



# NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP)



## DISTRICT AGRICULTURE PLAN

### NAGAPATTINAM



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



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2017

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## EXECUTIVE SUMMARY

District of Nagapattinam has been carved out on October 18, 1991, as a separate district due to bifurcation of Thanjavur district. According to this division, five taluks namely Sirkazhi, Tharangampadi, Mayiladuthurai, Nagapattinam and Vedaranyam were detached from their parent district i.e. Thanjavur to form this new district. The district boundary is shared by Karaikal, Thiruvarur, Tanjore and Cuddalore districts. It lies on the shores of the Bay of Bengal and has a large coastline of 189 km. The Nagapattinam district receives huge amount of rainfall during the North East monsoon when compared to South West. There are not less than eleven ports on the coast of Nagapattinam district, of which eight are open to foreign trade. Nagapattinam District has a dry humid climate.

The district has been divided into two revenue divisions viz., Nagapattinam and Mayiladuthurai. There are eight revenue Taluks namely Nagapattinam, Vedaranyam, Thirukuvalai, Kilvelur, Mayiladuthurai, Sirkazhi, Kuttalam and Tarangam Padi. There are 11 blocks namely Nagapattinam, Kilvelur, Keelaiyur, Thirumarugal, Vedaranyam, Thalainayar, Mayiladuthurai, Kuttalam, Sembanarkoil, Sirkali and Kollidam. Average literacy rate of Nagapattinam in 2011 were 83.59 compared to 76.34 of 2001. If things are looked out at gender wise, male and female literacy were 89.79 per cent and 77.58 percent respectively.

The district constitutes 4.86 lakhs peoples i.e. were total main workers and 1.87 lakhs folks were marginal workers. It is accounted for 30.91 per cent of the total population who also engaged in other professionals. Sandy Coastal Alluvium and Black Soil types cover 88.71 per cent and 6.58 per cent respectively in the district. Other Soils in the district Comprises 4.71 per cent. The soil of the district is mostly alluvial but varies greatly in quality. The rich soil is found in the north and the south of the railway line between Mayuram and Thiruthuraippondi. The worst land in the delta is found in the Vedaranyam and Nagapattinam taluks where the soil is saline and drainage is very poor. The district receives rainfall under the influence of both southwest and northeast monsoon.

In Nagapattinam district the area under forest is 4633 ha which comes under the blocks Vedaranyam, Thalainayar and Kollidam. Vedaranyam constitutes the major portion of the barren and uncultivable land. Efforts can be taken to bring this cultivable

wasteland under cultivation so as to increase the production to meet out the growing demand and also to generate additional income to the farmers. The entire area of cropping has been irrigated by the canal source and sources like open and bore wells irrigate very meager amount of area at around 0.5 per cent of the net irrigated area. Paddy, black gram and green gram are the major crops growing in the district. Besides other crops like Ground nut, coconut, gingelly, sugarcane and mango are also grown in the district.

Nagapattinam district has the following Strength, Weaknesses, Opportunities, and Threats which are essential for the better understanding for improving the district future. The major strengths are progressive nature of the farming community and most of the people are engaged in fishing as where they are located in the Seashore area. Sheep and Goat rearing & Poultry rearing in the district plays a vital role in the economy of the district.

The major weaknesses are more number of resource poor farmers, fragmented holdings, dependence on monsoon rain, low soil productivity, poor soil drainage and soils are alluvial in nature. Low adoption of plant population, non-adoption of optimum seed rate, lack of awareness of latest technologies among the farmers is the other weaknesses.

The Opportunities are immense scope for increasing area under hybrid vegetables (tomato, bhendi, cabbage) and medicinal plants. Infrastructure facilities such as transport, communication, roads, location advantages such as national highway connecting to Chennai and Bangalore for easy transport of agricultural produce to the markets, development of seed industry, production of milk products and selling of packaged mutton and broiler meat, rearing of back yard poultry and Japanese quills are the other opportunities for development.

However, the threats identified are low productivity of crops, higher cost of cultivation, agricultural labour shortage, and uncertainty in market price for the produce and finally the gambling nature of agriculture.

The agriculture sector and allied sectors such as agricultural engineering, animal husbandry and fisheries are the major sectors to be improved to enhance production and productivity of the crops and other products to improve the net income of the producers. This in turn will contribute for increasing the agricultural growth in the beyond XII plan. The total budget requirements of proposed plan for agricultural and allied sectors are given below.

**Total budget requirements for agricultural and allied sectors in Nagapattinam district**

(₹. in Lakh)

Sl. No.	Components	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	13271.50	12625.52	12865.25	12453.95	12867.62	64083.74
2	Agricultural Research (TNAU)	0.00	20.00	0.00	0.00	0.00	20.00
3	Horticulture	1360.48	1426.13	1360.48	1326.13	2960.48	8433.72
4	Agricultural Engineering	5896.01	4593.71	4793.26	4589.36	4545.56	24417.90
5	Agricultural Marketing	103.10	284.60	120.40	147.10	122.60	777.75
6	Seed Certification & Organic Certification	5.00	15.56	2.20	2.20	2.20	27.16
7	Animal Husbandry	1478.09	1228.09	1058.09	938.09	938.09	5640.45
8	Animal Science Research (TANUVAS)	0.00	0.00	0.00	0.00	0.00	0.00
9	Dairy Development	449.25	790.25	740.25	449.25	459.25	2888.25
10	Fisheries	492.65	612.65	492.65	492.65	2542.65	4633.25
11	Fisheries Research (TNFU)	8584.20	2012.50	808.73	290.73	1290.73	12986.91
12	Water Resource Organization (PWD)	12832.00	220.00	84.00	22500.00	0.00	35636.00
13	Civil Supplies & Co-Operation	5.38	18.28	12.80	2.00	3.80	42.26
	<b>Grand total</b>	<b>44477.66</b>	<b>23827.29</b>	<b>22338.11</b>	<b>43191.46</b>	<b>25732.98</b>	<b>159587.39</b>

The total budget requirement for the implementation of various interventions by different departments in Nagapattinam district is **₹. 159587.39 Lakh**

# **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 11<sup>th</sup> and 12<sup>th</sup> 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 12<sup>th</sup> Plan period. These plans have to be revised and updated appropriately for implementing RKVY-RAFTAAR during 14<sup>th</sup> 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 11<sup>th</sup> and 12<sup>th</sup> Plan periods. Tamil Nadu State has 32 districts including Chennai. The District Agriculture Plan were prepared for 31 districts excluding Chennai during 12<sup>th</sup> plan period. Thus, the current exercise is the continuation of the 12<sup>th</sup> plan period: which also covered two years of the 14<sup>th</sup> 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 plan 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 Nagapattinam 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

#### 2.1 Nagapattinam at a Glance

District of Nagapattinam has been carved out on October 18, 1991, as a separate district due to bifurcation of Thanjavur district. According to this division, five taluks namely Sirkazhi, Tharangampadi, Mayiladuthurai, Nagapattinam and Vedaranyam were detached from their parent district i.e. Thanjavur to form this new district. The earlier history of this district is more or less the same as of its parent district i.e. Thanjavur being its part till recently. Nagapattinam is one of the constituents of Chola. Nagapattinam Town is the district headquarters. The district boundary is shared by Karaikal, Thiruvarur, Tanjore and Cuddalore districts. It lies on the shores of the Bay of Bengal and has a large coastline of 189 km. The Nagapattinam district receives huge amount of rainfall during the North East monsoon when compared to South West. There are not less than eleven ports on the coast of Nagapattinam district, of which eight are open to foreign trade. Nagapattinam District has a dry humid climate.

##### 2.1.1 Revenue Administrative Particulars

Revenue administrative particulars are presented in Table.2.1.

**Table2.1 Revenue Administrative particulars**

<b>Details</b>	<b>Nos.</b>
Revenue Divisions	2
Taluks	8
Municipalities	4
Panchayat Unions	11
Town Panchayats	8
Village Panchayats	434



## 2.2 Area, Location and Geographical features

Nagapattinam a coastal district of Tamil Nadu lies between 10° 8` and 11° 28` in North Latitude and 76 ° 34` and 75 ° 53` in East Longitude. The details of revenue divisions, taluks and blocks of Nagapattinam district are furnished in Table 2.2.

**Table 2.2 Revenue divisions, Taluks, Blocks and Agricultural Divisions**

<b>Revenue divisions (2)</b>	<b>Taluks (8)</b>	<b>Villages (524)</b>	<b>Blocks (11)</b>
Nagapattinam	Nagapattinam	85	Nagapattinam
	Vedaranyam	61	Kilvelur
	Thirukuvalai	35	Keelaiyur
	Kilvelur	55	Thirumarugal
Mayiladuthurai	Mayiladuthurai	65	Vedaranyam
	Sirkazhi	94	Thalainayar
	Kuttalam	59	Mayiladuthurai
	Tharangampadi	70	Kuttalam
			Sembanarkoil
			Sirkazhi
			Kollidam

## 2.3 Administrative Structure of Nagapattinam District

The district has been divided into two revenue divisions viz., Nagapattinam and Mayiladuthurai. There are eight revenue Taluks namely Nagapattinam, Vedaranyam, Thirukuvalai, Kilvelur, Mayiladuthurai, Sirkazhi, Kuttalam and Tarangam Padi. There are 11 blocks namely Nagapattinam, Kilvelur, Keelaiyur, Thirumarugal, Vedaranyam, Thalanayar, Mayiladuthurai, Kuttalam, Sembanarkoil, Sirkazhi and Kollidam. The district has also accommodates 11 Panchayat Unions, 8 Town Panchayats, 434 Village Panchayats and 524 Revenue Villages as given in Table 2.1 and 2.2.

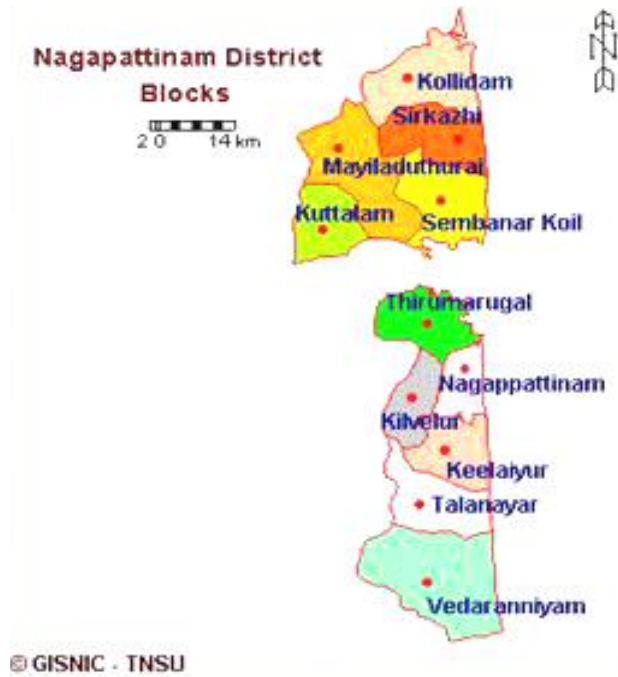


Fig. 1 Block Maps of Nagapattinam district

### Nagapattinam District

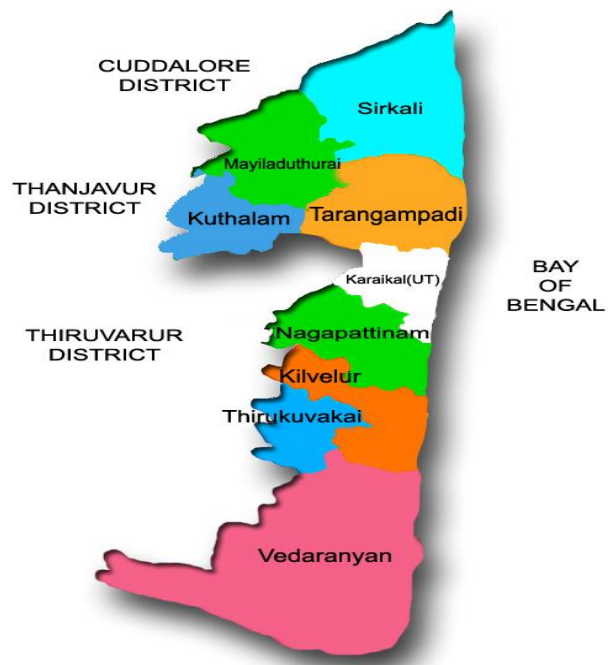


Fig. 2 Taluk Map of Nagapattinam district

## 2.4 Demographic Profile

### 2.4.1 Population

The demographic details of the Nagapattinam district are furnished in Table 2.3, 2.4 and 2.5. In 2011, Nagapattinam had population of 1,614,069 of which male and female were 797,214 and 816,855 respectively. In 2001 census, Nagapattinam had a population of 1,488,839 of which males were 739,074 and remaining 749,765 were females. The initial provisional data released by census India 2011, shows that density of Nagapattinam district for 2011 is 668 people per sq. km. In 2001, Nagapattinam district density was at 616 people per sq. km. Nagapattinam district administers 2,417 square kilometers of areas.

With regards to Sex Ratio in Nagapattinam, it stood at 1025 per 1000 male compared to 2001 census figure of 1014. The average national sex ratio in India is 940 as per latest reports of Census 2011 Directorate. In 2011 census, child sex ratio is 961 girls per 1000 boys compared to figure of 963 girls per 1000 boys of 2001 census data.

In Nagapattinam district, there were total 154,543 children under age of 0-6 against 183,346 of 2001 census. Of total 154,543 male and female were 78,826 and 75,717 respectively. Child Sex Ratio as per census 2011 was 961 compared to 963 of census 2001. In 2011, Children under 0-6 formed 9.57 percent of Nagapattinam District compared to 12.31 percent of 2001. There was net change of -2.74 percent in this compared to previous census of India.

**Table 2.3 Demographic particulars of Nagapattinam district**

Description	2011	2001
Actual Population	1614069	1488839
Male	797214	739074
Female	816855	749765
Population Growth (%)	8.41	8.07
Area Sq. Km	2417	2417
Density/km <sup>2</sup>	668	616
Proportion to Tamil Nadu Population (%)	2.24	2.39
Sex Ratio (Per 1000)	1025	1014
Child Sex Ratio (0-6 Age)	961	963

<b>Description</b>	<b>2011</b>	<b>2001</b>
Total Child Population (0-6 Age)	154543	183346
Male Population (0-6 Age)	78826	93396
Female Population (0-6 Age)	75717	89950
Child Proportion (0-6 Age) (%)	9.57	12.31
Boys Proportion (0-6 Age) (%)	9.89	12.64
Girls Proportion (0-6 Age)(%)	9.27	12.00

**Source:** Commodity potential report, TNAU, 2013

**Table 2.4 Rural and urban population in Nagapattinam district (2011)**

<b>Description</b>	<b>Rural</b>	<b>Urban</b>
Population (%)	77.46	22.54
Total Population	1,250,291	363,778
Male Population	618,594	178,620
Female Population	631,697	185,158
Sex Ratio	1021	1037
Child Sex Ratio (0-6)	963	953
Child Population (0-6)	119,479	35,064
Male Child(0-6)	60,875	17,951
Female Child(0-6)	58,604	17,113
Child Percentage (0-6)	9.56	9.64
Male Child Percentage	9.84	10.05
Female Child Percentage	9.28	9.24

**Source:** Commodity potential report, TNAU, 2013

**Table 2.5 Block wise demographic details of Nagapattinam district (2011 census)**

<b>Sl. No</b>	<b>Block</b>	<b>Area (Km)</b>	<b>Male (Nos.)</b>	<b>Female (Nos.)</b>	<b>Total (Nos.)</b>
1	Nagapattinam	122.92	41272	41841	83113
2	Keelaiyur	178.15	37704	38373	76077
3	Kilvelur	154.92	34910	35751	70661
4	Thirumarugal	177.62	43397	44124	87521
5	Thalainayar	144.18	30399	30781	61180
6	Vedaranyam	314.68	70357	70591	140948
7	Mayiladuthurai	238.75	81857	83128	164985

Sl. No	Block	Area (Km)	Male (Nos.)	Female (Nos.)	Total (Nos.)
8	Kuthalam	190.43	65169	67552	132721
9	Sembanarkoil	265.61	87357	90086	177443
10	Sirkazhi	189.54	63868	64900	128768
11	Kollidam	236.07	67804	70067	137871

**Source:** Census of India, 2011, District Census Handbook, Nagapattinam

#### 2.4.2 Literacy Rate

Average literacy rate of Nagapattinam in 2011 were 83.59 compared to 76.34 of 2001. If things are looked out at gender wise, male and female literacy were 89.79 per cent and 77.58 percent respectively. For 2001 census, same figures stood at 84.89 and 67.96 in Nagapattinam District. Total literate in Nagapattinam District were 1213008 of which male and female were 640916 and 572092 respectively. In 2001, Nagapattinam district had 996,580 literates. Overall, for a period of time the literacy rate has increased which shows the improved awareness. The data regarding the literacy in the district and across the blocks are given in the table 2.6 and 2.7.

**Table 2.6 Literacy Level in Nagapattinam District**

Description	No. of persons	Literacy rate %	
		2011	2001
Total	12,13,008	83.59	76.34
Male	6,40,916	89.79	84.89
Female	5,72,092	77.58	67.96

**Source:** Census of India 2011, District census handbook Nagapattinam

Among the blocks, Sembanarkoil (1,32,050 nos.), Mayiladuthurai (1,23,667 nos.), Vedaranyam (1,06,466 nos.) is having more literates of the total literate population, 12,13,008 nos.

**Table 2.7 Literacy Level of Nagapattinam District in block level**

S. No	Name of the Block	Persons	Male	Female
1	Nagapattinam	61,780	33,016	28,764
2	Keelaiyur	56,464	30,231	26,233
3	Kilvelur	52,279	27,893	24,386
4	Thirumarugal	65,076	34,663	30,413

S. No	Name of the Block	Persons	Male	Female
5	Thalainayar	43,690	23,637	20,053
6	Vedaranyam	1,06,466	57,863	48,603
7	Mayiladuthurai	1,23,667	65,639	58,028
8	Kuthalam	98,331	51,883	46,448
9	Sembanarkoil	1,32,050	69,578	62,472
10	Sirkazhi	92,475	49,456	43,019
11	Kollidam	97,091	51,388	45,703
	<b>Total</b>	<b>12,13,008</b>	<b>6,40,916</b>	<b>5,72,092</b>

*Source: Census of India 2011, District census handbook Nagapattinam*

### 2.4.3 Households

Of the total population, the households are 3,25,625 numbers in the district. There are cultivator households, scheduled caste households and schedule tribe households. Among 11 blocks in the district, Sembanarkoil, Mayiladuthurai and Vedaranyam block recorded the highest household (1,25,197 No's). The least number of households were in Thalainayar (16,494No's) and Kilvelur block (18,812No's). The total number of SC and ST households was 1,16,874 and 493 No's, respectively. The detail of households in the district was illustrated in the Table 2.8.

**Table 2.8 Block wise house hold details of the Nagapattinam district**

Sl. No	Name of the Block	Total	SC	ST
1	Nagapattinam	21355	8122	49
2	Keelaiyur	20569	7494	5
3	Kilvelur	18812	10326	54
4	Thirumarugal	22655	9677	45
5	Thalainayar	16494	5913	6
6	Vedaranyam	39774	8440	4
7	Mayiladuthurai	40905	16269	106
8	Kuthalam	33096	10706	18
9	Sembanarkoil	44518	14618	11
10	Sirkazhi	32528	12149	73
11	Kollidam	34919	13160	122

*Source: Census of India 2011, District census handbook Nagapattinam*

#### 2.4.4 Workers population

The total workers in the district were 6.72 lakhs. The work force details of the Nagapattinam district and across the block are presented in the Table 2.9 and 2.10. The district constitutes 4.86 lakhs of total main workers and 1.87 lakhs folks of marginal workers. It is accounted for 30.91 per cent of the total population who also engaged in other professionals. Of the total workers of the district, 72.37 per cent of worker population are main workers which include cultivators (8.08 per cent), agricultural labourers (32.20 per cent), household industry workers (1.18 per cent) and the marginal workers population contributes about 27.63 per cent. The non-workers population is about 944456 folks in the district. Overall, the district's major occupation is agriculture.

**Table 2.9 Workers Details in Nagapattinam District**

Sl. No	Category of workers	District		Tamil Nadu	
		Persons	% to total workers	Persons	% to total workers
1	Main workers				
	a) Cultivators	54329	8.08	5116039	18.40
	b) Agricultural labours	216353	32.20	8637630	30.98
	c) Household industry	7925	1.18	1499761	5.38
	d) Other workers	207721	30.91	12624852	45.29
2	Marginal Workers	185666	27.63		
	<b>Total Workers</b>	671994	100.00	27878282	100.00
3	Non Workers	944456		34527397	

**Source:** Census of India 2011, District census handbook, Nagapattinam

Across the 11 blocks, Sembanarkoil (75736 nos.), Mayiladuthurai (69607 nos.) and Vedaranyam (61591 nos.) constitutes more work force when compared to other blocks of the district. With respect to agricultural labours, Sembanarkoil, Mayiladuthurai and Kuthalam blocks contributes up to 78688 folks i.e. 36.61 per cent of the total.

**Table 2.10 Block wise workers details of Nagapattinam district**

Sl. No	Block	Total	Cultivator	Agricultural Labours	Household workers	Other workers	Marginal
1	Nagapattinam	34342	2489	9490	493	12183	9687
2	Keelaiyur	36316	3731	12758	278	5646	13903
3	Kilvelur	33878	2945	18013	329	5372	7219
4	Thirumarugal	39294	3377	18158	483	7926	9350
5	Thalainayar	29921	2470	10768	230	3965	12488
6	Vedaranyam	61591	11295	19004	411	10342	20539
7	Mayiladuthurai	69607	5424	24649	943	17075	21516
8	Kuthalam	54673	6637	25681	674	12320	9361
9	Sembanarkoil	75736	4871	28358	730	21361	20416
10	Sirkazhi	54999	3720	19182	596	13883	17618
11	Kollidam	58269	3951	19673	710	15468	18467
	Others	103816	2432	9193	1959	77349	12883
	<b>Total</b>	<b>652442</b>	<b>53342</b>	<b>214927</b>	<b>7836</b>	<b>202890</b>	<b>173447</b>

**Note:** Others include Sirkazhi (M), Vaitheeswarankoil (TP), Manalmedu (TP), Mayiladuthurai (M), Kuthalam (TP), Tharangambadi (TP), Tittacheri (TP), Nagapattinam (M), Manjakollai (CT) Poravacheri (CT) and Kilvelur (TP)

**Source:** Census of India 2011, District census handbook Nagapattinam

## 2.5 Topography

Temperature, in the district, varies between 24.6° C to 32.0° C. The normal rainfall in this district is 1367.4 mm against the state average of 974.6 mm. This high rainfall supplements the Cauvery water for the high water requirements of paddy, which is the main crop of this district. Sandy Coastal Alluvium is the predominant soil type. Cauvery and Vennar are the main rivers flowing in this district.

## 2.6 Soil type

The soil types of the district includes red loam, laterite, black, sandy coastal alluvium and red sandy soil. Sandy Coastal Alluvium and Black Soil types cover 88.71 per cent and 6.58 per cent respectively in the district. Other Soils in the district Comprises 4.71 percent.

The soils of the district are mainly identified as soil series 15. Nagapattinam is mainly constituted by Kalathur, Adhanur, Keelayur and Melakadu soil series which mainly



accounted for 56 per cent of the total area. The other major soil series are Kondal (7.46 %), Padugai (7.37 %), Valuthalagudi (6.69 %), Nedumbalam (4.07 %) and Kallivayal (3.74 %). The details of the area under different soil types are furnished in the Table 2.11.

**Table 2.11 Details of soil types in Nagapattinam district**

SI. No	Soil description	Area (Ha)
1.	Very deep, fine, montmorillonitic, Vertisols	60821.42
2.	Moderately deep, fine, mixed, Alfisols	36220.14
3.	Deep, fine, mixed, Inceptisols	33425.24
4.	Deep, fine, mixed, Alfisols	20700.00
5.	Deep, fine loamy, mixed, Alfisols	17916.18
6.	Very deep, fine, mixed, Entisols	10825.78
7.	Deep, fine, montmorillonitic, Vertisols	8527.05
8.	Very deep, fine loamy, mixed, Alfisols	6136.95
9.	Very deep, fine loamy, mixed, Inceptisols	5676.93
10.	Very deep, fine, kaolinitic, Alfisols	5238.77
11.	Moderately shallow, fine loamy, mixed, Inceptisols	4517.22
12.	Very deep, coarse loamy, mixed, Inceptisols	3355.98
13.	Very deep, coarse loamy, mixed, Entisols	3327.43
14.	Deep, fine loamy, mixed, Inceptisols	2155.33
15.	Deep, fine loamy, mixed, Ultisols	2012.75
16.	Deep, coarse loamy, mixed, Entisols	1751.73
17.	Deep, fine silty, mixed, Inceptisols	610.26
18.	Deep, contrasting particle size, mixed, Inceptisols	43.75

**Source:** Commodity potential report, TNAU, 2014

### 2.6.1 Soil Problems

The soil of the district is mostly alluvial but varies greatly in quality. The rich soil is found in the north and the south of the railway line between Mayuram and Thiruthuraippondi. The worst land in the delta is found in the Tirutturaippondi and Nagapattinam taluks where the soil is saline and drainage is very poor. The chief sources of irrigation in the district are the rivers, a few rainfed tanks and wells. These tanks and wells occur mostly in the upland regions. About 7.09% of the land is affected by water logging and marshy land and 56.21% are prone to floods. About 3.49% of the land available for

cultivation suffers from salinity/alkalinity and 17.69% of the land is coastal sand. Thus the land affected by soil problems constitutes about 84.48% of the total geographical area excluding forest area and area not available for cultivation.

**Table 2.12 Area under problem soils in Nagapattinam district**

S.No	Type	Problem	Area (in ha)
1.	Inland	Saline soils	9525
		Alkaline soils	1960
		<b>Total</b>	<b>11485</b>
2.	Coastal	Saline alkaline	18133

## 2.7 Climatic Condition and Rainfall

The district receives rainfall under the influence of both southwest and northeast monsoon. A good part of the rainfall occurs as very intensive storms resulting mainly from cyclones generated in the Bay of Bengal especially during northeast monsoon. The district receives rainfall almost throughout the year. This district receives rainfall in all the seasons which accounted for average of 1419 mm. The distribution of rainfall in Nagapattinam District is presented in the Table 2.13.

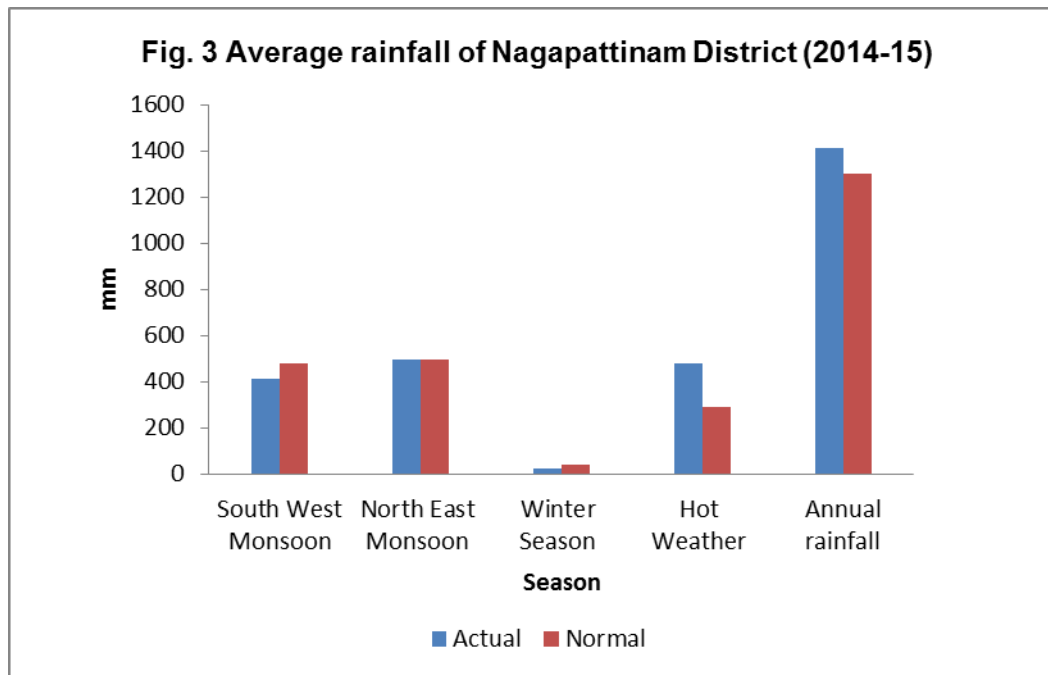
The normal average and season wise average rainfall of the district is presented in the Fig. 3 and 4. The district receives around 71.64 per cent of its normal annual rainfall from North East Monsoon which indicating more or less a unimodal rainfall pattern. South West Monsoon contributes just around 15.54 per cent of normal annual average rainfall.

**Table 2.13 Monthly Rainfall in Nagapattinam district in 2014-15**

Season / Month	2014-2015	
	Actual	Normal
<b>South West Monsoon</b>		
June	35	36.8
July	51.6	59.9
August	98.3	93
September	35.5	96.4
<b>Total</b>	<b>220.4 (15.54)</b>	<b>286.1</b>
<b>North East Monsoon</b>		
October	459.8	241.2

November	351.6	411.7
December	204.8	288.1
<b>Total</b>	<b>1016.2 (71.64)</b>	<b>941</b>
<b>Winter Season</b>		
January	19.8	62.6
February	0	23.1
<b>Total</b>	<b>19.8 (1.40)</b>	<b>85.7</b>
<b>Hot Weather</b>		
March	0.3	18.5
April	51.9	24
May	109.9	38
<b>Total</b>	<b>162.1 (11.43)</b>	<b>80.5</b>
<b>Annual rainfall</b>	<b>1418.5</b>	<b>1393.3</b>

**Source:** Season and Crop Report (2014-15), Department of Economics and Statistics, Government of Tamil Nadu. Figures in parentheses denote percentage to total annual rainfall.



### Season wise actual rainfall distribution (mm)

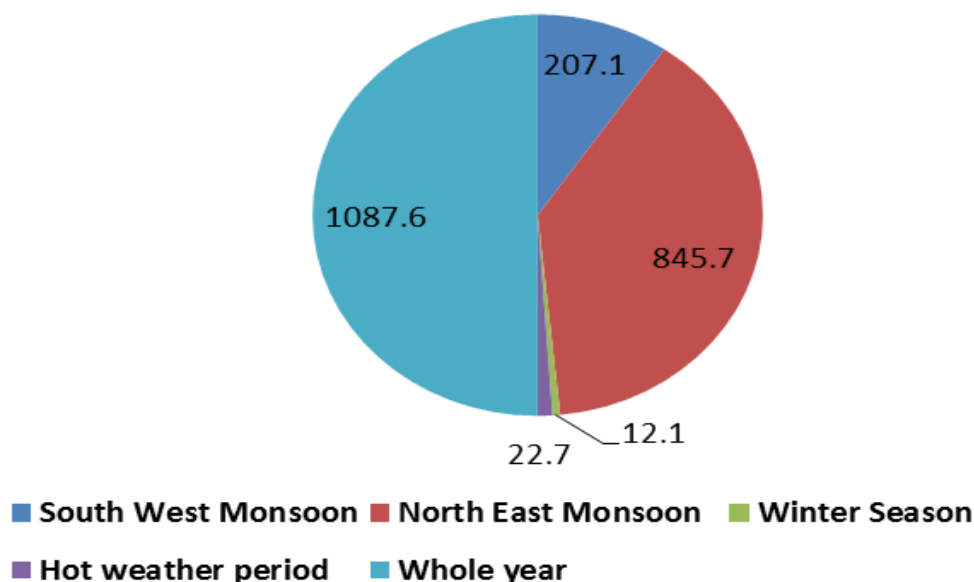


Fig. 4 Season wise actual rainfall distribution in Nagapattinam district during 2011-12

## 2.8 Land

### 2.8.1 Types of land

The nine-fold classification of the land use pattern is given in Table 2.15. The total geographical area of the district is 2,71,583 ha of which the net sown area (56.69 per cent) constituted more than half the total area, whereas the forests covered very meager area, 4633 ha i.e. 1.71 per cent of the total area. As per the National Forest Policy – 1988, the area under forest cover should be one – third of the total geographical area in order to maintain the ecological balance. However, the forest area in Nagapattinam district was far below the national goal of achieving the minimum area under forest. The area put to non – agricultural uses accounted for 17.58 per cent of the total area. The share of area under cultivable waste, current fallow and other fallow accounted for about 9.0 per cent of the total area and this would reveal that investment on land reclamation, strengthening of irrigation facilities and so on would facilitate the increase in either net sown area or are under forest.

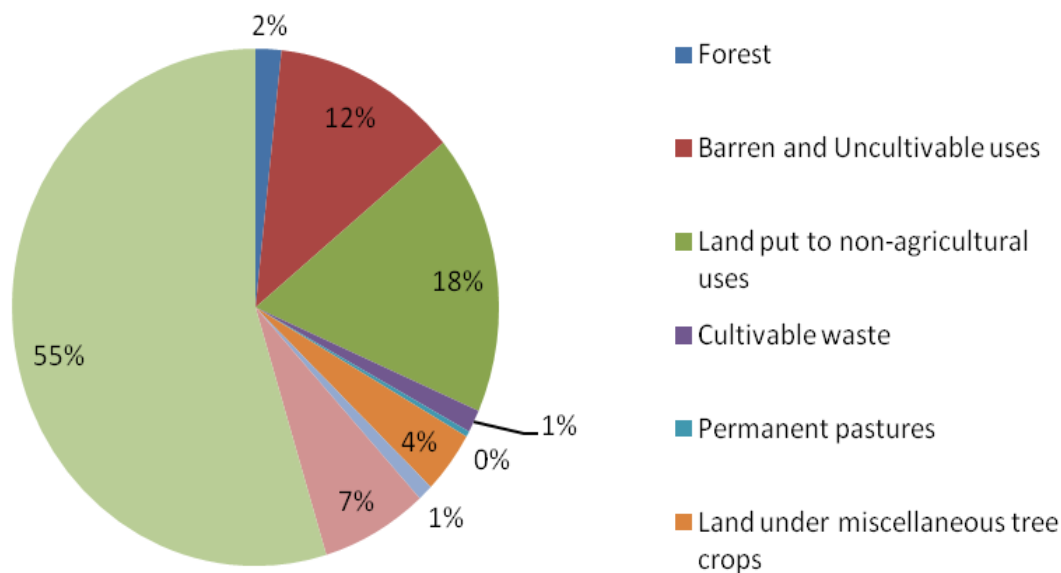
## 2.8.2 Land use pattern

In Nagapattinam district, more than half of its total geographical area is under the cultivation of crops. The land utilization pattern of Nagapattinam district furnished in Table 2.14. Fallow lands are increasing marginally over past three years. The land not available for cultivation, covering barren and uncultivable land and land put to non-agricultural uses, accounts for 29.88 per cent. The other uncultivated lands including permanent pastures and miscellaneous tree crops and groves not in the net area sown cover 2.62 per cent. The area coming under fallows including the current fallows constitute about 9.89 per cent. Area sown more than once constitutes around 119005 ha. The land use pattern of the district is depicted in the Fig. 5.

**Table 2.14 Land Use Pattern of Nagapattinam District (2014-15)**

Sl.No	Particulars	Area (ha)	per cent
1	Geographical Area	271583	100.00
2	Forest	4633	1.71
3	Barren & Unculturable Area	33418	12.30
4	Land Put to Non-agricultural Uses	47738	17.58
5	Permanent Pastures & Other grazing lands	846	0.31
6	Misc. tree crops & groves not incl. in the net area sown	6307	2.32
7	Current Fallow	9831	3.62
8	Other Fallow	17029	6.27
9	Net area sown	149687	55.12
10	Area sown more than once	119005	43.82
11	Gross area sown	268692	98.94
	<b>Total</b>	<b>928769</b>	

**Source:** Season and Crop Report (2014-15), Department of Economics and Statistics.



**Fig. 5 Land use pattern in Nagapattinam district**

The land use pattern among the blocks in the district is furnished in the Table 2.15. The geographical area of the blocks in the district is constituted with different land use pattern. In Nagapattinam district the area under forest is 4633 ha which comes under the blocks Vedaranyam, Thalainayar and Kollidam. Vedaranyam constitutes the major portion of the barren and uncultivable land i.e. 28428.07 ha of the district total 33418.43 ha. Cultivable wasteland is more in Keelaiyur block i.e. 661.68 ha of total 2097.65 ha. Efforts can be taken to bring this cultivable wasteland under cultivation so as to increase the production to meet out the growing demand and also to generate additional income to the farmers. The net sown area is more in Vedaranyam block i.e. 22937.26 ha, which is followed by Sembanarkovil (18018.87 ha), Mayiladithurai (16607.59 ha) and Kuttalam (14072.82 ha).

**Table 2.15 Block wise land use pattern in Nagapattinam district during 2014-15**

<b>Blocks</b>	<b>Forest</b>	<b>Barren and uncultivable</b>	<b>Land put to non agrl. uses</b>	<b>Cultivable waste</b>	<b>Pasture</b>	<b>Miscellaneous trees</b>	<b>Current fallow</b>	<b>Other fallow</b>	<b>Net sown area</b>
Nagapattinam	-	87.00	3516.15	295.63	21.00	236.40	986.59	879.13	6821.12
Thirumarugal	-	-	3610.00	62.09	69.95	159.66	1032.11	708.06	12706.14
Kilvelur	-	-	3587.61	183.14	40.35	368.70	360.13	242.44	12004.64
Keelaiyur	-	428.00	3538.76	661.68	51.00	826.64	2126.93	509.72	11393.27
Vedaranyam	2295.00	28428.07	6123.52	239.36	194.96	1159.80	1138.32	154.81	22937.26
Thalainayar	1236.00	3723.93	3710.00	83.71	36.02	844.94	1611.62	488.64	12305.06
Mayiladithurai	-	-	7227.62	10.54	103.24	454.99	420.75	1168.41	16607.59
Kuttalam	-	-	3650.20	-	84.50	219.87	473.96	1329.65	14072.82
Sembanarkovil	-	549.43	4045.14	270.42	116.30	542.77	775.16	2787.33	18018.87
Sirkazhi	-	100.00	5128.88	168.55	58.20	751.43	636.64	1563.11	12538.45
Kollidam	1102.00	102.00	3587.86	122.54	70.81	881.17	724.74	3188.93	13703.20
<b>District total</b>	<b>4633.00</b>	<b>33418.43</b>	<b>47725.73</b>	<b>2097.65</b>	<b>846.31</b>	<b>6446.35</b>	<b>10286.92</b>	<b>13020.22</b>	<b>153108.39</b>

*Source: Commodity potential report, TNAU, 2015*

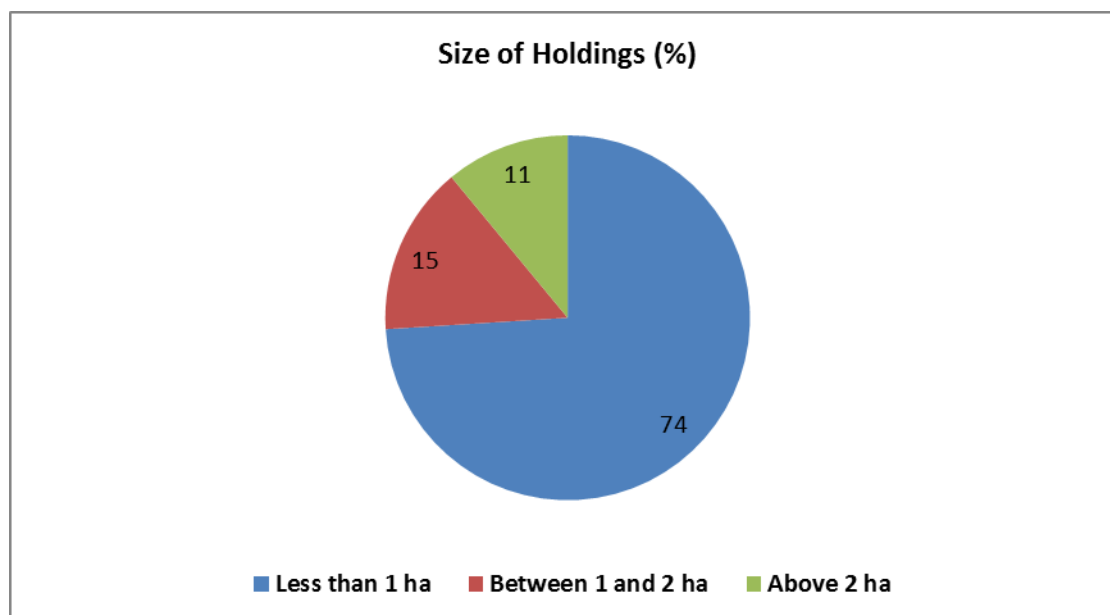
### 2.8.3 Land holding pattern

The distribution of farm holdings exhibited the same patterns found in the national and state trend. Around two third of the total number of holdings were of marginal size with less than 1 hectare. Large size holdings (more than 2 ha) were occupied a share of around 10 percent. The detail on size of holdings and distribution is given in Table 2.16 and Fig. 6.

**Table 2.16 Size of Holdings and distribution in Nagapattinam distribution (2014-15)**

S. No	Classification	Number	Percentage (%)
1.	Less than 1 ha	146357	74
2.	Between 1 and 2 ha	29083	15
3.	Above 2 ha	21055	11
	<b>Total</b>	<b>196495</b>	<b>100</b>

*Source: Commodity potential report, TNAU, 2015*



**Fig. 6 Distribution of size wise land holdings in Nagapattinam district**

The number and area of operational land holdings based on different categories and block wise land holdings are given in Table 2.18 and 2.19. The total land holdings by SC, ST, others and institutions are 22456.08, 0.36, 130321.58 and 1006.37 ha of the total land of 153784.39 ha. From the table 2.17, it can be inferred that in all the blocks land fragmentation is very common. However, in all cases, the operational land holding is more between 0.5 to 3.0 ha. This indicates the status of land fragmentation in the district, because of which the mechanization is impossible.



**Table 2.17 Number and area of operational holdings in Nagapattinam district in 2014-15**

Size class (ha)	Number of operational holdings					Area operated (ha)				
	SC	ST	Others	Institutional	Total	SC	ST	Others	Institutional	Total
< 0.5	23970	1	75728	60	99759	6501.04	0.36	19351.86	11.03	25864.29
0.5-1.0	10082	-	40993	16	51091	7151.57	-	29336.26	10.79	36498.62
1.0-2.0	4583	-	27129	21	31733	6257.89	-	38590.48	30.73	44879.10
2.0-3.0	615	-	7123	25	7763	1459.59	-	17137.61	59.71	18656.91
3.0-4.0	131	-	2638	8	2777	451.42	-	9171.85	26.87	9650.14
4.0-5.0	68	-	1181	7	1256	297.67	-	5254.24	31.99	5583.90
5.0-7.5	34	-	965	4	1003	205.19	-	5762.61	26.39	5994.19
7.5-10.0	7	-	299	8	314	53.93	-	2560.06	69.94	2683.93
10.0-20.0	4	-	167	9	180	53.33	-	2149.86	127.63	2330.82
>20.0	1	-	27	14	42	24.45	-	1006.75	611.29	1642.49
<b>Total</b>	<b>39495</b>	<b>1</b>	<b>156250</b>	<b>172</b>	<b>195918</b>	<b>22456.08</b>	<b>0.36</b>	<b>130321.58</b>	<b>1006.37</b>	<b>153784.39</b>

Source: Commodity potential report, TNAU, 2015

**Table 2.18 Details of land holding pattern in the blocks of Nagapattinam district (2013-14)**

S. No	Size class (ha)	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11
1.	Upto 0.5	300	500	20	30	200	500	100	60	500	300	600
2.	0.5-1.0	20	200	4	10	60	100	10	5	200	50	300
3.	1.0-2.0	10	20	2	4	20	60	2	1	100	10	60
4.	2.0-3.0	2	10	1	1	10	20	0	0	40	5	15
5.	3.0-4.0	1	5	0	0	5	10	0	0	10	2	2
6.	4.0-5.0	-	-	-	-	-	-	-	-	-	-	-
7.	5.0-7.5	-	-	-	-	-	-	-	-	-	-	-
8.	7.5-10.0	-	-	-	-	-	-	-	-	-	-	-
9.	10.0-20.0	-	-	-	-	-	-	-	-	-	-	-
10.	20.0 & Above	-	-	-	-	-	-	-	-	-	-	-

Source: O/o, Joint Director of Agriculture, Nagapattinam

B1-Nagapattinam, B2-Keelaiyur, B3-Kilvelur, B4-Thirumarugal, B5-Thalainayar, B6-Vedaranyam, B7-Mayiladuthirau, B8-Kuthalam, B9-Sembanarkoil, B10-Sirkazhi, B11-Kollidam.

## 2.9 Sources of Irrigation

The district is situated in the deltaic region of the famous river Cauvery and criss-crossed by lengthy network of irrigation canals. Kollidam river forms the northern boundary of the district, whereas Arasalar, Tirumalairajanar, Vettar and Vennar rivers drained the other parts of it. These all rivers are tributaries and branches of the river Cauvery. Nearly canals serve 80 percent of the total net area irrigated and only the river Cauvery feeds these canals. The Cauvery Delta system is the most ancient of all irrigation schemes in the undivided Thanjavur. This comprises mainly of three important projects. They are the famous Grand Anicut, the Upper Anicut and the Cauvery Vennar Regulator Project.

The entire area of cropping has been irrigated by the canal source and sources like open and bore wells irrigate very meager amount of area at around 0.5 per cent of the net irrigated area. Irrigation intensity was very less at around 124 per cent as the result of non-availability of other sources of irrigation and the duration water availability in the canals. The the district and block wise details regarding sources of irrigation of area irrigated by canals in the district is given in the Table 2.19 and 2.20. The net irrigated area under canal irrigation is totally 1.20 Lakh ha in the district.

**Table 2.19 Sources of irrigation in Nagapattinam district (2014-15)**

(in ha)

Sl.No.	Particulars		2012-13	2013-14	2014-15	Average
1	Canals	Gross	133466	148838	152427	144910.33
		Net	118077	122484	119797	120119.33
2	Supplementary wells	Gross	16360	24356	29676	23464.00
		Net	15255	20996	27513	21254.67
3	Other Sources	Gross	837	494	718	683.00
		Net	777	476	706	653.00

**Source:** Season and Crop Report (2014-15), Department of Economics and Statistics.

**Table 2.20 Block-wise net area irrigated by canal (2014-15)**

<b>S. No</b>	<b>Block</b>	<b>Canals (ha)</b>
1.	Nagapattinam	6915
2.	Thirumarugal	12213
3.	Kilvelur	12062
4.	Keelaiyur	10178
5.	Vedaranyam	545
6.	Thalainayar	12208
7.	Myladuthurai	15236
8.	Kuthalam	13966
9.	Sembanarkoil	17275
10.	Sirkazhi	13003
11.	Kollidam	11487
	<b>Total</b>	<b>125088</b>

*Source: Commodity Potential Report, TNAU, 2015*

## 2.10 Cropping pattern

Paddy, black gram and green gram are the major crops growing in the district. Besides other crops like Ground nut, coconut, gingelly, sugarcane and mango are also grown in the district. The details of the cropping pattern are furnished in the Table 2.21.

**Table 2.21 Area, production and productivity under major crops in Nagapattinam district(Triennium average ending 2014-15)**

<b>Sl.No</b>	<b>Particulars</b>	<b>Area (in ha)</b>	<b>Production (in tonnes)</b>	<b>Productivity (in t/ha)</b>
1	Paddy	152153.00	462281.33	3.04
2	Maize	27.00	153.33	5.67
3	Cholam	19.67	25.00	1.27
4	Cumbu	5.33	11.33	2.12
5	Red Gram	0.33	0.33	1
6	Black Gram	39824.00	26268.67	0.65
7	Green Gram	35350.67	21429.67	0.60
8	Groundnut	1714.33	5330.67	3.10
9	Gingelly	796.00	214.67	0.26
10	Cotton	1840.33	7473.00	4.06
11	Coconut	3812.67	546.00	0.14
12	Sugarcane	2986.33	274664.00	91.97

13	Tobacco	148.00	178.67	1.20
14	Onion	3.33	38.67	11.61
15	Brinjal	153.67	1391.33	9.05
16	Bhendi	59.33	438.33	7.38
17	Banana	586.67	23228.00	39.59
18	Mango	2975.67	12483.33	4.19
19	Jack Fruit	7.33	93.00	12.68
20	Pine Apple	2.00	55.67	27.83
21	Guava	11.00	67.67	6.15
22	Chillies	32.00	13.33	0.42
23	Turmeric	2.33	9.00	3.86
24	Tamarind	419.00	953.00	2.27
25	Tapioca	107.33	3463.00	32.26
	<b>Total</b>	<b>243037.33</b>	<b>840811.00</b>	<b>272.47</b>

*Source: Season and Crop Report (2014-15), Department of Economics and Statistics.*

The Block wise details about area, production and productivity of the horticultural crops cultivated in the district is furnished in the table 2.22. Mango, Banana, Cashew, Jasmine, Cassava, Bhendi and Brinjal are the major crops cultivated in the district. From the table it could be inferred that, the area under mango is more in Vedaranyam i.e. 1421 ha with a productivity of 6 tonnes/ha, which is followed by Keelaiyur which covers an area of about 547 ha. Banana is cultivated in an area of about 244 ha in Sembanarkoil block with productivity of 44 t/ha is the highest among the blocks. Vedaranyam block also has more area under Cashew (842 ha) and Jasmine (192 ha).

**Table 2.22 Details of area, production & productivity of major horticultural crops in the blocks (2013-14)**

S. No	Major crops	B1			B2			B3		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
1.	Mango	175.0	1034.3	5.90	547.0	3282.00	6.00	5.0	25.0	5.0
2.	Banana	20.0	830.6	41.50	8.00	320.00	40.00	0.0	0.0	0.0
3.	Cashew	0.0	0.00	0.40	127.00	63.50	0.50	0.0	0.0	0.0
4	Jasmine	13.0	131.00	10.10	7.00	70.00	10.00	7.0	63.0	9.0
5	Cassava	0.0	0.00	0.00	0.00	0.0	0.00	0.0	0.0	0.0
6	Bhendi, brinjal	5.0	44.90	9.00	51.0	408.00	8.00	5.0	35.0	7.0

**Contd.,**

S. No	Major crops	B4			B5			B6		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
1.	Mango	5.0	25.0	5.0	335.0	2010.0	6.0	1421.0	8526.0	6.0
2.	Banana	5.0	200.0	40.0	5.0	195.0	39.0	35.0	1435.0	41.0
3.	Cashew	0.0	0.0	0.0	83.0	66.4	0.8	842.0	505.2	0.6
4	Jasmine	0.0	0.0	10.0	10.0	100.0	10.0	190.0	1900.0	10.0
5	Cassava	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0.0
6	Bhendi, brinjal	3.0	24.0	8.0	1.0	7.5	7.5	8.0	64.0	8.0

Contd.,

S. No	Major crops	B7			B8			B9		
		Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
1.	Mango	67.0	402.00	6.00	35.00	210.00	6.00	153.00	918.00	6.00
2.	Banana	80.0	3280.00	41.00	62.00	2480.00	40.00	244.00	9760.00	40.00
3.	Cashew	21.0	16.80	0.80	0.00	0.00	0.00	19.00	13.30	0.70
4.	Jasmine	22.0	220.00	10.00	0.00	0.00	0.00	11.00	121.00	11.00
5.	Cassava	6.0	174.00	29.00	0.00	0.00	0.00	42.00	1176.00	28.00
6.	Bhendi, brinjal	49.0	392.00	8.00	11.00	88.00	8.00	54.00	486.00	9.00

Contd.,

S. No	Major crops	B10			B11		
		Area	Production	Productivity	Area	Production	Productivity
1.	Mango	86.00	516.00	6.00	384.00	2304.00	6.00
2.	Banana	52.00	2132.00	41.00	36.00	1440.00	40.00
3.	Cashew	2.00	1.20	0.60	499.00	349.30	0.70
4.	Jasmine	4.00	40.00	10.00	65.00	650.00	10.00
5.	Cassava	60.00	1740.00	29.00	60.00	1800.00	30.00
6.	Bhendi, brinjal	108.00	918.00	8.50	70.00	560.00	8.00

Source: O/o Deputy Director of Horticulture, Nagapattinam

B1-Nagapattinam, B2-Keelaiyur, B3-Kilvelur, B4-Thirumarugal, B5-Thalainayar, B6-Vedaranyam, B7-Mayiladuthirau, B8-Kuthalam, B9-Sembanarkoil, B10-Sirkzhi, B11-Kollidam.

## 2.12 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 2.23. From the table it could be observed that the nitrogenous fertilizer consumption was high (41246 MT) followed by phosphatic fertilizer (12037MT) in the district. Pesticide used in the form of dust was 88.0 M.T and in liquid form was 52 litres.

**Table 2.23 Consumption of Chemical Fertilizers and Pesticides during 2014-15**

Fertilizers (MT)				Pesticides	
Nitrogenous (N)	Phosphatic (P2 O5)	Potassic (K2 O)	Total (NPK)	Dust (in M.T.)	Liquid (in Lit.)
41246.00	12037.00	7049.00	60332.00	88.00	52.00

*Source: Joint Director of Agriculture, Nagapattinam*

## 2.13 Agricultural 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 the district are given in Table 2.24.

**Table 2.24 Agricultural Implements and Machinery in Nagapattinam district (2014-15)**

<b>Facilities</b>	<b>Numbers</b>
Number of regulated markets	8
Number of farmers markets	3
Agmark labs	Nil
<b>Facilities available in Nagapattinam Regulated Markets</b>	
Own land	3
Godown	5
Rural godown	5
Transaction shed	2
Rural business hub	--
Drying yard	6
Automatic weighing and bagging machine	-
Farmers rest shed	--
Sanitary facilities	5
Drinking water facilities	7

## **2.14 Regulated Markets**

There are two main regulated markets in the district at Kadampadi (Nagapattinam) and Mayiladuthurai respectively. Some of the principal crops marketed are paddy, rice, blackgram and greengram. During 1997-98, 1286.4 tonnes of paddy arrived in these regulated markets and 1445.5 tonnes during 1996-97. Similarly 1671.1 tonnes of paddy arrived during 1997-98 and 1773 tonnes during 1996-97. 776 tonnes of black gram arrived during 1996-97. Similarly 824 tonnes of green gram arrived during 1997-98 and 512 tonnes during 1996-97. Apart from these, weekly markets are located in a number of places in the district where mostly vegetables, fish and groceries are marketed. The list of regulated markets present in the district and the details of the commodities transacted in those



regulated markets are provided in the table 2.25 and 2.26. Moreover three farmers market is available in the district at Mayiladuthurai, Nagapattinam and Sirkazhi.

**Table 2.25 List of regulated market**

<b>S. No</b>	<b>Regulated Market</b>
1	Kilvelur
2	Kuttalam
3	Mayiladuthurai
4	Nagapattinam
5	Sembanarkoil
6	Sirkazhi
7	Vedaranayam
8	Thirupoondi

**Table 2.26 Quantity and Value of Commodities Transacted in six Regulated Markets of Nagapattinam District during 2014-15**

<b>Sl. No.</b>	<b>Quantity of arrivals</b>		<b>Receipts(Rs. Lakhs)</b>
	<b>Product</b>	<b>Quantity (MT)</b>	
1	Paddy	27682.883	3000.95
2	Black gram	251.027	112.82
3	Green gram	198.29	95.79
4	Red gram	5.365	3.21
5	Ground nut kernels	89.449	26.32
6	Cotton	497.636	173.85
7	Chillies	1.828	1.28
8	Tobacco	291.129	50.68

**Table2.27 Farmers markets available in Nagapattinam district**

<b>S. No</b>	<b>Farmers Market</b>
1	Mayiladuthurai
2	Nagapattinam
3	Sirkazhi

## 2.15 Storage Facilities

Nagapattinam district consists of seven storage godowns and two is under progress with a capacity of 3800 MT and 4000 MT, respectively (Table 2.28).

**Table 2.28 Storage infrastructure facilities available in Nagapattinam district**

Sl. No	Particulars	No	Capacity (MT) / Area(Sqm)
1	Storage Godown (completed)	7	3800
2	Storage Godown (under progress)	2	4000
3	Cold Storage	-	-
4	Agri Business Centre	-	-
5	Collection centre	-	-
6	Rural Business Hub	-	-
7	Ripening chamber	-	-
8	Market complex with cold storage	-	-
9	Market complex	-	-
10	Drying yard	105	42000

## 2.16 Animal husbandry

The total livestock population in Nagapattinam district is presented in Table 2.29.

**Table 2.29 Livestock population in Nagapattinam district**

(Numbers)		
Sl. No.	Particulars	Population
1	Cattle	266267
2	Buffaloes	12080
3	Sheep	7335
4	Goats	435039
5	Horses and ponies	50
6	Donkeys	7
7	Camels	1
8	Pigs	1153
	<b>Total Livestock</b>	<b>721932</b>
9	Dogs	42928
10	Rabbits	711
	<b>Poultry</b>	
11	Bank yard Poultry	279817
12	Farm Poultry	8837
	<b>Total Poultry</b>	<b>288654</b>

Source: 19<sup>th</sup> Livestock Census, 2012.

The livestock population in Nagapattinam district is presented in table 2.29. Of the total livestock in Nagapattinam district, goat population was highest (435039 No.) followed by cattle (266267 No.) and buffalo (12080 No.). Total poultry population was 288654 No.. The detail of livestock population is presented in Table 2.29.

### 2.16.1 Livestock population

The block wise livestock population in the district is presented in the Table 2.30.

**Table 2.30 Livestock population block wise**

S. No.	Livestock	Kollidam	Kuttalam	Mayiladuthurai	Sembanarkoil	Sirkazhi	Keelaiyur
1	Cattle	25140	28941	22561	29437	21111	11260
2	Buffalo	2385	343	1512	940	758	669
3	Sheep	918	0	372	151	803	1326
4	Goat	24128	31824	30245	41131	26079	37781
5	Pigs	79	246	89	262	85	138
6	Poultry	22106	32323	22587	33868	23041	15213
7	Others	0	0	0	0	0	0

*Source: TANUVAS, Chennai*

### 2.16.2 Veterinary institutions and hospitals

The detail on the infra-structure facilities available in the district is presented in the Table 2.31.

**Table 2.31 Veterinary Infrastructure facilities in Nagapattinam district**

<b>S. No.</b>	<b>Details</b>	<b>Kollidam</b>	<b>Kuttalam</b>	<b>Mayiladuthurai</b>	<b>Sembanarkoil</b>	<b>Sirkazhi</b>	<b>Keelaiyur</b>
1	Dairy co-operative Society	Yes	Yes	Yes	Yes	Yes	Yes
2	Veterinary clinics	Yes	Yes	Yes	Yes	Yes	Yes
	a. Veterinary Hospital	-	-	-	-	-	-
	b. Veterinary Dispensary	-	-	-	-	-	-
	c. Sub Centre	-	-	-	-	-	-
	d. Profile unit	-	-	-	-	-	-
	e. RVD	-	-	-	-	-	-
3	Milk Collection Centre	Yes	Yes	Yes	Yes	Yes	Yes
	a. Bulk Milk Cool	-	-	-	-	-	-

## 2.17 Banking and Insurance

Banking sector should cater to the short and long term credit needs of farmers, especially marginal and small farmers, so as to facilitate them in procuring the required farm inputs at appropriate time. The regulated markets and co-operative marketing societies are required to create adequate infrastructural facilities like, grading, packing and storing the produces at different production centres of the district. It is also suggested that the farmers are to make use of the several benefits such as subsidized seeds, fertilizers, plant protection chemicals, machineries and tools, extended through various agricultural development programmes. They should also come forward to adopt the new/modern agricultural practices and technologies developed by the agricultural research institutes. The details of banks in Nagapattinam district are presented in Table 2.32.

**Table 2.32 Details of banks present in Nagapattinam District**

S. No.	Bank	Nos.	Blocks
1.	Canara Bank	11	Kilvelur, Manganallur, Mayiladuthurai, Nagapattinam, Keelaiyur, Valivalam, Kariapattinam, Kuruvapulam, Thethakudi, Vedaranyam, Sirkazhi
2.	Central Bank Of India	2	Mayiladuthurai, Nagapattinam
3.	City Union Bank	10	Tirupoondi, Kuthalam, Mayiladuthurai, Nagapattinam, Nagore, Tirumagal, Poraiyar, Sembanar Koil and Vedaranyam, Sirkazhi
4.	Indian Bank	18	Kilvelur, Mannapandal, Kali (2), Korainadu, Mayiladuthurai, Nagapattinam (2), Nagore, Thittachery, Kollidam, Melasalai, Sirkali (2), Tharangambadi, Ettugudi, Kallimedu, Vedaranyam And Voimeda
5.	Indian Overseas Bank	36	Velankanni, Vilundamavadi, Kilayanur, Kuthalam, Kuttalam, Therezhundur, Thiruvaduthurai, Elanthangudi, Manalmedu, Mayiladuthurai (2), Nidur, Nagapattinam, Enangudi, Kankalancheri, Nagapattinam, Nagore, Pakkam-Kottur, Sikkal, Thandalai, Thenmangalam-Azhiyur, Thittachery, Vadakarai, Punganur, sirkali, Thirumullaivasal, Sirkali- Vaitheeswaran Koil, Tharangambdi - Akkur, Tharangambdi - Kaveripoopattinam, Tharangambdi - kiliyanur, Tharangambdi - Sankaranpandal, Tharangambdi -Sembanurkoil, Tharangambdi - Thirukalacheri, Vedaranyam - Ayyakaranpulam, Vedaranyam - Thopputhurai (2)
6.	Pandiyan Grama bank	5	Kilvelur – Thirupoondi, Nagapattinam – Keezha

S. No.	Bank	Nos.	Blocks
			Sannanallur, Nagapattinam, Nagapattinam – Perambalur, Vedaranyam - Thalanayar
7.	State bank of India	9	Kilvelur – Koothur, Kuthalam, mayiladuthurai, Nagapattinam (2), Sirkali – Puthupattinam, Sirkazhi, Sirkazhi – Thiruvankadu, Thirukuvalai
8.	Syndicate bank	2	Kilvelur – Velankanni, Nagapattinam
9.	Bank of baroda	2	Mayiladuthurai, Thirukkuvalai - Thalanayar
10.	Ing vysya	1	Mayiladuthurai
11.	Lakshmi vilas bank	3	Mayiladuthurai, Nagapattinam, Tharangambadi - Thirukadaiyur
12.	Punjab national bank	4	Mayiladuthurai, Nagapattinam, Nagapattinam - Sembian Mahadevi, Sirkazhi - Puthur
13.	Tamil Nadu mercantile bank ltd	3	Mayiladuthurai, Nagapattinam, Sirkazhi
14.	Union bank of India	2	Mayiladuthurai, Nagapattinam
15.	Vijaya bank	2	Mayiladuthurai, Nagapattinam
16.	Axis bank	1	Nagapattinam
17.	Bank of India	2	Nagapattinam, sirkazhi - kadavasal
18.	Corporation bank	1	Nagapattinam
19.	HDFC bank ltd.	2	Nagapattinam, Sirkazhi
20.	ICICI bank	2	Nagapattinam, Sirkazhi
21.	Karur Vysya Bank	2	Nagapattinam, Thirukuvalai - Neermulai
22.	Oriental bank of commerce	1	Nagapattinam
23.	South Indian bank	1	Nagapattinam
24.	UCO bank	1	Nagapattinam
25.	State bank of Travancore	1	Vedaranyam

## 2.17 Co-operation

A co-operative society is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. These societies are there to ensure the financial aids as loans for the common people. There are 122 Primary Agricultural Cooperative Banks, 3 Primary Co-op Agri. & Rural Development. Bank, 3 Cooperative Marketing societies, 25 Employees Co-op Credit societies, 7 Primary Cooperative Stores, 2 Urban Co-op Bank, 83 Student's Cooperative Stores, 1 Cooperative Union, 1 Salt Producer

Cooperative Society, 1 Cooperative Whole sale store, 2 Cooperative Urban Banks and 16 Other type Societies in this district (Table 2.33).

### **Primary Agricultural Co-Operative Banks**

The organization of Cooperative System in Tamil Nadu is integrated vertically on the basis of functional responsibilities viz., the Primary Agricultural Cooperative Banks at the base level the District Central Cooperative Banks in the middle level and the State Cooperative Bank at apex level. The Primary Societies at the base are in general multipurpose in character. But in a large number of cases they deal mainly with credit. There are 122 Primary Agricultural Cooperative Credit Societies in the Nagapattinam District lending short term and medium term agricultural credit to farmers dealing in seasonal agricultural operations.

### **Primary Cooperative Agricultural Rural Development Bank**

An unique feature of the Agricultural Cooperative Banking in our country is the organization of separate institutions for providing long term loans, on the mortgage of loaded property. To issue especially long-term loans, an independent agency viz., Primary Cooperative Agricultural and Rural Development Banks are established. In Nagapattinam District, three Primary Cooperative Agricultural Rural Development Banks are functioning one each at Vedaranyam, Sirkazhi, and Mayiladuthurai. Total number of members is 30,298 Out of this 1861 belong to Scheduled Castes. The Share Capital Collection from members was Rs. 149.76 lakhs as on 31.3.2002.

The purpose of loans issued by the Primary Cooperative Agricultural Rural Development Bank is for Minor Irrigation, Farm Mechanization, NFS activities and Animal Husbandry etc. During the year 2001-2002 a sum of Rs. 475.36 lakhs have been disbursed by the three Primary Cooperative Agricultural and Rural Development Banks for the purposes mentioned above.

### **Agricultural Producers Cooperative Marketing Societies**

The main objective of an Agricultural producers Cooperative marketing Society is to provide an outlet for profitable marketing of the produce of the grower members, so as to minimize their dependence on open market forces, especially the Private traders. The other

objectives include distribution of fertilizers, pesticides and agricultural implements and issue of produce pledge loan etc.

In the Nagapattinam District, three Agricultural Producers Cooperative Marketing Societies are functioning one each at Vedaraniyam, Sirkali and Mayiladuthurai. Total number of members was 7515 as on 31.3.2002. Out of this 1089 members belong to Scheduled Castes. Total Share Capital Collocated from members was Rs. 15.91 lakhs as on 31.3.2002. During the year 2001-2002 the total value of agricultural produce marketed through the societies was Rs. 131.71 lakhs.

### **Primary cooperative stores**

There are seven Cooperative Stores functioning in Nagapattinam District. The main functions of the Primary Cooperative Stores are sale of controlled and non-controlled commodities through their retail outlets. During the year 2001-2002 controlled commodities amounting to Rs. 163.80 lakhs and non-controlled commodities amounting to Rs. 17.63 lakhs have been sold by the Primary Cooperative Stores.

### **Employees cooperative thrift and credit societies:**

There are 25 Employees cooperative Societies functioning in Nagapattinam District. This type of Societies are serving for the benefit of salary earners to enable them to avail surety loan, consumer loan, based on their share capital and gross salary and on able Individual maximum borrowing power as fixed by Registrar of Cooperative Societies from time to time, The working fund of these societies depends mainly upon the member's thrift deposit and share capital.

### **Consumer Cooperative Wholesale Store**

In the Nagapattinam District, the Mayiladuthurai Consumer Cooperative Wholesale store is functioning. The main function of this institution is supplying essential commodities for the Public Distribution System as lead society in the Nagapattinam District.



### **Salt Producers Cooperative Production and Marketing Society**

In the Nagapattinam District the Vedaranyam salt Producer Cooperative Production and Marketing society is a special type of society. This special type of society is formed for the welfare of salt producers. Out of 236 acres of Saltpan of Central Salt Department 188 acres of land is handed over to 188 members for the purpose of production of edible salt. The salt produced by members is procured by the society and sold to the other Cooperative Institutions. The Society is collecting Rs. 300/- P.A. Per acre of saltpan from members. The society has earned Rs. 0.23 Lakhs as profit for the year ending 31.3.2002.

### **Urban Cooperative Banks**

There are two cooperative urban banks functioning in Nagapattinam District. One is at Mayiladuthurai and the other at Sirkazhi. The banks have 15863 members and 1080 belong to scheduled castes. These banks have deposits of Rs. 6374.11 lakhs and cater to the needs of urban people. Jewel loan, housing loan, professional loan, surety loan, mortgage loan, loan to weaker sections, micro credit loans are issued by these banks. During the year 2001-2002 all type of loans are issued through the banks which amount to Rs. 3,212.52 lakhs. Both the banks are coming under banking regulation act and have got license from Reserve Bank of India. The two cooperative urban banks are working on profit and have been declaring dividend at 14% every year for the past 15 years.

### **Students Cooperative Stores**

There are 83 Students Cooperative Stores functioning in the educational institutions to supply stationery and other requirements of the student community in the district.

### **District Cooperative Union**

In the Nagapattinam District, the Nagapattinam District Cooperative Union is functioning. The main purpose of the Cooperative Union is promoting cooperative Education and training. The District Cooperative Union is conducting members education programme periodically at village level and creating awareness about cooperative principles and benefits accruing to public of Cooperative movement.

## Public Distribution System

Another important function of the Cooperative Department and the Cooperative institutions are running Fair Price Shops. In the Nagapattinam District 636 Public Distribution System outlets are run by the cooperative societies. The total number of cards attached to these shops is more than 3.35 lakhs. Distribution of essential commodities such as rice, sugar, and kerosene for cardholders, old age pensioners, Anthodia Anna Yojana Scheme SGRY rice, free rice to small and marginal farmer beneficiaries are the main function of these shops. The Public Distribution System shops run by the coops are distributing every month 4500 MT of rice, 350 MT of sugar and 950 K.L. of Kerosene in the Nagapattinam District.

Besides, as a Government policy these shops are also selling dhoties and sarees, tea and salt to general public. In addition they above shops are also selling non-controlled items of groceries soaps etc., purchased from wholesale stores.

**Table 2.33 Co-operative Institutions Functioning in Nagapattinam District**

S. No.	Type of societies	Nos.
1	Primary Agricultural Cooperative Banks	122
2	Primary Cooperative Agricultural Rural Development Bank s	3
3	Cooperative Marketing societies	3
4	Employee's Cooperative Societies	25
5	Primary Cooperative Stores	7
6	Urban Cooperative Credit Societies	2
7	Student's Cooperative Stores	83
8	Cooperative Union	1
9	Other type Societies	16
10	Salt Producer Cooperative Society	1
11	Cooperative Whole sale store	1
12	Cooperative Urban Banks	2

## 2.19 Industries

There are 500 industrial units situated in the district, of which 40 industries are only agro based industry. The details of industries present in Nagapattinam district are furnished in the table 2.34.

**Table 2.34 Details of existing Micro & Small Enterprises and Artisan Units**

Type of industry	Number of units as on 31.03.2012	Units registered during		
		2012-13	2013-14	2014-15
Agro based	1219	11	13	40
Soda water	160	-	-	-
Cotton textile	38	3	4	13
Woolen, silk & artificial Thread based clothes	65	-	-	-
Jute & jute based	1	-	-	-
Ready-made garments & embroidery	1410	5	5	217
Wood/wooden based furniture	363	5	6	12
Paper & Paper products	399	1	9	32
Leather based	139	-	1	-
Chemical/Chemical based	268	1	4	18
Rubber, Plastic & petro based	290	3	1	3
Mineral based	204	3	-	32
Metal based (Steel Fab.)	69	2	7	3
Metal Products and Parts	559	15		22
Machinery Parts and Electrical Machinery	344	5		10
Electrical machinery and Parts	279	3	4	4
Transport equipment and parts	274	1		2
Other Manufacturing Industries	1930	14	5	13
Construction				13
Repair of Motor Vehicles				1
Other Service enterprises		14	30	62
	8011	95	98	500

*Source: DIC Nagapattinam(Brief Industrial Profile of Nagapattinam District)*

## 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 12<sup>th</sup> Plan period (2015-16)
- ii. Yield gap analysis for the major crops

#### 3.1 Trends in area, production and productivity of major crops

The compound growth rate is worked out for the selected crops for 15 years from 2000-01 to 2014-15 and projection is made up to 2023. The compound growth rate was calculated for area, production and productivity for major crops using following formulae. The CGR measures the annual growth of any variable over a period of time and it is expressed in percentage.

$$Y_t = ab^t$$

It is estimated by fitting a semi-log equation of the following form.

The logarithmic form of the above equation is :  $\ln Y = \ln a + t \ln b$  (or  $\log Y_t = \log a + t \log b$ )

Where,

Y	=	Time series data of Area, Production & Yield of Sugarcane
t	=	Number of years varies from the value 1,2,3...n
a	=	Intercept or constant coefficient
b	=	Regression coefficient of t
r	=	Compound Growth Rate

The value of b is computed by using OLS method. Further the value of CGR in percentage was worked out using the formula:  $CGR = [\text{Antilog } b-1] \times 100$ .

The area, production and productivity (CGR) of major crops of Nagapattinam district are given in Table 3.1. From the table it could be inferred that Paddy, Black gram, Green gram, Sugarcane, Coconut, Groundnut and Gingelly are the major crops cultivated in the district. On an average the district showed paddy output of 579962 tonnes from 159499 ha with a productivity of 3.63 t/ha. Pulses like black gram and green gram covers totally an area of about 85140 ha producing 27428.67 and 24148.67 tonnes with a productivity of 0.65 t/ha and 0.55 t/ha, respectively. Coconut the next important crop of the district occupies 3919 ha with a productivity 404 lakh nuts/ha. Sugarcane is cultivated in an area 2576 ha.

The results exhibited a maximum growth rate of 11.933 per cent in the case of mango with respect to area under cultivation, followed by 8.642 percent in green gram and 3.931 in black gram. Other crops viz., coconut, sugarcane, groundnut and paddy exhibited minor growth rates ranging from 1.673 to 0.581. Among the crops gingelly followed a negative trend in all area, production and productivity. Even though crops like green gram, black gram and sugarcane had positive growth rates in their area, their productivity exhibited a negative growth rate, since black gram is grown as sole crop in very recent years and the crop has shown high positive growth rate in area.

**Table3.1 Area, Production and Productivity under major crops in Nagapattinam District during 2014-2015 (% per year)**

Sl.No.	Crops	Area (Ha)	Production (Tonnes)	Yield (t/ha)
1	Paddy	159499	579962	3.63
2	Black gram	41800	27428	0.65
3	Green gram	43340	24148	0.55
4	Ground nut	1601	5206	3.25
5	Coconut	3919	404	0.10
6	Gingelly	628	181	0.28
7	Sugar cane	2576	225455	87.52
8	Mango	3034	6375	2.10
	<b>TOTAL</b>	<b>256397</b>		

\*In lakh nuts.

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

Sl.No.	Crops	CGR during 2000-2001 to 2014-15 (%)		
		Area	Production	Productivity
1	Paddy	0.581	2.824	2.223
2	Black gram	3.931	1.034	-2.784
3	Green gram	8.642	3.314	-4.904
4	Ground nut	0.848	9.478	8.564
5	Coconut	1.673	6.060*	5.422*
6	Gingelly	-2.209	-6.087	-3.948
7	Sugar cane	1.482	-1.648	-3.092
8	Mango	11.933	13.444	1.349

\* Denotes growth rates from 2000-2014

The area and growth rate of major crops of the Nagapattinam district is projected in the Table 3.3. From the table it could be inferred that among the major crops viz., paddy, green gram, black gram, sugar cane, gingelly and ground nut, except green gram and black gram all other crops exhibited a negative growth rate with regards to area over the years.

**Table 3.3 Area and growth rate for major crops in Nagapattinam district (ha)**

Years	Paddy	Green gram	Black gram	Sugarcane	Gingelly	Ground nut
1992-93	306091	0	1492	9662	5948	9694
1993-94	313475	0	273	8567	2770	7935
1994-95	321128	0	170	9227	5386	6377
1995-96	291843	0	421	10434	4932	8141
1996-97	145355	0	0	6156	459	5622
1997-98	156953	0	0	4601	443	5900
1998-99	159259	21090	54055	3958	400	4189
1999-2000	163620	19726	54339	3837	517	3412
2000-01	167317	19091	53088	3903	1376	2496
2001-02	168265	18497	50669	3661	1680	2604
2002-03	137724	8582	21509	3288	928	2314
2003-04	136069	14294	28408	2213	1735	2817
2004-05	153139	27053	45465	2550	3306	3306
2005-06	158100	22039	42930	4358	2735	137
2006-07	165714	23714	60413	6246	849	3119

Years	Paddy	Green gram	Black gram	Sugarcane	Gingelly	Ground nut
2007-08	154040	30768	64860	6443	4451	4109
2008-09	170840	34588	61503	9958	1428	3708
2009-10	157855	34789	51819	3958	683	2386
2010-11	156049	28761	51549	3046	914	2495
b-value	-0.03474	0.075621	0.421589	-0.038	-0.03377	-0.08578
CGR	-3.41404	7.855404	52.4382	-3.72889	-3.32015	-8.21997
Average of last three years	161581	32712.667	54957	5654	1008.333	2863
% share to total cropped area	58.24	11.798	19.81	2.04	0.36	1.03

The details of production and its growth rate of major crops cultivated in Nagapattinam district is given in Table 3.4. In case of production growth rate, invariably all the crops exhibit a negative trend over years.

**Table 3.4 Production and growth rate for major crops in Nagapattinam district (tonnes)**

Years	Paddy	Green gram	Black gram	Sugarcane	Gingelly	Ground nut
1992-93	1028220	11370	26810	1220480	2330	13040
1993-94	633190	4540	12150	711600	1150	14390
1994-95	1175290	11170	33280	803030	2600	10530
1995-96	676610	7390	11420	963230	1170	14400
1996-97	239560	3340	8320	429820	90	8020
1997-98	269630	3020	18670	490990	150	7540
1998-99	454190	10270	25050	465570	150	6820
1999-2000	547520	5360	13440	417900	200	5420
2000-01	547630	9970	31310	408600	510	4120
2001-02	427500	4270	11340	36680	3380	1020
2002-03	159449	3150	7523	14988	241	2180
2003-04	259866	4689	7095	20213	554	3641
2004-05	140662	10882	5335	222240	124	5630
2005-06	136637	4468	8268	401341	64	9161
2006-07	630607	15555	33196	585919	43	11853
2007-08	289317	1416	3620	505202	496	8155
2008-09	225147	2933	4739	329449	167	9334

Years	Paddy	Green gram	Black gram	Sugarcane	Gingelly	Ground nut
2009-10	432029	8283	14400	288713	180	7199
2010-11	321506	8298	21033	289076	338	7894
b-value	-0.0602	-0.0163	-0.0439	-0.0722	-0.1105	-0.0238
CGR	-5.8412	-1.6159	-4.2987	-6.9612	-10.458	-2.3558
Average of last three years	326227.3	6504.667	13390.67	302412.7	228.3333	8142.333

### 3.2 Projected area, production and yield of selected crops

The details of projected area, production and productivity with the compound growth rate of the identified crops in the Nagapattinam district are furnished in Table 3.5. From this table it could be inferred that paddy, coconut, ground nut mango shows a positive trend in area, production and productivity up to 2010-11. Black gram and green gram and registered a negative trend in productivity, despite of the increasing trend in area and production. Though the area under sugar cane has increased, the production and productivity is decreased. The negative trend in production and productivity of major crops emphasizes the importance of the improved technologies adoption and use of improved varieties.

To analyze the potentiality of selected agricultural commodities in 2023 the area, production and productivity of those crops need to be explored and projection of these parameters need to be worked out for the year 2023. The results of the linear forecasting using Ordinary Least Square are presented in Table 3.6. As per the current trend in the area, production and productivity of potential crops and their corresponding growth rates the projections for the year 2023 more or less similar to the area production and productivity of the current year *i.e.* 2010-11 in the case of paddy and pulses. The productivity of sugarcane and ground nut in 2023 need to be taken care since they are expected to show much lower in 2023 than their current productivity. The crop of gingelly only shows some satisfying figure of more than double the productivity in the year 2023.



**Table 3.5 Projected Area, Production and Yield based for the Major Potential Crops Identified**

Description	Paddy			Black gram			Green gram		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rates (%)	0.581	2.824	2.223	3.931	1.034	-2.784	8.642	3.314	-4.904
Triennium Average ending 2011 -12	161315	443520	2730	51283	17438	340	29980	9319	310
2012-13	163564	363867	2224	59845	11712	196	38026	6789	179
2013-14	164515	374141	2274	62197	11833	190	41312	7014	170
2014-15	165471	384706	2324	64642	11955	185	44882	7247	161
2015-16	166433	395569	2376	67184	12079	180	48761	7487	154

Description	Ground nut			Coconut			Gingelly		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rates (%)	0.848	9.478	8.564	1.673	6.060	5.422	-2.209	-6.087	-3.948
Triennium Average ending 2011 -12	2492	8353	3340	4057	727	17886	786	254	319
2012-13	3006	11804	3929	4337	818	19643	826	176	213
2013-14	3031	12923	4265	4409	867	20708	808	165	205
2014-15	3057	14148	4631	4483	920	21831	790	155	197
2015-16	3083	15489	5027	4558	976	23015	773	146	189

Description	Sugar cane			Mango		
	Area	Production	Yield	Area	Production	Yield
Compound Growth Rates (%)	1.482	-1.648	-3.092	11.933	13.444	1.349
Triennium Average ending 2011 -12	3361	281371	85	2869	15365	5367
2012-13	4161	307726	74	3377	18204	5391
2013-14	4223	302654	71	3780	20652	5464
2014-15	4286	297665	69	4231	23428	5537
2015-16	4349	292759	67	4736	26578	5612

*Area in Hectares; Production in Tonnes; Yield in Kg/ ha (\* Denotes growth rates from 2004 to 2011)*

**Table 3.6 Projected area, production and productivity of identified crops for 2023 in Nagapattinam district**

Sl. No	Crops	Area (ha)	Production (tonnes)	Productivity (t/ha)
1.	Paddy	180726.70	421774.60	2.33
2.	Black gram	37425.11	15116.74	0.41
3.	Green gram	28980.73	6807.99	0.24
4.	Sugar cane	5365.13	418991.60	78.00
5.	Ground nut	3914.36	10014.63	2.56
6.	Gingelly	2030.58	1475.33	0.73

### 3.1.2 Yield Gap Analysis

#### Yield gap I

The difference between Maximum yield in CCE (potential yield) and progressive farms yields (achievable yield) is termed as yield gap I.

The maximum yields in Crop Cutting Experiments (CCE) compared with yields obtained by progressive farmers (achievable yield) for the estimation of yield gap-I. The CCE yields are obtained from the office of Joint Director of Agriculture, Nagapattinam. Yield gap-I is calculated as follows. The progressive farms yields are obtained from the office of Joint Director of Agriculture, Nagapattinam and it is crosschecked with officials in line departments.

Yield Gap-I = Maximum yield in CCE (potential yield) - Progressive farms yields (achievable yield)

#### Yield gap II

The difference between progressive farms yields (achievable yield) and farmers average yield (actual yields) is termed as yield gap II.

The yields obtained by the farmers under improved technologies were recorded as progressive farms yields (achievable yield) and compared with the district level average yields for the estimation of yield gap-II. The progressive farms yields are obtained from the office of Joint Director of Agriculture, Nagapattinam and it is crosschecked with officials in line departments. Yields obtained at district level represent the farmers average yields

(actual yields) for triennium ending (2009-2011) were collected from season and crop report, Department of Economics and Statistics, Tamil Nadu. Yield gap-II is calculated as follows.

Yield Gap-II = Progressive farms yields (achievable yield) - Farmers average yield  
(actual yields)

### 3. Estimation of yield gaps

Table 3.7 presents the estimation results of variety wise yield gaps for identified potential crops in Nagapattinam district.

The difference between potential yield and progressive farms yields explains about the yield gap I which was higher than the yield gap II (difference between progressive farmers yield and actual yield) in paddy varieties like ADT 45 and BPT 5204 paddy varieties whereas the overall % yield gap to total potential yield was much higher at 38 per cent in the case of ADT 43. There exist a sizeable yield gaps in the paddy varieties of ADT 43, 45 and BPT 5204 varieties with a range of 39 to 20 per cent.

Pulses crop especially black gram showed more than one third yield gap in both identified varieties. ADT3 and ADT5 exhibited an overall yield gap of 39 and 30 per cent to the maximum potential yield respectively. This situation warrants for higher scope of obtaining better yield to achieve the target of double the yield in the year 2023 with concerted effort to make the farmers adopting improved technologies and high yielding varieties.

Oilseeds sector also has maximum rate of over all yield gaps at 30 and 36 per cent to the potential yield respectively in TMV 7 and VRI 1 ground nut varieties. Among these two varieties, in VRI 1 the contribution of yield gap I is more pronounced than yield gap II and the yield gap suffered by the progressive farmers accounted to 740 Kg/ha which was 82 percent to the total yield gap. Concentration in this crop to bridge this component of yield gap I will have a huge impact in increasing or doubling the production in the future. Another oilseed crop, gingelly has very huge yield gap at 34 and 43 per cent to potential yield in the cases of TMV 3 and TMV 5 varieties respectively.

More than 41 percent yield losses from the potential yield have been incurred in sugarcane crops implying that bridging this yield gap will have a very huge impact in state's exchequer

Yield gap analysis indicates that in pulses there existed yield gap to the tune of about 1/3 to the potential yield. Oil seeds crops like ground nut and gingelly exhibited more than 1/3 to the potential yield (up to 43 per cent in TMV 5 gingelly). Sugarcane crop also exhibited more than 40 per cent of yield gap to the potential yield. When compared to oilseeds and pulses, yield gap in paddy was comparatively low and manageable especially in paddy varieties like CR 1009 and BPT 5204.

### **3.4 Projected yield and production of selected crops**

#### **3.4.1. Paddy**

##### **3.4.1.1 Variety wise yield gap in Paddy in Nagapattinam district**

Yield gap analyses in paddy crops were presented variety wise in the following Table 3.8. The gap varied from 12 per cent in ADT 38 to 39 per cent in ADT 43. BPT 5204, a high yielding fine rice variety exhibited 20 per cent of yield gap to the potential yield mainly suffered by the progressive farmers (1358 kg/ha) than the average farmer (380 kg/ha). The overall yield gap is more or less equally shared by average and progressive farmers with 1600 and 1477 kg/ha in ADT 45 paddy variety. Except CR 1009 and ADT 39, the contribution of yield gap I (loss suffered by progressive farmer) of all were more predominant than the yield suffered by the average farmer when compared to the progressive farmer.

**Table 3.7 Yield gap analysis of identified crops and varieties in Nagapattinam district (kg/ha)**

S.No	Crops	Variety	Potential Yield (Kg/ha) (A)	Progressive Farmers Yield (Kg/ha) (B)	Actual yield (Kg/ha) (C)	Yield gap I (kg) (A-B)	Yield gap II (kg) (B-C)	Yield gap III/ over all yield gap (kg) (A-C)	% yield gap to potential yield
1.	Paddy	1)CR-1009	6000	5800	5020	200	780	980	16.33
		2)ADT-43	7957	6480	4880	1477	1600	3077	38.67
		3)ADT-45	9230	7600	7040	1630	560	2190	23.73
		4)ADT-39	6525	6200	5470	325	730	1055	16.17
		5)ADT-38	5500	4880	4820	620	60	680	12.36
		6)BPT-5204	8658	7300	6920	1358	380	1738	20.07
2.	Black gram	1)ADT-3	900	860	550	40	310	350	38.89
		2)ADT-5	1300	1240	910	60	330	390	30.00
3.	Green gram	ADT-3	500	465	413	35	52	87	17.40
4.	Groundnut	1)TMV-2	1025	984	890	41	94	135	13.17
		2)VRI-1	2500	1760	1595	740	165	905	36.20
		3)TMV-7	1900	1700	1340	200	360	560	29.47
5.	Sugarcane	COC-771	160000	140000	94000	20000	46000	66000	41.25
6.	Gingelly	1)TMV-3	750	635	495	115	140	255	34.00
		2)TMV-5	650	460	370	190	90	280	43.08
		3)TMV-6	950	880	830	70	50	120	12.63

**Table 3.8 Variety wise yield gap of Paddy in Nagapattinam district**

Varieties	Yield Gap I (kg)	Yield Gap II (kg)	Overall Yield Gap (kg)	% yield gap to potential yield
CR-1009	200	780	980	16.33
ADT-43	1477	1600	3077	38.67
ADT-45	1630	560	2190	23.73
ADT-39	325	730	1055	16.17
ADT-38	620	60	680	12.36
BPT-5204	1358	380	1738	20.07

**3.4.1.2 Performance and required growth of select varieties of paddy to bridge the yield gap in 2023**

The expected growth rates of paddy varieties to bridge the yield gap in 2023 has been worked out with recorded overall yield gap of those varieties and the growth rates are presented in Table 3.9. The required cumulative growth rates were arrived to the range of 14 to 63 per cent over a period of the next 11 years. The required annual growth rate to bridge the yield gap was the lowest at 1.28 in ADT 38 and it was the highest in the case paddy variety ADT 43 at 5.73 per cent. This result indicates that there were quite number of areas of concern in the case of ADT 43 since the variety exhibited large amount of yield gaps. If technological factors are being efficiently used and proper interventions being made there will be huge impact in the scenario of production of paddy in Nagapattinam district. Likewise another variety ADT 45 may also contribute heavily in paddy production in the district since these varieties are high yielders and their potentiality was not effectively exploited (to the maximum) so far in the history of Nagapattinam district.

**Table3.9 Performance of selected varieties of Paddy crop in Nagapattinam district**

Particulars	CR 1009	ADT43	ADT45	ADT39	ADT38	BPT 5204
Potential Yield (kg/ha)	6000	7957	9230	6525	5500	8658
Progressive farmer yield (kg/ha)	5800	6480	7600	6200	4880	7300
Average Yield (kg/ha)	5020	4880	7040	5470	4820	6920
Overall Yield Gap(kg)	980	3077	2190	1055	680	1738
Required Growth Rates (%)	19.52	63.05	31.11	19.29	14.11	25.12
Annual Growth Rates (%)	1.77	5.73	2.83	1.75	1.28	2.28

### 3.4.1.3 Projected yield of paddy crops in 2023

Using the historical data of yield of different paddy varieties in the districts the yield rates are projected to the year 2022-23 and these projections are presented in Table 3.10. The results are showing very moderate performance that with the current rate of growth in the yield we can achieve the maximum potential yield somewhere around in the years between 2020 and 2023 only. Among these varieties, ADT 43 can achieve this a bit earlier by somewhere around the year 2020. Again there are concerns over this issue will arise that during this period these varieties may lose their genetic potential and the maximum potential may not be achieved.

**Table 3.10 Yield projection for select varieties of paddy in Nagapattinam district (kg/ha)**

Year	CR 1009	ADT 43	ADT 45	ADT 39	ADT 38	BPT 5204
2011-12	5020	4880	7040	5470	4820	6920
2012-13	5109	5160	7239	5566	4882	7078
2013-14	5199	5455	7444	5663	4944	7239
2014-15	5291	5768	7655	5762	5007	7404
2015-16	5385	6098	7871	5863	5072	7573
2016-17	5480	6448	8094	5966	5136	7746
2017-18	5577	6817	8323	6070	5202	7923
2018-19	5676	7208	8559	6176	5269	8103
2019-20	5776	7621	8801	6284	5336	8288
2020-21	5879	8058	9050	6394	5405	8477
2021-22	5983	8519	9306	6506	5474	8670
2022-23	6089	9007	9570	6620	5544	8868

### 3.4.1.4 Projection of paddy production in 2023

Paddy production (for the objective of doubling the production) for the year 2023 is projected using the proportion of area under different varieties of paddy and their actual area and the yield of the respective year has been projected for various years up to 2022-23 and the results are presented in Table 3.11. The result shows a very interesting picture that by following the current trend in area and doubled yield of paddy varieties and by achieving the maximum potential yield of varieties CR 1009 alone can contribute more than the projection made for 2023 with current trend of area and yield.

The variety CR 1009 is being cultivated in about 45 per cent of total paddy area. Projection of CR 1009 paddy production during 2022-23 will be around 427558 tonnes when the expected yield is being doubled where as the projection of this variety with current yield in year 2023 is estimated at around 421774 tonnes (Table 3.4).

It is important to note that by doubling the productivity of all these varieties we can not only achieve more than double production (1164876 tonnes) the double production in 2022-23 but also we can achieve the potential maximum of all important varieties in the same year and even one or two years earlier in the case of ADT 43 variety.

**Table 3.11 Projection of variety wise paddy production (t) for 2023 in Nagapattinam district**

Varieties	CR 1009	ADT 43	ADT 45	ADT 39	ADT 38	BPT 5204	Total
Proportion of varieties	0.45	0.15	0.15	0.05	0.05	0.15	1.00
Area (ha)	70222.05	23407.35	23407.35	7802.45	7802.45	23407.35	156049
2012-13	358754	120773	169451	43426	38089	165672	896165
2013-14	365104	127693	174247	44186	38577	169455	919262
2014-15	371566	135010	179178	44960	39071	173318	943103
2015-16	378143	142746	184249	45746	39571	177270	967725
2016-17	384836	150926	189463	46547	40077	181312	993161
2017-18	391648	159574	194825	47361	40590	185446	1019444
2018-19	398580	168717	200338	48190	41110	189674	1046609
2019-20	405635	178385	206008	49034	41636	193998	1074696
2020-21	412815	188606	211838	49892	42169	198421	1103741
2021-22	420122	199413	217833	50765	42709	202945	1133787
2022-23	427558	210840	223997	51653	43255	207573	1164876

### 3.4.2 Pulses

#### 3.4.2.1 Variety wise yield gap in pulses in Nagapattinam district

Pulses were other important crops for which yield gap analysis was carried out in black gram and green gram which were grown extensively in Nagapattinam district mainly as rice fallow and in sizeable are as sole crops. In black gram varieties like ADT 3 and ADT 5 are cultivated whereas in green gram farmers grow only ADT 3 variety. Yield gaps were calculated for three varieties of these two pulse crops and the results were presented in Table 3.12.



Yield gaps were as higher as 39 per cent in ADT 3 black gram variety and around 30 per cent in ADT 5 variety. It was around 17 per cent in the case of ADT 3 green gram. Among these two pulse crops green gram performed well with lesser yield loss suffered by the farmers. The results indicated that in all three varieties yield gap II contributed more in overall yield gap contributing around 89 and 85 percent in ADT3 and ADT 5 of black gram and 60 percent in the case of ADT 3 green gram.

This phenomenon indicate the technical inputs utilization and intensiveness of good agricultural practices adopted by the average farmers are far below and there is warranted a huge task to educate and build up the capacity of average farmer with concerted effort by both scientists and extension workers apart from making the farmers more accessible to technical and physical inputs of pulses cultivation and credit accessibility.

**Table 3.12 Variety wise yield gap in pulses in Nagapattinam district**

<b>Crops</b>	<b>Variety</b>	<b>Yield Gap I (kg)</b>	<b>Yield Gap II (kg)</b>	<b>Overall Yield Gap</b>	<b>% yield gap to potential yield</b>
Black gram	ADT-3	40	310	350	38.89
	ADT-5	60	330	390	30.00
Green gram	ADT-3	35	52	87	17.40

#### **3.4.2.2 Performance and required growth of select varieties of pulses to bridge the yield gap in 2023**

With their poor performance and huge yield gaps there lies great concern in pulses especially in black gram. The expected growth rates of these pulse varieties to bridge the yield gap in 2023 has been worked out with recorded overall yield gap of those varieties and the growth rates are presented in Table 3.13.

The required cumulative growth rates were arrived higher than that of paddy varieties to the range of 17 to 64 per cent over a period of the next 11 years. The required annual growth rate to bridge the yield gap was the lowest at 1.58 in ADT 3 green gram and it was higher in black gram varieties indicating the highest in the case of ADT 3 black gram at 5.79 per cent. This result indicates that there were quite number of areas of concern in all black gram varieties since they exhibited large amount of yield gaps. If technological factors are being efficiently used and proper interventions being made there will be huge impact in the scenario of production of pulses in Nagapattinam district.

**Table3.13 Performance of select varieties of pulses in Nagapattinam district**

Particulars	Black gram		Green gram
	ADT 3	ADT 5	ADT 3
Ruling Varieties			
Potential Yield (Kg/ha)	900	1300	500
Progressive farmer yield (Kg/ha)	860	1240	465
Average Yield (Kg/ha)	550	910	413
Overall Yield Gap (Kg/ha)	350	390	87
Required Growth Rates	63.64	42.86	17.40
Annual Growth Rates	5.79	3.90	1.58

**3.4.2.3 Projected yield of pulses in 2023**

Yield rates of black gram and green gram varieties are projected to the year 2022-23 and these projections are presented in Table 3.14. The results are showing very poor performance that with the current rate of growth in the yield we can't achieve the maximum potential yield even in the year of 2023 itself for which this vision document is being prepared. Among these varieties ADT 3 green gram is slowly nearing the target around the year 2023. The problem will be more aggravated when these varieties lose their genetic potential and the maximum potential may not be achieved.

**Table 3.14Yield projection for select varieties of Pulses in Nagapattinam district**

Year	Black gram		Green gram
	ADT 3	ADT 5	ADT 3
2011-12	550	910	413
2012-13	582	945	420
2013-14	616	911	426
2014-15	651	947	433
2015-16	689	912	440
2016-17	729	948	447
2017-18	771	913	454
2018-19	816	949	461
2019-20	551	914	469
2020-21	583	950	476

Year	Black gram		Green gram
	ADT 3	ADT 5	ADT 3
2021-22	617	915	483
2022-23	652	951	491

#### 3.4.2.4 Projection of pulses production in 2023

Pulses production for the year 2023 is projected using the proportion of area under different varieties of pulses and their actual area and the yield of the respective year has been projected for various years up to 2022-23 and the results are presented in Table 3.15.

The result shows a very interesting picture that by following the current trend in area and doubled yield of black gram varieties and by achieving the maximum potential yield of varieties ADT 5 alone can contribute more than the projection made for 2023 with current trend of area and yield.

The variety ADT 5 is being cultivated in about 65 per cent of total pulses area of the district. Projection of ADT 5 black gram production during 2022-23 will be around 30659 tonnes when the expected yield is being doubled, whereas the projection of this variety with current yield in year 2023 is estimated at around 30232 tonnes (Table 3.4).

It is important to note that by doubling the productivity of all these varieties of black gram we can achieve more than double production (41785 tonnes) the double production in 2022-23 even though we cannot achieve the potential maximum of all important varieties even in the year 2022-23. Similar conclusion can be arrived in the case of green gram where the single variety grown viz., ADT 3 is expected to achieve the double production in the year 2023 without achieving maximum potential yield in year 2023.

**Table 3.15 Projection of variety wise pulses production for 2023 in Nagapattinam district**

Particulars	Black gram			Green gram
	ADT 3	ADT5	Total	ADT 3
Varieties	0.35	0.65	1.00	1.00
Proportion of varieties	0.35	0.65	1.00	1.00
Area	18042	33507	51549	28761
2012-13	9923	30491	40414	11878
2013-14	10498	31680	42178	12066
2014-15	11106	30525	41631	12257
2015-16	11749	31715	43464	12450
2016-17	12429	30558	42987	12647
2017-18	13148	31750	44898	12847
2018-19	13910	30592	44502	13050
2019-20	14715	31785	46500	13256
2020-21	9941	30625	40566	13465
2021-22	10517	31820	42337	13678
2022-23	11126	30659	41785	13894

### 3.4.3. Oil Seeds

Though the area of oilseeds is much less when compared to paddy and pulses in Nagapattinam district, yield gap analysis was carried out in groundnut and gingelly crops for representing the oil seeds category in which yield gaps are more pronounced indicating that these crops are performing very low. Yield gaps were calculated for three varieties each from these two oil seeds and the results were presented in Table 3.16. The yield gaps were estimated in a range from 13 to 43 per cent.

#### 3.4.3.1. Variety wise yield gap in oilseeds in Nagapattinam district

Varieties like TMV-2, TMV-7 and VRI-1 in groundnut crops and varieties like TMV-3, TMV-5 and TMV-6 in gingelly are taken into yield gap analysis. The results registered a very high yield gap of more than 30 per cent (up to 43 per cent) in four out of six oilseed varieties (except TMV 2 ground nut and TMV 6 gingelly). Yield gaps were more pronounced in gingelly than in groundnut. In contrary to pulses, yield gap I is contributing more to over all yield gap. Yield gap was in a range of 0.5 to 1 ton in groundnut warranting intervention through quality inputs and technical inputs apart from irrigation facilities.

**Table 3.16 Variety wise yield gap in oilseed crops in Nagapattinam district**

Crops	Variety	Yield Gap I (Kg)	Yield Gap II (Kg)	Overall Yield Gap (Kg)	% yield gap to potential yield
Ground nut	TMV-2	41	94	135	13.17
	VRI-1	740	165	905	36.20
	TMV-7	200	360	560	29.47
Gingelly	TMV-3	115	140	255	34.00
	TMV-5	190	90	280	43.08
	TMV-6	70	50	120	12.63

### 3.4.3.2 Performance and required growth of oilseeds varieties to bridge the yield gap in 2023

With their poor performance and huge yield gaps there lies great concern in oilseeds especially in groundnut and gingelly. The expected growth rates of these varieties to bridge the yield gap in 2023 has been worked out with recorded overall yield gap of those varieties and the growth rates are presented in Table.3.17.

The required cumulative growth rates for doubling the growth rates in oilseed crops were arrived to the range of 12 to 43 per cent over a period of the next 11 years. The required annual growth rate to bridge the yield gap was the lowest at 1.15 in TMV 6 gingelly and it was higher in all ground nut varieties, the highest being in the case of TMV 5 gingelly at 3.92 per cent.

This result indicates that there were quite number of areas of concern in oil seed crops like in the case of pulses due to huge yield gaps. If technological factors are being efficiently used and proper interventions being made there will be huge impact in the scenario of oil seeds production in Nagapattinam district.

**Table 3.17 Performance of select varieties of oilseeds in Nagapattinam district**

Particulars	Ground nut			Gingelly		
	TMV 2	VRI 1	TMV 7	TMV 3	TMV 5	TMV 6
Ruling Varieties						
Potential Yield (Kg/ha)	1025	2500	1900	750	650	950
Progressive farmer yield (Kg/ha)	984	1760	1700	635	460	880
Average Yield (Kg/ha)	890	1595	1340	495	370	830
Overall Yield Gap	135	905	560	255	280	120
Required Growth Rates	13.17	36.20	29.47	34.00	43.08	12.63
Annual Growth Rates	1.20	3.29	2.68	3.09	3.92	1.15

**3.4.3.3 Projected yield of oilseeds in 2023**

Yield rates of groundnut and gingelly varieties are projected to the year 2022-23 and these projections are presented in Table 3.18. The results show very poor performance that with the current rate of growth in the yield we can't achieve the maximum potential yield in gingelly even in the year of 2023 itself. The same is observed in the case of ground nut varieties. Among these varieties only TMV 6 gingelly and TMV 2 groundnut can reach nearer to the target around the year 2023.

**Table 3.18 Yield projection for select varieties of oilseeds in Nagapattinam district**

Year	Ground nut			Gingelly		
	TMV 2	VRI 1	TMV 7	TMV 3	TMV 5	TMV 6
2011-12	890	1595	1340	495	370	830
2012-13	900.7	1647.5	1375.9	510.3	384.5	839.5
2013-14	911.5	1701.7	1412.8	526.1	399.6	849.2
2014-15	922.4	1757.7	1450.6	542.3	415.2	859.0
2015-16	933.5	1815.5	1489.5	559.1	431.5	868.8
2016-17	944.7	1875.2	1529.4	576.4	448.4	878.8
2017-18	956.0	1936.9	1570.4	594.2	466.0	888.9
2018-19	967.5	2000.6	1612.5	612.5	484.3	899.2
2019-20	979.1	2066.5	1655.7	631.4	503.3	909.5
2020-21	990.9	2134.4	1700.1	651.0	523.0	920.0
2021-22	1002.8	2204.7	1745.7	671.1	543.5	930.5
2022-23	1014.8	2277.2	1792.5	691.8	564.8	941.2

### 3.4.3.4 Projection of oilseeds production in 2023

Oilseeds production for the year 2023 is projected using the proportion of area under different varieties of ground nut and gingelly and their actual area and the yield of the respective year has been projected for various years up to 2022-23 and the results are presented in Table 3.19.

The result shows a very interesting picture that by following the current trend in area and doubled yield of ground varieties and by achieving the maximum potential yield of varieties TMV 7 alone can contribute nearer to the projection made for 2023 with current trend of area and yield.

The variety TMV 7 is being cultivated in about 40 per cent of total groundnut area of the district. Projection of TMV 7 ground nut production during 2022-23 will be around 17422 tonnes when the expected yield is being doubled where as the projection of this variety with current yield in the year 2023 is estimated at around 10014 tonnes (Table 3.19).

It is important to note that by doubling the productivity of all these varieties of groundnut we can achieve more than double production (38431 tonnes) with this double production in 2022-23 we cannot achieve the potential maximum of all important varieties even in the year 2022-23. The similar conclusion can't be arrived in the case of gingelly, as no one variety grown is expected to achieve the double production in the year 2023 apart from missing to achieve maximum potential yield in year 2023.

**Table 3.19 Projection of variety wise oilseeds production for 2023 in Nagapattinam district**

Particulars	Ground nut			Gingelly		
	TMV 2	VRI 1	TMV 7	TMV 3	TMV 5	TMV 6
Proportion of varieties	0.4	0.2	0.4	0.2	0.3	0.5
Area	998	499	998	183	274	457
2012-13	8882	7959	13373	90	101	379
2013-14	8989	8221	13732	93	105	384
2014-15	9097	8491	14100	96	110	388
2015-16	9206	8771	14477	99	114	393
2016-17	9316	9059	14865	102	118	397
2017-18	948	9357	15264	105	123	402

Particulars	Ground nut			Gingelly		
	TMV 2	VRI 1	TMV 7	TMV 3	TMV 5	TMV 6
2018-19	9541	9665	15673	109	128	406
2019-20	9656	9983	16093	112	133	411
2020-21	9772	10312	16524	115	138	416
2021-22	9889	10651	16967	119	143	420
2022-23	10008	11001	17422	123	149	425

#### **3.4.4. Sugarcane**

Sugarcane is the most important commercial crop; we have to concentrate on national interest which is being cultivated at around 3000 hectares in Nagapattinam district. Almost all farmers are cultivating COC 771 variety uniformly which was influenced by the industry demand and directed by sugar factories.

##### **3.4.4.1. Yield gap in sugarcane in Nagapattinam district**

Yield gap was estimated for COC 771 variety of sugarcane and it was arrived at 66 tonnes constituting 41.25 per cent to the maximum potential yield of that variety (Table 3.20). Probably the shortage in availability of irrigation water, spacing and rationing might be the reasons for high yield gap of the variety which actually has a very huge genetic potential of 160 tonnes per hectare.

##### **3.4.4.2. Performance and required growth of sugarcane to bridge the yield gap in 2023**

The expected growth rates of COC 771 variety of sugarcane to bridge the yield gap in 2023 has been worked out with recorded overall yield gap of those varieties and the growth rates are presented in Table 3.21.

The required cumulative growth rates for doubling the growth rates in sugarcane crop were arrived to 16.25 per cent over a period of the next 11 years. The required annual growth rate to bridge the yield gap was less than 1.5 per cent which is very much moderate and achievable. Wide spread adoption of Sustainable Sugarcane Initiatives (SSI) in recent years might be the reason for moderate expected growth rate in sugarcane in the district.



### 3.4.4.3. Projected yield of sugarcane in 2023

Yield rates of sugarcane variety COC 771 are projected to the year 2022-23 and these projections are presented in Table 3.22. The results indicate that with the current rate of growth in the yield we can achieve the maximum potential yield somewhere at around the year of 2023.

### 3.4.4.4. Projection of sugarcane production in 2023

Sugarcane production for various years up to 2022-23 and the results are presented in Table 3.23.

The result shows a very interesting picture that by following the current trend in area and doubled yield of sugarcane variety COC 771 the projection made for yield may reach its maximum potential at 2023. It is not convincing that even though we can achieve the maximum potential it seems it is not possible to reach the projected production and double production in the year 2023 since we are unable to reach the expected area of sugarcane even in the year 2023.

**Table 3.20 Yield gap of sugarcane variety COC- 771 in Nagapattinam district**

Variety	Yield Gap I (Kg)	Yield Gap II (Kg)	Overall Yield Gap (Kg)	% yield gap to potential yield
COC-771	20000	46000	66000	41.25

**Table3.21 Performance of sugarcane variety COC 771 in Nagapattinam district**

Ruling Varieties	COC 771
Potential Yield (Kg/ha)	160000
Progressive farmer yield(Kg/ha)	140000
Average Yield (Kg/ha)	134000
Overall Yield Gap(Kg/ha)	66000
Required Growth Rate	16.25
Annual Growth Rate	1.48

**Table 3.22 Yield projection for sugarcane variety COC 771 in Nagapattinam district**

<b>Year</b>	<b>COC 771</b>
2011-12	134000
2012-13	135980
2013-14	137996
2014-15	140040
2015-16	142111
2016-17	144210
2017-18	146348
2018-19	148510
2019-20	150712
2020-21	152940
2021-22	155206
2022-23	157500

**Table 3.23 Projection of variety wise Sugarcane production for 2023 in Nagapattinam district**

<b>Variety</b>	<b>COC 771</b>
<b>Proportion of varieties</b>	1
Area	3046
2012-13	408160
2013-14	414200
2014-15	420340
2015-16	426560
2016-17	432870
2017-18	439280
2018-19	445780
2019-20	452370
2020-21	459070
2021-22	465860
2022-23	472760

**3.5. Milk yield gap of different animals**

The detail of the milk yield gap of the animals in the different block of the district is presented in the Table 3.24.

**Table 3.24 Milk yield gap of different animals in the blocks**

Sl. No.	Type of Animal	Kollidam			Kuttalam			Mayiladuthurai		
		Potential	Actual	Reason	Potential	Actual	Reason	Potential	Actual	Reason
<b>1</b>	<b>Cows</b>									
	a. Local	3	2	Poor AH management	2	1	Poor AH management	2	1.5	Poor AH management
	b. Cross breed	10	7		7	4		7	4	
<b>2</b>	<b>Buffalo</b>									
	a. Local	5	3	Poor AH management	2	0	Poor AH management	2	1.5	Poor AH management
	b. Cross breed	7	5		5	0		4	3	

**Contd.,**

Sl. No.	Type of Animal	Sembanarkoil			Srikazhi			Keelaiyur		
		Potential	Actual	Reason	Potential	Actual	Reason	Potential	Actual	Reason
<b>1</b>	<b>Cows</b>									
	a. Local	2	1.5	Poor AH management	2	1	Poor AH management	13512	10134	Poor plane of nutrition
	b. Cross breed	7	4		7	5		29276	21957	
<b>2</b>	<b>Buffalo</b>									
	a. Local	2	1	Poor AH management	2	1	Poor AH management	1070	856	Poor plane of nutrition
	b. Cross breed	5	3		5	3		1610	1288	

### **3.6. Technological Interventions and strategies to reduce the yield gaps**

#### **Necessary interventions need for increasing the productivity**

The following are the important issues discussed in the four interactive meetings arranged at Krishi Vigyan Kendra involving University scientist, officials from line district and progressive farmers

##### **a. Rural Credit**

- Interest rate for rural farm credits may be slashed down and timely disbursal of credit should be ensured apart from the removal of hidden charges for farm credit.
- Credit delivery system should be strengthened and it should be routed through cooperative societies.
- Gold loans for cropping should be discouraged as it may lead to malpractices where credit may be diverted to unproductive and non agricultural purposes in the name of crop loans.

##### **b. Labour**

- Suitable alternate mechanism should be evolved to solve the problem of labour shortage in agriculture during the time of MGNREGS operation in the villages.

##### **c. Irrigation**

- All the 21 rivers running in the district should be built with automatic check dams
- River banks should be strengthened with stone points to increase water storage
- Dates of pre monsoon sowing should be officially announced every year for all crops to take up better water management practices.
- Desiltation of water bodies and irrigation channels and removal of encroachments in rivers and channels are needed

##### **d. Seeds and seed certification**

- Adequate infrastructure and man power development should be generated to ensure the level of seed distribution by the government players up to 50 per cent

- Quality of seeds distributed by the private players should be ensured and proper control mechanism over private seed merchants should be evolved
- Seed banks should be developed at national level
- Hybrids of superior quality on par with private hybrid should be developed by government and they should be distributed by government.

#### **e. Climate**

- Swarna Sub 1 and CR 1009 Sub 1 varieties should be explored further for flood tolerant through appropriate breeding programme
- Drought and high temperature tolerant varieties should be developed
- Afforestation should adopted in a large way to maintain food chain

#### **f. Soil Health**

- Mass soil health programmes to be conducted
- Green manures utilization in the district may be encouraged large scale by way of subsidy.
- Farm level manure pits should be popularized

#### **g. Mechanization**

- Popularization of combined harvester for pulses
- Combined harvester should be modified/ improved by inclusion of drier component into it
- Workshops for agricultural machineries should be started in more numbers at block level
- Laser levelers, Transplanters and Harvesters should be made available at block level.

#### **h. Crop insurance**

- Under NAIS notified areas should be brought down to villages
- Medicinal plants should be brought under crop insurance schemes

#### **i. Paddy**

- Replacement variety for ADT 43 should be evolved
- Substitute for BPT 5204, CR 1009, TKM 9 and ASD 16 should be evolved
- Establishment of aerobic rice without puddling

#### **j. Pulses**

- Specialized market place should be developed in the district
- Flood resistant and resistant variety to water stagnation should be evolved
- Black gram varieties for higher milling percentage should be developed

#### **k. Horticulture**

- Banana crops should also be included into crop insurance schemes
- Establishment of Government horticultural farm/ nursery in the district
- Cultivation of Poyyur Brinjal variety should be popularized

#### **l. General discussion**

- Storage facilities should be made available with 2000 MT capacity at block level storage godowns.
- Maize as an alternate crop may be popularized at large scale
- Fish based industries need to be developed in the district since the district has high scope for inland and marine fish catches
- Awareness programmes on organic farming and precision farming need to be conducted extensively in large number across the district
- Programmes for desiltation and restoration of irrigation structures at village level with local participation need to be implemented in the district
- Steps need to be taken to prevent the cultivation lands being converted into fallow and plots/flats/ buildings.

## **CHAPTER IV**

### **DISTRICT PLAN**

The interventions proposed, the associated outlays, the physical targets, budgetary requirements, time frame for achievements in the Agriculture, Horticulture, Agricultural Engineering, Agricultural Marketing, Seed Certification, Animal Husbandry, Dairy Development, Fisheries, Fisheries Research, Public Welfare Department and Cooperation and Civil Supplies sectors are discussed in this chapter. This would comprehend the activities and the achievements to be made in beyond twelfth plan.

#### **4.1. Agriculture**

The development of agriculture sector has been aimed at by mainly pushing up the productivity levels of the major crops *viz.*, Rice, Millets, Pulses, Oilseed, Oil palm, Cotton, Sugarcane, Coconut and others interventions like training, infrastructure development, soil health management, IPM, farm mechanization and agricultural information technology in the district. Activities planned for and the costs involved under each crop are detailed below.

##### **4.1.1. Enhancing the rice productivity in Nagapattinam District**

In Nagapattinam district rice is the most important food grain crops. The area under rice is decreasing year by year due to the failure of monsoon. But the demand for food is increasing due to the rise in population. This has to be met with only by increasing the productivity of paddy from the limited available area. System of Rice Intensification (SRI) and Integrated management practices (IPM) are the new technologies which need awareness creation and adoption for improving the productivity of the crop. Besides due to shortage of farm workers, farmers are not in a position to undertake various field operations in time. So the distribution of incentives for combined harvester and the supply of farm machineries like power tiller. Transplanter, power weeder, bund trimmer, laser leveler, rotavator, mini tractor, seed drill and power sprayer for pesticides application will enhance the efficient and judicious use of inputs. The supply of certified seeds, portrays and tarpaulin for nursery establishment, micronutrients, herbicides, bio-fertilizers, manures, biocontrol agents and rat traps will certainly improve the production and productivity of rice. Thus the overall goal is to enhance the rice yield upto 6-7 tonnes/ha through encouraging techniques such as SRI apart from traditional techniques

### **Project components**

- ✓ Promotion of SRI- to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of MN mixture, biofertilizer, zinc sulphate, herbicides and portrays- to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of certified seeds and Polyvinyl coated tarpaulin - to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Certified seed production and incentives for paddy machine planting- to be covered in all blocks except in Kollidam and Sembanarkoil blocks

### **Budget**

The budget requirement for fulfilling the various interventions is ₹. 42892.60 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.1.

### **Expected outcome**

Supply of quality seeds of certified varieties will certainly increase the production and productivity. Reduction in cost of cultivation of crops due to supply of fertilizers and plant protection chemicals at a cost lower than market price. Assured supply of fertilizers and plant protection chemicals even in the condition of shortage of supply in market.

### **Implementing agency**

The projects will be implemented by the Department of Agriculture.



**Table 4.1. Budget Requirement for Rice Crop in Nagapattinam District**

**(Rs. in Lakh)**

No.	Interventions	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	Promotion of SRI	Ha	15000	All Blocks Except B3, B7	15200	2280.00	15200	2280.00	15200	2280.00	15600	2340.00	15600	2340.00	76800	11520.00
2	Distribution of High Yielding Varieties	MT	35000	All Blocks Except B3, B7	350	122.50	400	140.00	430	150.50	460	161.00	490	171.50	2130	745.50
3	Distribution of Foundation	MT	40000	All Blocks Except B3, B7	10	4.00	10	4.00	10	4.00	10	4.00	10	4.00	50	20.00
4	seed production - Foundation	MT	32000	All Blocks Except B3, B7	3	0.96	3	0.96	3	0.96	3	0.96	3	0.96	15	4.80
5	seed production - Certified class	MT	26000	All Blocks Except B3, B7	420	109.20	420	109.20	480	124.80	480	124.80	540	140.40	2340	608.40
6	Incentives for paddy machine planting	Ha	10000	All Blocks Except B3, B7	24000	2400.00	24000	2400.00	25000	2500.00	25000	2500.00	25000	2500.00	123000	12300.00
7	Distribution of Protray	No	80	All Blocks Except B3, B7	15500	12.40	15500	12.40	16000	12.80	15500	12.40	15500	12.40	78000	62.40
8	Distribution of MN mixture/ Copper Sulphate	Ha	1000	All Blocks Except B3, B7	34500	345.00	34500	345.00	34500	345.00	34500	345.00	34500	345.00	172500	1725.00
9	Distribution of biofertilizer / PPFM / bioinputs / plant nutrient mobilizing bacteria	Ha	300	All Blocks Except B3, B7	34500	103.50	34500	103.50	34500	103.50	34500	103.50	34500	103.50	172500	517.50
10	Distribution of Zinc sulphate (Soil application & foliar)	Ha.	1000	All Blocks Except B3, B7	32000	320.00	32000	320.00	32000	320.00	32000	320.00	33000	330.00	161000	1610.00

No.	Interventions	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
11	Distribution of biocontrol agents/biopesticides	Ha..	1000	All Blocks Except B3, B7	20000	200.00	20000	200.00	20000	200.00	20000	200.00	20000	200.00	100000	1000.00
12	Gypsum application	Ha.	1500	All Blocks Except B3, B7	20000	300.00	22000	330.00	22000	330.00	22000	330.00	22000	330.00	108000	1620.00
13	Distribution of herbicides	Ha.	1000	All Blocks Except B3, B7	20000	200.00	22000	220.00	22000	220.00	22000	220.00	22000	220.00	108000	1080.00
14	Polyvinyl coated Tarpaulin (6m x 5m)	No.	2000	All Blocks Except B3, B7	715	14.30	715	14.30	715	14.30	715	14.30	715	14.30	3575	71.50
15	Direct sown paddy with seed drill sowing	Ha	7000	B6, B10, B2, B1, B8, B5, B9, B11	28000	1960.00	29000	2030.00	28000	1960.00	28000	1960.00	28000	1960.00	141000	9870.00
16	Establishment of community paddy nursery	ha	25000	All Blocks	30	7.50	30	7.50	30	7.50	30	7.50	30	7.50	150	37.50
17	Demon-stration of drip irrigation	ha	100000	All Blocks	20	20.00	20	20.00	20	20.00	20	20.00	20	20.00	100	100.00
	<b>Total</b>					<b>8399.36</b>		<b>8536.86</b>		<b>8593.36</b>		<b>8663.46</b>		<b>8699.56</b>		<b>42892.60</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.2. Enhancing the pulses productivity in Nagapattinam District**

Pulse crops have been an important component of agriculture since ancient times. Red gram, black gram, green gram, Bengal gram, horse gram, lentil, peas and beans, soya beans and cowpea are some of the important pulse crops grown in many parts of the country. The increase in area and production is attributed to the development of high yielding and MYMV resistant varieties suitable for cultivation in rabi season in rice fallows. Pigeon pea is yet another important source of vegetable protein, used either as dhal or as green vegetable which is largely grown in Nagapattinam district of Tamil Nadu. Pulses fit well under different cropping systems and thus have enormous potential for the future which needs to be capitalized. A horizontal expansion area under pulses could be possible in the country, under new niches of cultivation and improved package of practices.

#### **Project components**

- ✓ Demonstration (supply of seed, seed treatment & MN mixture) – to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Production of foundation/certified pulses seeds- to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of certified seeds, micro nutrients, weedicide and DAP Spray- to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of biofertilizer (Rhizobium + Phosphobacteria) - liquid / carrier- to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Cropping system based demonstration- to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Pure crop demonstration - to be black gram and green gram- covered in all blocks except in Kollidam and Sembanarkoil blocks

#### **Budget**

The total budget for the proposed intervention is ₹. 3734.78 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.2.

#### **Expected outcome**

The timely supply of seed material of ruling varieties and distribution of machineries through Department of Agriculture at block level will facilitate the farmers to adopt high yielding varieties in turn to get higher income.

#### **Implementing agency**

The projects will be implemented by the Department of Agriculture.

**Table 4.2. Budget Requirement for Pulses in Nagapattinam District**

(₹. in lakhs)

Sl. No.	Inter-ventions	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
1	Production of Foundation/ Certified pulses seeds	MT	86000	All Blocks Except B3,B7	5	4.09	5	4.09	5	4.09	5	4.09	5	4.09	24	20.43
2	Distribution of Certified Seeds	MT	100000	All Blocks Except B3,B7	33	33.00	33	33.00	33	33.00	33	33.00	33	33.00	165	165.00
3	Distribution of Gypsum	ha	400	All Blocks Except B3,B7	11800	47.20	10800	43.20	10800	43.20	11800	47.20	11800	47.20	57000	228.00
4	Distribution of Biofertilizer ( Rhizobium + Phosphobact eria) - Liquid / Carrier	Ha	600	All Blocks Except B3,B7	10800	64.80	10800	64.80	10800	64.80	10800	64.80	10800	64.80	54000	324.00
5	Distribution of Micro Nutrients(5 kgs/ Ha)	Ha	350	All Blocks Except B3,B7	10800	37.80	10800	37.80	10300	36.05	10800	37.80	10800	37.80	53500	187.25
6	DAP Spray	Ha	700	All Blocks Except B3,B7	11400	79.80	13400	93.80	15400	107.80	15400	107.80	18400	128.80	74000	518.00
7	Pulse wonder - 5 kg/ha	Ha	1000	All Blocks Except B3,B7	7300	73.00	7300	73.00	8800	88.00	10800	108.00	11880	118.80	46080	460.80
8	Bund Cropping	Ha	300	All Blocks Except B3,B7	3600	10.80	3600	10.80	3600	10.80	3600	10.80	3600	10.80	18000	54.00
9	Line sowing	Ha	2250	All Blocks Except B3,B7	3600	81.00	6600	148.50	8100	182.25	9600	216.00	11100	249.75	39000	877.50
10	Distribution of Yellow sticky trap /pheromone trap	ha	1000	All Blocks Except B3,B7	450	4.50	450	4.50	450	4.50	450	4.50	450	4.50	2250	22.50

Sl. No.	Inter-ventions	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
11	Cropping system based demonstration	Ha	12500	All Blocks Except B3,B7	210	26.25	210	26.25	210	26.25	210	26.25	210	26.25	1050	131.25
12	Plant Protection Chemicals	Ha	1000	All Blocks Except B3,B7	6000	60.00	6000	60.00	6000	60.00	6000	60.00	6000	60.00	30000	300.00
13	Seed treatment and soil application with Trichoderma viridi	Ha	700	All Blocks Except B3,B7	8000	56.00	8000	56.00	8000	56.00	8000	56.00	8000	56.00	40000	280.00
14	Demonstration on intercropping of pulses with other crops	Ha	8300	All Blocks Except B3,B7	90	7.47	90	7.47	90	7.47	90	7.47	90	7.47	450	37.35
15	Demonstration through NGOs	Ha	8250	All Blocks Except B3,B7	312	25.74	312	25.74	312	25.74	312	25.74	312	25.74	1560	128.70
	<b>Grand total</b>					<b>611.45</b>		<b>688.95</b>		<b>749.95</b>		<b>809.45</b>		<b>875.00</b>		<b>3734.78</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

### **4.1.3. Enhancing the oilseeds productivity in Nagapattinam District**

Oilseed crops have become cash crops as they command more prices in the market. Oilseed industry is also depending on the prospects of increasing the area under these crops for supply of raw materials. Though the area of oilseeds is much less when compared to paddy and pulses in Nagapattinam district, Production and Distribution of quality seeds of high yielding varieties to the farmers is the need of the hour. Replacement of existing variety particularly in Gingelly and Groundnut should be given prior importance. More than 90% of the farmers use only indiscriminate varieties, since seed production ratio in groundnut is very low. Hence it is necessary to increase the productivity of these oilseed crops. As these oilseeds crops are cultivated under rainfed conditions, their productivities are lesser. However, as their outputs fetch higher prices in the market, farmers could get more income, if they could get more yield from oilseed crops. Therefore, it is necessary to provide the needed assistance to the farmers by way of subsidized inputs and promotion of technology.

#### **Project components**

- ✓ Certified seed production – to be covered in Keelaiyur, Nagapattinam, Sirkali Thalainayar and Vedaranyam blocks
- ✓ Distribution of certified seeds, MN mixture, gypsum and liquid biofertilizer- to be covered in Keelaiyur, Nagapattinam, Sirkali Thalainayar and Vedaranyam blocks
- ✓ Application of herbicide, bio pesticide/fungicide- to be covered in Keelaiyur, Nagapattinam, Sirkali Thalainayar and Vedaranyam blocks
- ✓ Bund cropping – castor- to be covered in Keelaiyur, Nagapattinam, Sirkali Thalainayar and Vedaranyam blocks
- ✓ CBD - groundnut - to be covered in Keelaiyur, Nagapattinam, Sirkali Thalainayar and Vedaranyam blocks

#### **Budget**

The total cost of the project for five years works to ₹. 801.53 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.3.

#### **Expected outcome**

The supply of good quality seeds, planting materials, and distribution of micronutrients, gypsum and bio-fertilizers will enhance the production and productivity of oilseeds.

#### **Implementing agency**

The projects will be implemented by the Department of Agriculture.

**Table 4.3. Budget Requirement for Oilseeds in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Interventions	Unit	Unit Cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	<b>OILSEEDS</b>															
1	Polythene mulch Inclusive of erection	Ha	0.50	B8, B9, B11, B1, B6	20	10.00	20	10.00	20	10.00	20	10.00	20	10.00	100	50.00
2	Herbicide	Ha	0.01	B8, B9, B11, B1, B6	40	0.40	40	0.40	40	0.40	40	0.40	40	0.40	200	2.00
3	Light trap (NCIPM)	Nos.	0.01	B8, B9, B11, B1, B6	175	1.75	175	1.75	175	1.75	175	1.75	175	1.75	875	8.75
4	Bio pesticide/fungicide	Ha	0.01	B8, B9, B11, B1, B6	40	0.40	40	0.40	40	0.40	40	0.40	40	0.40	200	2.00
5	CBD-Groundnut	Ha	0.20	B8, B9, B11, B1, B6	4	0.80	4	0.80	4	0.80	4	0.80	4	0.80	20	4.00
6	CBD-Gingelly / Castor	Ha	0.06	B8, B9, B11, B1, B6	4	0.24	4	0.24	4	0.24	4	0.24	4	0.24	20	1.20
	<b>Groundnut</b>															
7	Seed Production-Foundation seeds	Mt	0.76	B8, B9, B11, B1, B6	4	3.04	4	3.04	4	3.04	4	3.04	4	3.04	20	15.20
8	Seed Production - certified seeds	Mt	0.73	B8, B9, B11, B1, B6	20	14.60	20	14.60	20	14.60	20	14.60	20	14.60	100	73.00
9	Distribution of Certified seeds	Mt	0.84	B8, B9, B11, B1, B6	50	42.00	50	42.00	50	42.00	50	42.00	50	42.00	250	210.00
10	Distribution of Seed Treatment Chemicals and Bioagents (T.Viridi)	Kg	0.00	B8, B9, B11, B1, B6	30	0.05	30	0.05	30	0.05	30	0.05	30	0.05	150	0.23
11	Application of Gypsum to	Ha	0.02	B8, B9, B11, B1, B6	210	3.36	210	3.36	210	3.36	210	3.36	210	3.36	1050	16.80

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
	Groundnut Crop															
12	Distribution of Micro Nutrient Mixture	Ha	0.02	B8, B9, B11, B1, B6	130	1.95	130	1.95	130	1.95	130	1.95	130	1.95	650	9.75
13	Distribution of Biofertilizer	Ha	0.01	B8, B9, B11, B1, B6	200	1.20	200	1.20	200	1.20	200	1.20	200	1.20	1000	6.00
14	Distribution of Liquid Biofertilizer	Ha	0.01	B8, B9, B11, B1, B6	200	1.20	200	1.20	200	1.20	200	1.20	200	1.20	1000	6.00
15	Distribution of Light Traps	Nos.	0.02	B8, B9, B11, B1, B6	40	0.80	40	0.80	40	0.80	40	0.80	0	0.00	160	3.20
16	Castor as Bund crop	Ha	0.01	B8, B9, B11, B1, B6	40	0.24	40	0.24	40	0.24	40	0.24	40	0.24	200	1.20
17	Combined Nutrient Spray	Ha	0.02	B8, B9, B11, B1, B6	40	0.60	40	0.60	40	0.60	40	0.60	40	0.60	200	3.00
18	Seed Drill Sowing / Line sowing of Groundnut with Pulses as intercrop(hiring charges only)	Ha	0.03	B8, B9, B11, B1, B6	200	6.00	200	6.00	200	6.00	200	6.00	200	6.00	1000	30.00
19	Distribution of Tractor operated thresher	Nos.	1.50	B8, B9, B11, B1, B6	4	6.00	4	6.00	4	6.00	4	6.00	4	6.00	20	30.00
20	Distribution of Power Operated Groundnut Stripper	Nos.	1.30	B8, B9, B11, B1, B6	4	5.20	4	5.20	4	5.20	4	5.20	4	5.20	20	26.00



Sl. No.	Interventions	Unit	Unit Cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Distribution of Power operated Groundnut Decorticator	Nos.	1.00	B8, B9, B11, B1, B6	4	4.00	4	4.00	4	4.00	4	4.00	4	4.00	20	20.00
	<b>GINGELLY</b>															
22	Production of Foundation Seeds	Mt	1.13	B8, B9, B11, B1, B6	8	9.04	8	9.04	8	9.04	8	9.04	8	9.04	40	45.20
23	Production of Certified Seeds	Mt	1.09	B8, B9, B11, B1, B6	20	21.80	20	21.80	20	21.80	20	21.80	20	21.80	100	109.00
24	Distribution of certified seeds	Mt	1.25	B8, B9, B11, B1, B6	20	25.00	20	25.00	20	25.00	20	25.00	20	25.00	100	125.00
25	Distribution of Micro nutrients (Manganese sulphate/ Zinc sulphate)	Ha	0.00	B8, B9, B11, B1, B6	200	0.80	200	0.80	200	0.80	200	0.80	200	0.80	1000	4.00
	<b>Grand total</b>					<b>160.47</b>		<b>160.47</b>		<b>160.47</b>		<b>160.47</b>		<b>159.67</b>		<b>801.53</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.4. Enhancing the Oil Palm productivity in Nagapattinam District**

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

#### **Project components**

- ✓ Oil palm area expansion programme to be covered in Mayiladuthurai, Sirkali, Thalainayar blocks
- ✓ Inputs for intercropping to be covered in Mayiladuthurai, Sirkali, Thalainayar blocks
- ✓ Supply of diesel pumps to be covered in Mayiladuthurai, Sirkali, Thalainayar blocks
- ✓ Supply of aluminium ladder, wire mesh and oil palm cutter- to be covered in Mayiladuthurai, Sirkali, Thalainayar blocks

#### **Budget**

It is proposed to incur ₹. 108.20 Lakh over a period of five years (Table 4.4) with the finance facilities under the NADP and other sources.

**Expected outcome**

The expected outcome of the project will result in an increase in the production of oil palm for producing oil and major supply of quality raw material to the oilseed industry which will improve the income of the farmers and requirement of oilseeds.

**Implementing agency**

Department of Agriculture will implement the project

**Table 4.4. Budget Requirement for Oil palm in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Interventions	Unit	Unit Cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total		
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	
II	<b>OILPALM</b>																
1	NMOOP -Mini Mission -II (Oilpalm)																
2	Oilpalm Area Expansion Programme	Ha	0.14	B9, B5, B8	9	1.26	9	1.26	13	1.82	17	2.38	25	3.50	73	10.22	
3	Cultivation maintenance	Ha	0.1	B5, B8, B9	25	2.50	25	2.50	25	2.50	5	0.50	5	0.50	85	8.50	
4	Inputs for Intercropping	Ha	0.1	B5, B8, B9	9	0.90	9	0.90	13	1.30	17	1.70	25	2.50	73	7.30	
5	Supply of Diesel pumps	No	0.3	B5, B8, B9	11	3.30	11	3.30	11	3.30	11	3.30	11	3.30	55	16.50	
6	Construction of Borewells	No	1	B5, B8, B9	10	10.00	10	10.00	10	10.00	10	10.00	10	10.00	50	50.00	
7	Motorised Chisel	No	0.2	B5, B8, B9	3	0.60	3	0.60	3	0.60	3	0.60	3	0.60	15	3.00	
8	Alumium portable ladder	No	0.06	B5, B8, B9	1	0.06	1	0.06	1	0.06	0	0.00	0	0.00	3	0.18	
9	Wire mesh	No	0.1	B5, B8, B9	25	2.50	25	2.50	25	2.50	25	2.50	25	2.50	125	12.50	
	<b>Grand total</b>					<b>21.12</b>		<b>21.12</b>		<b>22.08</b>		<b>20.98</b>		<b>22.90</b>		<b>108.20</b>	

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.5. Enhancing the cotton productivity in Nagapattinam District**

Cotton is the most important fibre crop of India. It provides the basic raw material (cotton fibre) to cotton textile industry. Its seed used as part of fodder for milch cattle to get better milk. The reduction in the area under cotton is mainly due to the increased cost of cultivation because of the high cost of labour and plant protection in the cultivation of cotton. Cotton is susceptible to many insects and pests especially sucking pests like Whiteflies, Aphids and Leaf hoppers. Though HYV seeds and hybrid seeds are available in market the complete eradication of pests and diseases is not achievable. The integrated pest management (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. Alternatively, production of cotton can be increased through varying cultivation practices that could achieve sustainable development. To supply the raw material to the textile industry, it is necessary to increase the productivity of cotton Therefore, it is necessary to provide the needed assistance to the farmers by way of subsidized inputs and promotion of technologies.

#### **Project components**

- ✓ Distribution of MN mixture and biofertilizer- to be covered in Kuthalam, Mayiladuthurai, Sirkali and Thirumarugal blocks
- ✓ Distribution of PP chemicals- to be covered in Kuthalam, Mayiladuthurai, Sirkali and Thirumarugal blocks- to be covered in Kuthalam, Mayiladuthurai, Sirkali and Thirumarugal blocks
- ✓ Application of weedicide- to be covered in Kuthalam, Mayiladuthurai, Sirkali and Thirumarugal blocks

#### **Budget**

The total cost of the project for five years works to ₹. 988.32 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.5.

#### **Expected outcome**

The timely supply of inputs like MN mixture, biofertilizer, PP chemicals, weedicide and machineries will certainly increase the production and productivity of cotton.

#### **Implementing agency**

The projects will be implemented by the Department of Agriculture.

**Table 4.5. Budget Requirement for Cotton in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Interventions	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
1	Cotton seed treatment	Ha	300	B8, B4, B5, B10	0	0.00	200	0.60	400	1.20	400	1.20	400	1.20	1400	4.20
2	Demonstration of IPT	Ha	15000	B8, B4, B5, B10	0	0.00	4	0.60	4	0.60	4	0.60	4	0.60	16	2.40
3	Distribution of biofertilizer	Ha	300	B8, B4, B5, B10	0	0.00	200	0.60	400	1.20	400	1.20	400	1.20	1400	4.20
4	Distribution of biopesticides / Bio agents	Ha	1000	B8, B4, B5, B10	0	0.00	200	2.00	200	2.00	400	4.00	400	4.00	1200	12.00
5	Distribution of MN Mixture	Ha	1000	B8, B4, B5, B10	0	0.00	400	4.00	400	4.00	400	4.00	400	4.00	1600	16.00
6	Distribution of Pheromone trap	No	6000	B8, B4, B5, B10	0	0.00	200	12.00	200	12.00	200	12.00	200	12.00	800	48.00
7	Distribution of PP chemicals	Ha	1000	B8, B4, B5, B10	0	0.00	800	8.00	2400	24.00	2600	26.00	2800	28.00	8600	86.00
8	Distribution of Yellow Sticky trap	No	3000	B8, B4, B5, B10	0	0.00	200	6.00	280	8.40	320	9.60	400	12.00	1200	36.00
9	Exposure visits	No	40000	B8, B4, B5, B10	0	0.00	4	1.60	4	1.60	4	1.60	4	1.60	16	6.40
10	Farmers training	No	20000	B8, B4, B5, B10	0	0.00	8	1.60	8	1.60	8	1.60	8	1.60	32	6.40
11	Field days	No	10000	B8, B4, B5, B10	0	0.00	4	0.40	4	0.40	4	0.40	4	0.40	16	1.60
12	Intercropping with pulses	Ha	10000	B8, B4, B5, B10	0	0.00	400	40.00	600	60.00	800	80.00	1000	100.00	2800	280.00

Sl. No.	Interventions	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
13	Soil reclamation with gypsum	Ha	1000	B8, B4, B5, B10	0	0.00	400	4.00	1600	16.00	2000	20.00	2000	20.00	6000	60.00
14	TNAU Cotton plus distribution (6 Kg./ Ha)	Ha	1200	B8, B4, B5, B10	0	0.00	400	4.80	800	9.60	1200	14.40	1600	19.20	4000	48.00
15	Frontline demo on ICM in cotton	Ha	7000	B8, B4, B5, B10	0	0.00	4	0.28	4	0.28	4	0.28	4	0.28	16	1.12
16	Application of weedicide	Ha	3000	B8, B4, B5, B10	0	0.00	400	12.00	400	12.00	400	12.00	400	12.00	1600	48.00
17	Spraying of growth regulator	Ha	3000	B8, B4, B5, B10	0	0.00	400	12.00	400	12.00	800	24.00	800	24.00	2400	72.00
18	Topping of cotton	Ha	1000	B8, B4, B5, B10	0	0.00	400	4.00	400	4.00	400	4.00	400	4.00	1600	16.00
19	Summer ploughing	Ha	7500	B8, B4, B5, B10	0	0.00	800	60.00	800	60.00	800	60.00	800	60.00	3200	240.00
	<b>Grand total</b>					<b>0.00</b>		<b>174.48</b>		<b>230.88</b>		<b>276.88</b>		<b>306.08</b>		<b>988.32</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.6. Enhancing the sugarcane productivity in Nagapattinam District**

Sugarcane is one of the important cash crop and a perfect gift to mankind. The demand for sugarcane in the country is mainly for the purpose for which they are utilized in the various form for consumption. There exist wide variations in the productivity of sugarcane in Nagapattinam district. In areas between Nagapattinam and Neyveli, the yield levels are comparable with very good yield per hectare, while in other areas, the yield levels are considerably lower. The low yield per hectare in most of the areas in the district needs the application of science – based production technologies. So, the strategy must be to increase the yield per hectare, by the application of latest technologies and through infrastructure developments.

##### **Project components**

- ✓ Sustainable Sugarcane Initiative (Shade net establishment and distribution of single bud seedling) to be covered in Kuthalam, Mayiladuthurai and Sirkali blocks
- ✓ Distribution of micro nutrient mixture, biofertilizer and weedicide to be covered in Kuthalam, Mayiladuthurai and Sirkali blocks
- ✓ Micro-irrigation (drip)- to be covered in Kuthalam, Mayiladuthurai and Sirkali blocks
- ✓ Demonstration on intercropping in Sugarcane- to be covered in Kuthalam, Mayiladuthurai and Sirkali blocks

##### **Budget**

The total cost of the project for five years works to ₹. 330.35 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.6.

##### **Expected outcome**

Fertility status of the soil will be improved by application of micronutrient mixture and biofertilizers. Hence assurance of nutritional sustainability will be kept. The timely supply of inputs will increase the production and productivity of sugarcane. Minimum of 5 to 10 tonnes increase in cane production per hectare could be achieved.

##### **Implementing agency**

The projects will be implemented by the Department of Agriculture.



**Table 4.6. Budget Requirement for Sugarcane in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Disribution of Gypsum (500 Kg/Ha)	Ha	0.02	B5,B4,B8	300	6.00	300	6.00	300	6.00	300	6.00	300	6.00	1500	30.00
2	Distri. of biofertilizer (Ha)	Ha	0.006	B4,B5,B8	300	1.80	300	1.80	300	1.80	300	1.80	300	1.80	1500	9.00
3	Distri. of weedicide (Ha)	Ha	0.01	B4,B5,B8	300	3.00	300	3.00	300	3.00	300	3.00	300	3.00	1500	15.00
4	Distribution of FeSO4 Spray	Ha	0.005	B4,B5,B8	300	1.50	300	1.50	300	1.50	300	1.50	300	1.50	1500	7.50
5	Distribution of ZnSO4 Spray	Ha	0.005	B4,B5,B8	300	1.50	300	1.50	300	1.50	300	1.50	300	1.50	1500	7.50
6	Distribution of Micro Nutrient Mixture	Ha	0.02	B4,B5,B8	300	6.00	300	6.00	300	6.00	300	6.00	300	6.00	1500	30.00
7	Distribution of Parasite Trichogramma	Ha	0.00125	B4,B5,B8	300	0.38	300	0.38	300	0.38	300	0.38	300	0.38	1500	1.88
8	Microirrigation - Drip (1.2x0.6)	ha	1.24	B4,B5,B8	30	37.20	30	37.20	30	37.20	30	37.20	30	37.20	150	186.00
9	<b>Sustainable Sugarcane Initiative (SSI)</b>					0.00		0.00		0.00		0.00		0.00		

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
10	A. Establishment of Shadenet	Nos	1.5	B4,B5,B8	3	4.50	3	4.50	3	4.50	3	4.50	3	4.50	15	22.50
11	B.Distribution of Single Bud Seedling	Ha	0.225	B4,B5,B8	3	0.68	3	0.68	3	0.68	3	0.68	3	0.68	15	3.38
12	Trash Mulching	Ha	0.04	B4,B5,B8	30	1.20	30	1.20	30	1.20	30	1.20	30	1.20	150	6.00
13	Demonstration on intercropping in Sugarcane	Ha	0.08	B4,B5,B8	14	1.12	14	1.12	14	1.12	14	1.12	14	1.12	70	5.60
14	State Level training in Sugarcane cultivation	No	0.4	B4,B5,B8	3	1.20	3	1.20	3	1.20	3	1.20	3	1.20	15	6.00
	<b>Grand total</b>					<b>66.07</b>		<b>66.07</b>		<b>66.07</b>		<b>66.07</b>		<b>66.07</b>		<b>330.35</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.7. Enhancing the coconut productivity in Nagapattinam District**

Coconut is cultivated in all the districts of Tamil Nadu with Cauvery delta zone contributing to about 62,000 hectares of land. Nagapattinam holds about 4,100 hectares of land under coconut cultivation. Coconut cultivation can yield remunerative results through effective mechanization, plant protection, releases of new varieties, value addition and modern technologies. 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 generate employment opportunities for over two million people in India. The aim is to enhancing coconut production through providing new varieties, distribution of machineries to farmers.

#### **Project components**

- ✓ Distribution of T × D hybrid seedlings and tall seedlings to be covered in Keelaiyur, Nagapattinam, Thalainayar, Thirumarugal, and Vedaranyam blocks
- ✓ Distribution of power operated coconut leaf shredder, tree climber, power operated rocker sprayer and copre drier to be covered in Keelaiyur, Nagapattinam, Thalainayar, Thirumarugal, and Vedaranyam blocks
- ✓ Distribution of MN mixture, pheromone traps to be covered in Keelaiyur, Nagapattinam, Thalainayar, Thirumarugal, and Vedaranyam blocks

#### **Budget**

The total cost of the project for five years works to ₹. 406.48 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.7.

#### **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.

#### **Implementing agency**

The projects will be implemented by the Department of Agriculture.

**Table 4.7. Budget Requirement for Coconut in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Distribution of T x D hybrid seedlings	No	0.0006	B10, B6, B9, B11, B1	5000	3.00	5000	3.00	5000	3.00	5000	3.00	5000	3.00	25000	15.00
2	Distribution of Tall Seedlings	No	0.0004	B10, B6, B9, B11, B1	2500	1.00	2500	1.00	2500	1.00	2500	1.00	2500	1.00	12500	5.00
3	Boom sprayer	No	0.2000	B6, B9, B11, B1	3	0.60	3	0.60	3	0.60	3	0.60	3	0.60	15	3.00
4	Distribution of D xT hybrid Seedlings	No	0.0015	B6, B9, B11, B1	1500	2.25	1500	2.25	1500	2.25	1500	2.25	1500	2.25	7500	11.25
5	Distribution of power operated coconut leaf shredder	No	0.6000	B6, B9, B11, B1	12	7.20	12	7.20	12	7.20	12	7.20	12	7.20	60	36.00
6	Distribution of MN mixture	Ha	0.1000	B6, B9, B11, B1	40	4.00	40	4.00	40	4.00	40	4.00	40	4.00	200	20.00
7	Distribution of Pheromone traps for Red palm weevil/ Rhinoceros beetle	Ha	0.0160	B6, B9, B11, B1	45	0.72	45	0.72	45	0.72	45	0.72	45	0.72	225	3.60
8	Distribution of power operated rocker sprayer	No	0.1000	B6, B9, B11, B1	0	0.00	12	1.20	12	1.20	12	1.20	12	1.20	48	4.80
9	Distribution of Solar copra drier	No	0.2000	B6, B9, B11, B1	5	1.00	5	1.00	7	1.40	11	2.20	15	3.00	43	8.60
10	Distribution of tree climbers	No	0.1500	B6, B9, B11, B1	25	3.75	25	3.75	25	3.75	25	3.75	25	3.75	125	18.75
11	Drip irrigation	Ha	0.3500	B6, B9,	35	12.25	35	12.25	35	12.25	35	12.25	35	12.25	175	61.25

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
				B11, B1												
12	Replanting and Rejuvenation of coconut gardens	Ha	0.4500	B6, B9, B11, B1	30	13.50	30	13.50	30	13.50	30	13.50	30	13.50	150	67.50
13	Thanjavur wilt management (root feeding /soil application)	Ha	0.0300	B6, B9, B11, B1	250	7.50	250	7.50	250	7.50	250	7.50	250	7.50	1250	37.50
14	Demonstration on Integrated fertiliser management	Ha	0.7500	B6, B9, B11, B1	30	22.50	30	22.50	30	22.50	30	22.50	30	22.50	150	112.50
15	Control of Eriophid mite	No. of tree	0.0002	B6, B9, B11, B1	450	0.09	450	0.09	450	0.09	450	0.09	450	0.09	2250	0.45
16	Control of slug caterpillar	No. of tree	0.0003	B6, B9, B11, B1	450	0.14	450	0.14	450	0.14	450	0.14	450	0.14	2250	0.68
17	Distribution of wheel barrow	No	0.0400	B6, B9, B11, B1	3	0.12	3	0.12	3	0.12	3	0.12	3	0.12	15	0.60
	<b>Grand total</b>					<b>79.62</b>		<b>80.82</b>		<b>81.22</b>		<b>82.02</b>		<b>82.82</b>		<b>406.48</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.8. Enhancing the livelihood of farmers through training in Nagapattinam District**

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.

##### **Project components**

- ✓ Awareness campaigns to be covered in all blocks
- ✓ State level and interstate level training programmes to farmers to be covered in all blocks except in Thalainayar block
- ✓ Exposure visits to be covered in all blocks

##### **Budget**

It is proposed to incur ₹. 1333.94 Lakh over a period of five years (Table 4.8) with the finance facilities under the NADP and other sources.

##### **Expected outcome**

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

##### **Implementing agency**

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

**Table 4.8. Budget Requirement for Training of Farmers in Nagapattinam District**

(₹. in Lakh)

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		
1	<b>District Level</b>															
2	<b>Training of Farmers</b>															
3	Inter State Training of Farmers	Nos.	1.25	All Blocks Except B9	10	12.50	10	12.50	10	12.50	10	12.50	10	12.50	50	62.50
4	Inter State Training of Farmers	Nos.	1.75	All Blocks Except B9	10	17.50	10	17.50	10	17.50	10	17.50	10	17.50	50	87.50
5	Training of 536 Groups of Seed Village Farmers in quality Seed Production technology.	Nos.	0.1	All Blocks Except B9	10	1.00	10	1.00	10	1.00	10	1.00	10	1.00	50	5.00
6	Training of Farmers under Mission Soil Health Card	Nos.	0.15	All Blocks Except B9	10	1.50	10	1.50	10	1.50	10	1.50	10	1.50	50	7.50
7	With in the district training of Farmers	Nos.	0.1	All Blocks Except B9	100	10.00	100	10.00	100	10.00	100	10.00	100	10.00	500	50.00
8	With in the State training of Farmers	Nos.	1.2	All Blocks Except B9	16	19.20	22	26.40	34	40.80	46	55.20	46	55.20	164	196.80
9	<b>Training of Farmers With in the district</b>															
10	Awareness campaigns	Nos.	0.1	All Blocks	220	22.00	220	22.00	220	22.00	220	22.00	220	22.00	1100	110.00
11	Cotton	Nos.	0.1	All Blocks	110	11.00	110	11.00	110	11.00	110	11.00	110	11.00	550	55.00
12	Groundnut	Nos.	0.1	All Blocks	55	5.50	55	5.50	55	5.50	55	5.50	55	5.50	275	27.50
13	IFS	Nos.	0.1	All Blocks	55	5.50	66	6.60	55	5.50	55	5.50	55	5.50	286	28.60
14	Major & Minor Millets	Nos.	0.1	All Blocks	101	10.10	101	10.10	101	10.10	101	10.10	101	10.10	505	50.50

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
15	Moisture conservation practices	Nos.	0.1	All Blocks	77	7.70	55	5.50	77	7.70	77	7.70	77	7.70	363	36.30
16	oil Palm	Nos.	0.1	All Blocks	66	6.60	66	6.60	66	6.60	66	6.60	66	6.60	330	33.00
17	Organic cultivation practices	Nos.	0.1	All Blocks	110	11.00	66	6.60	110	11.00	110	11.00	110	11.00	506	50.60
18	Paddy	Nos.	0.1	All Blocks	101	10.10	100	10.01	101	10.10	101	10.10	101	10.10	504	50.41
19	Pulses	Nos.	0.1	All Blocks	152	15.15	152	15.15	152	15.15	152	15.15	152	15.15	758	75.75
20	Sugarcane	Nos.	0.1	All Blocks	101	10.10	101	10.10	101	10.10	101	10.10	101	10.10	505	50.50
21	Value addition training	Nos.	0.1	All Blocks	110	11.00	66	6.60	110	11.00	110	11.00	110	11.00	506	50.60
22	<b>Exposure visit of Farmers</b>															
23	Rodent Pest Management Demonstration	Nos.	0.04	All Blocks	446	17.84	444	17.76	444	17.76	444	17.76	444	17.76	2222	88.88
24	With in State Exposure visit	Nos.	0.4	All Blocks	62	24.80	62	24.80	62	24.80	62	24.80	62	24.80	310	124.00
25	Organisation of Kisan gosthies on Soil test based nutrient application (Campaign)	Nos.	0.15		62	9.30	62	9.30	62	9.30	62	9.30	62	9.30	310	46.50
26	With in the district exposure visit	Nos.	0.15	All Blocks	62	9.30	62	9.30	62	9.30	62	9.30	62	9.30	310	46.50
	<b>Grand total</b>					<b>248.69</b>		<b>245.82</b>		<b>270.21</b>		<b>284.61</b>		<b>284.61</b>		<b>1333.94</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11



#### **4.1.9. Infrastructure Development in Nagapattinam District**

Quality control is the process of checking the quality of the material against the standard set by the organizations and if the material does not match with the standards, then such material is said to be substandard. Quality control laboratories are being established by the Government with an intention to supply quality inputs viz., seed, fertilizers and pesticide and services like soil testing to the farmers. Storage Godown, Seed Processing Unit Machineries, Construction of Uzhavar Maiyam/Farmers Hub, IAEC and Sub-AEC, Strengthening of STL, MSTL, FCL, CCL, BFQCL, PTL, Organic Fertilizer Testing Lab and Bio-fertilizer production unit operating in the State are doing yeomen services to the farming community and public by providing technical advices and expertise for the holistic development of the farmers. They also prioritize their actions so as to ensuring food and nutritional security. However, they are not endeavored with adequate infrastructure, which is absolutely essential for growth and development. Strengthening the existing and creating new assets/amenities would bring profound influence on the constructive and technical services effectively.

#### **Project components**

- ✓ Seed godown was covered in Kuthalam and Sirkali blocks and bag closure to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Dunnage, electronic platform balance and moisture meter to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Seed Processing unit machineries- to be covered in Kuthalam, Nagapattinam and Sirkali blocks
- ✓ Construction of Sub-AEC- to be covered in Nagapattinam and Thalainayar blocks
- ✓ Construction of Uzhavar Maiyam/Farmers Hub- to be covered in all blocks except in Kollidam, Sembanarkoil and Sirkali blocks
- ✓ Construction of Integrated Agricultural Extension Centre with vehicle shed and compound wall to be covered in Thalainayar block
- ✓ Strengthening of Mobile Soil Testing Laboratory and Strengthening of Pesticide Testing Laboratory to be covered in Nagapattinam
- ✓ Strengthening of training institute / nursery / FTC / KVK to be covered in all blocks
- ✓ Infrastructure for empowerment of coconut nurseries to be covered in all blocks

#### **Budget**

It is proposed to incur ₹. 3337.40 Lakh over a period of five years (Table 4.9) with the finance facilities under the NADP and other sources.

**Expected outcome**

The implementation of the above project will result in better activities which in turn results in better infrastructure facilities and higher agricultural production.

**Implementing agency**

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

**Table 4.9. Budget Requirement for Infrastructure Development in Nagapattinam District**

(₹. in Lakh)

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	Seed Godown (300 MT)	Nos.	2500000	B4, B8	0	0.00	2	50.00	0	0.00	0	0.00	0	0.00	2	50.00
2	Seed Processing Unit Machineries	Nos.	2650000	B4, B6, B8	0	0.00	4	106.00	0	0.00	0	0.00	0	0.00	4	106.00
3	Additional Seed Godown	Nos.	1250000	B6, B8, B4	0	0.00	2	25.00	0	0.00	0	0.00	0	0.00	2	25.00
4	Construction of Integrated Agricultural Extension Centre with vehicle shed and compound wall	Nos.	25000000	B9	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
5	Construction of Sub-Agricultural Extension Centre (498 Nos.)	Nos.	3000000	B6, B9	6	180.00	0	0.00	0	0.00	0	0.00	0	0.00	6	180.00
6	Strengthening of Soil Testing Laboratory	Nos.	6000000	B6	1	60.00	0	0.00	0	0.00	0	0.00	0	0.00	1	60.00
7	Strengthening of Mobile Soil Testing Laboratory	Nos.	3000000	B6	1	30.00	0	0.00	0	0.00	0	0.00	0	0.00	1	30.00

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
8	Strengthening of Pesticide Testing Laboratory	Nos.	6000000	B6	1	60.00	0	0.00	0	0.00	0	0.00	0	0.00	1	60.00
9	Construction of Uzhavar Maiyam (Farmers Hub)	Nos.	15000000	All Blocks Except B3,B7,B8	8	1200.00	0	0.00	0	0.00	0	0.00	0	0.00	8	1200.00
10	Establishment of Threshing floor/drying yard	Nos.	500000	All Blocks Except B3,B7	9	45.00	9	45.00	9	45.00	9	45.00	9	45.00	45	225.00
11	Dunnage	Nos.	7500	All Blocks Except B3,B7	60	4.50	60	4.50	60	4.50	60	4.50	60	4.50	300	22.50
12	Moisture meter	Nos.	25000	All Blocks Except B3,B7	27	6.75	0	0.00	0	0.00	0	0.00	0	0.00	27	6.75
13	Bag closure	Nos.	10000	All Blocks Except B3,B7	60	6.00	60	6.00	60	6.00	60	6.00	60	6.00	300	30.00
14	Electronic platform balance	Nos.	150000	All Blocks Except B3,B7	0	0.00	0	0.00	11	16.50	1	1.50	1	1.50	13	19.50
15	Seed rack	Nos.	30000	All Blocks Except B3,B7	0	0.00	18	5.40	0	0.00	0	0.00	0	0.00	18	5.40
16	Tarpaulin	Nos.	25000	All Blocks Except	285	71.25	295	73.75	305	76.25	309	77.25	315	78.75	1509	377.25

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
				B3,B7												
17	Office Furnishings and other amenities	Nos.	200000	All Blocks Except B3,B7	9	18.00	9	18.00	9	18.00	9	18.00	9	18.00	45	90.00
18	Strengthening of training institute / nursery / FTC / KVK	Nos.	50000000	All Blocks	0	0.00	1	500.00	0	0.00	0	0.00	0	0.00	1	500.00
19	Infrastructure for empowerment of coconut nurseries	Nos.	5000000	All Blocks	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00	2	100.00
	<b>Grand total</b>					<b>1931.50</b>		<b>833.65</b>		<b>216.25</b>		<b>152.25</b>		<b>203.75</b>		<b>3337.40</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.10. Soil Health Management in Nagapattinam District**

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

##### **Project component**

- ✓ Green manuring to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Establishment of permanent and HDPE vermicompost units to be covered in Keelaiyur, Kilvelur, Nagapattinam, Thalainayar, and Vedaranyam blocks
- ✓ Distribution of soil health card to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Establishment of Model organic villages to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Reclamation of Alkali soil to be covered in all blocks except in Kollidam and Sembanarkoil blocks

##### **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 Nagapattinam district is ₹. 1430.47 Lakh (Table 4.10).

##### **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.

##### **Implementing agency**

The projects will be implemented by the Department of Agriculture.

**Table 4.10. Budget Requirement for Soil Health Management in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Inter-ventions	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
	<b>Soil Health Management</b>															
1	Permanent Vermi compost units	Cluster Nos.	50000	All Blocks Except B3, B7	9	4.50	9	4.50	9	4.50	9	4.50	9	4.50	45	22.50
2	HDPE Vermi compost units	Kit Nos	12000	B8, B1, B2, B6, B11, B9	0	0.00	6	0.72	0	0.00	0	0.00	0	0.00	6	0.72
3	Reclamation of Alkali Soil	MT	50000	All Blocks Except B3, B7	30	15.00	140	70.00	140	70.00	140	70.00	140	70.00	590	295.00
4	Reclamation of Acid Soil	L. No.	6000	B8, B1, B11, B9	9	0.54	17	1.02	17	1.02	17	1.02	17	1.02	77	4.62
5	Green Manuring	Nos	4000	All Blocks Except B3, B7	5000	200.00	5000	200.00	5000	200.00	5000	200.00	5000	200.00	25000	1000.00
6	Establishment of Model organic villages	Ha	1000000	All Blocks Except B3, B7	0	0.00	0	0.00	9	90.00	0	0.00	0	0.00	9	90.00
7	Procurement and Distribution of Blue Green Algae	Nos	2500	B4, B5, B10	15	0.38	15	0.38	15	0.38	15	0.38	15	0.38	75	1.88

Sl. No.	Inter-ventions	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
8	Composting of Farm Waste Through Pluerotus (Production and Distribution of Kits)	MT	200	All Blocks Except B3, B7	900	1.80	900	1.80	900	1.80	900	1.80	900	1.80	4500	9.00
9	Distribution of Soil Health Card	Ha	300	All Blocks Except B3, B7	450	1.35	450	1.35	450	1.35	450	1.35	450	1.35	2250	6.75
	<b>Grand total</b>					<b>223.57</b>		<b>279.77</b>		<b>369.05</b>		<b>279.05</b>		<b>279.05</b>		<b>1430.47</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11



#### **4.1.11. Farm Mechanization in Nagapattinam District**

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

##### **Project component**

- ✓ Distribution of tractor and power tiller to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of rotavator to be covered in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of pump set to be covered in all blocks except in Kollidam, Mayiladuthurai and Sirkali blocks and PVC pipes(to be covered in all blocks except in all blocks except in Kollidam and Sembanarkoil blocks) to carry irrigation water from source to field
- ✓ Distribution of power operated sprayers to be covered in all blocks except in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of tarpaulins to be covered in all blocks except in all blocks except in Kollidam and Sembanarkoil blocks
- ✓ Distribution of Baler to be covered in Keelaiyur, Sirkali Thalainayar, Thirumarugal, and Vedaranyam blocks
- ✓ Distribution of Paddy transplanter to be covered in Keelaiyur, Kuthalam, Mayiladuthurai and Sirkali blocks

##### **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 ₹. 7656.68 Lakh (Table 4.11).

**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.

**Implementing agency**

The projects will be implemented by the Department of Agriculture.

**Table 4.11. Budget Requirement for Farm Mechanization in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Interventions	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
	<b>Farm Mechanization</b>															
1	Solar light trap	No.	4000	All Blocks Except B3, B7	84	3.36	99	3.96	114	4.56	129	5.16	144	5.76	570	22.80
2	Battery operated sprayer	Nos.	4000	All Blocks Except B3, B7	22	0.88	22	0.88	22	0.88	22	0.88	22	0.88	110	4.40
3	Power operated sprayer	Nos.	8000	All Blocks Except B3, B7	350	28.00	350	28.00	350	28.00	350	28.00	370	29.60	1770	141.60
4	Hand operated sprayer	0	0	All Blocks Except B3, B7	155	2.33	155	2.33	155	2.33	155	2.33	155	2.33	775	11.63
5	Distribution of Baler	Nos	350000	B1, B8, B9, B10, B11	1	3.50	5	17.50	5	17.50	5	17.50	5	17.50	21	73.50
6	Distribution of chaff cutter	Nos	25000	B1, B8, B9, B10, B11	2	0.50	5	1.25	5	1.25	5	1.25	5	1.25	22	5.50
7	Distribution of combine harvester	Nos	1700000	B1, B8, B9, B10, B11	1	17.00	1	17.00	5	85.00	1	17.00	1	17.00	9	153.00
8	Distribution of cono weeder	Nos	2000	B8, B4, B1, B5, B9, B10, B11	455	9.10	455	9.10	455	9.10	475	9.50	495	9.90	2335	46.70
9	Distribution of Laser leveller	Nos	380000	B1, B8, B9, B10, B11	5	19.00	5	19.00	5	19.00	5	19.00	5	19.00	25	95.00

Sl. No.	Interventions	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
10	Distribution of Manual Weeder	Nos	2000	B10	2	0.04	2	0.04	2	0.04	2	0.04	2	0.04	10	0.20
11	Distribution of MB plough	Nos	80000	B1, B8, B9, B10, B11	5	4.00	5	4.00	5	4.00	5	4.00	5	4.00	25	20.00
12	Distribution of Mini Tractor	Nos	300000	All Blocks Except B3, B7	15	45.00	18	54.00	27	81.00	27	81.00	54	162.00	141	423.00
13	Distribution of Mobile Sprinklers	Ha	30000	All Blocks Except B3, B7	300	90.00	300	90.00	300	90.00	300	90.00	300	90.00	1500	450.00
14	Distribution of Paddy transplanter	Nos	1200000	B1, B8, B4, B5	3	36.00	3	36.00	3	36.00	3	36.00	3	36.00	15	180.00
15	Distribution of Power Weeder	Nos	65000	B1, B9, B10, B11	1	0.65	31	20.15	31	20.15	31	20.15	31	20.15	125	81.25
16	Distribution of Powertiller	Nos	150000	All Blocks Except B3, B7	85	127.50	85	127.50	85	127.50	125	187.50	181	271.50	561	841.50
17	Distribution of Pumpset	Nos	30000	All Blocks Except B3, B5, B7	405	121.50	405	121.50	405	121.50	415	124.50	425	127.50	2055	616.50
18	Distribution of Rain guns	Ha	40000	B4, B5, B8	83	33.20	85	34.00	91	36.40	95	38.00	99	39.60	453	181.20
19	Distribution of Rotary Power weeder	Nos	70000	B1, B8, B2, B9, B11	1	0.70	5	3.50	5	3.50	5	3.50	5	3.50	21	14.70
20	Distribution of Rotavator	Nos	80000	All Blocks Except B3, B7	30	24.00	35	28.00	40	32.00	45	36.00	40	32.00	190	152.00
21	Distribution of Tarpaulins	Nos	8000	All Blocks Except B3, B7	1120	89.60	1120	89.60	1120	89.60	1140	91.20	1140	91.20	5640	451.20

Sl. No.	Interventions	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
22	Distribution of Tractor	Nos	600000	All Blocks Except B3, B7	37	222.00	38	228.00	38	228.00	38	228.00	38	228.00	189	1134.00
23	Distribution of Tractor Drawn Seed cum Fertilizer Drill	Nos	70000	B1, B10	2	1.40	2	1.40	2	1.40	2	1.40	2	1.40	10	7.00
24	PVC Pipes to carry Irrigation water from source to field	Unit	40000	All Blocks Except B3, B7	975	390.00	975	390.00	975	390.00	975	390.00	1125	450.00	5025	2010.00
25	Solar power pump system	Nos	600000	B5, B8	10	60.00	20	120.00	20	120.00	20	120.00	20	120.00	90	540.00
	<b>Grand total</b>					<b>1329.26</b>		<b>1446.71</b>		<b>1548.71</b>		<b>1551.91</b>		<b>1780.11</b>		<b>7656.68</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.1.12. Agricultural Information Technology in Nagapattinam District**

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.

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.

#### **Project Components**

Components include input devices, output devices, processors, storage devices, software, networking devices, transmission media and other accessories to be covered in all blocks

#### **Budget**

It is proposed to incur ₹. 115.19 Lakh over a period of five years (Table 4.12) with the finance facilities under the NADP and other sources.

#### **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

#### **Implementing Agency**

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

**Table 4.12. Budget Requirement for Information Technology in Nagapattinam District**

(₹. in Lakh)

Sl. No	Interventions	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
1	Procurement of Hardware for replacement of old hardware	Nos	50000	All Blocks	44	22.00	0	0.00	0	0.00	0	0.00	0	0.00	44	22.00
2	Connectivity Charges	Nos	11000	All Blocks	44	4.84	0	0.00	0	0.00	0	0.00	0	0.00	44	4.84
3	Printer cum Scanner	Nos	20000	All Blocks	11	2.20	0	0.00	0	0.00	0	0.00	0	0.00	11	2.20
4	UPS and Electrical Accessories	Nos	35000	All Blocks	11	3.85	0	0.00	0	0.00	0	0.00	0	0.00	11	3.85
5	Xerox machine	Nos	75000	All Blocks	11	8.25	0	0.00	0	0.00	0	0.00	0	0.00	11	8.25
6	Laptop/Desktop	Nos	50000	All Blocks	22	11.00	0	0.00	0	0.00	0	0.00	0	0.00	22	11.00
7	Anti -virus software	Nos	2500	All Blocks	22	0.55	0	0.00	0	0.00	0	0.00	0	0.00	22	0.55
8	Television	Nos	100000	All Blocks	11	11.00	0	0.00	0	0.00	0	0.00	0	0.00	11	11.00
9	Colour printer	Nos	15000	All Blocks	11	1.65	0	0.00	0	0.00	0	0.00	0	0.00	11	1.65
10	4G Internet - Dongle	Nos	2500	All Blocks	22	0.55	0	0.00	0	0.00	0	0.00	0	0.00	22	0.55
11	<b>Equipments for Documentation</b>															
a	Handycam	Nos	30000	All Blocks	11	3.30	0	0.00	0	0.00	0	0.00	0	0.00	11	3.30
b	Camera	Nos	25000	All Blocks	11	2.75	0	0.00	0	0.00	0	0.00	0	0.00	11	2.75
c	GPS instrument	Nos	20000	All Blocks	11	2.20	0	0.00	0	0.00	0	0.00	0	0.00	11	2.20
d	Android mobile	Nos	15000	All Blocks	22	3.30	0	0.00	0	0.00	0	0.00	0	0.00	22	3.30

Sl. No	Interventions	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
e	External Hard disk	Nos	5000	All Blocks	55	2.75	0	0.00	0	0.00	0	0.00	0	0.00	55	2.75
12	Audio - visual Aids	Nos	150000	All Blocks	11	16.50	0	0.00	0	0.00	0	0.00	0	0.00	11	16.50
	LCD projector	Nos	75000	All Blocks	11	8.25	0	0.00	0	0.00	0	0.00	0	0.00	11	8.25
	pico Projector	Nos	35000	All Blocks	11	3.85	0	0.00	0	0.00	0	0.00	0	0.00	0	3.85
13	Air conditioner for computer room	Nos	40000	All Blocks	16	6.40	0	0.00	0	0.00	0	0.00	0	0.00	16	6.40
	<b>Grand total</b>					<b>115.19</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>		<b>0.00</b>		<b>115.19</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11



#### **4.1.13 Integrated Pest Management (IPM)**

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

Integrated pests 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) to be covered in all blocks except in Kollidam and Sembanarkoil blocks
2. Field days to be covered in all blocks except in Kollidam and Sembanarkoil blocks
3. Integrated Pest Management Villages to be covered in all blocks except in Kollidam and Sembanarkoil blocks
4. Establishment of Coconut Parasite Breeding Station to be covered in Keelaiyur, Sirkali, Thalainayar and Vedaranyam blocks
5. Establishment of Sugar cane Parasite Breeding Station to be covered in all blocks except in Kollidam and Sembanarkoil blocks

#### **Budget**

It is proposed to incur ₹. 947.80 Lakh over a period of five years (Table 4.13) with the finance facilities under the NADP and other sources.

**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

**Implementing Agency**

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

**Table 4.13 Budget requirement for Integrated Pest Management**

**(Rs.in Lakh)**

Sl. No.	Interventions	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Farmers Field Schools (FFS)	Nos.	20000	All Blocks Except B3, B7	66	13.20	66	13.20	72	14.40	90	18.00	96	19.20	390	78.00
2	Field days	No.	20000	All Blocks Except B3, B7	57	11.40	60	12.00	60	12.00	66	13.20	66	13.20	309	61.80
3	Integrated Pest Management Villages	Nos.	100000	All Blocks Except B3, B7	39	39.00	44	44.00	54	54.00	54	54.00	54	54.00	245	245.00
4	Establishment of Coconut Parasite Breeding Station	Nos.	3500000	B1, B9, B11, B8	0	0.00	0	0.00	4	140.00	0	0.00	0	0.00	4	140.00
5	Establishment of Sugar cane Parasite Breeding Station	Nos.	3500000	All Blocks Except B3, B7	0	0.00	0	0.00	9	315.00	0	0.00	0	0.00	9	315.00
6	IPM School	Nos.	40000	All Blocks Except B3, B7	54	21.60	54	21.60	54	21.60	54	21.60	54	21.60	270	108.00
	<b>Grand total</b>					<b>85.20</b>		<b>90.80</b>		<b>557.00</b>		<b>106.80</b>		<b>108.00</b>		<b>947.80</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

**Table 4.14. Consolidated Agriculture Budget for Nagapattinam District**  
(₹. in Lakh)

Sl. No.	Crops	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Paddy	8399.36	8536.86	8593.36	8663.46	8699.56	42892.60
2	Millets	0.00	0.00	0.00	0.00	0.00	0.00
3	Pulses	611.45	688.95	749.95	809.45	875.00	3734.78
4	Oilseeds	160.47	160.47	160.47	160.47	159.67	801.53
5	Oilpalm	21.12	21.12	22.08	20.98	22.90	108.20
6	Cotton	0.00	174.48	230.88	276.88	306.08	988.32
7	Sugarcane	66.07	66.07	66.07	66.07	66.07	330.35
8	Coconut	79.62	80.82	81.22	82.02	82.82	406.48
9	Training	248.69	245.82	270.21	284.61	284.61	1333.94
10	Infrastructure	1931.50	833.65	216.25	152.25	203.75	3337.40
11	Soil Health Management	223.57	279.77	369.05	279.05	279.05	1430.47
12	Rainfed Area Development		0.00	0.00	0.00	0.00	0.00
13	Integrated Pest Management	85.20	90.80	557.00	106.80	108.00	947.80
14	Farm Mechanization	1329.26	1446.71	1548.71	1551.91	1780.11	7656.68
15	Strengthening of State Seed Farm	0.00	0.00	0.00	0.00	0.00	0.00
16	Agriculture Information Technology	115.19	0.00	0.00	0.00	0.00	115.19
	<b>Grand total</b>	<b>13271.50</b>	<b>12625.52</b>	<b>12865.25</b>	<b>12453.95</b>	<b>12867.62</b>	<b>64083.74</b>

**Agricultural Research**

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		
1	Popularization of MGR 100 Rice	No	26	All Blocks	0	0	1	26	0	0	0	0	0	0	1	26
	<b>Total</b>				<b>0</b>	<b>0</b>	<b>1</b>	<b>26</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>1</b>	<b>26</b>

## **4.2. Horticulture**

### **4.2.1 Enhancing the productivity of horticultural crops**

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. Commercial production of Traditional varieties to be covered in all blocks

##### **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 Brinjal, Bhendi, Green Chillies have to be increased in all blocks Commercial production of choice vegetables to be covered 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. Area expansion of loose flowers - Jasmie sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia have to be increased Kollidam, Sembanarkoil and Vedaranyam blocks

### **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. Seed and Rhizomatic spices (Coriander, Turmeric, Ginger, Dry Chilly, Cumin, Fennel, Fenu greek, Dil, Cardamom *etc.*.) to be covered 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 coconut (all blocks), cashew (Kollidam block). So the promotion of cultivation of plantation crops in the potential districts will increase the economy of the farmer and also Indian economy.

### **f. Area expansion by Precision Farming Technology**

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

### **Area expansion by high density planting**

By adopting high density planting in mango, guava and sapota, the area under fruit trees could be increased. This includes supply of pedigree planting materials, integrated nutrient management and integrated pest management. UHDP in Papaya, Mango, Guava, Pomegranate to be covered in Keelaiyur block Acidlime and HDP in Mango, Guava, Litchi, Pomegranate to be covered in all blocks.

### **g. Area expansion by Normal Planting**

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

### **Rejuvenation of Old Orchards – Mango and Guava**

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

### **Pollination support** to be covered in all blocks

Pollination of fruits, vegetables, spices and plantation crops would be enhanced through the establishment of bee hives and colonies.

### **Organic farming** to be covered in all blocks

Organic farming is an alternative agricultural system which originated early in the 20<sup>th</sup> 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. Also HDPE vermibed have to be developed 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. Integrated farming system -



Horticulture Based farming, Green manuring and Moisture stress management - Minimum irrigation gurantee by PUSA hydrogel to be covered in all blocks.

### **Coastal area development programme**

The coastal area in Tamil Nadu is susceptible to cyclones periodically, which cause damage to life and property. The coastal area supports several important economic activities such as fisheries, ports, industries and tourism. Most ecologically critical and threatened areas in the coastal areas are coastal wet lands especially lagoons and estuaries and their mangrove swamps. The coastal areas provide food and shelter for waterfowls, fishes, crustaceans, molluscs including some of the world's lucrative fisheries. Mangroves and coral reef system are important for protecting shorelines and coastal lines against erosion. Thus coastal areas play a prominent role in the human life. To be covered in all blocks except in Kilvelur, Sembanarkoil and Thirumarugal blocks

### **Special Interventions**

#### **a. Production Enhancement through Precision Farming**

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

#### **b. Pandal / Trellis cultivation, Propping / Support / Staking**

Pandal vegetables being short duration crops fit very well in the cropping system by offering viable option to the growers to get increased income per unit area. However, the cultivation of vegetables is too constrained due to high initial investment cost. With the objective of enhancing area under pandal vegetables and encouraging farmers to realize increased income, this project is proposed by popularizing high yielding/hybrid seed materials and dissemination of improved method of cultivation to farmers. It is proposed to

cover at least 500 hectares in crops like bitter gourd, ribbed gourd, snake gourd, pandal beans etc.

**c. Banana Bunch Sleeve** (was covered in Keelaiyur and Sembanarkoil blocks)

'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 scotch). 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.

**Agro Ecosystem Analysis (AESA) based IPM-** was covered in all blocks

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.

**d. Control of coconut Red Palm weevil**

Coconut is a perennial crop and longevity of the tree is about 50 to 70 years. The red palm weevil is a fatal enemy and less than 20 years coconut palm succumbs to severe damage when infected. Hence it is highly necessary to control the attack of red palm weevil pest on war footing. It is programmed to distribute 50, 000 traps of ferrolure of five traps per ha for 1.00 lakh hectare with subsidies assistance of 50 per cent. The total cost for one hectare of Rs.325/ferrolure comes to Rs.3, 250. Hence, an assistance of Rs.1600/ha is proposed for five ferrolure per ha.

**e. Promotion of Roof top Garden / Potager garden** was covered in all blocks

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.

#### **f. 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.

#### **g. Establishing Centre of Excellence for different crops** was covered in all blocks

Centre of Excellence for Horticulture crops like fruits, vegetables and flowers are aimed at designing, manufacturing and installation of State of the art facilities be it greenhouse technology, environmental control systems, tissue culture labs, crop production modules specializes in developing Centre of Excellence for fruits, vegetables and flowers in different states of India.

#### **h. 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.

#### **i. Research on Crop Diversification**

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

**Crop Insurance** was covered in all blocks

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.

#### **Infra structures and Assets**

##### **Protected cultivation**

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

**Mushroom production** covered in all blocks except in Kilvelur block

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.

##### **Vermicompost unit**

Earthworms are often referred to as farmer's friends 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.

### **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** were covered in Kollidam, Mayiladuthurai, Sembanarkoil and Sirkali block

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

#### **b. Pandal structure** was covered in all blocks

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

### **District Horticulture information and training centre**

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

Additionally, to augment the promotion of cut flowers and other horticulture crops cold storage facilities can also be made in the horticulture complex. The other facilities like glass house, green house for production and multiplication of ornamental plants will also be established in the training centre for demonstration purpose.

Community Seed Banks (CSBs) are places of storage where indigenous seed varieties are conserved and managed by community members. These ex-situ conservation sites provide farmers with free and easy access to traditional seeds under the condition that a farmer returns twice the amount of seeds he or she borrowed. They not only reduce farmers' dependence on seed companies but also help conserve the agro-biodiversity of their villages. These seed banks form the cornerstone of GREEN's efforts for biodiversity conservation through community empowerment.

### **Post-Harvest Management**

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

### **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.

**Horticultural mechanization** was covered in all blocks except in Kilvelur block

With increasing agricultural labour Shortage in India, a calculated shift to mechanization is imperative. Not only does mechanization provide for optimal utilization of factor resources (viz., land, labour, water, capital and expensive farm inputs), it also helps farmers to save valuable time and effort. Judicious use of time, labour and resources helps facilitate sustainable intensification (multi-cropping) and timely planting of crops and towards giving crops more time to mature, leading to improved productivity.

**Micro Irrigation, Water harvesting and Management** was covered in all blocks

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.

**Capacity building of Horticultural Officers and Farmers** was covered in all blocks

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.

**Budget**

The budget requirement for fulfilling the various interventions is ₹. 8433.72 Lakh. The details of budget requirement for each intervention across the blocks are shown in Table 4.15.

**Implementing agency**

The projects will be implemented by the Department of Horticulture.



**Table 4.15. Budget Requirement for Horticulture in Nagapattinam District**

(₹. 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.
<b>A</b>	<b>Production Growth</b>															
<b>I</b>	<b>Area expansion of fruit crops</b>															
1	TC Banana & TC Pineapple	Ha	1.25	B3, B4, B5, B7 & B8	10	12.50	10	12.50	10	12.50	10	12.50	10	12.50	50	62.50
2	Banana / Hill Banana sucker & Pine apple sucker	Ha	0.875	B3, B4, B5, B7 & B8	50	43.75	50	43.75	50	43.75	50	43.75	50	43.75	250	218.75
3	UHDP in Papaya, Mango, Guava, Pomegranate, Acidlime	Ha	1.25	B1	1	1.25	1	1.25	1	1.25	1	1.25	1	1.25	5	6.25
4	HDP in Mango, Guava, Litchi, Pomegranate	Ha	1	All Blocks	20	20.00	20	20.00	20	20.00	20	20.00	20	20.00	100	100.00
5	Area expansion of fruits with traditional varieties	Ha	0.6	All Blocks	20	12.00	20	12.00	20	12.00	20	12.00	20	12.00	100	60.00
6	Area expansion under Palmyrah,	Ha	0.6	B1, B9 & B11	10	6.00	10	6.00	10	6.00	10	6.00	10	6.00	50	30.00
7	Commercial production of choice fruits (Kiwi, Mangoosteen, Rambutan, Fig, Date palm, Durian, Carambola, Dragon fruit, Passion Fruit, Kiwi, Grapes, Strawberry, etc.,)	Ha	1.25	B7	1	1.25	1	1.25	1	1.25	1	1.25	1	1.25	5	6.25

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	Commercial production of Traditional fruits (Woodapple, Manila Tamarind, Jamun, Ber, Karonda, Annona, Egg fruit, etc.,)	Ha	0.6	All Blocks	10	6.00	10	6.00	10	6.00	10	6.00	10	6.00	50	30.00
<b>II</b>	<b>Area expansion of vegetable crops</b>															
9	Brinjal	Ha	0.5	All Blocks	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00
10	Bhendi	Ha	0.5	All Blocks except B2	110	55.00	110	55.00	110	55.00	110	55.00	110	55.00	550	275.00
11	Green Chillies	Ha	0.5	All Blocks	5	2.50	5	2.50	5	2.50	5	2.50	5	2.50	25	12.50
12	Gourds including pumpkin and tinda	Ha	0.5	All Blocks	25	12.50	25	12.50	25	12.50	25	12.50	25	12.50	125	62.50
13	Greens	Ha	0.5	All Blocks	100	50.00	100	50.00	100	50.00	100	50.00	100	50.00	500	250.00
14	Radish	Ha	0.5	All Blocks	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00
15	Melons	Ha	0.5	All Blocks	25	12.50	25	12.50	25	12.50	25	12.50	25	12.50	125	62.50
16	Coccinea	Ha	0.5	All Blocks	1	0.50	1	0.50	1	0.50	1	0.50	1	0.50	5	2.50
17	Cluster bean	Ha	0.5	All Blocks	50	25.00	50	25.00	50	25.00	50	25.00	50	25.00	250	125.00
18	Tapioca	Ha	0.5	All Blocks	20	10.00	20	10.00	20	10.00	20	10.00	20	10.00	100	50.00
19	Commercial production of choice vegetables (Bread fruit, Brussels sprout, Broccoli, Spring Onion, Knol Khol,	Ha	0.5	All Blocks	1	0.50	1	0.50	1	0.50	1	0.50	1	0.50	5	2.50

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.
	Turnip, Winged Bean, Butter Bean, Chinese Cabbage, Lettuce, Leek, Porum, etc.,															
20	Commercial production of location specific traditional vegetables (Athalakkai, Palu Pavakkai, Mullu kathiri, Poiyur kathiri, Kottapatti kathiri etc.,)	Ha	0.5	B1, B9 & B10	20	10.00	20	10.00	20	10.00	20	10.00	20	10.00	100	50.00
<b>III</b>	<b>Area expansion of Medicinal and Aromatic plants</b>															
21	Amla	Ha	0.7771	All Blocks	10	7.77	10	7.77	10	7.77	10	7.77	10	7.77	50	38.86
22	Gloriosa	Ha	1.6438	B1, B6, B9 & B11	100	164.38	100	164.38	100	164.38	100	164.38	100	164.38	500	821.90
23	Red sandal	Ha	0.6754	B3	1	0.68	1	0.68	1	0.68	1	0.68	1	0.68	5	3.38
24	Sandal	Ha	0.5822	B4	1	0.58	1	0.58	1	0.58	1	0.58	1	0.58	5	2.91
<b>IV</b>	<b>Area expansion of Spices crops</b>															
25	Seed and Rhizomatic spices (Coriander, Turmeric, Ginger, Dry Chilly, Cumin, Fennel, Fenu greek, Dil, Cardamom etc.,)	Ha	0.3	All Blocks	10	3.00	10	3.00	10	3.00	10	3.00	10	3.00	50	15.00
26	Perennial spices (Pepper, Curry leaf, All spice,	Ha	0.5	B7	2	1.00	2	1.00	2	1.00	2	1.00	2	1.00	10	5.00

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.
	Cinnamon, Clove, Tamarind, Nut meg etc.,)															
<b>V</b>	<b>Area expansion of Flower crops</b>															
27	Loose flowers - Jasminum sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia	Ha	0.4	B3, B7 & B11	25	10.00	25	10.00	25	10.00	25	10.00	25	10.00	125	50.00
28	Bulbous flowers - Tube rose, Gladioli, Dahlia, Bird of paradise, Heliconia, Tulip	Ha	1.5	B7	2	3.00	2	3.00	2	3.00	2	3.00	2	3.00	10	15.00
<b>VI</b>	<b>Area expansion /Gap filling of Plantation crops</b>															
29	Cashew	Ha	0.5	B3	50	25.00	50	25.00	50	25.00	50	25.00	50	25.00	250	125.00
30	Coconut	Ha	0.5	All Blocks	100	50.00	100	50.00	100	50.00	100	50.00	100	50.00	500	250.00
<b>VII</b>	<b>Rejuvenation/INM - IPM/Mulching/Ant i bird net</b>															
31	Mulching	Ha	0.32	B1	2	0.64	2	0.64	2	0.64	2	0.64	2	0.64	10	3.20
<b>VIII</b>	<b>Pollination Support through Bee Keeping</b>															
32	Bee hive & Colony	No	0.04	All Blocks	100	4.00	100	4.00	100	4.00	100	4.00	100	4.00	500	20.00
33	Honey Extractor	No	0.2	All Blocks except B2	10	2.00	10	2.00	10	2.00	10	2.00	10	2.00	50	10.00
<b>IX</b>	<b>Organic Farming</b>															

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.
34	HDPE Vermibed	No	0.16	All Blocks	200	32.00	200	32.00	200	32.00	200	32.00	200	32.00	1000	160.00
<b>X</b>	<b>Rainfed Area development</b>															
35	Integrated farming system - Horticulture Based farming	Ha	0.5	All Blocks	50	25.00	50	25.00	50	25.00	50	25.00	50	25.00	250	125.00
36	Green manuring	Ha	0.04	All Blocks	50	2.00	50	2.00	50	2.00	50	2.00	50	2.00	250	10.00
37	Moisture stress management - Minimum irrigation gurantee by PUSA hydrogel	Ha	0.1	All Blocks	200	20.00	200	20.00	200	20.00	200	20.00	200	20.00	1000	100.00
<b>B</b>	<b>Infra structures and Assets creation</b>															
I	Protected cultivation															
1	Poly Green House	1000 Sq.m	9.35	B4 & B6	1	9.35	0	0.00	1	9.35	0	0.00	1	9.35	3	28.05
<b>II</b>	<b>Mushroom production</b>															
2	Spawn Production	1 No.	15	All Blocks except B2	10	150.00	10	150.00	10	150.00	10	150.00	10	150.00	50	750.00
<b>IV</b>	<b>Supporting structures for Horticulture crop production</b>															
3	Staking/ Trellies/ Propping	Ha	1	B3, B4, B5, B7 & B8	10	10.00	10	10.00	10	10.00	10	10.00	10	10.00	50	50.00
4	Permanent Pandhal structure	Ha	4	All Blocks	50	200.00	50	200.00	50	200.00	50	200.00	50	200.00	250	1000.00
<b>V</b>	<b>District Horticulture information and</b>															

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.
	training centre															
VI	Community seed bank															
C	Special interventions															
5	Farm deficiency correction	Ha	0.04	All Blocks except B2	10	0.40	10	0.40	10	0.40	10	0.40	10	0.40	50	2.00
6	Promotion of Roof top Garden/Potager garden Kit	No	0.005	All Blocks	200	1.00	200	1.00	200	1.00	200	1.00	200	1.00	1000	5.00
7	Promotion of Roof top Garden/Potager garden Kit with shadenet	No	0.0735	All Blocks except B2	10	0.74	10	0.74	10	0.74	10	0.74	10	0.74	50	3.68
8	Banana Bunch Sleeve	Ha	0.25	B1 & B7	10	2.50	10	2.50	10	2.50	10	2.50	10	2.50	50	12.50
9	AESA based IPM in fruits and vegetables Pheramone trap	Ha	0.04	All Blocks	100	4.00	100	4.00	100	4.00	100	4.00	100	4.00	500	20.00
10	AESA Based IPM in fruits and vegetables Yellow sticky trap	Ha	0.04	All Blocks	100	4.00	100	4.00	100	4.00	100	4.00	100	4.00	500	20.00
11	AESA Based IPM in fruits and vegetables Light trap	Ha	0.08	All Blocks	100	8.00	100	8.00	100	8.00	100	8.00	100	8.00	500	40.00
12	Coastal area development programme - Public	Per village	1	All Blocks except B2, B7 & B10	5	5.00	5	5.00	5	5.00	5	5.00	5	5.00	25	25.00
13	Coastal area development programme - Private	Ha	0.2	All Blocks except B2, B7 & B10	20	4.00	20	4.00	20	4.00	20	4.00	20	4.00	100	20.00

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.
<b>E</b>	<b>Development of Farms, Nurseries and Parks</b>															
14	Orchard development	No	100	All Blocks	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
15	Development of eco park / Rose garden	No	600	All Blocks	0	0.00	0	0.00	0	0.00	0	0.00	1	600.00	1	600.00
16	Developmental activities in new/existing state Horticultural farm, Keelapalur	No	25	B11	1	25.00	0	0.00	1	25.00	0	0.00	1	25.00	3	75.00
17	Centre of Excellence for different crops	No	1000	All Blocks	0	0.00	0	0.00	0	0.00	0	0.00	1	1000.00	1	1000.00
<b>F</b>	<b>Mechanization - Machineries, Equipments &amp; Tools</b>															
18	Power tiller/Tractor/Minitractor	Nos	1	All Blocks except B2	10	10.00	10	10.00	10	10.00	10	10.00	10	10.00	50	50.00
19	Post Hole Digger/Augur, Pneumatic/ other Planter		1.26	All Blocks except B2	5	6.30	5	6.30	5	6.30	5	6.30	5	6.30	25	31.50
20	Fruit Plucker, Tree pruners, Fruit Harvester, Fruit Graders, Track Trolley, Nursery Media Filling Machine, Power operated horticulture tools for pruning, budding, grating, shearing etc.	No	2.5	All Blocks except B2	10	25.00	10	25.00	10	25.00	10	25.00	10	25.00	50	125.00

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.
21	Hand operated sprayer with face mask	Nos	0.025	All Blocks	50	1.25	50	1.25	50	1.25	50	1.25	50	1.25	250	6.25
22	Plastic crates for vegetable & fruits handling	No of sets containing 10 crates	0.075	All Blocks	100	7.50	100	7.50	100	7.50	100	7.50	100	7.50	500	37.50
23	5 layered Polythene spread sheets for drying horticulture produce	No	0.16		50	8.00	50	8.00	50	8.00	50	8.00	50	8.00	250	40.00
24	Equipments for manure management (Motorized Shredder for cutting biomass for making Vermicomposts and organic mulching )	No	1.26	All Blocks except B2	10	12.60	10	12.60	10	12.60	10	12.60	10	12.60	50	63.00
<b>G</b>	<b>Water / Irrigation Management</b>															
25	Micro Irrigation - Drip	Ha	1.12	All Blocks except B2	10	11.20	10	11.20	10	11.20	10	11.20	10	11.20	50	56.00
26	Rain gun	Ha	0.34	All Blocks	200	68.00	200	68.00	200	68.00	200	68.00	200	68.00	1000	340.00
27	Sprinkler	No	0.195	All Blocks	100	19.50	100	19.50	100	19.50	100	19.50	100	19.50	500	97.50
<b>H</b>	<b>Capacity Building</b>															
28	Training to farmers within the State. 2 days Rs.1000/farmer/day	No	0.02	All Blocks	200	4.00	200	4.00	200	4.00	200	4.00	200	4.00	1000	20.00



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.
29	Training to farmers outside the state. 30 farmers/Batch	No	0.105	All Blocks except B2	30	3.15	30	3.15	30	3.15	30	3.15	30	3.15	150	15.75
30	Exposure visit to farmers for 5 days. Rs.1000/farmer/day	No	0.05	All Blocks	25	1.25	25	1.25	25	1.25	25	1.25	25	1.25	125	6.25
31	Exposure visit of farmers outside India	No	4	All Blocks	2	8.00	2	8.00	2	8.00	2	8.00	2	8.00	10	40.00
32	Training to staff outside the state / Batch of 5 members	No	0.04	B1, B3, B6 & B7	5	0.20	5	0.20	5	0.20	5	0.20	5	0.20	25	1.00
33	Training to staff outside India	No	6	B6	1	6.00	1	6.00	1	6.00	1	6.00	1	6.00	5	30.00
34	HRD for supervisors and entrepreneurs	No	20	All Blocks	1	20.00	1	20.00	1	20.00	1	20.00	1	20.00	5	100.00
35	HRD for gardeners	No	15	All Blocks	5	75.00	5	75.00	5	75.00	5	75.00	5	75.00	25	375.00
36	District level seminar	No	2	All Blocks	1	2.00	1	2.00	1	2.00	1	2.00	1	2.00	5	10.00
37	Computerization & governance	No	1	B6	2	2.00	2	2.00	2	2.00	2	2.00	2	2.00	10	10.00
38	Publicity and Documentation	No	0.5	B6	4	2.00	4	2.00	4	2.00	4	2.00	4	2.00	20	10.00
<b>I</b>	<b>Crop Insurance and Risk Mitigating schemes</b>															
39	Crop Insurance	Ha	0.025	B3, B4, B5, B7 & B8	50	1.25	50	1.25	50	1.25	50	1.25	50	1.25	250	6.25
	<b>Grand total</b>					<b>1360.48</b>		<b>1426.13</b>		<b>1360.48</b>		<b>1326.13</b>		<b>2960.48</b>		<b>8433.72</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

### 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.

#### **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 to be covered in all blocks.
- ✓ Demonstration, Training and Distribution of post-harvest Technology and Management (PHTM) to popularize the technology for primary processing, value addition, low cost scientific storage/transport and the crop by-product management through demonstrations, capacity building of farmers and end users to be covered in all blocks. Provides financial assistance for establishing PHT units.
- ✓ 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, Leveler 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.
- ✓ Provision of suitable financial assistance to establish farm machinery banks for custom hiring for appropriate locations and crops (to be covered in 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.

- ✓ Strengthening of communication and information facilities in order to disseminate the information in rural areas.
- ✓ Awareness to be created towards the usage of Sugarcane infielder, Bird scarer, Mechanized row crop cultivation and Modernization of tractor workshop which indirectly increase the production.
- ✓ 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 (Mini Rice mill, Mini Dhall mill, Millet Mill, Oil mill with filters, Extractor, pomegranate air extractor, Custard apple pulper, Dehydration unit, Pricking Machine, Humidifier, 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 (to be covered in 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 (to be covered in all blocks).
- ✓ Promotion of training to AED engineers on post-harvest techniques and bio energy (were covered in all blocks).

### **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.

### **Budget**

The overall budget requirement for implementation of above interventions is ₹. 24417.90 Lakh. The details of budget requirement for each intervention across the blocks are shown in **Table 4.16**.

### **Implementing agency**

The projects will be implemented by the Department of Agricultural Engineering.

**Table 4.16. Budget Requirement for Agricultural Engineering in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Inter-ventions	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	Capacity Building															
2	Demonstration of Agricultural Machinery	All Blocks	No's/Ha	0.04	25	1.00	25	1.00	25	1.00	25	1.00	25	1.00	125	5.00
3	Training of farmers	All Blocks	No's/Ha	0.04	100	4.00	100	4.00	100	4.00	100	4.00	100	4.00	500	20.00
4	Training of Rural Youth in workshops	All Blocks	No's/Ha	0.04	100	4.00	100	4.00	100	4.00	100	4.00	100	4.00	500	20.00
5	Demonstration of Post Harvest Technologies	All Blocks	No's/Ha	0.04	25	1.00	25	1.00	25	1.00	25	1.00	25	1.00	125	5.00
6	Financial assistance for Post Harvest Equipment	All Blocks Except B1, B2, B6, B10	No's/Ha	4	2	8.00	0	0.00	2	8.00	2	8.00	2	8.00	8	32.00
7	Tractor (15-20 PTO HP)	All Blocks	No's/Ha	4	10	40.00	10	40.00	10	40.00	10	40.00	10	40.00	50	200.00
8	Tractor (Above 20-40 PTO HP)	All Blocks	No's/Ha	6	50	300.00	50	300.00	50	300.00	50	300.00	50	300.00	250	1500.00
9	Tractor (40-70 PTO HP)	All Blocks	No's/Ha	8.5	25	212.50	25	212.50	25	212.50	25	212.50	25	212.50	125	1062.50

Sl. No.	Inter-ventions	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
10	<b>Power Tillers</b>															
11	Power Tiller (8 BHP & above)	All Blocks	No's/Ha	1.75	1000	1750.00	600	1050.00	600	1050.00	600	1050.00	600	1050.00	3400	5950.00
12	<b>Rice Transplanter</b>															
13	Self Propelled Rice Transplanter (4 rows)	All Blocks	No's/Ha	2.5	30	75.00	30	75.00	30	75.00	30	75.00	30	75.00	150	375.00
14	Self Propelled Rice Transplanter (Above 4-8 rows)	All Blocks	No's/Ha	16	20	320.00	20	320.00	20	320.00	20	320.00	20	320.00	100	1600.00
15	<b>Tractor/Power Tiller (below 20 BHP) driven equipments</b>															
16	<b>a. Land Development, tillage and seed bed preparation equipments</b>															
17	<b>c. Inter Cultivation Equipments</b>															
18	Power Weeder	All Blocks	No's/Ha	0.7	4	2.80	4	2.80	4	2.80	4	2.80	4	2.80	20	14.00

Sl. No.	Inter-ventions	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
	(engine operated above 2 BHP)															
19	<b>e.Harvesting &amp; Threshing Equipments</b>															
20	Brush Cutter	All Blocks	No's/Ha	0.3	10	3.00	10	3.00	10	3.00	10	3.00	10	3.00	50	15.00
21	<b>Tractor (above 35 BHP) driven equipments</b>															
22	<b>a.Land Development, tillage and seed bed preparation equipments</b>															
23	Cultivator	All Blocks	No's/Ha	0.3	10	3.00	10	3.00	10	3.00	10	3.00	10	3.00	50	15.00
24	Rotavator	All Blocks	No's/Ha	0.95	25	23.75	25	23.75	25	23.75	25	23.75	25	23.75	125	118.75
25	<b>e.Equipments for Residue management/Hay and Forage Equipments</b>															
26	Balers (Round)	All Blocks	No's/Ha	3.5	10	35.00	10	35.00	10	35.00	10	35.00	10	35.00	50	175.00
27	<b>Plant protection</b>															

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
	<b>equipments</b>															
28	Manual sprayer: Knapsack/foot operated sprayer	All Blocks	No's/Ha	0.015	200	3.00	200	3.00	200	3.00	200	3.00	200	3.00	1000	15.00
29	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity 8-12 lts)	All Blocks	No's/Ha	0.06	100	6.00	100	6.00	100	6.00	100	6.00	100	6.00	500	30.00
30	<b>Establishment of Farm Machinery Banks for Custom Hiring</b>	All Blocks	No's/Ha	28	5	140.00	11	308.00	11	308.00	11	308.00	11	308.00	49	1372.00
31	<b>Establishment of Hi-Tech, High Productive Equipment Hub for Custom Hiring</b>	All blocks Except B1, B2, B9, B11	No's/Ha	112	2	224.00	2	224.00	2	224.00	2	224.00	2	224.00	10	1120.00
32	<b>Promotion of Farm Mechanization in Selected Villages</b>	All Blocks	No's/Ha	11.5	10	115.00	10	115.00	10	115.00	10	115.00	10	115.00	50	575.00



Sl. No.	Inter-ventions	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
33	<b>Financial assistance for promotion of Mechanized Farming operations</b>	All Blocks	No's/Ha	0.04	1000	40.00	1000	40.00	1000	40.00	1000	40.00	1000	40.00	5000	200.00
34	<b>Tractor Hiring Scheme</b>															
35	Purchase of Tractors for AED	All Blocks	No's/Ha	8	55	440.00	11	88.00	11	88.00	11	88.00	11	88.00	99	792.00
36	Purchase of Tractor drawn implements for AED	All Blocks	No's/Ha	0.5	55	27.50	11	5.50	11	5.50	11	5.50	11	5.50	99	49.50
37	Purchase of Bull Dozers for AED	All Blocks	No's/Ha	80	2	160.00	2	160.00	2	160.00	2	160.00	2	160.00	10	800.00
38	Purchase of Paddy Transplanter for AED	All Blocks	No's/Ha	18	11	198.00	10	180.00	10	180.00	10	180.00	10	180.00	51	918.00
39	Purchase of Paddy combine Harvester for AED	All Blocks	No's/Ha	17	44	748.00	11	187.00	11	187.00	11	187.00	11	187.00	88	1496.00
40	Purchase of Balers for AED	All Blocks	No's/Ha	4.5	20	90.00	5	22.50	5	22.50	5	22.50	0	0.00	35	157.50

Sl. No.	Inter-ventions	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
41	Purchase of Multi Crop Thresher for AED	All Blocks	No's/Ha	3.5	10	35.00	10	35.00	10	35.00	10	35.00	10	35.00	50	175.00
42	<b>Minor Irrigation Scheme</b>															
43	Purchase of Rotary Drill for AED	B5,B7 ,B8,B10	No's/Ha	72	2	144.00	2	144.00	2	144.00	0	0.00	0	0.00	6	432.00
44	Purchase of Air Compressor 750 cfm for AED	B5	No's/Ha	25	1	25.00	0	0.00	0	0.00	0	0.00	0	0.00	1	25.00
45	Purchase of Resitivity Metres for AED	B5,B7 ,B8,B10	No's/Ha	3	1	3.00	1	3.00	1	3.00	1	3.00	0	0.00	4	12.00
46	Purchase of Electrical Loggers for AED	B5,B7 ,B8,B10	No's/Ha	7.5	1	7.50	1	7.50	1	7.50	1	7.50	0	0.00	4	30.00
47	<b>Solar Energy</b>															
48	<b>5 hp</b>	All Blocks	No's/Ha	3.75	50	187.50	50	187.50	50	187.50	50	187.50	50	187.50	250	937.50
49	<b>7.5 hp</b>	All Blocks	No's/Ha	5.3	50	265.00	50	265.00	50	265.00	50	265.00	50	265.00	250	1325.00
50	<b>upto 400sq.ft</b>	All Blocks	No's/Ha	4.25	10	42.50	10	42.50	10	42.50	10	42.50	10	42.50	50	212.50
51	<b>Information Technology (IT) related</b>															

Sl. No.	Inter-ventions	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
	<b>items</b>															
52	Computer & its accessories		No's/Ha	0.8	2	1.60	1	0.80	1	0.80	1	0.80	1	0.80	6	4.80
53	Tablet (Tab)	All Blocks	No's/Ha	0.25	4	1.00	2	0.50	2	0.50	2	0.50	2	0.50	12	3.00
54	Xerox machine	B5,B7	No's/Ha	1.5	1	1.50	1	1.50	0	0.00	0	0.00	0	0.00	2	3.00
55	<b>Mecanized row crop cultivation-Pilot mechanization Demonstration</b>	All Blocks	No's/Ha	0.04	25	1.00	20	0.80	20	0.80	10	0.40	10	0.40	85	3.40
56	Chain saw/ Wheel barrow/ Mango grader/ planter and other suitable self propelled machineries and equipments for horticulture Crops	All Blocks	No's/Ha	1	20	20.00	10	10.00	10	10.00	10	10.00	10	10.00	60	60.00
57	<b>Manual Horticultural Equipments</b>															

Sl. No.	Inter-ventions	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
58	Aluminium Ladder/ Ladder	All Blocks	No's/Ha	0.2	20	4.00	10	2.00	10	2.00	10	2.00	10	2.00	60	12.00
59	Aluminium pole	All Blocks	No's/Ha	0.03	20	0.60	10	0.30	10	0.30	10	0.30	10	0.30	60	1.80
60	Plucker	All Blocks	No's/Ha	0.02	20	0.40	10	0.20	10	0.20	10	0.20	10	0.20	60	1.20
61	<b>Post Harvest Equipments for food grains, oil seeds and Horticultural Equipments</b>															
62	Mini Rice Mill	B5,B7 ,B8,B10	No's/Ha	1.5	2	3.00	2	3.00	0	0.00	1	1.50	1	1.50	6	9.00
63	Mini Dal Mill	B5,B7 ,B8,B10	No's/Ha	1.7	2	3.40	2	3.40	1	1.70	1	1.70	1	1.70	7	11.90
64	Oil mill with filter press (for all type of Horticulture / Food grain / Oil seeds crop)	B5,B7 ,B8	No's/Ha	1.2	2	2.40	2	2.40	0	0.00	0	0.00	1	1.20	5	6.00
65	Packing Machines (for all types of Horticulture / Food grain / Oil seeds crop)	B5,B7 ,B8,B10	No's/Ha	3	4	12.00	2	6.00	2	6.00	0	0.00	1	3.00	9	27.00

Sl. No.	Inter-ventions	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
66	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)	B5,B7 ,B8,B10	No's/Ha	1.2	4	4.80	0	0.00	1	1.20	1	1.20	1	1.20	7	8.40
67	All types of Boiler/ Steamer/ Dryer solar (for all type of Horticulture / Food grain / Oil seeds crop)	B5,B7 ,B8,B10	No's/Ha	2	2	4.00	1	2.00	1	2.00	1	2.00	1	2.00	6	12.00
68	All types of Grinder/ Pulveriser/ Polisher (for all type of	B5,B7 ,B8,B10	No's/Ha	0.3	2	0.60	2	0.60	1	0.30	1	0.30	1	0.30	7	2.10

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
	Horticulture / Food grain / Oil seed crop)															
69	All types of Cleaner cum grader/ Gradient separator/ Specific gravity separator (for all types of Horticulture / Food grain / Oil seed crop)	B5,B7 ,B8,B10	No's/Ha	0.75	2	1.50	2	1.50	1	0.75	1	0.75	1	0.75	7	5.25
70	<b>Construction of Agricultural Engineering Extension centres (AEECs)</b>	All Blocks	No's/Ha	75	2	150.00	2	150.00	3	225.00	2	150.00	2	150.00	11	825.00
71	<b>Training of AED Engineers on " Agricultural Processing" and " Bio-Energy"</b>	All Blocks	No's/Ha	0.04	4	0.16	4	0.16	4	0.16	4	0.16	4	0.16	20	0.80

Sl. No.	Inter-ventions	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
72	<b>Prevention of sea water intrusion</b>															
73	Subsurface dyke	All Blocks	No's/Ha	15	0	0.00	5	75.00	5	75.00	5	75.00	6	90.00	21	315.00
74	Farm Pond	All Blocks	No's/Ha	1	0	0.00	100	100.00	150	150.00	200	200.00	200	200.00	650	650.00
75	Recharge shaft	All Blocks	No's/Ha	1.5	0	0.00	50	75.00	100	150.00	100	150.00	100	150.00	350	525.00
76	Weir/ Bed Dam	B5,B7 ,B8,B10	No's/Ha	30	0	0.00	2	60.00	2	60.00	1	30.00	0	0.00	5	150.00
	<b>Grand total</b>					<b>5896.01</b>		<b>4593.71</b>		<b>4793.26</b>		<b>4589.36</b>		<b>4545.56</b>		<b>24417.90</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **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.

#### **Project components**

- ✓ Constructed of regulated market- to be covered in Thirumarugal block
- ✓ Construction of Storage godown for commodity groups- to be covered in Kuthalam block
- ✓ Construction of drying yards- covered in all blocks
- ✓ Formation of Farmer Producer Organizations (FPO)- to be covered in Kilvelur and Vedaranyam blocks
- ✓ Imparting value addition trainings to commodity group farmers- to be covered in all blocks
- ✓ Exposure visit (within state & outside state) for commodity group farmers to acquire value addition technologies- to be covered in all blocks

#### **Budget**

The district plan proposes an outlay of ₹. 777.75 Lakh over a period of five years for Nagapattinam district. The details of budget requirement for each intervention across the blocks are shown in **Table 4.17**.

**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.

**Implementing Agency**

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

**Table 4.17. Budget for Strengthening of Agricultural Marketing and Agri-Business in Nagapattinam District**

(₹. in lakhs)

Sl. No.	Intervention	Unit (Nos.)	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
	<b>Strengthening of Uzhavar Sandhai and Regulated Market</b>															
1	Drying Yard	Nos	5.5	All Blocks	12	66.00	18	99.00	15	82.50	20	110.00	15	82.50	80	440.00
2	construction of regulated market	1	150	B4		0.00	1	150.00		0.00		0.00		0.00	1	150.00
3	Storage godown	Nos	7.5	B8	1	7.50		0.00		0.00		0.00		0.00	1	7.50
4	office automation	1	3	B10	1	3.00		0.00		0.00		0.00	1	3.00	2	6.00
	<b>Formation of FPO / Strengthening of Existing Commodity Groups</b>															
5	FPO	Nos.	0.25	B3, B7	4	1.00	4	1.00	4	1.00	1	0.25	1	0.25	14	3.50
	<b>Provision of Market Access and Market Activities</b>															
6	Tarpaulin	4	0.08	All Blocks	110	8.80	110	8.80	110	8.80	110	8.80	110	8.80	550	44.00
	<b>Capacity building Programme</b>															
7	Exposure Visits - within state	Nos.	0.75	All Blocks	6	4.50	10	7.50	11	8.25	11	8.25	11	8.25	49	36.75
8	Exposure Visits - outside state - 3 days	Nos.	1.5	All Blocks	6	9.00	10	15.00	11	16.50	11	16.50	11	16.50	49	73.50
9	Training on Market led Extension, Agmark grading&Food safety, post harvest technology, Supply Chain Management, Grading-sorting-packing, Market linkages & Exports, Food processing and value addition at district level	Nos.	0.3	All Blocks	11	3.30	11	3.30	11	3.30	11	3.30	11	3.30	55	16.50
	<b>Grand total</b>					<b>103.10</b>		<b>284.60</b>		<b>120.40</b>		<b>147.10</b>		<b>122.60</b>		<b>777.75</b>

**B1-Nagapattinam, B2- Keelaiyur, B3-Kilvelur, B4-Thirumarugal, B5-Thalainayar, B6- Vedaranyam, B7-Mayiladuthurai, B8-Kuthalam, B9-Sembanarkoil, B10-Sirkali, B11-Kollidam**

#### **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 Tamil nadu 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.

##### **Project components**

- Strengthening of Seed Testing laboratories (to be covered in all blocks)

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 Dehumidifier, R.O. System, Humidifier,

Thermo hydrometer, Digital Moisture meter, Microscope, Working table, Working Chair, Air conditioner, Sample Racks, Geaser, Heater, Trolley for Carriages, Generator 30KV, Induction Stove, Fabricated Display Racks, Conductivity Meter, Dehuller/Scarifier, Seed Grinder, Blower, Hot Air oven, Incubator and Miscellaneous are required.

- Creation of infrastructure facilities in seed testing laboratories

A laboratory may be a completely separate building, or a part of a larger building housing a department. Regardless of how this space need is met a minimum of 1500 sq. ft. of working space should be provided for the laboratory analyzing about 10000 samples annually. The space provided should be divided into general work areas. These may be completely separate rooms or they may be portions of the same room. The areas to be considered include sample receiving, preparation, purity analysis, germination, seed storage, tags, supplies, mailing, general storage and office with a main objective to occupy large number of samples.

- Capacity building (to be covered in all blocks)

Promotion of quality seed production and distribution the training programmes would be organized. The training to be given on the seed production to seed producers. The training includes seed growers who are mostly small and marginal farmers. Also training to be given to the seed dealers on quality maintenance in storage, selling of seeds.

- Strengthening of communication and networking facilities (to be covered in all blocks)

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

### **Expected outcome**

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

### **Budget**

The overall budget requirement for implementation of above interventions is ₹. 27.16 Lakh. The details of budget requirement for each intervention across the blocks are shown in **Table 4.18**.

### **Implementing agency**

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

**Table 4.18. Budget for Seed and Organic Certification in Nagapattinam District**

(₹. in Lakh)

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
<b>I</b>	<b>Strengthening of Seed Certification lab</b>															
	Blower, Conductivity meter, Dehuller/Scarifier, Dehumidifier Air Conditioner, Digital moisture meter, Dunnage, Fabricated display Racks, Geaser, Generator, Heater, Hot air oven, Humidifier, Incubator, Induction stove, Microscope, Moisture meter, Packing machine, R. O system, Sample racks, Seed Grinder, Sieve, Thermohydro meter, Dunnage, Trolley for carriages, Working chair, Working table, Miscellaneous,	All Blocks	No's	13.36	0	0.00	1	13.36	0	0.00	0	0.00	0	0.00	1	13.36
<b>II</b>	<b>Strengthening of communication and networking facilities</b>															
	Computer accessories	All Blocks	No's	0.5	10	5.00	0	0.00	0	0.00	0	0.00	0	0.00	10	5.00
<b>III</b>	<b>Capacity Building</b>															
	Training to seed grower for quality seed production	All Blocks	No's	0.2	0	0.00	11	2.20	11	2.20	11	2.20	11	2.20	44	8.80
	<b>Total</b>					<b>5.00</b>		<b>15.56</b>		<b>2.20</b>		<b>2.20</b>		<b>2.20</b>		<b>27.16</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### 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 12<sup>th</sup> five year plan. The major interventions are:

- ✓ Increasing the availability of fodder through field level interventions (to be covered in all blocks)
- ✓ Increasing the availability of fodder by strengthening farm infrastructure (to be covered in all blocks)
- ✓ Livestock breeding management (to be covered in all blocks)
- ✓ Improving the livestock productivity (to be covered in all blocks)
- ✓ Improving the service delivery at veterinary institutions (to be covered in all blocks)
- ✓ Enhancing livestock management (to be covered in all blocks)
- ✓ Capacity building

1. Campaigns and creating awareness- (to be covered in all blocks)
2. Hands on training- to be covered in Sembanarkoil block

### **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.

- ✓ Establishment of vermicomposting unit- (covered in all blocks)
- ✓ Distribution of Azolla trays-(covered in all blocks)
- ✓ Fodder plot development- (covered in all blocks)
- ✓ Meikal land development -(covered in all blocks)
- ✓ Distribution of seedlings, sprinklers, grass cutter and raingun to the farmers-(covered in all blocks)
- ✓ Development of seed production plots -(covered in 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 centres where best practices can be disseminated to the farmers. The following infrastructure facilities will strengthen the fodder availability such as

- ✓ Establishment of farm production cover- covered in all blocks except in Sirkali block
- ✓ Construction of silo pit and overhead tanks- covered in all blocks
- ✓ Establishment of feed mixing units- covered in all blocks
- ✓ Installation of rain gun and sprinklers- covered in all blocks
- ✓ Procurement of agri inputs- covered in all blocks

### **Livestock breeding management**

Over the past few decades, imported exotic cow varieties have gain a boost in milk production in Tamil Nadu. Most of the cattle breeds are exotic. These breeds theoretically produce a lot of milk, but are not well-adapted to our conditions. About 69% of Indian cows are owned by the economically poor strata of the society. These folks cannot afford to house these exotic breeds in regulated climate conditions.

The government has significantly mismanaged cow breeding. The average milk yield per animal in India is just 3.2 kgs, compared to a global average of 6.6 kgs. The dairy policy and outlook is highly outdated and needs to be replaced with modern, evidence-based thinking

Livestock industry continues to demonstrate a beneficial impact on rural people by improving their income, employment and consumption and thereby acting as a potential tool in alleviating rural poverty. Artificial insemination (AI) has proven to be very effective for the improvement of the genetic potential of animals for higher production

and there is no surprise why today AI is the back bone of all breeding programmes in India. The replacement of unproductive and ageing animals in the herd and its expansion are very important to maintain the scale of economy of the farm. Augmentation of fertility in repeat breeders and sex-sorted semen are some of the modern scientific tools which have been proposed to be employed for effective breeding management to enhance the livestock fertility and productivity. The following interventions will help to improve livestock breeding management, such as

- ✓ CIDR- covered in all blocks
- ✓ Establishment and distribution of sex-sorted semen facility
- ✓ Establishment of IVF lab- covered in all blocks
- ✓ Establishment of LN2 and embryo transfer lab
- ✓ Oestrous synchronization

### **Livestock health**

A large number of infectious and metabolic diseases prevalent in Indian livestock have serious implication for animal productivity, export potential and safety/ quality of livestock products and many of these diseases have zoonotic implications. The current efforts of prevention and control of livestock diseases needs to be strengthened. There is a shortage of veterinary and Para-veterinary manpower and facilities including mechanisms for diagnosis, treatment, tracking and prevention of the diseases. Adequate infrastructure for ensuring bio-security, proper quarantine systems and services to prevent the ingress of diseases across the states and national borders is not available. By providing the following facilities will prevent the above diseases such as

- ✓ Upgradation of vaccine production facilities for bacteria and virus
- ✓ Procurement of vaccines, medicine, diagnostic kit
- ✓ Animal quarantine facility in govt. farm
- ✓ Animal testing facility

### **Improving the livestock productivity**

Although India is a major producer of livestock products the average productivity of livestock is lower compared to world average. Inadequate availability of feed and fodder, insufficient coverage through artificial insemination, low conception rates, non-availability of quality males for breeding, poor management practices, high mortality and morbidity losses due to diseases, inadequate marketing infrastructure and unorganized marketing are the other major concerns. To maximize the livestock productivity the following activities should be implement. The intervention have been propose are

- ✓ Distribution of sheep, goat, buffalo, piggery, poultry units to be covered in all blocks
- ✓ Establishment of modern poultry, rabbit , piggery, sheep, goat and bull shed covered in all blocks to be covered in all blocks
- ✓ Popularizing quail rearing to be covered in all blocks
- ✓ Integrated farming were to be covered in 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

- ✓ Deep freezer facility for storage of vaccines and medicines to be covered in all blocks
- ✓ Establishment of infrastructure facilities, disease diagnostic lab, mobile veterinary units, surgical theatres and ambulance facilities to be covered in all blocks

### **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 is helpful to enhancing livestock management. The intervention have been propose are

- ✓ Animal identification and traceability- to be covered in all blocks
- ✓ Conservation of indigenous breeds- to be covered 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.

- ✓ Establishment of farmers training Centre- to be covered in all blocks
- ✓ Conducting demonstrations camps and campaigns- to be covered in all blocks
- ✓ Creating awareness of livestock management to the farmers through training programmes- to be covered in all blocks

### **Budget**

The major themes proposed in the plan for animal husbandry sector with a total budget out lay of ₹. 5640.45 Lakh (Table 4.19).

### **Implementing agency**

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

**Table 4.19 Budget requirement for Animal Husbandry Sector in Nagapattinam District**

(₹. 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		
<b>Increasing the Availability of Fodder through Field level Interventions</b>																
1	Establishment of Vermi-composting unit (single bed)	Nos	0.05	All Blocks	44	2.20	44	2.20	44	2.20	44	2.20	44	2.20	220	11.00
2	Fodder production to the farmers by Hydroponic methods	Nos	0.1	All Blocks	60	6.00	60	6.00	60	6.00	60	6.00	60	6.00	300	30.00
3	Distribution of Azolla trays	Nos	0.03	All Blocks	550	16.50	550	16.50	550	16.50	550	16.50	550	16.50	2750	82.50
4	Distribution of Silage bags for conservation of fodder crops	Nos	0.005	All Blocks	44	0.44	44	0.44	44	0.44	44	0.44	44	0.44	220	2.20
5	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
6	Meikal land development (incl infrastructure development)	acre	6	All Blocks	22	132.00	22	132.00	22	132.00	22	132.00	22	132.00	110	660.00
7	Distribution of Raingun to Livestock farmers	0	0	All Blocks	88	22.00	88	22.00	88	22.00	88	22.00	88	22.00	440	110.00
8	Distribution of sprinkler for fodder production	0	0	All Blocks	88	13.20	88	13.20	88	13.20	88	13.20	88	13.20	440	66.00
<b>Increasing the Availability of Fodder by Strengthening Farm Infrastructure</b>																
9	Establishment of Farm Protection Cover (Bio-	0	0	All Blocks except	10	30.00	10	30.00	10	30.00	10	30.00	10	30.00	50	150.00

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
	security wall)			B8												
10	Establishment of Feed mixing/ feed block units	0	0	All Blocks	44	22.00	44	22.00	44	22.00	44	22.00	44	22.00	220	110.00
11	Construction of Over Head Tanks/ GLR / Pre-fabricated tanks in farm	0	0	All Blocks	44	26.40	44	26.40	44	26.40	44	26.40	44	26.40	220	132.00
12	Drip irrigation for livestock farms	0	0	All Blocks	11	88.00	0	0.00	0	0.00	0	0.00	0	0.00	11	88.00
<b>Livestock Breeding Management</b>																
13	CIDR (Controlled Internal Drug Release) for increasing Fertility in Cattle	Nos	0.01	All Blocks	2050	20.50	2050	20.50	2050	20.50	2050	20.50	2050	20.50	10250	102.50
14	Distribution of sex sorted semen to veterinary institution	Nos	0.015	All Blocks	8800	176.00	8800	176.00	8800	176.00	8800	176.00	8800	176.00	44000	880.00
<b>Improving the Livestock Productivity</b>																
15	Distribution of Sheep/Goat units -semi intensive system	Nos	0.6	All Blocks	220	132.00	220	132.00	220	132.00	220	132.00	220	132.00	1100	660.00
16	Distribution of Buffalo units(5 Buffaloes)	Nos	4.5	All Blocks	22	99.00	22	99.00	22	99.00	22	99.00	22	99.00	110	495.00
17	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

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
18	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
19	Establishment of disposal pits for poultry unit	Nos	1	All Blocks	22	22.00	22	22.00	22	22.00	22	22.00	22	22.00	110	110.00
20	Distribution of Piggery units (fattening-5 Nos)	0	0	All Blocks	11	13.75	11	13.75	11	13.75	11	13.75	11	13.75	55	68.75
<b>Improving the Service Delivery at Veterinary Institutions</b>																
21	Deep freezer facility for Storage of vaccines and Medicines	Nos	10	All Blocks	0	0.00	0	0.00	11	110.00	0	0.00	0	0.00	11	110.00
22	Establishment of Mobile Disease Diagnostic Labs	Nos	20	B11	1	20.00	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00
23	Establishment of Mobile Veterinary Units	Nos	10	All Blocks Except B9, B11	9	90.00	0	0.00	0	0.00	0	0.00	0	0.00	9	90.00
24	Establishment of surgical theatres at veterinary institution	Nos	30	All Blocks	3	90.00	2	60.00	2	60.00	2	60.00	2	60.00	11	330.00
25	Providing solar lighting panels at veterinary institution	Nos	1	All Blocks	11	11.00	11	11.00	11	11.00	11	11.00	11	11.00	55	55.00
26	Package of Modern Veterinary Diagnostic Aids to Veterinary	Nos	30	All Blocks	3	90.00	2	60.00	2	60.00	2	60.00	2	60.00	11	330.00

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
	Institutions such as Computerised X rays, Ultrasound, Diathermy etc.															
27	Establishment of Ambulance facility for animals	Nos	80	B6	1	80.00	1	80.00	0	0.00	0	0.00	0	0.00	2	160.00
	<b>Livestock Management</b>															
28	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
29	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
	<b>Capacity Building</b>															
30	Establishment of Farmers training Centre	Nos	200	B6	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
31	Conducting Demonstrations, Camps and Campaigns	Nos	0.1	All Blocks	110	11.00	110	11.00	110	11.00	110	11.00	110	11.00	550	55.00
32	Creating awarness of livestock management to the farmers through Training Programmes	Nos	0.1	All Blocks	11	1.10	11	1.10	11	1.10	11	1.10	11	1.10	55	5.50
33	Update of scientific	0	0	B7	1	3.00	1	3.00	1	3.00	1	3.00	1	3.00	5	15.00



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
	advancement and technical skill of Veterinarians (Workshop, Hands-on trainings)															
	<b>Grand total</b>					<b>1478.09</b>		<b>1228.09</b>		<b>1058.09</b>		<b>938.09</b>		<b>938.09</b>		<b>5640.45</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **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 per cent of the world's buffaloes and 20 per cent 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.

##### **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,

- ✓ Milk storage tanks of various capacities- to be covered in all blocks
- ✓ Milk tankers- to be covered in all blocks
- ✓ Milk pumps to be covered in all blocks
- ✓ Processing equipment's- to be covered in all blocks
- ✓ Pasteurizers- to be covered in all blocks
- ✓ Heaters and chillers- to be covered in all blocks

- ✓ Washer and conveyors- to be covered in all blocks
- ✓ Pipes and fittings- to be covered in all blocks
- ✓ Cleaning equipment's - were covered in all blocks
- ✓ Electrical installations (UPS, generators, stabilizers, control panel)- to be covered in all blocks

### **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.

- ✓ Provision of veterinary medicine - to be covered in all blocks
- ✓ Fodder development equipment and seed material- to be covered in all blocks
- ✓ Milk testing equipment's- to be covered in all blocks
- ✓ Equipment's for artificial insemination- to be covered in all blocks
- ✓ Milk society buildings and cow shed - to be covered in all blocks
- ✓ Cryogenic containers - to be covered in all blocks
- ✓ Weighing machines - to be covered in all blocks
- ✓ Computer accessories - to be covered in all blocks

### **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 per cent 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.

- ✓ Training of personnel of MPCs, Union and federation - to be covered in all blocks
- ✓ Infertility camps - to be covered in all blocks

### **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

- ✓ Parlour structure- to be covered in all blocks
- ✓ Milk product storage cabinets to be covered in all blocks
- ✓ Product billing system- to be covered in all blocks

### **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

- ✓ Adulteration detection equipment's- to be covered in all blocks

- ✓ Milk testing equipment and laboratory - to be covered in all blocks

### **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

- ✓ Dairy processing plants- to be covered in all blocks
- ✓ Water and effluent treatment plants- to be covered in all blocks
- ✓ Fat handling and other dairy equipment's to be covered in all blocks

### **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. BMC building-was covered in all blocks
2. Ware house for dairy products- was covered in all blocks

### **Budget**

An outlay of **₹. 2888.25 Lakh** is proposed to fulfill the aforementioned interventions for five years. This foresighted implementation of developmental schemes in Dairy Sector

has enabled to increase the per capita income of rural households in backward Districts. The details of budget requirement for each intervention across the blocks are shown in Table 4.20.

**Implementing agency**

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

**Table 4.20 Budget requirement for Dairy Development Sector in Nagapattinam District**

(₹. in Lakh)

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
<b>Engineering section</b>																
1	Electrical installation like Tranformemr, UPS, Stabilisers, Control Panel MCC etc.,	All blocks	1	25	1	25.00	1	25.00	0	0.00	0	0.00	0	0.00	2	50.00
2	Milk Storage Tanks of various capacities	All blocks	1	15	0	0.00	2	30.00	2	30.00	2	30.00	2	30.00	8	120.00
3	Tub washer, Canwashers, Crate conveyor systems.	All blocks	1	10	0	0.00	0	0.00	0	0.00	1	10.00	1	10.00	2	20.00
4	SS pipes and fittings	All blocks	1	5	1	5.00	1	5.00	1	5.00	1	5.00	1	5.00	5	25.00
5	Solar system for water heating	All blocks	1	2	2	4.00	2	4.00	2	4.00	2	4.00	2	4.00	10	20.00
6	Packing Machineries for milk, Butter, Ghee, SMP and Other Milk products	All blocks	1	18	0	0.00	2	36.00	2	36.00	0	0.00	0	0.00	4	72.00
7	Plate Heat type Chillers and pasteurizers	All blocks	1	10	1	10.00	0	0.00	0	0.00	1	10.00	0	0.00	2	20.00
8	Milk Pumps of Vaious capacities	All blocks	1	0.5	5	2.50	5	2.50	5	2.50	5	2.50	5	2.50	25	12.50
9	Generator of various capacities	All blocks	1	20	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00	1	20.00
10	Cleaning In Place equipments with accessories	All blocks	1	75	0	0.00	0	0.00	1	75.00	0	0.00	0	0.00	1	75.00

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
	<b>Procurement and Input</b>															
11	Veterinary Medicine	All blocks	1	2	2	4.00	2	4.00	2	4.00	2	4.00	2	4.00	10	20.00
12	Two wheeler for AI technician	All blocks	1	0.5	5	2.50	5	2.50	5	2.50	5	2.50	5	2.50	25	12.50
13	Computer system with accessories	All blocks	1	0.5	5	2.50	5	2.50	5	2.50	5	2.50	5	2.50	25	12.50
14	Fodder seed materials	All blocks	1	0.25	5	1.25	5	1.25	5	1.25	5	1.25	5	1.25	25	6.25
15	Fodder development equipments like chaff cutter, Mower etc.,	All blocks	1	0.2	15	3.00	15	3.00	15	3.00	15	3.00	15	3.00	75	15.00
16	Bulk Milk coolers of Various capacities	All blocks	1	15	2	30.00	2	30.00	2	30.00	2	30.00	2	30.00	10	150.00
17	Milk cans	All blocks	1	0.035	200	7.00	200	7.00	200	7.00	200	7.00	200	7.00	1000	35.00
18	Electronic weighing scales of various capacities.	All blocks	1	0.3	5	1.50	5	1.50	5	1.50	5	1.50	5	1.50	25	7.50
19	Electronic milk testing equipments	All blocks	1	1.25	5	6.25	5	6.25	5	6.25	5	6.25	5	6.25	25	31.25
20	Milking machine	All blocks	1	0.8	5	4.00	5	4.00	5	4.00	5	4.00	5	4.00	25	20.00
21	Cow shed	All blocks	1	5	5	25.00	5	25.00	5	25.00	5	25.00	5	25.00	25	125.00
22	Society Buildings	All blocks	1	20	5	100.00	5	100.00	5	100.00	5	100.00	5	100.00	25	500.00
23	Cryogenic containers	All blocks	1	0.35	5	1.75	5	1.75	5	1.75	5	1.75	5	1.75	25	8.75
24	Equipments for Artificial Insemination	All blocks	1	0.5	5	2.50	5	2.50	5	2.50	5	2.50	5	2.50	25	12.50
	<b>Capacity building</b>															
25	Training of personnel of MPCS, Union and Federation.	All blocks	1	0.05	50	2.50	50	2.50	50	2.50	50	2.50	50	2.50	250	12.50
26	Infertility Camps	All blocks	1	0.2	50	10.00	50	10.00	50	10.00	50	10.00	50	10.00	250	50.00



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
	<b>Marketing</b>															
27	Parlour structures	All blocks	1	5	10	50.00	10	50.00	10	50.00	10	50.00	10	50.00	50	250.00
28	Milk product storage cabinets	All blocks	1	0.3	100	30.00	50	15.00	50	15.00	50	15.00	50	15.00	300	90.00
29	Product Billing systems	All blocks	1	0.3	100	30.00	100	30.00	100	30.00	100	30.00	100	30.00	500	150.00
	<b>Quality control</b>															
30	Adulteration detection equipments	All blocks	1	4	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	5	20.00
31	Milk testing equipment and Laboratory.	All blocks	1	5	1	5.00	1	5.00	1	5.00	1	5.00	1	5.00	5	25.00
	<b>Processing</b>															
32	Effluent treatment plant	All blocks	1	100	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
33	Fat handling equipments	All blocks	1	200	0	0.00	0	0.00	1	200.00	0	0.00	0	0.00	1	200.00
34	Dairy equipments	All blocks	1	50	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00
	<b>Civil work Infrastructure</b>															
35	BMC buildings	All blocks	1	15	2	30.00	2	30.00	2	30.00	2	30.00	2	30.00	10	150.00
36	Ware house for Dairy products	All blocks	1	200	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
	<b>Grand total</b>					<b>449.25</b>		<b>790.25</b>		<b>740.25</b>		<b>449.25</b>		<b>459.25</b>		<b>2888.25</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

## 4.8. Fisheries

Indian fisheries and aquaculture is an important sector of food production, providing nutritional security to the food basket, contributing to the agricultural exports and engaging about fourteen million people in different activities. With diverse resources ranging from deep seas to lakes in the mountains and more than 10% of the global biodiversity in terms of fish and shellfish species, the country has shown continuous and sustained increments in fish production since independence. Constituting about 6.3% of the global fish production, the sector contributes to 1.1% of the GDP and 5.15% of the agricultural GDP. The total fish production of 10.07 million metric tonnes presently has nearly 65% contribution from the inland sector and nearly the same from culture fisheries. Hence its necessary to improve the fisheries development throughout the country.

Fisheries, the Economic backbone of this coastal District. Having a long coastal area, this District plays a major role in marine commodities. The marine ecosystem provides mankind with food, medicines, industrial products and pleasure. This ecosystem has to be maintained in a healthy state, if it is to provide people the benefits in a sustained manner.

### **I. Enhancement of fisheries production** (to be covered in all blocks except in Kuthalam, Mayiladuthurai, Thalainayar and Thirumarugal blocks)

Aquatic plants growing in ponds and lakes are beneficial for fish and wildlife. They provide food, dissolved oxygen, and spawning and nesting habitat for fish and waterfowl. Aquatic plants can trap excessive nutrients and detoxify chemicals. However, dense growths (over 25% of the surface area) of algae and other water plants can seriously interfere with pond recreation and threaten aquatic life. Water plants can restrict swimming, boating, fishing, and other water sports. Biological controls for aquatic vegetation have received considerable publicity. Several species of fish are herbivorous in that their principal diet is aquatic vegetation. One such species, the grass carp (also known as the white amur or Chinese carp), is being tested in various parts of the country. Hence in this district it is suggested to implement the biological control of aquatic weeds by stocking of Grass Carps in Aquatic Weed Infested water bodies.

Tremendous potential exists in India to augment fish production from freshwater aquaculture resources, which are spread across the length and breadth of the country. 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 through increasing Fishing Efficiency of Inland Fishermen and Fish Farmers, Enhancement of Fish production in irrigation tanks and panchayat tanks by stocking fish seeds, Promotion of quality fish marketing by traditional fishers by providing moped with ice box, Increasing safety at sea by providing life safety appliances,Improvement of hygienic fish handling by providing ice boxes,Propagation of Fish Culture in Multi-purpose farm ponds,Up gradation of Fishing Efficiency of Inland Fishermen and Introduction of short seasonal fish species in existing farm ponds.

## **II. Infrastructure and assets** (to be covered in all blocks)

Fish Farming is an age old activity and in practice from ancient times. The successful fish culture requires ploughing 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. Hence the construction of fish ponds in this district is recommended for its commercial production

The handling, processing, and marketing of fish products are essential complementary functions of all food production systems. Marketing of fish products usually provides rural women with their source of income. In rural areas the customers become aware of a pond harvesting by informal contacts and buy their fish at the pond site. Most of the customers are women, who use the fish for home consumption or local marketing. The closer the market is to the farm, the fewer intermediaries and the greater the chance that women become actively involved in marketing aquatic products..

The establishment of domestic markets plays a very crucial role in the development of fisheries sector in the country. Apart from ensuring nutritional and food security, it also helps in minimizing post-harvest losses, increase revenue, enhance employment opportunities and offers high standards of hygiene and sanitation leading to food safety. The importance of domestic marketing can be understood from the fact that only about 15% of the total fish landing is utilized for export of fishery products and the remaining about 85% is distributed through domestic markets. As more and more trade restrictions are being imposed on the fishery product exports, a well-developed domestic marketing system only can ensure the viability of the fisheries sector. Hence it is necessary to improve the hygienic fish marketing by establishing modern fish kiosk TNFDC, construction of shrimp farms for DFFDA farmers and Increasing fish production in existing fish/shrimp farms by providing aerators and infrastructure

**III. Capacity Building** (to be covered in all blocks except in Kollidam, Kuthalam, Mayiladuthurai, Sembanarkoil and Sirkali blocks)

Effective extension support is essential for the promotion of Aquaculture in freshwater and brackish water areas. It is necessary to establish the information centres/data dissemination centres in Fishermen villages, animation camps in fisheries villages, seminars, exhibitions and workshop, and awareness centres for linking the fishing villages, marketing centres and the district offices.

**Budget**

The budget requirement for fulfilling the above interventions is ₹ 2633.25 Lakh

**Implementing agency**

Department of Fisheries will be implementing the project

**Table 4.21 Budget requirement for Fisheries in Nagapattinam District**

(₹ in Lakh)

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
	<b>Enhancement of fisheries</b>															
1	Up gradation of Fishing Efficiency of Inland Fishermen of Tamil Nadu.	All Blocks	No's	0.05	55	2.75	55	2.75	55	2.75	55	2.75	55	2.75	275	13.75
2	Propagation of Fish Culture in Multi-purpose farm ponds in Tamil Nadu	All Blocks	Ha.	0.4	110	44.00	110	44.00	110	44.00	110	44.00	110	44.00	550	220.00
3	Promotion of quality fish marketing by traditional fishers by providing mobbed with icebox	All Blocks except Kuthalam, Mayiladuthurai, Thalainayar, thirumarugal	No's	0.6	280	168.00	280	168.00	280	168.00	280	168.00	280	168.00	1400	840.00
4	Introduction of short seasonal fish species in existing farm ponds	All Blocks	Ha.	0.25	110	27.50	110	27.50	110	27.50	110	27.50	110	27.50	550	137.50
5	Increasing safety at sea by providing life buoy/life jackets	All Blocks except Kuthalam, Mayiladuthurai, Thalainayar, thirumarugal	No's	0.03	700	21.00	700	21.00	700	21.00	700	21.00	700	21.00	3500	105.00

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	Increasing fishing efficiency of inland fishermen and fish farmers	All Blocks	No's	0.05	55	2.75	55	2.75	55	2.75	55	2.75	55	2.75	275	13.75
7	Increasing fish production in existing fish/shrimp farms by providing aerators and infrastructure	All Blocks	Ha.	0.25	44	11.00	44	11.00	44	11.00	44	11.00	44	11.00	220	55.00
8	Improvement of hygienic fish handling by providing ice boxes	All Blocks except Kuthalam, Mayiladuthurai, Thalainayar, thirumarugal	No's	0.07	280	19.60	280	19.60	280	19.60	280	19.60	280	19.60	1400	98.00
9	Improvement of hygienic fish marketing by establishing modern fish kiosk TNFDC	Keelaiyur, Kilvelur, Nagapattinam	No's	10	0	0.00	3	30.00	0	0.00	0	0.00	0	0.00	3	30.00
10	Enhancement of Fish production in irrigation tanks and Panchayat tanks by stocking fish seeds	All Blocks	Ha.	0.05	55	2.75	55	2.75	55	2.75	55	2.75	55	2.75	275	13.75
11	Biological Control of Aquatic Weeds by Stocking of Grass Carps in Aquatic Weed Infested water	All Blocks	Ha.	0.02	525	10.50	525	10.50	525	10.50	525	10.50	525	10.50	2625	52.50

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
	bodies															
12	Assistance for construction of shrimp farms for DFFDA farmers	All Blocks	Ha.	2	55	110.00	55	110.00	55	110.00	55	110.00	55	110.00	275	550.00
<b>Creation of infrastructure facilities</b>																
13	Establishment of fish culture ponds and provision of inputs	All Blocks	Ha.	1	11	11.00	11	11.00	11	11.00	11	11.00	11	11.00	55	55.00
<b>Capacity building programme</b>																
14	Establishment of modern mobile fish marketing vehicles	All Blocks except Thalainayar, Vedaranyam	No's	10	0	0.00	9	90.00	0	0.00	0	0.00	5	50.00	14	140.00
15	Exposure visit to farmers to other states	All Blocks except Kollidam, Kuthalam, Mayiladuthura, Sembanarkoil, Sirkali	No's	0.06	30	1.80	30	1.80	30	1.80	30	1.80	30	1.80	150	9.00
16	Marine infrastructure facilities for the fisher-folk of coastal towns and villages	All Blocks	No	400	0	0	0	0	0	0	0	0	5	2000	5	2000
<b>Grand total</b>						<b>492.65</b>		<b>612.65</b>		<b>492.65</b>		<b>492.65</b>		<b>2542.6</b>		<b>4633.25</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.10. Fisheries Research**

Nagapattinam District spreads over an area of 3,678 sq. km with 57.5 kms of coast line and 8104 ha area of inland water resources. The principal river of the district is the Pennar or the Ponnaiyar. The Gadilam River also flows through Nagapattinam District. A part of river Paravanar, also called Uppanar also flows through the district. Major irrigation and long seasonal tanks are spread in 5986 ha area. Veeranam Lake is considered as one of major water resources of the district. There are around 11,735 inland fishermen and a total of 28 Inland Fishermen Co-operative societies are functioning. Around 129 shrimp farms are registered in Coastal Aquaculture Authority. There are fish rearing centers and a number of shrimp aqua farms. A government fish seed farm was located in Lalpettai to supply the Indian Major Carp seeds. But the district does not have training centers exclusive for fisheries to guide the fish and shrimp farmers.

Considering the above, rich potential resources a fisheries training centre (FTC) could be created with the following facilities like a training hall, dormitory hall, wet training lab, etc. If the centre will be created it will help to expert and public for effectively transfer the technology and study the impact of the technology. Also this would help us to cater the needs of technology in the districts in order to redefine the technology transfer programmes for the future.

#### **Project components**

- ✓ Inland Aquaculture- to be covered in Nagapattinam block
- ✓ Harvest and Post harvest management- to be covered in Nagapattinam block
- ✓ Fish resource management and conservation- to be covered in Nagapattinam block
- ✓ Fisheries Engineering- to be covered in Nagapattinam block
- ✓ Incubation centres- to be covered in Nagapattinam block

#### **Budget**

The budget requirement for fulfilling the above interventions is ₹. 12986.91 Lakh (Table 4.22).

#### **Expected outcome**

The creation of infrastructure will enhance the quality of the research and it paves way for the state-of-art for the young researchers. The research and developmental activities is a continuous process, the innovative ideas that emerges from the young minds will help in identifying solutions to the field problem.

#### **Implementing agency**

The projects will be implemented by Tamil Nadu Fisheries University in the various colleges and research stations.



**Table 4.22 Budget Requirement for Fisheries Research in Nagapattinam District**

(₹. in Lakh)

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
<b>1</b>	<b>Aquaculture</b>														
<b>i</b>	<b>Inland Aquaculture</b>														
<b>a</b>	Development of Integrated water reuse system through Multitrophic Aquaculture Practice	455.58	Nagapattinam	1	455.58	0	0.00	0	0.00	0	0.00	0	0.00	1	455.58
<b>2</b>	<b>Harvest and Post harvest</b>														
<b>i</b>	<b>fish processing technology</b>														
<b>a</b>	<b>Fish processing novel technologies and techniques</b>														
<b>1</b>	Development of techniques to improvise and modernize traditional preservation of fish	50	Nagapattinam	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
<b>2</b>	Modernization of dry fish production through solar driver	100	Nagapattinam	1	100.00	1	100.00	1	100.00	1	100.00	1	100.00	5	500.00
<b>b</b>	<b>Value addition and fish product diversification</b>														
<b>3</b>	Development of snack foods from fish	100	Nagapattinam	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
<b>4</b>	Promotion of consumption of farmed Tilapia through product	100	Nagapattinam	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	1	100.00

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
	development and diversification														
5	Development of ready to eat products from farmed freshwater fishes	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
c	<b>Branding of fish products and institutional marketing</b>														
6	Creation of regional production centers for fishery products with state Brand	500	Nagapattinam	1	500.00	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00
d	<b>Reduction of post harvest losses</b>														
7	Awareness to fishers on hygienic handling of fish	0.005	Nagapattinam	133	0.67	133	0.67	133	0.67	133	0.67	133	0.67	665	3.33
8	Creation of awareness among fishers on fish processing technologies	0.6	Nagapattinam	25	15.00	25	15.00	25	15.00	25	15.00	25	15.00	125	75.00
9	Capacity building and skill development programmes on fish processing technologies	6.6	Nagapattinam	13	85.80	13	85.80	13	85.80	13	85.80	13	85.80	65	429.00
e	<b>Enhancement of per capita consumption of fish</b>														
10	Awareness campaign on health beneficial attributes of fish	0.005	Nagapattinam	52	0.26	52	0.26	52	0.26	52	0.26	52	0.26	260	1.30

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
11	Production of short films on nutritive value of fish and screening in theatres and television channels	50	Nagapattinam	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
f	<b>Utilization of seaweeds and other marine resources for food security</b>														
12	Development of neutraceutical products from seaweeds	50	Nagapattinam	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
13	Popularization of seaweed products through mass media	0.005	Nagapattinam	400	2.00	400	2.00	400	2.00	400	2.00	400	2.00	2000	10.00
14	Development of seaweed snack foods	50	Nagapattinam	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
g	<b>Ensuring nutritional security through fish and fishery products</b>														
15	supply of preserved ready to eat and ready to cook fish products through public distribution systems	12.9	Nagapattinam	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
16	Supply of fish and fish products in mid day meal programme	12.9	Nagapattinam	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
17	Supply chain management to promote consumption	64.5	Nagapattinam	0	0.00	1	64.50	0	0.00	0	0.00	0	0.00	1	64.50

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
	of farmed freshwater fishes														
<b>h</b>	<b>Enforcement of international quality standards in fishery products meant for domestic market</b>														
<b>18</b>	Creation of laboratory facility at regional level for testing and certification of fish and fishery products	1000	Nagapattinam	1	1000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	1000.00
<b>19</b>	Establishment of sea food forensic laboratory to ensure supply of quality products to domestic and international market	800	Nagapattinam	1	800.00	0	0.00	0	0.00	0	0.00	0	0.00	1	800.00
<b>20</b>	Establishment of Aquatic Food Safety Analytical Center	500	Nagapattinam	1	500.00	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00
<b>21</b>	Accredited Microbial Quality Testing Laboratory for Certification of Aquatic Food Products in South Tamil Nadu	1000	Nagapattinam	1	1000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	1000.00
<b>i</b>	<b>Utilization of fish processing waste and by catch</b>														
<b>22</b>	installation of waste rendering plant at selected fishing	130	Nagapattinam	0	0.00	1	130.00	0	0.00	0	0.00	0	0.00	1	130.00

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
	harbors and fish markets														
23	Development of fish compost for production of organic agricultural and horticultural crops	65	Nagapattinam	0	0.00	1	65.00	0	0.00	0	0.00	0	0.00	1	65.00
24	Installation of unit for biogas from fish waste	161.5	Nagapattinam	0	0.00	1	161.50	0	0.00	0	0.00	0	0.00	1	161.50
25	Development of technologies for effective utilization of shrimp shell waste	100	Nagapattinam	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
26	Development of peptides from fish processing wastes as dietary supplement	100	Nagapattinam	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
ii	<b>fishing technology</b>														
27	Establishment of ecofriendly fishing gear technology unit to cater the needs of fishermen of Tamil Nadu	350	Nagapattinam	1	350.00	0	0.00	0	0.00	0	0.00	0	0.00	1	350.00
3	<b>Fish resource management and conservation</b>														
b	<b>Indigenous fisheries resource conservation centres</b>														
28	Brackishwater (Pulicat lake and	300	Nagapattinam	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00

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
	Kodiyakarai)														
f	Blue carbon initiative in fisheries resource conservation	1000	Nagapattinam	0	0.00	0	0.00	0	0.00	0	0.00	1	1000.00	1	1000.00
4	<b>Fisheries Engineering</b>														
i	<b>Aquacultural engineering</b>														
a	<b>Farm implements</b>														
29	Design and development of farm implements for effective aquaculture	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
30	Deisgn and development of e interface gadgets for sustainable aquaculture	20	Nagapattinam	0	0.00	1	20.00	0	0.00	0	0.00	0	0.00	1	20.00
b	<b>Harvestors</b>		Nagapattinam	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
31	Deisgn and development of shrimp harvester	25	Nagapattinam	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00	1	25.00
32	Deisgn and development of synchronised harvester for freshwater aquaculture	30	Nagapattinam	1	30.00	0	0.00	0	0.00	0	0.00	0	0.00	1	30.00
c	<b>Renewable energy technologies</b>														
33	Design and development of	200	Nagapattinam	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00

Sl. No.	Interventions	Unit cost	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
	renewable energy power backup for aquacultural farm														
d	<b>Automation technologies</b>														
34	Development of sensors for aquaculture practices	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
35	Development of wireless sensor network monitoring system for aquaculture farms	150	Nagapattinam	1	150.00	0	0.00	0	0.00	0	0.00	0	0.00	1	150.00
36	Development of mobile gadgets/apps for remote monitoring system for aquaculture farms	15	Nagapattinam	0	0.00	1	15.00	0	0.00	0	0.00	0	0.00	1	15.00
e	<b>Advanced aquaculture systems</b>														
37	Design and development of advanced aquaponics systems	50	Nagapattinam	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
38	Deisgn and development of nanocomposites for water recirculation in aquaculture farms	100	Nagapattinam	1	100.00	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00
39	Development of bionanosensor for water quality monitoring system	150	Nagapattinam	1	150.00	0	0.00	0	0.00	0	0.00	0	0.00	1	150.00

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
40	Development of modified abosrbents for waste water treatment system	50	Nagapattinam	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
f	<b>Feeding technologies</b>														
41	Design and development of effective feeders for aquaculture	35	Nagapattinam	1	35.00	0	0.00	0	0.00	0	0.00	0	0.00	1	35.00
ii	<b>Navigation and Fisheries Engineering</b>														
42	Deisgn and construction of fibreboat	250	Nagapattinam	1	250.00	0	0.00	0	0.00	0	0.00	0	0.00	1	250.00
43	Establishment of weather station for effective fishing	300	Nagapattinam	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
44	Establishment of fisheries information technology centre	35	Nagapattinam	1	35.00	0	0.00	0	0.00	0	0.00	0	0.00	1	35.00
45	Development of cost effective gadgets for effective fishing	15	Nagapattinam	1	15.00	0	0.00	0	0.00	0	0.00	0	0.00	1	15.00
46	Development of mobile apps for effective fishing	8	Nagapattinam	1	8.00	0	0.00	0	0.00	0	0.00	0	0.00	1	8.00
iii	<b>Post-harvest fisheries engg</b>														
a	<b>Handling, transportation and storage</b>														



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
47	Design and development of handling devices/machines for fish processing	50	Nagapattinam	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00
48	Design and development of solar powered tricycle for fish vendors	2	Nagapattinam	1	2.00	1	2.00	0	0.00	1	2.00	1	2.00	4	8.00
49	Design and development of cost effective packaging technologies for fish processing	6	Nagapattinam	1	6.00	0	0.00	0	0.00	0	0.00	0	0.00	1	6.00
b	<b>Processing machines</b>														
50	Design and development of shrimp processing machines	15	Nagapattinam	1	15.00	1	15.00	1	15.00	1	15.00	1	15.00	5	75.00
51	Design and development of freshwater fish processing machines	20	Nagapattinam	1	20.00	1	20.00	1	20.00	1	20.00	1	20.00	5	100.00
52	Design and development of gadgets for fish processing	20	Nagapattinam	0	0.00	0	0.00	1	20.00	0	0.00	0	0.00	1	20.00
53	Technologies development for preservation of fish and value added fish products	15	Nagapattinam	1	15.00	0	0.00	0	0.00	0	0.00	0	0.00	1	15.00
c	<b>Waste utilization technologies</b>														

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
54	Design and development of waste utilization centre	85	Nagapattinam	1	85.00	0	0.00	0	0.00	0	0.00	0	0.00	1	85.00
55	Design and development of energy harvesting mechanisms from sea materials	65	Nagapattinam	0	0.00	1	65.00	0	0.00	0	0.00	0	0.00	1	65.00
56	Design and development of nanotechnological applications for fisheries engineering	85	Nagapattinam	1	85.00	0	0.00	0	0.00	0	0.00	0	0.00	1	85.00
5	<b>Fisheries technology transfer</b>														
c	Establishment of Communication Centre to Improve Production and Employment Opportunities in Fisheries Sector in the State through Propagation of Improved technologies	300.9	Nagapattinam	1	300.90	0	0.00	0	0.00	0	0.00	0	0.00	1	300.90
d	Establishment of Fisheries Knowledge Centres for farming and fishing community	500	Nagapattinam	1	500.00	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00
g	Capacity building and training of trainers, fishers, fish farmers and entrepreneurs in	8	Nagapattinam	1	8.00	0	0.00	0	0.00	0	0.00	0	0.00	1	8.00

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
	the adoption of advanced farming techniques														
h	Establishment of Mobile training unit to cater the needs of fishermen of Tamil Nadu on engine maintenance, sea safety and responsible fishing	300	Nagapattinam	1	300.00	0	0.00	0	0.00	0	0.00	0	0.00	1	300.00
6	<b>Incubation centres</b>														
a	Establishment of Fisheries technopark cum fish processing business incubation centre	50	Nagapattinam	1	50.00	0	0.00	1	50.00	0	0.00	0	0.00	2	100.00
b	Establishment of incubation centre for extruded products	65	Nagapattinam	1	65.00	0	0.00	0	0.00	0	0.00	0	0.00	1	65.00
d	Establishment of incubation centre for dried sea food products	150	Nagapattinam	1	150.00	1	150.00	0	0.00	0	0.00	0	0.00	2	300.00
e	Establishment of seafood pack house	300	Nagapattinam	0	0.00	1	300.00	1	300.00	0	0.00	0	0.00	2	600.00
f	Establishment of cold storage centre for sea foods	200	Nagapattinam	1	200.00	1	200.00	0	0.00	0	0.00	0	0.00	2	400.00
	<b>Grand total</b>				<b>8584.20</b>		<b>2012.50</b>		<b>808.73</b>		<b>290.73</b>		<b>1290.73</b>		<b>12986.91</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.11. Public Works Department**

##### **Increasing the ground water level**

The rivers and its branches have become degraded due to various reasons and hence the actual bed level becomes lower than the theoretical bed level resulting into inadequate supply to the offtake canals, thereby leading to excessive drawl of water to meet the demand of tail end areas. In order to alleviate this situation and to enhance the ground water potential, construction of check dams, bed dams and grade walls have been taken up. There is a need for farmer's participation not only in the construction of infrastructure but also in its maintenance to the benefits. The source of the water for tanks only from during the monsoon rains. The run off of the rain water needs to be reduced to store the water in the village itself. Most of the canals and tanks are silted and bushes occupied major part of the tanks and canals, which are major source of flow water for tanks during the rainy period. There by storage capacity of the tank is very much reduced. Hence, to raise the water table level, construction of grade wall need to be taken up in canals to increase the storage capacity of the tanks and there by crop cultivation area in tank ayacut area may be increased.

##### **Project components**

- Construction of grade wall across the rivers – to be covered in Kuthalam, Sirkali and Thirumarugal blocks
- Construction of Check dam- to be covered in Sirkali block

##### **Budget**

It is proposed to incur Rs.35636.00 Lakh over a period of five years

##### **Expected outcome**

The project will increase the Ground water table level and carrying capacity of canals during the heavy rain period and thereby increasing the crop cultivation area. This will result in the ensuring of food security for the people.

##### **Implementing agency**

Department of Public Works will be implementing the project

**Table 4.23 Budget Estimate for PWD works in Nagappattinam District**

(Rs. in Lakh)

Sl. No.	Intervention	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	Infrastructure development work by Constructing Grade Wall Across North Puthar River @ Mile 85/2 To feed Thirumarugal Channel and Kannadikanni Channel in Karaiyeruppu Village of Nagappattinam Taluk and District	Thirumarugal	Ha	0.55	132	72.00	0	0.00	0	0.00	0	0.00	0	0.00	132	72.00
2	Infrastructure development work by Constructing Grade wall across Thirumalairajan river at mile 80/0 in Sagadamangalam Village of Nagapattinam Taluk in Nagapattinam District.	Thirumarugal	Ha	1.75	126	220.00	0	0.00	0	0.00	0	0.00	0	0.00	126	220.00
3	Construct a grade wall across Manjalar river at LS. 109.390 Km to feed A2 Thiruvavaduthurai Puthumadhagu channel and A3 Kunjipanayadi	Kuthalam	Ha	0.43	212	90.00	0	0.00	0	0.00	0	0.00	0	0.00	212	90.00

Sl. No.	Intervention	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 in Thiruvavaduthurai Village of Kuthalam Taluk in Nagapattinam District.															
4	Construction of Grade Wall across Vellapallam Uppanar @ Ls. 10.500 Km in sattanathapuram village of Sirkali Taluk of Nagapattinam District.	Sirkali	Ha	0.47	1163	550.00	0	0.00	0	0.00	0	0.00	0	0.00	1163	550.00
5	Construction of Check dam across coleroon river @ LS. 152.00 Km Thirumailadi (santhapadugai) village in sirkali Taluk in Nagapattinam District.	Sirkali	Ha	11200.00	1	11200.00	0	0.00	0	0.00	0	0.00	0	0.00	1	11200.00
6	Construction of New Tail end Regulator across Cauvery @ LS 152.300 Km in Dharamakulam Village of Sirkali Taluk in Nagapattinam District.	Sirkali	Ha	700.00	1	700.00	0	0.00	0	0.00	0	0.00	0	0.00	1	700.00
7	Infrastructure	Thiru-	Ha	1.75	0	0.00	126	220.00	0	0.00	0	0.00	0	0.00	126	220.00

Sl. No.	Intervention	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
	development work by Constructing Grade wall across Thirumalairajan river at mile 82/0 in Neikunnam Village of Nagapattinam Taluk in Nagapattinam District.	marugal														
8	Infrastructure development work by Constructing Grade wall across Velappar river at mile 83/3 to feed in Periyakannamang alam Channel Periyakannamang alam Village of Nagapattinam Taluk in Nagapattinam District.	Thiru-marugal	Ha	0.66	0	0.00	0	0.00	127	84.00	0	0.00	0	0.00	127	84.00
9	Construction of barrage with Head Sluices across River Coleroon at RD 74/3 mile in Adhanur Kumaramangalam Villages of Nagapattinam District	Mayiladurai	Ha	3.56	0	0.00	0	0.00	0	0.00	6320	22500.00	0	0.00	6320	22500.00
	<b>Grand total</b>					<b>12832.00</b>		<b>220.00</b>		<b>84.00</b>		<b>22500.00</b>		<b>0.00</b>		<b>35636.00</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

#### **4.12. Cooperatives**

Agricultural cooperatives or farmers' cooperatives are cooperatives where farmers pool their resources for mutual economic benefit. Agricultural cooperatives are broadly divided into agricultural service cooperatives, which provide various services to their individual farming members, and agricultural production cooperatives, where production resources such as land or machinery are pooled and members farm jointly. Agricultural supply cooperatives aggregate purchases, storage, and distribution of farm inputs for their members. By taking advantage of volume discounts and utilizing other economies of scale, supply cooperatives bring down members' costs. Supply cooperatives may provide seeds, fertilizers, chemicals, fuel, and farm machinery. Some supply cooperatives also operate machinery pools that provide mechanical field services (e.g., plowing, harvesting) to their members. Agricultural marketing cooperatives are often formed to promote specific commodities.

#### **Project components**

- ✓ Infrastructure Development – to be covered in Nagapattinam block
- ✓ Asset Creation- to be covered in Keelaiyur, Kivelur, Nagapattinam, Sirkali , Thalainayar and Vedaranyam blocks

#### **Budget**

The budget requirement for fulfilling the above interventions is ₹. 42.26 Lakh (Table 4.18).

#### **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 4.24 Budget Requirement for Cooperatives in Nagapattinam District**

(₹. in Lakh)

Sl. No.	Co-operation	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	Renovation of Godown	B1, B2, B6, B8, B9 and B11	5	5.38	7	18.28	2	6.30	1	2.00	1	3.80	16	35.76
2	Amenities for Cooperative Centres (RO Water unit, Sanitation, Vehicle Parking Shed, Construction and renovation of Marriage Hall, Construction and renovation of amenity centres)	All Blocks	0	0.00	0	0.00	1	6.50	0	0.00	0	0.00	1	6.50
	<b>Total</b>			<b>5.38</b>		<b>18.28</b>		<b>12.80</b>		<b>2.00</b>		<b>3.80</b>		<b>42.26</b>

Keelaiyur – B1, Kilvelur – B2, Kollidam – B3, Kuthalam – B4, Mayiladuthurai – B5, Nagapattinam – B6, Sembanarkoil – B7, Sirkali – B8, Thalainayar – B9, Thirumarugal – B10, Vedaranyam – B11

**Table 4.25. Consolidated Budget for Nagapattinam District****(₹. in Lakh)**

Sl. No.	Components	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	13271.50	12625.52	12865.25	12453.95	12867.62	64083.74
2	Agricultural Research (TNAU)	0.00	20.00	0.00	0.00	0.00	20.00
3	Horticulture	1360.48	1426.13	1360.48	1326.13	2960.48	8433.72
4	Agricultural Engineering	5896.01	4593.71	4793.26	4589.36	4545.56	24417.90
5	Agricultural Marketing	103.10	284.60	120.40	147.10	122.60	777.75
6	Seed Certification & Organic Certification	5.00	15.56	2.20	2.20	2.20	27.16
7	Animal Husbandry	1478.09	1228.09	1058.09	938.09	938.09	5640.45
8	Animal Science Research (TANUVAS)	0.00	0.00	0.00	0.00	0.00	0.00
9	Dairy Development	449.25	790.25	740.25	449.25	459.25	2888.25
10	Fisheries	492.65	612.65	492.65	492.65	2542.65	4633.25
11	Fisheries Research (TNFU)	8584.20	2012.50	808.73	290.73	1290.73	12986.91
12	Water Resource Organization (PWD)	12832.00	220.00	84.00	22500.00	0.00	35636.00
13	Civil Supplies & Co-Operation	5.38	18.28	12.80	2.00	3.80	42.26
	<b>Grand total</b>	<b>44477.66</b>	<b>23827.29</b>	<b>22338.11</b>	<b>43191.46</b>	<b>25732.98</b>	<b>159587.39</b>

The total budget requirement for the implementation of various interventions by different departments in Nagapattinam district is ₹. **159587.39 lakhs**

