NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP)

DISTRICT AGRICULTURE PLAN

KANYAKUMARI

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

NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP / RKVY)

DISTRICT AGRICULTURE PLAN

KANYAKUMARI

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

2017

CONTENTS

LIST OF TABLES

LIST OF FIGURES

EXECUTIVE SUMMARY

Kanyakumari District at a Glance

The area comprising the present Kanyakumari district was a part of the erstwhile Travancore state. In 1835, when the state was divided into Northern and Southern divisions, this area formed part of Southern division and was placed in charge of DewanPeishkar, Kottayam. In July 1949, when the United States of Travancore and Cochin was inaugurated, the present Kanyakumari area continued to be a part of Trivandrum district of Kerala State. However, the States Reorganization Act, 1956 was passed and the Kanyakumari District was formed on 1st November 1956, with four Taluks, *viz*., Agasteeswaram, Thovalai, Kalkulam and Vilavancode and merged with Tamil Nadu.

Area, location and geographical features

The total area of Kanyakumari district is 1672 km^2. The district lies between 77^o 15' and 77^o 36' of the Eastern Longitudes and 8^o 03' and 8^o 35' of the Northern Latitudes. The District is bound by Tirunelveli District on the North and the East. The South Eastern boundary is the Gulf of Mannar. On the South and the South West, the boundaries are the Indian Ocean and the Arabian Sea. On the West and North West sides the district is bound by Kerala.

Administrative Structure of the District

There are four taluks in Kanyakumari district *viz.,*Thovalai, Agastheeswaram, Kalkulam and Vilavancode but comprises of nine blocks *viz.,*Thovalai, Agastheeswaram, Rajakkamangalm, Kurunthancode, Thackalay, Thiruvattar, Melpuram, Killiyoor and Munchirai.

Demographic Profile

Population

The total population of the district (as per 2011 census) was 18.63 lakhs of which 9.27 lakhs were males and 9.36 lakhs were females. Rural and urban population was 326616 (17.53%) and 1536558 (82.47%) respectively. The overall literacy level of the district population was 82.80 per cent.

Soil Type

Based on the agro-climatic and topographic conditions, the district can be divided into three regions, namely: Uplands, Middle lands and Low lands.Soil in the district is mostly of the clay loam and sandy clay variety. However, on the sea coasts, the sandy type of soil prevails and near the mountain ranges, gravelly soil is generally seen. In low lands, there is neither white sand nor sandy loam, while in the midlands and high lands there prevails fairly fertile soil of the fine type. The valley in the midland has loamy clay soil with high sand content. In the midlands, in general, the soil is clay-loam of lateritic origin with an admixture of gravel and sand.

i. Strengths of the District

- Good forest cover in this district
- Good source of irrigation- dams, river and tank.
- Receipt of both south-west and North east monsoon
- Topography and other climate factors favouring the growth of various crops.
- Proximity to international airport in Trivandrum

ii. Weaknesses

- Poor availability of farm labourers
- High cost of wages than rest of the district.
- Excessive rain during certain months causing more damage to the crops
- Poor storage capacities of irrigation sources due to soil deposition
- Very small land holdings
- Crop damage by wild animals

Opportunities

- Good scope to exploit multi-tier system of cropping to increase productivity per unit area.
- Wide scope for small scale industries which could use agricultural produces like coconut, banana, tapioca, rubber etc.
- Wide scope for promotion of drip irrigation in perennial crops like coconut

Threat

- Fast shrinking of cultivable land for housing and other purposes.
- Non availability of quality seed and planting materials.
- Lesser adoption of modern and improved agricultural/ horticultural practices.
- More threat from serious biotic factors in crop like coconut.

- Exploitation of local traders in the absence of adequate marketing facilities.

Major interventions addressed in the district

1. **Agriculture**
   - Certified seed production and distribution
   - Distribution of green manure seeds, bio fertilizer, bio-organics, coconut tonic and micronutrient mixture
   - Distribution of Protrays
   - Establishment of vermi compost production unit
   - Promotion of organic farming
   - Promotion of pulses production
   - Training and demonstrations
2. **Horticulture**
   - Creation of cold storages
   - Establishment of banana ripening chamber
   - Distribution of coconut seedling and pepper planting materials
   - Management of pests and diseases of coconut and banana
   - Training on value addition of horticultural produces
   - Subsidy for application of lime and dolomite
   - Establishment of flower market
   - Constriction of smoke house
3. **Agricultural Engineering**
   - Desilting of tanks
   - Strengthening and rectification of bunds
   - Creation of threshing floor in villages
   - Laying out farm roads
   - Custom hiring of machineries
   - Promotion of soil & water conservation and infrastructure development
   - Promotion of solar pumps
4. **Animal Husbandry**
   - Establishment of pasture lands
   - Training and awareness programmes on vaccination
   - Strengthening of Animal Husbandry department
5. **Sericulture**
   - Subsidy on plantation, shed construction and storage building construction
   - Distribution of improved mulberry varieties

- Establishment of storage building

6. Fisheries

- Establishment of training centre
- Construction of fish drying yards
- Training and demonstration's on value addition of fisheries
- Strengthening of spawn production and parasite breeding station

7. Others

- Strengthening of Agricultural Research Station, Thirupathisaram

Project Cost for interventions for five years

The total district agriculture plan to be implemented by agriculture and other allied departments are given below.

Consolidated Budget for Kanyakumari District (₹. in lakhs)

Sl. No.	Name of the Department	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	879.30	600.67	1013.32	473.37	525.42	3492.05
2.	Horticulture	1858.84	2129.27	2391.07	2593.28	2889.51	11861.97
3.	Agricultural Engineering	133.55	71.78	92.42	163.20	165.13	626.08
4.	Agricultural Marketing	158.84	117.40	79.74	57.13	56.92	470.03
5.	Seed Certification	18.36	13.36	0.00	0.00	0.00	31.72
6.	Animal Husbandry	394.56	556.79	600.56	405.25	308.15	2265.31
7.	Animal Science Research (TANUVAS)	0.00	0.00	0.00	0.00	0.00	0.00
8.	Dairy development	219.80	431.80	347.75	509.80	224.60	1733.75
9.	Fisheries	718.30	207.90	708.30	702.90	203.30	2040.70
10.	Fisheries Research (TNFU)	418.73	820.53	168.73	123.73	109.73	1641.44
11.	Water Resource Organization (PWD)	14136.00	13365.00	11401.00	8380.00	9520.00	56802.00
11.	Civil Supplies & Co-Operation	54.00	32.50	34.50	42.00	28.00	191.00
	Grand total	**18990.28**	**18347.00**	**16837.39**	**12950.66**	**14030.76**	**81156.05**

The total budget requirement for the implementation of various interventions by different departments in Kanyakumari District is **₹. 81156.05 Lakhs.**

The proposed schemes are expected to increase the production and productivity of major crops in the district like paddy, coconut, pulses, banana, tapioca and cashew. The implementation of the scheme would help in achieving the required growth in agriculture as indicated in the XII plan.

CHAPTER I

INTRODUCTION

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

The overall objectives of RKVY (NADP) are as follows:

Objectives of RKVY

a. To strengthen the 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 informed choices.

b. To provide autonomy, flexibility to States to plan and execute schemes as per local/ farmers' needs.

c. To promote value chain addition linked production models that will help farmers increase their income as well as encourage production/productivity

d. To mitigate risk of farmers with focus on additional income generation activities - like integrated farming, mushroom cultivation, bee keeping, aromatic plant cultivation, floriculture etc.

e. To attend national priorities through several sub-schemes.

f. To empower youth through skill development, innovation and agri-entrepreneurship based agribusiness models that attract them to agriculture.

District and State Agriculture Plans

As per the recent guidelines issued by the Government of India under Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RAFTAAR), the new projects proposed and are 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, such action-oriented plan documents will remain as a 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 Plan will 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.

The Process

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 district plans. 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 allied sectors.

Revision and Updation of DAP and SAP in Tamil Nadu

Tamil Nadu State continued to receive Central Assistance under NADP/RKVY. The Government of Tamil Nadu also prepared District and State Agriculture Plans covering 11th and 12th Plan periods. Tamil Nadu State has 32 districts including Chennai. The District Agriculture Plan were prepared for 31 districts excluding Chennai during 12th plan period. Thus, the current exercise is the continuation of the 12th plan period: which also covered two years of the 14th

Finance Commission period (2015-16 and 2016-17) and also keeping in view of the changing scenario in the development and emerging needs of the State and to be eligible for fresh grants from Government of India. These plans were further revised and updated appropriately for implementing RKVY during the periods from 2017-18 to 2021-22.

Methodology followed

The revision of the District Agricultural Plan of Kanyakumari district, was done by gathering the secondary data about district and block with respect to rainfall, land use pattern, demography, livestock, machinery, infrastructure so far created etc. In addition, the constraints in production and marketing of agricultural and livestock produce, crop/animal production and gaps between expected and actual yield and the reasons for such gaps were also discussed among the various stakeholders and incorporated in this plan document. Besides, in consultation with the line department officials and based on the data received from respective districts, a detailed year-wise action plan i.e. from 2017-18 to 2021-22 with physical and financial implications were presented.

CHAPTER II

PROFILE OF THE BLOCKS AND DISTRICT

In this chapter, the following details were discussed elaborately at block and district levels.

2.1 District at a glance

The area comprising the present Kanyakumari district was a part of the erstwhile Travancore state. In 1835, when the state was divided into Northern and Southern divisions, this area formed part of Southern division and was placed in charge of Dewan Peishkar, Kottayam. In July 1949, when the United States of Travancore and Cochin was inaugurated, the present Kanyakumari area continued to be a part of Trivandrum district of Kerala State. The people of Agastheeswaram, Thovalai, Kalkulam and VilavancodeTaluks, which formed the southern divisions of the former Trivandrum District, were predominantly Tamil speaking. They agitated for the merger of this area with Madras State. The States Reorganization Commission also recommended this. Accordingly, the States Reorganization Act, 1956 was passed and the Kanyakumari District was formed on 1st November 1956, with four Taluks, *viz*., Agastheeswaram, Thovalai, Kalkulam and Vilavancode and merged with Tamil Nadu. Thiru. R Thirumalai I.A.S assumed charge as the first Collector of Kanyakumari District on 01.11.1956.

2.2 Area, Location and Geographical features

The total area of Kanyakumari district is 1672 km^2.The district lies between 77^o 15$^{'}$ and 77^o 36$^{'}$ of the Eastern Longitudes and 8^o 03$^{'}$ and 8^o 35$^{'}$ of the Northern Latitudes. The District is bound by Tirunelveli District on the North and the East. The South Eastern boundary is the Gulf of Mannar. On the South and the South West, the boundaries are the Indian Ocean and the Arabian Sea. On the West and North West sides the district is bound by Kerala. The details of taluks, blocks and agricultural divisions of Kanyakumari district are furnished in Table 2.1.

Table 2.1 Taluks, Blocks and Agricultural Divisions in the Kanyakumari District

Name of the Taluks (4)	Name of theBlocks (9)	Name of Agrl. Division (9)
Thovalai	Thovalai	Thovalai
Agastheeswaram	Agastheeswaram	Agastheeswaram
Kalkulam	Rajakkamangalam	Rajakkamangalam
Vilvancode	Kurunthancode	Kurunthancode
	Thackalay	Thackalay
	Thiruvattar	Thiruvattar

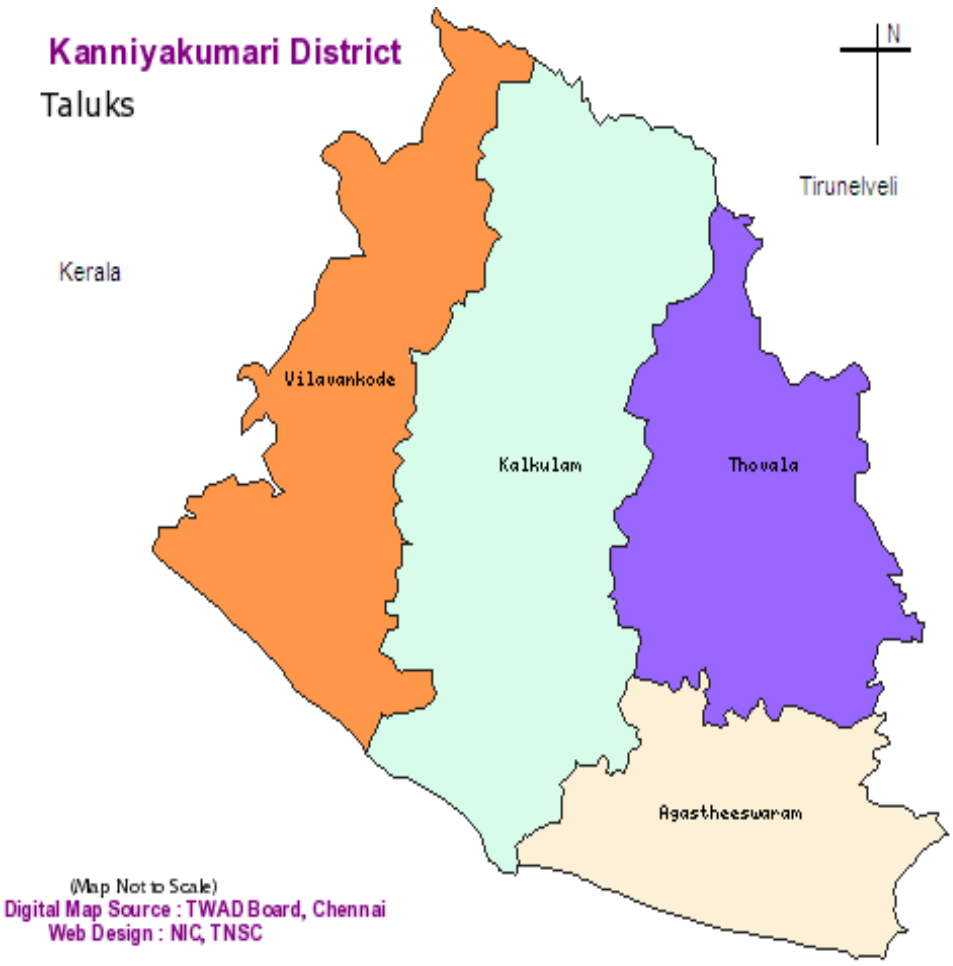
Name of the Taluks (4)	Name of theBlocks (9)	Name of Agrl. Division (9)
	Melpuram	Melpuram
	Killiyoor	Killiyoor
	Munchirai	Munchirai

Source: Records of the Office of the Joint Director of Agriculture, Kanyakumari

2.3 Administrative Structure of Kanyakumari District

There are four taluks in Kanyakumari district *viz.,*Thovalai, Agastheeswaram, Kalkulam and Vilavancode, which are depicted in Fig.1. Kanyakumari district comprises of nine blocks *viz.,* Thovalai, Agastheeswaram, Rajakkamangalm, Kurunthancode, Thackalay, Thiruvattar, Melpuram, Killiyoor and Munchirai and they are shown in Fig 2.

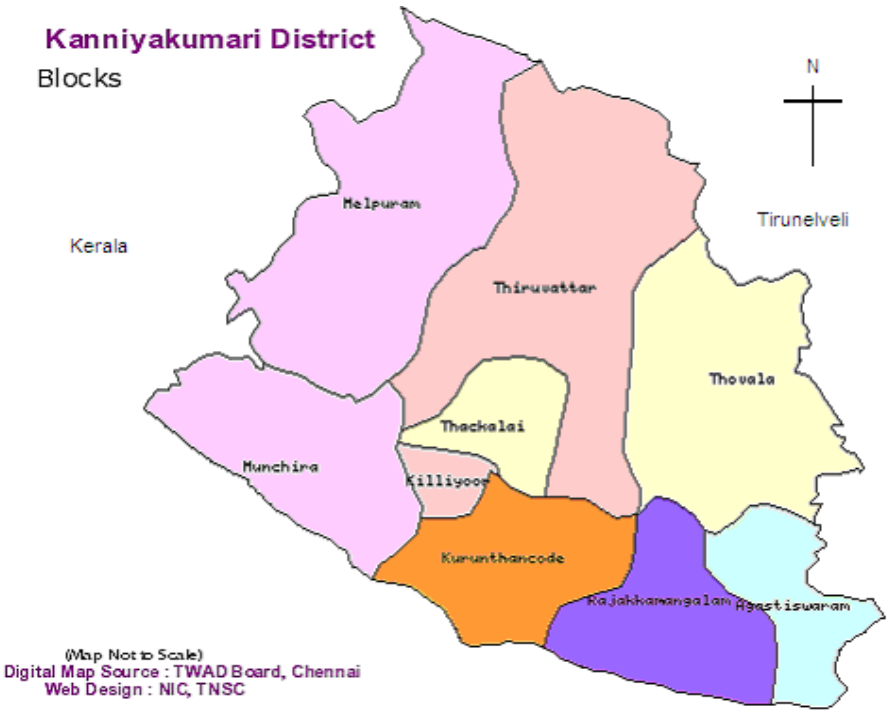
Fig.1 Location of Taluks in Kanyakumari District



Kanyakumari District consists of two Revenue Divisions *viz.,* Nagercoil and Padmanabhapuram. The Nagercoil Revenue Division consists of two taluks, *viz.,* Agastheeswaram with its headquarters at Nagercoil and Thovalai with its headquarters at Boothapandi. The Padmanabhapuram Revenue Division consists of two taluks, Kalkulam

with its headquarters at Thackalay and Vilavancode with its headquarters at Kuzhithurai. There are nine Panchayat Unions, 56 Town Panchayats and 99 Village Panchayats in the district. There are four Municipalities in Kanyakumari district *viz.*, Nagercoil, Padmanabhapuram, Colachel and Kuzhithurai.

Fig. 2 Blocks in Kanyakumari District



2.4 Demographic Profile

2.4.1 Population

The total population of the district (as per 2011 census) was 18.63 lakhs of which 9.27 lakhs were males and 9.36 lakhs were females. Rural and urban population was 326616 (17.53%) and 1536558 (82.47%) respectively (Table 2.2).

Table 2.2 Demographic Details of the Kanyakumari District

Description	Number	Percentage
Total population	1863174	100.00
Male	926800	49.74
Female	936374	50.26
Rural population	326616	17.53
Male	163118	8.75
Female	163498	8.78
Urban population	1536558	82.47
Male	763682	40.99
Female	772876	41.48

Source: Census of India, 2011; Statistical Hand Book (2011-2012)

The block wise populations were shown in the Table 2.3. Out of the total population of 18.70 lakhs in the district, Rajakkamangalam block was the most populous block in the district. This block had 20.76 per cent of the district population. Next to this block, Kurunthancode block had 11.81 per cent, Melpuram had 11.70 per cent, Thackalay had 11.19 per cent, Munchirai had 10.69 per cent, Tiruvattar had 9.45 per cent, Killiyoor had 9.18 per cent and Agastheeswaram had 8.76 per cent of the district population respectively. Thovalai block was the least populous with only 6.47 per cent of the district population. Number of Scheduled Caste population was also high in Rajakkamangalam block followed by Thovalai block and Scheduled Tribes population was high in Tiruvattar and Melpuram blocks.

2.4.2 Literacy level

The overall literacy level of the district population was 82.80 per cent. Among the different blocks in the district, the literacy level was found highest in Rajakkamangalam block (85.20 per cent) followed by Thackalay (83.71 per cent), Agastheeswaram block (83.55 per cent), Kurunthancode block (82.42 per cent), Tiruvattar (82.05 per cent), Killiyoor (81.91 per cent), Melpuram (81.86 per cent) Thovalai (81.78 per cent) and Munchirai (80.10 per cent). Although most of the blocks had higher percentage of male literates, female literates were highfor the whole district. Rajakkamangalam, Tiruvattar and Melpuram blocks had higher female literates and Agastheeswaram block had equal percentage of literates. Remaining block was higher in male literates. The literacy level across the blocks is presented in Table 2.4 & 2.5.

Table 2.3 Block wise population level - 2011

Sl. No	Particulars	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	Total
I.	Total Population	163842	388333	120926	209207	176681	220818	218873	199967	171727	**1870374**
A	Male										
	i. Adult	73031	172705	54231	93371	79646	99002	97114	88596	75814	**833510**
	ii. Children	8350	18307	5825	10352	8391	11421	10531	10648	9010	**92835**
B	Female										
	i. Adult	74382	179327	55315	95639	80653	99297	101013	90522	78366	**854514**
	ii. Children	8079	17994	5555	9845	7991	11098	10215	10201	8537	**89515**
C	Total										
	i. Adult (Ai + Bi)	147413	352032	109546	189010	160229	198299	198127	17918	154180	**1526754**
	ii. Children (Aii + Bii)	16429	36301	11380	20197	16382	22519	20746	20849	17547	**182350**
D	SC	12246	18266	13413	7616	3126	7624	4634	5248	2076	**74249**
E	ST	463	503	389	52	2798	107	2692	142	136	**7282**

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar; B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor

Table 2.4 Literacy Level by Social Groups -2011

Sl. No	Particulars	B 1	B 2	B 3	B 4	B 5	B 6	B 7	B 8	B 9	Total
I	**Number of literates**										
	i. Male	69017	165212	50439	88123	73594	92232	90225	81051	70648	**780541**
	ii. Female	67880	165657	48451	87009	71375	89758	88943	79114	70010	**768197**
	iii. Total literates	136897	330869	98890	175132	144969	181990	179168	160165	140658	**1548738**

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar; B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor

Table 2.5 Literacy level in the district

Description	Number of persons	Literacy rate (%)
Total literates	1567580	84.14
Male literates	792385	85.50
Female literates	775195	82.79

Source: Census of India 2011, Statistical Hand Book (2011-2012)

2.4.3 Households

Of the total 3,90,550 households, Melpuram block had the largest number of households (56,203). Next to this block, Kurunthancode block had 55,281 households followed by 53,722 households (Thackalay), 48861(Munchirai), 45697 (Tiruvattar), 43682 (Killiyoor), 43621 (Agastheeswaram), 33151 (Thovalai), and 10332 households in Rajakkamangalam block. The number of cultivator households was found to be high in Thovalai and Agastheeswaram blocks. Number of Scheduled Caste households was high in Rajakkamangalam and low in Killiyoor block. Scheduled tribes mostly spread over in Tiruvattar block and negligible in Thackalay block. In this district there were no BPL families. Block wise demographic details are presented in Table 2.6.

Table 2.6 Distribution of Households (Block wise)

Sl.No.	Particulars	B 1	B 2	B 3	B 4	B 5
i.	No. of households	43621	10332	33151	53722	45697
ii.	No. of Farm households	N.A	N.A	N.A	N.A	N.A
ii.	No. of Scheduled Caste households	480	730	250	304	125
iv.	No. of Scheduled Tribe households	18	10	15	2	111

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar;
B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor

Sl. No.	Particulars	B 6	B7	B8	B9	Total
i.	No. of households	55281	56203	48861	43682	390550
ii.	No. of Farm households	N.A	N.A	N.A	N.A	2,20,300
ii.	No. of Scheduled Caste households	304	152	184	83	2612
iv.	No. of Scheduled Tribe households	4	85	5	5	255

Note: B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor

2.4.4 Working Population

The total workers in the district were 6.79 lakhs. The demographic details regarding the working population of Kanyakumari district are present in Table 2.7.

Table 2.7 Workers in Kanyakumari District

Description	Number	Percentage
Total workers	679620	100.00
a. Total main workers	552658	81.32
b. Marginal workers	126962	18.68
i. Cultivators	15610	2.30
ii. Agricultural labourers	72867	10.72
iii. Household industries	35789	5.27
iv. Other workers	555354	81.72

Source: An Economic Appraisal 2015-16, Govt. of Tami Nadu, Chennai – 108

The main occupation of the district is agriculture and allied activities. About 18.68 per cent of the total work force is marginal workers and 81.32 per cent were main workers. The share of cultivators and agricultural labourers in the total number of workers in Kanyakumari district constituted 2.30 per cent and 10.72 per cent of the total working population respectively.

2.5 Topography

Based on the agro-climatic and topographic conditions, the district can be divided into three regions, namely:-

1. Uplands: Comprising of hills and hill bases suitable for growing crops like Rubber, Cloves, Nutmeg, Pepper, and Pineapple etc.
2. Middle lands: Comprising of plains and valleys fit for growing crops like Paddy, Tapioca, Banana, Coconut etc. and
3. Low lands: Comprising of the coastal belt ideal for growing Coconut and Cashew

2.5.1 Soil type

Soil in the district is mostly of the clay loam and sandy clay variety. However, on the sea coasts, the sandy type of soil prevails and near the mountain ranges, gravelly soil is generally seen. In low lands, there is neither white sand nor sandy loam, while in the midlands and high lands there prevails fairly fertile soil of the fine type. The valley in the midland has loamy clay soil with high sand content. In the midlands, in general, the soil is clay-loam of lateritic origin with an admixture of gravel and sand. In Kalkulam and Vilavancode taluks, the gravel content is low. From the table 2.8 it could be observed that Tiruvattar block had 12350 ha of clay loam and sandy clay is accounted for 16.11 per cent of the total area followed by Melpuram (15.50 per cent) and Thackalay block (12.20 per cent) with area of 11886 ha and 9356 ha respectively.

Table 2.8 Soil types – Area under sandy clay loam and sandy clay (block wise)

Sl. No	Blocks	Area (ha)	Percentage of contribution
1	Agastheeswaram	7858	10.25
2	Rajakkamangalam	8486	11.07
3	Thovalai	7653	9.98
4	Thackalay	9356	12.20
5	Tiruvattar	12350	16.11
6	Kurunthancode	7508	9.79
7	Melpuram	11886	15.50
8	Munchirai	5382	7.01
9	Killiyoor	6204	8.09
	Total	**76683**	**100.00**

The major soil type in the district is Red loam soil (65,608 ha), which constituted about 67 per cent of the total cultivated area. Lateritic soil (20,003 ha) is the next major soil type, which accounted for 22 per cent of the total cultivated area in the district. There are minor soil types like coastal alluvium and alluvium, which are found around four and two per cent to the total area respectively. The details of soil types are furnished in Table 2.9.

Table 2.9 Soil types of Kanyakumari district

Soil Type	Characteristics	Area (Ha)	% of contribution
Lateritic soil	Reddish brown sandy clay loam	20,033	22.00
Red loam soil	Red to yellow sandy clay or sandy loam	65,608	72.04
Coastal alluvium	Pale brown sand	3,830	4.21
Alluvium	Brown sandy clay loam	1,590	1.75
	Total	**91061**	**100.00**

Source: Records of the Office of the Joint Director of Agriculture, Kanyakumari

The area under different problem soils in the district is given in Table 2.10. Medium acidic soil with the pH ranging from 5.6 to 6.0 is spread over 46,265 ha (around 50 per cent of the total cultivated area) and next to this, strongly acidic soil is spread over 20,835 ha. Nearly 20 per cent of the total cultivated area is blessed with neutral soil (18,873 ha) in Kanyakumari district.

Table 2.10 Area under problem soils in Kanyakumari District

Sl.No.	Problem soil	Place	Area (ha)
1	Strongly acidic (pH 5.1 -5.5)	Marthandam and Mullucode	20835
2	Medium acidic (pH 5.6 – 6.0)	Tiruvattar, Thovalai, Colachel, Navalkadu, Thackalay	46265
3	Slightly acidic (pH 6.1 – 6.5)	Thengapattanam, Dharmapuram	2626
4	Neutral (pH 6.6 – 7.3)	Thalukudi, Kanyakumari, Thengampudur, Suchindram, Kottaram, Kumarakoil, Kalkulam	18,873
5	Mild alkaline (pH 7.4 -7.8)	Aramboly, Therur	2,462
		Total	**91061**

Source: Records of the Office of the Joint Director of Agriculture, Kanyakumari

The blockwise area under different problem soils is given in Table 2.11. In general, acidic soil (varying from slight to strong acidic) is found widely in the district. Soils of Rajakkamangalm block is affected by slight to medium acidity while Thovalai and Thackalay blocks are affected by medium acidic soils. Medium to strong acidic soils are found in Kurunthancode, Tiruvattar and Melpuram blocks while strong acidic soils are found in Killiyoor and Munchirai.

Table 2.11 Block wise area under problem soils

Sl.No.	Block	Problem Soils
1	Thovalai	Medium acidic
2	Agastheeswaram	--
3	Rajakkamangalam	Slight to medium acidic
4	Kurunthancode	Medium to strong acidic
5	Thackalay	Medium acidic
6	Thiruvattar	Medium to strong acidic
7	Melpuram	Medium to strong acidic
8	Killiyoor	Strong acidic
9	Munchirai	Strong acidic

Source: Records of the Office of the Joint Director of Agriculture, Kanyakumari

Different types of soil in the district and their coverage in hectares are shown in Table 2.12 with the soil map of Kanyakumari district.

2.5.2 Soil classification

Table 2.12 Classification soils in the Kanyakumari district

Soil Description	Area (ha)
Deep, fine loamy, mixed, Inceptisols	20557.84
Deep, fine, montmorillonitic, Vertisols	14557.70
Shallow, loamy, mixed, Inceptisols	13101.91
Deep, clayey skeletal, mixed, Inceptisols	10501.78
Deep, fine, mixed, Alfisols	9973.74

Table 2.12 Classification soils in the Kanyakumari district (Contd,...)

Soil Description	Area (ha)
Moderately deep, fine, mixed, Inceptisols	9916.07
Very deep, coarse loamy, mixed, Mollisols	9444.96
Deep, fine, mixed, Inceptisols	9334.69
Moderately deep, fine, mixed, Alfisols	6045.33
Deep, coarse loamy, mixed, Mollisols	5336.33
Deep, clayey skeletal, mixed, Alfisols	4852.14
Very deep, fine, mixed, Inceptisols	4552.02
Shallow, clayey, mixed, Inceptisols	4203.58
Shallow, loamy skeletal, mixed, Inceptisols	3407.69
Deep, fine loamy, mixed, Alfisols	3038.25
Very deep, clayey skeletal, kaolinitic, Alfisols	3003.94
Very deep, very fine, montmorillonitic, Inceptisols	2873.68
Very deep, coarse loamy, mixed, Inceptisols	2488.33
Deep, contrasting particle size, mixed, Entisols	2308.62
Very deep, fine, mixed, Mollisols	2015.77
Very deep, fine, mixed, Alfisols	1720.58
Very deep, fine loamy, mixed, Inceptisols	1687.62
Moderately shallow, fine, mixed, Inceptisols	1247.48
Very deep, fine loamy, mixed, Alfisols	1198.00
Very deep, contrasting particle size, mixed, Inceptisols	775.46
Very deep, sandy, mixed, Entisols	481.93
Shallow, clayey skeletal, mixed, Inceptisols	426.59
Very deep, fine, kaolinitic, Alfisols	399.65
Deep, sandy, mixed, Entisols	397.57
Deep, fine loamy, mixed, Entisols	378.88
Moderately deep, coarse loamy, mixed, Entisols	248.10
Deep, contrasting particle size, mixed, Inceptisols	226.60
Moderately deep, very fine, montmorillonitic, Vertisols	221.24
Very deep, fine, montmorillonitic, Vertisols	206.11
Shallow, clayey, mixed, Ultisols	154.13
Moderately shallow, fine loamy, mixed, Inceptisols	150.72
Moderately deep, fine, montmorillonitic, Vertisols	116.85
Very shallow, clayey skeletal, mixed, Entisols	78.98
Deep, coarse loamy, mixed, Entisols	74.23
Very deep, coarse loamy, mixed, Entisols	69.23
Moderately deep, fine loamy, mixed, Entisols	33.88
Total	**151808.20**

Source: Remote Sensing and GIS Centre, Tamil Nadu Agricultural University Coimbatore

Kanyakumari District Soil Legend

The details on classification of soil in the district are furnished in the Table 2.12. The maximum area is available under the classification Deep, fine loamy, mixed and inceptisols type. Other soil classifications like Alfisols, Mollisols, Ultisols and Entisols are also present in certain areas as described above.

2.6 Climatic condition and Rainfall

The District has a favourable agro-climatic condition, which is suitable for growing a number of crops. The proximity of equator, its topography and other climate factors favour the growth of various crops. The paddy varieties grown in the second crop season in Thovalai and Agastheeswaram taluks are grown during the first crop season in Kalkulam and Vilavancode taluks. This shows that there is distinct variation in the climatic conditions prevailing within the district. Unlike other district in Tamil Nadu, it has a rainfall both during the South West and the North East monsoons. The South West monsoon period starts from the month of June and ends in September, While the North East monsoon period starts from October and ends in the middle of December. The normal rainfall of the district is 1302.5 mm. The detail of average rainfall is shown in the Fig 3.

Table 2.13 Month wise / season wise rainfall distribution in Kanyakumari District

Season / Month	2013-2014		2014-2015	
	Normal	**Actual**	**Normal**	**Actual**
South West Monsoon				
June	186.1	68.4	47.5	186.1
July	112.5	112.5	29.3	112.5
August	76.7	93.8	263.7	76.7
September	102.1	36.9	73.7	102.1
Total	**477.4**	**311.6**	**414.2**	**477.4**
North East Monsoon				
October	226.3	226.6	233.1	226.3
November	208.6	122.2	214.4	208.6
December	61.5	24.6	47.5	61.5
Total	**496.4**	**373.4**	**495**	**496.4**
Winter Season				
January	18.4	24.7	10	18.4
February	22	70.3	12.5	22
Total	**40.4**	**95**	**22.5**	**40.4**
Hot Weather				
March	42.5	32.3	48.5	42.5
April	104.3	26.2	169.2	104.3
May	141.5	64	260.5	141.5
Total	**288.3**	**122.5**	**478.2**	**288.3**
Annual rainfall	**1302.5**	**849.2**	**1409.9**	**1302.5**

Source: Season and Crop Report (2014-15)

The normal rainfall range is the district is about 1302.50 mm while the actual fall is 849.20 mm. The district receives maximum rainfall during the North-East monsoon season of about 373.40 mm. All the other monsoon seasons received lesser fall than the normal which indicates that water table gets deeper and deeper and drought condition persists. The detailed rainfall pattern for the year 2013-14 and 2014-15 is given in the Table 2.13.

Fig.3 Season wise average rainfall (2014-2015)

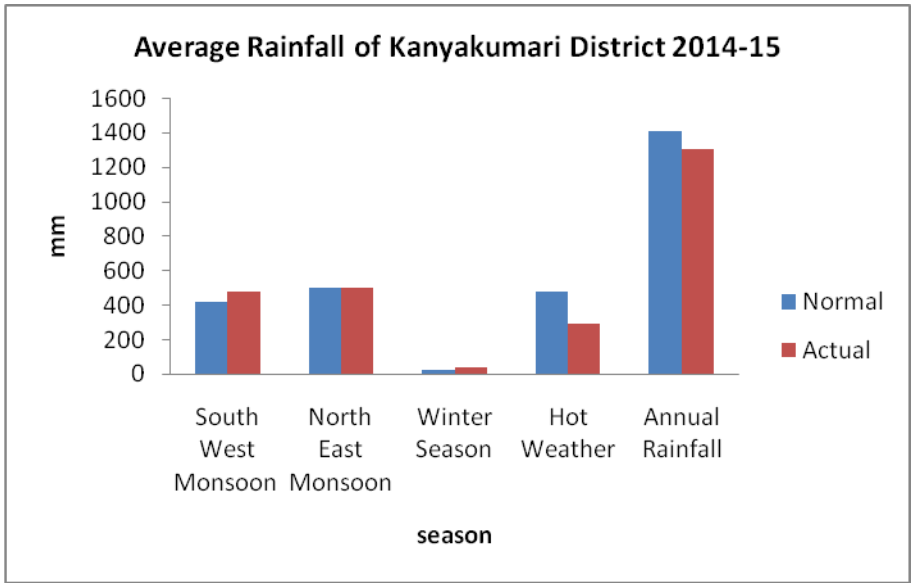


Table 2.14 Temperature and Humidity at Kanyakumari District

Year: 2014-2015

Months		Temperature in Celsius				Humidity (In %)			
		Mean Maximum		Mean Maximum		8.30 hrs.(IST)		17.30 hrs.(IST)	
		Normal	Actual	Normal	Actual	Normal	Actual	Normal	Actual
2011	June	30.5	31.8	24.5	24.5	81	79	77	76
	July	30.4	31.2	24.2	23.2	80	78	77	75
	August	30.4	31.6	23.9	23.5	80	76	78	77
	September	30.6	31.8	24.3	23.0	77	71	79	77
	October	30.5	32.0	24.3	24.2	78	70	79	75
	November	30.2	31.7	24.0	23.1	77	72	75	73
	December	30.2	31.8	23.8	23.0	72	68	68	65
2012	January	30.9	32.3	23.4	22.1	69	66	66	66
	February	31.6	33.3	23.8	23.2	68	67	68	67
	March	32.1	32.9	25.0	24.0	69	71	69	71
	April	32.8	33.3	26.2	25.0	72	73	73	73
	May	32.5	33.1	26.2	25.0	74	73	76	77

Source: Deputy Director General of Meteorology, Chennai

From the above Table 2.14, it could be observed that the average maximum temperature recorded in the district was 33.3ºC, and the minimum temperature was 22.1ºC.

2.7 Land

2.7.1. Land Use Pattern

The geographical area of district is 1, 67,200 ha. The gross cropped area was 883556 ha, which accounted for 49.97 per cent of the total geographical area. However, increasing area under current fallow, other fallow lands and land put to non-agricultural uses affect the net sown area and gross cropped area in the district. At the same time, it is important to note that area sown more than once is slowly declining during the recent years. Kanyakumari district is blessed with good forest cover, which accounted for nearly 32.38 per cent of total geographical area. The details of land use pattern are furnished in Table 2.15.

Table 2.15 Land Use Pattern – District (2014-15)

Sl.No	Particulars	2014-15	Percentage
1	Geographical Area	167200	100
2	Forest	54155	32.38
3	Barren & Unculturable Area	4001	2.39
4	Land Put to Non-agricultural Uses	29183	17.45
5	Permanent Pastures & Other grazing lands	104	0.06
6	Misc.tree crops & groves not incl. in the net area sown	637	0.38
7	Current Fallow	1771	1.05
8	Other Fallow	1285	0.76
9	Net area sown	75888	45.38
10	Area sown more than once	7668	4.58
11	Gross area sown	83556	49.97
	Total	**425448**	

Source: *Season and Crop Report (2014-15)*

2.7.2. Land Holding Pattern

The land holding pattern of the cultivators in the district is presented in Table 2.16. In the whole district marginal farmers with less than 1 ha. Constituted 74.96 per cent of the total land held by the farmers.

The data provided in the below table indicate that the small holdings with a size of up to 2 ha constitute more than 99.43 per cent of the total number of holdings in the district. On the other hand, the relatively larger land holdings with a size of more than five ha accounted for about just 0.13% of the total number of holdings in the district with 9.62 per cent of total land owned in the district.

Table 2.16 Number and area of operational land holdings in the district

Year: 2014-2015

Size/Class of Holdings (Ha)	Number of operational Holdings					Area operated (Ha)				
	SC.	**ST.**	**Others**	**Institutional**	**Total**	**SC**	**ST**	**Others**	**Institutional**	**Total**
Below 0.5	1479.00	34.00	392488	1887.00	**395888**	195.73	108	48793.10	313.52	**49410.30**
0.5-1.0	68.00	3.00	19705	254.00	**20030**	50.35	209	12968.90	184.33	**13412.60**
Marginal	1547.00	37.00	412193	2141.00	**415918**	246.08	318	61762.00	497.85	**62823.90**
1.0-2.0	32.00	0.00	5449	181.00	**5662**	46.41	0	7290.91	261.79	**7599.11**
Small	332.00	0.00	5449	181.00	**5962**	46.41	0	7290.91	261.79	**7599.11**
2.0-3.0	6.00	0.00	1266	70.00	**1342**	13.56	0	3100.27	170.75	**3284.58**
3.0-4.0	2.00	0.00	377	60.00	**439**	7.00	0	1301.45	203.72	**1512.17**
Semi- Medium	8.00	0.00	1643	130.00	**1781**	20.56	0	4401.72	374.46	**4796.74**
4.0-5.0	1.00	0.00	171	24.00	**196**	4.34	0	751.14	107.97	**863.45**
5.0-7.5	1.00	0.00	141	31.00	**173**	5.09	0	851.65	187.93	**1044.67**
7.5-10.00	0.00	0.00	59	13.00	**72**	0.00	0	504.57	113.64	**618.21**
Medium	2.00	0.00	371	68.00	**441**	9.43	0	2107.36	409.54	**2526.33**
10.0-20.0	0.00	0.00	62	37.00	**99**	0.00	0	784.57	512.47	**1297.04**
Above 20	0.00	0.00	72	25.00	**97**	0.00	0	2991.95	1674.20	**4666.15**
Large	0.00	0.00	134	62.00	**196**	0.00	0	3776.51	2186.70	**5963.21**
Total	**3478**	**74.00**	**839580**	**5164.00**	**848296**	**644.96**	**635**	**158677.00**	**7460.66**	**167417.60**

Source: Statistical report of the district (2015-16)

2.8 Sources of Irrigation

Water is a crucial input in the production of crops in the agricultural sector. Intensive and extensive cultivation of land depend mainly on the availability of water. Medium and minor irrigation projects are developed in the state for augmenting the irrigation for agriculture. The various sources of irrigation are canals, tanks, tube wells, open wells and springs. Wells and tanks play an important role in the irrigation in Kanyakumarai district. The details are given in Tables 2.17 and 2.18.

Table 2.17 Irrigation resources

Sl.No.	Particularls		Numbers	Area (in ha)
1	Canals	Gross	53	10456
		Net		8683
2	Tanks	Gross	2623	14899
		Net		11220
3	Tube wells / Bore wells	Gross		6376
		Net		5387
4	Open wells	Gross		2617
		Net		2604
5	Supplementary wells	Gross		83
		Net		83
6	Other Sources	Gross		0
		Net		0

Source: Season and Crop Report 2015-2016

Table 2.18 Different source of Irrigation

Sl.No.	Particularls		2012-13	2013-14	2014-15	Average
1	Canals	Gross	11539	11626	10456	11207.00
		Net	9800	9992	8683	9491.67
2	Tanks	Gross	19016	19890	14899	17935.00
		Net	14901	15466	11220	13862.33
3	Tube wells / Bore wells	Gross	2692	2719	6376	3929.00
		Net	2686	2579	5387	3550.67
4	Open wells	Gross	1702	2044	2617	2121.00
		Net	1671	1997	2604	2090.67
5	Supplementary wells	Gross	512	393	83	329.33
		Net	482	343	83	302.67
6	Other Sources	Gross	45	0	0	15.00
		Net	45	0	0	15.00

Among the major source of irrigation, Tanks contributed to 0.13 lakh ha followed by 0.09 lakh ha by canals and 0.035 lakh ha by Tube wells. These results in decline in the ground water of the all blocks in the district are over exploited and hence water management is more important while planning for agriculture

2.9 Cropping pattern

Paddy, coconut and rubber are the major crops grown in the district. Besides, banana, tapioca and cashew nut are also cultivated in the district. The details of area under major cereals and vegetables crops are furnished in Table 2.19. and Table 2.20 respectively.

Table 2.19 Area under major Cereals crops (2014-15 and Triennium ending 2014-15)

		Area (Ha)					Production (in tonnes)					Productivity (in kg / ha)				
Sl.No	**Particulars**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**
1	Paddy	12412	13619	13176	39207	13069.00	57882	66703	66943	191528	63842.67	4663	4898	5081	14642	4880.67
2	Maize	0	0	22	22	7.33	0	0	180	180	60.00	0	0	8167	8167	2722.33
3	Cholam	0	0	4	4	1.33	0	0	8	8	2.67	0	0	2009	2009	669.67
4	Cumbu	0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00
5	Ragi		0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00
6	Total Cereals	12412	13619	13202	39233	13077.67	57882	66703	67131	191716	63905.33				0	0.00
	Total	**24824**	**27238**	**26404**	**78466**	**26155.33**	**115764**	**133406**	**134262**	**383432**	**127810.67**	**4663**	**4898**	**15257**	**24818**	**8272.67**

Table 2.20 Area under major Vegetable crops (2014-15 and Triennium ending 2014-15)

		Area (Ha)					Production (in tonnes)					Productivity (in kg / ha)				
Sl. No	**Particulars**	**2012 -13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012 -13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012 -13**	**2013-2014**	**2014-2015**	**Total**	**Average**
1	Onion	0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00
2	Brinjal	18	21	12	51	17.00	166	189	107	462	154.00	9228	8978	8896	27102	9034.00
3	Bhendi	66	40	53	159	53.00	526	271	390	1187	395.67	7962	6772	7350	22084	7361.33
4	Cabbage	0	0	0	0	0.00	0	0	0	0	0.00	0	0	0	0	0.00
5	Tomato	24	22	10	56	18.67	341	271	145	757	252.33	14228	12338	14470	41036	13678.67
6	Other Vegetables	1100	1133	1268	3501	1167.00				0	0.00				0	0.00
	Total	**1208**	**1216**	**1343**	**3767**	**1255.67**	**1033**	**731**	**642**	**2406**	**802.00**	**31418**	**28088**	**30716**	**90222**	**30074.00**

Source: Season and Crop report 2014-2015

2.9.1 Major Crops and Varieties grown

Several high yielding varieties of major crops are grown in the district. In the case of rice ASD16, ADT37, Ponmani and TPS3 are the popular high yielding varieties. ADT5, T9 and Vamban 3 are the popular HYVs of black gram. East coast tall and T x D hybrid are the major coconut HYVs. In tapioca, Srijaya and SriVisakam are the HYVs widely grown in the district. Ney Poovan, Grand Naine, Nendran, Red Banana and Rasthali are the popular banana HYVs grown in the district.

Though there are several HYVs for cultivation, local varieties are also preferred by the farmers in the district. Kattisamba is the popular local rice variety and Kanyakumari green is the popular local variety of coconut. Noorumuttan and Kariyilaipoian are the local varieties of tapioca whereas Nendran, Poovan, Rasthali, Matti and Karpooravalli are the popular local varieties of banana.

2.9.2 Area under different crops in blocks

Factors such as fertility of land, monsoon behaviour, rainfall, irrigation, application of fertilizers, climatic conditions, marketing facilities, prices, availability of agricultural labour etc., determine the area, production and productivity of any crop. In Agastheeswaram block, paddy, coconut, tapioca and banana are grown predominantly. In Rajakkamangalm block, coconut, paddy, cashew nut and banana are grown. In Thovalai block, paddy, coconut, rubber and banana are cultivated. Rubber, coconut, paddy and banana are the predominant crops grown in Thackalay block. Rubber, coconut and banana are the major crops grown in Tiruvattar block. Coconut, paddy, banana and cashew nut are the major crops cultivated in Kurunthancode block. However, only rubber and coconut are found in Melpuram block. Besides coconut and banana, Palmyrah is found in Munchirai block. Coconut, rubber, banana and Palmyrah are the major crops cultivated in Killiyoor block. Areas under major crops blockwise are presented in Table 2.21.

Across the blocks, among the major crops, paddy is grown in predominantly in the following blocks: Thovalai, Agastheeswaram and Kurunthancode and pulse crop is grown in predominantly in Kurunthancode, Rajakkamangalam and Agastheeswaram blocks. Coconut is grown predominantly in Rajakkamangalam, Kurunthancode and Agastheeswaram blocks, whereas Palmyrah is grown in Munchirai, Killiyoor and Kurunthancode blocks. Vegetables are grown in Thovalai, Melpuram and Killiyoor block. Tapioca (table purpose) is grown in predominantly in Agastheeswaram, Thovalai and Munchirai blocks. Amla are grown predominantly in Thovalai and Rajakkamangalm blocks. Though Banana is grown throughout the district, concentration of cultivation of this

crop is found in Kurunthancode, Tiruvattar and Agastheeswaram blocks. Mango is grown predominantly in Rajakkamangalm, Munchirai and Killiyoor blocks and other fruits are grown in predominantly in Thovalai, Thackalay and Kurunthancode. Cashew nut is grown predominantly in Rajakkamangalm and Kurunthancode blocks. Flowers are grown in predominantly in Thovalai and Agastheeswaram whereas spices are grown predominantly in Munchirai, Kurunthancode and Killiyoor block. Plantation crops like Arecanut is also grown in the district and found predominantly in Tiruvattar and Munchirai blocks and rubber is grown predominantly in Melpuram, Tiruvattar and Thackalay blocks. Other plantation crops are grown in Tiruvattar block only. Mulberry crop is also cultivated in the district and found predominantly in Kurunthancode and Agastheeswaram blocks and Green manure crop is grown predominantly in Agastheeswaram block. The percentage of area under each crop across the blocks and within the blocks is presented in Table 2.22 and Table 2.23.

The major crops grown in the district are depicted in the Fig. 4.

Fig. 4 Major Crops grown in the Kanyakumari

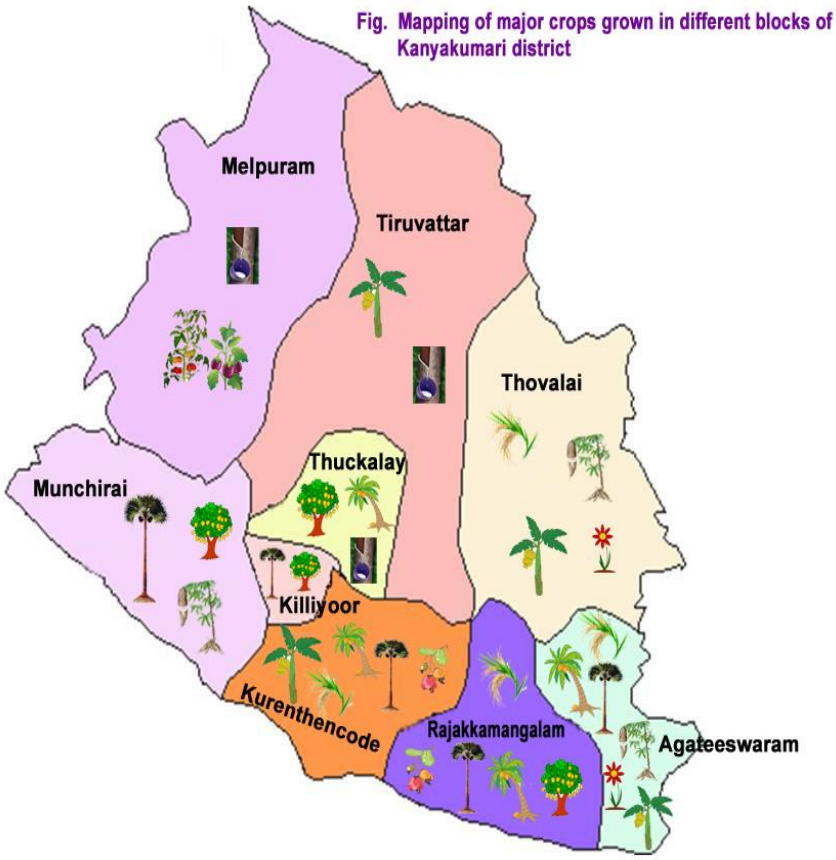


Table 2.21 Area under major Crops (Triennium average ending 2014-15)

(Hectares)

Crop	B1	B2	B3	B4	B5	B6	B7	B8	B9	Total
Paddy	2954.89	2094.32	5101.44	355.77	0.00	1869.23	3.06	29.56	3.10	12411.37
Pulses	67.05	74.17	0.00	0.00	1.00	182.49	3.00	4.50	6.00	338.21
Coconut	3659.51	5650.76	1739.31	2471.23	1368.89	4170.20	1407.15	2242.20	1792.36	24501.58
Palmyrah	128.06	125.85	0.00	121.44	3.03	157.96	38.39	365.53	303.00	1243.25
Vegetables	1.50	1.27	37.04	10.61	1.08	2.00	26.02	10.13	16.75	106.37
Tapioca	318.43	9.76	139.04	64.63	52.77	76.19	67.67	123.19	90.01	941.67
Amla	1.35	9.01	23.01	1.37	0.00	0.00	3.54	0.00	0.00	38.27
Banana	750.98	433.51	608.95	338.24	949.03	977.93	254.63	438.42	499.66	5251.33
Mango	100.49	309.14	111.97	186.07	68.71	162.99	86.05	209.42	198.00	1432.82
Fruits	32.36	25.05	123.53	122.88	103.39	114.37	108.38	81.38	99.77	811.08
Cashew nut	60.20	573.61	35.36	71.39	10.55	301.55	10.55	17.89	57.17	1138.25
Flowers	55.49	0.40	112.26	0.00	0.00	0.26	0.00	0.87	0.15	169.41
Spices	0.00	0.00	0.00	3.52	107.84	157.96	10.90	168.36	116.93	565.50
Arecanut	0.00	0.00	0.00	0.00	65.44	0.00	0.00	16.26	5.97	87.67
Rubber	0.00	0.00	1164.97	4040.30	8861.24	0.00	9699.67	0.00	1183.67	24949.84
Plantation crops	0.00	0.00	0.00	8.47	264.45	0.00	34.95	10.12	0.00	317.98
Mulberry	2.59	0.41	0.00	0.08	0.00	4.61	0.00	0.00	0.00	7.68
Green manure	180.90	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	180.90
Total	**8313.77**	**9307.24**	**9196.84**	**7795.97**	**11857.39**	**8177.70**	**11753.93**	**3717.80**	**4372.50**	**74493.12**

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar; B6- Kurunthancode;B7- Melpuram; B8- Munchirai; B9- Killiyoor

Table 2.22 Percentage of Area under major Crops (Across Blocks)

Crop	B1	B2	B3	B4	B5	B6	B7	B8	B9	Total
Paddy	23.81	16.87	41.10	2.87	0.00	15.06	0.02	0.24	0.02	**100.00**
Pulses	19.83	21.93	0.00	0.00	0.30	53.96	0.89	1.33	1.77	**100.00**
Coconut	14.94	23.06	7.10	10.09	5.59	17.02	5.74	9.15	7.32	**100.00**
Palmyrah	10.30	10.12	0.00	9.77	0.24	12.71	3.09	29.40	24.37	**100.00**
Vegetables	1.41	1.19	34.82	9.97	1.01	1.88	24.46	9.52	15.74	**100.00**
Tapioca	33.82	1.04	14.76	6.86	5.60	8.09	7.19	13.08	9.56	**100.00**
Amla	3.53	23.53	60.13	3.58	0.00	0.00	9.24	0.00	0.00	**100.00**
Banana	14.30	8.26	11.60	6.44	18.07	18.62	4.85	8.35	9.51	**100.00**
Mango	7.01	21.58	7.81	12.99	4.80	11.38	6.01	14.62	13.82	**100.00**
Other Fruits	3.99	3.09	15.23	15.15	12.75	14.10	13.36	10.03	12.30	**100.00**
Cashew nut	5.29	50.39	3.11	6.27	0.93	26.49	0.93	1.57	5.02	**100.00**
Flowers	32.75	0.24	66.26	0.00	0.00	0.15	0.00	0.51	0.09	**100.00**
Spices	0.00	0.00	0.00	0.62	19.07	27.93	1.93	29.77	20.68	**100.00**
Areca nut	0.00	0.00	0.00	0.00	74.65	0.00	0.00	18.55	6.80	**100.00**
Rubber	0.00	0.00	4.67	16.19	35.52	0.00	38.88	0.00	4.74	**100.00**
Plantation crops	0.00	0.00	0.00	2.66	83.17	0.00	10.99	3.18	0.00	**100.00**
Mulberry	33.68	5.28	0.00	1.04	0.00	60.00	0.00	0.00	0.00	**100.00**
Green manure	100.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	**100.00**

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar; B6- Kurunthancode;B7-Melpuram;B8-Munchirai;B9-Killiyoor

Table 2.23 Percentage of Area under Major Crops (Within the blocks)

Crop	B1	B2	B3	B4	B5	B6	B7	B8	B9	Total
Paddy	35.54	22.50	55.47	4.56	0.00	22.86	0.03	0.80	0.07	16.66
Pulses	0.81	0.80	0.00	0.00	0.01	2.23	0.03	0.12	0.14	0.45
Coconut	44.02	60.71	18.91	31.70	11.54	50.99	11.97	60.31	40.99	32.89
Palmyrah	1.54	1.35	0.00	1.56	0.03	1.93	0.33	9.83	6.93	1.67
Vegetables	0.02	0.01	0.40	0.14	0.01	0.02	0.22	0.27	0.38	0.14
Tapioca	3.83	0.10	1.51	0.83	0.45	0.93	0.58	3.31	2.06	1.26
Amla	0.02	0.10	0.25	0.02	0.00	0.00	0.03	0.00	0.00	0.05
Banana	9.03	4.66	6.62	4.34	8.00	11.96	2.17	11.79	11.43	7.05
Mango	1.21	3.32	1.22	2.39	0.58	1.99	0.73	5.63	4.53	1.92
Fruits	0.39	0.27	1.34	1.58	0.87	1.40	0.92	2.19	2.28	1.09
Cashew nut	0.72	6.16	0.38	0.92	0.09	3.69	0.09	0.48	1.31	1.53
Flowers	0.67	0.00	1.22	0.00	0.00	0.00	0.00	0.02	0.00	0.23
Spices	0.00	0.00	0.00	0.05	0.91	1.93	0.09	4.53	2.67	0.76
Areca nut	0.00	0.00	0.00	0.00	0.55	0.00	0.00	0.44	0.14	0.12
Rubber	0.00	0.00	12.67	51.83	74.73	0.00	82.52	0.00	27.07	33.49
Plantation crops	0.00	0.00	0.00	0.11	2.23	0.00	0.30	0.27	0.00	0.43
Mulberry	0.03	0.00	0.00	0.00	0.00	0.06	0.00	0.00	0.00	0.01
Green manure	2.18	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.24
Total	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**	**100.00**

Note:B1-Agaeteeswaram; B2-Rajakkamangalm;B3- Thovalai; B4- Thackalay; B5- Tiruvattar; B6- Kurunthancode;B7- Melpuram; B8- Munchirai; B9- Killiyoor

2.9.3 Productivity of Major Crops

The Area, Production and productivity of major crops are presented in Table 2.24 The productivity of major crops both in irrigated and rain fed conditions across the blocks is presented in Table 2.25. Differences existed in average yield levels achieved at block level. The maximum and minimum yield levels achieved are shown in Table 2.26.

Under irrigated condition a maximum yield of 5.33 tonnes/ha was achieved in Rajakkamangalam block and lowest (minimum) yield was 4.50 tonnes/ha was obtained in Thovalai block. With respect to pulse crop, the maximum yield of 1.09 tonnes/ha was obtained in Agastheeswaram block and lowest yield was 0.40 tonnes/ha in Thackalay block. In case of vegetables, the maximum yield obtained was 99.9 tonnes/ha in Melpuram block and lowest yield was 10.00 tonnes/ha in Tiruvattar block. In Tapioca crop, a maximum yield of 34.75 tonnes/ha was obtained in Agastheeswaram and Thovalai blocks and the lowest yield of 32.65 tonnes/ha in Killiyoor block. Banana, a traditional and high value crop is cultivated throughout the district with a yield 37.29 tonnes/ha. Similarly, Mango, other fruits and flowers cultivated in the district has achieved a maximum yield of 5.41 tonnes/ha (rain fed), 59.95tonnes/ha (rainfed) and 7.78 tonnes/ha (irrigated) and 9.73 tonnes/ha under rain fed conditions respectively. The lowest yields obtained were 5.40 tonnes/ha (mango), 26.77 tonnes/ha (other fruits) and 7.75 tonnes/ha (flowers irrigated) and 7.74 tonnes/ha (rain fed). The cashew nut grown in all blocks of this districts yielded a maximum of 730 kg/ha and the minimum yield obtained was 550 kg/ha (Rajakamangalam). In Rubber a maximum yield of 0.55 tonnes/ ha was obtained in Thackalay, Tiruvattar, Melpuram and Killiyoor blocks. In other plantation crops, the maximum yield of 1.00 tonnes/ha was obtained in Thackalay block while Arecanut and Tamarind also achieved a yield of 2.25 tonnes/ha and 2.01 tonnes/ha respectively.

Table 2.24. Area, Production and Productivity of Major Crops

Sl.No.	Particulars	Area (in ha)	Production (in tonnes)	Productivity (in kg/ha)
1	Paddy	13069.00	63842.67	4880.67
2	Maize	7.33	60.00	2722.33
3	Cholam	1.33	2.67	669.67
4	Total Cereals	13077.67	63905.33	0.00
5	Red Gram	5.00	5.00	1003.33
6	Black Gram	1011.33	848.67	744.33
7	Green Gram	1.00	1.00	250.00
8	Groundnut	24.33	59.33	1847.33
9	Coconut	24217.33	4167.67	11739.00
10	Sugarcane	1.00	101.67	34.67
11	Brinjal	17.00	154.00	9034.00
12	Bhendi	53.00	395.67	7361.33
13	Tomato	18.67	252.33	13678.67
14	Banana	6440.33	166824.00	25868.67
15	Mango	1344.33	9225.33	6823.00
16	Jack Fruit	610.00	11271.33	18285.67
17	Pine Apple	77.67	2428.33	30717.67
18	Guava	60.00	355.00	6151.67
19	Orange	0.33	0.67	728.00
20	Chillies	0.33	0.33	220.33
21	Ginger	7.33	138.33	15427.00
22	Pepper	233.67	36.00	153.00
23	Cloves & Cinnamon	702.33	620.33	883.00
24	Turmeric	0.33	1.33	1262.33
25	Tamarind	967.67	1882.00	1945.00
26	Tapioca	1050.67	34859.00	33234.67
	Total	**62999.00**	**361438.00**	**195665.33**

From the above table it could be seen that coconut is the predominant crop of the district with an area of 24217.33 ha. The other important crops are cereals with total area of 13077 ha. Among the pulses black gram is the important crop. But the productivity of crop is low. It shows an indication of lack of irrigation facilities in this district. This indicates the importance of extension in improving the adaptation of improved technologies in the cultivation of crops.

Table 2.25 Productivity of Major Crops

(Tonnes/ha)

Crops	B1		B2		B3		B4		B5	
	I	R	I	R	I	R	I	R	I	R
Paddy	5.17	0.00	5.33	0.00	4.50	0.00	5.16	0.00	0.00	0.00
Pulses	1.09	0.22	-	0.40	-	-	0.40	0.40	0.00	0.00
Vegetables	-	11.33	0.00	0.00	11.08	74.04	74.01	0.00	10.00	0.00
Tapioca	34.75	34.75	34.73	0.00	34.75	34.75	0.00	0.00	32.68	32.68
Banana	37.29	37.04	37.29	0.00	37.29	37.30	37.29	37.29	37.29	37.29
Mango	0.00	5.40	0.00	5.41	0.00	5.40	0.00	5.41	0.00	5.41
Other fruits	0.00	26.83	0.00	26.77	0.00	31.83	0.00	59.95	0.00	59.94
Flowers	7.78	0.00	7.75	7.74	0.00	9.73	0.00	0.00	0.00	0.00
Cashew nut	-	0.73	0.00	0.55	0.00	0.73	0.00	0.73	0.00	0.73
Rubber	-	0.00	0.00	0.00	0.00	0.55	0.55	0.55	0.55	0.00
Other Plantation Crops	-	0.00	0.00	0.00	0.00	0.00	1.00	1.26	0.25	1.26
Areca nut	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	2.25
Tamarind	-	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor I-Irrigated; R-Rain fed

Table 2.25 Productivity of Major Crops (Contd. Table 2.25)

Crops	B6		B7		B8		B9	
	I	R	I	R	I	R	I	R
Paddy	5.12	0.00	4.89	0.00	5.16	0.00	4.86	0.00
Pulses	0.00	0.40	0.00	0.50	0.00	0.40	0.00	0.40
Vegetables	0.00	11.00	99.97	10.00	0.00	60.00	22.00	50.00
Tapioca	32.68	32.68	0.00	32.68	32.68	32.68	32.65	32.68
Banana	37.29	0.00	37.29	0.00	37.29	37.29	37.29	0.00
Mango	0.00	5.41	0.00	5.40	0.00	5.41	0.00	5.41
Other fruits	0.00	26.95	0.00	59.94	0.00	26.95	0.00	26.95
Flowers	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
Cashew nut	0.00	0.73	0.00	0.73	0.00	0.73	0.00	0.73
Rubber	0.00	0.00	0.55	0.55	0.00	0.00	0.55	0.55
Other Plantation Crops	0.00	0.00	0.00	1.88	0.00	1.14	0.00	0.00
Areca nut	0.00	0.00	0.00	0.00	0.00	2.25	0.00	2.25
Tamarind	0.00	2.01	0.00	0.00	0.00	2.01	0.00	2.01

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5- Tiruvattar B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor I-Irrigated; R-Rain fed

Table 2.26 Maximum and Minimum Yields Achieved at block level

Crops	Irrigated		Rain fed	
	Max	Min	Max	Min
Paddy	5.33 (B2)	4.50 (B3)	-	-
Pulses	1.09 (B1)	0.40 (B4)	0.50 (B7)	0.22 (B1)
Vegetables	99.97 (B7)	10.00 (B5)	74.04 (B3)	10.00 (B7)
Tapioca	34.75 (B1 & B3)	32.65 (B9)	34.75 (B1 & B3)	32.68 (B5,B6, B7,B8 & B9)
Fruits Banana	37.29 (All blocks)		37.30 (B3)	37.04 (B1)
Mango	-	-	5.41 (B2,B4,B5,B6,B8,&B9)	5.40 (B1,B3,B7)
Other fruits	-	-	59.95 (B4)	26.77 (B2)
Flowers	7.78 (B1)	7.75 (B2)	9.73 (B3)	7.74 (B2)
Cashewnut	-	-	0.73 (Except B2)	0.55 (B2)
Rubber	0.55 (B4,B5,B7,B9)		0.55 (B3,B4,B7 & B9)	
Plantation Crops	1.00 (B4)	0.25 (B5)	1.88 (B7)	1.14 (B8)
Arecanut	-	-	2.25 (B5,B8 & B9)	
Tamarind	-	-	2.01 (B6,B8 & B9)	

Note: B1-Agaeteeswaram; B2-Rajakkamangalm; B3- Thovalai; B4- Thackalay; B5-Tiruvattar,B6- Kurunthancode; B7- Melpuram; B8- Munchirai; B9- Killiyoor Figures in parenthesis denote respective blocks where the yield was reported

2.10. Consumption of Chemical Fertilizers and Pesticides

The Department of Agriculture shoulders the responsibility to closely monitor the demand and supply the fertilizers to ensure timely availability to the farmers. To monitor the fertilizer supply, Facilitation centres were opened in all the districts from 8.00 A.M to 8.00 P.M. and the Department ensured timely availability of fertilizer at correct price. The consumption of fertilizers and pesticides during 2014-2015 is given in Table 2.27. From the table it could be observed that the nitrogenous fertilizer distribution was high (0.09 lakh tones) followed by Phosphorous fertilizer (0.05 lakh tones) in Kanyakumari district. Pesticide used in the form of dust was 15 kg.

Table 2.27 Distribution of Chemical Fertilizers and Pesticides during 2013-14

Fertilizers (in 'lakh' Tons)									Pesticides	
Nitrogenous (N)			Phosphatic(P_2O_5)			Potassic(K_2O)			Dust (Kgs)	Liquid (Lit.)
2012-13	2013-14	2014-15	2012-13	2013-14	2014-15	2012-13	2013-14	2014-15	2014-15	2014-15
0.05	0.10	0.09	0.02	0.05	0.03	0.02	0.04	0.04	15	7

Source: Statistical Report of the district (2014-15)

2.11 Agricultural Engineering - Machineries and Implements

Tools, implements and powered machinery, are essential and major inputs in agriculture. The term "Mechanization" is generally used as an overall description of the application of these inputs. There are three levels of farm power used to provide an energy source for the utilization of these tools, machines and equipment; manual power, animal draft and motorized power. The level, appropriate choice and proper use of mechanized inputs into agriculture have a direct and significant effect on achievable levels of agricultural production and the profitability of farming. Farm Power and Machinery consisting of manual labour, draught animals, tractors, implements, hand tools, equipment, and machinery is an essential farm input. In almost any agricultural production system the annual expenditure on farm power, whether on labour, draft animals, or fuel and depreciation of machines, largely exceeds the costs of other inputs such as agro-chemicals and seeds. Agricultural production and food security can adversely be affected because of insufficient use of farm power, low labour productivity and/or labour scarcity. Machines are also required to assist the post-harvest loss reduction and on-farm processing. Thus it is once again recognized that agricultural mechanization is crucial in the fight against hunger and poverty, and at the same time to address environmental and health concerns. The number of agricultural implements and machineries in Kanyakumari district are given in Table 2.28.

Table 2.28 Agricultural Implements and Machinery in Kanyakumari district (2014-15)

	Implements	Numbers
Manually Operated Implements		
a	Intercultural equipment	11.00
b	Rice planter	3.00
c	Thresher	130.00
Animal Operated Implements		
a	Winnower	23.00
b	Wooden plough	878.00
c	Steel plough	72.00
d	Cultivator	26.00

	Implements	Numbers
e	Disk harrow	48.00
f	Seed fertilizer drill	2.00
g	Leveler	78.00
h	Wet land puddler	86.00
i	Sugarcane crush	1.00
j	Cart	150.00
k	Ghanis	56.00
Irrigation Equipment's (Water lifting devices)		
a	Diesel Engine	87.00
b	Electric pump	330.00
Tractor and other Power Operated Implements		
a	Agricultural power tillers	7.00
b	Agricultural tractors(wheeled)	85.00
c	Crawler tractor	12.00
d	Mould Board plough	12.00
e	Cultivator	29.00
f	Disc harrow	22.00
g	Seed fertilizer drill	1.00
h	Leveller	1.00
i	Combine harvester tractor operated	2.00
j	Trailers	24.00
k	Power operated paddy thresher	35.00
l	Maize Sheller	1.00
m	Reapers	1.00
Equipment's for livestock and poultry		
a	Incubators / Breeders	2.00
b	Milking machine	3.00
c	Hay harvesting machine (Straw reaper)	10.00
d	Hay harvesting machine (Forage reaper)	8.00
e	Stationery baler	0.00
f	Chaff cutter (Manual)	33.00
g	Chaff cutter (Power operated)	0.00
h	Chaff cutter (Animal operated)	0.00
Horticulture Tools		
a	Hand tools	14436.00
b	Power operated tools	0.00

Source: Statistical Report of the district (2015-16)

2.12 Agricultural Marketing - Regulated Markets

There are six regulated market in Kanyakumari district**.** Majority of these Regulated Markets (RMs) are provided with the necessary infrastructure such as godowns, transaction sheds, drying yards and farmers' rest sheds etc. The total arrival of agricultural produce to these markets during 2014-15 was of the order of ₹ 298.88 lakhs. In order to avoid distress sale by the small and marginal farmers in the peak season, some of the RMs have been identified for providing pledge loans to the farmers. Under this scheme, the farmers can store their produce in these godowns for a maximum period of six months and take pledge loan at a maximum of 75 per cent of the value of the produce up to the maximum limit of ₹25000. The sector depends, to a large extent, on the support from the government. A capital investment subsidy scheme for construction / expansion / modernization of multi chamber / multi product cold storages and storages for horticultural produce was introduced by the GOI. Cold storages would help in minimizing post-harvest losses being suffered by farmers, particularly small and marginal farmers. The number of regulated markets and quantity and value of commodities transacted in those markets are given in Table 2.29.

Table 2.29 Quantity and Value of Commodities Transacted in 6 Regulated Markets of Kanyakumari District during 2014-15

Commodity	Arrivals	
	Quantity (Tonnes)	Receipts (₹ in Lakhs)
1.Coconut Copra	7611.32	12.24
2.Tamarind	27.00	0.15
3.Tapioca	73.73	0.68
4.Paddy	2675.18	3.61
5.Rubber	2012.29	184.29
6.Ground nut	-	0.04
7.Cashew nut	1389.42	97.87
Total	**13794.14**	**298.88**

Source: Secretary (G), Kanyakumari Market Committee, Nagercoil

2.13 Storage facilities

A capital investment subsidy scheme for construction/expansion/modernization of multi chamber / multi product cold storages and storages for horticultural produce was introduced by the GOI. Cold storages would help in minimizing postharvest losses being suffered by farmers, particularly small and marginal farmers. The scheme is implemented by National Horticulture Board in collaboration with NABARD / National Cooperative Development Corporation (NCDC) in IX Five Year Plan starting from 1999 –2000. The cold storage capacity may vary from 10 MT to 5000 MT depending upon the volume, value, etc. of the products to be stored such as horticultural produce and other perishable items such as dairy products, meat, fish, chicken, etc. The permissible subsidy is subject to a maximum of ₹.50 lakhs per project. The scheme has been extended for implementation during the Xth plan period also. Many bankers are encouraging the farmers in taking up this credit linked subsidy scheme. The details of the storage godowns and agricultural godowns available in Coimbatore district is given below. In Kanyakumari district, there are seven agricultural godown with each godown having capacity of 1000 MT.

2.14 Sericulture

Area, production and value of mulberry production in the district were given in the Table 2.30. The total area under Mulberry in the district was 6325 acres during 2014-15. Of which 55 per cent of the area is located in Thovalai block and followed by Agastheeswaram block which covered 30 per cent area (1925 acre). The blocks like Rajakkamangalm, Kurunthancode and Tiruvattar holds 470, 300 and 100 acres respectively. The district produced 15666,100 kg of Cocoons in an area of 6325 acre with a value of 2241663 rupees. In total, 47 per cent of value in cocoon production was observed in Thovalai block, however Melpuram and Thackalay were found to be less in terms of area, production and its value.

Table 2.30 Area and Production of mulberry and cocoon in blocks (2014-15)

Sl.No	Name of the block	Area under Mulberry (in Acre)	Production of Cocoons (Kg)	Value in Rupees
1	Rajakkamangalam	470	467,100	80372
2	Kurunthancode	300	769,000	113462
3	Agastheeswaram	1925	4984,700	914302
4	Thovalai	3480	9106,800	1075726
5	Melpuram	25	113,000	18475
6	Thackalay	25	141,400	23401
7	Thiruvattar	100	84,100	15895
	Total`	**6325**	**15666,100**	**2241633**

Source: Assistant Director of Sericulture, Konam, Nagercoil

2.15 Animal Husbandry and Dairy Development

2.15.1 Livestock Population

The total population of cattle in the district was 61268. Other than cattle, the farmers reared sheep (731), goats (110858), pigs (1551), rabbits (9061) and buffaloes (2952) for their source of supplementary income to the crops. Also the farmers maintained the poultry of about 6.43 lakhs for regular cash flow as per 19th livestock Census in the district. The details on livestock population in the district are presented in the Table 2.31.

Table 2.31 Livestock Population

(Numbers)

Sl. No.	Particulars	Population
1	Cattle	61268
2	Buffaloes	2952
3	Sheep	731
4	Goats	110858
5	Horses and ponies	3
6	Donkeys	285
7	Camels	0
8	Pigs	1551
	Total Livestock	**177648**
9	Elephants	0
10	Dogs	68122
11	Rabbits	9061
	Poultry	
12	Bank yard Poultry	560803
13	Farm Poultry	83042
	Total Poultry	**643845**

Source: 19th Livestock Census

2.15.2 Veterinary hospitals

All the blocks in the district holds Veterinary dispensary of about 36 for the effective production of livestock and poultry. Thackalay and Melpuram block possess each one Government hospitals. The details of the individual blocks were given in the Table 2.32.

Table 2.32 Block wise Veterinary Hospitals in the district

Year (2011-12)

Sl. No.	Name of the Block	Number		
		Government Hospitals	Private Hospitals	Veterinary Dispensary
1	Thovalai	-	-	6
2	Agastheeswaram	-	-	4
3	Rajakkamangalm	-	-	4

Sl. No.	Name of the Block	Number		
		Government Hospitals	Private Hospitals	Veterinary Dispensary
4	Thackalay	1	-	4
5	Kurunthancode	-	-	5
6	Killiyoor	-	-	4
7	Munchirai	-	-	3
8	Melpuram	1	-	4
9	Thiruvattar	-	-	2
Total		2	-	36

Source: Deputy Director of Animal Husbandry C.B & F.D, Nagercoil

2.15.3 Veterinary Institutions and Animals Treated (Block wise)

The number of veterinary institutions, sub centres and veterinary dispensaries in the blocks of district were presented in the Table 2.33. There are about 36 hospitals in the district, of which the maximum number of hospitals was located in Thovalai block (6 No's) followed by Kurunthancode (5 No's) and Agastheeswaram, Rajakkamangalm, Killiyoor and Melpuram. The number of Veterinary dispensaries in the district was 12 and more than 502166 animals were treated in the dispensaries.

The infrastructure facilities developed in the block are presented in the Table 2.34. The district possesses 36 veterinary clinics. There are potential for creation of infrastructures like milk collection centre and cooperative marketing societies in the district.

Table 2.33 Veterinary Institutions and Animals Treated Block wise (2011-12)

Sl. No.	Name of the Block	Veterinary Institutions					Sub centres	Veterinary Dispensaries	Other Units		Animals treated	Castration performed
		Poly- clinic	Hospitals	Dispensaries	Mobile Dispensaries	Clinician Centres			Animal disease investigation unit	Mobile units		
1	Thovalai	-	-	6	-	-	2	14	-	-	44164	485
2	Agastheeswaram	-	-	4	1	1	6	2	-	-	76715	918
3	Rajakkamangalm	-	-	4	-	-	2	2	-	-	61721	482
4	Thackalay	-	1	4	1	-	-	1	-	-	65702	45
5	Kurunthancode	-	-	5	-	-	1	1	-	-	50736	38
6	Killiyoor	-	-	4	-	-	-	-	-	-	47393	63
7	Munchirai	-	-	3	-	-	1	2	-	-	44351	72
8	Melpuram	-	1	4	-	-	3	1	-	-	68104	117
9	Thiruvattar	-	-	2	-	-	1	2	-	-	43280	156
	Total	**-**	**2**	**36**	**2**	**1**	**16**	**12**	**-**	**-**	**502166**	**2376**

Source: Deputy Director of Animal Husbandry, C.B. & F.D, Nagercoil

Table 2.34 Infra structure facilities in the district

Infrastructure facilities	B1	B2	B3	B4	B5	B6	B7	B8	B9
Co-operative marketing society	0	0	0	0	0	0	0	0	0
Veterinary clinics	11	4	5	2	1	2	5	2	4
Milk collection centre	0	0	0	0	0	0	0	0	0

B1- Agastheeswaram, B2 - Thovalai; B3 - Rajakkamangalam; B4 - Thackalay; B5 -Killiyur; B6- Kurunthencode;B7-Tiruvattar;B8-Melpuram;B9-Munchirai
Source: TANUVAS, Chennai

2.15.4 Dairy development in District (2011-12)

The number of milk societies, quantity and value of milk production was presented in the Table 2.35.

Table 2.35 Milk production in the district

Number of milk societies	Quantity of milk produced (in litres)	Value of milk produced (in₹.)
111 MPCS	1,56,14,670	265449390

Source: Deputy Registrar of Dairy Development

2.15.5 Poultry development in district

Table 2.36 Poultry population in the district (2011-12)

Backyard poultry	Farm poultry	Total Poultry
1301908	0.00	1301908

Source: Director of Animal Husbandry and Veterinary Services, Chennai-06

There are 1301908 back yard poultry birds are available during 2011-12. The details are furnished in the Table 2.36.

2.15.6 Egg production in the district (2014-15)

The total egg production in the district was 106.70 lakh No's in 2014-15 while 96.181 lakhs during 2012-13. The details are presented in the Table 2.37.

Table 2.37 Estimated Egg Productions in the district (lakhs)

2013-14		2014-15	
Desi	**Improved**	**Desi**	**Improved**
106.70	-	96.181	-

Source: Director of Animal Husbandry and Veterinary Services, Chennai-06

2.16 Fisheries

The total distance of coastal line of the district was 71.5 km. From this, total inland fresh water spread in an area of about 6984.10 ha and brackish water in 380 ha.

There are about 42 fishing villages in the district. The details are furnished in the Table 2.38.

Table 2.38 Area and water spread in the district

a.	Total Coastal Line of the District	71.5 Km
b.	Total Inland Fresh Water spread	6984.10 ha
	Estuaries and Brackish Water Area	380 ha
c.	Marine Fishing Villages	42

Source: Assistant Director of Fisheries, Nagercoil

The total quantity of fishing in various fishing centres of district was given in the Table 2.39. Total quantity of marine fish catch in the district in about 42 centres was 42716.6 tonnes and from other reservoirs about 436846 tonnes.

Table 2.39 Estimated Marine fish and Inland Fish production (2014-15)

Fishing Centres	Inland Fish Catch (Tonne)	Marine Fish Catch (Tonne)	Number of Fisherman Engaged	Value (₹ in crores)
Arockiapuram to Neerodi (42 centres	-	42716.6	2994 8	170.1
All Reservoirs and Tanks	4368.46	-	2470	10.92

Source: Assistant Director of Fisheries, Nagercoil

The facilities developed for the inland fisheries in the district were presented in the Table 2.40. From the nine blocks of the district, the government has created facilities such as 7 No's of Freezing plants, Ice plants, Cold chambers for welfare of the fisherman. There are 4793 Kattamaram, 4316 Vallam and 1198 boats in the district.

Table 2.40 Inland Fisheries Development (2014-15)

Sl.No.	Particulars	In Numbers
a.	Freezing Plants, Ice plants, Cold storages	7
b.	Walk in coolers	-
c.	Sea food manufacturing	2
d.	Fisheries Training center	
	i. Marine	1
	ii. Inland	-
	iii. Fishing Vessels Kattamaram	4793
e.	Vallam	4316
f.	Boats	1198
g.	Active Marine Fisherman (Census)	151160

Source: Assistant Director of Fisheries, Nagercoil

2.17 Banking and Insurance

Kanyakumari district has great advantage of having a large number of banks. Commercial banks having high advances (5060 Crores) and deposits (4372 crores) followed by private and co-operative banks. The extent of deposits, advances and sector wise credit details during 2014-15 are given in Table 2.41.

2.18 Co-operation

The different types of co-operative institutions including credit co-operatives and marketing co-operative society's function in Kanyakumari district during 2014-15 are given in Table 2.42.

Table 2.41 Extent of Deposits, Advances and Sector wise Credit Details of Kanyakumari District during 2014-15

Items	Deposit (₹ in Crores)	Advances (₹ In Crores)	Credit Deposit Ratio %	Sector wise Credit Details (₹ in Crores)			
				Agriculture	Industries	Service	Others
Commercial Bank	4372	5060	116	3091	298	127	1544
Private Bank	1267	1780	140	887	70	7	816
Co-op Bank	601	1138	189	319	8	8	803
Total	**6240**	**7978**	**128**	**4297**	**376**	**142**	**3163**

Source: Lead District Manager, Lead Bank office, I.O.B., Nagercoil

Table 2.42 Co-operative Institutions Functioning in Kanyakumari District during 2014-15

Sl.No.	Type of society	No.of Societies	Membership	Share Capital	Working Capital	Loan			No.of Employees
						Advanced	Out standing	Over due	
1	District Central Coop Bank	1	516	1629.11	58110.55	68410.31	45911.2	2475.1	131
2	PAC Bank	112	308313	1811.57	45158.61	51830.33	45015.17	1813.6	845
3	Urban Bank	1	16292	35.91	1338.65	1315.71	832.92	30.12	5
4	Co-op Wholesale Stores	-	-	-	-	-	-	-	-
5	Dist. Co-op Union	1	784	-	-	-	-	-	2
6	Institute of Co-op Management	1	195	1.54	1.54	-	-	-	2
7	Co-op Printing Press	1	517	12.99	15.26	-	-	-	30
8	Co-op Hospital	-	-	-	-	-	-	-	-
9	Formers service co-op Societies	2	28312	132.65	1895.1	2346.12	2005.13	186.15	37
10	Co-op Primary Agri. Rural Dev. Bank	5	28012	196.58	760.59	2545.76	2112.65	1192.6	28
11	Non Agricultural Credit Societies	1	193	0.31	0.31	-	-	-	1
12	Employees Co.Th & Credit Societies	41	24912	2518.82	16510.11	3992.15	167215	810.99	104
13	Urban Co-op Societies	4	14524	135.74	1620.37	1958.75	1911.08	26.1	17
14	Co-op Milk Societies	-	-	-	-	-	-	-	-
15	Co-op Marketing Societies	3	14680	12.26	276.15	372.19	200.65	3.15	80
16	Primary Co-op Stores	12	10115	2.63	115.55	-	-	-	47
17	Students Co-op Store	170	9011	3.04	4.47	-	-	-	12
18	Special type of Societies	9	2539	1.91	9.47	-	-	-	2

Source: Joint Registrar of Co-operative Societies, Nagercoil

CHAPTER III

DEVELOPMENT OF AGRICULTURE AND ALLIED SECTORS

Before suggesting an action plan for development of agriculture and allied sectors, a brief analysis (at district level) was done in the following components:

i. Assessing the trends in area, production and productivity of major crops and projection till the year 2014-15
ii. Yield gap analysis for the major crops

3.1 Trends in area, production and productivity of major crops

The past trends in area, production and productivity of major crops need to be analyzed to plan for future agricultural development. Compound Growth Rate (CGR) tool is used to measure the annual rate of growth in area, production and productivity of major crops cultivated in the district and it is expressed in percentage. The compound growth rate was estimated using 15 years' time series data from 2000-2001 to 2014-15. The equation used to estimate the annual compound growth rate is:

$$Y_t = ab^t e$$

Logarithmic form of the above equation is: $\ln Y = \ln a + t \ln b$

The compound growth rate (CGR) in percentage is derived using the formula:

$CGR(r) = [\text{Antilog } b-1] \times 100$

Where, Y_t = Area or Production or Yield

a = Intercept

b = Regression coefficient of t

t = Time variable

r = Compound Growth Rate

Average of area, production and productivity of major crops in the district is presented in Table 3.1. It could be seen from the Table 3.1 that, coconut, rubber and banana are the major crops grown in the district. On an average (triennium average ending 2014-15) the district showed a paddy output of 63,842.64 tonnes in an area of about 13,069 ha. The coconut is grown in an area of about 24,217.33 ha. and annually about 4167 lakh nuts are harvested in the district. Tapioca another major food crop is grown in 1050.67 ha. Yearly about 34859 tonnes are harvested. Banana a high value crop is grown in many pockets of the district and every year around 1.66 lakh tonnes of banana are produced.

Table 3.1 Area Production and Yield of major crops in Kanyakumari District (Triennium average ending 2014-15)

Sl.No.	Crops	Area(Ha)	%	Production (Tonnes)	Yield (kg/ha)
1	Paddy	13069.00	27.71	63842.67	4885.046
2	Black gram	1011.33	2.14	848.67	839.1623
3	Ground nut	24.33	0.05	59.33	2438.553
4	Coconut*	24217.33	51.35	4167.67	172.0945
5	Tapioca	1050.67	2.23	34859.00	33177.88
6	Banana	6440.33	13.66	166824.00	25903.02
7	Mango	1344.33	2.85	9225.33	6862.4
	Total	**47157.33**	**100**		

**In lakh nuts and N.A. denotes Not Available*

The Compound growth rates are shown in Table 3.2.

Table 3.2 Compound Growth Rates (CGR) of Area, Production and Productivity under major crops in Kanyakumari District

Sl.No.	Crops	CGR during 2005-2006 to 2014-15 (%)		
		Area	Production	Productivity
1	Paddy	-4.580	-2.455	2.125
2	Black gram	-17.035	-17.106	-0.071
3	Ground nut	-15.356	-11.814	3.542
4	Coconut*	1.112	-4.019	-5.131
5	Tapioca	-7.240	-4.051	3.189
6	Banana	1.762	1.896	0.134
7	Mango	-2.027	3.779	5.806
8	Cashew nut	-2.794	1.528	4.322
9	Rubber	2.803	NA	NA

* Denotes growth rates during 2005-06 to 2014-15

Barring a few crops like coconut, banana and rubber, the area under other crops has been declining. Similarly, the production of major crops (except banana, mango and cashew nut) suffered from a declining trend in production. Subsequently the trend in productivity of crops like black gram, coconut has shown a declining trend. The declining

trends in area under paddy and other crops were offset with the increasing trend in yield and thus minimizing decline in production.

3.1.1 Projected area, production and yield of selected crops

The area, production and yield were projected using CGR for the years up to 2015-16 and the results are presented in Table 3.3.

However, the major crops grown in the district are paddy, coconut, tapioca, banana, and rubber. These 5 crops together accounted for 86 per cent of the gross cropped area of the district. Therefore, these five crops were focused as potential crops of the district and the scope for further expansion of their potentiality in terms of production has been explored.

From the Table 3.3 it could be observed with the current pattern of changes (growth rates) in the area production and yield, the area under paddy would be around 13,354 ha in 2015-16 with the loss in area of about 3600 ha from the existing paddy area. Though the yield trend showed a positive sign, the loss in area could not compensate with a higher quantity of paddy production in the state. Similar conditions are prevailing in other major crops also barring banana, mango and cashew nut. In order to sustain the overall production of major crops in the district, there is a need to arrest further decline in area and adequate measures are to be taken to increase the productivity of the crops.

Table 3.3 Projected Area, Production and Yield based for the major potential crops identified

Description	Paddy			Black Gram			Ground Nut		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rate (%)	-4.580	-2.553	2.125	-17.035	-17.093	-0.071	-15.356	-12.442	3.542
Triennium Average ending 2011-12	16971	82245	4853	603	268	438	13	24	1845
2012-13	15370	75021	4881	393	144	366	9	17	1877
2013-14	14666	73106	4985	326	119	366	8	15	1943
2014-15	13995	71239	5091	270	99	366	6	13	2012
2015-16	13354	69420	5199	224	82	365	5	11	2083

Description	Coconut			Tapioca			Banana		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rate (%)	1.112	-4.572*	-5.131*	-7.240	-4.282	3.189	1.762	1.898	0.134
Triennium Average ending 2011-12	24930	3339	13394	4152	140231	35266	6083	195431	32272
2012-13	25822	2520	9991	3994	150573	37697	6300	219200	34792
2013-14	26109	2397	9460	3705	144126	38899	6411	223361	34839
2014-15	26399	2280	8956	3437	137954	40140	6524	227601	34885
2015-16	26693	2168	8480	3188	132047	41420	6639	231921	34932

Description	Mango			Cashew nut			Rubber		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rate (%)	-2.027	3.660	5.806	-2.794	1.398	4.322	2.803	NA	NA
Triennium Average ending 2011-12	1444	6771	4705	1528	983	611	23604	NA	NA
2012-13	1416	5994	4232	1502	816	543	24069	NA	NA
2013-14	1388	6213	4478	1460	827	566	24743	NA	NA
2014-15	1359	6441	4738	1419	838	591	25437	NA	NA
2015-16	1332	6676	5013	1380	850	616	26150	NA	NA

Area in Hectares; Production in Tonnes; Yield in Kg/ ha (Denotes growth rates from 2000 to 2014)*

3.2 Yield Gap Analysis

In order to raise the productivities of the selected crops, information regarding ruling varieties, their average yield, potential yield, progressive farmer's yield etc. were collected from the O/o the Joint Director of Agriculture and Deputy Director of Horticulture. From this information, yield gaps were analysed and it is shown in Table 3.4.

Yield Gap is the difference between the progressive farmer's yield and average farm yield which explains the gap due to soil and climatic factors, technologies adopted, availability of farm inputs like suitable varieties, fertilizers, plant protection chemicals, irrigation water, labour and so on, cultivation practices followed, etc.

Table 3.4 Yield gap analysis (kg/ha)

Sl. No.	Crops	Potential Yield	Progressive Farmer's Yield	Average yield	Yield Gap I	Yield Gap II	Gap I + II
		1	2	3	4=1-2	5=2-3	6=1-3
1	Paddy (Kg/ha)						
	a. ASD 16	12540	11645	7110	895	4535	5430
	b. Savithri	12540	12540	6942	0	5598	5598
	c. TPS 3	12540	8080	5975	4460	2105	6565
2	Coconut (Nuts)	18500	18500	18190	0	310	310
3	Tapioca (tonnes/ha)	42	36	34.75	6	1.25	7.25
4	Banana (tonnes/ha)	47.74	38	34.75	9.74	3.25	12.99
5	Rubber (tonnes/ha)	0.6	0.6	0.55	0	0.05	0.05

Table 3.4.1 Milk yield gaps of different animals in the district

Blocks	Milk yield	Cows		Buffalo	
		Local	Cross breed	Local	Cross breed
B1	**Potential (kgs)**	1500.00	4500	2400	3600
	Actual (kgs)	1000	2000	3600	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B2	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B3	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and		Lack of green fodder and	

Blocks	Milk yield	Cows		Buffalo	
		Local	Cross breed	Local	Cross breed
		poor management		poor management practice	
B4	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B5	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B6	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B7	**Potential**	1500	4500	2400	3600
	Actual	100	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B8	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	
B9	**Potential**	1500	4500	2400	3600
	Actual	1000	2000	1500	1800
	Reason for low yield	Lack of green fodder and poor management		Lack of green fodder and poor management practice	

B1- Agastheeswaram, B2 - Thovalai; B3 - Rajakkamangalam; B4 - Thackalay; B5 - Killiyur; B6- Kurunthancode; B7-Tiruvattar; B8-Melpuram; B9-Munchirai

3. 4 Crop area coverage and schemes implemented by various departments

The details about various schemes implemented by the line departments of the district are presented in Tables 3.9. (Agriculture), 3.10 (Horticulture) and 3.11 (Agricultural Engineering).

3.4.1 Agriculture

Paddy is one of the major crops grown in the district. It is cultivated in an area of about 17000 ha.To promote the SRI technology. SRI cultivation in the district is planned to promote in 14000 ha (70% coverage). Similarly, the pulse crop was estimated to improve in an area of 700 ha. The whole village concept, paddy seed farm arrangements, distribution of MN mixtures and biofertilizers and prepartion and distribution of farmers integrated handbook are some of the interventions that can be made in the district.

Various scheme / components can be implemented through state and centrally sponsored schemes. Paddy seed multiplication scheme can be implemented to fulfill adequate supply of paddy seed materials to the farmers. In order to promote pulses crop a scheme on pulses seed procurement and distribution can be implemented. To cover the risk in Agriculture, National Agriculture Insurance Scheme (NAIS) can be implemented to benefit approx. 20,000 farmers. The seeds and inputs can be distributed through Seed development Program. To promote pulses cultivation and marketing, a scheme through centrally sponsored scheme namely NFSM-Pulses can be sanctioned to the district. Other farmer oriented activities are implemented through ATMA. Supply of gypsum, micronutrients, rhizobial or phosphorous solubilizing bacteria can be done through Integrated Nutrient Scheme. Field days and farmer-scientist interaction can be made in various blocks of the district under different schemes.

3.4.2 Horticulture

Various schemes were implemented by the Department of Horticulture. The major centrally sponsored schemes are National Mission on Medicinal Plant and National Bamboo Mission. Under the state sponsored scheme, Integrated Horticulture Development Program can be made popular. Some schemes like NHM, Rain fed Area Development Program and National Mission and Micro Irrigation can also be implemented in the district.

3.4.3 Agricultural Engineering

Various schemes were implemented by the Department of Agricultural Engineering.

The major state sponsored schemes are Soil Conservation under Western Ghats Development Program and Agricultural Mechanization. These two schemes can also be implemented during the forthcoming years 2014-15 and 2015-16. Soil Conservation under Western Ghats Development Program should be planned to done during 2014-15. New schemes like Financial Assistance for Procurement of Agricultural

Machinery and Equipment and National Mission on sustainable Agriculture (NMSA) were can also be implemented.

3.5 Schemes implemented by the Department

The various schemes implemented in the Department of Agriculture, Horticulture and Agricultural Engineering during the year 2012-13 is presented in the Table 3.5, 3.6 and 3.7.

Table 3.5 Schemes implemented by Department of Agriculture (2012-13)

(₹ in Lakhs)

Sl.No.	Scheme / Project	Physical		Budget Allocation
		Unit	Target	
1	Paddy - Seed multiplication scheme (Procurement and Distribution)	MT	200	39.24
2	Pulses seed procurement and distribution	MT	2	75.00
3	Augmenting Pulses Production (Production subsidy)	MT	1	0.15
4	Augmenting Pulses Production (Distribution subsidy)	MT	1	0.08
5	Procurement and distribution of green manure seeds at 50% subsidy	MT	2	0.80
6	Production and distribution of blue green algae	MT	2	
7	Composting of farm wastes through Pleurotus	Nos	187	
8	Vermicomposting of Agricultural wastes (Demo & training)	Nos	7	0.27
9	Crop and plant protection			0.884
10	National Agricultural Insurance Scheme	Nos	17500	50.00
11	**Cereals Development Program**			
(i)	Paddy seed distribution	MT	200	10.00
(ii)	Distribution of Power Weeder	Nos	20	3.00
(iii)	Distribution of Zero till Seeddrill	Nos	6	1.20
(iv)	Distribution of Drum seeder	Nos	2	0.04
(v)	Distribution of Rotovators	Nos	2	0.40
(vi)	Distribution of Power tillers	Nos	2	0.90
(vii)	Distribution of Sprayers	Nos	30	0.60
(viii)	Distribution of Pumpsets	Nos	2	0.20
12	CDB SCHEMES- Establishment of Regional Coconut nurseries	Nos	0.160	1.25

Table 3.5 Schemes implemented by Department of Agriculture (2012-13) (Contd.)

Sl.No.	Scheme / Project	Physical		Budget Allocation
		Unit	Target	
13	Laying of demonstration plot new and maintenance	Ha	40	7.00
14	**NFSM - PULSES 2012-13**			
(i)	Distribution of Certified Seeds-₹.2200/ Qtl. for varieties less than 10 years	Qtl.	3	0.066
(ii)	Distribution of Certified Seeds-₹.1200/ qtl for varieties more than 10 years old	Qtl.	10	0.12
(iii)	Demonstration on improved Technologies -Cluster demn.(of 100 ha each) on intercropping improved varieties/farm implements like Ridge furrow makers/seed drills @ ₹. 5000/ha	Ha	100	5.00
(iv)	Integrated Nutrient management - Gypsum @ ₹.750/ Ha.	Ha	3	0.023
(v)	Integrated Nutrient management - Micro Nutrients ₹.500/ Ha.	Ha	4	0.02
(vi)	Assistance for Rhizobium culture/ PSB distribution @ ₹.100/Ha	Ha	20	0.02
(vii)	Integrated Pest management- I.P.M. Package @ ₹.750/ha.	Ha	7	0.053
(viii)	Integrated Pest management-Assistance for distribution of PP chemicals @ Rs.500/Ha	Ha	7	0.035
(ix)	Integrated Pest management-Assistance for weedicides @ ₹.500/Ha	Ha	1	0.005
(x)	Integrated Pest management-Distribution of NPV @ ₹.250/Ha	Ha	1	0.003
(xi)	Resource conservation technologies/tools-Assistance for Knap Sack Sprayers @ ₹.3000/Machine	Nos	1	0.03
(xii)	Efficient Water application tools-Distribution of Sprinkler sets @ ₹.7500/ha.	Ha	1	0.075
(xiii)	Efficient Water application tools-Incentive for Mobile Sprinklers/Rain guns @ ₹.15000/Rain gun	Nos	1	0.15
(xiv)	Efficient Water application tools-Assistance for pipe for carrying water from source to field @ ₹.15000/Farmer	Nos	1	0.15
(xv)	PMT & other Miscellaneous expenses - State Level - Contingency for Misc. Exp.			1.00
15	Accelerated Pulses Production Program (A3P) - UNDER NFSM-2011-12 Season-Rabi	Ha	100	4.80

Table 3.5 Schemes implemented by Department of Agriculture (2012-13) (Contd.)

Sl.No.	Scheme / Project	Physical		Budget Allocation
		Unit	Target	
16	Additional area coverage of pulses during Rabi/summer under National Food Security Mission Pulses			
(i)	Distribution of Certified Seeds ₹1200/ qtl for varieties more than 10 years old	Qtl	12	0.144
(ii)	Integrated Nutrient Management - Micro Nutrients ₹.500/ ha.	ha	10	0.05
(iii)	Integrated Nutrient Management - Gypsum @ ₹..750/ Ha.		10	0.075
(iv)	Integrated Pest management- I.P.M. Package @ ₹.750/ha.		10	0.075
17	**Seed village scheme**			
(i)	Paddy	Mt	20	2.00
(ii)	Training	Nos	10	1.50
18	**ATMA**			
(I)	**Farmer Oriented Activities**			
i.	**Farmers Training**			
a	Within state		6	2.25
b	Within District		3	0.60
ii.	**Demonstration**			
a	Agriculture		127	5.08
b	Allied		52	2.08
iii.	**Exposure Visit**			
a	Inter state		9	2.70
b	Within state		5	1.50
iv.	**Mobilizing Commodity Interest Groups**			

Table 3.5 Schemes implemented by Department of Agriculture (2012-13) (Contd.)

Sl.No.	Scheme / Project	Physical		Budget Allocation
		Unit	Target	
a	Capacity Building		25	1.25
b	Seed money		12	1.20
v.	**Farm school**		18	6.015
(II)	**Farm Information Dissemination**			9.00
(III)	**Agricultural Technology Refinement, Validation, Refinement, Validation and Adoption**			
a	Farmer - Scientists interaction		2.0	0.40
b	Field Days		21.0	3.15
(IV)	**Operational Expenses BTM**		9.0	5.40
(V)	**Operational Expenses SMS**		18.0	7.56
(VI)	**Farmer Friend**		40.0	0.80
	Total			**255.393**

Table 3.6 Schemes implemented by Department of Horticulture (2012-13 to 2014-15)

(₹. in Lakhs)

Sl.No.	Scheme / Project Title	Unit	2012-13		2013-14		2014-15	
			Physical Target	Budget Allocation	Physical Target	Budget Allocation	Physical Target	Budget Allocation
I	**Centrally sponsored**							
1	National Mission on Medicinal Plant	Ha	60.0	6.85	60.0	6.85	35	3.725
2	National Bamboo Mission	Ha	30	1.2	0	0	10	0.525
II.	**State sponsored**							
1	Integrated Horticulture Development Program	Ha	525	11.3414	350	7	176.5	7.00

Table 3.6 Schemes implemented by Department of Horticulture (2012-13 to 2014-15) (Contd.)

Sl.No.	Scheme / Project Title	Unit	2012-13		2013-14		2014-15	
			Physical Target	Budget Allocation	Physical Target	Budget Allocation	Physical Target	Budget Allocation
III.	**Central and State sponsored**							
1	National Horticulture Mission	Ha & No	1789	83.33	6898	221.15	5948	190.665
2	Rain fed Area Development Program	Ha	1155	72.2	219	24.7	100	13.075
3	National Mission on Micro Irrigation	Ha	400	22.2432	120	7.0485	25	

Table 3.7 Schemes implemented by Department of Agricultural Engineering (2012-13 to 2014-15)

(₹ in lakhs)

Sl.No.	Scheme / Project Title	Unit	2012-13		2013-14		2014-15	
			Physical Target	Budget Allocation	Physical Target	Budget Allocation	Physical Target	Budget Allocation
I	**Schemes shared between Centre and State**							
1	Agricultural Mechanization Program	Machinery/ Implements in Nos.	2	0.900	--	--	--	--
2	Financial Assistance for Procurement of Agricultural Machinery and Equipment	Machinery/ Implements in Nos.	--	--	--	--	232	73.582
II.	**Central Sector Schemes with 100% Central Assistance**							
1	Demonstration of Agricultural machinery and implements	No. of Demo Machinery in Nos	13	0.390	20	0.6	15	0.600

Table 3.7 Schemes implemented by Department of Agricultural Engineering (2012-13 to 2014-15) (Contd.)

Sl.No.	Scheme / Project Title	Unit	2012-13		2013-14		2014-15	
			Physical Target	Budget Allocation	Physical Target	Budget Allocation	Physical Target	Budget Allocation
2	Training Program to Farmers in handling and maintenance of Agricultural machinery	No. of Trainings	--	--	4	1.040	3	2.400
3	National Mission on Sustainable Agriculture (NMSA)	Structures in Nos.	--	--	--	--	324	91.950
III.	**State Plan Schemes**							
1	Rain Water Harvesting and Runoff Management Program	Structures in Nos.	--	--	10	23.530	--	--
2	Soil Conservation under Western Ghats Development Program	Structures in Nos.	417	94.942	341	146.846	283	133.062
3	Agricultural Mechanization	Machinery/ Implements in Nos.	110/2500	64.630	507	44.716	--	--
4	Formation of Farmers Group and Training to Farmers - Supply of Agricultural Machineries	Groups and Nos	1	11.730	2, 32	0.623	--	--
5	Provision of solar PV Pumping system of 5 hp AC Solar Powered pumping system - non tracking type	Nos.	--	--	5	16.760	--	--

3.3 Technological interventions and strategies to reduce the yield gaps

The adoption of suitable high yielding varieties and crop production technologies are the pre-requisites to boost the production. The strategy for increasing the production of potential crops in Kanyakumari district through the increase in productivities of those identified crops has already been discussed in the previous section. The productivities could be raised by growing the suitable high yielding varieties and as a consequence, the prevailing yield gap could be bridged. The specific features and the technologies for cultivating the selected high yielding varieties of the select crops are discussed below.

Table 3.8 Technological interventions and strategies to reduce the yield gaps

Sl. No.	Major crops& enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options					Proposed Intervention
1	Paddy	Lack of knowledge in identification and cultivation of specific high yield rice varieties suitable for Kanyakumari district	Multiplication and popularization of high yielding rice varieties	**Season**	**High Yielding Varieties**	**Duration (Days)**	**Yield (Kgs/ha)**	**Special Features**	Seed multiplication and distribution of seeds to the farmers at subsidized cost. Training and field demonstrations to be conducted at different levels Conduct of Field days, Farmer days and exhibition for popularization of varieties
				Kar (May-June)	ADT 36	110	*4000*	Medium	
					ASD 16	110-115	*5600*	Short bold	
					ASD18	105-110	*5900*	Medium slender	
					MDU 5	95-100	*4500*	Medium slender	
					ADT 43	110	*5900*	Medium slender	
					CO 47	110-115	*5832*	Medium slender	
					CORH 3	110-115	*7500*	Medium slender	
					ADT(R) 45	110	*5400*	Medium slender	
					ADT(R) 47	118	*6200*	Medium slender	
				Pishanam/Late Samba/Thaladi (Sep-Oct)	*White Ponni*	*135-140*	*4500*	*Medium slender*	
					CR 1009	*155-160*	*5300*	*Short bold*	

Sl. No.	Major crops& enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options					Proposed Intervention
					ADT 39	*120-125*	*5000*	*Medium slender*	
					CO(R) 49	130-135	6286	Medium slender	
					CO 43	135 - 140	5200	Medium slender	
				Semi dry (Jul-Aug)	ADT 36	110	*4000*	Medium	
					TKM (R)12	115-120	*5362*	Long slender	
					PKM(R) 3	110-115	*3025*	Long bold	
		Occurrence of seed borne diseases at nursery and establishment stage which caused reduction in population	Seed treatment with bio control agents and bio fertilizers through mass multiplication and distribution of bio control agents and bio fertilizers	Seedling dip with *Pseudomonas fluorescens* (Pf-1) @ 2.5 kg/ha or seed treatment (10g/kg)					Mass multiplication and distribution at research stations, KVK's and constituent colleges
		Reduction in yield due to insufficient supply of	Nutrient mixture application at	Foliar Nutrition in flowering stage: - 2% DAP + 1% KCL + 1% Urea at 50% flowering stage or TNAU Rainfed rice MN mixture					Distribution or supply of nutrient

Sl. No.	Major crops& enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention
		nutrients	critical stages	@ 12.5 kg/ha as EFYM at 1:10 ratio at tillering and panicle initiation stages.	mixtures by the department at subsidy
		Occurrence of Disease and pest incidence caused economic loos to the farmers	Control of pests and diseases through application of bio control agents	• **Rice blast & Sheath blight** – Seed treatment with TNAU Pf 1 10 ml/kg of seeds or spray Carbendazim 50WP @ 500g/ha or Tricyclozole 75 WP @ 500g/ha or Azoxystrobin 25 SC @ 500 ml/ha or Neem oil at 3% • **Rice root and White tip nematodes -** Seed treatment with *Pseudomonas fluorescens*(10 g/kg seed) and as foliar spraying @ 1 kg/ha thrice at 45, 55 and 65 DAT. • **Sucking pests (Brown leafhopper, Green leaf hopper, Thrips& Gall midge), Stem borer and leaf folder** – Spray Fipronil 5% SC 1000-1500 ml/ha or Triazophos 40% EC 625-1250 ml/ha or Seed treatment @ 5g/Kg of seed and foliar application of *Beauveriabassiana*@ 5g/ltwice at 15 days interval	Supply of biocontrol agents, awareness campaign on the usage of pesticides, training and demonstration on management of rice pests and diseases
		Weed menace due to lack of labour for manual weeding caused yield reduction	Weed management through mechanized farming	• Single row or double row rotary weeder for weeding	Supply of Cono weeder in subsidized rate

<table>
<tr><th>Sl. No.</th><th>Major crops& enterprises being practiced in the district</th><th>Prioritized problems in these crops/ enterprise</th><th>Title of intervention</th><th>Technology options</th><th>Proposed Intervention</th></tr>
<tr><td></td><td></td><td>Scarcity of labour at the harvesting season</td><td>Mechanical harvesting of paddy</td><td>• Combine harvester for harvesting</td><td>Strengthening the department of Agricultural Engineering by increasing the number of combined harvester which help the farmers to utilize them under custom hiring basis</td></tr>
<tr><td>2</td><td>Coconut</td><td>Yield decline due to old varieties causes economic loss to the farmers</td><td>Promotion of high yield varieties and hybrids suitable for the district</td><td>Varieties suitable for the district are Tall and T X D hybrids.
• Tall - VPM3, ALR 1, ALR 2 and West Coast Tall
• Dwarf (tender coconut) -COD, CYD, CGD and MYD+
• Hybrids - VHC1, VHC2 and COD X DCT
<table><tr><th>S. No</th><th>Variety</th><th>Nut yield (No’s / tree / year)</th><th>Earliness (year)</th></tr><tr><td>1</td><td>Hybrid ()</td><td>100</td><td>3 – 5</td></tr><tr><td>2</td><td>Tall ()</td><td>60– 80</td><td>6 – 7</td></tr><tr><td>3</td><td>Dwarf (tender coconut)</td><td>70 - 90</td><td>4 – 5</td></tr></table></td><td>Distribution high yielding coconut seedlings in the State Horticulture Farm, Research Stations.
Training and demonstrations on package of practices on coconut cultivation</td></tr>
</table>

Sl. No.	Major crops& enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention
		Due to improper management of coconut orchards, the nut yield is reduced.	Dissemination of advanced crop management technologies to the growers	• **Spacing:** Adopting square system of planting (7.5 x 7.5 m) by accommodating 175 plants/ha (For garden: 25' x 25') • **Drip irrigation** -Irrigating coconut trees at the rate of 30 l/h for 2.5 h with a irrigation frequency of 8 days. • **Fertigation** - To be done at monthly intervals with 75% RDF • **Micronutrient** – TNAU micronutrient mixture is recommended @ 1.0kg / tree /year. • **TNAU Coconut Tonic Nutrition**- Root feeding of TNAU coconut tonic @ 200 ml/palm once in six months decreases button shedding and increases the number and size of nuts.	Extension of micro irrigations schemes for coconut, supply of micronutrient mixture at subsidized cost, distribution of coconut tonic to the farmers, training and demonstration on advanced crop management technologies.
		Since price fluctuation occurs rapidly for coconut, the farmers incur a economic loss in coconut due to monocrop culture	Promotion of multitier cropping system in coconut plantations	• **Multitier cropping system** –Banana + pepper + cocoa + nutmeg + vanilla	Training and demonstrations on multitier cropping system, quality planting material distribution
		Loss of tree population in certain period of time due to heavy	Integrated pest and disease management	• **Rhinoceros beetle -**Place phorate 10 G 5 g in perforated sachets in two inner most leaf axils for 2 times at 6 months intervals.	Training and demonstration on pest and disease

Sl. No.	Major crops& enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention
		infestation of pests and diseases infection	technique in coconut	• **Red palm weevil -**Setting up of traps (mud pots) containing sugarcane molasses 2½ kg or toddy 2½ litres + acetic acid 5 ml + yeast 5 g + longitudinally split tender coconut stem/logs of green petiole of leaves of 30 numbers or Root feeding of monocrotophos 36 WSC 10 ml + water 10 ml in a 7 x 10 cm polythene bag. • **Basal stem rot / Bud rot / stem bleeding / Lethal leaf blight -** Spray 1.0 per cent Bordeaux mixture or 0.25 per cent Copper oxychloride or 0.2 per cent Mancozeb (4 times at monthly interval during February, March, April and May) and Soil application of *Pseudomonas fluorescens*(Pf1) @ 100 g/palm + *Trichodermaviride*@ 100 g/palm/year (or) *Bacillus subtilis*(TNAU-Bs 1 mixture) @300g/ palm at 3 months interval.	management of coconut
	Tapioca	Lack of knowledge on high yielding varieties of tapioca	Promotion of high yielding varieties of tapioca based on the market demand	• **Varieties -**CO 2, CO 3, CO (TP) 4, MVD 1, H 165, H 226, SreeVisakham (H.1687), SreeSahya (H 2304), SreePrakash (S. 856), SreeVijaya, Sree Jaya, SreeRekha and SreePrabha, • CTCRI CO (Tp) 5 (SreePadmanabha): Resistance to cassava mosaic disease with low cyanoglucoside content.	On farm field trial on evaluation of high yielding varieties' and field demonstrations

Sl. No.	Major crops& enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention
				Fair starch content (28%) and moderate tuber yield (38 t/ha).	
		Reduction of yield by the occurrence of cassava mosaic virus	Popularization of tapioca sett treatment by fungicides	• Mosaic free setts were treated with Carbendazim 1 g in one l of water for 15 minutes before planting.	Technology through field demonstrations
		Yield reduction due to drought and improper nutrient management system	Adoption of micro irrigation system in Tapioca	• **Irrigation –** Irrigation through drip with dripper rate of 4 LPH • **Fertigation** – Adoption of fertigation technique (Fertilizer requirement: 90: 90:240 kg of NPK / ha) once in three days throughout the cropping period.	On farm field trail, Field demonstrations, Supply of micro irrigation system at subsidized cost, training to the farmers on fertigation system`
		Pests and diseases like mosaic and sucking pests are widely prevalent. All these lead to a decline in yield.	Assessment of efficacy of pesticides and bio control agents Production of yellow sticky traps	• **Mosaic -** Spray Dichlorvos 76 WSC @ 1 ml/l or Triazophos 40 EC 2 ml/l and install sticky cum light traps. • **White fly -** Remove alternate weed hosts *viz*., *Abutilon indicum* and install yellow sticky trap at 12 No's/ha or Spray Neem oil 3 % or fish oil rosin soap 25 g/l or Methyl Dematon 25 EC 2 ml/l.	On farm trial, field demonstrations, supply of sticky traps to the farmers at subsidized cost

Banana

1. High Yielding Varieties (HYV)

- Cultivation of location specific varieties for different purposes *viz.,* dessert, export and processing will yield high and fetch high price.
- **Dessert varieties–**Red banana, Nendran, Karpooravalli, Robusta
- **Dual purpose** – Sakkai
- **Export market** – Grand Naine, Nendran, Ney Poovan
- **Culinary purpose -** Monthan, Nendran and Chakkia.
- **Hilly areas:** Matti, Rasa Kadali, Red Banana,

Table 3.9 Varieties of Banana suitable for the District

Type of land	Variety	Spacing	No. of plants/ha
Garden land	Nendran	1.8 x 1.8 m 1.5 x 1.5 m	3086 4444
Wet land	Poovan, Monthan, Rasthali, Ney poovan	2.1 x 2.1 m	2267
Hills	Red Banana, Matti and Ney Poovan	2.1 x 2.1 m	2267

1. Crop management

- **Selection of Sucker -** Select sword suckers of 1.5 to 2.0 kg weight which are free from diseases and nematodes.
- **Sucker treatment (**Pralinage**) –** It is done with 40 g of Carbofuran 3 G granules per sucker. (Dipping of corm in slurry solution containing 4 parts clay plus 5 parts water and sprinkle Carbofuran to control nematodes) or dipping of corms in 0.75% Monocrotophos, shade dry for at least 24 hours and plant.
- **High Density Planting (HDP) –**Planting of 3 suckers / pit at a spacing of 1.8 x 3.6 m (4600 plants / ha) for Cavendish varieties and 2 m x 3 m for Nendran (5000 plants /ha) for higher productivity.
- **Irrigation -** Irrigate the crop based on the water requirement at the critical stages.

Table 3.10 Water requirement of banana

Sl. No.	Crop Growth Stage	Duration (Weeks)	Quantity of Water (l/Plant)
1.	After Planting	1-4	4.00
2.	Juvenile Phase	5-9	8-10
3.	Critical Growth Stage	10-19	12.00
4.	Flower bud differentiation Stage	20-32	16-20
5.	Shooting Stage	33-37	20 and above
6.	Bunch Development Stage	38 x 50	20 and above

- **Fertigation** - Apply 50 % extra fertilizer for the Tissue culture banana.

2. Special operations

- **Desuckering** - It is done at monthly intervals
- **Bunch cover -** Cover the bunch immediately after opening of the last hand with transparent polyethylene sleeves with 2% (during cool season) to 4% (during summer season) to get better appearance.
- **Growth regulators -** Spray CCC 1000 ppm at 4th and 6th month after planting. Spray Plantozyme @ 2ml / l at 6th and 8th month after planting to get higher yield.
- **Micronutrients -**Spray micronutrients *viz*., $ZnSO_4$ (0.5%), $FeSO_4$ (0.2%), $CuSO_4$ (0.2%) and H_3BO_3 (0.1%) at 3rd, 5th and 7th MAP to increase yield and quality of banana.

3. Plant protection

- **Rhizome weevil / Stem weevil** – Corm injection with 2 ml Monocrotophos 36 WSC at 45 cm and 150 from the ground level or apply Carbofuran 3 % G @ 35 g /sucker or carbaryl @ 20 g/plant in the soil around the stem.
- **Bunchy Top disease -** Pairing and pralinage, insert a gelatin capsule containing 200 mg Fernoxone (2,4 – D) into the corm 7 cm deep using capsule applicator or inject 5 ml Fernoxone solution (125 gm/lit of water) into the pseudostem by using the injection gun**.**
- **Panama Disease (Fusarium wilt) -** Apply lime at 1– 2 kg in the pits after removal of the affected plants or Capsule application of carbendazim or *P. fluorescens* @ 60 mg/capsule/tree on 2nd, 4th and 6th month after planting. The capsule is applied in the corm by making a hole of 10 cm depth at 45°
- **Sigatoka leaf spot –** Spray Chlorothalonil at 2 g / lit**.** or Propiconazole 1 ml/lit

- **Anthracnose -**Post harvest dipping of fruits in Carbendazim 400 ppm, or Benomyl 1000 ppm

4. **Farm machinery**
    - **Banana injector -** Devised by the Tamil Nadu Agricultural University, Coimbatore for the control of diseases.

Rubber

1. **High Yielding Varieties (HYV)**
    - Select the right variety considering soil, climate and rainfall. Varieties suitable for this district are Tjir 1, PB 86, BD 5, BD 10, PR 17, GT 1, RRII 105, RRIM 600, PB 28/59, PB 217, PB 235, RRIM 703, RRII 5, PCK-1, 2 and PB 260.
2. **Crop management**
    - **Spacing** – Adopt recommended spacing to have better population and crop

Table 3.11 Spacing and optimum population of rubber crop

Planting material	Spacing(m)	Population/ha
Budded plants		
Hilly areas	6.7 x 3.4	445
Plains	4.9 x 4.9	420
Seedlings		
Hilly areas	6.1 x 3.0	539
Plains	4.6 x 4.6	479

- **Tapping** - Tap the seedling trees when the trunk attains a girth of 55 cm at 50 cm height from the ground and 50 cm at 125 cm height from the bud union in the budded trees.
- **Ethrel treatment -** It is applied at 5 % a.i. concentration with a brush below the tapping cut to a width of 5 cm after light scraping of the outer bark to increase latex yield of trees tapped on panel D.

3. **Plant protection**
    - **Abnormal leaf fall and Secondary leaf fall –** Spray bordeaux mixture 1% at 4000 - 5000 lit/ha using high volume sprayers or 30 - 37 lit of fungicide oil mixture per ha,
    - **Pink disease -** Application of Bordeaux paste in the early stages upto 30 cm above and below the affected region.
    - **Dry Rot, Stump Rot, Collar Rot or Charcoal Rot / Brown root disease –** Washing of roots with Carbendazim (0.1%) solution

- **Cockchafer grub / Termite** - Drench soil at the base of plants in the affected area with the solution of Chlorpyriphos 20 EC @ 2 ml/litre.

Jasmine

Adoption of precision production and post harvest technologies in the crop will reduce the technical gap by increase in production and produtivity.

1. **High Yileding Varieites**
   - Select and plant the high yielding varieties *viz.*, Ramanathapuram Gundumalli and Arka Aradhana
2. **Crop management**
   - **Planting system –** Soil application of 2 kg each of *Azospirillum* and *Phosphobacteria* per ha at the time of planting. It is to be mixed with 100 kg of FYM and applied in pits.
   - **Fertigation -** 100% RDF (60:120:120g NPK/plant/year) as WSF [Polyfeed (19:19:19), Potassium Nitrate (13:0:45) and Urea].
   - **Pruning -** Prune the bushes at 50 cm height from ground level during last week of November every year.
   - **Micronutrients and biostimulant application –** Foliar spray of $FeSO_4$ @ 0.5% + $ZnSO_4$ @ 0.5% at monthly intervals. Biostimulants like Panchagavya 3% + Humic acid 0.4% can be appied at monthly intervals.
   - **Offseason flower induction**

Interventions to be made for offseason flower induction in jasmine

- **Pruning / defoliation**.
  - Defoliation is an important practice for manipulation of growth and flowering as it influences growth, flower bud initiation, differentiation and ultimately the flower yield.
- **Integrated nutrient management**
  - Though jasmine respond well to intensive manuring, too much of manure encourage vegetative growth and hamper quality and quantity of blooming. So soil application of split doses of major nutrients during critical growth stages along with foliar application of micronutrients ($FeSO_4$ and $ZnSO_4$) is highly beneficial to regulate flowering.

3. **Plant protection**
    - **Bud worm -** Spray Profenofos 50 EC @ 1 ml/lit or Thiochloprid 240 SC @ 2 ml/l
    - **Sucking pests (Red spider mite, gall midge) -** Spray Wettable Sulphur 50 WP @ 2 g/l or Propargite 57 % EC @ 2ml/l or Fenazaquin 10 % EC @ 2 ml/l
    - **Leaf spot -** Spraying of Mancozeb @ 2.5g/l from the onset of monsoon at monthly intervals. Foliar application of Azoxystrobin @ 1g/l. Soil application of *Pseudomonas fluorescens* @ 25 g/m^2 and foliar application of *P. fluorescens*@ 5 g/l at monthly intervals after planting.
    - **Root rot / Wilt -** Soil drenching with Trifloxystrobin + Tebuconazole @ 0.75 g/litre or Difenoconazole @ 0.5g/l.

a. Production Technology

- Community nursery has to be promoted in large scale with more number of trays for increasing the area under SRI cultivation.
- Since the age of seedlings are important under SRI method, water release from the dams have to be announced well in advance so that planting can be done at appropriate time.
- Quality seeds of paddy and planting materials for coconut and tapioca may be made available through the department.
- To improve the soil health by controlling acidity and alkalinity, soil amendments and other inputs need to be distributed to the farmers.
- A new short duration variety with better grain weight is needed for 'Kumbhapoo' paddy season of district. In the existing variety TPS-3 the grian weight is less.
- The price of complex fertilisers have to be reduced or subsidy need to be hiked. Because of high price of complex fertilisers farmers are using more urea and results in unbalanced nutrient application to crops. This has led to high pest incidence, yield loss and poor soil health.
- Effective technology has to be developed for bat control in mango and 'maranai' problem in coconut.
- Under NHM all varieties of banana should made eligible for subsidy

b.Irrigation Management

- Large quantity of water is wasted in the sea during rainy season and to impound the rain water more number of check dams and desiltation and deepening of tanks and other water bodies has to be undertaken.

- In repairng waterbodies like tanks and ponds, due weightage need to be given for the suggestions of the local elected bodies, especially the fund allocation shold be prioratised by the elected bodies.
- Farmers association need to be given monetary support for maintenance of channels and tanks. To increase the wateruse efficiency, more budgetary support is needed for shutter maintenance.

c. Mechanisation

- Purchasing power of agricultural machinery is low and hence the subsidy component for tractors need to be enhanced
- Medium sized transplanters are required for district as the holdings are mostly small and marginal in the district. The transplanters need to be improved to suit the local conditions. Weight and size of harvesting machine need to be reduced inorder to use in small holdings. Agro-service centres and custom hiring service need to be promoted
- Old harvesting machines without proper maintenance results in grain loss to the extent of 10-15 per cent. The machines should be monitored and FC should be made cumpolsory
- Weeding machine shold be refined and cost reduced – or it should be subsidised.
- Most of the farmers are small farmers and not able to invest in machinery. Agrl. Engineering Dept. / or through PP mode machinery should be made available.
- Rubber is an important crop in the district and for mechanisation of planting of rubber,the machinery available may be perfected
- Small machinery is needed for sulphur-dusting in rubber conopy
- Channels leading to tanks are not notified in the revenue records, steps need to be taken to include it on revenue records to avoid encrochments
- Rates approved for drip irrigation is very low and it has to be revised. Farmers may be allowed to purchase the drip system and subsidy may be given to the farmers
- Electricity board fine the farmers who give water to nearby farmers. This in general affects agricultural production as the available water could not be used for agriculture
- Kappikkad water storage structure has to be revived for irrigation. Also Neyyar channel has to be revived for irrigation by taking up the matter with Kerala Government

d. Marketing

- In distict the moisture content norms for paddy procurement should be reduced as it is difficult to dry paddy due to rains in the harvest season
- Drier machines should be provided by market committee.
- Storage godowns are required in all Taluks.
- Industries which use Tapioca and Rubber should be promoted in the district.
- The market committee include persons below the age of 60. This restriction should be removed.
- A Flower market centre need to be established at Thovalai
- Traders should not be allowed to store in the regulated market

e. Other Issues / Constraints for enhancing agricultural output

- Migratory and other large flocks of birds visiting the water bodies pose a threat to agriculture and farmer incur crop losses due to bird menace. All concerned departments like forest, agriculture etc should coordinate the efforts to ward off the threat from birds to agricultural crops
- Animals like wild pigs, elephant, monkeys destroy agrl crops around the forest boundry and this has to be controlled. Farmers are harassed at the hands of forest officials. Solar fencing need to be explored.
- Farmers should be allowed to remove tank silt for enriching crop fields. The procedure for getting permission for taking tank silt need to be simplified/ removed.
- Spurious chemicals and fertilisers are sold in the market and the norms for quality control should be enforced strictly.
- Coconut price is very low and to increase the demand for coconut, coconut oil should be distributed through PDS.
- MANREGA during paddy transplanting and harvesting season, agicultural operations should also included in the Program.
- district is a leading honey production centre in the State. Honey bee research centre need to be started in the district.
- Insurance claim should be assessed at Firkka level
- Cooperative loans may be given for leased crop lands also
- SHGs related to agricultural activities need to be supported
- Training fee levied by Central Institutes/State institute for ATMA trainees need to be abolished or minimised

CHAPTER – IV

DISTRICT PLAN

Kanyakumari district is the southern most districts of Tamil Nadu coming under the West coast plains and Ghat region **(**high rainfall zone) agro-climatic conditions. The average annual rainfall is about 1456 mm. Red and lateritic soils are predominant in the district followed by coastal alluvium and alluvial soils. The district is bounded by Tirunelveli District on the north and the east. The south eastern boundary is the Gulf of Mannar. On the south and south west it is bounded by Indian Ocean and Arabian Sea and in the west and North West it is bounded by Kerala State. Paddy is the main crop of the District. It is cultivated in 20000 Ha. Every year the crops are cultivated in two seasons. First crop is sown in the month of April-June (Kannipoo) and the second crop is raised in the months of September – October (Kumbapoo). Kanyakumari district has a mottled topography with sea on three sides and the mountains of the Western Ghats bordering the northern side. The district comprises four taluks namely Thovalai, Agastheeswaram, Kalkulam, and Vilavancode. Kanyakumari has nine blocks namely Agastheeswaram, Rajakkamangalam, Thovalai, Kurunthancode,Thackalay, Thiruvattar, Killiyur, Munchirai and Melpuram besides four municipalities *viz.,*Nagercoil, Padmanabhapuram, Colachel and Kuzhithurai.

Topographically, the district has three distinct classifications similar to Kerala State *viz.,* (i) The uplands comprising of hills and hill based areas suitable for growing crops like rubber, clove, nutmeg, black pepper, pineapple etc., (ii) the midlands comprising of plains and valleys fit for growing crops like rice, tapioca, banana, coconut etc. and (iii) the coastal comprising the coastal belt ideal for growing coconut. The interventions proposed, the associated outlays, the physical targets, budgetary requirements, time frame for achievements in the agricultural (field crops) sector, horticultural sector, agricultural engineering sector, agricultural marketing and animal husbandry sector, fisheries sector and PWD sector are discussed in this chapter. This would comprehend the activities and the achievements to be made in the next five years' period (2017-22) under NADP.

4.1. Agriculture Sector

The various development issues, constraints and activities (interventions) planned for the development of agriculture and allied sectors were discussed in earlier chapters. Based on the discussions the district plan in full has been briefly outlined in this chapter. The activities planned and the associated targets and costs are presented for the development of both agricultural and allied sectors.

4.1.1. Paddy

4.1.1.1. Enhancing rice productivity

In Kanyakumari district, rice is an important cereal crop and grown in an area of 13,397 ha. The yield of rice is around 4.8 tonnes/ ha. Increasing the productivity of rice is highly dependent on the adoption of modern technology. This needs timely supply of seeds, availability of machineries and adoption of the improved package of practices. This will result in the reduction of labour cost and post-harvest losses. Hence, modernization of agriculture through agricultural mechanization is inevitable. Availability of farm power coupled with efficient and judicious use of inputs and farm implements/machinery would enable efficient utilization of various inputs such as seeds, fertilizers, plant protection chemicals and water in rice cultivation. Thus, the overall goal will be is to increase the yield of rice crop up to 5-6 tonnes/ha through the interventions like use of high yielding seeds, establishment of well-maintained nursery and farm machineries.

4.1.1.2. Project components

1. Promotion of SRI covering Agastheeswaran, Boothapandy, Kurnthancode, Rajakamangalam and Thuckalay.
2. Distribution of certified seeds and foundation seeds covering Agastheeswaran, Boothapandy, Kurnthancode, Rajakamangalam and Thuckalay.
3. Foundation and certified seed production covering Agastheeswaran, Boothapandy, Kurnthancode, Rajakamangalam and Thuckalay.
4. Incentives for paddy machine planting covering Agastheeswaran, Boothapandy, Kurnthancode, Rajakamangalam and Thuckalay.
5. Distribution of MN mixture, biofertilizer, Zinc sulphate, Polyvinyl coated Tarpaulin covering Agastheeswaran, Boothapandy, Kurnthancode, Rajakamangalam and Thuckalay.
6. Supply of bio control agent, biopesticide in Boothapandy block.
7. Distribution of herbicide covering Agastheeswaran, Boothapandy, Kurnthancode, Rajakamangalam block.

4.1.1.3. Budget

The budget requirement for fulfilling the various interventions is ₹ 1076.10 Lakhs. The details of budget requirement for each intervention across the blocks are shown in Table 4.1.

4.1.1.4. Expected outcome

Assured supply of quality seeds and other inputs would hasten the process of increasing the productivity levels.

4.1.1.5. Implementing agency

The projects will be implemented by the Department of Agriculture

Table. 4.1. Budget for increasing the productivity of paddy

(Rs.in lakhs)

Sl. No.	Interventions	Unit	Unit Cost (in Rs.)	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
1	Promotion of SRI	Ha	15000	B1, B2, B3, B7, B9	910	136.50	910	136.50	910	136.50	910	136.50	910	136.50	4550	682.50
2	Distribution of High Yielding Varieties	MT	35000	B1, B2, B3, B7, B9	20.0	7.00	20.0	7.00	20.0	7.00	20.0	7.00	20.0	7.00	100	35.00
3	Distribution of Foundation	MT	40000	B1, B2, B3, B7, B9	7	2.80	7	2.80	7	2.80	7	2.80	7	2.80	35	14.00
4	Seed production - Foundation	MT	32000	B1, B2, B3, B7, B9	7	2.24	7	2.24	7	2.24	7	2.24	7	2.24	35	11.20
5	Seed production - Certified class	MT	26000	B1, B2, B3, B7, B9	20	5.20	20	5.20	20	5.20	20	5.20	20	5.20	100	26.00
6	Incentives for paddy machine planting	Ha	10000	B1, B2, B3, B7, B9	545	54.50	545	54.50	545	54.50	545	54.50	545	54.50	2725	272.50
7	Distribution of MN mixture/ Copper Sulphate	Ha	1000	B1, B2, B3, B7, B9	220	2.20	220	2.20	220	2.20	220	2.20	220	2.20	1100	11.00
8	Distribution of biofertilizer / PPFM / bioinputs / plant nutrient mobilizing bacteria	Ha	300	B1, B2, B3, B7, B9	110	0.33	110	0.33	110	0.33	110	0.33	110	0.33	550	1.65
9	Distribution of Zinc sulphate (Soil application & foliar)	Ha.	1000	B1, B2, B3, B7	200	2.00	200	2.00	200	2.00	200	2.00	200	2.00	1000	10.00
10	Distribution of biocontrol agents/biopesticides	Ha..	1000	B2	25	0.25	25	0.25	25	0.25	25	0.25	25	0.25	125	1.25
11	Distribution of herbicides	Ha.	1000	B1, B2, B3, B7	200	2.00	200	2.00	200	2.00	200	2.00	200	2.00	1000	10.00
12	Polyvinyl coated Tarpaulin (6m x 5m)	No.	2000	B1, B2, B3, B7, B9	10	0.20	10	0.20	10	0.20	10	0.20	10	0.20	50	1.00
	Grand total					**215.22**		**215.22**		**215.22**		**215.22**		**215.22**		**1076.10**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.2. Pulses

4.1.2.1. Enhancing pulses productivity

Pulse is one of the important food components of human being. In Kanyakumari district pulses are grown in an area of 1323 ha. The major pulse crop grown in the district is black gram. With a decreasing area under cultivation, the possibility to improve the production of pulses is only through increasing the productivity of pulses through the adoption of better seed varieties and package of practices. Technological interventions and supply of inputs like high yielding variety seeds, DAP spray and plant protection chemicals will increase the yield of pulses up to 500-1000 kg/ha.

4.1.2.2. Project components

1. Provision of breeder seeds in Boothapandy and Rajakamangalam blocks.
2. Production and distribution of certified seeds covering all blocks.
3. Distribution of pulse wonder in Agastheeswaram block.
4. Distribution of biofertilizer, DAP spray, Seed treatment/ Soil application of *Trichoderma viridi* and Promotion of bund cropping in all blocks.
5. Promotion of line sowing, Redgram transplantation and seed treatment chemical in Agastheeswaram block.
6. Distribution of yellow sticky trap, weedicide, plant protection chemicals in Agastheeswaram block.
7. Demonstration of cropping system based, pure crop demo on intercropping and demo through NGO in Agastheeswaram block.

4.1.2.3. Budget

The budget requirement for fulfilling the various interventions is ₹ 160.31 Lakhs. The details of budget requirement for each intervention across the blocks are shown in Table 4.2.

4.1.2.4. Expected outcome

The outcome will be increase in area of the crop. The productivity can be enhanced through high yielding varieties, micro nutrient mixtures and hi-tech interventions.

4.1.2.5. Implementing agency

The projects will be implemented by the Department of Agriculture.

Table. 4.2. Budget requirement for interventions of pulses

(Rs.in lakhs)

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
1	Purchase of Breeder seeds	MT	250000	B2, B7	0	0.00	1	2.50	1	2.50	1	2.50	1	2.50	4	10.00
2	Production of Foundation/Certified pulses seeds	MT	86000	All Blocks	12	10.32	12	10.32	12	10.32	12	10.32	12	10.32	60	51.60
3	Distribution of Certified Seeds	MT	100000	All Blocks	11	10.50	11	10.50	11	10.50	11	10.50	11	10.50	53	52.50
4	Distribution of Biofertilizer/ Organic packages (Rhizobium + Phosphobacteria) - Liquid / Carrier	Ha	600	All Blocks	150	0.90	100	0.60	100	0.60	100	0.60	100	0.60	551	3.31
5	Distribution of Micro Nutrients(5 kgs/ Ha)	Ha	350	B1, B2, B3, B7	80	0.28	80	0.28	80	0.28	80	0.28	80	0.28	400	1.40
6	DAP Spray	Ha	700	All Blocks	450	3.15	450	3.15	420	2.94	450	3.15	450	3.15	2220	15.54
7	Pulse wonder - 5 kg/ha	Ha	1000	B1	0	0.00	0	0.00	20	0.20	0	0.00	0	0.00	20	0.20
8	Bund Cropping	Ha	300	All Blocks	70	0.21	70	0.21	70	0.21	70	0.21	70	0.21	350	1.05
9	Line sowing	Ha	2250	B1	0	0.00	0	0.00	20	0.45	0	0.00	0	0.00	20	0.45
10	Distribution of Yellow sticky trap /pheromone trap	ha	1000	B1	0	0.00	0	0.00	20	0.20	0	0.00	0	0.00	20	0.20
11	Cropping system based demonstration	Ha	12500	B1	0	0.00	0	0.00	20	2.50	0	0.00	0	0.00	20	2.50
12	Distribution of weedicide	Ha	1000	B1	0	0.00	0	0.00	20	0.20	0	0.00	0	0.00	20	0.20
13	Plant Protection Chemicals	Ha	1000	B1	0	0.00	0	0.00	20	0.20	0	0.00	0	0.00	20	0.20
14	Seed treatment & soil application with *Trichoderma viridi*	Ha	700	All Blocks	450	3.15	450	3.15	420	2.94	450	3.15	450	3.15	2220	15.54

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
15	Pure crop demonstration - Black gram and green gram	Ha	6300	B1	0	0.00	0	0.00	20	1.26	0	0.00	0	0.00	20	1.26
16	Demonstration on intercropping of pulses with other crops	Ha	8300	B1	0	0.00	0	0.00	20	1.66	0	0.00	0	0.00	20	1.66
17	Demonstration on pulses production	Ha	8250	B1	0	0.00	0	0.00	20	1.65	0	0.00	0	0.00	20	1.65
18	Promotion of Redgram Transplantation for nursery preparation	Ha	5000	B1	0	0.00	0	0.00	20	1.00	0	0.00	0	0.00	20	1.00
19	Seed treatment with chemicals	Ha	250	B1	0	0.00	0	0.00	20	0.05	0	0.00	0	0.00	20	0.05
	Grand total					**28.51**		**30.71**		**39.66**		**30.71**		**30.71**		**160.31**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.3. Coconut

4.1.3.1. Enhancing coconut productivity

The coconut palm exerts a profound influence on the rural economy of the many states where it is grown extensively and it provides sustenance to more than 10 million people. The processing and related activities centered on the crop and thus generates employment opportunities for over two million people in India. In Kanyakumari district, coconut is grown in an area of 24,074 ha. The introduction of high yielding hybrids (Tall × Dwarf) would add profit and increase the numbers and productivity of coconut trees. There is a scope for 5 percent increase of nuts yield of coconut by developing improved tall varieties or hybrids. Thus, the overall objective will be is to enhance the coconut area and their productivity through the use of new hybrids.

4.1.3.2. Project components

1. Distribution of Tall, TXD hybrid and DXT covering all blocks of this district
2. Distribution of micro nutrient mixture, Boom sprayer, power operated coconut leaf shedder covering all blocks.
3. Intercropping with green manures covering all blocks.
4. Distribution of pheromone traps for red palm weevil and *Rhinoceros* beetle in all blocks.
5. Distribution of power operated rocker sprayer in all blocks
6. Distribution of tree climbers in all blocks
7. Training on neera production in Kuruntancode, Rajakamangalam, and thucklay blocks.
8. Replanting and Rejunvation of coconut gardens, Distribution of coconut seedlings to school children and Demonstration on integrated fertilizer management in all bocks.
9. Control of Erophide mite in Rajakamangalam block.
10. Distribution of wheel barrow in Thiruvattur block.
11. Corpus fund release for FPG in all blocks.

4.1.3.3. Budget

The total cost of the project for five years works to ₹ 1178.17 Lakhs. The details of budget requirement for each intervention across the blocks are shown in Table 4.3.

4.1.3.4. Expected outcome

The implementation of the project will result in a minimum increase of coconut planting. This will help the coconut growing farmers to increase the area and productivity. This will help the employment opportunity and income of the farming community.

4.1.3.5. Implementing agency

The projects will be implemented by the Department of Agriculture.

Table. 4.3. Enhancing Coconut production activities

(Rs.in lakhs)

Sl. No.	Components	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
1	Distribution of T x D hybrid seedlings	No	60	All Blocks	9000	5.40	9000	5.40	9000	5.40	9000	5.40	9000	5.40	45000	27.00
2	Distribution of Tall Seedlings	No	40	All Blocks	16300	6.52	16300	6.52	16300	6.52	16300	6.52	16300	6.52	81500	32.60
3	Boom sprayer	Nos	20000	All Blocks	18	3.60	18	3.60	18	3.60	18	3.60	18	3.60	90	18.00
4	Distribution of D xT hybrid Seedlings	Nos	150	All Blocks	450	0.68	450	0.68	450	0.68	450	0.68	450	0.68	2250	3.38
5	Distribution of power operated coconut leaf shredder	Nos	60000	All Blocks	9	5.40	9	5.40	9	5.40	9	5.40	9	5.40	45	27.00
6	Distribution of MN mixture	Ha	10000	All Blocks	450	45.00	450	45.00	450	45.00	450	45.00	450	45.00	2250	225.00
7	Distribution of Pheromone traps for Red palm weevil/ Rhinocerous beetle	Ha	1600	All Blocks	225	3.60	225	3.60	225	3.60	225	3.60	225	3.60	1125	18.00
8	Distribution of power operated rocker sprayer	Nos	10000	All Blocks	18	1.80	18	1.80	18	1.80	18	1.80	18	1.80	90	9.00
9	Distribution of tree climbers	Nos	15000	All Blocks	45	6.75	45	6.75	45	6.75	45	6.75	45	6.75	225	33.75
10	Intercropping with green manures	Ha	3000	All Blocks	525	15.75	525	15.75	525	15.75	525	15.75	525	15.75	2625	78.75
11	Replanting and Rejunation of coconut gardens	Ha	45000	All Blocks	120	54.00	120	54.00	120	54.00	120	54.00	120	54.00	600	270.00
12	Demonstration on Integrated fertiliser management	Ha	75000	All Blocks	14	10.50	14	10.50	14	10.50	14	10.50	14	10.50	70	52.50
13	Distribution of coconut seedlings to school children	No	40	All Blocks	2400	0.96	2400	0.96	2400	0.96	2400	0.96	2400	0.96	12000	4.80
14	Control of Eriophid mite	no. of tree	20	B7	100	0.02	100	0.02	100	0.02	100	0.02	100	0.02	500	0.10

Sl. No.	Components	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
15	Training on neera production	Batc hes	25000	B3, B7, B9	4	1.00	3	0.75	2	0.50	2	0.50	2	0.50	13	3.25
16	Distribution of wheel barrow	Nos	4000	B8	1	0.04	0	0.00	0	0.00	0	0.00	0	0.00	1	0.04
	Collective Farming															
17	Corpus fund release for FPG (2000 nos.)	Nos.	500000	All Blocks	75	375.00	0	0.00	0	0.00	0	0.00	0	0.00	75	375.00
	Grand total					**536.02**		**160.73**		**160.48**		**160.48**		**160.48**		**1178.17**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.4. Training to farmers

4.1.4.1. Enhancing the livelihood of farmers through training

Agricultural extension is being provided at the Block level and below, under the Extension Reforms scheme being implemented. Contact them or any other functionary of the State Government in Agriculture and allied departments to get answers for the queries, information about any Programme / Scheme and appropriate technologies for the area or individual farmer. The new information that farmers gain through these training sessions makes their daily farming activities much easier. It also leads to an increase in productivity and bigger profits in the long run.

4.1.4.2. Project components

1. Training of 536 groups of seed village farmers in quality seed production technology in Agastheeswaran, Boothapandy, Kurunthacode, Killiyoor, Rajakamangalam and Thiruvattur block.
2. Training of farmers under mission soil health card have to implement in Agastheeswaran, Boothapandy, Kurunthacode, Killiyoor and Rajakamangalam blocks.
3. Awareness campaign within district have to implement in boothapandy block.
4. Organic cultivation practices have to implement in Rajakamangalam block.
5. Training on paddy have to conduct in Agastheeswaran, Boothapandy, Kurunthancode and Rajakamangalam whereas training on pulse have to give in all blocks.
6. Value addition training have to implement in boothapandy block.
7. Organistation of kisan gosthies on soil test based nutrient application have to implement in all blocks.

4.1.4.3. Budget

It is proposed to incur ₹. 24.00 lakhs over a period of five years with the finance facilities under the NADP and other sources as shown in table 4.4.

4.1.4.4. Expected outcome

The project will result better income to farmers. They may learn many things to improve their knowledge of cultivation if they listen this programme which will improve the income of the farmers.

4.1.4.5. Implementing Agency

Department of Agriculture will implement the project and report the progress to the District-level officials.

Table. 4.4. Budget requirement for training

(Rs.in lakhs)

Sl. No.	Cafeteria of Activities	Unit	Unit Cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	District Level															
	Training of Farmers															
1	Training of 536 Groups of Seed Village Farmers in quality Seed Production technology.	Nos.	0.1	B1, B2, B3, B4, B7, B8	3	0.30	3	0.30	3	0.30	3	0.30	3	0.30	15	1.50
2	Training of Farmers under Mission Soil Health Card	Nos.	0.15	B1, B2, B3, B4, B7	4	0.60	4	0.60	4	0.60	4	0.60	4	0.60	20	3.00
	Training of Farmers With in the district															
3	Awareness campaigns	Nos.	0.1	B2	5	0.50	5	0.50	5	0.50	5	0.50	5	0.50	25	2.50
4	Organic cultivation practices	Nos.	0.1	B7	1	0.10	1	0.10	1	0.10	1	0.10	1	0.10	5	0.50
5	Paddy	Nos.	0.1	B1, B2, B3, B7	7	0.70	7	0.70	7	0.70	7	0.70	7	0.70	35	3.50
6	Pulses	Nos.	0.1		9	0.90	9	0.90	9	0.90	9	0.90	9	0.90	45	4.50
7	Sugarcane	Nos.	0.1			0.00		0.00		0.00		0.00		0.00	0	0.00
8	Value addition training	Nos.	0.1	B2	5	0.50	5	0.50	5	0.50	5	0.50	5	0.50	25	2.50
	Exposure visit of Farmers															
9	Organisation of Kisan gosthies on Soil test based nutrient application (Campaign)	Nos.	0.15	All Blocks	8	1.20	8	1.20	8	1.20	8	1.20	8	1.20	40	6.00
	Grand total					**4.80**		**4.80**		**4.80**		**4.80**		**4.80**		**24.00**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.5. Infrastructure

4.1.5.1 Facilities for Seed production

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.

4.1.5.2. Establishment of Laboratories

Quality control is the process of checking the quality of the material against the standard set by the organizations and if the material does not match with the standards, then suchmaterial 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 with a budget outlay of ₹. 620.40 lakhs as shown in Table 4.5.

Strengthening of the seed testing laboratories the following equipments are required in this district are Dunnage, Moisture meter, Bag closure, Electronic platform balance, Seed rack and Tarpaulin covering all blocks. Office furnishing and other amenities in all blocks.

Table. 4.5. Budget requirement for Infrastructure

(Rs.in lakhs)

Sl. No.	Components	Unit	Unit Cost (in Rs.)	Block 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	Dunnage	Nos.	7500	All Blocks	0	0.00	90	6.75	80	6.00	0	0.00	10	0.75	180	13.50
2	Moisture meter	Nos.	25000	All Blocks	0	0.00	9	2.25	7	1.75	0	0.00	0	0.00	16	4.00
3	Bag closure	Nos.	10000	All Blocks	0	0.00	10	1.00	8	0.80	0	0.00	0	0.00	18	1.80
4	Electronic platform balance	Nos.	150000	All Blocks	0	0.00	9	13.50	6	9.00	0	0.00	0	0.00	15	22.50
5	Seed rack	Nos.	30000	All Blocks	0	0.00	11	3.30	11	3.30	2	0.60	3	0.90	27	8.10
6	Tarpaulin	Nos.	25000	All Blocks	0	0.00	9	2.25	9	2.25	0	0.00	0	0.00	18	4.50
7	Office Furnishings and other amenities	Nos.	200000	All Blocks	3	6.00	5	10.00	0	0.00	0	0.00	0	0.00	8	16.00
8	Strengthening of training institute / nursery / FTC / KVK	Nos.	50000000	All Blocks	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
9	Infrastructure for empowerment of coconut nurseries	Nos.	5000000	All Blocks	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00	1	50.00
	Grand total					**6.00**		**39.05**		**523.10**		**0.60**		**51.65**		**620.40**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.6. 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.

4.1.6.1. Project Component:

- Composting of farm waste through *Pluerotus* and Green manuring covering all blocks
- Distribution of blue green algae covering all blocks
- Establishment of permanent and HDPE vermicompost units in all blocks
- Distribution of soil health card in all blocks

4.1.6.2. 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 in Kannyakumari district is ₹. 136.59 lakhs as shown in table 4.6.

4.1.6.3. Expected Outcome:

Healthy soils are the foundation for profitable, productive and environmentally sound agricultural systems. In an agricultural context, it refers to the ability of the soil to sustain agricultural productivity and protect environmental resources. The proposed soil health management practices will improve soil health by increasing productivity and profitability immediately and into the future.

4.1.6.4. Implementing Agency:

The projects will be implemented by the Department of Agriculture.

Table. 4.6. Budget requirement for Soil Health Management

(Rs.in lakhs)

Sl. No.	Components	Unit	Unit Cost (in Rs.)	Block covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Soil Health Management															
1	HDPE Vermi compost units	Nos	12000	All Blocks	18	2.16	18	2.16	18	2.16	18	2.16	18	2.16	90	10.80
2	Green Manuring	Ha	4000	All Blocks	380	15.20	380	15.20	380	15.20	380	15.20	380	15.20	1900	76.00
3	Composting of Farm Waste Through Pluerotus (Production and Distribution of Kits)	Kit Nos	200	All Blocks	105	0.21	105	0.21	105	0.21	105	0.21	105	0.21	525	1.05
4	Distribution of Soil Health Card	L. No.	300	All Blocks	7997	23.99	8000	24.00	0	0.00	0	0.00	0	0.00	15997	47.99
	Grand total					**41.71**		**41.72**		**17.72**		**17.72**		**17.72**		**136.59**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.7. 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 pets 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) covering all blocks
2. Integrated Pest Management Villages in Rajakamangalam block
3. IPM School covering all blocks.

Budget

It is proposed to incur ₹. 38.00 Lakhs over a period of five years (Table 4.7) with the finance facilities under the NADP and other sources.

Expected outcome

Farmers Field Schools (FFS) is group based learning process that has been used by a government 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.

Implementing agency

The projects will be implemented by the Department of Agriculture.

Table.4.7. Budget requirement for Integrated Pest Management (IPM)

(Rs.in lakhs)

S.No	Components	Unit	Unit Cost (in Rs.)	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
1	Farmers Field Schools (FFS)	Nos.	20000	All Blocks	17	3.40	17	3.40	17	3.40	17	3.40	17	3.40	85	17.00
2	Integrated Pest Management Villages	Nos.	100000	B7	1	1.00	1	1.00	1	1.00	1	1.00	1	1.00	5	5.00
3	IPM School	Nos.	40000	All Blocks	8	3.20	8	3.20	8	3.20	8	3.20	8	3.20	40	16.00
	Grand total					**7.60**		**7.60**		**7.60**		**7.60**		**7.60**		**38.00**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.8. 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.

4.1.8.1. Project Component:

- Distribution of power tiller in all blocks
- Distribution of pump set, Tarpaulin and PVC Pipes to carry irrigation water from source to field covering all blocks.
- Distribution of Solar light trap in all blocks
- Distribution of sprayers (power and hand operated sprayer) covering all blocks
- Distribution of mobile sprinkler in Agastheeswaram block.

4.1.8.2. 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 of this district with a budget of ₹.156.68 lakhs as shown in Table 4.8.

4.1.8.3. Expected Outcome:

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

4.1.8.4. Implementing Agency:

The projects will be implemented by the Department of Agriculture

Table. 4.8. Budget requirement for Machineries

(Rs.in lakhs)

S.No	Components	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
	Farm Mechanization															
1	Solar light trap	No.	4000	All Blocks	80	3.20	80	3.20	80	3.20	80	3.20	80	3.20	400	16.00
2	Power operated sprayer	Nos.	8000	All Blocks	37	2.96	37	2.96	37	2.96	37	2.96	37	2.96	185	14.80
3	Hand operated sprayer	Nos.	1500	All Blocks	85	1.28	85	1.28	85	1.28	85	1.28	85	1.28	425	6.38
4	Distribution of Tarpaulins	Nos	8000	All Blocks	42	3.36	42	3.36	42	3.36	42	3.36	42	3.36	210	16.80
5	Distribution of Powertiller	Nos	150000	All Blocks	7	10.50	7	10.50	7	10.50	7	10.50	7	10.50	35	52.50
6	Distribution of Baler	Nos	350000	B1, B7	0	0.00	0	0.00	2	7.00	0	0.00	0	0.00	2	7.00
7	PVC Pipes to carry Irrigation water from source to field	Unit	40000	All Blocks	8	3.20	8	3.20	8	3.20	8	3.20	8	3.20	40	16.00
8	Distribution of Mobile Sprinklers	Ha	30000	B1	0	0.00	0	0.00	1	0.30	0	0.00	0	0.00	1	0.30
9	Distribution of Manual Weeder	Nos	2000	B1	0	0.00	5	0.10	5	0.10	5	0.10	5	0.10	20	0.40
10	Distribution of Pumpset	Nos	30000	All Blocks	18	5.40	13	3.90	18	5.40	13	3.90	18	5.40	80	24.00
11	Distribution of cono weeder	Nos	2000	All Blocks	25	0.50	25	0.50	25	0.50	25	0.50	25	0.50	125	2.50
	Grand Total					**30.40**		**29.00**		**37.80**		**29.00**		**30.50**		**156.68**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

4.1.9. 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.

4.1.9.1. Project components

- Soil Fertility Improvement and Land development works in boothapandy block.
- Supply of machineries like Dunnage, Seed grading machine and Tarupaulin in Boothapandy block.
- Infrastructure development for seed production in Boothapandy block.

4.1.9.2. Budget

It is proposed to incur ₹. 37.15 lakhs over a period of five years with the finance facilities under the NADP and other sources as shown in Table 4.9.

4.1.9.3. Expected outcome

The expected outcome of the project will result it will Enhance production of quality seeds of Crop varieties and Ensure timely delivery of seeds to farmers and it will increase supply of good quality seed which increase the production of the crops and the income of the farmers of Tamil Nadu.

4.1.9.4. Implementing Agency

Department of Agriculture will implement the project and report the progress to the District-level officials.

Table 4.9. Budget requirement for SSF

(Rs.in lakhs)

Sl. No.	Components	Unit	Unit cost in Rs.	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
1	Soil Fertility Improvement and Land development works in SSF	ac	200000	B2	1	1.00	1	1.00	1	1.00	1	1.00	1	1.00	3	5.00
II	**Irrigation Component**															
III	**Machineries**															
	Dunnage (Poly Pallets)	nos	7500	B2	10	0.75	10	0.75	10	0.75	10	0.75	10	0.75	50	3.75
	Seed grading machine	nos	2000000	B2	0	0.00	1	20.00	0	0.00	0	0.00	0	0.00	1	20.00
	Tarpaulin	nos	10000	B2	2	0.20	0	0.00	2	0.20	0	0.00	0	0.00	4	0.40
	Farm office	nos	800000	B2	0	0.00	1	8.00	0	0.00	0	0.00	0	0.00	1	8.00
	Total					**1.95**		**29.75**		**1.95**		**1.75**		**1.75**		**37.15**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

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

4.1.10.1. 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 required are,

1. Hardware replacement, connectivity charges, priner cum scanner, UPS and Electrical accessories, Xerox machine, Laptop/ Desktop and antivirus software covering all blocks.
2. Supply of TV in Agastheeswaram, Boothapandy and Rajakamangalam blocks.
3. Supply of colour printer and 4G dongle for all blocks.
4. Equipments for documentation on (Hand cam, Camera, GPS instrument, Android mobile, External Hard disk and LCD projector) required for all blocks.
5. AC for computer room covering Kurunthacode, Killiyoor, Munirachi, Melpuram, Thriuvattur and Thacklay blocks.

4.1.10.2. Budget

It is proposed to incur ₹.64.65 lakhs over a period of five years with the finance facilities under the NADP and other sources as shown in Table 4.10.

4.1.10.3. Expected outcome

The expected outcome of the project will result in an increase in the adoption of technologies for production of the crops which will improve the income of the farmers

4.1.10.4. Implementing Agency

Department of Agriculture will implement the project and report the progress to the District-level officials.

Table.4.10. Budget requirement for IT

(Rs.in lakhs)

Sl. No.	Components	Unit	Unit Cost (in Rs.)	Block 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 Blocks	9	4.50	8	4.00	8	4.00	9	4.50	8	4.00	42	21.00
2	Connectivity Charges	Nos	11000	All Blocks	9	0.99	9	0.99	9	0.99	9	0.99	9	0.99	45	4.95
3	Printer cum Scanner	Nos	20000	All Blocks	0	0.00	9	1.80	0	0.00	0	0.00	0	0.00	9	1.80
4	UPS and electrical accessories	Nos	35000	All Blocks	0	0.00	9	3.15	0	0.00	0	0.00	0	0.00	9	3.15
5	Xerox machine	Nos	75000	All Blocks	0	0.00	9	6.75	0	0.00	0	0.00	0	0.00	9	6.75
6	Laptop/Desktop	Nos	50000	All Blocks	0	0.00	9	4.50	0	0.00	0	0.00	0	0.00	9	4.50
7	Anti -virus software		2500	All Blocks	0	0.00	9	0.23	0	0.00	0	0.00	0	0.00	9	0.23
8	Television	Nos	100000	B1, B2, B7	0	0.00	3	3.00	0	0.00	0	0.00	0	0.00	3	3.00
9	Colour printer	Nos	15000	All Blocks	0	0.00	9	1.35	0	0.00	0	0.00	0	0.00	9	1.35
10	4G Internet - Dongle	Nos	2500	All Blocks	0	0.00	9	0.23	0	0.00	0	0.00	0	0.00	9	0.23
	Handycam	Nos	30000	All Blocks	0	0.00	9	2.70	0	0.00	0	0.00	0	0.00	9	2.70
	Camera	Nos	25000	All Blocks	0	0.00	9	2.25	0	0.00	0	0.00	0	0.00	9	2.25
11	GPS instrument	Nos	20000	All Blocks	0	0.00	9	1.80	0	0.00	0	0.00	0	0.00	9	1.80
12	Android mobile	Nos	15000	All Blocks	0	0.00	9	1.35	0	0.00	0	0.00	0	0.00	9	1.35
13	External Hard disk	Nos	5000	All Blocks	0	0.00	9	0.45	0	0.00	0	0.00	0	0.00	9	0.45
14	LCD projector	Nos	75000	All Blocks	0	0.00	9	6.75	0	0.00	0	0.00	0	0.00	9	6.75
15	Air conditioner for computer room	Nos	40000	B3, B4, B5, B6, B8, B9	4	1.60	2	0.80	0	0.00	0	0.00	0	0.00	6	2.40
	Grand total					**7.09**		**42.09**		**4.99**		**5.49**		**4.99**		**64.65**

B1- Agastheeswaram, B2- Boothapandy, B3- Kurunthancode, B4- Killiyoor, B5- Munchrai, B6- Melpuram, B7- Rajakamangalam
B8- Thiruvattar, B9- Thuckalay

Table 4.11. Budget Abstract for Agriculture Sector

(₹. in lakhs)

Sl. No	Interventions	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1.	Paddy	215.22	215.22	215.22	215.22	215.22	1076.10
2.	Millets	0.00	0.00	0.00	0.00	0.00	0.00
3.	Pulses	28.51	30.71	39.66	30.71	30.71	160.31
4.	Oilseeds	0.00	0.00	0.00	0.00	0.00	0.00
5.	Oilpalm	0.00	0.00	0.00	0.00	0.00	0.00
6.	Cotton	0.00	0.00	0.00	0.00	0.00	0.00
7.	Sugarcane	0.00	0.00	0.00	0.00	0.00	0.00
8.	Coconut	536.02	160.73	160.48	160.48	160.48	1178.17
9.	Training	4.80	4.80	4.80	4.80	4.80	24.00
10.	Infrastructure	6.00	39.05	523.10	0.60	51.65	620.40
11.	Soil Health Management	41.71	41.72	17.72	17.72	17.72	136.59
12.	Rainfed Area Development	0.00	0.00	0.00	0.00	0.00	0.00
13.	IPM	7.60	7.60	7.60	7.60	7.60	38.00
14.	Machineries	30.40	29.00	37.80	29.00	30.50	156.68
15.	Strengthening of State Seed Farm	1.95	29.75	1.95	1.75	1.75	37.15
16.	Information Technology	7.09	42.09	4.99	5.49	4.99	64.65
	Grand total	**879.30**	**600.67**	**1013.32**	**473.37**	**525.42**	**3492.05**

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. The farmers are ready to go in for the cultivation of horticultural crops which prove remunerative. The challenge lies in taking the technologies to 90 per cent of farmers who are small and marginal farmers. 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. The major strategies suggested are as follows:

Area expansion of Horticultural crops

a. Fruit Crops

Today's changing food pattern enhances the area expansion under fruits. The preferable choices of fruits are Mango, Apple, Banana, Grapes, Orange, Guava, Pomegranate, Sapota etc. Fruits are rich in fiber which is very essential for the smooth movement of the digestive system. There are some fruits that give body energy as they contain carbohydrates which are the main source of energy. Carbohydrates in fruits are mainly sugar which actually breaks down easily and make a quick source of energy. They also contain minerals, vitamins and nutrients that are useful for a healthy life. Considering the importance of fruits, the productivity can be increased by promotion of cultivation of fruit crops in the potential areas. The major interventions are,

1. Area expansion of Banana / Hill Banana sucker & Pine apple sucker covering all blocks
2. Normal planting in Guava have to implement in all blocks except Killiyoor, Melpuram and Thiruvattor block.
3. Normal planting in Amla have to implement in Agastheeswaram and Thuckalay.

b. Vegetable crops

Vegetables are the store houses of most of the vitamins and minerals and also proteins. In order to ensure continuous supply of fresh vegetables to the burgeoning urban markets, it is absolutely necessary to create forward linkages from rural to urban areas. This will also ensure assured income to farmers in the rural areas adjoining the cities. Cultivation of vegetables, formation of farmer clusters, formation of farmers society, collection centers, reefer vans, retail outlets, mobile stores are the components to be promoted for increasing the productivity and marketing of vegetables. Area expansion of Tapioca have to increase in all blocks.

c. Flower crops

The major flowers grown are Gundumalli, Mullai, Rose, Crossandra, Chrysanthemum, Marigold, Tuberose, Arali, Jathimalli etc. Floriculture activity has evolved as a viable and profitable alternative, with a potential to generate remunerative self-employment among small & marginal farmers. The flower crops require lots of manpower for picking flowers and perform other operations, hence providing opportunity to marginal and small farmers for generating more income, employment and promote greater involvement of women work force. Keeping this in mind, the promotion area of cultivation of traditional and cut flowers are planned for different flower crops. The major intervention are,

1. Loose flowers - Jasminum sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia have to implement in Thucklay
2. Bulbous flowers - Tube rose, Gladioli, Dahlia, Bird of paradise, Heliconia, Tulip have to implement in Agastheeswaram and Thucklay

d. Spice crops

Spice crops play a unique role in India's economy by improving the income of the rural people. Cultivation of spices is labor intensive so it can generate lot of employment opportunities for the rural population. The demand of Indian spice is very much in other countries. Hence production of spices has very much scope to meet that demand by huge production. Perennial spices (Pepper, Curry leaf, All spice, Cinnamon, Clove, Tamarind, Nut meg etc.,) have to implement in all blocks.

e. Plantation crops

Plantation crops are high value commercial crops of greater economic importance and play a vital role in our Indian economy. These crops help to conserve the soil and ecosystem. The crops include tea, coffee, rubber, cocoa, coconut, arecanut, oil palm, palmyrah, cashew, cinchona etc. So the promotion of cultivation of plantation crops in the potential districts will increase the economy of the farmer and also Indian economy. Area expansion of Cocoa have to implement in all blocks.

f. **Medicinal and Aromatic plants**

Medicinal and Aromatic plants form a numerically large group of economically important plants which provide basic raw materials for medicines, perfumes, flavors and cosmetics. These plants and their products not only serve as valuable source of income for small holders and entrepreneurs but also help the country to earn valuable foreign exchange by way of export. Therefore, the vast scope for expansion of medicinal and aromatic plants in this district. The major intervention are,

1. Area expansion of Ocimum have to implement in Agastheeswaram and Thucklay blocks.

2. Area expansion of Thipili have to implement in all blocks.

3. INM/IPM have to implement in Agastheeswaram block.

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. Provision of poly green house have to implement in all blocks.

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 3.70 lakh hectares worldwide were farmed organically, representing approximately 0.9 per cent 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 exporter's excellent opportunities to improve their income and living conditions. Organic farming and PGS certification in 50 acre cluster have to implement in all blocks.

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 including organic farming. Similarly, exposure visits to farmers to nearby districts / States and even foreign countries would help them aware and adopt new innovative technologies. The major interventions are,

1. Training to farmers within and outside state have to conduct in all blocks
2. Exposure visit, Training to staff have to conduct in all blocks
3. District level seminar have to conduct in Melpuram block.

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. Bee hive and Honey extractor have to implement in all blocks.

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 rotavator / equipment, power machines including accessories and equipment would strengthen the infrastructural facilities. Supply of power tiller/ mini tractor covering all blocks and distribution of plastic crates for vegetables and fruits in Agastheeswaram and Melpuram block.

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 a minimum percentage 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. Drip Irrigation have to implement in all blocks and water harvesting system have to implement in Agastheeswaram, Melpuram and Thucklay blocks.

Special Interventions

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 scrotch). 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. It would have to implement in Agastheeswaram block.

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. 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. In AESA based IPM emphasis is given to natural enemies, plant compensation ability, abiotic factors and P: D ratio. Distribution of AESA based IPM in fruits and Vegetables Pheremone traps, Yellow sticky trap, and light trap covering all blocks. Farm deficiency correction have to implement in all blocks.

Promotion of Roof top Garden / Potager garden

The traditional kitchen garden, also known as a 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.

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.

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. Promotion of Roof top garden/ Portager garden kit have to implement in all blocks.

Perimetro Vegetable Cluster Development Programme

Since production of vegetables is not in accordance with the market demand and the productivity of many vegetables is less than the potential yield, farmers are to be motivated to plan for cultivation of vegetables based on market demand. Market led production of vegetables need to be taken up to ensure continuous supply of vegetables to the market and the grower to get increased return out of sale of produce. Hence, it is necessary to go in for the productivity enhancement by advanced technologies. The project involves vegetable

Cultivation under protected condition, post-harvest management, collection centres, retail outlets and training to the growers. The vegetable produced in the project area will be

immediately transported to the pack house where grading, sorting and standard packing will be done. Further to narrow down the supply chain, open retail outlets and mobile stores are proposed. Packhouse have to implement in all blocks.

Computerization and Governance

As per the Stated 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. Publicity nd Documentation have to implement in all blocks.

Rainfed Area Development Programme (RADP)

Rainfed areas assume special significance in terms of ecology, agricultural productivity and livelihood for millions of rural households in India.

To ensure agriculture growth in the rainfed areas, the Government of India launched a new scheme “Rainfed Area Development Programme (RADP)” in the year 2011-12 as a sub-scheme under Rashtriya Krishi Vikas Yojana (RKVY).

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. RADP focuses on Integrated Farming System (IFS) for enhancing productivity and minimizing risks associated with climatic variabilities. IFS- Horticultural based farming system and moisture stress management have to implement in all blocks.

Infrastructure Development

Mushroom production

Commercial production of edible Mushrooms converts the agricultural, industrial, forestry and household wastes into nutritious food (Mushroom). Indoor cultivation of oyster mushrooms utilizes the vertical space and is regarded as the highest protein producer per unit area and time – almost 100 times more than the conventional agriculture and animal husbandry. Mushroom Production and compost making have to implement in Thucklay block and Cottage mushroom unit have to implement in Melpuram and Rajakamangalam block.

Vermicompost unit

Earthworms are often referred to as farmer’s friend s and nature’s ploughmen. Earthworms are extremely important in soil formation, principally through their activities in consuming organic matter, fragmenting and mixing it intimately with mineral particles to form aggregates. During their feeding, earthworms promote microbial activity greatly, which in turn accelerates the breakdown of organic matter and stabilization of soil aggregates. The end product, commonly termed vermicompost and obtained as the organic wastes pass

through the earthworm gut, is quite different from the parent waste material. Therefore it's necessary to establish a permanent vermicompost unit in all blocks.

Supporting structures for vegetable production

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

a. Staking, trellis and propping

Though most vegetables grow on their own, plants with vining and sprawling growth or with brittle stems and heavy fruits need support. Peas, cucumbers, pole beans, tomatoes, squash, eggplants and peppers benefit from trellising, caging or staking. The trick to heavy harvests knows which vegetable support system works best for each plant. Trellising, which involves tying plant stems to vertical structures with garden twine or plant ties, allows to fit more plants in the garden. It is the preferred support method for peas, indeterminate vine-type tomatoes, pole and runner beans, cucumbers and smaller squash varieties. It would have to implement in all blocks except Boothapandy.

Modernization of State Horticulture Farms

In Tamil Nadu, there are 52 State Horticulture Farms including six parks and garden. 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. Development activities in new/ existing state horticulture farm have to implement in Agastheeswaram and Killyoor blocks.

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. It would have to implement in all blocks.

4.2.1. Budget

The budget requirement for fulfilling the various interventions is ₹ **11861.97** Lakhs. The details of budget requirement for each intervention across the blocks are shown in Table.4.12.

4.2.2. Implementing agency

The projects will be implemented by the Department of Horticulture

Table 4.12. Budget for horticulture development

(Rs.in lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks 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	Banana / Hill Banana sucker & Pine apple sucker	Ha	0.875	All Blocks	845	739.38	955	835.63	1060	927.50	1175	1028.13	1315	1150.63	5350	4681.25
2	Normal planting in Guava	Ha	0.6	All Blocks except B4, B6 & B8	30	18.00	32	19.20	37	22.20	37	22.20	45	27.00	181	108.60
3	Normal planting in Amla	Ha	0.6	B1 & B9	12	7.20	15	9.00	20	12.00	25	15.00	30	18.00	102	61.20
II	**Area expansion of vegetable crops**															
4	Tapioca	Ha	0.5	All Blocks	180	90.00	220	110.00	265	132.50	340	170.00	400	200.00	1405	702.50
III	**Area expansion of Medicinal and Aromatic plants**															
5	Ocimum	Ha	0.3586	B1 & B9	10	3.59	10	3.59	10	3.59	10	3.59	10	3.59	50	17.93
6	Thippili	Ha	0.7472	All Blocks	45	33.62	45	33.62	45	33.62	45	33.62	45	33.62	225	168.12
IV	**Area expansion of Spices crops**															
7	Perennial spices (Pepper, Curry leaf, All spice, Cinnamon, Clove, Tamarind, Nut meg etc.,)	Ha	0.5	All Blocks	160	80.00	200	100.00	250	125.00	290	145.00	320	160.00	1220	610.00
V	**Area expansion of Flower crops**															

Sl. No.	Interventions	Unit	Unit cost	Blocks 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	Loose flowers - Jasminum sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia	Ha	0.4	B9	10	4.00	15	6.00	15	6.00	20	8.00	25	10.00	85	34.00
9	Bulbous flowers - Tube rose, Gladioli, Dahlia, Bird of paradise, Heliconia, Tulip	Ha	1.5	B1 & B9	35	52.50	50	75.00	55	82.50	55	82.50	60	90.00	255	382.50
VI	**Area expansion /Gap filling of Plantation crops**															
10	Cocoa	Ha	0.5	All Blocks	110	55.00	135	67.50	165	82.50	190	95.00	200	100.00	800	400.00
VII	**Rejuvenation/ INM-IPM/Mulching/ Anti bird net**															
11	INM/IPM for Horticultural crops	Ha	0.04	B1	0	0.00	10	0.40	10	0.40	10	0.40	10	0.40	40	1.60
VIII	**Pollination Support through Bee Keeping**															
12	Bee hive & Colony	No	0.04	All Blocks	1850	74.00	1920	76.80	1990	79.60	2110	84.40	2180	87.20	10050	402.00
13	Honey Extractor	No	0.2	All Blocks	185	37.00	192	38.40	199	39.80	211	42.20	218	43.60	1005	201.00
IX	**Organic Farming**															
14	Organic farming and PGS certification in 50 acre cluster	1 cluster	14.95	B4	0	0.00	1	14.95	0	0.00	0	0.00	0	0.00	1	14.95
X	**Rainfed Area development**															

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
15	Integrated farming system - Horticulture Based farming	Ha	0.5	All Blocks	40	20.00	41	20.50	42	21.00	44	22.00	44	22.00	211	105.50
16	Moisture stress management - Minimum irrigation gurantee by PUSA hydrogel	Ha	0.1		450	45.00	450	45.00	450	45.00	450	45.00	450	45.00	2250	225.00
B	**Infra structures and Assets creation**															
I	Protected cultivation															
1	Poly Green House	1000 Sq.m	9.35	All Blocks	2	18.70	3	28.05	5	46.75	3	28.05	5	46.75	18	168.30
II	**Mushroom production**															
1	Mushroom production and compost making	1 No.	20	B9	0	0.00	0	0.00	1	20.00	0	0.00	1	20.00	2	40.00
2	Cottage mushroom unit	1 No.	1	B6 & B7	1	1.00	1	1.00	1	1.00	1	1.00	2	2.00	6	6.00
III	**Vermicompost unit**															
6	Permanent Vermicompost Unit	600 cu.ft	1	All Blocks	9	9.00	9	9.00	9	9.00	9	9.00	10	10.00	46	46.00
IV	**Supporting structures for Horticulture crop production**															
1	Staking/ Trellies/ Propping	Ha	1	All Blocks except B2	250	250.00	300	300.00	350	350.00	440	440.00	480	480.00	1820	1820.00

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
V	**District Horticulture information and training centre**															
VI	**Community seed bank**															
C	**Special interventions**															
1	Farm deficiency correction	Ha	0.04	All Blocks	975	39.00	1035	41.40	1095	43.80	1105	44.20	1125	45.00	5335	213.40
2	Promotion of Roof top Garden/ Potager garden Kit	No	0.005	All Blocks	975	4.88	1035	5.18	1070	5.35	1095	5.48	1100	5.50	5275	26.38
3	Banana Bunch Sleeve	Ha	0.25	B1	10	2.50	50	12.50	50	12.50	0	0.00	0	0.00	110	27.50
4	AESA based IPM in fruits and vegetables Pheramone trap	Ha	0.04	All Blocks	155	6.20	165	6.60	170	6.80	180	7.20	190	7.60	860	34.40
5	AESA Based IPM in fruits and vegetables Yellow sticky trap	Ha	0.04	All Blocks	155	6.20	165	6.60	170	6.80	180	7.20	190	7.60	860	34.40
6	AESA Based IPM in fruits and vegetables Light trap	Ha	0.08	All Blocks	155	12.40	165	13.20	170	13.60	180	14.40	190	15.20	860	68.80
D	**Post Harvest Management**															
1	Pack house (9m X 6m)	1 No	4	All Blocks	6	24.00	5	20.00	7	28.00	5	20.00	8	32.00	31	124.00
E	**Development of Farms, Nurseries and Parks**															

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
1	Developmental activities in new/ exsisting state Horticultural farm, Keelapalur	No	25	B1 & B4	1	25.00	1	25.00	1	25.00	0	0.00	0	0.00	3	75.00
F	**Mechanization - Machineries, Equipments & Tools**															
1	Power tiller/Tractor/Minitr actor	Nos	1	All Blocks	13	13.00	13	13.00	13	13.00	13	13.00	13	13.00	65	65.00
2	Plastic crates for vegetable & fruits handling	No of sets containing 10crates	0.075	B1 & B6	4	0.30	4	0.30	4	0.30	4	0.30	4	0.30	20	1.50
G	**Water / Irrigation Management**															
1	Micro Irrigation - Drip	Ha	1.12	All Blocks	61	68.32	65	72.80	70	78.40	78	87.36	83	92.96	357	399.84
2	Water harvesting system for individuals	No	1.5	B1, B6 & B9	1	1.50	1	1.50	0	0.00	1	1.50	2	3.00	5	7.50
H	**Capacity Building**															
1	Training to farmers within the State. 2 days Rs.1000/farmer/ day	No	0.02	All Blocks	270	5.40	270	5.40	270	5.40	270	5.40	270	5.40	1350	27.00
2	Training to farmers outside the state. 30 farmers/Batch	No	0.105	All Blocks	45	4.73	45	4.73	45	4.73	45	4.73	45	4.73	225	23.63

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
3	Exposure visit to farmers for 5 days. Rs.1000/farmer/day	No	0.05	All Blocks	9	0.45	9	0.45	9	0.45	9	0.45	9	0.45	45	2.25
4	Exposure visit of farmers outside India	No	4	All Blocks	9	36.00	9	36.00	9	36.00	9	36.00	9	36.00	45	180.00
5	Training to staff outside the state / Batch of 5 members	No	0.04	All Blocks	9	0.36	9	0.36	9	0.36	9	0.36	9	0.36	45	1.80
6	Training to staff outside India	No	6	All Blocks	9	54.00	9	54.00	9	54.00	9	54.00	9	54.00	45	270.00
7	District level seminar	No	2	B6	1	2.00	1	2.00	1	2.00	1	2.00	1	2.00	5	10.00
8	Computerization & governance	No	1	All Blocks	9	9.00	9	9.00	9	9.00	9	9.00	9	9.00	45	45.00
9	Publicity and Documentation	No	0.5	All Blocks	9	4.50	9	4.50	9	4.50	9	4.50	9	4.50	45	22.50
I	**Crop Insurance and Risk Mitigating schemes**															
1	Crop Insurance	Ha	0.025	All Blocks	45	1.13	45	1.13	45	1.13	45	1.13	45	1.13	225	5.63
	Grand total					**1858.84**		**2129.27**		**2391.07**		**2593.28**		**2889.51**		**11861.97**

Agastheeswaram – B1, Boothapandy – B2, Kurunthancode – B3, Killiyoor – B4, Munchrai – B5, Melpuram – B6, Rajakamangalam – B7, Thiruvattar – B8, Thuckalay – B9

4.3. Agricultural Engineering

Agricultural mechanization is the process whereby equipments, machineries and implements are utilized to boost agricultural and food production. It is the application of machineries, equipments and implements in the day to day farm activities to increase marginal output in food production and poverty eradication. It increases productivity of land and labour by meeting timeliness of farm operations and increase work out-put per unit time. Besides its paramount contribution to the multiple cropping and diversification of agriculture, mechanization also enables efficient utilisation of inputs such as seeds, fertilisers and irrigation water. The agricultural mechanization is the only way out to face the challenge of farm worker's shortage. Thus the ultimate objective of Agricultural Mechanization Strategies in developing countries is to help increase the welfare of farm households and create positive dynamics and opportunities for economic growth in rural areas.

4.3.1. Strategies:

- Promotion and strengthening of Agricultural Mechanization through training, Testing and Demonstration in order to ensure performance testing of agricultural machinery and equipment, capacity building of farmers and end users and promoting farm mechanization through demonstrations. Demonstration of Agricultural Machinery have to implement in Agastheeswaram, Rajakamangalam and Thucklay blocks.
- Promotion of ownership to small and marginal farmers for various agricultural machinery and equipments such as Tractors, Power tillers, Rice transplanter, Self-propelled machinery, Tractor/Power tiller drawn equipments (MB Plough, Disc plough, Cultivator, Harrow, Leveller Blade, Ridger, Laser Land Leveller, Reversible Mechanical Plough, Rotavator, Rotopuddler, Reversible Hydraulic Plough, Post hole digger, Reaper, Seed driller, Balers, Coconut thrash cutter, coconut frond chopper, Multi crop thresher, Paddy thresher, Brush cutter, Chaff cutter, Drum Seeder) and Plant protection equipments covering all blocks. .
- Introduction of renewable energy in the villages which would replace other fuels. Also attractive for water pumping applications in remote areas. Hence solar operated photovoltaic water pumping system provides better sustainable alternative option to fulfill irrigation requirement of agriculture covering all blocks.
- Provision of components such as Telescopic Pruner, Motorized Rubber Roller, Trays for Paddy Nursery Raising, Combine Harvester, Diesel Pump, Rotary Tiller, Smoke House, Mist Blower covering all blocks.

- Strengthening of communication and information facilities in order to disseminate the information in rural areas covering Killiyoor, Thucklay, Thiruvattur, Melpuram and Munirachi block.
- Promotion of agro-processing and management machinery at community level through supply of post-harvest machinery such as self-propelled/other driven horticultural machinery (Chain saw/ wheel barrow/ Mango grader/ planter and other suitable self-propelled machineries and equipments), Manual horticultural equipments (Aluminium ladder/ Ladder, Aluminium pole, Plucker), Post-harvest equipments for grains, oil seeds and Horticultural crops (Packing machine, power driven dehusker, thresher, Harvester, De-spiking, Deconing, Peeler, Splitter, Stripper, Boiler, Steamer, Dryer solar, Washing Machine, Grinder, Pulveriser, Polisher, Cleaner cum grader, gradient separator, Specific gravity separator) this would make sure that more value is added to farm outputs locally covering all blocks.
- Establishment of Agricultural Engineering Extension centres in order to collect information related to Government subsidy on agricultural / machineries / equipment / irrigation systems etc., compilation of latest technologies related to Agricultural Engineering and Development of video cassettes library related to Processing of agricultural products, Working of important agricultural machines and equipment and Repair, maintenance and proper setting of the different agricultural Machines / and equipment in Killyoor and thucklay block.
- Promotion of training to AED engineers on post-harvest techniques and bio energy in this district.

4.3.2. Expected outcome

Implementation of the above strategies such as supply of farm implements to carry out mechanised cultivation operations and demonstration to farmers the advantage of using Agricultural implements and machinery would increase the production and productivity. Post- Harvest Technologies to farmers would prevent loss of food grains during harvest and storage and Preserve the quality of produce in respect of perishable commodities. Disseminated technologies on renewable energies, in particular, solar energy for agricultural activities in respect of pumping with solar powered pumps, drying farm produce for enhancement of quality to fetch reasonable market price.

4.3.3. Budget

Agriculture continues to be the most predominant sector of this district economy, as 70 percent of the population is engaged in Agriculture and allied activities for their livelihood. Agricultural Mechanization could provide the stability in agricultural production

in a sustainable manner to meet the food requirement of growing population and also to meet the raw material needs of agro based industries, thereby providing employment opportunities to the rural population. The Major component required to implement in this district are capacity building of farmers and end users with the budget of ₹1.68 lakhs, Financial assistance for the procurement of Agricultural Machinery, Post-harvest machinery and equipments in rural areas with the budget of ₹ 264.11 lakhs and also implementation of minor irrigation, Tractor hiring scheme, Solar energy, Innovative schemes of AED, Pilot mechanization Demonstration, Post-harvest technology and management machinery with budget of ₹ 210.05 lakhs. Some other interventions such as Bio- mass gasifier, Construction of Agricultural Engineering Extension centres (AEECs) with the budget of ₹150.24 lakhs are required to implement in this district to enhance the Agricultural Productivity. The overall budget requirement for implementation of above interventions is ₹626.08 lakhs . The details of budget requirement for each intervention across the blocks are shown in Table 4.13..

4.3.4. Implementing agency

The projects will be implemented by the Department of Agricultural Engineering

Table.4.13. Budget requirement for Agricultural Engineering

(₹. in lakhs)

Sl. No.	Interventions	Blocks 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
	Capacity Building															
1	**Demonstration of Agricultural Machinery**	B1 ,B7,B2	No's/Ha	0.04	8	0.32	8	0.32	9	0.36	9	0.36	8	0.32	42	1.68
2	Tractor (15-20 PTO HP)	All Blocks	No's/Ha	4	3	12.00	2	8.00	2	8.00	2	8.00	3	12.00	12	48.00
3	Tractor (Above 20-40 PTO HP)	All Blocks	No's/Ha	6	2	12.00	2	12.00	3	18.00	2	12.00	2	12.00	11	66.00
4	**Power Tillers**															
5	Power Tiller (8 BHP & above)	All Blocks	No's/Ha	1.75	4	7.00	4	7.00	3	5.25	4	7.00	4	7.00	19	33.25
6	**Rice Transplanter**															
7	Self Propelled Rice Transplanter (Above 4-8 rows)	All Blocks	No's/Ha	16	1	16.00	0	0.00	1	16.00	1	16.00	1	16.00	4	64.00
8	**Specialized Self Propelled Machinery**															
9	Post Hole Digger / Augur	All Blocks	No's/Ha	0.63	2	1.26	1	0.63	1	0.63	2	1.26	1	0.63	7	4.41
10	**Tractor/Power Tiller (below 20 BHP) driven equipments**															
11	**c.Inter Cultivation Equipments**															
12	Power Weeder (engine operated above 2 BHP)	All Blocks	No's/Ha	0.7	4	2.80	3	2.10	4	2.80	3	2.10	3	2.10	17	11.90
13	**e.Harvesting & Threshing Equipments**															
14	Brush Cutter	All Blocks	No's/Ha	0.3	9	2.70	10	3.00	9	2.70	9	2.70	9	2.70	46	13.80
15	**a.Land Development, tillage and seed bed preparation equipments**															
16	Disc Plow	B9,B8,B5	No's/Ha	0.6	1	0.60	1	0.60	1	0.60	0	0.00	0	0.00	3	1.80

Sl. No.	Interventions	Blocks 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
17	Cultivator	B9,B8,B5	No's/Ha	0.3	1	0.30	1	0.30	1	0.30	0	0.00	0	0.00	3	0.90
18	Rotavator	B4,B9,B8,B5,B6	No's/Ha	0.95	2	1.90	2	1.90	1	0.95	1	0.95	1	0.95	7	6.65
19	**e. Equipments for Residue management/Hay and Forage Equipments**															
20	Balers (Round)	B1	No's/Ha	3.5	1	3.50	0	0.00	0	0.00	0	0.00	0	0.00	1	3.50
21	**All Manual/animal drawn equipment/implements / Tools**															
22	Tree climber	All Blocks	No's/Ha	0.07	6	0.42	6	0.42	6	0.42	6	0.42	6	0.42	30	2.10
23	**Plant protection equipments**															
24	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 12-16 lts)	All Blocks	No's/Ha	0.08	13	1.04	13	1.04	13	1.04	13	1.04	13	1.04	65	5.20
25	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 16 lts)	All Blocks	No's/Ha	0.1	5	0.50	6	0.60	5	0.50	5	0.50	5	0.50	26	2.60
26	**Solar Energy**															
27	**5 hp**	All Blocks	No's/Ha	3.75	3	11.25	3	11.25	3	11.25	3	11.25	3	11.25	15	56.25
28	**upto 400sq.ft**	B1	No's/Ha	4.25	1	4.25	0	0.00	0	0.00	0	0.00	0	0.00	1	4.25
29	**Other machineries**				0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
30	Telescopic Pruner	B4,B9,B8,B5,B6	No's/Ha	0.6	1	0.60	1	0.60	0	0.00	1	0.60	1	0.60	4	2.40
31	Motorized Rubber Roller	B4,B9,B8,B5,B6	No's/Ha	0.6	2	1.20	1	0.60	2	1.20	1	0.60	2	1.20	8	4.80
32	Trays for Paddy Nursery Raising	All Blocks	No's/Ha	0.0008	1600	1.28	1600	1.28	1600	1.28	1600	1.28	1600	1.28	8000	6.40
33	Combine Harvester	B1 ,B7,B2	No's/Ha	17	0	0.00	1	17.00	1	17.00	1	17.00	1	17.00	4	68.00
34	Diesel Pump	B1 ,B7,B2	No's/Ha	0.4	1	0.40	1	0.40	1	0.40	1	0.40	1	0.40	5	2.00
35	Rotary Tiller	B5	No's/Ha	0.75	1	0.75	0	0.00	0	0.00	0	0.00	0	0.00	1	0.75
36	Smoke House	B1 ,B7,B2	No's/Ha	0.7	1	0.70	1	0.70	1	0.70	1	0.70	1	0.70	5	3.50

Sl. No.	Interventions	Blocks 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
37	Mist Blower	B5	No's/Ha	0.4	1	0.40	0	0.00	0	0.00	0	0.00	0	0.00	1	0.40
38	**Information Technology (IT) related items**															
39	Computer & its accessories	B4,B9,B8,B5,B6	No's/Ha	0.8	7	5.60	0	0.00	0	0.00	0	0.00	0	0.00	7	5.60
40	Tablet (Tab)	B4,B9,B8,B5,B6	No's/Ha	0.25	8	2.00	0	0.00	0	0.00	0	0.00	0	0.00	8	2.00
41	Xerox machine	B4,B9,B8,B5,B6	No's/Ha	1.5	5	7.50	0	0.00	0	0.00	0	0.00	0	0.00	5	7.50
42	**Mecanized row crop cultivation- Pilot mechanization Demonstration**	B7,B2	No's/Ha	0.04	2	0.08	0	0.00	0	0.00	0	0.00	0	0.00	2	0.08
43	Chain saw/ Wheel barrow/ Mango grader/ planter and other suitable self propelled machineries and equipments for horticulture Crops	All Blocks	No's/Ha	1	6	6.00	2	2.00	3	3.00	4	4.00	2	2.00	17	17.00
44	**Manual Horticultural Equipments**															
45	Aluminium Ladder/ Ladder	B4,B9,B8,B5,B6	No's/Ha	0.2	3	0.60	0	0.00	0	0.00	0	0.00	0	0.00	3	0.60
46	Plucker	B4,B9,B8,B5,B6	No's/Ha	0.02	6	0.12	0	0.00	0	0.00	0	0.00	0	0.00	6	0.12
47	**Post Harvest Equipments for food grains, oil seeds and Horticultural Equipments**															
48	Oil mill with filter press (for all type of Horticulture / Food grain / Oil seeds crop)	B1 ,B7	No's/Ha	1.2	2	2.40	0	0.00	0	0.00	0	0.00	0	0.00	2	2.40
49	Packing Machines (for all types of Horticulture /	B1 ,B7	No's/Ha	3	4	12.00	0	0.00	0	0.00	0	0.00	0	0.00	4	12.00

Sl. No.	Interventions	Blocks 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
	Food grain / Oil seeds crop)															
50	All types of Power driven Dehusker/ sheller/ Threshers/ Harvesters/ De-spiking/ Deconing Machine/ Peeler/ Splitter/ Stripper (for all type of Horticulture / Food grain / Oil seeds crop)	All Blocks	No's/Ha	1.2	10	12.00	0	0.00	0	0.00	0	0.00	0	0.00	10	12.00
51	All types of Boiler/ Steamer/ Dryer solar (for all type of Horticulture / Food grain / Oil seeds crop)	B7	No's/Ha	2	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00	1	2.00
52	**Construction of Agricultural Engineering Extension centres (AEECs)**	B4,B9	No's/Ha	75	0	0.00	0	0.00	0	0.00	1	75.00	1	75.00	2	150.00
53	**Training of AED Engineers on " Agricultural Processing" and " Bio-Energy"**	B4,B9,B8,B5,B6	No's/Ha	0.04	2	0.08	1	0.04	1	0.04	1	0.04	1	0.04	6	0.24
	Grand total					**133.55**		**71.78**		**92.42**		**163.20**		**165.13**		**626.08**

Agastheeswaram – B1, Boothapandy – B2, Kurunthancode – B3, Killiyoor – B4, Munchrai – B5, Melpuram – B6, Rajakamangalam – B7, Thiruvattar – B8, Thuckalay – B9

4.4. Agricultural Marketing

The Government is taking every effort to attain sustainable agricultural development by transforming agriculture into a commercial venture, by switching over to new scientific methods of cultivation so as to increase the productivity manifold. Besides, through value addition, processing and utilization of the marketing opportunities, the incremental output can be ensured. To further improve the marketing opportunities and to reduce the loss of agricultural produces, several measures have to be taken up by way of interventions like promotion of commodity groups and market information, strengthening of Uzhavar shandies and regulated markets, construction of storage godown, provision of market access and market activities, supply chain and post-harvest management, infrastructure and assets, and capacity building of farmers.

The core problem however in Agribusiness development is the general failure in coordinating the decisions of the private stakeholders *viz.,* farmers, traders and agricultural processors and service providers by the government and non-governmental sectors. In fact farmers fail to link themselves through effective producer-organizations to undertake joint decisions in production and marketing as well. Such weak linkages also due to limited access to relevant market intelligence and inadequate market infrastructure. Farmers are also poorly linked to research and extension service providers to address their specific technology and knowledge needs that would enable them into high-value production systems.

Entrepreneurs also have weak linkages with the farmers through contracts and vertical integration arrangements and are away from consumers because of absence of organized retail chains. Linkage with service providers are characterized by lack of confidence. The inadequacy in certification, quality assurance systems and inadequate infrastructure continues to limit the integration of production and international markets.

Agricultural produce are seasonal and perishable in nature. In a good season there may be a local glut, but because of insufficient transport facilities, lack of good roads and poor availability of packaging materials, the surplus cannot be taken quickly enough to the natural markets in urban areas. Moreover, the surplus often cannot be stored for sale in the off-season because of inadequate local storage facility; the farmers are often forced to market their produce at low price. Thus, the cultivars do not get a good price for their produce because of the glut, and some of it is spoiled resulting in complete loss. Currently pulses are processed manually using thirugu, ural, chakki, etc., which is laborious and time consuming. Due to existing problems in processing of pulses and millets, their market is not profitable for the farmers growing pulses. To reduce the loss of agricultural produce which

are up to 30 per cent, necessary provisions are needed to ensure remunerative price to the produce, encourage processing from the present level of 10 per cent of the total.

So, to accelerate the growth substantially, a new way of linking of Agricultural produce and marketing and promoting Agribusiness are focused. Promotion of commodity groups, farmer producer agencies, marketing organization and market linkage, encouraging of private players in marketing, value addition, crop specific supply chain management, more infrastructural facilities for processing and sensitizing the farmers for market-led agriculture by rendering crop advisory and market information are focused. Agri-business also contributes to the production of higher-value products and diversification away from the staple foods. Through this diversification and the development of the value chain between producers and consumers, the rural economy benefits from innovation and the creation of non-farm employment.

Components

- ✓ Promotion of commodity groups and market information through Establishment of e-learning Centre in Munirachi block
- ✓ Provision of Agmark Lab equipments in Thucklay and Munirachi block
- ✓ Construction of drying yard have to implement in Killyoor, Melpuram and Agastheeswaram.
- ✓ Provision of Electronic digital weighing scale have to implement in Kurunthancode, Killiyoor, Munirachi, Melpuram and Agastheeswaram
- ✓ Plastic crates have to implement in all blocks.
- ✓ Productive Investments for Farmer common service centre have to implement in Kurunthancode, Killiyoor, Munirachi, Melpuram and Agastheeswaram
- ✓ Provision of Gunnies have to implement in Kurunthancode, Killiyoor, Munirachi, Melpuram and Agastheeswaram
- ✓ Steel ladder have to implement in Kurunthancode, Killiyoor, Munirachi, Melpuram and Agastheeswaram
- ✓ Tarpaulin have to implement in Kurunthancode, Killiyoor, Munirachi, Melpuram and Agastheeswaram
- ✓ Coconut ladder have to implement in Kurunthancode, Killiyoor, Munirachi, Melpuram and Agastheeswaram
- ✓ Exposure visit within state have to implement in all blocks except Thuckalay and Rajakamangalam.

4.4.1. Budget

The district plan proposes an outlay of **₹.470.03 lakhs** over a period of five years for Kannyakumari district (Table 4.14).

4.4.2. Expected Outcome

The expected impact of the intervention will be increasingly competitive agribusiness sector leading to diversification, higher-value added products and higher incomes for farmers, farm workers and entrepreneurs and reduced rural poverty. The interventions will facilitate the development of a competitive agriculture sector, promoting diversification and contributing to the transformation of agriculture into a system producing higher value produces. The interventions will also provide higher-value for consumers, value that will be shared as distributed benefits to value chain stakeholders including farmers, entrepreneurs and workers.

4.4.3. Implementing Agency

The Block-level officials of the Department of Agricultural Marketing and Agri-Business will implement the programs.

Table 4.14. Budget for strengthening of Agricultural Marketing and Agri-Buiness in Kanyakumari District

(₹. in lakhs)

Sl. No.	Intervention	Unit	Unit cost	Block covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Promotion of Commodity Groups and Market Information															
1	e-learning Centre	1	25	B7	1	25.00	0	0.00	0	0.00	0	0.00	0	0.00	1	25.00
2	Provision of Agmark Lab equipments		0.21	B2, B7	14	2.94	50	10.50	4	0.84	3	0.63	2	0.42	73	15.33
	Strengthening of Uzhavar Sandhai and Regulated Market															
3	Drying Yard	1	5	B6, B8, B9	3	15.00	0	0.00	0	0.00	0	0.00	0	0.00	3	15.00
	Formation of FPO / Strengthening of Existing Commodity Groups															
4	FPO	1	0.25	All Blocks	8	2.00	8	2.00	8	2.00	8	2.00	8	2.00	40	10.00
	Provision of Market Access and Market Activities															
5	Electronic Digital Weighing Scale - 5 Kg	2	0.15	B1, B6, B7, B8, B9	17	2.55	15	2.25	15	2.25	15	2.25	15	2.25	77	11.55
6	Plastic crates	Nos	0.003	All Blocks	1200	3.60	1200	3.60	1200	3.60	1200	3.60	1200	3.60	6000	18.00
7	Productive Investments for Farmer Common service Center - FCSC	1 Nos	0.15	B1, B6, B7, B8, B9	17	2.55	15	2.25	15	2.25	15	2.25	15	2.25	77	11.55
8	Provision of Gunnies	Nos	0.0007	B1, B6, B7, B8, B9	25000	17.50	25000	17.50	25000	17.50	25000	17.50	25000	17.50	125000	87.50
9	Steel Ladder	10 Nos/CIG	0.016	B1, B6, B7, B8, B9	250	4.00	250	4.00	250	4.00	250	4.00	250	4.00	1250	20.00
10	Tarpaulin	Nos	0.016	B1, B6, B7, B8,	250	4.00	250	4.00	250	4.00	250	4.00	250	4.00	1250	20.00

Sl. No.	Intervention	Unit	Unit cost	Block covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				B9												
	Post Harvest Infrastructure and Machinaries															
11	Coconut Ladder	1	0.035	All Blocks	1680	58.80	1440	50.40	640	22.40	0	0.00	0	0.00	3760	131.60
	Capacity building Programme															
12	Exposure Visits - within state	1	1.25	All Blocks excpet B2, B3	7	8.75	7	8.75	7	8.75	7	8.75	7	8.75	35	43.75
13	Exposure Visits - outside state - 3 days	1	0.75	B2, B3, B4, B5	4	3.00	4	3.00	4	3.00	4	3.00	4	3.00	20	15.00
14	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	38	0.75	B1, B6, B7, B8, B9	5	3.75	5	3.75	5	3.75	5	3.75	5	3.75	25	18.75
15	Conducting festivals/melas, Field days, awareness campaign, seminar, Farmers-Scientists interaction, Village meeting	30	0.15	All Blocks	36	5.40	36	5.40	36	5.40	36	5.40	36	5.40	180	27.00
	Grand total					**158.84**		**117.40**		**79.74**		**57.13**		**56.92**		**470.03**

B1- Kurunthencode, B2- Thuckalay, B3- Rajakkamangalam, B4- Thovalai, B5- Thiruvattar, B6-Killiyoor, B7- Munchirai, B8- Melpuram, B9- Agastheeswaram

4.5. Seed and Organic Certification

Seed is a critical input for long-term sustained growth of agriculture. Timely availability of certified quality seeds with good yield potential continues to be a decisive factor in agricultural production. Farmers in Tamilnadu state are well aware of the benefits of using quality seeds which include foundation, certified and truthfully labelled seeds. In our State, the seed replacement rate is being adopted as per the guidelines of Government of India. In order to achieve the target of doubling the income of farmers, timely availability of quality seeds is given utmost importance. Concerted efforts are essential in ensuring timely availability of seeds as well as increasing the Seed Replacement Rate (SRR). The National Mission on Seeds has been formulated with a view to upgrade the quality of farm saved seeds and also to enhance Seed Replacement Rate. The Department of Seed Certification & Organic Certification plays the supporting role in the enhancement of Seed Replacement Rate by certifying quality seeds in an increasing trend over the years.

Seed certification is a legally sanctioned system for quality control of seed multiplication and production. The immediate objective of seed certification is to supply high quality seed to farmers and other growers, which is true to identity, high in purity and germination capacity and free from certain pests and diseases. Seed quality is most important in crop production, as high quality seed is essential for good crop yields and good returns, and minimize the likelihood of crop failure. Moreover, growing consciousness of health hazards due to possible contamination of farm products from use of chemicals have immensely contributed to the revival of organic agriculture. Organic certification is a certification body for organic production which was established as a government department on 17 of May 2007. Thus the major focus of the department will be creation of new facilities for better certification by strengthening the lab facilities, and infrastructure, create more awareness on quality seed and organic agriculture through capacity building, expanding communication and networking facilities in order to enhance the activities on seed and organic certification.

4.5.1. Project components

- Strengthening of Seed Testing laboratories

  Samples received in a seed testing laboratory should be processed through various stages in the laboratory as quickly as possible so that result may be sent to sender promptly. The space provided for seed testing, the arrangement of that space and furnishing available would contribute greatly in the efficient functioning of the laboratory. In order to carry out seed quality tests and maintaining the purity in the seed testing laboratory the equipments such as Dehuller/Scarifier,Blower, Hot air oven and Miscellaneous are required in all blocks.

- Strengthening of communication and networking facilities

  Information on quality seed production techniques would be disseminate among the farmers and seed growers covering all blocks.

4.5.2. Expected outcome

Enhancement of infrastructure facilities, capacity building, communication and networking would promote the quality of seed and organic certification.

4.5.3. Budget

Seed testing plays a pivotal role in modern agriculture. It is being carried out to analyze factors like germination, physical purity, moisture, seed health and admixture of other distinguishable varieties. Seed testing is carried out in the notified seed testing laboratories. The Seed testing results are very important for the successful implementation of Seed Certification and Seed Law Enforcement programmes. Apart from certified seed samples and samples received from the seed quality control wing, the service samples sent by the farmers, seed dealers and seed producers are also tested in these laboratories of Kannyakumari district. The overall budget requirement for implementation of above interventions is ₹.31.72.lakhs. The details of budget requirement for each intervention across the blocks are shown in Table 4.14.

4.5.4. Implementing agency

The projects will be implemented by the Directorate of seed and organic certification.

Table.4.15 Budget requirement for Seed and Organic Certification

(₹. in lakhs)

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	**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,	No's	13.36	All Blocks	1.00	13.36	1.00	13.36	0.00	0.00	0.00	0.00	0.00	0.00	2.00	26.72
II	**Strengthening of communication and networking facilities**															
	Computer accessories	No's	0.5	All Blocks	10	5.00	0	0.00	0	0.00	0	0.00	0	0.00	10.00	5.00
	Total					**18.36**		**13.36**		**0.00**		**0.00**		**0.00**		**31.72**

B1- Kurunthencode, B2- Thuckalay, B3- Rajakkamangalam, B4- Thovalai, B5- Thiruvattar, B6-Killiyoor, B7- Munchirai, B8- Melpuram, B9- Agastheeswaram

4.6. Animal husbandry

Livestock have been an integral component of India's agricultural and rural economy since time immemorial, supplying energy for crop production in terms of draught power and organic manure, and in turn deriving their own energy requirements from crop byproducts and residues. Livestock are now more valued as source of food and contribute over one-fourth to the agricultural gross domestic product and engage about 9% of the agricultural labour force. The livestock sector has been growing faster than crop sector; however, in recent years, the growth both in livestock production and productivity has decelerated considerably. India's livestock sector is one of the largest in the world. It has 56.7% of world's buffaloes, 12.5% cattle, 20.4% small ruminants, 2.4% camel, 1.4% equine, 1.5% pigs and 3.1% poultry. In 2010-11, livestock generated outputs worth Rs. 2075 billion which comprised 4% of the GDP and 26% of the agricultural GDP. The total output worth was higher than the value of food grains.

Animal Husbandry sector plays a crucial role in ensuring the welfare of rural population. A majority of farmers depend on Animal Husbandry for their livelihood. Moreover, livestock sector provides supplementary employment and sustainable source of income to many small and marginal farmers. Thus, this sector is emerging as an important sector, leveraging the rural economy. In addition, this sector provides a continuous flow of essential food products like milk, meat, eggs besides draught power, raw materials like wool and hides for industries, and manure. With increase in production of livestock products, livestock rearing is also considered as an avocation with high export potential. Distribution of livestock wealth is more egalitarian, compared to land and hence, from the equity and livelihood perspective, it is considered as an important component in poverty alleviation programmes.

Keeping view in this mind, various major interventions are being planned and proposed in the district agricultural plan to be implemented beyond 12th five year plan. The major interventions are:

1. Increasing the availability of fodder through field level interventions
2. Increasing the availability of fodder by strengthening farm infrastructure
3. Livestock breeding management
4. Livestock health
5. Improving the livestock productivity
6. Improving the service delivery at veterinary institutions
7. Enhancing livestock management
8. Capacity building

Increasing the availability of fodder through field level interventions

Livestock rearing is one of the major occupations in India and is making significant contribution to the country's GDP. The livestock population, over the years, has shown a steady growth on broadly two counts i.e. (i) increase in the number of stall feeding based bovine livestock viz. buffaloes and hybrid cattle, and (ii) increase in the number of free grazing based livestock like goats and sheep that can survive on the fast degrading pasturage. The animal husbandry sector has a good growth potential. However, further growth of the sector will be as much dependent upon the availability of fodder. The available data reveals that the present fodder availability in the country is well below requirement. The data also reveals that only about half of the annual fodder requirement is met from the cultivated fodder and crop residues, whereas open grazing and fodder availability from common property resources like forests, pastures, village commons, etc. fulfills the remaining half of the annual fodder requirement. The issue to be taken note of is that it is the open grazing and fodder availability from the common property resources that provides sustenance to a vast majority of households with animal husbandry as the only vocation.

The increasing number of livestock and the changing dynamics of animal husbandry practices require corresponding increase in the type of fodder needed to meet the requirements of these new situations. To overcome these issues the following field level interventions are proposed to improve the fodder availability.

1. Fodder production to the farmers by hydrophonic methods covering all blocks
2. Distribution of Azolla trays and Silage bags covering all blocks.
3. Fodder plot development all blocks

Increasing the availability of fodder by strengthening farm infrastructure

The livestock sector is handicapped due to inadequate infrastructure facilities as a result of low productivity. Infrastructure development for animal husbandry is felt essential to provide the desired veterinary services in the interior pockets of the districts so as to enable the livestock owners living in the remote areas can avail the opportunities to consider AH activities as livelihood option and maximize profit through livestock sector. 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.

Improved infrastructure facilities will provide improved veterinary services contributing to reduction in the incidences of animal diseases thereby increasing the overall productivity of animals. 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 it into knowledge resource centers where best practices can be disseminated to the farmers. The following infrastructure facilities will strengthen the fodder availability such as

1. Distibution of Sheep/Goat units -semi intensive system covering all blocks.
2. Distribution of Buffalo units(5 Buffaloes) covering all blocks.
3. Integrated farming (Goat+Cattle+Fish+Agriculture /Horticulture) covering all blocks.
4. Development of Native chicken farms covering all blocks.
5. Establishment of disposal pits for poultry unit covering all blocks.
6. Distribution of Piggery units (fattening-5 Nos) covering all blocks.
7. Establishment of Rabbit Units covering all blocks.
8. Popularising Quail Rearing covering all blocks.

Improving the service delivery at veterinary institutions

Veterinary hospitals, dispensaries, Aid Centers, diagnostic laboratories and veterinary manpower already available are much less than what is required. These services would be improved and expanded and will continue to be provided by the state owned facilities with an appropriate system of recovery of cost wherever feasible. Private investment to improve delivery of animal health services including facilities by private veterinary graduates would be encouraged. Mobile veterinary dispensaries with provision for vaccination and facilities to generate awareness of farmers regarding various livestock management issues would be promoted to improve outreach. For companion animals, state governments may consider to extend the veterinary services on full cost recovery basis. To improve the service delivery the below mentioned intervention have been proposed. The intervention have been propose are

1. Deep freezer facility for storage of vaccines and medicines covering all blocks
2. Establishment of Infrastructure facilities for Veterinary Institutions have to implement in all blocks except Rajakamangalam and Thiruvattur
3. Establishment of Mobile Disease Diagnostic Labs have to implement in Agastheeswaram and Rajakamangalam.
4. Establishment of Mobile Veterinary Units have to implement in all blocks except Agastheeswaram and Killiyoor.
5. Establishment of surgical theatres at veterinary institution, providing solar lighting panels at veterinary institution and Package of Modern Veterinary Diagnostic Aids

to Veterinary Institutions such as Computerised X rays, Ultrasound, Diathermy etc have to implement in all blocks

6. Establishment of Ambulance facility for animals have to implement in Agastheeswaram.

Enhancing livestock management

The country has rich and diverse genetic resources of livestock in the form of a large number of species, breeds, and strains within a species. India has some of the best breeds of cattle and buffaloes with traits for dairy, draught power and dual purposes, several carpet wool breeds of sheep, highly prolific breeds of goats and adaptive breeds of poultry. Such utility genes and breeds would be identified, conserved and utilized for breeding and research. The focus would be on conservation of indigenous breeds of livestock and poultry. By developing slaughter house, livestock shandy also be helpful to enhancing livestock management. The intervention have been propose are

1. Animal identification and traceability have to implement in all blocks.
2. Conservation of indigenous breeds have to implement in all blocks.

Capacity building

Educating the farmers about the advanced crop production technologies as well as the techniques will enrich the knowledge of farmers through conduct of trainings and demonstrations to the farmers, youths and young entrepreneurs. On field demonstrations are conducted on fodder production technologies, seed production, poultry farming and sheep farming etc.

Capacity building programme is to strengthen the capacities of farmers, indigenous and local communities, and their organizations and other stakeholders, to manage sustainable biodiversity so as to increase their benefits, and to promote awareness and responsible action, in the form of trainings, demonstrations, exposure visits, etc. To create awareness among the farmers the following trainings and campaigns have to be conducted.

1. Establishment of farmers training Centre have to implement in all blocks
2. Conducting demonstrations camps and campaigns have to implement in all blocks
3. Creating awareness of livestock management to the farmers through training programmes have to implement in all blocks

Budget allocation

The major themes proposed in the plan for animal husbandry sector with a total budget out lay of ₹. **2265.31** as shown in Table 4.16.

Project implementing agency

The projects proposed will be implemented by the Department of Animal husbandry sector.

Table.4.16. Budget requirement for Animal Husbandary

(₹. in lakhs)

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
	Increasing the Availability of Fodder through Field level Interventions															
1	Fodder production to the farmers by Hydrophonic methods	Nos	0.1	All Blocks	48	4.80	48	4.80	48	4.80	48	4.80	48	4.80	240	24.00
2	Distrbution of Azolla trays	Nos	0.03	All Blocks	171	5.13	171	5.13	171	5.13	171	5.13	171	5.13	855	25.65
3	Distribution of Silage bags for conservation of fodder crops	Nos	0.005	All Blocks	16	0.08	2	0.01	16	0.08	4	0.02	14	0.07	52	0.26
4	Fodder plot development	acre	0.05	All blocks	400	20.00	400	20.00	400	20.00	200	10.00	200	10.00	1600	80.00
	Improving the Livestock Productivity															
5	Distibution of Sheep/Goat units -semi intensive system	Nos	0.6	All Blocks	18	10.80	6	3.60	18	10.80	8	4.80	14	8.40	64	38.40
6	Distribution of Buffalo units(5 Buffaloes)	Nos	4.5	All Blocks	0	0.00	1	4.50	3	13.50	4	18.00	2	9.00	10	45.00
7	Integrated farming (Goat+Cattle+Fish+Agriculture /Horticulture)	Unit	2	All Blocks	5	10.00	5	10.00	5	10.00	5	10.00	5	10.00	25	50.00
8	Development of Native chicken farms	Farm	1	All Blocks	25	25.00	25	25.00	25	25.00	25	25.00	25	25.00	125	125.00
9	Establishment of disposal pits for poultry unit	Nos	1	All Blocks	25	25.00	25	25.00	25	25.00	25	25.00	25	25.00	125	125.00
10	Distribution of Piggery units (fattening-5 Nos)	Nos	1.25	All Blocks	10	12.50	7	8.75	6	7.50	8	10.00	7	8.75	38	47.50
11	Establishment of Rabbit Units	Nos	1.25	All Blocks	7	8.75	2	2.50	5	6.25	4	5.00	6	7.50	24	30.00
12	Popularising Quail Rearing	Nos	2	All Blocks	6	12.00	4	8.00	7	14.00	4	8.00	8	16.00	29	58.00
	Improving the Service															

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
	Delivery at Veterinary Institutions															
13	Deep freezer facility for Storage of vaccines and Medicines	Nos	10	All Blocks	0	0.00	0	0.00	9	90.00	0	0.00	0	0.00	9	90.00
14	Establishment of Infrastructure facilities for Veterinary Institutions	Nos	30	All Blocks Except B7,B8	0	0.00	0	0.00	6	180.00	2	60.00	2	60.00	10	300.00
15	Establishment of Mobile Disease Diagnostic Labs	Nos	20	B1,B7	0	0.00	0	0.00	0	0.00	1	20.00	1	20.00	2	40.00
16	Establishment of Mobile Veterinary Units	Nos	10	All Blocks Except B1, B4	0	0.00	0	0.00	3	30.00	4	40.00	0	0.00	7	70.00
17	Establishment of surgical theatres at veterinary institution	Nos	30	All Blocks	2	60.00	2	60.00	2	60.00	2	60.00	1	30.00	9	270.00
18	Providing solar lighting panels at veterinary institution	Nos	1	All Blocks	10	10.00	16	16.00	15	15.00	16	16.00	15	15.00	72	72.00
19	Package of Modern Veterinary Diagnostic Aids to Veterinary Institutions such as Computerised X rays, Ultrasound, Diathermy etc.	Nos	30	All Blocks	2	60.00	2	60.00	2	60.00	2	60.00	1	30.00	9	270.00
20	Establishment of Ambulance facility for animals	Nos	80	B1	1	80.00	1	80.00	0	0.00	0	0.00	0	0.00	2	160.00
	Livestock Management															
21	Animal Identification and Traceability	Unit of 1000 animals	0.1	All Blocks	300	30.00	30	3.00	30	3.00	30	3.00	30	3.00	420	42.00
22	Conservation of Indigenous breeds	Pack	10	All Blocks	1	10.00	1	10.00	1	10.00	1	10.00	1	10.00	5	50.00
	Capacity Building															
23	Establishment of Farmers training Centre	Nos	200	B1	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00

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
24	Conducting Demonstrations, Camps and Campaigns	Nos	0.1	All Blocks	57	5.70	57	5.70	57	5.70	57	5.70	57	5.70	285	28.50
25	Creating awarness of livestock management to the farmers through Training Programmes	Nos	0.1	All Blocks	48	4.80	48	4.80	48	4.80	48	4.80	48	4.80	240	24.00
	Grand total					**394.56**		**556.79**		**600.56**		**405.25**		**308.15**		**2265.31**

Agastheeswaram – B1, Boothapandy – B2, Kurunthancode – B3, Killiyoor – B4, Munchrai – B5, Melpuram – B6, Rajakamangalam – B7, Thiruvattar – B8, Thuckalay – B9

4.7.Dairy development

The importance of dairying in a country like India hardly needs emphasize. India has vast resources of livestock, which play an important role in the national economy and also in the socioeconomic development of millions of rural households. India has one of the largest stocks of cattle and buffaloes: more than 50 percent of the world's buffaloes and 20 percent of its cattle.

Dairy sector acts as an important source of income for rural families, plays a vital role in providing gainful employment and income generating opportunities in the district. Dairy industry in the country is expected to witness spectacular growth in 2017, according to experts.

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

4.7.1.Strengthening of milk storages and processing units

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

The major interventions are,

1. Milk storage tanks of various capacities covering all blocks.
2. Milk tankers covering all blocks.
3. Milk pumps covering all blocks.
4. Processing equipment’s covering all blocks.
5. Pasteurizers covering all blocks.
6. Heaters and chillers covering all blocks.

7. Washer and conveyors covering all blocks.
8. Pipes and fittings covering all blocks.
9. Cleaning equipment's covering all blocks.
10. Electrical installations (UPS, generators, stabilizers, control panel) covering all blocks.

4.7.2. Enhancing milk production and milk processing units

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

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

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

4.7.3.Capacity building

India is the largest milk producer in the world with an annual production of over 155.4 metric tonnes of milk, yet the sector faces numerous issues. One of the major challenges facing the dairy sector is the growing gap between milk supply and demand. Another major challenge arises from the fact that more than 92 percent of the animals are owned by smallholders who had little ownership of land to manage them. The small farmers do not have sufficient resources and lack training in dairy sector that leads to poor animal health and low milk yield. Furthermore, the small farmers lack knowledge of modern breeding practices. To make the farmers as scholars in particular thing some trainings and camps has to be conducted. To make sure this the following intervention has been proposed.

1. Training of personnel of MPCS, Union and federation covering all Blocks.
2. Infertility camps covering all Blocks.

4.7.4. Marketing structures

Marketing is generally defined as the process of planning and executing the conception, pricing, promotion, and distribution of ideas, goods, and services to create exchanges that satisfy individual and organizational objectives. The word Dairy marketing means where the milk is kept and marketing. Dairy marketing truly came into the public consciousness with the introduction of the “Got milk” campaign in 1993. Marketing plays a vital role not only in stimulating production and consumption, but also in accelerating the pace of economic development. An efficient marketing system minimizes costs, increases returns to farmers by reducing the number of middlemen or by restricting the commission of marketing system. To increase the income in dairy sector the suitable marketing structure is vital. For that the following structures have been suggested

1. Parlour structure covering all Blocks.
2. Milk product storage cabinets covering all Blocks
3. Product billing system covering all Blocks.

4.7.5. Quality control

Quality is a vital ingredient of a good brand. Remember the “core benefits” – the things consumers expect. These must be delivered well. To ensure the quality of the following interventions have been suggested

1. Adulteration detection equipment’s covering all Blocks.
2. Milk testing equipment and laboratory covering all Blocks.

4.7.6. Processing and value addition

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

1. Dairy processing plants covering all Blocks.
2. Water and effluent treatment plants covering all Blocks.

4.7.7.Development for dairy sector

Though the milk production has reached an all-time high in the district, the producers are not able to market the milk produced. This is mainly due to inadequate infrastructure available for procurement, processing of milk and marketing network. Providing proper infrastructure to the veterinary health care institutions is necessary for the timely diagnosis and treatment of animal diseases. An efficient management of cattle will be incomplete without a well-planned and adequate housing of cattle. Good quality milk is essential for production of good quality dairy products, taste and flavor, free from pathogens and long keeping quality. Immediately after milking, the milk must be cooled preferably to 4° C. This requires mechanical refrigeration or milk cooling tanks. These are expensive and can usually be afforded by large scale commercial farms. For small scale dairy farmers, setting up a milk cooling centre centrally may be the ideal solution. The following buildings have been proposed for better storage and improvement

1. Ware house for dairy products covering all Blocks.

4.7.8. Budget allocation

An outlay of ₹.**1733.75** lakhs is proposed to fulfill the aforementioned interventions for five years. The details of budget requirement for each intervention across the blocks are shown in Table (4.17).

4.7.9. Implementing agency

The projects will be implemented by the Department of Dairy Development.

Table.4.17. Budget requirement interventions for Dairy Development

(₹. in lakhs)

Sl. No.	interventions	Blocks covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
Strengthening of milk storage and processing units																
1	Electrical installation like Tranformemr, UPS, Stabilisers, Control Panel MCC etc.,	All blocks	1	25.00	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00	1	25.00
2	Milk Storage Tanks of various capacities	All blocks	1	15.00	0	0.00	0	0.00	1	15.00	0	0.00	0	0.00	1	15.00
3	Tub washer, Canwashers, Crate conveyor systems.	All blocks	1	10.00	0	0.00	0	0.00	1	10.00	0	0.00	0	0.00	1	10.00
4	Point of Sale Machines and billing systems	All blocks	1	0.25	5	1.00	5	1.00	5	1.00	5	1.00	5	1.00	25	6.00
5	SS pipes and fittings	All blocks	1	5.00	1	5.00	0	0.00	1	5.00	0	0.00	1	5.00	3	15.00
6	Solar system for water heating	All blocks	1	2.00	1	2.00	1	2.00	1	2.00	1	2.00	1	2.00	5	10.00
7	Packing Machineries for milk, Butter, Ghee, SMP and Other Milk products	All blocks	1	18.00	1	18.00	0	0.00	1	18.00	0	0.00	1	18.00	3	54.00
8	Plate Heat type Chillers and pasteurizers	All blocks	1	10.00	0	0.00	1	10.00	0	0.00	1	10.00	0	0.00	2	20.00
9	Milk Pumps of	All blocks	1	0.50	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00	15	8.00

Sl. No.	interventions	Blocks 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
	Vaious capacities															
Enhancing milk productions and milk processing units																
10	Veterinary Medicine	All blocks	1	2.00	2	4.00	2	4.00	2	4.00	2	4.00	3	6.00	11	22.00
11	Two wheeler for AI technician	All blocks	1	0.50	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00	15	8.00
12	Computer system with accessories	All blocks	1	0.50	3	2.00	3	2.00	3	2.00	3	2.00	3	2.00	15	8.00
13	Fodder seed materials	All blocks	1	0.25	4	1.00	4	1.00	4	1.00	4	1.00	4	1.00	20	5.00
14	Fodder development equipments like chaff cutter, Mower etc.,	All blocks	1	0.20	5	1.00	5	1.00	5	1.00	5	1.00	5	1.00	25	5.00
15	Milk cans	All blocks	1	0.04	200	7.00	200	7.00	200	7.00	200	7.00	200	7.00	1000	35.00
16	Electronic weighing scales of various capacities.	All blocks	1	0.30	10	3.00	10	3.00	20	6.00	20	6.00	20	6.00	80	24.00
17	Electronic milk testing equipments	All blocks	1	1.25	3	4.00	3	4.00	3	4.00	3	4.00	3	4.00	15	19.00
18	Milking machine	All blocks	1	0.80	5	4.00	5	4.00	5	4.00	5	4.00	5	4.00	25	20.00
19	Cow shed	All blocks	1	5.00	5	25.00	5	25.00	5	25.00	5	25.00	5	25.00	25	125.00
20	Society Buildings	All blocks	1	20.00	2	40.00	2	40.00	2	40.00	2	40.00	2	40.00	10	200.00
21	Cryogenic containers	All blocks	1	0.35	3	1.00	3	1.00	3	1.00	3	1.00	3	1.00	15	5.00
22	Equipments for Artificial Insemination	All blocks	1	0.50	2	1.00	2	1.00	2	1.00	2	1.00	2	1.00	10	5.00
Capacity building																
23	Training of personnel of	All blocks	1	0.05	25	1.00	25	1.00	24	1.00	25	1.00	25	1.00	124	6.00

Sl. No.	interventions	Blocks 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
	MPCS, Union and Federation.															
24	Infertility Camps	All blocks	1	0.20	20	4.00	20	4.00	20	4.00	20	4.00	19	4.00	99	20.00
Marketing																
25	Parlour structures	All blocks	1	5.00	5	25.00	5	25.00	5	25.00	5	25.00	5	25.00	25	125.00
26	Milk product storage cabinets	All blocks	1	0.30	25	8.00	25	8.00	25	8.00	25	8.00	25	8.00	125	38.00
27	Product Billing systems	All blocks	1	0.30	5	2.00	5	2.00	5	2.00	5	2.00	5	2.00	25	8.00
Quality control																
28	Adulteration detection equipments	All blocks	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	5	20.00
29	Milk testing equipment and Laboratory.	All blocks	1	5.00	1	5.00	1	5.00	1	5.00	1	5.00	1	5.00	5	25.00
Processing of value addition																
30	Water Treatment Plants. Reverse Osmosis plant	All blocks	1	100.00	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	1	100.00
31	Effluement treatment plant	All blocks	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00	0	0.00	1	100.00
32	Dairy equipments	All blocks	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00
Development of dairy sector																
33	Ware house for Dairy products	All blocks	1	200.00	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200
34	Ware house for Dairy consumables	All blocks	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00	0	0.00	1	200
	Grand total					**219.80**		**431.80**		**347.75**		**509.80**		**224.60**		**1733.75**

4.8. Fisheries sector

Fisheries sector is one of the important food production sector in the State contributing to the livelihood as well as food security of a large section of the economically under-privileged population. In recent years, it has assumed greater significance and its contribution towards the State and the National economy in terms of livelihood and nutritional security, rural employment generation and foreign exchange earnings have been enormous. Fisheries include marine, freshwater and brackish water subsectors. The Fisheries sector over the years has transformed from subsistence-based artisanal activities to modern livelihood activities with the application of science and modern technologies in the field of capture fishing and culture fisheries. It is developing as a major industry with diversifications viz., exploring deep sea resources and eco-friendly aquaculture practices for culture of finfish and shell fish, ornamental fish culture, co-tourism, fish processing parks, mid sea fish processing units, etc.

4.8.1. Enhancement of fisheries production

Fisheries sector occupies a very important place in the socio-economic development of the country. It has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries, and is a source of cheap and nutritious food besides being a foreign exchange earner. Most importantly, it is the source of livelihood for a large section of economically backward population of the country. The main challenges facing fisheries development in the country includes accurate data on assessment of fishery resources and their potential in terms of fish production, development of sustainable technologies for fin and shell fish culture, yield optimization, harvest and post-harvest operations, landing and berthing facilities for fishing vessels and welfare of fishermen.

With increasing pressure on the world's inland and coastal marine fisheries, increases in production and quality of yield are being sought through the application of a range of enhancement techniques. Which of these is applied depends on the attitude to the natural resource by societies at different levels of economic development. The range of enhancement techniques involves increasing levels of human input and control which raise productivity significantly, but which also raise costs. Introductions have raised production in many areas of the world at the price of the risk of environmental disruption. Stocking is extremely widespread but has generally been applied uncritically. A variety of models are proposed to serve as a basis for more rigorous evaluation of biological and economic

effectiveness of this practice. Fertilization of water bodies is used to raise levels of production further. Elimination of unwanted species then becomes necessary to maximize benefits from the target species. Adjustments to the habitats within the water body assist in raising general levels of productivity which culminate in the conversion of areas of the water into fish ponds or for cage culture. This process has important implications for the social, economic and policy context which necessitates shifts in ownership, finance and education among populations where these types of development occur**.**

In the inland fisheries sector, aquaculture is poised to play a pivotal role in increasing fish production, ensuring food security and enhancing growth of the State's economy. To maximize fish production from an unit area and to generate maximum income to the fish farmers, the Government has initiated innovative approaches such as stocking of fast growing fish species in the short seasonal water bodies, integrating aquaculture in the existing irrigation systems / rain water harvesting systems, brood stock development to produce quality fish fingerlings, promotion of fish culture in farm ponds and introduction of cage culture in reservoirs etc. With concerted efforts to mobilize farmers to adopt fish farming, application of appropriate technologies for sustainable fish farming and fish seed production and availability of institutional finance, it would be possible to bring in substantial hikes in the annual fish production from the aquaculture sector within a span of 5 years. Hence in this district it suggested to implement the following intervention to enhance the production and growth of fisheries with budget cost of ₹ 955.00 lakhs.

The interventions are

1. Increasing Fishing Efficiency of Inland Fishermen and Fish Farmers in Agastheeswaram, Thucklay and Thiruvattur block.
2. Enhancement of Fish production in irrigation tanks and Panchayat tanks by stocking fish seeds covering all blocks.
3. Improvement of hygienic fish handling by providing ice boxes in Agastheeswaram and Melpuram blocks.

4.8.1.1. Infrastructure and assets

Fish Farming is an age old activity and in practice from ancient times. The successful fish culture requires plugging of pond, addition of manure, stocking of fish seed; eradication of unwanted aquatic plants and animals, watering the pond; harvesting the crop and marketing of the produce. The fish culture technologies and economics are simple and understandable to the fish farmers. Also, the fishery wealth in the inshore waters is being

overexploited due to excessive fishing pressure on the resources. Artificial reefs help in augmenting the productivity of the marine ecosystem. Artificial reefs act as habitats to marine aquatic organisms enhance the fish production through increased breeding activity and survival of young ones and act as a barrier for bottom trawling operations.

Availability of quality seed of cultivable freshwater fish species has been a limiting factor for intensification of fish farming and also for coverage of additional area under aquaculture. While availability of fish seed is satisfactory in certain parts of the country, in other areas farmers face difficulties in procurement of quality seed in required quantities. Further, the seed in such deficit areas has to be transported over long distances, which adds to the cost of inputs. Presently, there are inadequate seed rearing facilities for rearing of spawn/fry to fingerlings, even though there is a demand for stock size fingerlings. Therefore, there is every need for creation of infrastructure facilities for rearing of spawn/fry to fingerlings. Thus, availability of stock size fingerlings of cultivable freshwater fish species for stocking in reservoirs has been a limiting factor for limited fishery production from the reservoirs. Availability of fish fingerlings is satisfactory in certain parts of the country, whereas the farmers in other areas face difficulties in procurement of quality fingerlings in required quantities. Further, the fish fingerlings in such deficit areas have to be transported over a long distance, which adds to the cost of inputs. Therefore, to meet the requirement of fish fingerlings for supplementary stocking in the reservoirs and ponds/tanks, it is proposed to support the entrepreneurs/ farmers in setting up of fish seed rearing units for production of quality fish fingerlings. The budget requirement for infrastructure facilities is around ₹ 575.00 lakhs.

The interventions are

1. Establishment of Aqua Eco Tourism center in Agastheeswaram block.
2. Increasing seed availability by establishing seed rearing units in Agastheeswaram block.

4.8.1.2. Capacity Building

Effective extension support is essential for the promotion of Aquaculture in freshwater and brackish water areas. It is necessary to establish the information centers/data dissemination centers in Fishermen villages, animation camps in fisheries villages, seminars, exhibitions and workshop, and awareness centers for linking the fishing villages, marketing centers and the district offices. Hence in this district it is necessary to give training to fish farmers covering all blocks with budget of cost of ₹10.70 lakhs

4.8.1.3. Budget

The budget requirement for fulfilling the above interventions is ₹ **2040.70 lakhs** as shown in Table 4.18.

4.8.1.4. Implementing agency

Department of Fisheries will be implementing the project

Table 4.18. Budget requirement for Fisheries Production

(₹in lakhs)

Sl. No	Interventions	Blocks covered	Unit	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
I. Enhancement of fisheries production																
1	Increasing Fishing Efficiency of Inland Fishermen and Fish Farmers	B1, B2, B6	No's	0.15	30	4.50	30	4.50	30	4.50	30	4.50	30	4.50	150	22.50
2	Enhancement of Fish production in irrigation tanks and panchayat tanks by stocking fish seeds	All Blocks	ha	2	90	180.00	90	180.00	90	180.00	90	180.00	90	180.00	450	900.00
3	Improvement of hygienic fish handling by providing ice boxes	B1, B9	No's	0.07	100	6.50	100	6.50	100	6.50	100	6.50	100	6.50	500	32.50
II.	**Creation of infrastructure facilities**															
4	Establishment of Aqua Eco Tourism center	B1	No's	500	1	500.00	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00
5	Increasing seed availability by establishing seed rearing units	B1	No's	5	5	25.00	3	15.00	3	15.00	2	10.00	2	10.00	15	75.00
III.	**Capacity Building Program**															
6	Training to fish farmers	All Blocks	No's	0.02	100	2.00	80	1.60	100	2.00	80	1.60	100	2.00	460	9.20
7	Providing trainers training and exposure visit to Departmental staff	B1	No's	0.02	15	0.30	15	0.30	15	0.30	15	0.30	15	0.30	75	1.50
8	Marine infrastructure facilities for the fisher-folk of coastal towns and villages	All Blocks	Nos	500	0	0	1	500	0	0	0	0	0	0	1	500
	Grand total					**718.30**		**707.90**		**208.30**		**202.90**		**203.30**		**2040.70**

B1-Agastheeswaram, B2- Thovalai, B3 – Rajakkamangalam, B4- Thuckalay, B5- Kurunthancode, B6- Thiruvattar, B7- Killiyoor, B8- Munchirai, B9- Melpuram

4.8.2. FISHERIES RESEARCH

Introduction

The Tamil Nadu Fisheries University, Nagapattinam (TNFU) is the unitary professional University in fisheries established in June 2012 by the Government of Tamil Nadu. NFU offers B.F.Sc and B.E (Fisheries Engineering) at Undergraduate level, M.F.Sc in the disciplines of Aquaculture, Fisheries Resource Management, Fish Processing Technology, Fish Quality Assurance and Management, Fisheries Engineering and Technology, Aquatic Environment Management, Fish Biotechnology, Aquatic Animal Health, Fish Pharmacology, Fisheries Extension, and Fisheries Economics at Postgraduate level and Ph.D. in the disciplines of Aquaculture, Fisheries Resource Management, Fish Processing Technology, Fish Quality Assurance and Management, Aquatic Environment Management, Aquatic Animal Health, Fisheries Extension, and Fisheries Economics at doctoral level.

1. AQUACULTURE

A. Inland Aquaculture

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

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

The following Table gives the fish productivity from the inland water resources of the State during 2015-16:

Sl. No.	Total available water spread (in ha)	Total production reported (in tonnes)	Fish productivity (kg /ha)
1.	383000	242000	631

The production that has been reported above is not falling in line with the actual carrying capacity of any tropical water body. The carrying capacity of the tropical water bodies has been reported to be around 500g of fish biomass per m^3, while the presently reported production is at 63g per m^3 indicating just 12% achievement of the available potential. Even at the worst situations like fluctuating monsoon and failure of rains in the tropical climate, the productivity can be 250g per m^3 leading to 2500 kg per ha which is about 4 times higher than what is achieved now.

The nominal estimations of the inland fisheries production in the State has revealed that a production of 4.50 lakh tonnes of fish in times of normal rainfall is possible in the State. This would present the situation of more than 1000kg (1.17 ton) production per ha. Achieving this production is the short-term goal for inland aquaculture, while the long-term goal must be 3.0 tons of fish per ha with the available water resources falling in line with other tropical countries in the World.

Interventions through infrastructure development and technology application

In filling up the above identified gap, interventions can be made in the following areas:

The present level of low productivity can be enhanced through creation of needed infrastructure at appropriate locations with introduction and adoption of improved technologies in inland aquaculture. The proven research data and strong research support system for drafting new policy or modification of existing policies can pave way for increasing the inland fisheries production. Introduction of alternate species and adoption of improved species, along with value addition on inland aquaculture can enhance fish production. Besides the above, channelizing the marketing procedure for increased income will attract more entrepreneurs. The intensification or expansion of aquaculture activity in the State may lead to a demand of 700 million fingerlings every year. Therefore, creation of additional rearing area is a must to cater to the needs of the inland sector.

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

Application of newer technologies

Following are the possible working models for the task:

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

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

1. Planning for more advanced infrastructure with suitable operation protocol for different farming systems, seed production activities, value addition, feed production and feeding processes.
2. Evaluation of identified water bodies for their suitability in terms of nutrient availability and application of intensive farming practices like cage farming, raceway or running water farming systems, integrated farming, increased stocking with conventional and alternative species like GIF Tilapia, Jayanthi Rohu, Pangassius, Murrel, Loaches, etc.
3. Development of Pilot level farming systems for Recirculatory Aquaculture System (RAS), integrated farming, culture of multi-species and alternative species, nutrient controlled farming system, etc can be established in different districts

based on the resources and available technical manpower. Technology can be demonstrated to the farmers and stake-holders.

4. Creation of regional water quality testing and disease diagnostics laboratories in different districts which can be established and manned for extending support services to the farmers and recommending the nutrient use in the aquaculture systems.
5. Major breeding Centres in the State can be equipped with the Sperm Bank for collection, storage and supply of cryopreserved spermatozoa for the breeding and production of genetically improved seeds. Characterization and spermatological features can be addressed by the University through the already established Cryopreservation Lab in the University. Technical inputs and needed training can be extended by the University as it was done earlier through NADP.
6. Cage culture of fast growing fishes in seasonal tanks: Open water bodies like tanks and lakes with large extend of water spread are reported to give a very low fish production in the country due to various reasons. The low stocking and poor control over the stock due to the large extend of the water span are the major reasons behind such low production and this can be rectified by the adoption of cage farming in the open waters. Natural fertility in the open water bodies can be used for the successful growth of fishes by adoption suitable stocking density and culture practice so as to have high survival and better growth. This has been proved beyond doubt in many east Asian countries where the per unit production is around 50kg per sq. m. Such high productivity is also possible in Indian water bodies, if suitable cages are framed and erected in the open water bodies like natural tanks, lakes, pools and reservoirs where the control of the fish stock will be possible in the cages.
7. Formation of Certification Centre will help in the certification of quality of broodstock and seeds. The protocol and procedure are already available for the fishes and in practice in other countries. The same can be done for the inland fish species to avoid culture of unwanted species. Only quality seeds can be used for the culture that can increase the production many folds.
8. Similar to Sperm Bank, separate Brood Banks can be established in selected places in the Cauveri, Thamirabarai, and Bhavani river basins, through which the quality brooders can be identified, segregated, developed and supplied to the farmers continuously so as to improve the seed production status in the State. In

this line, needed evaluation and identification can be done by the University for efficient functioning of the Brood Bank.

9. An analytical wing can be established to identify potential areas for aquaculture in the selected districts through GIS and nutrient mapping of the water bodies in order to suggest suitable species and culture methodology. Needed training for the extension workers / agencies and farmers can be done through this Unit.
10. Data recording and support system is an essential component for the development of inland aquaculture. Therefore, TNFU proposes to have a functional unit for the recording of fish production data in the inland water bodies of the State including species composition, their biological data and the farmers' attitude and mind-set in the inland fish farming so as to redefine the inland fish production policies of the Govt.

.

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

Possible outcome due to the above intervention in inland fisheries in the State

Inland fisheries in the State can yield the following benefits to the stakeholders and public in general:

1. With the creation of newer infrastructure in the farming and seed production centres, more technologies can be evaluated and disseminated for the benefit of the farmers. This would help in enhancing the area of production and yield. More production will ensure more fish available for consumption thereby good quality food is assured for the people of the State.
2. With adoption of newer and advanced technologies in the fish farming, the open waters can yield as high as 2 tonnes fish per ha, which is approximately 4 times higher than that of the present level of production. Ultimately the State's total fish production can go at least 100% increase from the present level.

3. Approximately 0.40 million tonnes of fish production is possible per annum from the available resources against the present production of 0.24 million tonnes. This can result in the increased revenue (at least 100% of the present level) and more protein rich food for the people.
4. Through the establishment of Brood Bank and Sperm Bank production, sub-standard seeds can be totally avoided. This would also ensure the higher yield through stocking of certified seeds.
5. There are 2.0 lakh inland fisherfolk depending on the inland fisheries in the State and they can be provided with assured revenue and employment by adopting best fish farming practices in the inland water bodies. Fish farmers can be supported with the Aquaculture Information Centre.
6. Approximately this would benefit 1.0 lakh people directly and 2.0 lakh people indirectly in addition to the supply of protein-rich food to approximately 20 million people residing in the inland areas of the State.

B. Coastal Aquaculture/ Mariculture

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

Tamil Nadu State with the second longest coastline in the country covers an area of 1,076 km accounting for 13.3 per cent of the Nation's Coastal line of 8,118 km. The following table gives the status of the marine fisheries in the State.

Exclusive Economic Zone (EEZ)	1.9 lakh sq. km
continental shelf	41,412 sq. km
Number of Coastal Districts	13
Number of Fishing Villages	608
Marine Fisher folk Population (Projected)	9.85 lakh
Fishing Crafts Registered (online): (2016-17)	

Mechanised Fishing boats	5,944
Traditional Crafts (mechanised & non - mechanised)	34,920 (29,587+ 5,333)
Infrastructure available	
Major Fishing Harbours	5 (Chennai, Thoothukudi, Chinnamuttom, Colachel and Muttom (PPP)
Medium Fishing Harbours	4 (Pazhayar, Mallipatnam, Nagapattinam and Cuddalore)
Fish landing Jetties (Landing Centres)	36
Misc Landing Points (unorganized)	254
Marine Fish Production 2015-16	4.77 lakh tonnes
Marine Products Export (2015-16)	85,063 MT (Rs.4,184.06 crore)

The inshore waters of 1,016 km long coast on the eastern side and 60 km long coast on the western side are found to be over-exploited, whereas the offshore and deep sea resources are yet to be exploited to its optimum levels. The marine fish production of the State presently is estimated to be 4.77 lakh tons against the estimated potential of 7 lakh tons.

Scope for coastal aquaculture in Tamil Nadu

People living along the coastal region have the greater chances of accessing the seawater and saline areas. Most of the population is largely depending on the exploitation of the sea and natural resources. Due to varied reasons there have been steady decline in the stock that results in diminishing revenue for the people who are depending on them. Therefore alternate livelihood options are to be developed and provided for the upliftment of their socio-economic status.

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

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

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

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

Achieving the goals

In achieving the goals, Centres can be established in 5 to 7 places identified in the coastal region where in the pilot level farming facilities for the above activities can be developed. Technical people at the level of Training Associates and Training Assistants can be employed for the training and demonstration purposes. Moderate level farming and laboratory facilities are to be established with a focus to assist the entrepreneurs to carry out the activities. Marketing assistances through buyer-seller meets can also be arranged for the efficient marketing of the produces.

Possible outcome due to the above intervention in the State

The adoption of the above activities along the coast of Tamil Nadu can yield the following benefits to the stakeholders and public in general:

1. With the creation of newer infrastructure in the farming and seed production centres, more technologies can be evaluated and disseminated for the benefit of the farmers. This would help in enhancing the area of production and yield.
2. Approximately 0.10 million ton of finfishes could be produced from coastal aquaculture that can increase the revenue and income to the farmers.
3. Alternative employment opportunities can help the coastal fisher folk to gain more control over their lives and economic development in the livelihood of the fisherfolk is possible.
4. There are about 0.4 million fishermen families depending on the sea in the State and they can be provided with assured revenue and employment by adopting fish farming in the coastal areas. Steady migration from capture to culture ensure their life.

2. AQUATIC ANIMAL HEALTH

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

The following are some of the bottle necks in aquatic animal health management

1. Lack of a well equipped facility under one umbrella to carry out the diagnosis of diseases caused by pathogens, parasites, analyse the variations in the water quality parameters
2. Unavailability of field level diagnostic kits for rapid and accurate diagnosis of diseases
3. Lack of surveillance and awareness on the existing and emerging diseases and appropriate management in aquaculture
4. Lack of training on the field level identification of diseases and their control measures
5. Lack of awareness on the Good management practices (GMPs) for successful and sustainable aquaculture practices

Hence, the identified thrust areas for proposing on aquatic animal health are

1. Establishment of satellite laboratories across the state with well equipped facilities to extend services on disease diagnosis and water quality analyses
2. Development of rapid and accurate diagnostics for field level and lab identification of diseases
3. A disease surveillance network and monitoring system for continuous monitoring of existing and emerging diseases to develop strategies to prevent disease outbreaks in aquaculture production systems
4. Conducting training and awareness programmes on the field level identification of diseases and their management measures including biosecurity methods

3. HARVEST AND POST-HARVEST TECHNOLOGY

A. Harvest Technology

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

Scope for Deepsea fishing in Tamil Nadu

In earlier days, Fishing in the state was purely a traditional activity has now transformed to a commercial, market driven, multi-dollar enterprise owing to introduction of synthetic fishing gear materials and mechanization. But due to uncontrolled increment of fishing vessels and over exploitation of fishery resources in the inshore waters, 90% of the stock within 50mt depth was exploited, this lead to reduction in livelihood income of the fishermen. Therefore the alternative livelihood option available with us is development of deep sea fishing for the upliftment of their socio-economic status.

Research and Extension gaps

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

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

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

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

The following activities can be considered for the inshore and deep sea fishing developments in Tamil Nadu:

1. Popularization of Eco-friendly fishing techniques – Gill netting , Long lining and Trap fishing Technologies
2. Organizing training on Sea safety and Responsible fishing methods
3. Imparting training programs on Engine maintenance
4. Imparting cost effective training on Deep sea fishing techniques with ship in campus facility
5. Creating Artificial fish bait development Laboratory to support the development of artificial fish baits for Long line fishing.
6. Introducing automated Trap fishing techniques as low energy fishing technique

Achieving the goals

In order to achieve the goals, Centres can be established both at main and shore laboratory campuses of Fisheries College and Research Institute, Thoothukudi. Technical personals such as Senior Research Fellow, Gear Technician, Skipper, Mechanical Engineer, Mechanic, Training Associates and Training Assistants can be employed for the training and demonstration purposes. Ship in campus facility will be established with a focus to reduce cost of training on deep sea fishing; Artificial fish bait development Laboratory will be developed with the objective of studying the behaviour response of marine predatory fishes to different types of artificial baits which are found to be very much essential for successful long line fishing being encouraged both by Central and State Governments in India. Trap setting vessel is yet to be introduced in India despite vast potential in Coral and rocky coasts of India.

Possible outcome due to the above intervention in the State

The adoption of the above activities can yield the following benefits to the fishermen community:

1. With the creation of new facilities such as Eco-friendly fishing gear Technology centre, Mobile training unit, Ship in campus facility, Artificial fish bait development Laboratory and Trap setting vessel, many technologies can be disseminated for the benefit of the fishermen communities which would pave way to increase fish production of the state and there by the livelihood of the fishermen.
2. Approximately 1,000 fishermen around the state will be trained to bridge the extension and research gaps in the field of fishing technology particularly with reference to Deep Sea fishing , Sea safety, Responsible fishing methods and marine engine maintenance.
3. Introduction of alternative fishing methods such as long lining and trap fishing can help the coastal fisher folk to venture into deep sea to harvest underutilized deep sea resources.

B. Post-Harvest Technology

Fisheries sector plays a significant role in the Indian economy in terms of its contribution to growth and development. For growth, the sector contributes through its share in GDP and foreign exchange earnings gained through the export of fish and fishery products. Tamil Nadu ranks fourth among the states in terms of total fish production. Fishes

can be effectively used for the preparation of value added fishery products which can provide better employment opportunities and income to the fishers. It can also provide high quality protein for human consumption by conversion into value added products in various convenient forms.

Being a highly perishable commodity, fish requires proper landing facilities, processing, storage, transport and distribution facilities running through the entire supply chain from capture to consumer. The demand for fish and fishery products shows growing trend and the depletion of resources in near shore waters demands the use of this resource effectively and make available to common man. Hence it is necessary to ensure that every kilogram of harvested fish is fully utilized for human consumption. The loss in the post harvest fishery has been estimated at 15% owing to lack of adequate post harvest infrastructure in the State.

If fishermen can sell their fish to consumers within a few hours of catching, little post-harvest technology is needed. However, this is seldom the case, and fish has always to be preserved in some way - iced, frozen or cured until it reaches the consumer in distant places. The major factors that affect the nutritive value of fish products depend on the way fish is handled, processed or preserved, stored, transported and marketed. The fish is exposed to stress from the time it is caught to landing onshore by the fishing vessel. Moreover, the time lag in transport of fish from the processing/wholesale markets to the consumers' table is very crucial that determines the quality of fish supplied. The way in which the fish is handled while transporting plays a vital role in ensuring the quality of fish that serves the consumers' table.

About two-thirds of the total landed fish in India is consumed in the fresh condition and the remaining is utilized for preservation by other methods. The fishes caught from inland sources are almost entirely diverted to the fresh fish market, none of the long-term preservation techniques being employed for them.

The post-harvest field with its emphasis on handling, processing, distribution and marketing is a complex series of events that is challenging to the policy making body/administration. Moreover, post-harvest fishery losses play an important role in maintaining or increasing the domestic supply of fresh fish or fishery products that can be purchased by middle and larger income level family.

Problems to be addressed

- *Percapita consumption of fish is very low,* it is only 9 kg against the recommendation 14 kg. Availability of diversified quality fish products in the domestic market has to be increased to ensure increase in percapita consumption of fish.
- *The post-harvest losses recorded is 12%* in the state which leads to intense revenue loss to fishers. Creation of awareness among fishers, train them on improvised fish preservation techniques and value addition will be the ideal solution to overcome this loss. *The reduction in post-harvest losses has a direct impact on local and regional trade flows.*
- There are entrepreneurs interested in taking up the business of production of value added fish products. But they could not as the *venture capital is high*. There are improvised and modern techniques available with state and central organizations for the entrepreneurs. The projects under NADP will serve as a bridge and fill the gap to promote entrepreneurship that results in *availability of diversified fish products in household brands in the domestic market*.
- Fish is a wonderful, nutritious food that has much health beneficial attributes which helps us to overcome lifestyle diseases and malnutrition. The project under will have great role in addressing *malnutrition issues, creating food security and providing employment opportunities*.
- Post harvest infrastructure is inadequate with regard to business incubation centers and marketing channels like Aavin. *The domestic fish marketing system is neither efficient nor modern and is mainly own by private hands with* a *huge number of intermediaries between producer and consumer*. This project under NADP will eliminate intermediaries and increase the fisher's share in consumer rupee. *Branding of state fishery products is essential that signals difference in quality and price points.*
- *The institutional fish marketing with the active participation of the stakeholders* would be successful. The production centers and retail units established through NADP project will function like Aavin to promote marketing of fish and fishery products to augment income to fishers.
- Awareness among consumers is lacking and the *consumers should be educated about their right to have healthy fish, free from spoilage and unhygienic environment, including their right to have value for their money*.

The following activities in Fish Processing that can be considered in the Action

Plan

I	**Fish processing - Novel technologies and techniques**
1	Development of techniques to improvise and modernize traditional preservation of fish
2	Modernization of dry fish production through solar drier
II	**Value addition and product diversification**
1	Development of snack foods from fish
2	Promotion of consumption of farmed Tilapia through product development and diversification
3	Development of ready to eat products from farmed freshwater fishes to promote consumption
III	**Branding of fish products and institutional marketing**
1	Creation of regional production centres for fishery products with State Brand
2	Creation of institutional fish retail outlets with the participation of stakeholders
IV	**Reduction of post harvest losses**
1	Awareness to fishers on hygienic handling of fish
2	Creation of awareness among fishers on fish processing technologies
3	Capacity building and skill development programmes on fish processing technologies
V	**Enhancement of percapita consumption of fish**
1	Awareness campaign on health beneficial attributes of fish
2	Production of short films on nutritive value of fish and screening in theaters and television channels
VI	**Utilization of seaweeds and other marine resources for food security**
1	Development of nutraceutical products form seaweeds
2	Popularization of seaweed products through mass media
3	Development of seaweed snack foods
VII	**Ensuring nutritional security through fish and fishery products**
1	Supply of preserved ready to eat and ready to cook fish products through public distribution systems
2	Supply of fish and fish products in mid day meal programme
VIII	**Enforcement of international quality standards in fishery products meant for domestic market**

1	Creation of laboratory facility at regional level for testing and certification of fish and fishery products
2	Establishment of sea food forensic laboratory to test the authenticity of fishery products international market
3	Establishment of state level Aquatic Food Safety Analytical Center
4	Accredited Microbial Quality Testing Laboratory for Certification of Aquatic Food Products in South Tamil Nadu
IX	**Utilization of fish processing waste and by catch**
1	Installation of fish waste rendering plant at selected fishing harbours and fish markets
2	Development of fish compost for production of organic food
3	Installation of unit for producing biogas from fish waste
4	Development of technologies for effective utilization of shrimp shell waste
5	Development of peptides from fish processing wastes as dietary supplement

Possible outcome due to the above intervention in the State

- Creation of “Fish Processing Business Incubation Centre” in all coastal districts and Fish and fishery products retail outlets in all inland (non coastal) districts to transfer fish processing and value addition technologies through incubation and marketing support to fishers, unemployed youth and women self help groups.
- Fishes could be processed using recent and updated techniques in production centers and packed in attractive packages distributed and sold through retail outlets.
- Better utilization of catch, improve returns to fishers and provide employment and income generation opportunities to the fishers and other entrepreneurs.
- Promotion of consumption of value added fish products among school children and general public through distribution of diversified value added fish and fishery products.
- Necessary guidance will be rendered to food industries and government agencies with sound scientific knowledge supported by state of art facilities.
- Nutritional labelling, quality testing, shelf life assessment, certification of cleanliness, safeness and nutritional quality of ingredients and products, analysis of additives, adulterants, contaminants will be carried for the aquatic products meant for domestic market which is not strictly adhered in the current scenario.

- The post harvest losses can be minimized by adopting suitable post harvest technologies to create direct impact on regional trade flows and to minimize the intermediaries to increase the returns to fishers.
- Branding of state fishery products to promote diversified fish products in household brands in the domestic market through institutional fish marketing with the participation of stakeholders.
- The nutritional benefits of edible macroplants from the sea can be made available for human consumption.
- Offal from finfish and shellfish can be effectively converted in to products of commercial importance

4. FISHERIES RESOURCE AND ENVIRONMENTAL MANAGEMENT

Tamil Nadu is one of the important state which is blessed with both freshwater and marine fisheries resources. Being part of tropical region it is blessed with rich aquatic diversity and fisheries in the state form one of the important sector which provides employment to millions of people and contributes to food security. It has a coastline of over 1076km and the continental shelf area of 41,412 sq.km. Tamil Nadu ranks second in marine capture production with the share of 7.07 lakh tonnes which is 20% of the total Indian Fisheries Landings during the year 2016. The marine fish landings has been a growing continuously growth.

The State is also endowed with extensive freshwater resources with an extent of 3.73 lakh ha. Fisheries play a vital role. Presently, this sector provides employment opportunity for 11.85 lakh people – 9.64 lakh in marine sector and the remaining 2.21 lakh in freshwater sector. The fisheries resources are essential for

i) food and nutrition security
ii) economic and social development from fisheries and aquaculture, marine and coastal tourism, shipping, mining, energy and
iii) ecosystem services such as carbon sequestration, water filtration, atmospheric and temperature regulation, protection from erosion and extreme weather event

There are 2500 species of fishes found in different aquatic environment. The fisheries in the state are one of the vital source for food security. These resources are affected by pollution, habitat alteration and over exploitation. The unique aquatic environment face gradual decline in aquatic resources particularly the rare and endangered organisms necessitates some urgent steps that need to be taken to conserve them. The existing resources have to be effectively managed to provide adequate employment.

As India is the signatory of Convention on Biodiversity, these distinctive aquatic marine gemplasms have to be preserved and conserved to get the benefit out of it. The conservation initiative will help to fulfil the prime objective of Tamil Nadu Biodiversity Board and Tamil Nadu State Fisheries Department on continuously improving knowledge and understanding of the aquatic resources, their conservation, management and development. Over recent decades, resource managers have been working to limit the loss of aquatic resource. Longstanding strategies and programs are in place across all jurisdictions that are concerned with conservation specifically or with the ecological sustainability of aquatic sectors. Despite limitations in the knowledge of what exists, its current condition and pressures, observations of significant decline in some aquatic resource in some areas lead to the conclusion that India's fisheries resources are in a state of continuing decline. The effects of a number of threatening processes are resulting in declines in habitats, changes in ecosystems and loss of species. The resources are eroding rapidly because of over fishing, pollution from land based sources, mangrove deforestation, climate change and ocean acidification. The effectiveness of, and seek improvements in, efforts to minimize future degradation has to be monitored and regulated.

Fishermen are constantly upgrading the fleet to reach new resources (species/stocks) and new areas after over-fishing the stocks in the earlier fishing grounds. The catches from the new areas and new resources mask the decline of many near shore resources. Small pelagic fishes contribute significantly during the recent years particularly the oil sardine, whose increase could be attributed to a combination of over-fishing of apex predators and increase in sea surface temperature. Available studies from marine indicates that the species like (i) elasmobranchs, (ii) anchovy, (iii) penaeid prawns, (iv) lobsters, (v) pomfrets and (vi) seerfishes were declined after reaching a peak and indicating overfishing. The large number of juveniles landed indicates recruitment over fishing and growth over fishing which leads to severe loss in yield. The bycatch related issues further worsens the

resource. Apart from this Indian is facing changing climatic conditions and on-going environmental degradation, which loom food security and livelihoods. So there is an urgent to conserve the resource from the impacts of climate change and evaluate the potential conservation strategies to improve food security. Presently the adoption of proper management measures to capture the right sized species, low-cost inshore fish-aggregating device utilization, and improved natural resources management (including marine-protected areas) were identified as important measures to conserve these resources.

The existing knowledge on inland aquatic resources is very little because of poor exploration activities particularly in Tamil Nadu. There is an urgent need to protect, sustain and responsibly use these resources. Managing these water bodies in proper manner will offer sustainable livelihood option for the rural poor.New initiatives should also be taken to exploit the resources effectively in a sustainable manner. Through sustained technological up gradation and proper managerial measure could help to use these resources. Eco-system approach to fisheries management has to be implemented for the sustainable harvest of these resources.

Deployment of low-cost inshore fish-aggregating devices is likely to have the highest positive impact on oceanic fish supply in Gulf of Mannar and Palk Bay and substantially enhancing the regions food security. Low-cost inshore FADs are accessible to subsistence and small-scale fishers, thereby increasing the domestic production of oceanic fish.

Introduction of more effective management of coastal and marine resources, especially those associated with coral reef ecosystems is evolved. This will help to maintain their productivity over a longer period of time, while building their resilience to climate change impacts and human-induced environmental threats. The project has to support capacity-building activities on integrated coastal resources management. Climate change adaptation for resilience-building has been emphasized through the implementation of project activities. The application of fish-aggregating devices, development of community-based resource management plans, and effective management of MPAs are much need activities.

Possible Interventions

State Apex fisheries biodiversity reference centre for resource conservation

It will provide a regional focus on developing taxonomic expertise and skills, as well as the infrastructure needed to support the natural resource management and scientific communities within the Gulf of Mannar region and Bay of Bengal area.

Although species identification and nomenclature are fundamental for resource conservation, Government agencies throughout the world often lack taxonomic expertise and some have little scientific credibility for their management of aquatic resources. Scientific advice is needed to improve environmental management, prevent harmful incursions of alien species and to identify new aquatic resources for aquaculture and fishery developments. Since the 1980s, there has been worldwide decline in the number of qualified taxonomists employed in research institutions.

The center will create awareness on the importance of fisheries resources through the collection housed at the biodiversity centre. DVDs on aquatic biodiversity will be produced and the same will be used to educate the need for conservation of aquatic resources to the coastal people. Awareness camp will also be conducted at school level.

Indigenous fisheries resource conservation

Tamil Nadu ranks 8th place in inland fish production in India (1.85 Lakh MTs). The inland fisheries sector has about 3.73 lakh ha. of water spread area with nearly 2.23 lakh inland fisherman directly depending on this sector for their livelihood. Diversification of agricultural activities for increased production, employment and income is well - known. Likewise, aquacultural activities also increased fish production and economical status. Fish seeds and broodstock quality, Monsoon failure affects the inland fish production. Introduction of Gangetic carps (catla, rohu, mrigal) in inland waters affected the minor carps. Hence, minor carps restoration and production must be done to improve TN fish production.

Native fish species form a major component of food consumed by families, especially those living closer to freshwater resources. Some species available and amenable for diversified in freshwater aquaculture are *Labeo cabasu, L. bata, L. gonius, L. fimbriatus, Puntius sarana, Mystus gulio, Anabas testudineus, Clarias batrachus, H. fossilis, Pangasius pangasius, Channa marulius* and *Etroplus suratensis*. These species are a rich source of nutrition for the rural poor either on a seasonal basis or round the year. These native species

are considered as low volume and high value fish species. These small indigenous species are always part of enhancing rural food and livelihood security.

Fish Genomic conservation centre

Threats to fish biodiversity are prevalent worldwide. Its conservation is imperative both for the continued development of aquaculture and for the re-establishment of weak stocks in natural systems. Fish gene banks have become an essential support system for existing efforts to protect habitat.

The fish genetic diversity of this region is not thoroughly studied. New species as well as new records have been described from the region especially from Western Ghat Rivers and Gulf of Mannar Biosphere. Further, studies on closely related fish group will help to find out new finfish varieties

Conservation of weak stock genetic diversity has particular importance for locals who rely on them for food. This centre will promote, train, and help implement the management and preservation of fish biodiversity in Tamil Nadu and help to establish "ex situ" (gene banking) conservation initiatives for the management of fish genetic resources.

This facility has to be created to guarantee the proper preservation of genetic resources (tissues samples, molecular preparations and products available in the southern Tamil Nadu region, particularly the aquatic resources of Gulf of Mannar and River Thamirabarani, and to facilitate their use by the National / global scientific community. The voucher specimen and data relevant to their value will be stored in this facility under sub-zero level.

The preservation of genetic diversity and enable healthy propagation of the breeds/strains, at present or some future date breeding objectives change. The fish gemplasm will also be maintained in live conditions.

GIS centre for fisheries resource management

Geo graphical information system technology has wider application. They can be used in optimizing sampling, explain spatial distribution of fish species. It could be used for ecosystem sensitive zone identification, effect of fishing and pollution. These information could also be useful in stock assessment and fisheries resource management. These

advanced information tools could facilitate knowledge based coastal resource management and provide sufficient input for the managers to take appropriate decisions.

Blue growth initiative in fisheries resource conservation

Aquatic ecosystems act as important reservoirs for inorganic carbon with the oceans storing roughly 50 times more carbon dioxide (CO2) than the atmosphere; ecosystems such as mangroves, seagrasses, and inland waters are among the most efficient ecosystems in sequestering CO2 in the form of 'blue carbon' sinks. They can sequester up to five times the amounts of carbon absorbed by tropical forests and function as important nursery, feeding and reproduction areas for many species. In addition, mangrove forests provide natural protection against storms and erosion for coastal communities and breeding grounds for many aquatic species.

The Climate change based projections from global warming models indicate that we may see nearly continuous warming of about 0.74°C per decade of this century. Climate change has the potential to significantly affect fisheries, as it will influence the workings of ecosystems and the abundance of different species. Blue Growth/ Blue Economy strategies have to be adopted to promote at the initial stages food security and decent livelihoods. Blue growth aims to assess ways and means to mitigate the cumulative impact of these economic sectors on the living aquatic resources, biodiversity and eco-system services and to develop synergies between the sectors. To overcome the effects of climate change, studies needed in the following areas for mitigation measures.

-Impact of climate change on critical habitats such as coral reefs, seagrasses and commercially important fish resources to evolve monitoring protocol and mitigation strategies

-Impact of climate change on coastal and inland aquaculture and possible mitigation measures

-Use of renewable energy resources to reduce the carbon emissions from fisheries and aquaculture activities

Possible Outcome

- With the creation of newer infrastructure will help to establish the existing fish Fisheries Resources of Tamil Nadu.
- Could help to monitoring and maintain endangered fish species.

- Help to use and exchange of aquatic genetic resources in a better way for aquaculture/ fisheries.
- These units will help to create public awareness on conservation and management of fisheries resources.

5. FISHERIES ENGINEERING

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

Problems to be addressed

- Inland aquaculture and mariculture involves many manual operations for effective aquaculture. In order to reduce the human drudgery during the farm operations, development of many on-farm implements/machines are essential.
- Harvesting of fish is the biggest task in aquaculture and it is mainly done by manual operations. Existing crafts and gears should be modernized to most sophisticated large scale modern fishing system for reducing the harvesting time and human drudgery.
- Energy requirement in the ponds as well as feeding cost occupies huge amount of operational cost. Also, uninterrupted power supply is essential for pond automation and effective management in aquaculture. Hence, renewable energy based farm systems will save the money as well as energy for the fish farmers.
- Automation is required for Fisheries and Aquaculture Technologies, since other industries (Manufacturing, Transportation and Food processing) are successfully well established. However, problems faced by the farmers in this sector require demand

based special solutions. Hence, automation of technologies could help this sector to flourish further.

- Management in fish farming is a high laborious task. Farmers are facing problems like water shortage, feed control, disease control, etc. that will severely affect the harvest. Hence, time-based control measures are required. That can be executed through remote monitoring systems through wireless sensor networks. Such sensor networks could be employed in advanced aquacultural systems like recirculatory aquaculture, nano-filtratiton system, cage culture and aquaponics.
- Precision Fish Farming (PFF) concept is required to apply control-engineering principles to fish production, thereby improving the farmer's ability to monitor, control and document biological processes in fish farms.
- Crossing international border line is one of the major issues faced by fishermen. Hence advanced navigational aids are essential to be a part of the any fishing boat. So that fishermen can safely do the fishing operation within a limit and international problems could be avoided.
- Fish needs to undergo Pre-processing operations like de-scaling and filleting that are important operations before the fish is further processed into next stage.
- Marine catches include variety of fishes that are categorized into low value and high value fishes based on need and utilization. However, utilization of low value fishes is very meagre and dumped as a waste. Hence, utilizing the low value fish into value addition to meet out the demand of fish and fish based products through extrusion and other processing technologies are necessary.
- It is necessary to provide them a unified facility whereas they can produce their products at a minimal cost. Hence, establishment of fish processing technology based business incubation centre that motivates the beneficiaries to turn-up the entrepreneurs is needed.
- Processing of fish leads to develop many value added products from the fully extracted meat. Such kind of machines is needed for the fish processing industries as well as fisherwomen for effective value addition.
- Waste in the fish/food industry is a major issue but generation of this waste is unavoidable. The kind of waste produced from processing industry primarily consists of the organic residue of processed raw materials. The utilization and disposal of product specific waste is difficult, due to its inadequate biological stability, potential

pathogenic load, high water content, potential for rapid auto-oxidation and high level of enzymatic activity.

The following are the thrust areas in Fisheries engineering that can be considered in the Action Plan

I	**Aquacultural Engineering**
1	Farm implements for effective aquaculture practices
2	e-interface gadgets for sustainable aquaculture practices
3	Renewable energy power operated aerators/feeders for aquaculture
4	Wireless sensor network/Remote monitoring system for aquaculture farms
5	Mobile gadgets/apps for remote monitoring system for aquaculture farms
6	Advanced aquaponics systems for dual income
7	Nanocomposites for effective water recirculation in aquaculture farms
8	Bionanosensors for water quality monitoring system
9	Modified abosrbents for wastewater treatment system
II	**Navigation and Marine Engineering**
1	Cost effective fibre boat
2	Weather station for effective fishing
3	Cost effective gadgets for sustainable fishing
III	**Fish Process Engineering**
1	Low cost handling devices/machines for fish processing
2	Solar power operated fish processing machines / tricycle for fish vendors
3	Cost effective packaging and storage technologies for fish and fish products
4	Fisheries technopark cum fish processing technology business incubation centre

Possible outcome due to the above interventions in the State

- Development of farm implements/machines for fish farming helps to reduce the human drudgery and encourage the fish farmers to do farming in a large scale.
- Development of gadgets for fish farming makes the fish farmers to do farming in a remote-control method. Hence, farmers need not be in a farm all the time. Farmers can able to operate a feeder or aerator being in a home or any other place.
- Precision fish farming helps to effectively utilize the resources and helps the farmers to achieve more profit.

- Advanced aquacultural systems helps to increase the production as well as managing the resources effectively.
- Development of harvestors could reduce the harvesting time for farmers and also reduce the human drudgery.
- Development of fish processing machines could make the pre-processing and processing in a hygienic manner. Better utilization of catch, improvement of returns to fishers and providing employment and income generation opportunities to the fishers and other entrepreneurs are possible through the development of many value added products.
- Retailing of fish could be increased by effective packaging techniques and advanced cold storage systems.
- Fisheries Techno Park cum Fish Processing Technology business incubation Centre shall enable fish farmers to take up the venture successfully, which shall later promote them to have their own self-employment and also it can be utilized to develop the skilled manpower to the Fish Processing Industries.
- The post-harvest losses can be minimized by processing the fish before it spoiled by adopting suitable post-harvest technologies to create direct impact on regional trade flows and to minimize the intermediaries to increase the returns to fishers.
- Waste utilization could be enhanced by adapting suitable technologies to convert waste into effective feed materials for usage by the farms.

6. FISHERIES EXTENSION

Fisheries, especially the areas of aquaculture and processing has already been globally acknowledged as important source of nutritional food and livelihood. Based on its continuous and enormous contribution in providing proteinaceous diet in recent years, fisheries is generally regarded as the most promising sub-sector in agriculture. However, food industry experts feel that the benefits from the sub-sector has not yet been optimally harvested on par with its actual potential. This can be understood, when we take the example of Tamil Nadu, one of the progressive States of India especially in terms of fisheries development. The State, with the second longest coastline in the country has been blessed with vast and diverse fisheries resources. Despite the abundant natural wealth, the State's marine (4.72 lakh tons) and inland (1.97 lakh tons) fish production is comparatively low against the estimated production (Marine - 7.00 lakh tons and inland - 4.50 lakh tons) potential of the State. It clearly depicts that there is a gap between fish production and

potential of the State. Subsequently, the gap extends in the form of recommended (13 kg) and actual (9.80 kg) annual percapita intake of the State.

Though several anthropogenic (pollution, destructive fishing methods, multiple stakeholders for fresh water) environmental degradation (climate change, habitat destruction) exists as a challenge for augmenting fish production in the State, Government of Tamil Nadu through Department of Fisheries and Tamil Nadu Fisheries University (TNFU) is on right track in scouting viable options for increasing fish production of the State. All the food production sector line departments (like Agriculture, Veterinary, fisheries etc) have been started in the respective States of our Country to ensure the increase in food production through research and extension activities. Hence, these departments can be considered as the first and largest extension system of a State. Since the establishment of State Agricultural Universities (SAUs) with the mandate of teaching, research and extension, these departments slowly deviated from their very purpose of creation and currently concentrating mainly on the prosperity of people involved in food production. In this case, Tamil Nadu Fisheries Department is also no more an exception. After the establishment of TNFU in 2012, the department is largely held responsible for the socio-economic welfare (through its schemes and subsidies) of 12.14 lakh fisher population whereas fisheries research and development activities of the State is entrusted with TNFU. However, none can deny the fact that both the TNFU and the State dept. of fisheries need to work together to narrow down the aforesaid gap in fish production through efficient utilization of the fisheries resources of the state.

Realizing the importance of research and human resource development activities of TNFU, Govt. of Tamil Nadu is constantly encouraging the University to strengthen its infrastructure by establishing new colleges, research and extension centres throughout Tamil Nadu. At present, the University in total has 34 constituent units across the State. For the past five years, the University has proved its calibre and has successfully emerged as the number one fisheries university of India (ICAR SAU ranking 16-17). Using its State-of-the art research infrastructure and faculty, the University has developed many innovative fish production technologies in accordance with different resources of fisheries existing in the State. These technologies can be used for increasing the production, only by ensuring adoption of it in large numbers by farmers. It has to be also noted that lack of awareness

about the scientific practices for obtaining optimum yields is often being cited as one of the major reasons for under-utilization of the available resources.

This is the point, where one of the mandate i.e., extension (transfer of technology) of the University is expected to play a major role to help increase fish production. However, it has been learned from the past experience of SAUs in the State that extension still remains as one of the weakest linkages that need to be strengthened sufficiently to realize the potential of any food producing sector to increase food production and generation of more employment opportunities in the sector. This strengthening will definitely help in addressing the major problems existing in fisheries technology transfer such as:

(a) Non-availability of skilled man power with different levels of skill to meet out the man power requirements of emerging fisheries enterprises
(b) Non-availability of incubation centres to train and encourage (in the form of hand holding) the aspiring youth to venture into fisheries based businesses
(c) Lack of fisheries related base line data especially the technology, training and other service requirements of farmers
(d) Lack of recent advancements in content generation infrastructure like Information and Communication Technology (ICT) driven communication lab which will enable developing required extension education materials like extension publications, educational video and audio (radio) programs
(e) Paucity of aforesaid extension education materials and appropriate training modules for imparting the knowledge and skills on the improved technologies among the farmers, interested entrepreneurs and educated youth

Hence, considering the above difficulties and keeping in mind the fact that it is a newly established University, TNFU's extension wing has to be exclusively strengthened in terms of infrastructure and manpower. Overcoming the aforesaid difficulties through various "extension exclusive" establishments will help to strengthen the extension linkages not only with the field functionaries but also with the various types of stakeholders associated with the development of fisheries. In most of the well-established SAUs of the State, KVKs and exclusive communication centres has already been established to carry out and coordinate various multiple extension activities which is helping them to get wider reach in the technology dissemination activities. Therefore, this proposal has been made as an initial step

for establishing a state of the art infrastructure exclusively for extension activities of all the constituent units of the University.

4.8.2.2. Project strategy

The present proposal is to demonstrate and train the inland fish farmers in cage farming of fishes and crustaceans for enhancing the production and revenue. The selected water bodies in the State districts will serve as a demo ground and dissemination centre for the technology. Appropriate cages of various sizes (from 1 to 10 m^2) will be procured from the standard cage manufacturers in the country or abroad and used for the farming purposes.

4.8.2.3. Project component

The following are the steps in this project:

1. Strenghtening of farm infrastructure facilities in marine centres of TNFU in Kannyakumari.
2. Awareness to fishers on hygienic handling of fish in Kannyakumari.
3. Creation of awareness among fishers on fish processing technologies in Kannyakumari.
4. Capacity building and skill development programmes on fish processing technologies in Kannyakumari.
5. Awareness campaign on health beneficial attributes of fish in Kannyakumari.
6. Production of short films on nutritive value of fish and screening in theatres and television channels in Kannyakumari.
7. supply of preserved ready to eat and ready to cook fish products through public distribution sytems in Kannyakumari.
8. Supply of fish and fish products in mid day meal programme in Kannyakumari.
9. Supply chain management to promote consumption of farmed freshwater fishes in Kannyakumari.
10. Installation of waste rendering plant at selected fishing harbors and fish markets in Kannyakumari.
11. Development of fish compost for production of organic agricultural and horticultural crops in Kannyakumari.
12. Installation of unit for biogas from fish waste in Kannyakumari.

13. Development of technologies for effective utilization of shrimp shell waste in Kannyakumari.
14. Establishment of trap setting vessel to impart eco friendly fish trapping technology among the fishermen of Tamil Nadu in Kannyakumari.
15. Deisgn and development of e interface gadgets for sustainable aquaculture in Kannyakumari.
16. Automation technologies in Kannyakumari.
17. Developnment of mobile gadgets/apps for remote monitoring system for aquaculture farms in Kannyakumari.
18. Development of cost effective gadgets for effective fishing in Kannyakumari.
19. Development of mobile apps for effective fishing in Kannyakumari.
20. Design and development of solar powered tricycle for fish vendors in Kannyakumari.
21. Design and development of gadgets for fish processing in Kannyakumari.

4.8.2.4. Budget

The proposed intervention will be implemented with a budget outlay of ₹ 1641.43 lakhs as shown in Table 4.19.

4.8.2.5. Project implementing agency

The project will be implemented by the Tamil Nadu Fisheries University. The progress of the work will be monitored by the Vice-Chancellor and Nodal Officer of the concerned project.

4.8.2.6. Expected outcome

The implementation of the project will trigger the adoption of cage farming in the inland fisheries system.

Table 4.19. Budget requirement for Fisheries research

(₹. in lakhs)

Sl. No.	Interventions	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
1	**Aquaculture**														
ii	**Mariculture**														
c	Strenghtening 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	**Reduction of post harvest losses**														
1	Awareness to fishers on hygienic handling of fish	0.005	Kanyakumari	133	0.67	133	0.67	133	0.67	133	0.67	133	0.67	665	3.33
2	Creation of awareness among fishers on fish processing technologies	0.6	Kanyakumari	25	15.00	25	15.00	25	15.00	25	15.00	25	15.00	125	75.00
3	Capacity building and skill development programmes on fish processing technologies	6.6	Kanyakumari	13	85.80	13	85.80	13	85.80	13	85.80	13	85.80	65	429.00
e	**Enhancement of per capita consumption of fish**														
4	Awareness campaign on health beneficial attributes of fish	0.005	Kanyakumari	52	0.26	52	0.26	52	0.26	52	0.26	52	0.26	260	1.30
5	Production of short films on nutritive	50	Kanyakumari	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00

Sl. No.	Interventions	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
	value of fish and screening in theatres and television channels														
g	**Ensuring nutritional security through fish and fishery products**														
6	supply of preserved ready to eat and ready to cook fish products through public distribution sytems	12.9	Kanyakumari	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
7	Supply of fish and fish products in mid day meal programme	12.9	Kanyakumari	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
8	Supply chain management to promote consumption of farmed freshwater fishes	64.5	Kanyakumari	0	0.00	1	64.50	0	0.00	0	0.00	0	0.00	1	64.50
i	**Utilization of fish processing waste and by catch**														
9	installation of waste rendering plant at selected fishing harbors and fish markets	130	Kanyakumari	0	0.00	1	130.00	0	0.00	0	0.00	0	0.00	1	130.00
10	Development of fish compost for production of organic agricultural and	65	Kanyakumari	0	0.00	1	65.00	0	0.00	0	0.00	0	0.00	1	65.00

Sl. No.	Interventions	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
	horticultural crops														
11	Installation of unit for biogas from fish waste	161.5	Kanyakumari	0	0.00	1	161.50	0	0.00	0	0.00	0	0.00	1	161.50
12	Development of technologies for effective utilization of shrimp shell waste	100	Kanyakumari	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
ii	**fishing technology**														
13	Establishment of trap setting vessel to impart eco friendly fish trapping technology among the fishermen of Tamil Nadu	300		1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
4	**Fisheries Engineering**														
i	**Aquacultural engineering**														
a	**Farm implements**														
14	Deisgn and development of e interface gadgets for sustainable aquaculture	20	Kanyakumari	0	0.00	1	20.00	0	0.00	0	0.00	0	0.00	1	20.00
d	**Automation technologies**														
15	Developnment of mobile gadgets/apps for remote monitoring system for aquaculture farms	15	Kanyakumari	0	0.00	0	0.00	1	15.00	0	0.00	0	0.00	1	15.00
ii	**Navigation and Fisheries**														

Sl. No.	Interventions	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
	Engineering														
16	Development of cost effective gadgets for effective fishing	15	Kanyakumari	1	15.00	0	0.00	0	0.00	0	0.00	0	0.00	1	15.00
17	Development of mobile apps for effective fishing	8	Kanyakumari	0	0.00	0	0.00	0	0.00	0	0.00	1	8.00	1	8.00
iii	**Post-harvest fisheries engg**														
a	**Handling, transportation and storage**														
18	Design and development of solar powered tricycle for fish vendors	2	Kanyakumari	1	2.00	1	2.00	1	2.00	1	2.00	0	0.00	4	8.00
b	**Processing machines**														
19	Design and development of gadgets for fish processing	20	Kanyakumari	0	0.00	0	0.00	0	0.00	1	20.00	0	0.00	1	20.00
	Grand total				**418.73**		**820.53**		**168.73**		**123.73**		**109.73**		**1641.43**

4.9. Public Works Department

Public Works Department is in charge of implementing irrigation schemes and Government agencies including maintenance of irrigation systems and public building. For effective implementation of Tamil Nadu Water resources Consolidation Project and to achieve functional specialization, the Public Works Department has been bifurcated as Water Resources Organization and Buildings Organization.

The entire Kanyakumari district is endowed with a number of canals and conveyance channels. The end and aim of the conveyance system is to maximize production by harnessing the waters of the streams, rivulets and rivers. Besides the major rivers such as Kathiawar, paraliyar, Pazhayar and Chittar, there are other small rivers such as Alathuraiyar, Valliyar, Mampazhathuraiyar and Multiyear. There are also the rivulets running indifferent parts of the district. Pannivaikal, Pampoorivaikal, Alenchyvaikal, Puttetivaikal, Paruthivaikal and Shenkodivaikal are the other major drainagestreams.The Government of Tamil Nadu placed emphasis on creating/augmenting water storage capacity in small water harvesting structures and check dams through new constructions or rehabilitation/rejuvenation and delisting of existing structures.

The major strategies proposed in the plan are:

- Rehabilitation of old rivers and supply channels in Thiruvattur, Thucklay, Agastheeswaram, Kurunthancode, Killyoor, Munirachi, Rajakamangalam and Melpuram.
- Construction of protection walls along the river and drainage canals in Agastheeswaram, Thucklay, Thiruvattur, Kurunthancode, Melpuram and Munirachi.
- Rehabilitation of check dams in Thiruvattur, Melpuram and Agastheeswaram.
- Rehabilitation of tanks in Muirachi
- Delisting of water channelsin Agastheeswaram, Thucklay
- Construction of Checkdam in Kurunthancode

4.9.1. Project area

The projects are proposed to implement in most of the block of the district. The blocks include Melpuram, Thuckalay, Kurunthancode, Agastheeswaram, Thovalai, Munchirai, Thiruvattar, Rajakkamangalam and Killiyoor.

4.9.2. Project implementing agency

The project will be implemented by the Water Resource Organization wing of the Public Works Department. The progress of the project will be monitored by District and State level officials from the district.

4.9.3. Budget

The total cost for the project for implementing of proposed interventions for 5 years will work out to ₹**.56802.00** lakhs is required as shown in Table 4.20.

4.9.4. Expected outcome

The proposed interventions will increase the ground water table in all the blocks. The assurance of availability of water will increase the cropping area and productivity in the district and indirectly increased the farming income of the farmer.

Table 4.20. Budget requirement for Public Works Department

(₹. in lakhs)

Sl. No	Interventions	Blocks 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
1	Rehabilitation of Surulacode Head Work of Pazhayar River and Ananthanar Channel.	Thiruvattar	Ha	0.093217	4452	415.00	0	0.00	0	0.00	0	0.00	0	0.00	4452	415.00
2	Rehabilitation of Veerapuli Anicut Across Pazhayar River and its supply Kals.	Thovalai	Ha	4.05457	105	425.00	0	0.00	0	0.00	0	0.00	0	0.00	105	425.00
3	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Agasthees-waram	No	780	1	780.00	0	0.00	0	0.00	0	0.00	0	0.00	1	780.00
4	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thovalai	No	710	1	710.00	0	0.00	0	0.00	0	0.00	0	0.00	1	710.00
5	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thiruvattar	No	130	1	130.00	0	0.00	0	0.00	0	0.00	0	0.00	1	130.00

Sl. No	Interventions	Blocks 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
6	Rehabilitation of Nanjilnadu Puthanar Channel, branch channels and escapes	Thovalai	Ha	0.261109	3638	950.00	0	0.00	0	0.00	0	0.00	0	0.00	3638	950.00
7	Rehabilitation of Anandanar Main Channel and Escape Canals.	Thovalai	Ha	0.168464	4452	750.00	0	0.00	0	0.00	0	0.00	0	0.00	4452	750.00
8	Rehabilitation of Anandanar Branch Channels (10 Nos)	Rajakka-mangalam	Ha	0.314446	2862	900.00	0	0.00	0	0.00	0	0.00	0	0.00	2862	900.00
9	Rehabilitation of Athamozhi Escape of N.P. Channel.	Agasthees-waram	Ha	1.372549	255	350.00	0	0.00	0	0.00	0	0.00	0	0.00	255	350.00
10	Rehabilitation of Mantharamputhoor escape under N.P. Channel System.	Agasthees-waram	No	150	1	150.00	0	0.00	0	0.00	0	0.00	0	0.00	1	150.00
11	Restoration of Thallakulam Supply Channel.	Agasthees waram	No	500	1	500.00	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00
12	Rehabilitation of tanks in Pazhayar Sub Basin.	Agasthees waram	Ha	0.558015	538	300.00	0	0.00	0	0.00	0	0.00	0	0.00	538	300.00
13	Rehabilitation of tanks in Pazhayar Sub Basin.	Kurunthan code	Ha	0.590179	127	75.00	0	0.00	0	0.00	0	0.00	0	0.00	127	75.00
14	Rehabilitation of tanks in Pazhayar Sub Basin.	Thovalai	Ha	0.179899	500	90.00	0	0.00	0	0.00	0	0.00	0	0.00	500	90.00
15	Construction of Protection	Kurunthan code	Ha	0.402188	62	25.00	0	0.00	0	0.00	0	0.00	0	0.00	62	25.00

Sl. No	Interventions	Blocks 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
	walls and river training works along the river course and drainage course, etc., in Valliyar river															
16	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Thuckalay	No	55	1	55.00	0	0.00	0	0.00	0	0.00	0	0.00	1	55.00
17	Construction of Check Dams across Pampuri Vaikal near Colochel and River training works at estuary of Valliyar	Kurunthan code	No	400	1	400.00	0	0.00	0	0.00	0	0.00	0	0.00	1	400.00
18	Rehabilitation of Pattanamkal Main channel and its allied distributories	Killiyoor	Ha	0.106546	4693	500.00	0	0.00	0	0.00	0	0.00	0	0.00	4693	500.00
19	Rehabilitation of Pattanamkal Main channel and its allied distributories	Municirai	No	300	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
20	Rehabilitation of Pattanamkal Main channel and its allied distributories	Thiruvattar	No	300	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
21	Rehabilitation of Pattanamkal Main channel and its allied distributories	Thuckalay	No	40	1	40.00	0	0.00	0	0.00	0	0.00	0	0.00	1	40.00

Sl. No	Interventions	Blocks 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
22	Rehabilitation of Padmanabapuram Puthanar channel at L.S 0/0 to 8/250 Km	Thiruvattar	Ha	0.233133	1716	400.00	0	0.00	0	0.00	0	0.00	0	0.00	1716	400.00
23	Rehabilitation of Padmanabapuram Puthanar channel at L.S 8/250 to 19/000 Km	Thuckalay	No	400	1	400.00	0	0.00	0	0.00	0	0.00	0	0.00	1	400.00
24	Rehabilitation of Padmanabapuram Puthanar channel at L.S 19/000 to 27/250 Km	Thuckalay	No	400	1	400.00	0	0.00	0	0.00	0	0.00	0	0.00	1	400.00
25	Rehabilitation of Melmanai Ela Drain	Munchirai	No	50	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
26	Rehabilitation of Keezhkottu Ela Drain	Killiyoor	No	30	1	30.00	0	0.00	0	0.00	0	0.00	0	0.00	1	30.00
27	Rehabilitation of Keezhkulam Ela Drain	Killiyoor	No	50	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
28	Rehabilitation of Munda Ela Drain	Killiyoor	No	50	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
29	Rehabilitation of Vannanparai Check Dam across Kodayar River.	Thiruvattar	No	700	1	700.00	0	0.00	0	0.00	0	0.00	0	0.00	1	700.00
30	Rehabilitation of Kodayar Left Bank Channel	Thiruvattar	No	600	1	600.00	0	0.00	0	0.00	0	0.00	0	0.00	1	600.00
31	Construction of Protection walls and river training works along the river	Thiruvattar	No	550	1	550.00	0	0.00	0	0.00	0	0.00	0	0.00	1	550.00

Sl. No	Interventions	Blocks 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
	course and drainage course, etc., in Kodayar river															
32	Construction of Protection walls and river training works along the river course and drainage course, etc., in Paraliyar river	Thiruvattar	No	250	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
33	Rehabilitation of Malaicode Check Dam - I across Mullaiyar Thodu.	Melpuram	Ha	0.622222	45	28.00	0	0.00	0	0.00	0	0.00	0	0.00	45	28.00
34	Rehabilitation of Check dam - II across Mullaiyar Thodu.	Melpuram	Ha	0.47619	53	25.00	0	0.00	0	0.00	0	0.00	0	0.00	53	25.00
35	Rehabilitation of Ambalathu nadai check dam across Mulliyar Thodu.	Melpuram	Ha	0.407407	54	22.00	0	0.00	0	0.00	0	0.00	0	0.00	54	22.00
36	Rehabilitation of Kallanakavilai Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.342857	70	24.00	0	0.00	0	0.00	0	0.00	0	0.00	70	24.00
37	Rehabilitation of Mamootu Anai Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.597701	44	26.00	0	0.00	0	0.00	0	0.00	0	0.00	44	26.00
38	Rehabilitation of Mela Anducode Check Dam across	Melpuram	Ha	0.619718	36	22.00	0	0.00	0	0.00	0	0.00	0	0.00	36	22.00

Sl. No	Interventions	Blocks 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
	Mullaiyar Thodu.															
39	Rehabilitation of Anducode Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.482759	58	28.00	0	0.00	0	0.00	0	0.00	0	0.00	58	28.00
40	Rehabilitation of Kadamacode Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.416667	60	25.00	0	0.00	0	0.00	0	0.00	0	0.00	60	25.00
41	Rehabilitation of Madathivilai Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.574468	47	27.00	0	0.00	0	0.00	0	0.00	0	0.00	47	27.00
42	Rehabilitation of Poonathi Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.475248	51	24.00	0	0.00	0	0.00	0	0.00	0	0.00	51	24.00
43	Rehabilitation of Keezha Kadamacode Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.708861	40	28.00	0	0.00	0	0.00	0	0.00	0	0.00	40	28.00
44	Rehabilitation of Onikavilai Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.65	40	26.00	0	0.00	0	0.00	0	0.00	0	0.00	40	26.00
45	Rehabilitation of Moolakavilai Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.617284	41	25.00	0	0.00	0	0.00	0	0.00	0	0.00	41	25.00

Sl. No	Interventions	Blocks 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
46	Rehabilitation of Malayarampark Check Dam across Mullaiyar Thodu.	Melpuram	Ha	0.613636	44	27.00	0	0.00	0	0.00	0	0.00	0	0.00	44	27.00
47	Construction of protective wall along the course and construction of supply channel in Mullaiyar thodu	Melpuram	No	350	1	350.00	0	0.00	0	0.00	0	0.00	0	0.00	1	350.00
48	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar river	Melpuram	No	150	1	150.00	0	0.00	0	0.00	0	0.00	0	0.00	1	150.00
49	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar - Thamiraparani river	Munchirai	No	450	1	450.00	0	0.00	0	0.00	0	0.00	0	0.00	1	450.00
50	Rehabilitation of tanks in Kuzhithuraiyar Sub Basin.	Municirai	Ha	0.348614	574	200.00	0	0.00	0	0.00	0	0.00	0	0.00	574	200.00
51	Rehabilitation of tanks in Chittar Sub Basin.	Thiruvattar	Ha	0.698812	64	45.00	0	0.00	0	0.00	0	0.00	0	0.00	64	45.00

Sl. No	Interventions	Blocks 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
52	Rehabilitation of Parayadi Anicut across Thuvalar and its supply kals.	Kurunthan code	Ha	0.341927	146	50.00	0	0.00	0	0.00	0	0.00	0	0.00	146	50.00
53	Rehabilitation of Kannamparai kulam Anicut across Thuvalar and its supply kals.	Kurunthan code	Ha	1.416431	28	40.00	0	0.00	0	0.00	0	0.00	0	0.00	28	40.00
54	Rehabilitation of Easalurkulam Anicut across Thuvalar and its supply kals.	Thuckalay	Ha	0.499279	90	45.00	0	0.00	0	0.00	0	0.00	0	0.00	90	45.00
55	Rehabilitation of Thenkarai Yela Anicut across Thuvalar and its supply kals.	Thuckalay	Ha	12.6506	3	42.00	0	0.00	0	0.00	0	0.00	0	0.00	3	42.00
56	Rehabilitation of Sadaya mangalam Anicut across Thuvalar and its supply kals.	Thuckalay	Ha	64.12214	1	42.00	0	0.00	0	0.00	0	0.00	0	0.00	1	42.00
57	Rehabilitation of Padmanabapuram Puthanar Channel Distributories of Thiruvithancode Branch Channel and Thiruvithancode Extension Channel.	Thuckalay	Ha	0.255898	1172	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1172	300.00
58	Rehabilitation of Padmanabapuram Puthanar	Thuckalay	Ha	0.087376	2289	200.00	0	0.00	0	0.00	0	0.00	0	0.00	2289	200.00

Sl. No	Interventions	Blocks 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
	Channel Distributories of Eraniel branch channel, Colachel Branch Channel, Ceramangalam Major and Minor Branch Channel, Neyyoor Branch Channel, Thickanamcode Channel, Chembonvilai Channel and Chenamvilai Channel.															
59	Rehabilitation of Padmanabapuram Puthanar Channel Distributories of Thotiyodu Branch Channel, Erattaikarai Channel, Madathattuvilai Branch Channel, Kandanvilai Branch Channel, Mallancode Branch Channel, Koduppa kuzhi Branch Channel, Muttom Branch Channel, Muttom	Thuckalay	Ha	0.064559	3098	200.00	0	0.00	0	0.00	0	0.00	0	0.00	3098	200.00

Sl. No	Interventions	Blocks 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
	Extension Channel, Rajakkamangalam Branch Channel, Santhapuram Branch Channel, Alaganvilai Branch Channel and Munchiravilai Branch Channel.															
60	Rehabilitation of Somaserikulam Anicut across Thuvalar and its supply kals.	Thuckalay	Ha	0.309909	129	40.00	0	0.00	0	0.00	0	0.00	0	0.00	129	40.00
61	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Agasthees-waram	No	650	0	0.00	1	650.00	0	0.00	0	0.00	0	0.00	1	650.00
62	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thiruvattar	No	130	0	0.00	1	130.00	0	0.00	0	0.00	0	0.00	1	130.00
63	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thovalai	No	710	0	0.00	1	710.00	0	0.00	0	0.00	0	0.00	1	710.00

Sl. No	Interventions	Blocks 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
64	Rehabilitation of Anandanar Main Channel and Escape canals	Thovalai	Ha	0.168464	0	0.00	4452	750.00	0	0.00	0	0.00	0	0.00	4452	750.00
65	Rehabilitation of Vannanparai Check dam across Kodayar river	Thiruvattar	No	700	0	0.00	1	700.00	0	0.00	0	0.00	0	0.00	1	700.00
66	Rehabilitation of Kodayar Left Bank Channel	Thiruvattar	No	600	0	0.00	1	600.00	0	0.00	0	0.00	0	0.00	1	600.00
67	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kodayar river	Thiruvattar	No	600	0	0.00	1	600.00	0	0.00	0	0.00	0	0.00	1	600.00
68	Construction of Protection walls and river training works along the river course and drainage course, etc., in Paraliyar river	Thiruvattar	No	300	0	0.00	1	300.00	0	0.00	0	0.00	0	0.00	1	300.00
69	Rehabilitation of Najilnadu Puthanar Channel, branch channels and escapes.	Agasthees-waram	Ha	0.240495	0	0.00	3638	875.00	0	0.00	0	0.00	0	0.00	3638	875.00
70	Rehabilitation of Najilnadu Puthanar Channel, branch Channels and escapes.	Thovalai	Ha	0.137426	0	0.00	3638	500.00	0	0.00	0	0.00	0	0.00	3638	500.00

Sl. No	Interventions	Blocks 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
71	Desilting and protection works of Elayanainar surplus of N.P. Channel.	Agasthees-waram	Ha	2.5	0	0.00	32	80.00	0	0.00	0	0.00	0	0.00	32	80.00
72	Restoration of Thallakulam supply channel	Agasthees-waram	No	500	0	0.00	1	500.00	0	0.00	0	0.00	0	0.00	1	500.00
73	Rehabilitation of Pattanamkal Main channel and its allied distributories	Killoyoor	Ha	0.106546	0	0.00	4693	500.00	0	0.00	0	0.00	0	0.00	4693	500.00
74	Rehabilitation of Pattanamkal Main channel and its allied distributories	Thiruvattar	No	200	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
75	Rehabilitation of Pattanamkal Main channel and its allied distributories	Thuckalay	No	40	0	0.00	1	40.00	0	0.00	0	0.00	0	0.00	1	40.00
76	Rehabilitation of Pattanamkal Main channel and its allied distributories	Munchirai	No	300	0	0.00	1	300.00	0	0.00	0	0.00	0	0.00	1	300.00
77	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Kurunthancode	Ha	0.32175	0	0.00	62	20.00	0	0.00	0	0.00	0	0.00	62	20.00
78	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Thuckalay	No	30	0	0.00	1	30.00	0	0.00	0	0.00	0	0.00	1	30.00

Sl. No	Interventions	Blocks 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
79	Rehabilitation of Aruvikarai Anicut across Paraliar River.	Thiruvattar	Ha	0.761218	0	0.00	394	300.00	0	0.00	0	0.00	0	0.00	394	300.00
80	Rehabilitation of Mukkaranai Anicut across Valliyar near Muttaikadu.	Thuckalay	Ha	2.802691	0	0.00	18	50.00	0	0.00	0	0.00	0	0.00	18	50.00
81	Rehabilitation of Odappakulam Anicut across Valliyar near Muttaikadu.	Thuckalay	Ha	1.810865	0	0.00	25	45.00	0	0.00	0	0.00	0	0.00	25	45.00
82	Rehabilitation of Vellari Yela Anicut across Valliyar near Muttaikadu near Charode.	Thuckalay	Ha	0.516648	0	0.00	87	45.00	0	0.00	0	0.00	0	0.00	87	45.00
83	Rehabilitation of Padmanabapuram Puthanar channel at L.S 0/0 to 8/250 Km	Thiruvattar	Ha	0.262274	0	0.00	1716	450.00	0	0.00	0	0.00	0	0.00	1716	450.00
84	Rehabilitation of Padmanabapuram Puthanar channel at L.S 8/250 to 19/000 Km	Thuckalay	No	460	0	0.00	1	460.00	0	0.00	0	0.00	0	0.00	1	460.00
85	Rehabilitation of Padmanabapuram Puthanar channel at L.S 19/000 to 27/250 Km	Thuckalay	No	320	0	0.00	1	320.00	0	0.00	0	0.00	0	0.00	1	320.00
86	Rehabilitation of Padmanabapuram Puthanar channel	Thuckalay	Ha	0.170599	0	0.00	1172	200.00	0	0.00	0	0.00	0	0.00	1172	200.00

Sl. No	Interventions	Blocks 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
	distributories of Thiruvithancode branch channel and Thiruvithancode Extension channel															
87	Rehabilitation of Padmanabapuram Puthanar channel distributories of Eraniel branch channel, Colachel branch channel, Ceramangalam Major and Minor Branch channel, Neyyoor Branch channel, Thickanamcode channel, Chembonvilai channel and Chenamvilai channel	Thuckalay	Ha	0.087376	0	0.00	2289	200.00	0	0.00	0	0.00	0	0.00	2289	200.00
88	Rehabilitation of Padmanabapuram Puthanar Channel Distributories of Thotiyodu Branch Channel, Erattaikarai Channel, Madathatti vilai Branch Channel, Kandanvilai Branch	Kurunthancode	Ha	0.064559	0	0.00	3098	200.00	0	0.00	0	0.00	0	0.00	3098	200.00

Sl. No	Interventions	Blocks 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
	Channel, Mallancode Branch Channel, Koduppa kuzhi Branch Channel, Muttom Branch Channel, Muttom Extension Channel, Rajakkamangalam Branch Channel, Santhapuram Branch Channel, Alaganvilai Branch Channel and Munchiravilai Branch Channel.															
89	Construction of protective wall along the course and construction of supply channel in Mullaiyar thodu	Melpuram	No	350	0	0.00	1	350.00	0	0.00	0	0.00	0	0.00	1	350.00
90	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar river	Melpuram	No	150	0	0.00	1	150.00	0	0.00	0	0.00	0	0.00	1	150.00
91	Construction of Protection walls and river training works along the river	Munchirai	No	450	0	0.00	1	450.00	0	0.00	0	0.00	0	0.00	1	450.00

Sl. No	Interventions	Blocks 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
	course and drainage course, etc., in Kuzhithuraiyar - Thamiraparani river															
92	Rehabilitation of tanks in Kuzhithuraiyar Sub Basin	Munchirai	Ha	0.348614	0	0.00	574	200.00	0	0.00	0	0.00	0	0.00	574	200.00
93	Rehabilitation of Anandanar Branch Channels (10 Nos)	Rajakka-mangalam	Ha	0.314446	0	0.00	2862	900.00	0	0.00	0	0.00	0	0.00	2862	900.00
94	Construction of Check Dams across Pampurivaikal near Colochel and River training works River training works at estuary of Valliyar.	Kurunthan code	No	400	0	0.00	1	400.00	0	0.00	0	0.00	0	0.00	1	400.00
95	Rehabilitation of Kutty Anicut across Pazhayar River and its supply kals.	Thovalai	Ha	10.19357	0	0.00	49	495.00	0	0.00	0	0.00	0	0.00	49	495.00
96	Rehabilitation of Chattuputhoor Anicut across Pazhayar River and its supply kals.	Thovalai	Ha	0.188984	0	0.00	3519	665.00	0	0.00	0	0.00	0	0.00	3519	665.00
97	Construction of Protection walls and river training works along the river course and drainage	Agasthees-waram	No	650	0	0.00	0	0.00	1	650.00	0	0.00	0	0.00	1	650.00

Sl. No	Interventions	Blocks 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
	course, etc., in Pazhayar river															
98	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thiruvattar	No	130	0	0.00	0	0.00	1	130.00	0	0.00	0	0.00	1	130.00
99	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thovalai	No	715	0	0.00	0	0.00	1	715.00	0	0.00	0	0.00	1	715.00
100	Rehabilitation of Vannanparai Check dam across Kodayar river	Thiruvattar	No	600	0	0.00	0	0.00	1	600.00	0	0.00	0	0.00	1	600.00
101	Rehabilitation of Kodayar Left Bank Channel	Thiruvattar	No	600	0	0.00	0	0.00	1	600.00	0	0.00	0	0.00	1	600.00
102	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kodayar river	Thiruvattar	No	650	0	0.00	0	0.00	1	650.00	0	0.00	0	0.00	1	650.00
103	Construction of Protection walls and river training works along the river course and drainage course, etc., in Paraliyar river	Thiruvattar	No	250	0	0.00	0	0.00	1	250.00	0	0.00	0	0.00	1	250.00

Sl. No	Interventions	Blocks 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
104	Rehabilitation of Nanjilnadu Puthanar Channel, branch channels and escapes	Agasthees-waram	Ha	0.240495	0	0.00	0	0.00	3638	875.00	0	0.00	0	0.00	3638	875.00
105	Rehabilitation of Anandanar Main Channel and Escape Canals.	Rajakka-mangalam	Ha	0.112309	0	0.00	0	0.00	4452	500.00	0	0.00	0	0.00	4452	500.00
106	Rehabilitation of Anandanar Main Channel and Escape Canals.	Thovalai	No	500	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
107	Rehabilitation of Anandanar Branch Channels (10 Nos)	Rajakka-mangalam	Ha	0.279508	0	0.00	0	0.00	2862	800.00	0	0.00	0	0.00	2862	800.00
108	Rehabilitation of Kothandaraman Escape of N.P. Channel.	Agasthees-waram	Ha	0.777778	0	0.00	0	0.00	225	175.00	0	0.00	0	0.00	225	175.00
109	Rehabilitation of Pattanamkal Main channel and its allied distributories	Killiyoor	Ha	0.063927	0	0.00	0	0.00	4693	300.00	0	0.00	0	0.00	4693	300.00
110	Rehabilitation of Pattanamkal Main channel and its allied distributories	Munchirai	No	300	0	0.00	0	0.00	1	300.00	0	0.00	0	0.00	1	300.00
111	Rehabilitation of Pattanamkal Main channel and its allied distributories	Thiruvattar	No	200	0	0.00	0	0.00	1	200.00	0	0.00	0	0.00	1	200.00
112	Construction of Protection walls and river training works	Kurunthancode	Ha	0.32175	0	0.00	0	0.00	62	20.00	0	0.00	0	0.00	62	20.00

Sl. No	Interventions	Blocks 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
	along the river course and drainage course, etc., in Valliyar river															
113	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Thuckalay	No	30	0	0.00	0	0.00	1	30.00	0	0.00	0	0.00	1	30.00
114	Rehabilitation of Padmanabapuram Puthanar channel distributories of Thiruvithancode branch channel and Thiruvithancode Extension channel	Thuckalay	Ha	0.170599	0	0.00	0	0.00	1172	200.00	0	0.00	0	0.00	1172	200.00
115	Rehabilitation of Padmanabapuram Puthanar channel distributories of Eraniel branch channel, Colachel branch channel, Ceramangalam Major and Minor Branch channel, Neyyoor Branch channel, Thickanamcode channel, Chembonvilai	Thuckalay	Ha	0.043688	0	0.00	0	0.00	2289	100.00	0	0.00	0	0.00	2289	100.00

Sl. No	Interventions	Blocks 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
	channel and Chenamvilai channel															
116	Rehabilitation of Padmanabapuram Puthanar channel distributories of Thotiyodu branch channel, Erattaikarai channel, Madathittuvilai branch channel, Kandanvilai branch channel, Mallancode branch channel, Koduppakuzhi branch channel, Muttom branch channel, Muttom extension channel, Rajakkamangalam branch channel, Santhapuram branch channel, Alaganvilai branch channel and Munchiravilai branch channel	Kurunthancode	Ha	0.064559	0	0.00	0	0.00	3098	200.00	0	0.00	0	0.00	3098	200.00
117	Construction of protective wall along the course and construction of	Melpuram	Ha	450	0	0.00	0	0.00	1	450.00	0	0.00	0	0.00	1	450.00

Sl. No	Interventions	Blocks 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
	supply channel in Mullaiyar thodu															
118	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar river	Melpuram	No	200	0	0.00	0	0.00	1	200.00	0	0.00	0	0.00	1	200.00
119	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar - Thamiraparani river	Munchirai	No	500	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
120	Rehabilitation of tanks in Kuzhithuraiyar Sub Basin	Munchirai	Ha	0.348614	0	0.00	0	0.00	574	200.00	0	0.00	0	0.00	574	200.00
121	Rehabilitation of Thuckalay Yela Anicut across Valliyar.	Thuckalay	No	46	0	0.00	0	0.00	1	46.00	0	0.00	0	0.00	1	46.00
122	Rehabilitation of Mulagupatti Anicut across Valliyar.	Thuckalay	No	50	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
123	Rehabilitation of Anicut across Valliyar near Eraniel Bridge.	Thuckalay	No	25	0	0.00	0	0.00	1	25.00	0	0.00	0	0.00	1	25.00
124	Rehabilitation of Pallikondan Anicut across Pazhayar River and its supply	Thovalai	Ha	4.563233	0	0.00	0	0.00	161	735.00	0	0.00	0	0.00	161	735.00

Sl. No	Interventions	Blocks 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
	kals.															
125	Rehabilitation of Chettithoppu Anicut across Pazhayar River and its supply Kals.	Thovalai	Ha	5.225635	0	0.00	0	0.00	268	1400.00	0	0.00	0	0.00	268	1400.00
126	Rehabilitation of Sabari dam across Pazhayar river and its supply kals	Agastheeswaram	Ha	2.631676	0	0.00	0	0.00	0	0.00	541	1425.00	0	0.00	541	1425.00
127	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Agastheeswaram	No	650	0	0.00	0	0.00	0	0.00	1	650.00	0	0.00	1	650.00
128	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thiruvattar	No	130	0	0.00	0	0.00	0	0.00	1	130.00	0	0.00	1	130.00
129	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thovalai	No	1015	0	0.00	0	0.00	0	0.00	1	1015.00	0	0.00	1	1015.00
130	Rehabilitation of Nanjilnadu Puthanar Channel, branch channels and	Agastheeswaram	Ha	0.137426	0	0.00	0	0.00	0	0.00	3638	500.00	0	0.00	3638	500.00

Sl. No	Interventions	Blocks 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
	escapes															
131	River Training works at estuary of Alankal Odai.	Kurunthan code	Ha	240	0	0.00	0	0.00	0	0.00	1	240.00	0	0.00	1	240.00
132	Desilting and Protection works of Ramasamudram Escape of Thovalai Channel.	Agasthees-waram	Ha	2.352941	0	0.00	0	0.00	0	0.00	85	200.00	0	0.00	85	200.00
133	Rehabilitation of M.M. Channel and its branches.	Agasthees-waram	No	750	0	0.00	0	0.00	0	0.00	1	750.00	0	0.00	1	750.00
134	Rehabilitation of Authuvarambu Anicut across Valliyar near Muttaikadu.	Kurunthan code	Ha	1.787538	0	0.00	0	0.00	0	0.00	39	70.00	0	0.00	39	70.00
135	Rehabilitation of Pallampalam Anicut across Valliyar near Muttaikadu.	Kurunthan code	Ha	1.402656	0	0.00	0	0.00	0	0.00	53	75.00	0	0.00	53	75.00
136	Rehabilitation of Thalakulam Anicut across Valliyar near Muttaikadu.	Kurunthan code	Ha	0.153286	0	0.00	0	0.00	0	0.00	489	75.00	0	0.00	489	75.00
137	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Kurunthan code	Ha	0.32175	0	0.00	0	0.00	0	0.00	62	20.00	0	0.00	62	20.00
138	Construction of Protection walls and river training works along the river	Thuckalay	No	30	0	0.00	0	0.00	0	0.00	1	30.00	0	0.00	1	30.00

Sl. No	Interventions	Blocks 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
	course and drainage course, etc., in Valliyar river															
139	Rehabilitation of Padmanabapuram Puthanar channel distributories of Thiruvithancode branch channel and Thiruvithancode Extension channel	Thuckalay	Ha	0.085299	0	0.00	0	0.00	0	0.00	1172	100.00	0	0.00	1172	100.00
140	Rehabilitation of Padmanabapuram Puthanar channel distributories of Eraniel branch channel, Colachel branch channel, Ceramangalam Major and Minor Branch channel, Neyyoor Branch channel, Thickanamcode channel, Chembonvilai channel and Chenamvilai channel	Thuckalay	Ha	0.043688	0	0.00	0	0.00	0	0.00	2289	100.00	0	0.00	2289	100.00
141	Construction of Protection walls and river training works along the river course and drainage	Thiruvattar	No	450	0	0.00	0	0.00	0	0.00	1	450.00	0	0.00	1	450.00

Sl. No	Interventions	Blocks 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
	course, etc., in Paraliyar river															
142	Rehabilitation of Padmanabapuram Puthanar channel distributories of Thotiyodu branch channel, Erattaikarai channel, Madathittuvilai branch channel, Kandanvilai branch channel, Mallancode branch channel, Koduppakuzhi branch channel, Muttom branch channel, Muttom extension channel, Rajakkamangalam branch channel, Santhapuram branch channel, Alaganvilai branch channel and Munchiravilai branch channel	Kurunthancode	Ha	0.03228	0	0.00	0	0.00	0	0.00	3098	100.00	0	0.00	3098	100.00
143	Construction of protective wall along the course and construction of supply channel	Melpuram	No	450	0	0.00	0	0.00	0	0.00	1	450.00	0	0.00	1	450.00

Sl. No	Interventions	Blocks 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
	in Mullaiyar thodu															
144	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar river	Melpuram	No	250	0	0.00	0	0.00	0	0.00	1	250.00	0	0.00	1	250.00
145	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar - Thamiraparani river	Munchirai	No	250	0	0.00	0	0.00	0	0.00	1	250.00	0	0.00	1	250.00
146	Rehabilitation of tanks in Kuzhithuraiyar Sub Basin	Munchirai	Ha	0.348614	0	0.00	0	0.00	0	0.00	574	200.00	0	0.00	574	200.00
147	Rehabilitation of Padmanabapuram Puthanar Channel Distributories of Thottiyodu Branch Channel, Erattaikarai Channel, Madathattu vilai Branch Channel, Kandanvilai Branch Channel, Mallancode Branch	Rajakka-mangalam	Ha	0.03228	0	0.00	0	0.00	0	0.00	3098	100.00	0	0.00	3098	100.00

Sl. No	Interventions	Blocks 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
	Channel, Koduppa kuzhi Branch Channel, Muttom Branch Channel, Muttom Extension Channel, Rajakkamangalam Branch Channel, Santhapuram Branch Channel, Alaganvilai Branch Channel and Munchiravilai Branch Channel.															
148	Rehabilitation of Veeranarayana Mangalam Anicut across Pazhayar River and its supply kals.	Thovalai	Ha	1.204348	0	0.00	0	0.00	0	0.00	996	1200.00	0	0.00	996	1200.00
149	Rehabilitation of Kumari dam across Pazhayar River and its supply kals.	Agasthees-waram	Ha	3.154972	0	0.00	0	0.00	0	0.00	0	0.00	396	1250.00	396	1250.00
150	Rehabilitation of Pillaipethan dam across Pazhayar river and its supply kals.	Agasthees-waram	Ha	4.514136	0	0.00	0	0.00	0	0.00	0	0.00	84	380.00	84	380.00
151	Rehabilitation of Cholanthittai dam across Pazhayar river and its supply kals	Agasthees-waram	Ha	2.67688	0	0.00	0	0.00	0	0.00	0	0.00	243	650.00	243	650.00

Sl. No	Interventions	Blocks 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
152	Rehabilitation of Mission dam across Pazhayar River and its supply kals.	Agasthees-waram	Ha	4.447739	0	0.00	0	0.00	0	0.00	0	0.00	40	180.00	40	180.00
153	Desilting of Alanthuraiyar of Pazhayar Sub Basin.	Thovalai	Ha	0.095847	0	0.00	0	0.00	0	0.00	0	0.00	313	30.00	313	30.00
154	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Agasthees-waram	No	1250	0	0.00	0	0.00	0	0.00	0	0.00	1	1250.00	1	1250.00
155	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thiruvattar	No	250	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00	1	250.00
156	Construction of Protection walls and river training works along the river course and drainage course, etc., in Pazhayar river	Thovalai	No	1100	0	0.00	0	0.00	0	0.00	0	0.00	1	1100.00	1	1100.00
157	Construction of Protection walls and river training works along the river course and drainage course, etc., in Paraliyar river	Thiruvattar	No	550	0	0.00	0	0.00	0	0.00	0	0.00	1	550.00	1	550.00

Sl. No	Interventions	Blocks 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
158	Rehabilitation of Nanjilnadu Puthanar Channel, branch channels and escapes	Agasthees-waram	Ha	0.137426	0	0.00	0	0.00	0	0.00	0	0.00	3638	500.00	3638	500.00
159	Rehabilitation of M.M channel and its branches	Agasthees-waram	No	750	0	0.00	0	0.00	0	0.00	0	0.00	1	750.00	1	750.00
160	River Training Works at estuary of Pozhikarai Sammankarai Drain.	Rajakka-mangalam	No	230	0	0.00	0	0.00	0	0.00	0	0.00	1	230.00	1	230.00
161	Desilting of Vambar Odai of Pazhayar Sub Basin.	Thovalai	Ha	2.5	0	0.00	0	0.00	0	0.00	0	0.00	20	50.00	20	50.00
162	Rehabilitation of Poigai Systems and drainages (2 Nos.)	Thovalai	Ha	0.79639	0	0.00	0	0.00	0	0.00	0	0.00	188	150.00	188	150.00
163	Rehabilitation of Nilaparai Channel.	Agasthees-waram	No	500	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00	1	500.00
164	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Kurunthan code	Ha	0.643501	0	0.00	0	0.00	0	0.00	0	0.00	62	40.00	62	40.00
165	Construction of Protection walls and river training works along the river course and drainage course, etc., in Valliyar river	Thuckalay	No	60	0	0.00	0	0.00	0	0.00	0	0.00	1	60.00	1	60.00

Sl. No	Interventions	Blocks 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
166	Construction of protective wall along the course and construction of supply channel in Mullaiyar thodu	Melpuram	No	400	0	0.00	0	0.00	0	0.00	0	0.00	1	400.00	1	400.00
167	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar river	Melpuram	No	250	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00	1	250.00
168	Construction of Protection walls and river training works along the river course and drainage course, etc., in Kuzhithuraiyar - Thamiraparani river	Munchirai	No	450	0	0.00	0	0.00	0	0.00	0	0.00	1	450.00	1	450.00
169	Rehabilitation of tanks in Kuzhithuraiyar Sub Basin	Munchirai	Ha	0.348614	0	0.00	0	0.00	0	0.00	0	0.00	574	200.00	574	200.00
170	Rehabilitation of Padmanabapuram Puthanar channel distributories of Eraniel branch channel, Colachel branch channel, Ceramangalam Major and	Thuckalay	Ha	0.131064	0	0.00	0	0.00	0	0.00	0	0.00	2289	300.00	2289	300.00

Sl. No	Interventions	Blocks 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
	Minor Branch channel, Neyyoor Branch channel, Thickanamcode channel, Chembonvilai channel and Chenamvilai channel															
	Grand total					**14136.00**		**13365.00**		**11401.00**		**8380.00**		**9520.00**		**56802.00**

Agastheeswaram – B1, Boothapandy – B2, Kurunthancode – B3, Killiyoor – B4, Munchrai – B5, Melpuram – B6, Rajakamangalam – B7, Thiruvattar – B8, Thuckalay – B9

4.10. Cooperative Sector

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.

Project components

1. Construction of Office Building covering in Agastheeswaram and Kurunthancode blocks.
2. Construction of compound wall covering have to implement in Agastheeswaram and Killyoor block.
3. Godown construction have to implement in Agastheeswaram, Kurunthancode, Killyoor, Munirachi, Melpuram and Rajakamangalam block.
4. Godown renovation have to be carryout in Munirachi block.

Budget

The budget requirement for fulfilling the above interventions is ₹**.** 191.00 Lakhs (Table 4.21).

Expected outcome

Agricultural marketing cooperatives will provide the services involved in moving a product from the point of production to the point of consumption. Agricultural marketing includes a series of interconnected activities involving planning production, growing and harvesting, grading, packing, transport, storage, food processing, distribution and sale.

Implementing agency

Department of Cooperative Societies will be implementing the project

Table 4.21. Budget requirement for Cooperative Sector

(₹in lakhs)

Sl. No.	Interventions	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
1	Construction of Compound wall	B1, B4	1	2.00	0	0.00	0	0.00	1	2.00	1	3.00	3	7.00
2	Construction of Godown	B1, B3, B4, B5, B6, B7	1	20.00	2	30.00	2	30.00	2	40.00	2	25.00	9	145.00
3	Construction of Office Building	B1, B3	1	7.00	0	0.00	1	4.50	0	0.00	0	0.00	2	11.50
	Renovation of Godown	B5	1	25.00	0	0.00	0	0.00	0	0.00	0	0.00	1	25.00
4	Strengthening of Cooperation Centres (Furniture's, Solar panel, Modern counter, Xerox machine, Air Conditioner, CCTV Camera, Bore well, Generator, UPS Battery, Cash Counting Machine, Invertor, Jewel Weighing Machine, Packing Machine, Purchase of computer and peripherals, Hand Billing machine, LED Display for tender process, Purchase of Jewel Carat Meter, Smart Card Printing Machine, Burglary 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)	All Blocks	0	0.00	1	2.50	0	0.00	0	0.00	0	0.00	1	2.50
5	Construction of Compound wall	B1, B4	1	2.00	0	0.00	0	0.00	1	2.00	1	3.00	3	7.00
	Grand total			**54.00**		**32.50**		**34.50**		**42.00**		**28.00**		**191.00**

Agastheeswaram – B1, Boothapandy – B2, Kurunthancode – B3, Killiyoor – B4, Munchrai – B5, Melpuram – B6, Rajakamangalam – B7, Thiruvattar – B8, Thuckalay – B9

Table 4.22. Budget Abstract for Kanyakumari district

(₹.in lakhs)

Sl. No.	Name of the Department	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	879.30	600.67	1013.32	473.37	525.42	3492.05
2.	Horticulture	1858.84	2129.27	2391.07	2593.28	2889.51	11861.97
3.	Agricultural Engineering	133.55	71.78	92.42	163.20	165.13	626.08
4.	Agricultural Marketing	158.84	117.40	79.74	57.13	56.92	470.03
5.	Seed Certification	18.36	13.36	0.00	0.00	0.00	31.72
6.	Animal Husbandry	394.56	556.79	600.56	405.25	308.15	2265.31
7.	Animal Science Research (TANUVAS)	0.00	0.00	0.00	0.00	0.00	0.00
8.	Dairy development	219.80	431.80	347.75	509.80	224.60	1733.75
9.	Fisheries	718.30	207.90	708.30	702.90	203.30	2040.70
10.	Fisheries Research (TNFU)	418.73	820.53	168.73	123.73	109.73	1641.44
11.	Water Resource Organization (PWD)	14136.00	13365.00	11401.00	8380.00	9520.00	56802.00
11.	Civil Supplies & Co-Operation	54.00	32.50	34.50	42.00	28.00	191.00
	Grand total	**18990.28**	**18347.00**	**16837.39**	**12950.66**	**14030.76**	**81156.05**

The total budget requirement for the implementation of various interventions by different departments in Kanyakumari district is **₹ 81156.05 lakhs.**


KARNATAKA
KERALA
SRI LANKA