1.43	8.05	5.62	1.54	8.68	5.64	1.65	10.05	6.11
4.	Plantation crops	2.57	2.57	8.13	3.43	2.49	8.30	2.55	10.50	4.12
5.	Flowers	0.23	1.87	8.06	0.25	2.02	8.11	0.26	2.74	10.35
6.	Medicinal plants	0.05	0.05	0.09	1.82	0.06	0.11	0.14	1.29	9.20
	Total	**8.79**	**126.20**	**14.70**	**9.21**	**135.08**	**14.71**	**10.01**	**152.62**	**15.24**

Note : Area: Lakh ha. P: Production lakh tonnes and Y : Tonnes / ha
Source: Commissioner, Department of Horticulture and Plantation crops, Chennai.

The details of production and yield of selected horticultural crops are furnished in Table 3.30. It could be seen that production of banana had increased from 34.62 lakh tonnes in 2004-05 to 45.05 lakh tonnes in 2014-2015. However there had been a decline in the production of mango from 5.39 lakh tonnes in 2004-05 to 5.38 lakh tonnes in 2005-06 and increased to 6.26 lakh tonnes in 2014-15. In all the other fruit crops, there had been an increase in production. In the case of vegetables, with the exception of sweet potato, tapioca and tomato, there had been an increase in production over years.

As regards the productivity, decrease in productivity was observed in all the chosen crops in 2014-15. Among the vegetables, a reduction in productivity was observed in brinjal.

The low levels and high fluctuations in productivity in fruit trees and vegetables might be due to lack of knowledge among the farmers about high tech approach and also due to frequent failures of the monsoons and skewed distribution of rainfall. High investment requirements particularly in wasteland reclamation and irrigation facilities and long years of waiting time for an economic bearing of fruit trees are the important reasons that constrain the area expansion. Non- availability of ready market, difficulties in having good access to nearby markets and lack of institutional support for marketing are the other constraints that deter the farmers from venturing into the cultivation of horticultural crops.

Table 3.30 Production and Yield Rates of Horticultural Crops

S.No.	Crops	Production in '000 tonnes			Yield Rate (kgs/ha.)		
Fruits		**2004-05**	**2005-06**	**2014-15**	**2004-05**	**2005-06**	**2014-15**
1	Banana	3462	4648	4505	42477	49104	43695
2	Mango	539	538	626	4554	4299	4438
3	Jack	25	38	14	8943	12346	4930
4	Guava	64	92	40	7995	10904	5244
5	Grapes	70	85	38	28176	32488	15321
Vegetables							
6	Potato	79	75	92	15705	14901	19732
7	Tapioca	4584	4857	3968	41298	38211	37663
8	Sweet Potato	21	30	8	15117	20857	20491
9	Onion	256	234	377	9677	8015	10797
10	Brinjal	101	76	101	12650	10690	10638
11	Tomato	322	278	265	12705	12627	12068

Source: Tamil Nadu – An Economic Appraisal – 2005-06 and 2014-15, Evaluation and Applied Research Department, Government of Tamil Nadu, Chennai.

3.2.2.1 Banana

During the 11th five year plan, the average area under banana was 1.10 lakh ha with an average production of 49.45 lakh tonnes and average productivity was 44,717 kg/ha covering 20 districts in the Tamil Nadu State. Banana is an important horticulture crop that is used both as vegetable and fruit. However, it is consumed more as fruit. The growth rates in Table 3.31 depicted that, fairly large number of districts had positive growth regarding area, production and productivity. Yet, few districts had negative growth, especially Tiruppur district which had shown the negative growth in area, production and productivity and Tirunelveli and Tiruppur districts had shown negative growth both in production and productivity. In the case of area under banana, the negative growth was found in four districts namely Pudukottai, Thanjavur, Tiruppur and Trichy districts, though the remaining districts had shown the positive growth.

As the level of living of people is changing due to per capita income increase, the demand for protective foods like banana fruit is also increasing in the recent times. Hence, there is an urgent need to keep increasing the production of banana. The export potential also indicates importance of boosting banana production. The strategy, therefore, must keep increasing productivity and production of banana in the State to meet the growing domestic and export demand. There exist scopes for value addition also. The distribution of districts according to growth trends in area, production and productivity is exhibited in Table 3.32. Tiruppur district requiring special attention for crop development has also been indicated there in.

Table 3.31 Compound Growth Rate of Area, Production and Productivity under Banana Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Coimbatore	3.18	5.22	1.46
2	Cuddalore	2.33	10.48	7.97
3	Dindigul	5.01	5.73	0.69
4	Erode	7.41	9.49	1.93
5	Kancheepuram	1.98	3.79	1.77

6	Kanyakumari	1.76	1.90	0.13
7	Karur	0.24	8.58	8.32
8	Namakkal	6.00	7.87	1.77
9	Pudukkottai	-1.07	1.02	2.11
10	Sivagangai	4.65	6.51	1.78
11	Thanjavur	-0.28	3.50	3.79
12	The Nilgiris	13.57	18.29	4.16
13	Theni	5.58	12.79	6.83
14	Thiruvannamalai	12.49	18.87	5.67
15	Thoothukudi	1.19	2.17	0.97
16	Tirunelveli	4.03	-1.57	-4.08
17	Tiruppur	-8.84	-8.12	-3.62
18	Thiruvallur	4.30	4.78	0.46
19	Trichy	-0.03	0.41	0.73
20	Vellore	10.58	11.59	0.91

Table 3.32 District-wise Distribution of Growths in Banana Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Coimbatore	Pudukkottai	Coimbatore	Tirunelveli	Coimbatore	Tirunelveli
Cuddalore	Thanjavur	Cuddalore	Tiruppur*	Cuddalore	Tiruppur*
Dindigul	Tiruppur*	Dindigul		Dindigul	
Erode	Trichy	Erode		Erode	
Kancheepuram		Kancheepuram		Kancheepuram	
Kanyakumari		Kanyakumari		Kanyakumari	
Karur		Karur		Karur	
Namakkal		Namakkal		Namakkal	
Sivagangai		Pudukkottai		Pudukkottai	
The Nilgiris		Sivagangai		Sivagangai	
Theni		Thanjavur		Thanjavur	
Thiruvannamalai		The Nilgiris		The Nilgiris	
Thoothukudi		Theni		Theni	
Tirunelveli		Thiruvannamalai		Thiruvannamalai	
Thiruvallur		Thoothukudi		Thoothukudi	
Vellore		Thiruvallur		Thiruvallur	
		Trichy		Trichy	
		Vellore		Vellore	

**Special attention required*

3.2.2.2 Mango

Mango is an important fruit crop grown in 18 districts of the State. The average area and production of mango were 13.12 lakh ha and 7.27 lakh tonnes respectively with average productivity of 5,523 kg/ha during 11th five year plan. Perusal of Table 3.33, exhibits the fact that Coimbatore, Dharmapuri, Kanyakumari, Krishnagiri and Thanjavur districts witnessed negative growth in area and in the remaining 13 districts, the growth rate of area under mango was positive. Similarly, Coimbatore, Dharmapuri, Theni, Thiruvallur and Virudhunagar district had negative growth in production. The productivity trend was negative in six districts namely Coimbatore, Madurai, Sivagangai, Theni, Tirunelveli, Thiruvallur and Virudhunagar. In all the other districts, positive trend could be observed. In all these districts, Coimbatore showed the negative growth in area, production and productivity. In sum, the development of mango crop in Tamil Nadu requires a thorough planning to increase area, production and productivity as this crop has got export market as well. The district-wise distribution of mango crop is presented in Table 3.34.

Table 3.33 Compound Growth Rate of Area, Production and Productivity under Mango Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Coimbatore	-3.77	-7.52	-4.57
2	Dharmapuri	-9.23	-7.93	1.43
3	Dindigul	2.18	17.24	14.74
4	Kancheepuram	3.75	5.05	1.25
5	Kanyakumari	-2.03	3.66	5.81
6	Krishnagiri	-0.59	2.11	2.71
7	Madurai	2.78	0.61	-2.11
8	Nagapattinam	11.93	13.44	1.35
9	Namakkal	6.07	7.50	1.35
10	Salem	4.65	5.18	0.51
11	Sivagangai	5.99	3.76	-2.10
12	Thanjavur	-0.13	1.22	1.35
13	Theni	1.91	-3.09	-4.91
14	Tirunelveli	4.84	1.42	-3.20
15	Thiruvallur	4.11	-6.53	-10.22
16	Vellore	0.22	2.23	2.01
17	Villupuram	8.06	9.13	0.99
18	Virudhunagar	7.56	-4.69	-11.39

Table 3.34 District-wise Distribution of Growths in Mango Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Dindigul	Coimbatore*	Dindigul	Coimbatore*	Dharmapuri	Coimbatore*
Kancheepuram	Dharmapuri	Kancheepuram	Dharmapuri	Dindigul	Madurai
Madurai	Kanyakumari	Kanyakumari	Theni	Kancheepuram	Sivagangai
Nagapattinam	Krishnagiri	Krishnagiri	Thiruvallur	Kanyakumari	Theni
Namakkal	Thanjavur	Madurai	Virudhunagar	Krishnagiri	Tirunelveli
Salem		Nagapattinam		Nagapattinam	Thiruvallur
Sivagangai		Namakkal		Namakkal	Virudhunagar
Theni		Salem		Salem	
Tirunelveli		Sivagangai		Thanjavur	
Thiruvallur		Thanjavur		Vellore	
Vellore		Tirunelveli		Villupuram	
Villupuram		Vellore			
Virudhunagar		Villupuram			

**Special attention required*

3.2.2.3 Grapes

Grapes is yet another important horticulture crop, grow only in Theni district in the State. In Tamil Nadu, average area under grapes was 2,545 ha with average production of 56,428 tonnes and average productivity of 22,069 kg/ha in the year 2006-07 to 2010-11. The area and production performance had shown positive growth and productivity of grapes had shown negative trend in Theni district. Therefore, strategy planning must aim at increasing growth trend in productivity of grapes through research and development and capacity building of grape growers. The compound growth rate of grapes crop in Theni district of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.35.

Table 3.35 Compound Growth Rate of Area, Production and Productivity under Grapes Crop in Theni during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Theni	3.60	0.75	-2.76

3.2.2.4 Chilli

Chilli is an important spice crop in horticulture sector grown in five districts in the State. During the 11th five year plan, the average area and average production of chilli were 61,268 ha and 32,529 tonnes respectively. The average productivity of chilli for the same period was 528 kg/ha. The rainfed chilli is famous in Pudur/Vilathikulam areas of Thoothukudi district. The Sattur samba of Virudhunagar district and Paramakudi gundu Chilli of Ramanathapuram district are also popular in southern districts. Perusal of Table 3.35, exhibits the fact that Sivagangai district alone witnessed positive growth in area, production and productivity where as Thoothukudi district had negative growth in area, production and productivity. Hence Thoothukudi district requires special attention of chilli crop. The growth trend in area was positive in Sivagangai and Ramanathapuram districts, negative in Ariyalur, Thoothukudi and Virudhunagar districts. The negative trend in production was found in Ariyalur, Ramanathapuram, Thoothukudi and Virudhunagar districts. In the case of productivity, the positive growth was seen in Ariyalur, Sivagangai and Virudhunagar districts and negative growth in Ramanathapuram and Thoothukudi districts. The development of chilli crop in Tamil Nadu requires appropriate interventions to increase productivity. The compound growth rate of chilli crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.36 and their district-wise distribution in Table 3.37.

Table 3.36 Compound Growth Rate of Area, Production and Productivity under Chilli Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Ariyalur	-25.66	-8.50	38.17
2	Ramanathapuram	1.87	-11.65	-13.27
3	Sivagangai	2.14	12.78	10.41
4	Thoothukudi	-6.85	-11.15	-4.61
5	Virudhunagar	-7.38	-3.33	4.37

Table 3.37 District-wise Distribution of Growths in Chilli Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Ramanathapuram	Ariyalur	Sivagangai	Ariyalur	Ariyalur	Ramanathapuram
Sivagangai	Thoothukudi*		Ramanathapuram	Sivagangai	Thoothukudi*
	Virudhunagar		Thoothukudi*	Virudhunagar	
			Virudhunagar		

**Special attention required*

3.2.2.5 Tomato

In Tamil Nadu, the average area under tomato crop was 22,794 ha with an average production of 2.97 lakh tonnes and average productivity was 13,054 kg/ha and mostly cultivated in five districts of the State. With reference to area, Krishnagiri district experienced positive growth, while Coimbatore, Dindigul, Salem and Theni districts have shown negative trend. The production witnessed uptrend in Dindigul and Krishnagiri districts and downtrend in Coimbatore, Salem and Theni districts. Similarly, in productivity, Coimbatore, Dindigul, Krishnagiri and Salem districts witnessed positive growth and Theni had negative trend. Theni district experienced negative growth rates in area, production and productivity. Hence, Theni district requires special efforts to boost production of tomato. The compound growth rate of tomato crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.38 and Fig. 3.10. District-wise distribution of tomato crop is shown in Table 3.39.

Table 3.38 Compound Growth Rate of Area, Production and Productivity under Tomato Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Coimbatore	-6.96	-4.74	1.86
2	Dindigul	-2.58	4.92	7.70
3	Krishnagiri	8.51	7.57	1.99
4	Salem	-4.05	-3.91	0.15
5	Theni	-2.66	-4.90	-2.30

Table 3.39 District-wise Distribution of Growth in Tomato Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Krishnagiri	Coimbatore	Dindigul	Coimbatore	Coimbatore	Theni*
	Dindigul	Krishnagiri	Salem	Dindigul	
	Salem		Theni*	Krishnagiri	
	Theni*			Salem	

**Special attention required*

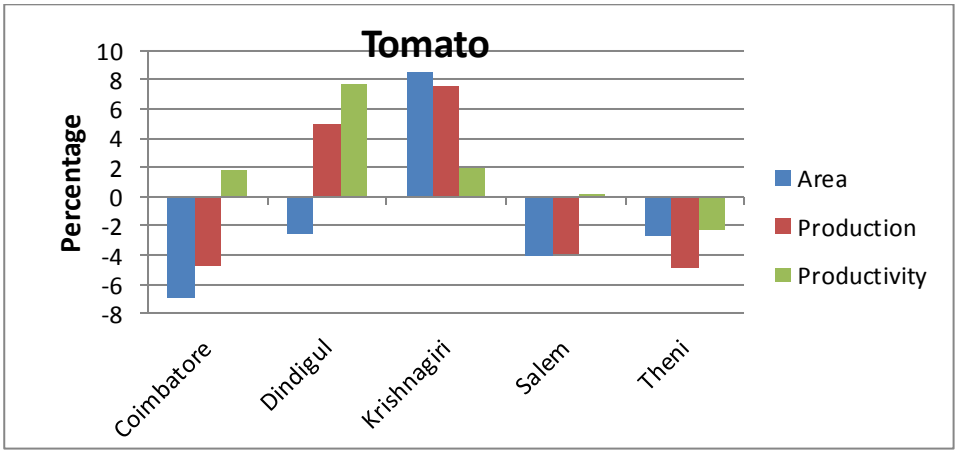

Fig. 3.10 Compound Growth Rate- Tomato

3.2.2.6 Tapioca

During the 11th five year plan period, the average area under Tapioca crop in the State was 1.28 lakh ha with production of 48.10 lakh tonnes and productivity of 37,190 kg/ha grown in 14 districts in the State. The performance of the crop with respect to growth rates (Table 3.40) shows that the growth rate of area was positive in eight districts. Similarly, the production and productivity were positive in seven districts. Negative trend in area was found in Cuddalore, Kanyakumari, Perambalur, Salem, Tirunelveli, and Thiruvallur districts. In the same way, the growth rate in production was negative in Cuddalore, Kanyakumari, Perambalur, Salem, Nilgiris, Tirunelveli and Thiruvallur districts. The area, production and productivity of tapioca were found to be negative in Cuddalore, Perambalur, Tirunelveli and Thiruvallur districts. This indicates that measures have to be taken as development strategy for tapioca to increase the productivity in these districts. The compound growth rate of tapioca crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.40 and in Fig. 3.11. District-wise growth rate of tapioca crop is shown in Table 3.41.

Table 3.40 Compound Growth Rate of Area, Production and Productivity under Tapioca Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Cuddalore	-4.38	-5.79	-1.48
2	Dharmapuri	5.69	6.55	0.81
3	Erode	5.59	8.03	2.31
4	Kanyakumari	-7.24	-4.28	3.19
5	Karur	18.71	19.36	0.55
6	Namakkal	4.88	0.63	-4.05
7	Perambalur	-6.71	-8.70	-2.14
8	Salem	-1.21	-0.05	1.17
9	The Nilgiris	4.30	-3.33	-0.46
10	Thiruvannamalai	23.32	24.39	0.87
11	Tirunelveli	-0.04	-0.51	-0.46
12	Thiruvallur	-3.49	-3.94	-0.46
13	Trichy	1.45	2.99	1.52
14	Villupuram	4.72	2.70	-1.93

Table 3.41District-wise Distribution of Growths in Tapioca Crop

Area		Production		Productivity		Special attention required
Positive	Negative	Positive	Negative	Positive	Negative	
Dharmapuri	Cuddalore	Dharmapuri	Cuddalore	Dharmapuri	Cuddalore	Cuddalore
Erode	Kanyakumari	Erode	Kanyakumari	Erode	Namakkal	Perambalur
Karur	Perambalur	Karur	Perambalur	Kanyakumari	Perambalur	Tirunelveli
Namakkal	Salem	Namakkal	Salem	Karur	The Nilgiris	Thiruvallur
The Nilgiris	Tirunelveli	Thiruvannamalai	The Nilgiris	Salem	Tirunelveli	
Thiruvannamalai	Thiruvallur	Trichy	Tirunelveli	Thiruvannamalai	Thiruvallur	
Trichy		Villupuram	Thiruvallur	Trichy	Villupuram	
Villupuram						

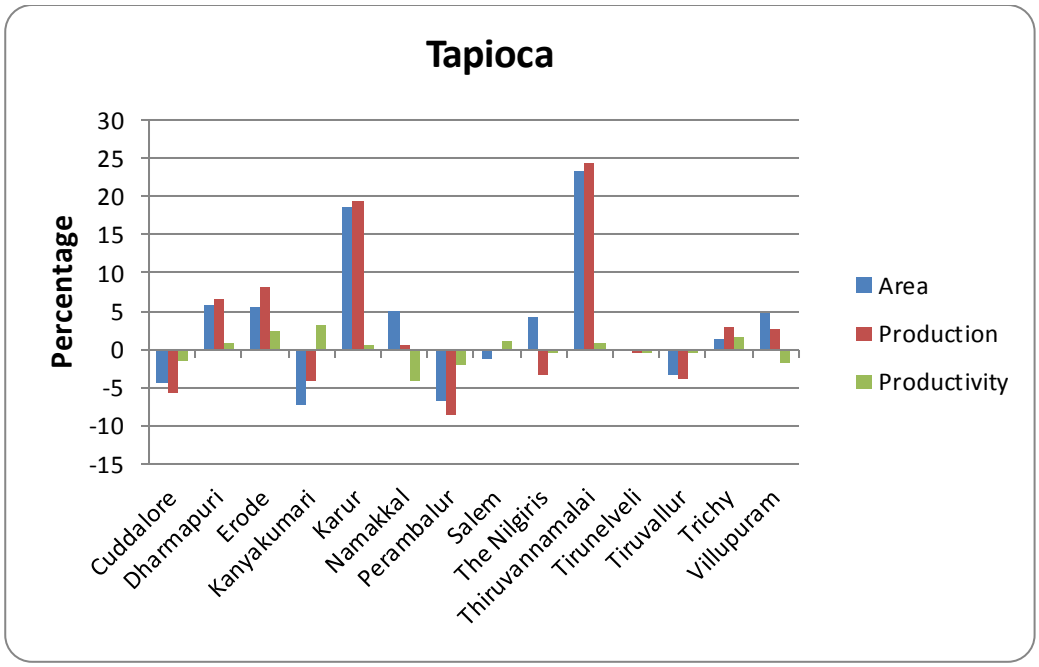

Fig. 3.11 Compound Growth Rate- Tapioca

3.2.2.7 Cashew nut

During the 11th five year plan period the average area under Cashew nut was one lakh ha with a production of 50,034 tonnes and productivity of 500 kg/ha covering five districts in Tamil Nadu. The growth trend of area was positive in Cuddalore and Tirunelveli districts and negative trend was seen in Kanyakumari, Sivagangai and Vellore districts. The production was positive only in Kanyakumari district and negative trend was found in the remaining four districts. In the same way, positive growth of productivity was noticed in Kanyakumari and Vellore districts and negative trend was seen in Cuddalore, Sivagangai and Tirunelveli districts. In Sivagangai district, area, production and productivity of cashew nut was negative. Therefore, the development strategy must focus on increasing the area and productivity of the crop so as to keep increasing production in Sivagangai district. The compound growth rate of cashew nut crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.42 and Fig. 3.12. District-wise distribution of growth rates in cashew nut crop is shown in Table 3.43.

Table 3.42 Compound Growth Rate of Area, Production and Productivity under Cashew nut Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Cuddalore	1.23	-3.36	-4.54
2	Kanyakumari	-2.79	1.40	4.31
3	Sivagangai	-1.72	-4.91	-3.25
4	Tirunelveli	1.48	-5.08	-6.45
5	Vellore	-6.07	-4.53	1.47

Table 3.43 District-wise Distribution of Growths in Cashew nut Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Cuddalore	Kanyakumari	Kanyakumari	Cuddalore	Kanyakumari	Cuddalore
Tirunelveli	Sivagangai*		Sivagangai*	Vellore	Sivagangai*
	Vellore		Tirunelveli		Tirunelveli
			Vellore		

**Special attention required*

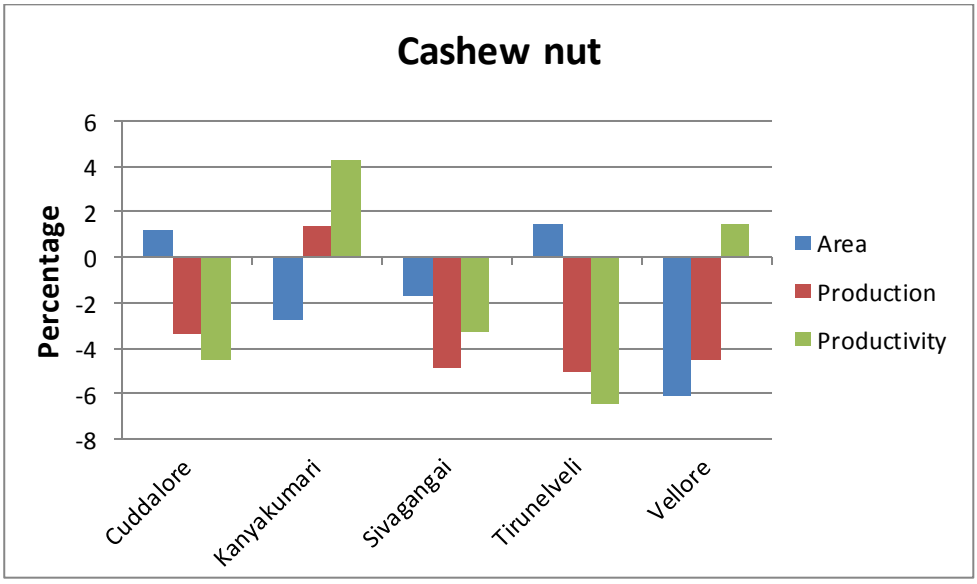

Fig. 3.12 Compound Growth Rate- Cashew nut

3.2.2.8 Onion

Onion is the important vegetable crop, grown in six districts namely Dindigul, Erode, Namakkal, Perambalur, Salem and Tiruppur districts. In Tamil Nadu, the average area under onion was 31,592 ha with production of 3.02 lakh tonnes and productivity was 9,834 kg/ha in the year 2006-07 to 2010-11. The growth rates presented in Table 3.44 depict that an uptrend in area was noticed in Perambalur and Tiruppur districts and downtrend was seen in Dindigul, Erode, Namakkal and Salem districts. The positive trend of production and productivity was found in Dindigul, Erode, Perambalur and Tiruppur districts. The negative trend of production was found in Namakkal and Salem districts. Likewise, a negative growth of productivity was seen in Perambalur district. Hence, Tamil Nadu State needs development strategy to boost production of onion. The compound growth rate of onion crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.43and in Fig. 3.13. District-wise distribution of growth rates in onion crop is shown in Table 3.45.

Table 3.44 Compound Growth Rate of Area, Production and Productivity under Onion Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Dindigul	-1.22	0.24	1.47
2	Erode	-2.63	0.08	2.79
3	Namakkal	-3.67	-0.73	3.05
4	Perambalur	6.63	5.10	-1.43
5	Salem	-5.29	-1.50	4.00
6	Tiruppur	7.08	56.36	44.48

Table 3.45 District-wise Distribution of Growths in Onion Crop

Area		Production		Productivity	
Positive	Negative	Positive	Negative	Positive	Negative
Perambalur	Dindigul	Dindigul	Namakkal	Dindigul	Perambalur
Tiruppur	Erode	Erode	Salem	Erode	
	Namakkal	Perambalur		Namakkal	
	Salem	Tiruppur		Salem	
				Tiruppur	

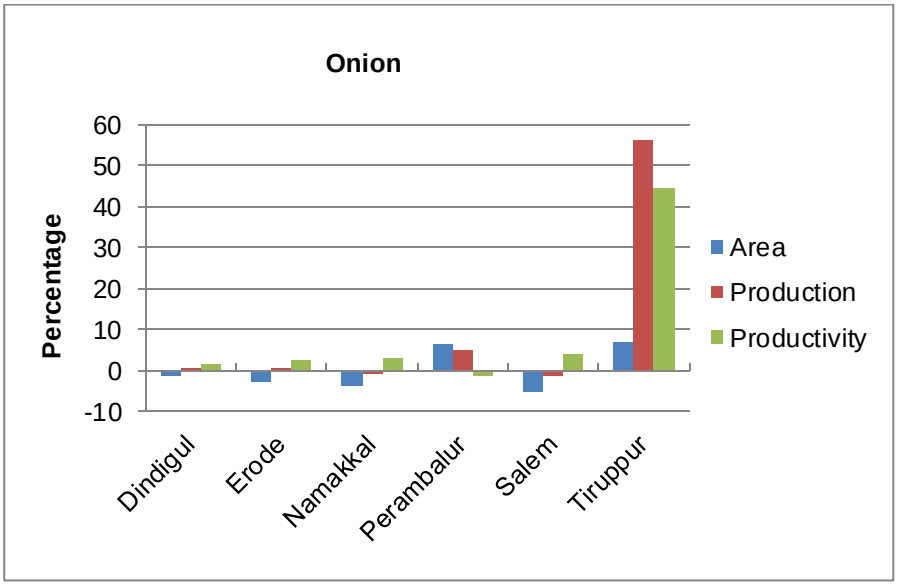

Fig. 3.13 Compound Growth Rate- Onion

3.2.2.9 Turmeric

During the 11th five year plan period, the average area under Turmeric in Tamil Nadu was 34,503 ha with a production of 18.81 lakh tonnes and the productivity achieved was 5,466 kg/ha. It was grown in six districts during the study period. In Turmeric, a positive trend in area, production and productivity was observed in Dharmapuri, Erode, Namakkal, Perambalur and Thiruvannamalai districts. A decline in growth rate of area under turmeric was noticed in Coimbatore district only. The compound growth rate of turmeric crop in major districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.46 and Fig. 3.14. District-wise growth rates in area, production and productivity of turmeric crop is shown in Table 3.47.

Table 3.46 Compound Growth Rate of Area, Production and Productivity under Turmeric Crop in Major Districts during 2000-01 to 2014-15

(Per cent per annum)

S.No.	District	CGR		
		Area	Production	Productivity
1	Coimbatore	-4.61	1.62	5.26
2	Dharmapuri	17.39	23.56	5.25
3	Erode	2.61	3.58	0.95
4	Namakkal	6.67	9.30	2.47
5	Perambalur	17.05	19.71	2.27
6	Thiruvannamalai	11.28	13.71	2.18

Table 3.47 District-wise Distribution of Growths in Turmeric Crop

Area		Production		Productivity	
Positive	**Negative**	**Positive**	**Negative**	**Positive**	**Negative**
Dharmapuri	Coimbatore	Coimbatore	-	Coimbatore	-
Erode		Dharmapuri		Dharmapuri	
Namakkal		Erode		Erode	
Perambalur		Namakkal		Namakkal	
Thiruvannamalai		Perambalur		Perambalur	
		Thiruvannamalai		Thiruvannamalai	

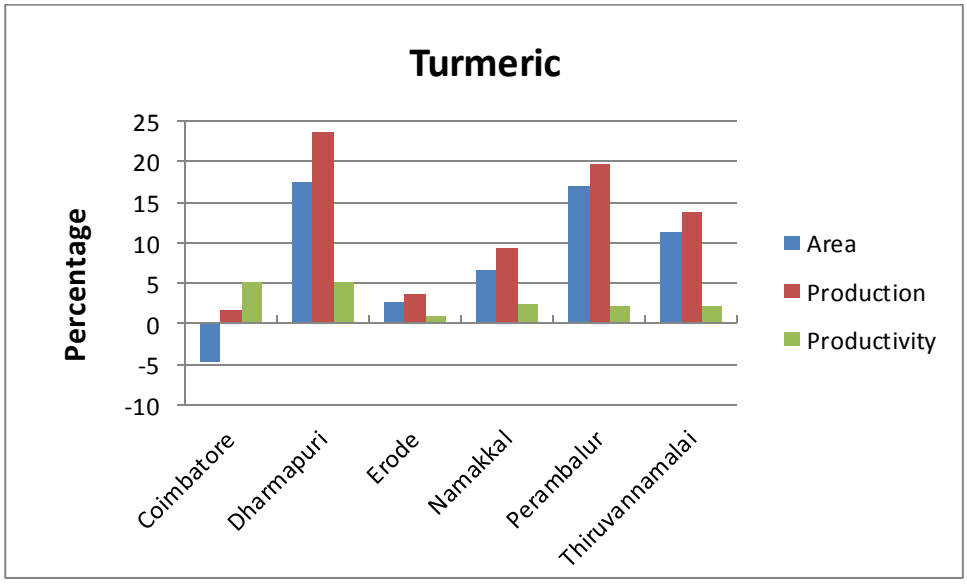

Fig. 3.14 Compound Growth Rate- Turmeric

3.2.2.10Other Horticultural Crops

The growth performance of other minor horticultural crops like guava, bhendi, brinjal, cabbage, potato, beetroot, carrot, etc. is outlined in this section.

With respect to guava, in Dindigul and Sivagangai districts, an upward trend of production and productivity and downward trend of area was observed. In Salem district, with regard to bhendi crop, a positive growth of area, production and productivity was found but in case of brinjal, it was reversible, as negative growth was seen in area, production and productivity. In the Nilgiris district, a positive trend of area was seen in cabbage, tuber crops

(potato, beetroot, carrot), spices and condiments (ginger, cardamom, pepper) and plantation crops (coffee, tea). The negative growth of production as well as productivity was observed in cabbage, ginger and pepper crops in the Nilgiris district. In Kanyakumari district, an upward positive trend in area was observed for rubber crop. In Dindigul district, a major tobacco growing area in the State, a negative growth of area and production but a positive growth of productivity was seen. The compound growth rate of these horticultural crops in major growing districts of Tamil Nadu during 2000-01 to 2014-15 is presented in Table 3.48 and their district-wise distribution in Table 3.49.

Table 3.48 Compound Growth Rate of Area, Production and Productivity of other Horticultural Crops during 2000-01 to 2014-15

(Per cent per annum)

S.No.	Crop	District	CGR		
			Area	Production	Productivity
Fruit Crops					
1	Guava	Dindigul	-3.64	4.88	8.85
		Sivagangai	-3.90	1.23	5.34
Vegetable Crops					
2	Bhendi	Salem	0.42	1.21	0.79
		Vellore	**6.23**	**6.47**	**0.23**
		Dharmapuri	7.69	2.45	2.56
3	**Brinjal**	**Salem**	**-0.92**	**-3.79**	**-2.90**
		Krishnagiri	7.39	1.70	-5.30
		Vellore	**-0.89**	**-3.92**	**4.23**
		Dindigul	-1.73	5.23	6.59
		Dharmapuri	**-0.33**	**1.22**	**-2.72**
4	Cabbage	The Nilgiris	3.36	-0.70	-3.93
Tuber Crops					
5	Potato	Dindigul	-0.07	2.23	2.43
		The Nilgiris	**8.34**	**-3.35**	**1.91**
6	Beet root	The Nilgiris	10.91	NA	NA
7	**Carrot**	**The Nilgiris**	**22.10**	**NA**	**NA**
Spices & Condiments					
8	**Ginger**	**The Nilgiris**	**3.61**	**-1.04**	**-3.77**
9	Cardamom	The Nilgiris	7.58	-4.74	0.00
10	**Pepper**	**The Nilgiris**	**7.01**	**-7.57**	**-0.99**

Table 3.48 Compound Growth Rate of Area, Production and Productivity of other Horticultural Crops during 2000-01 to 2014-15 (Contd.,)

S.No.	Crop	District	CGR		
			Area	Production	Productivity
Plantation Crops					
• 11	• Coffee	• The Nilgiris	• 15.35	• NA	• NA
12	Tea	The Nilgiris	21.24	NA	NA
13	Rubber	Kanyakumari	2.80	NA	NA
Narcotics					
14	Tobacco	Dindigul	-3.46	-1.64	0.13

Table 3.49 District-wise Distribution of Growths in other Horticultural Crops

S. No.	Crop	Area		Production		Productivity	
		Positive	Negative	Positive	Negative	Positive	Negative
Fruit Crops							
1	Guava	-	Dindigul	Dindigul	-	Dindigul	-
			Sivagangai	Sivagangai		Sivagangai	
Vegetable Crops							
2	Bhendi	Salem	-	Salem	-	Salem	-
		Vellore	-	Vellore	-	Vellore	-
		Dharmapuri	-	Dharmapuri	-	Dharmapuri	-
3	Brinjal	Krishnagiri	Salem*	Krishnagiri	Salem*	Vellore	Salem*
		-	Vellore	Dindigul	Vellore	Dindigul	Krishnagiri
		-	Dindigul	Dharmapuri	-	-	Dharmapuri
		-	Dharmapuri	-	-	-	-
4	Cabbage	The Nilgiris	-	-	The Nilgiris	-	The Nilgiris
Tuber Crops							
5	Potato	The Nilgiris	Dindigul	Dindigul	The Nilgiris	Dindigul	-
						The Nilgiris	
6	Beet root	The Nilgiris	-	NA	NA	NA	NA
7	Carrot	The Nilgiris	-	NA	NA	NA	NA
Spices & Condiments							
8	Ginger	The Nilgiris	-	-	The Nilgiris	-	The Nilgiris
9	Cardamom	The Nilgiris	-	-	The Nilgiris	The Nilgiris	-
10	Pepper	The Nilgiris	-	-	The Nilgiris	-	The Nilgiris

Table 3.49 District-wise Distribution of Growths in other Horticultural Crops (Contd.,)

S. No.	Crop	Area		Production		Productivity	
		Positive	Negative	Positive	Negative	Positive	Negative
	Plantation Crops						
11	Coffee	The Nilgiris	-	NA	NA	NA	NA
12	Tea	The Nilgiris	-	NA	NA	NA	NA
13	Rubber	Kanyakumari	-	NA	NA	NA	NA
	Narcotics						
14	Tobacco	-	Dindigul	-	Dindigul	Dindigul	-

**Special attention required*

3.2.3 Interventions under Agriculture

Agriculture development progrmmes from various funding sources mainly addresses augmentation of agricultural production in a sustainable way. The main focus of Agriculture under various programme has been towards increasing productivity and growth through efficient use of inputs and better management of natural resources viz., improving soil health by balanced use of micro and major nutrients, use of bio-fertilizer and bio agents, adoption of high yielding variety seeds and adoption of incentive based approach. In order to achive the targeted production through adoption of technologies by supporting with the provision of inputs like good quality seeds/planting materials, fertilizers, tools and equipments, intercropping and intercultural operation, plant protection materials, micro nutrients, micro irrigation, bio-fertilizers, bio-control agents, processing units and formation of groups etc. On an average annually the Department of Agriculture, government of Tamil Nadu spends an amount of Rs. 72814.79 lakh through various programmes.

3.2.4 Interventions under Horticulture

Horticulture sector remains one of the thrust areas of various programmes. The major horticulture development programmes includes implemented by the Government of Tamil Nadu includes Perimetro Vegetable Cluster Development Programme, protected cultivation of horticultural crops like nursery, shed net, poly house, green house etc., In order to encourage the farmers to cultivate horticultural crops in more area and intensive cultivation for increasing production by providing planting materials, fertiliser and other nutrients. The

productivity of crop is increased through adoption of precision farming techniques, use of tissue culture seedlings, provision of banana bunch sleeve, pandal/trellis vegetables and through supply of machineries at subsidized cost. The average annual budget outlay of Rs. 41277.64 lakh is being spent by the Department of Horticulture, Government of Tamil Nadu through various programmes.

3.2.5 Agricultural Engineering

To achieve the vision of increasing the Agricultural Production, the land and water resources of the State are to be conserved and developed effectively. Programmes for Water Management and Soil and Water Conservation are being implemented to ensure sustainable increase in agricultural production. Agricultural mechanization programmes are being implemented in a big way to increase the agricultural production and to popularize the agricultural machinery among the farmers. Custom hiring of agricultural machinery to farmers at nominal hire charges are also being carried out. On an average an amount of Rs. 23590.61 lakh has been spent annually by the Department Agriculture Engineering, Government of Tamil Nadu through various programmes.

3.2.5.1 Soil and Water Conservation Programmes

Effective soil and water conservation improves productivity in agriculture. Soil and water conservation prevent soil erosion and improves soil moisture for sustainability in agriculture. Agricultural production can also be increased through construction of rain water harvesting structures in dry lands.

3.2.5.2 Rain Water Harvesting and Run off Management

Rain water harvesting and runoff management works such as check dams, percolation ponds, farm ponds, new village tanks, ooranies and recharge shafts should be constructed to improve the moisture regime of the watershed for increased land use.

3.2.5.3 Scheme for Artificial Recharge of Ground Water

Artificial ground water recharge structures such as check dams, new village tanks, ooranies and percolation ponds with recharge shaft should be constructed to harvest rain water to augment the ground water aquifer for improving the ground water table.

3.2.5.4 Soil and Water Conservation in Tribal Areas under Integrated Tribal Development Programme

Development of tribal agricultural lands by adopting suitable soil and water conservation measures is the objective of this programme. Soil and water conservation measures such as land shaping, pipe laying, construction of contour rubble bunds, contour stone walls and check dams should be taken up by the department in the lands of the tribal farmers with assistance from the Government.

3.2.5.5 Soil and Water Conservation in River Valley Project Catchments

The River Valley Project may be implemented in the interstate river valley catchments of Tamil Nadu with the objectives viz., prevention of soil loss to reduce siltation of multipurpose reservoirs, prevention of land degradation, improvement of land capability, improvement of soil moisture regime and promotion of land use to match land capability. Soil and water conservation measures such as silt detention structures, contour bunding, farm ponds, water harvesting structures, drainage line treatments, horticultural plantations and agro forestry are to be taken up in the catchment area.

3.2.5.6 Water Management Programmes

Water Management Programmes may be taken up to optimize water use efficiency in Command Areas, to create new irrigation facilities by harnessing ground water for sustainable irrigation and to promote drip and sprinkler irrigation systems to increase area under irrigated agriculture.

3.2.5.7 Command Area Development and Water Management Programme

To improve water use efficiency in canal irrigated areas, On-farm development works should be taken up under this programme with farmers participation. On-farm development works such as construction of field channels, rotational water supply and construction of field drains should be taken up in the command areas.

3.2.5.8 World Bank Aided Tamil Nadu IAMWARM Projects

The World Bank aided Tamil Nadu Irrigated Agriculture Modernization and Water bodies Restoration and Management (TN-IAMWARM) Projects were implemented in Tamil Nadu to increase productivity in irrigated agriculture by promoting micro irrigation scheme. The project was phased over a period of six years from 2007-2008 to 2012-2013. It was programmed to implement various programmes such as micro irrigation, farm ponds, water

harvesting structures, farm mechanization, improved water conveyance through pipes for command areas, information, education, communication and capacity building programmes in various sub-basins of Tamil Nadu.

3.2.5.9 Agricultural Mechanization Programme

Agricultural Mechanization Programmes were being implemented in the State with an aim of popularizing the agricultural machinery among the farmers in order to overcome the difficulties that arise due to the shortage of agricultural labourers, to supplement the available farm power, to ensure timeliness in carrying out various farm operations and to increase agricultural production.

3.2.5.10 Machinery Hiring Programmes to Farmers

The minor irrigation machinery for hiring out to the farmers for irrigation activities such as sinking of new Bore wells / Tube wells and revitalization of dried up wells. Also, the services of A.C. Resistivity Meters and Electrical Loggers should be provided to farmers for locating well sites and aquifers.

3.2.5.11 Land Development Machinery

Land Development Machinery viz. Bull Dozers, Tractors, Combine Harvesters and Hydraulic Excavators should be made available for hiring out to farmers at nominal hire charges for taking up works such as land leveling, land shaping, ploughing and paddy harvesting. The machinery should also be used for relief work at the time of flood and natural calamities.

3.2.6 Agricultural Marketing

Agricultural marketing system is the critical link between farm and non-farm sector. Agricultural marketing adds value to the produce in terms of time, place and farm utilities as it encompasses all the steps involved from the producer to the consumer including various post harvest operations such as assembling, grading, storage, transportation and distribution. Apart from performing physical and facilitating functions of transferring the goods from producers to consumers, the marketing system also performs the function of discovering the prices at different stages of marketing and transmitting the price signals in the marketing chain. The prime objective of the Agricultural Marketing is to help the farmers

in marketing their agricultural produce at a fair price and to ensure remunerative returns to them.

3.2.6.1 Market Committees and Regulated Markets

In the State 278 Regulated Markets are established for better regulation of buying and selling of agricultural produce. For dissemination of market price information among the farmers, regulated markets and market committees have to be provided with computers. During 2016-2017, about 31.74 lakh MT of agricultural produce have been sold by farmers through Regulated markets. Pledge loan is provided up to a maximum of Rs.2,00,000. The rate of interest for pledge loan is five per cent for farmers and nine per cent for traders. Drying yards have been constructed for the benefit of farmers. A Market Complex has been established exclusively for paddy at Mattuthavani in Madurai district in an extent of 9.85 acres. A marketing space has been established at Oddanchatram of Dindigul District for fruits and vegetables.

3.2.6.2 Establishment of Terminal Markets

For Coimbatore region Terminal Market Complex, 40 acres of land has been selected at SIPCOT Industrial Growth Centre in Perundurai of Erode District during 2011-12. M/s.SPAC Tapioca Products (India) Ltd has been selected for establishment of Terminal Market Complex. For Chennai Terminal Market Complex, 33 acres of land has been selected at Navalur Village of Sriperumputhur Taluk in Kancheepuram District. Similarly, for Madurai Terminal Market Complex, 50 acres of land has been selected at Mukkampatti (35 acres) and Thiruvathavur (15 acres).

3.2.6.3 Agri Export Zones

Agri Export Zones have been established at four places by private anchor promoters with modern infrastructure facilities like cold storage, grading and sorting yard, pack house, processing units and reefer vans for the direct export of value added agricultural produce, at the production centres. An Agri Export Zone for cut-flowers has been established at Hosur in Krishnagiri district by a joint venture company; flowers at Udhagamandalam in the Nilgiris district; Mango at Nilakkotai in Dindigul District; cashew at Panruti in Cuddalore district has been established.

3.2.6.4 Specialized Market complexes

Value addition to agricultural produces fetch good price to farmers. This requires infrastructure like storage godowns, grading and sorting yard, pack house, drying yards, transaction sheds, auction halls and cold storage units. Market complexes with cold storage facility for Mango at Krishnagiri (Krishnagiri District), for Onion at Pongalur (Coimbatore District), for Grapes at Odaipatti (Theni District) and for Tomato at Palacode (Dharmapuri District) have been established in market complexes with grading and packing hall, electronic weighing balances, input shops, traders shop and cold storage units of 50 MT capacity. For the benefit of coconut growers in Thanjavur district, a coconut market complex has been established at Ponnavarayankottai Ukkadai village in Pattukottai taluk of Thanjavur District. The facilities created in the market complex are transaction shed, godown, drying yard, solar drier for copra, grading and sorting hall, input shops, electronic weighing balances and coconut oil mill unit with automatic oil packing facility.

3.2.6.5 Food Processing Industries

Food processing minimizes the wastage of agricultural produce to a greater extent. Food processing is now gaining momentum as food-processing industries ensure steady and better price to the farming community as well as availability of commodities in processed form to the consumer throughout the year. Farmers will get better returns and also employment opportunity by cultivation of good quality processable agricultural produce. At present, the Department of Agricultural Marketing and Agri Business is the State nodal agency to Ministry of Food Processing Industries, Government of India. The applications received up to 2007 for the establishment of food processing industries were scrutinized, recommended and forwarded by the State nodal agency to Ministry of Food Processing Industries, Government of India. The applications received after the year 2007 are being recommended by Nationalized Banks.

3.2.6.6 Agmark grading

Agmark grading is a symbol, for quality food products. In Tamil Nadu, 30 State Agmark grading laboratories and one Principal Agmark grading laboratory at Chennai are functioning to protect the consumers from harmful effects of adulterated food products and also to ensure quality. Agmark Grading is done for centralized and decentralized commodities. Agmark labels are issued to the authorized packers under direct supervision of

the staff to certify the quality and purity of food products. In 2016-17, 21.53 lakh quintals of food products were graded through these laboratories.

3.2.6.7 Flower Auction Centre

A Flower auction centre at Kavalkinaru in Tirunelveli district has been established for the benefit of flower growers.

3.2.6.8 Farmers' markets

Farmers' market functions with the object to ensure the farmers to get fair price for their produce and to enable the consumers to get fresh fruits and vegetables at a lesser price without middlemen. These Farmers' markets are being run at the expenses of the Market Committees. Computers have been provided to Farmers' markets. Cold storages with capacity of 2 MT have been established to prevent deterioration of fruits and vegetables in Farmers' markets.

3.2.7 Animal Husbandry

Animal Husbandry plays an important role in upliftment of the economic status of the rural and urban people. The sector is providing employment opportunities to unemployed and underemployed rural poor. Apart from generating employment and income, products like milk, meat, egg, wool, bone, skin, hide, offal, manure (dung) and draught power are supplied. Efforts for livestock development and to safe-guard the livestock and poultry from different diseases, initiatives have been taken through implementation of programmes. The activities such as the development of cattle, buffalo, sheep and goats, piggery, poultry, besides fodder resources, extension and training, implementation of socio-economic programmes, discharged through various categories of Veterinary Institutions, in the State are undertaken.

The contribution of livestock sector to the Gross State Domestic Product (GSDP) is 4.34 per cent and that to the Agriculture and allied activities is 36.26 per cent. During 2006-07 the gross value of output of livestock which was Rs.11,535.23 crore in the State has increased to Rs.47,659.71 crore during 2015-16. The estimated milk production, which was 54.74 lakh Metric Tonnes (LMT) during 2005-06 in Tamil Nadu has increased to 75.56 LMT during 2016-17. Likewise, the estimated egg production which was 62,225 lakh numbers during 2005-06 has increased to 1,66,824 lakh numbers during 2016-17. During 12th plan (2012-17), it was aimed to produce 77.65 lakh tonnes of milk, 19,718 million of eggs and 5.83 lakh tonnes of meat in the State. On an average amount of Rs. 1182.27 lakh has been incurred by Department of Animal Husbandry, Government of Tamil Nadu through various

programmes. The per capita availability of milk per day has increased from 231 gm during 2005-06 to 266 gm during 2016-17 and the per capita availability of eggs per annum has increased from 100 numbers during 2005-06 to 214 numbers during 2016-17. Apart from these, the estimated meat production (including poultry meat) which was 1,18,600 MT during 2005-06 has increased to 5,72,939 MT during 2016-17.

3.2.7.1 Cattle Development

The State's total livestock population as per 19th Quinquennial Livestock Census (2012) was 22.72 million. The prominent cattle rearing districts in the State are Thoothukudi (8.6 per cent), Villupuram (7.7 per cent), Thiruvannamalai (6.4 per cent), Pudukkottai (6.1 per cent), Kancheepuram (8.6 per cent), Vellore (5.1 per cent), Salem (5.0 per cent), Erode (4.9 per cent), Tirunelveli (4.5 per cent), Dharmapuri (4.0 per cent) and Thanjavur (4.0 per cent) in that order and they put together accounted for about 62 per cent of the States' total livestock population.

The State's total breedable bovine population as per 2007 census stood at 5.71 million. It's share in total bovine population was 43.2 per cent. In the case of cattle, the share of breedable population was 42.9 per cent and for buffaloes 45.0 per cent. Exotic and cross breed put together accounted for 70 per cent of the breedable cattle, whereas non-descript varieties with a share of 62 per cent among buffaloes were predominant. The State's relative share in total breedable cattle population was seven per cent and in buffaloes two per cent at all India.

The State's breeding policy for cattle and buffaloes aims to cross breed non-descript cattle with Holstein Friesian and Jersey cattle and upgrading the indigenous buffaloes with Murrah graded through cross breeding. Up gradation of local stock of cattle and buffaloes by Artificial Insemination using exotic and cross bred frozen semen straws through 3,358 Artificial Insemination Centres is being undertaken in the State effectively. It has increased from 44.44 lakh in 2011-12 to 46.95 lakh in 2012-13 (5.6 per cent). It was in the order of 47.40 lakh in 2013-14. The calving rate unchanged at around 42 per cent. There exists a yawning gap between the requirement and availability in respect of green fodder and current rates.

3.2.7.2 Fodder Development

The contribution of livestock to the economy through its products like milk, egg, meat and hide is invaluable. To increase the quality and quantity of these products, the livestock

specially requires good quality and quantity of green fodder. Increased milk production can be obtained through balanced feeding. The cost towards feed and fodder constitutes around 70per cent of the total production cost of livestock. Both quantitatively and qualitatively, there exists a huge gap between the demand and supply of green fodder. Moreover, the green fodder is not available throughout the year and is restricted to selected areas and seasons.

Based on 2007 (Provisional) livestock census, the deficit of green fodder has been worked out as 42.60 per cent to total demand. The availability of dry fodder is sufficient during normal monsoon period. The total grazing land available in the State is 1.10 lakh hectares. The average cultivated area devoted to fodder production is only three per cent of the total area cultivated. The area under fodder production has not increased considerably in the last few decades and the natural grazing lands and pastures are fast shrinking as a result of competing demands for food under ever increasing population pressure, urbanization and industrialization. The farmer`s preference for cash crops is one of the reasons for non-increase of area under fodder production. Thus, the plausible alternative is to search for the possibilities of growing fodder with increased bio-mass yield with more nutritive value.

Livestock population mostly subsists on vegetation of natural grasslands where grasses are cheap sources of forage. Crop residues, straw and dry grasses form the basal roughage for feeding livestock, which are poor in quality being deficient in protein, energy and minerals. Therefore, supplementation of green fodder becomes essential for the successful exploitation of this sector as this form the source of various nutritive elements of energy and protein levels for livestock production.

3.2.7.3 Dairy Development

Dairying, an important source of income for millions of rural families, plays an important role in providing gainful employment and income generating opportunities. To keep pace with the growing population and challenging consumption pattern caused by increasing per capita income, there is a need to improve milk production and availability in the State. Concerted efforts of the State's breeding policy and various healthcare measures have resulted in an increase in the number of cross breed breedable bovine population and helped to improve milk production in the State. There has been a steady increase in the total milk production in the State. The average milk yield per animal per day in the State rose from 2.58 kgs in 2011-12 to 2.72 kgs in 2012-13 (5.4 per cent) in the case of indigenous cows, from 6.41 kgs to 6.81 kgs (6.2 per cent) in respect of exotic and cross breeds and from 4.09 kgs to 4.40 kgs (7.6 per cent) for buffaloes. At the all India level, the estimated average milk yield

per animal per day was 2.27 kgs for indigenous, 6.97 kgs for cross breed and 4.71 kgs for buffaloes as of 2011-12. As against the requirement of 250 grams per day, the average per capita per day milk availability in the State was 262 grams during 2011-12 and remained unchanged at 2012-13 and 2013-14.

With a view to procure, process and market the milk in a cost-effective manner and to ensure remunerative price to milk producers and affordable price to consumers besides providing technical input services, Dairy development programmes are being implemented in the State through a well-designed network of milk co-operatives patterned on the Anand Model of Gujarat State. Milk and milk products are marketed by Tamil Nadu Co-operative Milk Producers Federation Limited with the brand name of 'Aavin'. It is the apex body of the District Co-operative Milk Producers Union in the State. The number of Primary Co-operative Milk Producers Societies established went up from 9,231 in 2011-12 to 12,139 in 2016-17 (31.50 per cent).

Apart from these societies, 1,793 Milk Producers Women Co-operative Societies are also functioning in the State. The total number of farmers brought under the ambit of these societies improved from 22.26 lakh in 2011-12 to 22.86 lakh in 2012-13 (2.7 per cent). At the union level, there are 35 milk processing centres functioning in the State with a total capacity of 33.74 lakh litres per day. The procurement of milk from these societies gradually expanded from 20.67 lakh litres per day in 2010-11 to 21.40 lakh litres per day in 2011-12 (3.5 per cent) and further to 35 lakh litres per day in 2016-17, an increase of 69.32 per cent with respect to 2010-11 procurement.

3.2.7.4 Poultry Development

Poultry sector provides direct and indirect employment to the ultra-poor in the State. To improve the supplementary income of people in rural areas, additional avocations like cattle and poultry rearing are being encouraged. Total poultry population in the State increased from 86.6 million in 2004 to 130.5 million in 2007, witnessing a growth of 50.7 per cent. The State's relative share at all the India level was 19.7 per cent and Tamil Nadu stood first in poultry rearing. The poultry population comprised 29.3 million back yard poultry (22 per cent) and 101.2 million commercial poultry (78 per cent). Of the total poultry population in the State, improved variety alone accounted for as high as 78 per cent and the remaining being desi varieties. Namakkal (32 per cent) and Coimbatore (34 per cent) district are the hubs of poultry rearing districts which accounted for about 66 per cent of the State's total poultry population.

3.2.7.5 Egg Production

There was a steady step up in egg production in the State. With a total egg production of 11,933 million in 2012-13 and 16,682 lakh the State scaled a new peak. Of the total egg production in the State, the contribution of improved variety was significant at 96 per cent and the remaining production was of desi variety. On an average, 1080 millions eggs per annum are being exported to other countries. The States relative share at the all India level was 18 per cent and stood in second place next only to Andhra Pradesh. Among the districts, Namakkal alone contributed a large chunk of 77 per cent of the total egg production in the State. The annual requirement of eggs per person worked out to 180 and now increased to 214 numbers during 2016-17.

3.2.7.6 Meat Production

In order to supply good quality and hygienic meat to consumers, registered slaughter houses are being set up in the State. Although the number of registered slaughter houses in the State declined from 113 in 2011-12 to 110 in 2012-13, the total number of animals slaughtered in registered slaughter houses climbed up from 60.84 lakh in 2011-12 to 70.32 lakh in 2012-13 (15.6 %). In 2013-14, it would further go up to 81.3 lakh. Of the total animals, slaughtered, small ruminants alone accounted for 93 per cent. The total meat production (excluding poultry) in the State increased from 1,106 lakh kgs in 2011-12 to 1279 lakh kgs in 2012-13. The anticipated production in 2013-14 was of the order of 1,480 lakh kgs. The State's share in total meat production at the all India level stood at 2.3 per cent (2010-11). Currently the estimated meat production (including poultry meat) which was 1.18 lakh MT during 2005-06 has increased to 5.72 lakh MT during 2016-17

3.2.8 Fisheries

Fisheries is one of the important food production sectors in India contributing to the livelihood as well as food security of a large section of the economically under - privileged population. It also is a foreign exchange earner. With the contribution of seven per cent to all India fish production, Tamil Nadu ranks fifth among the States. As per the latest statistics, the contribution of fisheries to total gross State domestic product (at 2004-05 prices) was Rs.2,748 crore in 2011-12. 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 fisherman population comprising those engaged in marine and inland fishing was in the ratio of 70:30. On an

average amount of Rs. 16450.00 lakh has been incurred by Department of Fisheries, Government of Tamil Nadu through various programmes.

3.2.8.1 Marine Fisheries

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 made up 57 per cent of the total marine fisherman population in the State. Tamil Nadu with its coastal length of 1,076 kms and continental shelf of 41,412 sq.km has ample scope for marine fish catches. It accounted for 13 per cent of the total length of the coastal line and eight per cent of the continental shelf of India. In the State, there are eight fishing harbours (3 major+5 medium), eight jetties and 363 fish landing centres. The total estimated marine fish potential in the State was seven lakh tonnes. Tamil Nadu with the present level of marine fish catch ranks fourth at the all India level. The marine fish production in the State gradually grew from 4.25 lakh tonnes in 2010-11 to 4.27 lakh tonnes in 2011-12 (0.5 per cent) and 4.72 lakh tons in 2016-17. Of the total fish production, the demersal varieties accounted for 55 per cent and the pelagic varieties accounted for the remaining. About 70 per cent of the State's marine fish catch was from five districts viz., Ramanathapuram (20 per cent), Nagapattinam (17 per cent), Thoothukudi (13 per cent), Kanyakumari (10 per cent) and Pudukottai (10 per cent).

Marine fishing is being done through 5,861 mechanized boats and 356,66 non-mechanized boats in the State. Of the total marine fish landings in the State, the catches by mechanized boats by and large hovered around 55 per cent and that of non-mechanized boats 45 per cent in a year. On an average, the fish catches per mechanized boat was 45 tonnes and that of non-mechanized boat was seven tonnes.

3.2.8.2 Inland Fisheries

The inland fisheries sector comprises reservoirs, major irrigation and long seasonal tanks, short seasonal tanks and ponds etc., which are amenable for both capture and culture fisheries. The sector has a potential production of 4.50 lakh tonnes which is aimed to be achieved during the12th five year plan period (2012-17). The total water spread area in the State is estimated at 3.83 lakh hectares, comprising of reservoirs (0.62 lakh hectares), tanks and ponds (2.65 lakh hectares) and brackish water (0.56 lakh hectares) provide scope for inland fisheries. It accounted for 5.1 per cent of the total water spread area available for inland fisheries at all India level. The total inland fishermen population in the State is about 2.29lakh spread over all districts. The increase in total inland fish catches was marginal in

recent years due to drought condition and it was 1.85 lakh tonnes in 2011-12 increased to 1.97 lakh tonnes in 2016-17.

3.2.8.3 Brackish water Fisheries

Tamil Nadu is bestowed with a total potential brackish water resource of 56,000 ha. The present area under brackish water aquaculture is 7,100 ha, comprising of 2,743 Shrimp Farms. In order to promote sustainable, eco-friendly aquaculture practices, five Brackish water Fish farmers Development Agencies (BFDA) have been established at Thiruvallur, Cuddalore, Nagapattinam, Ramanathapuram and Thoothukudi Districts. To promote shrimp farming in Tamil Nadu, the Government extends subsidy assistance of Rs. 60,000 per ha towards the construction cost, to small farmers having shrimp farm up to 2 ha Water Spread Area (WSA). For extending subsidy assistance, registration with Coastal Aquaculture Authority is mandatory. So far, 1739 farms with a total area of 3607.56 ha have been registered with Coastal Aquaculture Act ,2005

3.3 Overall Strategies for Development of Agriculture and Allied Sectors

Tamil Nadu has about six percent of Nation's population, occupies four percent of the land area and has three percent of the water resources of the Nation. In the State, agriculture provides livelihood to about 40 percent of the population. Hence, the State's economy swirls around agriculture and allied sectors. Therefore, any disturbance in the growth of the agriculture sector will influence the State's overall growth rate, ultimately leading to deceleration in its economic growth. Through appropriate land use, farm level planning through Farm Crop management System (FCMS), moisture harvesting, crop diversification, supporting secondary agriculture, value addition and facilitated marketing, it would be possible to enhance farmer's income. The major strategies of agriculture and allied sectors for adoption are identified as under:

3.3.1 Agriculture

Agriculture sector continues to confront with the shrinkage of area cultivated, mismatch between the drawal and recharge of ground water, growing conversion of agricultural land for non-agricultural uses that made disparities in yield rate of crops across the State, imbalanced application of chemical fertilizers and the dominance of small and marginal farmers.

a) Crop specific strategies like System of Rice Intensification (SRI) and SRI villages, Improved Pulses production technologies – System of Pulses Intensification (SPI) as

whole village concept, Sustainable Sugarcane Initiatives (SSI) and precision Farming for agricultural and horticultural crops are proposed to bridge the yield gap.

b) Improving agricultural marketing infrastructure and promoting primary producer owned agri business ventures.

c) Increasing the cultivable area and diversifying the cultivation in favour of high value, organic horticulture and commercial crops while ensuring food and nutritional security for all.

d) Assessing the requirement of agricultural inputs by conduct of meeting at village Panchayat level and bottom up planning will be given priority so as to meet the local needs effectively and ensuring availability of adequate quantity of inputs at appropriate time and that are to be locally produced.

e) Promotion of Dryland Agriculture and Collective farming for the benefit of small and Marginal farmers

f) Reclamation of saline and alkaline soil, issue of Soil Health Cards

g) Promoting hi-tech agriculture, precision farming and micro irrigation for efficient use of irrigation water – Promoting horticulture technologies and micro irrigation as whole village concept.

h) Farm level interventions for 'end to-end' involvement of extension staff with individual farmer – Conducting pre season village campaigns in close coordination with the all allied sectors.

i) Capacity building for farm based research and agriculture innovation and excellence by the farmers

j) Supply of gender friendly equipments such as power/conoweeders and markers.

Agricultural operations are constrained by sub-optimal water resources to a great extent. To ensure “more crop/income per drop of water”, special emphasis has to be given for the cultivation of high value – less water intensive crops for effective land use system.

Water Use Efficiency (WUE) has to be increased by enhancing productivity of per unit of water for which strategies such as mass adoption of Micro Irrigation Mission approach, promotion of Precision Farming, SSI, SRI and Rainwater Harvesting structures for recharging groundwater are proposed.

3.3.2 Horticulture

Major initiatives for increasing the area acreage and productivity were taken in the form of cultivation, rejuvenation of old orchards, canopy management, organic farming, post-

harvest management, creation of marketing infrastructure and human resource development. The strategies are

a) Horticultural Parks for fruits, vegetables and spices have to be developed across the State.
b) More thrust has to be given to micro irrigation with fertigation,
c) Precision farming,
d) Hi-density planting
e) Protected cultivation and
f) Organic cultivation by which large area will be covered under horticulture crops thereby the productivity per drop of water has to be enhanced.

Emphasis should be given on value addition by creating value addition centre and training the farmers accordingly.

3.3.3 Agricultural Engineering and Mechanization

Mechanization in agriculture is still limited to usage of tractors and motor pumps. With availability of better paying service sector and construction jobs, increased migration from agriculture to other sectors is observed in Tamil Nadu during the last decade. To increase the productivity of the land and to cope up with shrinking agricultural manpower, mechanization is not only essential but also imperative. The constraints in promotion of mechanization include non-standardized agricultural practices, small and marginal land holdings, low investment capacity of farmers, lack of know-how and non availability of service and maintenance facilities. Policy and structural mechanisms have to be developed and support increased mechanization in all phases of agriculture.

The farmers have to be motivated for solar energization of irrigation pump sets. Provision of solar energy is beneficial to the farmers on one hand and it also reduces the burden on the State Grid on the other. Besides, agro-service centers have to be created at block level and promoting rural youth for custom hiring of farm machineries and equipments.

3.3.4 Agricultural Marketing and Agri Business

Owing to a number of factors such as inadequate storage facilities, lack of quick and economical means of transportation, poor withholding capacity of the farmers and urgent credit needs, the unorganized sector comprising wholesale merchants, commission agents and other intermediaries continue to dominate the sphere of agricultural marketing. Efficient market with a dynamic supply chain is indispensable for the development of agricultural sector.

a) Enhancing the marketability of agricultural commodities by creating necessary modern infrastructure facilities and strengthening of existing markets by providing additional infrastructure facilities,
b) Formation of Commodity Groups and forward linkage for direct purchase of agricultural produce by the traders/ buyers from farmers.
c) Creating awareness among the farmers on market intelligence by providing market–led extension
d) Information, Education, Communication and Capacity Building (IEC&CB) activities.
e) Integrated approach from planting to marketing which includes choice of crops (mainly banana, mango, tapioca, spices, flowers crops) grading, packaging, storage and marketing in domestic and international markets.
f) Commercialization of agriculture through market driven production approach by utilizing the infrastructure and market intelligence available.
g) Encouraging to set up Agri/Horti processing units by arranging backward and forward linkages and also through venture capital assistance under Small Farmers Agribusiness Consortium.
h) Minimizing post harvest losses by creating market infrastructure, cold chain and scientific storage facilities,
i) Providing pack houses with gamma irradiation facilities.
j) Encouraging the private sector to set up agro processing industries and Food Parks for processing at large scale with farmers' participation.
k) Initiating Food Processing Business Incubator facilities near production catchments and
l) Empowering farmers with knowledge on price forecasting, high price period, best priced market, quality parameters, pre & post harvest technologies and value addition for different agricultural commodities and export opportunities for doubling their income through 'Market-led Agriculture'.

3.3.5 Agricultural Education and Agricultural Research

Agricultural education and research have to be focused more on the society's needs. It has to take more of changes due to globalization, technological development and growing emphasis on value addition. The thrust areas and strategies to be achieved have to be prioritized taking into consideration of positive impact and spin- off benefits.

a) Agricultural education to cater to the globalizing agriculture needs.
b) Crop improvement research on developing new varieties, hybrids and also to possess important traits such as drought tolerance, pest and disease resistance and nutrient enrichment especially in nutritional cereals.
c) Standardizing precision farming technologies for more crops which will help to increase yield of quality produce and conserve resources.
d) Strengthening research to develop implements and machinery considering the needs of the farming community, particularly marginal and small farmers besides paying attention to designing gender-friendly implements.
e) Research activities to reduce post harvest losses and to enhance value addition and emphasis to be given for nutritional cereals so that their consumption level increases.
f) Developing bio technology and nanotechnology based solutions for enhancing input use efficiency, productivity, post harvest life, value addition and maintaining resource quality.
g) Research on Bio inoculants to augment nutrient availability and to reduce pest incidence
h) Rhizosphere engineering to enhance soil plant relationship
i) Further intensification of research on climate change and mitigation
j) Market research to promote market-led agriculture.

The hiatus in agriculture is mainly due to deteriorating soil health, declining water resources, inadequate investment in rural infrastructure, spiraling prices of inputs and change in the mind sets of people viewing of agriculture as of low value. Hence farmer/ farm oriented, crop focused, region specific strategies with adequate investment in developing rural structure is absolutely essential.

In sum, the desired growth rate in order to achieve, crop based technology interventions along with genetically improved seeds and newer technologies are envisaged with timely availability of inputs. In addition, development of value added process especially in millets and horticultural produces with market driven approach should be given priority. Under infrastructure development, weather proofing of food grain production, linking the river as much as economically possible to bring surplus water of one area to other, micro-irrigation, high efficiency of water, nutrients and energy are to be addressed.

Strict enforcement to avoid encroachment of the existing of tanks and also the inlet channels should be given due consideration. Water harvesting and storage structures must

be improved and increased depending on the requirement so as to avoid runoff wastages. Storage capacity of the tanks should be enhanced with strengthening of the bunds and out let channels so that tail end areas also will avail tank irrigation and more area should be brought into cultivation. Maintenance of water bodies which leads the recharge of the groundwater so that over exploitation risks can be minimized. Cultivation of low fertile lands deprived of irrigation are to be used intensively for high value crops i.e., establishment of drought tolerant millet, fruit crops and agro-horti pasture. Integrated nutrient management including organic manures, green manures, compost, Vermicompost and proper application of major nutrients along with bio fertilizer will avoid the yield reduction due to deficiencies and increase the yield.

Proposed strategies will lead to achieve nine per cent growth in Agriculture production and triple the income of about 82 lakh farmers of Tamil Nadu by increasing the productivity by 50 per cent and above, increasing the cropping intensity, increasing the irrigation intensity and bringing fallow lands under cultivation. Strengthening of Agriculture infrastructure will ensure access to quality inputs, extensive adoption of innovative technologies like SRI, Micro irrigation, Precision farming resulting in increased water use efficiency. Besides, emphasis on organic farming, integrated farming systems, reduction of man – animal conflict need adequate consideration and adoption in the appropriate agro-economic zone.

3.3.6 Resources

Since the scope for extensive cultivation is rather limited, efforts have to be taken up for intensive cultivation. However, the cropping intensity is hovering around 120 per cent only in spite of developmental efforts taken up since independence.

The scope for bringing additional land under cultivation revolve around current fallows, cultivable wastes and other fallow lands which accounted for nearly 20.00 per cent of the geographical area of Tamil Nadu State. Hence efforts have to be taken up for identifying the green signals of the aforesaid areas under cultivation. In fallow lands, efforts have to be taken for cultivation of fodder crops which would mitigate the deficiencies in the availability of fodder area.

Further net area irrigated to net area sown accounted for nearly 52.00 per cent. Hence efforts have to be taken up by bringing green revolution in the rainfed areas giving emphasis to short duration drought resistant millets and pulses.

3.3.7 Irrigation water

Water is an essential input for agriculture. Linking of rivers, water harvesting and restoration of traditional water bodies will improve the overall water availability in the State. Water use efficiency can be achieved by modernization of irrigation system, improved service delivery, participation of farmers and popularization of micro irrigation.

a) Restoring the storage capacities of the old reservoirs and the tanks which are heavily silted up.
b) Utilizing surplus flood flows draining into the sea by putting up small structures and conveying it to drought prone high level commands by pumping schemes.
c) Removing the encroachments in water bodies and protecting them in an efficient manner.
d) Augmenting ground water potential through construction of artificial recharge structures and rain water harvesting systems for sustainable ground water development and management.
e) Augmenting the surface water potential byway of inter-basin transfer by inter-linking of rivers within the State.
f) Increasing the water holding capacity, by Restoration, Renovation and Rehabilitation (RRR) of traditional water bodies.
g) Preventing the pollution of water bodies such as rivers, streams, reservoirs, tanks, etc., and to reuse the treated effluent water for irrigation.
h) Intensifying the public awareness and training activities on water management in order to increase the efficiency of water use by implementing change management.

3.3.8 Size of the Land Holdings

As per the latest agricultural census 2010-11, marginal and small holdings of less than two hectares accounted for 92.00 per cent of the total holdings and 61.00 per cent of the total operated area. They in turn are unsuitable for process of marginalization of small and marginal farmers and casualisation of agricultural laborers. To derive the best results and to empower marginal and small farmers groups motivated to form farmer's groups so as to get all the technical inputs in time and to ensure judicious use of various scarce resources. Among the districts as per the agricultural census 2010-11, the average size of holdings was in the range of 0.22 hectare in Kanyakumari to 2.00 hectares in Tiruppur. Out of the 31 districts, in as many as 18 districts, the average size of holdings was below the State

average of 0.80 hectare. The small size of land holdings inhibits investment in productivity enhancing measures and makes many agricultural holdings sub-optimal.

3.3.9 Animal Husbandry

Limitation on increasing the fodder area is the main reason for the shortfall of fodder requirement. The fodder production has to be increased by promoting high yielding fodder varieties. Adequately providing proper infrastructure and equipment to the veterinary health care institution is necessary for the timely diagnosis and treatment of animal diseases. Further emphasis has to be laid on optimum utilization of waste land to grow fodder.

The major strategies are:

a) Provision of animal breeding, doorstep veterinary and emergency health care services, subsidized Artificial Insemination services, up gradation of milch animals, supply of feed, cultivation of fodder and insurance cover to animals of milk producers in cooperative fold.
b) Ensuring clean milk production with quality testing at village level.
c) Modernization of cooperative dairy infrastructure.
d) Development of e-governance programmes.
e) Bringing the landless labourers and marginal farmers especially women farmers into the fold of organized livestock rearing.
f) Strengthening of Veterinary Services Delivery System.
g) Increasing the fodder availability.
h) Improving the Diagnostic services.
i) Improving the capability of all frozen semen production stations.
j) Providing marketing access and improving cold chain.
k) Human Resource Development (HRD) of the staff of Animal Husbandry Department.
l) Strengthening of extension services.
m) A mixture of technology, policy and institutional innovations needs to be combined for sustainable and equitable livestock sector growth.
n) Promoting Backyard Family Poultry.

Creation of adequate process infrastructure facilities for marine fisheries and promotion of fresh water fish culture in seasonal tanks/ ponds owned by Panchayat

3.3.10 Animal Husbandry Research

a. Ensuring breeds / technologies for sustained increase in yield and to meet the end users' expectations in terms of quality and food safety.
b. Ensuring service provision and to enable farmers to take informed decisions based on prices of different animal products.
c. Harnessing research output of frontier sciences to increase value added animal products, storage and processing.

The details of interventions and action plans to address the issues for achieving further development are discussed in the next chapter.

STATE AGRICULTURE PLAN

District Agriculture Plan (DAP)

CHAPTER IV

The objective of preparing District Agriculture Plan is to evolve an action plan for achieving sustainable agricultural growth. It must be ensured in the process that the agriculture plan is based on agro-climatic conditions, availability of technology, trained manpower and natural resources, the local needs and priorities in agriculture and allied sectors are reflected; productivity gaps in all such sectors are reduced and returns to the farmers are maximized; leading to quantifiable and qualitative changes in agriculture and allied sectors.

The District Agriculture Plan prepared for 31 districts of Tamil Nadu State covered wide a range of activities involving crop-specific as well as non-crop-specific development activities. Agriculture and allied sectors such as horticulture, agricultural engineering, agricultural marketing, animal husbandry, seed certification, sericulture, fisheries and PWD are the implementing agencies including State Agricultural, Veterinary and Fisheries Universities suggested investments on popularization of latest technologies, strengthening extension support, farmer's training as well as strengthening the required infrastructure facilities needed to spur growth in agricultural and rural sectors. Such plans prepared were presented before the stakeholders and District Collectors of respective districts and few suggestions proposed are presented below.

- Integrated Farming System (IFS) / models should be introduced to improve the livelihood of farmers.
- To increase the soil fertility, production and distribution of green manure seeds and establishment of Vermi compost units may extensively increased.
- Pulse production should be boosted up through assured production support and value addition / processing technologies.
- Comprehensive and special programmes for improvement of livelihoods of Tapioca growers through special marketing strategies and value added technologies in Tapioca need to be implemented in Salem, Namakkal, Dharmapuri, Karur and Perambalur districts.
- The subsidy for drip irrigation up to 90 per cent may be given to all types of farmers without any farmer category / classification.

- Trainings and demonstrations on operation of agricultural machineries and implements should be given to the rural youth and farmers.
- Construction of storage godowns, cold storages and drying yards may be promoted to improve the quality of the agricultural commodities and to ensure remunerative prices for farmers.
- Availability of fodder should be ensured by promotion of sorghum, cowpea and desmanthus cultivation and through establishment of azolla units.
- Fingerlings fish production and private participation in fish culture extension may be promoted.
- Creation of infrastructure facilities like modern fish stall, fish market and establishment of GIFT Farms may be introduced.
- Introduction of rearing of short seasonal fish varieties may be scaled up.
- Construction of check dams across the rivers may be initiated to increase water harvesting.
- Desilting of distribution channels, tanks etc. should be focused.

The details of sector-wise requirement of funds across the districts and the percentage share of State Agriculture Plan budget among the districts are Tables.

District Irrigation Plan (DIP)

Besides under Pradhan Mantri Krishi Sinchayee Yojana (PMKSY), the State Irrigation Plan (SIP) of Tamil Nadu was compiled from the District Irrigation Plan (DIP) of all the districts. The major outlines of these plans are medium irrigation scheme under Accelerated Irrigation Benefit programme (AIBP) i.e. formation of flood carrier canal, Command Area Development Program, rain water harvesting system, repair renovation and restoration (RRR) and minor irrigation schemes and per drop more crop is initiated under micro irrigation, watershed development etc. The total proposed fund requirement is ₹ 5915801.52 lakh.

Interventions and Budget requirement Sector Wise

4.1 AGRICULTURE

State agricultural sector continues to confront the shrinkage of area cultivated, mismatch of the drawl and recharge of ground water, ensuring conversion of agricultural land for non agricultural uses, wide disparities in yield rate of crops**,** variation in application of chemical nutrients erratic monsoon etc. Considering these constraints emphasis is being given for the enhancement of crop production, usage of balanced application of chemical nutrients and the like. Besides, emphasis is given for organic agriculture, integrated farming system, integrated nutrient management and strengthening of infrastructural facilities.

4. 1.1 ENHANCEMENT OF RICE PRODUCTION

In Tamil Nadu, the paddy cultivation is taken up in three seasons namely kar, kuruvai, sornavari, samba/pishanam and Navarai/kodai. Among these three seasons, controlling irrigation is possible, predominantly in kar/kuruvai/sornavari. The samba season is totally depended on the supply of water through canal/tank irrigation wherein SRI technology practices can be adopted. The farmers have gained high confidence over this technique and were impressed on high tillering, healthy root development, vigorous crop growth, non lodging nature and also its high yield. In order to motivate the farmers to adopt the technology, efforts have to be taken to supply critical inputs like bio fertilizers, zinc sulphate, micro nutrients, bio-pesticides etc. in time, besides resorting to community nursery in rice growing areas, promotion of laser leveler and demonstration. The overall budget to undertake the various interventions are shown in Table 4.1.

Table 4.1 District wise Proposed Budget for Enhancing Rice Production

(Rs. in lakh)

Sl. No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	450.94	474.20	518.93	593.68	708.18	2745.92
2	Coimbatore	6.60	17.65	17.65	17.65	18.10	77.65
3	Cuddalore	2353.96	2676.61	2814.10	2876.82	2940.26	13661.75
4	Dharmapuri	135.54	300.96	400.80	434.40	548.85	1820.55
5	Dindigul	53.99	55.77	58.59	63.45	71.49	303.29
6	Erode	280.90	289.48	292.03	292.03	300.07	1454.52
7	Kancheepuram	609.83	1434.54	1392.15	1384.41	1230.42	6051.33
8	Kanyakumari	215.22	215.22	215.22	215.22	215.22	1076.10
9	Karur	614.81	793.25	793.25	793.25	1025.23	4019.80
10	Krishnagiri	614.81	793.25	793.25	793.25	1025.23	4019.80
11	Madurai	1049.36	1125.29	3660.16	6182.79	8718.36	20735.95
12	Nagapattinam	8399.36	8536.86	8593.36	8663.46	8699.56	42892.60
13	Namakkal	41.79	160.07	160.36	160.78	161.17	684.16
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	211.49	239.95	261.63	263.96	284.94	1261.97
16	Pudukottai	895.12	918.55	930.25	938.90	943.20	4626.02
17	Ramanathapuram	230.58	615.89	744.77	872.75	1001.69	3465.68
18	Salem	212.62	213.10	213.61	213.71	213.71	1066.75
19	Sivagangai	567.24	842.97	929.24	1001.66	1678.03	5019.14
20	Thanjavur	3991.06	4759.99	4955.68	5267.23	5468.72	24442.69
21	Theni	622.09	661.22	702.32	737.23	791.93	3514.78
22	Thiruvallur	2066.68	2314.93	2507.87	2695.00	2886.09	12470.56
23	Thiruvannamalai	3732.46	3981.25	4423.25	4609.14	5087.73	21833.83
24	Thiruvarur	14402.40	15483.40	16154.90	16320.90	16447.90	78809.50
25	Thoothukudi	41.30	538.68	555.51	587.29	610.83	2333.61
26	Tirunelveli	980.94	890.09	911.29	931.09	948.54	4661.95
27	Tiruppur	94.40	173.42	175.49	187.38	191.54	822.22
28	Trichy	969.27	1013.67	1115.05	1234.23	1258.19	5590.41
29	Vellore	702.63	705.76	737.77	770.16	804.27	3720.59
30	Villupuram	693.25	1342.81	1584.75	1792.92	2003.06	7416.80
31	Virudhunagar	806.68	877.39	937.03	988.58	1038.47	4648.16
	Total	**46047.30**	**52446.23**	**57550.26**	**61883.31**	**67320.95**	**285248.04**

Table 4.2 Component wise Proposed Budget for Enhancing Rice Production

(Rs. in lakh)

Sl. No	Interventions	Unit	Unit cost	District 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	Promotion of SRI	Ha	0.15	All districts Except D14,D17,D 18	91734.00	13760.10	109614.00	16442.10	115440.00	17316.00	120671.20	18100.68	127716.02	19157.40	565175.00	84776.28
2	Distribution of High Yielding Varieties	MT	0.35	All districts Except D14	8596.00	3008.71	9928.22	3474.88	10455.06	3659.27	11028.20	3859.87	11464.55	4012.59	51472.00	18015.32
3	Distribution of Foundation	MT	0.4	All districts Except D1,D2,D5, D7,D11,D1 4,	1023.00	409.04	1543.35	617.34	1724.65	689.86	1882.23	752.89	2021.65	808.66	8194.00	3277.79
4	seed production - Foundation	MT	0.32	All districts Except D1,D2,D5, D7,D11,D1 4,D15,D31	1026.00	328.16	1729.80	553.54	1784.80	571.14	1867.35	597.55	1922.70	615.26	8330.00	2665.65
5	seed production - Certified class	MT	0.26	All districts Except D14	7903.00	2054.78	9820.37	2553.30	10318.69	2682.86	10500.01	2730.00	13114.08	3409.66	51656.00	13430.60
6	Incentives for paddy machine planting	Ha	0.1	All districts Except D4,D14,D1 5,D17	142544.00	14254.40	150623.00	15062.30	160279.48	16027.95	163761.22	16376.12	169415.45	16941.55	786623.00	78662.32
7	Distribution of Protray	No	0.000 8	All districts Except D2,D4,D5, D7,D14,D1 5,D16,D17, D18,D21,D 25,D27,D2 9	143085.00	114.47	162800.00	130.24	175015.00	140.01	182749.50	146.20	192230.25	153.78	855880.00	684.70
8	Distribution of MN mixture/ Copper Sulphate	Ha	0.01	All districts Except D14	142232.00	1422.32	148512.00	1485.12	231625.00	2316.25	315540.00	3155.40	399291.00	3992.91	1237200.00	12372.00
9	Distribution	Ha	0.00	All districts	166826.00	500.48	175709.00	527.13	230425.20	691.28	284597.30	853.79	320587.15	961.76	1178145.00	3534.43

Sl. No	Interventions	Unit	Unit cost	District 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 / PPFM / bioinputs / plant nutrient mobilizing bacteria		3	Except D14												
10	Distribution of Zinc sulphate (Soil application & foliar)	Ha	0.01	All districts Except D14	151797.00	1517.97	161074.00	1610.74	315089.00	3150.89	468021.00	4680.21	626911.20	6269.11	1722892.00	17228.92
11	Distribution of biocontrol agents/biop esticides	Ha	0.01	All districts Except D1,D2,D4, D5,D14,D15,D18,	50809.00	508.09	59371.00	593.71	67286.50	672.87	74202.75	742.03	81355.13	813.55	333024.00	3330.24
12	Gypsum application	Ha	0.015	All districts Except D1,D2,D4, D5,D8,D14 ,D15,D18, D26,D27D 29,D30	67776.00	1016.64	88820.00	1332.30	91831.00	1377.47	93660.00	1404.90	96231.20	1443.47	438318.00	6574.77
13	Distribution of herbicides	Ha	0.01	All districts Except D14,D15,D 18,D26	83994.00	839.94	112234.00	1122.34	115794.70	1157.95	118835.10	1188.35	122104.40	1221.04	552962.00	5529.62
14	Hybrid Rice seed distribution	Ha	0.04	D1,D3,D5, D8,D20,D2 1,D22,D23, D24,D25,D 28,D31	3542.00	141.69	7090.38	283.62	7729.51	309.18	8030.66	321.23	8383.83	335.35	34777.00	1391.07
15	Polyvinyl coated Tarpaulin (6m x 5m)	No	0.02	All districts Except D2,D14,D1 8	9587.00	191.74	11822.50	236.45	12612.75	252.26	14663.83	293.28	15582.31	311.65	64268.00	1285.37
16	Direct sow n paddy w ith seed drill	Ha	0.07	D1,D3,D8, D12,D16,D 17,D19,	76711.00	5369.77	83030.50	5812.14	84657.75	5926.04	86740.23	6071.82	89488.45	6264.19	420628.00	29443.95

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	sowing			D22,D23,D24,D26,D28,D31												
17	Establishment of community paddy nursery	ha	0.25	D3, D12, D20, D26, D28, D30	180	45.00	180	45.00	180.00	45.00	180.00	45.00	180.00	45.00	900	225.00
18	Demonstration of drip irrigation	ha	1.00	All Districts except D8 & D14	580	564.00	580	564.00	580.00	564.00	580.00	564.00	580.00	564.00	2900	2820.00
	Total					**46047.30**		**52446.23**		**57550.26**		**61883.31**		**67320.95**		**285248.04**

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

4.1.2 INTENSIVE MILLET PRODUCTION

Millets form an important component of nutritional and livelihood security of resource poor farmers. They exhibit wide adaptation in marginal production and niche areas and provide farmers with best available opportunity for assured harvest, staple food, required nutrition and sufficient fodder in an environment characterized by scantyrainfall. These crops area also climates change complaint. Besides, these millets provide raw materials for agro industries such as poultry and cattle feed, value added products, potable alcohol, starch, bio fuel etc., With the exception of maize, area under millets has drastically reduced and yield also considerably declined. Production of millets could be enhanced by adoption of system of millet intensification and transplanting of seedlings in irrigated millet, precision farming in maize, use of farm machineries, distribution of certified seeds, integrated nutrient management in maize and training farmers for adoption of precision farming. Promotion of value addition of millet crops will also augment the income of millet farmers. The overall budget to undertake the various interventions are shown in Table 4.3.

Table 4.3 District wise Proposed Budget for Enhancing Millet Production

(Rs. in lakh)

Sl.No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	64.69	67.46	76.22	88.12	104.43	400.91
2	Coimbatore	132.70	230.36	222.86	222.86	222.86	1031.64
3	Cuddalore	10456.22	10869.94	11025.97	11162.42	11400.97	54915.51
4	Dharmapuri	146.69	251.44	254.09	262.34	264.23	1178.79
5	Dindigul	919.73	967.12	1065.55	1217.61	1455.58	5625.58
6	Erode	242.12	242.12	242.12	242.12	242.37	1210.85
7	Kancheepuram	28.68	126.99	148.89	153.30	140.70	598.56
8	Kanyakumari	0.00	0.00	0.00	0.00	0.00	0.00
9	Karur	60.72	93.01	82.57	74.03	70.41	380.75
10	Krishnagiri	672.28	868.49	867.24	877.24	1132.31	4417.56
11	Madurai	107.25	107.73	113.20	121.18	117.73	567.09
12	Nagapattinam	0.00	0.00	0.00	0.00	0.00	0.00
13	Namakkal	58.55	60.18	61.54	60.66	60.53	301.46
14	Nilgiris	0	0	0	0	0	0
15	Perambalur	160.65	202.15	222.53	249.36	283.99	1118.68
16	Pudukottai	27.90	39.77	51.51	48.09	48.80	216.06
17	Ramanathapuram	106.27	94.33	97.83	98.81	101.82	499.06
18	Salem	235.94	236.98	238.67	239.09	240.14	1190.81
19	Sivagangai	87.35	114.78	114.85	117.99	121.68	556.64
20	Thanjavur	202.74	207.14	210.10	213.05	216.01	1049.04
21	Theni	387.75	451.33	509.59	565.18	647.54	2561.39
22	Thiruvallur	716.66	738.78	752.59	769.94	783.66	3761.63
23	Thiruvannamalai	1335.34	1391.88	1444.87	1774.04	1907.91	7854.04
24	Thiruvarur	971.60	972.40	973.20	974.00	974.80	4866.00
25	Thoothukudi	56.33	302.31	307.37	312.97	366.06	1345.02
26	Tirunelveli	73.50	73.50	73.50	73.50	73.50	367.50
27	Tiruppur	77.26	156.44	167.04	180.82	190.70	772.25
28	Trichy	274.79	292.66	307.85	346.41	360.04	1581.76
29	Vellore	77.31	74.81	70.99	65.68	68.44	357.22
30	Villupuram	75.22	126.19	162.83	194.31	227.17	785.72
31	Virudhunagar	340.96	363.13	369.70	376.10	375.70	1825.60
	Total	**18097.17**	**19723.38**	**20235.25**	**21081.24**	**22200.07**	**101337.12**

Table 4.4 Component wise Proposed Budget for Enhancing Millet Production

(Rs. in lakh)

Sl. No	Interventions	Unit	Unit cost	District 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	Distribution of LPG operated Bird Scarrer	Nos.	0.1	D2, D3, D9, D10, D17, D19, D20, D21,D22, D23, D24, D25, D27, D28, D30 and D31	1024.00	102.00	1307.00	131.00	1410.00	141.00	1517.00	152.00	1565.00	156.00	**6823.00**	**682.35**
2	Distribution on biofertilizer - Liquid / Carrier	Ha	0.003	All districts except Ariyalur, Kanchipuram, Kanyakumari, Madurai, Nagapattinam, Namakkal, Nilgiris, Perambalur, Pudukkottai, Tirunelveli, Tiruppur and Vellore	37310.00	112.00	42957.00	129.00	44924.00	135.00	52514.00	158.00	55088.00	165.00	**232794.00**	**698.38**
3	Expansion of area under Minor Millets (Demo - supply of seed, seed treatment, MN mixture & Organic package)	Ha	0.05	All districts except Ariyalur, Kanchipuram, Kanyakumari, Nagapattinam, Namakkal, Nilgiris, Pudukkottai, Tirunelveli and Vellore	10598.00	530.00	12885.00	644.00	13758.00	688.00	14436.00	722.00	16947.00	847.00	**68623.00**	**3431.15**
4	Formation of	Nos	0.2	D2, D3,	248.00	50.00	280.00	56.00	303.00	61.00	318.00	64.00	355.00	71.00	**1504.00**	**300.85**

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	small millet groups	.		D9, D10, D17, D19, D20, D21, D22, D23, D28, and D31												
5	Millet Processing unit-Minor millet	Nos.	2.5	D2, D4, D9, D10, D13, D17, D20, D21, D22, D23, D28, D30 and D31	75.00	188.00	104.00	261.00	123.00	308.00	122.00	306.00	161.00	402.00	**585.00**	**1463.40**
6	Seed Production / Incentives for quality seed	MT	0.63	D2, D3, D4, D7, D10, D15, D17, D18, D21, D22, D23, D27, D28, D29 and D31	300.00	189.00	482.00	304.00	512.00	323.00	538.00	339.00	574.00	362.00	**2406.00**	**1515.89**
7	Soil moisture conservation practices	Ha	0.05	D2, D3, D4, D18, D28, D9, D27, D13, D30, D10, D25, D11, D31, D29, D23, D21	2725	136	2360	118	2225	111	2670	134	2225	111	12205	610.25
8	Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP)	ha	0.04	D2, D3, D4, D18, D28, D9, D27, D13, D30, D10, D25, D11, D31, D29, D23, D21	4800	192	4800	192	4800	192	4800	192	4800	192	24000	960.00
	Sorghum															
9	Demonstration (Supply of seed, seed	Ha	0.05	D2, D5, D6, D9, D11, D13, D17, D19,	5450.00	273.00	6642.00	332.00	6674.00	334.00	7003.00	350.00	7826.00	391.00	**33595.00**	**1679.75**

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	treatment, MN mixture & Organic package)			D21, D23, D24, D25, D26, D27, D28 and D31												
10	Distribution of biofertilizers Liquid / Carrier	Ha	0.003	D1, D2, D4, D5, D9, D13, D17, D18, D19, D21, D23, D24, D25, D27, D28 and D31	19776.00	59.00	16834.00	51.00	17367.00	52.00	17782.00	53.00	18881.00	57.00	**90640.00**	**271.92**
11	Distribution of MN mixture (12.5kg/ha)	Ha	0.007	D1, D2, D4, D5, D9, D13, D17, D18, D19, D21, D23, D24, D25, D27, D28 and D31	17167.00	120.00	15115.00	106.00	15212.00	106.00	15819.00	111.00	16851.00	118.00	**80164.00**	**561.15**
12	Seed distribution	MT	0.7	D2, D5, D9, D13, D17, D19, D21, D23, D24, D25, D27, D28 and D31	267.00	187.00	303.00	212.00	328.00	230.00	358.00	250.00	390.00	273.00	**1646.00**	**1152.44**
	Maize															
13	Demonstration (Supply of seed, seed treatment & MN mixture, organic package)	Ha	0.05	All districts except Kanchipuram, Kanyakumari, Nagapattinam, Nilgiris, Salem	10248.00	512.00	13560.00	678.00	14400.00	720.00	15395.00	770.00	18118.00	906.00	**71722.00**	**3586.09**

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				Villupuram and Vellore												
14	Distribution of biofertilizers Liquid / Carrier	Ha	0.003	All districts except Kanchipuram, Kanyakumari, Madurai, Nagapattinam, Nilgiris, Thanjavur, Villupuram and Vellore	17642.00	53.00	16908.00	51.00	17536.00	53.00	18421.00	55.00	20012.00	60.00	**90518.00**	**271.55**
15	Distribution of herbicides	Ha	0.008	All districts except Coimbatore, Dharmapuri, Kanchipuram, Kanyakumari, Madurai, Nagapattinam, Nilgiris, Perambalur, Pudukkottai, Theni, Thiruvarur, Villupuram and Vellore	5821.00	47.00	7372.00	59.00	7922.00	63.00	8730.00	70.00	10627.00	85.00	**40472.00**	**323.77**
16	Distribution of Maize maxim (15 kg/ha)	Ha	0.045	All districts except Ariyalur, Coimbatore, Dharmapuri, Dindigul, Krishnagiri, Madurai, Nagapattinam, Namakkal, Nilgiris, Perambalur, Salem, Villupuram and Vellore	5034.00	227.00	5917.00	266.00	6005.00	270.00	6192.00	279.00	6928.00	312.00	**30075.00**	**1353.38**

Sl. No	Interventions	Unit	Unit cost	District 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	Drip irrigation for maize	Ha	1	All districts except Kanchipuram, Kanyakumari, Krishnagiri, Madurai, Nagapattinam, Nilgiris, Perambalur, Salem, Thiruvarur, Thoothukudi, Tirunelveli, Villupuram and Vellore	900.00	900.00	1036.00	1036.00	1071.00	1071.00	1153.00	1153.00	1265.00	1265.00	**5426.00**	**5425.50**
18	Seed Distribution	MT	0.4	D3, D5, D6, D9, D16, D17, D19, D20, D21, D23, D24, D25, D26, D27, D28 and D31	773.00	309.00	789.00	316.00	809.00	324.00	820.00	328.00	836.00	334.00	**4027.00**	**1610.98**
19	Seed Distribution Hybrid seeds for maize	MT	1.8	All districts except Ariyalur, Coimbatore, Kanchipuram, Kanyakumari, Krishnagiri, Madurai, Nagapattinam, Namakkal, Nilgiris, Perambalur, Thanjavur, Villupuram and Vellore	6168.00	11102.00	6401.00	11523.00	6494.00	11688.00	6576.00	11837.00	6714.00	12085.00	**32353.00**	**58235.30**

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Cumbu															
20	Demonstration (Supply of seed, seed treatment & MN mixture, organic package)	Ha	0.05	D1, D3, D5, D6, D9, D16, D17, D19, D21, D23, D25, D28, D29 and D31	3006.00	150.00	5323.00	266.00	6101.00	305.00	7020.00	351.00	7935.00	397.00	**29384.00**	**1469.18**
21	Distribution of biofertilizers Liquid / Carrier	Ha	0.003	D1, D3, D5, D6, D9, D17, D19, D21, D22, D23, D25, D28, D29, D30 and D31	4635.00	14.00	5314.00	16.00	5118.00	15.00	5468.00	16.00	5526.00	17.00	**26061.00**	**78.18**
22	Distribution of cumbu hybrid seed	MT	2.6	D1, D3, D4, D5, D17, D19, D22, D23 and D31	619.00	1610.00	623.00	1620.00	629.00	1636.00	738.00	1918.00	751.00	1952.00	**3360.00**	**8736.13**
23	Distribution of MN mixture (12.5kg/ha)	Ha	0.007	D1, D3, D4, D5, D9, D16, D17, D19, D21, D22, D23, D25, D28 and D31	5889.00	41.00	4984.00	35.00	5113.00	36.00	5105.00	36.00	5406.00	38.00	**26497.00**	**185.48**
24	Seed Distribution	MT	0.53	D1, D3, D5, D9, D17, D19, D21, D22, D23, D25, D28, , D30 and D31	434.00	230.00	678.00	359.00	690.00	366.00	734.00	389.00	760.00	403.00	**3297.00**	**1747.25**
	Ragi															
25	Demonstration (supply of seed, seed	Ha	0.05	D3, D4, D6, D10, D11, D17, D18, D19,	7359.00	368.00	8879.00	444.00	9029.00	451.00	9198.00	460.00	11031.00	552.00	**45495.00**	**2274.74**

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	treatment, MN mixture & organic package)			D21, D22, D23, D28, D29 and D31												
26	Distribution of biofertilizers Liquid / Carrier	Ha	0.003	D3, D4, D6, D7, D10, D11, D17, D18, D19, D21, D22, D23, D28, D29 and D31	12763.00	38.00	15298.00	46.00	15786.00	47.00	16510.00	50.00	18620.00	56.00	**78977.00**	**236.93**
27	Distribution of MN mixture	Ha	0.007	D3, D4, D6, D10, D11, D17, D18, D19, D22, D23, D28, D29 and D31	7982.00	56.00	9390.00	66.00	9636.00	67.00	9697.00	68.00	11462.00	80.00	**48167.00**	**337.17**
28	Seed Distribution	MT	0.66	D3, D4, D6, D7, D9, D10, D11, D13, D17, D18, D19, D21, D22, D23, D28, D29, D30 and D31	459.00	303.00	620.00	409.00	668.00	441.00	716.00	473.00	777.00	513.00	**3239.00**	**2137.97**
	Total					**18097**		**19723**		**20235**		**21081**		**22200**		**101337.1**

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

4.1.3 ENHANCEMENT OF PULSES PRODUCTION

Pulse crops has been grown in Tamil Nadu in about nine lakh hectares and the average State productivity revolves around 600kg/ha. The average productivity is considerably low due to poor crop management and lack of irrigation. Pulses production could be increased by adopting precision farming, intensification of transplantation by giving incentives and adoption of System of Pulses Intensification (SPI) technology package, distribution of certified seeds, increasing rice fallow pulses area, bund cropping of pulses cultivation and promotion of variety having synchronized maturity. The overall budget to undertake the various interventions are shown in Table 4.5.

Table 4.5 District wise Proposed Budget for Enhancing Pulses Production

(Rs. in lakh)

S.No.	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	150.99	155.66	175.12	202.25	240.36	924.36
2	Coimbatore	147.35	192.20	192.20	192.20	192.20	916.13
3	Cuddalore	799.60	897.48	907.87	1008.72	1030.30	4643.97
4	Dharmapuri	559.91	589.45	762.75	796.75	805.55	3514.41
5	Dindigul	554.22	581.46	638.96	732.17	875.43	3382.24
6	Erode	72.42	76.36	76.36	76.36	76.36	377.87
7	Kancheepuram	50.18	803.94	818.62	818.71	818.98	3310.41
8	Kanyakumari	28.51	30.71	39.66	30.71	30.71	160.31
9	Karur	122.52	140.27	162.38	164.75	168.17	758.08
10	Krishnagiri	798.24	1037.71	1037.71	1037.71	1349.03	5260.40
11	Madurai	114.43	123.49	131.15	137.86	146.17	653.09
12	Nagapattinam	611.45	688.95	749.95	809.45	875.00	3734.78
13	Namakkal	67.79	124.04	124.39	124.75	125.53	566.50
14	Perambalur	115.58	87.85	96.83	106.97	116.29	523.51
15	Pudukkottai	233.20	281.59	282.98	287.20	290.84	1375.80
16	Ramanathapuram	104.05	115.56	115.56	115.76	115.81	566.73
17	Salem	612.06	531.81	537.54	539.00	539.42	2759.83
18	Sivagangai	197.11	130.49	137.32	144.23	152.98	762.13
19	Thanjavur	5690.27	6812.81	7853.35	8888.12	9924.88	39169.43
20	Theni	480.05	538.01	603.20	659.67	620.50	2901.43
21	Thiruvallur	447.10	473.55	513.49	536.17	571.69	2542.00
22	Thiruvannamalai	1580.55	1689.48	1757.19	1767.71	1799.65	8594.58
23	Thiruvarur	1340.12	1610.12	1803.00	2015.00	2209.00	8977.23
24	Thoothukudi	611.07	1242.82	1406.61	1430.15	1474.63	6165.28
25	Tirunelveli	268.67	268.12	268.82	271.73	287.24	1364.58
26	Tiruppur	242.79	309.21	320.48	327.35	346.18	1546.01
27	Trichy	283.92	331.51	361.04	406.45	438.71	1821.62
28	Vellore	414.76	374.78	379.66	390.19	396.76	1956.15
29	Villupuram	5988.51	7877.70	6706.49	6879.19	8600.09	36051.97
30	Virudhunagar	410.03	430.17	431.27	431.90	432.90	2136.26
	Total	**23096.49**	**28546.34**	**29390.95**	**31328.20**	**35050.36**	**147412.34**

Table 4.6 Component wise Proposed Budget for Enhancing Pulses Production

(Rs. in lakh)

Sl. No	Interventions	Unit	Unit cost	District 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	Purchase of breeder seeds	MT	250000	All districts except D1, D5, D6, D11, D12, D15, D18, D19, D20, D24, D25, D28	45.62	114.05	837.827	2094.57	290.45	726.14	287.73	719.34	839.63	2099.08	2301.27	5753.17
2	Production of Foundation/ Certified pulses seeds	MT	86000	All districts except D20	6115.35	5259.2	7321.75	6296.71	8074.9	6944.41	8714.41	7494.39	9550.63	8213.54	39777.04	34208.25
3	Distribution of Certified Seeds	MT	100000	All districts except D20	10031.9	10031.85	10900.3	10900.3	11632.53	11632.53	12296.15	12296.15	13070.77	13070.77	57931.6	57931.6
4	Distribution of Gypsum	ha	400	All districts except D3, D5, D6, D7, D9, D10, D11, D12, D16, D17, D18, D19, D21, D22, D23, D24, D25, D28, D29, D30, D31	69677	278.71	69887	279.55	72490	289.96	79819	319.28	83241.1	332.96	375114.1	1500.46
5	Distribution of Biofertilizer/ Organic packages (Rhizobium + Phosphobacteria) - Liquid / Carrier	Ha	600	All districts except D20	84648	507.89	89257.3	535.54	92621.3	555.73	95830.8	574.98	100316.9	601.9	462674.3	2776.05

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
6	Distribution of Micro Nutrients(5 kgs/ Ha)	Ha	350	All districts except D20, D26	71979	251.93	80212	280.74	82839	289.94	86529.1	302.85	90862.51	318.02	412421.61	1443.48
7	DAP Spray	Ha	700	All districts except D20	103881	727.17	120664	844.65	130257.8	911.8	139097.48	973.68	152203.13	1065.42	646103.41	4522.72
8	Pulse wonder - 5 kg/ha	Ha	1000	All districts except D1, D4, D11, D13, D14, D15, D17, D20, D27	37785	377.85	46607	466.07	55813	558.13	65877.2	658.77	75290.82	752.91	281373.02	2813.73
9	Bund Cropping	Ha	300	All districts except D1, D11, D17, D20	36609	109.83	41857	125.57	42953	128.86	45956.1	137.87	48303.41	144.91	215678.51	647.04
10	Line sowing	Ha	2250	All districts except D1, D11, D15, D17, D20	43198	971.96	63354	1425.47	72317.8	1627.15	81186.48	1826.7	90472.13	2035.62	350528.41	7886.89
11	Distribution of Yellow sticky trap /pheromone trap	ha	1000	All districts except D1, D4, D6, D14, D17, D20	13015	130.15	15436.2	154.36	15914.4	159.14	16630.1	166.3	17424.85	174.25	78420.55	784.21
12	Cropping system based demonstration	Ha	12500	All districts except D7, D11, D13, D17, D20, D26	9265	1158.13	11842.1	1480.26	13850.3	1731.29	14285.11	1785.64	15177.09	1897.14	64419.6	8052.45
13	Distribution of weedicide	Ha	1000	All districts except D4, D7, D12, D14, D15, D20, D26, D27	18642	186.42	25733.5	257.34	27810.5	278.11	31090.75	310.91	34647.08	346.47	137923.83	1379.24
14	Plant Protection Chemicals	Ha	1000	All districts except D1, D4, D7, D14, D15, D17, D20, D26	53282	532.82	61656	616.56	64139	641.39	67129	671.29	70562.1	705.62	316768.1	3167.68

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
15	Seed treatment and soil application with *T.viridi*	Ha	700	All districts except D1, D4, D7, D13, D14, D17, D20, D30	56253	393.77	53505.5	374.54	54525	381.68	57149	400.04	60190.05	421.33	281622.55	1971.36
16	Pure crop demonstration - Black gram and green gram	Ha	6300	All districts except D7, D12, D17, D20, D30	13227	833.3	14636.5	922.1	15514	977.38	16048	1011.02	17078.05	1075.92	76503.55	4819.72
17	Demonstration on intercropping of pulses with other crops	Ha	8300	All districts except D1, D2, D4, D7, D11, D13, D17, D20, D26, D29, D30	6394	530.7	8707.5	722.72	8925.2	740.79	9755.22	809.68	10139.69	841.59	43921.61	3645.49
18	Demonstration on pulses production	Ha	8250	D3, D6, D8, D12, D16, D18, D19, D21, D22, D23, D24, D25, D28	3523	290.65	3252.1	268.3	3414.4	281.69	3556.92	293.45	3509.68	289.55	17256.1	1423.63
19	Promotion of Redgram Transplantation for nursery preparation	Ha	5000	All districts except D1, D2, D5, D7, D11, D12, D13, D14, D15, D16, D20, D24, D26, D27, D29, D30	7009	350.45	8805.2	440.26	9436.6	471.83	10191.22	509.56	11859.58	592.98	47301.6	2365.08
20	Promotion of ridges and furrow	Ha	1000	D19	0	0	1000	10	1100	11	1200	12	1200	12	4500	45
21	Seed treatment with Trichoderma	Ha	700	D19	130	0.91	132	0.92	134	0.94	136	0.95	138	0.97	670	4.69

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	viridi															
22	Seed treatment with chemicals	Ha	250	D3, D4, D5, D8, D9, D11, D14, D21, D22, D23, D24, D26, D28	23872	59.68	20298	50.75	20804	52.01	21720.2	54.3	23349.82	58.37	110044.02	275.11
	Total					**23096.49**		**28546.34**		**29390.95**		**31328.20**		**35050.36**		**147412.34**

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-Pudukkottai, D16-Ramanathapuram, D17-Salem, D18-Sivagangai, D19-Thanjavur, D20- The Nilgiris, D21- Theni, D22-Thiruvallur, D23-Thiruvannamalai, D24-Thiruvarur, D25-Thoothukudi, D26-Tirunelveli, D27-Tiruppur, D28-Trichy, D29-Vellore, D30-Villupuram, D31-Virudhunagar

4.1.4 ENHANCING OILSEEDS PRODUCTION

In Tamil Nadu, oil seeds are largely grown as rainfed crop and only 30 per cent of the area is only under irrigated condition. Further, delayed monsoon affects the crops. The deficiency of secondary nutrients like sulphur and calcium and micro nutrients like zinc, boron, molybdenum and iron also limits the productivity to a considerable extent. Consequently, the farmers are reluctant to invest much on the inputs resulting in instability in yield. Hence, identifying and adopting crop management technologies suitable to the tracts are absolutely essential. Usage of bio-fertilizers, micronutrient mixture, insecticide, bio-pesticide, pheromone traps, tractor drawn seed drill (for groundnut), training of farmers on familiarization and usage of farm equipments, gypsum application (for groundnut) and certified seeds would enhance the production and productivity of oilseed crops considerably. The overall budget to undertake the various interventions are shown in Table 4.7.

Table 4.7 District wise Proposed Budget for Enhancing Oilseeds Production

(Rs. in lakh)

S.No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
		Fin	Fin	Fin	Fin	Fin	Fin
1	Ariyalur	154.06	166.94	182.56	211.87	256.14	971.56
2	Coimbatore	176.02	233.70	215.38	216.98	212.98	1055.06
3	Cuddalore	1336.25	1058.52	1026.50	1047.07	1055.04	5523.39
4	Dharmapuri	344.55	385.32	395.22	417.42	419.82	1962.34
5	Dindigul	38.02	37.29	41.92	48.46	57.50	223.18
6	Erode	385.07	490.35	385.60	341.10	399.10	2001.21
7	Kancheepuram	214.17	545.73	551.69	557.71	598.39	2467.67
8	Kanyakumari	0.00	0.00	0.00	0.00	0.00	0.00
9	Karur	66.49	87.54	96.00	105.55	111.18	466.75
10	Krishnagiri	852.55	1108.31	1108.31	1108.31	1440.80	5618.27
11	Madurai	1045.14	1121.38	1289.70	1353.44	1523.12	6332.76
12	Nagapattinam	160.47	160.47	160.47	160.47	159.67	801.53
13	Namakkal	479.33	603.24	604.85	570.20	559.62	2817.25
14	Nilgiris	0	0	0	0	0	0
15	Perambalur	40.48	41.48	45.12	53.30	55.68	236.06
16	Pudukkottai	355.65	362.93	770.03	341.05	365.17	2194.82
17	Ramanathapuram	86.12	106.66	120.77	134.88	148.99	597.42
18	Salem	569.52	525.49	634.72	585.48	589.94	2905.13
19	Sivagangai	355.27	470.93	519.29	464.53	563.88	2373.89
20	Thanjavur	1251.48	1274.72	1305.58	1335.79	1368.11	6535.67
21	Theni	138.45	154.41	169.97	186.40	198.02	847.27
22	Thoothukudi	27.36	65.90	73.49	84.90	95.61	347.26
23	Tirunelveli	75.01	75.01	75.01	75.01	75.01	375.03
24	Tiruppur	144.59	193.48	203.89	218.90	239.88	1000.74
25	Tiruvallur	704.26	831.59	852.12	870.72	955.87	4214.56
26	Tiruvannamalai	3868.91	4067.73	4381.32	4634.03	4381.02	21333.00
27	Thiruvarur	181.99	183.86	183.86	183.86	183.86	917.42
28	Trichy	423.25	411.68	546.44	540.08	636.09	2557.53
29	Vellore	932.77	835.59	976.34	998.89	952.83	4696.41
30	Villupuram	6168.16	7401.98	7800.23	8158.04	8582.05	38110.47
31	Virudhunagar	205.36	216.33	218.34	218.35	218.37	1076.75
	Total	**20780.69**	**23218.53**	**24934.69**	**25222.74**	**26403.73**	**120560.38**

Table 4.8 Component wise Proposed Budget for Enhancing Oilseeds Production

(Rs. in lakh)

Sl. No	Interventions	Unit	Unit cost	District 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	Purchase of Breeder seed	MT	1.5	D2, D3, D4, D7, D10, D13, D15, D17, D19, D21, D23, D24, D25, D26, D29, D30 and D31	280.94	421.41	826.09	1239.14	902.55	1353.82	983.51	1475.26	1053.87	1580.81	4046.95	6070.43
2	Polythene mulch Inclusive of erection	Ha	0.5	D3, D10, D11, D12, D17, D19, D20, D21, D22, D24, D25, D26 and D28	2488.2	1244.1	2934.95	1467.48	2974.45	1487.23	3271.78	1635.89	3181.21	1590.6	14850.58	7425.29
3	Herbicide	Ha	0.01	D1, D3, D5, D6, D9, D10, D12, D13, D17, D19, D20, D22, D24, D25, D26 and D28	9542	95.42	11065.5	110.66	11607.5	116.08	12093.05	120.93	12745.71	127.46	57053.76	570.54
4	Light trap (NCIPM)	Nos.	0.01	D3, D6, D10,D12, D17, D19, D20, D22, D24, D25, D26, D27, D28 and D31	4949	49.49	5745.25	57.45	5895	58.95	6738.3	67.38	6912.71	69.13	30240.26	302.4
5	Bio pesticide/fungicide	Ha	0.01	D1, D3, D5, D6, D10, D11, D12, D13, D17, D19, D20, D22, D24, D25,	6200	62	7370.25	73.7	7743	77.43	8260.3	82.6	9197.71	91.98	38771.26	387.71

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D26, D27, D28, D29 and D31												
6	Compact Block Demonstration - Groundnut	Ha	0.2	All Districts except, D8, D11 and D14	6692	1338.4	7529.5	1505.9	7832	1566.4	8347.5	1669.5	8951.5	1790.3	39352.5	7870.5
7	Compact Block Demonstration - Gingelly / Castor	Ha	0.06	D2, D3,D9, D16, D17, D19, D20, D24, D25, D26, D27, D28 and D31	537	32.22	691.3	41.48	774.55	46.47	838.8	50.33	901.05	54.06	3742.7	224.56
8	Compact Block Demonstration - Sunflower	Ha	0.08	D16, D22, D25, D26, D27 and D28	175	14	183.5	14.68	194.5	15.56	207.5	16.6	191.5	15.32	952	76.16
9	Microirrigation (Raingun / Microsprinkler)	ha	0.55	D29, D25, D30, D16, D19, D11, D3, D26, D18, D13, D6	1030.0	566.50	1205.00	662.75	1160.00	638.00	1140.00	627.00	1005.00	552.75	5540.00	3047.00
10	Distribution of IPM kit	Nos.	0.10	D29, D25, D30, D16, D19, D11, D3, D26, D18, D13, D6	12000	1200.00	10500.0	1050.00	18000.00	1800.00	9100.00	910.00	12000.00	1200.00	61600	6160.00
11	Growth Regulator / DAP	ha	0.01	D29, D25, D30, D16, D19, D11, D3, D26, D18, D13, D6	2350	18.50	1900.00	16.25	1750.00	15.50	1800.00	15.75	1850.00	16.00	9650	82.00
	GROUNDNUT															
9	Strengthening seed chain by	Mt	0.76	All Districts except, D1, D5, D8,	928.47	705.64	1044.5	793.82	1127.32	856.76	1220.72	927.75	1285.48	976.96	5606.49	4260.93

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	foundation seed production			D14 and D18												
10	Strengthening seed chain by certified seed production	Mt	0.73	All Districts except D5, D8, D14 and D21	7675.51	5603.12	7871.55	5746.23	8206.82	5990.98	8572.07	6257.61	8809.75	6431.12	41135.7	30029.06
11	Distribution of Certified seeds	Mt	0.84	All Districts except D5, D8 and D14	7193.68	6042.69	7675.4	6447.34	7920.37	6653.11	8203.78	6891.17	8573.6	7201.83	39566.82	33236.13
12	Distribution of Seed Treatment Chemicals and Bioagents (T.Viridi)	Kg	0	All Districts except D1, D4,D7l, D8, D14, D24 and D31	8975.7	13.46	11019	16.53	11425.65	17.14	11942.02	17.91	12938.67	19.41	56301.03	84.45
13	Application of Gypsum to Groundnut Crop	Ha	0.02	All Districts except D8 and D14	25660	410.56	31206	499.3	34936.71	558.99	37743.94	603.9	40673.88	650.78	170220.49	2723.53
14	Distribution of Micro Nutrient Mixture	Ha	0.02	All Districts except D8, D14, D15, D23 and D30	17525	262.88	21180.2	317.7	22391.93	335.88	23407.06	351.11	25183.69	377.76	109687.86	1645.32
15	Distribution of Biofertilizer	Ha	0.01	All Districts except D1, D8 and D14	30663	183.98	29179.5	175.08	30339.85	182.04	31519.14	189.11	33384.45	200.31	155085.94	930.52
16	Distribution of Liquid Biofertilizer	Ha	0.01	All Districts except D8 and D14	30152	180.91	28435.6	170.61	29841.3	179.05	31221.05	187.33	32874.3	197.25	152524.2	915.15
17	Distribution of Rhizobium/ PSB Culture	Ha	0.01	D3, D5, D6, D9, D10, D11, D13, D17, D18, D19, D20, D21, D24, D25,	10892	65.35	12252	73.51	13034.5	78.21	13947.28	83.68	15121.35	90.73	65247.13	391.48

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D26, D27, D28 and D31												
18	Distribution of Pheromone Traps	Nos.	0.02	D3, D9, D10, D11, D17, D19, D20, Thei, D22, D25, D26, D27 and D28	3814	76.28	4210.3	84.21	4484.55	89.69	4730.08	94.6	4920	98.4	22158.93	443.18
19	Distribution of Light Traps	Nos.	0.02	D3, D9, D10, D11, D17, D19, D20, Thei, D22, D23, D25, D26, D27, D28 and D30	3603	72.06	4055.8	81.12	4278.5	85.57	4554.42	91.09	4878.98	97.58	21370.7	427.41
20	Castor as Bund crop	Ha	0.01	All Districts except D8, D11, D14 and D18	5839	35.03	4905.4	29.43	5296.56	31.78	5783.79	34.7	6067.08	36.4	27891.83	167.35
21	Combined Nutrient Spray	Ha	0.02	All Districts except D1, D2, D4, D8, D13, D14, D23, D24, D29, D30 and D31	7081	105.77	7701.5	115.07	7930	118.5	8217.5	122.81	9151	136.82	40081	598.97
22	Seed Drill Sowing / Line sowing of Groundnut with Pulses as intercrop(hiring charges only)	Ha	0.03	All Districts except D1, D8, D11, D14, D15, D16, D23and D30	11392	341.76	18895.8	566.87	19367.75	581.03	20197.03	605.91	21149.1	634.47	91001.63	2730.05
23	Seed drill Sowing of Groundnut	Ha	0.04	D5, D9, D10, D13, D18, D19,	5962	238.48	7230.53	289.22	7485.28	299.41	7932.31	317.29	7933.63	317.35	36543.75	1461.75

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	with Redgram as Intercrop			D21, D24, D25, D26, D27, D28 and D29												
24	Distribution of Tractor operated thresher	Nos.	1.5	D2, D9, D10, D12, D19, D20, D25, D26 and D27	262	393	278.15	417.23	276.15	414.23	293.15	439.73	278.27	417.41	1387.72	2081.58
25	Distribution of Power Operated Groundnut Stripper	Nos.	1.3	D2, D10, D11, D12, D20, D26, D27 and D28	215	279.5	237.15	308.3	294.15	382.4	299.15	388.9	309.95	402.94	1355.4	1762.02
26	Distribution of Power operated Groundnut Decorticator	Nos.	1	D2, D9, D10, D12, D19, D20, D26 and D28	302	302	327	327	348	348	359	359	401.7	401.7	1737.7	1737.7
	SUNFLOWER															
27	Production of Foundation Seeds	Mt	0.52	D9 and D26	0.9	0.47	0.9	0.47	1.1	0.57	3.1	1.61	3.1	1.61	9.1	4.73
28	Production of Certified Seeds	Mt	0.5	D18, D22, D26 and D31	3.3	1.65	3.3	1.65	3.3	1.65	3.5	1.75	3.5	1.75	16.9	8.45
29	Distribution of certified seeds	Mt	0.57	D9, D18, D22, D26 and D31	3.3	1.88	3.4	1.94	3.4	1.94	3.65	2.08	3.6	2.05	17.35	9.89
	GINGELLY															
30	Production of Foundation Seeds	Mt	1.13	D3, D6, D9,D12, D17, D19, D20, D25, D26, D27, and D28	56.9	64.3	64.23	72.57	69.55	78.59	74.78	84.5	80	90.4	345.45	390.36
31	Production of Certified Seeds	Mt	1.09	D3, D4, D6, D7, D9,D12, D13, D17, D18, D19,	89.7	97.77	124.88	136.11	130.15	141.86	135.43	147.61	141.7	154.45	621.85	677.82

Sl. No	Interventions	Unit	Unit cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D20, D21, D25, D26, D27, D28 and D31												
32	Distribution of certified seeds	Mt	1.25	D3, D6, D7, D9,D12, D13, D16, D17, D18, D19, D20, D21, D25, D26, D27, D28 and D31	169.05	211.31	202.3	252.88	218.45	273.06	231.01	288.76	248.75	310.93	1069.56	1336.95
33	Distribution of Micro nutrients (Manganese sulphate/ Zinc sulphate)	Ha	0	D3, D6, D7, D9,D12, D13, D16, D17, D18, D19, D20, D21, D22, D25, D26, D28 and D31	4220.5	16.88	5763.82	23.06	6252.82	25.01	6784.09	27.14	7455.67	29.82	30476.89	121.91
	CASTOR															
34	Production of Foundation Seeds	Mt	0.52	D3, D19, D26, D27 and D28	1.6	0.83	2.23	1.16	2.73	1.42	2.73	1.42	2.73	1.42	12	6.24
35	Production of Certified Seeds	Mt	0.5	D3, D19, D21, D26, D27 and D28	53.15	26.58	53.4	26.7	53.9	26.95	53.95	26.98	54	27	268.4	134.2
36	Distribution of certified seeds	Mt	0.58	D3, D19, D21, D25, D26 and D28	7.79	4.52	6.84	3.97	9.39	5.45	10.44	6.06	11.54	6.69	46	26.68
	Total					**20780.69**		**23218.53**		**24934.69**		**25222.74**		**26403.73**		**120560.38**

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

4.1.5 Enhancing the productivity of Oil palm

India is the largest consumer of palm oil in the world, consuming around 17 per cent of total world consumption. India is also the largest importer of palm oil amounting to 44 per cent of world imports. Palm Oil is extracted from the pulpy portion (monocarp) of the fruit of Oil Palm. The Crude Palm Oil is deep orange red in colour and is semi solid at a temperature of 20 degree centigrade. Palm Oil contains an equal proportion of saturated and unsaturated fatty acid containing about 40 per cent oleic acid, 10 per cent linoleic acid, 44.00 per cent palmitic acid and 5 per cent stearic acid. The unprocessed palm oil is used for cooking in various countries. Palm Oil is a very rich source of Beta Carotene, an important source of Vitamin A and it contains Tocopherols and Tocotrienols, a natural source of Vitamin E. Vitamin A and Vitamin E contents are the highest in palm oil in comparison with any other types of oil and hence consumption of the same boosts health. By virtue of the high vitamin contents the Red Palm Oil is a nature's gift for the human beings. In view of the rich content of vitamins, palm oil can be utilized for the preparation of cosmetics as well there is a need to promote oil palm by way of area expansion and better cultivation practices, it is equally important to focus on innovative growth strategies through National Mission on Oilseeds and Oil Palm (NMOOP) that has been launched in which Mini Mission-II (MM-II) is dedicated to oil palm area expansion and productivity increase. MM-II of NMOOP and MM-III of NMOOP are being implemented in 13 States viz; Tamil Nadu, Andhra Pradesh, Assam, Arunachal Pradesh, Chhattisgarh, Gujarat, Karnataka, Kerala, Mizoram, Nagaland, Odisha, Telangana, and West Bengal.

Project components

- Oil palm area expansion programme
- Inputs for intercropping
- Supply of diesel pumps
- Supply of aluminium ladder, wire mesh and oil palm cuter

Budget

It is proposed to incur **₹ 6759.86** lakh over a period of five years with the finance facilities under the NADP and other sources.

Table 4.9 District wise Proposed Budget for Oil palm Production

(Rs. in lakh)

S. No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
		Fin	Fin	Fin	Fin	Fin	Fin
1	Ariyalur	4.08	4.08	4.08	4.08	5.44	21.76
2	Coimbatore	38.98	32.45	33.76	30.62	30.56	166.37
3	Cuddalore	71.31	60.88	62.40	66.40	64.40	325.39
4	Dharmapuri	27.72	0.00	0.00	0.00	0.00	27.72
5	Dindigul	0.00	0.00	0.00	0.00	0.00	0.00
6	Erode	9.90	9.90	9.90	9.90	9.90	49.50
7	Kancheepuram	24.25	0.00	0.00	0.00	0.00	24.25
8	Kanyakumari	0.00	0.00	0.00	0.00	0.00	0.00
9	Karur	21.27	22.08	23.74	23.65	23.28	114.02
10	Krishnagiri	26.65	34.65	34.65	34.65	45.04	175.62
11	Madurai	0.00	0.00	0.00	0.00	0.00	0.00
12	Nagapattinam	21.12	21.12	22.08	20.98	22.90	108.20
13	Namakkal	18.54	0.65	0.65	0.65	0.65	21.14
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	6.79	4.00	1.70	1.70	1.70	15.89
16	Pudukkottai	9.00	3.00	3.00	3.00	3.00	21.00
17	Ramanathapuram	7.20	3.30	3.30	3.30	3.30	20.40
18	Salem	0.00	0.00	0.00	0.00	0.00	0.00
19	Sivagangai	8.06	0.78	0.78	0.78	0.78	11.18
20	Thanjavur	215.42	283.08	308.04	333.24	359.47	1499.25
21	Theni	31.97	35.06	38.39	39.99	41.80	187.21
22	Thoothukudi	27.05	10.60	8.30	8.10	8.10	62.15
23	Tirunelveli	64.40	64.40	64.40	64.40	64.54	322.14
24	Tiruppur	28.16	28.30	35.14	42.24	50.38	184.22
25	Tiruvallur	10.79	13.31	14.28	17.97	19.06	75.42
26	Tiruvannamalai	101.63	154.15	197.25	234.75	258.89	946.67
27	Thiruvarur	82.57	82.57	83.85	77.33	84.19	410.51
28	Trichy	157.78	165.52	179.51	181.84	189.60	874.25
29	Vellore	78.08	74.48	74.48	74.48	74.48	376.00
30	Villupuram	72.93	114.44	139.93	166.47	191.29	685.06
31	Virudhunagar	10.75	7.00	6.00	5.40	5.40	34.55
	Total	**1176.40**	**1229.79**	**1349.61**	**1445.92**	**1558.15**	**6759.86**

Table 4.10 Component wise Proposed Budget for Oil palm Production

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	NMOOP - Mini Mission -II (Oil palm)															
1	Oil palm Area Expansion Programme	Ha	0.14	All Districts except D5, D8, D11, D14, D16, D17, D18, Sivagangai ,D22 and D31	1119	156.66	1037.3	145.22	1184	165.76	1313.95	183.95	1491.48	208.81	6145.73	860.4
2	Cultivation maintenanc e	Ha	0.1	All Districts except D5, D8, D11, D14, D16, D17, D18, Sivagangai , D22, D23 and D31	1397.7	133.72	1511.35	143.24	1803.7	171.57	1973.95	187.7	2194.41	208.79	8881.11	845.01
3	Inputs for Intercroppin g	Ha	0.1	All Districts except D5, D8, D11, D14, D16, D17, D18, Sivagangai , D22, D23 and D31	1359.7	135.97	1471.05	147.11	1794.6	179.46	2087.35	208.74	2347.48	234.75	9060.18	906.02
4	Supply of Diesel pumps	No	0.3	All Districts except D1, D5, D6, D8, D11, D14, D16, D17, D18, Sivagangai , D22, D23 and D31	184	55.2	257.8	77.34	290.4	87.12	323.9	97.17	345.52	103.66	1401.62	420.49
5	Construction of Bore w ells	No	1	All Districts except D1, D5, D6,	167	167	205.2	205.2	219.8	219.8	228.3	228.3	240.14	240.14	1060.44	1060.44

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D8, D11, D14, D16, D17, D18, Sivagangai , D22, D23 and D31												
6	Motorized Chisel	No	0.2	D3, D7, D9, D10, D12, D15, D20, D21, D24, D25, D26, D28 and D30	79	15.8	104	20.8	114.3	22.86	116.55	23.31	126.14	25.23	539.99	108
7	Aluminium portable ladder	No	0.06	D2, D3, D4, D7, D9, D10, D12,D13, D15, D20, D21, D24, D25, D26,D27, D28 and D30	113	6.78	160.7	9.64	186	11.16	200.25	12.02	223.45	13.41	883.4	53
8	Wire mesh	No	0.1	D2, D3, D6, D7, D9, D10, D12, D13, D15, D20, D21, D24, D25, D26,D27, D28,D30	1782.5	178.25	1913.15	191.32	1971.2	197.12	2028.7	202.87	2088.41	208.84	9783.96	978.4
9	Oil palm Cutter	No	0.03	D2, D3, D7, D9, D10, D13, D15, D20, D21, D24, D25, D26,D27, D28 and D30	192	5.76	273.9	8.22	294.2	8.83	315.95	9.48	341.21	10.24	1417.26	42.52

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	NMOOP - Mini Mission -III (Tree Borne Oilseeds)															
10	Neem/ Pungam Area Expansion Programme	Ha	0.2	D2, D3, D4, D6, D9, D10, D13, D16, D17, D19, D20, D21, D22, D23, D24, D25, D26, D29 and D31	1174.2	234.84	1062.84	212.57	1066.9	213.38	1086.95	217.39	1118.48	223.7	5509.37	1101.87
11	Cultivation main-tenance	Ha	0.02	D2, D3, D6, D9, D10, D13, D16, D17, D19, D20, D21, D22, D23, D24, D25, D26, D29, D30 and D31	870.2	43.5	735.84	36.78	774.9	38.74	801.95	40.09	860.48	43.01	4043.37	202.12
12	Inputs for Inter-cropping	Ha	0.01	D2, D3, D6, D9, D10, D13, D16, D17, D19, D20, D21, D22, D23, D24, D25, D26, D29 and D31	883.2	42.91	649.84	32.36	678.9	33.81	700.95	34.91	754.48	37.59	3667.37	181.59
	Total					**1176.39**		**1229.8**		**1349.61**		**1445.93**		**1558.17**		**6759.86**

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

4.1.6 Coconut Development

Tamil Nadu tops the country in coconut production with about 4.5 million tons. It is cultivated across the State in 0.46 million hectare. Coimbatore, Tiruppur, Thanjavur, Dindigul, Kanyakumari, Vellore and Theni are the districts where coconut is grown predominantly. The increasing trend of coconut production has brought new challenges like systematic replanting to replace the old, senile, unproductive and disease palms and supply of quality planting material. The IPM approach allows pest and disease management without any adverse effect on sustainability. Steps have to be taken to procure surplus copra from farmers in case of fall in prices. Neera tapping is to be promoted with the idea of increasing the income of coconut growers. The overall budget to undertake the various interventions are shown in Table 4.11.

Table 4.11 District wise Proposed Budget for Enhancing Coconut Production

(Rs. in lakh)

S. No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	802.10	2.21	2.43	2.79	3.35	812.87
2	Coimbatore	651.22	1312.19	709.54	689.04	675.54	4037.54
3	Cuddalore	458.89	422.24	422.88	423.57	423.96	2151.54
4	Dharmapuri	64.75	217.25	220.31	259.50	367.40	1129.21
5	Dindigul	1278.85	1136.54	1248.17	1429.99	1712.74	6806.29
6	Erode	262.74	262.74	262.74	262.74	262.74	1313.71
7	Kancheepuram	0.00	18.95	18.95	18.95	18.95	75.81
8	Kanyakumari	536.02	160.73	160.48	160.48	160.48	1178.17
9	Karur	1527.24	1462.80	1490.27	2067.53	2090.36	8638.20
10	Krishnagiri	937.65	1218.94	1218.94	1218.94	1584.62	6179.08
11	Madurai	360.22	401.57	441.28	480.04	519.45	2202.56
12	Nagapattinam	79.62	80.82	81.22	82.02	82.82	406.48
13	Namakkal	0.00	71.69	72.48	73.39	74.53	292.09
14	Perambalur	103.60	3.70	3.80	3.80	4.00	118.90
15	Pudukottai	723.60	273.12	273.12	273.12	273.12	1816.06
16	Ramanathapuram	2432.01	123.89	156.29	216.29	216.29	3144.77
17	Salem	319.41	584.43	584.47	54.47	54.47	1597.25
18	Sivagangai	1916.17	1999.18	1381.04	1987.15	1383.83	8667.36
19	Thanjavur	493.46	535.28	619.65	618.03	666.15	2932.57
20	Theni	526.63	544.71	877.79	884.58	951.29	3784.99
21	Thiruvarur	23.30	23.55	23.30	23.30	23.30	116.75
22	Thoothukudi	201.00	172.90	211.36	236.44	282.45	1104.14
23	Tirunelveli	371.14	350.89	370.89	390.89	370.89	1854.68
24	Tiruppur	1137.92	832.47	856.96	871.37	891.26	4589.99
25	Tiruvallur	95.06	66.92	71.36	76.09	82.47	391.90
26	Tiruvannamalai	1320.08	743.19	758.07	773.37	795.80	4390.50
27	Trichy	1906.20	2396.15	2620.65	2245.12	1869.68	11037.80
28	Vellore	202.44	202.44	198.06	198.06	198.06	999.06
29	Villupuram	2164.19	2190.65	2470.65	2550.65	2770.65	12146.80
30	Virudhunagar	112.50	174.94	162.96	165.98	169.00	785.36
	Total	**21007.95**	**17987.05**	**17990.09**	**18737.69**	**18979.62**	**94702.38**

Table 4.12 Component wise Proposed Budget for Enhancing Coconut Production

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Distribution of T x D hybrid seedlings	No	0.0006	All districts	24293100	145.76	280850.00	168.51	293544.00	176.13	310605.00	186.36	329525.00	197.71	1457455.00	874.47
2	Distribution of Tall Seedlings	No	0.0004	All districts	270675.00	108.27	299055.00	119.62	310663.00	124.27	325179.00	130.07	351100.00	140.44	1556672.00	622.67
3	Boom sprayer	No	0.2	D3, D5, D8, D10, D11, D12, D15, D16, D18, D19, D21, D26, D27, D28	240.00	48.00	279.00	55.80	289.00	57.80	309.00	61.80	345.00	68.92	1462.00	292.32
4	Distribution of D xT hybrid Seedlings	No	0.0015	D2, D3, D5, D6, D8, D12, D16, D18, D19,D24, D25, D26, D27, D28, D29, D31	15585.00	23.38	26128.00	39.19	26873.00	40.31	27333.00	41.00	27947.00	41.92	123865.00	185.80
5	Distribution of pow er operated coconut leaf shredder	No	0.6	D3, D5, D8, D9, D10, D12, D16, D18, D21, D23, D25, D27	196.00	112.60	237.00	134.70	253.00	142.30	270.00	150.00	306.00	167.36	1262.00	706.96
6	Distribution of MN mixture	Ha	0.1	All districts except D1, D7, D14, D17	12266.00	1226.60	16456.00	1645.61	17402.00	1740.22	18826.00	1882.63	20881.00	2088.10	85832.00	8583.16
7	Distribution of Pheromone traps for Red palm w eevil/	Ha	0.016	All districts except D1, D4, D7, D14, D17, D22, D29, D31	6094.00	97.50	5010.00	80.15	5337.00	85.39	5498.00	87.96	6029.00	96.46	27967.00	447.47

	Rhinoceros beetle															
8	Distribution of pow er operated rocker sprayer	No	0.1	All districts except D1, D4, D6, D7, D13, D15, D22, D24, D29, D30	415.00	41.50	561.00	56.11	597.00	59.72	667.00	66.73	753.00	75.31	2994.00	299.37
9	Distribution of Solar copra drier	No	0.2	D3, D9, D10, D11, D12, D16, D19, D23, D27	38.00	7.60	48.00	9.60	57.00	11.40	68.00	13.60	83.00	16.58	294.00	58.78
10	Distribution of tree climbers	No	0.15	All districts except D1, D2, D4, D7, D11, D14, D15, D17, D29, D30	417.00	62.55	589.00	88.37	607.00	91.07	628.00	94.22	663.00	99.39	2904.00	435.59
11	Drip irrigation	Ha	0.35	All districts except D1, D7, D14, D15, D16, D17, D21, D22	2472.00	855.45	3088.00	1070.40	3456.00	1168.65	3510.00	1215.50	3958.00	1371.51	16484.00	5681.51
12	Establishme nt of nursery Area	ha	2	D18, D19, D27	55.00	110.00	66.00	131.00	72.00	144.00	78.00	155.00	89.00	177.00	359.00	717.00
13	Intercroppin g w ith green manures	Ha	0.03	All districts except D1, D4, D7, D12, D14, D15, D21, D22, D27	5450.00	163.50	7493.00	224.78	7740.00	232.19	7923.00	237.68	8784.00	263.52	37388.00	1121.65
14	Managemen t of Black headed caterpillar	Ha	0.05	D3, D5, D9, D10, D11, D18, D19, D21, D27	2338.00	116.90	3017.00	150.86	3140.00	157.01	3306.00	165.32	3997.00	199.83	15798.00	789.91
15	Replanting and Rejuvenatio n of coconut	Ha	0.45	All districts except D1, D4, D7, D13, D14,	4650.00	2092.50	5596.00	2517.98	6177.00	2779.43	6346.00	2855.48	7132.00	3209.20	29899.00	13454.57

	gardens			D17, D21, D22, D24, D25, D26, D31												
16	Thanjavur wilt management (root feeding /soil application)	Ha	0.03	D3, D5, D10, D11, D12, D18, D19, D23, D24, D27	997.00	29.91	1073.00	32.19	1100.00	33.00	1128.00	33.84	1193.00	35.80	5491.00	164.74
17	Demonstration on Integrated fertilizer management	Ha	0.75	All districts except D1, D2, D4, D11, D14, D17, D21, D22, D24, D28, D30	928.00	696.00	1133.00	849.45	1339.00	1003.95	1400.00	1049.70	1565.00	1173.74	6364.00	4772.84
18	Distribution of coconut seedlings to school children	No	0.0004	D3, D5, D6, D8, D10, D15, D16, D18, D19, D21, D23, D24, D28, D30	33874.00	13.55	44101.00	17.64	45336.00	18.13	46297.00	18.52	48886.00	19.55	218494.00	87.40
19	Control of Eriophid mite	No. of tree	0.0002	D5, D9, D18, D21, D23, D28, D31	14995.00	3.00	17817.00	3.56	19482.00	3.90	21692.00	4.34	24486.00	4.90	98472.00	19.69
20	Establishment of Neera processing unit	No	600	D2, D9, D16, D18, D25, D27, D28	12.00	7200.00	11.00	6600.00	9.00	5400.00	10.00	6000.00	8.00	4800.00	50.00	30000.00
21	Control of slug caterpillar	No. of tree	0.0003	D5, D10, D12, D21, D24, D28	10090.00	3.03	11300.00	3.39	11990.00	3.60	12855.00	3.86	14493.00	4.35	60728.00	18.22
22	Training on neera production	Batches	0.25	D3, D6, D8, D9, D10, D14, D16, D18, D19, D21, D23, D27, D28, D29	942.00	235.50	1827.00	456.63	2694.00	673.38	3569.00	892.13	4450.00	1112.59	13481.00	3370.21
23	Distribution of wheel barrow	No	0.04	D2, D10, D12, D21, D25	565.00	22.60	788.00	31.52	788.00	31.52	788.00	31.52	870.00	34.80	3799.00	151.96

24	Removal of wilt affected coconut trees	Ha	0.4	D19	50.00	20.00	50.00	20.00	50.00	20.00	50.00	20.00	50.00	20.00	250.00	100.00
25	corpus fund release for FPG (2000 nos.)	No	5	All districts except D2, D4, D7, D10, D12, D22, D29	1514.00	7570.00	696.00	3477.50	758.00	3790.00	668.00	3337.50	712.00	3557.50	4347.00	21732.50
26	Distribution of MN mixture/ Coconut tonic	Ha		D19	225.00	2.25	250.00	2.50	275.00	2.75	295.00	2.95	315.00	3.15	1360.00	13.60
	Total					**21007.95**		**17987.06**		**17990.12**		**18737.71**		**18979.63**		**94702.39**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11- Madurai, D12-Nagapatinam, 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

4.1.7 Enhancing Sugarcane Productivity

In Tamil Nadu, sugarcane is cultivated in 3.05 lakh ha with an average productivity of 105 tonnes/ha and a total production of 357.07 lakh tonnes of sugarcane and 25.40 lakh tonnes of sugar. However, the problems facing sugarcane cultivation are high cost of cultivation, non-availability of good quality seed material, improper cultivation practices, unbalanced nutrient management and mono cropping resulting in low yields, increased pest and disease menace etc. Hence, Sustainable Sugarcane Initiative (SSI) is to be popularized since it involves use of less set, less water and optimum utilization of fertilizer and tend to achieve higher yields. Besides, it is an alternate to the conventional seed, water and space intensive sugarcane cultivation. This calls for provision of shade net, supply of critical inputs, training of the farmers and documentation. The overall budget to undertake the various interventions are shown in Table 4.13.

Table 4.13 District wise Proposed Budget for Enhancing Sugarcane Production

(Rs. in lakh)

S. No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	378.45	106.08	115.87	134.85	163.33	898.58
2	Coimbatore	43.40	79.44	42.24	42.24	79.44	286.76
3	Cuddalore	1845.83	2274.74	2417.79	2618.80	2734.77	11891.93
4	Dharmapuri	2817.55	1798.30	1800.40	2173.60	2174.20	10764.05
5	Dindigul	114.08	120.80	132.69	152.96	182.71	703.23
6	Erode	772.88	776.88	776.88	776.88	776.88	3880.38
7	Kancheepuram	69.00	472.73	436.18	396.50	392.10	1766.50
8	Kanyakumari	0.00	0.00	0.00	0.00	0.00	0.00
9	Karur	317.03	816.51	898.95	1283.12	1379.20	4694.81
10	Krishnagiri	113.85	148.00	148.00	148.00	192.40	750.24
11	Madurai	131.63	138.83	142.58	148.03	155.43	716.48
12	Nagapattinam	66.07	66.07	66.07	66.07	66.07	330.35
13	Namakkal	249.36	203.21	202.96	202.96	203.03	1061.51
14	Perambalur	183.60	90.27	86.37	90.00	90.60	540.84
15	Pudukottai	368.02	401.13	411.17	419.74	428.46	2028.52
16	Ramanathapuram	0.00	0.00	0.00	0.00	0.00	0.00
17	Salem	8.00	8.00	8.00	8.00	8.00	40.00
18	Sivagangai	586.13	489.83	471.23	453.99	467.51	2468.69
19	Thanjavur	764.97	4187.85	4363.83	4610.87	6521.87	20449.39
20	Theni	665.80	666.61	668.68	670.50	672.98	3344.57
21	Thiruvarur	179.19	179.19	179.19	179.19	179.19	895.93
22	Thoothukudi	26.95	23.96	49.94	35.19	55.41	191.45
23	Tirunelveli	13.75	13.75	13.75	13.75	13.75	68.75
24	Tiruppur	105.25	119.25	125.45	131.66	144.06	625.67
25	Tiruvallur	16274.31	20170.09	22151.96	24150.70	24271.35	107018.41
26	Tiruvannamalai	4497.32	4832.75	5128.33	5725.83	5711.66	25895.88
27	Trichy	93263.52	93274.91	93292.33	93312.13	93322.02	466464.92
28	Vellore	180.94	180.94	180.94	180.94	180.94	904.70
29	Villupuram	4766.73	6382.83	6462.95	6688.63	6750.58	31051.71
30	Virudhunagar	22.58	15.86	22.22	31.06	37.42	129.14
	Total	**128826.16**	**138038.78**	**140796.92**	**144846.15**	**147355.34**	**699863.36**

Table 4.14 Component wise Proposed Budget for Enhancing Sugarcane Production

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Distribution of Gypsum (500 Kg/Ha)	Ha	0.02	D2, D3, D6, D7, D9, D12, D14, D18, D19, D22, D25, D26, D27, D28, D30	5561	111.22	16341	326.82	163825	327.65	16665.65	333.31	19060.615	381.21	74010.765	1480.22
2	Distribution of biofertilizer (Ha)	Ha	0.006	All districts except D8, D10, D14, D16, D23, D24, D25, D31	8941	53.65	18438.5	110.63	19126.25	114.76	19836.275	119.02	22364.6025	134.19	88706.6275	532.24
3	Distribution of weedicide (Ha)	Ha	0.01	All districts except D4, D7, D8, D9, D10, D14, D16, D23, D24, D29, D30	6216	62.16	11957.5	119.58	12274.25	122.74	13045.275	130.45	15791.6025	157.92	59284.6275	592.85
4	Distribution of Chip Cutter	Nos	0.05	D3, D5, D6, D9, D13, D15, D18, D19, D21, D23, D25, D26, D27, D28, D30, D31	1163	58.15	1693	84.65	1863	93.15	1913	95.65	2072	103.6	8704	435.2
5	Distribution of FeSO4 Spray	Ha	0.005	D3, D6, D9, D11, D12, D18, D19, D21, D22, D26, D27, D28,D30, D31	5901	29.51	11834.5	59.17	12275	61.38	10922.5	54.61	13781.5	68.91	54714.5	273.57
6	Distribution of ZnSO4 Spray	Ha	0.005	D3, D9, D6, D11, D18, D19,	5120	25.6	9717	48.59	9849	49.25	10227	51.14	12610	63.05	47523	237.62

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D21, D22, D26, D27, D28, D29, D31												
7	Distribution of Micro Nutrient Mixture	Ha	0.02	All districts except D8, D10, D13, D14, D15, D16, D23, D24, D25	5695.5	113.91	15954.5	319.09	16294.25	325.89	16874.775	337.5	19483.6025	389.67	74302.6275	1486.05
8	Distribution of Parasite Trichogramma	Ha	0.00125	D3, D5, D6, D9, D12, D13, D18, D19, D21, D24, D26, D27, D30	3996	5	13493	16.87	13668.25	17.09	14148.775	17.69	16854.6025	21.07	62160.6275	77.7
9	Distribution of Protray (2500 nos/ha)	Nos	0.0008	D3, D5, D6, D9, D13, D15, D19, D26, D27, D28	171224	136.98	191394	153.12	222698	178.16	243018	194.41	263530	210.82	1091864	873.49
10	Distribution of Sugarcane Booster (10 Kg/Ha)	Ha	0.035	D3, D5, D7, D9, D18, D19, D21, D26, D27, D18, D30	1596	55.86	7122	249.27	7185.25	251.48	7503.775	262.63	9840.6025	344.42	33247.6275	1163.67
11	Distribution of Sugarcane Harvester	Nos	75	D9, D19, D21, D26, D27, D28	264	19800	324	24300	353	26475	389	29175	393	29475	1723	129225
12	Distribution of Water Soluble Fertilizers	ha	0.25	D3, D6, D7, D9, D11, D15, D18, D19, D21, D23, D25, D26, D27, D28, D30	2519	629.75	7543	1885.75	7826	1956.5	7909	1977.25	10296	2574	36093	9023.25
13	Micro irrigation - Drip	ha	1.24	All districts except D8, D10, D16,	95372	11826.13	109455	13572.42	112121.5	13903.07	118039.65	14636.92	119959.615	14874.99	554947.765	68813.52

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	(1.2x0.6)			D17, D21, D24												
	Sustainable Sugarcane Initiative (SSI)				189	0	206	0	213	0	217	0	207	0	1032	0
14	A. Establishment of	Nos	1.5	All districts except D2, D8, D16, D17, D21, D31	1486	2229	694.8	1042.2	721.9	1082.85	744	1116	815.41	1223.12	4462.11	6693.17
15	B.Distribution of Single Bud Seedling	Ha	0.225	All districts except D2, D8, D16, D17, D21, D31	414194	93193.74	412491	92810.49	413180.6525	92965.65	413905.3126	93128.7	414722.386	93312.54	2068493.8	465411.11
16	Trash Mulching	Ha	0.04	All districts except D1, D2, D4, D7, D8, D16, D17	6408	256.32	16767	670.68	14532.25	581.29	15039.775	601.59	17772.1025	710.88	70519.1275	2820.77
17	Demonstration on intercropping in Sugarcane	Ha	0.08	All districts except D2, D4, D8, D11, D13, D14, D15, D16, D17, D23, D24, D31	2445	195.6	7634.8	610.78	7879.45	630.36	8135.155	650.81	10538.3805	843.07	36632.7855	2930.62
18	Breeder seed production in sugarcane / Promotion of new variety /Varietal rejuvenation	Ha	0.4	D19, D26	50	20	4075	1630	4080	1632	4085	1634	6085	2434	18375	7350
19	Strengthening of sugarcane tissue culture	No	150	D27	0	0	0	0	0	0	2	300	0	0	2	300

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	laboratory															
20	State Level training in Sugarcane cultivation	No	0.4	D3, D9, D10, D11, D12, D19, D22, D26, D23, D27	59	23.6	71.7	28.68	71.7	28.68	73.7	29.48	82.21	32.88	358.31	143.32
	Total					**128826.18**		**138038.79**		**140796.95**		**144846.16**		**147355.34**		**699863.37**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11- Madurai, D12-Nagapatinam, 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

4.1.8 INCREASING PRODUCTIVITY OF COTTON

Cotton, popularly known as white gold, is cultivated in 1.22 lakh hectares of which nearly 65 percent of area is under rainfed condition. The State productivity of cotton crop revolves around 3.00 to 3.50 qtls (lint) per hectare as compared to the neighbouring State's productivity of 5-6 qtls per hectare. The productivity of cotton depends on the quality of seeds especially on genetic and physical purity, adoption of Integrated Nutrient Management, Integrated Pest Management practices and other post harvest technologies. Hence emphasizes is given to quality seed procurement and distribution of certified seeds, supply of bio agents, distribution of micro nutrient mixture, and training programmes to the cotton growers in the usage of INM/IPM technologies. Precision farming and distribution of power sprayers, battery operated power sprayers and cotton picking machine. The overall budget to undertake the various interventions are shown in Table 4.15.

Table 4.15 District wise Proposed Budget for Enhancing Cotton Production

(Rs. in lakh)

Sl.No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	45.40	47.68	52.47	60.39	72.45	278.39
2	Coimbatore	4.71	7.15	7.15	7.15	7.15	33.31
3	Cuddalore	48.61	398.27	435.54	468.93	499.88	1851.23
4	Dharmapuri	68.20	76.80	86.00	103.70	107.70	442.40
5	Dindigul	273.47	286.74	312.15	353.88	418.60	1644.84
6	Erode	2.87	2.87	2.87	2.87	2.87	14.36
7	Kancheepuram	0.00	0.00	0.00	0.00	0.00	0.00
8	Kanyakumari	0.00	0.00	0.00	0.00	0.00	0.00
9	Karur	0.00	0.00	0.00	0.00	0.00	0.00
10	Krishnagiri	128.00	166.40	166.40	166.40	216.32	843.52
11	Madurai	45.57	46.20	46.83	47.46	48.09	234.15
12	Nagapattinam	0.00	174.48	230.88	276.88	306.08	988.32
13	Namakkal	0.80	35.70	35.93	36.25	36.53	145.19
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	308.45	165.03	169.01	171.74	174.47	988.70
16	Pudukottai	0.00	0.00	0.00	0.00	0.00	0.00
17	Ramanathapuram	145.18	145.18	145.18	145.18	145.18	725.88
18	Salem	92.56	92.56	92.56	92.56	92.56	462.79
19	Sivagangai	0.00	0.00	0.00	0.00	0.00	0.00
20	Thanjavur	85.71	195.18	220.75	246.22	271.69	1019.55
21	Theni	160.63	175.11	189.35	203.38	218.15	946.63
22	Thiruvallur	0.00	0.00	0.00	0.00	0.00	0.00
23	Thiruvannamalai	0.00	0.00	0.00	0.00	0.00	0.00
24	Thiruvarur	158.52	278.01	332.66	371.66	396.06	1536.91
25	Thoothukudi	30.06	56.11	57.16	57.68	58.67	259.67
26	Tirunelveli	83.57	83.57	83.97	101.57	121.57	474.23
27	Tiruppur	0.00	0.00	0.00	0.00	0.00	0.00
28	Trichy	96.39	97.02	98.06	100.56	103.70	495.72
29	Vellore	47.28	47.28	47.28	47.28	47.28	236.40
30	Villupuram	6.60	16.50	20.79	24.75	27.72	96.36
31	Virudhunagar	228.42	256.70	263.70	265.11	266.56	1280.49
	Total	**2060.98**	**2850.50**	**3096.68**	**3351.59**	**3639.27**	**14999.01**

Table 4.16 Component wise Proposed Budget for Enhancing Cotton Production

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Cotton seed treatment	Ha	300	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	1615	4.85	2660	7.98	3455	10.37	3659	10.98	3891	11.67	15280	45.84
2	Demonstrati on of IPT	Ha	1500 0	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	1462	219.3	702	105.3	726	108.9	749	112.35	777	116.55	4416	662.4
3	Distribution of biofertilizer	Ha	300	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	10899	32.7	12377	37.13	13846	41.54	15263	45.79	15955	47.87	68340	205.02
4	Distribution of biopesticide s / Bio agents	Ha	1000	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	9346	93.46	9492	94.92	10265	102.65	12170	121.7	12730	127.3	54003	540.03
5	Distribution of cotton picking machine	No	5000	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	325	16.25	404	20.2	414	20.7	434	21.7	526	26.3	2103	105.15
6	Distribution of MN Mixture	Ha	1000	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	7129	71.29	8916	89.16	9435	94.35	9709	97.09	10358	103.58	45547	455.47
7	Distribution of	No	6000	All districts except	1410	84.6	2336	140.16	2445	146.7	2556	153.36	2750	165	11497	689.82

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Pheromone trap			D7,D8,D9, D14,D16,D 19,D22,D2 3,D25												
8	Distribution of PP chemicals	Ha	1000	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	9666	96.66	11167	111.67	14352	143.52	15556	155.56	16455	164.55	67196	671.96
9	Distribution of Yellow Sticky trap	No	3000	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	1605	48.15	2465	73.95	2739	82.17	2924	87.72	3195	95.85	12928	387.84
10	Exposure visits	No	4000 0	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	54	21.6	78.2	31.28	80.2	32.08	86.2	34.48	90.76	36.3	389.36	155.74
11	Farmers training	No	2000 0	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	89	17.8	132.2	26.44	138.2	27.64	143.2	28.64	151.76	30.35	654.36	130.87
12	Field days	No	1000 0	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	73	7.3	102	10.2	107	10.7	111	11.1	123.8	12.38	516.8	51.68
13	Intercroppin g w ith pulses	Ha	1000 0	All districts except D7,D8,D9, D14,D16,D 19,D22,D2 3,D25	2454	245.4	3629	362.9	4135	413.5	4596	459.6	5154	515.4	19968	1996.8
14	Promotion of precision farming in	Ha	5000 0	All districts except D7,D8,D9,	271	135.5	298	149	325	162.5	392.5	196.25	460	230	1746.5	873.25

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	cotton -WSF			D14,D16,D19,D22,D23,D25												
15	Soil reclamation with gypsum	Ha	1000	All districts except D7,D8,D9, D14,D16,D19,D22,D23,D25	1015	10.15	2305	23.05	5660	56.6	6810	68.1	6860	68.6	22650	226.5
16	Foundation seed production	MT	111300	All districts except D7,D8,D9, D14,D16,D19,D22,D23,D25	1.75	1.95	2.05	2.28	2.35	2.62	2.65	2.95	3	3.34	11.8	13.13
17	Certified seed production	MT	107900	All districts except D7,D8,D9, D14,D16,D19,D22,D23,D25	16.75	18.07	17	18.34	17.15	18.5	17.3	18.67	17.5	18.88	85.7	92.47
18	TNAU Cotton plus distribution (6 Kg./ Ha)	Ha	1200	All districts except D7,D8,D9, D14,D16,D19,D22,D23,D25	1960	23.52	3427	41.12	4256	51.07	5090	61.08	5933	71.2	20666	247.99
19	Frontline demo on ICM in cotton	Ha	7000	All districts except D7,D8,D9, D14,D16,D19,D22,D23,D25	230	16.1	269	18.83	280	19.6	283	19.81	300	21	1362	95.34
20	Frontline Demo on Desi and ELS cotton seed production	Ha	8000	All districts except D7,D8,D9, D14,D16,D19,D22,D23,D25	10	0.8	44	3.52	49	3.92	49	3.92	49	3.92	201	16.08
21	Trials on High Density Planting system in	Ha	9000	All districts except D7,D8,D9, D14,D16,D	272	24.48	544	48.96	561	50.49	582	52.38	597	53.73	2556	230.04

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	cotton			19,D22,D23,D25												
22	Application of weedicide	Ha	3000	All districts except D7,D8,D9,D14,D16,D19,D22,D23,D25	3790	113.7	4790	143.7	5097	152.91	5553	166.59	6186	185.58	25416	762.48
23	Spraying of growth regulator	Ha	3000	All districts except D7,D8,D9,D14,D16,D19,D22,D23,D25	651	19.53	1421	42.63	1488	44.64	2155	64.65	2217	66.51	7932	237.96
24	Topping of cotton	Ha	1000	All districts except D7,D8,D9,D14,D16,D19,D22,D23,D25	2950	29.5	4780	47.8	5081	50.81	5620	56.2	6423	64.23	24854	248.54
25	Summer ploughing	Ha	7500	All districts except D7,D8,D9,D14,D16,D19,D22,D23,D25	7400	555	13894	1042.05	14491	1086.83	15148	1136.1	16412	1230.9	67345	5050.88
26	Distribution of Certified seed	MT	115000	All districts except D7,D8,D9,D14,D16,D19,D22,D23,D25	35.5	40.83	39.5	45.43	42.5	48.88	45.5	52.33	48.5	55.78	211.5	243.23
27	Distribution of Hybrid seed	MT	2500000	All districts except D7,D8,D9,D14,D16,D19,D22,D23,D25	4.5	112.5	4.5	112.5	4.5	112.5	4.5	112.5	4.5	112.5	22.5	562.5
	Total					**2060.99**		**2850.5**		**3096.69**		**3351.6**		**3639.27**		**14999.01**

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- The Nilgiris, D15-Perambalur, D16-Pudukkottai, D17-Ramanathapuram, D18-Salem, D19-Sivagangai, D20-Thanjavur, , D21- Theni, D22-Thiruvallur, D23-Thiruvannamalai, D24-Thiruvarur, D25-Thoothukudi, D26-Tirunelveli, D27-Tiruppur, D28-Trichy, D29-Vellore, D30-Villupuram, D31-Virudhunagar

4.1.9 Capacity Building

Capacity Building Programme is to strengthen the capacities of farmers, indigenous and local communities, and their organizations and other stakeholders, to manage sustainably agricultural biodiversity so as to increase their benefits, and to promote awareness and responsible action, in the form of trainings, demonstrations, exposure visits, etc. Promotion of innovation in application of information communication technology in agriculture and dissemination of knowledge plays a critical role in knowledge-based growth of agriculture. Therefore, it is imperative to update the professional skills of farmers and extension specialists in the latest knowledge and techniques in the field of their specialization to bring about the desired qualitative improvement and necessary orientation to contemporary problems to make research and education more relevant. The overall budget to undertake the various interventions are shown in Table 4.17.

Table 4.17 District wise Proposed Budget for Capacity Building

(Rs. in lakh)

S.No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	21.00	21.00	21.00	21.00	21.00	105.00
2	Coimbatore	1.80	10.55	2.00	2.00	2.00	18.35
3	Cuddalore	131.69	133.73	135.13	136.48	135.73	672.76
4	Dharmapuri	53.20	53.20	53.20	53.20	53.20	266.00
5	Dindigul	16.45	16.45	16.45	16.45	16.45	82.25
6	Erode	39.57	39.57	39.57	39.57	39.57	197.85
7	Kancheepuram	0.00	0.00	0.00	0.00	0.00	0.00
8	Kanyakumari	4.80	4.80	4.80	4.80	4.80	24.00
9	Karur	156.40	156.50	156.40	156.40	156.50	782.20
10	Krishnagiri	62.95	115.40	83.50	84.45	121.40	467.70
11	Madurai	10.45	16.20	15.00	16.55	16.00	74.20
12	Nagapattinam	248.69	245.82	270.21	284.61	284.61	1333.94
13	Namakkal	0.00	13.69	13.99	13.69	13.99	55.35
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	20.00	20.00	20.00	20.00	20.00	100.00
16	Pudukkottai	50.46	50.46	50.46	50.46	50.46	252.30
17	Ramanathapuram	47.30	47.30	47.30	47.30	47.30	236.50
18	Salem	95.70	95.70	95.70	95.70	95.70	478.50
19	Sivagangai	82.21	82.21	82.21	82.21	82.21	411.05
20	Thanjavur	27.73	41.22	45.32	57.08	69.18	240.53
21	Theni	18.88	18.88	18.88	18.88	18.88	94.40
22	Thiruvallur	125.72	139.71	143.60	123.79	123.59	656.41
23	Thiruvannamalai	143.78	146.55	137.79	144.30	139.51	711.93
24	Thiruvarur	231.20	222.20	231.20	231.20	231.20	1147.00
25	Thoothukudi	50.48	50.48	50.58	50.48	50.48	252.50
26	Tirunelveli	67.00	67.00	67.00	67.00	280.08	548.08
27	Tiruppur	20.23	23.20	23.30	23.30	23.30	113.33
28	Trichy	239.50	328.86	416.92	504.98	593.04	2083.30
29	Vellore	118.80	164.80	114.80	164.80	114.80	678.00
30	Villupuram	299.20	496.80	496.80	496.80	496.80	2286.40
31	Virudhunagar	20.20	48.16	52.26	64.71	69.91	255.24
	Total	**2405.39**	**2870.44**	**2905.37**	**3072.19**	**3371.69**	**14625.07**

Table 4.18 Component wise Proposed Budget for Capacity Building

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Training Extension Functionaries**															
1	Inter State Training of Extension functionaries	Nos.		D16, D29	3.00	2.25	5.00	3.75	8.00	6.00	7.00	5.25	8.00	6.00	31.00	23.25
2	Within the State Training of Extension functionaries	Nos.		D29	5.00	4.50	5.00	4.50	5.00	4.50	5.00	4.50	5.00	4.50	25.00	22.50
3	Paddy	Nos.		D16, D28, D29	10.00	9.00	26.00	23.40	28.00	25.20	30.00	27.00	32.00	28.80	126.00	113.40
4	Major & Minor Millets	Nos.		D16, D28	14.00	12.60	21.00	18.90	21.00	18.90	21.00	18.90	21.00	18.90	98.00	88.20
5	Pulses	Nos.		D16, D28	17.00	15.30	21.00	18.90	21.00	18.90	21.00	18.90	21.00	18.90	101.00	90.90
6	Sugarcane	Nos.		D16, D28	7.00	6.30	14.00	12.60	14.00	12.60	14.00	12.60	14.00	12.60	63.00	56.70
7	Cotton	Nos.		D16, D28, D29	6.00	5.40	10.00	9.00	10.00	9.00	10.00	9.00	10.00	9.00	46.00	41.40
8	Groundnut	Nos.		D16, D28	10.00	9.00	21.00	18.90	21.00	18.90	21.00	18.90	21.00	18.90	94.00	84.60
9	oil Palm			D16, D28	10.00	9.00	21.00	18.90	21.00	18.90	21.00	18.90	21.00	18.90	94.00	84.60
10	IFS	Nos.		D16, D28	10.00	9.00	21.00	18.90	21.00	18.90	21.00	18.90	21.00	18.90	94.00	84.60
11	Moisture conservation practices	Nos.		D16, D28, D29	16.00	14.40	27.00	24.30	26.00	23.40	27.00	24.30	27.00	24.30	123.00	110.70
12	Value addition training			D16, D28, D29	12.00	10.80	23.00	20.70	22.00	19.80	23.00	20.70	23.00	20.70	103.00	92.70
13	Organic cultivation practices	Nos.		D16, D28, D29	99.00	89.10	230.00	207.00	231.00	207.90	234.00	210.60	236.00	212.40	1030.00	927.00
14	Awareness campaigns			D28	180.00	1.80	390.00	3.90	390.00	3.90	390.00	3.90	390.00	3.90	1740.00	17.40
15	Training of Technical Staff in STL / MSTL	Nos.		D16	2.00	1.20	2.00	1.20	2.00	1.20	2.00	1.20	2.00	1.20	10.00	6.00
16	Training of	Nos		D16, D29	3.00	0.60	3.00	0.60	3.00	0.60	3.00	0.60	3.00	0.60	15.00	3.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Extension functionaries on Soil Testing and balanced Nutrition	.														
17	Refresher Training of all ATMA functionaries	Nos.		D16, D29	1.00	1.20	2.00	2.40	2.00	2.40	3.00	3.60	3.00	3.60	11.00	13.20
18	**District Level**															
19	**Training of Farmers**															
20	Intra State Training of Farmers	Nos.	Rs.1,25,000/- (20 Farmers x 5days x Rs.1250/- per day)	All districts except D2, D5, D7, D12, D24, D25	208.00	260.00	277.00	346.25	247.00	308.75	302.00	377.50	284.00	355.00	1318.00	1647.50
21	Inter State Training of Farmers	Nos.	Rs.1,75,000/- (20 Farmers x 7days x Rs.1250/- per day)	All districts except D1, D2, D5, D6, D7, D12, D14, D15, D17, D19, D23, D24, D25, D27	109.00	190.75	140.00	245.00	147.00	257.25	165.00	288.75	184.00	322.00	745.00	1303.75
22	Training of 536 Groups of Seed Village Farmers in quality Seed Production technology.	Nos.	Rs.10,000/- (40 Farmers x 1day x Rs.250/- per day)	All districts except D1, D5, D7, D9, D10, D12, D14, D15	564.00	56.40	609.00	60.90	620.00	62.00	630.00	63.00	640.00	64.00	3063.00	306.30
23	Training of Farmers under Mission Soil	Nos.	Rs.15,000/- (30	All districts except D1, D5, D10,	587.00	88.05	619.00	92.85	623.00	93.45	637.00	95.55	662.00	99.30	3128.00	469.20

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Health Card		Farmers x 2days x Rs.250/- per day)	D12,												
24	Within the district training of Farmers	Nos.	Rs.10,000/- (40 Farmers x 1day x Rs.250/- per day)	All districts except D1, D4, D12, D16, D27	810.00	81.00	873.00	87.30	876.00	87.60	890.00	89.00	907.00	90.70	4356.00	435.60
25	Within the State training of Farmers	Nos.	Rs.1,20,000/- (40 Farmers x 3days x Rs.1000/- per day)	All districts except D5, D7, D12	340.00	408.00	389.20	467.04	399.00	478.80	427.00	512.40	518.00	621.60	2073.20	2487.84
	Training of Farmers Within the district															
26	Awareness campaigns	Nos.	Rs.10,000/- (40 Farmers x 1day x Rs.250/- per day)	All districts except D1, D2, D7, D13, D14, D15, D25, D28	1096.00	109.60	1137.20	113.72	1154.20	115.42	1170.20	117.02	1235.20	123.52	5792.80	579.28
27	Cotton	Nos.	Rs.10,000/- (40 Farmers x 1day x	D3, D7, D10, D11, D12, D13, D16, D18, D19, D20, D21, D22,	263.00	26.30	274.20	27.42	278.20	27.82	283.20	28.32	359.20	35.92	1457.80	145.78

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
			Rs.250 /- per day)	D24, D29												
28	Groundnut	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D1, D2, D5, D7, D8, D13, D15, D18, D28, D29	357.00	35.70	399.20	39.92	412.20	41.22	423.20	42.32	518.20	51.82	2109.80	210.98
29	IFS	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D2, D4,D5, D7, D10, D13, D14, D15, D18, D23, D29	380.00	38.00	404.00	40.40	395.00	39.50	404.00	40.40	424.00	42.40	2007.00	200.70
30	Major & Minor Millets	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D6, D7, D14, D15, D28	493.00	49.30	514.20	51.42	526.40	52.64	536.20	53.62	623.20	62.32	2693.00	269.30
31	Moisture conservation practices	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D2, D4, D5, D7, D10, D12, D13, D14, D15, D28	350.00	35.00	334.00	33.40	390.00	39.00	404.00	40.40	500.00	50.00	1978.00	197.80
32	oil Palm	Nos.	Rs.10, 000/- (40 Farme	D3, D6, D8, D9, D10, D11, D16, D18,	207.00	20.70	233.00	23.30	245.00	24.50	257.00	25.70	354.00	35.40	1296.00	129.60

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
			rs x 1day x Rs.250 /- per day)	D19, D20, D21, D22, D24, D26												
33	Organic cultivation practices	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D4, D5, D7, D10, D12, D13, D14, D15, D29	522.00	52.20	467.00	46.70	566.00	56.60	577.00	57.70	603.00	60.30	2735.00	273.50
34	Paddy	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D1	649.00	64.90	706.30	70.63	715.40	71.54	728.20	72.82	754.20	75.42	3553.10	355.31
35	Pulses	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D2, D15, D28, D29	705.50	70.55	740.70	74.07	754.70	75.47	767.70	76.77	826.70	82.67	3795.30	379.53
36	Sugarcane	Nos.	Rs.10, 000/- (40 Farmers x 1day x Rs.250 /- per day)	All districts except D1, D2, D4, D14, D15, D18, D25, D26, D27	350.00	35.00	363.20	36.32	370.20	37.02	369.20	36.92	444.20	44.42	1896.80	189.68
37	Value addition training	Nos.	Rs.10, 000/-	All districts except D1,	496.00	49.60	446.00	44.60	550.00	55.00	566.00	56.60	646.00	64.60	2704.00	270.40

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
			(40 Farmers x 1day x Rs.250/- per day)	D2, D5, D7, D10, D12, D13, D15, D19												
	Exposure visit of Farmers			D7, D24, D28	7.00	2.80	7.00	2.80	7.00	2.80	7.00	2.80	79.00	31.60	107.00	42.80
39	Rodent Pest Management Demonstration	Nos.	Rs. 4000/- per Unit	All districts except D1, D2, D7, D12, D13	2482.00	99.28	2516.00	100.64	2527.00	101.08	2556.00	102.24	2606.00	104.24	12687.00	507.48
40	With in State Exposure visit (50 Farmers x 2days x Rs.400/- per day)	Nos.	Rs.40,000/-	All districts except D2, D7	540.40	216.16	583.60	233.44	595.60	238.24	603.60	241.44	705.60	282.24	3028.80	1211.52
41	Organization of Kisan gosthies on Soil test based nutrient application (Campaign)	Nos.	Rs.15,000/- (100 Farmers x 1day)	All districts except D1, D2, D5, D7, D10, D25	705.00	105.75	724.00	108.60	750.00	112.50	758.00	113.70	808.00	121.20	3745.00	561.75
42	Within the district exposure visit	Nos.	Rs.15,000/- (50 Farmers x 1day x Rs.300/- per day)	All districts	726.00	108.90	772.45	115.87	774.45	116.17	796.45	119.47	859.45	128.92	3928.80	589.32
	Total					**2405.39**		**2870.44**		**2905.37**		**3072.19**		**3371.69**		**14625.07**

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

4.1.10 Strengthening of Infrastructure facilities

In order to enhance the production and productivity of crops, the infrastructure facilities have to be strengthened sufficiently. Hence, emphasis is given for Integrated Agriculture Extension centre (IAEC), State Seed Farm (SSF), Pesticide Testing Laboratory (PTL), establishing bio-units, encouraging organic agriculture and establishing extension service centres to offer training to extension personnel, exposure visit to different States and other countries by the extension personnel and farmer groups, etc. The overall budget to undertake the various interventions are shown in Table 4.19.

Table 4.19 District wise Proposed Budget for Infrastructure

(Rs. in lakh)

Sl.	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	64.85	514.85	14.85	14.85	14.85	624.25
2	Coimbatore	0.00	274.00	550.00	774.00	0.00	1598.00
3	Cuddalore	568.75	1108.95	1248.75	628.75	698.95	4254.15
4	Dharmapuri	0.00	599.73	50.00	600.00	0.00	1249.73
5	Dindigul	0.00	125.33	25.00	503.38	54.05	707.75
6	Erode	2010.00	300.00	0.00	0.00	500.00	2810.00
7	Kancheepuram	0.00	352.90	229.75	687.75	191.25	1461.65
8	Kanyakumari	6.00	39.05	523.10	0.60	51.65	620.40
9	Karur	822.50	738.58	86.50	250.00	62.50	1960.08
10	Krishnagiri	4.50	2790.88	1258.00	288.00	815.40	5156.78
11	Madurai	67.48	43.05	35.63	535.25	86.00	767.40
12	Nagapattinam	1931.50	833.65	216.25	152.25	203.75	3337.40
13	Namakkal	30.00	66.00	130.00	155.00	180.00	561.00
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	581.13	0.00	50.00	4.13	12.00	647.25
16	Pudukottai	215.45	287.30	510.50	60.50	41.45	1115.20
17	Ramanathapuram	112.65	123.25	58.25	508.25	8.25	810.65
18	Salem	176.88	505.00	93.38	5.00	97.00	877.25
19	Sivagangai	0.00	2783.30	500.00	0.00	12.00	3295.30
20	Thanjavur	3671.03	587.60	564.43	529.85	3.30	5356.20
21	Theni	2355.00	305.93	4.00	504.00	4.00	3172.93
22	Thiruvallur	1202.25	846.90	449.15	479.26	944.79	3922.35
23	Thiruvannamalai	2406.53	1568.88	2172.73	2055.95	2171.70	10375.78
24	Thiruvarur	2260.85	257.25	316.55	191.55	259.05	3285.25
25	Thoothukudi	40.75	1491.15	56.00	557.58	55.75	2201.23
26	Tirunelveli	384.80	196.05	630.05	141.45	74.95	1427.30
27	Tiruppur	30.00	1030.00	50.00	500.00	0.00	1610.00
28	Trichy	65.00	50.00	500.00	0.00	0.00	615.00
29	Vellore	89.50	1900.00	501.50	50.00	189.50	2730.50
30	Villupuram	250.00	1600.00	550.00	1000.00	500.00	3900.00
31	Virudhunagar	387.40	311.50	305.00	505.00	5.00	1513.90
	Total	**19684.78**	**21281.05**	**11129.35**	**11382.34**	**6987.136**	**70464.65**

Table 4.20 Component wise Proposed Budget for Infrastructure

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Nos.	6000000	All districts except D14	0	0.00	2	120.00	0	0.00	0	0.00	0	0.00	2	120.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	production unit															
10	Strengthening of Biofertilizer Quality Control Laboratory	Nos.	3000000	All districts except D14	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
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

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
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 and other amenities	Nos.	200000	All districts except D14	189	378.00	248	495.00	148	296.10	148	295.31	165	329.04	897	1793.45
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 demonstration 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
	Total					**19684.78**		**21281.05**		**11129.35**		**11382.34**		**6987.14**		**70464.65**

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

4.1.11 Rain fed area development programme

Tamil Nadu has a total geographical area of 13 million hectares of which six million hectares are cultivable. Dry land farming occupies a predominant place consisting nearly 56 percent of net cultivated area. Dry farming supports more than 50 percent of the population of Tamil Nadu. Further year to year variation in total amount of rainfall and skewed distribution of rainy days in a year are the major constraints in improving the productivity of rainfed crops. Hence, ways and means to conserve soil mixture and excess rainwater and utilize the excess water for increasing of agricultural production is thought of. Drought resistant and short duration varieties of pulses and groundnut are suggested for cultivation in these rainfed areas. The everlasting green revolution is possible only by reviving rainfed farming by way of rejuvenating the water storage structures and adopting the rain water harvesting techniques.

Budget: The overall budget to undertake the various interventions is **₹ 90555.50** lakh as shown in Table 4.21.

Table 4.21 District wise Proposed Budget for Rainfed area development

(Rs. in lakh)

S. No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	1239.30	231.00	255.20	292.60	352.00	2370.10
2	Coimbatore	330.00	1082.55	275.00	220.00	110.00	2017.55
3	Cuddalore	1817.18	1647.30	1392.47	1222.59	1222.59	7302.13
4	Dharmapuri	440.00	0.00	385.00	0.00	385.00	1210.00
5	Dindigul	2226.68	1632.09	18.25	18.30	18.36	3913.68
6	Erode	275.50	275.58	275.58	275.58	275.58	1377.82
7	Kancheepuram	0.00	2.04	2.51	2.98	3.45	10.98
8	Kanyakumari	0.00	0.00	0.00	0.00	0.00	0.00
9	Karur	679.53	1.35	87.78	29.96	10.10	808.72
10	Krishnagiri	2024.98	2032.48	2307.48	2032.48	2032.48	10429.91
11	Madurai	1274.12	424.71	0.00	0.00	0.00	1698.83
12	Nagapattinam	0.00	0.00	0.00	0.00	0.00	0.00
13	Namakkal	849.42	2123.54	1444.01	84.94	0.00	4501.90
14	Perambalur	1138.17	1193.17	1212.42	374.00	385.00	4302.75
15	Pudukottai	537.95	539.55	543.75	549.55	553.35	2724.15
16	Ramanathapuram	1166.81	1834.82	1644.90	1803.10	1957.45	8407.07
17	Salem	2823.25	1719.01	275.00	275.00	275.00	5367.25
18	Sivagangai	755.07	1194.32	489.92	235.30	320.44	2995.05
19	Thanjavur	0.00	0.00	0.00	0.00	0.00	0.00
20	Theni	11.85	11.85	11.85	11.85	9.78	57.18
21	Thiruvarur	0.00	0.00	0.00	0.00	0.00	0.00
22	Thoothukudi	1745.32	2989.39	468.64	441.24	441.34	6085.93
23	Tirunelveli	254.82	1104.24	1104.24	849.42	0.00	3312.72
24	Tiruppur	166.48	1059.68	125.36	125.40	125.44	1602.36
25	Tiruvallur	5.65	5.66	5.66	5.67	5.67	28.32
26	Tiruvannamalai	3041.70	2808.90	2012.00	2220.70	3273.90	13357.20
27	Trichy	596.05	1111.20	186.59	196.55	206.73	2297.11
28	Vellore	0.00	1100.00	0.00	0.00	1100.00	2200.00
29	Villupuram	0.00	27.50	0.00	0.00	0.00	27.50
30	Virudhunagar	594.59	1335.12	73.20	73.20	73.20	2149.31
	Total	**23994.41**	**27487.01**	**14596.81**	**11340.41**	**13136.86**	**90555.50**

Table 4.22 Component wise Proposed Budget for Rainfed area development

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Stress Management in crops by the Application of Pink Pigmented Facultative Methylotrophs (PPFM spray)/ Kcl Spray	Ha	0.004	D5, D6, D9, D15, D16, D18, D21, D23, D25, D26, D27, D28	7508	30.03	9015	36.06	11119	44.48	14888	59.55	17397	69.59	59927	239.71
2	Milch Animal (1 no) + 1 ha cropping farming system (Cropping system with inter crop & border plantation like castor/sesbania etc.) @ Rs.27500/ as subsidy per Unit	Ha	0.55	All districts except D5, D8, D11, D12, D13, D19, D24	7952	4373.60	8684	4776.20	8354	4594.70	7138	3925.90	9739	5356.45	41867	23026.85
3	Small ruminant (9+1)+ 1 ha Tree based farming system (Cropping system with inter crop & border plantation like	Ha	0.47	D3, D5, D7, D10, D16, D18, D21, D23, D25, D27, D28	2936	1379.92	3333	1566.51	3714	1745.58	4135	1943.45	4730	2223.10	18848	8858.56

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	castor/sesbania etc.) @ Rs.23500/ as subsidy per Unit															
4	Organic Mulching	Ha	0.06	D5, D9, D6, D10, D21, D27, D28	923	55.38	1023	61.38	1714	102.84	1724	103.44	2384	143.04	7768	466.08
5	Creation of Farm pond	Nos.	0.75	D2, D5, D9, D10, D15, D16, D18, D23, D25, D27, D28, D31	1802	1351.50	2076	1557.00	2256	1692.00	2356	1767.00	3457	2592.75	11947	8960.25
6	Soil Moisture conservation strategies(contour bunding/Dust mulching/Polythene mulch etc.)	Ha.	0.1	D5, D6, D9, D10, D27, D28	705	70.50	1232	123.20	1273	127.30	1347	134.70	1903	190.30	6460	646.00
7	Promotion of Farmers club for Sustainable Dryland Agriculture	Cluster	84.9415	All districts except D4, D6, D7, D8, D12, D15, D19, D21, D22, D26, D29, D30	197	16733.48	228	19366.66	74.05	6289.92	40.1025	3406.37	30.15763	2561.63	569.3101	48358.06
	Total					**23994.41**		**27487.01**		**14596.82**		**11340.41**		**13136.86**		**90555.51**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11- Madurai, D12-Nagapatinam, 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

4.1.12 Soil Health Management

It has been observed that the average productivity of major crops in Tamil Nadu is only about 60 percent of the potential yield. The reason may be due to decline in organic matter content of the soil of the State leading to low soil fertility. The availability of organic manures to farmers has become scanty and costly. The importance of FYM/Green manuring in maintaining the organic matter status of the soil has to be educated to the farmers. The total production of bio-fertilizers has to be stepped up to meet the growing demand. Similarly, crop based micronutrient mixtures need to be promoted. Soil amendments *viz.,* gypsum and lime have to be provided at a subsidized rate as a reclamation measure for the cultivable acid and alkali soils. Besides, efficient earthworm cultures should be provided for Vermicompost unit by providing subsidy for establishment of Vermicompost units with training in Vermicompost.

Project Component:

- Reclamation of acid and alkali soils
- Production of enriched FYM and composting of farm waste through *Pluerotus*
- Distribution of enriched press mud and blue green algae
- Establishment of permanent and HDPE Vermicompost units
- Establishment of model organic villages
- Adoption of PGS certification through cluster approach
- Strengthening of soil survey and land use organization units
- Distribution of soil health card

Budget:

Enhancing soil health by distributing enriched farm yard manure, micro-nutrient mixture, gypsum, bio-fertilizers, *etc.* is essential to maximize profitability. The overall budget to undertake the various interventions is **₹ 35913.67 lakh**.

Table 4.23 District wise Proposed Budget for Soil Health Management

(Rs. in lakh)

Sl. No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	61.40	63.62	71.81	82.97	98.02	377.828
2	Coimbatore	37.40	120.44	120.44	120.44	120.44	519.16
3	Cuddalore	191.71	239.91	232.97	242.20	247.48	1154.27
4	Dharmapuri	58.02	92.18	96.50	96.50	96.50	439.70
5	Dindigul	35.93	37.43	39.98	44.51	51.10	208.96
6	Erode	45.78	43.78	43.78	43.78	43.78	220.90
7	Kancheepuram	0.00	0.00	0.00	0.00	0.00	0.00
8	Kanyakumari	41.71	41.72	17.72	17.72	17.72	136.59
9	Karur	262.21	264.72	70.46	73.25	78.76	749.40
10	Krishnagiri	273.83	363.53	273.83	275.49	275.73	1462.39
11	Madurai	690.24	664.60	682.60	681.94	684.80	3404.18
12	Nagapattinam	223.57	279.77	369.05	279.05	279.05	1430.47
13	Namakkal	3.98	17.09	17.09	17.09	17.09	72.32
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	32.88	38.64	39.44	44.40	46.88	202.24
16	Pudukottai	628.38	853.72	269.05	269.05	269.05	2289.25
17	Ramanathapuram	384.95	675.00	571.70	710.20	718.10	3059.95
18	Salem	79.35	84.35	85.35	85.35	86.35	420.73
19	Sivagangai	258.15	277.85	309.85	296.85	311.85	1454.55
20	Thanjavur	130.81	169.42	298.53	221.03	255.53	1075.32
21	Theni	99.18	99.18	99.18	99.18	99.18	495.92
22	Thiruvallur	247.77	260.86	290.83	297.52	326.12	1423.10
23	Thiruvannamalai	879.86	1004.14	1248.35	1411.65	1549.10	6093.11
24	Thiruvarur	260.65	260.65	360.65	260.65	260.65	1403.25
25	Thoothukudi	137.26	146.74	153.70	159.31	155.20	752.21
26	Tirunelveli	37.86	24.00	24.40	24.35	24.35	134.95
27	Tiruppur	255.29	388.71	309.79	323.51	315.78	1593.09
28	Trichy	164.42	144.02	151.43	174.98	178.53	813.38
29	Vellore	40.00	40.00	52.40	40.00	40.00	212.40
30	Villupuram	174.66	1074.96	912.00	912.00	912.00	3985.62
31	Virudhunagar	60.93	65.76	67.92	66.92	66.92	328.45
	Total	**5798.17**	**7836.78**	**7280.79**	**7371.88**	**7626.05**	**35913.67**

Table 4.24 Component wise Proposed Budget for Soil Health Management

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Permanent Vermi compost units	Cluster Nos.	1495000	All districts except D7,D14	861	430.50	968	484.00	1090	545.00	1113	556.50	1235	617.50	5267	2633.50
2	HDPE Vermi compost units	Kit Nos	200	All districts except D7,D14	935	112.20	1223	146.76	1344	161.28	1503	180.36	1592	191.04	6597	791.64
3	Reclamation of Alkali Soil	MT	1000	All districts except D7,D14	1096	548.00	2361	1180.50	2578	1289.00	2539	1269.50	2571	1285.50	11145	5572.50
4	Reclamation of Acid Soil	L. No.	300	All districts except D7,D14	639	38.34	687	41.22	887	53.22	922	55.32	977	58.62	4112	246.72
5	Empowering the entrepreneurship for seed production / green manuring	Nos	1000000	All districts except D7,D14	28420	1136.80	42241	1689.64	41669	1666.76	45044	1801.76	46467	1858.68	203841	8153.64
6	Establishment of Model organic villages	Ha	4000	All districts except D7,D14	110	1100.00	147	1470.00	161	1610.00	134	1340.00	140	1400.00	692	6920.00
7	Adoption of PGS certification through cluster approach	Nos	12000	All districts except D7,D14	29	433.55	60	897.00	58	867.10	60	897.00	60	897.00	267	3991.65
8	Procurement and Distribution of Blue Green Algae	Nos	50000	All districts except D7,D14	430	10.74	348	8.70	373	9.33	382	9.54	385	9.62	1917	47.93
9	Production of Enriched FYM	MT	2500	All districts except D7,D14	1936	48.39	2789	69.71	3433	85.81	3893	97.31	4955	123.86	17004	425.09

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Composting of Farm Waste Through Pluerotus (Production and Distribution of Kits)	MT	2500	All districts except D7,D14	9721	19.44	10042	20.08	10886	21.77	11102	22.20	11281	22.56	53032	106.06
11	Strengthening of Four Soil survey and Land Use Organization Units Vellore, Coimbatore, Tirunelveli and Thanjavur	Ha	6000	All districts except D7,D14	3	33.75	2	22.50	2	22.50	2	22.50	2	22.50	11	123.75
12	Distribution of Soil Health Card	Ha	50000	All districts except D7,D14	612937	1838.81	597901	1793.70	311892	935.67	368678	1106.03	375030	1125.09	2266438	6799.31
13	Distribution of Enriched Press mud (37.5 Mt/ha)	units	1125000	All districts except D7,D14	4765	47.65	1296	12.96	1334	13.34	1385	13.85	1409	14.09	10188	101.88
	Total					**5798.17**		**7836.77**		**7280.78**		**7371.87**		**7626.06**		**35913.67**

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

4.1.13 Integrated Pest Management (IPM)

Integrated Pest Management also known as integrated pest control is a broad based approach that integrates practices for economic control of pests. IPM aims to suppress pest populations below the economic injury level. IPM used in agriculture, horticulture, forestry, human habitations, preventive conservation and general pest control, including structural pest management. The principle is on control not eradication. IPM holds that wiping out an entire pest population is often impossible, and the attempt can be expensive and unsafe. IPM programmes first work to establish acceptable pest levels, called action thresholds, and apply controls if those thresholds are crossed. The IPM process starts with monitoring, which includes inspection and identification, followed by the establishment of economic injury levels.

Integrated pest management employ a variety of actions including cultural controls, including physical barriers, biological controls, including adding and conserving natural predators and enemies to the pest and finally chemical controls or pesticides.

Farmers Field Schools (FFS) is group based learning process that has been used by a governments to promote Integrated Pest Management (IPM). The FFS is a form of adult education, which evolved from the concept that farmers learn optimally from field observation and experimentation. It was developed to help farmers tailor their IPM practices to diverse and dynamic ecological conditions.

Interventions

1. Farmers Field Schools (FFS)
2. Field days
3. Integrated Pest Management Villages
4. Establishment of Coconut Parasite Breeding Station
5. Establishment of Sugar cane Parasite Breeding Station
6. Establishment of Bio-pesticide production unit
7. IPM School

The overall budget to undertake the various interventions are shown in Table 4.25.

Table 4.25 District wise Proposed Budget for Integrated Pest Management

(Rs. in lakh)

Sl. No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	0.00	0.00	0.00	0.00	0.00	0.00
2	Coimbatore	0.00	4.80	0.00	0.00	4.80	9.60
3	Cuddalore	13.20	20.00	20.00	20.00	20.00	93.20
4	Dharmapuri	0.00	9.60	9.60	9.60	9.60	38.40
5	Dindigul	0.00	0.00	0.00	0.00	0.00	0.00
6	Erode	5.80	5.80	5.80	5.80	5.80	29.00
7	Kancheepuram	0.00	261.40	13.40	12.20	12.20	299.20
8	Kanyakumari	7.60	7.60	7.60	7.60	7.60	38.00
9	Karur	0.00	2.60	1.80	3.80	4.80	13.00
10	Krishnagiri	45.20	46.40	1246.00	46.40	46.40	1430.40
11	Madurai	12.00	12.40	1212.40	12.40	12.40	1261.60
12	Nagapattinam	85.20	90.80	557.00	106.80	108.00	947.80
13	Namakkal	0.00	8.40	8.80	8.80	8.80	34.80
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	7.20	7.20	7.20	7.20	7.20	36.00
16	Pudukottai	7.80	7.80	7.80	7.80	7.80	39.00
17	Ramanathapuram	3.60	8.00	8.00	8.00	8.00	35.60
18	Salem	19.60	19.60	19.60	19.60	19.60	98.00
19	Sivagangai	7.00	13.00	13.80	17.00	17.00	67.80
20	Thanjavur	7.20	701.20	703.40	705.60	707.80	2825.20
21	Theni	10.20	10.20	10.20	10.20	10.20	51.00
22	Thiruvallur	43.60	46.20	55.00	52.20	56.60	253.60
23	Thiruvannamalai	306.40	314.00	439.20	320.80	327.40	1707.80
24	Thiruvarur	204.00	96.00	470.00	132.00	136.00	1038.00
25	Thoothukudi	10.40	12.20	203.80	203.80	203.80	634.00
26	Tirunelveli	0.00	0.00	0.00	0.00	0.00	0.00
27	Tiruppur	0.40	0.40	0.40	0.40	0.40	2.00
28	Trichy	17.80	21.00	23.00	27.40	30.00	119.20
29	Vellore	56.00	56.00	56.00	56.00	56.00	280.00
30	Villupuram	0.00	16.00	16.00	16.00	16.00	64.00
31	Virudhunagar	2.80	6.60	7.60	7.60	7.60	32.20
	Total	**873.00**	**1805.20**	**5123.40**	**1825.00**	**1851.80**	**11478.40**

Table 4.26 Component wise Proposed Budget for Integrated Pest Management

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Farmers Field Schools (FFS)	Nos.	20000	All districts except D1, D5,D14,D26	743	148.60	956	191.20	991	198.20	1109	221.80	1171	234.20	4970	994.00
2	Field days	No.	20000	All districts except D1, D4, D5,D14,D16, D20, D26	522	104.40	677	135.40	663	132.60	668	133.60	697	139.40	3227	645.40
3	Integrated Pest Management Villages	Nos.	100000	D3,D8,D9, D12,D15,D19,D20,D22,D23,D24	182	182.00	227	227.00	267	267.00	267	267.00	274	274.00	1217	1217.00
4	Establishment of Coconut Parasite Breeding Station	Nos.	3500000	D7,D12,D20,D23,D25	1	35.00	10	350.00	8	280.00	4	140.00	4	140.00	27	945.00
5	Establishment of Sugar cane Parasite Breeding Station	Nos.	3500000	D12,D20,D23,D24,D25	1	35.00	4	140.00	24	840.00	5	175.00	5	175.00	39	1365.00
6	Establishment of Bio-pesticide production unit	Nos.	12000000	D10,D11,D20,D23,D24,D25	2	240.00	5	600.00	27	3240.00	6	720.00	6	720.00	46	5520.00
7	IPM School	Nos.	40000	All districts except D1, D2,D5,D7, D14,D18,D26,D27,D30,D31	320	128.00	404	161.60	414	165.60	419	167.60	423	169.20	1980	792.00
	Total					**873.00**		**1805.20**		**5123.40**		**1825.00**		**1851.80**		**11478.40**

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

4.1.14 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 of Cuddalore district.

Project Component:

- Distribution of tractor, mini tractor and power tiller
- Distribution of MB plough, Rotovators, laser leveler, baler and paddy transplanter
- Distribution of tractor drawn seed cum fertilizer drill
- Distribution of pump set, mobile sprinklers, rain guns and PVC Pipes to carry irrigation water from source to field
- Solar power pump system and Solar light trap
- Distribution of sprayers (power, hand and battery operated sprayer)
- Distribution of chaff cutter, combine harvester, multicrop thrasher and Tarpaulins
- Distribution of weeder (manual, cono weeder and rotary power weeder)

Budget:

Agricultural mechanization programs are proposed to implement in a big way to increase the agricultural production and to popularize the agricultural machinery among the farmers with a budget of **₹ 180365.85 lakh.**

Table 4.27 District wise Proposed Budget for Farm Machineries

(Rs. in lakh)

Sl.No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	493.20	516.12	569.88	649.44	772.80	3001.44
2	Coimbatore	133.92	399.62	374.82	300.60	391.72	1600.68
3	Cuddalore	1285.13	1763.64	1834.39	1863.39	1806.19	8552.74
4	Dharmapuri	154.00	507.90	580.70	646.70	679.00	2568.30
5	Dindigul	173.09	173.49	192.16	211.23	232.58	982.55
6	Erode	367.03	367.03	367.03	367.03	367.03	1835.15
7	Kancheepuram	64.80	2255.78	2142.50	1960.98	2048.98	8473.04
8	Kanyakumari	30.40	29.00	37.80	29.00	30.50	156.70
9	Karur	233.61	221.01	212.15	221.30	258.95	1147.02
10	Krishnagiri	1207.43	1280.16	1293.05	1479.93	1782.43	7043.00
11	Madurai	325.42	365.59	411.14	462.66	510.39	2075.20
12	Nagapattinam	1329.26	1446.71	1548.71	1551.91	1780.11	7656.70
13	Namakkal	34.38	215.69	217.73	218.59	220.83	907.22
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	699.20	816.32	872.78	954.84	1037.70	4380.84
16	Pudukottai	863.55	898.85	899.35	944.85	961.95	4568.55
17	Ramanathapuram	715.00	783.20	792.55	919.60	943.80	4154.15
18	Salem	434.00	423.31	441.56	448.16	453.06	2200.19
19	Sivagangai	891.93	1510.00	1507.45	1583.90	1586.35	7079.63
20	Thanjavur	3219.13	3760.17	4274.90	4649.41	5296.67	21200.28
21	Theni	275.93	419.69	507.95	665.01	781.11	2649.69
22	Thiruvallur	865.47	865.26	932.55	982.59	1063.68	4709.55
23	Thiruvannamalai	5511.80	6167.67	7576.47	8650.20	9685.57	37591.71
24	Thiruvarur	2419.15	2471.65	1912.35	2622.05	4415.35	13840.55
25	Thoothukudi	253.95	364.86	372.01	393.05	410.85	1794.72
26	Tirunelveli	307.60	308.40	308.40	308.40	308.40	1541.20
27	Tiruppur	188.33	313.24	318.52	319.14	331.04	1470.27
28	Trichy	674.25	775.07	840.64	894.46	4478.04	7662.46
29	Vellore	662.80	662.80	662.80	662.80	662.80	3314.00
30	Villupuram	249.28	3276.80	3516.30	3755.80	3995.30	14793.48
31	Virudhunagar	163.60	292.54	317.74	320.01	321.27	1415.16
	Grand Total	**24226.59**	**33651.54**	**35836.34**	**39036.98**	**47614.40**	**180365.85**

Table 4.28 Component wise Proposed Budget for Farm Machineries

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Solar light trap	No.	4000	All Districts except The Nilgiris	8026.00	321.04	7840.00	313.60	8462.00	338.48	8800.00	352.00	8512.00	340.48	41390.00	1665.60
2	Battery operated sprayer	Nos.	4000	All Districts except The Nilgiris	2777.00	111.92	4666.00	188.12	4880.00	197.08	5147.00	207.76	5413.00	218.40	22873.00	923.26
3	Power operated sprayer	Nos.	8000	All Districts except The Nilgiris	5702.00	454.16	8607.00	685.52	9078.00	722.24	10995.00	874.57	11414.00	907.15	45656.00	3643.64
4	Hand operated sprayer	0	0	All Districts except The Nilgiris	5360.00	82.83	6736.00	103.17	5764.00	88.74	7412.00	113.46	7699.00	117.76	32751.00	505.94
5	Distribution of Baler	Nos	350000	All Districts except The Nilgiris	88.00	308.00	122.00	427.00	130.00	455.00	141.00	493.50	228.00	798.00	705.00	2481.50
6	Distribution of chaff cutter	Nos	25000	All Districts except The Nilgiris	213.00	65.00	680.00	181.75	718.00	191.25	730.00	194.25	803.00	212.50	3142.00	844.75
7	Distribution of combine harvester	Nos	1700000	All Districts except The Nilgiris	88.00	1496.00	98.00	1666.00	112.00	1904.00	113.00	1921.00	179.00	3043.00	578.00	10030.00
8	Distribution of cono weeder	Nos	2000	All Districts except The Nilgiris	2258.00	45.16	6278.00	122.06	6933.00	130.67	7874.00	143.48	9049.00	165.48	32332.00	606.85
9	Distribution of Laser leveler	Nos	380000	All Districts except The Nilgiris	147.00	542.50	171.00	633.70	183.00	679.30	191.00	709.70	265.00	990.90	952.00	3556.10
10	Distribution of Manual Weeder	Nos	2000	All Districts except The Nilgiris	560.00	12.56	689.00	15.14	783.00	17.02	852.00	18.40	941.00	20.18	3815.00	83.30
11	Distribution of MB plough	Nos	80000	All Districts except The Nilgiris	115.00	92.00	131.00	104.80	155.00	124.00	170.00	136.00	244.00	195.20	815.00	652.00
12	Distribution of Mini Tractor	Nos	300000	All Districts except The Nilgiris	311.00	935.50	600.00	1801.00	642.00	1928.65	643.00	1930.47	806.00	2421.46	2956.00	9017.08
13	Distribution of Mobile Sprinklers	Ha	30000	All Districts except The Nilgiris	3324.00	997.20	4443.00	1332.75	4892.00	1467.62	4925.00	1477.40	5109.00	1532.80	22619.00	6807.76
14	Distribution of multicrop	Nos	400000	All Districts except The	55.00	233.00	61.00	257.00	76.00	317.00	97.00	401.00	164.00	669.00	453.00	1877.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	thrasher			Nilgiris												
15	Distribution of Paddy transplanter	Nos	1200000	All Districts except The Nilgiris	249.00	2057.00	306.00	2713.00	300.00	2613.00	326.00	2897.00	417.00	3961.00	1598.00	14241.00
16	Distribution of Power Weeder	Nos	65000	All Districts except The Nilgiris	615.00	399.75	1100.00	715.00	1245.00	809.25	1141.00	741.65	1465.00	952.25	5566.00	3617.90
17	Distribution of Power tiller	Nos	150000	All Districts except The Nilgiris	1758.00	2664.00	2364.00	3564.75	2614.00	3940.58	2884.00	4344.98	3327.00	5010.48	12879.00	19524.79
18	Distribution of Pump set	Nos	30000	All Districts except The Nilgiris	1001.00	306.00	1116.00	346.20	1152.00	362.70	1172.00	374.40	1250.00	403.50	5691.00	1792.80
19	Distribution of Rain guns	Ha	40000	All Districts except The Nilgiris	2999.00	1113.30	4093.00	1551.20	4763.00	1812.82	5346.00	2039.86	5906.00	2256.93	22898.00	8774.11
20	Distribution of Rotary Power weeder	Nos	70000	All Districts except The Nilgiris	410.00	287.00	484.00	338.80	585.00	409.50	690.00	483.00	850.00	595.00	3019.00	2113.30
21	Distribution of Rotovators	Nos	80000	All Districts except The Nilgiris	2051.00	1637.20	3113.00	2478.80	3456.00	2753.20	3837.00	3058.00	4187.00	3338.00	16595.00	13265.20
22	Distribution of Tarpaulins	Nos	8000	All Districts except The Nilgiris	7926.00	633.88	10564.00	840.88	10974.00	873.74	11634.00	926.54	12312.00	980.73	52880.00	4255.77
23	Distribution of Tractor	Nos	600000	All Districts except The Nilgiris	593.00	3532.00	933.00	5545.00	965.00	5740.30	983.00	5845.93	1081.00	6437.92	4454.00	27101.15
24	Distribution of Tractor Drawn Seed cum Fertilizer Drill	Nos	70000	All Districts except The Nilgiris	315.00	219.70	477.00	333.10	485.00	338.70	505.00	352.70	466.00	325.40	2246.00	1569.60
25	PVC Pipes to carry Irrigation water from source to field	Unit	40000	All Districts except The Nilgiris	9106.00	3643.80	11328.00	4525.30	12341.00	4330.50	12925.00	5164.10	14120.00	6942.10	59704.00	24605.80
26	Solar light trap	No.	4000	All Districts except The Nilgiris	180.00	7.20	180.00	7.20	200.00	8.00	200.00	8.00	240.00	9.60	1000.00	40.00
27	Solar power pump system	Nos	600000	All Districts except The Nilgiris	376.00	1536.45	508.00	2297.60	580.00	2698.75	663.00	3171.40	813.00	4040.55	2926.00	13744.75

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
28	Distribution Oil Engine Pump set	Nos	30000	All Districts except The Nilgiris	1552.00	465.60	1778.00	533.25	1838.00	551.42	2069.00	620.60	2299.00	689.80	9196.00	2860.66
29	Distribution of Seed drill	Nos	50000	All Districts except The Nilgiris	8.00	4.00	14.00	7.00	20.00	10.00	26.00	13.00	32.00	16.00	100.00	50.00
30	Seed drill Sowing of Groundnut with Redgram as Intercrop	Nos	70000	All Districts except The Nilgiris	2.00	1.40	2.00	1.40	2.00	1.40	2.00	1.40	2.00	1.40	10.00	7.00
31	Distribution of dry land weeder (Power weeder)	Nos	65000	All Districts except The Nilgiris	33.00	21.45	33.00	21.45	33.00	21.45	33.00	21.45	33.00	21.45	165.00	107.25
	Total					**24226.60**		**33651.54**		**35836.36**		**39037.00**		**47614.42**		**180365.86**

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

4.1.15 Strengthening of State Seed Farm

Seed is the basic and most critical input for sustainable agriculture. The response of all other inputs depends on quality of seeds to a large extent. It is estimated that the direct contribution of quality seed alone to the total production is about 15–20% depending upon the crop and it can be further raised up to 45% with efficient management of other inputs. The total seed requirement of the country amounts to 2.56 lakh tonnes. However, about 20 per cent of the total seed requirement is met as quality seeds, while the rest is managed by farm saved seeds. The main reason for wider gap in agricultural crops especially pulses and oilseeds was that most of the private and multinational companies are concentrating on high value and low volume crops like hybrid cotton, millets and vegetables whereas only public institutions are producing and marketing high volume and low value crops like pulses and oilseeds. Hence, high emphasis has to be given for the production and supply of quality seeds of pulses and oilseeds to farmers and increase the Seed Replacement Rate. Hence there is an urgent need for the State Seed Corporations also to transform themselves in tune with the industry in terms of infrastructure, technologies, approach and the management culture to be able to survive in the competitive market and to enhance their contribution in the national endeavour of increasing food production to attain food & nutritional security.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 in Tamil Nadu.

Project components

- Soil Fertility Improvement and Land development works
- Provision of Irrigation facilities viz., Solar pump sets, Deepening of bore wells, Laying of pipelines, Rain gun, Mobile sprinkler, Laying of drip, New bore well with EB connection, Deepening of open well and Farm Pond .
- Supply of machineries
- Infrastructure development for seed production

Budget

It is proposed to incur **₹ 6077.32** lakh over a period of five years with the finance facilities under the NADP and other sources (Table 4.29).

Table 4.29 District wise Proposed Budget for Strengthening of State Seed Farm

(Rs. in lakh)

Sl. No	Districts	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Cuddalore	276.25	94.83	8.50	7.50	9.00	**396.08**
2	Dharmapuri	0.00	18.80	0.00	10.00	0.00	**28.80**
3	Erode	175.70	112.28	28.38	10.18	1.45	**327.98**
4	Kancheepuram	0.00	259.10	238.50	132.20	120.00	**749.80**
5	Kanyakumari	1.95	29.75	1.95	1.75	1.75	**37.15**
6	Karur	286.28	0.00	0.00	0.00	0.00	**286.28**
7	Krishnagiri	69.38	166.63	100.13	95.13	113.13	**544.38**
8	Madurai	137.30	41.50	26.70	21.70	20.95	**248.15**
9	Pudukkottai	604.70	306.80	273.55	174.25	118.25	**1477.55**
10	Salem	193.90	60.20	29.50	0.00	0.00	**283.60**
11	Thanjavur	43.75	0.00	0.00	0.00	0.00	**43.75**
12	Theni	0.00	313.97	6.00	1.00	5.00	**325.97**
13	Thiruvannamalai	109.90	5.20	5.58	12.70	2.70	**136.08**
14	Thiruvarur	903.00	4.00	0.00	0.00	0.00	**907.00**
15	Tirunelveli	42.25	0.00	0.00	0.00	0.00	**42.25**
16	Tiruppur	89.30	40.75	23.00	3.00	16.00	**172.05**
17	Trichy	30.45	20.00	20.00	0.00	0.00	**70.45**
	Total	**2964.11**	**1473.81**	**761.79**	**469.41**	**408.23**	**6077.32**

Table 4.30 Component wise Proposed Budget for Strengthening of State Seed Farm

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Soil Fertility Improvement and Land development works in SSF**	ac	2	Cuddalore, Dharmapuri, Kanchipuram, Krishnagiri, Madurai, Pudukkottai, Theni, Thiruvannamalai, Thiruvarur, Tiruppur, Tiruchirappalli,	288.00	575.00	206.00	412.28	131.00	262.50	122.00	243.00	117.00	233.00	863.00	1725.78
II	**Irrigation Component**															
1	Solar pump sets	nos	6	Cuddalore, Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Pudukkottai, Salem, Theni, Thiruvannamalai, Thiruvarur	18.00	108.00	8.00	48.00	5.00	30.00	3.00	18.00	3.00	18.00	37.00	222.00
2	Deepening of bore well	nos	4	Kanchipuram, Karur, Krishnagiri, Madurai, Salem, Thanjavur, Thiruvannamalai, Thiruvarur	9.00	36.00	8.00	32.00	2.00	8.00	2.00	8.00	2.00	8.00	23.00	92.00
3	Laying of	mt	0.05	Cuddalore,	4240.00	212.00	2777.00	138.85	1250.00	62.50	1150.00	57.50	1000.00	50.00	10417.00	520.85

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	pipelines			Erode, Kanchipuram, Krishnagiri, Madurai, Pudukkottai, Salem, Theni, Thiruvannamalai, Thiruvarur, Tiruppur, Tiruchirappalli												
4	Rain gun	nos	0.4	Cuddalore, Dharmapuri, Erode, Kanchipuram, Krishnagiri, Madurai, Pudukkottai, Salem, Thanjavur, Theni, Thiruvannamalai, Thiruvarur, Tirunelveli, Tiruppur	42.00	16.80	142.00	56.80	1.00	0.40	1.00	0.40	1.00	0.40	187.00	74.80
5	Mobile sprinkler	nos	0.3	Cuddalore, Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Pudukkottai, Theni, Thiruvannamalai, Thiruvarur, Tiruppur	55.00	16.50	41.00	12.30	52.00	15.60	33.00	9.90	21.00	6.30	202.00	60.60
6	Laying of drip	nos	2	Dharmapuri, Erode,	30.00	60.00	43.00	86.00	18.00	36.00	14.00	28.00	1.00	2.00	106.00	212.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				Kanchipuram, Kanyakumari, Krishnagiri, Madurai, Pudukkottai, Salem, Thanjavur, Thiruvannamalai, Tiruppur												
7	New bore well with EB connection	nos	8	Dharmapuri, Erode, Karur, Krishnagiri, Pudukkottai, Salem, Thanjavur, Theni, Thiruvannamalai, Thiruvarur, Tirunelveli, Tiruppur	22.00	176.00	14.00	112.00	12.00	96.00	1.00	8.00	1.00	8.00	50.00	400.00
8	New open well + Pump set	nos	10	Kanchipuram, Krishnagiri, Salem, Thiruvannamalai	2.00	20.00	6.00	60.00	1.00	10.00	1.00	10.00	1.00	10.00	11.00	110.00
9	Deepening of open well	nos	8	Dharmapuri, Erode, Karur, Krishnagiri, Madurai, Salem, Theni, Tirunelveli, Tiruppur	4.00	32.00	8.00	64.00	1.00	8.00	1.00	8.00	0.00	0.00	14.00	112.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
10	Farm Pond	nos	1	Cuddalore, Kanchipuram, Karur, Krishnagiri, Pudukkottai, Theni	17.00	17.00	20.00	20.00	13.00	13.00	13.00	13.00	13.00	13.00	76.00	76.00
III	Machineries															
11	Dunnage (Poly Pallets)	nos	0.075	Cuddalore, Dharmapuri, Erode, Kanchipuram, Kanyakumari, Karur, Krishnagiri, Madurai, Pudukkottai, Thanjavur, Theni, Thiruvannamalai, Thiruvarur, Tirunelveli, Tiruppur, Tiruchirappalli	1090.00	81.75	360.00	27.00	245.00	18.38	190.00	14.25	185.00	13.88	2070.00	155.25
12	Seed grading machine	nos	20	Cuddalore, Kanyakumari, Karur, Krishnagiri, Pudukkottai, Theni, Thiruvarur, Tirunelveli, Tiruppur	10.00	200.00	3.00	60.00	0.00	0.00	1.00	20.00	1.00	20.00	15.00	300.00
13	Paddy Transplanter	nos	5	Cuddalore, Erode, Karur, Thanjavur, Theni, Thiruvanna	9.00	45.00	1.00	5.00	1.00	5.00	0.00	0.00	0.00	0.00	11.00	55.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				malai, Thiruvarur												
14	Rotovators	nos	1	Erode, Karur, Krishnagiri, Pudukkotta i, Salem, Theni, Thiruvanna malai, Thiruvarur	9.00	9.00	2.00	2.00	2.00	2.00	1.00	1.00	1.00	1.00	15.00	15.00
15	Tractor and accessories	nos	10	Erode, Karur, Pudukkotta i, Salem, Theni, Thiruvanna malai, Thiruvarur	10.00	100.00	2.00	20.00	1.00	10.00	0.00	0.00	0.00	0.00	13.00	130.00
16	Pow er Tiller	nos	3	Cuddalore, Karur, Thanjavur, Thiruvanna malai, Thiruvarur	9.00	27.00	0.00	0.00	1.00	3.00	0.00	0.00	0.00	0.00	10.00	30.00
17	Tarpaulin	nos	0.1	Cuddalore, Erode, Kanchipura m, Kanyakum ari, Karur, Krishnagiri, Madurai, Pudukkotta i, Salem, Thanjavur, Theni, Thiruvanna malai, Thiruvarur, Tiruppur	138.00	13.80	34.00	3.40	60.00	6.00	22.00	2.20	15.00	1.50	269.00	26.90
18	Generator	nos	7	Cuddalore,	16.00	112.00	2.00	14.00	2.00	14.00	0.00	0.00	1.00	7.00	21.00	147.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Pudukkottai, Theni, Thiruvarur, Tiruppur												
IV	Civil Works															
19	Farm protection structure	mt	0.15	Kanchipuram, Karur, Krishnagiri, Madurai, Salem, Theni, Thiruvarur	2395.00	359.25	601.00	90.15	6.00	0.90	1.00	0.15	1.00	0.15	3004.00	450.60
20	New Threshing floor	nos	5	Cuddalore, Erode, Kanchipuram, Karur, Krishnagiri, Madurai, Salem, Theni, Thiruvarur	18.00	90.00	9.00	45.00	5.00	25.00	2.00	10.00	1.00	5.00	35.00	175.00
21	seed godown	nos	25	Cuddalore, Erode, Karur, Pudukkottai, Salem, Thiruvarur, Tiruppur	14.00	350.00	3.00	75.00	0.00	0.00	0.00	0.00	0.00	0.00	17.00	425.00
22	Farm office	nos	8	Cuddalore, Erode, Kanchipuram, Karur, Krishnagiri, Salem,	13.00	104.00	6.00	48.00	4.00	32.00	0.00	0.00	1.00	8.00	24.00	192.00

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				Theni, Thiruvannamalai, Thiruvarur												
23	culvert	nos	6	Kanchipuram, Kanyakumari, Pudukkottai, Theni, Thiruvarur, Tiruppur	11.00	66.00	1.00	6.00	2.00	12.00	2.00	12.00	0.00	0.00	16.00	96.00
24	Farm office renovation	nos	3	Cuddalore, Erode, Kanyakumari, Karur, Krishnagiri, Madurai, Pudukkottai, Theni, Tiruppur	22.00	66.00	7.00	21.00	2.00	6.00	2.00	6.00	1.00	3.00	34.00	102.00
25	Farm connectivity	Meter	0.015	Cuddalore, Kanchipuram, Kanyakumari, Karur, Pudukkottai, Salem, Thanjavur, Theni, Thiruvannamalai, Thiruvarur, Tirunelveli	11700.00	175.50	1001.00	15.02	5700.00	85.50	0.00	0.00	0.00	0.00	18401.00	276.02
	Total					**2964.11**		**1473.80**		**761.78**		**469.40**		**408.23**		**6077.32**

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

4.1.16 Information Technology in Agriculture

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 to 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 adopting and making use of IT to help improve agricultural progress, everyone benefits from the union of these sectors.

Role of IT 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 include input devices, output devices, processors, storage devices, software, networking devices, transmission media and other accessories.

Budget

It is proposed to incur **₹ 3482.05** lakh over a period of five years with the finance facilities under the NADP and other sources (Table 4.31 & 4.32).

Table 4.31 District wise Proposed Budget for information Technology

(Rs. in lakh)

Sl. No	District	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Ariyalur	41.70	0.00	0.00	0.00	0.00	41.70
2	Coimbatore	0.00	90.12	1.32	7.32	0.00	98.76
3	Cuddalore	0.00	79.30	0.00	0.00	79.30	158.60
4	Dharmapuri	0.00	52.13	0.00	0.00	0.00	52.13
5	Dindigul	90.35	0.00	0.00	0.00	0.00	90.35
6	Erode	10.08	36.49	9.54	8.54	8.54	73.19
7	Kancheepuram	0.00	81.71	0.00	0.00	81.71	163.41
8	Kanyakumari	7.09	42.09	4.99	5.49	4.99	64.65
9	Karur	67.94	0.00	0.00	0.00	0.00	67.94
10	Krishnagiri	1.35	53.47	2.67	2.67	53.47	113.63
11	Madurai	86.53	0.33	0.33	0.33	0.33	87.83
12	Nagapattinam	115.19	0.00	0.00	0.00	0.00	115.19
13	Namakkal	0.00	155.71	9.21	35.91	80.36	281.17
14	Nilgiris	0.00	0.00	0.00	0.00	0.00	0.00
15	Perambalur	30.39	1.54	2.94	4.54	4.54	43.95
16	Pudukottai	98.28	7.93	7.93	7.93	7.93	130.00
17	Ramanathapuram	77.01	1.71	1.71	1.71	1.71	83.85
18	Salem	100.74	5.77	5.77	5.77	5.77	123.80
19	Sivagangai	0.00	101.64	0.00	0.00	0.00	101.64
20	Thanjavur	133.56	0.00	0.00	0.00	0.00	133.56
21	Theni	34.36	0.40	0.40	0.40	0.40	35.96
22	Thiruvallur	105.37	0.00	0.00	0.00	0.00	105.37
23	Thiruvannamalai	90.36	22.64	5.74	3.74	6.09	128.57
24	Thiruvarur	102.90	0.00	0.00	0.00	0.00	102.90
25	Thoothukudi	0.00	72.72	0.00	0.00	71.97	144.69
26	Tirunelveli	150.42	13.50	13.50	13.50	0.00	190.92
27	Tiruppur	0.00	88.51	7.93	7.93	9.15	113.52
28	Trichy	3.97	0.00	0.00	0.00	0.00	3.97
29	Vellore	0.00	152.01	0.00	0.00	142.51	294.52
30	Villupuram	0.00	126.27	0.00	0.00	126.27	252.54
31	Virudhunagar	83.16	0.00	0.00	0.00	0.00	83.16
	Grand Total	**1430.73**	**1186.57**	**73.97**	**105.77**	**685.02**	**3482.05**

Table 4.32 Component wise Proposed Budget for information Technology

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit Cost	District 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	Procurement of Hardware for replacement of old hardware	Nos	50000	All districts except D1,D3,D5, D7,D14, D21	275	137.5	217	108.5	54	27	84	42	155	77.5	785	392.5
2	Connectivity Charges	Nos	11000	All districts except D1,D3,D5, D14	316	34.76	239	26.29	149	16.39	149	16.39	182	20.02	1035	113.85
3	Printer cum Scanner	Nos	20000	All districts	212	42.4	209	41.8	7	1.4	1	0.2	133	26.6	562	112.4
4	UPS and Electrical Accessories	Nos	35000	All districts except D6,D14	208	72.8	229	80.15	18	6.3	17	5.95	160	56	632	221.2
5	Xerox machine	Nos	75000	All districts except D6,D14,D28	192	144	165	123.75	2	1.5	1	0.75	109	81.75	469	351.75
6	Laptop/Desktop	Nos	50000	All districts	287	143.25	254	127	5	2.5	24	12	154	77	724	361.75
7	Anti -virus software	Nos	2500	All districts except D4,D14	406	10.15	413	10.33	116	2.9	116	2.9	350	8.75	1401	35.03
8	Television	Nos	100000	All districts except D14,D28	182	182	167	167	0	0	0	0	90	90	439	439
9	Colour printer	Nos	15000	All districts except D14,D28	172	25.77	184	27.6	5	0.75	16	2.4	107	16.05	484	72.57
10	4G Internet - Dongle	Nos	2500	All districts except D14,D15,D28	274	6.85	364	9.1	35	0.88	35	0.88	286	7.15	994	24.85
11	Equipments for Documen-tation															
a	Handy cam	Nos	30000	All districts	153	45.9	166	49.8	0	0	12	3.6	85	25.5	415	124.8
b	Camera	Nos	25000	All districts except	201	50.25	168	42	0	0	15	3.75	84	21	467	117

Sl. No	Intervention	Unit	Unit Cost	District Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D14,D18,D21,D28												
c	GPS instrument	Nos	20000	All districts except D14,D27	229	45.8	171	34.2	4	0.8	7	1.4	99	19.8	530	102
d	Android mobile	Nos	15000	All districts except D14,D27	399	59.85	267	40.05	0	0	0	0	128	19.2	858	119.1
e	External Hard disk	Nos	5000	All districts except D6, D14	347	17.35	332	16.6	1	0.05	1	0.05	224	11.2	801	45.25
12	Audio - visual Aids	Nos	150000	All districts except D3,D4,D6, D7,D8,D10,D14,D15, D18,D21,D25,D26,D28,D30	119	178.5	76	114	0	0	0	0	32	48	248	340.5
	LCD projector	Nos	75000	All districts except D6,D11,D14	175	131.25	150	112.5	0	0	0	0	82	61.5	366	305.25
	Pico Projector	Nos	35000	All districts except D3,D6,D8, D10,D11,D14,D15,D18,D19,D21, D23,D27,D29,D30	105	36.75	66	23.1	18	6.3	18	6.3	24	8.4	83	80.85
13	Air conditioner for computer room	Nos	40000	All districts except D3,D6,D10,D14,D19, D20,D27,D28,D29,D30	164	65.6	82	32.8	18	7.2	18	7.2	24	9.6	306	122.4
	Total					**1430.73**		**1186.57**		**73.97**		**105.77**		**685.02**		**3482.05**

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

4.1.17 Agricultural Research and Development

Increased production and sustained productivity calls for an innovative system with research and development capabilities in areas of agriculture, animal husbandry and fishery sector. In this regard, a robust and cost effective mechanism is required to face emerging challenges, converting such challenges into opportunities through developing location specific and problem solving technologies to achieve higher output levels.

Besides, the mandate for overcoming the major hurdles in the present crop/farming scenario should be addressed with working together of researchers, extension officials, and farmers. This would ensure greater production and productivity of crops in the State. For instance, in pest management, it is essential to identify major pests/diseases and developing measures to combat them. The agenda for the researcher subsequently at this situation would be to develop disease/pest resistant varieties besides developing and propagating crop specific integrated pest management practices such that the farmers can save on plant protection chemicals thereby increasing their return from crops and produce quality produce.

Thus the research activities need to be oriented towards enhancing production of major agricultural crops like paddy, pulses, millets, oilseeds, cotton, sugarcane etc. and also in horticulture (fruits and vegetables). Specific interventions are to be made for achieving overall production growth. For instance, enhancing paddy production especially in areas with uncertain/erratic rainfall can be possible through adoption of technologies like Direct Seeded Rice (DSR), micro nutrients and nutrient mobilization, stage specific plant growth promoting bacterial culture, bioinput organic rice production, drought resistant varieties, drought mitigating mechanism like spraying, PPFM and micronutrients. Similarly, in pulse production through popularizing of varieties suited to synchronized maturity, application of boosters, bioinoculant application etc.

Few more interventions proposed during the plan periods are System Pulses Intensification, Sub-surface irrigation techniques to mitigate the water stress, market led agriculture to promote supply chain and formation of FPO, documentation and dissemination of technologies through 3GP techniques, production and supply of green manures to enhance soil fertility, etc. Further, establishment of Centers of excellence in molecular breeding, dry farming, soil health, innovative agriculture, research on oil palm, farm-women knowledge centers in different agro climatic regions of Tamil Nadu. Besides the supply of quality seeds of paddy, both major and minor millets, pulses, oil seeds and green manure crops of high yielding varieties through strengthening of seed chain. Popularization of climate resilient technologies, food cum fodder supply, agri-silvi-pasture, and biointensive pest

management techniques are some of the potential technologies for ensuring farmers income. Besides promotion of GAP for vegetables and annual fruits and pandal vegetables, polyhouse cultivation of vegetables.

Establishment of Agricultural Media Centre (AMC), for the dissemination of agricultural technologies, price forecasting, development of market advisories, documentation of agricultural technologies and empowerment of farmers on market led precision farming system would pave the way for furthering the adoption of modern technologies in the cultivation of crops and augmenting the income of farmers.

It is also proposed to establish new research facilities for mango, grapes, flowers, tapioca, citrus etc, preservation of germplasms, creation of insect museum, demonstrating the impact of the microbial inoculation for higher crop productivity, attracting rural youth through establishment of diversified agricultural cafeteria, organic cultivation of few spices like pepper to promote export potential in the State, capacity building of rural youths by establishing skill development centres and develop modules to suit the need of the villagers etc would help in modernizing the agricultural sector in the State. Much focus on soil health and residual analysis through NABL laboratories would also pave way for food safety issues. Due to decline in the water resources, micro irrigation with fertigation scheduling has been demonstrated. In order to avoid post harvest losses, demonstration of post harvest technologies have been focused. Besides, skill development programmes for nematode management, apiculture based agripreneurship skill development programmes have been proposed. Possibility of delivering proteins from beneficial insects has also proposed for implementation. Demonstration of technologies for the reclamation and use of saline / alkaline soils and culturedwastelands offers god scope for augmenting agriculture production.

Research Infrastructure

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 for the various Agricultural research and development activities representing different districts are furnished in Table 4.33.

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.

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.

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.

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.

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.

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 is also 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.

Establishement/Strengthening of Botanical garden of Teaching campuses of TNAU

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.

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

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.

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.

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.

Mango Research Centre at Krishnagiri

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

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.

Bioinoculant production units for enhancing productivity of pulses

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/ KVKs 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 other infrastructrure requirements are

- Infrastructure for promotion of agribusiness development
- Infrastructure for animal health mangement
- Infrastructure for biodiversity conservation
- Infrastructure facilites for communication
- Infrastructure for DATA managemet
- Infrastructure for demonstration of agricultural technologies
- Infrastructure for fertilizer/manure production
- Infrastructure for research and development
- Infrastructure for mushroom and spawn production

- Infrastructure for good qualtiy seedling production
- Infrastructure for Post harvest management
- Infrastructure for protected cultivation
- Infrastructure for seed production/processing
- Infrastructure for storage
- Infrastrucutre for technology transfer

A budget outlay of Rs 391.78 crore is proposed during the five year period to carry out production growth oriented interventions and creation of infrastructure to carry out need based research activities. There is also an urgent need for strengthening the research stations and extension centres of Tamil Nadu Agricultural University for promotion of location specific –problem based technologies (Table 4.33).

Table 4.33 Budget for Agricultural Research

(Rs. in lakh)

S. No.	Interventions	Districts Covered	Unit Cost	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
				Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy	Fin.	Phy.	Fin.
	Production and Growth														
A	**Qualidy seed production**														
1	Small millets	Coimbatore	32	1	32	0	0	0	0	0	0	0	0	1	32
2	Hybrid / varietal seed production of maize and millets	Coimbatore	130	0	0	0	0	1	130	0	0	1	130	2	260
3	Groundnut	Coimbatore	264.32	0	0	1	91.44	0	159.94	0	12.94	0	0	1	264.32
4	Oilseed	Erode	30	0	0	1	30	0	0	0	0	0	0	1	30.00
5	Castor hybrid	Salem	12	0	0	0	0	0	0	1	12	0	0	1	12.00
6	Rice / MGR 100 Rice	Tiruvarur, Thanjavur, Nagapattinam, Villupuram, Cuddalore, Tirunelveli, Coimbatore, Thiruvallur, Erode and Trichy	118.93	0	0	1	118.93	0	0	0	0	0	0	1	118.93
7	Seed production and seed storage	Tiruvannamalai, Vellore, Villupuram, Namakkal, Erode and Salem	0	0	0	1	106.56	0	0	0	0	0	0	1	106.56
B	**Crop Management / Improvement**														
1	Sustainable food cum fodder supply		105	1	105	0	0	0	0	0	0	0	0	1	105
2	Technological interventions on soil, water and crop management	Coimbatore	360	1	360	0	0	0	0	0	0	0	0	1	360
3	Popularization of Climate resilient technologies	Erode	100	0	0	0	0	1	100	0	0	0	0	1	100.00
4	Popularization of Silicate Solubilizing bacterium and Arbuscular Mycorrhizal fungi in crops	Madurai	108.22	0	0	1	86.61	0	21.61	0	0	0	0	1	108.22

5	Introduction of hybrid castor in non-traditional area	Salem	95	0	0	1	95	0	0	0	0	0	0	1	95.00
C	**Organic Agriculture and Soil health improvement**														
1	Mainstreaming of organic production practices for rice, pulses and small millets	Coimbatore	65	0	0	0	0	1	65	0	0	0	0	1	65
2	Seed Production in Green Manure Crops	Coimbatore	101.82	0	0	1	66.94	0	14.94	0	19.94	0	0	1	101.82
3	Formulation of Bio-Matrix Fertilizer	Madurai	22	0	0	1	4.5	0	11.5	0	5.5	0	0	1	21.50
4	Integrating Agri-Silvi-Pasture to sustain soil health	Ramanathapuram and Salem	80	0	0	0	0	2	160	0	0	0	0	2	160
5	Restoration of soil health in Prosopis cleared farm lands	Ramanathapuram	903.54	0	0	1	448.55	0	441.65	0	13.34	0	0	1	903.54
6	Improving crop productivity in intensively cultivated areas through soil health cards	Tiruchirappalli	120	1	120	0	0	0	0	0	0	0	0	1	120
7	Organic Vegetable Production	Coimbatore, Salem, Dharmapuri, Krishnagiri, Dindigul, Theni, Cuddalore, Villupuram, Vellore and Pudukkottai	260	0	0	1	260	0	0	0	0	0	0	1	260
8	Organic rice production	Thanjavur and Pudukkottai	240	0	0	0	0	1	240	0	0	0	0	1	240
D	**Horticulture development**														
1	Production of turmeric and ginger transplants		100	1	100	0	0	0	0	0	0	0	0	1	100
2	Promotion of homestead nutritional and medicinal garden	Coimbatore	135	0	0	1	135	0	0	0	0	0	0	1	135
3	Production of elite planting materials	Coimbatore	99	1	99	0	0	0	0	0	0	0	0	1	99
4	GAP in Capsicum and Cucumber	Coimbatore	160	1	160	0	0	0	0	0	0	0	0	1	160

5	Popularization of TNAU Papaya CO 8	Coimbatore	50	0	0	1	50	0	0	0	0	0	0	1	50
6	Cucurbitaceous vegetable production under polyhouse	Coimbatore	185.5/ 253	0	0	2	438.5	0	0	0	0	0		2	438.5
7	Supply chain management in tomato and onion	Coimbatore and Trichy	640	0	0	2	1280	0	0	0	0	1	640	3	1920
E	**Rainfed development**														
1	Quinoa farming	Erode	65	1	65	0	0	0	0	0	0	0	0	1	65.00
2	Comprehensive Assessment of Soil Health in Rainfed Agriculture	Madurai	190	1	190	0	0	0	0	0	0	0	0	1	190.00
3	Demonstration of drough mitigation technologies	Sivagangai	250	0	0	1	250	0	0	0	0	0	0	1	250.00
4	Agri-Silvi pasture systems for rainfed farmers	Ramanathapuram	100	0	0	1	100	0	0	0	0	0	0	1	100.00
5	Drought mitigation through microbial systems	Coimbatore and Madurai	193.88	0	0	0	0	1	193.8 8	0	0	0	0	1	193.88
F	**Pest Management**														
1	Biointensive pest management	Madurai	90	0	0	0	0	1	90	0	0	0	0	1	90
2	Detectiobn kit for pesticide residue analysis	Coimbatore	100	0	0	0	0	0	0	1	100	0	0	1	100
3	Management of important diseases of vegetable and flow er crops under protected cultivation	Madurai	39.7	0	0	1	39.7	0	0	0	0	0	0	1	39.70
4	Rodent management in field and storage godow ns	Madurai	51.5	0	0	1	22.5	0	14.5	0	14.5	0	0	1	51.50
5	Termite Management	Pudukkottai	36.446	0	0.00	1	36.446	0	0	0	0	0	0	1	36.45
6	Production of bio control agents	Tiruchirappalli	69.00	1	69	0	0	0	0	0	0	0	0	1	69

7	Nematode management in Tamil Nadu	Coimbatore, The Nilgiris, Erode, Krishnagiri, Dindigul, Theni and Madurai	150.00	0	0	1	150	0	0	0	0	0	0	1	150
G	**Micro irrigation**		75	0	0	0	0	1	75	0	0	0	0	1	75
H	**TOT and IT based interventions**														
1	Remote sensing for crop management	Coimbatore	255	0	0	0	0	1	255	0	0	0	0	1	255
2	Viable model for effective TOT	Erode	35	1	35	0	0	0	0	0	0	0	0	1	35.00
3	Adoption of Recently Released Varieties of TNAU	Madurai	49.5	0	0	1	16.5	0	16.5	0	16.5	0	0	1	49.50
I	**Bee Keeping**	Coimbatore	250	1	250	0	0	0	0	0	0	0	0	1	250
J	**Post harvest management**														
1	Minimizing Groundnut seed storage deterioration	Coimbatore	115	0	0	1	115	0	0	0	0	0	0	1	115
2	Popularization of improved scientific storage techniques	Madurai	34	0	0	1	16	0	18	0	0	0	0	1	34.00
K	**Skill Development / Capacity building**														
1	Skill Development on Nematode management	Coimbatore	150	0	0	1	150	0	0	0	0	0	0	1	150
2	Apiculture based Agripreneurship skill development	Madurai	**78.00**	0	0	1	38.5	0	39.5	0	0	0	0	1	78.00
L	**Innovative Schemes**														
1	Supply of protein food to humans and animal through insects	Coimbatore	155	1	155	0	0	0	0	0	0	0	0	1	155
	Total				**1740**	**27**	**4146.676**	**10**	**2047.02**	**2**	**194.72**	**2**	**770**	**54**	**8898.416**
M	**Infrastructure for promotion of agribusiness development**														

1	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
N	**Infrastructure for animal health mangement**		0	0	0		0	0	0	0	0	0	0	0	0.00
1	Animal husbandry unit	Thoothukudi	10	10	100	0	0	0	0	0	0	0	0	10	100.00
2	Cattle Breeding Farm	Coimbatore	10	10	100	0	0	0	0	0	0	0	0	10	100.00
3	Poultry unit	Thoothukudi	5	4	20	0	0	0	0	0	0	0	0	4	20.00
O	**Infrastructure for biodiversity conservation**													0	0.00
1	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
P	**Infrastructure facilites for communication**													0	0.00
1	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
Q	**Infrastructure for DATA managemet**													0	0.00
1	DATA Centre	Coimbatore, Tiruchirappalli	50	1	50	0	0	1	50	0	0	0	0	2	100.00
R	**Infrastructure for demonstration of agricultural technologies**													0	0.00
1	Model Mechanized Research Farm	Cuddalore, Krishangiri, Thanjavur and Theni	250	0	0	1	250	1	250	1	250	1	250	4	1000.00
S	**Infrastructure for fertilizer/manure production**													0	0.00
1	Modern industrial fertilizer mixing unit	Coimbatore	610	1	610	0	0	0	0	0	0	0	0	1	610.00

2	Controlled Release Bio-Matrix Fertilizer production unit	Madurai	21.298	0	200	1	21.298	0	0	0	0	0	0	1	221.30
3	Water soluble fertilizer production unit	Coimbatore, Madurai, Thoothukudi	100	1	100	1	100	1	100	0	0	0	0	3	300.00
4	Vermicompost unit	Krishnagiri, Tiruchirappalli, Thanjavur	5	1	5	1	5.00	1	5.00	1	5.00	0	0.00	4	20.00
T	**Infrastructure for research and development**													0	0.00
1	Photosynthetic analytic laboratory	Dindigul, Sivagangai, Thanjavur	300	1	300	1	300	1	300	0	0	1	300	4	1200.00
2	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
3	Strengthening of department laboratories in Teaching campus of TNAU	Thoothukudi, Villupuram, Coimbatore, Dindigul, Cuddalore, Krishnagiri, Pudukkottai, Tirunelveli, Salem, Tiruchirappalli and Thanjavur	5	6	30	6	30	5	25	5	25	6	30	28	140.00
4	Microbiological laboratory	Theni	50	0	0	0	0.00	0	0.00	5	250.00	0	0.00	5	250.00
5	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
6	Bio inoculants production units	Coimbatore, Thoothukudi and Tiruvannamalai	100	1	100	1	100	1	100	0	0	0	0	3	300.00
7	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
8	Biofertilizer laboratory	Thanjavur	90	0	0	1	90	0	0	0	0	0	0	1	90.00
9	Centre for Plant molecular biological laboratory	Thoothukudi, Theni	200	1	200	1	200	0	0	0	0	0	0	2	400.00
10	Microanalytical laboratory	Thiruvannamalai	50	0	0	0	0	1	50	0	0	0	0	1	50.00

11	Microbial Type Culture Collection Facility and Mycological Museum	Coimbatore	330	0	0	0	0	0	0	1	330	0	0	1	330.00
12	NABL Accredited laboratory	Tiruchirappalli, Madurai, Thoothukudi, Tiruvallur and Tiruvannamalai	40	1	40	1	40	1	40	1	40	1	40	5	200.00
13	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
14	Plant tissue culture laboratory	Tiruchirappalli, Theni	250	0	0	1	250	1	250	0	0	0	0	2	500.00
15	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
16	Surveying & land levelling lab, Remote sensing & GIS lab	Tiruchirappalli	10	1	200	1	10	1	10	1	10	1	10	5	240.00
17	Pesticide Residue Laboratory	Krishnagiri	50	0	0	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
18	Mango Research Centre	Krishnagiri	100	0	0	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
19	Strengthening research infrastructure in research stations / KVKs / Centre of Execellence of Tamil Nadu Agricultural University	All districts except Ariyalur and Chennai	200	10	2000	10	2000	10	2000	10	2000	10	2000	50	10000.00
U	**Infrastructure for mushroom and spawn production**													0	0.00
1	Automated mushroom spaw n production unit	Thoothukudi, Coimbatore	225	1	225	1	225	0	0	0	0	0	0	2	450.00
2	Mushroom Research laboratory	Coimbatore, Tiruchirappalli	15	1	15	0	0	1	15	0	0	0	0	2	30.00
V	**Infrastructure for good qualtiy seedling production**													0	0.00
1	Creation of nursery infrastructures (Mist chambers, shadenet house & Environment	Coimbatore	50	1	50	0	0	0	0	0	0	0	0	1	50.00

	controlled chamber)														
2	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
3	Modern hi-tech nurseries	Coimbatore	155	0	0	1	155	0	0	0	0	0	0	1	155.00
4	Mother block plant nursery	Theni, Coimbatore	10	0	0	1	10.00	1	10.00	0	0.00	0	0.00	2	20.00
5	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
W	**Infrastructure for Post harvest management**													0	0.00
1	Cold storage	Coimbatore	25	0	0	1	25	0	0	0	0	0	0	1	25.00
2	Concrete Extraction Unit	Theni, Tiruchirappalli	25	1	25	1	25	0	0	0	0	0	0	2	50.00
3	Dry flower processing unit	Tiruchirappalli, Kanyakumari	5	1	5	1	5	0	0	0	0	0	0	2	10.00
4	Post Harvest Technology Centre	Thanjavur, Pudukkottai, Tiruvallur, Theni, Tiruvannamalai	40	1	40	1	40	1	40	1	40	1	40	5	200.00
5	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
6	Coconut Processing Facility	Thanjavur	50	1	50	0	0	0	0	0	0	0	0	1	50.00
7	Millet Processing and Value Addition Facility	Thiruvannamalai	100	0	0	1	100	0	0	0	0	0	0	1	100.00
8	Oil palm Processing unit	Thanjavur	50	1	50	0	0	0	0	0	0	0	0	1	50.00
9	Fruit and Vegetable Processing unit	Tiruchirappalli, Madurai, Thoothukudi	50	1	50	1	50	0	0	0	0	0	0	2	100.00
10	Model Lime Processing Unit	Thoothukudi	100	0	0	1	100	0	0	0	0	0	0	1	100.00
11	Castor seed processing unit	Salem	20	0	0	1	20	0	0	0	0	0	0	1	20.00
12	Chewing Cane –	Cuddalore	50	0	0	1	50	0	0	0	0	0	0	1	50.00

	Production and Processing Unit														
13	Dhal mill for pulses	Pudukkottai	100	0	0	0	0	1	100	0	0	0	0	1	100.00
14	Food processing Laboratory	Thiruvannamalai, Tiruchirappalli, Madurai	50	2	100	2	100	0	0	0	0	0	0	4	200.00
16	Organic Jaggery Processing Unit	Cuddalore, Vellore	75	0	0	1	75	1	75	0	0	0	0	2	150.00
17	Palmyrah processing pilot plant	Sivagangai	75	0	0	1	75	0	0	0	0	0	0	1	75.00
18	Tapioca minimal processing Unit	Salem	100	1	200	0	0	0	0	0	0	0	0	1	200.00
19	Flower processing and Training Institute	Kanyakumari	225	0	0	1	225	0	0	0	0	0	0	1	225.00
20	Fruit Processing and Training Institute	Krishnagiri	225	0	0	0	0	1	225	0	0	0	0	1	225.00
21	Jack fruit Cluster and Jack Processing Unit	Pudukkottai, Cuddalore, Coimbatore	100	1	100	1	100	1	100	0	0	0	0	3	300.00
22	Rice Technology Park Complex	Coimbatore	250	0	0	1	250	0	0	0	0	0	0	1	250.00
X	**Infrastructure for protected cultivation**													0	0.00
1	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
2	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
3	Model protected growing model	Tiruchirappalli	170	1	170	0	0	0	0	0	0	0	0	1	170.00
4	Polyhouse	Dindigul	6	1	6	1	6	1	6	0	0	0	0	3	18.00
5	Protected model precision farming systems	Theni	155	1	155	0	0.00	0	0.00	0	0.00	0	0.00	1	155.00
Y	**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
Z	**Infrastructure for storage**													0	0.00
1	Storage godowns	Dindigul, Tirunelveli, Thoothukudi	10	1	10	1	10	1	10	1	10	0	0	4	40.00

AA	**Infrastrucutre for technology transfer**													0	0.00
1	Technology Park	Cuddalore, Thanjavur	100	0	0	1	100	0	0	0	0	1	100	2	200.00
2	Farm Women Development Centre	Tiruchirappalli, Madurai	100	0	0	0	0	1	100	0	0	1	100	2	200.00
3	Green Globe Centre	Tiruvallur	1500	0	0	1	500	0	0	0	500	0	0	1	1000.00
4	Farmers Training Centre	Salem, Thanjavur, Theni, Tiruvallur	200	1	200	1	200	1	200	1	200	1	200	5	1000.00
5	Information Training Centre	Tiruvallur	500	0	0	0	0	0	0	1	500	0	0	1	500.00
6	Training Institutes	Tirunelveli, Theni	100	1	100	0	0	1	200	0	0	0	0	2	300.00
7	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				**4852**		**5698.30**		**5269**		**3256**		**2105**		**21180.3**
	Grand Total				**8412**		**11664.974**		**9136.02**		**5270.72**		**4695**		**39178.71**

Table 4.34 Consolidated Budget for Agriculture including Research

(Rs. in lakh)

Sl. No.	Components / Interventions	Year					
		2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Enhancement of Paddy Production	46047.3	52446.23	57550.26	61883.31	67320.95	285248.04
2	Intensive Millet Production	18097.17	19723.38	20235.25	21081.24	22200.07	101337.12
3	Enhancement of Pulses Production	23096.49	28546.34	29390.95	31328.2	35050.36	147412.34
4	Enhancing Oilseeds Production	20780.69	23218.53	24934.69	25222.74	26403.73	120560.38
5	Oil palm	1176.4	1229.79	1349.61	1445.92	1558.15	6759.86
6	Coconut development	21007.95	17987.05	17990.09	18737.69	18979.62	94702.38
7	Enhancing Sugarcane productivity	128826.2	138038.8	140796.9	144846.2	147355.3	699863.36
8	Increasing Productivity of Cotton	2060.98	2850.5	3096.68	3351.59	3639.27	14999.01
9	Capacity Building programmes	2405.39	2870.44	2905.37	3072.19	3371.69	14625.07
10	Infrastructure development programs	19684.78	21281.05	11129.35	11382.34	6987.136	70464.65
11	Rainfed Area Development Programme	23994.41	27487.01	14596.81	11340.41	13136.86	90555.5
12	Soil health management	5798.17	7836.78	7280.79	7371.88	7626.05	35913.67
13	IPM	873	1805.2	5123.4	1825	1851.8	11478.4
14	Farm Machineries	24226.59	33651.54	35836.34	39036.98	47614.4	180365.85
15	SSF	2964.11	1473.81	761.79	469.41	408.23	6077.32
16	Information Technology	1430.73	1186.57	73.97	105.77	685.02	3482.05
	Total	**342470.36**	**381633.02**	**373052.25**	**382500.87**	**404188.636**	**1883845.00**
17	Agricultural Research and Development	8412	11664.974	9136.02	5270.72	4695	39178.714
	Grand Total	**350882.36**	**393297.994**	**382188.27**	**387771.59**	**408883.636**	**1923023.714**

4.2 HORTICULTURE

Horticulture plays a vital role in the food and nutritional security of the people as well as in earning foreign exchange through export of raw and value added horticultural crops. In the context of increasing population, swelling urbanization and a favourable shift in the consumption of fruits and vegetables, there in a need for covering larger area under horticultural crops. The farmers are ready to go in for the cultivation of horticultural crops which prove remunerative. The focus should be to give healing touch to the farmers and the challenge lies in taking the technologies to 90 per cent of farmers who are small and marginal farmers.

Tamil Nadu is blessed with agro-climatic zones, which favours the cultivation of almost all kind of horticulture crops. In all, horticulture crops are grown in 10.01 lakh hectares, of which vegetables, spices, plantation crops, flowers and medicinal plants are the major crops cultivated in the State. Totally, 86 horticultural crops are grown in the State which clearly indicates the crop diversity and also the possibility of augmenting the income of farmers. Therefore emphasis is to be given for production enhancement through precision farming for fruits, vegetables and for perennial crops and also through provision of shade net, green house, pandal cultivation etc. The major strategies suggested are as follows:

4.2.1. Plantation Infrastructure and Development

Improving Infrastructural facilities for production

To increase the income of the horticultural farmers, support for the establishment of pandals, trellies, staking and propping polygreen houses, (tubular structure) have to be provided. Vegetables like bitter gourd, snake gourd, ribbed gourd, pandal avarai, pole beans, tomato, gherkin, cucumber, squash and in fruits grapes, musk melons and in spices pepper etc could be cultivated under pandal cultivation. Similarly, crops like peas, musk melon, pole beans, tomatoes, ivy gourd could be raised in trellies. High value vegetables like capsicum, beans and flowers like carnation, roses etc could be raised in poly houses.

Maintenance of Plantation

The existing fruit trees have to be maintained properly until they attain fruit bearing stage and thereafter up to economically profitable bearing stage. This calls for proper maintenance of fruit trees with appropriate intercultural operations periodically. Regular maintenance of orchards / fruit trees would enhance the production / productivity as well.

4.2.2. Establishment of new gardens / Area Expansion

Area expansion by Precision Farming Technology

By providing inputs like water soluble fertilizers, hybrid / high yielding vegetable seeds and plant protection chemicals, the area under annual crops like vegetables, flowers, spices, medicinal plants and one year long season crops like banana, tapioca, annual moringa and turmeric could be raised under precision farming technology.

Area expansion by high density planting

By adopting high density planting in mango, guava and sapota, the area under fruit trees could be increased. This includes supply of pedigree planting materials, integrated nutrient management and integrated pest management.

Area expansion by Normal Planting

Besides precision farming and high density planting, the area could be increased by normal planting as well by using pedigree planting materials in fruits, spices, flowers and plantation crops. Similarly, by extending support for the planting materials of high value vegetables, the protected cultivation of vegetable area could also be increased. Likewise, cultivation of cut flowers and filler foliage also need to be encouraged.

4.2.3. Protected cultivation

Precision Farming through Hi tech cultivation Practices

It is proposed to plan for increasing the production of crops by adopting advanced technology like high tech cultivation practices which includes high density planting, use of quality planting materials, tissue culture planting materials, canopy management, micro irrigation fertigation, mulching, use of bunch sleeves for banana, protected cultivation, shade net nursery and mechanization in horticulture crop cultivation by popularizing the same among the growers to enhance productivity. It is proposed to adopt high density planting in mango, guava and sapota in select districts of the State by providing subsidy.

Shade net nursery

Vegetable seedlings established in shade nursery shows uniformity in growth, irrigation, free from pest and disease attack. These attributes lead to 100 per cent crop stand in the main field and increase the productivity. These nurseries also serve as a place for curing the graft, layers, budded plants and newly potted plants.

4.2.4. Rejuvenation of Old Orchards – Mango and Guava

In general, 40-45 years old mango trees exhibit decline in fruit yield because of dense and overcrowded canopy. The trees do not get proper sunlight resulting in decreased production of shoots. New emerging shoots are weak and are unsuitable for flowering and fruiting. The population of insects and pests builds up and the incidence of diseases increases in such orchards. These unproductive trees can be converted into productive ones by pruning with the techniques developed. Similarly, a procedure to rejuvenate and restore the production potential of old unproductive and wilt affected guava orchards has been developed, which employs pruning of branches at different periodicity and at different severities. Crowding and encroachment of guava trees with subsequent inefficient light utilization is an obvious problem with older orchards, if trees are not well managed. The internal bearing capacity of guava trees also decreases with time, due to overshadowing of internal bearing wood.

4.2.5. Organic Farming

Organic farming is an alternative agricultural system which originated early in the 20th Century in reaction to rapidly changing farming practices. It relies on fertilizers of organic origin such as compost, manure, green manure, and bone meal and places emphasis on techniques such as crop rotation, companion planting. Biological pest control, mixed cropping and fostering of insect predators are encouraged. Since 1990, the market for organic food and other products has grown rapidly, reaching $63 billion worldwide in 2012. This demand has driven a similar increase in organically managed farmland that grew from 2001 to 2011 at a compounding rate of 8.9 per cent per annum. As of 2011, approximately 3.70lakhhectaresworldwide were farmed organically, representing approximately 0.9 percent of total world farmland. Organic farming encourages crop diversity. The science of agro ecology has revealed the benefits of polyculture (multiple crops in the same space), which is often employed in organic farming. Planting a variety of vegetable crops supports a wider range of beneficial insects, soil microorganisms, and other factors that add up to overall farm health. Crop diversity helps environments thrive and protects species from going extinct. The profitability of organic agriculture can be attributed to a number of factors. First, organic farmers do not rely on synthetic fertilizer and pesticide inputs, which can be costly. In addition, organic foods currently enjoy a price premium over conventionally produced foods, meaning that organic farmers can often get more for their yield.

The price premium for organic food is an important factor in the economic viability of organic farming. Organic agriculture can contribute to ecologically sustainable, socio-economic development, especially in poorer countries. The application of organic principles enables employment of local resources (e.g., local seed varieties, manure, etc.) and therefore cost-effectiveness. Local and international markets for organic products show tremendous growth prospects and offer creative producers and exporters' excellent opportunities to improve their income and living conditions.

4.2.6. Post Harvest Management

In agriculture, post harvest handling is the stage of crop production immediately following harvest, including cooling, cleaning, sorting and packing. The instant a crop is removed from the ground, or separated from its parent plant, it begins to deteriorate. 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.

After the field, post-harvest processing is usually continued in a packing house. This can be a simple shed, providing shade and running water, or a large-scale, sophisticated, mechanized facility, with conveyor belts, automated sorting and packing stations, walk-in coolers and the like. In mechanized harvesting, processing may also begin as part of the actual harvest process, with initial cleaning and sorting performed by the harvesting machinery. Initial post-harvest storage conditions are critical to maintaining quality. Each crop has an optimum range of storage temperature and humidity. Also, certain crops cannot be effectively stored together, as unwanted chemical interactions can result. Various methods of high-speed cooling, and sophisticated refrigerated and atmosphere-controlled environments, are employed to prolong freshness, particularly in large-scale operations.

Regardless of the scale of harvest, from the domestic garden to industrialized farm, the basic principles of post-harvest handling for most crops are the same: handle with care to avoid damage (cutting, crushing, and bruising), cool immediately and maintain in cool conditions, and cull (remove damaged items).

Once harvested, vegetable and fruit are subject to the active process of senescence. Numerous biochemical processes continuously change the original composition of the crop

until it becomes unmarketable. The period during which consumption is considered acceptable is defined as the time of "post harvest shelf life". Post harvest shelf life is typically determined by objective methods that determine the overall appearance, taste, flavour, and texture of the commodity. These methods usually include a combination of sensorial, biochemical, mechanical, and colorimetric (optical) measurements. A recent study attempted (and failed) to discover a biochemical marker and fingerprint methods as indices for freshness.

An example of the importance of the field to post-harvest handling is the discovery that ripening of fruit can be delayed, and thus, their storage prolonged, by preventing fruit tissue respiration. This insight allowed scientists to bring to bear their knowledge of the fundamental principles and mechanisms of respiration, leading to post-harvest storage techniques such as cold storage, gaseous storage, and waxy skin coatings. Another well-known example is the finding that ripening may be brought on by treatment with ethylene.

4.2.7. Marketing Interventions

Interventions to build the marketing system are essential such that marketing expenses should be shifted as an expense towards an investment. It's important that interactions between farmers and market intermediaries should match the image of marketing portrays.

4.2.8. Capacity Building

Capacity building of Horticultural Officers and Farmers

In service training of horticultural officers regularly would help them to update the modern technologies in production, marketing and value addition of horticultural crops. Similarly, exposure visits to farmers to nearby districts / States and even foreign countries would help them aware of new and innovative technologies in production, handling, marketing of horticultural produce and value added horticultural products. Besides, it would also motivate the horticultural farmers to enhance the quality of the produce and expand their marketing horizons.

4.2.9. Bee Keeping

Production of apiary honey in the country reached 10,000 tons, valued at about Rs. 300 million. Bee-Keeping Industry is one of the important activities. The Government provides financial support to this Industry by way of providing grant for supply of bee-hives to the Tribal on hill areas, Scheduled Castes/Scheduled Tribes under Western Ghats

Development Programmes, Hill Area Development Programme and Integrated Tribal Development Programme. The income earned by the farmers through bee-keeping activities is an additional income to their agriculture income.

Honey industry in the country can well become a major foreign exchange earner if international standards are met. Beekeeping is an age-old tradition in India but it is considered a no-investment profit giving venture in most areas. Of late, it has been recognized that it has the potential to develop as a prime agri-horticultural and forest-based industry. Honey production is a lucrative business and it generates employment.

Apiary honey is produced in bee hives and is harvested by extraction in honey extractors. Other types of beekeeping equipment like queen excluder, smoker, hive tool, pollen trap and honey processing plant are also used. Indian honey has a good export market. With the use of modern collection, storage, beekeeping equipment, honey processing plants and bottling technologies, the potential export market can be tapped.

4.2.10. Mechanization in cultivation of horticultural crops

Mechanization encourages large scale production and improves the quality of farm produce. It ensures reduction of drudgery associated with variety of farm operations and also encourages the utilization of input and thereby harnessing the potential of available resources. Provision of power operated machineries and tools including power operated saw and plant protection equipments, power machines with Rotovators / equipment, power machines including accessories and equipment would strengthen the infrastructural facilities.

4.2.11. Micro Irrigation, Water harvesting and Management

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.

Majority of fruit trees / orchards are under rainfed cultivation. It is advisable to bring at least 10 per cent of the area under irrigation by providing and strengthening the water harvesting system. This includes provision of drip irrigation facilities wherever possible, recharge of defunct bore wells, provision of pipes and protected distribution system, provision of water lifting devices, Insitu water conservation and the like.

4.2.12. Special Interventions

4.2.12.1 Production Enhancement through Precision Farming

Farmers have experienced fruitful results of technology especially during the past five years. Hence further increase in the production of horticultural crops would be possible both by increasing area and productivity by adopting advanced technologies like precision farming, high density planting, protected cultivation, shade net nursery, integrated pest management and integrated nutrient management. Besides increasing infrastructure and mechanization facilities, productivity enhancement can be thought of by area expansion and resorting to high tech cultivation practices. Annual crops like vegetables, flowers, spices, medicinal plants and one year long season crops like banana, tapioca, turmeric and annual moringa could be considered for expansion by precision farming technology and providing assistance for inputs like water soluble fertilizers, hybrid/ high yielding vegetable seeds, plant protection chemicals etc., with subsidy.

4.2.12.2 Pandal / Trellies cultivation, Propping / Support / Staking

The agro-climatic conditions of Tamil Nadu are favourable for growing large variety of vegetable crops. Nearly two lakh hectares are under vegetable cultivation and it occupies prominent share of 26 per cent of horticultural crops. Vegetables combat under nourishment and are known to be cheapest source of vitamins and minerals such as calcium and iron besides protein and carbohydrates. Pandal vegetables being short duration crops fit very well in the cropping system by offering viable option to the growers to get increased income per unit area. However, the cultivation of vegetables is too constrained due to high initial investment cost. With the objective of enhancing area under pandal vegetables and encouraging farmers to realize increased income, this project is proposed by popularizing high yielding/hybrid seed materials and dissemination of improved method of cultivation to farmers. The cost of pandal has to be provided to the beneficiary farmers as back ended subsidy. Similarly, the beneficiary farmers will be encouraged to install drip irrigation. It is proposed to cover at least 500 hectares in crops like bitter gourd, ribbed gourd, snake gourd, pandal beans etc.

4.2.12.3 Banana Bunch Sleeve

'Bunch care techniques' are to be followed in banana cultivation to achieve the best quality. Transparent polyethylene sleeves are recommended to cover the bunch immediately after opening of the last hand. Using of opaque polythene covers / sleeves gauge (during

winter) and paper bags (to avoid chilling injury at frost conditions and sun scorch).The bunch will be free from insect bites, fungi, bacteria attacks and physical injuries. The cover will also improve bunch appeal and maturity of bunch will be advanced by 7 to 10 days.

4.2.12.4 Agro Ecosystem Analysis (AESA) based IPM

The IPM has been evolving over the decades to address the deleterious impacts of synthetic chemical pesticides on environment ultimately affecting the interests of the farmers. The economic threshold level (ETL) was the basis for several decades but in modern IPM (FAO 2002) emphasis is given to AESA where farmers take decisions based on larger range of field observations. The health of a plant is determined by its environment which includes physical factors (i.e. soil, rain, sunshine hours, wind etc.) and biological factors (i.e. pests, diseases and weeds). All these factors can play a role in the balance which exists between herbivore insects and their natural enemies. Understanding the intricate interactions in an ecosystem can play a critical role in pest management. Decision making in pest management requires a thorough analysis of the agro-ecosystem. Farmer has to learn how to observe the crop, how to analyze the field situation and how to make proper decisions for their crop management. This process is called the AESA. Participants of AESA will have to make a drawing on a large piece of paper (60 x 80 cm), to include all their observations. The advantage of using a drawing is that it requires the participants/farmers to observe closely and intensively. It is a focal point for the analysis and for the discussions that follow, and the drawing can be kept as a record.

AESA is an approach, which can be gainfully employed by extension functionaries and farmers to analyze field situations with regard to pests, defenders, soil conditions, plant health, the influence of climatic factors and their inter-relationship for growing healthy crop.

Such a critical analysis of the field situations will help in taking appropriate decision on management practices.

One of the problems of the ETL is that it is based on parameters that are changing all the time, and that are often not known. The damage or losses caused by a certain density of insects cannot be predicted at all. In ETL the due recognition of the role of natural enemies in decreasing pest population is ignored. Farmers cannot base their decisions on just a simple count of pests. They have to consider many other aspects of the crop (crop ecology, growth stage, natural enemies, weather condition, etc.) and their own economic and social situation before they can make the right crop management decisions. In ETL based IPM, natural enemies, plant compensation ability and abiotic factors are not considered. In AESA based IPM emphasis is given to natural enemies, plant compensation ability, abiotic factors and P: D ratio.

Control of coconut Red Palm weevil

Coconut is a perennial crop and longevity of the tree is about 50 to 70 years. The red palm weevil is a fatal enemy and less than 20 years coconut palm succumbs to severe damage when infected. Hence it is highly necessary to control the attack of red palm weevil pest on war footing. It is programmed to distribute 50, 000 traps of ferrolure of five traps per ha for 1.00 lakh hectare with subsides assistance of 50 per cent. The total cost for one hectare of Rs. 325/ferrolure comes to Rs.3,250. Hence, an assistance of Rs. 1600/ha is proposed for five ferrolure per ha. It is expected to prevent 10 per cent loss of coconut population, in all major coconut growing districts with the exception of Chennai and the Nilgiris and thereby increase the production in long run eradicating the Red Palm weevil.

4.2.12.5 Promotion of Roof top Garden / Potager garden

The traditional **kitchen garden**, also known as a **potager** (in French, *jardin potager*) is a space separate from the rest of the residential garden i.e the ornamental plants and lawn areas. Most vegetable gardens are still miniature versions of old family farm plots, but the kitchen garden is different not only in its history, but also its design. The kitchen garden may serve as the central feature of an ornamental, all-season landscape, or it may be little more than a humble vegetable plot. It is a source of herbs, vegetables and fruits, but it is often also a structured garden space with a design based on repetitive geometric patterns. The kitchen garden has year-round visual appeal and can incorporate permanent perennials or woody shrub plantings around (or among) the annuals.

Potager garden is a French term for an ornamental vegetable or kitchen garden. The goal is to make the function of providing food aesthetically joyful. Plants are chosen as much for their functionality as for their color and form. Many are trained to grow upward. A well-designed potager can provide food as well as cut flowers and herbs for the home with very little maintenance. Potagers can disguise their function of providing for a home in a wide array of forms—from the carefree style of the cottage garden to the formality of a knot garden.

A **vegetable garden** (also known as a **vegetable patch** or **vegetable plot**) is a garden that exists to grow vegetables and other plants useful for human consumption, in contrast to a flower garden that exists for aesthetic purposes. It is a small-scale form of vegetable growing. A vegetable garden typically includes a compost heap, and several plots or divided areas of land, intended to grow one or two types of plant in each plot. Plots may also be divided into rows with an assortment of vegetables grown in the different rows. It is usually located to the rear of a property in the back garden or back yard.

With worsening economic conditions and increased interest in organic and sustainable living, many people are turning to vegetable gardening as a supplement to their family's diet. Food grown in the back yard consumes little if any fuel for shipping or maintenance, and the grower can be sure of what exactly was used to grow it. Organic horticulture, or organic gardening, has become increasingly popular for the modern home gardener.

There are many types of vegetable gardens. The potager, a garden where vegetables, herbs and flowers are grown together, has become more popular than the more traditional rows or blocks.

The herb garden is often a separate space in the garden, devoted to growing a specific group of plants known as herbs. These gardens may be informal patches of plants, or they may be carefully designed, even to the point of arranging and clipping the plants to form specific patterns, as in a knot garden.

Herb gardens may be purely functional or they may include a blend of functional and ornamental plants. The herbs are usually used to flavour food in cooking, though they may also be used in other ways, such as discouraging pests, providing pleasant scents, or serving medicinal purposes (such as a physic garden), among others.

A kitchen garden can be created by planting different herbs in pots or containers, with the added benefit of mobility. Although not all herbs thrive in pots or containers, some herbs

do better than others. Mint, a fragrant yet invasive herb, is an example of an herb that is advisable to keep in a container or it will take over the whole garden.

Some popular culinary herbs in temperate climates are to a large extent still the same as in the medieval period. Herbs often have multiple uses. For example, mint may be used for cooking, tea, and pest control.

4.2.12.6 Establishing Centre of Excellence for different crops

Centre of Excellence for Horticulture crops like fruits, vegetables and flowers are aimed at designing, manufacturing and installation of State of the art facilities be it greenhouse technology, environmental control systems, tissue culture labs, crop production modules specializes in developing Centre of Excellence for fruits, vegetables and flowers in different States of India as per the specifications and the recommendations of Ministry of Agriculture, Department of Agriculture & Cooperation, Horticulture Division, Government of India.

The Major Components of such centres could be:

- Hi-Tech green house (fitted with cooling, misting, heating system along with humidity and temperature control system and raised platforms)
- Naturally ventilated green house (with inside net system)
- Net house
- Low tunnel polyhouse
- Support system (GI wire) for kiwi, passion fruit, grapes etc
- Creation of irrigation facilities-Water storage tank/water pond
- Overhead drip irrigation system
- Mini-sprinklers for irrigation nursery plants
- Automation fertigation/irrigation unit
- Vermi compost/FYM unit
- Soil solarization/sterilization system
- Shade house for filling of rooting media and for grafting & budding operations
- Tissue culture unit
- Establishment of Root Stock and Mother Plant Block
- Establishment of recommended rootstock block of citrus & apple (Under open field conditions)
- Establishment of mother block of citrus in greenhouse (under insect proof net house having virus indexing facility) as well as in open field conditions.

Other Components:

- Training center
- Grading, pack house and cold room
- Room along with toilet facility for laborers
- Horticulture machinery, tools and equipments
- Fencing, kacha farm road
- Inputs like improved seed/planting materials, fertilizers, micronutrients, plant protection chemicals, seedling traps, poly bags, material, labeling, etc.
- Technical support/manpower.

4.2.12.7 Computerization and Governance

As per the State's policy under the scheme of E-governance and computerization of the various development departments, desktop computers and associated equipments had been contemplated. In order to ensure effective implementation of E-Governance, computer equipments (such as laptops, personal computers, Tablets etc) are essential.

Measures have been taken to implement the E-Filing system developed through the medium of N.I.C. in all departments of the Secretariat. This E-Filing system had been implemented as a pilot project in Secretariat Administration Department and 16 departments of the Secretariat having one Section. Subsequently the E-Filing system has been introduced in 28 Departments in the first phase.

The operation of this software is included in the compulsory E-Governance Computer Training. The employees concerned with this work have been given special training for operating the E-Filing software.

4.2.12.8 Research on Crop Diversification

Crop Diversification refers to a shift from the regional dominance of one crop to regional production of a number of crops, to meet ever increasing demand of cereals, pulses, vegetables, fruits, oilseeds, fibres, fodder, grasses etc. It aims to improve soil health and to maintain dynamic equilibrium of the agro-ecosystem. In the instant case, crop diversification is intended to promote technological innovations for sustainable agriculture and enable farmers to choose crop alternatives for increased productivity and income.

4.2.12.9 Special Development Programme – Onion

Onion Storage Structures

India is one of the largest producers of onion in the world. It is one of the most important vegetable crops of our country and forms a part of daily diet in almost all households. In Tamil Nadu onion was grown in an area of about 35,000 ha with a production of 3,80,000 tons (2011-12). Most of the farmers bring onion directly to the market after harvest as proper storage facilities are not available with them. The present storage capacities are quite inadequate and most of the available units are traditional and unscientific. Fearing losses, farmers usually unload their entire stock within a month of harvest. As a result, during this period prices rule very low due to glut situation. Thereafter, the rise in prices is quite rapid and sometimes wide fluctuations occur leading to dissatisfaction amongst the producers as well as consumers. To improve the situation, appropriate storage structures for onion, both at farm level as well as at market places are essential.

4.2.12.10 Tissue Culture Unit

Plant tissue culture is a collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition. Plant tissue culture is widely used to produce clones of a plant in a method known as micro propagation. Different techniques in plant tissue culture may offer certain advantages over traditional methods of propagation, including:

- The production of exact copies of plants that produce particularly good flowers, fruits, or have other desirable traits.
- To quickly produce mature plants.
- The production of multiples of plants in the absence of seeds or necessary pollinators to produce seeds.
- The regeneration of whole plants from plant cells that have been genetically modified.

- The production of plants in sterile containers that allows them to be moved with greatly reduced chances of transmitting diseases, pests, and pathogens.
- The production of plants from seeds that otherwise have very low chances of germinating and growing, i.e.: orchids and *Nepenthes*.
- To clean particular plants of viral and other infections and to quickly multiply these plants as 'cleaned stock' for horticulture and agriculture.

Plant tissue culture relies on the fact that many plant cells have the ability to regenerate a whole plant (totipotency). Single cells, plant cells without cell walls (protoplasts), pieces of leaves, stems or roots can often be used to generate a new plant on culture media given the required nutrients and plant hormones.

Although some growers and nurseries have their own labs for propagating plants by the technique of tissue culture, additional number of laboratories need to be created to provide custom propagation services and commercially viable plants to propagate in a laboratory.

4.2.12.11 Off-season Moringa Production – Pods and Leaves

Moringa green pod is a most popular vegetable of Tamil Nadu and the crop is being grown on commercial scale in about 7000 ha at Moolanur, Aravakurichi and Oddanchatram region. Homestead cultivation of perennial Moringa as isolated single tree for pod as well as green leaves is being practiced almost in every village. Oddanchatram and Aravakurichi are the major market centers for trade in truckloads while small quantities of moringa green pods are being traded every day at every Uzhavar sandai and local shandies of entire State,. Extremes of weather conditions that prevail in Northern States during Kariff as well as Rabi seasons do not favour the cultivation of Moringa. Hence truckloads of drumsticks are being transported from Tamil Nadu, Andhra Pradesh and Karnataka to Northern States. Though the moringa pod is demanded throughout the year, the production is meager during winter and rainy seasons owing to the inadequate thermal requirements of the crop. Various systems of cultivation are in vogue to produce moringa round the year production. Commercial cultivation of annual Moringa PKM-1can fit into any crop rotation. Though it is annual, it is amenable for rationing twice.

4.2.12.12 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. Fats occur in mushrooms in minor amounts, especially compared with protein and

carbohydrates, and the fatty fraction consists predominantly of unsaturated fatty acids such as linoleic acid, they may be the perfect food for maintaining a healthy heart and cardiovascular system. 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.

4.2.12.13 Rainfed Area Development (RAD)

Rainfed areas assume special significance in terms of ecology, agricultural productivity and livelihood for millions of rural households in India. These areas not only constitute about three-fourth of the land mass under arid, semi-arid, and dry-humid zones, but also account for nearly 57 per cent of the agricultural land spread across large parts of the country. Rainfed agriculture is complex, diverse and risk-prone activity. However, rainfed areas if managed properly have the potential to contribute a larger share in the food grain production. These high potential rainfed areas provide us with opportunities for faster agricultural growth as compared to irrigated areas that have reached a plateau.

Holistic agriculture development through Integrated Farming System (IFS) provides an opportunity for development and integration of multiple components of agricultural system such as crops, horticulture, livestock, fishery, agro-forestry with agro-based income generating activities and value addition. To ensure agriculture growth in the rainfed areas, the Government of India launched a new component "Rainfed Area Development (RAD)" under National Mission for Sustainable Agriculture in the year 2014-15. It aims at improving quality of life of farmers especially, small and marginal farmers by offering a complete package of activities to maximize farm returns. RAD focuses on Integrated Farming System (IFS) for enhancing productivity and minimizing risks associated with climatic variability. The broad objectives of the scheme are:

- Increasing agricultural productivity of rainfed areas in a sustainable manner by adopting appropriate farming system based approaches.
- To minimize the adverse impact of possible crop failure due to drought, flood or un-even rainfall distribution through diversified and composite farming system.
- Restoration of confidence in rainfed agriculture by creating sustained employment opportunities through improved on-farm technologies and cultivation practices.

- Enhancement of farmer's income and livelihood support for reduction of poverty in rainfed areas.
- Convergence of relevant developmental programmes in project area for optimal utilization of resources by establishing an integrated and coordinated system involving different sectors and institutions.

4.2.13. Infrastructure Development

Modernization of State Horticulture Farms

In Tamil Nadu, there are 52 State Horticulture Farms including six parks and gardens. The prime objectives of these farms are to produce pedigree planting materials of fruits, flowers, spices and vegetables. The quality planting materials produced in these farms are distributed to the farmers directly and through various schemes of the department. The parks and garden serve as study centre to the students apart from educating the public on eco-preservation.

It is programmed to expand the production of planting materials of various kinds of fruits viz., mango, guava, sapota and flowers like rose, jasmine and ornamental plants and avenue trees by modernizing the nurseries, developing the farms as demonstration centres for the latest techniques in horticulture, enhancing the productivity and augmenting farm mechanization for increasing the efficiency. It is aimed to enhance the productivity levels of orchard crops by 30 per cent and increase the production level of planting materials by 25 per cent.

Establishment of Processing Units

Tamil Nadu produces nearly 110 lakh tones of vegetables and fruits but it has only 136 cold storage locations with a capacity of 2.3 lakh tonnes which is shared amongst marine, milk and agro produce. The combined capacity is small as compared to required capacity. Further it has been reported that nearly 30 percent of the horticultural crops produced are wasted due to rotting and in the post harvest supply chain of storage and handling. Reducing this wastage calls for conversion of value added horticultural crops, fruits and flowers. Hence, it has been programmed to establish horticultural processing unit and essential oil extraction unit.

4.2.14. Crop Insurance

Crop Insurance coverage has to be done for major crops like paddy, millets, pulses, oilseeds, sugarcane, cotton, cash crops and all Horticulture crops in the notified areas. However, eligible farmers can be covered in all the districts. Now loanee farmers are

compulsorily enrolled and non-loanee farmers are enrolled on voluntary basis. Subsidy is given on payment of premium to all the owner and tenant cultivators.

4.2.15. Conducting Field Days / Shows and Farmer's mela

Regular training programmes on relevant topics for Upgradation of knowledge and skill of extension functionaries of development department and farmers are essential. Apart from this, exhibition, horticulture show, Farmers' Mela, Field Days in farmer's field and Frontline Demonstrations to demonstrate technologies are to be regularly conducted.

Considering the budget allocation for horticulture sector during the next five years, an outlay of Rs. 994783.79 lakh is proposed to fulfill the aforementioned interventions for five years. The details of budget requirement for each intervention are shown in Table (4.35).

Table 4.35 Consolidated Budget Outlay for Horticulture

(Rs. 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.
A	**Production Growth**															
I	**Area expansion of fruit crops**															
1	Grapes	Ha	1.25	D5,D22,D26,D28	92	115.00	97	121.25	133	166.25	138	172.50	165	206.25	625	781.25
2	TC Banana & TC Pineapple	Ha	1.25	All blocks except B3,B7,B8,B9,B17, B21,B25,B26,B28, B31	1664	2080.00	1925	2405.63	2217	2771.50	2422	3027.65	2651	3314.10	10879	13598.88
3	Banana / Hill Banana sucker & Pine apple sucker	Ha	0.875	All blocks except D1,D6,D7,D14,D16 ,D19	6799	5949.13	7213	6311.38	7701	6738.03	8207	7181.00	8765	7669.24	38684	33848.77
4	UHDP in Papaya, Mango, Guava, Pomegranate, Acid lime	Ha	1.25	D2,D5,D11,D12,D1 6,D18,D19,D20,D2 2,D28,D29,D30,D3 1	331	413.13	367	458.75	421	525.63	470	587.50	507	633.75	2095	2618.75
5	HDP in Mango, Guava, Litchi, Pomegranate	Ha	1	All blocks except D1,D7,D8,D14	1829	1829.00	2001	2000.60	2276	2275.56	2540	2539.92	2730	2729.71	11375	11374.78
6	Area expansion fruits with traditional varieties	Ha	0.6	D3,D6,D10,D12,D1 5,D16,D18,D19,D2 0,D21,D22,D26,D2 8,D29,D30,D31	306	183.60	342	205.20	388	232.80	415	249.00	457	274.20	1908	1144.80
7	Normal Planting in lime / lemons	Ha	0.6	All blocks except D2,D4,D8,D10,D12 ,D17,D19	787	472.20	824	494.40	936	561.72	1021	612.37	1100	660.17	4668	2800.86
8	Normal Planting in Mango	Ha	0.6	All blocks except D3,D8,D11,D12,D1 4,D17,D19,D27	1182	709.20	1319	791.40	1446	867.72	1610	966.07	1782	1069.37	7340	4403.76
9	Normal planting in Guava	Ha	0.6	All blocks except D3,D12,D14,D15,D 16,D27	1062	636.90	1161	696.60	1297	778.02	1426	855.67	1606	963.47	6551	3930.66
10	Normal planting in Sapota	Ha	0.6	D6,D9,D11,D18,D2 0,D21,D22,D23,D2 4,D25,D28,D29,D3 0,D31	219	131.40	246	147.60	292	175.32	337	201.97	382	229.37	1476	885.66
11	Normal planting in Amla	Ha	0.6	All districts except D1,D3,D4,D7,D12, D13,D14,D15,D16, D17,D19,D24,D27	393	235.80	492	295.20	600	360.12	695	416.77	779	467.57	2959	1775.46
12	Normal planting in Papaya	Ha	0.6	All districts except D1,D8,D12,D13,D1	839	503.16	972	582.96	1086	651.36	1188	712.64	1339	803.35	5422	3253.47

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.
				6,D17												
13	Normal planting in Jack	Ha	0.6	D3,D6,D9,D13,D18,D20,D22,D23,D25,D29,D30,D31	118	70.80	121	72.60	132	79.26	137	82.39	143	85.58	651	390.63
14	Normal planting in Pomegranate	Ha	0.6	D1,D5,D6,D10,D18,D21,D22,D23,D25,D28,D30	155	93.00	188	112.80	228	136.86	264	158.59	310	185.78	1145	687.03
15	Normal planting in Avacado	Ha	0.6	D5,D14,D18	111	66.60	111	66.60	112	67.20	112	67.20	112	67.20	558	334.80
16	Banana for leaf production	Ha	0.6	D2,D3,D5,D6,D9,D10,D18,D20,D21,D22,D26,D29,D30	546	327.30	648	388.50	744	446.10	858	514.50	938	562.50	3732	2238.90
17	Area expansion under Palmyra,	Ha	0.6	D5,D12,D26,D30	93	55.80	97	58.20	100	60.00	104	62.40	106	63.60	500	300.00
18	Commercial production of choice fruits (Kiwi, Mangosteen, Rambutan, Fig, Date palm, Durian, Carambola, Dragon fruit, Passion Fruit, Kiwi, Grapes, Strawberry, etc.,)	Ha	1.25	D5,D10,D12,D14,D18,D20,D21,D22,D26,D30	123	153.75	132	165.00	177	221.25	180	225.00	183	228.75	795	993.75
19	Commercial production of Traditional fruits (Wood apple, Manila Tamarind, Jamun, Ber, Karonda, Annona, Egg fruit, etc.,)	Ha	0.6	D3,D5,D6,D9,D10,D11,D12,D18,D20,D22,D25,D26,D27,D29,D30,D31	271	162.60	324	194.40	360	216.00	379	227.40	415	249.00	1749	1049.40
II	**Area expansion of vegetable crops**															
20	Brinjal	Ha	0.5	All districts except D8,D14,D17	1873	936.25	2065	1032.25	2343	1171.50	2595	1297.53	2868	1433.85	11743	5871.38
21	Bhendi	Ha	0.5	All districts except D8,D14,D17	2349	1174.50	2552	1275.75	2835	1417.25	3124	1562.03	3442	1720.85	14301	7150.38
22	Green Chillies	Ha	0.5	All districts except D7,D8,D13,D14,D15,D28	1800	899.75	2051	1025.25	2282	1140.75	2484	1242.03	2734	1366.85	11349	5674.63
23	Tomato	Ha	0.5	All districts except D1,D3,D7,D8,D12,D14,D16,D17	1980	990.00	2256	1127.75	2564	1281.88	2877	1438.41	3174	1586.90	12850	6424.94

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.
24	Gourds including pumpkin and tinda	Ha	0.5	All districts except D8,D10,D14,D17,D19,D21	1436	717.75	1639	819.25	1872	935.75	2008	1003.80	2137	1068.46	9090	4545.01
25	Peas & Beans	Ha	0.5	D2,D5,D6,D14,D18,D21,D22,D23	379	189.50	412	206.00	462	230.75	486	242.78	519	259.60	2257	1128.63
26	Greens	Ha	0.5	All districts except D1,D5,D8,D10,D14,D15,D16,D17,D19,D21,D26,D27	1016	508.00	1134	567.00	1283	641.25	1483	741.28	1650	824.85	6565	3282.38
27	Small Onion	Ha	0.5	All districts except D7,D8,D10,D12,D14,D16,D17,D19,D24	4852	2426.00	5163	2581.50	5504	2752.10	5941	2970.31	6360	3180.14	27820	13910.05
28	Bellary Onion	Ha	0.5	D1,D2,D3,D10,D11,D18,D26,D27,D28,D29,D30	840	419.75	866	432.75	909	454.25	941	470.25	959	479.25	4513	2256.25
29	Cauliflower	Ha	0.5	D2,D3,D5,D6,D10,D14,D18,D20,D21,D22,D23,D27,D29,D30	165	82.50	189	94.50	222	111.00	238	119.00	264	132.00	1078	539.00
30	Annual Moringa	Ha	0.5	D1,D2,D3,D4,D5,D6,D9,D15,D16,D18,D20,D21,D22,D23,D25,D27,D28,D29,D30,D31	860	429.85	1028	513.75	1179	589.74	1335	667.48	1513	756.68	5915	2957.50
31	Cabbage	Ha	0.5	D2,D5,D6,D10,D14,D18,D20,D22,D27,D29,D30	250	125.00	266	133.00	278	139.00	293	146.50	305	152.50	1392	696.00
32	Cucumber/gherkin	Ha	0.5	D2,D4,D6,D9,D10,D11,D13,D15,D16,D18,D20,D22,D25,D26,D27,D28,D30,D31	448	224.00	483	241.50	537	268.50	610	305.00	670	335.00	2748	1374.00
33	Potato	Ha	0.5	D5,D6,D14,D18,D20	171	85.50	176	88.00	231	115.50	236	118.00	241	120.50	1055	527.50
34	Carrot	Ha	0.5	D5,D14,D18,D20,D30	719	359.50	719	359.50	719	359.50	719	359.50	719	359.50	3595	1797.50
35	Lab Lab	Ha	0.5	D5,D6,D18,D20,D21,D22,D27,D28,D29,D30	406	203.00	469	234.50	517	258.50	610	305.00	661	330.50	2663	1331.50
36	Chowchow	Ha	0.5	D5,D14,D18,D20	93	46.50	93	46.50	143	71.50	143	71.50	144	72.00	616	308.00
37	Radish	Ha	0.5	D6,D10,D12,D13,D14,D15,D18,D20,D21,D22,D23,D28,D29,D30	284	142.00	319	159.50	346	173.10	388	193.81	461	230.64	1798	899.05
38	Melons	Ha	0.5	D4,D5,D6,D7,D10,D12,D13,D16,D18,	1107	553.50	1139	569.50	1192	596.00	1248	624.03	1284	642.10	5970	2985.13

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.
				D20,D21,D22,D23, D24,D25,D26,D27, D28,D29,D30												
39	Coccinea	Ha	0.5	D5,D12,D18,D22,D 30	64	32.00	71	35.50	102	51.00	109	54.50	121	60.50	467	233.50
40	Cluster bean	Ha	0.5	D5,D6,D9,D11,D12 ,D13,D18,D20,D21 ,D22,D23,D24,D28 ,D29,D30	448	224.00	492	246.00	560	280.15	616	307.97	669	334.46	2785	1392.58
41	Beetroot	Ha	0.5	D2,D5,D6,D14,D18 ,D20,D22,D27,D30 ,D31	322	161.00	410	205.00	457	228.50	511	255.50	562	281.00	2262	1131.00
42	Tapioca	Ha	0.5	All districts except D5,D7,D10,D11,D1 5,D17,D19,D25,D3 1	5164	2582.00	5492	2746.00	5976	2988.00	6463	3231.55	6769	3384.71	29865	14932.26
43	Yams and colacassia	Ha	0.5	D3,D6,D9,D13,D18 ,D20,D21,D22,D23 ,D26,D28,D29,D30	426	213.00	470	235.00	509	254.60	530	264.81	554	277.14	2489	1244.55
44	Sweet potato	Ha	0.5	D18,D20,D21,D22, D23,D28,D30,D31	65	32.50	72	36.00	83	41.60	92	45.81	99	49.64	411	205.55
45	Commercial production of choice vegetables (Bread fruit, Brussels sprout, Broccoli, Spring Onion, Knol Khol, Turnip, Winged Bean, Butter Bean, Chinese Cabbage, Lettuce, Leek, Porum, etc.,	Ha	0.5	D5,D10,D12,D14,D 18,D21,D22,D30,D 31	123	61.25	145	72.25	157	78.25	174	86.75	186	92.75	783	391.25
46	Commercial production of location specific traditional vegetables (Athalakkai, Palu Pavakkai, Mullu kathiri, Poiyur kathiri, Kottapatti kathiri etc.,)	Ha	0.5	D3,D5,D6,D12,D16 ,D18,D22,D26,D28 ,D29,D30	297	148.50	383	191.50	465	232.50	518	259.00	574	287.00	2237	1118.50
47	Cultivation of hybrid Vegetables under protected structures	1000 Sq.m	1.4	D2,D4,D5,D10,D11 ,D13,D14,D15,D18 ,D20,D22,D24,D25 ,D28,D29,D30	6195	8673.00	6135	8589.00	7143	10000.20	7156	10018.40	6146	8604.40	32775	45885.00

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.
III	**Area expansion of Medicinal and Aromatic plants**															
48	Vasambu	Ha	0.7472	D30	30	22.42	30	22.42	30	22.42	30	22.42	30	22.42	150	112.08
49	Aloe vera	Ha	0.5081	D18,D22,D26,D30	26	13.21	30	15.24	34	17.28	36	18.29	38	19.31	164	83.33
50	Neem	Ha	0.4483	D3,D18,D26,D30,D31	158	70.83	158	70.83	160	71.73	160	71.73	160	71.73	796	356.85
51	Asparagus	Ha	0.7472	D22,D30	9	6.72	10	7.47	10	7.47	10	7.47	10	7.47	49	36.61
52	Amla	Ha	0.7771	D3,D9,D11,D12,D16,D18,D19,D22,D26,D27,D30	168	130.16	216	167.47	258	200.10	314	244.01	345	268.10	1300	1009.84
53	Gloriosa	Ha	1.6438	D5,D6,D9,D12,D13,D18,D27,D28,D30	502	825.19	558	917.24	602	989.57	630	1035.59	658	1081.62	2950	4849.21
54	Coleus	Ha	0.5141	D3,D13,D18,D23,D28,D29,D30	2079	1068.81	2192	1126.91	2423	1245.41	2690	1383.01	2817	1448.05	12200	6272.18
55	Senna	Ha	0.2988	D11,D25,D30,D31	540	161.35	582	173.90	618	184.66	659	196.91	717	214.24	3116	931.06
56	Periwinkle	Ha	0.2988	D9,D11,D30,D31	241	72.01	279	83.37	302	90.24	316	94.42	346	103.38	1484	443.42
57	Vallarai	Ha	0.4782	D30	23	11.00	25	11.96	25	11.96	25	11.96	25	11.96	123	58.82
58	Safed Musli	Ha	3.7359	D30	5	18.68	5	18.68	5	18.68	5	18.68	5	18.68	25	93.40
59	Kodampuli	Ha	0.7472	D30	3	2.24	3	2.24	3	2.24	3	2.24	3	2.24	15	11.21
60	Gymnema	Ha	0.2989	D30	2	0.60	3	0.90	3	0.90	3	0.90	3	0.90	14	4.18
61	Ocimum	Ha	0.3586	D8,D18,D21,D30,D31	60	21.52	61	21.87	65	23.31	73	26.00	84	29.94	342	122.64
62	Phyllanthus	Ha	0.3288	D30	2	0.66	3	0.99	3	0.99	3	0.99	3	0.99	14	4.60
63	Thippili	Ha	0.7472	D8,D30	47	35.12	47	35.12	47	35.12	47	35.12	47	35.12	235	175.59
64	Solanum nigrum	Ha	0.2989	D21,D22,D30	8	2.39	9	2.69	14	4.04	14	4.04	14	4.18	58	17.34
65	Vettiver	Ha	0.3	D3,D5,D21,D30	105	31.50	105	31.50	156	46.80	106	31.80	106	31.80	578	173.40
66	Lemon grass/palmarosa	Ha	0.32	D4,D5,D20,D23,D30	107	34.25	113	36.17	119	37.93	125	39.86	131	41.99	594	190.19
67	Red sandal	Ha	0.6754	D12,D20,D30	49	33.09	47	31.74	47	31.74	47	31.74	47	31.74	237	160.07
68	Sandal	Ha	0.5822	D12,D20,D30	40	23.29	39	22.71	37	21.54	37	21.54	36	20.96	189	110.04
69	Stevia	Ha	3.7359	D30	2	7.47	2	7.47	0	0.00	0	0.00	0	0.00	4	14.94
70	Rosemary	Ha	1	D5,D14	6	6.00	6	6.00	6	6.00	6	6.00	6	6.00	30	30.00
71	Mint	Ha	0.15	D10,D11,D18,D20,D22,D28,D29,D30	174	26.03	181	27.08	190	28.43	196	29.33	200	29.93	939	140.78

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.
IV	**Area expansion of Spices crops**				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
72	Seed and Rhizomatic spices (Coriander, Turmeric, Ginger, Dry Chilly, Cumin, Fennel, Fenu greek, Dil, Cardamom etc.,)	Ha	0.3	All districts except D8	4590	1376.85	4884	1465.20	5350	1605.11	5894	1768.08	6035	1810.42	26752	8025.65
73	Perennial spices (Pepper, Curry leaf, All spice, Cinnamon, Clove, Tamarind, Nut meg etc.,)	Ha	0.5	All districts except D1,D9,D11,D15,D17,D19	1128	564.00	1284	641.75	1437	718.38	1586	792.89	1736	868.05	7170	3585.06
74	Bulbous spices Garlic	Ha	0.5	D5,D6,D10,D14,D18,D22,D30	327	163.50	342	171.00	357	178.50	352	176.00	372	186.00	1750	875.00
V	**Area expansion of Flower crops**															
75	Loose flowers - Jasminum sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia	Ha	0.4	All districts except D14,D17,D27	2050	820.00	2444	977.60	2700	1080.00	2997	1198.64	3235	1293.96	13426	5370.20
76	Bulbous flowers - Tube rose, Gladioli, Dahlia, Bird of paradise, Heliconia, Tulip	Ha	1.5	All districts except D7,D13,D14,D17,D24,D26,D31	887	1330.50	966	1449.00	1056	1583.25	1528	2291.33	1374	2061.31	5810	8715.38
77	Cut flowers under open condition - Alstromaria, Golden Rod	Ha	1	D5,D6,D10,D30	70	70.00	72	72.00	75	75.00	75	75.00	75	75.00	367	367.00
78	Cost of planting material & cultivation of Orchid, Eustoma & Anthurium under poly house / Shade net house	1000 Sq.m	7	D5,D10,D18, D30	10	70.00	10	70.00	10	70.00	10	70.00	11	77.00	51	357.00
79	Cost of planting material & cultivation of carnation & Gerbera under poly house /	1000 Sq.m	6.1	D5,D10,D14, D18,D30	125	759.45	125	762.50	130	793.00	130	793.00	135	823.50	645	3931.45

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.
	Shade net house															
80	Cost of planting material & cultivation of Rose, Lilium, under poly house / Shade net house	1000 Sq.m	4.26	D10,D14,D18,D26, D30	96	406.83	96	406.83	95	402.57	95	402.57	96	406.83	476	2025.63
VI	**Area expansion /Gap filling of Plantation crops**															
81	Coffee	Ha	0.5	D5,D13,D18,D22,D 30	197	98.50	242	121.00	307	153.50	327	163.50	357	178.50	1430	715.00
82	Tea	Ha	0.5	D22	30	15.00	80	40.00	105	52.50	130	65.00	160	80.00	505	252.50
83	Rubber	Ha	0.5		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
84	Cocoa	Ha	0.5	D2,D3,D5,D6,D18, D20,D22,D24,D26, D27,D31	536	268.00	661	330.50	765	382.50	822	411.00	890	445.00	3674	1837.00
85	Cashew	Ha	0.5	D1,D3,D5,D8,D12, D16,D18,D19,D20, D21,D22,D25,D26, D27,D28,D30,D31	866	433.00	1016	508.00	1099	549.50	1197	598.50	1273	636.50	5451	2725.50
86	Arecanut	Ha	0.5	D2,D6,D13,D14,D1 8,D20,D22,D23,D2 4,D28,D30	269	134.50	294	147.00	303	151.55	327	163.66	348	173.82	1541	770.53
87	Betel vine	Ha	0.5	D3,D6,D9,D13,D20 ,D22,D24,D25,D29 ,D30,D31	135	67.50	161	80.50	177	88.50	203	101.50	219	109.50	895	447.50
88	Coconut	Ha	0.5	D2,D3,D6,D12,D18 ,D20,D22,D24,D26 ,D29,D30	1093	546.50	1271	635.50	1428	714.00	1526	763.00	1661	830.50	6979	3489.50
89	Bamboo and Other crops	Ha	0.6	D3,D22,D25,D26,D 30,D31	42	25.20	43	25.80	32	19.20	33	19.80	50	30.00	200	120.00
VII	**Rejuvenation/INM IPM/Mulching/Ant i bird net**															

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.
90	Mango/Cashew - Rejuvenation	Ha	0.4	All districts except D6,D7,D8,D11,D12 ,D13,D14,D15,D17 ,D24,D25,D27	1690	676.00	1789	715.60	1920	768.00	2100	839.80	2226	890.40	9725	3889.80
91	INM/IPM for Horticultural crops	Ha	0.04	All districts except D12	6565	262.60	6948	277.92	7307	292.28	7663	306.53	7979	319.15	36462	1458.48
92	Mulching	Ha	0.32	All districts except D8,D14,D17,D24	2871	918.56	3100	992.00	3294	1054.18	3526	1128.46	3742	1197.42	16533	5290.61
93	Anti Bird net	1000 Sq.m	0.35	All districts except D1,D3,D4,D7,D8,D 9,D10,D11,D12,D1 5,D16,D17,D20,D2 1,D23,D24,D25,D2 8,D29	332	116.20	346	121.10	403	141.05	428	149.80	437	152.95	1946	681.10
VIII	**Pollination Support through Bee Keeping**															
94	Bee hive & Colony	No	0.04	All districts except D7,D21	17311	692.44	18214	728.56	18836	753.42	20154	806.16	21481	859.25	95996	3839.83
95	Honey Extractor	No	0.2	All districts except D7,D21,D25	1734	346.80	1837	367.30	1790	357.91	1952	390.44	2119	423.71	9431	1886.16
IX	**Organic Farming**				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
96	Organic farming and PGS certification in 50 acre cluster	1 cluste r	14.95	All districts except D12	91	1359.70	59	883.55	73	1094.49	59	887.00	52	784.34	335	5009.07
97	HDPE Vermibed	No	0.16	All districts except D8	2774	443.87	2992	478.77	3223	515.73	3412	545.99	3504	560.60	15906	2544.95
X	**Rainfed Area development**															
98	Integrated farming system - Horticulture Based farming	Ha	0.5	All districts except D14,D21,D23	3679	1839.50	3919	1959.50	4404	2202.00	4685	2342.50	4904	2452.00	21591	10795.50
99	Green manuring	Ha	0.04	All districts except	1896	75.84	2032	81.26	2146	85.82	2260	90.40	2466	98.63	10799	431.95

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.
				D1,D4,D6,D7,D8,D13,D14,D16,D17,D19,D24,D25,D26,D27,D28												
100	Moisture stress management - Minimum irrigation guarantee by PUSA hydrogel	Ha	0.1	All districts except D11,D13	8983	898.25	9397	939.65	9719	971.85	10164	1016.38	10640	1064.00	48901	4890.13
B	**Infra structures and Assets creation**															
I	Protected cultivation				1	0.00	0	0.00	1	0.00	0	0.00	1	0.00	3	0.00
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,D12,D17,D25	15258	108331.80	6283	44609.30	7820	55519.80	7344	52143.03	7356	52229.15	44061	312833.08
II	**Mushroom production**															
3	Mushroom production and compost making	1 No.	20	D5,D8,D14,D18,D20,D22,D27,D28,D31	11	220.00	11	220.00	11	220.00	14	280.00	11	220.00	58	1160.00
4	Spawn Production	1 No.	15	D12,D17,D27,D28,D31	13	195.00	11	165.00	10	150.00	11	165.00	11	165.00	56	840.00
5	Cottage mushroom unit	1 No.	1	All districts except D12	33	33.00	47	47.30	48	47.63	51	50.99	46	46.39	225	225.32
III	**Vermicompost unit**				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
6	Permanent Vermicompost Unit	600 cu.ft	1	All districts except D12,D17	566	566.00	622	622.40	671	671.34	723	722.87	802	802.06	3385	3384.68
IV	**Supporting structures for Horticulture crop production**															
7	Staking/ Trellies/ Propping	Ha	1	All districts except D1,D3,D9,D13,D14,D17,D25,D26	2379	2379.00	2661	2661.00	2905	2904.50	3212	3212.45	3462	3462.35	14619	14619.30

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.
8	Permanent Pandhal structure	Ha	4	All districts except D3,D8	788	3152.00	922	3686.00	1033	4130.20	1170	4680.82	1296	5182.10	5208	20831.12
V	**District Horticulture information and training centre**			D2,D12,D20,D21	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
VI	**Community seed bank**			D5,D6,D12,D30,D31	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
C	**Special interventions**															
1	Offseason Annual Moringa production - Pod	Ha	1.25	D1,D3,D5,D9,D20, D22,D23,D30,D31	309	386.25	322	402.13	349	435.71	366	457.03	391	488.61	1736	2169.73
2	Offseason Annual Moringa production -Leaf	Ha	2	D3,D5,D9,D20,D22 ,D27,D30,D31	211	422.00	236	472.00	251	502.00	271	542.00	282	563.00	1251	2501.00
3	Farm deficiency correction	Ha	0.04	All districts except D13,D21,D23,D24, D25,D27	27183	1087.32	29890	1195.60	31240	1249.60	33175	1327.00	34430	1377.20	155918	6236.72
4	Promotion of Roof top Garden/ Potager garden Kit	No	0.005	All districts	39685	198.43	37260	186.30	39185	195.93	41706	208.53	43807	219.04	201643	1008.21
5	Promotion of Roof top Garden/ Potager garden Kit with shade net	No	0.0735	All districts except D8,D10,D23,D25	6322	464.67	3120	229.32	3436	252.55	3786	278.27	4002	294.15	20666	1518.95
6	Banana Bunch Sleeve	Ha	0.25	All districts except D27	2808	702.00	3096	774.00	3317	829.13	3132	782.99	3409	852.21	15761	3940.32
7	AESA based IPM in fruits and vegetables Pheromone trap	Ha	0.04	All districts	8753	350.12	9335	373.40	8308	332.33	8796	351.83	9292	371.67	44484	1779.34
8	AESA Based IPM in fruits and vegetables Yellow sticky trap	Ha	0.04	All districts except D27	9024	360.96	9597	383.88	8554	342.17	9062	362.47	9563	382.51	45800	1831.98
9	AESA Based IPM in fruits and vegetables Light trap	Ha	0.08	All districts except D10	7474	597.92	7815	625.20	6688	535.06	7164	573.10	7616	609.26	36757	2940.53

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.
10	Coastal area development programme – Public	Per village	1	D1,D3,D12,D16,D20,D26,D27,D30	182	182.00	198	198.00	211	211.00	225	225.00	237	237.00	1053	1053.00
11	Coastal area development programme – Private	Ha	0.2	D1,D12,D30	31	6.20	31	6.20	31	6.20	31	6.20	31	6.20	155	31.00
D	**Post Harvest Management**															
1	Pack house (9m X 6m)	1 No	4	All districts except D7,D9,D12,D13,D17,D21,D23,D24,D25,D27	290	1160.00	304	1216.00	336	1344.00	348	1392.00	364	1456.00	1642	6568.00
2	Low cost onion structure 25 mt	1 No	1.75	D1,D2,D3,D5,D6,D13,D15,D17,D18,D19,D20,D22,D25,D26,D27,D28,D30,D31	396	693.00	413	722.75	477	834.75	490	857.50	506	885.50	2282	3993.50
3	Drying yard	1 No	5	D2,D5,D6,D11,D14,D16,D18,D20,D22,D27,D28,D30,D31	86	430.00	90	450.00	94	470.00	89	445.00	96	480.00	455	2275.00
4	Pre cooling unit 6 mt	1 No	25	D10,D16,D21,D30,D31	7	175.00	5	125.00	7	175.00	6	150.00	8	200.00	33	825.00
5	Integrated pack house (9m X 18 m)	1 No	50	D3,D22,D30,D31	1	50.00	7	350.00	1	50.00	1	50.00	1	50.00	11	550.00
6	Mobile pre cooling unit	1 No	25	D30,D31	1	25.00	2	50.00	1	25.00	2	50.00	1	25.00	7	175.00
7	Cold storage unit 3000 mt	1 No	400	D3,D21,D22,D30,D31	2	800.00	4	1600.00	1	400.00	1	400.00	1	400.00	9	3600.00
8	Cold storage unit 5000 mt	1 No	500	D22,D30,D31	1	500.00	2	1000.00	1	500.00	1	500.00	1	500.00	6	3000.00
9	Collection centre	1 No	15	D5,D8,D21,D26,D28,D29,D30,D31	15	225.00	2	30.00	5	75.00	2	30.00	5	75.00	29	435.00
10	Retail outlet	1 No	15	D5,D26,D30,D31	6	90.00	5	75.00	4	60.00	5	75.00	5	75.00	25	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.
11	Refer van/collection vehicle	1 No	26	D3,D5,D6,D14,D28 ,D30,D31	7	182.00	5	130.00	5	130.00	5	130.00	4	104.00	26	676.00
12	Market intervention -Mobile vending cart	1 No	0.3	D5,D18,D20,D28,D 29,D30,D31	242	72.60	241	72.30	239	71.70	240	72.00	245	73.50	1207	362.10
13	Banana Ripening chamber (300 mt)	1 No	300	D9,D22	1	300.00	2	600.00	1	300.00	0	0.00	0	0.00	4	1200.00
E	**Development of Farms, Nurseries and Parks**															
1	Orchard development	No	100	D12	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
2	Development of eco park / Rose garden	No	600	D4,D12,D27	0	150.00	0	150.00	1	750.00	0	150.00	1	600.00	3	1800.00
3	Developmental activities in new/ existing state Horticultural farm, Keelapalur	No	25	D1,D3,D4,D5,D6,D 7,D8,D9,D10,D12, D14,D15,D16,D17, D18,D19,D21,D22, D25,D26,D28,D29, D31	34	850.00	26	650.00	32	800.00	31	775.00	30	750.00	153	3825.00
4	Development of small Nurseries Private sector	No	7.5	D5	1	7.50	0	0.00	0	0.00	0	0.00	0	0.00	1	7.50
5	Centre of Excellence for different crops	No	1000	D11,D12,D28, D30	1	1000.00	1	1000.00	0	0.00	0	0.00	3	3000.00	5	5000.00
F	**Mechanization - Machineries, Equipments & Tools**															
1	Power tiller/ Tractor/Mini tractor	Nos	1	All districts except D7,D13,D21,D31	632	632.00	679	678.80	717	716.78	749	748.96	775	775.35	3552	3551.89
2	Land development, tillage and seed bed preparation equipments	Nos	0.3	D2,D3,D5,D18,D20 ,D21,D22,D23,D27 ,D28,D29,D30,D31	268	80.40	322	96.54	366	109.73	421	126.29	462	138.71	1839	551.67
3	Manual Sprayer-Knapsack/Foot operated Sprayer	Nos	0.12	All districts except D3,D6,D8,D12,D13 ,D14,D16,D26,D27	2090	250.80	2206	264.72	2415	289.80	2615	313.81	2790	334.85	12117	1453.98
4	Tractor Mounted/ Operated Sprayer (Below 20HP)	Nos	0.2	D2,D3,D5,D9,D11, D20,D21,D22,D29,	229	45.80	245	49.00	277	55.40	290	58.00	292	58.40	1333	266.60

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												
5	Tractor Mounted/ Operated Sprayer (Above 20HP)	Nos	1.26	D5,D9,D11,D20,D29,D30,D31	101	127.26	105	132.30	117	147.42	111	139.86	112	141.12	546	687.96
6	Post Hole Digger/Augur, Pneumatic/ other Planter		1.26	D5,D12,D18,D20,D23,D29,D30,D31	155	195.30	124	156.49	129	163.07	125	157.07	126	158.67	659	830.60
7	Fruit Plucker, Tree pruners, Fruit Harvester, Fruit Graders, Track Trolley, Nursery Media Filling Machine, Power operated horticulture tools for pruning, budding, grating, shearing etc.	No	2.5	D1,D3,D5,D10,D11,D12,D18,D21,D22,D24,D28,D30,D31	153	382.50	162	405.00	242	605.00	264	660.00	296	740.00	1117	2792.50
8	Potato planter/Potato harvester / Onion harvester	No	0.3	D2,D5,D6,D11,D14,D30,D31	49	14.70	47	14.10	49	14.70	51	15.30	51	15.30	247	74.10
9	Mulch laying machine	No	0.7	D2,D5,D10,D18,D20,D22,D23,D30,D31	52	36.40	41	28.77	49	34.45	44	31.03	47	33.22	234	163.87
10	Hand operated sprayer with face mask	Nos	0.025	D2,D3,D4,D5,D7,D9,D10,D11,D12,D14,D17,D18,D19,D10,D22,D23,D26,D29,D30,D31	2404	60.10	2575	64.37	2854	71.34	3082	77.05	3179	79.48	14094	352.35
11	Nets for safe harvesting of fruits, Headlights for flower picking	Nos	0.005	D2,D4,D5,D9,D11,D18,D19,D20,D22,D24,D27,D29,D30,D31	2455	12.28	2693	13.47	2851	14.26	3062	15.31	3180	15.90	14241	71.21
12	Power operated sprayer	Nos	0.05	D2,D3,D4,D5,D6,D9,D10,D11,D13,D15,D16,D17,D18,D1	2622	131.10	2784	139.19	3043	152.14	3365	168.25	3576	178.82	15390	769.49

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.
				9,D20,D21,D22,D23,D24,D25,D26,D27,D28,D29,D30 ,D31												
13	Plastic crates for vegetable & fruits handling	No of sets containing 10crates	0.075	D1,D2,D3,D4,D5,D6,D9,D10,D11,D12,D13,D14,D15,D16,D17,D18,D19,D20,D21,D22,D23,D24,D26,D27,D28,D29,D30	7481	561.08	8126	609.45	8744	655.80	9360	702.01	9936	745.23	43648	327356
14	Turmeric Boiler		2.5	D2,D3,D4,D6,D10,D18,D23,D27,D28,D29,D30	305	762.50	325	812.75	339	848.03	351	878.33	373	933.66	1694	423526
15	Turmeric Polishing Machine		0.88	D2,D3,D4,D6,D10,D18,D23,D28,D29,D30	33	29.04	20	17.69	28	24.82	20	17.89	36	32.09	138	121.53
16	Pepper Spike Thresher Stripper, Pepper peeler cum Washer	No	0.15	D2,D5,D9,D13,D16,D28,D30	43	6.45	71	10.65	86	12.90	117	17.55	157	23.55	474	71.10
17	Oil engine	No	0.15	D1,D5,D9,D14,D18,D19,D22,D28,D30	618	92.70	725	108.75	755	113.25	781	117.15	824	123.60	3703	555.45
18	5 layered Polythene spread sheets for drying horticulture produce	No	0.16	D3,D4,D5,D6,D9,D10,D11,D12,D13,D14,D16,D17,D18,D19,D20,D22,D23,D24,D25,D29,D30	2488	398.08	2542	406.69	2679	428.60	2788	446.07	2954	472.70	13451	2152.14
19	Aluminium Ladders for Harvesting	No	0.2	D1,D2,D5,D9,D11,D13,D14,D16,D18,D19,D20,D22,D24,D27,D28,D29,D30,D31	916	183.20	977	195.40	1012	202.42	1014	202.86	1126	225.13	5045	1009.01
20	Equipments for manure management	No	1.26	D3,D5,D11,D12,D18,D20,D22,D28,D3	57	71.82	60	75.60	66	83.16	70	88.20	79	99.54	332	418.32

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.
	(Motorized Shredder for cutting biomass for making Vermicompost and organic mulching)			0												
G	**Water / Irrigation Management**															
1	Micro Irrigation - Drip	Ha	1.12	All districts except D14,D17,D27	21063	23600.56	22110	24763.64	23154	25932.37	24177	27078.28	25086	28096.99	115589	129459.84
2	Rain gun	Ha	0.34	All districts except D7,D8,D10,D14,D17,D21,D22,D25	6311	2145.74	6389	2172.33	6738	2290.77	6990	2376.50	7351	2499.37	33779	11484.70
3	Sprinkler	No	0.195	All districts except D1,D7,D8,D9,D11, D22,D25,D27	5989	1167.78	5992	1168.52	6279	1224.46	6512	1269.92	6850	1335.76	31623	6166.43
4	Community Tank/ On Farm Pond	No	20	D14,D17,D30,D31	63	1260.00	68	1360.00	70	1400.00	72	1440.00	72	1440.00	345	6900.00
5	Water harvesting system for individuals	No	1.5	All districts except D2,D7,D11,D12,D13,D14,D15,D16,D19,D21,D22,D23,D24,D25,D28,D29	331	496.50	352	528.00	374	561.00	387	580.50	404	606.00	1848	2772.00
H	**Capacity Building**															
1	Training to farmers within the State. 2 days Rs.1000/farmer/day	No	0.02	All districts except D27	12701	254.02	13026	260.51	13246	264.92	13511	270.23	13744	274.88	66228	1324.56
2	Training to farmers outside the state. 30 farmers/Batch	No	0.105	All districts except D6,D25	2943	309.03	3024	317.55	3196	335.54	3276	343.98	3334	350.11	15773	1656.21
3	Exposure visit to farmers for 5 days. Rs.1000/farmer/day	No	0.05	All districts except D9,D13,D25	3775	188.75	3796	189.79	3925	196.24	4041	202.05	4152	207.62	19689	984.45

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.
4	Training to farmers at HTC	No	0.0025	All districts except D1,D3,D6,D8,D12, D15,D19,D21,D24, D25,D28	4862	12.16	5057	12.64	5170	12.93	5267	13.17	5333	13.33	25690	64.22
5	Exposure visit of farmers outside India	No	4	All districts except D3,D13,D23, D25,D31	388	1552.00	404	1616.00	398	1592.00	401	1604.00	410	1640.00	2001	8004.00
6	Training to staff outside the state / Batch of 5 members	No	0.04	All districts except D3,D13,D25	499	19.96	478	19.11	498	19.91	475	19.00	540	21.61	2490	99.60
7	Training to staff outside India	No	6	All districts except D3,D21,D23,D25,D 28,D31	181	1086.00	181	1086.00	181	1086.00	177	1062.00	169	1014.00	889	5334.00
8	HRD for supervisors and entrepreneurs	No	20	D6,D12,D16,D17,D 20,D26,D30, D31	21	420.00	30	600.00	29	580.00	30	600.00	30	600.00	140	2800.00
9	HRD for gardeners	No	15	D12,D16,D17,D20, D30,D31	73	1095.00	72	1080.00	73	1095.00	73	1095.00	73	1095.00	364	5460.00
10	District level seminar	No	2	All districts except D1,D2,D7,D9,D13, D21,D23,D24,D25	76	152.00	69	138.00	68	136.00	68	136.00	94	188.00	375	750.00
11	Computerization & governance	No	1	All districts	199	198.50	144	144.30	171	171.28	152	152.46	170	169.85	836	836.39
12	Publicity and Documentation	No	0.5	All districts except D15,D23	1025	512.70	1076	538.15	1143	571.50	1203	601.35	1281	640.70	5729	2864.40
I	**Crop Insurance and Risk Mitigating scheme**															
	Crop Insurance	Ha	0.025	All districts	51008	1275.20	52418	1310.45	53655	1341.37	54423	1360.56	54902	1372.54	266404	6660.11
	Grand Total					**22767.56**		**17295.35**		**19182.64**		**19614.05**		**20618.20**		**99478.79**

4.3 AGRICULTURAL ENGINEERING

Farm Power requirement include human labour, draft animal, tractor, power tiller, electric motor and diesel engine power to cultivate crop. Currently the Farm Power availability of Tamil Nadu State (kW/ha) is 1.42 kW/ha. This will be increased by implementing the scheme of “Agricultural Mechanization Programme in Tamil Nadu”. The major focus of the Agricultural Engineering Department (AED) is agricultural mechanization, harnessing solar energy, soil conservation in river valley project, increasing the conveyance efficiency of irrigation water and ground water recharge.

4.3.1 Demonstration of Agricultural machinery

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.

Agricultural Mechanization is described as an appropriate package of technology for ensuring timely farm operations to increase productivity, reduce crop losses and for improving the quality of agricultural produce. A delay beyond appropriate period of particular farming operation by every one week leads to about 5-10 per cent decrease in the yield in some crops. The farm operations like hoeing, irrigation, harvesting, threshing and marketing which needs 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.

As the improved agricultural implements and machinery, compared to the traditional ones, results in increased agricultural production and at the same time reduce drudgery, different size and shapes of machineries and equipments have been popularized for efficient and expeditious operations under varying conditions. 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 and maximizing the efficiency of inputs thereby increasing the overall agricultural production of the country. 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.

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 farmer's field in Tamil Nadu.

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/ equipments are to be popularized among the farming community.

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 per cent 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 per cent 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, oil seeds, horticultural crops and sugarcane etc.

4.3.2. Training of farmers and rural youths

In service training of Officers regularly would help them to update the knowledge on modern machines and their operations. Similarly, exposure visits to farmers to nearby districts / States and even foreign countries would help them aware of new and innovative technologies in production, post harvest management and value added of agricultural and horticultural products. Besides, it would also motivate the farmers to enhance the quality of the produce and expand their marketing horizons.

Besides, skilled man power engaged in the repair and maintenance of the commonly used agricultural machinery / implements is shrinking day by day on one side and another side, advanced hi-tech, hi-value and hi-productive agricultural machinery / implements are getting popularization among the farmers. To inculcate the rural youth in skill power development, training programmes on the repair and maintenance of tractors / agricultural machinery / implements are to be introduced. The reputed firms have given job opportunities to some of these trained rural youth in the past. Training programmes to rural youth on operation and maintenance of the newly developed agricultural machinery / implements are to be conducted across the districts in the State.

4.3.3 Establishment of Farm Machinery Banks for Custom Hiring

To develop efficient custom hiring and custom servicing in farming operations and to reduce the burden of ownership of equipments on the farmers, agricultural machinery/implements custom hiring centres are to be created at block level in Tamil Nadu.

4.3.4 Promotion of Farm Mechanization in Selected Villages-Farm Machinery Bank

This 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.

4.3.5 Renewable energy - Solar Energy and 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.

4.3.6 Publicity and propaganda for farm mechanization

Informing the farmers through electronic and print media, about the various schemes operated by the Department of Agricultural Engineering, the benefits on mechanization, the procedure for handling various machines and information about other services like repair, maintenance, custom hiring etc.

4.3.7 Water conservation measures

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.

4.3.8 Minor Irrigation Scheme

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.

4.3.9 Soil Conservation Measures

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 project is proposed in Kundha, South Pennaiyar and Mettur catchment area covering three districts viz. Erode, Krishnagiri and Dharmapuri.

For increasing the conveyance efficiency of irrigation water through underground/buried pipeline system in the tank ayacut, about 79.02 ha area in Villupuram district and 102.63 ha in Tirunelveli district is proposed with a financial outlay of Rs. 55 lakh.

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 as 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 wells available in river bed, conveyance of pumped water to a tank through pipes and enabling stabilization of agriculture in the zone of influence.

Thus the major components/interventions are as follows. The budget outlay for each component is presented in Table. 4.36.

It could be seen from the table that an outlay of Rs. 305924.43 lakh is proposed to fulfill the aforementioned interventions for five years (Table 4.36).

- Demonstration of agricultural machineries.
- Training of farmers in handling the agricultural machineries and implements.
- Training of Rural Youth in workshops for handling the agricultural machineries, implements and tools, post-harvest and repair and maintenance of different categories of agricultural machineries, implements and tools.
- Demonstration of post harvest technologies.
- Financial assistance for promotion and procurement of agricultural machinery and equipments covering different operations for the cultivation of varied crops including post-harvest technology equipments, solar pumps and solar driers.
- Establishment of Farm Machinery Banks for custom hiring.
- Establishment of Hi-Tech and High Productive Equipment Hub for custom hiring.

- Promotion of farm mechanization in Selected Villages-Farm Machinery Bank.
- Financial assistance for promotion of mechanized farming operations.
- Maintenance of departmental tractor hiring scheme and minor irrigation scheme machinery by overhauling and repairing taken as the major task of the workshops. These workshops would undertake major overhauling and top overhauling of tractors, bulldozers, drilling units etc., as per the Scheduled Maintenance Programme (SMP). Breakdown maintenance of all machinery would be also attended at once when machinery fell sick. Repair works would also be carried at site if necessary by the staff of the workshop whenever required. It is proposed to strengthen the workshop since the workshop building and the machinery available in the workshop.
- Minor irrigation scheme.
- Solar energy and solar pump sets.

Table 4.36 Consolidated Budget outlay for Agricultural Engineering

(Rs. 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
I	**Capacity Building**															
1	Demonstration of Agricultural Machinery - Rs.4000/- Demo	No's/ Ha	0.04	All Districts	785	31.40	785	31.40	779	31.16	782	31.28	781	31.24	3912	156.48
2	Training of farmers- Rs.4000/ per trainee per week	No's/ Ha	0.04	All Districts Except D8	1743	69.72	1659	66.36	1814	72.56	1744	69.76	1763	70.52	8723	348.92
3	Training of Rural Youth in workshops- Rs.4000/ per trainee per week	No's/ Ha	0.04	All Districts Except D8, D1, D5,D24, D21, D20, D19, D17, D15 and D11	1146	45.84	1143	45.72	1143	45.72	1143	45.72	1143	45.72	5718	228.72
4	Demonstration of Post Harvest Technologies- Rs.4000/ Demo	No's/ Ha	0.04	All Districts Except D8, D19, and D14	496	19.84	505	20.20	500	20.00	499	19.96	506	20.24	2506	100.24
II	Financial assistance for Post Harvest Equipment	No's/ Ha	4	All Districts Except D1, D5, D7, D8, D14,D17, D19,D22, D20, D23, D25	116	464.00	89	356.00	116	464.00	119	476.00	111	444.00	551	2204.00
III	**Financial assistance for Procurement of Agricultural Machinery and Equipments**															
1	**Tractors**															
	Tractor (8-15 PTO HP)	No's/ Ha	3	D1, D2, D4, D6, D7, D9, D10, D11, D20, D21, D23, D26 and D28.	123	369.00	112	336.00	106	318.00	108	324.00	107	321.00	556	1668.00
	Tractor (15-20 PTO HP)	No's/ Ha	4	All Districts	925	3700.00	931	3724.00	911	3644.00	913	3652.00	924	3696.00	4604	18416.00
	Tractor (Above 20-40 PTO HP)	No's/ Ha	6	All Districts expect D3, D9,D14, D15,D22 and D29	466	2796.00	452	2712.00	452	2712.00	446	2676.00	448	2688.00	2264	13584.00

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
	Tractor (40-70 PTO HP)	No's/ Ha	8.5	All Districts except D8	815	6927.50	809	6876.50	813	6910.50	798	6783.00	817	6944.50	4052	34442.00
2	**Power Tillers**															
	Power Tiller (below 8 BHP)	No's/ Ha	1	D2,D4,D6,D7,D9,D11, D13,D18,D23,D25, D26,D30 and D31.	328	328.00	298	298.00	295	295.00	295	295.00	296	296.00	1512	1512.00
	Power Tiller (8 BHP & above)	No's/ Ha	1.75	All Districts	4730	8277.50	3796	6643.00	3744	6552.00	3780	6615.00	3833	6707.75	19883	34795.25
3	**Rice Transplanter**															
	Self Propelled Rice Transplanter (4 rows)	No's/ Ha	2.5	All Districts Except D2,D5,D8,D9,D13, D14,D15,D16, D17, D18,D21,D24 and D29	260	650.00	268	670.00	258	645.00	243	607.50	236	590.00	1265	3162.50
	Self Propelled Rice Transplanter (Above 4-8 rows)	No's/ Ha	16	All Districts Except D1, D2,D5,D13,D14, D15,D17, D18,D22 and D30	90	1440.00	86	1376.00	88	1408.00	89	1424.00	91	1456.00	444	7104.00
4	Self Propelled Machinery				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Reaper cum Binder	No's/ Ha	3	D2,D4,D6,D7,D10, D13,D16,D22,D24, D25, D26,D28 and D29	116	348.00	125	375.00	105	315.00	116	348.00	116	348.00	578	1734.00
5	Specialized Self Propelled Machinery				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Reaper	No's/ Ha	1.1	D2, D4,D6,D7,D13,D16, D17,D22,D24,D25, D28 and D29	85	93.50	79	86.90	82	90.20	79	86.90	79	86.90	404	444.40
	Post Hole Digger / Augur	No's/ Ha	0.63	All districts except D1,D3,D9,D11,D12, D14,D15,D19 and D24	116	73.08	113	71.19	104	65.52	102	64.26	116	73.08	551	347.13
6	**Tractor/Power Tiller (below 20 BHP) driven equipments**															
	a. Land Development, tillage and seed bed preparation equipments															

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
	MB Plow	No's/ Ha	0.3	D6,D7,D10,D18,D26 and D31	26	7.80	26	7.80	25	7.50	25	7.50	25	7.50	127	38.10
	Disc Plow	No's/ Ha	0.3	D6,D7,D10,D18,D26,D30 and D31	38	11.40	37	11.10	37	11.10	37	11.10	37	11.10	186	55.80
	Cultivator	No's/ Ha	0.2	D2,D4,D5,D6,D7,D10,D13,D14,D16,D18,D26,D29,D30 and D31.	137	27.40	137	27.40	138	27.60	136	27.20	138	27.60	686	137.20
	Harrow	No's/ Ha	0.6	D6,D7,D26 and D31	10	6.00	10	6.00	10	6.00	10	6.00	9	5.40	49	29.40
	Leveler Blade	No's/ Ha	0.15	D6,D7,D18,D26,D27 and D31	18	2.70	18	2.70	18	2.70	17	2.55	16	2.40	87	13.05
	Ridger	No's/ Ha	0.25	D4,D6,D7,D18 and D26	19	4.75	19	4.75	19	4.75	19	4.75	19	4.75	95	23.75
	Laser Land Leveler	No's/ Ha	3.4	D7 and D25	6	20.40	6	20.40	6	20.40	6	20.40	6	20.40	30	102.00
	Reversible Mechanical plough	No's/ Ha	0.5	D7 and D26	5	2.50	5	2.50	5	2.50	5	2.50	5	2.50	25	12.50
	Rotovators	No's/ Ha	0.35	All Districts except D3,D5,D8,D9,D10,D12,D15,D17,D19,D22,D24 and D28	407	142.45	389	136.15	385	134.75	385	134.75	395	138.25	1961	686.35
	Rotopuddler	No's/ Ha	1	D4,D7 and D10	21	21.00	21	21.00	19	19.00	19	19.00	19	19.00	99	99.00
	Reversible Hydraulic plough	No's/ Ha	0.45	D7 and D26	8	3.60	8	3.60	8	3.60	8	3.60	8	3.60	40	18.00
	b. Sowing Planting, Reaping and Digging Equipments:															
	Post Hole Digger	No's/ Ha	0.8	D1,D4,D7, D10,D14, D18, D26 and D31.	41	32.80	37	29.60	37	29.60	37	29.60	37	29.60	189	151.20
	Tractor drawn reaper	No's/ Ha	0.95	D4,D7,D10,D13 and D26	31	29.45	31	29.45	31	29.45	31	29.45	31	29.45	155	147.25
	Zero till seed cum fertilizer drill	No's/ Ha	0.5	D7, D13,D25,D26 and D31	41	20.50	41	20.50	41	20.50	41	20.50	41	20.50	205	102.50
	Seed drill	No's/ Ha	0.4	D7,D21,D26 and D30	16	6.40	16	6.40	16	6.40	14	5.60	14	5.60	76	30.40
	c. Intercultivation Equipments															

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
	Power Weeder (engine operated below 2 BHP)	No's/ Ha	0.25	All Districts except D3,D8,D9,D12,D16, D17,D19,D20,D27, D29 and D30	206	51.50	204	51.00	198	49.50	197	49.25	205	51.25	1010	252.50
	d. Equipment for residue management / hay and forage equipments															
	Sugarcane thrash Cutter	No's/ Ha	1.5	D6,D7,D26 and D31	16	24.00	16	24.00	16	24.00	15	22.50	15	22.50	78	117.00
	Coconut Frond chopper	No's/ Ha	0.8	D2,D6,D7,D18,D21 and D26	20	16.00	20	16.00	21	16.80	21	16.80	21	16.80	103	82.40
	Balers	No's/ Ha	2.9	D1,D7,D18,D21 and D26	17	49.30	15	43.50	19	55.10	18	52.20	19	55.10	88	255.20
	e**. Harvesting and Threshing equipments**															
	Multi crop Threshers	No's/ Ha	2.5	D7,D26 and D31	14	35.00	14	35.00	14	35.00	14	35.00	14	35.00	70	175.00
	Paddy Thresher	No's/ Ha	1.6	D7 and D26	6	9.60	6	9.60	6	9.60	6	9.60	6	9.60	30	48.00
	Brush Cutter	No's/ Ha	0.25	All Districts except D3,D4,D8,D10, D12,D15,D17,D20, D23,D28,D29 and D30	377	94.25	380	95.00	385	96.25	382	95.50	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)	No's/ Ha	0.25	All Districts except D3, D8,D12,D14, D15,D16,D17,D20, D22,D26 and D29	1247	311.75	1177	294.25	1216	304.00	1076	269.00	1071	267.75	5787	1446.75
7	**Tractor (above 20-35 BHP) driven equipments**															
	a. Land Development, tillage and seed bed preparation equipments															
	MB Plow	No's/ Ha	0.8	D6, D7 and D31	10	8.00	10	8.00	9	7.20	9	7.20	9	7.20	47	37.60
	Disc Plow	No's/ Ha	0.4	D2, D6, D7,D10, D11,D16,D19,D23 and D31	56	22.40	54	21.60	54	21.60	54	21.60	53	21.20	271	108.40
	Cultivator	No's/ Ha	0.25	All Districts except D3,D8,D9,D12,D14, D15, D17, D22,D24,D28, D29	262	65.50	253	63.25	270	67.50	258	64.50	272	68.00	1315	328.75

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
				and D30												
	Harrow	No's/ Ha	0.9	D6,D7 and D26	6	5.40	5	4.50	6	5.40	5	4.50	5	4.50	27	24.30
	Leveler Blade	No's/ Ha	0.25	D6,D7 and D19	6	1.50	5	1.25	6	1.50	6	1.50	6	1.50	29	7.25
	Ridger	No's/ Ha	0.3	D6,D7 and D26	6	1.80	6	1.80	5	1.50	6	1.80	5	1.50	28	8.40
	Laser Land Leveler	No's/ Ha	3.6	D7	3	10.80	3	10.80	3	10.80	3	10.80	3	10.80	15	54.00
	Reversible Mechanical plough	No's/ Ha	0.65	D7 and D19	5	3.25	5	3.25	5	3.25	5	3.25	5	3.25	25	16.25
	Rotovators	No's/ Ha	0.8	All Districts except D3,D8,D9,D12,D14, D15,D17,D20,D23, D22, D24,D27, D29 and D30	554	443.20	567	453.60	554	443.20	584	467.20	583	466.40	2842	2273.60
	Rotopuddler	No's/ Ha	1.2	D6, D7 and D19	5	6.00	5	6.00	6	7.20	5	6.00	5	6.00	26	31.20
	Reversible Hydraulic plough	No's/ Ha	1.9	D2,D6, D7 and D13	28	53.20	29	55.10	29	55.10	29	55.10	29	55.10	144	273.60
	b. Sowing, Planting, Reaping and Digging Equipments															
	Post Hole digger	No's/ Ha	0.9	D5, D7, D10, D11, D18, D19, D25, D26 and D31	32	28.80	33	29.70	35	31.50	33	29.70	31	27.90	164	147.60
	Tractor drawn reaper	No's/ Ha	1.1	D7, D13, D25 and D26	30	33.00	30	33.00	30	33.00	30	33.00	30	33.00	150	165.00
	Zero till seed cum fertilizer drill	No's/ Ha	0.6	D2,D7,D13, D26 and D31	33	19.80	28	16.80	24	14.40	24	14.40	25	15.00	134	80.40
	Seed drill	No's/ Ha	0.5	D2,D4,D7,D16,D17, D19,D26 and D31	43	21.50	38	19.00	37	18.50	37	18.50	37	18.50	192	96.00
	c.Inter Cultivation Equipments	No's/ Ha			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Power Weeder (engine operated above 2 BHP)	No's/ Ha	0.7	All Districts except D3, D7, D9, D13, D14, D16, D23, D24, D28, D29 and	248	173.60	246	172.20	254	177.80	255	178.50	263	184.10	1266	886.20

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
				D30												
	d. Equipments for Residue management/Hay and Forage Equipments															
	Sugarcane thrash Cutter	No's/ Ha	1.75	D7, D26 and D31	6	10.50	6	10.50	6	10.50	6	10.50	6	10.50	30	52.50
	Coconut Frond chopper	No's/ Ha	0.9	D2, D6, D7 and D26	27	24.30	28	25.20	28	25.20	28	25.20	28	25.20	139	125.10
	Balers	No's/ Ha	3	D6, D7, D18, D26 and D25	18	54.00	18	54.00	18	54.00	18	54.00	18	54.00	90	270.00
	e.Harvesting & Threshing Equipments				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Multi crop Threshers	No's/ Ha	3	D4, D6, D7, D10, D11, D26 and D31	21	63.00	21	63.00	21	63.00	21	63.00	21	63.00	105	315.00
	Paddy Thresher	No's/ Ha	1.9	D4, D7, D10 and D31	15	28.50	15	28.50	15	28.50	15	28.50	15	28.50	75	142.50
	Brush Cutter	No's/ Ha	0.3	D1, D2, D5, D7, D8, D12, D13, D18, D19, D21, D23, D25, D26, D27 and D31	160	48.00	163	48.90	165	49.50	165	49.50	166	49.80	819	245.70
	f.Chaff Cutter (Operated by engine / electric motor above 3-5 hp and by power tiller and tractor of below 35 BHP tractor)	No's/ Ha	0.4	D1, D6, D7, D10, D11, D18, D21, D22, D23, D25 and D31	45	18.00	45	18.00	45	18.00	45	18.00	43	17.20	223	89.20
8	**Tractor (above 35 BHP) driven equipments**															
	a. Land Development, tillage and seed bed preparation equipments															
	MB Plow	No's/ Ha	1	D6, D7, D10, D16, D22, D23 and D31	123	123.00	119	119.00	118	118.00	116	116.00	116	116.00	592	592.00
	Disc Plow	No's/ Ha	0.6	All Districts except D3, D9, D12, D13, D14, D18, D20, D25 and B9	242	145.20	231	138.60	227	136.20	225	135.00	225	135.00	1150	690.00
	Cultivator	No's/ Ha	0.3	All Districts except D17	648	194.40	632	189.60	623	186.90	617	185.10	619	185.70	3139	941.70

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
	Harrow	No's/ Ha	1	D6, D7, D11, D21 and D31	20	20.00	20	20.00	21	21.00	20	20.00	20	20.00	101	101.00
	Leveler Blade	No's/ Ha	0.3	D4, D6, D7, D9, D16, D19, D21, D23 and D31	32	9.60	32	9.60	32	9.60	29	8.70	32	9.60	157	47.10
	Ridger	No's/ Ha	0.4	D4, D6, D7, D9 and D21	20	8.00	20	8.00	20	8.00	18	7.20	18	7.20	96	38.40
	Reversible Mechanical plough	No's/ Ha	0.8	D4, D6, D7 and D13	28	22.40	28	22.40	28	22.40	28	22.40	28	22.40	140	112.00
	Laser Land Leveler	No's/ Ha	3.8	D7, D17 and D20	6	22.80	6	22.80	6	22.80	6	22.80	6	22.80	30	114.00
	Rotovators	No's/ Ha	0.95	All Districts	2505	2379.75	2430	2308.50	2348	2230.60	2358	2240.10	2385	2265.75	12026	11424.70
	Rotopuddler	No's/ Ha	1.4	D3, D6 and D7	154	215.60	154	215.60	154	215.60	154	215.60	154	215.60	770	1078.00
	Reversible Hydraulic plough	No's/ Ha	2	D2, D4, D6, D7, D29 and D31	39	78.00	37	74.00	37	74.00	37	74.00	37	74.00	187	374.00
	b. Sowing Planting, Reaping and Digging Equipments:															
	Zero till seed cum fertilizer drill	No's/ Ha	0.7	D4, D7, D9, D10, D13, D15, D16, D17, D20, D21, D22, D23, D28, D29, D26, D30 and D31	182	127.40	180	126.00	180	126.00	175	122.50	172	120.40	889	622.30
	Tractor drawn reaper	No's/ Ha	1.25	D4, D6, D7, D13, D24, D26, D25	52	65.00	52	65.00	51	63.75	51	63.75	51	63.75	257	321.25
	Post Hole digger	No's/ Ha	1.05	D1, D4, D5, D6, D7, D10, D13, D18, D24, D25, D26, D27, D28, D29 and D31.	66	69.30	66	69.30	67	70.35	65	68.25	64	67.20	328	344.40
	Automatic Rice Nursery Sowing Machine	No's/ Ha	2.5	D6, D7, D13, D16, D21, D25 and D26	39	97.50	39	97.50	40	100.00	41	102.50	40	100.00	199	497.50
	e.Harvesting & Threshing Equipments				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

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
	Thresher/Multi Crop threshers	No's/ Ha	4	D1, D4, D6, D7, D9, D10, D11, D13, D15, D16, D18, D19, D21, D22, D26, D28, D29, D30 and D31	188	752.00	177	708.00	178	712.00	174	696.00	176	704.00	893	3572.00
	Paddy Thresher	No's/ Ha	2.2	D4, D7, D11, D13 and D22	47	103.40	49	107.80	48	105.60	46	101.20	48	105.60	238	523.60
	e.Equipments for Residue management/Hay and Forage Equipments															
	Sugarcane thrash Cutter	No's/ Ha	2	D6, D7, D9, D13, D26 and D30	36	72.00	34	68.00	33	66.00	33	66.00	33	66.00	169	338.00
	Coconut Frond chopper	No's/ Ha	1.05	D2, D6, D7, D9, D10, D19, D20, D23, D24, D26, D28 and D31	67	70.35	63	66.15	58	60.90	61	64.05	60	63.00	309	324.45
	Balers (Round)	No's/ Ha	3.5	All Districts except D2, D9, D10, D14, D21, D23 and D31	157	549.50	149	521.50	152	532.00	151	528.50	180	630.00	789	2761.50
	Baler (Rectangular)	No's/ Ha	8	D6, D7, D13, D15, D19 and D31	22	176.00	23	184.00	24	192.00	24	192.00	24	192.00	117	936.00
	Sugarcane ratoon manager	No's/ Ha	1	D6,D7,D9,D13,D16 and D30	23	23.00	20	20.00	21	21.00	20	20.00	20	20.00	104	104.00
9	**All Manual/animal drawn equipment/implements / Tools**															
	Drum Seeder (Below 4 Row)	No's/ Ha	0.1	D4, D7, D13, D16, D22, D25, D26, D29, D30 and D31	119	11.90	121	12.10	121	12.10	121	12.10	121	12.10	603	60.30
	Drum Seeder (Above 4 Row)	No's/ Ha	0.15	D3, D4, D7, D10, D13, D16, D23, D24, D25, D26, D29, D30 and D31	145	21.75	105	15.75	105	15.75	110	16.50	110	16.50	575	86.25
	Tree climber	No's/ Ha	0.07	All Districts except D1, D3, D11, D12, D14, D15, D17, D19, D23, D25, D24, D27, D28 and D29	190	13.30	177	12.39	179	12.53	177	12.39	179	12.53	902	63.14
10	**Plant protection equipments**															
	Manual sprayer: Knapsack/foot operated sprayer	No's/ Ha	0.015	All Districts except D8,D21 and D24	2147	32.21	2111	31.67	2085	31.28	2119	31.79	2062	30.93	10524	157.86

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
	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity 8-12 lts)	No's/ Ha	0.06	All Districts except D8, D17, D19, D20 and D29	1270	76.20	1109	66.54	1104	66.24	1090	65.40	1102	66.12	5675	340.50
	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 12-16 lts)	No's/ Ha	0.08	All Districts except D3, D12, D17, D24 and D27	952	76.16	923	73.84	950	76.00	896	71.68	930	74.40	4651	372.08
	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 16 lts)	No's/ Ha	0.1	All Districts except D3,D11,D12,D15,D19,D23,D24 and D27	726	72.60	734	73.40	732	73.20	744	74.40	746	74.60	3682	368.20
IV	Establishment of Farm Machinery Banks for Custom Hiring (Up to Rs.25.00 Lakh)- Subsidy Rs.10.00 Lakh	No's/ Ha	28	All Districts except D8 and D25	193	5404.00	167	4676.00	156	4368.00	154	4312.00	153	4284.00	823	23044.00
V	Establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring (up to Rs.100.00 Lakh)- Subsidy -Rs.40.00 Lakh	No's/ Ha	112	D2, D3, D12, D18, D25, D26, D30 and D31	16	1792.00	15	1680.00	15	1680.00	14	1568.00	15	1680.00	75	8400.00
VI	Promotion of Farm Mechanization in Selected	No's/ Ha	11.5	All Disticts except D1, D3, D5, D8, D17, D18, D19, D20, D22 and D23	260	2990.00	226	2599.00	213	2449.50	217	2495.50	216	2484.00	1132	13018.00

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
	Villages- Rs.10.00 Lakh per Farm Machinery Bank															
VII	Financial assistance for promotion of Mechanized Farming operations- Rs.2000/- per Ha per farmer per year	No's/ Ha	0.04	D2, D4, D6, D7, D9, D10, D11, D12, D13, D14, D16, D21, D26, D27, D28, D29, D30 and D31.	6776	271.04	8763	350.52	8756	350.24	8740	349.60	8753	350.12	41788	1671.52
VIII	**Tractor Hiring Scheme**															
1	Purchase of Tractors for AED	No's/ Ha	8	All Districts except D1, D5, D8, D14, D17 and D23	164	1312.00	41	328.00	33	264.00	64	512.00	35	280.00	337	2696.00
2	Purchase of Tractor drawn implements for AED	No's/ Ha	0.5	All Districts except D1, D5, D8, D10, D14 and D23	278	139.00	104	52.00	91	45.50	104	52.00	115	57.50	692	346.00
3	Purchase of Bull Dozers for AED	No's/ Ha	80	All Districts except D1, D3, D4, D5, D6, D8, D14, D15, D17, D19, D20, D21, D24 and D23	30	2400.00	10	800.00	8	640.00	14	1120.00	9	720.00	71	5680.00
4	Purchase of Paddy Transplanter for AED	No's/ Ha	18	D2, D7, Nagapattinam, D20, D21, D22, D26, D27, D29, D30 and D31	39	702.00	13	234.00	16	288.00	20	360.00	14	252.00	102	1836.00
5	Purchase of Paddy combine Harvester for AED	No's/ Ha	17	D7, D12, D16, D20, D21, D22, D25, D26, D27, D29, D30 and D31	88	1496.00	16	272.00	17	289.00	36	612.00	15	255.00	172	2924.00
6	Purchase of Balers for AED	No's/ Ha	4.5	D2, D3, D7, D12, D11, D15, D16, D17, D20, D21, D26, D27, D28, D29, D30 and D31	72	324.00	20	90.00	17	76.50	14	63.00	6	27.00	129	580.50

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
7	Purchase of Multi Crop Thresher for AED	No's/ Ha	3.5	D2, D7, D10, D12, D11, D15, D17, D20, D21, D26, D27, D28, D29, D30 and D31	27	94.50	14	49.00	14	49.00	14	49.00	14	49.00	83	290.50
IX	Minor Irrigation Scheme															
1	Purchase of Rotary Drill for AED	No's/ Ha	72	D2, D3, D7, D12, D16, D19, D20, D26 and D27	19	1368.00	5	360.00	2	144.00	3	216.00	0	0.00	29	2088.00
2	Hammer cum Rotary Drill for AED	No's/ Ha	150	D7 and D11	3	450.00	1	150.00	0	0.00	0	0.00	0	0.00	4	600.00
3	Purchase of Air Compressor 750 cfm for AED	No's/ Ha	25	D2, D3, D7, D12, D18, D20, D26 and D27	10	250.00	1	25.00	0	0.00	0	0.00	1	25.00	12	300.00
4	Purchase of Resistivity Meters for AED	No's/ Ha	3	D7, D10, D11, D12, D16, D18, D19, D24, D26, D27, D28 and D31	13	39.00	2	6.00	2	6.00	2	6.00	2	6.00	21	63.00
5	Purchase of Electrical Loggers for AED	No's/ Ha	7.5	D10, D12, D16, D18, D27 and D31	5	37.50	2	15.00	1	7.50	1	7.50	0	0.00	9	67.50
X	**Solar Energy**															
1	**Solar Powered Pumping System with automatic tracking facility**															
	5 hp	No's/ Ha	3.75	All Districts except D3 and D20	939	3521.25	892	3345.00	910	3412.50	871	3266.25	900	3375.00	4512	16920.00
	7.5 hp	No's/ Ha	5.3	All Districts except D8, D11, D14, D21, D22 and D23	567	3005.10	659	3492.70	559	2962.70	553	2930.90	571	3026.30	2909	15417.70
	10 hp	No's/ Ha	6.75	All Districts except D3, D8, D9, D11, D12, D14, D15, D17, D21, D22, D23, D25, D26 and D27	300	2025.00	301	2031.75	306	2065.50	310	2092.50	311	2099.25	1528	10314.00
2	Solar Driers to farmers / farmers' groups				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

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
	for drying agricultural produce															
	up to 200sq.ft	No's/ Ha	2	D24 and D31	16	32.00	14	28.00	13	26.00	12	24.00	30	60.00	85	170.00
	up to 400sq.ft	No's/ Ha	4.25	D2, D5, D6, D8, D10, D11, D12, D13, D16, D17, D18, D19, D20, D22, D23, D24, D25, D29 and D31	59	250.75	54	229.50	55	233.75	54	229.50	54	229.50	276	1173.00
	400-600sq.ft	No's/ Ha	6.5	D2, D5, D6, D7, D10, D13, D17, D18, D19, D20, D24, D28, D29, D30 and D31	34	221.00	33	214.50	34	221.00	33	214.50	33	214.50	167	1085.50
XI	**Any other innovative schemes of AED with Components & its unit cost**															
	Poly Green House with Fogging facility	No's/ Ha	50	D29	5	250.00	5	250.00	5	250.00	5	250.00	5	250.00	25	1250.00
	Vermi Compost unit with packing accessories	No's/ Ha	7.5	D29	5	37.50	5	37.50	5	37.50	5	37.50	5	37.50	25	187.50
	Farm pond / Fish pond	No's/ Ha	1	D29	20	20.00	20	20.00	20	20.00	20	20.00	20	20.00	100	100.00
	Farmers kit (Crow bar, Hand hoe, rose can, pruning sicature, coconut dehusker, trolley etc.,)	No's/ Ha	0.05	D29	200	10.00	200	10.00	200	10.00	200	10.00	200	10.00	1000	50.00
	Land levelling,Pipe laying	No's/ Ha	0.07	D4	290	20.30	290	20.30	290	20.30	290	20.30	290	20.30	1450	101.50
	Stening wall	No's/ Ha	0.25	D4	125	31.25	125	31.25	125	31.25	125	31.25	125	31.25	625	156.25
	Well deepening	No's/ Ha	0.5	D4	125	62.50	125	62.50	120	60.00	120	60.00	120	60.00	610	305.00

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
	Replacement of old Pump sets	No's/ Ha	0.2	D4	300	60.00	285	57.00	200	40.00	200	40.00	200	40.00	1185	237.00
	Infrastructure like packing unit, godown, cattle shed and Threshing floor	No's/ Ha	1	D4	108	108.00	105	105.00	125	125.00	120	120.00	120	120.00	578	578.00
	Publicity and propaganda for farm mechanization in AED	No's/ Ha	0.5	D9	4	2.00	4	2.00	4	2.00	4	2.00	4	2.00	20	10.00
	Special Training for Coconut Growers. Special	No's/ Ha	0.45	D2	100	45.00	75	33.75	75	33.75	50	22.50	50	22.50	350	157.50
	J C B	No's/ Ha	28	D31	7	196.00	1	28.00	1	28.00	1	28.00	1	28.00	11	308.00
	Mini Drill (Chain Type) with 14 HP slow speed engine	No's/ Ha	4	D17	2	8.00	0	0.00	0	0.00	0	0.00	0	0.00	2	8.00
	Compartmental Bund Formation Rs.5000/- Ha.	No's/ Ha	0.05	D16	600	30.00	600	30.00	600	30.00	600	30.00	600	30.00	3000	150.00
	Farm Ponds (NEW)	No's/ Ha	0.75	D16	130	97.50	130	97.50	130	97.50	120	90.00	120	90.00	630	472.50
	Community Bore wells @ Rs.5.00 Lakh.	No's/ Ha	5	D16	10	50.00	10	50.00	10	50.00	9	45.00	8	40.00	47	235.00
	Deepening of Open Wells @ Rs.5.00 Lakh	No's/ Ha	5	D16	60	300.00	60	300.00	60	300.00	60	300.00	52	260.00	292	1460.00
	Renovation of MI Tanks @ Rs.4.00 Lakh	No's/ Ha	4	D16	60	240.00	60	240.00	60	240.00	60	240.00	60	240.00	300	1200.00
	Check Dam @ 1.80 Lakh	No's/ Ha	1.8	D16	12	21.60	12	21.60	12	21.60	12	21.60	12	21.60	60	108.00
	Percolation Pond	No's/ Ha	5	D16	1	5.00	1	5.00	1	5.00	1	5.00	1	5.00	5	25.00

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
	Recharge Shaft	No's/ Ha	1.7	D16	40	68.00	40	68.00	40	68.00	40	68.00	40	68.00	200	340.00
	Summer Ploughing	No's/ Ha	0.0136	D16	1000	13.60	1000	13.60	1000	13.60	1000	13.60	1000	13.60	5000	68.00
	PVP pipe laying (ha) @ 90% subsidy or Rs.20000/ha @ 40 ha/block/year, Total 15 Blocks	No's/ Ha	0.2	D13	600	120.00	600	120.00	600	120.00	600	120.00	600	120.00	3000	600.00
	Replacement of Submersible Motors pump sets with pipe and electrical arrangement for Bore well , 5HP&7.5HP	No's/ Ha	0.5	D13	150	75.00	150	75.00	150	75.00	150	75.00	150	75.00	750	375.00
	Other machineries				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Telescopic Pruner	No's/ Ha	0.6	D8	1	0.60	1	0.60	0	0.00	1	0.60	1	0.60	4	2.40
	Motorized Rubber Roller	No's/ Ha	0.6	D8	2	1.20	1	0.60	2	1.20	1	0.60	2	1.20	8	4.80
	Trays for Paddy Nursery Raising	No's/ Ha	0.0008	D8	1600	1.28	1600	1.28	1600	1.28	1600	1.28	1600	1.28	8000	6.40
	Combine Harvester	No's/ Ha	17	D8	0	0.00	1	17.00	1	17.00	1	17.00	1	17.00	4	68.00
	Diesel Pump	No's/ Ha	0.4	D8	1	0.40	1	0.40	1	0.40	1	0.40	1	0.40	5	2.00
	Rotary Tiller	No's/ Ha	0.75	D8	1	0.75	0	0.00	0	0.00	0	0.00	0	0.00	1	0.75
	Smoke House	No's/ Ha	0.7	D8	1	0.70	1	0.70	1	0.70	1	0.70	1	0.70	5	3.50
	Mist Blower	No's/ Ha	0.4	D8	1	0.40	0	0.00	0	0.00	0	0.00	0	0.00	1	0.40
	Tea Harvester	No's/ Ha	0.25	D14	35	8.75	35	8.75	35	8.75	35	8.75	35	8.75	175	43.75
	Construction of LD & MI Repair Shed	No's/ Ha	20	D30	1	20.00	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00

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
	Construction of Training Centre for farmers with furniture and accessories	No's/ Ha	50	D30	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
XII	**Information Technology (IT)**															
a	Computer & its accessories	No's/ Ha	0.8	All Districts except D23	31	24.80	59	47.20	48	38.40	39	31.20	31	24.80	208	166.40
b	Tablet (Tab)	No's/ Ha	0.25	All Districts except D5, D19, D20, D23 and D30	48	12.00	103	25.75	91	22.75	53	13.25	33	8.25	328	82.00
c	Xerox machine	No's/ Ha	1.5	All Districts except D5 and D23	18	27.00	45	67.50	25	37.50	28	42.00	18	27.00	134	201.00
d	Server and software development	No's/ Ha	30	D7	0	0.00	1	30.00	0	0.00	0	0.00	0	0.00	1	30.00
XIII	Sugarcane Infielder	No's/ Ha	7	D3, D16, D18 and D19	1	7.00	3	21.00	3	21.00	3	21.00	2	14.00	12	84.00
XIV	Bird Scarer	No's/ Ha	0.4	D2, D16, D18 and D19,	0	0.00	51	20.40	53	21.20	50	20.00	63	25.20	217	86.80
XV	Mechanized row crop cultivation- Pilot mechanization Demonstration	No's/ Ha	0.04	D1, D2, D8, D10, D11, D12, D13, D16, D18, D28, D30 and D31	41	1.64	62	2.48	75	3.00	64	2.56	53	2.12	295	11.80
XVI	Modernization of Tractor workshops of AED	No's/ Ha	50	D2, D11, D23, D27, D28 and D29	6	300.00	6	300.00	6	300.00	6	300.00	6	300.00	30	1500.00
XVII	**Post Harvest Technology and Management machinery (PHTM)**															
1	**Self propelled / other power driven Horticultural Machinery**															
	Chain saw / Wheel barrow / Mango grader/ planter and other suitable self propelled machineries and equipments for horticulture	No's/ Ha	1	All Districts expect D4,D15,D22 and B9	77	77.00	784	784.00	702	702.00	1006	1006.00	507	507.00	3076	3076.00

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
	Crops															
2	**Manual Horticultural Equipments**															
a	Aluminium Ladder/ Ladder	No's/ Ha	0.2	All Districts except D1, D4, D7, D22, D23, D27, D28 and D30	258	51.60	666	133.20	674	134.80	710	142.00	620	124.00	2928	585.60
b	Aluminium pole	No's/ Ha	0.03	D2, D3, D6, D11, D12, D14, D16, D18, D19, D20, D21, D24, D25 and D31	167	5.01	194	5.82	185	5.55	177	5.31	182	5.46	905	27.15
c	Plucker	No's/ Ha	0.02	D2, D3, D5, D6, D8, D9, D10, D11, D12, D13, D14, D16, D18, D19, D20, D21, D24, D25 and D31	266	5.32	294	5.88	306	6.12	309	6.18	301	6.02	1476	29.52
3	Post Harvest Equipments for food grains, oil seeds and Horticultural Equipments				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
a	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			D3, D15, D16 and D22	0	0.00	90	0.00	0	0.00	0	0.00	0	0.00	90	0.00

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
b	Mini Rice Mill	No's/ Ha	1.5	D1, D3, D7, D11, D12, D13, D16, D18, D19, D21, D25 and D28	5	7.50	20	30.00	23	34.50	23	34.50	19	28.50	90	135.00
c	Mini Dal Mill	No's/ Ha	1.7	D2, D3, D5, D7, D9, D11, D12, D13, D16, D18, D20, D22, D24, D25, D27, D28, D30 and D31	9	15.30	57	96.90	39	66.30	40	68.00	45	76.50	190	323.00
d	Millet Mill	No's/ Ha	1.5	All Districts except D6, D7, D8, D10, D12, D14, D15 and D23	2	3.00	51	76.50	47	70.50	45	67.50	49	73.50	194	291.00
e	Oil mill with filter press (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	1.2	All districts except D5, D7, D10, D11, D14, D17 and D23	23	27.60	81	97.20	81	97.20	71	85.20	70	84.00	326	391.20
f	Extractor (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	1	D1, D3, D4, D8, D9, D12, D13, D15, D16, D18, D19, D21, D22 and D31	1	1.00	20	20.00	23	23.00	22	22.00	22	22.00	88	88.00
g	Pomegranate Aril Extractor	No's/ Ha	1.5	D16	0	0.00	1	1.50	1	1.50	1	1.50	1	1.50	4	6.00
h	Custard Apple Pulper (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	1	D16	0	0.00	1	1.00	1	1.00	1	1.00	1	1.00	4	4.00
i	Dehydration unit/ Pricking Machine/ Humidifier (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	1	D9, D10, D16, D18 and D20	0	0.00	3	3.00	5	5.00	3	3.00	7	7.00	18	18.00

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
j	Packing Machines (for all types of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	3	All Districts except D5, D6, D14, D15, D17,D23 and D24	27	81.00	151	453.00	152	456.00	125	375.00	121	363.00	576	1728.00
k	All types of Pow er driven Dehusker/ Sheller/ Threshers/ Harvesters/ De-spiking/ Deconing Machine/ Peeler/ Splitter/ Stripper (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	1.2	All Districts except D14, D17, D23, D24, D26, D27 and D29	26	31.20	108	129.60	92	110.40	92	110.40	98	117.60	416	499.20
l	All types of Boiler/ Steamer/ Dryer solar (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	2	All Districts except D1, D3, D4, D5, D14, D20, D22, D26, D27, D29 and D31	22	44.00	60	120.00	67	134.00	44	88.00	66	132.00	259	518.00
m	All types of Washing Machines (for all type of Horticulture / Food grain / Oil seed crop)	No's/ Ha	1.5	D1, D3, D6, D14, D16, D18, D21, D22, D23, D25, D30 and D31	8	12.00	34	51.00	46	69.00	56	84.00	44	66.00	188	282.00
n	All types of Grinder/ Pulveriser/ Polisher (for all type of Horticulture / Food grain / Oil	No's/ Ha	0.3	All Districts except D1, D5, D7, D8, D9, D10, D14, D15, D17, D19, D21, D24, D26 and D29	29	8.70	78	23.40	67	20.10	57	17.10	73	21.90	304	91.20

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
	seed crop)															
o	All types of Cleaner cum grader/ Gradient separator/ Specific gravity separator (for all types of Horticulture / Food grain / Oil seed crop)	No's/ Ha	0.75	D1, D3, D4, D12, D13, D16, D18, D20, D22, D23, D25, D28 and D30	18	13.50	66	49.50	59	44.25	59	44.25	56	42.00	258	193.50
XVIII	Bio- mass gasifier	No's/ Ha	1.2	D2,D18 and D25	0	0.00	3	3.60	0	0.00	0	0.00	4	4.80	7	8.40
XIX	Construction of Agricultural Engineering Extension centres (AEECs)	No's/ Ha	75	All Districts except D10, D22, D26 and D27	9	675.00	30	2250.00	22	1650.00	12	900.00	13	975.00	86	6450.00
XX	Training of AED Engineers on " Agricultural Processing" and " Bio-Energy"	No's/ Ha	0.04	All Districts except D4, D5, D9, D15, D17, D20, D22, D26, D27 and D29	21	0.84	50	2.00	54	2.16	47	1.88	46	1.84	218	8.72
XXI	**Rehabilitation of Irrigation Network in Chittar Sub Basin under NABARD assistance**															
	On Farm Development works	No's/ Ha	0.35	D22	250	87.50	500	175.00	587	205.45	0	0.00	0	0.00	1337	467.95
	Extension, Renovation and Modernization of Field Channels	No's/ Ha	0.15	D22	800	120.00	1600	240.00	1600	240.00	0	0.00	0	0.00	4000	600.00
	Gravity flow Pipeline System	No's/ Ha	0.5	D22	0	0.00	250	125.00	250	125.00	0	0.00	0	0.00	500	250.00
	Construction of farm pond	No's/ Ha	1	D22	20	20.00	40	40.00	40	40.00	0	0.00	0	0.00	100	100.00
	Construction of Water	No's/ Ha			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00

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
	Harvesting Structures															
	I. Check dams	No's/ Ha	5	D22	25	125.00	20	100.00	15	75.00	0	0.00	0	0.00	60	300.00
	II.Percolation Pond	No's/ Ha	15	D22	0	0.00	2	30.00	3	45.00	0	0.00	0	0.00	5	75.00
	III. Recharge shafts	No's/ Ha	0.6	D22	15	9.00	45	27.00	10	6.00	0	0.00	0	0.00	70	42.00
	Micro Irrigation System	No's/ Ha	0.8	D22	45	36.00	50	40.00	50	40.00	0	0.00	0	0.00	145	116.00
	Provision of solar pumping system	No's/ Ha	5	D22	10	50.00	25	125.00	25	125.00	0	0.00	0	0.00	60	300.00
	Promotion of fodder bank for cattle	No's/ Ha	0.1	D22	60	6.00	40	4.00	40	4.00	0	0.00	0	0.00	140	14.00
XXII	**Prevention of sea water intrusion**															
	Subsurface dyke	No's/ Ha	15	D3, D12, D17, D20, D22 and D27	0	0.00	36	540.00	37	555.00	39	585.00	46	690.00	158	2370.00
	Village pond/communit y pond	No's/ Ha	5.5	D3, D17, D20, D22 and D27	0	0.00	62	341.00	77	423.50	85	467.50	100	550.00	324	1782.00
	Farm Pond	No's/ Ha	1	D3, D12, D16, D17, D22 and D27	0	0.00	420	420.00	520	520.00	640	640.00	730	730.00	2310	2310.00
	Recharge shaft	No's/ Ha	1.5	D12 and D22	0	0.00	70	105.00	125	187.50	200	300.00	150	225.00	545	817.50
	Weir/ Bed Dam	No's/ Ha	30	D3, D12, D16, D17, D20, D22 and D27	27	810.00	2	60.00	2	60.00	1	30.00	0	0.00	32	960.00
XXIII	Reclamation of Problem(Alkalin e & Saline) soils	No's/ Ha	0.6	D3, D7, D17, D22, D23 and D30	2850	1710.00	950	570.00	500	300.00	500	300.00	700	420.00	5500	3300.00
	Total				**47652**	**67821.28**	**49517**	**61709. 69**	**48866**	**59349. 91**	**46392**	**58889. 55**	**46275**	**58154. 02**	**238702**	**305924.4 3**

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

4.4 AGRICULTURAL MARKETING AND AGRI-BUSINESS

Paving the way forward towards market-led agriculture and to help the farmers to realize a better price for their produce through market information are the major thrusts in the marketing sector. Moreover, the agricultural marketing system of Tamil Nadu is confronted with the following problems / issues.

- Heavy post harvest lesses
- Lack of consistency in supply of quality agricultural produce.
- Insufficient handling and transportation of farm produce
- Small marketable surplus
- Low utilization in processing sector
- Lack of direct linkages with buyers or consumers
- Predominance of middle men
- Inadequate infrastructure
- Inadequate market information and
- Insufficient market research and analysis

These issues call for various interventions and the suggested interventions to overcome the aforesaid problems are

- Promotion of commodity interest groups and formation of Farmer Producers Organization and market linkages.
- Strengthening post harvest infrastructure facilities to handle marketable surplus.
- Encouraging of private players in infrastructure facilities, value addition, food processing and marketing under public private partnership
- Sensitizing the farmers towards market-led agriculture through capacity building.
- Crop advisory and market information.
- Provision of market accessories.

Hence, priority is given for establishment of need based storage and drying facilities at key villages, establishment of the drying yard (floor with cudapah stone) in major crop growing areas, provision of covering facilities to the farmers, providing solar driers and plastic crates and construction of cold storages. Training to farmers on value addition of horticultural and agricultural crops for augmenting their income are the other suggested interventions for strengthening the activities of marketing sector.

The action plans can be channelized through the following interventions

1. Creation of new or strengthening of existing market infrastructure through construction of storage godowns, drying yards, value addition, AGMARK Lab, e-learning centre etc.
2. Strengthening of market institutions viz Uzhavar Shandies, Rural Shandies and Regulated Markets functioning in the different localities
3. Formation of Farmer Producer Organization (FPO) and facilitating Commodity Interest groups
4. Provision of market accessories through supply of plastic crates, dunnage, tarpaulins etc.
5. Update and accessible market information and capacity Building to farmers

4.4.1 Creation of new or strengthening of market infrastructure

a. Drying yard and Storage Godown

In post-harvest management of grains, maximum benefit can be achieved by following improved storage practices at optimum moisture content. About 5 to 10 per cent 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.

Benefits to the farmers:

- Reduce 5-10 per cent of post harvest losses in cereals and pulses.
- Increase the quality and value of the produce
- Better price realization for their produce

b. Strengthening of Agmark Laboratories By Providing Lab Equipments

The AGMARK scheme was set up by the Directorate of Marketing and Inspection, Government of India, under the Ministry of Agriculture. As per the Agricultural Produce (Grading and Marketing) Act 1937, the AGMARK Grading scheme is being implemented in Tamil Nadu. The main objective of the scheme is to provide unadulterated food products to the consumers. 'AGMARK' is the symbol of quality and purity. This scheme is a voluntary one. The scheme is implemented as per the norms prescribed by Government of India. The Grade standards are prescribed for more than 213 agriculture and allied products.

In Tamil Nadu, the products under AGMARK Grading are Rice, pulses, Ghee, Honey, Ground spices, Whole spices, Wheat products, Sago, vegetable Oils, Gram flour, compounded asafetida etc., In Tamil Nadu, 30 State AGMARK grading laboratories are

functioning under the control of Deputy Director of Agriculture (Agri business) for grading centralized and decentralized commodities. One Principal laboratory is functioning under the control of Commissioner of Agricultural Marketing and Agri Business, Chennai.

Every year the department is achieving targets under AGMARK grading scheme earmarked by the government. Provision of lab equipment is necessary to increase the efficiency of testing in terms of accuracy and reliability.

In order to cater to the needs of the packers for grading their produce and for ensuring quality to the consumers, the construction of own building for agmark lab and purchase of computer with accessories are suggested to increase the efficiency.

c. E Learning centre

Learning centres are intended to provide formal management mechanism between the scientists and technology users. It will provide single window information on post harvest and marketing aspects and facilitate direct access to the farmers to the institutional resources. Information will be aided through exhibits, audio visual aids, farm literature, kiosk (Touch screen), video documentaries on various agricultural marketing interventions and latest developments in agri business sector.

Each e-Learning Centres will have the facilities like e-Class room, e-library, Informative kiosk, Demonstration plots, Mini project models and Video chats between experts and technology users.

- e-Class room -Video chats between experts and technology users
- e-library -Achieves of Project profiles, Business Plan documents, Video clipping of technology, success stories and schedule of Exhibitions in and around the world etc
- Informative kiosks - All aspects from production to post harvest handling of various crops, Market intelligence and logistics for farmers
- Mini project models and Miniature models - Silo models, value addition, post harvest technology and Agro processing units etc.

4.4.2 Strengthening of market institutions namely Uzhavar Shandies, Rural Shandies and Regulated Markets

a. Strengthening of Infrastructural facilities of market institutions

Improving efficiency of market institutions at all levels including grass root level market outlets will facilitate price discovery, minimize costs and pave way for introduction of market innovations. Numbers of studies have shown that efficiency of market institution at grass root level (Uzhavar Shandies) is poor due to high degree of congestion at market

yards, less number of traders, non availability of supporting facilities and services. Hence, there is a need to develop these markets on priority basis so that marketing efficiency could be increased and farmers get remunerative prices for their produce. The general infrastructural facilities proposed for strengthening of upgrading Uzhavar Shandies include grading and sorting facilities, trading platform with GI roof, market information through ticker boards, electronic weighing balance, display boards, approach roads, drinking water facilities, vehicle stands, electricity for evening shandies and toilet facilities.

Rural Shandies are the age old marketing avenue for the villagers both for growers and consumers. Ninety per cent of the total marketable surplus in the remote areas is sold through these rural market outlets. The rural shandies are functioning in the villages weekly once or weekly twice or daily depending on the need of consumers. Vegetables, Fruits, Dried Fish, Groceries, Pulses, Agricultural implements, Meat, Fish, Ropes for Cow and Bullock and Household needs, Mats, Natural Medicines etc., are traded in these outlets and these rural sandhais are owned and managed by the panchayats, town panchayats, municipalities and private agencies like temple in some places

Improving efficiency of this grass root level market outlets (Rural shandies) will facilitate proper price discovery, minimize costs and pave way for introduction of market innovations.

Temporary sheds are made by sellers by using poly sheets, tarpaulins and thatched materials locally available. There is no protection from sun and rain both for farmers/traders and consumers. Other infrastructure facilities like grading, sorting, primary processing facilities, trading platforms, market information, toilet facilities, vehicle stands, approach roads, canteen, drinking water facilities, dust bin and electricity for evening sandhais are not available for the farmers and traders.

Strategies for improving efficiency of Rural Sandhais are

- Providing grading and sorting facilities
- Improving infrastructure facilities
- Capacity building on improved marketing practices
- Providing market information
- Improving hygiene of markets
- Commodity based rural shandies will be selected on priority basis at one per district for piloting. Preference will be given to shandies with higher frequency of market. These pilot project will be implemented only in rural shandies located in Government poramboke of panchayat/town panchayat/municipality

- Baseline survey will be conducted before intervention for proper assessment of the local needs
- General infrastructure facilities proposed for upgrading these rural sandhais are (1) grading and sorting facilities (2) trading platforms with GI roof (3) market information through ticker boards (4) electronic weighing balance (5) display boards (6) approach roads (7) drinking water facilities (8) waste bin (9) vehicle stands (10) electricity supply to conduct evening Sandhais (11) toilet facilities wherever essential

The agricultural produce sector has been one of the most important components of Indian Economy. The increasing trend in agricultural production has brought in its wake, new challenges in terms of finding market for the increasing marketable surplus. To benefit the farming community from the new global market access opportunities, the internal agricultural marketing system needs to be strengthened and integrated.

A marketing system backed by strong, adequate infrastructure is at the core of agricultural marketing. The agriculture markets have the potential to act as powerful tool for improving the economic viability of agriculture, for reduction of rural poverty and for achieving sustainable agriculture development. Market infrastructure is important not only for the performance of various marketing and expansion of the size of the market but also for transfer of appropriate price signals leading to improved marketing efficiency. High investment is required for creation and management of the agricultural marketing infrastructure. Thus external funding will augment to support the infrastructure development program.

Tamil Nadu has 277 Regulated Markets under 21 Market Committees. Competitive and remunerative prices are ensured for the produce in the regulated markets. No fee is collected from farmers for any service rendered in the Regulated Markets. The information on commodity price prevailing in various markets is made by moving their produce at right time to the market which pays higher price. During 2011-12 (up to February) 14.64 lakh MT of agricultural produce have been sold by farmers through Regulated markets. It is proposed to construct own buildings for the regulated market.

The arrivals to regulated markets need to be increased and these markets have to be strengthened with adequate infrastructural facilities. The transaction shed, storage godowns, cold storage facilities, drying yard, weigh bridges etc. have to be strengthened. Further in districts where the regulated markets are not functioning in their own building, new own regulated market buildings have to be constructed. Besides, the regulated markets have to

be modernized. The grading and storage facilities have to be improved on par with the facilities at National Commodity Exchange. Besides, operation at regulated markets must be at electronic mode. Transparent dissemination of market and price information would facilitate farmers to get remunerative prices.

b. Cold storage

The post harvest loss is estimated at 25 to 40 per cent in respect of Fruits and Vegetables which is primarily due to non adoption of post harvest management technologies. The Post harvest losses start in the farm and travels along the procurement chain and the entire marketing channel. Cold Storage is a special kind of room, the temperature of, which is kept very low with the help of machines and precision instruments. Cold storage helps to preserve the perishable commodities of food items for a longer period with retention of the original colour, flavor and taste.

The cold storage facilities are the prime infrastructural component for such perishable commodities. Besides the role of stabilizing market prices and evenly distributing both on demand basis and time basis, the cold storage industry renders other advantages and benefits both the farmers and the consumers.

The farmers get opportunity of producing cash crops to get remunerative prices. The consumers get the supply of perishable commodities with lower fluctuation of prices. Commercially apples, potatoes and oranges are stored on large scale in the cold storages. Other important costly raw materials like dry Fruits, chemicals, essences and processed foods like fruit juice/pulp, concentrate dairy products, frozen meat, fish and eggs are being stored in cold storages to regulate marketing channels of these products.

Hence cold storages are used for high value items or when prices crash down due to bumper crop or for such items which are grown during the season but there is a demand round the year or for products like Meat, fish, milk products which are quickly perishable. Cold storages are being used for preservation of many food products since long. Their location has to be strategic and they should have easy access.

Facilities provided in the Cold Storage

- Pre cooling room
- Cold storage room
- Washing ,grading and packing hall
- Sanitary facilities
- Road and common facilities
- Uninterrupted power supply for cold storage

- Plastic crates for produce

Facilities in the Market complex with cold storages

- Washing, grading and packing hall.
- Transaction shed
- Cold storage unit with pre-cooling room.
- Traders shop
- Sanitary facilities
- Road and common facilities
- Uninterrupted electricity for cold storage
- Plastic crates for produce

Facilities in the market complex

- Transaction shed
- Traders shop
- Sanitary facilities
- Water facilities

Market complexes are provided for the better price realization, better export opportunity, commodity specific market for easy marketing and Interface trading without middle men.

Facilities in the Terminal Markets

Cold Storages, Pack houses, Primary processing centres, Collection centres and other market infrastructures.

4.4.3 Formation of Farmer Producer Organization (FPO) and facilitating commodity interest groups

Establishment of Farmer Producer Organization (FPO)

FPO is the ideal platform to provide technical and credit support to a group of SMF's, prepare them for high quality production by adopting common cultivation protocol, aggregate the produce to make higher volume which acts as key element to link the farmers with market or directly to the consumers.

Objectives:

1. Mobilizing farmers into groups of between 15-20 members at the village level (called Farmer Interest Groups or FIGs) and building up their associations to an appropriate federating point i.e. Farmer Producer Organizations (FPOs) so as to plan and implement product-specific cluster/commercial crop cycles.

2. Strengthening farmer capacity through agricultural best practices for enhanced productivity.
3. Ensuring access to and usage of quality inputs and services for intensive agriculture production and enhancing cluster competitiveness.
4. Facilitating access to fair and remunerative markets including linking of producer groups to marketing opportunities through market aggregators.

State SFAC shall engage Resource Institutions empanelled by Central SFAC for facilitating in three years period as per the policy and process guidelines issued by Department of Agriculture and Co-operation, Government of India, New Delhi, through monitoring and evaluation agency empanelled by SFAC New Delhi in all the stages.

Moreover, in view of expanding retail trade, organizing the farmers and equipping the commodity groups can facilitate aggregation of produce and also enhancing the bargaining power of the farmers. The FPOs can move directly to the markets without any intermediary. Further, adoption of technology within the production and post-harvest management which is expected to flow from organized retailers and other research institutions can be efficient through farmer commodity groups. Hence, with the financial assistance FPOs for group marketing is suggested at direct level. Farmers growing paddy, groundnut, sugarcane, banana, gingelly, coconut, tapioca, fruits and vegetables will be benefited. This would also pave way for infrastructural development, purchase of machineries, capacity building of farmers and the like.

4.4.4 Provision of market accessories

Market accessories and infrastructure facilities are said to be the blood vessels for the smooth and effective functioning of market institutions at all levels. Provision of market accessories like weighing electronic balance, tarpaulins, dunnage, plastic crates etc and market infrastructures like thrashing floor, drying yard, storage shed, grain silts, provision of computers and solar dryers would go long way in upgrading market institutions and both buyers and sellers would be benefitted mutually.

4.4.5 Capacity Building

Market led agriculture through capacity building

Government adopted several programmes of providing market supported services since independence through planned approach. However, it hardly reached the target groups adequately. The main reason could be that agricultural marketing on business related aspects of training, education and research remained neglected. In this regard,

training on grading and storing the produce, training on market intelligence, training on post harvest management, training on value addition of the produce, exposure visits to nearby districts, State and foreign countries where in marketing of agricultural commodities are in advanced level would facilitate the capacity building of the farmer-producers. Further this would also facilitate the stakeholders in the supply chain to augment their income through remunerative prices and meet their requirement adequately. The budget requirement for implementing above intervention are presented in the Table 4.37.

Table: 4.37 Consolidated Budget Outlay for Agricultural Marketing

(Rs. in Lakh)

Sl. No.	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
1	**Promotion of Commodity Groups and Market Information**															
2	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
3	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
4	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
5	Development of post harvest technology packages on electronic form to be shared through IT and other media	Nos.	0.2	D12	2	0.40	2	0.40	2	0.40	2	0.40	2	0.40	10	2.00
6	Documentation of Traditional and Improved Technologies in Food processing and Value addition	Nos.	0.25	D12	1	0.25	1	0.25	1	0.25	1	0.25	1	0.25	5	1.25
7	Equipping field level extension functionaries with real-time on farm reporting and documentation tools with internet connectivity	Nos.	0.25	D12	9	2.25	0	0.00	0	0.00	0	0.00	0	0.00	9	2.25

Sl. No.	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
8	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
9	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
10	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
11	Integrated Commodity Management through Aggregation	Nos.	8-10	D11, D24, D29	21	750.54	21	250.54	20	0.54	20	0.54	20	0.54	102	1002.70
12	Logistic Support	Nos.	0.08	D17	220	17.60	220	17.60	220	17.60	220	17.60	220	17.60	1100	88.00
13	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
14	Hot Air Oven	Nos.	25-26	D2	0	0.00	2	50.35	0	0.00	0	0.00	0	0.00	2	50.35
15	Muffle furnace	Nos.	0.2	D2	0	0.00	1	0.20	0	0.00	0	0.00	0	0.00	1	0.20
16	Hot Plate	Nos.	0.05	D2	3	0.15	0	0.00	0	0.00	0	0.00	0	0.00	3	0.15
17	Water Bath	Nos.	0.05	D2	3	0.15	0	0.00	0	0.00	0	0.00	0	0.00	3	0.15
18	Distillation unit	Nos.	0.4	D2	0	0.00	1	0.40	0	0.00	0	0.00	0	0.00	1	0.40
19	Provision of Agmark Lab equipments	Nos.	0.5-1	D3, D4, D6, D8, D11, D12, D25, D30	42	80.60	65	20.82	13	9.60	6	6.57	5	6.36	131	123.95
20	Publicity-Press Release, Printing of	Nos.	0.002-0.003	D12, D18, D23	5677	15.70	6865	14.80	6415	13.90	6415	13.90	6515	14.10	31887	72.40

Sl. No.	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
	Pamphlets, Booklets, Banners, Flex.															
21	Setting up of permanent Agmark Exhibition with models & displays	Nos.	2	D12	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00	1	2.00
22	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
23	**Strengthening of Uzhavar Sandhais and Regulated Market**															
24	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
25	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
26	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
27	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
28	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
29	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
30	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
31	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

Sl. No.	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
32	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
33	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
34	office automation		3-5	D3, D13	1	3.00	0	0.00	0	0.00	0	0.00	1	3.00	2	6.00
35	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
36	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
37	Provision of Automatic seed vending machine in Uzhavar Sandhais	Nos.	1-2	D12, D29	4	5.00	0	0.00	0	0.00	0	0.00	0	0.00	4	5.00
38	Provision of ICT Tools to Uzhavar Sandhais	Nos.	1	D16	6	6.00	0	0.00	0	0.00	0	0.00	0	0.00	6	6.00
39	Provision of modern roofing (galvanized zinc sheets) in Uzhavar Sandhais 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
40	Daily Message on Market Rate to Uzhavar Sandhais Farmers Mobile.	Nos.	0.6	D16	6	3.60	6	3.60	6	3.60	6	3.60	6	3.60	30	18.00
41	Drinking Water Facility	Nos.	0.5	D18, D20, D22, D29	46	133.50	17	8.50	0	0.00	0	0.00	0	0.00	63	142.00
42	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
43	Administrative Office Room (Vehicle shed,waiting hall, wa$hing Room, 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
44	Strengthening of	Nos.	5-10	D3, D11, D12,	530	3200.34	506.15	225.75	502.15	35.75	503.15	45.75	502.15	45.75	2543.6	3553.34

Sl. No.	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
	RM			D16, D17, D18, D21, D22, D25, D26, D29												
45	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
46	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
47	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
48	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
49	Vacuum cleaner with Blower(High speed)	Nos.	0.25	D12	9	2.25	0	0.00	0	0.00	0	0.00	0	0.00	9	2.25
50	**Formation of FPO / Strengthening of Existing Commodity Groups**															
51	FPO	Nos.	3,43	All districts except D6, D17, D18, D23	1410	3775.93	674	2925.80	679	2449.56	630	1209.25	631	1867.19	4024	12227.73
52	Commodity Group	Nos.	0.25	D3, D6, D18	410	14.50	10	2.50	25	717.50	71	1018.70	31	1017.50	547	2770.70
53	Formation of Commodity Group, FPCs and Business Support to FPCs	Nos.	03-0.12	D4,D12	107	41.08	106	5.30	106	5.30	106	5.30	106	5.30	531	62.28
54	Establishment of Inputs shop to the existing FPOs	Nos.	10	D12	3	30.00	0	0.00	2	20.00	0	0.00	2	20.00	7	70.00
55	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
56	Environmentally	Nos.	0.4	D12	8	3.20	2	0.80	3	1.20	1	0.40	6	2.40	20	8.00

Sl. No.	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
	controlled Mobile vending carts to the existing FPOs/Commodity Groups															
57	Provision of pre-fabricated "Sales Kiosks" to the existing FPOs/Commodity Groups	Nos.	2	D12	7	14.00	0	0.00	0	0.00	0	0.00	3	6.00	10	20.00
58	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
59	**Provision of Market Access and Market Activities**															
60	Secateurs for 1000 farmers per year	Nos.	0.003	D10	3000	10.50	3000	10.50	3000	10.50	3000	10.50	3000	10.50	15000	52.50
61	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
62	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
63	Chaff cutter	Nos.	0.6	D5	26	15.60	26	15.60	23	13.80	23	13.80	23	13.80	121	72.60
64	Collection Van	Nos.	10-50	D4	12	600.00	0	0.00	0	0.00	0	0.00	0	0.00	12	600.00
65	Computer with Accesories	Nos.	4	D4	9	36.00	0	0.00	0	0.00	0	0.00	0	0.00	9	36.00
66	Dept of Agricultural Engineering: Farm Pond and Oil Engine, Dovetail under AED scheme	Nos.		D17	0	355.50	0	355.50	0	0.00	0	0.00	0	0.00	0	711.00
67	Dept of Horticulture: Area expansion and MI, Dovetail under	Nos.		D17	0	31.76	0	31.76	0	0.00	0	0.00	0	0.00	0	63.52

Sl. No.	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
	NHM 2017 -18															
68	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
69	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
70	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
71	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
72	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
73	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
74	Dustbin	Nos.	0.5	D4	10	5.00	0	0.00	0	0.00	0	0.00	0	0.00	10	5.00
75	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
76	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
77	Ghani (Wood)	Nos.	2	D26	14	28.00	15	30.00	14	28.00	15	30.00	15	30.00	73	146.00
78	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

Sl. No.	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
79	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
80	Infrastructure Civil work	Nos.		D17	0	472.50	0	472.50	0	0.00	0	0.00	0	0.00	0	945.00
81	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
82	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
83	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
84	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
85	NIR Analyzer	Nos.	0.1	D30	4	0.40	0	0.00	0	0.00	0	0.00	0	0.00	4	0.40
86	Oven	Nos.	4	D26	1	10.00	1	1.00	0	0.00	0	0.00	0	0.00	2	11.00
87	Packing Machine	Nos.	4	D26	2	8.00	1	4.00	0	0.00	0	0.00	0	0.00	3	12.00
88	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
89	Plastic crates	Nos.	0.01		67221	674.61	69082	680.55	72182	686.16	67567	636.02	67102	627.97	343154	3305.29
90	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
91	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
92	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
93	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

Sl. No.	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
94	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
95	RURBAN			D3, D25	0	27.40	0	32.90	0	0.00	0	0.00	0	0.00	0	60.30
96	Special Area Development Programme			D12, D25	12	8.20	0	0.00	0	0.00	0	0.00	0	0.00	12	8.20
97	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
98	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
99	Tinto Meter	Nos.	0.03	D30	110	3.30	165	4.95	220	6.60	220	6.60	275	8.25	990	29.70
100	Travelling Microscope.	Nos.	5	D3, D30	5	25.00	4	20.00	2	10.00	1	5.00	0	0.00	12	60.00
101	Trolleys	Nos.	0.3	D12, D18	49	12.45	9	2.70	7	2.30	0	0.00	0	0.00	65	17.45
102	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
103	**Post Harvest Infrastructure and Machineries**															
104	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
105	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
106	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
107	Bhendi Plucker	Nos.	0.02	D22	300	4.50	350	5.25	350	5.25	300	4.50	300	4.50	1600	24.00
108	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
109	Coconut Ladder	Nos.	0.05-0.08	D3, D5, D8, D15, D16, D17, D18, D19, D29, D30	2094	122.50	1891	126.33	1068	101.49	375	69.42	376	73.10	5804	492.83
110	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
111	Color Sorter	Nos.	12	D26	1	12.00	0	0.00	0	0.00	0	0.00	0	0.00	1	12.00

Sl. No.	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
112	Cotton Plucker	Nos.	0.05	D17	80	4.00	80	4.00	80	4.00	80	4.00	80	4.00	400	20.00
113	Cassava chipper	Nos.	0.15	D3	2	0.30	2	0.30	1	0.15	0	0.00	0	0.00	5	0.75
114	Destoner in millets	Nos.	2	D22	1	2.00	1	2.00	1	2.00	0	0.00	0	0.00	3	6.00
115	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
116	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
117	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
118	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
119	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
120	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
121	Establishment of Virgin Coconut Oil Production unit in Coconut market complex	Nos.	30	D19	0	0.00	0	0.00	1	30.00	0	0.00	0	0.00	1	30.00
122	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
123	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
124	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

Sl. No.	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
125	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
126	Groundnut Grader	Nos.	1	D26	0	0.00	1	1.00	0	0.00	1	1.00	0	0.00	2	2.00
127	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
128	Groundnut Stripper	Nos.	3.5	D19	5	17.50	7	24.50	5	17.50	5	17.50	4	14.00	26	91.00
129	Jack Fruit Pulvariser	Nos.	2	D3	1	2.00	1	2.00	0	0.00	0	0.00	0	0.00	2	4.00
130	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
131	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
132	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
133	Maize Sheller	Nos.	3	D20	0	0.00	1	3.00	0	0.00	1	3.00	0	0.00	2	6.00
134	Maize Thresher	Nos.	2.5	D16	0	0.00	2	5.00	1	2.50	0	0.00	1	2.50	4	10.00
135	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
136	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
137	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
138	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
139	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
140	SCM-PPC for Banana and Onion, Creating infrastructure, Ripening Chamber, Weigh Bridge, Grading and Packing hall, Onion Grading machine and other	Nos.	320-327	D24, D25, D27	19	6125.00	3	1056.70	0	0.00	0	0.00	0	0.00	22	7181.70

Sl. No.	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
	accessories															
141	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
142	Onion peeling Machine	Nos.	25	D14	0	0.00	8	200.00	0	0.00	0	0.00	0	0.00	8	200.00
143	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
144	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
145	Paddy - Combine harvester	Nos.	23	D5	0	0.00	1	23.00	1	23.00	1	23.00	1	23.00	4	92.00
146	Paddy Winnower	Nos.	1	D26	2	2.00	3	3.00	3	3.00	3	3.00	3	3.00	14	14.00
147	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
148	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
149	Potato harvester	Nos.	20	D21	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00	1	20.00
150	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
151	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
152	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

Sl. No.	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
153	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
154	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
155	Seed Processing Unit to individual farmers	Nos.	16-18	D15	1	16.88	0	0.00	0	0.00	0	0.00	0	0.00	1	16.88
156	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
157	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
158	Solar tunnel dryer	Nos.	15	D20	0	0.00	0	0.00	15	225.00	0	0.00	0	0.00	15	225.00
159	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
160	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
161	Supply chain Management-Up gradation of existing regulated market(Ripening chamber, Controlled atmosphere with	Nos.	237-250	D3, D10	0	0.00	7	1827.70	1	68.50	0	0.00	0	0.00	8	1896.20

Sl. No.	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
	conventional bin storage, Pack house, Cold Storage, Collection van, E Auction Hall, Refeer van, Collection van}															
162	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
163	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
164	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
165	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
166	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
167	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
168	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
169	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
170	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
171	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
172	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
173	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
174	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
175	**Capacity building Programme**															
176	Exposure Visits - within state	Nos	0.75	All districts	6496	547.10	6832	520.36	6847	533.31	6844	530.76	6876	530.90	33895	2662.43
177	Exposure Visits - outside state - 3	Nos	0.45-2	All districts	2839	1410.12	2722	1172.91	2761	1227.73	2749	1227.97	2742	1200.13	13813	6238.86

Sl. No.	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
	days															
178	Training on Market led Extension, Agmark grading Food safety, post harvest technology, Supply Chain Management, Grading-sorting-packing, Market linkages & Exports, Food processing and value addition at district level	Nos.	0.25	All districts	10875	341.66	11157	278.66	10658	276.68	10800	272.83	10810	282.13	54300	1451.98
179	Conducting festivals/melas, Field days, awareness campaign, seminar, Farmers-Scientists interaction, Village meeting	Nos.	0.08	D6, D12, D16, D18	4840.8	44.05	5840.8	49.05	5340.8	46.55	5340.8	46.55	5329.8	44.35	26693	230.55
	Total					**37027.74**		**22357.70**		**18810.01**		**16287.39**		**18457.33**		**112940.18**

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

4.5. Seed Certification and Organic Certification

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 a 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.

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. The details of district wise budget requirement for undertaking the above interventions are furnished in Table 4.38.

It could be seen from the table that the budget requirement for implementation of interventions such as strengthening seed testing laboratory is Rs. 654.64 lakh, Creation of infrastructure facilities in seed testing laboratories is Rs. 1708.8 lakh, for capacity building is Rs. 103.60 lakh and Strengthening of communication and network facilities is Rs. 203.50 lakh. The overall budget requirement for implementation of above interventions is Rs. 2670.538 lakh.

Table 4.38 Budget Outlay - Seed Certification and Organic Certification

(Rs. in lakh)

S.No	Interventions	Unit	Unit Cost (Rs. in lakh)	2017-18		2018-19		2019-20		2020-21		2021-22		Total		Districts Covered
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
I	**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,	Nos	0.01 - 3.00	23	307.28	18	240.48	7	93.52	1	13.36	0	0	49	654.64	All districts except D1 and D14
II	**Strengthening of communication and networking facilities**															
	Computer accessories	Nos	0.46	442	203.5	0	0	0	0	0	0	0	0	442	203.5	All District except D1 and D24
III	**Capacity Building**															
	Training to seed grower for quality seed production	Nos	0.20	0	0	111	22.2	113	22.6	119	23.8	121	24.2	464	92.8	D4, D5, D6, D9, D10, D11, D12, D13, D16, D19, D20, D22,

S.No	Interventions	Unit	Unit Cost (Rs. in lakh)	2017-18		2018-19		2019-20		2020-21		2021-22		Total		Districts Covered
				Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
																D23, D27 and D28
	Training to seed producers on seed certification procedures	Nos	0.10	0	0	27	2.7	27	2.7	27	2.7	27	2.7	108	10.8	D5, D6, D11, D13, D19, D20, D22, D23, D28 and D31
IV	**Infrastructure and assets**															
	Strengthening of office premises by constructing new buildings	Nos	0.12 - 0.16	884.6	189.2	1200	282.3096	1400	362.2889	2000	500	3000	375	8484.6	1708.798	D9, D10, D17, D20, D28 and D31
	Total			**1349.6**	**699.98**	**1356**	**547.6896**	**1547**	**481.1089**	**2147**	**539.86**	**3148**	**401.9**	**9547.6**	**2670.538**	

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

4.6 ANIMAL HUSBANDRY AND DAIRY DEVELOPMENT

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.

Fodder scarcity and poor quality of available fodder are the major constraints in increasing livestock productivity. Livestock are affected by many ailments. Delay in diagnosis will lead to increase in loss of productive days, increase in the recovery period and consequent loss of production. Further, due to difficulties in transporting the ailing animals, cost and time involved, farmers generally do not take their animals to the referral centres which are few and far apart. Hence, it is necessary to enable select veterinary institutions function as referral centres by providing them culturing technologies. Similarly, 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. Similarly, strengthening of veterinary institutions, livestock farms, modernization of dairy units and conduct of health camps are suggested for enhancing the activities of animal husbandry sector.

Animal Husbandry and dairying activities play a vital role in promoting the socio – economic development of rural folk. These value adding activities have sufficiently contributed to the food basket, nutritional security and household income of the rural people and generated gainful employment particularly among the landless, small and marginal farmers besides women.

Dairying, as an important source of income for millions of rural families, plays an important role in providing gainful employment and income generating opportunities. However, to keep pace with increasing population and changing consumption pattern caused by increasing per capita income, these two sectors have to augment their production and availability.

Goat farming is an extremely demanding activity especially for the economically developing countries. Problems and prospects vary through regions; consequently have different cultural and economic implications. In recent years, the overall appreciation of this long under-estimated species has grown and thus enhancing its importance in the livestock

industry. Hence rearing of goats should be examined in a new light and from new perspectives.

The demand for animal protein is increasing at a very faster rate. Human population growth, increasing urbanization vis-a vis income are predicted to double the demand for livestock and livestock production by 2020. The trends reveal that the role of small ruminants in meat supply is growing and meat from these animals is most preferred. The small ruminants sector will therefore play a significant role in the coming decade in impacting on the livelihoods of small and marginal farmers who rear them.

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. Hence, improving fodder production by promoting high yielding fodder varieties is needed. Besides, emphasis has to be laid on optimum utilization of wasteland to grow fodder. 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 education the people about animal diseases. Training on value addition of milk and milk products and capacity building of livestock farmers, besides strengthening activities of veterinary hospitals, dispensaries and clinics, would go long way in improving this sector. The details of specific interventions are discussed below

4.6.1. Provision of Modern Veterinary Diagnostic aids to Veterinary Institutions

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 from farmer's perspective. They are affected by many ailments. While some are contagious and infectious diseases for which vaccinations are the best ways of prevention, a predominant number of cases presented to the Veterinary Institutions relate to pathological conditions other than infectious and contagious diseases. These include trauma cases, medical emergencies like metabolic diseases, Gynaecological conditions like anoestrus, repeat breeding conditions, metritis etc.

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. This results in the farmer incurring direct loss. Sometimes, due to inaccurate or delayed diagnosis, loss of life of the animals also results. In order to avoid these loses to the farmers / animal owners 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, reduce loss of productivity due to delay in diagnosis and will significantly reduce infertility among dairy cattle and prevent loss of germplasm.

With around 2600 institutions, it is imperative that such facilities are provided in block head quarters and district head quarters so that the benefits of such cutting edge diagnostic facilities are accessible to vast majority of livestock owners. With this objective it is proposed to provide diagnostic facilities such as Ultrasound, Computerized X-rays, diathermy units, Haemocytometers, Laparoscopy etc and surgical theatres to 400 institutions over a period of five years.

4.6.2. Enhancement of Livestock Productivity adopting recent concepts in Breeding Management

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 per cent 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 economic wellbeing of a dairy farmer depends on the productive and reproductive ability of the herd that he maintains. The replacement of unproductive and ageing animals in the herd and its expansion are very important to maintain the scale of economy of the farm.

Oestrus synchronization with CIDR, sex-sorted semen and MOET (Multiple Ovulation and Embryo Transfer) are some of the modern scientific tools which have been proposed to be employed for effective breeding management to enhance the livestock fertility and

productivity. 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. It is proposed that 10,000 animals will be synchronized in a planned manner through the veterinary institutions of the State. About 10,000 doses of sex-sorted semen will be imported and distributed to institutions. Embryo Transfer will be conducted across the State, utilizing the elite cows of farmers as donors and other healthy animals as recipients. Departmental Farms will also be strengthened to act as ET hubs to revamp the frozen semen production, processing, storage and distribution.

4.6.3.Improving the animal protein availability by establishing small holder dairy, sheep/goat and piggery units.

Proteins are the building blocks of human life, essential for normal growth. Proteins form the foundation of muscles, bones, skin, hair, blood and heart. Proteins contain 22 amino acids. Eight of those amino acids are essential because the body cannot produce them, therefore, they must be obtained from our diet. Dietary proteins provide amino acids for the synthesis of body proteins, both structural proteins and biologically active enzymes and other biologically important nitrogenous compounds in the body. Adequate dietary protein is essential during growth when new tissue proteins are being synthesized. In the adult, dietary protein is essential for the synthesis of new proteins to replace those, which are being broken down.

Milk, meat and egg play a crucial role in fulfilling the protein requirements of human beings. In recent times, increasing urbanization has led to shrinkage of pasture land and related natural resources putting enormous strain on animal husbandry. This necessitates facilitating farmers to take up dairy, goat and sheep farming, piggery and poultry as an avocation to embolden not only the rural economy but also to enhance the animal protein availability.

It is proposed to establish 300 dairy units (both cows and buffaloes), 1000 piggery units and 5000 sheep/goat units over the next five years.

4.6.4. Improving the infrastructure facilities of the veterinary Institutions to ensure better service delivery

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. In the absence of any of the

components of this system, the GVP and GAP shall be severely compromised. 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 are either functioning from rented premises or in dilapidated buildings. Further, functioning of Veterinary Institutions in the rental buildings do not satisfy the requirement of a typical Veterinary Institution and 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. It is proposed to improve the infrastructure facility of 200 veterinary institutions.

4.6.5. Livestock Health Management

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.

Up gradation of vaccine production facilities at IVPM, Ranipet, Vellore to GMP standards

The Institute of Veterinary Preventive Medicine, Ranipet, a unit of the Department of Animal Husbandry and Veterinary Services, Government of Tamil Nadu, is engaged in the production of Veterinary Biological and Pharmaceuticals for use by the field Veterinary Institutions in the State. The WHO has mandated that any institution involved in vaccine production must have facilities compliant with GMP norms to be eligible for licensing. As most of the production facilities at IVPM, Ranipet were established several decades back, the following facilities have to be provided to make the institute GMP compliant.

- Establishment of Animal testing facility
- Establishment of QC lab
- Up gradation of FMD regional centre to GMP standards
- Establishing PPR vaccine production unit of GMP standards
- Construction of Warehouse

- Strengthening of Brucella vaccine production unit
- Up gradation of pharmaceutical division
- Establishment of Tissue Culture facility for Sheep pox Vaccine Production
- Up gradation of Diagnostic section to GLP standards
- Improving the infrastructure facilities
- Establishment of feed milling plant.

Vaccination and Sero-Surveillance

Strengthening the sero-surveillance mechanism by improving the infrastructure facilities of Animal Disease Intelligence Units, Poultry Disease Diagnostic Labs, Central Referral Lab and the field units assumes greater significance. Establishment of more number of mobile veterinary units, mobile disease diagnostic laboratories and facilities for cold-chain management also will strengthen the disease monitoring and management capabilities of the Department.

4.6.6. Strengthening the Departmental Farms for enhancing Livestock Productivity

The Department of Animal Husbandry has under its control 11 Livestock Farms, one poultry Farm and one Fodder Farm. These farms were established with a mandate to demonstrate latest technologies in the field of Animal Husbandry and to supply quality genetic material to the farmers.

One of the major factors influencing livestock productivity is Housing. Animal shelter is required to protect the livestock from vagaries of climate and to provide comfortable environment which will greatly enhance productivity. The Departmental Livestock Farms were established several decades back with the oldest one being 200 years and the youngest being 25 years. Many of the shelters are in dilapidated State with very minimal scope for renovation. With the advancement of Science in the concept of animal shelter establishment and management, these shelters have lost relevance implying the need for provisioning of modern scientific shelters. These modern amenities will be provided taking into account animal physiology, behaviour, climatic conditions of the area and scientific designing**.**

Such modern infrastructure will provide health sustaining and comfortable environment to different categories of livestock for health, longevity and ideal productivity, desirable working conditions for labour and supervisory staff of the farm, harmonized integration of housing with feeding, watering, milking and manure handling systems for efficient production.

It is hence proposed to provide modern shelters taking into consideration of factors such as heat, humidity, over-crowding, light, ventilation, sanitation etc, at departmental farms at Abisegapatti (Tirunelveli District), Sattur (Virudhunagar), Chettinad (Sivagangai), Pudukottai, Naduvoor & Eachenkottai (Thanjavur), Korukkai (Thiruvarur), Chinnasalem (Villupuram), Mukundarayapuram (Vellore), Hosur (Krishnagiri), Kattupakkam & Padappai (Kancheepuram) and Ooty.

Induction of new genetic pool

Department livestock farms serve not only as demonstration units but also provide livestock of good genetic merit for breeding purposes to the farmers. Scientific principle advocates continuous replacement of genetic pool in the breedable age group to avoid undesirable effects of inbreeding. In addition ageing animals with declining production and reproductive potential also need to be continuously replaced. Taking the above factors into consideration, approximately 25 per cent of the breedable population in the livestock farms is proposed to be replaced every year by purchasing quality livestock from various sources. This will increase the number of quality off - springs of high genetic merit, so that more number of such animals can be distributed to the farmers for breeding purpose. This will facilitate increase in livestock production and productivity with a direct bearing on socio economic condition of the farmers.

4.6.7 Augmentation of Fodder availability in the State

Animal Husbandry sector contributes approximately 30 per cent to the Agricultural GDP of the State and approximately 5 per cent to the State GDP in terms of revenue from milk, meat, egg, leather, draught power, dung etc. Livestock industry continues to demonstrate a beneficial impact on rural people by improving their income, employment and consumption thereby acting as a potential tool in alleviating rural poverty. The health and productivity of livestock are closely linked with the quantum and quality of forage production. Forage-based economical feeding strategies are required to reduce cost of quality livestock products; as feed alone constitutes 60-70 per cent of milk-production cost.

Both quantitatively and qualitatively, there exist a huge gap between the demand and supply of green fodder in the State. It is estimated that the average cultivated area devoted to fodder production is only 1.3 per cent of the total area and the pasture and grazing land comprises only 0.8 per cent of the total area to cater the need of the Livestock population in the State. At present, the State faces a net deficit of around 30-40% of green fodder (Table 4.21)

Table 4.39 Grazing Resources Available for Production of Fodder / Pasture in Tamil Nadu and India

(in million hectares)

Category	India	Tamil Nadu
Total geographical area	328.7	13.00
Forest	69.7	2.11
Cultivable waste land	13.12	0.36
Pasture and grazing land	10.4	0.11
Fodder crops	8.3	0.17
Tree crops and groves	3.5	0.27

Future development and growth of livestock sector are highly associated with the scope of availability of fodder from cultivable lands, grazing lands and efficient utilization of available fodder. Focused strategies and concerted efforts are the need of the hour to face this challenge

The strategies to be adopted in the State to augment green fodder production and thereby enhancing the livestock productivity are detailed below

4.6.7.1 Increasing fodder biomass by bringing more area under fodder

A cost effective feeding practice for productive crossbred animal can be achieved by decreasing the dependence on external input i.e., concentrates & increasing the internal input system through fodder production at farmer's level. Thus, cultivated fodder has an important role in meeting the requirement of various nutrients & roughage to produce milk most economically as compared to concentrates. Hence, it is proposed to encourage farmers to take up cultivation of green fodder in their own holdings to ensure year round availability of fodder to the livestock maintained by them. At present, State faces deficit of around 117.85 lakh tonnes of green fodder annually. To meet out the deficit annually around 1.83 lakh hectares need to be brought under green fodder production. Hence, it is proposed to address the issue by encouraging farmers to take up cultivation of fodder crops for green fodder production by distribution of required seed material, fertilizer, agricultural machineries etc. It is proposed to bring 2.50 lakh acres under green fodder production over a period of five years.

4.6.7.2 Efficient Utilization of available Fodder

Provision of Chaff Cutters

Animals tend to eat only the succulent leaves of the plant and generally waste the stem part. By chopping the green/dry fodder, effective utilization of fodder is obtained thus

reducing the wastage of fodder. Thus, to economize the use of available fodder, the farmers across the State are to be distributed with power operated chaff cutters at subsidized price to chop the fodder and feed their animals. It is proposed to provide Chaff cutter to 25,000 farmers over a period of five years.

Preservation of surplus fodder available during flush season

It is customary that forages are consumed by domestic animals either in grazing land or stall seasonally. However, it is possible to serve the animals round the year conserving the forage properly. The availability of green grass is mostly seasonal, only in monsoon, when plant growth is high. The green grass is highly deficient in dry season and during flood. The seasonal deficiency can considerably be reduced by conserving the surplus forage during high fodder availability period. Hence farmers are encouraged to ensile the excess fodder available during flush season for utilization during lean months by a technique called "Ensiling ". It is proposed to establish 10,000 units across the State.

4.6.7.3 Efficient utilization of water thereby optimizing the fodder yield

Water is the vital input in crop production. It is essential to maximize both yield and quality. Hence, to utilize the available water efficiently and enhance the yield of the fodder crop, it is proposed to provide financial assistance to farmers for installation of rain guns to cover 10,000 acres of farmers' land with rain gun system of irrigation.

4.6.7.4 Reducing drudgery and timely operation by distribution of Grass Cutters

The harvesting of crops is traditionally is done by using sickle. This traditional method involves drudgery and consumes long time. Timeliness of harvest is of prime importance. The use of machines can help to harvest at proper stage of crop maturity and reduce drudgery and operation time. Considering these, grass cutter/brush cutters are to be distributed to farmers. It is proposed to provide grass cutter/brush cutter to 10,000 farmers over a period of five years.

4.6.7.5 Promotion of alternate feed substitute –Azolla

The demand for milk and meat is creating new potential in the profitability of animal husbandry as an occupation. Yet, at the same time, fodder availability is a great concern. The shortage of fodder is therefore compensated with commercial feed, resulting in increased costs in meat and milk production. The search for alternatives to concentrates led to a wonderful plant azolla, which holds the promise of providing a sustainable feed for livestock.Azolla is very rich in proteins, essential amino acids, vitamins (vitamin A, vitamin B12 and Beta- Carotene), growth promoter intermediaries and minerals like calcium,

phosphorous, potassium, ferrous, copper, magnesium etc. Livestock could digest the plant easily. Due to its high protein and low lignin content, the livestock could become accustomed to it. Moreover, it is easy and economical to grow. Hence, to familiarize the method of propagation of Azolla among the farmers and to meet out the requirement of fodder, 50,000 Azolla units will be established across the State.

4.6.7.6 Augmenting Fodder Resource in the Livestock Farms

To produce quality fodder of different crops for feeding Livestock of the farms to exploit its full genetic potential and yield superior germplasm animals for distribution to farmers and to serve as fodder bank to ensure availability of fodder throughout the year to the farmers, fodder production will be undertaken in the Departmental Livestock farms by provision of adequate infrastructure like bore wells, pipelines, fencing, creation of water harvesting structures, procurement of agricultural machineries etc.

4.6.7.7 Production of quality seeds to expand area under fodder cultivation

In order to achieve the projected demand of fodder, it is necessary to bring more area under cultivated fodder crops. Sowing a new fodder area requires a reliable source of seed as quality seeds are very crucial and essential for fodder production and productivity. Therefore, an assured supply of fodder seeds at the appropriate time to farmers is crucial for enhancing fodder production.

To bring requisite area under green fodder production, annually around 7000 MT of fodder seeds of cereals and leguminous fodder crops are essential. Since, most the fodder crops are shy seed bearer; it requires adoption of better technology in seed production to enhance quality seed production. Hence, to ensure assured supply of fodder seeds at the appropriate time to farmers, fodder seed production will be taken up in Departmental Farms by adopting better technology and by providing adequate infrastructure like bore wells/open wells, farm ponds, percolation ponds, pipelines, ground level reservoirs, over head tanks, fencing, farm roads, erection of transformers, godowns, drying yards, store rooms, procurement of agricultural machineries etc. Besides, Vermicomposting units will also be established in all the farms to enhance the fodder/fodder seed production.

4.6.7.8 Distribution of tree fodder seedlings to farmers

During dry periods, feed shortage is often experienced and therefore feed of low quality is used. The animals are not able to obtain enough energy and protein to grow or to produce milk. Sometimes animals are even fed less than the daily ‘maintenance requirements’ as the green fodder is scarce. During these periods, fodder trees become

important source of energy and protein to maintain the animal, improve growth rates and even increase milk production. Hence, to enlighten the farmers on the importance of raising and feeding tree fodder, tree seedlings of various fodder tree varieties according to the regional adaptation will be raised in departmental farms and distributed to farmers across the State for raising them in their fields. It is proposed to distribute 50 lakh seedlings to the farmers.

4.6.7.9 Water conserving hydroponic green forage production to augment livestock productivity

A major concern in developing sustainable dairy farming is inadequate availability of green fodder. The major constraints in production of green fodder by dairy farmers are decreasing land holdings size, high cost of land, scarcity of water, more labour requirement for cultivation (sowing, earthing up, weeding, harvesting etc.), requirement of manure and fertilizer, long growth time, non-availability of same quality green fodder round the year, influence of natural calamities etc. As an alternative to conventional method of fodder cultivation is the emergence of hydroponics technology to grow fodder for farm animals without soil and minimum water. Green fodders produced by growing seeds without soil but in water or nutrients rich solutions are known as hydroponics green fodder. Hence, it is proposed to establish Hydroponic units in the Departmental farms and popularize the method among the farmers across the State by establishing mini units in their premises.

A sum of Rs 100 crore will be required to establish Hydroponic units at Departmental farms at Abisegapatti (Tirunelveli District), Sattur (Virudhunagar), Chettinad (Sivagangai), Pudukottai, Naduvoor & Eachenkottai (Thanjavur), Korukkai (Thiruvarur), Chinnasalem (Villupuram), Mukundarayapuram (Vellore), Hosur (Krishnagiri), Kattupakkam & Padappai (Kancheepuram) and Ooty.

4.6.7.10 Establishment of Fodder Production units in Meikkal Lands across the State

A large majority of the farming community in our State are small and marginal farmers with limited land holdings. These farmers traditionally rely on common lands and other common resources to meet out a significant portion of green fodder requirements for their livestock. There are 1.10 lakh ha of common grazing lands in the State that are under various stages of degradation and are not producing optimum quantities of fodder due to various reasons. The deficit in green fodder production can be addressed efficiently by adopting a community centric approach by undertaking fodder production in the common property lands which are in various stages of degradation. These lands need to be converted into an area suitable for fodder cultivation so that green fodder can be made available at the

village level throughout the year. It is proposed to establish Fodder Production unit in meikkal poromboke lands in all districts of the State by providing infrastructure facilities such as bore well, open wells, farm ponds, percolation ponds, pipelines, ground level reservoir, over head tanks, fencing, farm roads, silage pits, etc.

4.6.8 Strengthening of infrastructure for milk processing and dairy development

In Tamil Nadu, milk contributes more than 43 per cent share in the value of output from livestock sector (Policy note on diary development, Govt. of Tamil Nadu). There are 17 milk processing units run by Milk Producer's Unions and 11,503 Primary Milk Producer's Co-operative Societies in the State. Out of 22.94 lakh members in the Milk Producer's Co-operative Societies, about 4.30 lakh members are regularly supplying milk to the Milk Producer's Co-operative Societies. The Milk Producer's Unions have milk processing capacity of 21.07 lakh litre/day. Besides, there are 35 chilling centres and 262 Bulk Milk Coolers run by the Societies. During 2011-12 about 9.78 lakh litre/day of milk has been sold by the Co-operative Societies. There are also 42 private diaries functioning in the State.

Some of the strategies to be followed to achieve higher and quality milk production are:

- Strengthening of milk testing at village level for clean milk production.
- Strengthening of dairy plants functioning under Co-operative sector through capacity expansion.
- Enabling supply of clean, hygienic milk and milk products.
- Providing veterinary health cover, implementation of AI program, supply of cattle feed, fodder and insurance cover to animals.
- Computerization of dairy activities at various levels to improve the efficiency and ensure more transparency in milk handling.
- Training to farmers, provision of antiseptic chemicals and utensils, strengthening of lab at Union dairies and chilling centres and installation of Bulk Milk Coolers (BMC) at societies.

4.6.9 Budget outlay

The budget outlays for each intervention are presented in Table 4.25. It could be seen from the Table that an outlay of Rs. 320918.35 lakh is proposed to fulfill the aforementioned interventions for five years.

Table 4.40 Consolidated Budget Outlay for Animal Husbandry

(Rs. in lakh)

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Increasing the Availability of Fodder through Field level Interventions**															
1	Establishment of Vermicomposting 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 production to the farmers by Hydroponic methods	Nos	0.10	All Districts except D4, D15, D16, D19, D20, D22, D23, D24, D27, D30	2362	1000.95	2410	1000.04	2467	1025.64	2476	1006.64	2476	1006.64	12191	5039.90
3	Distribution of Azolla trays	Nos	0.03	All Districts except D5, D6, D13, D16	9313	359.08	9368	359.77	9380	360.06	9385	360.28	9405	360.88	46851	1800.05
4	Distribution of Silage bags for conservation of fodder crops	Nos	0.01	All Districts except D4, D5, D6,D10, D13, D15, D16, D19, D20, D26, D30	6766	34.05	7048	35.46	9261	46.53	9649	48.47	9658	48.51	42382	213.01
5	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
6	Meikkal land development (incl infrastructure development)	Acre	6.00	D1, D2, D4, D7, D9, D10, D12, D14, D18, D21, D24, D26, D28, D31	222	1113.60	127	697.00	177	672.50	118	589.90	165	517.90	809	3590.90
7	Distribution of Chaff Cutter to farmers	Nos	0.25	D2, D5, D6, D9, D10, D14, D18, D19, D23, D25, D26, D28, D31	3286	823.65	3312	831.05	3312	831.05	3292	826.05	3274	821.55	16476	4133.35
8	Distribution of Grass Cutter to farmers	Nos	0.20	D2, D4, D5, D9, D10, D13, D14, D18, D23, D26, D28, D31	2371	462.30	2393	467.30	2389	466.50	2363	461.30	2359	460.50	11875	2317.90
9	Development of Seed Production plots	Acre	0.25	D2, D3, D9, D10, D11, D14, D15, D18, D21, D23, D24, D25, D26, D28, D30, D31	514	628.25	464	116.00	488	122.00	503	125.75	503	125.75	2472	1117.75
10	Distribution of Rain gun to Livestock farmers	Nos	0.25	D4, D10, D12, D15, D16, D18, D26, D28, D31,	1056	264.00	1062	296.50	1058	280.00	1058	280.00	1058	280.00	5292	1400.50

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				D31												
11	Distribution of Tree Seedlings to livestock farmers	Nos	0.02	D6, D31	780	7.60	780	7.60	780	7.60	780	7.60	780	7.60	3900	38.00
12	Distribution of sprinkler for fodder production	Nos	0.15	D10, D12, D15, D18, D24, D26, D28, D30, D31	946	140.58	947	140.83	947	140.83	947	140.83	947	140.83	4734	703.88
II	**Increasing the Availability of Fodder by Strengthening Farm Infrastructure**															
13	Establishment of Vermicompost unit (10 beds) at Farms	Nos	4.00	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
14	Erection of Transformers to improve irrigation facility in Govt. Farm	Nos	30.00	D10, D15, D18, D19, D20, D22, D24, D29, D30 , D31	0	0.00	10	300.00	0	0.00	0	0.00	0	0.00	10	300.00
15	Establishment of Farm Protection Cover (Bio-security wall)	Km	5.00	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	30	130.00	165	805.00	10	30.00	10	30.00	10	30.00	225	1025.00
16	Establishment of Feed mixing/ feed block units	Nos	25.00	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	44	22.00	54	272.00	44	22.00	44	22.00	44	22.00	230	360.00
17	Construction of silo Pit for livestock farm	Nos	1.00	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	50	204.00	34	34.00	34	34.00	34	34.00	34	34.00	186	340.00
18	Construction of Over Head Tanks/ GLR / Pre-fabricated tanks in farm	Nos	20.00	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	44	26.40	64	426.40	44	26.40	44	26.40	44	26.40	240	532.00
19	Drip irrigation for livestock farms	Acre	0.60	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	401	322.00	390	234.00	390	234.00	360	216.00	360	216.00	1901	1222.00
20	Bore well for livestock farms	Nos	8.00	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	24	192.00	24	192.00	24	192.00	20	160.00	20	160.00	112	896.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Installation of Rain gun in Govt. Farm in cultivated areas	Acre	0.40	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	180	72.00	180	72.00	180	72.00	170	68.00	170	68.00	880	352.00
22	Installation of Sprinkler system in fodder cultivated areas in Govt. Farm	Acre	0.40	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	97	38.80	97	38.80	97	38.80	87	34.80	87	34.80	465	186.00
23	Procurement of Agri inputs for Farms	Acre	0.15	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	667	100.05	667	100.05	667	100.05	617	92.55	617	92.55	3235	485.25
24	Procurement of Agricultural implements (tractor, trailers, harvesters, ploughs, chaff cutter, grass cutter etc)	Pack	50.00	D10, D12, D15, D18, D19, D20, D22, D24, D29, D30 , D31	10	500.00	10	500.00	10	500.00	10	500.00	10	500.00	50	2500.00
III	**Livestock Breeding Management**															
25	CIDR (Controlled Internal Drug Release) for increasing Fertility in Cattle	Nos	0.01	All Districts exceptD3, D8, D15, D20, D26	36845	401.70	37530	408.55	37985	413.10	38835	421.60	39290	426.15	190485	2071.10
26	Distribution of sex sorted semen to veterinary institution	Nos	0.02	D1, D5, D6, D7, D11, D12, D15, D16, D18, D22, D23, D27, D28	117342	2308.10	117592	2311.85	117490	1810.35	117490	1810.35	117490	1810.35	587404	10051.00
27	Establishment of Infrastructure facilities for sex-sorting facility	Nos	300.00	D7, D10, D20, D21	26	1320.00	22	880.00	19	570.00	20	1040.00	17	730.00	104	4540.00
28	Induction of new Genetic Pool	Nos	0.50	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
29	Establishment of IVF Lab	Nos	300.00	D10, D19, D20	1	300.00	2	600.00	0	0.00	0	0.00	0	0.00	3	900.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
30	Establishment of Liquid Nitrogen Plant	Nos	500.00	D10, D19, D20, D24	3	1500.00	3	1500.00	0	0.00	0	0.00	0	0.00	6	3000.00
31	Establishment of Embryo Transfer Lab	Nos	100.00	D10, D19, D20	1	100.00	2	200.00	0	0.00	0	0.00	0	0.00	3	300.00
32	Establishment/ Strengthening of Semen Processing Lab	Nos	25.00	D10, D19, D20, D25	3	75.00	4	275.00	3	75.00	2	50.00	2	50.00	14	525.00
33	Oestrous Synchronization for timely conception in animals	Nos	0.01	D31	240	2.40	230	2.30	240	2.40	230	2.30	230	2.30	1170	11.70
IV	**Livestock Health**															
34	Up gradation of Vaccine Production Facilities -Bacterial	Nos	50.00	D7, D11, D29, D30	47	5860.00	47	1910.00	46	1860.00	46	1860.00	22	660.00	208	12150.00
35	Up gradation of Vaccine Production Facilities -Viral	Nos	30.00	D7, D29, D30	23	5100.00	22	1100.00	23	1130.00	22	1100.00	22	1100.00	112	9530.00
36	Procurement of vaccines, medicines, diagnostic kits, reagents etc	Nos	1000.00	D7, D24, D29	20	20380.00	19	19380.00	19	19380.00	19	19380.00	19	19380.00	98	97900.00
37	Animal Quarantine Facility in Govt. Farm to prevent disease outbreak	Nos	50.00	D10, D15, D18, D19, D20, D22, D24, D29, D30, D31	10	480.00	0	0.00	0	0.00	0	0.00	0	0.00	10	480.00
38	Animal Testing Facility	Nos	4000.00	D29	1	4000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	4000.00
V	**Improving the Livestock Productivity**															
39	Distribution of Sheep/Goat units - semi intensive system	Nos	0.60	All districts	5755	3451.15	5747	3445.70	5720	3429.50	5781	3466.10	5798	3476.95	28801	17269.40

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
40	Distribution of Buffalo units(5 Buffaloes)	Nos	4.50	All districts	1359	6115.50	1351	6079.50	1341	6034.50	1354	6093.00	1314	5913.00	6719	30235.50
41	Integrated farming (Goat+Cattle+Fish +Agriculture /Horticulture)	Unit	2.00	All districts	155	310.00	155	310.00	155	310.00	155	310.00	155	310.00	775	1550.00
42	Development of Native chicken farms	Farm	1.00	All districts	775	775.00	775	775.00	775	775.00	775	775.00	775	775.00	3875	3875.00
43	Establishment of disposal pits for poultry unit	Nos	1.00	All districts	1820	1820.00	1546	1560.00	1546	1560.00	1446	1460.00	1345	1345.00	7703	7745.00
44	Milking Machine		0.30	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
45	Distribution of Piggery units (fattening-5 Nos)	Nos	1.25	All Districts except D1, D5, D6, D7, D15, D16, D19, D20, D22, D25, D27, D29, D30	342	333.90	324	311.40	338	328.90	325	312.65	326	313.90	1655	1600.75
46	Starting of Rural Backyard Poultry Scheme (50) to unemployed	Nos	0.10	D4, D31	667	21.70	667	21.70	667	21.70	667	21.70	667	21.70	3335	108.50
47	Establishment of Modern Poultry Shed	Nos	25.00	D7, D10, D18, D24, D29	5	150.00	5	175.00	5	175.00	5	175.00	5	175.00	25	850.00
48	Establishment of Modern Hatchery Complex	Nos	300.00	D7, D10, D18, D24, D15	1	300.00	0	0.00	5	1500.00	0	0.00	0	0.00	6	1800.00
49	Establishment of Rabbit Units	Nos	1.25	D8, D31	82	11.00	22	3.10	60	7.90	44	6.20	61	9.15	269	37.35
50	Popularizing Quail Rearing	Nos	2.00	D8	6	12.00	4	8.00	7	14.00	4	8.00	8	16.00	29	58.00
51	Establishment of Modern Dairy/ Bull Shed	Nos	150.00	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
52	Establishment of Modern Piggery Shed	Nos	150.00	D10, D15, D18, D19, D20, D22, D24, D29	5	750.00	0	0.00	5	750.00	0	0.00	5	750.00	15	2250.00
53	Establishment of Modern	Nos	50.00	D10, D15, D18, D19, D20, D22,	7	350.00	1	50.00	5	250.00	1	50.00	10	500.00	24	1200.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Sheep/Goat Shed			D24, D29, D30, D31												
54	Improvement of infrastructure facilities at PEC, Vaigai dam	50.00	D11, D21	0	0.00	0	0.00	1	50.00	0	0.00	1	35.00	2	85.00	4.00
VI	**Improving the Service Delivery at Veterinary Institutions**															
55	Deep freezer facility for Storage of vaccines and Medicines	Nos	10.00	All districts	0	0.00	0	0.00	385	3850.00	0	0.00	0	0.00	385	3850.00
56	Establishment of Infrastructure facilities for Veterinary Institutions	Nos	30.00	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
57	Establishment of Mobile Disease Diagnostic Labs	Nos	20.00	All districts	71	1420.00	42	840.00	43	860.00	37	740.00	34	680.00	227	4540.00
58	Establishment of Mobile Veterinary Units	Nos	10.00	All districts	113	1200.00	41	480.00	36	420.00	31	360.00	16	180.00	237	2640.00
59	Establishment of surgical theatres at veterinary institution	Nos	30.00	All districts	84	2520.00	81	2430.00	81	2430.00	81	2430.00	58	1740.00	385	11550.00
60	Providing solar lighting panels at veterinary institution	Nos	1.00	All Districts except D13, D15, D20, D25	743	743.00	381	381.00	376	376.00	353	353.00	309	309.00	2162	2162.00
61	Package of Modern Veterinary Diagnostic Aids to Veterinary Institutions such as Computerized X rays,	Nos	30.00	All districts	84	2520.00	81	2430.00	81	2430.00	81	2430.00	58	1740.00	385	11550.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Ultrasound, Diathermy etc.															
62	Establishment of Ambulance facility for animals	Nos	80.00	All districts	31	2480.00	31	2480.00	0	0.00	0	0.00	0	0.00	62	4960.00
VII	**Livestock Management**															
63	Animal Identification and Traceability	Unit of 1000 animals	0.10	All Districts except D18	9000	900.00	900	90.00	900	90.00	900	90.00	900	90.00	12600	1260.00
64	Conservation of Indigenous breeds	Pack	10.00	All districts	330	330.00	60	303.00	60	303.00	60	303.00	60	303.00	570	1542.00
65	Livestock Shandy improvement works	Pack	10.00	D16, D18	2	20.00	2	20.00	2	20.00	2	20.00	2	20.00	10	100.00
66	Development of slaughter house infrastructure	Nos	20.00	D16	1	20.00	1	20.00	1	20.00	1	20.00	1	20.00	5	100.00
VIII	**Capacity Building**															
67	Establishment of Farmers training Centre	Nos	200.00	All districts	0	0.00	31	6200.00	0	0.00	0	0.00	0	0.00	31	6200.00
68	Conducting Demonstrations, Camps and Campaigns	Nos	0.10	All districts except D15, D16, D26	2333	225.20	2348	226.70	2384	230.30	2390	230.90	2401	232.00	11856	1145.10
69	Creating awareness of livestock management to the farmers through Training Programmes	Nos	0.10	All districts except D15, D26	2755	275.95	2754	275.40	2784	278.40	2806	280.60	2812	281.20	13911	1391.55
70	Conducting demonstration on enrichment of dry fodder and silo making for green fodder	Nos	0.50	D4, D22	77	11.70	77	11.70	77	11.70	77	11.70	77	11.70	385	58.50
71	Update of scientific advancement and technical skill of	Nos	0.05	D4, D11, D12, D24	99	11.85	99	11.85	99	11.85	99	11.85	99	11.85	495	59.25

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Veterinarians (Workshop, Hands-on trainings)															
	Grand Total				**228317**	**82445.32**	**220282**	**68699.21**	**223297**	**62379.07**	**217525**	**54302.63**	**217958**	**53092.13**	**1107381**	**320918.35**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11- Madurai, D12-Nagapatinam, 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

Considering the dairy development sector (Table 4.41), an outlay of Rs. 428286 lakh is proposed to fulfill the aforementioned interventions for five years. The major intervention proposed in this plan is infrastructure for improving the rural dairy sector of the state; construction of dairy in rural areas more and more beneficiaries belonging to the weaker sections of the State are bailed out of poverty, thus ensuring equitable growth and development; enhancement of milk processing units such as dairy processing plants, skim milk processing plants; marketing of milk products and capacity building. This foresighted implementation of developmental schemes in Dairy Sector has enabled to increase the per capita income of rural households of the state.

Table 4.41 Consolidated Budget Outlay for Dairy Development

(Rs. in lakh)

Sl. No	Intervention	Unit	Unit cost	District covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Engineering section**															
1	Electrical installation like Transformer, UPS, Stabilizers, Control Panel MCC etc.,	No	25	All Districts except D1, D3	27	675.00	23	575.00	20	500.00	16	400.00	15	375.00	101	2525.00
2	Milk Storage Tanks of various capacities	No	15	All districts except D1	40	600.00	54	810.00	48	720.00	61	915.00	43	645.00	246	3690.00
3	Tub washer, Can washers, Crate conveyor systems.	No	10	All districts except D2	17	170.00	30	300.00	21	210.00	28	280.00	24	240.00	120	1200.00
4	Point of Sale Machines and billing systems	No	0.25	All Districts except D1, D9, D12, D16, D18, D22, D23, D26, D31	525	131.25	550	137.50	551	137.75	625	156.25	630	157.50	2881	720.25
5	SS pipes and fittings	No	5	All Districts except D1, D3	38	190.00	40	200.00	38	190.00	41	205.00	40	200.00	197	985.00
6	Solar system for water heating	No	2	All districts except D1	78	156.00	81	162.00	80	160.00	81	162.00	81	162.00	401	802.00
7	Packing Machineries for milk, Butter, Ghee, SMP and Other Milk products	No	18	All districts except D1	24	432.00	42	756.00	38	684.00	22	396.00	27	486.00	153	2754.00

Sl. No	Intervention	Unit	Unit cost	District covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
8	Plate Heat type Chillers and pasteurizers	No	10	All districts except D1	37	370.00	32	320.00	30	300.00	37	370.00	27	270.00	163	1630.00
9	Milk Tankers of various capacities	No	25	All Districts except D1, D3, D8, D9, D12, D15, D16, D18, D19, D20, D21, D22, D23, D25, D26, D31	20	500.00	30	750.00	34	850.00	30	750.00	22	550.00	136	3400.00
10	Milk Pumps of Various capacities	No	0.5	All districts except D1	175	87.50	186	93.00	178	89.00	178	89.00	190	95.00	907	453.50
11	Generator of various capacities	No	20	All Districts except D1, D2, D8, D25	9	180.00	21	420.00	9	180.00	10	200.00	13	260.00	62	1240.00
12	Curd processing equipments	No	50	All Districts except D1, D3, D8, D12, D16, D21, D22, D23, D26	1	50.00	11	550.00	10	500.00	3	150.00	2	100.00	27	1350.00
13	Cleaning In Place equipments with accessories	No	75	All Districts except D1, D3, D8	0	0.00	7	525.00	20	1500.00	5	375.00	3	225.00	35	2625.00
II	**Procurement and Input**															
14	Veterinary Medicine	No	2	All Districts	143	286.00	147	294.00	153	306.00	158	316.00	175	350.00	776	1552.00
15	Two wheeler for AI technician	No	0.5	All Districts	493	246.50	493	246.50	543	271.50	473	236.50	553	276.50	2555	1277.50
16	Computer system with accessories	No	0.5	All Districts except D20	472	236.00	472	236.00	477	238.50	477	238.50	477	238.50	2375	1187.50
17	Fodder seed materials	No	0.25	All Districts except D5	637	159.25	642	160.50	672	168.00	632	158.00	687	171.75	3270	817.50

Sl. No	Intervention	Unit	Unit cost	District covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
18	Fodder development equipments like chaff cutter, Mower etc.,	No	0.2	All Districts	778	155.60	793	158.60	828	165.60	798	159.60	818	163.60	4015	803.00
19	Bulk Milk coolers of Various capacities	No	15	All Districts except D8	136	2040.00	134	2010.00	138	2070.00	129	1935.00	139	2085.00	676	10140.00
20	Milk cans	No	0.035	All Districts	18425	644.88	18525	648.38	19125	669.38	19250	673.75	19250	673.75	94575	3310.13
21	Electronic weighing scales of various capacities.	No	0.3	All Districts except D31	964	289.20	934	280.20	964	289.20	984	295.20	1004	301.20	4850	1455.00
22	Electronic milk testing equipments	No	1.25	All Districts	1050	1312.50	1050	1312.50	1073	1341.25	1073	1341.25	1113	1391.25	5359	6698.75
23	Milking machine	No	0.8	All Districts	1105	884.00	1105	884.00	1205	964.00	1105	884.00	1205	964.00	5725	4580.00
24	Cow shed	No	5	All Districts	770	3850.00	720	3600.00	725	3625.00	725	3625.00	725	3625.00	3665	18325.00
25	Society Buildings	No	20	All Districts	471	9420.00	471	9420.00	471	9420.00	471	9420.00	496	9920.00	2380	47600.00
26	Cryogenic containers	No	0.35	All Districts	685	239.75	685	239.75	698	244.30	730	255.50	718	251.30	3516	1230.60
27	Equipments for Artificial Insemination	No	0.5	All Districts except 2	230	115.00	230	115.00	232	116.00	233	116.50	231	115.50	1156	578.00
III	**Capacity building**															
28	Training of personnel of MPCS, Union and Federation.	No	0.05	All Districts	6125	306.25	6175	308.75	6424	321.20	6425	321.25	6475	323.75	31624	1581.20
29	Infertility Camps	No	0.2	All Districts	3155	631.00	3155	631.00	3205	641.00	3305	661.00	3104	620.80	15924	3184.80

Sl. No	Intervention	Unit	Unit cost	District covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
IV	**Marketing**															
30	Parlour structures	No	5	All districts except D1	805	4025.00	805	4025.00	810	4050.00	810	4050.00	820	4100.00	4050	20250.00
31	Milk product storage cabinets	No	0.3	All districts except D1	4400	1320.00	4270	1281.00	4280	1284.00	4255	1276.50	4355	1306.50	21560	6468.00
32	Product Billing systems	No	0.3	All Districts except D1, D31	1680	504.00	1680	504.00	1675	502.50	1680	504.00	1720	516.00	8435	2530.50
V	**Quality control**															
33	Adulteration detection equipment	No	4	All Districts except D24	41	164.00	45	180.00	39	156.00	45	180.00	38	152.00	208	832.00
34	Milk testing equipment and Laboratory .	No	5	All Districts except D24	37	185.00	43	215.00	39	195.00	35	175.00	42	210.00	196	980.00
VI	**Processing**															
35	Skim Milk powder Plants	No	6000	D7, D11, D14, D17	0	0.00	3	18000.00	1	6000.00	0	0.00	0	0.00	4	24000.00
36	Dairy Processing Plants	No	6000	D5, D6, D7, D10, D13, D19, D21, D24, D25, D26, D28, D29, D30, D31	0	0.00	1	6000.00	8	48000.00	3	18000.00	3	18000.00	15	90000.00
37	Refrigeration Plants	No	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
38	Water Treatment	No	100	All districts except D1, D12,	1	100.00	10	925.00	15	1425.00	7	700.00	6	600.00	39	3750.00

Sl. No	Intervention	Unit	Unit cost	District covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Plants. Reverse Osmosis plant			D16, D22, D23, D25												
39	Effluent treatment plant	No	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
40	Steam raising plant with accessories	No	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
41	Fat handling equipments	No	200	All Districts except D1, D2, D3, D8, D9, D28	4	800.00	8	1600.00	13	2600.00	8	1600.00	3	600.00	36	7200.00
42	Dairy equipments	No	50	All districts except D1	30	1500.00	34	1700.00	30	1500.00	31	1550.00	31	1550.00	156	7800.00
VI	**Civil work Infrastructure**															
43	Construction of Dairy	No	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
44	Construction of Skim milk powder Plant	No	1500	D11, D14, D17, D27	0	0.00	4	6000.00	0	0.00	0	0.00	0	0.00	4	6000.00
45	BMC buildings	No	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
46	Cattle feed Plants	No	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
47	Ice cream and dairy product buildings	No	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
48	Ware house for Dairy	No	200	All districts except D1, D9,	6	1200.00	15	3000.00	11	2200.00	14	2800.00	7	1400.00	53	10600.00

Sl. No	Intervention	Unit	Unit cost	District covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	products			D24, D31												
49	Ware house for Dairy consumables	No	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				**43772**	**41395.68**	**43920**	**108083.68**	**45120**	**140489.18**	**45163**	**73070.80**	**45460**	**65246.90**	**223435**	**428286.23**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11- Madurai, D12-Nagapatinam, 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

4.6.12. Animal Husbandry Research

Livestock and poultry sectors are becoming increasingly important in the growth of agriculture. The contributions made by animal husbandry including poultry to both agriculture and GDP have risen at a time when the contribution of agriculture per-se has fallen. However, though the State is one of the leading producers of milk, meat and eggs, productivity of animals is about 20 to 60 per cent lower than the global average productivity due to improper nutrition, inadequate health care and management.

Specific focus on bovine infertility diagnostic centre, monitoring, surveillance and controlling poultry diseases, establishment of frozen semen banks, food processing centre, establishment of nucleus jersey cross breed bull, mother farm, capacity building programme to field veterinarians, centre for poultry products certification, dairy entrepreneurs training facility, hydroponic green forage production, increasing animal production and health through nanotechnology, animal mobile medical ambulance and strengthening of veterinary institutions are necessary. Increasing fodder production by making available quality fodder seeds to the farmers, enhancing the productivity of livestock through of superior crossbred bulls for sustainable milk production, increasing availability of green fodder, harnessing the production potential to maximize the returns from dairy farming by improved feeding, breeding and management techniques, reducing the cost of production of milk through proper care to the animals, enhancing the accessibility to veterinary services to the farmers at the door step by providing animals mobile medical ambulances for rural veterinary care, capacity building to field veterinarians and entrepreneurship training for dairy and poultry farmers, developing training models for training beneficiaries would help in modernizing this sector. Tamil Nadu Veterinary and Animal Science University will also establish Centres with special reference to buffaloes and poultry, products certification, bovine infertility diagnostic centre and for freedom from microbes for export respectively (Table 4.42).

- Establishment of Bovine Infertility Diagnostic and Training Centre with special reference to Buffaloes
- Monitoring, surveillance and control of emerging and reemerging diseases of poultry at field level
- Establishment of Frozen Semen Bank at Veterinary College and Research Institute, Namakkal

- Establishment of “State Level Food Processing Training Centre (FPTC)” at College of Food and Dairy Technology, Koduvalli
- Establishing Nucleus Jersey Crossbred Bull-Mother Farm: Production of Superior Crossbred Bulls for Sustainable Milk Production under Rural Conditions
- Augmenting Animal Productivity and Advanced Veterinary Care Delivery through Continuing Education to Field Veterinarians
- Strengthening of University peripheral centers and developing training modules for training beneficiaries towards distribution of milch animal and sheep and Goat Schemes
- Establishment of a “Centre for Poultry Products Certification for freedom from microbes for Export”
- Animal Mobile Medical Ambulance for Rural Veterinary Care in Tamil Nadu
- Establishment of "Regional Dairy Entrepreneurs Training facility (RDEF)" at Veterinary College and Research Institute, Orathanadu, Thanjavur
- Establishing Regional Feed Processing and demonstration unit
- Water Conserving Hydroponic Green Forage Production for Livestock Farming
- Nanotechnology facility to Augment Farm Animal Production and Health
- Strengthening of Diagnostic Modalities in Teaching Veterinary Hospitals of Tamil Nadu
- Establishment of Innovation and Instrumentation Centre to fabricate farm equipments/ devices for sustainable livestock farming
- Establishment of Veterinary Forensic Sciences Laboratory
- Climate resilient fodder production through Hydroponic mode to augment livestock productivity in Tamil Nadu.

Table 4.42 Consolidated Budget Outlay for Animal Science Research

(Rs. in lakh)

S.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
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

S.No	Interventions	Districts Covered	Unit	Unit Cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
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	11	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 novelties	Tiruvallur	Nos	245	1	245.00	1	245.00	1	245.00	2	490.00	2	490.00	7	1715.00
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**

The consolidated budget for Tamil Nadu Veterinary and Animal Science University is provided in Table 4. 42. It could be seen from the table that an outlay of Rs. 53669.74 lakh is proposed to fulfill the aforementioned interventions for five years.

Table 4.43 Consolidated budget for Animal Husbandry, Dairying and Research

(Rs. in lakh)

S. No	Interventions	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
		Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Animal Husbandry	228317.00	82445.32	220282.00	68699.21	223297.00	62379.07	217525.00	54302.63	217958.00	53092.13	1107381.00	320918.35
2	Dairy Development	43772.00	41395.68	43920.00	108083.68	45120.00	140489.18	45163.00	73070.80	45460.00	65246.90	223435.00	428286.23
3	TANUVAS	46.00	14645.30	47.00	14890.76	48.00	15016.48	37.00	4587.80	34.00	4529.40	207.00	53669.74
	total	**272135.00**	**138486.30**	**264249.00**	**191673.65**	**268465.00**	**217884.73**	**262725.00**	**131961.23**	**263452.00**	**122868.43**	**1331023.00**	**802874.32**

4.7 FISHERIES

India ranks second in aquaculture production in the world and its fertile aquatic bodies offer vast scope for cultivation of commercially important finfish and shellfish. Fisheries is recognized as a powerful income and employment generation enterprise as it stimulates growth of a number of subsidiary industries and is also a source of cheap and nutritious food for the people besides a foreign exchange earner.

Tamil Nadu has a long coast line of 1000 km and fish and shellfish farming is emerging as a high volume activity in the State. About 70 per cent of State's marine fish catch is from five districts viz, Ramanathapuram, Nagapattinam, Thoothukudi, Kanyakumari and Pudukkottai. While demand for fish products is on the increase continuously, marine fish market generally suffer from poor handling of fish, unhygienic conditions and large wastage. Besides, lack of supporting infrastructure results in inability to gain access to more efficient marketing system. Similarly, inland fish catches are conditioned by aberration of rainfall, less retention of water in the water bodies, inadequate fish seed and feed and absence of scientific storage and marketing.

In inland fishing on the other side, the feed constitutes 50-60 per cent of running expenditure in such aquaculture. Hence, it is imperative that fish diet should be scientifically formulated, prepared and made available to the farming systems. Developing cost efficient feeds by balancing essential nutrients and maximizing nutrient digestibility is needed. This would increase in fish production in farm ponds and cages. The other major issues are optimization of fish yield, stock enhancement in inland and marine water, reduction in post harvest losses, promotion of deep sea fishing, development of adequate infrastructure for modern fishing and adequate processing and pack houses. This calls for increasing fishing efficiency of inland fishermen, improvement of hygienic fish marketing, promotion of quality fish marketing by providing moped with ice box, establishment of modern fish markets, exposure visits of fish farmers to other State, establishment of mini lab facilities in government fish farms and establishment of marine fish seed production centre.

Encouraging fish culture by the establishment of fish culture ponds, introduction of short seasonal fish species in existing farm ponds, increasing seed availability by establishing seed rearing units, increasing quality seed production through seed rearing in cages, strengthening of existing fish farms, promotion of hygienic handling and providing training to fish farmers. Diversification of fish farming, promotion of ornamental fish farming and establishment of marine fish seed production centre will also help to overcome the sufferings of this vulnerable sector.

4.7.1 Biological Control of Aquatic Weeds by Stocking of Grass Carps in Aquatic Weed Infested water bodies of Tamil Nadu.

Presence of plants in the water bodies is essential for the conversion of solar energy into chemical energy for the development of aquatic fauna like fish and for continuous addition of oxygen to water during photosynthesis. If water plants due to overgrowth make such water bodies unfit and take the shape of noxious aquatic vegetation, these may be called as aquatic weeds. Aquatic weeds are those unwanted plants growing in water and complete at least a part of their life cycle in water. The economic importance of the aquatic weeds may be accelerated from the fact that they may pollute the water when they die and decay. Besides, providing convenient breeding sites for mosquito, they may also invade large areas impeding the free water movement and use of water in irrigation systems and in fish culture.

In Tamil Nadu, many rivers irrigation canals, lakes, reservoirs, tanks are choked by the explosive growth of aquatic weeds resulting in enormous economic losses. Besides, different types of algae, most important aquatic weeds are *Eichhornia crassipes, Nimphaea stellata, Hydrilla sp, Potamogeton sp., Salvinia sp, Azolla, Valisinaria, Najas, Utricularia, Chara* etc. make water bodies unsuitable for fish culture. In Tamil Nadu, many water bodies have turned eutrophic due to *Ipomoea aquatic* and water hyacinth. Ipomoea aquatic is in the first order among water weeds causing menace. In Tamil Nadu almost 80 per cent of the tanks are already infested with this weed. Hence, aquatic weed management is imperative in order to enhance the fish production.

The aquatic weed management may be done by manual, mechanical, ecological, biological and chemical methods. Amongst several methods, use of herbivorous fish is an effective biological tool in controlling the aquatic weeds in the long term period. Use of Grass carp (*Ctenopharyngodon idella*) a herbivorous fish have been introduced in many countries for aquatic weed control. The use of grass carp for biological control of aquatic plans has been found to be advantageous in many situations and less expensive. It is reported that in total, Grass carp have been reported to consume over 170 different species of aquatic macrophytes. In India, Grass carp was introduced in the year 1959 and since then it has been used in composite culture of carps, particularly in ponds infested with aquatic weeds. It *controls Hydrilla, Najas, Ceratophyllum, Wolffia, Lemna, Spirodela, Vallisneria, Potamogeton, Utricularia, Trapa, Myriophyllum, Limnophila, Nechamandra, Eichhornia crassipes* and algae *Nitella, Spirogyra, Pithophora* etc.

Grass carp is also found to be effective weed control agent for submerged aquatic plants. Total removal of submerged vegetation is normally the long term outcome. Grass carp is preferential browsers of plants, consuming both target and non-target species in order of their relative palatability and their accessibility to the grass carp. Grass carps effectively control the aquatic vegetation, particularly submerged vegetation. The key to using grass carp is to stock the proper number based on their vegetation preferences, the water temperature, the biomass and pond coverage of the plants. Grass carps are especially advantageous in aquaculture because they

- Eliminate chemical treatments that could involve water use restrictions.
- Relatively inexpensive and require less man power.
- Usually do not have to be handled.

4.7.2 Encouraging Fish Culture by Establishment of Fish Culture Ponds and Provision of Inputs

In Tamil Nadu, almost all the water bodies are dependent on the seasonal monsoon. 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 labourers 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 farmers can be utilized for fish culture, conservation, critical Irrigation, horticulture and plantation to improve their livelihood status.

The construction of multipurpose 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 details of coverage and budget requirement of the above intervention are furnished in Table 4.44

4.7.3 Introduction of short seasonal fish species in existing farm ponds

Homestead seasonal ponds and road-side canals, which are formed either due to burrowing of soil for house or road construction or ponds dug for household uses (bathing, washing) or irrigation, can be used for aquaculture of short-cycle species. The culture practice is simple, requiring very low labour input and hence, can be undertaken by women and children, producing fish for household consumption and for market. Landless farmers can also benefit from this technology by culturing fish.

4.7.4 Introduction of Indian Major Carps (IMC) seeds in riverine check dams and weirs (Advanced fingerlings)

Indian major carps (IMC) and exotic carps (silver carp, grass carp and common carp) form the mainstay of Indian freshwater aquaculture and contribute over 90 percent of the total freshwater aquaculture production. Besides the IMC and exotic carps, there are several other fast growing species, which include minor carps (*Labeo calbasu, L. bata*), catfishes (singhi, *Heteropneustes fossilis* and magur, *Clarias batrachus*), murrels (*Channa* spp), koi (*Anabas testudineus*), pearlspot (*Etroplus suratensis*), pangas (*Pungasius* spp.), mashseer (*Tor spp*.) giant freshwater prawn *(Macrobrachium rosenbergii)* and riverine prawm (*Macrobrachium malcomsonii*) are the species that can also be cultured as the demand for such fish species is high in certain areas of the country.

Check dams are constructed across small streams and the water stored in these structures is mostly confined to stream course. These structures can be used to rear Indian Major Carps (IMC) as advanced fingerlings. Similarly, small check dams/diversion weirs built across river community managed irrigation system can also be effectively used for rearing of fish. It is a common experience that a fish farmer skilled in the rearing of advanced fry and fingerlings of common carp will have no problem in adopting the technology to the rearing of other valuable carps.

4.7.5 Increasing seed availability by establishing seed rearing units

The fish seed for stocking in water bodies is met from outside source. The demand of fish seed is increasing every year, as more farmers and entrepreneurs tend to venture into aquaculture. Presently, there is no supply of fish seeds to meet out the fish seed demand in that area. To meet the present gap as well as the future demand, it is necessary to utilize the available land to construct a Fish Rearing Centre so as to bridge the gap.

The inland fishermen are mostly traditional fishermen and their livelihood is totally dependent on the fish stock available in the lake. Hence, supply of quality fish seed from the

Fisheries Department to local private fish farmers and the departmental stocking of the lakes. Presently, the fish farmers are procuring the fish seeds from faraway places including other States which leads to transit mortality and poor survival in fish farms duo to which the fish farmers are unable to get good fish production. The productivity of the water bodies can be utilized by stocking right mix of quality fish seeds so as to cater the stocking needs of two large water bodies under the control of Government and to augment fish production, to increase the productivity of the water bodies thereby to enhance the livelihood of the inland fisher folk and to sustain livelihood of the inland fisher folk living around these water bodies.

4.7.6 Establishment of Genetically Improved Farmed Tilapia (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 than 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.

4.7.7 Increasing Fishing Efficiency of Inland Fishermen and Fish Farmers of Tamil Nadu

The Fisheries Cooperative Societies play a dynamic role in the upliftment of fishermen and fisherwomen in the State by extending many Welfare Schemes to the members. In Tamil Nadu, there are 311 Inland Fishermen Cooperative Societies; 84 Inland Fisherwomen Cooperative Societies and 10 Special Types of Inland Cooperative Societies. About 80,994 fishermen and 11,111 fisherwomen have been enrolled as members of the fishermen / fisherwomen cooperative societies. The inland water bodies are leased out to the Inland Fishermen Cooperative Societies towards exploitation of fishes not only to uplift the livelihood but also to generate income to the Government. Hence, it is proposed to provide fishing implements like fishing nets for the fishermen co-operative members fishing in water bodies such as reservoirs, ponds and tanks in Tamil Nadu and to support the fish farmers engaged in fish seed rearing and fish culture.

4.7.8 Increasing quality seed production through seed rearing in cages

The major quantum of fish production through aquaculture is being achieved following cage culture in most of the Asian countries. Though the Inland Reservoirs offer immense potential for development of cage culture in Tamil Nadu, it is yet to be popularized. Considering the constraints of pond culture system in terms of shortage of ground nurseries, problems of retrieval of stock, predation, loss of water through seepage and cost of fertilization, etc., the recent trend has been to turn into intensive fish culture systems in cages, enclosures, raceways etc., which utilize 'lesser space, circumvent the environmental limiting factors leading to higher fish production.

Cage culture is a process in which fishes are reared from fry to fingerling, fingerling to table size, or table size to marketable size while captive in an enclosed space that maintains the free exchange of water with the surrounding water body. A cage is an enclosure on all sides with mesh webbing nets made from synthetic material that can resist decomposition in water for a long period of time. Due to the rough weather conditions, fabrication of cages and various other reasons, the trail cage farming activities have not been succeeded. For easy maneuvering and cost effectiveness in terms of reduced labour, the HDPE cages have been reported to be better than other materials.

In Tamil Nadu, it has been proposed to establish battery of cages in the identified areas of perennial water resources for increasing inland fish production by utilizing the surface area of reservoirs, irrigation channels and running water system etc., The project will be implemented using value chain approach, not only to make the project success but also to have a long lasting impact.

4.7.9 Direct stocking of advanced fingerlings in irrigation tanks and panchayat tanks

Stocking of fish seed is one of the important factors for the fish production. It is the best to stock advanced fingerlings in irrigation tanks and panchayat tanks, and in both small and large reservoirs, since they can better escape predators and competitors.

4.7.10 Promotion of cage farming of fishes in back waters, open sea and inland water bodies

Cage culture has been originated in Southeast Asian countries and now it is a major culture activity all over the world. Cages account for about 60 per cent of coastal fish culture and if considering Mediterranean aquaculture, it account above 90 per cent of all sea bass and sea bream production. Cage culture is rearing of stock size fingerlings from late fry to table fish in an enclosure which permits water enhance and waste removal. Cage culture can be adopted in perennial water bodies where there is sufficient water depth. In order to promote cage culture as a main livelihood activity for the poor fishermen who were hither to

make their livelihood by fishing in reservoir, this project proposal has been prepared to give them training, assist them in putting cages, rearing, harvesting, marketing and to prepare value added products. One of the identified areas for increasing inland fish production is by utilizing the surface area of reservoirs, irrigation channels and running water system etc.,. The main advantages of cages when compared to conventional land-based systems include low capital costs and simple management.

As per the Open sea cage technology developed by CMFRI different criteria must be addressed before site selection for cage culture. The first is primarily concerned with the physico-chemical conditions like temperature, salinity, oxygen, currents, pollution, algal blooms, water exchange etc. that determine whether a species can thrive in an environment. Other criteria that must be considered for site selection are weather conditions, shelter, depth, substrate etc. Finally, legal aspects, access, proximity to hatcheries or fishing harbour, security, economic, social and market considerations etc., are to be taken care.

Using value chain approach, it is proposed to

- Promote Cage culture as a method of intensive fish culture to the fishermen so as to produce more fish and thus by increasing the availability of protein supplement to the community.
- To demonstrate the Cage culture technology to the fishermen as a viable option for livelihood improvement.
- To effectively utilize the water bodies such as reservoir as a natural resource for livelihood promotion and employment generation.
- To create a better model by assisting the inland fishing sector thro' value chain approach.

4.7.11 Promotion of Ornamental fish culture and Establishment of marine ornamental unit

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 when 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 rising 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.

Most important challenges requiring immediate attention in Tamil Nadu State are:

- Supply of quality breeders and fish seeds for ornamental fish farming.
- Infrastructure and technical expertise for mass production of valuable species.
- Assured supply of quality fishes in bulk quantities at any given point of time.
- Ensuring health quality standards, animal welfare conditions, stipulated by importing countries.

The major technology gaps identified in this potential ornamental fish farming sector are

i. Non-availability of quality breeders

ii. Lack of technology for mass production of ornamental fishes by introducing advanced breeding protocol such as selective breeding, hormone based breeding etc.

iii. Further, farming of ornamental fish is being undertaken in smaller size culture systems. Adequate quantities for trading (indigenous and export) is not available.

By introducing innovative culture system viz. raceways, lined ponds, recirculation systems and cages using microbial flocculent technology and green water technology mass production of various types of ornamental fishes can be ensured. This would help to strengthen the trading sector of Ornamental fish farming with the following objectives

- To ensure the availability of quality fish breeders for ornamental fish production in the State.
- Awareness shall be created among the farming community that quality fish production alone can sustain the trade in indigenous and export markets.

- The sector which is still in its cottage State can be taken to the next level by introducing innovative culture system (raceways, lines ponds and FRP cages) so that the socio economic status will improve.
- Mass production will be undertaken in improved culture systems which would make the marketing sector viable and sustainable. More fishes can be listed for export from Tamil Nadu.
- To develop brood banks for all valuable indigenous and exotic freshwater ornamental fishes under biosecured conditions.
- To standardize breeding protocols for high value ornamental fishes through selective breeding, hormone based induced breeding. etc.

4.7.12 Improvement of hygienic fish marketing by establishing modern fish stall/ fish kiosk and fish markets

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.

4.7.13 Promotion of quality fish marketing by traditional fishers by providing moped with ice box

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 to 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 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.

4.7.14 Increasing safety at sea by providing life buoys/life jackets

It is proposed that in order to increase the safety of the fishermen while moving to sea to provide life buoys and life jackets.

4.7.15 Improvement of hygienic fish handling by providing ice boxes

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 equipment 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 reduction in losses and could increase their income by around three times and that this equipment would quickly pay for itself.

4.7.16 Installation of Artificial Reefs in the Inshore Areas of Tamil Nadu Coast

Fishes tend to aggregate around floating objects as well as to underwater reefs. Creation of artificial habitats will attract fishes and the areas in which they are installed will serve as fishing centres. It is a very good economical activity for the fishermen, since the ground assures good fish catch and catch rates. The fuel and time for searching for fishing grounds can be saved. An Artificial reef is a recycled, underwater artificial habitat for marine life. It helps in augmenting the productivity of the marine ecosystem. It increases the available area for food, shelter and breeding activities for fishes and other marine organisms. This also enhances the fish production through increased breeding activity and survival of young ones. Moreover, it acts as the barrier for bottom trawling operations by mechanized

boats in these areas and prevents the destruction of reefs which are the natural breeding habitats.

Prefabricated concrete structures (modules) for different varieties of fish viz. grouper fish, reef fish etc., are fabricated in the shore and deployed in inshore waters at a depth of 20 fathoms. The Coromandal coast which is surf beaten and the Gulf of Mannar are ideally suitable for installation of artificial reefs. Installation of reefs will also help in the increased catches in the areas where they are laid, thereby increasing the income of the fishermen, mainly from the traditional sector. These reefs will also prevent the usage of pair trawling which has banned in the coast of Tamil Nadu to conserve fishery wealth.

4.7.17 Promotion of sea weed culture

The Southern Coast of India bears luxuriant growth of seaweeds. More than 200 species of seaweeds have been found in this area. In coastal waters they grow almost like grass in large areas, extending over hundreds of kilometers. Indian seaweed industries depend on this coastline for raw materials for the production of Agar and Sodium Alginate. At present, hundreds of fishermen are engaged in the harvest of seaweeds. Agar yielding Red Algae such as *Gelidiella acerpsa, Oracilaria adulis, Gracilaria crassa* and *Gracilaria follifera* are collected throughout the year while Algin yielding Brown Algae such as Sargassum and Turbinaria are collected seasonally from August to January. In coastal Tamil Nadu and in many other places, seaweeds are made into halwa or used for making porridge. At present, *K. alvarezii* production is carried out in five coastal districts of Tamil Nadu namely Ramanathapuram, Pudukottai, Thoothukudi, Thanjavur and Kanyakumari. There is a need to strengthen the sea weed culture in the State by creating awareness and popularization of the technology.

4.7.18 Intensive fish seed rearing with and water quality maintenance with probiotic in Government owned Fish Seed Farm

Water quality for aqua culturists refers to the quality of water that enables successful propagation of the desired organisms. The required water quality is determined by the specific organisms to be cultured and has many components that are interwoven. Growth and survival, which together determine the ultimate yield, are influenced by a number of ecological parameters and managerial practices. High stocking density in ponds usually exacerbates problems with water quality and sediment deterioration. Hence, analysis of water quality parameters is most important because water is always a limiting factor in commercial fish production.

In fish farms, routine laboratory testing provides useful baseline information on a water source. But many of the water quality parameters cannot be detected by routine testing, including low dissolved oxygen, a common pond problem and the leading cause of fish kills. Such parameters should be measured on-site as it may change dramatically during a sample shipment to the laboratory. Similarly, well water problems such as high carbon di-oxide or hydrogen sulphide may not be detected in samples transported to laboratory. Water quality parameters such as pH and ammonia can be influenced and altered by the organisms naturally present in pond water samples and are best measured on site as well. For accurate results, water quality analysis must be performed within a certain time period after sampling. In the event of fish kill, determining the cause requires a rapid response and a range of specialized tests. Therefore, routine water analysis may not be helpful and farmers also reluctant to spend money for testing of water quality parameters. Hence, it is suggested to undertake intensive fish seed rearing with and water quality maintenance with probiotic in Government owned Fish Seed Farm.

The present scenario is that there is limited scope for expansion of fish seed rearing area due to the high cost of land and suitability apart from availability of required quantity and quality water. Considering this situation, it is proposed to increase the stocking density in fish seed rearing tanks coupled with proper aeration and use of probiotics to increase the survival rate and production of fish seed per unit area which aims to increase the fish seed production per unit area using aeration and to improve the water quality in fish seed farms using probiotics. This intervention envisages the use of aeration and probiotics in the departmental fish seed rearing and fish brood stock ponds to get better results in terms of quality of fish seed and survival.

Probiotics and defined by FAO / WHO as “living micro organisms which when administered in adequate amount confer a health benefit on the host”. In relation to aquaculture probiotic is defined broadly “it is microbial supplement with living microorganism with beneficial effects to the host, by modifying its microbial community associated with the host or its farming environment, ensuing the host’s response to diseases and improving the quality of farming environment”.

Usage of probiotics has been studied in various marine and fresh water environments and species of fishes, shrimps etc., and results showed that usage of probiotics in feed and water increased the disease resistance, survival of fishes and shrimps. The usage of aeration and probiotics leads to biodegrade the accumulated organic waste comprising of uneaten feed and fecal matter. This will lead to increased growth rate and survival of the fish

seed. Further the breeder ponds would be fixed with 1 HP aerators and probiotics would be applied in pond and feed lead to good quality brood stock, which further enhances the quality of seed produced.

4.7.19 Increasing fish production in existing fish/shrimp farms by providing aerators and infrastructure

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. The following interventions are suggested

- To revive the shrimp farming activities in the coastal districts of Tamil Nadu.
- To create awareness among the shrimp farmers about the new Exotic. Species which is more resistant to disease.
- To educate the farmers about the sustainable farming of SPF L.vannamei by following Good Management Practices (GMP).
- To modify the existing shrimp farms for SPF L.*vannamei* culture by undertaking repair and renovation, thereby increasing area of production.

4.7.20 Resource conservation in marine sector by promotion of fishing using passive gears

Passive fishing gear is the umbrella term for all fishing methods with static fishing gear in the water. There are different types of passive fishing gear, the most common being a static net. Other common types of passive fishing gear are fyke nets, lobster pots, and seine nets. Passive gears are left in place for a period before retrieval. They may either attract fish using bait, or may passively wait for a fish to swim into a net or trap. Examples of passive gear are gill nets, long lines, traps and pots. This is also considered as one of the resource conservation in marine seas.

4.7.21 Resource enhancement by ranching of seeds in rivers and sea

Ranching is resorted to when natural populations in the rivers and sea have been depleted due to overfishing. This technique aims at enhancement of fish resource such that the balance in the fish population is maintained.

4.7.22 Renovation/additional area creation and Mini lab facilities of Government fish farms

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.

4.7.23 Establishment of Aqua Eco Tourism center

To create awareness about the various fish species and to promote fishing as an avocation, aqua eco- tourism may be established.

4.7.24 Diversification of fishing by promoting squid jigging

Squid jigging is one of the popular and modern techniques of capturing squids which are abundant in the west coast of India. Kanyakumari district fishermen are already engaged in this particular type of fishery. It is proposed to encourage the fishermen to take up this diversified fishing method, by giving subsidy for 160 OBM fitted traditional crafts in Kanyakumari district, for purchase of accessories required for squid jigging.

The mechanized boats and trawlers which were originally designed for shrimp trawling for export market have to diversify their fishing methods, in view of the ever increasing cost of fuel and poor returns. The comprehensive Marine Fisheries Policy of Government of India, 2004 aims at promoting sustainable exploitation of the fishery resources in the deep sea and oceanic waters for reducing fishing pressure in the traditional fishing areas. The policy also promotes introduction of resource specific fishing vessels for tuna fishing and squid jigging. Among the various commercial fish species landed in the country, Tamil Nadu contributes to about 13 per cent of the cephalopod production in India.

Squids swim very fast using water jet propulsion but still are often eaten by whales, seals, birds and large fish. They have an ink sack from which they produce a black cloud around themselves in which to hide when they are scared. They also change colour as they move from shade to light and vice versa and are therefore difficult to see. This explains why they can be difficult to catch and why jigging is most often the best method. Jigging for squid is being practiced traditionally in many parts of Asia. The common squid aggregating materials used in the traditional system are, old fishing nets, coconut flowering stem which are bound together and sunk in higher depths. The areas of this squid aggregates are marked with GPS and manual squid jigging is carried out using low wattage battery operated surface lights.

Squid jigging most often takes place at night with bright overhead lights to attract the squid. Jigs of various types, makes and colour are attached to the hand line at 70 to 90 cm intervals. Often as many as 8 to 12 jigs are on one line, and many more are used on

automated squid reeling systems. The lines are lowered to 30 to 100 meters depth depending on the strength of the lights used, but less deep on a small boat with one or two lamps. It is important to keep the jig moving constantly in the water. This is usually done by jerking the line, quickly pulling in the slack, jerking once again and so on, until the jig is back to the surface. The line is then thrown out and allowed to sink to the desired depth, and the same jerking motion is repeated over again. Each jigging line normally has almost from 15 to 30 lures with hooks fitted at one meter intervals. The colours of the lures can be green, dark green, fluorescent green, red, fluorescent red, pink, fluorescent pink, light and dark purple, light, dark and fluorescent blue, clear and opaque white. At the end of each line, a 1.5 kg weight is attached.

Sometimes squid can be caught by jigging during the daytime, especially in areas where they come in large schools for spawning, but more often they are caught at night with the help of lights. On a small canoe, one or two lamps can be fixed above or even outside the bulwark on one side and still create a shaded zone under the boat. On larger boats with stronger lights, the lamps will be positioned well above and inside the boat. Sometimes underwater lights are used on large boats. They are sunk as deep as possible and then slowly hauled back to the boat. This is done to try to lure the squid from deep water into the light or shade from the above deck lights.

The interventions suggested are:

- Extending subsidy assistance to the motorized traditional crafts to procure squid jigging equipment for catching squids, under diversified fishing methods and
- To Increase the exploitation of the important cephalopod fishery.

4.7.25 Conservation of endangered/indigenous fish species

The country has large potential for development of freshwater aquaculture in the form of land resources and availability of large number of other cultivable fish species. Due to various reasons, this potential has remained untapped. Availability of quality seed of cultivable freshwater fish species has always been a limiting factor for intensification of fish production and also for coverage of additional area proposed to be developed under aquaculture. While availability of fish seed is satisfactory in certain parts of the country, in other areas farmers face difficulties in procurement of seed in required quantities. Besides the conservation of endangered and indigenous fish species is essential to maintain the balance.

Among the classification of endangered/threatened species, the category critically endangered corresponds to the greatest risk. In India, there are 70+ critically endangered

animals and 60+ critically endangered plants. 300+ animals fall under the category of endangered while 140+ plants fall under the category of endangered. This post is a detailed list of the critically endangered animal species in India. Around 30 fish species in the Western Ghats have been included in the endangered species list and 15 species in the critically endangered list of the International Union for Conservation of Nature. Despite being in a comparatively inaccessible habitat, many endemic fish species in India are at the verge of extinction. According to the latest IUCN red data list, there are more than a dozen species of organisms under the Chondrichthyes class of fishes in India which are classified as endangered. Among this, five of them are considered in India. Hence it is proposed to conserve such species with appropriate action plans.

4.7.26 Mapping and pooling of indigenous fish /water resources

Abstract the mapping of indigenous lands to secure tenure, manage natural resources, and strengthen cultures is a recent phenomenon, having begun in Canada and Alaska in the 1960s and in other regions during the last decade and a half. A variety of methodologies have made their appearance, ranging from highly participatory approaches involving village sketch maps to more technical efforts with Geographic Information Systems (GIS) and remote sensing. In general, indigenous mapping has shown itself to be a powerful tool and it has spread rapidly throughout the world. The distribution of mapping projects is uneven, as opportunities are scarce in many parts of the world. The development of indigenous atlases and guidebooks for mapping water resources and fish could be the focus.

Often, in biological studies, it is necessary to identify an organism's chromosomes. In some organisms, the individual chromosomes can be identified by staining procedures while many other species have a very large number of chromosomes, often of similar size, which defy identification by traditional staining methods. Devised strategies based on Fluorescent In Situ Hybridization (FISH), which allow the assignment of a preset number of probes to each chromosome without prior chromosome identification. By hybridizing mixtures of probes labeled with different colored fluorescent molecules, the chromosomal origin of each probe can be determined. In a Common-Pool Resource (CPR), also called a common property resource, is a type of consisting of or -made system (e.g. an irrigation system or fishing grounds), whose size or characteristics makes it costly, but not impossible, to exclude potential beneficiaries from obtaining benefits from its use. Unlike pure, common pool resources face problems of overuse, because they are subtractable. A common-pool resource typically consists of a core resource (e.g. water or fish), which defines the *stock variable*, while providing a limited quantity of extractable fringe units, which defines the *flow*

variable. While the core resource is to be protected or nurtured in order to allow for its continuous exploitation, the fringe units can be harvested or consumed.

4.7.27 Promotion of hygienic fish handling in fishing Harbours and fish landing centers

The fishing harbours and landing centres are the initial centres of fish handling. Due to poor sanitary and hygienic conditions as well as temperature prevailing at these centres, there is substantial reduction in quality of the fish landed. Provision of clean and sanitary building with ancillary facilities like potable water and ice, fly-proofing arrangements and chilled storage at fishing harbors is an essential requirement to maintain quality and safety requirements for the fish landed. The major objectives would be

- To bring significant reduction in the loss due to fish spoilage.
- To make available clean, hygienic fish to consumers in local and overseas markets
- To improve the overall conditions of the existing FHs/FLCs in the country to international standards like HACCP/Euro norms.

The Existing fishing harbors owned by State/Central Govt. Departments, Maritime board/Port trust, Boat owners' associations and cooperatives will be eligible for the support. Generally, the grant shall be released for activities relating to modernization of fishing harbours and landing centres.

Fishing harbors play an important role in determining the quality of seafood produced as it is the main area where fish is handled after their landing at shore. Though these harbors are reportedly coming under the Department of Fisheries, Harbor Engineering Department (HED) controls most of them and carries out major harbor engineering works. The crafts and gears used to capture fish viz., trawlers, gill netters and purse seiners are more or less similar to those operated for fishing harbors. However, the fishery related activities are found to be different from harbor to harbor. Both primary and secondary data from these harbors on the fishery related activities were collected and compared. Primary data were collected from various stakeholder groups such as auctioneers, ice crusher groups, factory agents, loading and unloading workers and water supply teams through personal interviews with the help of pre-tested survey schedule.

Hence, providing a strong base for the holistic development of fisheries in an integrated way is essential.Undertaking various innovative and novel programmes for increasing fish production, conservation of resources and ensuring sustainable exploitation of fisheries wealth, promotion of sustainable Aquaculture practices, development of infrastructure facilities such as fishing harbors / fish landing centres for safe berthing of

fishing crafts and providing shore based facilities for hygienic fish landing, for strengthening domestic marketing of fish, strengthening human resource development in fisheries, providing protein rich hygienic fish as food to the people and the upliftment and welfare of the fishers.

4.7.28 Promotion of Hygienic Fish Handling in Inland areas by establishing Flake Ice Plants

The TNFDC Ltd is carrying out retail fish marketing activities in the catches of the reservoirs with marketing units. In a major step to modernize the retail fish marketing stalls and to provide hygienic conditions in and around the stalls, TNFDC Ltd established six numbers of modern fish stalls. The fishes caught presently from the reservoirs managed by TNFDC Ltd are collected, segregated, stored and distributed in the places like Coimbatore, Tiruppur and Pollachi. In order to have a better storage, quality ice for preservation and distribution system, it is proposed to establish a fish handling centre with ice plant and cold storage.

The Tamil Nadu Fisheries Development Corporation Limited is under taking fish marketing activities of both marine and inland fisheries in order to cater the needs of general public. The TNFDC Ltd is operating around 50 such retail fish stalls throughout the State and handled around thousand five hundred tones of fish during the year 2011-2012.

- An ice plant with capacity of five tons per day need to be installed in the handling centre.
- A cold storage-cum-chill room with capacity to store 10 MT of fishes at +2 degree Celsius with crushed ice.

4.7.29 Larvivorous Fish Seed Production

As part of the Government's mosquito control efforts to prevent the spread of epidemic diseases, the Fisheries Department has started a larvivorous fish seed hatchery at Thevally in the city. Results are presented of a study of the food and feeding habits of *Aplocheilus lineatus* under natural conditions and the manner in which dietary preferences are influenced by the habitat/environment, seasons and stage of maturity of the fish is explained, based on data from monthly random samples collected for a year. A qualitative assessment of the diet reveals that it is not confined to a varied range of aquatic fauna, but also encompasses allochthonous fauna. Quantitative and qualitative analyses of the diet indicate its feeding habit which does not alter with size or seasonal changes. The range of prey consumed does not differ radically, qualitatively, as a function of size, but quantitatively exhibits five levels of discrimination and differential exploitation related mainly to prey size.

Seasonal fluctuations in feeding are more qualitative than quantitative and seem dependent on the occurrence of food organisms. Lack of correlation between breeding and feeding is linked to extent of the development of the gonad in the body cavity. In conclusion, the potential of the fish as an effective biological control agent of mosquito larvae is indicated by the fact that dipteran larvae are a preferred item of its diet in all size groups.

These fishes are self-perpetuating after its establishment and continuous to reduce mosquito's larvae for long time. The cost of introducing larvivorous fish is relatively lower than that of chemical control. Use of fish is an environment friendly method of control. Larvivorous fish such as *Gambusia* and *Poecilia* prefer shallow water where mosquito larvae also breed.

Characteristics of Larvivorous Fish

- Should be small in size to survive in shallow water.
- Should be surface feeders and carnivorous.
- Should be able to survive in the absence of mosquito larvae.
- Should be easy to rear.
- Should be able to withstand a wide range of temperature and light intensity.
- Should be hardy and able to withstand transport and handling.
- Should be insignificant/ useless as food for other predators.
- Should have preference for mosquito larvae over other types of food available at the water surface.

Often large adult breeders have also to be transported for facilitating seed production. Indeed, in certain parts of the world, large level of transport of commercial fish in live condition from the areas of capture to the markets is a part of a highly organized industry, but we shall confine here to the transport of brood fish and fish seed, particularly the latter for culture purposes. Fish transport technology has developed from the transport of simple earthen pots, as already referred to, to transport in polythene bags under high pressure of oxygen and use of anesthetics and chemicals. Under anesthesia, fish can be transported without water even, provided the skin and gills are kept moist under low temperature. The cryopreservation of fish sperm for use at any convenient time can be referred to here, though this would concern seed production more directly than live seed transport.

4.7.30 Organization of Fish festival

Communities living around these rivers engage in fishing activities all year round. It is in recognition of this, that the State Government made efforts to bring to limelight the Fishing and Cultural Festival in Local Government Area, as one out of the potentials discovered in

the State for the development of tourism and incorporating various activities. The fish-catch competition is the main event of the festival. The importance of the festival to the economy has led the government to conserve fish stock.

4.7.31 Establishment of Modern Mobile Sea Food Restaurant (TNFDC), Central Kitchen for Sea Food Products and Training Centre for SHG and Production and Marketing of Ready to Cook Sea food Products

The TNFDC Ltd is a fully owned Government of Tamil Nadu undertaking formed under Companies Act during the year 1974 to look after the commercial activities of Fisheries Sector. During 1978, TNFDC Ltd, commenced the fish marketing activity and it is now being undertaken in Chennai, Madurai, Coimbatore, Tiruppur, Pollachi, Thiruvannamalai etc. through retail fish stalls. The fish marketing activity of TNFDC Ltd can be broadly classified into two categories (viz.) marine fish marketing and reservoir based (inland) fish marketing. There are two major marine fish retail marketing centres in Chennai and Madurai. Coimbatore, Tiruppur, Pollachi and Thiruvannamalai are the major towns for inland retail fish marketing centers managed by TNFDC Ltd.

Considering the consumer preference, high valued marine fishes take the major chunk of the Chennai marketing followed by medium valued fishes. There is limited demand for the low valued fishes in the stalls of TNFDC Ltd., at Chennai and hence value addition is being carried out through Sea Food Restaurant.

The TNFDC Ltd is annually marketing around 350 tonnes of fresh fish in Chennai city through its retail outlets. The experience gained in the fish marketing is effectively utilized for popularizing the value added products through its sea food restaurants. The TNFDC has already gained confidence from the consumers of fish that the products of TNFDC are undoubtedly of good quality, correct weighment, fair price, timely supply and high standards of hygiene. Fish retail marketing units are also effectively functioning in other major towns of Tamil Nadu such as Coimbatore, Madurai and Pollachi etc.

Similarly, TNFDC has been running fish food restaurants in Chennai, Coimbatore and Tiruppur cities, where in value added fish food items are being sold in a hygienic manner, which has gained good popularity among the general public and there are lot of scope for expanding these sea food restaurants in Chennai city and in other major towns and cities of Tamil Nadu. As there is constraint for land to establish few more such modern fish stalls and restaurants in other major towns of Tamil Nadu, TNFDC now proposes to built mobile sea food restaurants with State of art technology for storage, cooking, display and service facilities inside the vehicle itself to ensure availability of hygienic protein rich fresh fish

varieties to the consumers at reasonable price even in moderate strategic locations and to encourage value addition offers with wide range of sea food delicacies at the doorstep (Shrimp Manchurian, Tandoori Shrimp, Grilled Fish, Fish Tikka, Fish fillet, Garlic fish etc.,).

4.7.32 Repairs and renovation of fish processing plant and Private Fish culture Ponds/ Earthen Seed Rearing farms

In Tamil Nadu, the open water bodies viz. reservoirs, long seasonal tanks, short seasonal tanks and community ponds constitute 60 per cent (2.20 lakh ha) out of the total estimated inland fishery resources of 3.7 lakh ha. To harness these inland resources for fish production, the total fish seed requirement to stock the water bodies is about 232 millions. However, the present fish seed production by Government and private sector is estimated to be 192 millions leaving 40 millions as a gap to bridge the demand.

The demand in fish seed will be increased in the ensuing years as the Agri farmers tend to venture into aquaculture. To improve this trend and to meet the demand, it is necessary to utilize the existing resources optimally to bridge the gap. This intervention will not only restore the infrastructure of the Government fish seed farms but also self sufficiency can be achieved in the near future in seed production. Such seed farms have to be strengthened by undertaking repair and renovation, thereby increasing the fish seed production and narrow the gap between the demand and supply and by renovating breeder pond, additional breeders can be maintained for sustained fingerling production.

Tamil Nadu is known for erratic rain fall which have an impact on fish seed production and in turn fish production. Seed rearing is a simple technology which can be easily adopted by farmers. Development of seed farm in turn can ensure continuous availability of seed for stocking. These rearing ponds will also serve as a water storage pond for the farmers for agriculture purpose after the harvest of fish seeds in a shorter duration. Tamil Nadu is already striving to increase its inland fish production which would cater to the protein need of the people. Farmers have been encouraged to venture in the field of fish culture activity by means of subsidies. There is always a mismatch of fish seed production season and water availability in the existing water bodies for fish culture. At this juncture, it is proposed to encourage the farmers who are already in the fish seed rearing activities by providing inputs such as seed and feed so as to rear the fish seeds into advanced fingerlings and keep them ready for stocking as and when the ponds get water due to monsoon. To begin with, it is proposed to give one time input (Fish seed and feed) at subsidized rate to the small farmers who are having a rearing space up to 2.0 ha. at an unit cost of Rs.1.00 lakh/ha. The farmers who are undertaking fish rearing activity will be encouraged to extend the fish rearing period

so as to produce advanced fingerlings. Such interventions would increase in fish production, generate additional revenue to the farmers, help the farmer to have water storage / percolation pond, as the surface layer of the pond bottom soil is good manure, its usage will enhance agriculture / horticulture yield and the pond bund can be utilized to grow beneficial vegetative plants like creepers.

4.7.33 Establishment of modern mobile fish marketing vehicles

The mobile fish marketing vehicle body has to design for maintaining the high quality food. The material and the facilities should comply with hygienic storing of fishes, display to the customers, electronic weighment, hygienic dressing and cleaning. It is now proposed to operate such vehicles in Chennai city and other major towns in the State of Tamil Nadu. Similarly, the proposed mobile restaurant vehicle shall have facilities for cooking, display and sales of various fish food varieties. It is proposed to operate one such mobile restaurant in Chennai city. As there are problems in availability of land to establish few more such modern fish stalls and restaurants in other major towns of Tamil Nadu, it is proposed to built mobile fish marketing vehicles with State of art technology for storage, cooking, display and service facilities inside the vehicle itself.

4.7.34 Establishment of Marine Fish Seed Production Centre and Rearing Centre

To attain self sufficiency in fish seed production in the State, the private sector needs to be encouraged apart from developing infrastructure facilities by the Government. The Department of Fisheries has already initiated many steps to attain self sufficiency in fish seed production. Fish production from the existing water body resources can be achieved only if sufficient seed materials are available for stocking. It is inevitable to bridge the fish seed gap by making private participation in the fish seed production as it is not possible by the Government to take the responsibility of bridging the gap by creating the infrastructure on its own.

Hence, it is necessary to encourage private sector in developing fish seed production hatcheries. The beneficiaries of this approach are the fish farmers. Beneficiaries will be identified and subsidy will be extended as back-ended subsidy on completion of the project. The intervention would also increase the fish seed production by encouraging private entrepreneurs to establish fish seed production centre by extending 50 per cent subsidy assistance.

Technical, financial and management skills are essential for the development of fisheries sector. Human Resource Development must be introduced in fisheries sector from bottom up participatory approach. Dissemination of information on diversified opportunities,

improved post harvest practices, sustainable utilization of the resources of the marine fisheries is the need of the hour for increasing marine fish production in the State. It is proposed to develop skill up gradation among marine fishermen in the State by exposing them to the different and modern methods of fishing practiced in other coastal States.

The inshore fishery resources have been over exploited necessitating the introduction of diversified fishing methods. Though training is being given to the fishermen, by the departmental agencies on diversified fishing methods like Tuna long lining etc., practical training and knowledge of the fishing methods which are adopted in other States will help the fishermen of Tamil Nadu to acquire more skill and diversify their fishing methods to obtain maximum catches. The fishermen can also be exposed to the various types of fishing crafts and gear and fish handling and processing methods in practice in other States and try the viable practices in Tamil Nadu. The specific interventions are

- To educate the fishermen engaged in fishing in various types of crafts on the modern methods of fishing practiced in the neighbouring States.
- To acquire knowledge on the rules and regulations of fishing followed in the State and to have a better view on conserving fisheries.
- To facilitate adoption of viable techniques in boat designs / gear in Tamil Nadu thereby increasing fish production.

4.7.35 Training to fish farmers, Establishment of District Extension and Training centers, providing trainers training and exposure visits and Exposure visit to farmers to other States

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, this 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 to be proper marketing approach so as to get good economic return.

- To provide training to farmers in different innovative fish culture technologies.
- To encourage fish farmers to take up farming activity on commercial basis.
- To establish a training center for ornamental fish breeding and rearing.

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. Dissemination of information on diversified opportunities and improves post harvest practices.

The details of budget requirement for each intervention are shown in Table 4.44.

Table 4.44 Consolidated Budget Outlay for Fisheries

(Rs. in lakh)

Sl. No	Fisheries	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
I	**Enhancement of fish production**													
1	Up gradation of Fishing Efficiency of Inland Fishermen of Tamil Nadu.	D1,D4,D5, D10,D12, D14,D21, D25,D26,	668	192.20	375	50.75	295	38.75	290	38.00	270	35.00	1898	354.70
2	Resource conservation in marine sector by promotion of fishing using passive gears	D7,D24	200	5.00	230	35.00	230	35.00	240	45.00	310	115.00	1210	235.00
3	Resource enhancement by ranching of seeds in rivers and sea	D4,D6,D7,D9, D10,D11, D12D28,D30	100001	1.50	1045017	118.30	1045016	117.30	1045020	116.80	1045020	116.80	4280074	470.70
4	Providing 50 % subsidy assistance to traditional fishermen of Cauvery waters for the purchase of Bamboo layered coracle	D4	50	2.00	50	2.00	50	2.00	50	2.00	50	2.00	250	10.00
5	Propagation of Fish Culture in Multi-purpose farm ponds in Tamil Nadu	D1,D2,D5,D10,D12,D 13,D17,D18,D19,D21 ,D22,D26	261.85	178.03	239.6	143.38	230.1	130.67	229.1	130.34	229.6	130.46	1190.25	712.88
6	Promotion of quality fish marketing by traditional fishers by providing mobbed with icebox	D4,D5,D6,D7,D9,D1, D11,D12,D13,D14, D17,D19,D22,D24, D26,D27,D28,D29	544	287.80	731	378.60	681	354.60	761	393.60	696	353.60	3413	1768.20
7	Promotion of Ornamental fish culture	D3,D5,D7,D10,D18, D23,D26,D31	24	27.00	43	84.00	37	68.00	27	38.00	30	47.00	161	264.00
8	Promotion of hygienic fish handling in fishing Harbours and fish landing centers	D10,D19	1	20.00	15	90.00	4	20.00	4	20.00	4	20.00	28	170.00
9	Promotion of cage farming of fishes in back waters and open sea	D16	0	0.00	25	134.08	25	134.08	25	134.08	25	134.08	100	536.30
10	Promotion of cage	D4	0	0.00	0	0.00	0	0.00	1	5.50	1	5.50	2	11.00

Sl. No	Fisheries	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
	farming of fishes in inland water bodies													
11	Promotion Hygienic Fish handling in Inland by Establishing Flake ice plant	D10	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
12	Larvivorous Fish Seed Production	D4	0	0.00	12	14.00	12	14.00	10	10.00	15	15.00	49	53.00
13	Introduction of short seasonal fish species in existing farm ponds	D1,D2,D4,D7,D9,D10 ,D11,D12,D14,D15, D16,D18,D19,D22, D26, D27, D28, D29, D30, D31	121.8	38.73	140.3	46.24	140.3	45.49	142.8	47.27	126.8	34.83	672	212.56
14	Introduction of IMC seeds in riverine check dams and weirs	D6,D19,D23,D25,D2 8,D30	21.2	20.64	105096.2	85.29	105101.2	66.29	105031.2	44.29	105031.2	44.29	420281	260.80
15	Installation of Artificial Reefs in The Inshore Areas of Tamil Nadu Coast (Unit)	D3,D23,D28,D30	21	30.00	23	65.00	22	55.00	22	55.00	22	55.00	110	260.00
16	Increasing safety at sea by providing life buoy/life jackets	D7,D12,D16,D19,D2 4,D28,D30	900	27.00	5125	102.04	4400	88.25	4650	92.63	4400	88.25	19475	398.17
17	Increasing quality seed production through seed rearing in cages	D3,D4,D5,D7,D9,D10 ,D11	5	2.00	7	6.00	5	2.00	7	6.00	7	6.00	31	22.00
18	Increasing fishing efficiency of inland fishermen and fish farmers	All the districts except D5,D14,D15,D16,D1 8,D24,	2079	280.58	1672	209.40	1602	198.90	1552	191.40	1580	202.50	8485	1082.78
19	Increasing fish production in existing fish/shrimp farms by providing aerators and infrastructure	D7,D9,D12,D19,D26, D28,D30	44	11.00	77	118.15	81	132.20	106	215.95	156	383.45	464	860.75
20	Increasing fish production in Tamil Nadu through production and distribution of genetically improved Tilapia	D19,D21	2	1.58	1	100.00	0	0.00	0	0.00	0	0.00	3	101.58
21	Improvement of hygienic	D2,D4,D5,D6,D7,D8,	692	62.20	1423	114.79	1287	102.54	1286	99.89	1270	97.54	5958	476.96

Sl. No	Fisheries	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
	fish handling by providing ice boxes	D9,D10,D12,D16,D19,D23,D24,D25,D26,D30												
22	Improvement of Hygienic fish marketing by Establishing Modern Fish Market	D10	1	120.00	0	0.00	0	0.00	0	0.00	0	0.00	1	120.00
23	Improvement of hygienic fish marketing by establishing modern fish kiosk TNFDC	D4,D5,D9,D10,D11,D12D26,D28	5	25.00	7	62.00	6	117.00	52	24.17	56	42.00	126	270.17
24	Improvement of hygienic fish marketing by establishing modern fish stall/fish kiosk/	D16,D30	1	10.00	0	0.00	0	0.00	1	10.00	1	10.00	3	30.00
25	Increasing seed availability by establishing seed rearing farms	D1,	2	10.00	0	0.00	0	0.00	0	0.00	0	0.00	2	10.00
26	Expansion of fish culture in Multipurpose farm ponds by encouraging farmers of Tamil Nadu	D1,D14	19	38.00	0	0.00	0	0.00	0	0.00	0	0.00	19	38.00
27	Establishment of GIFT farms and provision of inputs	D4,D7,D10,,D11,D15,D19,D26,D30	2.3	23.25	26.3	117.00	10.3	59.18	27.3	117.58	12.8	70.54	79	387.54
28	Enhancement of Fish production in irrigation tanks and Panchayat tanks by stocking fish seeds	All the districts exceptD1,D3,D14,D15,D16,D20D24,D25,DD30	6855	389.15	160246	551.75	160011	640.25	160496	611.65	158281	512.99	645889	2705.79
29	Diversification of fishing by promoting squid jigging	D7	10	2.50	0	0.00	0	0.00	0	0.00	0	0.00	10	2.50
30	Direct stocking of advanced fingerlings in irrigation tanks and panchayat tanks	D1,D3,D14,D16,D30	3100	24.00	1350	54.00	1400	56.00	1350	54.00	1400	56.00	8600	244.00
31	Cage Culture of Cobia and Lobster	D7,D9,D28	10	40.48	10	40.48	4	11.66	4	11.66	4	11.66	32	115.93

Sl. No	Fisheries	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
32	Biological Control of Aquatic Weeds by Stocking of Grass Carps in Aquatic Weed Infested water bodies	D2,D3,D4,D5,D6,D7, D9,D10,D11,D12,D13,D17,D18,D21,D22, D23,D26,D28,D30	244820	583.03	192705	268.68	193085	142.98	194190	166.88	192645	135.98	1017445	1297.55
33	Assistance for construction of shrimp farms for DFFDA farmers	D6,D12,D26	63	138.00	64	142.50	65	146.00	65	146.00	65	146.00	322	718.50
	Section Total		**3605242**	**2590.66**	**1514710**	**3133.42**	**1513801**	**2828.13**	**1515639**	**2827.68**	**1511708**	**2871.46**	**6416383**	**14251.35**
	Creation of infrastructure facilities													
36	Repair and renovation of Government fish farms (unit) 1.GOMUKHI, 2. THALANGADU	D30	2	700.00	0	0.00	0	0.00	0	0.00	0	0.00	2	700.00
37	Renovation / addition area creation govt. fish farm	D9,D15,D31	11	176.50	0.23	0.03	2	30.15	1	30.00	0	0.00	14.23	236.68
38	Increasing seed availability by establishing seed rearing units	D4,D8,D9,D15,D19,D28	5	25.00	21	79.00	10	42.00	4	16.00	2	10.00	42	172.00
39	Establishment of fish culture ponds and provision of inputs	D4,D6,D7,D9,D10,D11,D12,D18,D19,D25, D28,D31	31	64.63	35.5	77.50	31	60.75	33.25	68.63	31.5	63.00	162.25	334.50
40	Establishment of District Extension and Training centres	D5,D10,D11,D19,D24,D27,D29,D31	3	1150.00	3	100.00	1	50.00	15	201.10	0	0.00	22	1501.10
41	Establishment of Aqua Eco Tourism center	D8,D10,D24	3	615.00	0	0.00	0	0.00	0	0.00	0	0.00	3	615.00
42	Encouraging fish culture by establishment of fish culture ponds and provision inputs	D1,D3,D14,D30	21	70.50	16	33.60	20	42.00	24	50.40	30	63.00	111	259.50
	Section Total		**76**	**2801.63**	**75.73**	**290.13**	**64**	**224.90**	**77.25**	**366.13**	**63.5**	**136.00**	**356.48**	**3818.78**
	Infrastructure and Assets													
43	Construction of fish seed rearing centre at Agaram	D3	1	400.00	0	0.00	0	0.00	0	0.00	0	0.00	1	400.00
44	Construction of fish seed rearing centre at	D3	1	200.00	0	0.00	0	0.00	0	0.00	0	0.00	1	200.00

Sl. No	Fisheries	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
	Lalpettai													
45	Establishment of Ornamental Fish Aquarium	D10	0	0.00	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00
46	Establishment of Farm ponds	D23	15	3.75	15	3.75	15	3.75	15	3.75	15	3.75	75	18.75
47	Establishment of Marine fish seed production centre	D16	0	0.00	1	400.00	0	0.00	0	0.00	0	0.00	1	400.00
48	Establishment of marine engine and sea safety training centre for the fisher folk in Tamilnadu	D24	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
49	Establishment of mini lab facilities in Government fish farms	D3,D4,D5,D7,D9,D10 ,D11,D21,D26,D31	8	15.20	11	30.20	7	10.20	6	5.20	5	0.20	37	61.00
50	Establishment of marine fish seed rearing units	D16	0	0.00	1	50.00	1	50.00	0	0.00	0	0.00	2	100.00
51	Establishment of marine ornamental units	D16	0	0.00	2	6.00	2	6.00	2	6.00	2	6.00	8	24.00
52	Establishment of chemical residue monitoring laboratory for fish in Tamil Nadu	D26	0	0.00	1	30.00	0	0.00	0	0.00	0	0.00	1	30.00
53	Establishment of gift farms and provision of inputs	D1	5	25.25	0	0.00	0	0.00	0	0.00	0	0.00	5	25.25
	Section Total		**31**	**744.20**	**31**	**519.95**	**25**	**69.95**	**24**	**64.95**	**22**	**9.95**	**133**	**1409.00**
54	Capacity building programme		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
55	Cage culture demonstration in rural tanks	D5	7	39.27	3	16.83	7	39.27	3	16.83	7	39.27	27	151.47
56	Establishment of modern mobile fish marketing vehicles	D2,D4,D6,D7,D9,D12 ,D15,D21,D23,D30	3	26.10	14	128.00	13	49.00	2	18.10	7	67.00	39	288.20
57	Establishment of Seafood Knowledge Highway to improve health, combat	D26	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00

Sl. No	Fisheries	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
	malnutrition and enhance income of fisheries													
58	Exposure visit to farmers to other states	D4,D5,D6,D7,D9,D1, D11,D12,D13,D14, D17,D18,D19,D20, D21,D22,D24,D26, D28,D29,D30,D31	262	164.30	575	41.64	521	194.76	373	23.76	429	172.64	2160	597.10
59	Improvement of GIFT Tilapia Government Fish Farm	D10	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
60	Organization of Fish festival	D2,D3,D4,D5,D6,D9, D10,D11,D13,D17, D19,D28,D30,D31	4	20.00	11	47.00	8	36.00	6	30.00	4	20.00	33	153.00
61	Promotion of sea weed culture	D16	0	0.00	25	11.25	25	11.25	25	11.25	25	11.25	100	45.00
62	Providing Geo tube seawall and training wall to prevent in Coastal areas of Tamil Nadu (Bommaiyar palayam and Pillaichavady)	D3,D30	3	1200.00	0	0.00	0	0.00	0	0.00	0	0.00	3	1200.00
63	Providing trainers training and exposure visit to Departmental staff	D4,D7,D8,D10,D11, D14,D15,D16,D19, D21,D26,D29,D30	29	1.70	89	7.45	82	6.75	59.1	4.46	59	4.70	318.1	25.06
64	Training to fish farmers	All the districts except D1,D16	2377	128.59	2738	159.16	2722	157.43	2153	122.35	2506	132.00	12496	699.53
65	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	Thiruvallur, Kancheepuram Villupuram, Cuddalore Nagapattinam Tiruvarur,Thanjavur Pudukottai Ramanathapuram Thoothukudi Tirunelveli and Kanniyakumari	10	4112.5	10	4112..5	10	4112..50	10	4112.5	0	0	40	16450
	Section Total			**1839.96**		**411.33**		**494.46**		**226.75**		**446.86**		**1986939**
	Grand Total			**12088.94**		**8467.34**		**7729.94**		**7598.01**		**3464.27**		**39348.49**

4.7.36 Fishery Research

Fisheries Research

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.

The more specific interventions could be

- Establishment of fish feed quality testing laboratory
- Increasing fish production through production and distribution of genetically improved inland fishes especially Tilapia
- Developing aqua culture entrepreneurship by improving the breeding strategies for high value ornamental fishes
- Establishing marine engine and safety training centres
- Establishment of sea food knowledge high way, post harvest centres in fishery.
- Establishment of chemical residue monitoring laboratory, fish feed quality testing laboratory, marine fin-fish hatchery system, Shrink breed bank, essential fisheries research and extension centre
- Eco technologies centre for fisheries and fish and selfish health certification.
- Mass breeding and production of ornamental fishes and major carp seeds
- Developing aquaculture entrepreneurship by improving breeding strategies and innovative farming protocols for high value ornamental fishes
- Establishment of Post harvest centre in fisheries in Thiruvallur district
- Establishment of Regional Fisheries Research and Extension Centre in Krishnagiri District
- Establishment of Multiplier Station for the Breeding and dissemination of Jayanti Rohu Seeds to Farmers
- Farmed Pearl Spot (Etroplus suratensis) Production as an Alternative Livelihood to Promote Brackish Water Aquaculture Entrepreneurship for Fishers of Pulicat Lake

- Establishment of Fish and Shellfish Health Certification and Disease Surveillance Laboratories in Tamil Nadu for enhancement of aquaculture production
- Development of Cost Efficient Feeds for Enhancing Freshwater Fish Production
- Strengthening of Regional stations of Centre for Sustainable Aquaculture (CeSA)
- Establishment of post harvest technology center in College of Fisheries Engineering

The consolidated budget of Fisheries and University is shown in Table. 4.44 and the budget for the Department and University are shown in Table 4.30.

Table 4.45 Budget requirement for Fishery Research

(Rs. 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	Development of Integrated water reuse system through Multitrophic Aquaculture Practice	455.58	Nagapattinam	1	455.58	0	0.00	0	0.00	0	0.00	0	0.00	1	455.58
b	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
c	Brood stock development through hormonal manipulation	250	Thoothukudi, Erode	1	250.00	0	0.00	1	250.00	0	0.00	0	0.00	2	500.00
d	Yield enhancement through innovative farming techniques for commercially important inland fishes	200	Krishnagiri, Thanjavur	2	400.00	0	0.00	0	0.00	2	400.00	0	0.00	4	800.00
e	Evolving new candidate species for diversified aquaculture	250	Erode, Krishnagiri, Tiruvallur	0	0.00	1	250.00	2	500.00	0	0.00	0	0.00	3	750.00
f	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
g	Development of low cost feed using local agro waste	200	Kancheepuram, Krishnagiri	0	0.00	2	400.00	0	0.00	0	0.00	0	0.00	2	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
ii	**Mariculture**														
a	Establishment of demonstration unit for intensive raceway and biofloc based larval rearing and lined pond based grow out system for L.vannamei at Tharuvaikulam	372.4	Thoothukudi	0	0.00	1	372.40	0	0.00	0	0.00	0	0.00	1	372.40
b	Seed bank and nursery for sea weeds	500	Ramnad	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
c	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
d	Yield enhancement through innovative farming techniques for commercially important marine fishes	300	Ramnad	0	0.00	1	300.00	0	0.00	0	0.00	0	0.00	1	300.00
e	Development of low cost feed using local agro waste	200	Ramnad	0	0.00	0	0.00	0	0.00	1	200.00	0	0.00	1	200.00
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
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

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 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	Development of innovative field level diagnostics for diseases of commercial importance	300	Tiruvallur	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
e	Development of advanced (molecular) diagnostic assays/kits for diagnosis of diseases in aquaculture	100	Tiruvallur	0	0.00	1	100.00	0	0.00	1	100.00	0	0.00	2	200.00
f	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
g	Guided increase of aquaculture produce through networked disease surveillance and health certification of cultured fish and shellfish in Tamil Nadu	0		0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
h	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	**fish processing technology**														
a	**Fish processing novel technologies and techniques**														
	Development of techniques to improvise and modernize traditional preservation of fish	50	Tiruvallur, Nagapattinam, Thoothukudi	1	50.00	1	50.00	0	0.00	0	0.00	0	0.00	2	100.00
	Modernization of dry fish production through solar driver	100	Tiruvallur, Nagapattinam, Thoothukudi	3	300.00	3	300.00	3	300.00	3	300.00	3	300.00	15	1500.00
b	**Value addition and fish product diversification**														
	Development of snack foods from fish	100	Tiruvallur, Nagapattinam, Thoothukudi, Kancheepuram	0	0.00	3	300.00	1	100.00	0	0.00	0	0.00	4	400.00
	Promotion of consumption of farmed Tilapia through product development and diversification	100	Tiruvallur, Nagapattinam, Thoothukudi, Kancheepuram	0	0.00	0	0.00	2	200.00	2	200.00	0	0.00	4	400.00
	Development of ready to eat products from farmed freshwater fishes	100	Tiruvallur, Nagapattinam, Thoothukudi, Kancheepuram	2	200.00	1	100.00	0	0.00	1	100.00	0	0.00	4	400.00
c	**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

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	**Reduction of post harvest losses**														
	Awareness to fishers on hygienic handling of fish	0.005	all maritime districts	1596	7.98	1596	7.98	1596	7.98	1596	7.98	1596	7.98	7980	39.90
	Creation of awareness among fishers on fish processing technologies	0.6	all maritime districts	300	180.00	300	180.00	300	180.00	300	180.00	300	180.00	1500	900.00
	Capacity building and skill development programmes on fish processing technologies	6.6	all maritime districts	156	1029.60	156	1029.60	156	1029.60	156	1029.60	156	1029.60	780	5148.00
e	**Enhancement of per capita consumption of fish**														
	Awareness campaign on health beneficial attributes of fish	0.005	all districts	1612	8.06	1612	8.06	1612	8.06	1612	8.06	1612	8.06	8060	40.30
	Production of short films on nutritive value of fish and screening in theatres and television channels	50	all districts	1	50.00	8	400.00	22	1100.00	0	0.00	0	0.00	31	1550.00
f	**Utilization of seaweeds and other marine resources for food security**														
	Development of Nutraceuticals products form seaweeds	50	Tiruvallur, Nagapattinam, Thoothukudi	2	100.00	1	50.00	0	0.00	0	0.00	0	0.00	3	150.00
	Popularization of seaweed products through mass media	0.005	Tiruvallur, Nagapattinam, Thoothukudi, Ramnad	1600	8.00	1600	8.00	1600	8.00	1600	8.00	1600	8.00	8000	40.00
	Development of seaweed snack foods	50	Tiruvallur, Nagapattinam, Thoothukudi, Ramnad	3	150.00	1	50.00	0	0.00	0	0.00	0	0.00	4	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
g	**Ensuring nutritional security through fish and fishery products**														
	supply of preserved ready to eat and ready to cook fish products through public distribution systems	12.9	all districts	3	38.70	19	245.10	9	116.10	0	0.00	0	0.00	31	399.90
	Supply of fish and fish products in mid day meal programme	12.9	all districts	1	12.90	30	387.00	0	0.00	0	0.00	0	0.00	31	399.90
	Supply chain management to promote consumption of farmed freshwater fishes	64.5	all districts	11	709.50	19	1225.50	0	0.00	1	64.50	0	0.00	31	1999.50
h	**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
	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	1000	Tiruvallur, Nagapattinam, Thoothukudi	3	3000.00	0	0.00	0	0.00	0	0.00	0	0.00	3	3000.00

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
	Certification of Aquatic Food Products in South Tamil Nadu														
i	**Utilization of fish processing waste and by catch**														
	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
	Development of fish compost for production of organic agricultural and horticultural crops	65	all maritime districts	0	0.00	11	715.00	0	0.00	1	65.00	0	0.00	12	780.00
	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
	Development of technologies for effective utilization of shrimp shell waste	100	all maritime districts	1	100.00	11	1100.00	0	0.00	0	0.00	0	0.00	12	1200.00
	Development of peptides from fish processing wastes as dietary supplement	100	Tiruvallur, Nagapattinam, Thoothukudi	0	0.00	2	200.00	0	0.00	0	0.00	1	100.00	3	300.00
ii	**Fishing technology**														
	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
	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

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 eco friendly fishing gear technology unit to cater 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
	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
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	Conservation of dwindling fisheries resource through native fish asylum	300	Nilgiris	0	0.00	0	0.00	0	0.00	1	300.00	0	0.00	1	300.00
f	Blue carbon initiative in fisheries resource conservation	1000	Nagapattinam, Tiruvallur, Pudukottai	0	0.00	0	0.00	0	0.00	1	1000.00	2	2000.00	3	3000.00

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
4	**Fisheries Engineering**														
i	**Aqua cultural engineering**														
a	**Farm implements**														
	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
	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
b	**Harvesters**														
	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
	Design and development of synchronized 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
c	**Renewable energy technologies**														
	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
	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
	Design and development of renewable energy power backup for aqua	200	Nagapattinam	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	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
	cultural farm														
d	**Automation technologies**														
	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
	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
	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
e	**Advanced aquaculture systems**														
	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
	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
	Development of bio nano sensor 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
	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
f	**Feeding technologies**														
	Design and development of	35	Nagapattinam, Tiruvallur and	2	70.00	1	35.00	0	0.00	0	0.00	0	0.00	3	105.00

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
	effective feeders for aquaculture		Thoothukudi												
ii	**Navigation and Fisheries Engineering**														
	Design and construction of fibre boat	250	Nagapattinam	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
	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
	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
	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
	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
iii	**Post-harvest Fisheries Engineering**														
a	**Handling, transportation and storage**														
	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
	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
	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

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	**Processing machines**														
	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
	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
	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
	Technologies development for preservation of fish and value added fish products	15	Nagapattinam, Tiruvallur and Thoothukudi	2	30.00	0	0.00	0	0.00	1	15.00	0	0.00	3	45.00
c	**Waste utilization technologies**														
	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
	Design and development of energy harvesting mechanisms from sea materials	65	Nagapattinam, Tiruvallur and Thoothukudi	1	65.00	1	65.00	0	0.00	1	65.00	0	0.00	3	195.00
	Design and development of nanotechnological applications for fisheries engineering	85	Nagapattinam, Tiruvallur and Thoothukudi	1	85.00	0	0.00	1	85.00	0	0.00	1	85.00	3	255.00
5	**Fisheries technology transfer**														

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
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
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
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 and training of 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

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
h	Establishment of Mobile training unit to cater the needs of fishermen of Tamil Nadu 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**			0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
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
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				**22052.82**		**17445.04**		**9140.74**		**6566.64**		**5461.64**		**60666.88**

Table 4.46 Consolidated Budget Outlay - Fisheries and Fisheries Research

(Rs. in lakh)

Sl. No.	Sector	Year					
		I	II	III	IV	V	Total
A	Department of Fisheries	36318.20	4354.84	3617.44	3485.51	3464.27	**22898.49**
B	Tamil Nadu Fisheries University	22052.82	17445.04	9140.74	6566.64	5461.64	**60666.88**
	Total	**58371.02**	**21799.88**	**12758.18**	**10052.15**	**8925.91**	**83565.37**

4.10 WATER RESOURCE ORGANIZATION (WRO) – PWD IRRIGATION

Investment options for tank irrigation development in Tamil Nadu State

There are around 41,127 tanks in Tamil Nadu State alone, with varying sizes and types. Out of the total of 41,127 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 WRO based on the management activity. The PU tanks have a command area less than 40 ha and 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 WRO. 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 have been taken by the State in investment on tank modernization under different programmes and grants helped 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.

It is estimated that there are 41,127 tanks out of which 6628 were Public Work tanks. Theses tanks spread across the State which could irrigate about 2.65 lakh ha. The rehabilitation activities may include bund strengthening, sluice repairing, repairing of surplus weirs, cleaning supply channels and desilting.

In this five year plan period, it is proposed to cover certain districts and a budget outlay of Rs. 1371154.23 lakh is required to undertake various activities like construction and repairing of water outlets, rehabilitation of canals, check dams, anicuts, removal of encroachment in and around reservoirs, maintenance and extension of water channels, and construction of bed dam and reconstruction of regulator. These activities have to be undertaken periodically by the Public Works Department (WRO). Besides, the specific interventions to be carried out along with budget requirement to improve the water storage and management of water are:

The details of proposed activities in the respective districts and budget outlay are furnished in Table 4.47.

Table: 4.47 Consolidated Budget Outlay for PWD (WRD)

(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 w all	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 w alls and river training w orks	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 w all	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 w orks	D8, D24	Ha	0.10-4.34	532.36	500	32	80	0	0	85	200	333	80	982.36	860
Diversion of surplus w ater	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
Excavation of supply and link	D10, D23, D25, D28,	Nos & Ha	1.28-23.55	3409.51	71265	0	0	18857.67	60579	0	0	302.71	1663	22569.9	133507

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
channel	D29														
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
Modernization 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 distributaries	D2, D3, D5, D6, D8, D17, D24, D27, D28	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
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 parapet wall, chutes and reclamation of	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
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**

4.11 Cooperatives

Agricultural cooperatives or farmers' cooperatives are cooperatives where farmers pool their resources for mutual economic benefit. Agricultural cooperatives are broadly divided into agricultural service cooperatives, which provide various services to their individual farming members, and agricultural production cooperatives, where production resources such as land or machinery are pooled and members farm jointly. Agricultural supply cooperatives aggregate purchases, storage, and distribution of farm inputs for their members. By taking advantage of volume discounts and utilizing other economies of scale, supply cooperatives bring down members' costs. Supply cooperatives may provide seeds, fertilizers, chemicals, fuel, and farm machinery. Some supply cooperatives also operate machinery pools that provide mechanical field services (*e.g.,* plowing, harvesting) to their members. Agricultural marketing cooperatives are often formed to promote specific commodities.

The details of budget requirement for each intervention are shown in Table 4.48. An outlay of Rs 61345.74 lakh is proposed to fulfill the aforementioned interventions for five years.

Table: 4.48 Consolidated Budget Outlay – Cooperation

(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 w all	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 Godow n	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 Godow n Keepers Office	D2, D10 and D23	Nos	0	0	0	0	0	0	3	24	0	0	3	24
10	Construction of Night	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
	watchman room														
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	D6	Nos	1	5	0	0	0	0	0	0	0	0	1	5

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
	Yard														
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, D6, D10, D13, D14, D17, D18, D19, D24, D25, D27,D28, D29 and D31	Nos	36	427.39	13	198.31	1	250	2	335.6	5	104.45	57	1315.75
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

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
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
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	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
	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 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)														

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
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
				4511	**22975.5**	**2270**	**12994.56**	**2020**	**10904.93**	**1609**	**8767.72**	**1037**	**5703.03**	**11447**	**61345.74**

D1- Ariyalur, D2- Coimbatore, D3- Cuddalore, D4- Dharmapuri, D5- Dindigul, D6- Erode, D7- Kancheepuram, D8- Kanyakumari, D9- Karur, D10-Krishnagiri, D11- Madurai, D12-Nagapatinam, 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

Overall Budget for all the sectors

The overall budget requirement for five years is estimated at Rs. 11564983.83 lakh. The strategies are mainly focused on solving the major challenges faced by the farming community. The sector-wise breakup of fund requirement is presented in Table 4.49.

Table 4.49 Sector wise Funds Requirements

(Rs.in lakh)

S. No	Sectors	2017-18	2018-19	2019-20	2020-21	2021-22	Total	Percentage
1	Agriculture	342470.36	381633.02	373052.25	382500.87	404188.6	1883845.14	**16.25**
2	Agricultural Research (TNAU)	8412	11664.974	9136.02	5270.72	4695	39178.714	**0.34**
3	Horticulture	227674.56	172956.35	191823.64	196148.05	206181.2	994783.8	**8.58**
4	Agricultural Engineering	67821.28	61709.69	59349.91	58889.55	58154.02	305924.45	**2.64**
5	Agricultural Marketing	37027.74	22357.7	18810.01	16287.39	18457.33	112940.17	**0.97**
6	Seed Certification & Organic Certification	699.98	547.69	481.11	539.86	401.9	2670.54	**0.02**
7	Animal Husbandry	82445.32	68699.21	62379.07	54302.63	53092.13	320918.36	**2.77**
8	Animal Science Research (TANUVAS)	14645.3	14890.76	15016.48	4587.8	4529.4	53669.74	**0.46**
9	Dairy Development	41395.68	108083.68	140489.18	73070.8	65246.9	428286.24	**3.70**
10	Fisheries	12088.94	8467.34	7729.94	7598.01	3464.27	39348.49	**0.34**
11	Fishery Research (TNFU)	22052.82	17445.04	9140.74	6566.64	5461.64	60666.88	**0.52**
12	Public Works Department	465733.8	334496.08	326675.78	185549.75	58698.82	1371154.23	**11.83**
13	Co-operation	22975.5	12994.56	10904.93	8767.72	5703.03	61345.74	**0.53**
	Total	**1345443.3**	**1215946.09**	**1224989.06**	**1000079.8**	**888274.3**	**5674732.49**	**48.96**
14	**District Irrigation Plan**							
	AIBP						385000.47	**3.32**
	Har Khet Ko Pani Component- Extension, Renovation and Modernisation						2123600.30	**18.32**
	Drop more crop component						1272800.50	**10.98**
	Watershed Development Component						221800.05	**1.91**
	MGNREGS						1912600.20	**16.50**
	Total (DIP)						**5915801.52**	**51.04**
	Grand Total						**11564983.83**	**100.00**

ANTICIPATED FUND FLOW (2017-22)

Anticipated fund flow covers a range of Agricultural activities involving crop-specific as well as non-crop-specific development activities. Allied sectors such as Horticulture, Agricultural engineering, Agricultural marketing, Seed certification, Animal husbandry, Dairy development, Fisheries, Water Resource Organization and Cooperation are proposed to be developed through Central/State sector schemes with investments on popularization of latest technologies, strengthening extension support, farmers training as well as through strengthening the required infrastructure facilities needed to energize the growth in agricultural and allied sectors.

The Agriculture Department is implementing various schemes with a budget for **₹ 1181044.24 lakh** to increase the production and productivity of a wide range of crops, cultivated in the state. The state sector schemes implemented in the state are through Establishment of State Seed Farms, Multiplication and Distribution of Pulses Seeds, Seed Processing Unit, Establishment of Foundation Seed Farm for oilseeds, Production and Distribution of quality coconut seedlings and Renovation of Coconut trees in urban areas, Foundation seed production centre for Groundnut, Procurement and Distribution of Paddy seeds, Multiplication of Sugarcane Seeds, Establishment of Seed centres for procurement and distribution of seeds, Distribution of green manure seeds at subsidy, Compost Development, Composting of Farm waste through *Pleurotus*, Crop and plant production, Pesticides Testing Laboratories, Parasite Breeding stations, Sugarcane Development, Increasing the production of oil seeds, Development of cotton cultivation, Integrated Coconut Development Programme, Establishment of Oil Seeds Centre, Farmers Training Centre, Training and visits, Soil testing laboratories, Soil survey and land use organization, Mobile soil testing laboratories, Central control laboratory, Preparation and Distribution of bacterial culture packets, Production and Distribution of Blue Green Algae, Crop Yield competition, Payment of Production incentive, Kuruvai special package, Special Award to Farmer, Incentive to farmer paddy production, Crop and Plant protection, Dryland farming, Water shed project, Strengthening of seed production infrastructure with NABARD assistance and Distribution of MN Mixture.

National Agricultural Insurance Scheme, Prathan mantri Fasal Bima Yojana, Integrated farming in coconut, Replanting and rejuvenation in coconut, Crop productivity for tank and non-tank irrigation, TN-Irrigated Agri modernization project II, National Mission on Agri. Extension and Technology, Integrated watershed management programme are other important projects proposed from Central Sector schemes. In addition, National Mission on Sustainable Agriculture that includes Rainfed Area Development, Paramparaghat Krishi Vikas Yojana, Soil Health

Management, Soil Health Card, National Food Security Mission, National Agriculture Development Programme, National eGovernance, NMOOP – Oilseeds, Oil palm, Tree borne oilseeds, Dwarf and Tall hybrid coconut seedlings, Production and Distribution of Quality seeds are also proposed.

Horticulture Department has proposed **₹ 579638.36 lakh** for the improvement in yield, efficient water and fertilizer use, improvement of soil health which ultimately fetches additional income to the farmer. Central Sector schemes includes NADP-RKVY, RAD, PKVY, MIDH – NHM, Micro Irrigation PMKSY, National Ayush Mission, National Bamboo Mission Maintenance with a budget outlay of ₹. 571619.07 lakh. In addition the Department of Horticulture is implementing Externally Aided Project (IAMWARM) TN IAMP and Integrated Horticulture Development Scheme also. There is a lot of scope to further strengthen these schemes and dovetail them with the schemes under NADP.

Agricultural Engineering Department, proposed projects for popularization and adoption of labour saving package for timely operation through agricultural implements and reducing post-harvest losses for improving income and value addition with a total fund requirement of **₹ 336516.87 lakh**.

Department of Agricultural Marketing and Agri Business Department has proposed a total budget of **₹ 11844.80 lakh** for the year 2017-2022 through a Central Sector scheme (TNIAMP). Seed certification has proposed a total of **₹ 650.00 lakh** for establishment of seed processing avenues to enhance seed quality and supply of high quality seeds to the farming community.

Animal Husbandry Department has sought for **₹ 353010.19 lakh** for five years to undertake several activities under livestock improvement programme to increase milk production and bring additional income to the farmers through rearing of goats and poultry. It also includes provision of mini diary unit, establishment of ultrasound scanners, distribution of sex-sorted semen to veterinary Institution, multiple ovulation and embryo transfer at field level, Vermicompost unit *etc*.

TANUVAS projected a budget of **₹ 29777.91 lakh** based on the Central Sector schemes such as NADP, NABARD, NLM, NPBB, NMBP and State Sector Schemes *viz.,* TANII, TNSLURB, and SPC for Animal Science Research.

It could be seen from the table that an outlay of **₹ 66539.00 lakh** is proposed to fulfill the Dairy Department interventions for five years. Out of this, ₹ 39024.00 lakh allocated from

Central Sector schemes such as National Program on Dairy Development (NPDD), MOFPI, Dairy Infrastructure Development Fund (DIDF), RURBAN, while ₹ 27515.00 lakh is allocated from State Sector Schemes (NADP, NABARD, SBGF).

Fisheries Department has proposed to create additional area of Government fish farms and fish marketing, quality seed production, fingerlings in irrigation tanks, establishment of mini lab facilities and to conduct trainings and exposure visits with a budget requirement of **₹ 25188.34 lakh**. Similarly, TNFU has requested **₹ 42499.72 lakh** through NADP/RKVY (Central Sector scheme) for Fisheries research.

An outlay of **₹ 53.09 lakh** is proposed to fulfill the Cooperative Department interventions for five years (2017-22). It is allocated through Central Sector scheme (NADP) for infrastructure development and assets creation by Installation of coconut oil crushing unit, seed processing unit, electronic packing units, gingelly cleaning and sorting machine, turmeric processing unit and electronic weighing machine *etc*.

The Public Works Department has requested a total of **₹ 1508269.65 lakh** for overall public undertakings and construction of check dams, anicuts, roads and other infrastructure.

By implementing these programs, it is expected that agricultural production would increase considerably and lead to high per capita income growth of the farm households. Such growth would induce the private sectors to initiate the starting up of processing industries and other related industries in the State. The backward and forward linkage would ensure the overall growth of the State. The abstract of the activities and the proposed budgetary requirements (**₹ 4135032.17 lakh**) are given in the following table (4.450)

Table 4.50 Anticipated fund flow during 2017-2022

S. No.	Sectors	Expected budget (₹ in Lakh)					
		2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	227722.49	230284.72	238731.43	238993.81	245311.79	**1181044.24**
2	Horticulture	97667.03	105218.42	114882.76	125461.71	136408.44	**579638.36**
3	Agricultural Engineering	74603.40	67880.65	65284.90	64778.50	63969.42	**336516.87**
4	Agricultural Marketing	117.56	5449.84	2716.80	1962.40	1598.20	**11844.80**
5	Seed Certification	200.00	125.00	125.00	100.00	100.00	**650.00**
6	Animal Husbandry	90689.85	75569.13	68616.97	59732.89	58401.34	**353010.19**
7	TANUVAS	12336.94	4692.00	5057.00	3888.00	3803.97	**29777.91**
8	Dairy Development	4039.00	27350.00	19750.00	7800.00	7600.00	**66539.00**
9	Fisheries	8774.09	4790.32	3979.18	3834.06	3810.69	**25188.34**
10	TNFU	1192.92	14705.90	11350.90	8800.00	6450.00	**42499.72**
11	Co-operation	53.09	0.00	0.00	0.00	0.00	**53.09**
12	Public Works Department	512307.18	367945.69	359343.35	204104.73	64568.70	**1508269.65**
	Grand Total	**1029703.55**	**904011.68**	**889838.29**	**719456.09**	**592022.56**	**4135032.17**

CHAPTER V

SUMMARY

During the year 2007, the National Development Council (NDC) while taking stock of the growth in agriculture and allied sectors, felt that further potentials for faster growth in the States can be tapped provided that the States are granted with special funds by the Government of India. Henceforth, the Government of India launched the Rashtriya Krishi VikasYojana (RKVY)/ National Agriculture Development Program (NADP).

This Special Additional Assistance Scheme aims to rejuvenate agriculture and allied sectors and accelerate the growth process based on projects prepared in detail. Accordingly, each State government had the freedom for formulating various strategies on individual project basis for the development of agriculture and allied sectors that are unique to the State. The Government also suggested that the proposed projects/interventions must be implemented through a well-documented exercise by preparing District Agriculture Plans (DAPs) and State Agriculture Plan. Thus by considering the positive impacts created during the 12th Plan period through this approach of funding by Government of India, the Assistance continued to operate beyond the 12th Five Year Plan period with appropriate modifications by considering the 14th Finance period. Thus the current exercise is covering the 14th Finance Commission period and beyond (2017-22).

The Government of India also suggested that as in the 12th Plan, every State has to prepare the District Agriculture Plans (DAPs), State Agriculture Plan (SAP) and also State Agricultural Infrastructure Development Program (SAIDP) to be eligible for funding from Government of India beyond the 12th Plan period (2017-22). Subsequently, District Agriculture Plan is prepared for each district of Tamil Nadu State by taking into account of the resource potentials available followed thereafter integrating these district level plans as State Agriculture Plan.

The salient features of the State Agriculture Plan are summarized in this Chapter.

Tamil Nadu is situated in the Northern Hemisphere in the hot zone between 8° and 13° North latitude and between 78° and 80° Eastern longitude. Tamil Nadu is the eleventh largest State in India by area and the seventh most populous State. It is one of the 29 States of India and lies on the eastern coast of the southern Indian peninsula bordered by Pudhucherry, Kerala, Karnataka and Andhra Pradesh States. Tamil Nadu is bound by Eastern Ghats in the North, the Nilgiris, the Anamalai Hills and Palakkad in the West, Bay of Bengal in the East, Gulf of Mannar and Palk Strait in the South East and Indian Ocean in the South. The eastern most

point is formed by the Point calimer and the Mudumalai welfare sanctuary in the western most point. The Pulicat Lake is situated in the northern extreme. The southernmost tip of Tamil Nadu is the Cape Comorin or Kanyakumari. West and north of the State has lofty hills while the east and south are coastal plains.

Agriculture development in Tamil Nadu is laden with a number of adverse characteristics such as declining total cultivable area vis-a-vis scarcity of cultivable land, low productivity per unit of labor in most of the regions, predominance of small and marginal farmer households, risk aversion due to production by tenants and agricultural laborers under insecure conditions, vast seasonal variations and presence of a large percentage of tradition loving farmers. Despite of the aforesaid constraints, agricultural development needs to achieve self-reliance in food grains. The estimated food requirement of various food crops by 2020 based on the projected population suggests that the area required in 2020 would be 186.63 lakh ha. For producing required food which exceeds the existing geographical area of the State (130.15 lakh ha). Hence, enhancing the productivity of the crops is the only option to meet the food requirement in 2020. Erratic and inadequate monsoon rain, shrinkage of area cultivated, cropping intensity hovering around 120 per cent, for the last two to three decades, diversion of fertile lands to non-agricultural uses, mismatch between the withdrawal and recharge of groundwater, need to intensification of water and soil conservation works especially in dry land tracts, restoration and maintenance of existing water bodies, desilting, widening and strengthening of water bodies, training activities on water management, conservation of rain water and efficiency of water use and proper maintenance and construction of check dams, disparities in productivity of crops across the state, unfavorable pattern of land ownership, imbalanced application of chemical nutrients and low seed replacement rate for most of the crops are the major challenges facing the sector.

Strengthening of market intelligence and information system, capacity building training on post – harvest management, value addition and processing and food safety among the farmers and market intermediaries, strengthening of rural shandies and regulated markets with infrastructural facilities and establishment of processing units for fruits and flowers are some of the requirements to ensure better marketing platform for rising production at farmer's level.

Owing to labor scarcity for performing agricultural operation, mechanization is considered as an alternative. Proper training of farmers for upkeep of machinery and equipment's and encouraging custom hiring of machinery and equipment's by training educated rural youths are some of the basic requirements to go ahead with the mechanization policy.

In the case of Animal Husbandry and Dairy Development, limitation on increasing the fodder area and yawning gap between the availability and requirement of fodder, diminishing of pasture / grazing of lands and their poor quality, inadequate infrastructure and equipment for timely diagnosis and treatment of animal diseases and inadequate veterinary health care institutions to support health related programs, difficulties in ensuring clean milk production, need for mobile veterinary services to ensure door- step veterinary support especially in inaccessible areas and provision of cold storage facilities to each veterinary health care institution to adequately store vaccines are some of the challenges related to development.

With the contribution of seven per cent to all India fish production, Tamil Nadu ranks fifth among the States. 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. Decline in fish catches in in-shore areas due to depleted fish stock, need for technologically up gradation and skill up gradation and adoption to sustainable practices, aberrations of rainfall, less retention of water in the water bodies, inadequate fish seed and feed and absence of proper marketing need for further promotion of fresh water fish culture in seasonal tanks / ponds owned by Panchayats and strengthening of infrastructure facilities for fish landing are some of the challenges faced by the sector.

Considering the above challenges, the State Agriculture Plan proposed the following interventions sector wise:

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

Agriculture Research and Development

Production and Growth

- Quality seed production
- Crop management / crop improvement
- Organic agriculture and soil health improvement
- Horticulture development

- Rain fed area development
- Pest management
- Micro irrigation
- Transfer of Technology and IT based interventions
- Bee keeping
- Post harvest management
- Skill development / capacity building
- Innovative schemes

Research infrastructure

- Infrastructure for promotion of agribusiness development
- Infrastructure for animal health management
- Infrastructure for biodiversity conservation
- Infrastructure facilites for communication
- Infrastructure for DATA managemet
- Infrastructure for demonstration of agricultural technologies
- Infrastructure for fertilizer/manure production
- Infrastructure for research and development
- Infrastructure for mushroom and spawn production
- Infrastructure for qualtiy seedling production
- Infrastructure for Post harvest management
- Infrastructure for protected cultivation
- Infrastrucuture for seed production
- Infrastrucuture for storage
- Infrastrucutre for technology transfer

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 Sandhais
- 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

Fisheries Research

- Inland Aquaculture
- Mariculture
- Aquatic animal health and management
- Harvest and Post harvest
- Fish resource management and conservation
- Fisheries Engineering
- Fisheries technology transfer
- Incubation centres

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 infrastructures
- Modernization and enhancing the existing capacity of tanks by desilting and creation of Island
- AIBP
- HarKhetKoPani Component-Extension, Renovation and Modernisation
- 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 Godown
- Shopping complex for the society

State Agriculture Plan

For carrying out the developmental activities as specified above in the form of interventions, the State Agriculture Plan proposed a budget of **Rs. 11564983.83** lakh including District Irrigation Plan with sectoral allocation as furnished in the Table 5.1 below. Thus, about 51.04 per cent of the total outlay is shared by District Irrigatiobn Plan, Agriculture (16.25) and followed by Water Resource Organization (11.83 per cent), Horticulture (8.58 per cent), Agricultural Engineering (2.64 per cent), Animal Husbandry & Dairy Development (6.93 per cent), Agricultural Marketing (0.97 per cent), Fisheries (0.34 per cent), Seed Certification (0.02 per cent) and Cooperation (0.53 Per cent).

Table 5.1 Sector wise budget Requirements in percentage

(Rs. in lakh)

S. No	Sectors	2017-18	2018-19	2019-20	2020-21	2021-22	Total	Percentage
1	Agriculture	342470.36	381633.02	373052.25	382500.87	404188.6	1883845.14	**16.25**
2	Agricultural Research (TNAU)	8412	11664.974	9136.02	5270.72	4695	39178.714	**0.34**
3	Horticulture	227674.56	172956.35	191823.64	196148.05	206181.2	994783.8	**8.58**
4	Agricultural Engineering	67821.28	61709.69	59349.91	58889.55	58154.02	305924.45	**2.64**
5	Agricultural Marketing	37027.74	22357.7	18810.01	16287.39	18457.33	112940.17	**0.97**
6	Seed Certification & Organic Certification	699.98	547.69	481.11	539.86	401.9	2670.54	**0.02**
7	Animal Husbandry	82445.32	68699.21	62379.07	54302.63	53092.13	320918.36	**2.77**
8	Animal Science Research (TANUVAS)	14645.3	14890.76	15016.48	4587.8	4529.4	53669.74	**0.46**
9	Dairy Development	41395.68	108083.68	140489.18	73070.8	65246.9	428286.24	**3.70**
10	Fisheries	12088.94	8467.34	7729.94	7598.01	3464.27	39348.49	**0.34**
11	Fishery Research (TNFU)	22052.82	17445.04	9140.74	6566.64	5461.64	60666.88	**0.52**
12	Public Works Department	465733.8	334496.08	326675.78	185549.75	58698.82	1371154.23	**11.83**
13	Co-operation	22975.5	12994.56	10904.93	8767.72	5703.03	61345.74	**0.53**
	Total	**1345443.3**	**1215946.09**	**1224989.06**	**1000079.8**	**888274.3**	**5674732.49**	**48.96**
14	**District Irrigation Plan**							
	AIBP						385000.47	**3.32**
	Har Khet Ko Pani Component- Extension, Renovation and Modernisation						2123600.30	**18.32**
	Drop more crop component						1272800.50	**10.98**
	Watershed Development Component						221800.05	**1.91**
	MGNREGS						1912600.20	**16.50**
	Total (DIP)						**5915801.52**	**51.04**
	Grand Total						**11564983.83**	**100.00**


KARNATAKA
KERALA
SRI LANKA