



NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP)



DISTRICT AGRICULTURE PLAN

VELLORE



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



NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP / RKVY)



DISTRICT AGRICULTURE PLAN

VELLORE

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

2017

CONTENTS

Sl. No.	Particulars	Page No.
I	INTRODUCTION	1
II	PROFILE OF BLOCKS AND DISTRICT	5
III	DEVELOPMENT OF AGRICULTURE AND ALLIED SECTORS	52
IV	DISTRICT PLAN	90

LIST OF TABLES

Table No.	Particulars	Page No.
2.1	Administrative set up of Vellore District	6
2.2	Block wise population level in the district	8
2.3	Census of Rural and Urban in Vellore district	9
2.4	Block wise Literacy Level by Social Groups in Vellore district	10
2.5	Population by broad industrial categories of workers	11
2.6	Soil types in Vellore district	11
2.7	Soil productivity of major series in Vellore district	13
2.8	Distribution of rainfall in the district	16
2.9	Land Use Pattern in the district	17
2.10	Land Use particulars of Vellore District	18
2.11	Land Use Pattern	20
2.12	Number and Area of Operational Land Holdings in Vellore District	23
2.13	Sources of Water Supply - Block wise	24
2.14	River basins in the district	25
2.15	Actual Area Irrigated by Source	26
2.16	Details of Dams, Tanks, Wells and Bore Wells	26
2.17	Area Irrigated by Crops	28
2.18	Irrigation Intensity	28
2.19	Crops grown	29
2.20	Area, production and productivity of major crops	30
2.21	Block wise major crops grown	32
2.22	Potential Blocks for seed production in Vellore district	33
2.23	Consumption of chemical fertilizers and pesticides	34
2.24	Agricultural Machineries and Implements in Vellore District	35
2.25	Regulated markets in the district	36
2.26	Details of Uzhavar Santhai	37
2.27	Rural hub commodity details	38

Table No.	Particulars	Page No.
2.28	Infrastructure Facilities in Vellore District	39
2.29	List of Agricultural and Non-Agricultural Storage Godowns	39
2.30	Sericulture development in the district	40
2.31	Livestock population of Vellore district	41
2.32	Veterinary hospitals in Vellore district	42
2.33	Milk production in the district	43
2.34	Poultry development in the district	45
2.35	Egg production in the district	46
2.36	Fisheries development in the district	46
2.37	Estimated Marine Production / Inland ProductionYear	47
2.38	Number of families engaged in Fishing	47
2.39	Infrastructure Facilities in Vellore District	48
2.40	Insurance schemes in the district	49
2.41	Cooperative societies in the district	50
2.42	Activity wise data of existing MSME units	51
3.1	Compound Growth Rate of Area under Major Crops Grown in Vellore District	53
3.2	Compound Growth Rate of Production of Major Crops Grown in Vellore District	54
3.3	Compound Growth Rate of Productivity of Major Crops Grown in Vellore District	55
3.4	Yield gap analysis for identified potential crops in Vellore district	56
3.5	Existing and Projected Yield and Production of Paddy in Vellore District	59
3.6	Projected Increase in Yield and Production of paddy	60
3.7	Existing and Projected Yield and Production of Groundnut Vellore District	61
3.8	Projected Increase in Yield and Production of groundnut	62
3.9	Existing and Projected Yield and Production of Sugarcane Vellore District	63
3.10	Projected Increase in Yield and Production of Sugarcane	64
3.11	Existing and Projected Yield and Production of Red gram in Vellore District	65
3.12	Projected increase in Yield and Production of red gram	65

Table No.	Particulars	Page No.
3.13	Existing and Projected Yield and Production of banana in Vellore District	66
3.14	Projected Increase in Yield and Production of Banana	67
3.15	Existing and Projected Yield and Production of Mango in Vellore District	69
3.16	Projected Increase in Yield and Production of Mango	70
3.17	Existing and Projected Yield and Production of Cotton in Vellore District	71
3.18	Projected Increase in Yield and Production of cotton	72
3.19	Existing and Projected Yield and Production of Coconut in Vellore District	73
3.20	Projected increase in Yield and Production of Coconut	73
3.21	Projection of Agricultural Production	74
3.22	Major Crops Contributing 80 Percentage share of Area	75
3.23	Projected Area, Production and Productivity for Potential crops identified	77
3.24	Technological interventions and strategies to reduce the yield gaps	78
4.1	Budget requirement for enhancing paddy production	91
4.2	Budget requirement for enhancing millet productivity	93
4.3	Budget requirement for enhancing productivity of pulses	95
4.4	Budget requirement for enhancing the productivity of oilseeds	98
4.5	Budget requirement for enhancing the productivity of oil palm	101
4.6	Budget requirement for enhancing productivity of cotton	103
4.7	Budget requirement for enhancing productivity of sugarcane	105
4.8	Budget requirement for enhancing productivity of coconut	107
4.9	Budget requirement for training of farmers	109
4.10	Budget requirement for infrastructure development	113
4.11	Budget requirement for soil health management	115
4.12	Budget requirement for Rainfed Area Development	117
4.13	Budget requirement for Integrated Pest Management	119
4.14	Budget requirement for farm mechanization	121
4.15	Budget requirement for strengthening of state seed farm	124
4.16	Budget requirement for Information Technology in Agriculture	126

Table No.	Particulars	Page No.
4.17	Budget abstract for agriculture development	127
4.18	Budget requirement for strengthening of Agricultural Research	130
4.19	Budget requirement for horticulture development	141
4.20	Budget requirement for agricultural engineering	154
4.21	Budget requirement for agricultural marketing	163
4.22	Budget requirement for Seed Certification and Organic Certification	167
4.23	Budget requirement of animal husbandry	174
4.24	Budget requirement for dairy development	183
4.25	Budget requirement for fisheries development	189
4.26	Budget requirement for fisheries research	195
4.27	Budget requirement for public works department (WRO)	197
4.28	Budget requirement for Cooperation	204
4.29	Sector wise budget requirement for Vellore district	206

LIST OF FIGURES

Figure No.	Particulars	Page No.
1	District Location Map of Vellore District	6
2	Map of Vellore district and Blocks	7
3	Rural and Urban Population in Vellore district	10
4	Soil map of Vellore District	14
5	Vellore district soil legend	15
6	Distribution of rainfall in the district (2014-15)	16
7	Major Crops contributing 80% share of area in Vellore district	76
8	Projected Area, Production and Productivity for Potential crops	78

EXECUTIVE SUMMARY

Vellore district is located in northern part of Tamil Nadu and comes under the North Eastern Zone of Tamil Nadu. The district is bound on north by Andhra Pradesh State, east by Thiruvallur and Kancheepuram districts, south by Tiruvannamalai district and west by Krishnagiri district. There are eleven taluks, 20 blocks and seven agricultural divisions in the district. Average rainfall in Vellore district is 971 mm. Almost one – fifth of the total geographical area (19 per cent) is under problem soils in the district. The degraded and fallow lands like cultural waste, and current and other fallow lands accounted for 21.7 per cent of the total geographical area. As regards animal husbandry, five per cent of the cattle and buffalo population of the State is in the district. Sheep and goat population in Vellore district account for about four per cent of the State. Since Vellore district is a land locked district, only inland fisheries development is being followed.

The District Plan at a Glance

The Govt. of Tamil Nadu is focusing on doubling the production and trebling the farmer's income. Keeping this idea in mind, the Agricultural Department has proposed a budget for ₹.23060.47 lakhs for increasing area under major crops like paddy, groundnut, pulses, sugarcane, millets, maize, ragi, and cotton. In this five year plan the latest technologies like SSI in sugarcane, mechanization in agriculture and application of organic inputs like bio fertilizers, biological control agents and bio-pesticides will be recommended. To increase of productivity, the Integrated Nutrient Management concept is considered for all the agricultural crops. To enhance the soil health, importance will be given for soil test based recommendations.

Horticulture Department has proposed Rs.22146.23lakhs for the plan period to bring more area under fruit, vegetable and flower crops. The targeted crops are tomato, brinjal, chillies, bhendi, cluster beans, gourds, greens, coriander and fruit crops like mango and banana. For sustainability of the integrated cropping system in horticulture, vermicompost units and bee hives will be promoted. To provide quality seedlings for horticultural crops, the shade net nursery with pro tray method will be promoted in this plan for the benefit of farming community. Latest production technologies in Jasmine, crossandra and tube rose will be recommended for higher yield.

Similarly, Agricultural Engineering Department has proposed to supply tools and machineries under subsidized cost and custom hiring of tractors, combined harvesters etc.to

overcome the labour scarcity and increase the productivity of crops with budget requirement of ₹.17421.75lakhs. Animal Husbandry Department has sought for ₹.116244.76lakhs for the period 2017-22 to undertake several activities under livestock improvement programme to increase milk production and bring additional income to the farmers through rearing of goats and poultry.

Department of Agri Business and Marketing has proposed a total of ₹.1140.15lakhs for the establishment of market intelligence and training centre for value addition and exposure visits. The seed certification department anticipated ₹.31.72lakhs for their development activities. The department of Fisheries requested ₹.33.59 lakhs for inland fisheries improvement programme.

The year wise fund requirements of different departments are presented below.

Budget abstract for Vellore district

(₹. in lakhs)

Outcomes as a Result of I

Sl. No.	Components	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	3707.81	6571.69	4053.02	3699.28	5028.67	23060.47
2	Agricultural Research (TNAU)	50.00	200.00	26.00	0.00	0.00	276.00
3	Horticulture	3923.56	4126.21	4405.97	4729.71	4960.78	22146.23
4	Agricultural Engineering	3636.15	3575.75	3425.75	3395.75	3388.35	17421.75
5	Agricultural Marketing	475.00	182.85	186.20	158.40	137.70	1140.15
6	Seed Certification & Organic Certification	18.36	13.36	0.00	0.00	0.00	31.72
7	Animal Husbandry	33002.80	20937.99	21007.99	20447.99	20847.99	116244.76
8	Animal Science Research (TANUVAS)	0.00	0.00	0.00	0.00	0.00	0.00
9	Dairy Development	2566.00	5496.00	2641.00	2521.00	13651.00	26875.00
10	Fisheries	0.00	0.25	6.85	17.89	8.60	33.59
11	Fisheries Research (TNFU)	64.76	63.16	13.16	0.26	0.26	141.60
12	Water Resource Organization (PWD)	3410.00	1665.00	4176.44	505.00	600.00	10356.44
13	Civil Supplies & Co-Operation	1712.86	1023.45	454.00	140.50	74.50	3405.31
	Grand total	52567.30	43855.71	40396.38	35615.78	48697.85	221133.02

Implementation of the Plan

Implementation of proposed schemes / projects in Velloredistrict in different sectors will definitely address the current issues and resolve the problems and fulfill the gaps identified in each sectors. In turn it will reflect on increasing employment, better products, and increasing farmers' net income and finally it will improve the standard of living of the farmers and other stakeholders involved in various activities.

CHAPTER I

INTRODUCTION

Agriculture sector plays a strategic role in the process of economic development of a country. It has already made a significant contribution to the economic prosperity of the country and its role in the economic development is of vital importance. The National Development Council (NDC), in its meeting held on 29th May, 2007 observed that a special Additional Central Assistance (ACA) Scheme is to be introduced to incentivize States to draw up comprehensive agriculture development plans taking into account of the different agro-climatic conditions, natural resources and technology for ensuring more inclusive and integrated development of agriculture and allied sector.

In pursuance of the aforesaid observations and in consultation with the Planning Commission, the Department of Agriculture and Cooperation (DAC), Ministry of Agriculture, Govt. of India launched Rashtriya Krishi Vikas Yojana (RKVY) / National Agricultural Development Programme (NADP) during 2007-2008. Since then, the different states in India received grants for implementation of projects under NADP/RKVY based on project mode. The overall objectives of NADP/RKVY are as follows:

Objectives of RKVY

RKVY aims at achieving and sustaining desired annual growth by ensuring holistic development of agriculture and allied sectors.

To recapitulate, the main objectives of the scheme are:

- to incentivize the States so as to increase public investment in Agriculture and allied sectors.
- to provide flexibility and autonomy to States in the process of planning and executing Agriculture and allied sector schemes.
- to ensure the preparation of agriculture plans for the districts and the States based on agro-climatic conditions, availability of technology and natural resources.
- to ensure that the local needs/crops/priorities are better reflected in the agricultural plans of the States.
- to achieve the goal of reducing the yield gaps in important crops, through focused interventions.

- to maximize returns to the farmers in Agriculture and allied sectors.
- to bring about quantifiable changes in the production and productivity of various components of Agriculture and allied sectors by addressing them in a holistic manner.

Preparation of District and State Agriculture Plans

As per the recent guidelines issued by the Government of India, the new project proposals to be implemented under NADP must be in accordance with the basic documents namely District Agricultural Plans (DAP), State Agriculture Plans (SAP) and State Agriculture Infrastructure Development Programme (SAIDP). Thus, these plan documents will remain as cornerstone of planning and implementation of the NADP/RKVY and other schemes during the period coinciding with 14th Finance Commission period.

The overall guidelines suggested by the Government of India to be followed for preparation of District Agriculture Plans (DAP) under NADP/RKVY are as follows:

- The DAPs are integral to the District Development Plan.
- Each District will have a DAP after taking into consideration of resources that would be available from other ongoing schemes (both State and Central), like Mahatma Gandhi National Rural Employment Guarantee Scheme (MGNREGS), Swarnajayanti Gram SwarajYojana (SGSY), Backward Regions Grant Fund (BRGF), Integrated Watershed Management Programme (IWMP), Accelerated Irrigation Benefit Programme (AIBP), Bharat Nirman, District/State Irrigation Plans (PMKSY) etc.
- The District Agriculture Plan shall not be the usual aggregation of the existing schemes but would aim at moving towards projecting the requirements for development of agriculture and allied sectors of the district. These plans will present the vision for agriculture and allied sectors within the overall development perspective of the district. DAP's would also present their financial requirements in addition to sources of financing the agriculture development plans in a comprehensive way. Since achievement of RKVY's objectives is sequel to proper District Planning, these requirements should be adhered to by the State as far as possible.
- The States will have to specify the institutional mechanisms evolved by them for District Planning and submit a status report at the stage of the Annual Plan exercise. DAP will also include animal husbandry and fishery development, minor irrigation

projects, rural development works, agricultural marketing schemes and schemes for water harvesting and conservation, etc. keeping in view of 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 programmes as well as the role assigned to the Panchayat Raj Institutions (PRIs) are appropriately incorporated in DAPs. States may also engage consultants / consulting agencies to revise / update DAPs and SAPs.
- Thus, each State will also have a comprehensive State Agricultural Plan (SAP) for the plan period by integrating the District Plans. SAPs will invariably have to indicate resources that can flow from the State to the districts.

Revision and Updation of 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 for 11th and 12th Plan periods (2012 - 2017). However, keeping in view of the changing scenario in the development and emerging needs of the State and also to be eligible for fresh grants from Government of India, these plans have to be revised and updated appropriately for implementing RKVY during the 14th Finance Commission period (2015 - 2020). The current exercise is the continuation of the 12th plan period which covers two years of the 14th Finance Commission period (2015-16 and 2016-17). The remaining period has to be covered under this current revision. Considering the normal practice of preparing a plan for five years, the present revision is attempted for covering the period from 2017-18 to 2021-22.

State Agriculture Infrastructure Development Programme (SAIDP)

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

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

Methodology followed

The revision of the District Agricultural Plan, State Agricultural Plan and State Agriculture Infrastructure Development Programme was done by following the above guidelines.

The secondary data on district and block with respect to rainfall, land use pattern, demography, livestock, machinery, infrastructure created, constraints in production and marketing of agricultural and livestock produce, crop/animal production, gaps between expected and actual yield and reasons for such gaps were updated from various published sources.

In consultation with the various stakeholders and on-going development schemes, the line departments from respective districts furnished a detailed year-wise action plan i.e. from 2017-18 to 2021-22 for each block. These action plans proposed indicates the nature and type of interventions to be made, area of operation and their coverage, budget requirement etc. These block-wise action plans were further consolidated into district level plans which are discussed with stakeholders and finalized. Finally the district plans are integrated into state level plans (SAP and SAIDP).

CHAPTER II

PROFILE OF THE DISTRICT

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

2.1 District at glance

It is the third most populous district of Tamil Nadu, after Chennai and Kanchipuram. The modern Vellore District was formerly part of North Arcot District, which was established by the British in the 19th century. On 30 September 1989, the district was split into Tiruvannamalai - Sambuvarayar and North Arcot Ambedkar districts. Then the North Arcot Ambedkar District was later renamed Vellore District in 1996.

2.2 Area, Location and Geographical features

Vellore district lies between 12.15' and 13.15' of the Northern latitude and 78.20' and 79.50' of the Eastern Longitude. It is bounded on North by Chittoor district of Andhra Pradesh, on the South by Tiruvannamalai district, on the West by Dharmapuri of Tamil Nadu and Chittoor district of Andhra Pradesh and on the East by Kancheepuram district. Total geographical area of the district is 5920 sq.km. The district is shown in Fig. 1

Headquarters	: Vellore
No of taluks	: 8
Revenue divisions	: 3
Community divisional blocks	: 20
Municipal towns	: 14
No of town Panchayats	: 22
No of village Panchayats	: 763
No of revenue villages	: 843



Fig. 1 Location Map of Vellore District

2.3 Administrative Structure of the district

Vellore district with its headquarters at Vellore is divided into 3 revenue divisions, 9 taluks, 20 blocks, 9 municipalities, 27 town Panchayats and 842 Revenue villages. The details are presented in the Table 2.1 & Fig. 2

Table 2.1 Administrative set up of Vellore District

S.No	Taluk	Block	Name of Agricultural Division	Number of villages
1	Gudiyatham	Vellore	Vellore	30
		Vaniyambadi		30
		Anaicut		52
		Madhanur	Ambur	47
2	Katpadi	Katpadi	K.V. Kuppam	28
3	Wallajah	K.V. Kuppam	Gudiyatham	47
		Gudiyatham		53
4	Arakonam	Pernampattu	Gudiyatham	65
		Walajapet	Walajapet	41

S.No	Taluk	Block	Name of Agricultural Division	Number of villages
5	Arcot	Sholingur	Arakonam	49
		Arakonam		27
6	Vellore	Nemili	Arakonam	59
		Kaveripakkam		57
7	Vaniyambadi	Arcot	Arcot	45
		Timiri		71
		Tirupattur		20
8	Ambur	Jolarpet	Tirupattur	24
		Kandili		38
		Natrampalli		19
9	Tirupattur	Alangayam	Vaniyambadi	26

Source: Statistical Handbook of the Vellore District (2011)

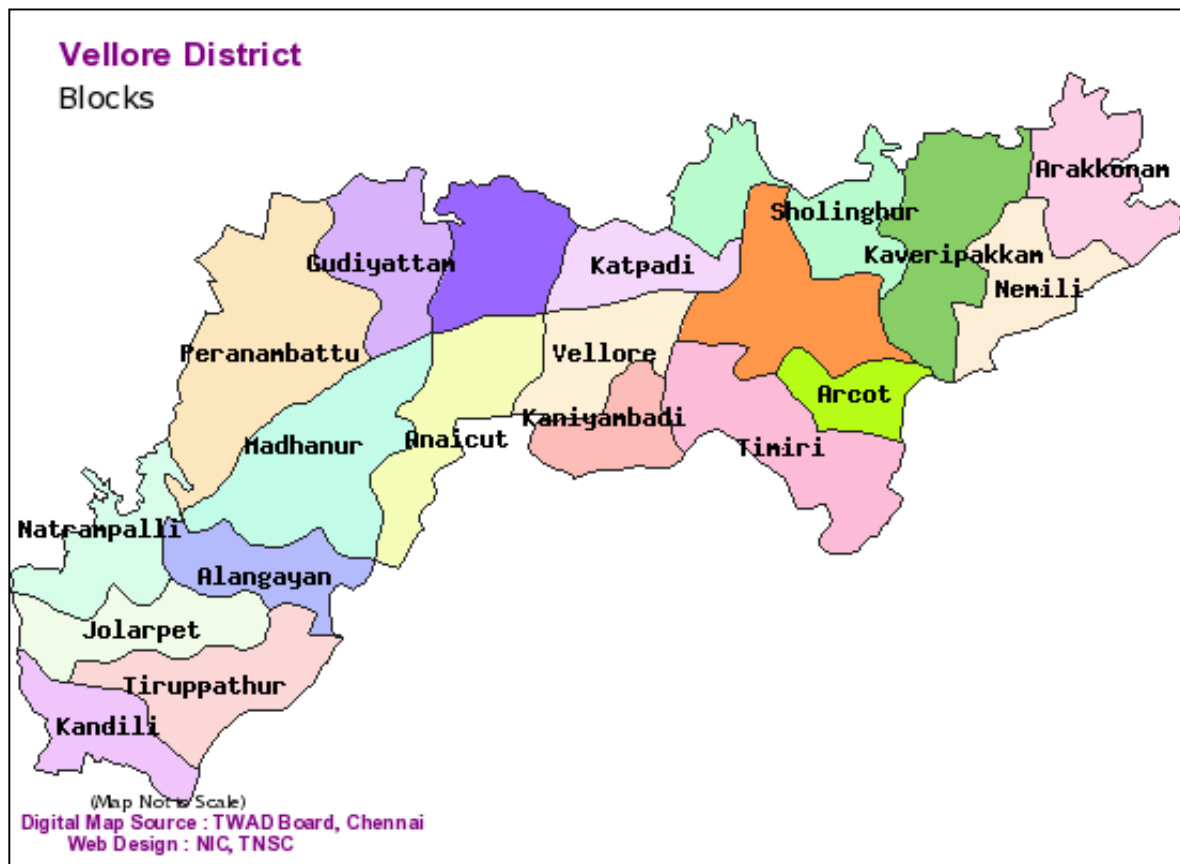


Fig.2 Map of Vellore district and blocks

2.4 Demographic profile

2.4.1 Population

In 2011, Vellore had population of 3,477,317 of which male and female were 1,741,083 and 1,736,234 respectively. In 2001 census, Vellore had a population of 3,60,780

of which males were 1,80,083 and remaining 1,80,697 were females. Vellore District population constituted 5.46 percent of total Maharashtra population. In 2001 census, this figure for Vellore District was at 5.57 percent of Maharashtra population. The total number of population are presented in the Table 2.2

Table 2.2 Block wise population level in the district (Number) 2011 census

S. No.	Name of the block	Total Male	Total Female	Total Population
1	Vellore	180083	180697	360780
2	Vaniyambadi	54975	55717	110692
3	Anaicut	72578	72393	144971
4	Madhanur	125312	125619	250931
5	Katpadi	59153	59559	118712
6	K.V. Kuppam	83065	84176	167241
7	Gudiyatham	96068	97553	193621
8	Pernampattu	106538	107064	213602
9	Walajapet	104768	103199	207967
10	Sholingur	99845	97534	197379
11	Arakonam	85585	83741	169326
12	Nemili	66515	64157	130672
13	Kaveripakkam	47631	46670	94301
14	Arcot	105704	106533	212237
15	Timiri	67482	67114	134596
16	Tirupattur	89309	89666	178975
17	Jolarpet	65459	66212	131671
18	Kandili	80117	78042	158159
19	Natrampalli	70983	70830	141813
20	Alangayam	79913	79758	159671
	Total	1741083	1736234	3477317

Source: Statistical Handbook of Vellore district (2011)

Table 2.3 Census of Rural and Urban population in Vellore district

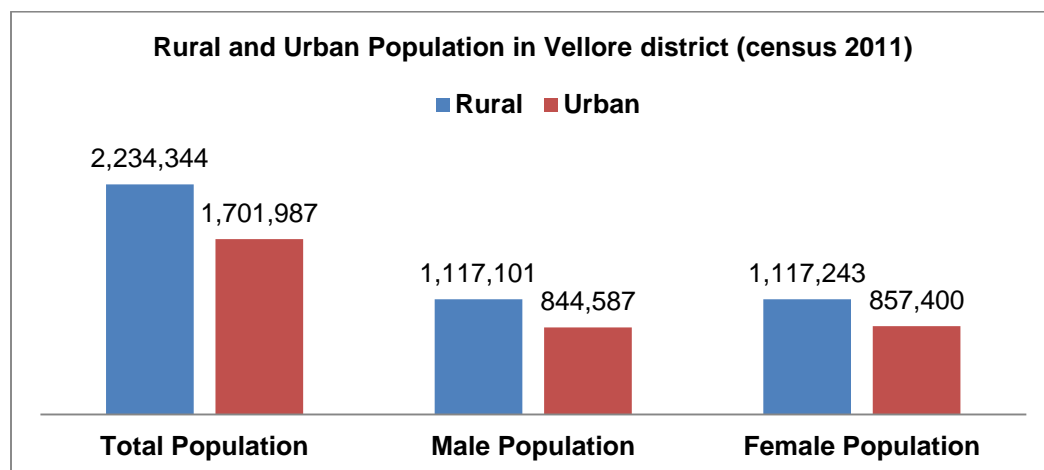
Description	Rural	Urban
Population (%)	56.76 %	43.24 %
Total Population	2,234,344	1,701,987
Male Population	1,117,101	844,587
Female Population	1,117,243	857,400
Sex Ratio	1000	1015
Child Sex Ratio (0-6)	938	953
Child Population (0-6)	249,146	183,404
Male Child(0-6)	128,558	93,902
Female Child(0-6)	120,588	89,502
Child Percentage (0-6)	11.15 %	10.78 %
Male Child Percentage	11.51 %	11.12 %
Female Child Percentage	10.79 %	10.44 %
Literates	1,482,931	1,290,997
Male Literates	824,307	680,048
Female Literates	658,624	610,949
Average Literacy	74.70 %	85.01 %
Male Literacy	83.39 %	90.59 %
Female Literacy	66.08 %	79.56 %

Source: Department of Statistics, Vellore (2011)

2.4.1.1 Vellore Sex Ratio 2011

With regards to Sex Ratio in Vellore, it stood at 1007 per 1000 male compared to 2001 census figure of 997. The average national sex ratio in India is 940 as per latest reports of Census 2011 Directorate. In 2011 census, child sex ratio is 944 girls per 1000 boys compared to figure of 943 girls per 1000 boys of 2001 census data. The sex ratio, population and literates are presented in the above Table 2.3 and Fig. 3

Fig.3 Rural and Urban Population in Vellore district (census 2011)



2.4.2 Literacy level

Average literacy rate of Vellore in 2011 were 79.17 compared to 72.36 of 2001. If things are looked out at gender wise, male and female literacy were 86.99 and 71.95 respectively. For 2001 census, same figures stood at 81.99 and 62.79 in Vellore District. Total literate in Vellore District were 22,11,317 of which male and female were 12,41,465 and 9,69,852 respectively The literacy levels in the district are presented in the Table 2.4.

Table 2.4 Block wise Literacy Level by Social Groups in Vellore district (2011)

S. No	Literacy Level	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
1	Male	139613	42068	48838	64966	64966	43103	89705	70549	81927	49220
2	Female	118125	33040	35884	54170	54170	32754	69293	53614	66058	49220
	Total	257738	75108	84722	119136	119136	75857	158998	124163	147985	98440

B1- Vellore, B2 -Vaniyambadi , B3 - Anaicut, B4 -Madhanur, B5 -Katpadi , B6 - K.V. Kuppam , B7 - Gudiyatham, B8 - Pernampattu, B9 - Walajapet, B10-Sholingur

S.No	Literacy Level	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	Total
1	Male	62847	50038	55892	66054	46697	67377	56144	42653	31245	67563	1241465
2	Female	49514	35072	39086	50535	33878	50927	40352	29850	21837	52473	969852
	Total	112361	85110	94978	116589	80575	118304	96496	72503	53082	120036	2211317

B11-Arakonam, B12 - Nemili, B13 - Kaveripakkam, B14 - Arcot, B15 -Timiri, B16 -Tirupattur, B17 - Jolarpet, B18 - Kandili, B19- Natrampalli, B20- Alangayam,

Source: Office of Deputy Director of Horticulture, Salem

2.4.3 Working population

The working population is presented in the Table 2.5. This includes main workers and marginal workers. More than 80 per cent of the population is main workers and around 17.83 per cent of the population fall under the marginal workers category. Among the main workers cultivators and agricultural labourers alone shares 16 per cent each of the divisions whereas 9.56 per cent of them were household industry, manufacturers, processors, servicing and repair workers. The total workers consisted of 1427180 numbers. This indicates that, the people of the district were engaged in farming activity and not migrated to far extent.

Table 2.5 Population by broad industrial categories of workers

S. No	Industrial category	Number	Percentage
1	Total main workers	1172645	82.16
a	Cultivators	232840	16.31
b	Agricultural Labourers	232731	16.30
c	Household Industry, manufacturing, Processing, Servicing and Repairs	136491	9.56
d	Other – workers	570583	39.98
2	Marginal workers	254535	17.83
	Total workers	1427180	

Source: Department of Statistics, Vellore (2011)

2.5 Topography

2.5.1 Soil type

Table 2.6 Soil types in Vellore district

S.No	Soil Series	Symbol	Extent	
			Ha	%
1	Mangalathupatty	Mng	1,27,342	21.50
2	Kolathur	Kol	77,292	13.06
3	Ethapur	Etp	41,630	7.03
4	Suramangalam	Sur	29,860	5.05
5	Vannapatti	Vpt	24,293	4.10

S.No	Soil Series	Symbol	Extent	
			Ha	%
6	Padugai	Pdg	15,163	2.56
7	Chickarasampalayam	Cpm	11,243	1.98
8	Vadapudupattu	Vdp	10,093	1.71
9	Vadavalam	Vdv	9,862	1.67
10	Arasanatham	Anm	7,341	1.24
11	Kadambadi	Kdb	6,612	1.02
12	Mailam	Mlm	5,870	0.99
13	Pallipalayam	Ppm	4,778	0.81
14	Idayapatti	Idp	4,020	0.68
15	Soil association	-	17,859	3.02
16	Miscellaneous Land	MLT	37,531	6.33
17	Forest	-	1,61,229	27.23
		Total	5,92,018	100.00

Source: Department of Agriculture, Vellore

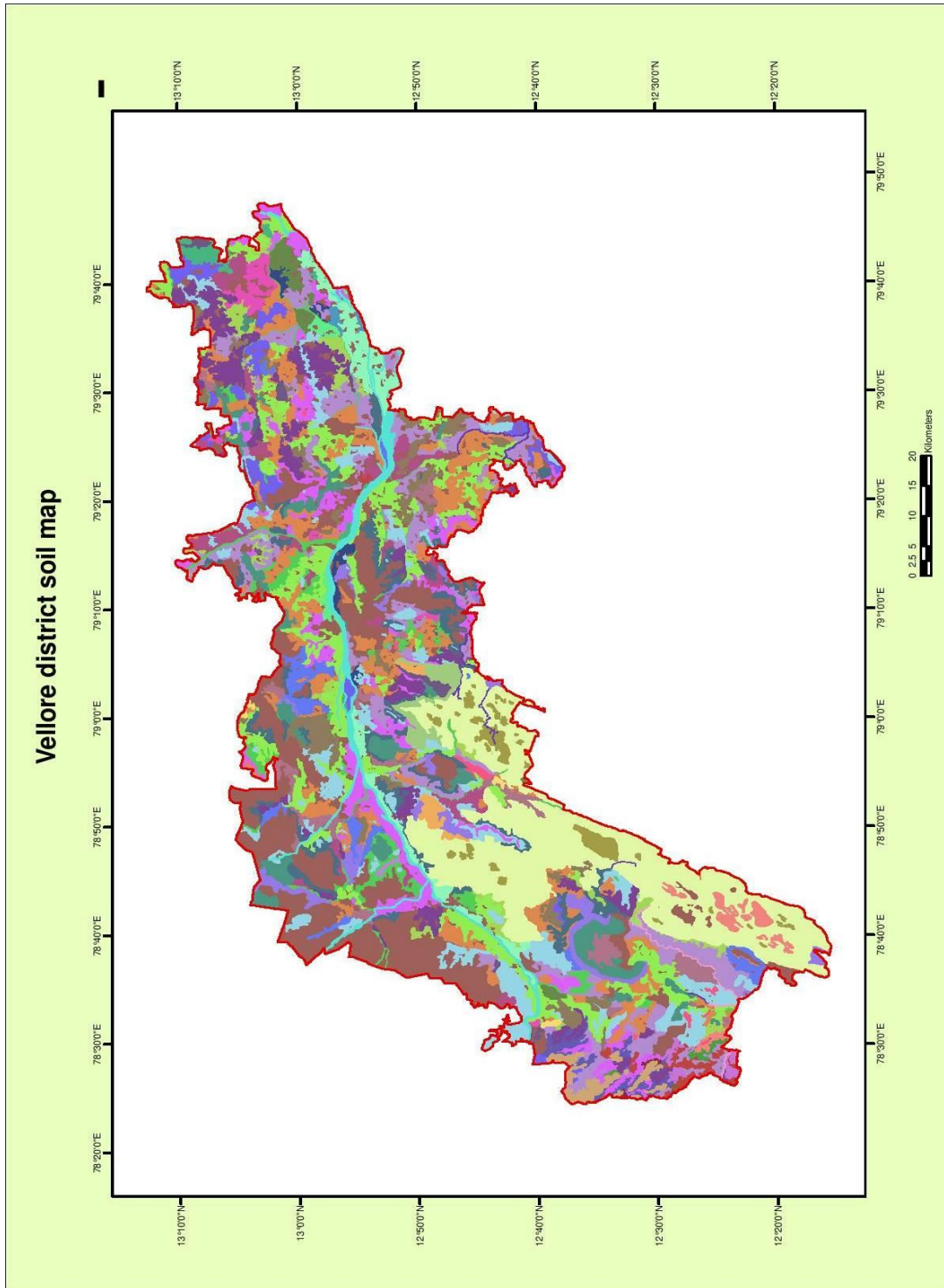
The soil types are classified based on the productivity of major crops in the district and it is presented in the Table 2.6. Soil productivity of major series for Vellore district was furnished in the Table. 2.7. The major area consists of average soil type which comes under the series Idayapatti, Kadampady, Suramangalam, Chickarasampalayam, Mangalathupatty and Arassanatham. It holds about 186418 ha. The next to which is the series from Kolathur, Ethapur, Vadapudupattu and Vadavalam are good types which have rating of 35.64. Padugaiseries are of poor type of soil which has least area of about 15163 ha.

Table 2.7 Soil productivity of major series in Vellore district

Area(Ha)	Productivity		Soil series
	Rating	Grouping	
34,941	0.97	Extremely poor	Vannapatti,Mailam,Pallipalayam
15,163	8.19	Poor	Padugai
1,68,563	20.34	Average	Idayapatti,Kadampady,Suramgalam Chickarasampalayam, Mangalathupatty Arasanatham
1,61,732	35.64	Good	Kolathur,Ethapur, Vadapudupattu Vadavalam

Source: Department of Agriculture, Vellore

Based on the productivity the soil series are classified as extremely poor (0.97), poor (8.19), average (20.34) and good (35.64). Table 2.7& Fig.4 shows the area covered under different series.



Copyright © 2008: Remote Sensing and GIS Centre, Tamil Nadu Agricultural University, Coimbatore - 641 003.

Fig. 4 Soil map of Vellore District

Fig.5 Velloredistrict soil legend

Legend

	DEEP, COARSE LOAMY, MIXED, INCEPTISOL		MODERATELY SHALLOW, FINE, MIXED, ALFISOLS
	DEEP, COARSE LOAMY, MIXED, ULTISOLS		MODERATELY SHALLOW, FINE, MIXED, INCEPTISOL
	DEEP, CONTRASTING PARTICLE SIZE, MIXED, ENTISOLS		MODERATELY SHALLOW, FINE, MONTMORILLONITIC, INCEPTISOI
	DEEP, FINE LOAMY, MIXED, ALFISOLS		MODERATELY SHALLOW, LOAMY SKELETL, MIXED, ENTISOLS
	DEEP, FINE LOAMY, MIXED, ULTISOLS		SHALLOW, CLAYEY SKELETL, MIXED, INCEPTISOL
	DEEP, FINE, MIXED, ALFISOLS		SHALLOW, CLAYEY, MIXED, ALFISOLS
	DEEP, FINE, MIXED, INCEPTISOL		SHALLOW, CLAYEY, MIXED, INCEPTISOL
	DEEP, FINE, MONTMORILLONITIC, INCEPTISOL		SHALLOW, LOAMY SKELETL, MIXED, ALFISOLS
	DEEP, FINE, MONTMORILLONITIC, VERTISOLS		SHALLOW, LOAMY SKELETL, MIXED, ENTISOLS
	DEEP, LOAMY SKELETL, MIXED, ALFISOLS		SHALLOW, LOAMY SKELETL, MIXED, INCEPTISOL
	DEEP, SANDY, MIXED, ENTISOLS		VERY DEEP, CLAYEY SKELETL, KAOLINITIC, ALFISOLS
	MODERATELY DEEP, CLAYEY SKELETL, MIXED, ALFISOLS		VERY DEEP, COARSE LOAMY, MIXED, INCEPTISOL
	MODERATELY DEEP, COARSE LOAMY, MIXED, INCEPTISOL		VERY DEEP, FINE LOAMY, MIXED, ALFISOLS
	MODERATELY DEEP, FINE LOAMY, MIXED, ALFISOLS		VERY DEEP, FINE LOAMY, MIXED, INCEPTISOL
	MODERATELY DEEP, FINE LOAMY, MIXED, INCEPTISOL		VERY DEEP, FINE LOAMY, MIXED, ULTISOLS
	MODERATELY DEEP, FINE, MIXED, ALFISOLS		VERY DEEP, FINE SILTY, MIXED, ENTISOLS
	MODERATELY DEEP, FINE, MIXED, INCEPTISOL		VERY DEEP, FINE, KAOLINITIC, ALFISOLS
	MODERATELY DEEP, FINE, MONTMORILLONITIC, INCEPTISOL		VERY DEEP, FINE, MIXED, ALFISOLS
	MODERATELY DEEP, LOAMY SKELETL, MIXED, INCEPTISOL		Very SHALLOW, LOAMY SKELETL, MIXED, ENTISOLS
	MODERATELY SHALLOW, CLAYEY SKELETL, MIXED, INCEPTISOL		Very SHALLOW, LOAMY, MIXED, ENTISOLS
	MODERATELY SHALLOW, COARSE LOAMY, MIXED, ENTISOLS		WATERBODY / SETTLEMENT / MISCELLANEOUS LANDFORM
	MODERATELY SHALLOW, FINE LOAMY, MIXED, ENTISOLS		

2.6 Climatic Condition and Rainfall

The temperature and Rainfall in the district in general are moderate. The Vellore, Wallajah and Gudiyatham taluks, which are surrounded by hills, are subjected to extreme climate conditions either being very hot during summer or very cold during winter. The rainfall in this district is due to southwest and northeast monsoons. South –West monsoon provides more rain than the North - East monsoon. The normal mean rainfall of the district was 936.20 mm during the 2014-15 and the actual rainfall of the District was 750.8 mm. Good showers are rarely received. More than 53 per cent of the area cultivated is under South West monsoon period. As a result of erratic distribution of rainfall, crop production often fails causing economic loss besides unemployment problem. Drought is a regular phenomenon in this district. The mean normal and actual rainfall during 2014-15 at different monsoon seasons is furnished in the Table 2.8 and Fig 5.

Table 2.8 Distribution of rainfall in the district (2014-15)

Period	Actual Rainfall (mm)	Normal Rainfall (mm)
1.South West Monsoon Period		
June	94.3	45.9
July	69.3	107.3
August	94	129
September	142.4	163.9
Total	400 (53.28)	446.1 (47.65)
2.North East Monsoon		
October	108.1	163.2
November	51.8	127.2
December	23.6	58.3
Total	183.5 (24.44)	348.7 (37.25)
3.Winter-Period		
January	1.3	8.1
February	0.3	6.8
Total	1.6 (0.21)	14.9 (1.59)
4.Hot-Summer Period		
March	10.5	9.2
April	92.5	22.3
May'	62.7	75
Total	165.7 (22.07)	106.5 (11.38)
Total	750.8	936.2

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

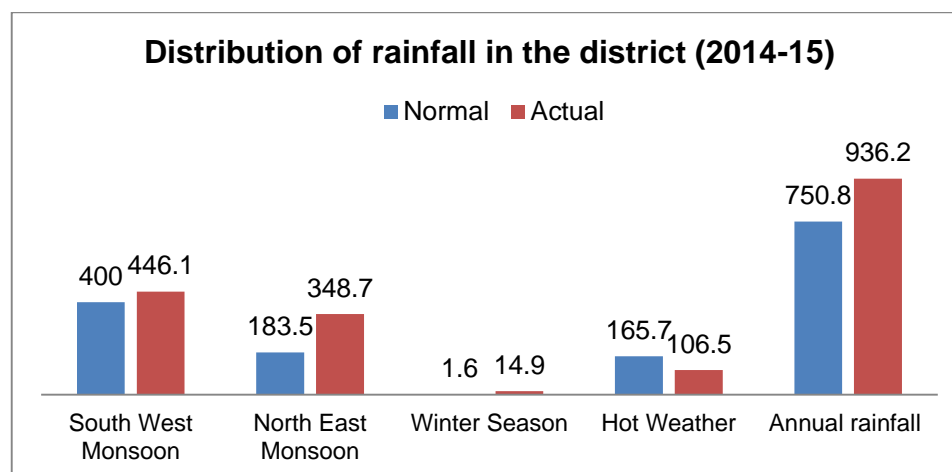


Fig. 6 Distribution of rainfall in the district (2014-15)

Vellore is the hottest place in Tamil Nadu. Hot climate prevails during the month of March to June and humid climate during the rest of the year except Nov-Feb when it is extreme cold. Rainfall is mainly received during North East and South West Monsoons. The normal rainfall of the district is 936.2 mm (100%). The distribution of rainfall is 106.5mm as summer showers, 14.9 mm as winter showers, 466.1 mm as South West Monsoon rains and 348.7 as North East Monsoon showers. (Fig. 6).

2.7 Land

2.7.1 Land Use pattern

The total Geographical area of the district is 592018 ha. It has been classified according to different types of land use during 2014-15 and presented in the Table 2.9

Table 2.9 Land Use Pattern in the district (2014-15)

Particulars	Area (ha)	Per cent
Geographical Area	592018	100.00
Forest	162286	27.41
Barren & Uncultivable Area	20445	3.45
Land Put to Non-agricultural Uses	80706	13.63
Permanent Pastures & Other grazing lands	4037	0.68
Misc. tree crops & groves not incl. in the net area sown	3003	0.51
Current Fallow	71094	12.01
Other Fallow	74174	12.53
Net area sown	170522	28.80
Area sown more than once	31829	5.38
Gross area sown	202351	34.18

Source: Season and Crop Report (2014-15)

Hills and Forest

The highest mountain in the district is the Jawadhu hills, which covers the eastern part of Tirupattur taluk. The elevation of the Jawadhu hills is 2500 feet above mean sea level with peaks rising up to 4200 feet. The Yelagiri hills lie in the Central part of Tirupattur taluk

with an altitude of 3200 feet. The forest areas are predominantly found in Vellore, Tirupattur and Gudiyatham taluks.

Forest represent all actually forested area on the lands classed or administered as forest under any legal enactment dealing with forest, whether state owned or private. The forest area of the state during 2014-15 is 162286 ha accounting for 27.41% of the total geographical area of the district.

Cultivable Waste

All lands available for cultivation whether not taken up for cultivation or taken up for cultivation once, but not cultivated during the current year and continuously for the last five years or more in succession for one reason or the other are classified as cultivable waste. Such lands may be either fallow or covered with shrubs and jungles which are not put to any use. The total area under cultivable waste is 20445 ha or 3.45% of the total geographical area of the district.

Net Area Sown

Net area sown represents the area sown under first crop during the fasli year. Out of 592018 ha of the total geographical area, 170522 ha of land constituting 28.8% was cultivated more than once (i.e Net area sown) with various crops during the year 2014-15. The mean land use particulars are presented in the Table 2.10.

Land use particulars (Triennium average ending 2011)

Table 2.10 Land Use particulars of Vellore District

Land Use	2008-09	2009-10	2010-11	Average
Net Sown area	190058	174859	175564	180160.33
Gross Cropped area	211986	192725	194105	199605.33
Cropping Intensity	1.115	1.102	1.106	1.1076

Source: Department of Agriculture, Vellore (2013)

While cultivated land (cultivated at least once in its entire span) consisting of net area sown, current fallow and other fallow lands is 180160 ha (which is 30.43% of the total

geographical area), land not cultivated but available for cultivation (cultivable waste) is 5766 ha forming 0.97% of the total geographical area during 2011-12.

Land use pattern in the blocks

Among the different blocks in the district, Natrampalli block constitutes the major forest area in the district of about 2210 ha which helps in sharing 0.95 % of the total geographical area. This is followed by Alangayam block (1891 ha) and Jolarpet block (555 ha). In case of Net area sown, Kandili block has the highest cropping area (13466 ha) followed by which Tirupattur block registered the highest net area sown (12698 ha). The details are presented in the Table 2.11.

Table 2.11 Land Use Pattern (Triennium average ending 2014-15) and Extent of Waste Land Area (ha)

S.No	Particulars	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10
1	Area under forest	0	0	0	0	0	0	0	0	17	0
2	Barren and Uncultivable Waste	790	1400	1449	745	1586	668	1471	1679	1677	2348
3	Land put to Non-Agricultural Uses	3488	2135	3092	2768	2877	3508	4883	3664	5982	5176
4	Area under cultivable waste	123	157	250	270	239	246	98	515	658	352
5	Area under permanent pastures	25	63	22	25	117	58	94	363	91	209
6	Area under miscellaneous tree crops and groves not included in net area sown	65	75	29	49	68	107	17	187	16	306
7	Area under current fallows	1159	539	5365	3352	1617	2258	3572	4960	2982	2905
8	Area under other fallows	2458	2568	83	186	3436	1188	346	1035	6673	6420
9	Net area sown	3446	5570	10945	8238	5241	10039	11989	12190	4198	10152
10	Total geographical area	11554	12507	21235	16456	15181	18072	22470	24593	22294	27868
11	Gross cropped area										

B1- Vellore, B2 -Vaniyambadi , B3 - Anaicut, B4 -Madhanur, B5 -Katpadi , B6 - K.V. Kuppam , B7 - Gudiyatham, B8 - Pernampattu, B9 - Walajapet, B10-Sholingur

Source: Office of Deputy Director of Horticulture, Vellore

Table 2.11 (Contd.)

S. No	Particulars	B11	B12	B13	B14	B15	B16	B17	B18	B19	B20	Total	Percentage
1	Area under forest	0	0	0	0	0	0	555	152	2210	1891	5648	0.95
2	Barren and Uncultivable Waste	195	67	300	528	1126	643	1104	561	1108	1000	20445	3.45
3	Land put to Non-Agrl. Uses	4960	7498	7309	4271	5644	2777	3602	2532	1587	2227	79980	13.49
4	Area under cultivable waste	88	99	320	659	874	335	86	18	162	217	5766	0.99
5	Area under permanent pastures	195	590	380	235	180	173	83	143	759	233	4038	0.68
6	Area under miscellaneous tree crops and groves not included in net area sown	235	319	367	270	670	104	67	34	18	58	3061	0.52
7	Area under current fallows	2757	4242	6378	1064	2463	2180	5504	5748	2720	6848	68613	11.75
8	Area under other fallows	7075	8891	9453	7550	12365	256	312	1344	586	908	73133	12.17
9	Net area sown	3640	7981	9748	6644	9457	12698	9702	13466	9214	10138	174696	29.54
10	Total geographical area	19145	29687	34255	21221	32779	19166	21015	23998	18364	23520	435380	26.46
11	Gross cropped area											196241	33.10

B11-Arakonam, B12 - Nemili, B13 - Kaveripakkam, B14 - Arcot, B15 -Timiri, B16 -Tirupattur, B17 - Jolarpet, B18 - Kandili, B19- Natrampalli, B20- Alangayam

Source: Office of Deputy Director of Horticulture, Vellore (2015)

2.7.2 Land holding pattern

The number and area of operational holdings of Vellore district is presented in the Table 2.12. The data provided in the below table indicate that the small holdings with a size of up to 2 ha constitute more than 94.58 per cent of the total number of holdings in the district. On the other hand, the relatively larger land holdings with a size of more than 5.0 ha accounted for about just 0.49% of the total number of holdings in the district. Medium size holdings of about 2.0 to 3.0 ha areas were about 4.93 per cent of the total land holdings. The analysis indicates that the farm holdings were marginal and the district requires maximum interventions and development schemes for the welfare of the people and overall development of the district.

Table 2.12 Number and Area of Operational Land Holdings in Vellore District in 2010-11

Size Class of holdings (ha)	Number				Area (in Hectares)				Percentage of Contribution (Numbers)
	S.C.	S.T.	Others	Total	S.C.	S.T.	Others	Total	
Below 0.5	19555	3272	198197	221084	4428.93	820.59	44687.62	49951.37	94.58
0.5 to 1.0	6891	3183	78033	88124	4820.99	2364.07	54905.91	62102.04	
1.0 to 2 ha	3354	2754	45798	51951	4481.26	3790.83	62773.96	71110.48	
2.0 to 3.0	606	1015	11162	12820	1432.84	2419.78	26546.86	30486.89	4.93
3.0 to 4.0	180	389	3627	4214	602.68	1349.23	12385.50	14398.84	
4.0 to 5.0	37	225	1536	1804	163.76	991.19	6803.90	7985.92	
5.0 to 7.5	21	188	1108	1321	121.90	1106.87	6560.60	7813.20	0.49
7.5 to 10.0	15	63	282	362	134.29	556.44	2378.23	3087.31	
10.0 to 20.0	2	29	121	158	20.11	361.84	1514.94	1985.73	
>20.0	0	2	11	20	0	42.45	406.28	776.51	
Total	30661	11120	339875	381858	16206.76	13803.29	218963.80	249698.29	

Source: Statistical Handbook of Vellore District (2011)

2.8 Sources of Irrigation

Water is one of the most important things for the success of agriculture. Failure of water resources will lead to failure of the crops and gradually the reduction in the area. The sources of water supply in the district are presented in the Table 2.13. The main sources of irrigation are from the well which covered an area of about 99977 ha. This is followed by tank irrigation which constitutes 1355 numbers. The remaining part of the sources of irrigation is canal which covers length 1067 km in 604 numbers. There are about 3 reservoirs from Pernampattu, Tirupattur and Jolarpet blocks where the waters are used for irrigation purposes in and around the blocks.

Table 2.13 Sources of water supply in different blocks (2011-12)

Sl. No.	Name of the Block	Canals		Wells used for irrigation purpose only	Tube Wells	Wells used for Domestic Purpose only	Reservoirs	Tanks (Nos.)
		Numbers	Length (Km.)					
1	Vellore	102	170	2130	7	10770		21
2	Vaniyambadi	0	0	3288	331	1074		39
3	Anaicut	0	0	8177	8	1428		58
4	Gudiyattam	54	184	7289	0	2411		73
5	Pernambut	40	84	5708	0	1245	1	31
6	K.V.Kuppam	12	12	6884	50	449		34
7	Katpadi	10	15	2590	368	3743		55
8	Wallajah	20	35	4266	3	2901		113
9	Sholingur	32	18	5246	206	2294		101
10	Arcot	42	89	5249	4	2893		53
11	Thimiri	55	86	8288	0	707		120
12	Arakonam	4	8	2362	23	9154		70
13	Nemili	32	64	6290	325	395		108
14	Kaveripakkam	30	60	8799	91	894		99
15	Tirupattur	26	49	4087	317	6109	1	73
16	Kandili	57	69	4021	330	787		119

Sl. No.	Name of the Block	Canals		Wells used for irrigation purpose only	Tube Wells	Wells used for Domestic Purpose only	Reservoirs	Tanks (Nos.)
		Numbers	Length (Km.)					
17	Natrampalli	16	19	3523	197	869		32
18	Jolarpet	30	50	5016	736	2192	1	93
19	Alangayam	7	12	3612	86	2963		55
20	Madhanur	35	43	3152	197	3306		8
	Total	604	1067	99977	3279	56584	3	1355

Source: Assistant Director of Statistics, Vellore.

River and Lakes

Palar and Ponnai are the major rivers flowing through the district. However they remain dry for most part of the year. The details of Ayacuts projects with area and number of tanks benefited are given in the Table 2.14.

Table 2.14 River basins in the district

River Basin	No of Tanks	Area (in ha)
PalarAyacut Project	-	-
Direct	-	-
Indirect Ayacut	-	-
1. Walajah	12	12
2. Arkonam	88	24371
3. Arcot	48	7199
Total	148	34302
PonnaiAyacut Project	-	-
Direct	-	-
Indirect Ayacut	-	-
4. Gudiyatham	6	919
5. Walajah	61	9222
6. Arakonam	59	12031
Total	126	22172

Source: Department of Agriculture, Vellore (2011-12)

Table 2.15 Actual Area Irrigated by Source (Area in Hectares) - Year: 2014-2015

Source	Number	Area Irrigated (ha)	
		Gross	Net
I. Surface Water			
1. Canals i) Government Canals ii) Private Canals	604	10	10
2. Tanks i) Large ii) Small	420 935	1960	2333
3. Other Sources: i) Lift Irrigation ii) Flow Irrigation II Ground Water:1.Public 2.Private Tube Wells/Bore Wells Dug Wells	14663 95099	13133 15157	89206 88529
3. I) With Pump sets ii) Without Pump sets			

Source: Assistant Director of Statistics, Vellore

The sources of irrigation and the area irrigated in the district are presented in the Table 2.15. The majority of the area is irrigated through tanks (1960 ha were gross area) and 2333 ha are net irrigated area. The other sources of irrigation are lift and flow irrigation. Irrigation through pump sets is higher than other sources such as bore wells and lift irrigation systems.

The details on different sources of irrigation are presented in the Table 2.16

Table 2.16 Details of Dams, Tanks, Wells and Bore Wells (2011-12)

Sl. No.	Name of the Block	Dams & Reservoirs				Tanks				No. of Wells in use	No. of Bore wells in use
		No. of Dams	Water spread area	Height	Capacity mcft	Length of canals	Gross area Irrigated (ha)	Capacity	Height		
1	Vellore						0			2137	40
2	Vaniyambadi						0			3619	7
3	Anaicut						0			7904	281
4	Gudiyattam						0			6640	608
5	Pernambut	1			261.3		0			5208	500
6	K.V.Kuppam	1			11.00		0			6883	1

Sl. No.	Name of the Block	Dams & Reservoirs				Tanks			No. of Wells in use	No. of Bore wells in use	
		No. of Dams	Water spread area	Height	Capacity mcft	Length of canals	Gross area Irrigated (ha)	Capacity			Height
7	Katpadi						0			2190	0
8	Wallajah						0			4269	247
9	Sholingur						0			5412	110
10	Arcot						1413			5253	1745
11	Timiri						0			8287	209
12	Arakkonam						136			1555	522
13	Nemili						1982			5673	1129
14	Kaveripakkam						446			8980	786
15	Tirupattur	1			112.2		0			3990	97
16	Kandili						0			4351	2
17	Natrampalli						0			3720	74
18	Jolarpet	1			54.24		0			5616	0
19	Alangayam						0			3698	111
20	Madhanur						0			3088	37
	Total	4			438.74		3977			98473	6506

Source: Assistant Director of Statistics, Vellore

The crops that are cultivated under irrigated conditions are paddy, sugarcane, coconut, gingelly, fruits and vegetables. Paddy is the principal crop that cultivated under irrigated condition in an area of about 36582 ha and followed by coconut (21600 ha), sugarcane (15085 ha) and fruits and vegetables are in about 9346 ha area during 2014-15. (Table 2.17).

Table 2.17 Area Irrigated by Crops (Minor Irrigation Census) - Year: 2014-15

Sl. No.	Crop	Area (in '000' Ha)
1	Paddy	36.582
2	Cholam	165.0
3	Cumbu	295.0
4	Maize	5.059
5	Ragi	5.806
6	Sugarcane	15.085
7	Onion	0.071
8	Fruits and Vegetables	9.346
9	Gingelly	8.25
10	Groundnut	5.350
11	Coconut	21.6
12	Sunflower	0.045
13	Cotton	0.58
14	Green gram	1.152
15	Black gram	1.031
16	Chillies	0.924
17	Turmeric	4.55
	Total	575.431

Source: Department of Agriculture, Vellore

Table 2.18 Irrigation Intensity

Irrigation Intensity	2008-09	2009-10	2010-11	Average
	1.19	1.16	1.18	1.17

Intensity of irrigation is the Percentage of the irrigation proposed to be irrigated annually. Usually the area irrigated during each crop season (Rabi, Kharif, etc.) is

expressed as a Percentage of the CCA which represents the intensity of irrigation for the crop season. The value in the Table 2.18 indicates that the irrigation intensity is greater 1.0. The surface water in the district is high enough for the cultivation of crops like paddy, maize under irrigated conditions.

2.9 Cropping pattern

2.9.1 Major crops grown

Both agricultural and horticultural crops are being grown in the district (Table 2.19). The food grains like paddy, pulses and millets are grown depend upon the soil series. In Vannapatti and Mailam soil series, groundnuts, paddy, sugarcane, pulses and millets are grown. In case of Padugai, Pallipalayam, Vadavalam, Mangalathupatty, Kolathur, Ethapur, Vadaputhupattu, Kadampady and Chickarasampalayam soil series, fruit crops like mango, banana and vegetables, plantation crops, pulses and millets are well suitable.

Table 2.19 Crops grown

Soil Series	Crops Grown	
	Rainfed	Irrigated
Vannapatti, Mailam	Groundnut, Pulses, Millets	Paddy, Sugarcane
Padugai, Pallipalayam Vadavalam, Mangalathupatty Kolathur, Ethapur, Vadapudupattu Kadambady, Chickarasampalayam	Groundnut, Pulses, Millets, Mango	Pulses, Paddy, Millets, Chillies Vegetables, Groundnut Sugarcane, Banana, Flowers Coconut
Suramangalam, Idayapatti	Pulses, Cotton, Coriander, Sunflower	Paddy, Sugarcane, Cotton Banana, Coconut, Sunflower Vegetables.

Source: Department of Agriculture, Vellore

The cropping pattern in the district indicated that paddy, groundnut, cotton and sugarcane are the predominant crop that cultivated in the district. The pattern is Paddy followed by Paddy, Paddy followed by Pulses and Paddy followed by Millets under irrigated system. It varies for rainfed system. Under this system, groundnut is followed by red gram and other pulses. Cotton is followed by red gram and ragi. Then cotton followed by ragi and or else red gram or cholam as a pure crop.

I. Rainfed system

Groundnut+Red gram+other pulses-Horse gram /Ragi /Pulses

Cotton+Red gram+Ragi

Cotton+Ragi

Redgram(or)Cholam apure crop

II. Irrigated system

Paddy+Paddy – Ragi/Groundnut

Paddy-pulses

Paddy-millets

Paddy-Groundnut

Sugarcane

Area under different crops in Vellore district is given in Tables 2.20. As could be seen from Table, area under groundnut was higher than paddy. Other major crops in the district are coconut (21853 ha), sugarcane (11187.33 ha) and red gram (13200.33 ha) in terms of area. The production and productivity of major crops are given below.

**Table 2.20 Area, production and productivity of major crops
(Triennium average ending in ha for 2014-15)**

Sl. No	Particulars	Area (in ha)	Production (in tonnes)	Productivity (kg/ha)
1	Paddy	37218.67	180008.33	4830.67
2	Maize	3993.67	25075.33	5508.33
3	Cholam	6166.33	9877.33	1510.00
4	Cumbu	1948.00	6650.00	3348.00
5	Ragi	6878.67	28200.33	3588.67
6	Bengal Gram	82.67	39.67	159.67
7	Red Gram	13200.33	14715.67	1106.33
8	Black Gram	2735.33	1940.67	698.00
9	Green Gram	1846.00	1104.67	557.67
10	Horse Gram	8920.67	7447.67	787.67

Sl. No	Particulars	Area (in ha)	Production (in tonnes)	Productivity (kg/ha)
11	Groundnut	37801.33	93773.00	1787.33
12	Sunflower	24.33	33.33	1024.33
13	Gingelly	601.33	376.00	426.67
14	Castor	311.00	116.33	248.67
15	Cotton	7612.67	19700.00	307.00
16	Coconut	21853.00	1837.00	6616.00
17	Sugarcane	11187.33	1024662.00	59.33
18	Tobacco	2.67	2.67	611.00
19	Onion	45.33	305.67	9190.67
20	Brinjal	1073.67	7215.67	7091.33
21	Bhendi	975.33	6905.67	7149.33
22	Cabbage	2.33	122.67	55314.67
23	Tomato	1087.00	7544.67	7127.33
24	Banana	4571.33	119947.33	26841.00
25	Mango	12541.00	114145.67	9444.00
26	Jack Fruit	60.33	776.00	12870.67
27	Guava	669.33	1088.33	1679.33
28	Grapes	4.00	62.00	9906.00
29	Chillies	818.67	535.33	722.33
30	Ginger	3.00	16.33	3732.67
31	Coriander	116.67	25.33	439.67
32	Turmeric	777.00	3858.67	5087.67
33	Tamarind	347.67	2016.67	5836.00
34	Potato	0.67	7.67	7564.33
35	Tapioca	290.33	9348.00	32180.00
36	Sweet Potato	2.00	41.00	13680.67
	Total	185769.67	1689522.67	249033.00

Source: Season & Crop Report, 2014-15

The potential horticultural crops cultivated are mango (12541 ha) with a production of 114145.67. The other fruit crops grown are banana (4571.33 ha), jack fruit (60.33 ha), guava (669.33 ha) and grapes (4 ha). Among the spices, chillies (818.67 ha) and turmeric (777 ha) possess huge potential to increase the economy of the farmers. So the cultivation of these potential crops can be recommended in future so that the livelihood of the farmers can be improved.

2.9.2 Area under different crops

The major crops grown in the different blocks of the district are presented in the Table 2.21. It shows that paddy is the predominant crop that grows almost in all the blocks. Sugarcane is the predominant crops that grow in most of the blocks such as Pernampattu, Alangayam, Vaniambadi, Anaicut, Jolarpet, Tirupattur and Kandili etc.,

Table 2.21 Block wise major crops grown (2012-2013)

S.No	Name of the Block	Major crops grown
1.	Arakonam	Paddy, ragi, blackgram, green gram
2.	Sholingur	Paddy, ragi, blackgram, green gram
3.	Walaja	Paddy, ragi, blackgram, green gram
4.	Arcot	Paddy, sugarcane, ragi, banana, green gram, blackgram
5.	Thimiri	Paddy, cholam, maize, ragi, redgram, blackgram, green gram, cowpea, horsegram
6.	Nemili	ragi, redgram, blackgram, green gram, cowpea, horsegram paddy, cholam, maize,
7.	Kaveripakkam	Paddy, ragi, maize , Black gram, green gram
8.	Vellore	Paddy, ragi, maize, cholam, red gram, black gram, green gram, cowpea, horse gram and vegetables
9.	Vaniyambadi	Paddy, ragi, maize , Black gram, green gram
10.	Katpadi	Paddy, sugarcane, ragi, red gram, blackgram, green gram, cowpea, horsegram, Paddy, cholam, maize,
11.	K.V.Kuppam	Paddy, sugarcane, ragi, red gram, blackgram, green gram, cowpea, horsegram, banana
12.	Gudiyatham	Paddy, sugarcane, ragi, red gram, blackgram, cotton green gram, cowpea, horsegram, banana, mango
13.	Madhanur	Paddy, sugarcane, ragi, red gram, blackgram, green gram, cowpea, horse gram
14.	Pernampet	Paddy, sugarcane, ragi, red gram, vegetables, mango
15.	Alangayam	Paddy, sugarcane, red gram, vegetables, flowers
16.	Vaniyambadi	Paddy, sugarcane, red gram, vegetables, flowers, cotton
17.	Anaicut	Paddy, sugarcane, red gram, vegetables, flowers
18.	Jolarpet	Paddy, sugarcane, red gram, flowers, cotton
19.	Tirupattur	Paddy, sugarcane, red gram, vegetables, cotton
20.	Kandili	Paddy, sugarcane, red gram, vegetables, cotton

Source: Department of Agriculture, Vellore

Seed production is one of the most important operations. It enables the public sector to supply quality seeds and planting materials to the farmers and growers. The seed production of units ensures enough quantity of seeds and seed supply. The different blocks in the district are involved in the seed production. The crops and different varieties are presented in the Table 2.22.

Table 2.22 Potential Blocks for seed production in Vellore district

S.No	Crops	Varieties	Blocks
1.	Paddy	ADT 43, 45	Walaja, Arcot, Sholingur, Timiri, Arokonam, Nemili and Kaveripakkam
2.	Milletts		
	Cumbu Samai	Co9 Co5, Co6	Alangayam, Jolarpet, Tirupattur, Kandili, Anaicut, Pernampet, Madhaur, Natrampalli
3.	Pulses		
	Red gram	Co 6,7, LRG 41, Vamban 2, 3, ICPL 85063	Alangayam, Jolarpet, Tirupattur, Kandili, Anaicut, Pernampet, Madhaur, Natrampalli and Sholingar
	Black gram	VBN 2, 3	Timiri, Vellore, K.V.Kuppam, Kandili, Natrampalli, Walaja, Sholingur
	Green gram	Co 6, 7	Vellore, Sholingar, Madhaur, Gudiyatham,
		VRMGG 1	K.V.Kuppam, Timiri, Walaja
Cowpea	COCP 7, CO 6	Vaniyambadi, Arcot, Madhaur, Timiri, Jolarpet, Sholingar, Walaja	
4.	Oilseeds		
	Groundnut	TMV 7	Alangayam, Jolarpet, Tirupattur, Kandili, Natrampalli,
		VRI 2	Jolarpet, Nemili
		VRI 13	Jolarpet

Source: Department of Agriculture, Vellore

2.10 Consumption of Chemical Fertilizers and Pesticides

The Department of Agriculture shoulders the responsibility to closely monitor the demand and supply the fertilizers to ensure timely availability to the farmers. To monitor

the fertilizer supply, Facilitation centres were opened in all the districts from 8.00 A.M to 8.00 P.M. and the Department ensured timely availability of fertilizer at correct price. The consumption of fertilizers and pesticides during 2011-2012 is given in Table 2.23. From the table it could be observed that the nitrogenous fertilizer consumption was high (20800 MT) followed by Phosphoric fertilizer (11090 MT) in the district. Pesticide used in the form of dust was 143000 kg and urea consumption was 45200 MT.

Table 2.23 Consumption of chemical fertilizers and pesticides (2011-12)

Fertilizers (in '000' Tone)				Pesticides		Urea (000 Tone)
Nitrogenous (N)	Phosphoric (P ₂ O ₅)	Potassium (K ₂ O)	Total (NPK)	Dust (KGB)	Liquid (Litres)	
20800	11090	8400	40290	143000	34600	45200

Source: Joint Director of Agriculture, Vellore -2

2.11 Agricultural Engineering - Machineries and Implements

Due to shortage in farm workers, farmers are not in a position to undertake various field operations in time. Hence, modernization of agriculture through Agricultural Mechanization is inevitable. Availability of farm power coupled with efficient and judicious use of farm implements/ machinery enable efficient utilization of various inputs such as seeds, fertilizers, plant protection chemicals and water for irrigation besides eliminating the drudgery in various farm operations from land preparation to post-harvest technology and value addition.

Productivity of the farm depends considerably on the availability of farm power and its efficient use. The districts which have higher farm power availability per hectare show higher productivity. The Agricultural Mechanization is the only way out to face the challenge of farm workers' shortage. The educated youth feel discouraged to work in farms due to human drudgery. Migration of farm workers from rural to urban areas for other works is a common phenomenon. Farm mechanization has been helpful to bring about significant improvement in agricultural productivity by bridging the demand-supply gap of farm workers. The increase in food grains production is possible only when heavy demand for tractors, power tillers and other Agricultural machinery / implements by the farmers are met.

During the year 2006-13, a total of 1633 crop based machineries had been given to 1283 PACCS by the Agricultural Engineering Department for hiring out to individual

farmers / farmers group. The number of farm implements distributed is given in the Table 2.24.

Table 2.24 Agricultural Machineries and Implements in Vellore District

S.No.	Name of the implements/ machineries	Nos. distributed (2006 - 2013)
1.	Power tiller	840
2.	Power weeder (riding type)less than 20 HP	181
3.	Power weeder (walk behind)less than 20 HP	212
4.	Multicrop thresher	13
5.	Rotavator	166
6.	Paddy Combined harvester	8
7.	Paddy transplanter – less than 2 acres	4
8.	Special implement- earth auger and chain saw	54
9.	Power sprayer	119
10.	Tractor	36
	Total	1633

Source: Department of Agricultural Engineering, Vellore.

2.12 Agricultural Marketing and Regulated Markets

Regulated markets are functioning under market committees. A regulated market or controlled market, is a market where the government controls the forces of supply and demand, such as who is allowed to enter the market or what prices may be charged. The details of regulated markets in the district are presented in the Table 2.25. There are about 12 regulated markets and one sub regulated market. The commodities like groundnut, paddy, gingelly, Cane guar, Chillies, ragi, cholam, cumbu, horse gram, tamarind, coconut, red gram, castor, cotton and Varagu are sold in the market. During 2011-12, about 74637 tonnes of commodities were arrives and it worth's for about 225 lakhs.

Table 2.25 Regulated markets in the district (2011-12)

No. of Regulated Markets	No. of sub Regulated Markets	Name of crops	Quantity arrivals (in MT) (Product wise)	Receipts (Rs in Lakhs) (Product wise)
12	1	Groundnut	345.240	2.51
		Paddy	73493.127	73.45
		Gingelly	19.764	0.06
		Cane guar	268.938	11.12
		Chillies	9.708	0.07
		Ragi	176.710	0.29
		Cholam	20.843	0.06
		Cumbu	44.473	0.11
		Horse gram	25.585	0.15
		Tamarind	0.371	0.10
		Coconut	91.958	116.64
		Red gram	11.572	0.03
		Castor	4.188	0.02
		Cotton	125.053	20.23
Varagu	0.000	0.00		
		Total	74637.530	224.84

Source: Statistical Handbook of Vellore District (2011)

The location of the “Uzhavar Santhai” is of utmost importance. The Uzhavar Santhais are located in a consumer area, where the consumers can approach to the market easily. In fact, the main intention is to ensure the urban character of the location, so that adequate number of consumers will benefit from the market. The location and quantity of commodities arrival are given in Table 2.26.

Table 2.26 Details of Uzhavar Santhai in the district

Sl. No	Name of Uzhavar Sandhai	Nos.	Vegetables arrivals (MTS)	Value in Rs.	Farmers arrivals (No's)	Consumer arrivals (No's)	Vegetables arrivals (MTS)	Value in Rs.	Farmers arrivals	Consumer arrivals
			2012-2013				Average per day			
1	Vellore	1	10076	1475	54042	4030409	30.53	4.47	165	12213
2	Katpadi	2	10493	1652	49050	4149340	31.80	5.01	155	12574
3	Kakithapattarai	3	5868	1176	35975	1959854	17.78	3.56	118	5939
4	Gudiyatham	4	3235	551	17565	1078151	9.80	1.67	117	3267
5	Vaniyampadi	5	3734	545	19810	1137868	11.32	1.65	50	3448
6	Arcot	6	3306	475	13919	1083905	10.02	1.44	43	3285
7	Ranipet	7	4314	755	16263	1527921	13.07	2.29	52	4630
8	Thirupatur	8	5276	864	16333	1762689	15.99	2.52	49	5341
9	Natrampalli	9	292	46	1058	97744	0.88	0.14	5	296
	Total		46594	7539	224015	16827881	141.19	22.84	764	50994

Source: Department of Agriculture, Vellore

The term 'commodity' is commonly used in reference to basic agricultural products that are either in their original form or have undergone only primary processing. Examples include cereals, coffee beans, sugar, palm oil, eggs, milk, fruits, vegetables, beef, cotton and rubber. In this district, commodity groups were being operated for major crops like paddy and groundnut. There are about 4 groups for paddy and 2 groups for groundnut. The procurement details are depicted in the Table 2.27.

Table 2.27 Rural hub commodity details

Name of the block	Name of the commodity group	No.of groups	Procurement (MT)	Total value in lakh Rs.
Timiri	Paddy	4	0.62	16.80
	Groundnut	2		
	Total	6		

Source: Department of Agriculture, Vellore

2.13 Storage Facilities

Storage is an important marketing function, which involves holding and preserving goods from the time they are produced until they are needed for consumption. The storage of goods, therefore, from the time of production to the time of consumption, ensures a continuous flow of goods in the market. Storage protects the quality of perishable and semi-perishable products from deterioration some of the goods e.g., woolen garments, have a seasonal demand. To cope with this demand, production on a continuous basis and storage become necessary; It helps in the stabilization of prices by adjusting demand and supply; Storage is necessary for some period for performance of other marketing functions. Storage provides employment and income through price advantages.

For storing the varied agricultural commodities, infrastructural facilities are required. The district possesses storage godowns, drying yards and community centre. The total number of storage facilities is presented in the Table 2.28.

Table 2.28 Infrastructure Facilities in Vellore District

Sl.No	Name of the Structures	Village	Numbers
1	ABC	N.K. Pett	1
2	Community centre	Vangur	1
3	Storage Godown	Seyur	1
4	Drying yard	Pulivalam	1
5	Drying yard	Karpanthangal	1
6	Drying yard	Vayalampadi	1
7	Community centre	Kilveethi	1
8	Storage Godown	Redivalam	1
9	Storage Godown	Kodampakam	1
10	Storage Godown	Siruvalayam	1
11	Drying yard	Redivalam	1
12	Drying yard	Kilveethi	1
13	Drying yard	Govindacheri	1
14	ABC	Erayangadu	1
15	Community Centre	Vanjur	1
16	Storage Godown	Senoor	1
17	Drying yard	Pasumathur	1
	Total		17

Source: Department of Agriculture, Vellore

Table 2.29 List of Agricultural and Non-Agricultural Storage Godowns (2011-12)

Sl.No	Name of the Warehouse	Capacity
1	TamilNadu Warehousing Corporation, Vellore Warehouse, Vellore	9500 M.T.
2	TamilNadu Warehousing Corporation, Katpadi Warehouse, Katpadi(Near VIT)	3400 M.T.
3	TamilNadu Warehousing Corporation, Arakkonam Warehouse, Arakkonam, Vellore Dt	21400 M.T.
4	TamilNadu Warehousing Corporation, Ranipet Warehouse, SIPCOT Complex, Ranipet.	7800 M.T.

Source: District Warehousing Office

The agricultural and non-agricultural storage godowns in the districts are presented in the Table 2.29. There are four godowns from the Tamil Nadu Warehousing Corporation in the district during 2011-12 with different capacities.

2.14 Sericulture

Sericulture is an art of rearing silkworm for the production of cocoons which is the raw material for the production of silk. India has the unique distinction of being the only country producing all the five kinds of silk – Mulberry, Eri, Muga, Tropical Tasar and Temperate Tasar. The area under mulberry is about 1563 acres during 2010-11. They produced 526970 kgs of cocoons for the value of 100124300 lakhs. Among the different blocks, Tirupattur block registered the largest area of 292.25 acres and next to this is the Natrampalli block. The Vellore block doesnot have any area on mulberry cultivation and also registered highest cocoon production. The details on sericulture development for the whole district are presented in the Table 2.30.

Table 2.30 Sericulture development in the district (2010-11)

S.NO	Name of the block	Area under Mulberry (Acres)	Production of Cocoons (kgs)	Value of the Cocoon (Rs. in lakhs)
1	Vellore	0.00	0.00	0.00
2	Vaniyambadi	7.50	1829.00	347510
3	Anaicut	78.00	20150.00	3828500
4	Arcot	10.50	2869.00	545110
5	Timiri	17.00	2496.00	474240
6	Walajapet	74.35	22251.00	4227690
7	Sholingur	66.40	19619.00	3727610
8	Arakkonam	21.00	8100.00	1539000
9	Nemili	4.00	1100.00	209000
10	Kaveripakkam	95.50	20101.00	3819190
11	Gudiyatham	101.50	25396.00	4825240
12	K.V.Kuppam	33.00	12177.00	2313630
13	Pernambut	36.50	10127.00	1924130
14	Katpadi	29.00	8909.00	1692710
15	Alangayam	160.75	68580.00	13030200
16	Madhanur	68.00	15120.00	2872800
17	Tirupattur	292.25	100361.00	19068590
18	Natrampalli	270.75	111600.00	21204000
19	Kandili	114.00	41719.00	7926610
20	Jolarpet	83.50	34466.00	6548540
	Total	1563.50	526970.00	100124300

Source: Statistical Handbook of Vellore District, 2011

2.15 Animal husbandry and Dairy development

2.15.1 Livestock population

Livestock is an important source of income and employment in rural areas. They contribute to household income besides assisting crop production. This sector provides

full time occupation in some cases at the location itself with better utilization of human resources. It provides balanced nutrition in the form of milk, egg and meat besides farm power. Animal Husbandry plays a major role in providing employment especially self-employment with high participation of women. Livestock products also play a main role in export earnings

Livestock helps on food supply, family nutrition, family income, asset savings, soil productivity, livelihoods, transport, agricultural traction, agricultural diversification and sustainable agricultural production, family and community employment, ritual purposes and social status.

The total number of livestock's present in the district is given in the Table 2.31. The rearing of livestock includes cattle (either cross or exotic breed), sheep, goats, horses, pigs and domestic dogs. Among the group, cattle population was the highest (527080 numbers) followed by sheep population. The total livestock is about 1102821 numbers.

Table 2.31 Livestock population of Vellore district (2014-15)

SI.No.	Particulars	Population	Per cent
1	Cattle	527080	47.79
2	Buffaloes	16308	1.48
3	Sheep	275160	24.95
4	Goats	262659	23.82
5	Horses and ponies	904	0.08
6	Donkeys	1845	0.17
7	Camels	0	0.00
8	Pigs	18865	1.71
	Total Livestock	1102821	
9	Elephants	0	
10	Dogs	58151	
11	Rabbits	4818	
	Poultry		
12	Back yard Poultry	487596	
13	Farm Poultry	3828176	
	Total Poultry	4315772	

Source: Season and Crop Report (2014-15)

2.15.2 Veterinary institutions and hospitals

Animal Husbandry has great influence on the economic status of the farmers, in turn it place an important role in rural economy. The main occupation of majority of rural population in the district is Agriculture and allied activities. The district possesses 8 hospitals and 105 dispensaries and 26 sub-centres. There are only 3 mobile units that to

in the Walajabad, Tirupattur and Jolarpet. More than 8.0 lakh animals were treated in these veterinary institutions. There is a scope for establishment of veterinary dispensaries and clinical centres in this district. The details were given in the Table 2.32.

Table 2.32 Veterinary hospitals in Vellore district

S. No	Name of the block	Veterinary institutions				Sub centres	Mobile units	Animals treated	Castration performed
		Polyclinic	Govt. Hospitals	Dispensaries	Clinical centres				
1	Vellore	-	-	5	1	1	-	38750	280
2	Vaniyambadi	-	-	5	-	-	-	39550	245
3	Anaicut	-	-	6	-	1	-	53450	390
4	Arcot	-	-	4	-	3	-	45722	340
5	Timiri	-	-	6	-	2	-	58415	600
6	Walajapet	-	2	4	-	-	1	28800	250
7	Sholingur	-	-	5	-	-	-	48150	320
8	Arakkonam	-	-	4	-	1	-	33540	300
9	Nemili	-	-	6	-	3	-	53015	573
10	Kaveripakkam	-	-	7	-	3	-	50516	390
11	Gudiyatham	-	2	5	-	1	-	61151	3500
12	K.V.Kuppam	-	1	5	-	1	-	15950	350
13	Pernambut	-	-	9	-	4	-	56500	2891
14	Katpadi	-	1	3	-	1	-	27150	60
15	Alangayam	-	1	5	-	1	-	33103	280
16	Madhanur	-	-	6	-	-	-	29386	290
17	Tirupattur	-	1	6	-	2	1	36885	1200
18	Natrampalli	-	-	4	--	-	-	32150	800
19	Kandili	-	-	4	-	2	-	21350	835
20	Jolarpet	-	-	6	--	-	1	36891	1195
	Total	-	8	105	1	26	3	800424	15089

2.15.3 Dairy development

The advent of dairying has been a boon for dairy farmers and of particular importance to those segments of the society that have been traditionally weak, the small landholders, landless labourers and women. It has provided a year-round source of income for people who previously could only depend on payments from small seasonal crops or from occasional labour. It is estimated that up to 60-65 per cent of the income of this group (marginal and small-scale farmers) now comes from dairying. From the 20 blocks in the district, about 456 milking societies were present in the district. K. V. Kuppam and Sholingur holds the highest number (36) and next to this is the Thimiri and Gudiyatham block which has 35 numbers of societies. Among the blocks, Tirupattur produced highest quantity of milk (2998475 litres) in 20 societies. This indicates that milking is one of the major activities that people are all engaged. The details on number of societies, quantity of milk produced and worth of milk production were presented in the Table 2.33.

Table 2.33 Milk production in the district

Sl. No.	Name of the Block/ Urban Town	Name and address of milk		Quantity of milk produced in '000' liters	Value of Milk produced Rs.in Lakhs
		Societies	Nos.		
1	Vellore	Milk Federation Co- op. Societies	23	2670340	51003494
2	Vaniyambadi		30	2896640	55325824
3	Anaicut		28	2421410	46248931
4	Arcot		24	2319575	44303552.5
5	Thimiri		35	2432725	46465047.5
6	Walajapet		29	2353520	44952232
7	Sholingur		36	3428445	654832299.5
8	Arakkonam		7	2240370	42791067
9	Nemili		10	2274315	43439416.5
10	Kaveripakkam		8	2285630	43655533
11	Gudiyatham		35	2545875	48626212.5
12	K.V.Kuppam		36	2511930	4797786.3

Sl. No.	Name of the Block/ Urban Town	Name and address of milk		Quantity of milk produced in '000' liters	Value of Milk produced Rs.in Lakhs
		Societies	Nos.		
13	Pernambut		19	1765140	33714174
14	Katpadi		30	2851380	54461358
15	Alangayam		27	2545875	48626212.5
16	Madhanur		13	2670340	51003494
17	Thirupathur		20	2998475	57270872.5
18	Natrampalli		15	2625080	50139028
19	Kandili		19	2659025	50787377.5
20	Jolarpet		12	2794805	53380775.5
	Total		456	51290895	1525824688

Source: Statistical Hand of Vellore district (2011)

2.15.4 Poultry development

Poultry production in India was confined to backyards till recently. Local breed of birds were reared for the supply of eggs and meat. The increasing demand for poultry products necessitates augmenting the supply by importing improved breeds of poultry. It became one of the most specialized enterprises in many parts of the state. Almost all the blocks in the district were engaged in poultry rearing. The district possesses about 385 broiler farms and these farms contain 1030373 birds. With the inclusion of layer, quail, turkey and other birds, the district possess 401 farms and 1039369 birds. The number of farms and birds present in this sector is presented in the Table 2.34.

Table 2.34 Poultry development in the district (2011-12)

S. No	Name of the Block	No. Farms	Broiler	Layer		Quail		Turkey No. Farms	No. Birds	Others No. Farms	No. Birds	Total	
			No. Birds	No. Farms	No. Birds	No. Farms	No. Birds					No. Farms	No. Farms
1	Vellore	30	72185	0	0	0	0	0	0	02	180	32	72365
2	Anaicut	21	33146	0	0	0	0	0	0	0	0	21	33146
3	Vaniyambadi	5	7680	0	0	0	0	0	0	01	75	6	7755
4	Arakkonam	6	11156	0	0	0	0	0	0	0	0	6	11156
5	Sholingur	62	96105	0	0	0	0	0	0	0	0	62	96105
6	Nemili	3	11125	0	0	0	0	0	0	0	0	3	11125
7	Kaveripakkam	15	33450	0	0	0	0	0	0	02	105	17	33555
8	Thimiri	0	0	0	0	0	0	0	0	0	0	0	0
9	Wallajahpet	3	11550	0	0	0	0	0	0	0	0	3	11550
10	Madhanur	10	97680	0	0	0	0	0	400	0	0	10	97680
11	Arcot	9	28780	0	0	0	0	0	0	01	21	10	28801
12	Tirupattur	44	18850	0	0	0	0	0	0	0	0	44	18850
13	Jolarpet	0	0	0	0	03	7680	0	0	0	0	3	680
14	Kandili	0	0	0	0	0	0	0	0	0	0	0	0
15	Natrampalli	0	0	0	0	0	0	0	0	0	0	0	0
16	Alangayam	8	75166	0	0	0	0	0	0	0	0	8	75166
17	Pernampet	16	125000	0	0	0	0	0	0	01	400	17	125400
18	Gudiyattam	93	111500	0	0	05	7500	0	0	0	0	98	119000
19	K.V.Kuppam	40	198500	0	0	0	0	0	200	0	0	40	198500
20	Katpadi	20	98500	0	0	0	0	0	535	01	35	21	98535
	Total	385	1030373	0		8	15180	0	1135	8	816	401	1039369

Source: Statistical Handbook of Vellore district, 2011

2.15.5 Egg production

The total egg production in the district during 2010-11 is presented in the Table 2. 35. The value indicates that, desi breed produced 150.981 lakh number of eggs whereas improved breeds produced 118.70 lakh numbers.

Table 2.35 Egg production in the district (2010-11)

District	Desi (in lakh Nos)	Improved (in lakh Nos)	Total (in lakh Nos)
Vellore	150.981	118.70	269.051

Source: Statistical Handbook of Vellore District, 2011

2.16 Fisheries

Fishing is sustainable good for the environment and the economy. Fishing helps create substantial jobs around the district. Inland fishing is one of the major activities in the district. The fish products are given in the Table 2.36.

Table 2.36 Fisheries development in the district (2011-12)

1.	Area	Does not Arrive		
	a. Total Coastal Line of the district			
	b. i. Total Inland Fresh Water spread area			
	ii. Estuaries and Brackish Water area			
c. Marine Fishing Village				
2	Fish Production	Item	Quantity M. tonnes	Value (Rs.in Lakhs)
	Inland Fish Products (Tonne)	1	500.00	200.00
3.	Inland			
	Fisheries Development	Nil	--	-
	a. Freezing Plants	Nil	-	-
	b. Ice plants, Cold storage's and walk in coolers	Nil	-	-
	c. Sea food manufacturing units in private sector	Nil	-	-
	d. Fisheries Training Centre	Nil	-	-
	i. Marine	Nil	-	-
	ii. Inland	Nil	-	-
	e. Fishing Vessels	Nil	-	-
	f. Active Marine fishermen	Nil	-	-
4.	Export	Nil	-	-
	Fish and Fish Products	Nil	-	-
	a. Quantity (Tonne)	Nil	-	-
	b. Value (Rs, in Lakhs)	Nil	-	-

Source: Statistical Handbook of Vellore District, 2011

About 500 tonnes of inland fish were caught during 2011-12. Among the different blocks in the district, Vellore block have the highest quantity of fish catchment (260 tonnes) followed by Walajapet (60 tonnes) and Vaniyambadi (18 tonnes). The value of

this inland catch is about 200 lakhs. The details on quantity of fish catchment and its value are presented in the Table 2.37.

Table 2.37 Estimated Marine Production / Inland Production Year:2011-2012

S. No	Name of the Block / Municipality	Quantity (Tonnes)	Value (Rs.in Lakhs)
1.	Vellore	260.00	104.00
2.	Vaniyambadi	18.00	7.20
3.	Anaicut	09.00	3.60
4.	Arcot	09.00	3.60
5.	Timiri	16.00	6.40
6.	Walajapet	60.00	24.00
7.	Sholingur	16.00	6.40
8.	Arakkonam	15.00	6.00
9.	Nemili	15.00	6.00
10.	Kaveripakkam	10.00	4.00
11.	Gudiyatham	10.00	4.00
12.	K.V.Kuppam	09.00	3.60
13.	Pernampet	05.00	2.00
14.	Katpadi	10.00	4.00
15.	Alangayam	05.00	2.00
16.	Madhanur	05.00	2.00
17.	Tirupattur	10.00	4.00
18.	Natrampalli	05.00	2.00
19.	Kandili	06.00	2.40
20.	Jolarpet	07.00	2.80
	Total	500.00	200.00

Source: Statistical Handbook of Vellore District, 2011

The total number of families engaged in fishing is listed in the Table 2.38. About 370 families were engaged in fishing around the district. Among the different blocks in the district, Kaveripakkam block holds the highest number of fishing families.

Table 2.38 Number of families engaged in Fishing Year: 2011- 2012

S. No	Name of the Municipality/ Block	Number of Families engaged
1.	Vellore	10
2.	Vaniyambadi	20
3.	Anaicut	20
4.	Arcot	30
5.	Timiri	20
6.	Walajapet	30
7.	Sholingur	15
8.	Arakkonam	30

S. No	Name of the Municipality/ Block	Number of Families engaged
9.	Nemili	8
10.	Kaveripakkam	40
11.	Gudiyatham	10
12.	Pernampet	12
13.	Katpadi	15
14.	K.V.Kuppam	10
15.	Madanoor	15
16.	Alangayam	15
17.	Tirupattur	20
18.	Jolarpet	15
19.	Natrampalli	20
20.	Kandili	15
	Total	370

Source: Statistical Handbook of Vellore District, 2011

2.17 Banking and Insurance

The banking sector plays a major role in the financial management of people in the district. To meet the financial need, the district holds 181 Nationalized banks, 32 Scheduled banks and 34 Central Co-op banks. The details are presented in the Table 2.39.

Table 2.39 Infrastructure Facilities in Vellore District

Banks	Nos.
Nationalized Banks	181
Scheduled Banks	32
Central Co-op. Banks	34
Total	247

Source: Department of Agriculture, Vellore

The various agencies offering insurance schemes are given in the Table 2.40. In this district, the insurance companies paid an amount of Rs. 26crores as compensation to about 2, 95,061 beneficiaries. About 429728 policies were issued in 19 branches. Among the different sectors, General United India Insurance allotted the maximum amount (Rs. 12 crores) for compensation but in case of policy issuance and beneficiaries; Life Insurance Corporation issued 324222 numbers of policies to about 164904 beneficiaries.

Table 2.40 Insurance schemes in the district (2010-11)

Name of the Insurance	No. of branches	Policies issued	Sum Assured (in Crores)	No. of beneficiaries	Amount paid as compensation (in Crores)
L.I.C	10	324222	4327.47	164904	1637.38
General United India Insurance	6	41206	395.41	47721	128348050
Other connected schemes	0	0	0	0	0
RPLI	0	0	0	0	0
Oriental Insurance	03	64300	0	82436	135901857
Total	19	429728	4722.88	295061	264251544.38

Source: Statistical Handbook of Vellore District, 2011

2.18 Co-operation

District Cooperative Central Bank, popularly known as DCC Bank is a cooperative banking network. It provides banking to rural hinterland for agriculture sector with the branches primarily established at rural and semi-urban areas. The details of Cooperative banks are presented in the Table 2.41. There are about 456 cooperative societies in the district. These include DCCB, PACB, FSCS, Lamp Society, Vegetable Growers Cooperative marketing Society, Primary Cooperative Stores, Food processing Cooperative Society. About 2272 employees were employed in this sector and about 803639 members in the societies.

Table 2.41 Cooperative societies in the district (2010-11)

Loans and Advances(Rs. in Lakhs)

S. No	Types of societies	No. of societies	Member ship	Share capital	Working capital	Out standing	Overdue	No. of employees
1	District Central Co-operative Bank	1	654	2149.75	86632.62	67161.21	9568.84	210
2	Primary Agricultural Co-operative Bank	182	522375	2850.73	3451.67	25758.90	5023.93	1227
3	Farmer Service Co-operative Society	1	10189	25.74	267.27	293.59	52.43	34
4	Lamp Society	2	7920	46.13	433.78	453.12	6.65	18
5	Cooperative Primary Agricultural& Rural Development Bank	9	55477	337.92	1820.41	1586.59	903.75	53
6	Cooperative Urban Bank	10	76024	352.13	22727.72	15254.16	792.03	153
7	Employees Co-operative Bank	66	12582	1495.29	648.25	10250.23	728.00	76
8	Co-operative Marketing Society	7	50419	17.52	99.42	5.21	0	137
9	Students Co-operative Stores	152	40223	5.21	0	0	0	0
10	Vegetables Growers Co-op Marketing Society	1	50	0.09	7.15	0	0	1
11	Primary Co-operative Stores	18	21514	22.06	80.53	0	0	68
12	Labour Contract Society	0	0	0	0	0	0	0
13	Cooperative Canteen	1	567	0.07	0	0	0	17
14	Dt. Consumer Co-op. Wholesale Stores	1	689	1836.00	1062.22	223.64	0	247
15	District Cooperative Union	1	1156	4.11	0	0	0	2
16	DistrictCooperative Printing Press	1	992	7.89	25.25	25.22	0	19
17	DistrictTraining Institute	1	296	0.31	0	0	0	4
18	Automobile Spare parts Co-op. Society	1	563	0.92	22.00	0	0	3
19	Food Processing Cooperative society	0	0	0	0	0	0	0
20	Urban Credit Society	1	1949	5.69	265.95	241.95	11.72	3
	Total	456	803639	9157.56	117544.24	121253.82	17087.35	2272

Source: Special officer, Co-Operative societies, Salem

2.19 Industries

The agro based industries located in the Vellore district is presented in the Table 2.42. The industries include cotton textiles, wood and wood products, paper, paper products and printing industries, plastic based industries and leather based industries. There are about 3817 numbers of cotton textile industries, 677 food product industries, 365 wood and wood product industries and 264 paper and paper products based industries. These industries helped the people of the district to be employed and upliftment of the people. There are about 137456 people are employed in these industries.

Table 2.42 Activity wise data of existing MSME units

S.No.	Name of the activity	No. of units	No. of persons employed
1.	Food products	677	1425
2.	Cotton textiles, hosiery and garments	3817	8540
3.	Wood and wood products	365	945
4.	Paper, paper products and printing industries	264	645
5.	Leather and leather based industries	1655	39630
6.	Rubber and plastic based industries	201	520
7.	Chemical and chemical based industries	98	720
8.	Non-metallic and mineral based industries	162	356
9.	Metal based industries	1675	3835
10.	Transport equipment and spares manufacturing	5935	76795
11.	Computer based industries	551	1320
12.	Printing	455	840
13.	Miscellaneous industries	763	1885
	Total	16618	137456

Source: Indian Bank, Annual Report, Vellore (2011-12)

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 to ensure the current status of the area and production.

- i. Assessing the trends in area, production and productivity of major crops and projection till the 12th Plan period (2015-16)
- ii. Yield gap analysis for the major crops
- iii. Projection on yield and production by 2023
- iv. Technological intervention
- v. Strengthening of input supply system
- vi. Strengthening of infrastructural facilities

Trends in area, production and productivity of major crops

The past trends in area, production and productivity of major crops need to be analyzed to plan for future agricultural development. Compound Growth Rate (CGR) tool is used to measure the growth in area, production and productivity of major crops cultivated in the district and it is expressed in Percentage. The compound growth rate has been estimated using 15 year time series data from 1981-82 to 2014-15.

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

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

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

Where Y_t = Area or Production or Yield

a = Intercept

b = Regression coefficient of t

t = Time variable

r = Compound Growth Rate

3.1 Trends in area, production and productivity of major crops and projection till the 12th Plan period (2015-16)

3.1.1 Area

The CGR of area, production and yield of major crops grown in Vellore district are given in Table 3.1.

Table 3.1 Compound Growth Rate of Area under Major Crops Grown in Vellore District

Sl.No.	Crops	CGR (%)	Triennium average ending area 2014-15 (Ha)
1	Paddy	-3.71	37219
2	Cholam	-5.81	6166
3	Cumbu	-2.88	1948
4	Ragi	1.37	7452
5	Maize	36.62	3994
6	Blackgram	9.21	2735
7	Greengram	13.92	1846
8	Redgram	3.47	13200
9	Chillies	10.71	819
10	Turmeric	0.14	777
11	Sugarcane	-7.80	11187
12	Banana	-4.25	4571
13	Mango	0.04	12541
14	Onion	2.60	45
15	Cotton	2.12	7613
16	Groundnut	-2.98	37801
17	Gingelly	-2.74	601
18	Coconut	2.27	21853
	Total		172369

The net sown area accounted for only a less than one-third (29.60) per cent of the total geographical area of the district). Further, the gross cropped area had only a negative growth rate during the period from 2005-06 to 2014-15. This would indicate that intensive developmental efforts are needed at least to sustain the existing cropped area. However, the estimated compound growth rate of various crops grown in Vellore district would reveal that crops like Ragi, Maize, Black gram, green gram, Chillies, Onion, cotton, coconut, red gram,

turmeric and mango had a positive CGR of less than one per cent per annum. Therefore, the commercial / horticultural crops like fruits and vegetables are also to be covered under larger area.

3.1.2 Production

The growth rates of production of major crops of Vellore district are given below.

Table 3.2 Compound Growth Rate of Production of Major Crops Grown in Vellore District

Sl.No.	Crops	CGR (%)	Triennium average ending Production 2014-15 (tonnes)
1	Paddy	2.47	180008
2	Cholam	51.28	9877
3	Cumbu	11.9	6650
4	Ragi	9.64	28200
5	Maize	2.36	25075
6	Blackgram	17.67	1941
7	Greengram	26.46	1105
8	Redgram	14.73	14716
9	Chillies	11.37	542
10	Turmeric	-1.08	3859
11	Sugarcane	-7.59	1024662
12	Banana	-11.72	119947
13	Mango	5.24	114146
14	Onion	-0.25	306
15	Cotton	6.74	19700
16	Groundnut	0.84	93773
17	Gingelly	-0.48	376

As far as the production of major crops grown in Vellore district were concerned, maize, green gram, cotton, mango, paddy, cumbu, cholam, ragi, groundnut, Bengal gram, red gram, black gram, horse gram, castor, coconut and chillies had a positive CGR, while the major crops like turmeric, sugarcane, banana, Onion and Gingelly had negative growth rate in their production. Unless the average production of major food crops is not increased, it would be very difficult to ensure the food security.

3.1.3 Productivity

The growth rates of productivities of major crops of Vellore district are given in Table 3.3.

Table 3.3 Compound Growth Rate of Productivity of Major Crops Grown in Vellore District

SI.No.	Crops	CGR (%)	Triennium average ending Yield (kg/ha) - 2014-15
1	Paddy	6.42	4831
2	Cholam	3.67	1510
3	Cumbu	15.22	3348
4	Ragi	8.16	3589
5	Maize	10.73	5508
6	Blackgram	5.93	698
7	Greengram	10.99	558
8	Redgram	10.88	1106
9	Chillies	1.60	722
10	Turmeric	-1.21	5088
11	Sugarcane	0.23	91
12	Banana	-7.97	26841
13	Mango	5.84	9444
14	Onion	1.14	9191
15	Cotton	4.54	440
16	Groundnut	6.53	2495
17	Gingelly	5.98	597
18	Coconut	N.A	N.A

As far as the productivity of major crops grown in Vellore district were concerned, paddy, cumbu, ragi, Bengal gram, red gram, Black gram, chillies, sugarcane, groundnut, gingelly, onion, cotton, castor cholam, green gram, horse gram, coconut and mango had a positive CGR, while the other crops like turmeric and banana had negative growth rate in their productivities. Unless the average productivities of major food crops are not increased, it would be very difficult to ensure the food security.

3.2 Yield gap analysis for identified potential crops in Vellore district

Yield Gap Analysis

Gap I = Potential Yield – Progressive Yield

Gap II = Progressive Yield – average Yield

Gap III = Potential yield – average Yield

Table 3.4 Yield gap analysis for identified potential crops in Vellore district

Details	Paddy				Groundnut (UI)	Groundnut (I)	
	Ruling Varieties						
	ADT 45	ADT 43	ADT 37	ADT 36	TMV 7	TMV 7	VRI 3
Potential Yield	6100	5900	6200	6000	1100	1900	1830
Progressive farmer yield	6299	6716	6681	5640	3335	3630	3712
Average Yield	5016	4718	5542	5460	2042	2760.5	3539
Overall Yield Gap	1084	1182	658	540	-942	-860.5	-1709
Required Growth Rates	21.61	25.05	11.87	9.89	-46.13	-31.17	-48.29
Annual Growth Rate	1.96	2.27	1.07	0.8	-4.19	-2.83	-4.39

Table 3.4 (Contd...) Yield gap analysis for identified potential crops in Vellore district

Ruling Varieties	Red gram (kg/ha)		Cotton (kg/ha)		Sugarcane (tonnes/ha)			Coconut (Nuts / tree)	Mango(kg/ha)		Banana(kg/ha)		
	ICPL 85063	VBN 2	Mallika Bt	RCH 20	Co 86032	Co 8362	Co6304	Tall x Dwarf	Bangalora	Neelam	Grand Nine	Poovan	Karpooraval ii
Potential Yield	1500	1010	1728	1938	110000	124300	115000	130	15000	17000	60000	50000	50000
Progressive farmer yield	290	625	1214	1398	106000	68000	153600	110	14000	15000	55000	45000	45000
Average Yield	280	364.5	909	1023	85600	59800	110000	80	9000	10000	50000	40000	38000
Overall Yield Gap	1220	645.5	819	915	24400	64500	5000	50	6000	7000	10000	10000	12000
Required Growth Rates	435.71	177.09	90.09	89.44	28.50	107.86	4.54	62.5	66.66	70	20	25	31.57
Annual Growth Rate	39.61	16.09	8.19	8.13	2.59	9.80	0.41	5.68	6.06	6.36	1.81	2.27	2.87

3.3 Projected Yield and Production of the selected crops

Using the secondary data on area, yield and production of the selected crops, viz., paddy, sugarcane, ground nut, cotton coconut, red gram, mango and banana the projected yield and production for these crops for the year 2022-23 were estimated and the results are discussed in the following section. The annual growth rates of areas and production for the period between 1981-82 and 2010-11 were negative for the selected major crops like paddy, groundnut, sugarcane, red gram, cotton, coconut, mango and banana. Therefore, planned efforts are utmost necessary to sustain the areas under these crops so as to enhance the agricultural production by means of raising the productivities of these crops. The projection for rising the productivities of the selected crops alone was resorted to assess the estimated yield and production for the period from 2011-12 to 2022-23 and the results are discussed below.

3.3.1 Paddy

Sornavari is the major season for paddy in the district, which has 24.85 per cent of the total area under paddy followed by *Samba* (37.22 per cent) and *Navarai* (37.92 per cent) (Table 3.5). Policy intervention against the conversion of cultivable lands into real estate is required to arrest the negative trend in the gross cropped area. The maximum yields recorded in the crop cutting experiment was considered to assess the potential yield for paddy varieties like ADT43 and ADT45 grown in *Sornavari* and ADT36 and ADT45 and BPT5204 grown in *Samba* season and ADT36, 37 grown in *Navarai* seasons. These yield gaps in the three seasons could be gradually bridged over the next 12 year period, i.e., from 2011-12 to 2022-23 as indicated in the Table 3.6. Extension machinery needs to be strengthened to bridge the yield gap such that the yield is raised annually at the rate of 4.82 per cent. The bridging up of the yield gap would result in the gradual increase in paddy production from 1.53 lakh tonnes in 2010-11 to 2.63 lakh tonnes in 2022-23 accounting for an increase of 56.6 per cent.

Table 3.5 Existing and Projected Yield and Production of Paddy in Vellore District

Year	Season			Total
	Kar / Kuruvai / Sornavari (Apr-July)	Samba/ Taladi/ Pishanam (Aug-Nov)	Navarai/ Kodai (Dec-Mar)	
Area (Ha)				
2008-09	10230	16110	19077	45417
2009-10	9741	16309	13715	39765
2010-11	11943	15375	15904	43222
Triennium average ending 2010-11	10638	15931	16232	42801
Projected area for 2022-23	10638	15931	16232	42801
% to total	24.85	37.22	37.92	100
Varieties	ADT 43,45	ADT 45, BPT-5204	ADT 36, 37	-
Maximum yield as per Crop Cutting Experiment Kgs/Ha)	6716	6299	5640	6153
Average yield for Triennium average ending 2010-11 (Kgs/Ha)	3651	3415	3378	3481
Yield Gap(Kgs/ha)	3065	2884	2262	2737
Projected Production for 2022-23 (tonnes)*	71445	100349	91548	263342
Production for Triennium average ending 2010-11 (tonnes)	38856	56859	57796	153511
Percentage of increase in production over 2010-11	83.87	76.48	58.40	56.62

**Based on maximum yield as per Crop Cutting Experiment*

Table 3.6 Projected Increase in Yield and Production of paddy from 2011-12 to 2022-23

Year	Yield (kg/ha)				Production (Tonnes)			
	Sornavari	Samba	Navarai	Total	Sornavari	Samba	Navarai	Total
Triennium average ending 2010-11	3651	3415	3378	3481	38856	56859	57796	153511
2011-12	3906	3655	3567	3704	41572	60483	60609	162664
2012-13	4162	3896	3755	3926	44288	64107	63421	171816
2013-14	4417	4136	3944	4149	47003	67732	66234	180969
2014-15	4673	4376	4132	4372	49719	71356	69047	190121
2015-16	4928	4617	4321	4594	52435	74980	71859	199274
2016-17	5184	4857	4509	4817	55151	78604	74672	208427
2017-18	5439	5097	4698	5040	57866	82228	77485	217579
2018-19	5694	5338	4886	5262	60582	85852	80297	226732
2019-20	5950	5578	5075	5485	63298	89477	83110	235884
2020-21	6205	5818	5263	5708	66014	93101	85923	245037
2021-22	6461	6059	5452	5930	68729	96725	88735	254189
2022-23	6716	6299	5640	6153	71445	100349	91548	263342
Required Growth Rate (%)	5.16	5.18	4.33	4.82	5.16	4.81	3.89	4.57

Note: Area in Ha; Production in Tonnes; and Yield in Kgs per ha.

3.3.2 Ground nut

Groundnut is the major oilseed crop grown in Vellore district and it is grown under irrigated as well as unirrigated conditions. It is cultivated mostly in Kharif season accounting

for 75 per cent of the total area under groundnut. Major varieties grown in the district are TMV 7 and VRI 3. Of these varieties, VRI 3 has a very high yield potential of 3712 kgs per ha and it is suggested for bridging the yield gap. Selection of the suitable variety and timely application of inputs would improve the productivity. Extent of improvement of the average yield during the next 12-year period, i.e., from 2011-12 to 2022-23 and the resultant increase in the production are given in Table 3.8. After bridging the yield gap, the production could be increased from 90059 tonnes (2010-11) to 155656 tonnes (2022-23) accounting for an increase of 72.83 per cent.

Table 3.7 Existing and Projected Yield and Production of Groundnut in Vellore District

Year	Irrigated	Unirrigated	Total
Area (Ha)			
2008-09	6915	44146	51061
2009-10	6625	37060	43685
2010-11	4999	38183	43182
Triennium average ending 2010-11	6179	39796	45976
Projected area for 2022-23	6180	39796	45976
% to total	13.44	86.55	100
Varieties	TMV-7, VRI-3	TMV-7	-
Maximum yield as per Crop Cutting Experiment (Kgs/Ha)	3712	3335	3385
Average yield for Triennium average ending 2010-11 (Kgs/Ha)	2852	1829	4682
Yield gap	860	1506	1296
Yield Gap(Kgs/ha)	3065	2884	2737
Projected Production for 2022-23 (tonnes)*	22936	132719	155656
Production for Triennium average ending 2010-11 (tonnes)	17872	72187	90059
Percentage of increase in production over 2010-11	28.33	83.85	72.83

**Based on maximum yield as per Crop Cutting Experiment*

Table 3.8 Projected Increase in Yield and Production of groundnut (2011-12 to 2022-23)

S.No	Year	Yield (kg/ha)	Production (tonnes)
1	2010-11	2340	90059
2	2011-12	2439	95525
3	2012-13	2537	100992
4	2013-14	2636	106458
5	2014-15	2735	111925
6	2015-16	2833	117391
7	2016-17	2932	122858
8	2017-18	3031	128324
9	2018-19	3129	133790
10	2019-20	3228	139257
11	2020-21	3327	144723
12	2021-22	3425	150190
13	2022-23	3524	155656
	%CGR	3.46	4.63

3.3.3 Sugarcane

In Vellore district, sugarcane is grown in an area of 14034 ha and the canes are supplied to the Vellore Co-operative Sugar Mill Limited, Ambur Co-operative Sugar mill and Tirupattur Co-operative Sugar Mill. Planted crop accounts for a larger area of 61.90 per cent. Major varieties grown in the district are CoC 6304, CO8362 and CoC 86032. The yield gap estimated was only 20.5 tonnes per ha and this gap could be bridged as indicated in Table 3.9. The annual growth rate required to raise the yield from 86.6 tonnes per ha in 2010-11 to 115.5 tonnes per ha in 2022-23. The increase in production by way of bridging the yield gap, from 13.14 lakh tonnes (2010-11) to 16.54 lakh tonnes (2022-23) accounts for 25.89 per cent. The projected increase in yield and production of sugarcane from 2011-12 to 2022-23 is presented in Table 3.9.

Table 3.9 Existing and Projected Yield and Production of Sugarcane in Vellore District

Year	Season		
	Planted	Ratoon	Total
Area (Ha)			
2008-09	9712	7063	16775
2009-10	8956	5373	14329
2010-11	9275	4759	14034
Triennium average ending 2010-11*	9314	5732	15046
Projected area for 2022-23	9314	5732	15046
% to total	61.90	38.09	100.00
Varieties	COC6304 and CoC 86032	CO 8362 and CoC 86032	-
Maximum potential yield (tonnes/Ha)	110.5	120.5	115.5
Average yield for Triennium average ending 2010-11 (tonnes/Ha)*	86.6	86.6	86.6
Yield Gap (tonnes/Ha)	20.5	20.5	20.5
Projected Production for 2022-23 (tonnes)	-	-	1654950
Production for Triennium average ending 2010-11 (tonnes)*	-	-	1314590
Percentage of increase in production over 2010-11	-	-	25.89

* Source: Season and Crop Reports of 2008-09, 2009-10 and 2010-11

Table 3.10 Projected Increase in Yield and Production of Sugarcane from 2011-12 to 2022-23

S.No	Year	Yield (tonnes /ha)	Production (tonnes)
1	2010-11	86.6	1314590
2	2011-12	89	1342953
3	2012-13	91	1371317
4	2013-14	94	1399680
5	2014-15	96	1428043
6	2015-16	99	1456407
7	2016-17	101	1484770
8	2017-18	103	1513133
9	2018-19	106	1541497
10	2019-20	108	1569860
11	2020-21	111	1598223
12	2021-22	113	1626587
13	2022-23	115.5	1654950
	CGR%	2.42	1.93

3.3.4 Redgram

Redgram is major pulse crop in Vellore district. Previous years it was cultivated as intercrop in Cotton and groundnut. Nowadays, it has been changed and grown as pure crop. Also, the area has been increased. Major varieties grown in the district are ICPL, VBN-2and LRG. The yield gap estimated was only 604 kgs per ha and this gap could be bridged as indicated in Table 3.11. The annual growth rate required to raise the yield from 446 kgs per ha in 2010-11 to 1050 kgs per ha in 2022-23. The increase in production by way of bridging the yield gap, from 4768 tonnes (2010-11) to 9003 tonnes (2022-23) accounts for 97.67 per cent. The projected increase in yield and production of red gram from 2011-12 to 2022-23 is presented in Table 3.12.

Table 3.11 Existing and Projected Yield and Production of Red gram in Vellore District

RED GRAM	
Area (Ha)	
2008-09	8100
2009-10	7648
2010-11	9975
Triennium average ending 2010-11*	8574
Projected area for 2022-23	8574
% to total	100
Varieties	ICPL, VBN-2 and LRG
Maximum potential yield (tonnes/Ha)	1050
Average yield for Triennium average ending 2010-11 (Kgs/Ha)*	446
Yield Gap (Kgs/Ha)	604
Projected Production for 2022-23 (tonnes)	9003
Production for Triennium average ending 2010-11 (tonnes)*	4768
Percentage of increase in production over 2010-11	97.67

* Source: Season and Crop Reports of 2008-09, 2009-10 and 2010-11.

Table 3.12 Projected increase in Yield and Production of red gram from 2011-12 to 2022-23

S.No	Year	Red Gram	
		Yield (kg/ha)	Production (Tonnes)
1	2010-11	446	4768
2	2011-12	496	5121
3	2012-13	547	5474
4	2013-14	597	5827
5	2014-15	647	6180

S.No	Year	Red Gram	
		Yield (kg/ha)	Production (Tonnes)
6	2015-16	698	6533
7	2016-17	748	6886
8	2017-18	798	7238
9	2018-19	849	7591
10	2019-20	899	7944
11	2020-21	949	8297
12	2021-22	1000	8650
13	2022-23	1050	9003
	%CGR	7.26	5.38

3.3.5 Banana

Banana is commercial crop in Vellore district. It covers an area of 6800 ha. There is a wide yield gap in the varieties. G9, Poovan, Rasthali and Karpooravalli are grown in this district. G9 is more potential and higher yield potential of 85000 kgs as against the average yield of 56240 kgs per ha. The yield gap estimated was only 16240 kgs per ha and this gap could be bridged as indicated in Table 3.13. The increase in production by way of bridging the yield gap, from 57.8 tonnes (2010-11) to 69.95 tonnes (2022-23) accounts for 17.38 per cent. The projected increase in yield and production of banana from 2011-12 to 2022-23 is presented in Table 3.14.

Table 3.13 Existing and Projected Yield and Production of banana in Vellore District

BANANA	
Area (Ha)	
2008-09	6918
2009-10	6645
2010-11	6837
Triennium average ending 2010-11*	6800

BANANA	
Area (Ha)	
Projected area for 2022-23	6800
% to total	100.00
Varieties	G9, Rasthali, Povan and Karpooravalli
Maximum potential yield (tonnes/Ha)	85.0
Average yield for Triennium average ending 2010-11 (tonnes/Ha)*	56.0
Yield Gap (tonnes/Ha)	16.24
Projected Production for 2022-23 (tonnes)	69959
Production for Triennium average ending 2010-11 (tonnes)*	57800
Percentage of increase in production over 2010-11	17.38

* Source: Season and Crop Reports of 2008-09, 2009-10 and 2010-11.

Table 3.14 Projected Increase in Yield and Production of Banana from 2011-12 to 2022-23

S.No	Year	Banana	
		Yield kg/ha	Production(tonnes)
1	2010-11	5624	57800
2	2011-12	5864	58813
3	2012-13	6103	59827
4	2013-14	6343	60840
5	2014-15	6583	61853
6	2015-16	6822	62866
7	2016-17	7062	63880

S.No	Year	Banana	
		Yield kg/ha	Production(tonnes)
8	2017-18	7302	64893
9	2018-19	7541	65906
10	2019-20	7781	66919
11	2020-21	8021	67933
12	2021-22	8260	68946
13	2022-23	8500	69959
	%CGR	3.49	1.60

3.3.6 Mango

Mango is the major fruit crop grown in Vellore district with an area of 12436 ha. Absentee landlordism - with many land owners staying in faraway place is widely prevalent as far as mango orchards are concerned. There exists a wide yield gap in mango due to improper maintenance of mango orchards, old plantations, non - adoption of recommended package of practices and so on. Although many varieties of mango like Bangalora, Alphonso, Banganapalli, Rumani, Senthura and Neelam are grown in Vellore district. Implementation of Area Expansion Schemes with High Density Planting method, rejuvenation and gap – filling with preferred (choice) variety and chemical spraying and other precautionary methods to prevent flower dropping and button shedding would improve the yield potential of mango garden. Drip irrigation with the recommended dosage of manures and fertilizer would also improve the yield. The yield gap estimated was only 14.81 tonnes per ha and this gap could be bridged as indicated in Table 3.15. The increase in production by way of bridging the yield gap, from 42.22 tonnes (2010-11) to 64.66 tonnes (2022-23) accounts for 53.16 per cent. The projected increase in yield and production of mango from 2011-12 to 2022-23 is presented in Table 3.16.

Table 3.15 Existing and Projected Yield and Production of Mango in Vellore District

Mango	
Area (Ha)	
2008-09	12591
2009-10	12261
2010-11	12456
Triennium average ending 2010-11*	12436
Projected area for 2022-23	12436
% to total	100
Varieties	Banganapalli, Bangalora, Neelam and Senthura
Maximum potential yield (tonnes/Ha)	45.00
Average yield for Triennium average ending 2010-11 (tonnes/Ha)*	37.18
Yield Gap (tonnes/Ha)	14.81
Projected Production for 2022-23 (tonnes)	646672
Production for Triennium average ending 2010-11 (tonnes)*	422217
Percentage of increase in production over 2010-11	53.16

* Source: Season and Crop Reports of 2008-09, 2009-10 and 2010-11

Table 3.16 Projected Increase in Yield and Production of Mango from 2011-12 to 2022-23

S.No	Year	MANGO	
		Yield (kg/ha)	Production (Tonnes)
1	2010-11	37181	422217
2	2011-12	37833	440922
3	2012-13	38484	459626
4	2013-14	39136	478331
5	2014-15	39787	497035
6	2015-16	40439	515740
7	2016-17	41091	534445
8	2017-18	41742	553149
9	2018-19	42394	571854
10	2019-20	43045	590558
11	2020-21	43697	609263
12	2021-22	44348	627967
13	2022-23	45000	646672
	%CGR	1.60	3.60

3.3.7 Cotton

Cotton is cultivated under rainfed condition. The area of the cotton has been extended due to the many Government Schemes implemented by the Department of Agriculture. 95% of the area under BT cotton in the district. The yield has been reduced due to use of imbalanced fertilizer and poor maintenance in the field. The yield gap estimated was only 268 kgs per ha and this gap could be bridged as indicated in Table 3.17. The annual growth rate required to raise the yield from 1130 kgs per ha in 2010-11 to 1728 kgs per ha in 2022-23. The increase in production by way of bridging the yield gap, from 1113 tonnes (2010-11) to 12.63 tonnes (2022-23) accounts for 28.72 per cent. The projected increase in yield and production of cotton from 2011-12 to 2022-23 is presented in Table 3.18.

Table 3.17 Existing and Projected Yield and Production of Cotton in Vellore District

COTTON	
Area (Ha)	
2008-09	6689
2009-10	6928
2010-11	5713
Triennium average ending 2010-11*	6443
Projected area for 2022-23	6443
% to total	100
Varieties	BT-Cotton, Malliga
Maximum potential yield (kg /Ha)	1728
Average yield for Triennium average ending 2010-11 (kg /Ha)*	1130
Yield Gap (kg /Ha)	268
Projected Production for 2022-23 (tonnes)	12637
Production for Triennium average ending 2010-11 (tonnes)	11134
Percentage of increase in production over 2010-11	28.72

* Source: Season and Crop Reports of 2008-09, 2009-10 and 2010-11.

Table 3.18 Projected Increase in Yield and Production of cotton from 2011-12 to 2022-23

S.No	Year	COTTON	
		Yield (kg)	Production (tonnes)
1	2010-11	1130	11134
2	2011-12	1180	11259
3	2012-13	1230	11385
4	2013-14	1280	11510
5	2014-15	1329	11635
6	2015-16	1379	11760
7	2016-17	1429	11886
8	2017-18	1479	12011
9	2018-19	1529	12136
10	2019-20	1579	12261
11	2020-21	1628	12387
12	2021-22	1678	12512
13	2022-23	1728	12637
	%CGR	3.59	1.06

3.3.8 Coconut

Coconut area contribution is 11.17 per cent towards the total Gross cropped area. But yield gap is occurring because of poor maintenance of field and pest and disease problem. The yield gap estimated was only 1053 tonnes per ha and this gap could be bridged as indicated in Table 3.19. The annual growth rate required to raise the yield from 9446nuts per ha in 2010-11 to 10500 nuts per ha in 2022-23. The increase in production by way of bridging the yield gap, from 210600 nuts/ha (2010-11) to 234187 nuts/ha (2022-23) accounts for 11.19 per cent. The projected increase in yield and production of coconut from 2011-12 to 2022-23 is presented in Table 3.20.

Table 3.19 Existing and Projected Yield and Production of Coconut in Vellore District

COCONUT	
Area (Ha)	
2008-09	22416
2009-10	22203
2010-11	22292
Triennium average ending 2010-11*	22303
Projected area for 2022-23	22303
% to total	100
Varieties	Tall x Dwarf, Dwarf x Tall
Maximum potential yield (nuts/ha)	10500
Average yield for Triennium average ending 2010-11 (nuts /ha)*	9446
Yield Gap (nuts /ha)	1053
Projected Production for 2022-23 (nuts/ha)	234187
Production for Triennium average ending 2010-11 (nuts/ha)*	210600
Percentage of increase in production over 2010-11	11.19

* Source: Season and Crop Reports of 2008-09, 2009-10 and 2010-11.

Table 3.20 Projected increase in Yield and Production of Coconut from 2011-12 to 2022-23

S. No	year	Coconut	
		Yield (nuts/ha)	Production (nuts/ha)
1	2010-11	9446	210600
2	2011-12	9534	212566
3	2012-13	9622	214531
4	2013-14	9710	216497
5	2014-15	9797	218462
6	2015-16	9885	220428
7	2016-17	9973	222394
8	2017-18	10061	224359

S. No	year	Coconut	
		Yield (nuts/ha)	Production (nuts/ha)
9	2018-19	10149	226325
10	2019-20	10237	228290
11	2020-21	10324	230256
12	2021-22	10412	232221
13	2022-23	10500	234187
	%CGR	0.89	0.89

3.3.9 Projection of Agricultural Production for 2022-23 in Vellore District

The projected increase in the yield and production of the selected crops during the period from 2011-12 to 2022-23 are given in Table 3.21. The increase in paddy, groundnut, sugarcane, redgram, banana, mango, cotton and coconut are estimated at 56.62, 72.63, 25.89, 97.67, 17.38, 53.17, 28, 72 and 11.19 per cent respectively. Along with the increase in the production of these crops, if efforts are taken to raise the productivities of other cereals and pulses, the overall food grain production could be doubled from the existing levels. Similarly, there exists a scope to enhance the production of sugarcane, mango and groundnut during the year 2022-23.

Table 3.21 Projection of Agricultural Production for 2022-23 in Vellore District

S. No.	Crop	Area (Ha)		Yield (Kgs / Ha)			Production (Tonnes)		
		2010-11*	2022-23**	2010-11*	2022-23**	Difference between 2010-11 and 2022-23	2010-11*	2022-23**	Difference between 2010-11 and 2022-23
1.	Paddy	42801	42801	3481	6218	2737 (78.62%)	153511	263342	109831 (56.62%)
2.	Groundnut	45976	45976	2340	3524	1184 (50.59%)	90059	155656	65597 (72.83%)
3..	Sugarcane	15046	15046	86.6	115.5	20.5 (23.67%)	1314590	1654950	340360(25.89%)
4	Red gram	8574	8574	446	1050	604 (135.4%)	4768	9003	4235 (97.67)
5.	Banana	6800	6800	5624	8500	1624 (28.87%)	57800	69959	12156 (17.38%)

S. No.	Crop	Area (Ha)		Yield (Kgs / Ha)			Production (Tonnes)		
		2010-11*	2022-23**	2010-11*	2022-23**	Difference between 2010-11 and 2022-23	2010-11*	2022-23**	Difference between 2010-11 and 2022-23
6.	Mango	12436	12436	37181	45000	14819 (39.89%)	422217	646672	224455 (53.17%)
7.	Cotton	6443	6443	1130	1728	268 (23.71%)	11134	12637	1503 (28.72%)
8.	Coconut	22303	22303	9446	10500	1053 (11.14%)	210600	234187	23587 (11.19%)

*Triennium 2010-11; **Projected for 2022-23;

Figures in parentheses indicate the Percentage of difference over 2010-11

3.4 Projected Area, Yield, production based on Current trend (2023)

3. 4.1 Major potential crops identified based on criteria

The above calculated triennium values are arranged in descending order and the cumulative Percentage is calculated for those values and the crops which are falling above 80 Percentage in that is identified as major crop.

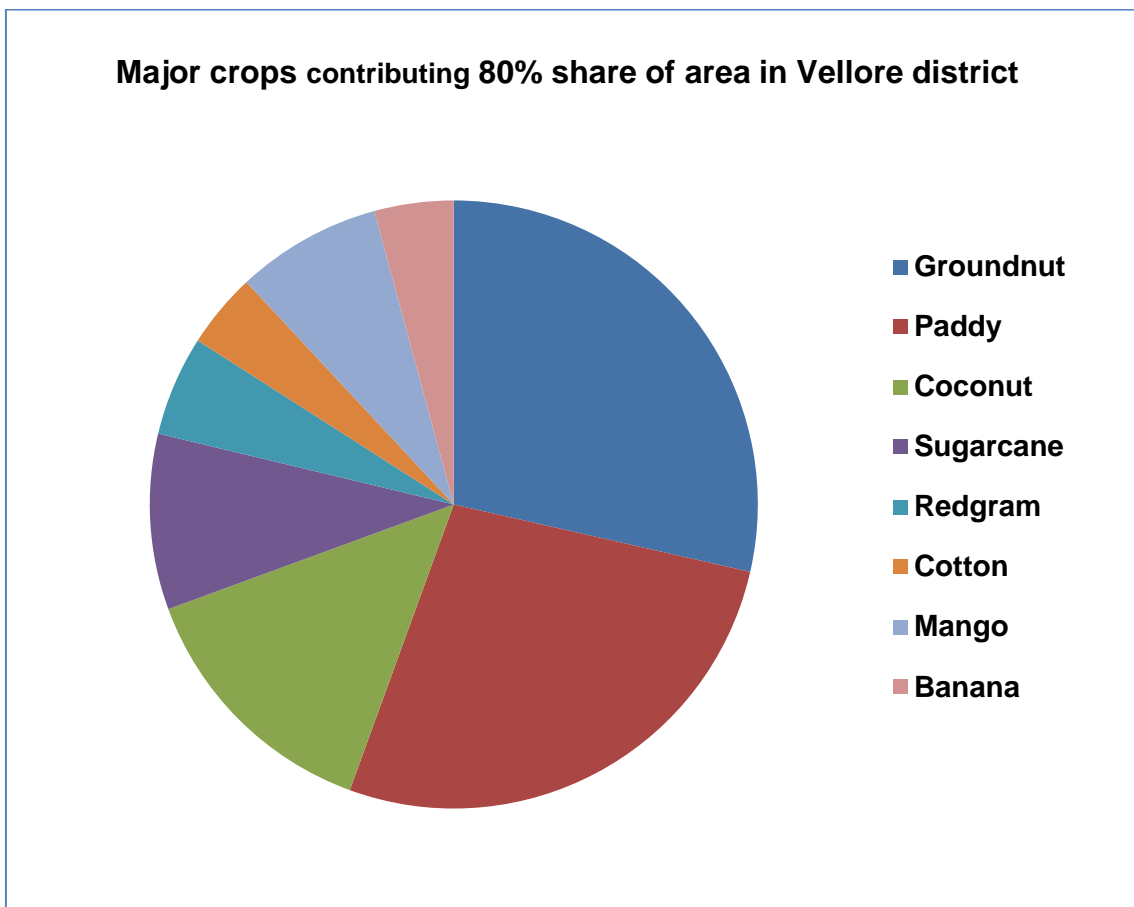
Table 3.22 Major Crops Contributing 80 Percentage share of Area

S.No	Crops	% share
1	Groundnut	23.03
2	Paddy	21.77
3	Coconut	11.17
4	Sugarcane	7.53
5	Mango	6.23
6	Red gram	4.29
7	Banana	3.40
8	Cotton	3.22

In Vellore district, net sown area is accounted for only a less than one third (29.60%) of the total geographical area. Further, the gross cropped area had a negative growth rate during the period from 1981 to 2011. This indicates that development efforts are needed to sustain the existing cropped area. Groundnut is the major predominant crop (23.03%), growing under rainfed condition. It is followed by paddy (21.77%), coconut (11.17%), sugarcane (7.53%), mango (6.23%), redgram (4.29%), banana (3.40%) and cotton (3.22%)

respectively. As these 8 crops accounted for 80 per cent of the gross cropped area, they need to be given focused attention for further development in the years to come.

Fig 7. Major Crops contributing 80% share of area in Vellore district



3.4.2 Projected Area, Production and Yield of Selected Crops

For the identified potential crops in Vellore district, area, production and yield were projected using CGR for the years 2016-17 and 2022-23 and the results are presented in Table 3.23

Table 3.23 Projected Area, Production and Productivity for Potential crops identified

Crop	Paddy (1)			Groundnut (2)			Sugarcane (3)		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
CGR	-5.3	-4.2	1.0	-5.5	-2.8	2.9	-2.4	-1.8	2.6
Triennium Average ending 2010-11	42801	153511	3481	45976	90059	19588	15046	1314590	86600
2012-13	43867	149750	3413	49127	106486	21675	16767	1492845	89034
2017-18	43899	143128	3260	46957	113122	24090	15141	1358950	89752
2022-23	43915	140987	3210	46256	115425	24953	14635	1317043	89992

Note: Area in Ha; Production in Tonnes; and Yield in Kgs per ha

Table 3.23 (Contd...)

Crop	Redgram (4)			Mango (5)			Banana (6)		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
CGR	-3.1	-2.2	1.4	-0.9	-0.3	-0.2	1.8	0.8	-4.3
Triennium Average ending 2010-11	8574	4768	446	12436	422217	37181	6800	5624	57800
2012-13	7648	4853	634	12677	398176	51035	7802	6365	50210
2017-18	6101	4008	656	12822	595438	52909	11254	6942	54145
2022-23	5659	3760	664	12871	680901	53551	12715	7146	55522

Note: Area in Ha; Production in Tonnes; and Yield in Kgs per ha

Table 3.23 (Contd..)

Crop	Cotton (7)			Coconut (No.of nuts/ha) (8)		
	Area	Production	Yield	Area	Production	Yield
CGR	8.0	6.9	3.1	3.3	-6.3	-1.2
Triennium Average ending 2010-11	6689	11134	1130	22303	210600	9446
2012-13	7770	16134	2076	23013	223000	9690
2017-18	11865	30102	2537	24913	253800	10187
2022-23	13664	37058	2712	25581	265000	10359

Note: Area in Ha; Production in Tonnes; and Yield in Kgs per ha

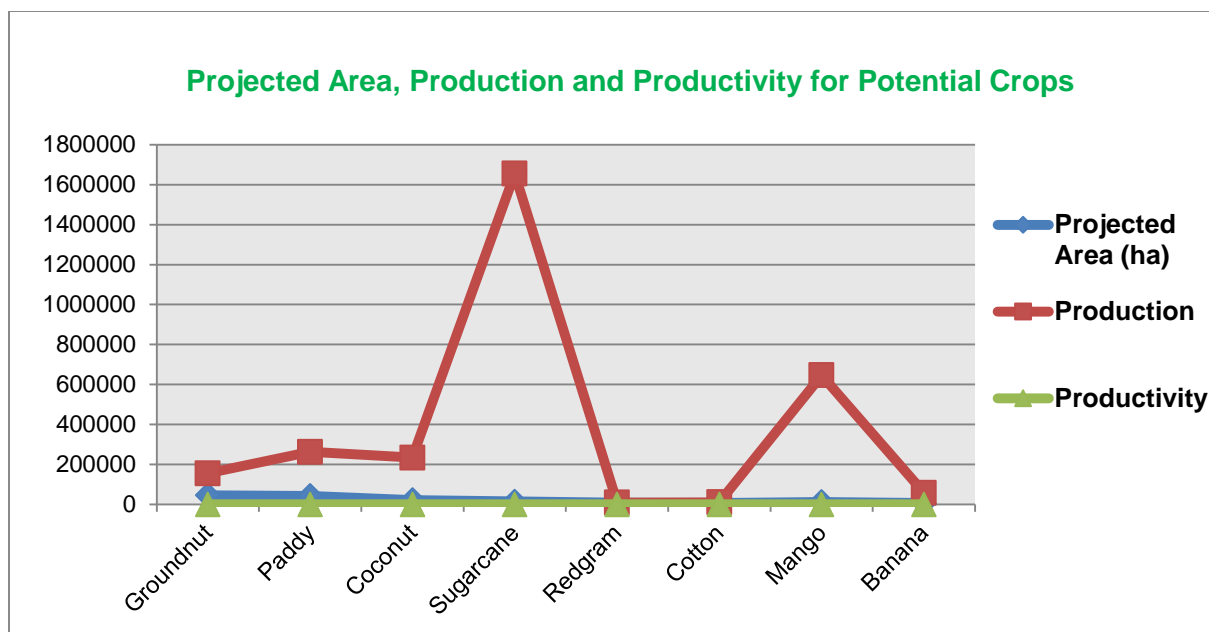


Fig 8. Projected Area, Production and Productivity for Potential crops

As could be seen from the above Table, the area and production of the selected crops like paddy, groundnut, sugarcane, mango and red gram have been projected to decline in 2022-23 owing to their negative annual compound growth rates. The production of mango alone has been projected to increase due to its positive growth rate. Further, the CGR of productivities of paddy, green gram and mango also have shown a marginal decline during the period. Nevertheless, the crops like paddy and green gram are important staple food crops; sugarcane provides raw material to sugar mill and it is important - high revenue yielding commercial crop to the farmers; mango is an important fruit crop besides having high export value; and ground nut is an important edible oilseed crop. In view of all these reasons, planned efforts are essential to sustain their current area. Also, their productions need to be increased by way of enhancing their productivities.

3.24 Technological interventions and strategies to reduce the yield gaps

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
Paddy	Lack of knowledge on high yielding varieties of paddy	Assessment of location specific high yielding rice varieties	The location specific high yielding varieties of paddy released by TNAU are found suitable for this district Sornavari ADT 36, ASD 16, ASD18, MDU 5, ADT 43, CO47,CORH 3, ADT(R) 45, ADT(R) 47, Paiyur 1	On farm trial, field demonstrations, seed multiplication and distribution of hybrid seeds to the farmers etc.,

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
	Seed borne diseases caused by fungus and bacteria leads to severe loss	Management of seed borne diseases through seed treatment bio control agents and chemicals	<ul style="list-style-type: none"> Seed hardening with 1% KCl (seed and KCl solution 1:1) for 16 hours to withstand early moisture stress Seedling dip with <i>Pseudomonas fluorescens</i> (Pf-1) @ 2.5 kg/ha or seed treatment (10g/kg) 	On farm trial, field demonstrations, mass production of <i>P. fluorescens</i> at research stations, KVK's, constituent colleges for supply to the farmers at subsidy, organizing training on mass production of bio control agents
	Reduction in yield and incurring of loss by the farmers due to erratic rainfall. Reduction in quality of rice due to nutrient imbalance	Popularization of SRI system of rice cultivation in the drought prone areas	<ul style="list-style-type: none"> Adoption of SRI technique with low seed rate (5-7 kg/ha), wider spacing (25 cm × 15cm) and improved package of practices. Foliar Nutrition in flowering stage: - 2% DAP + 1% KCL + 1% Urea at 50% flowering stage or TNAU Rainfed rice MN mixture @ 12.5 kg/ha as EFYM at 1:10 ratio at tillering and panicle initiation stages 	Field demonstrations, distribution of seeds to farmers at subsidized rate. Production and supply of TNAU micronutrient mixtures at university research stations and KVK's
	Pests and diseases like rice blast, sheath blight, rice root and white tip nematodes and sucking pests are widely prevalent which results in yield decline.	Assessment of efficacy of pesticides and bio control agents on pest control in rice. Mass multiplication of bio control agents at district headquarters/research stations/KVK's	<ul style="list-style-type: none"> Rice blast & Sheath blight – Seed treatment with TNAU Pf 10 ml/kg of seeds or spray Carbendazim 50WP @ 500g/ha or Tricyclozole 75 WP @ 500g/ha or Azoxystrobin 25 SC @ 500 ml/ha or Neem oil at 3% Rice root and White tip nematodes - Seed treatment with <i>Pseudomonas fluorescens</i> (10 g/kg seed) and as foliar spraying @ 1 kg/ha thrice at 45, 55 and 65 DAT. Sucking pests (Brown leafhopper, Green leaf hopper, Thrips & Gall midge), Stem borer and leaf folder – Spray Fipronil 5% SC 1000-1500 ml/ha or Triazophos 40% EC 625-1250 ml/ha or Seed treatment @ 5g/Kg of seed and foliar application of <i>Beauveria bassiana</i> @ 5g/l twice at 15 days interval 	On farm trial, field demonstrations, mass multiplication and supply of TNAU bio control agents at subsidized rate from all the research stations and KVK's

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
	Scarcity of labour for mechanical operations	Popularization agricultural equipments and machineries in paddy cultivation	<ul style="list-style-type: none"> • Seed drill – Sow of seeds with 20 cm inter row spacing • Rotary weeder - Single row or double weeder for weeding • Combine harvester for harvesting 	Distribution of seed drill, rotary weeder to the paddy farmers at subsidized rate Make availability of combine harvester at the Department of Agricultural Engineering for different blocks at rental basis, training and demonstrations
Sugar cane	Lack of knowledge on selection in high yielding varieties of sugarcane	Performance evaluation of high yield varieties, Popularization of varieties suitable for specific location	The primary seed materials are available in large quantity at the Sugarcane Research Stations at Cuddalore, Sirugamani and Melalathur.	Distribution of setts of high yielding sugar cane varieties, training and field demonstrations,
	Lack of knowledge on application of growth regulators and chemicals to increase yield and sugar Percentage	Popularization / dissemination of technologies through different modes	<ul style="list-style-type: none"> • Application of Micronutrients: To provide all micronutrients to sugarcane, 50 kg /ha of micronutrient mixture containing 20 kg Ferrous sulphate, 10 kg Manganese sulphate, 10 kg Zinc sulphate, 5 kg of Copper sulphate, 5 kg of Borax mixed with 100 kg of well decomposed FYM, can be recommended as soil application prior to planting or Apply TNAU MN mixture @ 50 kg/ha as EFYM for higher cane yield. 	Supply of TNAU micronutrient mixture at subsidized rate Dissemination of technologies through on farm trial, trainings and field demonstrations Through pamphlets, books and notices etc.
	Lack of knowledge on integrated pest and disease management	Standardization of pest management strategies for sugarcane	<ul style="list-style-type: none"> • Red rot: Setts treatment with Carbendazim before planting (Carbendazim 50 WP @ 0.05% or Carbendazim 25 DS @ 0.1% along with 1.0% Urea for 5 minutes) • Smut: Setts treatment with fungicides viz., Triadimefon @ 	Training and demonstration's on disease and pest management, distribution pest control kits on subsidy

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			<p>0.1% or Carbendazim @ 0.1% for 10 minutes or Treating the seed setts with Aerated Steam Therapy (AST) at 50 °C for 1 hour or in hot water at 50 °C for 30 minutes or at 52 °C for 18 minutes</p> <ul style="list-style-type: none"> • Shoot borer: Spraying of Fipronil 5%SC 1500-2000 ml/ha or Fipronil 0.3%GR 25-33.3 Kg/ha or intercropping of daincha in sugarcane can lower the shoot borer incidence. • Termite: Dip the setts in imidacloprid 70 WS 0.1% or Chlorpyrifos 20 EC 0.04 % for 5 minute or Imidacloprid 17.8% SL 350 ml/ha or Chlorpyrifos 20%EC 750 ml/ha. 	
	Preparation of setts and sugarcane planter is a labour intensive work	Popularization of technologies for sugarcane sett cutting and planting	<ul style="list-style-type: none"> • Sharp knife or sett cutting machine was developed by TNAU to prepare setts without splits. • TNAU mechanical planter is useful for cost effective planting with saving of Rs.3750 / ha and it can cover an area of 1.5ha/day 	Distribution of sett cutting machines and sugarcane planter in a block on custom hiring basis, training and demonstrations
Groundnut	Less productivity due to non-adoption of advanced technologies	Promotion / dissemination of advanced crop cultivation technologies	<ul style="list-style-type: none"> • Seed Treatment with talc formulation of <i>Trichoderma viride</i> @ 4 g/kg seed or <i>Pseudomonas fluorescens</i> @ 10 g/kg seed (or) with Thiram or Mancozeb @ 4 g/kg of seed or Carboxin or Carbendazim at 2 g/kg of seed (or) Treat the seeds with 3 packets (600 g)/ha of Rhizobial culture TNAU14 + 3 packets of Azospirillum (600 g/ha) and 3 packets (600 g/ha) of Phosphobacteria or 6 packets of Azophos (1200 g/ha) developed at TNAU using rice kanji as binder • Micronutrients: TNAU MN mixture @ 7.5 kg /ha as 	Mass production and supply of bio control agents / bio fertilizer at subsidy, distribution of TNAU MN mixture during rain fed conditions, supply of gypsum, polythene mulching, TNAU ground nut rich in subsidy, dissemination of technologies etc.,

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			<p>Enriched FYM (Prepare enriched FYM at 1:10 ratio of MN mixture & FYM; mix at friable moisture & incubate for one month in shade) under rainfed conditions.</p> <ul style="list-style-type: none"> • Apply Calcium Sulphate (Gypsum) @ 400 kg/ha by the side of the plants on 40th to 70th day depending upon soil moisture. Avoid gypsum in calciferous soils. Gypsum is effective in soils deficient in calcium and sulphur. Application of gypsum encourages pod formation and better filling up of the pods. Application of gypsum at the rate of 50 % basal both in rainfed and irrigated condition reduces Khadhasty malady and pod scab nematode under rainfed conditions. • Spray nutrient solution prepared by soaking DAP 2.5 kg, Ammonium sulphate 1 kg and borax 0.5 kg in 37 lit of water overnight. The next day morning it can be filtered and about 32 litre of mixture can be obtained and it may be diluted with 468 lit of water so as to made up to 500 litre to spray for one ha. Plano fix at the rate of 350 ml can also be mixed while spraying. This can be sprayed on 25th and 35th day after sowing under rainfed conditions. • Polythene Film Mulching: Spread black polythene sheet (90 cm width) over the soil surface. • Irrigation based on physiological growth phases. • Foliar spray of TNAU Groundnut Rich @ 2 kg/acre 	

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			<p>in 200 litres of water at peak flowering and at pod development stages increases flower retention, pod filling and improves moisture stress tolerance and pod yield.</p> <ul style="list-style-type: none"> • Spraying 0.5% Potassium chloride during flowering and pod development stages will aid to mitigate the ill effects of water stress. 	
	Harvesting and separation of groundnut husk is a laborious task	Popularization of TNAU groundnut stripper	Farm mechanization: Groundnut stripper developed by TNAU can be used for stripping the pods from the plants	Distribution of groundnut stripper at subsidy, training and demonstrations on groundnut stripping
Mango	Less productivity due to less population and older varieties	Promotion of high density planting systems and advanced management techniques	<ul style="list-style-type: none"> • High Density Planting: 5 m x 5 m (400 plants / ha). Dwarf statured varieties with narrow canopy are much suitable for HDP system. • Double hedge row system: Adopt a spacing of 5 m x 5 m within double rows and 10 m between successive double rows (266 plants / ha) 	Training and field demonstrations on HDP systems in fruit crops, subsidy for promotion of HDP systems
	Reduction on productivity by old varieties and long old orchards	Promotion of rejuvenating old orchards through top working techniques	<ul style="list-style-type: none"> • Top working of senile orchards for rejuvenation: Use scions of choice varieties like Alphonso and Banganapalli for top working. Behead the trees to be top worked portion during July- August leaving the main trunk at a convenient height and allow for new shoots to develop. Adopt cleft method of grafting or softwood grafting on the emerging shoots on the main stem from the cut end during September- October. 	Training and demonstrations on rejuvenation, introduction of subsidy component for converting unfruitful old orchards to fruitful one, dissemination of technologies
	Fruit yield is reduced by non-	Foliar spraying of	<ul style="list-style-type: none"> • Spray NAA @ 20 ppm at flowering to increase the fruit retention. 	<ul style="list-style-type: none"> • Distribution of nutrients and chemicals at

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
	application of nutrients and chemicals at critical stages of the crop	chemicals and secondary nutrients at critical stages of the crop during peak season	<ul style="list-style-type: none"> During February 0.5% Urea (5 g / lit.) or 1% Potassium nitrate (10 g / lit.) may be sprayed to induce flowering, if trees do not flower by that time. Spray 2% KNO₃ at mustard size to increase fruit set and retention of fruits. Spray 2 % Sulphate of potash at pea stage and 15 days after to improve yield and quality. 	<ul style="list-style-type: none"> subsidy Training and demonstrations on chemical application Dissemination of technologies through pamphlets (multilingual languages), books, notices etc.,
	Irregular bearing nature of mango leads to fluctuation in the yield and income to the farmers	Promotion of off season production of mango through chemical application and pruning time	<ul style="list-style-type: none"> To induce off-season flowering, heading back of 10 cm terminal growth after the emergence of new growth (vegetative and floral growth) during December to January along with soil application of Paclobutrazol @ 0.75g a.i. per tree during March and April is recommended for mango cv. Neelum. Keeping good soil moisture conditions and nutrient health status of the plant are very important when Paclobutrazol application is resorted. 	<ul style="list-style-type: none"> Training and demonstration on off season mango production Distribution of Paclobutrazol in subsidy
	Economic loss occurs due to mismanagement of pests and diseases in the mango orchard	Integrated disease and pest management through new generations fungicides and insecticides	<ul style="list-style-type: none"> Anthracnose and Stalk end-rot: Spray Mancozeb 2 g / lit or Carbendazim 1 g / lit or Thiophanate methyl 1 g / lit or Chlorothalonil 2 g / lit as pre-harvest spray, 3 times at 15 days interval (or) Spray chitin based <i>Pseudomonas fluorescens</i>(Pf 7) immediately after flowering @ 5 g / lit five times at 21 days interval. 	<ul style="list-style-type: none"> Supply of recommended dose of insecticides and fungicides as a kit on subsidy basis during onset of the pests and diseases
Coconut	Lack of awareness on location specific coconut varieties	Assessment of high yielding varieties of coconut for the specific locations	<ul style="list-style-type: none"> Varieties suitable for the district are Tall and T X D hybrids. Tall - VPM3, ALR 1, ALR 2 and West Coast Tall Dwarf (tender coconut) - COD, CYD, CGD and MYD+ 	<ul style="list-style-type: none"> On farm trial, field demonstrations Supply of coconut seedlings of high yielding varieties at subsidized cost

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			<ul style="list-style-type: none"> • Hybrids - VHC1, VHC2 and VHC3 	
	Increase in button shedding and yield reduction was observed.	Assessment of effect of coconut tonic for the control of physiological disorders. Commercialization of coconut tonic to the coconut farmers	<ul style="list-style-type: none"> • TNAU Coconut Tonic Nutrition- Root feeding of TNAU coconut tonic @ 200 ml/palm once in six months decreases button shedding and increases the number and size of nuts. 	Distribution of coconut tonic at subsidized cost. Mass production of coconut tonic at KVKs and colleges. Trainings and demonstrations
	Integrated pest and disease management	Mass production of bio controls at research stations, kvks and colleges.	<ul style="list-style-type: none"> • Rhinoceros beetle - Place Phorate 10 G 5 g in perforated sachets in two inner most leaf axils for 2 times at 6 months intervals. • Red palm weevil - Setting up of traps (mud pots) containing sugarcane molasses 2½ kg or toddy 2½ litres + acetic acid 5 ml + yeast 5 g + longitudinally split tender coconut stem/logs of green petiole of leaves of 30 numbers or Root feeding of Monocrotophos 36 WSC 10 ml + water 10 ml in a 7 x 10 cm polythene bag. • Basal stem rot / Bud rot / stem bleeding / Lethal leaf blight - Spray 1.0 per cent Bordeaux mixture or 0.25 per cent Copper oxychloride or 0.2 per cent Mancozeb (4 times at monthly interval during February, March, April and May) and Soil application of <i>Pseudomonas fluorescens</i> (Pf1) @ 100 g/palm + <i>Trichoderma viride</i>@ 100 	Field trials, trainings and demonstrations, mass production and supply of bio control agents at low cost.

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			g/palm/year (or) <i>Bacillus subtilis</i> (TNAU-Bs 1 mixture) @300g/ palm at 3 months interval.	
Cotton	Lack of knowledge on high yielding varieties of cotton	Promotion of high yield varieties	High yielding varieties	On farm trail, field demonstrations Supply of seeds of high yielding varieties at subsidized cost
	Lack of awareness on application of basal fertilizers and seed treatment at the time of planting	Popularization of bio fertilizers for basal application and seed treatment techniques Mass production of bio fertilizers at research stations, KVKs and constituent colleges.	<ul style="list-style-type: none"> • Basal application of fertilizers: Azophos 2kg/ha or Azospirillum + Phosphorus Solubilising Bacteria + Pink Pigmented Facultative Methylotropics @ 2.2 kg/ha each apply as basal application. • Seed treatment: Seed treatment with 3 packets of Azospirillum (600 g/ha) and 3 packets (600 g/ha) of Phosphobacteria or 6 packets of Azophos (1200 g/ha). In addition apply 10 packets of Azospirillum (2000 g/ha) and 10 packets (2000 g/ha) of Phosphobacteria or 20 packets of Azophos (4000 g/ha) mixed with 25 kg FYM and 25 kg of soil on the seed line. This saves 25% nitrogen besides increasing yield. 	Field demonstrations, supply of bio fertilizers at subsidized cost
	Yield and quality were reduced by the non-adoption of integrated nutrient management system	Popularization and adoption of STCR-IPNS system of plant nutrition system. Popularization of TNAU MN mixture	<ul style="list-style-type: none"> • Adoption of soil test crop response based integrated plant nutrition system (STCR- IPNS) • Micro nutrient application:TNAU MN mixture 12.5 kg/ha for variety and 15 kg/ha for hybrid apply as enriched FYM or apply 12.5 kg of micronutrient mixture formulated by the Department of Agriculture, Tamil Nadu with enough 	On farm trial, supply of TNAU micronutrient mixture at subsidized cost.

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			sand to make a total quantity of 50 kg for one ha.	
	Growth and yield reduction by the lack of growth regulators	Testing of crop boosters for enhance of yield and quality of cotton	<ul style="list-style-type: none"> • Spray 40 ppm NAA at 60 and 90 days after sowing on the crop to prevent early shedding of buds and squares and to increase the yield. 	On Farm trial, field demonstration
	Reduction in yield and cotton quality due to occurrence of pests and disease	Testing of NPV virus and pesticides on boll worm control. Assessment of bacteriomycin and fungicide on cotton leaf blight	<ul style="list-style-type: none"> • American bollworm: Application of Nuclear Polyhedrosis Virus (NPV) at 3 x 10¹² POB /ha in evening hours at 7th and 12th week after sowing or spraying of Fipronil 5%SC 2000 ml/ha at early stages or spraying of Carbaryl 50 WP 2.5 kg/ha at bolling and maturation stage. • Bacterial leaf blight: Spray Streptomycin sulphate + Tetracycline mixture 100g + Copper oxychloride 1250g/ha. Repeat spraying at 10 days interval twice or thrice if drizzling continues. 	Filed demonstrations, Popularization of bacteriomycin on cotton leaf blight control.
Banana	Problem in selection of location specific varieties	Evaluation of banana germplasm for suitability of North - Eastern zones	Variety suitable for the district Dwarf Cavendish	<ul style="list-style-type: none"> • Supply of TC planting materials in subsidy, training and demonstration
	Occurrence of disease and gradual yield reduction due to non-adoption of package of practices	Precision farming techniques in banana cultivation	<ul style="list-style-type: none"> • Pre-treatment of suckers: Select sword suckers of 1.5 to 2.0 kg weight, free from diseases and nematodes. Trim the roots and decayed portion of the corm, cut the Pseudostem leaving 20 cm from the corm and grade the suckers to size. To avoid wilt disease, infected 	<ul style="list-style-type: none"> • Training and demonstrations, supply of disease free tissue culture planting materials at subsidized rate, supply of inputs such micronutrients,

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			<p>portions of the corm may be pared, dipped for 5 minutes in Carbendazim 0.1% (1 g in 1 lit of water) for Rasthali, Monthan, Neyvannan, Virupakshi and other wilt susceptible varieties. Pralinage with 40 g of Carbofuran 3 G granules per sucker (Dip the corm in slurry solution of 4 parts clay plus 5 parts water and sprinkle Carbofuran to control nematodes). Alternatively, dip the corm with 0.75% Monocrotophos, shade dry for atleast 24 hours and plant. Sow Sun hemp on 45th day; incorporate it after about a month. This operation reduces nematode build up.</p> <ul style="list-style-type: none"> • Adoption of high density planting for higher productivity - Plant 3 suckers / pit at a spacing of 1.8 x 3.6 m (4600 plants / ha) for Cavendish varieties and 2 m x 3 m for Nendran (5000 plants / ha). • For maximizing productivity follow Fertigation Technique - Apply 25 litres of water / day + 200:30:300 g N: P₂O₅: K₂O / plant using water soluble fertilizers. For economizing the cost of fertilizers, fertigate using normal fertilizers (Urea and Muriate of potash) with 50% of the recommended dose along with recommended dose of phosphorus as basal at 2nd month after planting. • Special Practices: The dry and diseased leaves are removed and burnt to control the spread of leaf spot diseases. Male flowers may be removed a week after opening of last hand. The plants at flowering may be 	<p>fertilizer's, bio fertilizers, bio control agents, post- harvest chemicals etc., distribution of bunch covers at subsidized cost</p>

Major crops	Prioritized problems	Title of Intervention	Technology options	Proposed Intervention
			<p>propped. Cover the peduncle with flag leaf to prevent stalk end rot. Cover the bunches with banana leaves to avoid sun scald.</p> <ul style="list-style-type: none"> ● Growth regulators: To improve the grade of bunches, 2,4-D at 25 ppm (25 mg / lit.) may be sprayed in Poovan and CO 1 banana after the last hand has opened. This will also help to remove seediness in Poovan variety. Spray CCC 1000 ppm at 4th and 6th month after planting. Spray Plantozyme @ 2ml / l at 6th and 8th month after planting to get higher yield. ● Micronutrients Spray: Spray micronutrients viz., ZnSO₄ (0.5%), FeSO₄ (0.2%), CuSO₄ (0.2%) and H₃BO₃ (0.1%) at 3rd, 5th and 7th MAP to increase yield and quality of banana. 	

Chapter IV DISTRICT PLAN

4. 1. AGRICULTURE

4.1.1. Enhancing Rice Production

Paddy is one of the most important food grain crop of the state. In Vellore district, paddy is the second important crop grown in an area of 37988 ha and is gaining importance because of recent unexpected heavy rainfall during 2015-16. Increasing the productivity of paddy is highly dependent on the adoption of modern technology. This needs the timely supply of seeds, availability of machineries and adoption of the improved package of practices. This will result in the reduction of labour cost and post-harvest losses. Soil is the most important component deciding the crop growth and the yield of each crop. Any deficiencies of nutrients or soil problems affect the crop growth and result in reduction of yield even if other inputs are applied in optimum levels. Integrated Nutrient Management is the important approach for promoting efficient and balanced use of plant nutrients. Usage of appropriate inorganic fertilizers including MN Mixture, Organic Manure and Bio-fertilizer should be considered for better plant growth and improving soil fertility. There is a scope for better management practices in paddy cultivation in the District.

Project Component:

- IPM School for Paddy
- Production and distribution of Certified seeds in all blocks
- Incentives for paddy machine planting in all blocks except Alangayam, Madhanur, Natrampalli, Tirupattur and Vellore
- Distribution of MN mixture in all blocks
- Distribution of polyvinyl coated tarpaulin
- Distribution of biofertilizer, zinc sulphate and herbicides

Budget: To enhance the production of paddy in this district a budget ₹3720.59lakhs is proposed (Table 4.1).

Expected Outcome: Intensification of modern technologies will result in an increase in the yield of paddy. This will result in the ensuring of food security in the district.

Implementing Agency: The projects will be implemented by the Department of Agriculture. The progress of the project will be monitored by Director of Agriculture & State Nodal Agency.

Table 4.1 Budget requirement for enhancing paddy production

(Rs. in Lakhs)

Sl. No	Interventions	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	Promotion of SRI	Ha	0.150	2110	316.50	2128	319.20	2239	335.85	2352	352.80	2474	371.10	11303	1695.45
2	Distribution of High Yielding Varieties	MT	0.350	305	106.75	305	106.75	316	110.60	327	114.45	338	118.30	1591	556.85
3	Distribution of Foundation seeds	MT	0.400	27	10.80	27	10.80	27	10.80	27	10.80	27	10.80	135	54.00
4	seed production - Foundation	MT	0.320	69	22.08	69	22.08	71	22.72	73	23.36	75	24.00	357	114.24
5	seed production - Certified class	MT	0.260	285	74.10	285	74.10	296	76.96	307	79.82	318	82.68	1491	387.66
6	Incentives for paddy machine planting	Ha	0.100	970	97.00	970	97.00	1022	102.20	1074	107.40	1128	112.80	5164	516.40
7	Distribution of MN mixture/ Copper Sulphate	Ha	0.010	1210	12.10	1216	12.16	1275	12.75	1334	13.34	1398	13.98	6433	64.33
8	Distribution of biofertilizer / PPFM / bioinputs / plant nutrient mobilizing bacteria	Ha	0.003	5900	17.70	5978	17.93	6267	18.80	6575	19.73	6902	20.71	31622	94.87
9	Distribution of Zinc sulphate (Soil application & foliar)	Ha.	0.010	1340	13.40	1346	13.46	1415	14.15	1486	14.86	1562	15.62	7149	71.49
10	Distribution of biocontrol agents/biopesticides	Ha..	0.010	540	5.40	546	5.46	574	5.74	602	6.02	630	6.30	2892	28.92
11	Distribution of herbicides	Ha.	0.010	670	6.70	682	6.82	720	7.20	758	7.58	798	7.98	3628	36.28
12	Polyvinyl coated Tarpaulin (6m x 5m)	No.	0.020	5	0.10	0	0.00	0	0.00	0	0.00	0	0.00	5	0.10
13	Demonstration of drip irrigation	Ha	100000	20	20	20	20	20	20	20	20	20	20	100	100
	Total				702.63		705.76		737.77		770.16		804.27		3720.59

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.2 Enhancing the millets productivity

Millets are one of the important food crop for the health of the human. The crops are mainly sorghum, cumbu, ragi and samai under rain fed condition in Vellore district. The area under millets in Vellore district is 5854 ha with a productivity of around 500 – 600 kg/ha. Millets requirement is for below in Tamil Nadu. The area under cultivation is decreasing. The possibility to improve the production of millets is only through the adoption of improved seed varieties and package of practices. Therefore, there is scope for increasing the productivity and production of millets through appropriate technologies like distribution of quality seeds, soil health enhancers, plant protection measures and demonstration of technologies.

Project components

- Distribution of biofertilizer for ragi in all blocks except Arakonam, Kaveripakkam and Nemili.
- Seed production and distribution in all blocks except Arakonam.
- Distribution of MN mixture in Arakonam, Sholinghur, Thimiri and Walajabad blocks.

Budget

It is proposed to incur ₹. **357.22** lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.2).

Expected outcome

The expected outcome will be increased area under maize and other minor millets at least 15-20 per cent with improved varieties along with the package of practices resulting in an increase in the millets production.

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and the State Nodal Agency.

Table 4.2 Budget requirement for enhancing millet productivity

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Millets															
1	Distribution on biofertilizer - Liquid / Carrier	Ha	0.003	All blocks except Arakonam	2800	8.40	2800	8.40	2913	8.74	3026	9.08	3152	9.46	14691	44.07
2	Seed Production / Incentives for quality seed	MT	0.63	All blocks except Arakonam	18	11.34	18	11.34	18	11.34	18	11.34	18	11.34	90	56.70
	Soil moisture conservation practices	Ha	0.05	All Blocks	400	20.00	350	17.50	250	12.50	120	6.00	150	7.50	1270	63.50
	Initiative for Nutritional Security through Intensive Millet Promotion (INSIMP)	ha	0.04	All Blocks	300	12.00	300	12.00	300	12.00	300	12.00	300	12.00	1500	60.00
	Ragi															
3	Demonstration (supply of seed, seed treatment & MN mixture)	Ha	0.05	All blocks except Arakonam, Kaveripakkam and Nemili	170	8.50	170	8.50	183	9.15	196	9.80	209	10.45	928	46.40
4	Distribution of biofertilizers Liquid / Carrier	Ha	0.003	All blocks except Arakonam	1900	5.70	1900	5.70	1965	5.90	2030	6.09	2108	6.32	9903	29.71
5	Distribution of MN mixture	Ha	0.007	Arakonam, Sholingur, Thimiri and Walaja	40	0.28	40	0.28	40	0.28	40	0.28	40	0.28	200	1.40
6	Seed distribution	MT	0.66	All blocks except Arakonam	16.8	11.09	16.8	11.09	16.8	11.09	16.8	11.09	16.8	11.09	84	55.44
	Grand total					77.31		74.81		70.99		65.68		68.44		357.22

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholingur – B16, Thimiri – B17, Tirupattur – B18, Vellore – B19, Walajah – 20

4.1.3 Enhancing the productivity of pulses

Pulses are one of the important food component crop for human health. The area under pulses in Vellore district is 21499 ha with a productivity of around 400 – 600 kg/ha only. Farmers are getting low yield due to lack of knowledge on pure crop cultivation and timely adoption of DAP spray and use of IPM practices. The state of Tamil Nadu is deficit in pulse production. Consumption of pulse per head is also less than the recommended level. The project will aim to increase the productivity of pulses through modern technologies. To increase the area and productivity of pulses crop through field demonstration of new technologies, supply of high yielding variety seeds and adoption of improved package of practices.

Project components

- Procurement, production and distribution of breeder and certified seeds in all the blocks except Kaveripakkam and Nemili.
- Distribution of gypsum in Arakonam block.
- Crop system based demonstration in all the blocks.
- Distribution of inputs, plant protection chemicals and yellow sticky traps in all the blocks.

Budget

It is proposed to incur ₹ 1956.16 lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.3).

Expected outcome

The project will results increased area under pulse with the package of practices resulting in an increase in the pulse productivity and production at least 10-15 per cent than current level.

Implementing Agency

Department of Agriculture will implement the project at the district level. The progress of the project will be monitored by the Director of Agriculture and the State Nodal Agency.

Table 4.3 Budget requirement for enhancing productivity of pulses

(Rs. 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	Purchase of breeder seeds	MT	250000	All blocks except B11,B14	2	4.50	2	3.75	2	3.75	2	3.75	2	3.75	8	19.50
2	Production of Foundation/ Certified pulses seeds	MT	86000	All blocks	147	126.42	126	108.36	126	108.36	126	108.36	126	108.36	651	559.86
3	Distribution of Certified Seeds	MT	100000	All blocks	147	147.00	126	126.00	126	126.00	126	126.00	126	126.00	651	651.00
4	Distribution of Gypsum	ha	400	B3	100	0.40	100	0.40	100	0.40	100	0.40	100	0.40	500	2.00
5	Distribution of Biofertilizer/ Organic packages (Rhizobium + Phosphobact eria) - Liquid / Carrier	Ha	600	All blocks	5900	35.40	5000	30.00	5190	31.14	5393	32.36	5608	33.65	27091	162.55
6	Distribution of Micro Nutrients(5 kgs/ Ha)	Ha	350	All blocks except B14	750	2.63	930	3.26	974	3.41	1018	3.56	1068	3.74	4740	16.59
7	DAP Spray	Ha	700	All blocks	1010	7.07	1160	8.12	1210	8.47	1260	8.82	1316	9.21	5956	41.69
8	Pulse wonder - 5 kg/ha	Ha	1000	All blocks except B4,B14	390	3.90	990	9.90	1039	10.39	1088	10.88	1143	11.43	4650	46.50
9	Bund Cropping	Ha	300	All blocks	1880	5.64	1580	4.74	1644	4.93	1708	5.12	1784	5.35	8596	25.79
10	Line sowing	Ha	2250	B1,B2,B1 5,B19	85	1.91	55	1.24	55	1.24	55	1.24	55	1.24	305	6.86

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	Distribution of Yellow sticky trap /pheromone trap	ha	1000	All blocks	310	3.10	280	2.80	293	2.93	306	3.06	319	3.19	1508	15.08
12	Cropping system based demonstration	Ha	12500	All blocks	390	48.75	390	48.75	409	51.13	428	53.50	447	55.88	2064	258.00
13	Distribution of weedicide	Ha	1000	All blocks except Jolarpet, B6,B8, B12,B13, B14	375	3.75	195	1.95	202	2.02	209	2.09	216	2.16	1197	11.97
14	Plant Protection Chemicals	Ha	1000	All blocks	700	7.00	550	5.50	871	8.71	910	9.10	949	9.49	3980	39.80
15	Seed treatment and soil application with <i>Trichoderma viride</i>	Ha	700	All blocks	1300	9.10	1150	8.05	571	4.00	1192	8.34	1213	8.49	5426	37.98
16	Pure crop demonstration - Black gram and green gram	Ha	6300	All blocks except B2,B4,B11,B14,B16,B17	130	8.19	190	11.97	203	12.79	216	13.61	229	14.43	968	60.98
	Grand total					414.76		374.78		379.66		390.19		396.76		1956.16

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.4. Enhancing the productivity of oilseeds

Vellore district has an area of 42513ha under Groundnut cultivation with the productivity of 1946 kg/ha. Groundnut is cultivated under rainfed condition during *Kharif* season in large area. Production and productivity of the crop are not satisfactory due to non-adoption of new technologies. Because of declining water table in the district, the farmers get poor yield of groundnut year after year. To get higher yield, the high yielding varieties and modern mechanized cultivating methods are needed. This project will help the farmers for improving the yield and get more revenue by adoption of new technologies. There is scope for increasing the yield in Groundnut as in Irrigated condition. Therefore, it is necessary to provide the needed assistance to the farmers by way of integrated approach technologies and promotion of technologies for increasing the productivity of oilseeds.

Project components

- Production and distribution of certified seeds in Anaicut, Gudiyatham, KV Kuppam, Kaniyambadi, Katpadi and Peranampet blocks
- Supply of MN mixture and biofertilizers in all blocks.
- Distribution of gypsum in all blocks.
- Seed drill for Sowing of Groundnut with Red gram as Intercrop in all blocks.
- Incentives for bund cropping in Alangayam, Arakonam, Jolarpet, Kandhili, Madhanur, Natrampalli and Tirupattur blocks.

Budget

It is proposed to incur ₹4696.41lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.4).

Expected outcome

The project results will be an increasing the oilseed especially groundnut yield per hectare. The oilseed area would also increase from 15 to 20 per cent from the exiting area especially Groundnut in this district.

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and the State Nodal Agency.

Table 4.4 Budget requirement for enhancing the productivity of oilseeds

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit Cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	OILSEEDS															
1	Purchase of Breeder seed	Mt	1.50	B2,B5,B7,B9, B10,B15	9	13.50	9	13.50	9	13.50	9	13.50	9	13.50	45	67.50
2	Herbicide	Ha	0.01	B1,B6,B8,B12 ,B13,B18	0	0.00	120	1.20	126	1.26	132	1.32	138	1.38	516	5.16
3	Bio pesticide/ fungicide	Ha	0.01	B1,B6,B8,B12 ,B13,B18	20	0.20	140	1.40	146	1.46	152	1.52	158	1.58	616	6.16
4	Compact Block Demonstration-Groundnut	Ha	0.20	All blocks except B3	950	190.00	950	190.00	998	199.60	1052	210.40	1106	221.20	5056	1011.20
5	Microirrigation (Raingun / Microsprinkler)	ha	0.55	All Blocks	200	110.00	150	82.50	175	96.25	160	88.00	200	110.00	885	486.75
6	Distribution of IPM kit	Nos.	0.10	All Blocks	1000	100.00	500	50.00	1500	150.00	1500	150.00	500	50.00	5000	500.00
7	Growth regulator / DAP	ha	0.01	All Blocks	150	7.50	150	7.50	150	7.50	150	7.50	150	7.50	750	37.50
	Groundnut															
8	Strengthening seed chain by foundation seed productionseeds	Mt	0.76	All blocks	39	29.26	39	29.26	39	29.26	39	29.26	39	29.26	193	146.30
9	Strengthening seed chain by certified seed production	Mt	0.73	All blocks	153	111.69	153	111.69	153	111.69	153	111.69	153	111.69	765	558.45
10	Distribution of Certified seeds	Mt	0.84	All blocks	191	160.44	179	150.36	189	158.76	201	168.84	213	178.92	973	817.32

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
11	Distribution of Seed Treatment Chemicals and Bioagents (T.Viridi)	Kg	0.00	All blocks	410	0.62	410	0.62	426	0.64	444	0.67	462	0.69	2152	3.23
12	Application of Gypsum to Groundnut Crop	Ha	0.02	All blocks	1930	30.88	1930	30.88	2010	32.16	2100	33.60	2206	35.30	10176	162.82
13	Distribution of Micro Nutrient Mixture	Ha	0.02	All blocks	600	9.00	600	9.00	632	9.48	668	10.02	704	10.56	3204	48.06
14	Distribution of Biofertilizer	Ha	0.01	All blocks	3700	22.20	3700	22.20	3860	23.16	4052	24.31	4244	25.46	19556	117.34
15	Distribution of Liquid Biofertilizer	Ha	0.01	All blocks	3700	22.20	3700	22.20	3860	23.16	4052	24.31	4244	25.46	19556	117.34
16	Castor as Bund crop	Ha	0.01	B1,B3,B6,B8, B12,B13,B18	130	0.78	130	0.78	140	0.84	152	0.91	164	0.98	716	4.30
17	Seed Drill Sowing / Line sowing of Groundnut with Pulses as intercrop (hiring charges only)	Ha	0.03	All blocks	1910	57.30	1910	57.30	1990	59.70	2080	62.40	2186	65.58	10076	302.28
18	Seeddrill Sowing of Groundnut with Redgram as Intercrop	Ha	0.04	All blocks except B3,B11,B14	1680	67.20	1380	55.20	1448	57.92	1516	60.64	1594	63.76	7618	304.72
	Grand total					932.77		835.59		976.34		998.89		952.83		4696.41

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.5 Enhancing the productivity of Oil palm

India is the largest consumer of palm oil in the world, consuming around 17 per cent of total world consumption. India is also the largest importer of palm oil amounting to 44 per cent of world imports. Palm Oil is extracted from the pulpy portion (monocarp) of the fruit of Oil Palm. The Crude Palm Oil is deep orange red in colour and is semi solid at a temperature of 20 degree centigrade. Palm Oil contains an equal proportion of saturated and unsaturated fatty acid containing about 40 per cent oleic acid, 10 per cent linoleic acid, 44 per cent palmitic acid and 5 per cent stearic acid. The unprocessed palm oil is used for cooking in various countries. 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

- Promotion of Oil palm area expansion programme in Arakonam, Kaveripakkam, Nemili and Vellore blocks.
- Distribution of Inputs for intercropping in Arakonam, Kaveripakkam, Nemili and Vellore covering 360 ha.
- Neem and pungam area expansion programme in Anaicut, Kaniyambadi and Katpadi blocks.

Budget

It is proposed to incur ₹ 376.00lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.5).

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 and report the progress to the Director of Agriculture and the State Nodal Agency.

Table 4.5 Budget requirement for enhancing the productivity of oil palm

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
II	OILPALM															
1	NMOOP -Mini Mission -II (Oilpalm)															
1	Oilpalm Area Expansion Programme	Ha	0.14	B3,B11,B14,B19	72	10.08	72	10.08	72	10.08	72	10.08	72	10.08	360	50.40
2	Cultivation maintenance	Ha	0.1	B3,B11,B14,B19	72	7.20	72	7.20	72	7.20	72	7.20	72	7.20	360	36.00
3	Inputs for Intercropping	Ha	0.1	B3,B11,B14,B19	72	7.20	72	7.20	72	7.20	72	7.20	72	7.20	360	36.00
4	Construction of Borewells	No	1	B3,B11,B14,B19	50	50.00	50	50.00	50	50.00	50	50.00	50	50.00	250	250.00
	NMOOP -Mini Mission -III (Tree Borne Oilseeds)															
5	Neem/ Pungam Area Expansion Programme	Ha	0.2	B2,B9,B10	12	2.40	0	0.00	0	0.00	0	0.00	0	0.00	12	2.40
6	Cultivation maintenance	Ha	0.05	B2,B9,B10	12	0.60	0	0.00	0	0.00	0	0.00	0	0.00	12	0.60
7	Inputs for Intercropping	Ha	0.05	B2,B9,B10	12	0.60	0	0.00	0	0.00	0	0.00	0	0.00	12	0.60
	Grand total					78.08		74.48		74.48		74.48		74.48		376.00

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.6 Enhancing the productivity of Cotton

Vellore district has an area 6547 ha under cotton cultivation. The reduction in area is due to labour problem, declining in the water table and market fluctuation. To get higher yield, the high yielding varieties and modern mechanized cultivating methods are needed. Cotton is cash crop because of its use in cloth and industry purpose. The farmers of cotton need to get a fair return from this crop. This is possible only by the improved varieties and modern technologies.

Project components

- Distribution of MN Mixtures, plant protection chemicals and yellow sticky trap in all blocks.
- Exposure visits to all blocks except Arakonam, Arcot, Kaveripakkam, Sholinghur, Thimiri and Walajah blocks.
- Frontline demonstrations in Alangayam, Jolarpet, Kandhili, Madhanur, Natrampalli and Tirupattur blocks.
- Summer ploughing in all blocks except Walajah, Vellore, Thimiri and Sholinghur blocks.

Budget

It is proposed to incur ₹**236.40** lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.6).

Expected outcome

The expected outcome is Immediate output would be increasing the Cotton productivity per hectare. Based on the profitability in Cotton cultivation, it is expected that the cotton area would increase from 15 to 20 per cent from the exiting area under cotton or previous area under 3000 ha could be achieved.

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and the State Nodal Agency.

Table 4.6 Budget requirement for enhancing productivity of cotton

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Distribution of biofertilizer	Ha	300	All blocks except B3,B4,B11,B14,B16,B17,B19,B20	360	1.08	360	1.08	360	1.08	360	1.08	360	1.08	1800	5.40
2	Distribution of MN Mixture	Ha	1000	B1,B6,B8,B12,B13,B18	60	0.60	60	0.60	60	0.60	60	0.60	60	0.60	300	3.00
3	Distribution of PP chemicals	Ha	1000	All blocks except B3,B4,B11,B14,B16,B17,B19,B20	240	2.40	240	2.40	240	2.40	240	2.40	240	2.40	1200	12.00
4	Distribution of Yellow Sticky trap	No	3000	B1,B6,B8,B12,B13,B18	60	1.80	60	1.80	60	1.80	60	1.80	60	1.80	300	9.00
5	Exposure visits	No	40000	All blocks except B3,B4,B11,B14,B16,B17,B19,B20	12	4.80	12	4.80	12	4.80	12	4.80	12	4.80	60	24.00
6	Farmers training	No	20000	All blocks except B3,B4,B11,B14,B16,B17, B19,B20	18	3.60	18	3.60	18	3.60	18	3.60	18	3.60	90	18.00
7	Field days	No	10000	B1,B6,B8,B12,B13,B18	12	1.20	12	1.20	12	1.20	12	1.20	12	1.20	60	6.00
8	Frontline demo on ICM in cotton	Ha	7000	B1,B6,B8,B12,B13,B18	30	2.10	30	2.10	30	2.10	30	2.10	30	2.10	150	10.50
9	Application of weedicide	Ha	3000	B1,B6,B8,B12,B13,B18	90	2.70	90	2.70	90	2.70	90	2.70	90	2.70	450	13.50
10	Summer ploughing	Ha	7500	All blocks except B3,B4,B11,B14,B16,B17, B19,B20	360	27.00	360	27.00	360	27.00	360	27.00	360	27.00	1800	135.00
	Grand total					47.28		47.28		47.28		47.28		47.28		236.40

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.7 Enhancing the productivity of sugarcane

Sugarcane is one of the most important cash crops of the state. In Vellore district, sugarcane is grown in an area of 15085 ha and is mostly raised under irrigated condition. Hence, the requirement of sugar is to be met only by increasing the productivity of sugarcane which is around 20 t/ ac in Vellore district. Management practices like trace mulching will influence the production and ultimately the productivity of the crop.

Project components

- Distribution of biofertilizer in all blocks.
- Establishment of shade net in Jolarpet, Kandhili, Madhanur, Natrampalli and Tirupattur blocks.
- Trash mulching in all blocks except Arakonam.
- Demonstration on intercropping in Jolarpet, Kandhili, Madhanur, Natrampalli and Tirupattur blocks.

Budget

It is proposed to incur **₹904.70** lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.7).

Expected outcome

The implementation of the project will increase the productivity of crop by the adoption of advanced crop management strategies

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and the State Nodal Agency.

Table 4.7 Budget requirement for enhancing productivity of sugarcane

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Distribution of biofertilizer (Ha)	Ha	0.006	All blocks	260	1.56	260	1.56	260	1.56	260	1.56	260	1.56	1300	7.80
2	Distribution of ZnSO4 Spray	Ha	0.005	B6, B8, B12, B13, B18	60	0.30	60	0.30	60	0.30	60	0.30	60	0.30	300	1.50
3	Distribution of Micro Nutrient Mixture	Ha	0.02	B6, B8, B12, B13, B18	60	1.20	60	1.20	60	1.20	60	1.20	60	1.20	300	6.00
4	Microirrigation - Drip (1.2x0.6)	ha	1.24	All blocks except B3	92	114.08	92	114.08	92	114.08	92	114.08	92	114.08	460	570.40
Sustainable Sugarcane Initiative (SSI)																
5	A. Establishment of Shadenet	Nos	1.5	B6, B8, B12, B13, B18	6	9.00	6	9.00	6	9.00	6	9.00	6	9.00	30	45.00
6	B. Distribution of Single Bud Seedling	Ha	0.225	All blocks except B3	152	34.20	152	34.20	152	34.20	152	34.20	152	34.20	760	171.00
7	Trash Mulching	Ha	0.04	All blocks except B3	395	15.80	395	15.80	395	15.80	395	15.80	395	15.80	1975	79.00
8	Demonstration on intercropping in Sugarcane	Ha	0.08	B6, B8, B12, B13, B18	60	4.80	60	4.80	60	4.80	60	4.80	60	4.80	300	24.00
Grand total						180.94		180.94		180.94		180.94		180.94		904.70

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.8 Enhancing the productivity of Coconut

Coconut area contribution is 22680 ha (11.17 per cent) towards the total Gross cropped area. Lack of awareness s on location specific coconut varieties Increase in yield can be obtained by way of introducing high yielding varieties/hybrids, removal of wilt infected plants from existing coconut gardens.

Project components

- Distribution of quality Tall, T x D and D x T seedlings in all blocks except Arakonam, Arcot, Gudiyatham and Sholinghur.
- Distribution of MN mixture and drip irrigation in all blocks except Arakonam.

Budget

It is proposed to incur ₹999.06lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.8).

Expected outcome

The project outcome will results in an increase in the yield and production of coconut.

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and the State Nodal Agency.

Table 4.8 Budget requirement for enhancing productivity of coconut

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Distribution of T x D hybrid seedlings	No	0.0006	All blocks except B3	6900	4.14	6900	4.14	8100	4.86	8100	4.86	8100	4.86	38100	22.86
2	Distribution of Tall Seedlings	No	0.0004	All blocks except B3,B4,B5,B16,B17	2000	0.80	2000	0.80	2000	0.80	2000	0.80	2000	0.80	10000	4.00
3	Distribution of D xT hybrid Seedlings	No	0.0015	All blocks	3000	4.50	3000	4.50	3600	5.40	3600	5.40	3600	5.40	16800	25.20
4	Distribution of MN mixture	Ha	0.1000	All blocks except B3	250	25.00	250	25.00	190	19.00	190	19.00	190	19.00	1070	107.00
5	Drip irrigation	Ha	0.3500	All blocks except B3	190	66.50	190	66.50	190	66.50	190	66.50	190	66.50	950	332.50
6	Replanting and Rejuvenation of coconut gardens	Ha	0.4500	All blocks except B3	215	96.75	215	96.75	215	96.75	215	96.75	215	96.75	1075	483.75
7	Training on neera production	Batches	0.2500	All blocks except B3	19	4.75	19	4.75	19	4.75	19	4.75	19	4.75	95	23.75
	Grand total					202.44		202.44		198.06		198.06		198.06		999.06

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.9 Training to farmers

Enhancing the livelihood of farmers through training

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

Project components

- State level trainings to Extension officials in all blocks.
- Training to farmers within the district in all blocks.
- Exposure visits to farmers in all districts

Budget

It is proposed to incur ₹ 678.00 lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.9).

Expected outcome

The projects will result in better income to farmers. They may learn many things to improve their knowledge of cultivation which will improve the income of the farmers.

Implementing Agency

The project will be implemented by Department of Agriculture. The progress of the project is monitored by Director of Agriculture and the State Nodal Agency.

Table 4.9 Budget requirement for training of farmers

(Rs. in Lakhs)

Sl. No.	Cafeteria of Activities	Unit	Unit Cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Training of Farmers															
2	Inter State Training of Farmers	Nos.	1.25	All blocks	0	0.00	40	50.00	0	0.00	40	50.00	0	0.00	80	100.00
3	Training of 536 Groups of Seed Village Farmers in quality Seed Production technology.	Nos.	0.1	All blocks	100	10.00	100	10.00	100	10.00	100	10.00	100	10.00	500	50.00
4	Training of Farmers under Mission Soil Health Card	Nos.	0.15	All blocks	100	15.00	100	15.00	100	15.00	100	15.00	100	15.00	500	75.00
5	Within the district training of Farmers	Nos.	0.1			0.00		0.00		0.00		0.00		0.00	0	0.00
6	Within the State training of Farmers	Nos.	1.2	All blocks	40	48.00	40	48.00	40	48.00	40	48.00	40	48.00	200	240.00
	Training of Farmers With in the district															
7	Awareness campaigns	Nos.	0.1	All blocks	20	2.00	20	2.00	20	2.00	20	2.00	20	2.00	100	10.00
8	Groundnut	Nos.	0.1	All blocks	40	4.00	40	4.00	40	4.00	40	4.00	40	4.00	200	20.00
9	IFS	Nos.	0.1	All blocks	20	2.00	0	0.00	0	0.00	0	0.00	0	0.00	20	2.00
10	Major & Minor Millets	Nos.	0.1	All blocks	20	2.00	0	0.00	0	0.00	0	0.00	0	0.00	20	2.00

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
11	Moisture conservation practices	Nos.	0.1	All blocks	20	2.00	20	2.00	20	2.00	20	2.00	20	2.00	100	10.00
12	Organic cultivation practices	Nos.	0.1	All blocks	40	4.00	40	4.00	40	4.00	40	4.00	40	4.00	200	20.00
13	Paddy	Nos.	0.1	All blocks	20	2.00	20	2.00	20	2.00	20	2.00	20	2.00	100	10.00
14	Pulses	Nos.	0.1	All blocks	40	4.00	40	4.00	40	4.00	40	4.00	40	4.00	200	20.00
15	Value addition training	Nos.	0.1	All blocks	60	6.00	60	6.00	60	6.00	60	6.00	60	6.00	300	30.00
Exposure visit of Farmers																
16	Rodent Pest Management Demonstration	Nos.	0.04	All blocks	20	0.80	20	0.80	20	0.80	20	0.80	20	0.80	100	4.00
17	Within State Exposure visit	Nos.	0.4	All blocks	20	8.00	20	8.00	20	8.00	20	8.00	20	8.00	100	40.00
18	Organization of Kisan gosthies on Soil test based nutrient application (Campaign)	Nos.	0.15	All blocks	40	6.00	40	6.00	40	6.00	40	6.00	40	6.00	200	30.00
19	Within the district exposure visit	Nos.	0.15	All blocks	20	3.00	20	3.00	20	3.00	20	3.00	20	3.00	100	15.00
Grand total						118.80		164.80		114.80		164.80		114.80		678.00

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Tirupattur – B18, Vellore – B19, Walajah – 20

4.1.10 Infrastructure Development

Facilities for Seed production

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

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

Establishment of Laboratories

Quality control is the process of checking the quality of the material against the standard set by the organizations and if the material does not match with the standards, then such material is said to be substandard. Quality control laboratories are being established by the Government with an intention to supply quality inputs viz., seed, fertilizers and pesticide and services like soil testing to the farmers. To have effective quality control of inputs, quality inspectors are to be appointed.

The Agricultural Research - NABL Accreditation lab, Organic Fertilizer Testing laboratory, Bio-Fertilizer Quality Control Laboratory, Pesticide Residual Laboratory and laboratory for leaf analysis for selective nutrient application, Soil Testing Laboratory and Fertilizer Control Laboratory, Strengthening of Mobile Soil Testing Laboratory for Ensuring Soil Health were proposed.

The major interventions are

1. Additional Seed Godown and Bag closure in all blocks.
2. Construction of sub IAEC with vehicle shed and compound wall in all blocks.

3. Establishment of Thrashing floor/drying yard in all blocks
4. Strengthening of Seed testing Laboratory in all blocks.

Budget

It is proposed to incur ₹ 2730.50lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.10).

Expected outcome

The projects will results better income to farmers. They may learn many things to improve their knowledge of cultivation which will improve the income of the farmers.

Implementing Agency

The project will be implemented by Department of Agriculture. The progress of the project is monitored by Director of Agriculture and the State Nodal Agency.

Table 4.10 Budget requirement for infrastructure development

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of Sub-Agricultural Extension Centre (498 Nos.)	Nos.	3000000	All blocks	0	0.00	20	600.00	0	0.00	0	0.00	0	0.00	20	600.00
2	Strengthening of Soil Testing Laboratory	Nos.	6000000	All blocks	0	0.00	20	1200.00	0	0.00	0	0.00	0	0.00	20	1200.00
3	Establishment of Threshing floor/drying yard	Nos.	500000	All blocks	0	0.00	20	100.00	0	0.00	0	0.00	20	100.00	40	200.00
4	Dunnage	Nos.	7500	All blocks	20	1.50	0	0.00	20	1.50	0	0.00	20	1.50	60	4.50
5	Moisture meter	Nos.	25000	All blocks	20	5.00	0	0.00	0	0.00	0	0.00	20	5.00	40	10.00
6	Bag closure	Nos.	10000	All blocks	20	2.00	0	0.00	0	0.00	0	0.00	20	2.00	40	4.00
7	Electronic platform balance	Nos.	150000	All blocks	20	30.00	0	0.00	0	0.00	0	0.00	20	30.00	40	60.00
8	Seed rack	Nos.	30000	All blocks	20	6.00	0	0.00	0	0.00	0	0.00	20	6.00	40	12.00
9	Tarpaulin	Nos.	25000	All blocks	20	5.00	0	0.00	0	0.00	0	0.00	20	5.00	40	10.00
10	Office Furnishings and other amenities	Nos.	200000	All blocks	20	40.00	0	0.00	0	0.00	0	0.00	20	40.00	40	80.00
11	Strengthening of training institute / nursery / FTC / KVK	Nos.	5000000	All Blocks	0	0.00	0	0.00	1	500.00	0	0.00	0	0.00	1	500.00
12	Infrastructure for empowerment of coconut nurseries	Nos.	5000000	All Blocks	0	0.00	0	0.00	0	0.00	1	50.00	0	0.00	1	50.00
	Grand Total					89.50		1900.00		501.50		50.00		189.50		2730.50

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Tirupattur – B18, Vellore – B19, Walajah – 20

4.1.11 Soil Health Management

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

Project Component

- Green manuring in all blocks
- Establishment of permanent and HDPE vermicompost units in all blocks.
- Distribution of soil health card in all 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 Vellore district is ₹ 212.403lakhs (Table 4.11).

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. The progress will be monitored by Director of Agriculture and State Nodal Agency.

Table 4.11 Budget requirement for soil health management

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Permanent Vermi compost units	Cluster Nos.	50000	All blocks	0	0.00	0	0.00	20	10.00	0	0.00	0	0.00	20	10.00
2	HDPE Vermi compost units	Kit Nos	12000	All blocks	0	0.00	0	0.00	20	2.40	0	0.00	0	0.00	20	2.40
3	Green Manuring	Nos	4000	All blocks	1000	40.00	1000	40.00	1000	40.00	1000	40.00	1000	40.00	5000	200.00
4	Distribution of Soil Health Card	Ha	300	All blocks	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	1	0.00
	Grand total					40.00		40.00		52.40		40.00		40.00		212.40

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.12 Rainfed Area Development

Rainfed areas account for nearly 57 per cent of the agricultural land in India. Rainfed areas if managed properly have the potential to contribute a larger share in the food grain production. These high potential rainfed areas provide us with opportunities for faster agricultural growth compared to irrigated areas that have reached a plateau. In fact the potential is such that there is more opportunity for faster agricultural growth here than in irrigated areas. With proper management, rainfed areas have the potential of contributing a larger share to food grain production. Increasing agricultural productivity of rainfed areas in a sustainable manner by adopting appropriate farming system based approaches through Restoration of confidence in rainfed agriculture by creating sustained employment opportunities through improved on-farm technologies and cultivation practices Enhancement of farmer's income and livelihood support for reduction of poverty in rainfed areas.

Project components

- Milch Animal (1 no) + 1 ha cropping system with inter crop & border plantation like castor/sesbania in all blocks.

Budget

It is proposed to incur ₹2200.00 lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.12).

Expected outcome

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

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and State Nodal Agency.

Table 4.12 Budget requirement for Rainfed Area Development

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Milch Animal (1 no) + 1 ha cropping farming system (Cropping system with inter crop & border plantation like castor/sesbania etc.) @ Rs.27500/ as subsidy per Unit	Ha	0.55	All blocks	0	0.00	2000	1100.00	0	0.00	0	0.00	2000	1100.00	4000	2200.00
	Grand total					0.00		1100.00		0.00		0.00		1100.00		2200.00

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.13 Integrated Pest Management (IPM)

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

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

Interventions

1. Conduct of Farmer Field Schools (FFS) in all blocks.
2. Conduct of Field days in all blocks.
3. Conduct of IPM School in all blocks.

Budget

It is proposed to incur ₹280.00 lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.13).

Expected outcome

The expected outcome of the project will result in an increase in the 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 Director of Agriculture and State Nodal Agency.

Table 4.13 Budget requirement for Integrated Pest Management

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Farmers Field Schools (FFS)	Nos.	20000	All blocks	80	16.00	80	16.00	80	16.00	80	16.00	80	16.00	400	80.00
2	Field days	No.	20000	All blocks	80	16.00	80	16.00	80	16.00	80	16.00	80	16.00	400	80.00
3	IPM School	Nos.	40000	All blocks	60	24.00	60	24.00	60	24.00	60	24.00	60	24.00	300	120.00
Grand total						56.00		56.00		56.00		56.00		56.00		280.00

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.14 Farm Mechanization

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

Project Component:

- Distribution of rotavator, power tiller, cono weeder, power operated sprayer and tractor in all blocks.
- PVC pipes to carry irrigation water in all the blocks.
- Distribution of oil engine pumpsets in all 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 ₹3314.00 lakhs (Table 4.14).

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. The progress of the project will be implemented by Director of Agriculture and the State Nodal Agency.

Table 4.14 Budget requirement for farm mechanization

(Rs. in Lakhs)

Sl. 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
	Farm Mechanization															
1	Power operated sprayer	Nos.	8000	All blocks	300	24.00	300	24.00	300	24.00	300	24.00	300	24.00	1500	120.00
2	Distribution of cono weeder	Nos	2000	All blocks	40	0.80	40	0.80	40	0.80	40	0.80	40	0.80	200	4.00
3	Distribution of Powertiller	Nos	150000	All blocks	60	90.00	60	90.00	60	90.00	60	90.00	60	90.00	300	450.00
4	Distribution of Rotavator	Nos	80000	All blocks	60	48.00	60	48.00	60	48.00	60	48.00	60	48.00	300	240.00
5	Distribution of Tarpaulins	Nos	8000	All blocks	100	8.00	100	8.00	100	8.00	100	8.00	100	8.00	500	40.00
6	Distribution of Tractor	Nos	600000	All blocks	60	360.00	60	360.00	60	360.00	60	360.00	60	360.00	300	1800.00
7	PVC Pipes to carry Irrigation water from source to field	Unit	40000	All blocks	300	120.00	300	120.00	300	120.00	300	120.00	300	120.00	1500	600.00
8	Distribution Oil Engine Pumpset	0	0	All blocks	40	12.00	40	12.00	40	12.00	40	12.00	40	12.00	200	60.00
	Grand total					662.80		662.80		662.80		662.80		662.80		3314.00

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Tirupattur – B18, Vellore – B19, Walajah – 20

4.1.15 Strengthening of State Seed Farm

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

Project components

- Soil Fertility Improvement and Land development works in SSF in Walajah block.
- Supply of machineries in Walajah block.
- Infrastructure development for seed production in Walajah block.

Budget

It is proposed to incur ₹ 104.50 lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.15).

Expected outcome

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

Implementing Agency

Department of Agriculture will implement the project and report the progress to the Director of Agriculture and State Nodal Agency.

Table 4.15 Budget requirement for strengthening of state seed farm

(Rs. in Lakhs)

Sl. No	Intervention	unit	unit cost in Rs.	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Soil Fertility Improvement and Land development works in SSF	ac	2	B20	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00	1	2.00
2	Solar pumpsets	nos	6	B20	2	12.00	0	0.00	0	0.00	0	0.00	0	0.00	2	12.00
3	Rain gun	nos	0.4	B20	5	2.00	0	0.00	0	0.00	0	0.00	0	0.00	5	2.00
4	Mobile sprinkler	nos	0.3	B20	5	1.50	0	0.00	0	0.00	0	0.00	0	0.00	5	1.50
5	Laying of drip	nos	2	B20	3	6.00	0	0.00	0	0.00	0	0.00	0	0.00	3	6.00
6	seed godown	nos	25	B20	1	25.00	0	0.00	0	0.00	0	0.00	0	0.00	1	25.00
7	Farm office	nos	8	B20	1	8.00	0	0.00	0	0.00	0	0.00	0	0.00	1	8.00
8	Farm office renovation	nos	3	B20	1	3.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.00
9	Farm connectivity	Meter	0.015	B20	3000	45.00	0	0.00	0	0.00	0	0.00	0	0.00	3000	45.00
	Grand total					104.50		0.00		0.00		0.00		0.00		104.50

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.1.16 Information Technology in Agriculture

Agriculture is a major sector which is vital for the survival of modern man. The produce from agriculture drives trade from one country to another, brings income 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.

Role of IT in Agriculture

In the context of agriculture, the potential of information technology (IT) can be assessed broadly under two heads: (a) as a tool for direct contribution to agricultural productivity and (b) as an indirect tool for empowering farmers to take informed and quality decisions which will have positive impact on the way agriculture and allied activities are conducted. The indirect benefits of IT in empowering farmer are significant and remain to be exploited. The farmer urgently requires timely and reliable sources of information inputs for taking decisions. At present, the farmer depends on trickling down of decision inputs from conventional sources which are slow and unreliable. The changing environment faced by farmers makes information not merely useful, but necessary to remain competitive. Components include input devices, output devices, processors, storage devices, software, networking devices, transmission media and other accessories.

Budget

It is proposed to incur ₹294.52 lakhs over a period of five years with the finance facilities under the NADP and other sources (Table 4.16).

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 Director of Agriculture and State Nodal Agency.

Table 4.16 Budget requirement for Information Technology in Agriculture

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Procurement of Hardware for replacement of old hardware	Nos	50000	All blocks	0	0.00	21	10.50	0	0.00	0	0.00	21	10.50	42	21.00
2	Connectivity Charges	Nos	11000	All blocks	0	0.00	21	2.31	0	0.00	0	0.00	21	2.31	42	4.62
3	Printer cum Scanner	Nos	20000	All blocks	0	0.00	24	4.80	0	0.00	0	0.00	24	4.80	48	9.60
4	UPS and Electrical Accessories	Nos	35000	All blocks	0	0.00	24	8.40	0	0.00	0	0.00	24	8.40	48	16.80
5	Xerox machine	Nos	75000	All blocks	0	0.00	21	15.75	0	0.00	0	0.00	21	15.75	42	31.50
6	Laptop/Desktop	Nos	50000	All blocks	0	0.00	40	20.00	0	0.00	0	0.00	21	10.50	61	30.50
7	Anti -virus software	Nos	2500	All blocks	0	0.00	29	0.73	0	0.00	0	0.00	29	0.73	58	1.45
8	Television	Nos	100000	All blocks	0	0.00	20	20.00	0	0.00	0	0.00	20	20.00	40	40.00
9	Colour printer	Nos	15000	All blocks	0	0.00	21	3.15	0	0.00	0	0.00	21	3.15	42	6.30
10	4G Internet - Dongle	Nos	2500	All blocks	0	0.00	23	0.58	0	0.00	0	0.00	23	0.58	46	1.15
11	Equipments for Documentation															
a	Handycam	Nos	30000	All blocks	0	0.00	22	6.60	0	0.00	0	0.00	22	6.60	43	13.20
b	Camera	Nos	25000	All blocks	0	0.00	21	5.25	0	0.00	0	0.00	21	5.25	41	10.50
c	GPS instrument	Nos	20000	All blocks	0	0.00	20	4.00	0	0.00	0	0.00	20	4.00	40	8.00
d	Android mobile	Nos	15000	All blocks	0	0.00	20	3.00	0	0.00	0	0.00	20	3.00	44	6.00
e	External Hard disk	Nos	5000	All blocks	0	0.00	24	1.20	0	0.00	0	0.00	24	1.20	44	2.40
12	Audio - visual Aids	Nos	150000	All blocks	0	0.00	20	30.00	0	0.00	0	0.00	20	30.00	41	60.00
	LCD projector	Nos	75000	All blocks	0	0.00	21	15.75	0	0.00	0	0.00	21	15.75	21	31.50
	Grand total					0.00		152.01		0.00		0.00		142.51		294.52

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

Table 4.17 Budget abstract for agriculture development**(Rs. in Lakhs)**

Sl. No.	Crops	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Paddy	702.63	705.76	737.77	770.16	804.27	3720.59
2	Millets	77.31	74.81	70.99	65.68	68.44	357.23
3	Pulses	414.76	374.78	379.66	390.19	396.76	1956.15
4	Oilseeds	932.77	835.59	976.34	998.89	952.83	4696.42
5	Oilpalm	78.08	74.48	74.48	74.48	74.48	376.00
6	Cotton	47.28	47.28	47.28	47.28	47.28	236.40
7	Sugarcane	180.94	180.94	180.94	180.94	180.94	904.70
8	Coconut	202.44	202.44	198.06	198.06	198.06	999.06
9	Training	118.80	164.80	114.80	164.80	114.80	678.00
10	Infrastructure	89.50	1900.00	501.50	50.00	189.50	2730.50
11	Soil Health Management	40.00	40.00	52.40	40.00	40.00	212.40
12	Rainfed Area Development	0.00	1100.00	0.00	0.00	1100.00	2200.00
13	Integrated Pest Management	56.00	56.00	56.00	56.00	56.00	280.00
14	Farm Mechanization	662.80	662.80	662.80	662.80	662.80	3314.00
15	Strengthening of State Seed Farm	104.50	0.00	0.00	0.00	0.00	104.50
16	Agriculture Information Technology	0.00	152.01	0.00	0.00	142.51	294.52
	Grand total	3707.81	6571.69	4053.02	3699.28	5028.67	23060.47

4.2 AGRICULTURE RESEARCH INFRASTRUCTURE AND DEVELOPMENT

Cultivation of field crops and vegetables are the most preferred crops by the farmers of Vellore district having areas with medium drainage, above medium soil depth and moderate quality of irrigation water. On a verge of development in the agriculture system, the government should open linkage and infrastructure that can help in better functioning of the procedure and help in rural development. Therefore in context to this and provide linkage between research and farm activities, the government is all set to construct permanent infrastructure for Agriculture Technology Park .It aims to cover rural women, farmers, unemployed youths, field-level agriculture personnel and rural volunteers on scientific farming to boost socio-economic condition of rural areas.

The most damaging ecological disturbance of injudicious use of pesticides in the existence of high concentration of pesticide residues in food chain including vegetables and other crops. To produce pesticide free agricultural produce, it is highly necessary to introduce bio control as one of the major tool for pest management in vegetable crops. Training and demonstrations on precision water and nutrient usage, INM, IPM, use of natural plant enemies, cultivation under protected structures etc. imparts confidence with in the farmers in agriculture and make them to adopt to harvest bumper crop and to get triple the income. In this regard, setting up of training institute will be off immense use in changing the economic and social status of the farmers, skilled workers, rural women and self-entrepreneurship development among the stake holders.

Establishing organic Jaggery processing unit will help the sugarcane Jaggery farmer by way of disseminating improved post-harvest technique in view to avoid the quality loss of Jaggery during processing and storage. Jaggery is best when consumed as organic. Organic Jaggery retains not only all the sucrose but all the other natural nutrients like calcium, phosphorous, magnesium and potassium. Therefore the establishment of Chewing Cane Production and Organic Jaggery Processing Unit is essential. These problems all necessitate the need for making them aware of good farming practices from research infrastructure which may provide better infrastructure facilities and higher agricultural production by adopting the following research infrastructure facilities so they can be getting a better knowledge on crops for getting higher agricultural production at Vellore district.

Project components

- Establishment of Advanced grain quality analysis laboratory
- Establishment of Chewing Cane – Production and Processing Unit
- Establishment of Organic Jaggery Processing Unit

Budget

The budget requirement for the above research and development activities is estimated at Rs.250.00 lakhs over a period of five years (Table 4.18).

Expected outcome

The implementation of the above project will result in better research activities and trainings on latest technologies for higher agricultural production.

Implementing agency

Tamil Nadu Agricultural University will be implementing the project. The progress of the project will be monitored by the Vice-Chancellor, TNAU and Director of Research.

Table 4.18 Budget requirement for strengthening of Agricultural Research

(Rs. in Lakhs)

Sl. No.	Interventions	Blocks Covered	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	Establishment of Chewing Cane – Production and Processing Unit	Gudiyatham	50	0	0.00	1	50.00	0	0.00	0	0.00	0	0.00	1	50.00
2	Establishment of Organic Jaggery Processing Unit	Gudiyatham	150	0	0.00	1	150.00	0	0.00	0	0.00	0	0.00	1	150.00
3	Establishment of Advanced grain quality analysis laboratory	Gudiyatham	50	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
	Grand total				50.00		200.00		0.00		0.00		0.00		250.00

4.3 HORTICULTURE

Production and Growth

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, Banana, Grapes, Orange, Guava, Pomegranate, Sapota, Litchi 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.

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.

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.

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.

e. Plantation crops

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

Improving Infrastructural facilities for production

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

Area expansion by Precision Farming Technology

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

Area expansion by high density planting

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

Area expansion by Normal Planting

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

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.

Rejuvenation of old fruitorchards

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.

Organic farming

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

The price premium for organic food is an important factor in the economic viability of organic farming. Organic agriculture can contribute to ecologically sustainable, socio-economic development, especially in poorer countries. The application of organic principles enables employment of local resources (e.g., local seed varieties, manure, etc.) and therefore cost-effectiveness. Local and international markets for organic products show

tremendous growth prospects and offer creative producers and exporter's excellent opportunities to improve their income and living conditions.

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.

Capacity building

Capacity building of Horticultural Officers and Farmers

In service training of horticultural officers regularly would help them to update the modern technologies in production, marketing and value addition of horticultural crops including organic farming. Similarly, exposure visits to farmers to nearby districts / States and even foreign countries would help them aware and adopt new innovative technologies.

Mechanization in cultivation of horticultural crops

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

Micro Irrigation, Water harvesting and Management

With increasing demand on water from various sectors, the availability of water is under severe stress. Agriculture sector is the largest use of water. While irrigation projects (Major and medium) have contributed to the development of water resources, conventional methods of irrigation are inefficient and lead to wastage of water. It has been recognized that

the use of modern irrigation methods like drip and sprinkler irrigation are the ways for the efficient use of surface as well as ground water resources.

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

Special Interventions

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.

Banana Bunch Sleeve

'Bunch care techniques' are to be followed in banana cultivation to achieve the best quality. Transparent polyethylene sleeves are recommended to cover the bunch immediately after opening of the last hand. Using of opaque polythene covers / sleeves gauge (during winter) and paper bags (to avoid chilling injury at frost conditions and sun scratch). 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

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.

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.

Establishing Centre of Excellence for different crops

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

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.

Establishment of Mushroom unit

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

Infrastructure Development

Supporting structures for vegetable production

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

a. Staking, trellis and propping

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

b. Pandal structure

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

Modernization of State Horticulture Farms

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

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

Establishment of Processing Units

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

Crop Insurance

Crop Insurance coverage has to be done for major crops like paddy, millets, pulses, oilseeds, sugarcane, cotton, cash crops and all Horticulture crops in the notified areas.

Horticultural mechanization

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 in horticultural crops

Micro-irrigation will generally use less than half the volume of water required by the more traditional 'watering' systems such as sprinkler irrigation. Lower pressures used mean less energy for pumping while precise placement of more exact water volumes enhances and improves water management. Micro Irrigation system scales down requirement of labour and takes care of application of fertilizers.

Budget

The budget requirement for fulfilling the various interventions is ₹.22146.23 Lakhs. The details of budget requirement for each intervention across the blocks are shown in Table 4.19.

Implementing agency

The projects will be implemented by the Department of Horticulture and Plantation crops. The progress will be monitored by Director of Horticulture and Plantation crops and State Nodal Agency.

Table 4.19 Budget requirement for horticulture development

(Rs. in Lakhs)

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.		
A	Production Growth															
I	Area expansion of fruit crops															
1	TC Banana & TC Pineapple	Ha	1.25	All Blocks except B3	108	135.00	130	162.50	150	187.50	177	221.25	180	225.00	745	931.25
2	Banana / Hill Banana sucker & Pine apple sucker	Ha	0.875	All Blocks except B3	496	434.00	511	447.13	541	473.38	571	499.63	601	525.88	2720	2380.00
3	UHDP in Papaya, Mango, Guava, Pomegranate, Acidlime	Ha	1.25	All Blocks except B19	23	28.75	23	28.75	23	28.75	23	28.75	23	28.75	115	143.75
4	HDP in Mango, Guava, Litchi, Pomegranate	Ha	1	All Blocks	41	41.00	41	41.00	41	41.00	41	41.00	41	41.00	205	205.00
5	Area expansion fruits with traditional varieties	Ha	0.6	All Blocks except B8 and B20	52	31.20	52	31.20	52	31.20	52	31.20	52	31.20	260	156.00
6	Normal Planting in lime / lemons	Ha	0.6	All Blocks except B8 and B19	35	21.00	35	21.00	36	21.60	39	23.40	39	23.40	184	110.40
7	Normal Planting in Mango	Ha	0.6	All Blocks	99	59.40	70	42.00	73	43.80	76	45.60	79	47.40	397	238.20
8	Normal planting in Guava	Ha	0.6	All Blocks	53	31.80	66	39.60	80	48.00	93	55.80	108	64.80	400	240.00
9	Normal planting in Sapota	Ha	0.6	All Blocks except B19 & B20	19	11.40	18	10.80	29	17.40	29	17.40	40	24.00	135	81.00
10	Normal planting in Amla	Ha	0.6	B9 & B11	6	3.60	6	3.60	6	3.60	6	3.60	6	3.60	30	18.00
11	Normal planting in Papaya	Ha	0.6	All Blocks	104	62.40	135	81.00	137	82.20	154	92.40	184	110.40	714	428.40
12	Normal planting in Jack	Ha	0.6	B9	2	1.20	2	1.20	2	1.20	2	1.20	2	1.20	10	6.00
13	Banana for leaf production	Ha	0.6	B8, B10, B14 & 19	18.5	11.10	18.5	11.10	18.5	11.10	18.5	11.10	18.5	11.10	92.5	55.50

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.
14	Commercial production of Traditional fruits (Woodapple, Manila Tamarind, Jamun, Ber, Karonda, Annona, Egg fruit, etc.)	Ha	0.6	All Blocks except B2, B8 & B14	32	19.20	32	19.20	32	19.20	32	19.20	32	19.20	160	96.00
II	Area expansion of vegetable crops															
15	Brinjal	Ha	0.5	All Blocks	108	54.00	120	60.00	146	73.00	170	85.00	190	95.00	734	367.00
16	Bhendi	Ha	0.5	All Blocks	204	102.00	223	111.50	242	121.00	266	133.00	282	141.00	1217	608.50
17	Green Chillies	Ha	0.5	All Blocks except B20	91	45.50	103	51.50	114	57.00	126	63.00	139	69.50	573	286.50
18	Tomato	Ha	0.5	All Blocks	178	89.00	209	104.50	240	120.00	299	149.50	330	165.00	1256	628.00
19	Gourds including pumpkin and tinda	Ha	0.5	All Blocks	115	57.50	115	57.50	115	57.50	115	57.50	115	57.50	575	287.50
20	Peas & Beans	Ha	0.5	B1, B6, B9 & B15	19	9.50	28	14.00	32	16.00	41	20.50	44	22.00	164	82.00
21	Greens	Ha	0.5	All Blocks except B10	167	83.50	219	109.50	274	137.00	340	170.00	405	202.50	1405	702.50
22	Small Onion	Ha	0.5	B2, B13 & B14	8	4.00	9	4.50	12	6.00	13	6.50	16	8.00	58	29.00
23	Bellary Onion	Ha	0.5	B9, B12 & B14	8	4.00	9	4.50	10	5.00	11	5.50	12	6.00	50	25.00
24	Cauliflower	Ha	0.5	B1 & B6	4	2.00	4	2.00	4	2.00	5	2.50	5	2.50	22	11.00
25	Annual Moringa	Ha	0.5	B2, B9, B12, B13, B14, B19 & B20	14	7.00	16	8.00	18	9.00	20	10.00	22	11.00	90	45.00
26	Cabbage	Ha	0.5	B1 & B6	4	2.00	4	2.00	4	2.00	5	2.50	5	2.50	22	11.00
27	Lab Lab	Ha	0.5	All Blocks	60	30.00	83	41.50	98	49.00	115	57.50	127	63.50	483	241.50
28	Radish	Ha	0.5	All Blocks	70	35.00	96	48.00	114	57.00	135	67.50	149	74.50	564	282.00
29	Melons	Ha	0.5	B10 & B16	5	2.50	6	3.00	7	3.50	8	4.00	9	4.50	35	17.50
30	Cluster bean	Ha	0.5	All Blocks	67	33.50	93	46.50	111	55.50	132	66.00	146	73.00	549	274.50
31	Tapioca	Ha	0.5	B7 & B18	35	17.50	45	22.50	55	27.50	60	30.00	65	32.50	260	130.00

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.
32	Yams and colacassia	Ha	0.5	All Blocks except B1, B2, B4, B5, B6, B7, B11, B12, B13, B15 & B18	86	43.00	93	46.50	102	51.00	110	55.00	118	59.00	509	254.50
33	Commercial production of location specific traditional vegetables (Athalakkai, Palu Pavakkai, Mullu kathiri, Poiyur kathiri, Kottapatti kathiri etc.,)	Ha	0.5	All Blocks except B13 & B20	77	38.50	106	53.00	126	63.00	146	73.00	165	82.50	620	310.00
34	Cultivation of hybrid Vegetables under protected structures	1000 Sq.m	1.4	B14	1	1.40	1	1.40	1	1.40	1	1.40	1	1.40	5	7.00
III	Area expansion of Medicinal and Aromatic plants															
35	Coleus	Ha	0.514 1	B1, B2 & B12	50	25.71	60	30.85	80	41.13	90	46.27	100	51.41	380	195.36
36	Mint	Ha	0.15	B2, B9, B12 & B14	9	1.35	11	1.65	13	1.95	15	2.25	16	2.40	64	9.60
IV	Area expansion of Spices crops															
37	Seed and Rhizomatic spices (Coriander, Turmeric, Ginger, Dry Chilly, Cumin, Fennel, Fenu greek, Dil, Cardamom etc.,)	Ha	0.3	All Blocks except B3	161	48.30	193	57.90	202	60.60	222	66.60	234	70.20	1012	303.60
38	Perennial spices (Pepper, Curry leaf, All spice, Cinnamon, Clove, Tamarind, Nut	Ha	0.5	B8 & B9	7	3.50	7	3.50	7	3.50	7	3.50	7	3.50	35	17.50

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.
	meg etc.,)															
V	Area expansion of Flower crops															
39	Loose flowers - Jasminum sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia	Ha	0.4	All Blocks	151	60.40	181	72.40	189	75.60	222	88.80	230	92.00	973	389.20
40	Bulbous flowers - Tube rose, Gladioli, Dahlia, Bird of paradise, Heliconia, Tulip	Ha	1.5	All Blocks	44	66.00	44	66.00	44	66.00	45	67.50	45	67.50	222	333.00
VI	Area expansion /Gap filling of Plantation crops															
41	Betel vine	Ha	0.5	B12	5	2.50	7	3.50	10	5.00	12	6.00	15	7.50	49	24.50
42	Coconut	Ha	0.5	All Blocks	100	50.00	100	50.00	100	50.00	100	50.00	100	50.00	500	250.00
VII	Rejuvenation/INM-IPM/Mulching/Anti bird net															
43	Mango/Cashew - Rejuvenation	Ha	0.4	All Blocks	58	23.20	68	27.20	77	30.80	87	34.80	97	38.80	387	154.80
44	INM/IPM for Horticultural crops	Ha	0.04	All Blocks	300	12.00	300	12.00	300	12.00	300	12.00	300	12.00	1500	60.00
45	Mulching	Ha	0.32	All Blocks	94	30.08	93	29.76	92	29.44	92	29.44	92	29.44	463	148.16
VIII	Pollination Support through Bee Keeping															
46	Bee hive & Colony	No	0.04	All Blocks	390	15.60	390	15.60	390	15.60	390	15.60	390	15.60	1950	78.00
47	Honey Extractor	No	0.2	All Blocks	39	7.80	39	7.80	39	7.80	39	7.80	39	7.80	195	39.00
IX	Organic Farming															
48	Organic farming and PGS certification in 50 acre cluster	1 cluster	14.95	B19	1	14.95	1	14.95	1	14.95	1	14.95	1	14.95	5	74.75
49	HDPE Vermibed	No	0.16	All Blocks	205	32.80	205	32.80	205	32.80	205	32.80	205	32.80	1025	164.00
X	Rainfed Area development															

Sl. No.	Interventions	Unit	Unit cost	Blocks covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
50	Integrated farming system - Horticulture Based farming	Ha	0.5	All Blocks	185	92.50	185	92.50	186	93.00	187	93.50	187	93.50	930	465.00
51	Green manuring	Ha	0.04	All Blocks	100	4.00	100	4.00	100	4.00	100	4.00	100	4.00	500	20.00
52	Moisture stress management - Minimum irrigation guarantee by PUSA hydrogel	Ha	0.1	All Blocks	500	50.00	500	50.00	500	50.00	500	50.00	500	50.00	2500	250.00
B	Infra structures and Assets creation															
I	Protected cultivation															
1	Poly Green House	1000 Sq.m	9.35	B1, B6, B7 & 18	4	37.40	4	37.40	4	37.40	4	37.40	4	37.40	20	187.00
2	Shade net	1000 Sq.m	7.1	All Blocks except B4, B5, B11, B13 & B18	11.5	81.65	11.5	81.65	11	78.10	11	78.10	11.5	81.65	56.5	401.15
II	Mushroom production															
3	Mushroom production and compost making	1 No.	20	B14	1	20.00	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00
4	Spawn Production	1 No.	15	B14	1	15.00	0	0.00	0	0.00	0	0.00	0	0.00	1	15.00
5	Cottage mushroom unit	1 No.	1	B19	0	0.00	1	1.00	1	1.00	1	1.00	0	0.00	3	3.00
III	Vermicompost unit															
6	Permanent Vermicompost Unit	600 cu.ft	1	All Blocks	46	46.00	48	48.00	50	50.00	52	52.00	53	53.00	249	249.00
IV	Supporting structures for Horticulture crop production															
7	Staking/ Trellis/ Propping	Ha	1	All Blocks except B1 & B5	83	83.00	101	101.00	113	113.00	125	125.00	146	146.00	568	568.00
8	Permanent Pandal structure	Ha	4	All Blocks	40	160.00	41	164.00	43	172.00	58	232.00	59	236.00	241	964.00
V	District Horticulture information and training centre															
VI	Community seed bank															

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.
C	Special interventions															
9	Farm deficiency correction	Ha	0.04	All Blocks	1010	40.40	1020	40.80	1200	48.00	1300	52.00	1400	56.00	5930	237.20
10	Promotion of Roof top Garden/ Potager garden Kit	No	0.005	All Blocks	3525	17.63	3525	17.63	3525	17.63	3525	17.63	3525	17.63	17625	88.13
11	Promotion of Roof top Garden/ Potager garden Kit with shade net	No	0.0735	B4, B9, B16, B18 & B19	39	2.87	39	2.87	39	2.87	39	2.87	39	2.87	195	14.33
12	Banana Bunch Sleeve	Ha	0.25	All Blocks except B17	36	9.00	36	9.00	36	9.00	36	9.00	36	9.00	180	45.00
13	AESA based IPM in fruits and vegetables Pheromones trap	Ha	0.04	All Blocks	200	8.00	200	8.00	200	8.00	200	8.00	200	8.00	1000	40.00
14	AESA Based IPM in fruits and vegetables Yellow sticky trap	Ha	0.04	All Blocks	400	16.00	400	16.00	400	16.00	400	16.00	400	16.00	2000	80.00
15	AESA Based IPM in fruits and vegetables Light trap	Ha	0.08	All Blocks	200	16.00	200	16.00	200	16.00	200	16.00	200	16.00	1000	80.00
D	Post-Harvest Management															
16	Pack house (9m X 6m)	1 No	4	B1 & B7	3	12.00	3	12.00	3	12.00	3	12.00	3	12.00	15	60.00
17	Collection centre	1 No	15	B14	0	0.00	0	0.00	1	15.00	0	0.00	0	0.00	1	15.00
18	Market intervention -Mobile vending cart	1 No	0.3	All Blocks	40	12.00	40	12.00	40	12.00	40	12.00	40	12.00	200	60.00
E	Development of Farms, Nurseries and Parks															
19	Developmental activities in new/ existing state Horticultural farm, Keelapalur	No	25	B1 & B18	0	0.00	0	0.00	1	25.00	1	25.00	1	25.00	3	75.00

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.
F	Mechanization - Machineries, Equipments & Tools															
20	Power tiller/Tractor/Minitractor	Nos	1	B2, B9, B10, B15 & B20	9	9.00	9	9.00	9	9.00	9	9.00	9	9.00	45	45.00
21	Land development, tillage and seed bed preparation equipments	Nos	0.3	B9	2	0.60	2	0.60	2	0.60	2	0.60	2	0.60	10	3.00
22	Manual Sprayer-Knapsack/Foot operated Sprayer	Nos	0.12	All Blocks	100	12.00	100	12.00	100	12.00	100	12.00	100	12.00	500	60.00
23	Tractor Mounted / Operated Sprayer (Below 20HP)	Nos	0.2	B9	2	0.40	2	0.40	2	0.40	2	0.40	2	0.40	10	2.00
24	Tractor Mounted / Operated Sprayer (Above 20HP)	Nos	1.26	B9	2	2.52	2	2.52	2	2.52	2	2.52	2	2.52	10	12.60
25	Post Hole Digger/Augur, Pneumatic/ other Planter		1.26	B9	1	1.26	1	1.26	1	1.26	1	1.26	1	1.26	5	6.30
26	Hand operated sprayer with face mask	Nos	0.025	All Blocks	98	2.45	98	2.45	98	2.45	98	2.45	98	2.45	490	12.25
27	Nets for safe harvesting of fruits, Headlights for flower picking	Nos	0.005	All Blocks	400	2.00	400	2.00	400	2.00	400	2.00	405	2.03	2005	10.03
28	Power operated sprayer	Nos	0.05	All Blocks	200	10.00	220	11.00	240	12.00	260	13.00	300	15.00	1220	61.00
29	Plastic crates for vegetable & fruits handling	No of sets containing 10 crates	0.075	All Blocks	200	15.00	200	15.00	200	15.00	200	15.00	200	15.00	1000	75.00
30	Turmeric Boiler		2.5	B8	1	2.50	1	2.50	1	2.50	1	2.50	1	2.50	5	12.50
31	Turmeric Polishing Machine		0.88	B8	1	0.88	1	0.88	1	0.88	1	0.88	1	0.88	5	4.40

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.
32	5 layered Polythene spread sheets for drying horticulture produce	No	0.16	All Blocks	100	16.00	100	16.00	100	16.00	100	16.00	100	16.00	500	80.00
33	Aluminium Ladders for Harvesting	No	0.2	All Blocks except B8	38	7.60	38	7.60	38	7.60	38	7.60	38	7.60	190	38.00
G	Water / Irrigation Management															
34	Micro Irrigation - Drip	Ha	1.12	All Blocks	665	744.80	665	744.80	665	744.80	665	744.80	665	744.80	3325	3724.00
35	Rain gun	Ha	0.34	All Blocks	325	110.50	325	110.50	325	110.50	325	110.50	325	110.50	1625	552.50
36	Sprinkler	No	0.195	All Blocks	285	55.58	285	55.58	285	55.58	285	55.58	285	55.58	1425	277.88
H	Capacity Building															
37	Training to farmers within the State. 2 days Rs.1000/farmer/day	No	0.02	All Blocks	1000	20.00	1000	20.00	1000	20.00	1000	20.00	1000	20.00	5000	100.00
38	Training to farmers outside the state. 30 farmers/Batch	No	0.105	All Blocks	60	6.30	60	6.30	60	6.30	60	6.30	60	6.30	300	31.50
39	Exposure visit to farmers for 5 days. Rs.1000/farmer/day	No	0.05	All Blocks	200	10.00	200	10.00	200	10.00	200	10.00	200	10.00	1000	50.00
40	Training to farmers at HTC	No	0.0025	All Blocks	200	0.50	200	0.50	200	0.50	200	0.50	200	0.50	1000	2.50
41	Exposure visit of farmers outside India	No	4	All Blocks	20	80.00	20	80.00	20	80.00	20	80.00	20	80.00	100	400.00
42	Training to staff outside the state / Batch of 5 members	No	0.04	All Blocks	40	1.60	40	1.60	40	1.60	40	1.60	40	1.60	200	8.00
43	Training to staff outside India	No	6	All Blocks	20	120.00	20	120.00	20	120.00	20	120.00	20	120.00	100	600.00
44	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

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.
45	Computerization & governance	No	1	All Blocks	5	5.00	5	5.00	5	5.00	5	5.00	5	5.00	25	25.00
46	Publicity and Documentation	No	0.5	All Blocks	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00
I	Crop Insurance and Risk Mitigating schemes															
47	Crop Insurance	Ha	0.025	All Blocks	400	10.00	400	10.00	400	10.00	400	10.00	400	10.00	2000	50.00
	Grand total					3923.56		4126.21		4405.97		4729.71		4960.78		22146.23

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.4 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 utilization of inputs such as seeds, fertilizers 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.
- 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. 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

- Establishment of hi-tech machinery hubs for high value crops like sugarcane, cotton etc.
- Promotion of appropriate technologies and to set up farm machinery banks in identified villages
- Provision of financial assistance on per hectare basis to the beneficiaries hiring machinery/equipments from custom hiring centres
- Increases the tractor hire services in the farms of small and marginal farmers
- Strengthening of Minor irrigation for the rainfed and hard rock areas. It would establish through construction of open well, tube wells and Bore wells. Revitalization of wells by side boring and blasting in hard rock areas.
- 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.
- Provision of components such as High tech Earth excavator, Poly Green House with Fogging facility, Vermi Compost unit with packing accessories, Farm pond / Fish pond, Farmers kit (Crow bar, Hand hoe, rose can, pruning secateurs, coconut dehusker, trolley etc.), Land levelling, Pipe laying, Stening wall, Well deepening, Replacement of old Pumpsets, Infrastructure like packing unit, godown, cattle shed and Threshing floor, Publicity and propaganda for farm mechanization in AED, Special Training for Coconut Growers, Special Training for Coconut Tree Climbing, J C B, Mini Drill, Compartmental Bund Formation, Farm Ponds, Community Bore wells, Deepening of Open Wells, Renovation of MI Tanks, Check Dam, Percolation Pond, Recharge Shaft, Summer Ploughing, PVP pipe laying, Replacement of Submersible Motors pump sets, Telescopic Pruner, Motorized Rubber Roller, Trays for Paddy Nursery Raising, Combine Harvester, Diesel Pump, Rotary Tiller, Smoke House, Mist Blower, Tea Harvester, Construction of LD & MI Repair Shed and Construction of Training Centre for farmers with furniture and accessories at the department of Agricultural engineering
- 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
- Promotion of Bio-mass gasifier unit which hold huge potential technology for decentralized electricity generation in rural villages. Biomass is a CO₂ neutral fuel and, therefore, unlike fossil fuels such as diesel does not contribute to net CO₂ emissions, which makes biomass based power generation systems an attractive option in mitigating the adverse effects of climate change.
- 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
- Promotion of training to AED engineers on post-harvest techniques and bio energy
- Rehabilitation of irrigation network to bring water directly to the root zone of the crop, improve application and conveyance efficiency, thereby reduce the wastage of water due to flood irrigation.
- Prevention of sea water intrusion through construction of subsurface dyke, Village Pond / Community Pond, Farm Pond, Recharge shaft and Weir/Bed Dam.

Expected outcome

Implementation of the above strategies such as supply of farm implements to carry out mechanized 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

Agriculture continues to be the most predominant sector of this district economy, as 70 percent of the population is engaged in Agriculture and allied activities for their livelihood. Agricultural Mechanization could provide the stability in agricultural production in a sustainable manner to meet the food requirement of growing population and also to meet the raw material needs of agro based industries, thereby providing employment opportunities to the rural population. The overall budget requirement for implementation of above interventions is ₹17421.75 lakhs. 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 Agricultural Engineering. The progress will be monitored by the Chief Engineer and State Nodal Agency.

Table 4.20 Budget requirement for agricultural engineering

(Rs. in Lakhs)

Sl. No.	Interventions	Blocks Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Capacity Building															
1	Demonstration of Agricultural Machinery	All Blocks	No's/Ha	0.04	40	1.60	40	1.60	40	1.60	40	1.60	40	1.60	200	8.00
2	Training of farmers	All blocks	No's/Ha	0.04	200	8.00	200	8.00	200	8.00	200	8.00	200	8.00	1000	40.00
3	Training of Rural Youth in workshops	All blocks except B5 & B14	No's/Ha	0.04	200	8.00	200	8.00	200	8.00	200	8.00	200	8.00	1000	40.00
4	Demonstration of Post Harvest Technologies	All Blocks	No's/Ha	0.04	40	1.60	40	1.60	40	1.60	40	1.60	40	1.60	200	8.00
5	Financial assistance for Post Harvest Equipment	All blocks	No's/Ha	4	20	80.00	20	80.00	20	80.00	20	80.00	20	80.00	100	400.00
6	Tractor (15-20 PTO HP)	All Blocks	No's/Ha	4	60	240.00	60	240.00	60	240.00	60	240.00	60	240.00	300	1200.00
7	Tractor (40-70 PTO HP)	All Blocks	No's/Ha	8.5	60	510.00	60	510.00	60	510.00	60	510.00	60	510.00	300	2550.00
8	Power Tillers															
9	Power Tiller (8 BHP & above)	All Blocks	No's/Ha	1.75	200	350.00	200	350.00	200	350.00	200	350.00	200	350.00	1000	1750.00
10	Rice Transplanter															
11	Self Propelled Rice Transplanter (Above 4-8 rows)	All Blocks	No's/Ha	16	5	80.00	5	80.00	5	80.00	5	80.00	5	80.00	25	400.00
12	Self Propelled Machinery															
13	Reaper cum Binder	All Blocks	No's/Ha	3	5	15.00	5	15.00	5	15.00	5	15.00	5	15.00	25	75.00
14	Specialized Self Propelled Machinery															

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
15	Reaper	All Blocks	No's/Ha	1.1	5	5.50	5	5.50	5	5.50	5	5.50	5	5.50	25	27.50
16	Post Hole Digger / Augur	All Blocks	No's/Ha	0.63	5	3.15	5	3.15	5	3.15	5	3.15	5	3.15	25	15.75
17	Tractor/Power Tiller (below 20 BHP) driven equipments															
18	a. Land Development, tillage and seed bed preparation equipments															
19	Cultivator	All Blocks	No's/Ha	0.2	20	4.00	20	4.00	20	4.00	20	4.00	20	4.00	100	20.00
20	Rotavator	All Blocks	No's/Ha	0.35	20	7.00	20	7.00	20	7.00	20	7.00	20	7.00	100	35.00
21	a.Land Development, tillage and seed bed preparation equipments															
22	Disc Plow	All Blocks	No's/Ha	0.6	10	6.00	10	6.00	10	6.00	10	6.00	10	6.00	50	30.00
23	Cultivator	All Blocks	No's/Ha	0.3	40	12.00	40	12.00	40	12.00	40	12.00	40	12.00	200	60.00
24	Rotavator	All Blocks	No's/Ha	0.95	200	190.00	200	190.00	200	190.00	200	190.00	200	190.00	1000	950.00
25	Reversible Hydraulic plough	All Blocks	No's/Ha	2	5	10.00	5	10.00	5	10.00	5	10.00	5	10.00	25	50.00
26	b. Sowing Planting, Reaping and Digging Equipments:															
27	Zero till seed cum fertilizer drill	All Blocks	No's/Ha	0.7	40	28.00	40	28.00	40	28.00	40	28.00	40	28.00	200	140.00
28	Post Hole digger	All Blocks	No's/Ha	1.05	5	5.25	5	5.25	5	5.25	5	5.25	5	5.25	25	26.25
29	d.Harvesting & Threshing Equipments															
30	Thresher/Multi Crop threshers	All Blocks	No's/Ha	4	20	80.00	20	80.00	20	80.00	20	80.00	20	80.00	100	400.00

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
31	e.Equipments for Residue management/Hay and Forage Equipments															
32	Balers (Round)	All Blocks	No's/Ha	3.5	5	17.50	5	17.50	5	17.50	5	17.50	5	17.50	25	87.50
33	All Manual/animal drawn equipment/implements / Tools															
34	Drum Seeder (Below 4 Row)	All Blocks	No's/Ha	0.1	40	4.00	40	4.00	40	4.00	40	4.00	40	4.00	200	20.00
35	Drum Seeder (Above 4 Row)	All Blocks	No's/Ha	0.15	40	6.00	40	6.00	40	6.00	40	6.00	40	6.00	200	30.00
36	Plant protection equipments															
37	Manual sprayer: Knapsack/foot operated sprayer	All Blocks	No's/Ha	0.015	10	0.15	10	0.15	10	0.15	10	0.15	10	0.15	50	0.75
38	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 12-16 lts)	All Blocks	No's/Ha	0.08	20	1.60	20	1.60	20	1.60	20	1.60	20	1.60	100	8.00
39	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 16 lts)	All Blocks	No's/Ha	0.1	20	2.00	20	2.00	20	2.00	20	2.00	20	2.00	100	10.00
40	Establishment of Farm Machinery Banks for Custom Hiring	All Blocks	No's/Ha	28	20	560.00	20	560.00	20	560.00	20	560.00	20	560.00	100	2800.00
41	Promotion of Farm Mechanization in Selected Villages	All Blocks	No's/Ha	11.5	40	460.00	40	460.00	40	460.00	40	460.00	40	460.00	200	2300.00

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
42	Financial assistance for promotion of Mechanized Farming operations	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
43	Tractor Hiring Scheme															
44	Purchase of Tractors for AED	B10, B13,B6	No's/Ha	8	3	24.00	0	0.00	0	0.00	0	0.00	0	0.00	3	24.00
45	Purchase of Tractor drawn implemnets for AED	B10, B13,B6	No's/Ha	0.5	3	1.50	0	0.00	0	0.00	0	0.00	0	0.00	3	1.50
46	Purchase of Bull Dozers for AED	B12, B13,B6	No's/Ha	80	3	240.00	0	0.00	0	0.00	0	0.00	0	0.00	3	240.00
47	Purchase of Paddy Transplanter for AED	Gudyatham	No's/Ha	18	1	18.00	0	0.00	0	0.00	0	0.00	0	0.00	1	18.00
48	Purchase of Paddy combine Harvester for AED	Gudyatham	No's/Ha	17	1	17.00	0	0.00	0	0.00	0	0.00	0	0.00	1	17.00
49	Purchase of Balers for AED	Gudyatham	No's/Ha	4.5	1	4.50	0	0.00	0	0.00	0	0.00	0	0.00	1	4.50
50	Purchase of Multi Crop Thresher for AED	Gudyatham, Pernampet	No's/Ha	3.5	2	7.00	0	0.00	0	0.00	0	0.00	0	0.00	2	7.00
51	Solar Energy															
52	5 hp	All Blocks	No's/Ha	3.75	20	75.00	20	75.00	20	75.00	20	75.00	20	75.00	100	375.00
53	7.5 hp	All Blocks	No's/Ha	5.3	20	106.00	20	106.00	20	106.00	20	106.00	20	106.00	100	530.00
54	10 hp	All Blocks	No's/Ha	6.75	5	33.75	5	33.75	5	33.75	5	33.75	5	33.75	25	168.75
55	upto 400sq.ft	All Blocks	No's/Ha	4.25	5	21.25	5	21.25	5	21.25	5	21.25	5	21.25	25	106.25
56	400-600sq.ft	All Blocks	No's/Ha	6.5	3	19.50	3	19.50	3	19.50	3	19.50	3	19.50	15	97.50
57	Any other innovative schemes of AED with Components & its unit cost															

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
58	Poly Green House with Fogging facility	All Blocks	No's/Ha	50	5	250.00	5	250.00	5	250.00	5	250.00	5	250.00	25	1250.00
59	Vermi Compost unit with packing accessories	All Blocks	No's/Ha	7.5	5	37.50	5	37.50	5	37.50	5	37.50	5	37.50	25	187.50
60	Farm pond / Fish pond	All Blocks	No's/Ha	1	20	20.00	20	20.00	20	20.00	20	20.00	20	20.00	100	100.00
61	Farmers kit (Crow bar, Hand hoe, rose can, pruning siccature, coconut dehusker, trolley etc.,)	All Blocks	No's/Ha	0.05	200	10.00	200	10.00	200	10.00	200	10.00	200	10.00	1000	50.00
62	Information Technology (IT) related items															
63	Computer & its accessories	B10, B13,B6	No's/Ha	0.8	1	0.80	3	2.40	3	2.40	3	2.40	0	0.00	10	8.00
64	Tablet (Tab)	B10, B13,B6	No's/Ha	0.25	0	0.00	2	0.50	2	0.50	2	0.50	0	0.00	6	1.50
65	Xerox machine	B10, B13,B6	No's/Ha	1.5	0	0.00	3	4.50	3	4.50	3	4.50	0	0.00	9	13.50
66	Modernisation of Tractor workshops of AED	B10, B13,B6	No's/Ha	50	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00
67	Post Harvest Technology and Management machinery (PHTM)															
68	Self propelled / other power driven Horticultural Machinery															
69	Chain saw/ Wheel barrow/ Mango grader/ planter and other suitable self propelled machineries and	All Blocks	No's/Ha	1	0	0.00	10	10.00	10	10.00	10	10.00	10	10.00	40	40.00

Sl. No.	Interventions	Blocks Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	equipments for horticulture Crops															
70	Manual Horticultural Equipments															
71	Aluminium Ladder/ Ladder	All Blocks	No's/Ha	0.2	0	0.00	50	10.00	50	10.00	50	10.00	50	10.00	200	40.00
72	Post Harvest Equipments for food grains, oil seeds and Horticultural Equipments															
73	Millet Mill	B10, B13,B6	No's/Ha	1.5	0	0.00	2	3.00	2	3.00	2	3.00	2	3.00	8	12.00
74	Oil mill with filter press (for all type of Horticulture / Food grain / Oil seeds crop)	All Blocks	No's/Ha	1.2	0	0.00	10	12.00	10	12.00	10	12.00	10	12.00	40	48.00
75	Packing Machines (for all types of Horticulture / Food grain / Oil seeds crop)	All Blocks	No's/Ha	3	0	0.00	20	60.00	20	60.00	10	30.00	10	30.00	60	180.00
76	Construction of Agricultural Engineering Extension centres (AEECs)	B10, B13,B6	No's/Ha	75	0	0.00	2	150.00	0	0.00	0	0.00	0	0.00	2	150.00
	Grand total					3636.15		3575.75		3425.75		3395.75		3388.35		17421.75

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.5 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.

Major Components

- Strengthening of Uzhavar Sandhai and regulated market
- Formation of FPO/ strengthening of existing commodity groups
- Capacity building programme
- Provision of market accessories

Budget

The district plan proposes an outlay of **Rs.1140.15** lakhs over a period of five years for Vellore district (Table 4.21).

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. The progress is monitored by Commissioner of Agricultural Business and Agricultural marketing.

Table 4.21 Budget requirement for agricultural marketing

(Rs. in Lakhs)

Sl. No.	Intervention	Unit No	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
	Strengthening of Uzhavar Sandhai and Regulated Market															
1	Cold Storage	Nos.	35	B6, B10, B13	3	105.00	0	0.00	0	0.00	0	0.00	0	0.00	3	105.00
2	Strengthening of cold storage unit(Epoxy coated steel racks and plastic crates	Nos.	5	B12	1	5.00	0	0.00	0	0.00	0	0.00	0	0.00	1	5.00
3	Drying Yard	Nos.	4	All Blocks	24	96.00	22	88.00	22	88.00	21	84.00	19	76.00	108	432.00
4	Storage godown	Nos.	10	B1, B2, B4, B14, B16, B17, B18, B19, B20	12	120.00	6	60.00	6	60.00	4	40.00	3	30.00	31	310.00
5	Transaction Shed	Nos.	0.75	B6, B10	20	15.00	20	15.00	20	15.00	20	15.00	20	15.00	100	75.00
6	Upgradation of Uzhavar Shadhais	Nos.	2	B1, B4, B16	3	6.00	0	0.00	0	0.00	0	0.00	0	0.00	3	6.00
	Formation of FPO / Strengthening of Existing Commodity Groups															
7	FPO	Nos.	30	B4, B6, B13, B19	4	120.00	0	0.00	0	0.00	0	0.00	0	0.00	4	120.00
	Provision of Market Access and Market Activities	Nos.				0.00		0.00		0.00		0.00		0.00	0	0.00
8	Dunnage	Nos.	0.05	B1, B2, B4, B6, B13, B14, B16, B17, B18, B19, B20	0	0.00	200	10.00	200	10.00	0	0.00	0	0.00	400	20.00

Sl. No.	Intervention	Unit No	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
9	Tarpaulin	Nos.	0.07	B1, B2, B4, B6, B13, B14, B16, B17, B18, B19, B20	5	0.35	60	4.20	65	4.55	0	0.00	0	0.00	130	9.10
	Post Harvest Infrastructure and Machineries	Nos.				0.00		0.00		0.00		0.00		0.00	0	0.00
10	Turmeric grader	Nos.	2	B2	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00	1	2.00
	Capacity building Programme	Nos.				0.00		0.00		0.00		0.00		0.00	0	0.00
11	Exposure Visits - within state	Nos.	0.5	All Blocks	6	3.00	3	1.50	6	3.00	17	8.50	18	9.00	50	25.00
12	Exposure Visits - outside state - 3 days	Nos.	0.75	All Blocks	1	0.75	3	2.25	5	3.75	12	9.00	8	6.00	29	21.75
13	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.	0.1	All Blocks	19	1.90	19	1.90	19	1.90	19	1.90	17	1.70	93	9.30
	Grand total					475.00		182.85		186.20		158.40		137.70		1140.15

B1-Vellore, B2- Kaniyambadi, B3- Anaicut, B4- Arcot, B5- Thimiri, B6- Alangayam, B7- madahnur, B8- Katpadi, B9- K.V.Kuppam, B10- Gudiyatham, B11- Pernambet, B12- Jolarpet, B13- Thirupathur, B14- Kandili, B15- Natrampalli, B16- Walajah, B17- Sholingur, B18- Arakonam, B19- Nemili, B20- Kaveripakkam

4.7 Seed Certification 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 labeled 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**

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 and Incubator will be strengthened.

- **Strengthening of communication and networking facilities**

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

Expected outcome

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

Budget

Seed testing plays a pivotal role in modern agriculture. It is being carried out to analyze factors like germination, physical purity, moisture, seed health and admixture of other distinguishable varieties. Seed testing is carried out in the notified seed testing laboratories. The Seed testing results are very important for the successful implementation of Seed Certification and Seed Law Enforcement programmes. Apart from certified seed samples and samples received from the seed quality control wing, the service samples sent by the farmers, seed dealers and seed producers are also tested in these laboratories of Vellore district. The overall budget requirement for implementation of above interventions is ₹ 31.72 lakhs. The details of budget requirement for each intervention across the blocks are shown in Table 4.22.

Implementing agency

The projects will be implemented by the Directorate of Seed Certification and Organic Certification.

Table 4.22 Budget requirement for Seed Certification and Organic Certification

(Rs. in Lakhs)

Sl. No.	Interventions	Blocks Covered	Unit	Unit cost	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	Strengthening of laboratory facilities															
1	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	1.00	13.36	1.00	13.36	0.00	0.00	0.00	0.00	0.00	0.00	2.00	26.72
II	Strengthening of communication and networking facilities															
2	Computer accessories	All Blocks	No's	0.25	20	5.00	0	0.00	0	0.00	0	0.00	0	0.00	20	5.00
	Grand total					18.36		13.36		0.00		0.00		0.00		31.72

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.8 Animal Husbandry

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.

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.

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

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

Increasing the availability of fodder through field level interventions

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

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

1. Establishment of vermicomposting unit
2. Distribution of Azolla trays
3. Fodder plot development
4. Distribution of seedlings, sprinklers, grass cutter and raingun to the farmers
5. Development of seed production plots

Increasing the availability of fodder by strengthening farm infrastructure

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

necessary for the timely diagnosis and treatment of animal diseases. Further, emphasis has to be laid on optimum utilization of waste land to grow fodder.

Improved infrastructure facilities will provide improved veterinary services contributing to reduction in the incidences of animal diseases thereby increasing the overall productivity of animals. The Rural Veterinary Dispensaries are either functioning from rented premises or in dilapidated buildings. Further, functioning of Veterinary Institutions in the rental buildings do not satisfy the requirement of a typical Veterinary Institution and with a restricted scope for further expansion, these are not ideal infrastructure. This necessitates strengthening the infrastructure of the veterinary institutions to offer better delivery of services and to reshape it into knowledge resource centers where best practices can be disseminated to the farmers. The following infrastructure facilities will strengthen the fodder availability such as

1. Establishment of farm protection cover
2. Construction of silo pit and overhead tanks
3. Erection of transformers
4. Establishment of feed mixing units& vermicompost units
5. Installation of rain gun and sprinklers
6. Procurement of agri inputs and agricultural implements

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

1. Controlled Internal Drug Release (CIDR)
2. Induction of new genetic pool

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

1. Upgradation of vaccine production facilities for bacteria and virus
2. Procurement of vaccines, medicine, diagnostic kit
3. Animal quarantine facility in govt. farm
4. 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

1. Distribution of sheep, goat, buffalo, piggery, poultry units
2. Establishment of modern poultry, rabbit , piggery, sheep, goat and bull shed
3. Popularizing quail rearing
4. Integrated farming
5. Milking machine
6. Establishment of modern poultry shed
7. Establishment of modern dairy
8. Establishment of modern piggery shed
9. Establishment of modern goat shed

Improving the service delivery at veterinary institutions

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

1. Deep freezer facility for storage of vaccines and medicines
2. Establishment of infrastructure facilities, disease diagnostic lab, mobile veterinary units, surgical theaters and ambulance facilities.
3. Providing solar lightening panels at veterinary institutions
4. Package of modern veterinary diagnostic aids to veterinary institutions

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

1. Animal identification and traceability
2. Conservation of indigenous breeds

Capacity building

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

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

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

Budget allocation

The major themes proposed in the plan for animal husbandry sector with a total budget out lay of ₹. 116244.80 lakhs (Table 4.23).

Project implementing agency

The projects proposed will be implemented by the Department of Animal husbandry. The progress of the project will be monitored by the Director of Animal husbandry and the State Nodal Agency.

Table 4.23 Budget requirement of Animal Husbandry

(Rs. in Lakhs)

Sl. No.	Intervention	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Increasing the Availability of Fodder through Field level Interventions															
1	Establishment of Vermicomposting unit (single bed)	Nos	0.05	All Blocks except B1	57	2.85	57	2.85	57	2.85	57	2.85	57	2.85	285	14.25
2	Fodder production to the farmers by Hydroponic methods	Nos	0.1	All Blocks	134	778.15	133	772.34	133	772.34	133	772.34	133	772.34	666	3867.50
3	Distribution of Azolla trays	Nos	0.03	All Blocks except B1	380	11.40	380	11.40	380	11.40	380	11.40	380	11.40	1900	57.00
4	Fodder plot development	acre	0.05	All blocks	400	20.00	400	20.00	400	20.00	200	10.00	200	10.00	1600	80.00
5	Developemnt of Seed Production plots	0	0	All Blocks except B1	54	13.50	54	13.50	54	13.50	54	13.50	54	13.50	270	67.50
6	Distribution of Raingun to Livestock farmers	0	0	All Blocks	395	98.75	395	98.75	395	98.75	395	98.75	395	98.75	1975	493.75
7	Distribution of sprinkler for fodder production	0	0	All Blocks except B1	285	42.75	285	42.75	285	42.75	285	42.75	285	42.75	1425	213.75
	Increasing the Availability of Fodder by Strengthening Farm Infrastructure															
8	Establishment of Vermicompost unit (10 beds) at Farms	0	0	B20	1	4.00	1	4.00	1	4.00	1	4.00	1	4.00	5	20.00
9	Erection of Transformers to improve irrigation facility in Govt.farm	0	0	B20	0	0.00	1	30.00	0	0.00	0	0.00	0	0.00	1	30.00
10	Establishment of Farm Protection Cover (Bio-security wall)	0	0	B20	0	0.00	15	75.00	0	0.00	0	0.00	0	0.00	15	75.00
11	Establishment of Feed mixing/feed block units	0	0	B20	0	0.00	1	25.00	0	0.00	0	0.00	0	0.00	1	25.00

Sl. No.	Intervention	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
12	Construction of silo Pit for livestock farm	0	0	B20	5	5.00	4	4.00	4	4.00	4	4.00	4	4.00	21	21.00
13	Construction of Over Head Tanks/ GLR / Pre-fabricated tanks in farm	0	0	B20	0	0.00	2	40.00	0	0.00	0	0.00	0	0.00	2	40.00
14	Drip irrigation for livestock farms	0	0	B20	20	12.00	20	12.00	20	12.00	20	12.00	20	12.00	100	60.00
15	Borewell for livestock farms	0	0	B20	2	16.00	2	16.00	2	16.00	2	16.00	2	16.00	10	80.00
16	Installation of Raingun in Govt.farm in cultivated areas	0	0	B20	5	2.00	5	2.00	5	2.00	5	2.00	5	2.00	25	10.00
17	Installation of Sprinkler system in fodder cultivated areas in Govt.farm	0	0	B20	5	2.00	5	2.00	5	2.00	5	2.00	5	2.00	25	10.00
18	Procurement of Agri inputs for Farms	0	0	B20	30	4.50	30	4.50	30	4.50	30	4.50	30	4.50	150	22.50
19	Procurement of Agricultural implements (tractor, trailers, harvesters, ploughs, chaff cutter, grass cutter etc)	0	0	B20	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00
	Livestock Breeding Management															
20	CIDR (Controlled Internal Drug Release) for increasing Fertility in Cattle	Nos	0.01	All Blocks except B1	190	1.90	190	1.90	190	1.90	190	1.90	190	1.90	950	9.50
21	Induction of new Genetic Pool	0	0	B20	50	10.00	50	10.00	50	10.00	50	10.00	50	10.00	250	50.00
22	Upgradation of Vaccine Production Facilities -Bacterial	0	0	B16	1	4000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	4000.00
23	Upgradation of Vaccine Production Facilities -Viral	0	0	B16	1	4000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	4000.00
24	Procurement of vaccines, medicines, diagnostic kits, reagents etc	0	0	All Blocks except B1	19	19000.00	19	19000.00	19	19000.00	19	19000.00	19	19000.00	95	95000.00
25	Animal Quarantine Facility in Govt.farm to prevent disease outbreak	0	0	B20	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
26	Animal Testing Facility	0	0	B16	1	4000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	4000.00

Sl. No.	Intervention	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
	Improving the Livestock Productivity															
27	Distribution of Sheep/Goat units - semi intensive system	Nos	0.6	All Blocks	25	15.00	25	15.00	25	15.00	25	15.00	25	15.00	125	75.00
28	Distribution of Buffalo units(5 Buffaloes)	Nos	4.5	All Blocks	5	22.50	5	22.50	5	22.50	5	22.50	5	22.50	25	112.50
29	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
30	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
31	Establishment of disposal pits for poultry unit	Nos	1	All Blocks	25	25.00	25	25.00	25	25.00	25	25.00	25	25.00	125	125.00
32	Milking Mechine	0	0	0	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00
33	Establishment of Modern Poultry Shed	0	0	0	1	25.00	1	25.00	1	25.00	1	25.00	1	25.00	5	125.00
34	Establishment of Modern Dairy/ Bull Shed	0	0	B20	1	150.00	0	0.00	1	150.00	0	0.00	1	150.00	3	450.00
35	Establishment of Modern Piggery Shed	0	0	B20	1	150.00	0	0.00	1	150.00	0	0.00	1	150.00	3	450.00
36	Establishment of Modern Sheep/Goat Shed	0	0	B20	1	50.00	0	0.00	1	50.00	0	0.00	2	100.00	4	200.00
	Improving the Service Delivery at Veterinary Institutions															
37	Deep freezer facility for Storage of vaccines and Medicines	Nos	10	All Blocks	0	0.00	0	0.00	20	200.00	0	0.00	0	0.00	20	200.00
38	Establishment of Infrastructure facilities for Veterinary Institutions	Nos	30	B1	0	0.00	1	30.00	0	0.00	0	0.00	0	0.00	1	30.00
39	Establishment of Mobile Disease Diagnostic Labs	Nos	20	B1	1	20.00	0	0.00	0	0.00	0	0.00	0	0.00	1	20.00
40	Establishment of Mobile Veterinary Units	Nos	10	B1	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00
41	Establishment of surgical theatres at veterinary institution	Nos	30	All Blocks	4	120.00	4	120.00	4	120.00	4	120.00	4	120.00	20	600.00
42	Providing solar lighting panels at veterinary institution	Nos	1	B1	1	1.00	0	0.00	0	0.00	0	0.00	0	0.00	1	1.00

Sl. No.	Intervention	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
43	Package of Modern Veterinary Diagnostic Aids to Veterinary Institutions such as Computerised X rays, Ultrasound, Diathermy etc.	Nos	30	All Blocks	4	120.00	4	120.00	4	120.00	4	120.00	4	120.00	20	600.00
44	Establishment of Ambulance facility for animals	Nos	80	B1	1	80.00	1	80.00	0	0.00	0	0.00	0	0.00	2	160.00
	Livestock Management															
45	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
46	Conservation of Indigenous breeds	Pack	10	All Blocks	1	10.00	1	10.00	1	10.00	1	10.00	1	10.00	5	50.00
	Capacity Building															
47	Establishment of Farmers training Centre	Nos	200	B1	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
48	Conducting Demonstrations, Camps and Campaigns	Nos	0.1	All Blocks except B1	38	3.80	38	3.80	38	3.80	38	3.80	38	3.80	190	19.00
49	Creating awareness of livestock management to the farmers through Training Programmes	Nos	0.1	All Blocks except B1	57	5.70	57	5.70	57	5.70	57	5.70	57	5.70	285	28.50
	Grand total					33002.80		20937.99		21007.99		20447.99		20847.99		116244.80

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.9 Dairy Development

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

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

Strengthening of milk storages and processing units

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

The major interventions are,

1. Milk storage tanks of various capacities
2. Milk tankers
3. Milk pumps
4. Processing equipment's
5. Pasteurizers

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

Enhancing milk production and milk processing units

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

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

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

Capacity building

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

1. Training of personnel of MPCs, Union and federation
2. Infertility camps

Marketing structures

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

1. Parlour structures
2. Milk product storage cabinets
3. Product billing system

Quality control

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

1. Adulteration detection equipment's
2. Milk testing equipment and laboratory

Processing and value addition

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

1. Skim milk powder plant
2. Dairy processing plants
3. Water and effluent treatment plants
4. Steam raising plant
5. Fat handling and other dairy equipment's

Infrastructure development

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. Construction of dairy farm and skim milk powder plant
2. BMC building
3. Cattle feed plants
4. Ware house for dairy products
5. Ice cream manufacturing buildings.

Budget allocation

An outlay of Rs.**26875.00 lakhs** is proposed to fulfill the aforementioned interventions for five years. The foresighted implementation of developmental schemes in dairy sector has enabled to increase the per capita income of rural households in backward districts (Table 4.24).

Implementing agency

The projects will be implemented by the Department of Dairy Development. The progress of the projects will be monitored by Commissioner of Dairy Development and the State Nodal Agency.

Table 4.24 Budget requirement for Dairy Development

(Rs. in Lakhs)

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	Electrical installation like Tranformemr, UPS, Stabilisers, Control Panel MCC etc.,	All blocks	1	25	1	25.00	1	25.00	1	25.00	1	25.00	1	25.00	5	125.00
2	Milk Storage Tanks 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
3	Tub washer, Canwashers, Crate conveyor systems.	All blocks	1	10	2	20.00	2	20.00	2	20.00	2	20.00	2	20.00	10	100.00
4	Point of Sale Machines and billing systems	All blocks	1	0.25	50	12.50	50	12.50	50	12.50	50	12.50	50	12.50	250	62.50
5	SS pipes and fittings	All blocks	1	5	2	10.00	2	10.00	2	10.00	2	10.00	3	15.00	11	55.00
6	Solar system for water heating	All blocks	1	2	5	10.00	5	10.00	5	10.00	5	10.00	5	10.00	25	50.00
7	Packing Machineries for milk, Butter, Ghee, SMP and Other Milk products	All blocks	1	18	2	36.00	2	36.00	2	36.00	2	36.00	2	36.00	10	180.00
8	Plate Heat type Chillers and pasteurizers	All blocks	1	10	2	20.00	2	20.00	2	20.00	2	20.00	2	20.00	10	100.00
9	Milk Tankers of various capacities	All blocks	1	25	3	75.00	3	75.00	3	75.00	3	75.00	3	75.00	15	375.00
10	Milk Pumps of Vaious capacities	All blocks	1	0.5	8	4.00	8	4.00	8	4.00	8	4.00	8	4.00	40	20.00
11	Generator of various capacities	All blocks	1	20	1	20.00	0	0.00	1	20.00	0	0.00	0	0.00	2	40.00
12	Curd processing equipments	All blocks	1	50	0	0.00	1	50.00	0	0.00	0	0.00	0	0.00	1	50.00

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
13	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
	Procurement and Input															
14	Veterinary Medicine	All blocks	1	2	8	16.00	8	16.00	8	16.00	8	16.00	8	16.00	40	80.00
15	Two wheeler for AI technician	All blocks	1	0.5	55	27.50	55	27.50	55	27.50	5	2.50	55	27.50	225	112.50
16	Computer system with accessories	All blocks	1	0.5	50	25.00	50	25.00	50	25.00	50	25.00	50	25.00	250	125.00
17	Fodder seed materials	All blocks	1	0.25	40	10.00	40	10.00	40	10.00	40	10.00	40	10.00	200	50.00
18	Fodder development equipments like chaff cutter, Mower etc.,	All blocks	1	0.2	50	10.00	50	10.00	50	10.00	50	10.00	50	10.00	250	50.00
19	Bulk Milk coolers of Various capacities	All blocks	1	15	7	105.00	7	105.00	7	105.00	7	105.00	7	105.00	35	525.00
20	Milk cans	All blocks	1	0.035	1200	42.00	1200	42.00	1200	42.00	1200	42.00	1200	42.00	6000	210.00
21	Electronic weighing scales of various capacities.	All blocks	1	0.3	100	30.00	100	30.00	100	30.00	100	30.00	100	30.00	500	150.00
22	Electronic milk testing equipments	All blocks	1	1.25	50	62.50	50	62.50	50	62.50	50	62.50	50	62.50	250	312.50
23	Milking machine	All blocks	1	0.8	50	40.00	50	40.00	50	40.00	50	40.00	50	40.00	250	200.00
24	Cow shed	All blocks	1	5	50	250.00	50	250.00	50	250.00	50	250.00	50	250.00	250	1250.00
25	Society Buildings	All blocks	1	20	50	1000.00	50	1000.00	50	1000.00	50	1000.00	50	1000.00	250	5000.00
26	Cryogenic containers	All blocks	1	0.35	50	17.50	50	17.50	50	17.50	50	17.50	50	17.50	250	87.50
27	Equipments for Artificial Insemination	All blocks	1	0.5	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00

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
	Capacity building															
28	Training of personnel of MPCPS, Union and Federation.	All blocks	1	0.05	500	25.00	500	25.00	500	25.00	500	25.00	500	25.00	2500	125.00
29	Infertility Camps	All blocks	1	0.2	400	80.00	400	80.00	400	80.00	400	80.00	400	80.00	2000	400.00
	Marketing															
30	Parlour structures	All blocks	1	5	50	250.00	50	250.00	50	250.00	50	250.00	50	250.00	250	1250.00
31	Milk product storage cabinets	All blocks	1	0.3	400	120.00	400	120.00	400	120.00	400	120.00	400	120.00	2000	600.00
32	Product Billing systems	All blocks	1	0.3	50	15.00	50	15.00	50	15.00	50	15.00	50	15.00	250	75.00
	Quality control															
33	Adulteration detection equipments	All blocks	1	4	2	8.00	2	8.00	2	8.00	2	8.00	2	8.00	10	40.00
34	Milk testing equipment and Laboratory.	All blocks	1	5	2	10.00	2	10.00	2	10.00	2	10.00	2	10.00	10	50.00
	Processing															
35	Dairy Processing Plants	All blocks	1	6000	0	0.00	0	0.00	0	0.00	0	0.00	1	6000.00	1	6000.00
36	Refrigeration Plants	All blocks	1	500	0	0.00	0	0.00	0	0.00	0	0.00	1	500.00	1	500.00
37	Water Treatment Plants. Reverse Osmosis plant	All blocks	1	100	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00
38	Effluent treatment plant	All blocks	1	100	0	0.00	0	0.00	0	0.00	0	0.00	2	200.00	2	200.00
39	Steam raising plant with accessories	All blocks	1	100	0	0.00	0	0.00	0	0.00	0	0.00	1	100.00	1	100.00

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
40	Fat handling equipments	All blocks	1	200	0	0.00	0	0.00	0	0.00	0	0.00	1	200.00	1	200.00
41	Dairy equipments	All blocks	1	50	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00
	Civil work Infrastructure															
42	Construction of Dairy	All blocks	1	1500	0	0.00	0	0.00	0	0.00	0	0.00	1	1500.00	1	1500.00
43	BMC buildings	All blocks	1	15	7	105.00	7	105.00	7	105.00	7	105.00	7	105.00	35	525.00
44	Ice cream and dairy product buildings	All blocks	1	2500	0	0.00	1	2500.00	0	0.00	0	0.00	1	2500.00	2	5000.00
45	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
46	Ware house for Dairy consumables	All blocks	1	200	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
	Grand total					2566.00		5496.00		2641.00		2521.00		13651.00		26875.00

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.10 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.

Enhancement of fisheries production

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 and Introduction of short seasonal fish species in existing farm ponds.

Infrastructure and assets

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 establishment of District Extension and Training centres in this district is recommended for its commercial production.

Capacity Building

Effective extension support is essential for the promotion of Aquaculture in freshwater and brackish water areas. It is necessary to establish the information 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. Hence in this district it is necessary to give training to fish farmers, Exposure visit to farmers to other states and Providing trainers training and exposure visit to Departmental staff.

Budget

The budget requirement for fulfilling the above interventions is ₹.33.59 lakhs (Table 4.25).

Implementing agency

Department of Fisheries will be implementing the project. The progress of the project will be monitored by Commissioner of Fisheries.

Table 4.25 Budget requirement for fisheries development

(Rs. in Lakhs)

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	Promotion of quality fish marketing by traditional fishers by providing mobbed with icebox	Gudiyatham, Kandhili, Kaveripakkam, Walajah	No's	0.5	0	0.00	0	0.00	10	5.00	25	12.50	5	2.50	40	20.00
2	Introduction of short seasonal fish species in existing farm ponds	Walajah	No's	0.79	0	0.00	0	0.00	0	0.00	1	0.79	0	0.00	1	0.79
3	Increasing fishing efficiency of inland fishermen and fish farmers	Gudiyatham, Vellore	No's	0.15	0	0.00	0	0.00	0	0.00	10	1.50	10	1.50	20	3.00
4	Enhancement of Fish production in irrigation tanks and Panchayat tanks by stocking fish seeds	Katpadi, Vellore	Ha	0.04	0	0.00	0	0.00	25	1.00	50	2.00	25	1.00	100	4.00
	Creation of infrastructure facilities															
5	Establishment of District Extension and Training centres	Arcot, Vellore	No's	0.1	0	0.00	0	0.00	0	0.00	11	1.10	0	0.00	11	1.10
	Capacity building programme					0.00		0.00		0.00		0.00		0.00	0	0.00
6	Exposure visit to farmers to other states	Vellore	No's	0.06	0	0.00	0	0.00	10	0.60	0	0.00	0	0.00	10	0.60
7	Providing trainers training and exposure visit to Departmental staff	Alangayam	No's	0.05	0	0.00	5	0.25	5	0.25	0	0.00	0	0.00	10	0.50

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
8	Training to fish farmers	All Blocks Except Alangayam, Anaicut, Gudiyatham, Jolarpet, K.V.Kuppam, Madhanur, Natrampalli, Pernambet, Sholinghur	No's	0.03	0	0.00	0	0.00	0	0.00	0	0.00	120	3.60	120	3.60
Grand total						0.00		0.25		6.85		17.89		8.60		33.59

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.11 Fisheries Research

Post-Harvest Technology

Fisheries sector plays a significant role in the Indian economy in terms of its contribution to growth and development. For growth, the sector contributes through its share in GDP and foreign exchange earnings gained through the export of fish and fishery products. Tamil Nadu ranks fourth among the states in terms of total fish production. Fishes can be effectively used for the preparation of value added fishery products which can provide better employment opportunities and income to the fishers. It can also provide high quality protein for human consumption by conversion into value added products in various convenient forms.

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

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

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

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

Problems to be addressed

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

augment income to fishers.

- ❖ Awareness among consumers is lacking and the *consumers should be educated about their right to have healthy fish, free from spoilage and unhygienic environment, including their right to have value for their money.*

Project components

- Enhancement of per capita consumption of fish
- Utilization of seaweeds and other marine resources for food security
- Ensuring nutritional security through fish and fishery products

Possible outcome due to the above intervention in the State

- Fishes could be processed using recent and updated techniques in production centers and packed in attractive packages distributed and sold through retail outlets.
- Better utilization of catch, improve returns to fishers and provide employment and income generation opportunities to the fishers and other entrepreneurs.
- Promotion of consumption of value added fish products among school children and general public through distribution of diversified value added fish and fishery products.
- Necessary guidance will be rendered to food industries and government agencies with sound scientific knowledge supported by state of art facilities.
- Nutritional labeling, quality testing, shelf life assessment, certification of cleanliness, safeness and nutritional quality of ingredients and products, analysis of additives, adulterants, contaminants will be carried for the aquatic products meant for domestic market which is not strictly adhered in the current scenario.
- The post-harvest losses can be minimized by adopting suitable post-harvest technologies to create direct impact on regional trade flows and to minimize the intermediaries to increase the returns to fishers.
- Branding of state fishery products to promote diversified fish products in household brands in the domestic market through institutional fish marketing with the participation of stakeholders.

- The nutritional benefits of edible macroplants from the sea can be made available for human consumption.
- Offal from finfish and shellfish can be effectively converted in to products of commercial importance

Budget

The budget requirement for fulfilling the above interventions is ₹.141.60 lakhs (Table 4.26).

Implementing agency

Tamil Nadu Fisheries University will be implementing the project. The progress of the project will be monitored by Vice-Chancellor, TNFU, Director of Research and the State Nodal Agency.

Table 4.26 Budget requirement for fisheries research

(₹. in Lakhs)

Sl. No.	Interventions	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	Harvest and Post harvest													
i	fish processing technology													
a	Enhancement of per capita consumption of fish													
	Awareness campaign on health beneficial attributes of fish	0.005	52	0.26	52	0.26	52	0.26	52	0.26	52	0.26	260	1.30
	Production of short films on nutritive value of fish and screening in theatres and television channels	50	0	0.00	1	50.00	0	0.00	0	0.00	0	0.00	1	50.00
f	Utilization of seaweeds and other marine resources for food security													
	Development of nutraceutical products form seaweeds	50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Popularization of seaweed products through mass media	0.005	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Development of seaweed snack foods	50	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
9	Ensuring nutritional security through fish and fishery products													
	supply of preserved ready to eat and ready to cook fish products through public distribution sytems	12.9	0	0.00	0	0.00	1	12.90	0	0.00	0	0.00	1	12.90
	Supply of fish and fish products in mid day meal programme	12.9	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
	Supply chain management to promote consumption of farmed freshwater fishes	64.5	1	64.50	0	0.00	0	0.00	0	0.00	0	0.00	1	64.50
6	Incubation centres													
	Grand total			64.76		63.16		13.16		0.26		0.26		141.60

4.12 Public Works Department (Wro)

Increasing the ground water level

The water resource organization of the Public Works Department have indicated a number of proposals for harnessing water resources as well as for reducing the losses from existing canals irrigation projects. As many of the old irrigation systems are in deteriorating condition and in a state of disrepair, it is absolutely necessary to rehabilitate and/or to carry out the repair works so as to economize the water use and improve the conveyance efficiency and water use efficiency as well. It is hoped that better water control and delivery could be achieved by these measures so that the productivity per unit of water could be enhanced sufficiently.

Project components

- Construction of check dams across the rivers
- Formation of percolation pond
- Excavation of New Supply Channel from Gollamangalam tank to Agaramcheri tank
- Construction of a Diaphragm wall across Palar near Vasur village

Budget

It is proposed to incur ₹. **10356.44** lakhs over a period of five years (4.27).

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 4.27 Budget requirement for public works department (WRO)

(₹. in Lakhs)

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	Construction of check dam across Pambar near Chinnarampatti village in Tirupatthur taluk .	Kandhili	Ha	10.00	25	250.00	0	0.00	0	0.00	0	0.00	0	0.00	25	250.00
2	Construction of Diaphragm wall across Malattar near Nariampattu village in Gudiyatham taluk .	Pernamp et	Ha	10.77	65	700.00	0	0.00	0	0.00	0	0.00	0	0.00	65	700.00
3	Construction of Check dam across Kaanar near Vannandurai village in Ambur taluk .	Madhan ur	Ha	6.34	41	260.00	0	0.00	0	0.00	0	0.00	0	0.00	41	260.00
4	Construction of check dam across Pambar near Irunapattu village in Tirupatthur taluk .	Tirupath ur	Ha	4.81	52	250.00	0	0.00	0	0.00	0	0.00	0	0.00	52	250.00
5	Construction of check dam across Palar near Poigai village in Vellore taluk.	Anaicut	Ha	3.75	160	600.00	0	0.00	0	0.00	0	0.00	0	0.00	160	600.00

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
6	Construction of check dam across Palar near Vengili village in Ambur taluk.	Pernamp et	Ha	4.30	128	550.00	0	0.00	0	0.00	0	0.00	0	0.00	128	550.00
7	Construction of check dam across Palar near Pootuthakku village in Vellore taluk.	Walaja	Ha	3.77	212	800.00	0	0.00	0	0.00	0	0.00	0	0.00	212	800.00
8	Construction of check dam across Mannar near Alasandapuram village in Vaniyambadi taluk .	Natramp alli	Ha	4.69	0	0.00	48	225.00	0	0.00	0	0.00	0	0.00	48	225.00
9	Construction of check dam across Agaram River near Karungali village in Ambur taluk .	Anaicut	Ha	6.59	0	0.00	82	540.00	0	0.00	0	0.00	0	0.00	82	540.00
10	Formation of new Reservoir across Kaanar near Kasam village in Katpadi taluk .	Katpadi	Ha	2.94	0	0.00	204	600.00	0	0.00	0	0.00	0	0.00	204	600.00
11	Construction of check dam across Ponnai river near Ponnai village to feed Keerasathu tank	Katpadi	Ha	2.78	0	0.00	108	300.00	0	0.00	0	0.00	0	0.00	108	300.00

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
12	Construction of Percolation Pond across odai near Melpallipattu village .	Madhanur	Ha	2.98	0	0.00	0	0.00	5	14.90	0	0.00	0	0.00	5	14.90
13	Construction of a Diaphragm wall across Palar near Ocheri village.	Vellore	Ha	10.77	0	0.00	0	0.00	24	258.46	0	0.00	0	0.00	24	258.46
14	Excavation of New Supply Channel from Gollamangalam tank to Agaramcheri tank .	Anaicut	Ha	5.37	0	0.00	0	0.00	67	360.00	0	0.00	0	0.00	67	360.00
15	Construction of a Diaphragm wall across Palar near Vasur village .	Walaja	Ha	3.00	0	0.00	0	0.00	80	240.00	0	0.00	0	0.00	80	240.00
16	Formation of Percolation pond near Santhumalai kaanar Melarasampattu .	Odugathur	Ha	4.81	0	0.00	0	0.00	1.25	6.01	0	0.00	0	0.00	1.25	6.01
17	Formation of Percolation pond near Pakkampalayam Ettikuttai kanar (Survey No.106 & 107).	Madhanur	Ha	4.81	0	0.00	0	0.00	1.25	6.01	0	0.00	0	0.00	1.25	6.01

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
18	Formation of Percolation Pond in Rayalakothur Kaanar near Vengadasamut hiram village in Vaniyambadi taluk .	Vaniyam badi	Ha	4.81	0	0.00	0	0.00	12.48	60.03	0	0.00	0	0.00	12.48	60.03
19	Formation of New Reservoir across Naganathi river near Amirthi vllage .	Kaniyam badi	Ha	14.22	0	0.00	0	0.00	225	3200.00	0	0.00	0	0.00	225	3200.00
20	Formation of Percolation pond in Mutkur Kaanar near Raangampettai village in Gudiyatham taluk .	Gudiyatham	Ha	4.81	0	0.00	0	0.00	2.25	10.82	0	0.00	0	0.00	2.25	10.82
21	Formation of Percolation pond in Kaanar near Ramanayakan pettai village in Gudiyatham taluk .	Gudiyatham	Ha	4.81	0	0.00	0	0.00	4.2	20.20	0	0.00	0	0.00	4.2	20.20
22	Construction of check dam across Kanar River Arumalpattu village of pudur nadu hills of Thirupathur Taluk .	Tirupathur	Ha	2.10	0	0.00	0	0.00	0	0.00	31	65.00	0	0.00	31	65.00

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
23	Construction of check dam across Kanar River Chinavattanur village of pudur nadu hills of Thirupathur Taluk	Tirupathur	Ha	2.40	0	0.00	0	0.00	0	0.00	25	60.00	0	0.00	25	60.00
24	Construction of checkdam across kanar near Pudur Village in Thirupattur taluk	Tirupathur	Ha	3.33	0	0.00	0	0.00	0	0.00	39	130.00	0	0.00	39	130.00
25	Construction of checkdam across kanar near Pungapattu Nadu in Thirupattur taluk .	Tirupathur	Ha	3.57	0	0.00	0	0.00	0	0.00	28	100.00	0	0.00	28	100.00
26	Construction of checkdam across kanar near Palla thruvaru in Thirupattur taluk .	Tirupathur	Ha	4.76	0	0.00	0	0.00	0	0.00	21	100.00	0	0.00	21	100.00
27	Construction of check dam across Kanar River Nesampadi village of pudur nadu hills of Thirupathur Taluk .	Tirupathur	Ha	1.52	0	0.00	0	0.00	0	0.00	33	50.00	0	0.00	33	50.00

SI. 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
28	Construction of Sub surface dyke across Palar near Ambalur village.	Natrampalli	Ha	5.26	0	0.00	0	0.00	0	0.00	0	0.00	114	600.00	114	600.00
	Grand total					3410.00		1665.00		4176.44		505.00		600.00		10356.44

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

4.13 Cooperation

In Tamil Nadu, Cooperatives play a prominent role in the day to day affairs of the common man. They help the farmer to improve agricultural production by providing crop loans and by supplying agricultural inputs such as fertilizers and insecticides. They also enable the farmer to store and market his produce. In most districts, cooperatives run the fair price shops which provide the rural and urban poor essential commodities at highly subsidized prices. The policy of the State Government is to ensure adequate availability of essential commodities of acceptable quality at an affordable price to the general public particularly the poor. Public Distribution System has been one of the most crucial elements in food policy and food security system in the country.

Cooperatives all over the world have become an effective and potential instrument of economic development. The Cooperative Movement in Tamil Nadu has witnessed over the decades substantial growth in diverse areas of economy. There is not a single major sphere of economic activity which has not been touched by Cooperatives. Cooperatives are also envisaged as an instrument for implementing many important policies like agricultural credit, urban credit, market intervention, price support for agricultural commodities through Cooperative Wholesale stores, Public Distribution system etc. The office infrastructure has to be improved. The intervention is proposed for creating of infrastructure facilities.

Project components

- Office Infrastructure such as compound wall, office renovation, common service centre in all blocks except Anaicut, Kandhili, Kaniyambadi, Kaveripakkam and Vellore.
- Creation of Assets such as godown renovation, godown construction, weighing balance, drying yard, pallets, shed etc.,

Budget

It is proposed to incur ₹. **3405.31** lakh over a period of five years (Table 4.28).

Implementing agency

Department of Cooperation will be implementing the project.

Table 4.28 Budget requirement for Cooperation

(₹. in Lakhs)

Sl. No.	Intervention	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	Infrastructure													
1	Construction of Compound wall	All blocks	84	871.91	15	134.00	15	91.00	7	30.00	6	32.55	127	1159.46
2	Construction of Godown	B1,B3,B4,B10, B12,B13,B14, B16,B17,B19,B20	1	6.00	18	614.90	0	0.00	0	0.00	0	0.00	19	620.90
3	Construction of room for Common Service Centre	All blocks except B2,B8,B9,B11,B19	82	210.45	6	13.25	9	29.00	6	17.50	2	4.00	105	274.20
4	Construction of Shed for Banana Market Hall	B18	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00
5	Constuaction of Drying Yard	B3,B6,B18	0	0.00	0	0.00	3	195.00	0	0.00	0	0.00	3	195.00
6	Constuaction of Electronic Weigh bridge	B3,B4,B12	0	0.00	3	64.00	0	0.00	0	0.00	0	0.00	3	64.00
7	Establishment of Processing unit	B5	0	0.00	2	90.00	0	0.00	0	0.00	0	0.00	2	90.00
8	Renovation of Godown	B1,B3,B4,B10 ,B12,B13,B14, B15,B16, B17,B19,B20	24	194.15	3	19.00	6	25.50	4	21.00	1	2.00	38	261.65
9	Renovation of Office Building	All blocks	47	290.35	8	48.30	13	93.50	13	72.00	7	35.95	88	540.10
10	Strengthening of Cooperation Centres (Furniture's, Solar panel, Modern counter, Xerox machine, Air Conditioner, CCTV	All Blocks	5	130.00	1	20.00	2	20.00	0	0.00	0	0.00	8	170.00

Sl. No.	Intervention	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
	Camera, Bore well, Generator, UPS Battery, Cash Counting Machine, Invertor, Jewel Weighing Machine, Packing Machine, Purchase of computer and peripherals, Hand Billing machine, LED Display for tender process, Purchase of Jewel Carat Meter, Smart Card Printing Machine, Burglary Alarm, Agricultural Equipments, Safety Locker, Purchase of Display racks, Defender Door, Purchase of Paddy drying machine, Automatic Printer machine, Conveyer, E-Tender process, Fork Lifter, Gunny Bag Stitching machine, Jewel tester, Pallets, Tarpaulin, Trolley and Printing Press machineries)													
	Grand total			1712.86		1023.45		454		140.5		74.5		3405.31

Alangayam – B1, Anaicut – B2, Arakonam – B3, Arcot – B4, Gudiyatham – B5, Jolarpet – B6, K.V.Kuppam – B7, Kandhili – B8, Kaniyambadi – B9, Katpadi – B10, Kaveripakkam – B11, Madhanur – B12, Natrampalli – B13, Nemili – B14, Pernambet – B15, Sholinghur – B16, Thimiri – B17, Thirupathur – B18, Vellore – B19, Walajah – 20

Table 4.29 Sector wise Budget Requirement for Vellore District**(₹. in Lakhs)**

Sl. No.	Components	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	3707.81	6571.69	4053.02	3699.28	5028.67	23060.47
2	Agricultural Research	50.00	200.00	0.00	0.00	0.00	250.00
3	Horticulture	3923.56	4126.21	4405.97	4729.71	4960.78	22146.23
4	Agricultural Engineering	3636.15	3575.75	3425.75	3395.75	3388.35	17421.75
5	Agricultural Marketing	475.00	182.85	186.20	158.40	137.70	1140.15
6	Seed Certification & Organic Certification	18.36	13.36	0.00	0.00	0.00	31.72
7	Animal Husbandry	33002.80	20937.99	21007.99	20447.99	20847.99	116244.76
8	Animal Science Research (TANUVAS)	0.00	0.00	0.00	0.00	0.00	0.00
9	Dariy Development	2566.00	5496.00	2641.00	2521.00	13651.00	26875.00
10	Fisheries	0.00	0.25	6.85	17.89	8.60	33.59
11	Fisheries Research (TNFU)	64.76	63.16	13.16	0.26	0.26	141.60
12	Public Works Department (WRO)	3410.00	1665.00	4176.44	505.00	600.00	10356.44
13	Civil Supplies & Co-Operation	1712.86	1023.45	454.00	140.50	74.50	3405.31
	Grand total	52567.30	43855.71	40370.38	35615.78	48697.85	221107.02

