NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP)

DISTRICT AGRICULTURE PLAN

MADURAI

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

NATIONAL AGRICULTURE DEVELOPMENT PROGRAMME (NADP / RKVY)

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2017

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EXECUTIVE SUMMARY

Madurai district is one of the oldest districts of Madras Presidency. Madurai was an important cultural and commercial centre even as early as 550 AD. It is situated on the banks of the river Vaigai and is known as the city of temples and festivals. The city is surrounded by small but prominent hills of Yanaimalai, Nagamalai and Pasumalai. Madurai district is located in between 9 32' 00" and 10 18' 00" N Latitude and 77 28' 00" and 78 27' 00" E Longitude Madurai is Tamil Nadu's culturally vast active city. It is the second largest city of Tamil Nadu after Chennai. A teeming city with hub of social activity in the state. Madurai District is situated in the South of Tamil Nadu state. It is bounded on the North by the districts Dindigul, Tiruchirappalli and on the East by Sivagangai and on the West by Theni and South by Virudhunagar. It has a rich cultural heritage passed on from the great Tamil era and it is more than 2500 years old.

Later the district was trifurcated to Madurai, Theni and Dindigul districts. The average annual rainfall of the district is 903.8 mm classified as sub-tropical climate region without any sharp variation. The total red soil comprises of 1, 37,200 ha, black soil occupies 76,100 ha and brown soil occupies 51,700 ha in Madurai district. Dug well is the major source of irrigation in Madurai district followed by canals. Agriculture sector provides the major source of income to the population of the district and the major crops in this district are paddy, cholam, cotton, groundnut and maize. In addition, the other allied sectors like dairy, sheep/goat, and inland fishing are the major sectors contributing to the district economy as well as act as a major sources of providing livelihood for improving the income and standard of living of the people.

Agriculture Department has proposed a budget for ₹. 41059.56 lakhs for increasing area under major crops of paddy, coconut, cholam and cotton at end of the project period and increase of productivity through various interventions by adopting improved varieties and technologies. It is proposed to create awareness on sustainable agriculture, organic farming and irrigation management.

Horticulture Department has proposed ₹. 17465.90 lakhs for the plan period to improve horticulture based farming. The targeted crops are vegetable crops and fruits crops. The major components are precision farming, hi-tech farming and micro irrigation. Agricultural Engineering department has proposed for a total budget of ₹. 5623.67 lakhs.

Department of Agri Business and Marketing has proposed a total of ₹.1568.90 lakhs for the establishment of market intelligence and training centre for value addition and exposure visits. The department of Seed Certification, Animal Husbandry, Dairy development and Fisheries requested ₹.37.42, ₹.9532.28, ₹.28448.25 and ₹.1391.60 lakhs respectively for improvement programmes.

Consolidated budget for Madurai District

(₹. In lakhs)

Sl. No	Sectors	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	5457.14	4632.87	8208.70	10201.63	12559.22	41059.56
2	Agricultural Research (TNAU)	388.00	305.61	171.61	136.50	0.00	1001.70
3	Horticulture	4049.53	3059.13	3181.90	3705.65	3469.68	17465.90
4	Agricultural Engineering	1128.12	1281.79	1114.61	1018.14	1081.02	5623.67
5	Agricultural Marketing	532.20	650.60	134.10	69.20	182.80	1568.90
6	Seed Certification & Organic Certification	16.86	1.80	15.16	1.80	1.80	37.42
7	Animal Husbandry	2266.64	2378.84	2318.74	1937.04	631.04	9532.28
8	Animal Science Research (TANVAS)	192.39	360.64	360.64	219.64	219.64	1352.95
9	Dairy Development	2197.45	14853.45	6465.45	2612.45	2319.45	28448.25
10	Fisheries	71.50	50.54	34.05	37.89	27.00	220.98
11	Fisheries Research (TNFU)	0.26	1190.56	50.26	150.26	0.26	1391.60
12	Public Works Department (WRO)	1191.00	4300.00	0.00	0.00	0.00	5491.00
13	Civil Supplies & Co-Operation	429.92	399.93	809.80	217.90	150.50	2008.05
	Total	**17921.01**	**33465.76**	**22865.02**	**20308.10**	**20642.41**	**115202.26**

The total budget requirement for the implementation of various interventions by different departments in Madurai district is **₹. 115202.26 Lakhs.**

By implementing the NADP, it is expected that agricultural production would increase considerably and lead to high per capita income growth of the farm households. Such growth would induce the private sectors to initiate the starting up of processing industries and other related industries in the district. The backward and forward linkages would ensure the overall growth of the district.

This Programme would also ensure that farmers gain access to modern technology by training and exposure visits, adequate marketing means and storage facilities in a single location. The plan was expected to increase not only productivity but also quality of the farm produce. With the implementation of the programme, farmers in the district would get a remunerative price for their produce, besides ensuring benefits to agro-based industries.

CHAPTER I

INTRODUCTION

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

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

Objectives of RKVY

a. To strengthen the farmers' efforts through creation of required pre and post-harvest agri-infrastructure that increases access to quality inputs, storage, market facilities etc. and enables farmers to make informed choices.

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

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

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

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

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

District and State Agriculture Plans

As per the recent guidelines issued by the Government of India under Remunerative Approaches for Agriculture and Allied sector Rejuvenation (RAFTAAR), the new

projects proposed and are to be implemented under NADP/RKVY must be in consonant with District Agricultural Plans (DAP), State Agriculture Plans (SAP) and State Agriculture Infrastructure Development Program (SAIDP) prepared by the individual States. Thus, such action-oriented plan documents will remain as a cornerstone of planning and implementation of the NADP/RKVY and other schemes.

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

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

well as the role assigned to the Panchayati Raj Institutions (PRIs) are appropriately incorporated in DAPs.

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

The Process

Revision and updating of SAPs could be a two-way process. Firstly, State Nodal Department (or Agriculture Department) could get DAPs revised in the first instance to ensure that priorities of the State are properly covered in the district plans. States should, at this stage of scrutiny, ensure that requirements of districts and priorities of the State are appropriately captured and aligned in DAPs. Alternately, State Nodal Agency could communicate to the districts in the first instance, the State's priorities that ought to be reflected in the respective district plans and the districts may incorporate these in their updated district plans. Preparation/revision of the DAPs need to be an elaborate, exhaustive and iterative process and care has to be taken by the State Nodal department and District Agriculture Department in ensuring that these plans cover the entire gamut of agriculture and allied sectors.

Revision and Updation of DAP and SAP in Tamil Nadu

Tamil Nadu State continued to receive Central Assistance under NADP/RKVY. The Government of Tamil Nadu also prepared District and State Agriculture Plans covering 11th and 12th Plan periods. Tamil Nadu State has 32 districts including Chennai. The District Agriculture Plan were prepared for 31 districts excluding Chennai during 12th plan period. Thus, the current exercise is the continuation of the 12th plan period: which also covered two years of the 14th Finance Commission period (2015-16 and 2016-17) and also keeping in view of the changing scenario in the development and emerging needs of the State and to be eligible for fresh grants from Government of India. These plans were further revised and updated appropriately for implementing RKVY during the periods from 2017-18 to 2021-22.

Methodology followed

The revision of the District Agricultural Plan of Madurai district, was done by gathering the secondary data about district and block with respect to rainfall, land use pattern,

demography, livestock, machinery, infrastructure so far created etc. In addition, the constraints in production and marketing of agricultural and livestock produce, crop/animal production and gaps between expected and actual yield and the reasons for such gaps were also discussed among the various stakeholders and incorporated in this plan document. Besides, in consultation with the line department officials and based on the data received from respective districts, a detailed year-wise action plan i.e. from 2017-18 to 2021-22 with physical and financial implications were presented.

CHAPTER II

PROFILE OF THE BLOCK AND DISTRICT

2.1 District at a Glance

Madurai district is one of the oldest districts of Madras Presidency. It has a rich cultural heritage passed on from the great Tamil era and more than 2500 years old. Madurai was an important cultural and commercial centre even as early as 550 AD. It is situated on the banks of the river Vaigai and is known as the city of temples and festivals. The city is surrounded by small but prominent hills of Yanaimalai, Nagamalai and Pasumalai. Now the district was trifurcated to Madurai, Theni and Dindigul districts. Madurai is culturally vast active city. It is the second largest city of Tamil Nadu after Chennai. A teeming city with hub of social activity in the state. Madurai District is situated in the South of Tamil Nadu state. It is bounded on the North by the districts Dindigul and Tiruchirapalli and on the East by Sivagangai and on the West by Theni and South by Virudhunagar.

2.1.1 Revenue Administrative Particulars

Revenue administrative particulars are presented in Table.2.1.

Table 2.1 Revenue Administrative Particulars

Revenue Administrative Divisions	
Revenue Divisions	2
Revenue Taluks	7
Revenue Firkas	51
Revenue Villages	669
Local Bodies	
i. Corporation	1
ii. Municipalities	3
iii. Town Panchayats	15
iv. Village Panchayats	431
Community Development	
No of Development divisions	2
No of Blocks Covered	13
Population Covered (In Lakhs)	12,03,841
Area covered (in Sq. km)	3,64,433

Source: *www.tn.gov.in*

2.2 Area, Location and Geographical features

Madurai district is located in between 9 32’ 00” and 10 18’ 00” N Latitude and 77 28’ 00” and 78 27’ 00” E Longitude. The details of taluks, blocks and agricultural divisions (9) of Madurai district are furnished in Table 2.2.

Table 2.2 Taluks, Blocks and Agricultural Divisions in the Madurai District

Name of the Taluks (7)	Name of the Blocks (13)
Madurai-North	Madurai-East
Madurai-South	Madurai-West
Melur	Thiruparankundram
Vadipatti	Melur
Usilampatti	Kottampatti
Peraiyur	Vadipatti
Thirumanagalam	Alanganallur
	Usilampatti
	Chellampatti
	Sedapatti
	T. Kallupatti
	Thirumangalam
	Kalligudi

Source: *Census of India 2011, District census Handbook Madurai.*

2.3 Administrative Structure of Madurai District

Madurai district comprises of seven taluks namely Madurai-North, Madurai-South, Melur, Vadipatti, Usilampatti, Peraiyur and Thirumanagalam (Fig 1). It comprises of 13 blocks namely Madurai-East, Madurai-West, Thiruparankundram, Melur, Kottampatti, Vadipatti, Alanganallur, Usilampatti, Chellampatti, Sedapatti, T. Kallupatti, Thirumangalam and Kalligudi (Fig 2). There are 669 revenue villages, 431 village Panchayats, 15 town Panchayats, 3 municipalities and 1 corporation in this district. It has two revenue divisions namely Madurai and Usilampatti.

Fig. 1 Map Showing the Taluks Location of Madurai District

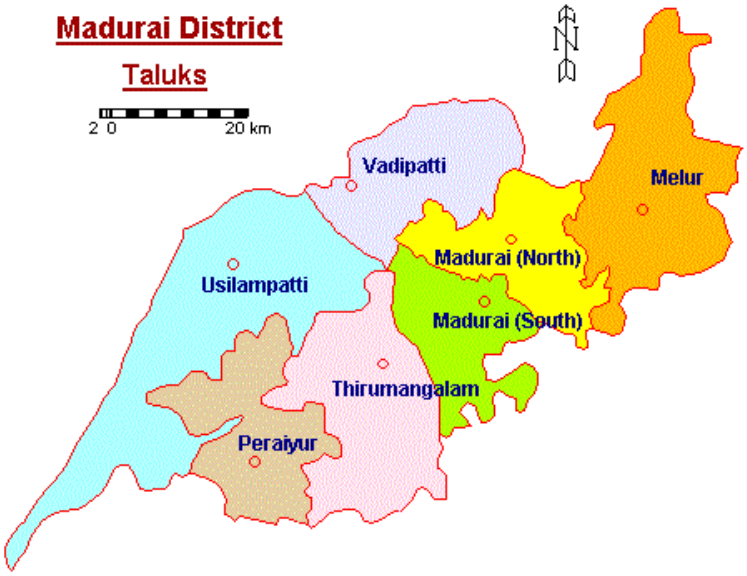
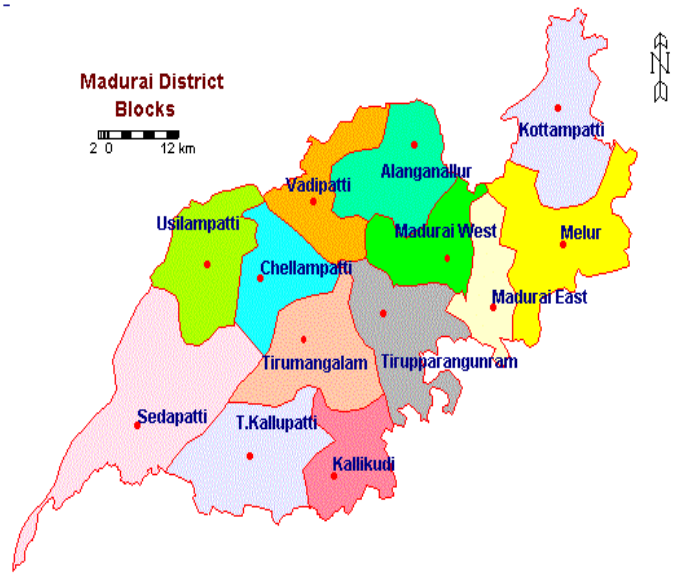


Fig. 2 Map Showing the Blocks available in Madurai District



2.4 Demographic Profile

2.4.1 Population

The population particulars of the district are presented in table2.3 and 2.4.Total population of Madurai is 30, 38,252 as per latest provisional figures released by Directorate of Census Operations in Tamil Nadu. The initial figures of data show that male and female were 15, 26,475 and 15, 12,730 respectively. Madurai District of Tamil Nadu comprises an area of 3,710 sq.km. As per census 2011, density of Madurai District per square km is 819 as compared to 698 per sq.km of 2001. Sex ratio of girls in Madurai district per 1000 boys was 990 which is an increase of 12 points from the figure of 2001 census which puts it at 978.In 2011 census, data of Madurai district regarding child under 0-6 age were also collected. There were 3,13, 978 children under age of 0-6 against 295,276 of 2001 census. Of total 3, 13, 978, male and female were 1, 62,517 and 1,51,461 respectively.

Table 2.3 Population details of the Madurai District

Description	Number	Percentage (%)
Total population	3038252	100.00
Male	1526475	50.24
Female	1512730	49.76
Rural population	1191451	39.22
Male	601247	50.46
Female	590204	49.54
Urban population	1846801	60.78
Male	925228	50.10
Female	921573	49.90
Density per sq. km.	819	-

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

Table 2.4 Block wise - Area, Population, Sex wise particulars, rural and urban population (2011)

Details		B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
Area in sq. km.		213.09	123.39	216.76	340.27	290.77	205.54	153.09	242.96	210.08	714.14	300.02	245.17	256.82
Total population	**Persons**	220132	159455	210056	128717	114339	73498	88785	73405	87132	96182	105038	67426	73413
	Male	111338	79768	105944	64787	57342	36977	44649	37664	44634	48574	53186	33,289	36747
	Female	108794	79687	104112	63930	56997	36521	44136	35741	42498	47608	51852	34,137	36666
	Rural	109564	76544	97390	128717	114339	73498	88785	73405	87132	96182	105038	67426	73413
	Urban	110568	82911	112666	0	0	0	0	0	0	0	0	0	0
Female per Males		963	976	976	987	1032	992	983	972	1021	952	904	971	1002
Density per sq. km.		709	1184	941	387	299	577	345	416	266	366	387	187	319

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

B1-Madurai East, B2-Madurai West, B3-TPKundram, B4-Melur, B5-Kottampatti, B6-Vadipatti, B7-Alanganallur, B8-Usilampatti, B9-Chellampatti, B10-Sedapatti, B11-Thirumangalam, B12-T.Kallupatti, B13-Kallikudi.

2.4.2 Literacy level

In all, there were total 1029532 literates as per 2011 census. The literacy rate of the district is 83.50 per cent. Among the blocks, Madurai East recorded higher literacy population of 160649.

Table 2.5 Literacy Level in Madurai District (Block level)

Sl. No.	Name of the Block	Persons	Male	Female
1	Madurai East	160649	87227	73422
2	Madurai West	124938	65803	59135
3	T.P.Kundram	149471	81825	67646
4	Melur	87633	49015	38618
5	Kottampatti	72971	42071	30900
6	Vadipatti	49904	27601	22303
7	Alanganallur	60551	33543	27008
8	Thirumangalam	72152	40790	31362
9	Kallikudi	47598	27185	20413
10	Usilampatti	46369	26955	19414
11	Chellampatti	55365	32607	22758
12	Sedapatti	58275	33985	24290
13	T. Kallupatti	43656	24777	18879
	Total	**1029532**	**573384**	**456148**

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

Table 2.6 Literacy Level in Madurai District

Description	No. of persons	Literacy rate %
Total	1029532	83.50
Male	573384	53.83
Female	456148	46.17

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

2.4.3 Households

Of the total population, Madurai East block was having more number of households (55337 Nos.). Next to this, Thiruparankundram block holds 54655 households. Number of scheduled caste was high in Madurai East and low in Usilampatti block. Scheduled tribes mostly spread over in Thiruparankundram which was followed by Alanganallur block.

2.4.4 Working population

The working population details are presented in Table 2.8. The total workers population in 13 blocks was about 13,54,632 numbers. The workers from other sectors constitute about 62.14 per cent and were followed by agricultural labourers with 27.52 per cent. The share of cultivators in the total number of workers in Madurai district constituted 6.84 per cent of the total working population. The lowest population group (3.49 per cent) was under the household industries.

Table 2.7 Distribution of Households (Block wise)

Sl. No.	House Hold Particulars	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	Total
i.	Number of households (Total)	55337	40035	54655	33713	29285	19197	23016	19681	24355	25907	28390	19134	20225	**392930**
ii.	Number of Scheduled Caste households	10069	7455	7812	6149	4304	5118	5007	3075	4027	7615	5726	4738	3551	**103274**
iii.	Number of Scheduled Tribe households	38	91	418	54	2	298	362	40	7	33	0	1	15	**2659**

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

B1-Madurai East, B2-Madurai West, B3-TPKundram, B4-Melur, B5-Kottampatti, B6-Vadipatti, B7-Alanganallur,B8-Usilampatti, B9-Chellampatti,B10-Sedapatti,B11-Thirumangalam, B12-T.Kallupatti, B13-Kallikudi.

Table 2.8 Workers Details in Madurai District

Description	Number	Percentage
Total workers	1354632	100.00
a) Total main workers	1173902	86.66
b) Marginal workers	180730	13.34
i. Cultivators	92719	6.84
ii. Agricultural labourers	372828	27.52
iii. Household industries	47.293	3.49
iv. Other workers	841792	62.14

Source: *Tamil Nadu - An Economic Appraisal 2011-12 to 2014-15 Report, Govt. of Tamil Nadu, Chennai – 108.*

2.5 Topography

Madurai which is located in southern zone is in the altitude of 100-600m with annual PET (Potential Evapotranspiration) of 1825 mm. Madurai district is a medium rainfall region with some parts located in low rainfall regions.

The average annual rainfall of the district is 903.80 mm classified as sub-tropical climate region without any sharp variation. There are four rainy seasons of South-West monsoon, North-East monsoon, winter and summer. Vaigai is a major river in the district which originates in the Western Ghats and joins Bay of Bengal in Ramanathapuram district.

2.6 Soil type

The total red soil comprises of 1,37,200 ha, black soil 76,100 ha and brown soil 51,700 ha in Madurai district. The name of the soil area and percentage under the particular soil is given in table 2.9. Block wise soil particulars are given in table 2.10. The soil legend and soil map of this district are given in Fig 3.

Table 2.9 Soil Types of Madurai District

Sl.No.	Major Soil	Area (ha)	Percent of total
1	Red alluvial soil	137200	51.77
2	Black soil	76100	28.72
3	Brown soil	51700	19.51
	Total Area	265000	100.00

Source: *JDA Office, Madurai*

Table 2.10 Block wise Soil Types

Sl. No.	Block	pH	EC	Texture	Nutrient Status (kg/ac)		
					N	P	K
1	Madurai East	7.2	0.1	SCL	Medium	Low	Low
2	Madurai West	7.2	0.1	SCL	Low	High	High
3	Thirupparankundram	7.2	0.1	SCL	Low	High	High
4	Melur	7.4	0.1	SCL	Low	High	High
5	Kottampatti	7.5	0.2	SCL	Low	Medium	High
6	Vadipatti	7.5	0.1	SCL	Low	High	High
7	Alanganallur	7.5	0.2	SCL	Low	High	High
8	Thirumangalam	7.5	0.2	SCL	Low	High	High
9	Kallikudi	7.8	0.1	SCL	Low	Medium	High
10	T.Kallupatti	7.6	0.6	SCL	Low	High	High
11	Usilampatti	7.3	0.1	SCL	Low	High	High
12	Chellampatti	7.5	0.1	SCL	Low	High	High
13	Sedapatti	7.9	0.4	SCL	Medium	Medium	High

Source: *JDA Office, Madurai*

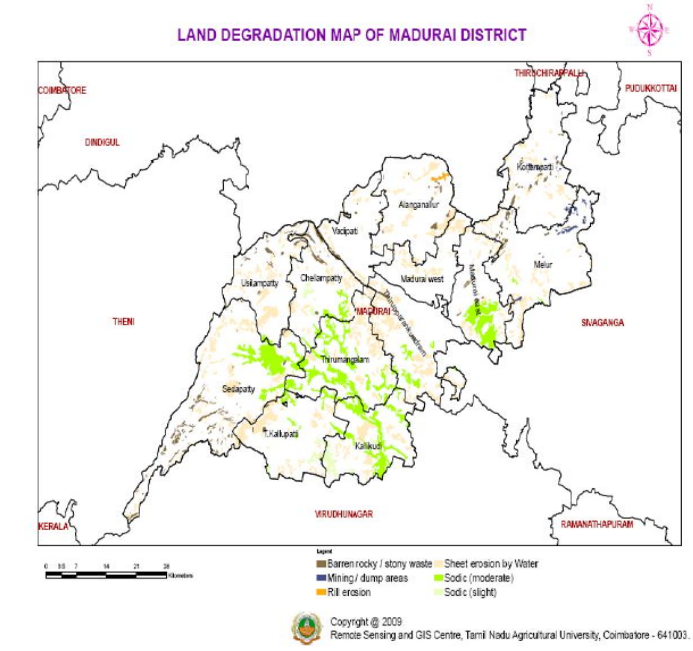
Table 2.11 Area under Problem Soils in Madurai District

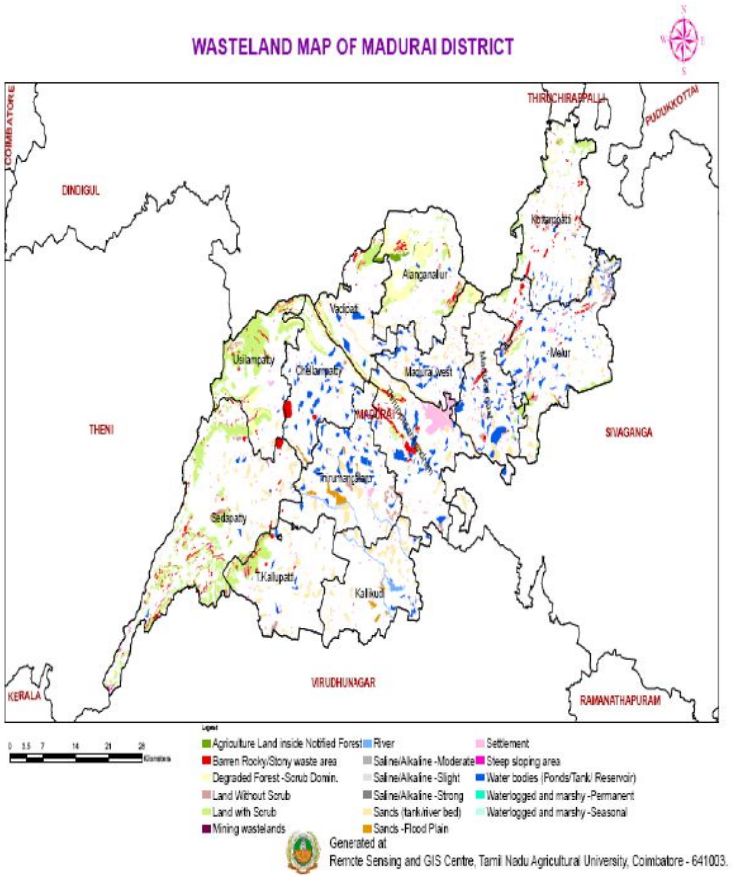
Problem soil	Area (ha)
Saline soil	Nil
Calcareous soil	1,06,038
Mild alkaline (pH 7.4-7.80)	96,550
Moderately alkaline (pH 7.9-8.4)	29,221

Source: *Soil Atlas Madurai District*

The details of problem soils of the district are furnished in table 2.11. The major problem soil is calcareous soil which covers an area of 1,06,038 ha out of 3,74,173ha of total geographical area. Proper management practices should be followed to overcome this problem and to increase the productivity of crops

Fig. 3 Soil map of Madurai district





Madurai district soil legend

Legend

2.7 Climatic Condition and Rainfall

The agricultural production and productivity of crops mainly depend on frequency and distribution of South-West and North-East monsoons. The average normal rainfall of 876.20 mm is received in the district. About 36.20 per cent of the total average rainfall is received during North-East monsoon, while 45.17 per cent is received during South-West monsoon during 2014-15. The balance of 18.63 per cent is obtained during summer and winter months.

Table 2.12 Month wise / season wise rainfall distribution (mm)

	Season / Month	2012-2013		2014-15	
		Normal	Actual	Normal	Actual
	South West Monsoon				
	June	48.7	5.9	32.5	48.7
	July	66.6	28.2	16	66.6
	August	87.3	61.6	105	87.3
	September	133.3	91.8	73.7	133.3
Total		**335.9**	**187.5**	**227.2**	**335.9**
	North East Monsoon				
	October	20.6.2	182.3	213.3	206.2
	November	151.3	35.5	85	151.3
	December	61.6	3.4	25.2	61.6
Total		**212.9**	**221.2**	**323.5**	**419.1**
	Winter Season				
	January	13.6	1.2	11.9	13.6
	February	14.5	42.4	0	14.5
Total		**28.1**	**43.6**	**11.9**	**28.1**
	Hot Weather				
	March	20.6	52.9	17.9	20.6
	April	57.8	21.4	158.7	57.8
	May	66.4	38.7	137	66.4
Total		**144.8**	**113**	**313.6**	**144.8**
	Annual rainfall	**927.9**	**565.3**	**876.2**	**927.9**

Source: *Season and Crop report 2014-2015*

Fig. 4 Average Rainfall data (2014-15)

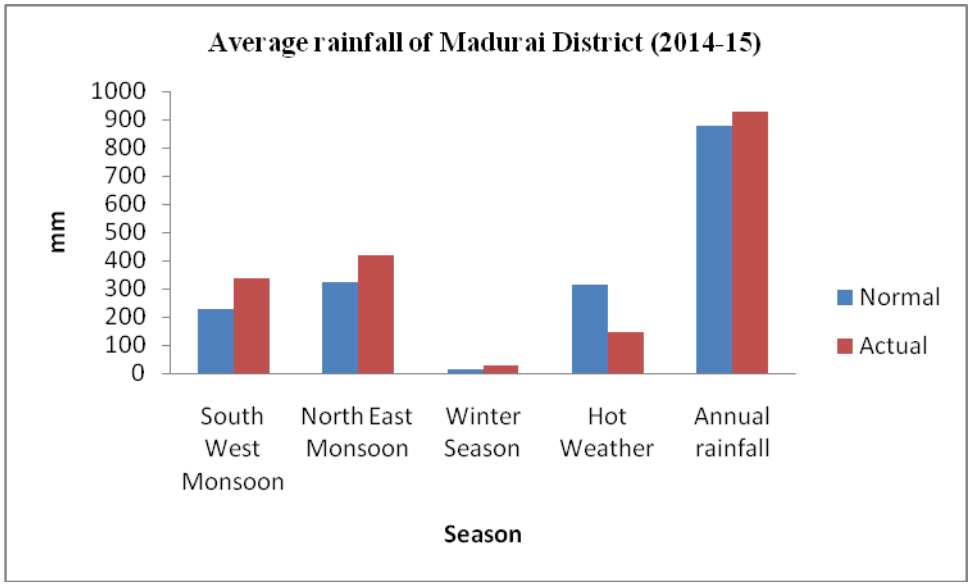


Table 2.13 Temperature and Humidity at Madurai District (2014-2015)

Months		Temperature (°C)				Humidity (in %)	
		Mean Maximum		Mean Maximum		8.30 hrs. (IST)	17.30 hrs.(IST)
		Normal	Actual	Normal	Actual		
2014	June	36.8	37.6	26.1	26.0	61	45
	July	36.0	36.7	25.6	25.6	61	49
	August	35.7	36.0	25.3	25.2	64	52
	September	34.8	36.1	24.3	25.0	62	52
	October	32.7	33.7	23.6	24.0	76	66
	November	30.6	30.4	22.6	22.5	78	69
	December	29.7	30.3	21.1	21.5	77	64
2015	January	30.6	30.9	20.1	20.3	75	50
	February	33.2	33.1	21.1	21.5	69	42
	March	35.8	36.7	23.0	24.5	68	37
	April	37.3	37.8	25.4	25.7	71	49
	May	37.7	38.6	26.1	26.4	64	52

Source: *India Meteorological Department, Chennai-6*

2.8 Land

2.8.2 Land use pattern

The land use pattern of the district is given in Table 2.14. The district has only 12.95% under forest as against the ecological norms of 33%. Being an urbanized district with a strong industrial and educational infrastructure area under non-agricultural use is 20.18%. Another area of concern is the area under current fallows with 1.69% and other fallow land is 23.75%. Net area sown formed 33.27% and hence aim should be to increase the land use intensity.

Table 2.14 Land Use Pattern (2014-15)

Sl.No	Particulars	Area(ha)	%
1	Geographical Area	374173	100
2	Forest	48473	12.95
3	Barren & Unculturable Area	13031	3.49
4	Land Put to Non-agricultural Uses	75537	20.18
5	Permanent Pastures & Other grazing lands	233	0.06
6	Misc.tree crops & groves not incl. in the net area sown	2737	0.73
7	Current Fallow	6354	1.69
8	Other Fallow	88866	23.75
9	Net area sown	124496	33.27
10	Area sown more than once	5804	1.55
11	Gross area sown	130300	34.83
	Total	**870004**	

2.8.3 Land Holding Pattern

The distribution of land size holdings is shown in Table 2.15, which indicated the fact that 1,91,795 farmers were holding less than 0.5 hectare and number of farmers gradually decreased with the operational holdings from 0.5 to 2.0 hectares and thereafter drastically reduced to very small number of farmers holding large area like 10 to 20 hectares. This fact showed the difficulty of the farm mechanization in very small fragmented holdings but can be made possible if the farmers follow contract or cooperative farming to reap the gains through farm mechanization.

The maximum operational holding in the district was in the size class upto 0.50 ha area which holds about 191795 No’s with an area coverage of 42277 ha. The least size of

land holding was between 20 ha and above which covers only 1557 ha from the total geographical area of the district. Also the block wise size of holding was given in Table 2.16.

Table 2.15 Average Size of Holding

Sl. No.	Size	Number				Area (ha)			
		SC	Others	Inst	Total	SC	Others	Inst	Total
1	**Below 0.5**	11675	179570	550	191795	2347	39810	119	42277
2	**0.5-1.0**	3090	52829	288	56207	2129	36086	205	38420
3	**1.0-2.0**	1425	30333	264	32022	1950	40743	378	43071
4	**2.0-3.0**	495	7632	96	8223	1218	18176	232	19626
5	**3.0-4.0**	70	2689	49	2808	238	9185	171	9593
6	**4.0-5.0**	37	1090	30	1157	163	4814	135	5112
7	**5.0-7.5**	22	816	50	888	136	4849	314	5299
8	**7.5-10.0**	4	227	18	249	34	1940	156	2130
9	**10.0-20.0**	2	154	29	185	28	2028	393	2449
10	**20 Ha and above**	-	23	21	44	-	729	828	1557
	Total	16820	275363	1395	293578	8243	158360	2931	169534

Source: *O/o Joint Director of Agriculture, Madurai*

Table 2.16 Block wise land holding pattern

Sl. No.	Size class (ha)	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13
1	Below 0.5	1894.74	1870.81	2216.05	4900.38	5462.58	2159.6	2707.6	5531.60	3863.52	4399.20	4601.69	3269.00	3359.35
2	0.5 – 1.0	2056.12	1634.03	1735.83	3889.04	3730.08	2347	2953.23	2827.50	4267.17	4525.30	4652.03	3770.00	3075.67
3	1.0 – 2.0	2093.87	1573.55	1626.54	3492.93	3476.22	2625.4	3547.69	5926.30	4162.24	5889.70	6008.315	4446.00	3101.93
4	2.0 – 3.0	904.23	638.52	676.39	1622.93	1549.86	1244.4	1341.36	2106.70	1566.52	3598.30	3318.355	2361.00	1146.71
5	3.0 – 4.0	609.77	320.2	353.51	804.14	747.59	776.06	564.46	943.61	658.15	1532.80	1380.725	1219.00	568.03
6	4.0 – 5.0	277.15	165.83	217.82	537.25	487.18	331.57	397.12	46143	254.88	729.40	871.245	661.00	314.21
7	5.0 -7.5	244.88	268.76	286.83	489.15	493.33	463.03	341.2	564.88	273.52	655.00	804.12	674.00	302.48
8	10.0 – 20.0	69.92	94.82	167.09	242.82	302.81	98.00	228.42	220.39	195.00	326.35	359.64	265.00	149.84
9	Above 20.0	156.53	60.82	225.5	211.46	219.38	100.72	58.42	188.53	0.00	300.2	126.295	81.00	0.00

Source: *O/o Joint Director of Agriculture, Madurai*

B1-Madurai East, B2-Madurai West, B3-Tirupparankundram, B4–Melur, B5–Kottampatty,B6-Vadipatti, B7–Alanganallur, B8–Usilampatti, B9–Chellampatti, B10–Sedapatti, B11–Thirumangalam, B12-T.Kallupatti, B13–Kallikudi.

2.9 Sources of Irrigation

Water is an important determinant factor of production of crops in agriculture sector. Intensive and extensive cultivation of land depend mainly on the availability of water. Medium and minor irrigation schemes are implemented in the state for augmenting the irrigation for agriculture. The various sources of irrigation are canals, tanks, tube wells and dug wells. The Public Works Department and Panchayat union tanks, ponds and supply channels play an important role in the irrigation of Madurai district. The sources of irrigation and area under irrigation are given in Table 2.17 and 2.18.

Table 2.17 Irrigation by Different Sources

Sl. No.	Particularls		Numbers	Area (in ha)
1	Canals	Gross	80	18998
		Net		17828
2	Tanks	Gross	2289	18500
		Net		17837
3	Tube wells / Bore wells	Gross		697
		Net		662
4	Open wells	Gross		42469
		Net		38949
5	Supplementary wells	Gross		797
		Net		797
6	Other Sources	Gross		0
		Net		0

Table 2.18 Sources of Irrigation

(in hectare)

Sl. No.	Particulars		2012-13	2013-14	2014-15	Average
1	Canals	Gross	5804	17114	18998	13972.00
		Net	5502	16155	17828	13161.67
2	Tanks	Gross	7163	12895	18500	12852.67
		Net	7157	12656	17837	12550.00
3	Tube wells / Bore wells	Gross	444	294	697	478.33
		Net	444	294	662	466.67
4	Open wells	Gross	32526	34648	42469	36547.67
		Net	32121	33476	38949	34848.67
5	Supplementary wells	Gross	780	796	797	791.00
		Net	780	796	797	791.00
6	Other Sources	Gross	0	0	0	0.00
		Net	0	0	0	0.00

Source: *Season and Crop Report, 2014-15*

From the table 2.18, it is inferred that most of the agricultural activities are done with the source of water from open wells with 34848.67 ha followed by canals (13161.67 ha) and tanks (12550 ha). Thus the open wells form the major source of irrigation water in the district.

Table 2.19 Irrigation Sources - (Block wise for each source)

Sl. No.	Sources / Block	No.	Gross Area Irrigated (ha.)	Net area irrigated (ha.)	Irrigation Intensity (%)
1	**CANALS**				
	Madurai East	4	3915	2148	182
	Madurai West	6	5580	3526	159
	Thirupparankundram	4100	348	348	0
	Melur	6	1835	1775	103
	Kottampatti	4	2320	2320	100
	Vadipatti	13	5762	3622	159.08
	Alanganallur	19	3048	3007	100
	Thirumangalam	2	0	0	0
	Kallikudi	--	--	--	--
	T.Kallupatti	--	--	--	--
	Usilampatti	--	--	--	--
	Chellampatti	3	2363	2233	106
	Sedapatti	--	--	--	--
	Total	**4157**	**25171**	**18979**	
2	**TANKS**				
	Madurai East	137	5398	5182	104.00
	Madurai West	110	2467	1521	162.00
	Thirupparankundram	114	4214	3020	139.50
	Melur	528	8649	8649	100.00
	Kottampatti	898	1181	1181	100.00
	Vadipatti	86	1485	1236	120.15

Sl. No.	Sources / Block	No.	Gross Area Irrigated (ha.)	Net area irrigated (ha.)	Irrigation Intensity (%)
	Alanganallur	35	1167	1167	100.00
	Thirumangalam	84	937	924	101.40
	Kallikudi	73	2718	2629	103.00
	T.Kallupatti	58	1545	1545	100.00
	Usilampatti	31	506	506	100.00
	Chellampatti	61	3216	3115	103.00
	Sedapatti	38	1840	1840	0
	Total	**2253**	**35323**	**32515**	
3	**WELLS**				
	Madurai East	758	109	64	170.00
	Madurai West	10685	2186	1308	160.00
	Thirupparankundram	12842	37116	33749	139.50
	Melur	4810	1798	1366	131.00
	Kottampatti	2253	251	243	103.00
	Vadipatti	3672	3673	3182	115.43
	Alanganallur	3972	4387	3517	101.00
	Thirumangalam	4978	2734	2701	101.20
	Kallikudi	2335	1606	1346	119.00
	T.Kallupatti	--	--	--	--
	Usilampatti	4323	3524	3588	100.00
	Chellampatti	6252	4095	3152	129.00
	Sedapatti	5070	8720	8618	102.00
	Total	**61950**	**70199**	**62834**	

Sl. No.	Sources / Block	No.	Gross Area Irrigated (ha.)	Net area irrigated (ha.)	Irrigation Intensity (%)
4	**TUBE WELLS**				
	Madurai East	3	2	1	200
	Madurai West	--	--	--	--
	Thirupparankundram	--	--	--	--
	Melur	5	113	113	100
	Kottampatti	--	--	--	--
	Vadipatti	--	--	--	--
	Alanganallur	--	--	--	--
	Thirumangalam	32	75	75	100
	Kallikudi	20	23	20	115
	T.Kallupatti	--	--	--	--
	Usilampatti	124	191	213	100
	Chellampatti	597	278	268	104
	Sedapatti	23	24	24	100
	Total	**804**	**706**	**714**	

Source: *O/o Joint Director of Agriculture, Madurai*

The block wise details under different sources of irrigation are furnished in table 2.19. With regard to canals, the irrigation intensity was higher in Madurai East (182 %) which is followed by Vadipatti block (159.08 %) and Madurai West (159.00 %). Madurai West has the highest tank irrigation intensity of 162 % with 110 tanks after which Thirupparankundram (139.50 %) has ranked second irrigation intensity as compared to other blocks. In case of dug wells, Madurai East has 170 % of irrigation intensity and is followed by Madurai West (160 %). Madurai East is having better utilization of ground water potential with tube well irrigation intensity (200 %). From this it can be inferred that the overall irrigation intensity is higher in Madurai East which means better utilization of ground water potential.

The water supply from different dams is given in the Table 2.20. Among the four dams in this district, the water spread area and capacity is more with Periyar and Vaigai dams. The catchment area for Periyar dam is 26.44 ha which is having a capacity of 317.38 cubic meters with a canal length of 596.96 km.

Table 2.20 Details of Dams in Madurai District

Sl. No.	Name	Water spread area (ha)	Height (m)	Capacity (cu. m)	Length of canals (km)
1.	Periyar Dam	26.44	41.46	317.38	596.96
2.	Vaigai Dam	24.20	21.64	172.60	19.00
3.	Peria Aruvi Dam	16.00	12.46	24.00	18.00
4.	Sathiyar Dam	9.24	8.84	0.63	20.00

Source: *Assistant Engineer, P.W.D., Madurai & Melur.*

2.10 Cropping pattern

Details of area under different crops for the district and block wise are shown in tables from 2.21 to 2.27 respectively.

Table 2.21. Area, Production and Productivity under major Cereals crops (2014-15 and Triennium ending 2014-15)

		Area (Ha)					Production (in tonnes)					Productivity (in kg / ha)				
Sl. No	**Particular**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**
1	Paddy	18024	35268	47717	101009	33669.67	65000	163965	197498	426463	142154.33	3606	4649	4139	12394	4131.33
2	Maize	7033	8028	8181	23242	7747.33	14740	35765	52247	102752	34250.67	2096	4455	6386	12937	4312.33
3	Cholam	6305	10490	15523	32318	10772.67	6707	20040	39497	66244	22081.33	1064	1910	2544	5518	1839.33
4	Cumbu	1688	2309	2229	6226	2075.33	3513	4311	5640	13464	4488.00	2081	1867	2530	6478	2159.33
5	Ragi	1	60	13	74	24.67	23	183	43	249	83.00	1912	3064	3279	8255	2751.67
6	Total Cereals	34913	58509	76836	170258	56752.67	91079	225661	296882	613622	204540.67				0	0.00
	Total	**67964**	**114664**	**150499**	**333127**	**111042.3**	**181062**	**449925**	**591807**	**1222794**	**407598.00**	**10759**	**15945**	**18878**	**45582**	**15194.00**

Source: *Season and Crop Report 2014-2015*

Table 2.22. Area, Production and Productivity under major Vegetable crops (2014-15 and Triennium ending 2014-15)

		Area (Ha)					Production (in tonnes)					Productivity (in kg / ha)				
Sl. No	**Particulars**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**	**2012-13**	**2013-2014**	**2014-2015**	**Total**	**Average**
1	Onion	341	492	537	1370	456.67	1594	4348	4607	10549	3516.33	4676	8837	8578	22091	7363.67
2	Brinjal	334	285	271	890	296.67	3144	2145	2060	7349	2449.67	9413	7525	7600	24538	8179.33
3	Bhendi	417	299	279	995	331.67	4043	3188	1793	9024	3008.00	9695	10663	6426	26784	8928.00
4	Cabbage	0	1	0	1	0.33	0	47	0	47	15.67	0	47065	0	47065	15688.33
5	Tomato	401	260	233	894	298.00	5705	3208	3372	12285	4095.00	14228	12338	14470	41036	13678.67
6	Other Vegetables	2259	2178	2168	6605	2201.67				0	0.00				0	0.00
	Total	**3752**	**3515**	**3488**	**10755**	**3585.00**	**14486**	**12936**	**11832**	**39254**	**13084.67**	**38012**	**86428**	**37074**	**161514**	**53838.00**

Table 2.23 Existing Crop Area in Madurai district – Block wise particulars (2014-15) (in ha)

Sl. No.	Blocks	Paddy	Cholam	Cumbu	Kuthi	Maize	Black gram	Green Gram	Redgram	Cowpea	Groundnut
1	B1	7938	2	0	0	1	3	0	2	0	0
	(%)	90.61	0.02	0.00	0.00	0.01	0.03	0.00	0.02	0.00	0.00
2	B2	6736	0	0	0	2	0	1	8	0	0
	%	84.54	0.00	0.00	0.00	0.03	0.00	0.01	0.10	0.00	0.00
3	B3	3129	224	20	3	1	9	73	34	1	227
	%	46.83	3.35	0.30	0.04	0.01	0.13	1.09	0.51	0.01	3.40
4	B4	11458	9	3	0	1	60	0	6	28	31
	%	75.52	0.06	0.02	0.00	0.01	0.40	0.00	0.04	0.18	0.20
5	B5	5780	4	1	0	0	21	9	8	77	859
	%	44.53	0.03	0.01	0.00	0.00	0.16	0.07	0.06	0.59	6.62
6	B6	4826	67	38	0	104	8	0	73	14	0
	%	53.47	0.74	0.42	0.00	1.15	0.09	0.00	0.81	0.16	0.00
7	B7	4296	448	127	0	61	34	2	29	78	181
	%	35.93	3.75	1.06	0.00	0.51	0.28	0.02	0.24	0.65	1.51
8	B8	2356	910	147	179	1126	119	361	119	83	319
	%	26.80	10.35	1.67	2.04	12.81	1.35	4.11	1.35	0.94	3.63
9	B9	2116	1732	39	123	135	199	784	397	51	250
	%	24.73	20.24	0.46	1.44	1.58	2.33	9.16	4.64	0.60	2.92
10	B10	1787	2107	204	450	1699	582	521	202	21	230
	%	12.70	14.97	1.45	3.20	12.07	4.13	3.70	1.44	0.15	1.63
11	B11	2471	1744	650	241	84	5	399	198	339	236
	%	28.52	20.13	7.50	2.78	0.97	0.06	4.61	2.29	3.91	2.72
12	B12	9445	810	361	282	34	4	288	138	276	115
	%	68.83	5.90	2.63	2.06	0.25	0.03	2.10	1.01	2.01	0.84
13	B13	3765	1634	2483	731	2445	0	170	265	533	924
	%	22.182	9.627	14.629	4.307	14.405	0.000	1.002	1.561	3.140	5.444
	Total	**66103**	**9691**	**4073**	**2009**	**5693**	**1044**	**2608**	**1479**	**1501**	**3372**
	%	**46.12**	**6.76**	**2.84**	**1.40**	**3.97**	**0.73**	**1.82**	**1.03**	**1.05**	**2.35**

B1-Madurai East, B2-Madurai West,B3-TPkundram, B4-Melur, B5-Kottampatti, B6-Vadipatti, B7-Alanganallur, B8-Thirumangalam, B9-Kallikudi, B10-T.Kallupatti, B11-Usilampatti, B12-Chellampatti, B13-Sedapatti

(Table 2.23 Contd...)

Sl.No.	Blocks	Coconut	Cotton	Sugarcane	Vegetables	Flowers	Sub total	Other crop	Grand total
1	B1	311	0	116	8	23	8404	357	8761
	(%)	3.55	0.00	1.32	0.09	0.26	95.93	4.07	100.00
2	B2	502	0	195	3	22	7469	499	7968
	%	6.30	0.00	2.45	0.04	0.28	93.74	6.26	100.00
3	B3	1033	31	46	87	532	5450	1231	6681
	%	15.46	0.46	0.69	1.30	7.96	81.57	18.43	100.00
4	B4	732	0	1252	43	2	13625	1547	15172
	%	4.82	0.00	8.25	0.28	0.01	89.80	10.20	100.00
5	B5	3356	8	102	14	8	10247	2733	12980
	%	25.86	0.06	0.79	0.11	0.06	78.94	21.06	100.00
6	B6	2393	1	45	32	100	7701	1324	9025
	%	26.52	0.01	0.50	0.35	1.11	85.33	14.67	100.00
7	B7	1464	1	521	342	225	7809	4147	11956
	%	12.24	0.01	4.36	2.86	1.88	65.31	34.69	100.00
8	B8	334	864	131	235	134	7417	1374	8791
	%	3.80	9.83	1.49	2.67	1.52	84.37	15.63	100.00
9	B9	70	187	77	152	106	6418	2140	8558
	%	0.82	2.19	0.90	1.78	1.24	74.99	25.01	100.00
10	B10	137	3307	94	409	123	11873	2202	14075
	%	0.97	23.50	0.67	2.91	0.87	84.36	15.64	100.00
11	B11	414	546	393	29	242	7991	672	8663
	%	4.78	6.30	4.54	0.33	2.79	92.24	7.76	100.00
12	B12	297	267	372	241	314	13244	478	13722
	%	2.16	1.95	2.71	1.76	2.29	96.52	3.48	100.00
13	B13	312	662	923	437	65	15349	1624	16973
	%	1.838	3.900	5.438	2.575	0.383	90.432	9.57	100.000
	Total	**11355**	**5874**	**4267**	**2032**	**1896**	**122997**	**20328**	**143325**
	%	**7.92**	**4.10**	**2.98**	**1.42**	**1.32**	**85.82**	**14.18**	**100.00**

Source: *Commodity Potential Report, TNAU, 2015*

Table 2.24 Details of Block wise area crops in Madurai district (2013-14)															
Particulars	**Madurai East**			**Madurai West**			**Thirupparankundram**			**Melur**			**Kottampatti**		
	Area	**Prodn**	**Productivity**	**Area**	**Prodn.**	**Productivity**	**Area**	**Prodn.**	**Productivity**	**Area**	**Prodn.**	**Productivity**	**Area**	**Prodn.**	**Productivity**
Paddy	4530.9	22228	4906	3973.9	28505	7173	1750.5	11958	6831	6231.9	38500	6178	3037.5	18793	6187
Cholam	3.0	5.12	1708	6.0	10.29	1708	160.5	274.15	1708	4.2	7.10	1708	5.7	9.74	1708
Cumbu	0.4	0.96	2411	0.2	0.51	2411	20.5	49.44	2411	0.7	1.61	2411	0.2	0.40	2411
Maize	0.7	1.99	2989	0.0	0.00	2989	2.3	6.98	2989	0.0	0.00	2989	0.0	0.00	2989
Kuthiraivali	0.0	0.00	1258	0.0	0.00	1258	2.0	2.51	1258	0.0	0.00	1258	0.0	0.00	1258
Total	**4535**	**22236.07**	**13272**	**3980.1**	**28515.8**	**15539**	**1935.8**	**12291.08**	**15197**	**6236.8**	**38508.71**	**14544**	**3043.4**	**18803.14**	**14553**
Blackgram	0.7	0.51	740	0.0	0.00	740	11.8	8.75	740	53.8	39.78	740	17.8	13.15	740
Greengram	1.2	0.86	740	0.1	0.07	740	89.3	66.05	740	0.0	0.00	740	6.6	4.89	740
Redgram	4.2	5.01	1192	1.3	1.56	1192	25.3	30.21	1192	7.2	8.60	1192	8.5	10.16	1192
Cowpea	0.2	0.12	740	0.0	0.00	740	28.0	20.73	740	11.9	8.81	740	83.5	61.83	740
Mochi	0.0	0.00	740	0.0	0.00	740	0.9	0.65	740	0.9	0.68	740	1.5	1.09	740
Total	**6.3**	**6.5**	**4152**	**1.4**	**1.63**	**4152**	**155.3**	**126.39**	**4152**	**73.8**	**57.87**	**4152**	**117.9**	**91.12**	**4152**
Groundnut	2.0	4.09	2085	0.9	1.91	2085	156.6	326.56	2085	14.2	29.67	2085	714.0	1349.46	1890
Gingelly	2.0	0.64	326	2.3	0.75	326	2.6	0.85	326	19.4	2.70	139	12.8	4.18	326
Cotton	1.7	1.59	927	0.4	0.41	927	13.7	12.74	927	0.4	0.37	927	3.6	3.33	927
Sugarcane	139.4	14220	102	208.1	21231	102	33.6	3427	102	1141.5	119862	105	101.9	10395	102
Total	**145.1**	**14226.32**	**3440**	**211.7**	**21234.07**	**3440**	**206.5**	**3767.15**	**3440**	**1175.5**	**119894.7**	**3256**	**832.3**	**11751.97**	**3245**

Particulars	Vadipatti			Alanganallur			Thirumangalam33			Kallikudi			T.Kallupatti		
	Area	Prodn	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity
Paddy	3248.4	27011	8315	2567.6	23021	8966	1781.9	11664	6546	1365.0	7486	5484	985.5	6603	6700
Cholam	40.5	69.21	1708	298.3	509.45	1708	1027.2	1916.77	1866	1975.8	3607.77	1826	2056.2	2631.88	1280
Cumbu	52.4	126.26	2632	142.1	373.95	2632	113.0	297.36	2632	30.3	53.35	1761	229.8	434.03	1889
Maize	79.5	237.64	2989	84.9	253.65	2989	1402.4	4191.80	2989	200.1	598.15	2989	2247.5	5459.29	2429
Kuthiraivali	0.0	0.00	1258	0.3	0.38	1258	182.8	229.99	1258	109.5	137.76	1258	563.0	708.22	1258
Total	**3420.8**	**27444.11**	**16902**	**3093.2**	**24158.43**	**17553**	**4507.3**	**18299.92**	**15291**	**3680.7**	**11883.03**	**13318**	**6082**	**15836.42**	**13556**
Blackgram	2.7	1.99	740	21.6	16.00	740	103.1	76.31	740	202.4	150.81	745	498.4	350.84	704
Greengram	0.5	0.35	740	20.7	15.31	740	253.4	187.53	740	796.1	593.10	745	486.4	342.41	704
Redgram	56.5	67.37	1192	28.4	33.90	1192	307.2	232.54	757	413.6	533.19	1289	242.6	262.49	1082
Cowpea	6.2	4.56	740	77.2	57.15	740	97.7	72.32	740	47.1	35.11	745	37.1	26.10	704
Mochi	16.1	11.88	740	126.9	93.90	740	147.0	108.78	740	115.2	85.8	745	73.5	51.74	704
Total	**82**	**86.15**	**4152**	**274.8**	**216.26**	**4152**	**908.4**	**677.48**	**3717**	**1574.4**	**1398.01**	**4269**	**1338**	**1033.58**	**3898**
Groundnut	4.2	8.70	2085	143.6	299.45	2085	272.0	567.21	2085	209.7	437.17	2085	119.3	248.68	2085
Gingelly	2.1	0.69	326	7.0	2.28	326	5.0	1.62	326	189.7	62.80	331	14.9	4.86	326
Cotton	3.4	3.19	927	1.7	1.55	927	1078.7	902.86	837	1062.6	875.59	824	2867.5	2256.76	787
Sugarcane	66.3	6758	102	553.3	56440	102	145.6	14853	102	78.8	8037	102	98.8	10080	102
Total	**76**	**6770.58**	**3440**	**705.6**	**56743.28**	**3440**	**1501.3**	**16324.69**	**3350**	**1540.8**	**9412.56**	**3342**	**3100.5**	**12590.3**	**3300**

Table 2.24 (Contd…)

Particulars	Usilampatti			Chellampatti			Sedapatti		
	Area	**Production**	**Productivity**	**Area**	**Production**	**Productivity**	**Area**	**Production**	**Productivity**
Paddy	1126.5	7285	6467	5659.3	37295	6590	3383.2	21653	6400
Cholam	1529.0	2432.59	1591	519.4	887.22	1708	1158.1	1839.13	1588
Cumbu	464.0	906.16	1953	203.1	383.67	1889	1426.7	3533.94	2477
Maize	146.5	437.95	2989	46.8	139.75	2989	2717.0	11169.54	4111
Kuthiraivali	250.5	315.07	1258	218.0	274.30	1258	674.8	848.94	1258
Total	**3516.5**	**11376.77**	**14258**	**6646.6**	**38979.94**	**14434**	**9359.8**	**39044.55**	**15834**
Blackgram	6.7	4.98	740	1.5	1.14	740	5.4	3.99	740
Greengram	175.1	129.59	740	152.9	113.16	740	177.2	131.10	740
Redgram	261.6	419.38	1603	95.9	176.87	1845	285.8	244.68	856
Cowpea	424.1	313.84	740	216.6	160.26	740	693.5	513.23	740
Mochi	509.3	376.85	740	68.6	50.76	740	36.9	27.29	740
Total	**1376.8**	**1244.64**	**4563**	**535.5**	**502.19**	**4805**	**1198.8**	**920.29**	**3816**
Groundnut	139.4	290.61	2085	74.9	156.19	2085	714.7	1573.05	2201
Gingelly	54.2	17.68	326	42.2	23.36	554	440.7	143.68	326
Cotton	475.8	405.88	853	176.6	138.82	786	491.8	563.14	1145
Sugarcane	466.3	47560	102	390.2	39802	102	1027.1	104768	102
Total	**1135.7**	**48274.17**	**3366**	**683.9**	**40120.37**	**3527**	**2674.3**	**107047.9**	**3774**

Table 2.25 Details of Block wise area under Horticultural crops in Madurai district (2013-14)

Particulars	Madurai East			Madurai West			Thirupparankundram			Melur			Kottampatti		
	Area	Prodn	Productivity	Area	Prodn.	Productivity	Area	Prodn.	Productivity	Area	Prodn.	Productivity	Area	Prodn.	Productivity
Fruits															
Banana	113	6497.5	57.5	207	11902.5	57.5	632	36340	57.5	368	21160	57.5	62	3565	57.5
Mango	274	1301.5	4.75	283	1344.25	4.75	118	560.5	4.75	1070	5082.5	4.75	2078	9871	4.75
Guava	14	280	20	36	720	20	23	460	20	48	960	20	22	440	20
Sapota	2	51	25.5	8	204	25.5	12	306	25.5	27	688.5	25.5	16	408	25.5
Aonla	9	94.5	10.5	9	94.5	10.5	58	609	10.5	50	525	10.5	30	315	10.5
Others (Specified)	3	46.8	15.6	7	109.2	15.6	8	124.8	15.6	25	390	15.6	10	156	15.6
Total	**415**	**8271.3**		**550**	**14374.5**		**851**	**38400.3**		**1588**	**28806**		**2218**	**14755**	
Vegetables															
Onion	12	156	13	3	39	13	100	1300	13	10	130	13	25	325	13
Brinjal	12	156	13	8	104	13	40	520	13	15	195	13	15	195	13
Ladies finger	7	59.5	8.5	6	51	8.5	75	637.5	8.5	15	127.5	8.5	43	365.5	8.5
Tomato	5	184	36.8	2	73.6	36.8	34	1251.2	36.8	15	552	36.8	8	294.4	36.8
Drumstick	0	0	50.2	0	0	50.2	16	803.2	50.2	8	401.6	50.2	2	100.4	50.2
Others	2	30	15	7	105	15	60	900	15	14	210	15	26	390	15
Total	**38**	**585.5**		**26**	**372.6**		**325**	**5411.9**		**77**	**1616.1**		**119**	**1670**	
Plantation Crops															
Cashew	2	1.44	0.72	2	1.44	0.72	2	1.44	0.72	43	30.96	0.72	85	61.2	0.72
Betalwine	0	0	22.75	6	136.5	22.75	55	1251.25	22.75	0	0	22.75	0	0	22.75
Total	**2**	**1.44**		**8**	**137.94**		**57**	**1252.69**		**43**	**30.96**		**85**	**61.2**	

Table 2.25 (Contd…)

Particulars	Vadipatti			Alanganallur			Usilampatti			Chellmpatti			Thirumangalam		
	Area	Prodn.	Productivity	Area	Prodn.	Product ivity	Area	Prodn.	Product Tivity	Area	Prodn.	Productivity	Area	Prodn.	Product Tivity
Fruits															
Banana	720	41400	57.5	465	26737.5	57.5	32	1840	57.5	38	2185	57.5	78	4485	57.5
Mango	460	2185	4.75	2920	13870	4.75	160	760	4.75	50	237.5	4.75	135	641.3	4.75
Guava	20	400	20	685	13700	20	34	680	20	17	340	20	32	640	20
Sapota	53	1351.5	25.5	0	0	25.5	42	1071	25.5	17	433.5	25.5	53	1352	25.5
Aonla	20	210	10.5	107	1123.5	10.5	65	682.5	10.5	22	231	10.5	82	861	10.5
Others (Specified)	35	546	15.6	122	1903.2	15.6	6	93.6	15.6	5	78	15.6	7	109.2	15.6
Total	**1308**	**46093**		**4299**	**57334.2**		**339**	**5127.1**		**149**	**3505**		**387**	**8088**	
Vegetables															
Onion	15	195	13	115	1495	13	10	130	13	98	1274	13	120	1560	13
Brinjal	10	130	13	34	442	13	160	2080	13	108	1404	13	70	910	13
Ladis finger	10	85	8.5	18	153	8.5	58	493	8.5	40	340	8.5	70	595	8.5
Tomato	8	294.4	36.8	25	920	36.8	50	1840	36.8	83	3054.4	36.8	101	3717	36.8
Drumstic	5	251	50.2	7	351.4	50.2	275	13805	50.2	7	351.4	50.2	3	150.6	50.2
Others	9	135	15	30	450	15	88	1320	15	140	2100	15	4	60	15
Total	**57**	**1090.4**		**229**	**3811.4**		**641**	**19668**		**476**	**8523.8**		**368**	**6992**	
Plantation Crops															
Cashew	3	2.16	0.72	14	10.08	0.72	7	5.04	0.72	8	5.76	0.72	2	1.44	0.72
Betalwine	115	2616.3	22.75	3	68.25	22.75	0	0	22.75	0	0	22.75	0	0	22.75
Total	**118**	**2618.4**		**17**	**78.33**		**7**	**5.04**		**8**	**5.76**		**2**	**1.44**	

Table 2.25 (Contd…)

Particulars	2013-14 Kallikudi			2013-14 T. Kallupatti			2013-14 Sedapatti			District total		
	Area	Prodn.	Productivity	Area	Prodn.	Productivity	Area	Prodn.	Productivity	Area	Prodn.	Productivity
Fruits												
Banana	20	1150	57.5	78	4485	57.5	20	1150	57.5	2833	162898	57.5
Mango	68	323	4.75	218	1035.5	4.75	225	1068.75	4.75	8059	38280.3	4.75
Guava	17	340	20	64	1280	20	28	560	20	1040	20800	20
Sapota	8	204	25.5	41	1045.5	25.5	42	1071	25.5	321	8185.5	25.5
Aonla	32	336	10.5	120	1260	10.5	48	504	10.5	652	6846	10.5
Others (Specified)	5	78	15.6	28	436.8	15.6	2	31.2	15.6	263	4102.8	15.6
Total	**150**	**2431**		**549**	**9542.8**		**365**	**4384.95**		**13168**	**241112**	
Vegetables												
Onion	60	780	13	148	1924	13	100	1300	13	816	10608	13
Brinjal	20	260	13	34	442	13	20	260	13	546	7098	13
Lady's finger	24	204	8.5	26	221	8.5	34	289	8.5	426	3621	8.5
Tomato	18	662.4	36.8	18	662.4	36.8	30	1104	36.8	397	14609.6	36.8
Drumstic	2	100.4	50.2	4	200.8	50.2	12	602.4	50.2	341	17118.2	50.2
Others	15	225	15	25	375	15	48	720	15	468	7020	15
Total	**139**	**2231.8**		**255**	**3825.2**		**244**	**4275.4**		**2994**	**60074.8**	
Plantation Crops												
Cashew	2	1.44	0.72	5	3.6	0.72	5	3.6	0.72	180	129.6	0.72
Betalwine	2	45.5	22.75	2	45.5	22.75	0	0	22.75	183	4163.25	22.75
Total	**4**	**46.94**		**7**	**49.1**		**5**	**3.6**		**363**	**4292.85**	

Source: *O/o Joint Director of Agriculture, Madurai*

Table 2.26 Details of block wise area, production and productivity under horticultural crops (Spices and condiments, Medicinal plants, flowers) in Madurai district (2013-14)

Particulars	Madurai East			Madurai West			Thirupparankundram			Melur		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Spices and												
Chillies	0	0	0.95	0	0	0.95	72	68.4	0.95	7	6.65	0.95
Coriander	0		0.6	0		0.6	7	4.2	0.6	0	0	0.6
Others (Specified)	17		6.35	31	196.85	6.35	34	215.9	6.35	85	539.75	6.35
Total	**17**			**31**	**196.85**		**113**	**288.5**		**92**	**546.4**	
Medicinal plants												
Senna	14	16.8	1.2	2	2.4	1.2	20	24	1.2	0	0	1.2
Others	0	0	15	2		15	2	30	15	4	60	15
Total	**14**				**2.4**		**22**	**54**		**4**	**60**	
Flowers												
Rose	0	0	8.15	11	89.65	8.15	0	0	8.15	3	24.45	8.15
Jasmine	12	96	8	14	112	8	510	4080	8	8	64	8
Tube rose	0	0	8	8	64	8	8	64	8	5	40	8
Others (Specified)	0	0	7.25	7	50.75	7.25	16	116	7.25	0	0	7.25
Total	**12**	**96**		**40**	**316.4**		**534**	**4260**		**16**	**128.45**	

*Bulk Productivity

*** Bulk Productivity = Total Production / Total area x 1000**

Table 2.26 (Contd…)

Particulars	2013-14 Kottampatti			2013-14 Vadipatti			2013-14 Alanganallur			2013-14 Usilampatti			2013-14 Chellampatti			2013-14 Thirumangalam		
	Area	Production	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity	Area	Prodn	Productivity
Spices and condiments																		
Chillies	20	19	0.95	5	4.75	0.95	9	8.55	0.95	9	8.55	0.95	18	17.1	0.95	210	199.5	0.95
Coriander	0	0	0.6	0	0	0.6	0	0	0.6	0	0	0.6	5	3	0.6	40	24	0.6
Others (Specified)	225	1429	6.35	96	609.6	6.35	332	2108.2	6.35	8	50.8	6.35	3	19.05	6.35	30	190.5	6.35
Total	**245**	**1448**		**101**	**614.35**		**341**	**2116.75**		**17**	**59.35**		**26**	**39.15**		**280**	**414**	
Medicinal plants																		
Senna	0	0	1.2	0	0	1.2	0	0	1.2	0	0	1.2	0	0		275	330	1.2
Others	10	150	15	0	0	15	0	0	15	0	0	15	0	0		4	60	15
Total	**10**	**150**		**0**	**0**		**0**	**0**		**0**	**0**		**0**	**0**		**279**	**390**	
Flowers																		
Rose	3	24.45	8.15	25	203.75	8.15	17	138.55	8.15	50	407.5	8.15	23	187.45	8.15	5	40.75	8.15
Jasmine	22	176	8	45	360	8	56	448	8	205	1640	8	200	1600	8	135	1080	8
Tube rose	5	40	8	5	40	8	90	720	8	50	400	8	60	480	8	15	120	8
Others (Specified)	0	0	7.25	0	0	7.25	93		7.25	11	79.75	7.25	11	79.75	7.25	6	43.5	7.25
Total	**30**	**240.5**		**75**	**603.75**		**256**	**1306.55**		**316**	**2527.3**		**294**	**2347.2**		**161**	**1284**	

Table 2.26 (Contd…)

Particulars	2013-14 Kallikudi			2013-14 T.Kallupatti			2013-14 Sedapatti			District total		
	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity	Area	Production	Productivity
Spices and condiments												
Chillies	275	261.25	0.95	70	66.5	0.95	255	242.25	0.95	740	703	0.95
Coriander	15	9	0.6	65	39	0.6	30	18	0.6	122	73.2	0.6
Others (Specified)	7	44.45	6.35	55	349.25	6.35	73	463.55	6.35	966	6134.1	6.35
Total	**297**	**314.7**		**190**	**454.75**		**358**	**723.8**		**1828**	**6910.3**	
Medicinal plants												
Senna	225	270	1.2	194	232.8	1.2	10	12	1.2	465	558	1.2
Others	75	1125	15	6	90	15	12	180	15	111	1665	15
Total	**300**	**1395**		**200**	**322.8**		**22**	**192**		**576**	**2223**	
Flowers												
Rose	0	0	8.15	5	40.75	8.15	3	24.45	8.15	140	1141	8.15
Jasmine	140	1120	8	31	248	8	40	320	8	1283	10264	8
Tube rose	0	0	8	55	440	8	15	120	8	301	2408	8
Others (Specified)	6	43.5	7.25	7	50.75	7.25	6	43.5	7.25	157	1138.3	7.25
Total	**146**	**1163.5**		**98**	**779.5**		**64**	**507.95**		**1881**	**14951**	

Table 2.27 Area, production and productivity of Major Crops

Sl.No	Particulars	Area (in ha)	Production (in tonnes)	Productivity (in t/ha)
1	Paddy	33669.67	142154.33	4.22
2	Maize	7747.33	34250.67	4.42
3	Cholam	10772.67	22081.33	2.04
4	Cumbu	2075.33	4488.00	2.16
5	Ragi	24.67	83.00	3.36
6	Bengal Gram	21.33	13.00	0.61
7	Red Gram	2134.00	1771.33	0.83
8	Black Gram	983.33	754.67	0.76
9	Green Gram	2220.33	1405.67	0.63
10	Horse Gram	61.33	35.33	0.57
11	Groundnut	2329.33	4866.67	2.08
12	Sunflower	55.33	63.00	1.13
13	Gingelly	869.33	472.33	0.54
14	Castor	49.33	18.33	0.37
15	Cotton	5815.00	8846.33	1.52
16	Coconut	11221.67	1390.67	0.12
17	Sugarcane	3929.33	372095.00	94.69
18	Onion	456.67	3516.33	7.69
19	Brinjal	296.67	2449.67	8.25
20	Bhendi	331.67	3008.00	9.06
21	Cabbage	0.33	15.67	47.48
22	Tomato	298.00	4095.00	13.74
23	Banana	2419.67	96005.33	39.67
24	Mango	6648.33	12313.67	1.85
25	Jack Fruit	20.67	266.00	12.86
26	Guava	993.67	998.67	1.01
27	Grapes	1.00	307.67	307.67
28	Orange	3.67	9.67	2.63
29	Chillies	462.33	231.33	0.51
30	Garlic	0.33	2.00	6.06
31	Coriander	102.00	48.00	0.47
32	Turmeric	13.33	50.67	3.80
33	Tamarind	1293.00	3902.00	32.25
34	Tapioca	69.33	2236.00	32.25
35	Sweet Potato	19.67	462.67	23.52
	Total	**97409.67**	**724708.00**	**7.44**

From the above table it could be seen that Paddy is the predominant crop of the district with an area of 33669.67ha. The other important crops are Coconut and Cholam with an area of 11221 ha. and 10772.87ha. respectively. Among the pulses, Green gram is the important crop. Sugarcane occupied 3929.33ha., while cotton occupied 5815 ha. The above pattern is an indication of lack of irrigation facilities in this district. The productivity of the crops is low. It is only 4.2 tonnes/ha in paddy and around 0.71 t/ha. in pulses. This indicates the importance of extension efforts in improving the adoption of improved technologies in the cultivation of crops.

2.11 Consumption of Fertilizers and Pesticides

The Department of Agriculture closely monitors the demand and supply of the fertilizers to ensure timely availability to the farmers. To monitor the fertilizer supply, facilitation centers were opened in all the districts from 8.00 A.M to 8.00 P.M. and the Department ensured timely availability of fertilizer at correct price. The consumption of fertilizers and pesticides during 2014-2015 is given in Table 2.28. The consumption of fertilisers was 46671 MT. Pesticide used in the form of dust was 73.00 M.T. and liquid was 47.00 M.lit.

Table 2.28 Consumption of Chemical Fertilizers and Pesticides during 2014-15

Fertilizers (MT)				Pesticides	
Nitrogen	**Phosphoric (P_2O_5)**	**Potassic (K_2O)**	**Total (NPK)**	**Dust (M.T.)**	**Liquid M.(Lit.)**
20857	12469	16875	46671	73.00	47.00

Source: *Joint Director of Agriculture, Madurai*

2.12 Agricultural Engineering – machineries and Implements

There is ample scope for selective mechanization in the district by large scale use of power tiller, thrasher, cultivators and harvesters. The use of agricultural implements and machineries has been practiced by farmers for efficiency and labour shortage during peak seasons. The ploughs, tractors, water pumps for irrigation purpose, sugarcane crushers and oil ghanis available were 34499, 1257, 17644, 239 and 414 respectively (Table 2.29).

Table 2.29 Agricultural Implements and Machinery in Madurai district (2004)

S. No.	Item	Numbers
I	**Ploughs**	
a	Wooden	25297
b	Iron	9202
	Total	34499
II	**Water pumps for irrigation purpose**	
a	Worked by oil engine	2281
b	Worked by electrical power	15363
	Total	17644
III	**Tractor**	
a	Government	31
b	Private	1226
	Total	1257
IV	**Sugarcane Crushers**	
a	Worked by power	232
b	Worked by bullocks	7
	Total	239
V	**Oil Ghanis**	
a	5 kg & above	414
b	Less than 5 kg	-
	Total	414

Source: *Quinquennial Livestock Census 16th (1997) and 17th (2004) Department of Economics & Statistics, Chennai.*

2.13 Agricultural Marketing and Regulated Markets

The details of agricultural regulated markets are presented in the table 2.30. In all the six regulated markets, the commodity transacted was paddy with quantity of 20470.01 MT.

Table 2.30 Quantity and Value of Commodities Transacted in 6 Regulated Markets of Madurai District during 2014-15

Sl. No.	Name of the Regulated Market	Commodities transacted	Quantity arrivals (in MT)	Receipts (Rs. In lakhs) (Inside &Outside Regulated market)	Godown (Stock)	
					Qty. (in Tonnes)	Value (in lakhs)
1	Madurai	Paddy	12817.37	133.61	1579.76	161.26
2	T.Vadipatti	Paddy	1122.27	1.33	128.73	13.86
3	Usilampatti	Paddy	2490.96	3.30	1167.65	113.35
4	Melur	Paddy	718.33	2.38	--	--
5	Thirumangalam	Paddy	538.07	1.04	754.99	63.81
6	T.Kallupatti	Paddy	2783.02	3.22	--	--
	Total		**20470.01**	**144.88**	**3631.12**	**352.28**

Source: *District Marketing committee, Madurai.*

2.14 Storage Facilities

The details of the storage facilities are given in table 2.31.Totally there are eleven storage godowns present in Madurai district and of which CAP Storage, Kappalur possesses the largest capacity (18000 m). Next to this, storage godown in Kadachanendal, Othakadai is having higher capacity (10550 m).

Table 2.31 List of Agriculture and Non-Agricultural Storage Godowns

Sl. No.	Name and address of agricultural godowns	Capacity (in Mtrs)
1	Venkatachalapuram – I	6000
2	Venkatachalapuram- II	1800
3	Usilamapatti road, Thirumangalam	3500
4	Attukulam, Sivagangai road, Melur	3950
5	Post office street, Usilampatti	1300
6	Channampatti, Vadipatti	1000
7	Kadachanendal, Othakadai	10550
8	Thoppur, Madurai	1200
9	CAP Storage, Kappalur	18000
10	Peraiyur (Rented Godown)	1000
11	Tai (G), K. Pudur	1500

Source*: General Manager, TNCSC, Madurai.*

2.15 Sericulture

The area under mulberry and production of cocoons in different blocks are given in the Table 2.32. The total area under mulberry in the district is 263.50 acres. The major area under mulberry production is Alanganallur block with an area of 53 acres which is followed by Thirumangalam (41 acres) and Sedapatti block (40.50 acres). In the whole district Chellampatti block was not involved in sericulture. The district produced 68540 kg of Cocoon for a value of rupees 88,94,885.

Table 2.32 Details of mulberry cultivation and cocoon production

Sl. No.	Name of the block	Area under Mulberry (Acres)	Laying Consumption	Production of Cocoons	
				Kg	Value (in Rs.)
1	Madurai East	16.25	6950	4395	594025
2	Madurai West	5.00	2100	1250	162500
3	Alanganallur	53.00	22.120	14250	1924150
4	Vadipatti	31.75	12450	7940	1151100
5	Usilampatti	20.50	8600	5370	698100
6	Sedapatti	40.50	17415	10795	1295400
7	Kalligudi	5.50	236.5	1465	190450
8	T.Kallupatti	7.00	3365	2085	260625
9	Thirupparankundram	10.50	4300	2665	319800
10	Melur	24.50	8025	5131	692685
11	Kottampatti	8.00	3650	2264	294450
12	Thirumangalam	41.00	17630	10930	1311600
13	Chellampatti	-	-	-	-
	Total	**263.50**	**108970**	**68540**	**8894885**

Source: *Assistant Director of Sericulture, Theni*

2.16 Animal husbandry and Dairy development

2.16.1 Livestock Population

The total livestock and poultry population details of the district and blocks were furnished in the Table 2.33 and 2.34. There are 214961 cattle present in the district. The other livestock such as buffaloes (5549), sheep (184433), goat (297052 no's), poultry (998396) and pig (1258) are also present.

Table 2.33 Total livestock and poultry in the district

		(Numbers)
Sl. No.	**Particulars**	**Population**
1	Cattle	214961
2	Buffaloes	5549
3	Sheep	184433
4	Goats	297052
5	Horses and ponies	47
6	Donkeys	200
7	Camels	2
8	Pigs	1258
	Total Livestock	**703502**
9	Elephants	2
10	Dogs	40618
11	Rabbits	585
	Poultry	
12	Bank yard Poultry	770396
13	Farm Poultry	228000
	Total Poultry	**998396**

Source: Season and crop report 2014-2015

Table 2.34 Block wise details of total livestock and poultry in the district

Sl. No	Particulars	B1	B2	B3	B4	B5	B6	B7	B8	B9	B10	B11	B12	B13	District
1	Cattle	12690	18428	6150	32634	41450	34190	43903	18886	7557	12520	78832	22283	10303	339826
2	Buffalo	147	104	160	403	973	422	527	715	90	125	1788	39	175	5668
3	Sheep	12000	11816	26354	21312	34229	41134	60872	16879	20114	20273	78706	6712	7134	357535
4	Goat	24000	17142	39920	26198	64446	52759	65476	23601	30513	26435	95481	16180	9009	491160
5	Pigs	186	140	206	93	207	207	4841	0	97	41	580	11	25	6634
6	Poultry	405000	77506	21928	119637	123294	113124	124107	24059	35103	229491	40000	80084	26745	1420078
7	Others (specify)			923		21	4	13		1315	17	170	2457	2064	6984

B-1Alanganallur, B-2 Chellampatti, B-3 Kalligudi, B-4 Kottampatti, B-5 Madurai East, B-6 Madurai west, B-7 Melur, B-8 Sedapatti, B-9 T. Kallupatti, B-10 Thirumangalam, B-11 Thirupparankundram, B-12 Usilampatti, B-13 Vadipatti

2.16.2 Veterinary Institutions and hospitals

The details of number of veterinary institutions, sub centers and veterinary dispensaries in the blocks of district are furnished in the Table 2.35. There are about 4 veterinary hospitals, 39 veterinary dispensaries; one polyclinic center, 10 upgraded sub-centers, 90 sub-centers, 1 other animal disease investigations and 1 mobile unit were present in the district for the welfare of the milch animals, pets and other livestock.

Table 2.35 Animal Husbandry and Dairy Development

Sl. No	Name of Block/ Municipalities	No. of Veterinary institutions					Other animal disease investigation (pvt)	Mobile units	No. of Animals treated	Castration performed
		Poly clinic	Hospitals	Dispensaries	Upgraded Sub centers	Sub centers				
1.	Madurai East	-	-	5	1	6	-	1	80923	3749
2.	Madurai West	-	1	4	-	8	-	-	78384	3482
3.	T.P. kundram	-	-	3	1	7	-	-	76687	2852
4.	Melur	-	-	3	1	7	-	-	70736	3357
5.	Kottampatti	-	-	3	1	9	-	-	64769	3562
6.	Vadipatti	-	-	3	1	6	-	-	67667	3863
7.	Alanganallur	-	-	3	1	7	-	-	70877	3512
8.	Tirumangalam	-	-	3	-	10	-	-	60482	3796
9.	Kalligudi	-	-	2	-	5	-	-	63403	3497
10.	Usilampatti	-	-	2	1	4	-	-	59463	3086
11.	Chellampatti	-	-	2	1	5	-	-	60541	3742
12.	Sedapatti	-	1	2	1	6	-	-	59514	4151
13.	T.Kallupatti	-	-	3	-	5	-	-	60635	4037
14.	Madurai Corporation	1	-	1	1	5	1	-	39141	662
15.	Melur Municipality	-	1	-	-	-	-	-	11813	874
16.	ThirumangalamMunicipality	-	1	-	-	-	-	-	15992	2054
17.	UsilampattiMunicipality	-	-	-	-	-	-	-	15013	2014
	Total	**1**	**4**	**39**	**10**	**90**	**1**	**1**	**956040**	**52290**

Source: *Deputy Director of Animal Husbandry, Madurai.*

2.16.3 Dairy Development

The number of milk societies, quantity of milk produced and value of milk in different blocks of the district is furnished in the Table 2.36. Chellampatti block has accounted for the possession of the highest number of milk societies in the district numbering 108 with a production capacity of 24738 lakhs liters of milk worth of Rs. 445284 lakhs. Next to this, the Sedapatti block holds the second highest milk societies (101) with a procurement volume of 14151 lakh liters. Though there are less collection centers in Melur block, the procurement volume is high of about 11724 lakh liters worth of 211032 lakhs rupees during 2014-15. On the whole, the district holds 622 dairy centers with procurement capacity of 94831 lakh liters, worth of Rs.1706958.

Table 2.36 Block wise milk production in the district 2014-15

Sl. No.	Name of the Block / Municipality	No. of Milk societies	Quantity of milk produced (in lakhs liters) Avg. Per Day	Value of milk (₹ in lakhs) Per day
1	Madurai East	11	140	2520
2	Madurai West	16	1542	27756
3	Thirupparankundram	31	3128	56304
4	Melur	43	11724	211032
5	Kottampatti	14	4363	78534
6	Vadipatti	33	3608	64944
7	Alanganallur	58	4389	79002
8	Thirumangalam	53	6804	122472
9	Kalligudi	23	1733	31194
10	Usilampatti	93	17005	306090
11	Chellampatti	108	24738	445284
12	Sedapatti	101	14151	254718
13	T.Kallupatti	38	1506	27108
	Total	**622**	**94831**	**1706958**

Source: *Deputy Registrar (Dairying), Madurai.*

2.16.4 Poultry Development

The poultry birds produced in the district are given in the Table 2.37. The total numbers of broilers are 82 and the total numbers of layers are 295000.

Table 2.37 Poultry Development in the district (2014-15)

Sl. No.	Name of the Block / Mpty	No. of Broilers	No. of Layers
1	Madurai East	-	-
2	Madurai West	-	-
3	Thirupparankundram	3	17000
4	Melur	-	-
5	Kottampatti	28	136000
6	Vadipatti	7	38000
7	Alanganallur	6	15000
8	Thirumangalam	5	25000
9	Kalligudi	-	-
10	Usilampatti	15	60000
11	Chellampatti	18	4000
12	Sedapatti	-	-
13	T.Kallupatti	-	-
	Total	**82**	**295000**

Source: *Deputy Director of Animal Husbandry, Madurai.*

2.16.5 Egg production

The estimated egg production in the district is presented in the Table 2.38. The district produces 266.904 lakh eggs in the year only from desi breed.

Table 2.38 Estimated egg production in the district (2014-15)

Desi (Lakh No's)	Improved (Lakh No's)	Total (Lakh No's)
266.904	-	266.904

Source: *Department of Animal Husbandry and Veterinary Services, Chennai-600 006*

2.17 Fisheries

The data regarding the fishing centers and total quantity of fishing in the district are furnished in the Table 2.39. The total inland fish production is about 4320 tonnes with a value of 2160 lakh rupees from Sathiyar dam, Shozhavandan, Vadiyurkanmai, Panchayat tanks and PWD tanks. 6320 fishermen are engaged in the occupation.

Table 2.39 Fisheries Development and Production (2010-11)

Sl. No.	Name and address of Fishing centres	Inland fish (Tonne)		No. of Fisherman engaged
		Catch (Tonnes)	Value in Lakh	
1.	Sathiar Dam, Shozhavandan, VadiyurKanmai, Panchayat Tanks & PWD Tanks	4320	2160	6320
	Total	**4320**	**2160**	**6320**

Source: *Assistant Director of Fisheries (Inland) Development, Madurai*

2.17 Banking and Insurance

Banking sector should cater to the short and long term credit needs of farmers, especially marginal and small farmers, so as to facilitate them in procuring the required farm inputs at appropriate time. The regulated markets and co-operative marketing societies are required to create adequate infrastructural facilities like grading, packing and storing the produces at different production centers of the district. It is also suggested that the farmers are to make use of the several benefits such as subsidized seeds, fertilizers, plant protection chemicals, machineries and tools extended through various agricultural development programmes. They should also come forward to adopt the newer modern agricultural practices and technologies developed by the agricultural research institutes. The details of banks of Madurai district are presented in Table 2.40 and 2.41. 304 banks exist in the district with an aggregate deposit of Rs.12161 crores.

Table 2.40 District and state bank details

District	Number of banks/ offices	Aggregate deposits (₹ crores)	Gross bank credit (₹ crores)
Madurai	304	12161	12915
Tamil Nadu	7253	401183	466031

Source: *Tamil Nadu - An Economic Appraisal 2011-12 to 2014-15 Report, Govt. of Tamil Nadu, Chennai – 108*

Table 2.41 Extent of Deposits, Advances and Sector wise Credit Details of Madurai District during 2013-14

Sl. No.	Name of the Bank	No. of Branches	Deposits (₹ in lakhs)	Advance (₹ in lakhs)	Cash deposit ratio
1.	Allahabad Bank	2	423600	308880	73
2.	Andhra Bank	2	286297	327928	115
3.	Bank of Baroda	4	2024522	1176469	58
4.	Bank of Maharashtra	2	237888	189518	80
5.	Bank of India	10	2625000	2271700	87
6.	Canara Bank	34	11613533	10724645	92
7.	Catholic Syrian bank	1	126966	309650	244
8.	Central Bank of India	6	2008735	2347934	117
9.	City Union Bank	3	2489938	2307818	93
10.	Corporation Bank	6	1099900	1189544	108
11.	Dena Bank	1	175665	106029	60
12.	Dhanalakshmi Bank	1	218697	88185	40
13.	Federal Bank	1	294712	230211	78
14.	Indian Bank	29	11576123	7928237	68
15.	Indian overseas Bank	32	13540300	7796900	58
16.	Karnataka Bank	1	244830	101641	42

Sl. No.	Name of the Bank	No. of Branches	Deposits (₹ in lakhs)	Advance (₹ in lakhs)	Cash deposit ratio
17.	Karur Vysya Bank	8	3168775	2383931	75
18.	Lakshmi Vilas Bank	3	1313129	370043	28
19.	Oriental Bank of Commerce	1	1082806	1012751	94
20.	Punjab National Bank	4	972914	679419	70
21.	State Bank of India	44	25515105	27035606	106
22.	State Bank of Mysore	1	479814	177258	37
23.	Syndicate Bank	6	1082132	784232	72
24.	State Bank of Travancore	3	964100	764700	79
25.	South Indian Bank	3	378954	562897	149
26.	Tamil Nadu Mercantile Bank	9	8309297	5254408	63
27.	TIIC	1	12850	406345	3162
28.	Union Bank of India	10	3350021	3738018	112
29.	United Bank of India	1	98961	290632	294
30.	UCO Bank	3	558062	757925	136
31.	Vijaya Bank	2	390856	344842	88
32.	ING Viysya Bank	1	184603	298014	161
33.	Pandian Grama Bank	9	1166854	2953906	253

Sl. No.	Name of the Bank	No. of Branches	Deposits (₹ in lakhs)	Advance (₹ in lakhs)	Cash deposit ratio
34.	State Bank of Hyderabad	1	134489	211438	157
35.	Industrial Credit and Investment of India (ICICI)	17	5087731	5389445	106
36.	Industrial Development Bank of India (IDBI)	4	8047800	10858600	135
37.	Housing Development Finance Corporation (HDFC)	4	1267751	3097895	244
38.	AXIS Bank	2	1115776	2104721	189
39.	Madurai District Central Co-Operative Bank	31	3980133	5064738	127
40.	SLARD Bank	7	0	42098	0
41.	State Bank of Patiala	1	73918	178598	242
42.	KOTAK MAHINDRA Bank	1	153935	633598	412
43.	TAI CO	1	128988	228514	177
44.	INDUS IND Bank	1	1183	74859	6328
	Total	**314**	**118007643**	**113104720**	**96**

Source: *General Manager, Lead Bank (Canara Bank), Madurai*

2.18 Co-operation

A co-operative society is an autonomous association of persons united voluntarily to meet their common economic, social and cultural needs and aspirations through a jointly-owned and democratically-controlled enterprise. These societies are therefore to ensure the financial aid as loans for the common people. There are one hundred and eighty two Primary Agricultural Co-Op Banks, seven Co-op Agri. & Rural Development. Bank, ninety five Employees Co-op Credit societies, five Urban Co-op Bank, six Primary Co-op Agricultural marketing society and seventy five student co-operative stores in this district (Table 2.42).

Table 2.42 Banks and Cooperative societies in the district

Sl. No.	Region	No. of society all kinds	Member ship	Share capital (in lakhs)	Working capital (in Lakhs)	Loans (₹ in Lakhs)		
						Advance	Out standing	O.D.
1.	Primary Agri. Co-Op Banks	182	352793	1963.20	32249.81	37697.00	33472.22	2763.68
2.	Co-op Agri. & Rural Devt. Bank	7	39675	143.54	3310.44	4305.32	2892.29	286.27
3.	Employees Co-op Credit societies	95	41837	4100.93	22898.24	15760.96	26908.11	1342.87
4.	Urban Co-op Bank	5	52798	3116.36	7390.91	8369.09	5077.02	107.70
5.	Primary Co-op Agri marketing society	6	27582	25.37	742.03	981.43	312.75	377.30
6.	Housing Co-op Society	-	-	-	-	-	-	-
7.	Students Co-op stores	75	16127	2.67	7.08	-	-	-
8.	Vegetables Crowers society	-	-	-	-	-	-	-
9.	MDCC Bank	1	885	4085.00	103215.00	92590.00	79984.62	9637.00
	TOTAL	**371**	**531697**	**13437.07**	169813.51	**159703.80**	**148647.01**	**14514.82**

Source: *Deputy Registrar, of Co-operative societies, Madurai, Thirumangalam and Managing Director of M.D.C.C Bank, Madurai*

2.19 Industries

The industries present in the district are furnished in the Table 2.43. Totally 2772 industries are functioning in Madurai district and of which 638 industries are registered Food Product industries. Next to this Hosiery and Garments are higher numbering 210. Repair and service industries were also functioning in large numbers in the district. Besides, Cotton Textiles, Paper & Products and Printing, Metal Products, Real Estate and Business Service, Rubber Product, Wooden product and leather product are some of the other important industries functioning in Madurai district.

Table 2.43 Industrial development in the district

S. No.	Industry Group Description	Division as per NIC 1998	Number of Units Registered
1.	Food Products	15	638
2.	Cotton Textiles	17	184
3.	Hosiery and Garments	18	210
4.	Wooden Products	20	148
5.	Paper & Products and Printing	21	194
6.	Leather Product	19	102
7.	Rubber Product	25	151
8.	Chemical and Chemical Products	24	71
9.	Non Metallic Mineral Products	26	99
10.	Basic Metal Products	27	34
11.	Metal Products	28	199
12.	Machinery Except Electrical Products	29	33
13.	Electrical Machinery	31	30
14.	Transport Machinery	35	6
15.	Misc. Manufacturing parts	36	93
16.	Real Estate and Business Service	74	158
17.	Personal Service	52	100
18.	Repair and Service	93	322
	TOTAL		2772

Source: *The General Manager, District Industries Centre, Madurai.*

Table 2.44 Khadi and Village Industries 2014-15

S. No.	Industry	Production (Value ₹ in lakhs)		Sales (Value ₹in lakhs)	No. of Employees	Earnings (₹ in lakhs)
		Qty.	Value			
I	**Khadi**					
	Cittam	2.99	16.74	-	27	5.60
	Cotton	0.20	15.06	-	23	3.36
	Polyester	0.07	6.00	-		
	Any other	-	-	-	-	-
II	**Khadi sales**					
	Khadi	-	-	33.50	-	-
	Polyster	-	-	23.81		
	Silk	-	-	27.21		
	Wollen	-	-	0.59		
III	**Village Industries**					
	Chappels	-	15.70	15.90	20	2.10
	Soap units	-	-	8.20	-	-
	Honey	-	-	0.69	-	-
	Any other (Specify)	-	-	3.47	-	-
	Carpentry & Black smithy unit	-	30.75	31.89	30	4.63

Source: *Assistant Director of Khadi and Village Industries, Madurai.*

The Khadi and village industries are also present in the district and the details are presented in Table 2.44. The Khadi industries like cittam, cotton and polyester are involved in the production of polyster, silk and wollen for about ₹ 37.80 lakhs. Khadi sales of khadi, polyster, silk and wollen sold worth of ₹ 85.11 lakhs, including khadi, Village industries like chappel, soap unit, honey and carpentry and blacksmith units are also produced materials worth of ₹ 46.45 lakhs during the year 2014-15.

CHAPTER III

DEVELOPMENT OF AGRICULTURE AND ALLIED SECTORS

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

i. Assessing the trends in area, production and productivity of major crops and projection till the 12th Plan period (2015-16)
ii. Yield gap analysis for the major crops

3.1 Trends in area, production and productivity of major crops

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

$Y_t = ab^t e$

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

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

CGR(r) = [Antilog of b-1] × 100

Where, Y_t = Area or Production or Yield

a = Intercept

b = Regression coefficient of t

t = Time variable

r = Compound Growth Rate

The value of 'b' is computed by using Ordinary Least Square (OLS) method and the Compound Growth Rate of area under major crops grown in Madurai district is given in Table 3.1. The area and production and productivity (CGR) of major crops of paddy, cholam, cumbu, maize, groundnut, coconut, cotton, mango and sugarcane of Madurai district are given in Table 3.1. Crops like paddy, maize, cumbu, coconut and mango had positive growth rates in their area, production and productivity. All other major crops like cholam and cotton exhibited a negative growth rate in cultivated area. Cotton crop exhibited a positive growth rate in production and yield even though the area under cotton has declined during recent years. However, the yield of maize is lower than cotton inspite of increasing trend in maize area.

Table 3.1 Area, Production and yield of major crops in Madurai district

Triennium average ending 2014-2015

Sl.No.	Crops	Area (ha)	%	Production	Yield (kg/ha)
1	Paddy	33670	39.98	142154	17932
2	Cholam	10773	12.79	34251	4439
3	Cumbu	2075	2.46	22081	2347
4	Maize	7747	9.20	4488	4371
5	Sugarcane	3929	4.67	372095	1379
6	Mango	6648	7.90	12314	1851
7	Cotton	5815	6.91	8846	257
8	Groundnut	2329	2.77	4867	2090
9	Coconut	11222	13.33	N.A	N.A
	Total	**84209**	**100.00**		

N.A denotes Not Available

The Compound growth rates of major crops of the district are shown in Table 3.2.

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

Sl.No.	Crops	CGR during CGR during 2005-2006 to 2014-2015 (%)		
		Area (ha)	Production	Yield (kg/ha)
1	Paddy	-10.71	-6.06	16.64
2	Cholam	-0.34	32.65	18.99
3	Cumbu	-11.78	9.86	9.35
4	Maize	18.49	-4.40	12.11
5	Sugarcane	-5.21	-5.79	22.64
6	Mango	1.23	-11.18	-12.26
7	Cotton	-5.64	-4.49	1.21
8	Groundnut	-12.22	-10.14	1.82
9	Coconut	0.76	N.A	N.A

N.A denotes Not Available

3.2 Projected area, production and yield of selected crops

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

The major crops grown in the district are paddy, cholam, cumbu, maize, groundnut, coconut, cotton, mango and sugarcane. These crops accounted for the gross cropped area in the district. Therefore, these crops can be further exploited for their yield potential and will be focused as potential crops to be intervened the technological gaps for their improvement in production and productivity.

The compound growth rate analysis revealed the current pattern of changes (percentage) in the area, production and yield. The area under crops like cholam, cotton, groundnut and sugarcane showed reduction in the area during the year 2011-12. Though the yield trend of cotton and groundnut showed a positive sign, the loss in the area could not compensate with a higher production in the district. For crops like cholam and sugarcane, area, production and yield were showing a negative trend, however in case of mango the area and production were increasing inspite of declining trend in yield. In order to reverse the reduction of the area, production and yield decline in the district, adequate interventions have to be made in the areas of planting materials, crop management and plant protection measures for the various crops that grown in the district.

Table 3.3 Projected Area, Production and Yield Based for the Major Potential Crops Identified

Description	Paddy			Cholam			Cumbu		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rates (%)	1.512	3.748	2.503	-1.330	-1.732	-0.382	8.404	14.332	5.474
Triennium Average ending 2011 - 12	59228	255969	4296	9813	13092	1338	4896	10275	2146
2012-13	65026	266697	4279	9826	10300	1055	6825	7351	2103
2013-14	66009	276692	4386	9696	10122	1051	7399	9636	2218
2014-15	67008	287061	4496	9567	9946	1047	8021	12631	2340
2015-16	68021	297819	4609	9439	9774	1043	8695	16557	2468

Description	Maize			Groundnut			Coconut		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rates (%)	33.359	43.854	8.020	-7.537	-4.670	3.107	1.243	5.869	2.819
Triennium Average ending 2011 - 12	4708	17955	3780	3171	5565	1755	11245	1859	16523
2012-13	10228	7025	4076	3066	8919	2008	11390	2162	17870
2013-14	13641	15683	4402	2835	9666	2071	11532	2289	18374
2014-15	18191	35011	4756	2621	10475	2135	11675	2423	18892
2015-16	24259	78161	5137	2424	11352	2201	11820	2565	19425

Description	Cotton			Mango			Sugarcane		
	Area	Production	Yield	Area	Production	Yield	Area	Production	Yield
Compound Growth Rates (%)	-5.340	4.735	10.667	2.782	0.613	-2.109	-3.151	-3.536	-0.405
Triennium Average ending 2011 - 12	6475	11519	300	6893	21620	3153	3916	371247	94
2012-13	6104	13620	380	7216	21056	2918	3893	376245	97
2013-14	5778	14265	420	7416	21185	2857	3770	362941	96
2014-15	5470	14940	465	7623	21315	2797	3652	350107	96
2015-16	5178	15647	514	7835	21446	2738	3537	337727	95

Area in Hectares; Production in Tonnes; Yield in kg/ha (Denotes growth rates from 2004 to 2016)

Table 3.4 Block wise Yield gap in Milk Yield and reasons for yield gap

Sl. No.	Type of animals	Alanganallur			Chellampatti			Kalligudi		
1	**Cows**	**Potential**	**Actual**	**Reason for low yield**	**Potential**	**Actual**	**Reason for low yield**	**Potential**	**Actual**	**Reason for low yield**
	a. Local	-	-	Feeding practices	1300 L	1032 L	-	-	-	-
	b. Cross breed	6000 lit	5000 lit		61600 L	44000 L	-	15 lit	8 lit	-
2	**Buffalo**	15000 lit	1600 lit	-	-	-	-			-
	a. Local			Feeding practices	240 L	144 L	-	12 lit	8 lit	-
	b. Cross breed	500 lit	300 lit							

Sl. No.	Type of animals	Kottampatti			Madurai East			Madurai West		
		Potential	**Actual**	**Reason for low yield**	**Potential**	**Actual**	**Reason for low yield**	**Potential**	**Actual**	**Reason for low yield**
1	**Cows**									
	a. Local	2.718	-	Fodder scarcity	-	2.718	Deficit of fodder	**-**	2.718	Improper feeding of greens and
	b. Cross breed	6.81	-		-	6.81		**-**	6.81	
2	**Buffalo**				-					
	a. Local	4.401	-	Water scarcity	-	4.401		**-**	4.401	concentrates
	b. Cross breed		-		-			**-**		

(Table 3.4 Contd..)

Sl. No.	Type of animals	Melur			Sedapatti			T. Kallupatti		
		Potential	Actual	Reason for low yield	Potential	Actual	Reason for low yield	Potential	Actual	Reason for low yield
1	**Cows**									
	a. Local	-	2.718	Scarcity of fodder and concentrates	6000	4500	Feeding practices	820	478	-
	b. Cross breed		6.81	-	15000	16000		-	-	-
2	**Buffalo**									
	a. Local		4.401	-	400	300	Feeding	948	372	-
	b. Cross breed		-	-	-	-	-	-	-	-

Sl. No.	Type of animals	Thirupparankundram			Usilampatti		
		Potential	Actual	Reason for low yield	Potential	Actual	Reason for low yield
1	**Cows**				-	-	-
	a. Local	-	2.718	Fodder and water scarcity	-	-	-
	b. Cross breed	-	6.81	-	-	-	-
2	**Buffalo**						
	a. Local	-	4.401	-	--	-	-
	b. Cross breed	-		-	-	-	-

3.3 Crop area coverage and schemes implemented by various departments

The details about various schemes implemented by the line departments of the district are presented in Tables 3.5. (Agriculture), 3.6 (Horticulture) and 3.7 (Agricultural Engineering).

3.3.1 Agriculture

The fund allocated and physical target for the district in the field of Agriculture during 2012-13 are given in the Table. 3.5.

Among various crops cultivated paddy (33669.67 ha) area occupies major area which is followed by coconut (11221.67 ha), cholam (10772.67 ha), maize (7747.33) and mango (6648.33 ha).The present Madurai district has an area of 3710 sq. km with a population of 24.00 Lakhs. The district is mainly agrarian with an average rain fall of 827.10 mm / annum. Paddy and sugar cane cultivation are the main crops in this district. The available soil types are thin red to deep red, laterite, black and red sandy. Fine stone deposits and granite are also available in this district. The geographical area of Madurai District is 3710 sq. km. covering about 2.09 per cent of the total geographical area of the State. The cultivable area of this District is 205674 hectares of which 48631 hectares (nearly 23.65 per cent of area) have irrigation facility from sources like canals, tanks and wells. The major part of the cultivable area (i.e.) 76.35 per cent is rain fed lands.

To improve the productivity of rice per unit area, SRI is a feasible technology. Demonstration trials should be organized in farmer's field and subsidy should be provided to farmers to encourage SRI adoption. Trainings have to be conducted for farmers to make awareness about the components of SRI like mat nursery, use of cono weeder and paddy transplanter. Paddy transplanter service could be provided to the beneficiaries through the department and KVKs of the district. The marketing of seed materials could be done through buyback method by the government which directly supports the farmers to augment additional /assured income.

To promote paddy cultivation in the district by providing quality seed materials to the farmers and to fulfill farmers demand, seed village concept and seed multiplication could be implemented in the potential blocks of the district. Technology on SRI of paddy could be demonstrated in the research stations and KVK s. This technology could be promoted through trainings and providing subsidy for seed production to the whole district area to increase production of paddy. Pulses seed multiplication could also be made in the district. Enhancing soil health through supply of organic manures and nutrients and it will enrich the soil micro flora and more natural. Vermi compost is one such organic

compound which supplements the major nutrients through organic means. Vermi composting is not tiresome; it can easily be produced by the farmers in the villages by using cattle dung for their own. Interventions can be made by the government for the production of Vermi compost by giving farm wastes demonstrations and trainings for the selected folks. Subsidy can also provide under National Agricultural Development Programme for setting up of Vermi compost unit.

Through the Department of Agricultural Marketing, minimum support price (MSP) for the cereals and pulses should be fixed to facilitate the farmers to preventing from economic loss.

To make the coconut cultivation more viable, integrated farming system under the coconut plantations should be promoted through issuing of subsidy to the potential farmers and plantations. Distribution of micro nutrient mixtures and bio fertilizers to increase the yield and quality of major crops can be made in the district

3.3.2 Horticulture

Various schemes are implemented by the department of horticulture during the year 2012-13 & 2013-14. The details of the target area and funds allotted for the period are presented in the Table.3.6. Through centrally sponsored schemes, majority of the funds are allotted in the National Agricultural Development Programme. A sum of 35.73lakhs was allotted during 2012-13. The other schemes which cover major crops are National Mission on Medicinal Plants (NMMP), and National Bamboo Mission. Under state sponsored schemes, a target of 2280ha area was fixed under Integrated Horticulture Development Scheme (IHDS) with a budget allocation of 29.24 lakhs. A sum of 204.27 lakhs was allotted to the Central and State sponsored schemes i) National Horticulture Mission and ii) National Mission on Micro Irrigation subsidy pattern. IAMWARM scheme assisted by Word Bank has a target of 230 ha with a fund of Rs. 44.12 lakhs during 2012-13.

3.3.3 Agricultural Marketing

The schemes implemented by the department of marketing are illustrated in the Table. 3.7

Table 3.5 Schemes implemented by Department of Agriculture (2012-13 to 2014-15)

(₹ in lakhs)

Sl. No.	Schemes / Project title	Unit	2012-13		2013-14		2014-15	
			Physical Target	Finance Allocation	Physical Target	Finance Allocation	Physical Target	Finance Allocation
I	**Centrally Sponsored**							
1	National Agricultural Development Programme		-	228.51150	-	329.331	-	261.142
2	Seed Village		-	48.878	-	37.45	-	32.256
3	Coconut Development Board Scheme		-	7.175	-	4.375	-	4.20
4	National Food Security Mission – Pulses		-	27.638	-	16.80796	-	25.537
5	National Food Security Mission - Commercial crops, Cotton		-	-	-	-	-	2.99
6	Accelerated Pulses Production Programme		-	-	-	14.20	-	-
7	National Mission for Sustainable Agriculture		-	-	-	-	-	49.35
II	**State Sponsored**							
1	Paddy procurement	MT	700	126.514	700	153.827	803.20	155.86
2	Pulses procurement	MT	50	42.016	50	35.127	40.70	38.26
3	Oil seed procurement	MT	56	45.541	56	38.22	30.836	46.53
4	Cotton procurement	MT	12	5.200	12	5.21	10.00	1.33
5	IAMWARM	Ha		67.833	-	13.65	-	27.61
6	CYC			0.400	-	0.40000	-	-
7	Vermicompost training	10	10	0.385	-	0.38500	-	-
8	Augmenting Pulses production through enhanced subsidy		-	6.468	-	5.106	-	-

Sl. No.	Schemes / Project title	Unit	2012-13		2013-14		2014-15	
			Physical	Finance	Physical	Finance	Physical	Finance
			Target	Allocation	Target	Allocation	Target	Allocation
9	Tamil Nadu Cotton Cultivation Mission		-	-	-	-	-	11.061
III	**Central and State Sponsored (indicate the share)**							
1	MM-II-Intensive Cotton Development Programme 75:25		-	2.17281	**-**	**-**	**-**	**-**
S. No.	**Schemes / Project title**	**Unit**	**2012-13**		**2013-14**		**2014-15**	
			Physical	**Finance**	**Physical**	**Finance**	**Physical**	**Finance**
			Target	**Allocation**	**Target**	**Allocation**	**Target**	**Allocation**
2	MI-Intensive Cotton Development Programme 75:25		-	-	-	3.46661	-	-
2	ISOPOM- Oilseeds 75:25		-	42.334	-	13.019	-	-
3	ISOPOM- Maize 75:25		-	4.121	-	3.6206	-	-
4	Cereal Development Scheme 90:10		-	48.969	-	1.00	-	-
5	MMOOP-MM I Oilseed 75:25		-	-	-	-	-	11.545
6	NMOOP-MM III Tree borne oil seed 75:25		-	-	-	-	-	5.68
7	Others – ATMA		-	148.22	-	124.352	-	13696582

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

(₹ in lakhs)

Sl. No	Scheme / Project Title	Unit	2012 - 2013		2013 - 2014		2014 - 2015	
			Physical Target	Finance Allocation	Physical Target	Finance Allocation	Physical Target	Finance Allocation
I.	**Centrally sponsored**						**Approved Target yet to be received**	
1	**National Agriculture Development Programme**							
	a. Precision Farming	Ha	43.00	20.00				
	b. Training	No	100.00	1.00				
	c. Hi-tech productivity Enhancement	Ha	97.00	8.73				
	d. RADP	Ha			100.00	50.33		
		No			215.00			
	e. Pandal cultivation	Ha/No	4/244	6.00	4.75	9.31		
	f. Training	No			141.00	1.50		
2	National Mission on Medicinal Plants	Ha	240.00	12.00	150.00	7.50		
3	National Bamboo Mission	Ha	10.00	0.80				
II.	**State sponsored**							
1	Integrated Horticulture Development Scheme	Ha	2280.00	29.24	725.00	14.50		
III.	**Central and State sponsored (Indicate the share)**							
1	National Horticulture Mission (85:15)	Ha	833.00	107.17	562.00	107.73		
		No	630.00		948.00			
		Sq. m	1000.00		4000.00			
2	National Mission on Micro Irrigation subsidy pattern 100% for SF (50:50) 75% for others (40:35)	Ha	336.36	97.10	1080.00	74.99		
IV	World Bank Assisted							
1	IAMWARM	Ha			230.00	44.12		

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

(₹ in lakhs)

Sl.No.	Scheme / project title	2012-13			2013-14			2014-15		
		Physical		Finance	Physical		Finance	Physical		Finance
		Unit	Target	Allocation	Unit	Target	Allocation	Unit	Target	Allocation
I.	Centrally sponsored									
	Nil									
II.	State sponsored									
	IAMWARM Post Project Infrastructure and Management Training	-	-	-		4	1.2	-	-	-
	ATMA Training	-	12	1.2	-	12	1.2	-	-	-
...	**ATMA** Exposure visit	-	-	-	-	1	0.1	-	-	-
III.	Central and State sponsored (Indicate the share)									
1	National Mission on Food Processing Training, Workshop & Seminar	-	-	-	-	-	2.1225			

3.4 Yield Gap Analysis

The yields obtained by the farmers under improved technologies were recorded as progressive farms yields (achievable yield) and compared with the district level average yields for the estimation of yield gap-II. The progressive farm yields are obtained from the office of the Joint director of Agriculture and Deputy Director of Horticulture, Madurai and it is cross checked with officials in line departments. Yields obtained at district level represent the farmers average yields (actual yields) for triennium ending (2009-2011) are collected from season and crop report, Department of Economics and Statistics, Tamil Nadu.

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

3.4.1. Estimation of yield gaps

Yield gap analyses in major crops were presented variety wise in the following Table 3.8.

Paddy

It was inferred from above tables that major rice varieties cultivated in Madurai district are ADT 45, ADT 39, BPT 5204 and ASD 16. Among these varieties, ADT 45 Kg/ha and ASD 16 are cultivated in major area and overall yield gap estimated in this variety was 1923 and 1680 kg/ha, respectively. Whereas overall yield gap estimated for other varieties was estimated from 1680 kg/ha to 2243. Required annual growth rate expected to double the paddy production was worked out from 2.18 to 3.05. In nutshell, the estimated overall production for paddy crop in Madurai district would be 495926 tonnes.

Cholam

It was inferred from above tables that major varieties cultivated in Cholam in Madurai district are K6, CO (S) 28, CO (S) 30, TNAU sorghum hybrid CO 5, BSR 1, K 11, APK 1 and K Tall. Among these varieties, K6 was cultivated in major area and overall yield gap estimated in this variety was 957 kg/ha. Whereas overall yield gap estimated for other cholam varieties was estimated from 408 kg/ha to 957 kg/ha. Required annual growth rate expected to double the cholam production was worked out from 1.73 to 3.90. In nutshell, the estimated overall production for Cholam crop in Madurai district would be 28819 tonnes.

Cotton

It was inferred from above table that major varieties cultivated in Cotton in Madurai district are SVPR 2 and others. Among these varieties, SVPR 2 was cultivated in major area and overall yield gap estimated in this variety was 515 bales/ha. Whereas overall yield gap estimated for other varieties was estimated from 272 bales/ha to 515 bales/ha. Required annual growth rate expected to double the cotton production was worked out from 2.09 to 4.05. In nutshell the estimated overall production for Cotton crop in Madurai district would be 5877 tonnes bales.

Cumbu

It was inferred from above table that major varieties cultivated in Cumbu in Madurai district are Pioneer and others. Among these varieties, Pioneer was cultivated in major area and overall yield gap estimated in this variety was 1090 kg/ha. Whereas overall yield gap estimated for other varieties was estimated from 1023 Kg/ha to 1090 kg/ha. Required annual growth rate expected to double the Cumbu production was worked out from 3.74 to 3.77. In nutshell the estimated overall production for Cumbu crop in Madurai district would be 18617 tonnes.

Maize

It was inferred from above table that major varieties cultivated in Maize in Madurai district are Pioneer and others. Among these varieties, Pioneer was cultivated in major area and overall yield gap estimated in this variety was 540 kg/ha. Whereas overall yield gap estimated for other varieties was estimated from 317 kg/ha to 540 kg/ha. Required annual growth rate expected to double the Maize production was worked out from 0.71 to 1.20. In nutshell, the estimated overall production for Maize crop in Madurai district would be 16221 tonnes.

Sugarcane

It was inferred from above tables that major varieties cultivated in Sugarcane in Madurai district were CO 86032 and others. Among these varieties, CO 86032 was cultivated in major area and overall yield gap estimated in this variety is 41 tonnes/ha. Whereas overall yield gap estimated for other varieties was estimated from 20 tonnes/ha to 41 tonnes/ha. Required annual growth rate expected to double the Sugarcane production was worked out from 1.60 to 3.13. In nutshell, the estimated overall production for Sugarcane crop in Madurai district would be 494419 tonnes.

3.4.2. Yield Gap for Horticultural Crops in Madurai district

Mango

It was inferred from above table that major variety cultivated in Mango in Madurai district is Bangalora. This variety was cultivated in major area and overall yield gap estimated in this variety is 7900 kg/ha. Required annual growth rate expected to double the Mango production was worked out as 10.79. In nutshell the estimated overall production for Mango in Madurai district would be 129779 tonnes.

Banana

It was inferred from above table that major variety cultivated in Banana in Madurai district is Poovan. This variety was cultivated in major area and overall yield gap estimated in this variety is 5000 kg/ha. Required annual growth rate expected to double the Banana production is worked out as 1.04. In nutshell the estimated overall production for Banana in Madurai district would be 106026 tonnes.

Coconut

In coconut the major varieties cultivated in Madurai district are Tall and T&D. Among these varieties, Tall variety was cultivated in major area and overall yield gap estimated in this variety is 6168 nuts /ha. Whereas overall yield gap estimated for other varieties was estimated from 6168 nuts/ha to 7575 nuts/ha. Required annual growth rate expected to double the coconut production was worked out from 4.34 to 4.81. In nutshell the estimated overall production for coconut trees in Madurai district would be 1072 lakh nuts

Table 3.8 Yield gap analysis (kg/ha)

Crop	Potential yield	Progressive yield	Average yield	Yield gap I	Yield gap II	Gap I + II
I. Paddy						
a. ADT 45	8500	7526	6577	974	949	1923
b. BPT 5204	7820	7232	5802	588	1430	2018
c. JCL	8373	7165	6130	1208	1035	2243
d. ASD 16	8098	7141	6418	957	723	1680
e. ASD 39	8350	7163	6513	1187	650	1837
Others	7429	6870	5512	559	1359	1917

Crop	Potential yield	Progressive yield	Average yield	Yield gap I	Yield gap II	Gap I + II
II. Coconut						
a. Tall	18000	16446	11832	1554	4614	6168
b. T&D	20700	18900	13125	1800	5775	7575
III. Cholam						
a. K6	3000	2230	2043	770	187	957
b. Others	2372	2137	1964	235	173	408
IV. Cotton						
a. SVPR 2	1574	1326	1059	248	267	515
b. others	1355	1254	1083	101	171	272
V. Cumbu						
a. Pioneer	3500	3263	2410	237	853	1090
b. Others	3300	2581	2277	719	304	1023
VI. Maize						
a. Pioneer	4280	3864	3740	416	124	540
b. Others	4036	3877	3719	159	158	317
VII. Sugarcane						
a. CO 86032	150	142	109	8	33	41
b. CO6304	124	112	104	12	8	20
VIII. Mango						
Bangalora	14000	NA	6100		(Yield gap III) 7900	7900
IX. Banana						
Poovan	45000	NA	40000		5000	5000

Source: *Commodity Potential Report, TNAU 2015.*

3.4.3. Technological Interventions and strategies to reduce the yield gaps

The adoption of suitable high yielding varieties and crop production technologies is the pre-requisite to boost the production. The strategy for increasing the production of potential crops in Madurai district through the increase in productivity of those identified crops has already been discussed in the previous section. The productivity could be raised by growing the suitable high yielding varieties and as a consequence, the prevailing yield gap could be bridged. The specific features and the technologies for cultivating the selected high yielding varieties of the select crops are discussed in table 3.9.

Table 3.9 Technological Interventions and strategies to reduce the yield gaps for major crops in the Madurai district

S. No.	Major crops & enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention (OFT, FLD, Training, extension activity etc.)
1	Paddy	Yield reduction • Lack of suitable varieties and cultivation method • Shortage of labourers	Improved cultivation technologies, mechanization and use of high yielding varieties	i) Popularization of SRI ii) Suitable varieties - cv.CO 50 iii) Rice production through Direct Seeding through Drum Seeder as Contingent Cropping Plan iv) Mechanization - Popularization of Laser Guided Land Leveler in SRI Cultivation, Power tiller, Paddy planter and Paddy harvester.	Subsidy and Demonstration for System of Rice Intensification, Drum seeder Laser Guided Land Leveler in SRI Cultivation, Power tiller, Paddy planter and Paddy harvester may be given
		Drought condition	Direct seeding as Contingent Plan for Rice cropping in Periyar Vaigai Command Area	Cultivation of Green manure along with rice crop(SRI / Drum seeding)	GM seeds with subsidy
		Nutrient management		• Use of LCC has more advantage in N management. • Green manure and farm yard manure application will enhance the growth and yield of rice in this system approach.	Provide Nutrient analysis services
		Pest and diseases	Chemical management	Popularizing chlorantraniliprole 20SC and copper hydroxide 77 WP for management of pest and diseases of rice	Create awareness about new

S. No.	Major crops & enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention (OFT, FLD, Training, extension activity etc.)
					herbicides and chemicals
		Diseases – Blast	Suitable Management practices and resistant varieties	• Apply N in three split doses (50% basal, 25% in tillering phase and 25% N in panicle initiation stage) • Popular resistant variety CO 47. • Spray after observing initial infection of the disease, Carbendazim 50WP @ 500g/ha (or) Tricyclozole 75 WP @ 500g/ha (or) Metominostrobin 20 SC @ 500ml/ha (or) Azoxystrobin 25 SC @ 500 ml/ha • Seed Treatment with TNAU Pf 1liquid formulation @ 10 ml/kg of seeds • Seedling root dipping with TNAU Pf 1liquid formulation (500 ml for one hectare seedlings) • Soil application with TNAU Pf 1liquid formulation (500ml/ha) • Foliar spray with TNAU Pf 1liquid formulation @ 5ml/lit	Supply of resistant varieties seeds and conducting farmers trainings
		Pest – Leaf folder	Suitable management practices	• Release both *Trichogramma chilonis* (for leaf folder) and *T. japonica*(for stem borer) thrice @ 1,00,000/ha each (if moth activity is noticed) and spray *Bacillus thuringiensis* @ 1.0 kg/ha when the stem borer / leaf folder crosses ETL. • Seed treatment @ 5g/Kg of seed followed by foliar application @ 5g/l of *Beauveria bassiana* twice at 15 days interval Spray Phosalone 35 EC 1500 ml/ha (or) Chloripyriphos 20 EC 1250 ml/ha (or) Carbaryl 50 WP 1.0 kg/ha (or) Acephate 75 % SP 666-1000 ml/ha (or) Azadirachtin 0.03% 1000 ml/ha (or) Carbosulfan 6% G 16.7 kg/ha	Conduct trainings to farmers by scientists and provide inputs.

<table>
<tr><th>S. No.</th><th>Major crops & enterprises being practiced in the district</th><th>Prioritized problems in these crops/ enterprise</th><th>Title of intervention</th><th>Technology options</th><th>Proposed Intervention (OFT, FLD, Training, extension activity etc.)</th></tr>
<tr><td></td><td></td><td>Rodent infestation is causing severe damage to crops across the district</td><td>Proper management practices</td><td>i) Integrated rodent management Narrow bund maintenance (45 cm x 30 cm)
ii) Zinc phosphide baiting (49: 1)
iii) Trapping with Thanjavur bow trap (100 nos./ha)
iv) Baiting with bromodialone</td><td></td></tr>
<tr><td rowspan="4">2</td><td rowspan="4">Coconut</td><td>IPM in Coconut</td><td></td><td>• Monocrotophos-20lit
• Aggregation Pheromone Trap with septa</td><td></td></tr>
<tr><td>Yield reduction due to Drought conditions</td><td>Drip irrigation method</td><td><table><tr><th>Season</th><th>Normal condition (for best yield)</th><th>Moderate water scarcity condition</th><th>Severe water scarcity condition</th></tr><tr><td>March - September</td><td>80 lit / day</td><td>55 lit / day</td><td>27 lit/day</td></tr><tr><td>October - February</td><td>50 lit / day</td><td>35 lit/ day</td><td>18 lit /day</td></tr></table></td><td>Subsidy for drip establishment</td></tr>
<tr><td></td><td>Drought management and soil moisture conservation:</td><td>a. Mulching with coconut husks/leaves/coir pith
b. Burial of coconut husk or coir pith</td><td></td></tr>
<tr><td></td><td>Proper weed management to improve water use efficiency</td><td>a. Broad-leaved weeds - PE spraying of atrazine @1.0 kg a.i. / ha
b. Grasses & Sedges - POE spraying of glyphosate @ 10 ml and 20 g ammonium sulphate/litre of water.</td><td></td></tr>
</table>

S. No.	Major crops & enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention (OFT, FLD, Training, extension activity etc.)
3	**Cotton**	**Delayed onset of monsoon**	Contingency measures	• Seed hardening (2% KCl 5 hr) • Sowing with tractor drawn seed drill • Sowing in BBF system • Seed treatment (mix with wood ash) • Nursery Cotton var. KC 2, SVPR 2 / red gram APK1, VBN 2,3 • Run-off harvesting • Contour sowing	
			Drip fertigation		
4	**Maize**	**Rainfed condition**	Soil moisture conservation	a. Pusa Hydrogel for Soil Moisture Conservation in Rainfed Maize	Demonstration trial may be conducted in farmers field
5	**Groundnut**	**Mechanization in Groundnut cultivation**		Hiring charges and fuel charges for tractor/stripper/harvester	Subsidy for machineries (or) machinery services can be rendered to farmers given to farmers
		Rodent problem has been severe in	Proper management	i) Zinc phosphide baiting (49: 1) ii) Trapping with Thanjavur bow trap (100 nos./ha)	

S. No.	Major crops & enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention (OFT, FLD, Training, extension activity etc.)
		Chellampatti and surrounding areas of the district.		iii) Baiting with bromodialone	
6	Sugarcane	Lack of Improved varieties	High yielding varieties	• Co 92012, Co 92008, Co 93001, Co 86032, Co Si(Sc)6, Co G (Sc)5, Co C (Sc)22, CoC 24 TNAU SC Si7, TNAU SC Si 8	
			Improved technologies	Sustainable Sugarcane Initiative (SSI)	
7	Greengram	Lack of suitable varieties, crop management and value addition knowledge	ICM for Green gram (Co 7(Gg)) and Entrepreneurship Development using Value Added Green gram		
8	Gingelly		Improved technologies and varieties	Integrated crop management for White Seeded Gingelly (SVPR1)	Subsidy and demonstrations for encouraging farmers
9	Mango	Yield loss due to summer rain failure	Drought	Adopt drip irrigation method to save water	
10	Banana	Drip irrigation			
11	Guava		High yielding varieties	Popularization of drought tolerant Red Fleshed Guava Variety TRY (G)1	Availability of saplings

S. No.	Major crops & enterprises being practiced in the district	Prioritized problems in these crops/ enterprise	Title of intervention	Technology options	Proposed Intervention (OFT, FLD, Training, extension activity etc.)
12	Tomato		Seed – 2.5 kg Need based plant protection chemical and value addition materials	Seed Production and Value Addition of Tomato (PKM1) by using Seed Extractor	
13	Onion	Yield reduction due to monsoon failure	Drip irrigation to save water and management techniques	• Inline drip laterals emitting point spaced at 30 cm distance and emitting at the rate of 2LPH • Spray anti-transparent Kaolinite @ 5% to reduce water loss through transpiration	Demonstrations in farmer's field may be done.
			Improve seed production with suitable varieties	Popularization Co-5 onion for seed production (Bulb to Seed)	

CHAPTER IV

BLOCK AND DISTRICT LEVEL PLAN

The interventions proposed, the associated outlays, the physical targets, budgetary requirements, time frame for achievements in the agricultural (field crops) sector, horticultural sector, agricultural engineering sector, agricultural marketing and animal husbandry sector and fisheries sector are discussed in this chapter. This would comprehend the activities and the achievements to be made in the next five years' period (2017-2022) under NADP.

4.1. Agriculture Sector

The various development issues, constraints and activities (interventions) planned for the development of agriculture and allied sectors were discussed in earlier chapters. Based on the discussions, the district plan is outlined in this chapter indicating the activities planned and the associated targets and cost for the development of both agricultural and allied sectors

4.1.1. Paddy

4.1.1.1. Enhancing Paddy Production

In Madurai district, Paddy is cultivated in Kuruvai, Samba and Navarai season covering total area of 35,268 ha. Out of the total area under paddy, 8 per cent of the area (2817 ha.) is cultivated in Kuruvai, 85 per cent of the area (30060 ha.) is in Samba and the remaining 7 per cent area (2391 ha.) is cultivated in Navarai. The major source of irrigation is Periyar and Vaigai rivers along with tube wells, tanks and open wells. The productivity of rice is about 4649 kg/ha. The farmers are well experienced in cultivating paddy. At present direct procurement of paddy by Tamil Nadu Civil Supplies Corporation helps the farmers to realize remunerative price. The paddy straw is also valuable to the farmers as cattle feed and also has good market value. There is a scope for better water management practices in paddy cultivation in the District. The major cultivating season happens to be in Samba which coincides with the North-East monsoon for the preparation of field as well as nursery rising. In what follows the details of interventions proposed to enhance the productivity of the crop are discussed.

4.1.1.2. Project Component:

- Promotion of SRI in all blocks of Madurai district

- Production and distribution of certified seeds to all blocks of Madurai district
- Incentives for paddy machine planting
- Distribution of protrays to Alanganallur,, Chellampatti, Madurai east blocks
- Distribution of Micro nutrient mixture to all blocks except Sedapatti, T. Kallupatty and Thirumangalam blocks.
- Distribution of biofertilizer and Zinc sulphate to all blocks
- Distribution bio control agents or bio-pesticides to all blocks except Chellampatti, Kallikudi, Madurai east, Madurai west, Melur, Sedapatti and T. Kallupatty blocks.
- Application of gypsum and herbicides
- Distribution of poly vinyl coated tarpaulins to Alanganallur, Chellampatti, Madurai west and Usilampatti blocks.

4.1.1.3. Budget:

To enhance the production of paddy in this district a budget ₹.**20735.95** lakh

Expected Outcome:

It will increase the production of paddy by 10 to 15 per cent.

4.1.1.4. Implementing Agency

The projects would be implemented by the Department of Agriculture.

Table 4.1. Budget Requirement for Paddy

(₹. in lakhs)

Sl. No.	Interventions	Unit	Unit Cost (in Rs.)	Blocks	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Promotion of SRI	Ha	15000	All Blocks	3075	461.25	3230	484.50	3360	504.00	3491	523.65	3646	546.90	16802	2520.30
2	Distribution of High Yielding Varieties	MT	35000	All Blocks	251	87.85	269.6	94.36	284	99.47	290	101.37	303	106.12	1398	489.17
3	seed production - Certified class	MT	26000	All Blocks	263	68.38	282	73.32	296	76.96	305	79.30	319	82.94	1465	380.90
4	Incentives for paddy machine planting	Ha	10000	All blocks except B9, B10, B11	3270	327.00	3441	344.10	3637	363.70	3808	380.80	4004	400.40	18160	1816.00
5	Distribution of Protray	No	80	B1, B2,B5	1600	1.28	1725	1.38	1850	1.48	1975	1.58	2100	1.68	9250	7.40
6	Distribution of MN mixture/ Copper Sulphate	Ha	1000	All Blocks except B8,B9,B10	1725	17.25	1925	19.25	82020	820.20	162065	1620.65	242160	2421.60	489895	4898.95
7	Distribution of biofertilizer / PPFM / bioinputs / plant nutrient mobilizing bacteria	Ha	300	All Blocks	2950	8.85	3700	11.10	43950	131.85	84205	252.62	124555	373.67	259360	778.08
8	Distribution of Zinc sulphate (Soil application & foliar)	Ha.	1000	All Blocks	1625	16.25	1980	19.80	151980	1519.80	301940	3019.40	451940	4519.40	909465	9094.65
9	Distribution of biocontrol agents/biopesticides	Ha..	1000	All Blocks except B2, B3, B5, B6, B7, B8, B9	350	3.50	355	3.55	5260	52.60	10165	101.65	15070	150.70	31200	312.00
10	Gypsum application	Ha.	1500	B1, B2, B4, B6, B12, B13	2100	31.50	3105	46.58	4110	61.65	4815	72.23	5620	84.30	19750	296.25
11	Distribution of herbicides	Ha.	1000	B4,B6,B12, B13	325	3.25	435	4.35	545	5.45	655	6.55	765	7.65	2725	27.25
12	Polyvinyl coated Tarpaulin (6m x 5m)	No.	2000	B1,B2, B6,B12	150	3.00	150	3.00	150	3.00	150	3.00	150	3.00	750	15.00
13	Demonstration of drip irrigation	ha	100000	All Blocks	20	20.00	20	20.00	20	20.00	20	20.00	20	20.00	100	100.00
	Total					**1049.36**		**1125.29**		**3660.16**		**6182.79**		**8718.36**		**20735.95**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.2. Millets

4.1.2.1. Enhancing Millets Production in the Madurai District

In Madurai district, millets are cultivated approximately in an area of 20941 ha, mostly under rainfed condition. Since nutritional awareness has increased, importance should be given to increase the area, production and productivity under millets. In Madurai district, there is a good scope for cultivation of millets especially maize and cumbu. Sorghum cultivation is also gaining momentum in rainfed areas. In blocks like Vadipatti, Alanganallur, Tirumangalam, Sedapatti, soils are suitable for cultivation of maize and other millets.

4.1.2.2. Project Component:

- Expansion of area under minor millets in Thirumangalam, Thirupparankundram and Vadipatti blocks.
- Formation of small millet groups in Thirumangalam block.
- Demonstration of seed treatment
- Supply of sorghum, maize, ragi seeds, Micro nutrient mixture to Sedapatti, T. Kallupatty, Thirumangalam and Vadipatti blocks.
- Distribution of bio-fertilizers to Thirumangalam, Thirupparankundram and Vadipatti blocks.

4.1.2.3. Budget:

The budget requirement to enhance the production of millet in this district is ₹.**567.09** lakh.

Expected Outcome:

Demonstration of good cultivation practices by way of demonstration and training in the leading farmers holdings with the help of local extension officials. Hence demonstration of various processing and value added products will help the tribal community to improve their livelihood. It will increase the production of millets by 10 to 15 per cent.

4.1.2.4. Implementing Agency:

The projects would be implemented by the Department of Agriculture.

Table 4.2. Budget Requirement for Millets Production

(₹. in lakhs)

Sl. No.	Components	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Millets															
1	Expansion of area under Minor Millets (Demo - supply of seed, seed treatment, MN mixture & Organic package)	Ha	0.05	B10, B11, B13	250	12.50	250	12.50	250	12.50	250	12.50	250	12.50	1250	62.50
2	Formation of small millet groups	Nos.	0.2	B10	2	0.40	2	0.40	2	0.40	2	0.40	2	0.40	10	2.00
3	Soil moisture conservation practices	Ha	0.05	All Blocks	150	7.50	150	7.50	150	7.50	300	15.00	125	6.25	875	43.75
4	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
	Sorghum															
5	Demonstration (Supply of seed, seed treatment, MN mixture & Organic package)	Ha	0.05	B8, B9	200	10.00	200	10.00	200	10.00	200	10.00	200	10.00	1000	50.00
	Maize															
11	Demonstration (Supply of seed, seed treatment & MN mixture, organic	Ha	0.05	B9, B10, B13	500	25.00	500	25.00	600	30.00	600	30.00	700	35.00	2900	145.00

Sl. No.	Components	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	package)															
	Ragi															
23	Demonstration (supply of seed, seed treatment, MN mixture & organic package)	Ha	0.05	B10	50	2.50	50	2.50	50	2.50	50	2.50	50	2.50	250	12.50
24	Distribution of biofertilizers - Liquid / Carrier	Ha	0.003	B10, B11, B13	1101	3.30	1201	3.60	1301	3.90	1401	4.20	1501	4.50	6505	19.52
25	Distribution of MN mixture	Ha	0.007	B10, B11, B13	150	1.05	175	1.23	200	1.40	225	1.58	225	1.58	975	6.83
26	Seed Distribution	MT	0.66	B11	50	33.00	50	33.00	50	33.00	50	33.00	50	33.00	250	165.00
	Total					**107.25**		**107.73**		**113.20**		**121.18**		**117.73**		**567.09**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.3. Pulses

4.1.3.1. Enhancing Pulses Production in the Madurai District

In Madurai district, pulses are cultivated in an area of around 8023 ha during the months of June - July. The soil is highly suitable for cultivation of pulses. The South-West monsoon is irregular in most of the times leading to poor yield and loss to the farmers. The average productivity is 670 Kgs/ha. Farmers are well experienced in pulses cultivation under rain fed areas and suitable interventions will help the farmers to grow the crops on scientific lines to increase the yield.

4.1.3.2. Project Component

- Demonstration for pure crop of green gram and black gram in Sedaptti, T. Kallupatty and Vadipatti blocks.
- Distribution of plant protection chemicals, yellow sticky trap, weedicide, soil and seed treatment chemicals.
- Production and distribution of certified seeds to all blocks
- Distribution of gypsum to Madurai east, Melur, Thirumangalam, Thirupparankundram and Vadipatti blocks.
- Distribution of biofertilizers and seed treatment chemicals to all blocks.
- Provision of DAP spray to all blocks except Alanganallur and Chellampatty blocks.

4.1.3.3. Budget:

The budget requirement to enhance the production of pulses in this district is ₹ **653.09** lakh

4.1.3.4. Expected Outcome

It enhances quality seed availability at a right time and right place and also increases the pulses production by 15-20 per cent.

4.1.3.5. Implementing Agency:

The projects would be implemented by the Department of Agriculture.

Table 4.3. Budget Requirement for Pulses Production

(₹. 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
1	Production of Foundation/ Certified pulses seeds	MT	86000	B4, B5, B6, B7, B8, B9, B10, B11, B12, B13	38	32.68	42	36.34	46	39.30	48	41.24	52	44.29	225	193.84
2	Distribution of Certified Seeds	MT	100000	All Blocks	37	37.00	41	40.75	44	43.70	46	46.45	50	50.00	218	217.90
3	Distribution of Gypsum	ha	400	B5, B7, B10, B11, B13	262	1.05	299	1.20	326	1.30	358	1.43	385	1.54	1630	6.52
4	Distribution of Biofertilizer/ Organic packages (Rhizobium + Phosphobacteria) - Liquid / Carrier	Ha	600	All Blocks	730	4.38	775	4.65	822	4.93	917	5.50	965	5.79	4209	25.25
5	Distribution of Micro Nutrients(5 kgs/ Ha)	Ha	350	B5,B7,B10, B11, B12, B13	360	1.26	395	1.38	430	1.51	490	1.72	525	1.84	2200	7.70
6	DAP Spray	Ha	700	All Blocks except B1, B2	1810	12.67	1870	13.09	1945	13.62	2005	14.04	2075	14.53	9705	67.94
7	Distribution of Yellow sticky trap /pheromone trap	ha	1000	B5,B11	60	0.60	70	0.70	80	0.80	90	0.90	100	1.00	400	4.00
8	Distribution of weedicide	Ha	1000	B10	50	0.50	50	0.50	50	0.50	50	0.50	50	0.50	250	2.50
9	Plant Protection Chemicals	Ha	1000	B5,B10, B13	260	2.60	320	3.20	380	3.80	440	4.40	500	5.00	1900	19.00
10	Seed treatment and soil application with Trichoderma viridi	Ha	700	All Blocks except B1, B2, B3,B5, B7	275	1.93	275	1.93	275	1.93	275	1.93	275	1.93	1375	9.63

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
11	Pure crop demonstration - Black gram and green gram	Ha	6300	B8, B9, B13	300	18.90	300	18.90	300	18.90	300	18.90	300	18.90	1500	94.50
12	Seed treatment with chemicals	Ha	250	All Blocks	345	0.86	345	0.86	345	0.86	345	0.86	345	0.86	1725	4.31
	Total					**114.43**		**123.49**		**131.15**		**137.86**		**146.17**		**653.09**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.3. Oilseeds

4.1.3.1. Enhancing Oilseeds Production

There is a good scope for increasing the area and productivity of irrigated and rainfed oilseed crops. Soils of Madurai district are highly suitable for the cultivation of oilseeds. The farmers are also well experienced in cultivation and marketing aspects. The climate is also suitable for drying and oil milling. In Madurai district, groundnut is cultivated as rainfed crop during July and as irrigated crop during the month of January and February. The source of irrigation is mainly ground water. The total area under groundnut in this district is 2100 ha. The present productivity level of groundnut is 2146 kg/ha. There is good scope for increasing the yield in groundnut both in irrigated and rainfed conditions.

4.1.4.2. Project Component:

- Production of foundation and certified seeds
- Distribution of certified seeds to Kallikudi and Thirupparanundram blocks
- Application of gypsum to groundnut crop in kallikudi, Madurai east, Thirumangalam and Vadipatti blocks.
- Distribution of power operated groundnut stripper to all blocks.
- Distribution of light traps and pheromone traps to Madurai east and Vadipatti blocks.
- Distribution of biopesticide/ fungicide, seed treatment chemicals and bio agents to Madurai east, T. Kallupatty, Thirumangalam, Thirupparankundram, Usilampatti and Vadipatti blocks.

4.1.4.3. Budget:

To enhance the production of oilseeds in this district, a budget ₹. **6332.76** lakh is required.

4.1.4.4. Expected Outcome:

Immediate output would be increasing the oilseed especially groundnut yield per hectare so as to improve the production further at State level. Based on the profitability in oilseed cultivation, it is expected that the oilseed area would increase from 15 to 20 per cent from the exiting area under oilseed especially groundnut cultivation.

4.1.4.5. Implementing Agency:

The projects will be implemented by the Department of Agriculture.

Table 4.4. Budget Requirement Oilseeds Production

(₹. in lakhs)

Sl. No.	Interventions	Unit	Unit Cost (in Lakhs.)	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	**OILSEEDS**															
1	Polythene mulch Inclusive of erection	Ha	0.5	B5, B10	51	25.50	52	26.00	53	26.50	54	27.00	55	27.50	265	132.50
2	Bio pesticide/ fungicide	Ha	0.01		25	0.25	30	0.30	35	0.35	40	0.40	45	0.45	175	1.75
3	Micro irrigation (Rain gun / Micro sprinkler)	Ha	0.55		50	27.50	50	27.50	45	24.75	50	27.50	75	41.25	270	148.50
4	Distribution of IPM kit	Nos.	0.1	All Blocks	1000	100.00	500	50.00	1000	100.00	500	50.00	1000	100.00	4000	400.00
5	Growth regulator / DAP	Ha	0.005	All Blocks	500	2.50	500	2.50	100	0.50	100	0.50	150	0.75	1350	6.75
	GROUNDNUT															
6	Strengthening seed chain by foundation seed production	Mt	0.76	B5, B9, B10, B11, B12, B13	14	10.64	17.5	13.30	20.5	15.58	23.5	17.86	25.8	19.61	101.3	76.99
7	Strengthening seed chain by certified seed production	Mt	0.73	B6, B9, B10, B11, B13	524	382.52	578	421.94	630	459.90	685	500.05	737	538.01	3154	2302.42
8	Distribution of Certified seeds	Mt	0.84	B3, B11	516	433.44	568.5	477.54	619	519.96	672	564.48	722	606.48	3097.5	2601.90
9	Distribution of Seed Treatment Chemicals and Bio-agents (T.Viridi)	Kg	0.0015	B5, B6, B8, B9, B10, B11, B13	100	0.15	110	0.17	120	0.18	125	0.19	135	0.20	590	0.89
10	Application of Gypsum to Groundnut Crop	Ha	0.016	B3, B5, B10, B13	2245	35.92	4265	68.24	6305	100.88	7325	117.20	8340	133.44	28480	455.68

Sl. No.	Interventions	Unit	Unit Cost (in Lakhs.)	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 Micro Nutrient Mixture	Ha	0.015	B5, B6, B8, B10, B11	645	9.68	950	14.25	1255	18.83	1560	23.40	1865	27.98	6275	94.13
12	Distribution of Bio-fertilizer	Ha	0.006	B5, B10, B11, B13	205	1.23	255	1.53	305	1.83	355	2.13	405	2.43	1525	9.15
13	Distribution of Liquid Bio-fertilizer	Ha	0.006	B11, B13	120	0.72	175	1.05	230	1.38	285	1.71	340	2.04	1150	6.90
14	Distribution of Rhizobium/ PSB Culture	Ha	0.006	B5, B10	100	0.60	155	0.93	210	1.26	265	1.59	320	1.92	1050	6.30
15	Distribution of Pheromone Traps	Nos.	0.02	B5, B13	610	12.20	620	12.40	630	12.60	640	12.80	650	13.00	3150	63.00
16	Distribution of Light Traps	Nos.	0.02	B13	3	0.06	5	0.10	8	0.16	10	0.20	12	0.24	38	0.76
17	Combined Nutrient Spray	Ha	0.015	B5, B10, B13	62	0.93	69	1.04	76	1.14	82	1.23	88	1.32	377	5.66
18	Distribution of Power Operated Groundnut Stripper	Nos.	1.3	All Blocks	1	1.30	2	2.60	3	3.90	4	5.20	5	6.50	15	19.50
	Total					**1045.14**		**1121.38**		**1289.70**		**1353.44**		**1523.12**		**6332.76**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.4. Cotton

4.1.4.1. Enhancing Cotton Production

Cotton is cultivated in this district during summer as well as winter seasons. Seventy seven per cent of the cotton area falls under rainfed condition and the rest 23 per cent is under irrigated condition. The area under cotton is 5895 ha in the district. Major area under cotton is covered by varieties like MCU5, SVPR-2 and Bt Cotton is getting popular now. There is a good scope for increasing the area and productivity of cotton crop. The district has suitable soil and climatic conditions for the cultivation of cotton. The farmers are also well experienced in cotton cultivation. Direct sown cotton is very popular in the tracts of Tirumangalam and Usilampatti Taluks covering six blocks.

4.1.4.2. Project Component:

- Distribution of bio-fertilizers, bio-pesticides, bio agents and micro nutrient mixture.
- Conducting field days in Thirupparanundram block.
- Cotton seed treatment demonstration in Sedapatti, T.Kallupatty, Thirumangalam and Thirupparankundram blocks.
- Distribution of yellow sticky trap to Thirupparankundram block.
- Exposure visits and farmers training.
- Soil reclamation with gypsum and summer ploughing to be established in Sedapatti, T. Kallupatty and Thirumangalam blocks.

4.1.4.3. Budget:

The budget requirement to enhance the production of cotton in this district is ₹.234.15 lakh.

4.1.4.4. Expected Outcome:

It is expected that the cotton area and productivity would be increased by 10 to 15 per cent.

4.1.4.5. Implementing Agency:

The projects would be implemented by the Department of Agriculture.

Table 4.5. Budget Requirement Cotton Production

(₹. in lakhs)

Sl. No	Components	Unit	Unit Cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Cotton seed treatment	Ha	300	B8, B9, B10, B11	275	0.83	275	0.83	275	0.83	275	0.83	275	0.83	1375	4.13
2	Distribution of biofertilizer	Ha	300	B8, B9, B10, B11, B12, B13	265	0.80	275	0.83	285	0.86	295	0.89	305	0.92	1425	4.28
3	Distribution of biopesticides / Bio agents	Ha	1000	B11, B13	70	0.70	75	0.75	80	0.80	85	0.85	90	0.90	400	4.00
4	Distribution of MN Mixture	Ha	1000	B8, B9, B10, B11, B12, B13	140	1.40	145	1.45	150	1.50	155	1.55	160	1.60	750	7.50
5	Distribution of Pheromone trap	No	6000	B11	50	3.00	50	3.00	50	3.00	50	3.00	50	3.00	250	15.00
6	Distribution of PP chemicals	Ha	1000	B8, B9, B10,B12	160	1.60	160	1.60	160	1.60	160	1.60	160	1.60	800	8.00
7	Distribution of Yellow Sticky trap	No	3000	B11	50	1.50	50	1.50	50	1.50	50	1.50	50	1.50	250	7.50
8	Exposure visits	No	40000	B10, B13	2	0.80	2	0.80	2	0.80	2	0.80	2	0.80	10	4.00
9	Farmers training	No	20000	B8, B9, B10, B11,B12, B13	10	2.00	10	2.00	10	2.00	10	2.00	10	2.00	50	10.00
10	Field days	No	10000	B13	2	0.20	2	0.20	2	0.20	2	0.20	2	0.20	10	1.00
11	Intercropping with pulses	Ha	10000	B8, B9, B10,B11, B13	195	19.50	200	20.00	205	20.50	210	21.00	215	21.50	1025	102.50
12	Promotion of precision farming in cotton -WSF	Ha	50000	B13	1	0.50	1	0.50	1	0.50	1	0.50	1	0.50	5	2.50
13	Soil reclamation with gypsum	Ha	1000	B8, B9, B10	150	1.50	150	1.50	150	1.50	150	1.50	150	1.50	750	7.50
14	Summer ploughing	Ha	7500	B8, B9, B10	150	11.25	150	11.25	150	11.25	150	11.25	150	11.25	750	56.25
	Grand total					**45.57**		**46.20**		**46.83**		**47.46**		**48.09**		**234.15**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.5. Sugarcane

4.1.5.1. Enhancing Sugarcane Production in the Madurai District

Sugarcane is one of the important cash crops and a perfect gift to mankind. Increasing the productivity, reducing the cost of production, integrated farming, farm level processing, proper value addition, product diversification and byproduct utilization coupled with effective marketing strategies and market promotional activities can definitely make the sugarcane industry more competitive and sustainable in the state of Tamil Nadu. There exist wide variations in the productivity of sugarcane in Madurai district. In this district, the yield levels are considerably lower. The low yield per hectare in most of the areas in the district needs the application of science - based production technologies

4.1.6.2. Project Component:

- Distribution of biofertilizer and weedicide
- Distribution of $FeSo_4$ and $ZnSo_4$ for spray in all blocks except Alanganallur, Kallikudi and Thirumangalam blocks.
- Distribution of micro nutrient mixture and water soluble fertilizer.
- Establishment of micro irrigation (Drip) to Alanganallur, Madurai east, Melur, Sedapatti and T. Kallupatty blocks.
- Trash mulching
- State level training for sugarcane cultivation
- Under sustainable sugarcane initiative, the establishment of shade net and single bud seedling distribution to all blocks except Alanganallur, Kallikudi and Thirumangalam.

4.1.6.3. Budget:

To enhance the production of sugarcane in this district a budget ₹716.48 lakh is required.

4.1.6.4. Expected Outcome:

Minimum of 5 to 10 tonnes increase in cane production per hectare could be achieved.

4.1.6.5. Implementing Agency:

The projects would be implemented by the Department of Agriculture.

Table 4.6. Enhancing Sugarcane Production in the Madurai District

(₹. in lakhs)

Sl. No	Components	Unit	Unit Cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Distribution of bio-fertilizer (Ha)	Ha	0.006	B6, B11, B12, B13	200	1.20	200	1.20	200	1.20	200	1.20	200	1.20	1000	6.00
2	Distribution of weedicide (Ha)	Ha	0.01	B2, B4, B6,B11, B12, B13	60	0.60	60	0.60	60	0.60	60	0.60	60	0.60	300	3.00
3	Distribution of FeSO4 Spray	Ha	0.005	All Blocks except B1, B3, B10	320	1.60	320	1.60	320	1.60	320	1.60	320	1.60	1600	8.00
4	Distribution of ZnSO4 Spray	Ha	0.005	All Blocks except B1, B3, B10	620	3.10	620	3.10	620	3.10	620	3.10	620	3.10	3100	15.50
5	Distribution of Micro Nutrient Mixture	Ha	0.02	B2,B4,B6,B11 , B12, B13	150	3.00	150	3.00	150	3.00	150	3.00	150	3.00	750	15.00
6	Distribution of Water Soluble Fertilisers	ha	0.25	B4,B6, B11, B12, B13	125	31.25	135	33.75	150	37.50	165	41.25	175	43.75	750	187.50
7	Micro irrigation - Drip (1.2x0.6)	ha	1.24	B1,B5,B7, B8, B9	35	43.40	40	49.60	40	49.60	40	49.60	45	55.80	200	248.00
	Sustainable Sugarcane Initiative (SSI)															
8	A. Establishment of Shade net	Nos	1.5	B2,B4,B6,B11 , B12, B13	6	9.00	5	7.50	5	7.50	6	9.00	5	7.50	27	40.50
9	B. Distribution of Single Bud Seedling	Ha	0.225	All Blocks except B1, B3, B10	155	34.88	155	34.88	155	34.88	155	34.88	155	34.88	775	174.38
10	Trash Mulching	Ha	0.04	B1	30	1.20	30	1.20	30	1.20	35	1.40	40	1.60	165	6.60
11	State Level training in Sugarcane cultivation	No	0.4	B1, B2,B4,B6, B11, B12, B13	6	2.40	6	2.40	6	2.40	6	2.40	6	2.40	30	12.00
	Grand Total					**131.63**		**138.83**		**142.58**		**148.03**		**155.43**		**716.48**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.6. Coconut

4.1.6.1. Enhancing Coconut Production

In Madurai, coconut occupies an area of 11,222 ha. Yield decline due to old varieties causes economic loss to the farmers. Distribution of high yielding coconut seedlings from the State Horticulture Farm and Research Stations, Training and demonstrations on package of practices on coconut cultivation are essential to increase the coconut production in this district.

4.1.7.2. Project Component:

- Distribution of T×D hybrid seedlings to all blocks.
- Distribution of tall seedlings to all blocks except Usilampatti.
- Replanting and Rejuvenation o0f coconut gardens in Madurai east and Vadipatti blocks
- Distribution of power operated rocker sprayer, solar copra drier to Madurai east blocks
- Distribution of pheromone traps for red palm weevil or rhinoceros beetle to Thirupparankundram block
- Establishment of intercropping with green manures in Madurai east, Melur and Vadipatti blocks
- Management of black headed caterpillar and Thanjavur wilt in Madurai east block
- Corpus fund release for FPG to all blocks except Usilampatti

4.1.7.3. Budget:

The budget requirement to enhance the production of coconut in this district is ₹ 2202.56 lakh

4.1.7.4. Expected Outcome:

Increase in coconut production per hectare could be achieved.

4.1.7.5. Implementing Agency:

The projects would be implemented by the Department of Agriculture.

Table 4.7. Budget Requirement for Coconut Production

(₹. in Lakhs)

Sl. No	Components	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Distribution of T x D hybrid seedlings	No	0.0006	All Blocks	5450	3.27	5700	3.42	6050	3.63	6300	3.78	6550	3.93	30050	18.03
2	Distribution of Tall Seedlings	No	0.0004	All Blocks except B12	5450	2.18	5900	2.36	6350	2.54	6700	2.68	7050	2.82	31450	12.58
3	Boom sprayer	No	0.2000	B12	25	5.00	25	5.00	25	5.00	25	5.00	25	5.00	125	25.00
4	Distribution of MN mixture	Ha	0.1000	B5,B7, B11, B12, B13	520	52.00	645	64.50	752	75.20	857	85.70	965	96.50	3739	373.90
5	Distribution of Pheromone traps for Red palm weevil/ Rhinocerous beetle	Ha	0.0160	B11	10	0.16	10	0.16	10	0.16	10	0.16	10	0.16	50	0.80
6	Distribution of power operated rocker sprayer	No	0.1000	B5	17	1.70	19	1.90	21	2.10	23	2.30	25	2.50	105	10.50
7	Distribution of Solar copra drier	No	0.2000	B5	2	0.40	4	0.80	5	1.00	6	1.20	7	1.40	24	4.80
8	Drip irrigation	Ha	0.3500	B5	6	2.10	8	2.80	10	3.50	11	3.85	13	4.55	48	16.80
9	Intercropping with green manures	Ha	0.0300	B5,B7, B13	17	0.51	19	0.57	31	0.93	33	0.99	35	1.05	135	4.05
10	Management of Black headed caterpillar	Ha	0.0500	B5	5	0.25	7	0.35	9	0.45	11	0.55	13	0.65	45	2.25
11	Replanting and Rejunation of coconut gardens	Ha	0.4500	B5, B13	150	67.50	210	94.50	270	121.50	330	148.50	390	175.50	1350	607.50
12	Thanjavur wilt management (root feeding /soil application)	Ha	0.0300	B5	5	0.15	7	0.21	9	0.27	11	0.33	13	0.39	45	1.35
13	corpus fund release for FPG (2000 nos.)	No	5.0000	All Blocks except B12	45	225.00	45	225.00	45	225.00	45	225.00	45	225.00	225	1125.00
	Grand Total					**360.22**		**401.57**		**441.28**		**480.04**		**519.45**		**2202.56**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.8.1. 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 Farmers can 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
- State level and interstate level training programmes to farmers
- District level training to farmers
- Awareness campaigns
- Exposure visits

Budget

It is proposed to incur ₹. 74.20 lakh over a period of five years with the finance facilities under the NADP and other sources.

Expected outcome

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

Implementing Agency

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

Table 4.8. Budget requirement for training

(₹. in lakhs)

Sl. No	Components	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
	Training of Farmers															
1	Inter State Training of Farmers	Nos.	1.25	B1, B2	0	0.00	1	1.25	0	0.00	1	1.25	0	0.00	2	2.50
2	Inter State Training of Farmers	Nos.	1.75	B1,B5	0	0.00	1	1.75	1	1.75	0	0.00	1	1.75	3	5.25
3	Within the district training of Farmers	Nos.	0.1	B1,B5	4	0.40	6	0.60	7	0.70	8	0.80	9	0.90	34	3.40
4	Within the State training of Farmers	Nos.	1.2	B5, B6	1	1.20	2	2.40	1	1.20	2	2.40	0	0.00	6	7.20
	Training of Farmers With in the district															
5	Awareness campaigns	Nos.	0.1	B5,B10,B11, B12, B13	25	2.50	29	2.90	32	3.20	35	3.50	38	3.80	159	15.90
6	Cotton	Nos.	0.1	B9	1	0.10	1	0.10	1	0.10	1	0.10	1	0.10	5	0.50
7	Groundnut	Nos.	0.1	B5,B6,B9,B11, B12, B13	9	0.90	10	1.00	11	1.10	12	1.20	13	1.30	55	5.50
8	Major & Minor Millets	Nos.	0.1	B10,B13	5	0.50	5	0.50	5	0.50	5	0.50	5	0.50	25	2.50
9	Paddy	Nos.	0.1	B1,B2,B3,B4 ,B5, B6,B7, B8,B13	23	2.30	28	2.80	30	3.00	33	3.30	36	3.60	150	15.00
10	Pulses	Nos.	0.1	B5,B6,B7,B8 ,B9,B10, B11, B12, B13	14	1.40	15	1.50	17	1.70	19	1.90	21	2.10	86	8.60
11	Sugarcane	Nos.	0.1	B4,B11, B12, B13	5	0.50	6	0.60	7	0.70	8	0.80	9	0.90	35	3.50
	Exposure visit of Farmers		0.4													
12	Rodent Pest Management Demonstration	Nos.	0.04	B1	5	0.20	5	0.20	5	0.20	5	0.20	5	0.20	25	1.00

Sl. No	Components	Unit	Unit Cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
13	Within State Exposure visit	Nos.	0.4	B1	0	0.00	0	0.00	1	0.40	0	0.00	1	0.40	2	0.80
14	Within the district exposure visit	Nos.	0.15	B1,B6,B9,B13	3	0.45	4	0.60	3	0.45	4	0.60	3	0.45	17	2.55
	TOTAL					**10.45**		**16.20**		**15.00**		**16.55**		**16.00**		**74.20**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.9. Infrastructure

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

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

Project components:

- Tonnage for all blocks
- Moisture meter and bag closure for all blocks
- Office furnishings and other amenities to all blocks
- Distribution of seed rack and tarpaulin for all blocks

Budget

It is proposed to incur ₹. **767.40** lakh over a period of five years with the finance facilities under the NADP and other sources.

Expected outcome

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

Implementing Agency

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

Table 4.9. Budget requirement for Infrastructure

(₹. in lakhs)

Sl. No.	Components	Unit	Unit Cost (in Rs.)	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Dunnage	Nos.	7500	All Blocks	85	6.38	80	6.00	85	6.38	80	6.00	90	6.75	420	31.50
2	Moisture meter	Nos.	25000	All Blocks	13	3.25	0	0.00	0	0.00	0	0.00	0	0.00	13	3.25
3	Bag closure	Nos.	10000	All Blocks	13	1.30	0	0.00	0	0.00	0	0.00	0	0.00	13	1.30
4	Electronic platform balance	Nos.	150000	All Blocks	13	19.50	0	0.00	0	0.00	0	0.00	0	0.00	13	19.50
5	Seed rack	Nos.	30000	All Blocks	26	7.80	26	7.80	0	0.00	0	0.00	0	0.00	52	15.60
6	Tarpaulin	Nos.	25000	All Blocks	13	3.25	13	3.25	13	3.25	13	3.25	13	3.25	65	16.25
7	Office Furnishings and other amenities	Nos.	200000	All Blocks	13	26.00	13	26.00	13	26.00	13	26.00	13	26.00	65	130.00
8	Strengthening of training institute / nursery / FTC / KVK	Nos.	50000000	All Blocks	0	0.00	0	0.00	0	0.00	1	500.00	0	0.00	1	500.00
9	Infrastructure for empowerment of coconut nurseries	Nos.	5000000	All Blocks		0.00	0	0.00	0	0.00	0	0.00	1	50.00	1	50.00
	Grand total					**67.48**		**43.05**		**35.63**		**535.25**		**86.00**		**767.40**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.10. 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 especially gypsum and lime have to be provided at subsidized rates as a reclamation measure for the cultivable acid and alkali soils. Besides, efficient earthworm cultures should be provided for vermicompost unit by providing subsidy for establishment of vermicompost units with training in vermicompost.

Project Component:

- Reclamation of acid and alkali soils in Alanganallur, Chellampatti, Melur, T.Kallupatty, Usilampatti and Vadipatti blocks
- Distribution of enriched press mud and blue green algae to Vadipatti block
- Establishment of permanent and HDPE vermicompost units to all blocks except Thirupparankundram block
- Establishment of model organic villages in Usilampatti block
- Distribution of soil health card to Madurai east block

Budget:

Enhancing soil health by distributing enriched farm yard manure, micro-nutrient mixture, gypsum and bio-fertilizers is essential to maximize profitability. The overall budget to undertake the various interventions in Madurai district is ₹.3404.18 lakh.

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 would be implemented by the Department of Agriculture.

Table 4.10. Budget requirement for Soil Health Management

(₹. in lakhs)

Sl. No	Components	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
	Soil Health Management															
1	Permanent Vermi compost units	Cluster Nos.	50000	All Blocks except B11, B12, B13	56	28.00	52	26.00	58	29.00	54	27.00	60	30.00	280	140.00
2	HDPE Vermi compost units	Kit Nos	12000	All Blocks except B11	70	8.40	75	9.00	70	8.40	75	9.00	70	8.40	360	43.20
3	Reclamation of Alkali Soil	MT	50000	B1, B2, B7,B9, B12, B13	195	97.50	215	107.50	245	122.50	245	122.50	245	122.50	1145	572.50
4	Reclamation of Acid Soil	L. No.	6000	B12	50	3.00	50	3.00	50	3.00	50	3.00	50	3.00	250	15.00
5	Green Manuring	Nos	4000	B1, B2, B3, B4, B6, B7	300	12.00	300	12.00	300	12.00	300	12.00	300	12.00	1500	60.00
6	Establishment of Model organic villages	Ha	1000000	B12	50	500.00	50	500.00	50	500.00	50	500.00	50	500.00	250	2500.00
7	Distribution of Soil Health Card	Ha	300	B5	400	1.20	700	2.10	900	2.70	1100	3.30	1300	3.90	4400	13.20
8	Distribution of Enriched Press mud (37.5 Mt/ha)	units	1000	B13	4014	40.14	500	5.00	500	5.00	514	5.14	500	5.00	6028	60.28
	Total					**690.24**		**664.60**		**682.60**		**681.94**		**684.80**		**3404.18**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.11. 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 in rainfed areas 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. This would restore 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

- Promotion of Farmers club for Sustainable Dryland Agriculture in Madurai east, Sedapatti, T. Kallupatty, Thirumangalam, Thirupparankundram, Usilampatti and Vadipatti blocks

Budget

It is proposed to incur ₹. 1698.83 lakh over a period of five years with the finance facilities under the NADP and other sources.

Expected outcome

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

Implementing Agency

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

Table 4.11.Budget requirement for Rainfed Area Development

(₹. in lakhs)

Sl. No	Components	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Promotion of Farmers club for Sustainable Dryland Agriculture	Cluster	84.9415	B5, B8, B9, B10, B11, B12, B13	15	1274.12	5	424.71	0	0.00	0	0.00	0	0.00	20	1698.83
	Total					**1274.12**		**424.71**		**0.00**		**0.00**		**0.00**		**1698.83**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.12. Integrated Pest Management (IPM)

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

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

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

Project components

1. Establishment of Farmers Field Schools (FFS) in all blocks
2. Field days
3. Establishment of Bio-pesticide production unit in all blocks
4. IPM School in all blocks

Budget

The budget requirement for fulfilling the above intervention is ₹. 1261.60 lakh.

Expected outcome

The projects will provide better knowledge to improve their plant protection methods which will improve the yield of the crops.

Implementing Agency

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

Table 4.12. Budget requirement for IPM

(₹. in lakhs)

Sl. No	Components	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	Farmers Field Schools (FFS)	Nos.	20000	All Blocks	15	3.00	15	3.00	15	3.00	15	3.00	13	2.60	73	14.60
2	Field days	No.	20000	All Blocks	13	2.60	13	2.60	13	2.60	13	2.60	13	2.60	65	13.00
3	Establishment of Bio-pesticide production unit	Nos.	12000000	All Blocks	0	0.00	0	0.00	10	1200.00	0	0.00	0	0.00	10	1200.00
4	IPM School	Nos.	40000	All Blocks	16	6.40	17	6.80	17	6.80	17	6.80	18	7.20	85	34.00
	Total					**12.00**		**12.40**		**1212.40**		**12.40**		**12.40**		**1261.60**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.13. 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 Madurai district.

Project Component:

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

Budget:

Agricultural mechanization programs are proposed to implement in a big way to increase the agricultural production and to popularize the agricultural machinery among the farmers of this district with a budget of ₹.2075.20 lakh.

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 would be implemented by the Department of Agriculture.

Table 4.13. Budget requirement for Farm Mechanization

(₹. in lakhs)

Sl. No	Components	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
	Farm Mechanization															
1	Power operated sprayer	Nos.	8000	All Blocks except B8	107	8.56	123	9.84	142	11.36	143	11.44	151	12.08	666	53.28
2	Hand operated sprayer	Nos.	1500	All Blocks except B1, B2, B3, B8, B9	112	1.68	122	1.83	133	2.00	144	2.16	154	2.31	665	9.98
3	Distribution of combine harvester	Nos	1700000	B5	1	17.00	0	0.00	0	0.00	0	0.00	0	0.00	1	17.00
4	Distribution of Manual Weeder	Nos	2000	B5	12	0.24	24	0.48	36	0.72	48	0.96	60	1.20	180	3.60
5	Distribution of Mini Tractor	Nos	300000	B5, B13	3	9.00	5	15.00	7	21.00	10	30.00	12	36.00	37	111.00
6	Distribution of Mobile Sprinklers	Ha	30000	B5	2	0.60	3	0.90	4	1.20	5	1.50	6	1.80	20	6.00
7	Distribution of Paddy transplanter	Nos	1200000	All Blocks	1	12.00	2	24.00	3	36.00	4	48.00	5	60.00	15	180.00
8	Distribution of Power tiller	Nos	150000	All Blocks except B10, B11	76	114.00	86	129.00	87	130.50	90	135.00	93	139.50	432	648.00
9	Distribution of Pumpset	Nos	30000	B4, B13	3	0.90	5	1.50	6	1.80	8	2.40	9	2.70	31	9.30
10	Distribution of Rain guns	Ha	40000	B1, B2,B4,B5,B8, B9, B10, B11, B13	66	26.40	70	28.00	73	29.20	77	30.80	79	31.60	365	146.00
11	Distribution of Rotavator	Nos	80000	All Blocks	54	43.20	62	49.60	70	56.00	79	63.20	87	69.60	352	281.60
12	Distribution of Tarpaulins	Nos	8000	All Blocks except B8, B9	178	14.24	193	15.44	207	16.56	220	17.60	235	18.80	1033	82.64
13	PVC Pipes to carry Irrigation water from source to field	Unit	40000	All Blocks	179	71.60	195	78.00	217	86.80	239	95.60	262	104.80	1092	436.80
14	Solar power pump system	Nos	600000	B5	1	6.00	2	12.00	3	18.00	4	24.00	5	30.00	15	90.00
	Total					**325.42**		**365.59**		**411.14**		**462.66**		**510.39**		**2075.20**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.14. 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 in pulses and oilseeds was that most of the private and multinational companies are concentrating on high value and low volume crops like hybrid cotton, millets and vegetables whereas only public institutions are producing and marketing high volume and low value crops like pulses and oilseeds. Hence, high emphasis has to be given for the production and supply of quality seeds of pulses and oilseeds to farmers and increase the Seed Replacement Rate. Hence there is an urgent need for the State Seed Corporations also to transform themselves in tune with the industry in terms of infrastructure, technologies, approach and the management culture to be able to survive in the competitive market and to enhance their contribution in the national endeavour of increasing food production to attain food & nutritional security.Therefore, the infrastructure facilities at the SSFs like levelled land, more area, assured irrigation, thrashing floor, drying yard, processing units and storage 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 Kottampatti block.
- Provision of Irrigation facilities with Solar pump sets, Deepening of bore well Laying of pipelines, Rain gun, Mobile sprinkler, Laying of drip, New bore well with EB connection, Deepening of open well and Farm Pond in Kottampatti block .
- Supply of machineries in Kottampatti block.
- Provision of farm protection structure and office renovation in Kottampatti block.

Budget

It is proposed to incur ₹. 248.15 lakh over a period of five years with the finance facilities under the NADP and other sources.

Expected outcome

The expected outcome of the project is that it would result in enhanced production of quality seeds of Crop varieties and ensure timely delivery of seeds to farmers. It would 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 would implement the project and report the progress to the District-level officials.

Table 4.14.Budget requirement for State Seed Farm (SSF)

(₹. in lakhs)

Sl. No.	Components	unit	unit cost in Rs.	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Soil Fertility Improvement and Land development works in SSF**	ac	2	B4	15	30.00	10	20.00	10	20.00	10	20.00	10	20.00	55	110.00
II	**Irrigation Component**															
1	Solar pumpsets	nos	6	B4	2	12.00	1	6.00	0	0.00	0	0.00	0	0.00	3	18.00
2	Deepening of bore well	nos	4	B4	2	8.00	2	8.00	0	0.00	0	0.00	0	0.00	4	16.00
3	Laying of pipelines	mt	0.05	B4	100	5.00	100	5.00	100	5.00	0	0.00	0	0.00	300	15.00
4	Rain gun	nos	0.4	B4	2	0.80	2	0.80	0	0.00	0	0.00	0	0.00	4	1.60
5	Mobile sprinkler	nos	0.3	B4	1	0.30	0	0.00	0	0.00	0	0.00	0	0.00	1	0.30
6	Deepening of open well	nos	8	B4	1	8.00	0	0.00	0	0.00	0	0.00	0	0.00	1	8.00
III	**Machineries**															
7	Tonnage (Poly Pallets)	nos	0.075	B4	40	3.00	20	1.50	20	1.50	20	1.50	10	0.75	110	8.25
8	Tarpaulin	nos	0.1	B4	2	0.20	2	0.20	2	0.20	2	0.20	2	0.20	10	1.00
9	Generator	nos	7	B4	1	7.00	0	0.00	0	0.00	0	0.00	0	0.00	1	7.00
IV	**Civil Works**															
10	Farm protection structure	mt	0.15	B4	400	60.00	0	0.00	0	0.00	0	0.00	0	0.00	400	60.00
11	Farm office renovation	nos	3	B4	1	3.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.00
	Grand total					**137.30**		**41.50**		**26.70**		**21.70**		**20.95**		**248.15**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.15. 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 is 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 ₹. 87.83 lakh over a period of five years with the finance facilities under the NADP and other sources.

Expected outcome

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

Implementing Agency

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

Table 4.15. Budget requirement for IT

(₹. in lakhs)

Sl. No	Components	Unit	Unit Cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Procurement of Hardware for replacement of old hardware	Nos	50000	All blocks	13	6.50	0	0.00	0	0.00	0	0.00	0	0.00	13	6.50
2	Connectivity Charges	Nos	11000	All blocks	13	1.43	0	0.00	0	0.00	0	0.00	0	0.00	13	1.43
3	Printer cum Scanner	Nos	20000	All blocks	13	2.60	0	0.00	0	0.00	0	0.00	0	0.00	13	2.60
4	UPS and Electrical Accessories	Nos	35000	All blocks	13	4.55	0	0.00	0	0.00	0	0.00	0	0.00	13	4.55
5	Xerox machine	Nos	75000	All blocks	13	9.75	0	0.00	0	0.00	0	0.00	0	0.00	13	9.75
6	Laptop/Desktop	Nos	50000	All blocks	13	6.50	0	0.00	0	0.00	0	0.00	0	0.00	13	6.50
7	Anti -virus software	Nos	2500	All blocks	13	0.33	13	0.33	13	0.33	13	0.33	13	0.33	65	1.63
8	Television	Nos	100000	All blocks	13	13.00	0	0.00	0	0.00	0	0.00	0	0.00	13	13.00
9	Colour printer	Nos	15000	All blocks	13	1.95	0	0.00	0	0.00	0	0.00	0	0.00	13	1.95
10	4G Internet - Dongle	Nos	2500	All blocks	13	0.33	0	0.00	0	0.00	0	0.00	0	0.00	13	0.33
11	**Equipments for Documentation**															
a	Handy cam	Nos	30000	All blocks	12	3.60	0	0.00	0	0.00	0	0.00	0	0.00	12	3.60
b	Camera	Nos	25000	All blocks	13	3.25	0	0.00	0	0.00	0	0.00	0	0.00	13	3.25
c	GPS instrument	Nos	20000	All blocks	13	2.60	0	0.00	0	0.00	0	0.00	0	0.00	13	2.60
d	Android mobile	Nos	15000	All blocks	85	12.75	0	0.00	0	0.00	0	0.00	0	0.00	85	12.75
e	External Hard disk	Nos	5000	All blocks	19	0.95	0	0.00	0	0.00	0	0.00	0	0.00	19	0.95
12	Audio - visual Aids	Nos	150000	All blocks	1	1.50	0	0.00	0	0.00	0	0.00	0	0.00	1	1.50
	LCD projector	Nos	75000	All blocks	13	9.75	0	0.00	0	0.00	0	0.00	0	0.00	13	9.75
13	Air conditioner for computer room	Nos	40000	All blocks	13	5.20	0	0.00	0	0.00	0	0.00	0	0.00	13	5.20
	Total					**86.53**		**0.33**		**0.33**		**0.33**		**0.33**		**87.83**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.1.16. Strengthening of research infrastructure for agriculture sector in Madurai District

Establishment of Food Processing Laboratory (Bakery unit)

The bakery industry plays an important role in industrial activities of food processing industry in the country. It provides nutritious food to large number of households in cities, in the modern times. Towns and even villages of any country, bread and biscuits consumption is increasing every day. Bakery activities have also an important role in popularising in traditionally non wheat consuming region of the country. Since the development of new food technology, a variety of products are prepared in the bakery. The proposed budget of above intervention is ₹. 50.00 lakh

Establishment of Fruit and Vegetable Processing unit

Processing is one of the most effective solutions to reduce wastage. In India processing of fruits and vegetables is extremely low and is below 2%. Value addition to the raw produce is only 7% compared to as much as 23% in China, 45% in the Philippines and 88% in the UK. Thus the processing industry holds tremendous potential not only for contributing to the GDP but also for generating employment in rural areas and business opportunities for entrepreneurs. There are various fruit processing technologies such as canning, dehydration, pickling, provisional preservation and bottling. With the advent of technology and preservatives, shelf life of such products has gone up and they can be preserved for many months with proper packing. The proposed budget for the above intervention is ₹. 50.00 lakh.

Establishment of Farm Women Knowledge Centre

India is home to the fourth largest agricultural sector in the world. India has an estimated 180 million hectares of farmland with 140 million of which are planted and continuously cultivated. Improving the efficiency of Indian farming especially requires improvement in farm mechanization which cannot be achieved in all the holdings simultaneously. On the other hand, improving the cultivation practices with increased efficiency of water, nutrients will definitely help in achieving increased productivity of crops. This improvement could be achieved by suitably advising the farm women who takes care of many of the important farm operations. This farm women knowledge centre primarily aims to infuse know how in the minds of farm women on the key technologies which have to be

necessarily concentrated in growing the crops. Thus, the cost cutting technologies, improved cultivation methods, drudgery reduction and improving the working ambience, values of post- harvest addition and marketing are required. The proposed budget for the above intervention is ₹100.00 lakh.

Creation of infrastructure facilities for research (glasshouse)

Infrastructure like protected cultivation (glass house) and protected nursery raising, proper spacing, fertigation and timely plant protection give higher yield than the conventional system of crop husbandry. So also with the production of flowers and hybrid vegetables especially tomato under net house structures are useful for the control of humidity, temperature, pest and disease management. Based on the new introduction and high cost involved and more of small and marginal farmers, we suggest to make the protected structure into small units. The total cost for the protected cultivation is estimated as ₹. 2.00 lakh.

Establishment of video conferencing lab

The video conferencing Lab offers individual coaching, targeted workshops, and a spectrum of initiatives to support students as they learn key transferable communication skills that will help them achieve their career goals. The purpose of the communication lab is to reinforce what the students are learning in class and to help them reach their cognitive, affective and behavioural goals. To improve the students by construction of video conferencing lab with an estimated budget of ₹. 10.00 lakh is suggested.

Comprehensive Assessment of Soil Health in Rainfed Agriculture

The causes for low productivity in agriculture are decline in soil organic matter, soil fertility status, land degradation and use of poor quality water apart from lack of awareness on balanced fertilization among farmers and insufficient soil analytical timely advisory services. Soil and water sampling and analysis will help to monitor the changes in soil fertility, water quality and support in planning for crop and location specific balanced fertilization based on soil test value to enhance crop productivity by comprehensive assessment of soil health with the proposed budget of ₹.190.00 lakh.

Budget

It is proposed to incurred **₹.975.72** lakh over a period of five years

Expected outcome

Improvement in the productivity and income level of the farmers.

Implementing agency

Tamil Nadu Agricultural University would be implementing the project.

Table 4.16. Budget requirement for Agriculture Sector

(₹. in lakhs)

Sl. No	Components	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Paddy	1049.36	1125.29	3660.16	6182.79	8718.36	20735.96
2	Millets	107.25	107.73	113.20	121.18	117.73	567.09
3	Pulses	114.43	123.49	131.15	137.86	146.17	653.10
4	Oilseeds	1045.14	1121.38	1289.70	1353.44	1523.12	6332.78
5	Oilpalm	0.00	0.00	0.00	0.00	0.00	0.00
6	Cotton	45.57	46.20	46.83	47.46	48.09	234.15
7	Sugarcane	131.63	138.83	142.58	148.03	155.43	716.50
8	Coconut	360.22	401.57	441.28	480.04	519.45	2202.56
9	Training	10.45	16.20	15.00	16.55	16.00	74.20
10	Infrastructure	67.48	43.05	35.63	535.25	86.00	767.41
11	Soil Health Management	690.24	664.60	682.60	681.94	684.80	3404.18
12	Rainfed Area Development	1274.12	424.71	0.00	0.00	0.00	1698.83
13	Integrated Pest Management	12.00	12.40	1212.40	12.40	12.40	1261.60
14	Farm Mechanization	325.42	365.59	411.14	462.66	510.39	2075.20
15	Strengthening of State Seed Farm	137.30	41.50	26.70	21.70	20.95	248.15
16	Information Technologies	86.53	0.33	0.33	0.33	0.33	87.85
	Total	**5457.14**	**4632.87**	**8208.70**	**10201.63**	**12559.22**	**41059.56**

Table 4.17. Budget for Agricultural Research infrastructure for Madurai

(₹. in lakhs)

Sl. No.	Interventions	Blocks Covered	Unit Cost	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
				Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A	**Research Infrastructure**														
1	Establishment of Food Processing Laboratory (Bakery unit)	Melur	50	0	0.00	1	50.00	0	0.00	0	0.00	0	0.00	1	50.00
2	Establishment of Fruit and Vegetable Processing unit	Melur	50	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
3	Establishment of Farm Women Knowledge Centre	Melur	100	0	0.00	0	0.00	0	0.00	1	100.00	0	0.00	1	100.00
4	Creation of infrastructure facilities for research (glasshouse)	Melur	2	1	2.00	0	0.00	0	0.00	0	0.00	0	0.00	1	2.00
5	Establishment of video conferencing lab	Melur	10	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	1	10.00
6	Production of water soluble fertilizers	Melur	170	1	170.00	0	0.00	0	0.00	0	0.00	0	0.00	1	170.00
7	Formulation of Controlled Release Bio-Matrix Fertilizer	Melur	21.298	0	0.00	1	21.30	0	0.00	0	0.00	0	0.00	1	21.30
	Subtotal (A)				**172.00**		**81.30**		**50.00**		**100.00**		**0.00**	**7**	**403.30**
B	**Production and Growth**														
1	Comprehensive Assessment of Soil Health in Rainfed Agriculture	Melur	190	1	190.00	0	0.00	0	0.00	0	0.00	0	0.00	1	190.00
2	Popularization of Silicate Solubilizing bacterium and Arbuscular Mycorrhizal fungi in rice, banana, sugarcane, cardamom and medicinal plants cultivated in southern districts of Tamil Nadu	Melur	108.22	0	0.00	1	86.61	0	21.61	0	0.00	0	0.00	1	108.22
3	Development of Apiculture based Agripreneurship skill for doubling the income of village SC&ST youths of Southern Districts of Tamil Nadu,	Melur	78.00	0	0.00	1	38.50	0	39.50	0	0.00	0	0.00	1	78.00

Sl. No.	Interventions	Blocks Covered	Unit Cost	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
				Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
	through hands on trainings.														
4	Formulation of Controlled Release Bio-Matrix Fertilizer	Melur	22	0	0.00	1	4.50	0	11.50	0	5.50	0	0.00	1	21.50
5	Imparting knowledge on diagnosis and management of important diseases of vegetable and flower crops under protected cultivation to farming community in southern districts of Tamil Nadu	Melur	39.7	0	0.00	1	39.70	0	0.00	0	0.00	0	0.00	1	39.70
6	Popularization of Improved scientific storage techniques for the management of stored product insects	Melur	34	0	0.00	1	16.00	0	18.00	0	0.00	0	0.00	1	34.00
7	Popularizing Innovative technologies for “Rodent management in field and storage godowns” to improve nutritional security and the livelihood of farmers in Madurai, Sivagangai and Virudhunagar districts of Tamil Nadu through hands-on-training and farm school programme	Melur	51.5	0	0.00	1	22.50	0	14.50	0	14.50	0	0.00	1	51.50
8	Elevating the Economic status of Farmers by Adoption of Recently Released Varieties of AC&RI, Madurai and their Value added Products along with Tamil Nadu Food grains Marketing Yard, Madurai	Melur	49.5	0	0.00	1	16.50	0	16.50	0	16.50	0	0.00	1	49.50
9	Nematode management in nursery	Melur	26	1	26	0	0	0	0	0	0	0	0	1	26
	Subtotal (B)				**216.00**		**224.31**		**121.61**		**36.50**		**0.00**		**572.42**
	Total				**388.00**		**305.61**		**171.61**		**136.50**		**0.00**		**1001.70**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.2. Horticulture

Horticulture plays a vital role in the food and nutritional security of the people as well as in earning foreign exchange through export of raw and value added horticultural crops. The farmers are ready to go in for the cultivation of horticultural crops which proved remunerative. The challenge lies in taking the technologies to 90 per cent of farmers who are small and marginal farmers. In all, horticulture crops are grown in 10.01 lakh hectares, of which vegetables, spices, plantation crops, flowers and medicinal plants are the major crops cultivated in the State. Totally, 86 horticultural crops are grown in the State which clearly indicates the crop diversity and also the possibility of augmenting the income of farmers. The major strategies suggested are as follows:

Area expansion of Horticultural crops

a. Fruit Crops

Today's changing food pattern enhances the area expansion under fruits. The preferable choices of fruits are Mango, Apple, Banana, Grapes, Orange, Guava, Pomegranate and Sapota. Fruits are rich in fibre 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 and Jathimalli. 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 to perform other operations and hence provide 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 and 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 and cinchona. 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 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 and roses could be raised in poly houses.

Maintenance of Plantation

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

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 and adoption of 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

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 Orchards – Mango and Guava

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

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 and 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 compound 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 farm land. 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 environment 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 is costly. In addition, organic foods currently enjoy a premium price over conventionally produced foods and hence organic farmers can get more income.

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 (like local seed varieties and farmyard manure) and therefore cost-effectiveness. Local and international markets for organic products show tremendous growth prospects and offer creative producers and exporters excellent opportunities to improve their income and living conditions.

Post-Harvest Management

In agriculture, postharvest handling is the stage of crop production immediately following harvest including cooling, cleaning, sorting and packing. Post harvest 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 goal of post-harvest handling is to avoid moisture loss, 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 residue from contaminated washing water.

Marketing Interventions

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

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.

Bee Keeping

Production of apiary honey in the country reached 10,000 tons valued at about Rs.300 million. Bee-Keeping Industry is one of the important activities. The Government

provides financial support to this Industry by way of providing grant for supply of bee-hives to the Tribal on hill areas, Scheduled Castes /Scheduled Tribes under Western Ghats Development Programmes, Hill Area Development Programme and Integrated Tribal Development Programme. The income earned by the farmers through bee-keeping activities is an additional income to their agriculture income. Honey industry in the country can well become a major foreign exchange earner if international standards are met. Beekeeping is an age-old tradition in India but it is considered as a no-investment profit giving venture in most of the areas. Of late, it has been recognized that it has the potential to develop as a prime agri-horticultural and forest-based industry. Honey production is a lucrative business and it generates employment.

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

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 and plant protection chemicals with subsidy.

Pandal / Trellis cultivation, Propping / Support / Staking

Pandal vegetables being short duration crops fit very well in the cropping system by offering viable option to the growers to get increased income per unit area. However, the cultivation of vegetables is too constrained due to high initial investment cost. With the objective of enhancing area under pandal vegetables and encouraging farmers to realize increased income, this project is proposed by popularizing high yielding/hybrid seed materials and dissemination of improved method of cultivation to farmers. It is proposed to cover at least 500 hectares in crops like bitter gourd, ribbed gourd, snake gourd and pandal beans.

Banana Bunch Sleeve

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

Control of coconut Red Palm weevil

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

Promotion of Roof top Garden / Potager garden

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

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

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

Perimetro Vegetable Cluster Development Programme

Since production of vegetables is not in accordance with the market demand and the productivity of many vegetables is less than the potential yield, farmers are to be motivated to plan for cultivation of vegetables based on market demand. Market led production of vegetables need to be taken up to ensure continuous supply of vegetables to the market and the grower to get increased return out of sale of produce. Hence, it is necessary to go in for the productivity enhancement by advanced technologies. The project involves vegetable Cultivation under protected condition, post-harvest management, collection centres, retail outlets and training to the growers. The vegetable produced in the project area will be immediately transported to the pack house where grading, sorting and standard packing will be done. Further to narrow down the supply chain, open retail outlets and mobile stores are proposed.

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 and it includes 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 and Tablets) are essential.

Research on Crop Diversification

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

Special Development Programme

Onion Storage Structures

India is one of the largest producers of onion in the world. It is one of the most important vegetable crops of our country and forms a part of daily diet in almost all households. In Tamil Nadu onion was grown in an area of about 35,000 ha with a production of 3,80,000 tons. Most of the farmers bring onion directly to the market after harvest as proper storage facilities are not available with them. The present storage capacities are quite inadequate and most of the available units are traditional and unscientific.

Tissue Culture Unit

Plant tissue culture is a collection of techniques used to maintain or grow plant cells, tissues or organs under sterile conditions on a nutrient culture medium of known composition. Plant tissue culture is widely used to produce clones of a plant in a method known as micro propagation.

Plant tissue culture relies on the fact that many plant cells have the ability to regenerate a whole plant (totipotency). Single cells, plant cells without cell walls (protoplasts), pieces of leaves, stems or roots can often be used to generate a new plant on culture media given the required nutrients and plant hormones. Although some growers and nurseries have their own labs for propagating plants by the technique of tissue culture, additional number of laboratories need to be created to provide custom propagation services and commercially viable plants to propagate in a laboratory.

Off-season Moringa Production – Pods and Leaves

Extreme weather conditions that prevail in Northern States during Kariff as well as Rabi seasons do not favour the cultivation of Moringa. Hence truckloads of drumsticks are

being transported from TN, AP and Karnataka to Northern States. Though the moringa pod is demanded throughout the year, the production is meager during winter and rainy seasons owing to the inadequate thermal requirements of the crop. Various systems of cultivation are in vogue to produce moringa round the year production. Commercial cultivation of annual moringa PKM-1 can fit into any crop rotation. Though it is annual, it is amenable for rationing twice.

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 Cusines and in everday 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.

Rainfed Area Development Programme (RADP)

Rainfed areas assume special significance in terms of ecology, agricultural productivity and livelihood for millions of rural households in India. To ensure agriculture growth in the rainfed areas, the Government of India launched a new scheme "Rainfed Area Development Programme (RADP)" in the year 2011-12 as a sub-scheme under Rashtriya Krishi Vikas Yojana (RKVY). It aims at improving quality of life of farmers especially, small and marginal farmers by offering a complete package of activities to maximize farm returns. RADP focuses on Integrated Farming System (IFS) for enhancing productivity and minimizing risks associated with climatic variabilities.

Coastal area development programme

The coastal area in Tamil Nadu is susceptible to cyclones periodically, which cause damage to life and property. The coastal area supports several important economic activities such as fisheries, ports, industries and tourism. Most ecologically critical and threatened areas in the coastal areas are coastal wet lands especially lagoons and estuaries and their mangrove swamps. The coastal areas provide food and shelter for waterfowls, fishes, crustaceans, molluscs including some of the world's lucrative fisheries. Mangroves and coral

reef system are important for protecting shorelines and coastal lines against erosion. Thus coastal areas play a prominent role in the human life.

Infrastructure Development

Mushroom production

Commercial production of edible Mushrooms converts the agricultural, industrial, forestry and household wastes into nutritious food (Mushroom). Indoor cultivation of oyster mushrooms utilizes the vertical space and is regarded as the highest protein producer per unit area and time and is almost 100 times more than the conventional agriculture and animal husbandry.

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 is based on the knowledge of 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 one 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 bitter gourd, snake gourd, ribbed gourd and pandal avarai. 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 the area and production of pandal vegetables. Along with this, the support on supply of high yielding / hybrid seed materials for cultivation will be additional assistance among the farmers to get enhanced yield per unit area.

District Horticulture information and training centre

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

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

Community Seed Bank

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

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 would serve as a 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 namely 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 2.30 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 of 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 facilitate sustainable intensification (multi-cropping), 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. Usage of lower pressures 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.

Conducting Field Days / Shows and Farmer's mela

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

4.2.1. Budget

The budget requirement for fulfilling the various interventions is ₹ **17465.90** Lakh.

4.2.2. Implementing agency

The projects would be implemented by the Department of Horticulture

Table 4.18. Budget for Horticulture development

(₹. in lakhs)

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
A	**Production Growth**															
I	**Area expansion of fruit crops**															
1	TC Banana & TC Pineapple	Ha	1.25	B4	5	6.25	5	6.25	5	6.25	5	6.25	5	6.25	25	31.25
2	Banana / Hill Banana sucker & Pine apple sucker	Ha	0.875	B6,B5,B7,B 4,B13, B11	200	175.00	200	175.00	220	192.50	220	192.50	220	192.50	1060	927.50
3	UHDP in Papaya, Mango, Guava, Pomegranate, Acid lime	Ha	1.25	B4	5	6.25	5	6.25	5	6.25	5	6.25	5	6.25	25	31.25
4	HDP in Mango, Guava, Litchi, Pomegranate	Ha	1	All Blocks	112	112.00	117	117.00	122	122.00	142	142.00	142	142.00	635	635.00
5	Normal Planting in lime / lemons	Ha	0.6	B9,B12,B8, B2,B10, B13,B1,B7	42	25.20	42	25.20	42	25.20	42	25.20	42	25.20	210	126.00
6	Normal planting in Guava	Ha	0.6	All Blocks	125	75.00	125	75.00	128	76.80	128	76.80	128	76.80	634	380.40
7	Normal planting in Sapota	Ha	0.6	All Blocks Except B3,B11, B13	50	30.00	50	30.00	50	30.00	50	30.00	50	30.00	250	150.00
8	Normal planting in Amla	Ha	0.6	All Blocks Except B3,B11, B13	50	30.00	50	30.00	50	30.00	50	30.00	50	30.00	250	150.00
9	Normal planting in Papaya	Ha	0.6	All Blocks	80	48.00	80	48.00	80	48.00	80	48.00	80	48.00	400	240.00

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
10	Commercial production of Traditional fruits (Wood apple, Manila Tamarind, Jamun, Ber, Karonda, Annona, Egg fruit, etc.,)	Ha	0.6	All Blocks	40	24.00	40	24.00	40	24.00	40	24.00	40	24.00	200	120.00
II	**Area expansion of vegetable crops**															
11	Brinjal	Ha	0.5	All Blocks	100	50.00	100	50.00	100	50.00	100	50.00	100	50.00	500	250.00
12	Bhendi	Ha	0.5	All Blocks	135	67.50	135	67.50	135	67.50	135	67.50	135	67.50	675	337.50
13	Green Chillies	Ha	0.5	B9,B12,B8, B2,B11,B10 ,B13,B4,B7	100	50.00	100	50.00	100	50.00	100	50.00	100	50.00	500	250.00
14	Tomato	Ha	0.5	All Blocks	80	40.00	80	40.00	80	40.00	80	40.00	80	40.00	400	200.00
15	Gourds including pumpkin and tinda	Ha	0.5	All Blocks Except B4,B11,B13	40	20.00	40	20.00	40	20.00	40	20.00	40	20.00	200	100.00
16	Greens	Ha	0.5	B1,B4,B7, B5,B6	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00
17	Small Onion	Ha	0.5	B9,B12,B8, B2,B13,B10 ,B4	50	25.00	50	25.00	53	26.50	58	29.00	68	34.00	279	139.50
18	Bellary Onion	Ha	0.5	B9,B12,B8, B2,B13,B10 ,B5	80	40.00	80	40.00	80	40.00	90	45.00	90	45.00	420	210.00
19	Cucumber/gherkin	Ha	0.5	All Blocks	24	12.00	24	12.00	24	12.00	23	11.50	24	12.00	119	59.50
20	Cluster bean	Ha	0.5	B9,B12,B8, B2,B11,B10 ,B7	30	15.00	30	15.00	30	15.00	30	15.00	30	15.00	150	75.00
21	Cultivation of hybrid Vegetables under protected structures	1000 Sq.m	1.4	All Blocks Except B2,B3,B4, B8	35	49.00	35	49.00	35	49.00	35	49.00	35	49.00	175	245.00

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
III	**Area expansion of Medicinal and Aromatic plants**															
22	Amla	Ha	0.7771	B9,B12,B13,B11,B10,B1	12	9.33	12	9.33	12	9.33	12	9.33	12	9.33	60	46.63
23	Senna	Ha	0.2988	B9,B12,B8,B2,B13,B10	130	38.84	130	38.84	130	38.84	130	38.84	130	38.84	650	194.22
24	Periwinkle	Ha	0.2988	B9,B12,B8,B2,B10	75	22.41	75	22.41	75	22.41	75	22.41	75	22.41	375	112.05
25	Mint	Ha	0.15	B2,B10,B12	15	2.25	15	2.25	15	2.25	15	2.25	15	2.25	75	11.25
IV	**Area expansion of Spices crops**															
26	Seed and Rhizomatic spices (Coriander, Turmeric, Ginger, Dry Chilly, Cumin, Fennel, Fenugreek, Dil, Cardamom etc.,)	Ha	0.3	B8,B9,B13	100	30.00	100	30.00	100	30.00	100	30.00	100	30.00	500	150.00
V	**Area expansion of Flower crops**															
27	Loose flowers - Jasminum sp, Crossandra, Marigold, Rose, Chrysanthemum, Nerium, Torenia	Ha	0.4	All Blocks Except B3,B8	100	40.00	100	40.00	100	40.00	100	40.00	100	40.00	500	200.00
28	Bulbous flowers - Tube rose, Gladioli, Dahlia, Bird of paradise, Heliconia, Tulip	Ha	1.5	B12,B2,B10,B13,B4,B5,B6	100	150.00	100	150.00	100	150.00	370	555.00	100	150.00	770	1155.00

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
VI	**Rejuvenation/INM-IPM/Mulching/Anti bird net**															
29	INM/IPM for Horticultural crops	Ha	0.04	All Blocks	500	20.00	500	20.00	510	20.40	510	20.40	500	20.00	2520	100.80
30	Mulching	Ha	0.32	All Blocks	100	32.00	100	32.00	100	32.00	100	32.00	100	32.00	500	160.00
VII	**Pollination Support through Bee Keeping**															
31	Bee hive & Colony	No	0.04	All Blocks	740	29.60	740	29.60	750	30.00	750	30.00	750	30.00	3730	149.20
32	Honey Extractor	No	0.2	All Blocks	74	14.80	74	14.80	74	14.80	74	14.80	74	14.80	370	74.00
VIII	**Organic Farming**															
33	Organic farming and PGS certification in 50 acre cluster	1 cluster	14.95	All Blocks	13	194.35	13	194.35	13	194.35	13	194.35	14	209.30	66	986.70
34	HDPE Vermibed	No	0.16	All Blocks	60	9.60	60	9.60	60	9.60	60	9.60	70	11.20	310	49.60
IX	**Rainfed Area development**															
35	Integrated farming system - Horticulture Based farming	Ha	0.5	All Blocks	128	64.00	128	64.00	138	69.00	138	69.00	180	90.00	712	356.00
36	Green manuring	Ha	0.04	All Blocks	143	5.72	143	5.72	153	6.12	153	6.12	205	8.20	797	31.88
B	**Infra structures and Assets creation**															
I	**Protected cultivation**															
37	Poly Green House	1000 Sq.m	9.35	All Blocks	5	46.75	5	46.75	7	65.45	7	65.45	12	112.20	36	336.60
38	Shade net	1000 Sq.m	7.1	All Blocks	11	78.10	11	78.10	13	92.30	15	106.50	15	106.50	65	461.50

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
II	**Mushroom production**															
39	Cottage mushroom unit	1 No.	1	B7	0	0.00	0	0.00	1	1.00	1	1.00	1	1.00	3	3.00
III	**Vermicompost unit**															
40	Permanent Vermicompost Unit	600 cu.ft	1	All Blocks	8	8.00	8	8.00	9	9.00	10	10.00	10	10.00	45	45.00
X	**Supporting structures for Horticulture crop production**															
41	Staking/ Trellies/ Propping	Ha	1	All Blocks	150	150.00	150	150.00	150	150.00	160	160.00	170	170.00	780	780.00
42	Permanent Pandhal structure	Ha	4	B9,B13,B2, B1,B7,B12	5	20.00	5	20.00	6	24.00	7	28.00	7	28.00	30	120.00
C	**Special interventions**															
43	Farm deficiency correction	Ha	0.04	All Blocks	1500	60.00	1500	60.00	1500	60.00	1500	60.00	1500	60.00	7500	300.00
44	Promotion of Roof top Garden/ Potager garden Kit	No	0.005	All Blocks	1200	6.00	1200	6.00	1200	6.00	1200	6.00	1200	6.00	6000	30.00
45	Promotion of Roof top Garden/ Potager garden Kit with shade net	No	0.0735	B13,B11,B4 ,B7,B5,B6	120	8.82	120	8.82	120	8.82	120	8.82	120	8.82	600	44.10
46	Banana Bunch Sleeve	Ha	0.25	All Blocks	75	18.75	70	17.50	75	18.75	70	17.50	75	18.75	365	91.25
47	AESA based IPM in fruits and vegetables Pheramone trap	Ha	0.04	All Blocks	175	7.00	180	7.20	180	7.20	180	7.20	190	7.60	905	36.20
48	AESA Based IPM in fruits and vegetables Yellow sticky trap	Ha	0.04	All Blocks	200	8.00	200	8.00	210	8.40	210	8.40	220	8.80	1040	41.60

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
49	AESA Based IPM in fruits and vegetables Light trap	Ha	0.08	All Blocks	200	16.00	200	16.00	200	16.00	210	16.80	220	17.60	1030	82.40
D	**Post Harvest Management**															
50	Pack house (9m X 6m)	1 No	4	All Blocks Except B3,B5,B6	5	20.00	5	20.00	7	28.00	10	40.00	11	44.00	38	152.00
51	Drying yard	1 No	5	All Blocks	13	65.00	13	65.00	13	65.00	14	70.00	18	90.00	71	355.00
52	Market intervention - Mobile vending cart	1 No	0.3	B9,B12,B8, B2,B11,B10 ,B7,B5,B6	25	7.50	25	7.50	25	7.50	25	7.50	30	9.00	130	39.00
E	**Development of Farms, Nurseries and Parks**															
53	Centre of Excellence for different crops	No	1000	B6	1	1000.00	0	0.00	0	0.00	0	0.00	0	0.00	1	1000.00
F	**Mechanization - Machineries, Equipments & Tools**															
54	Power tiller / Tractor / Mini tractor	Nos	1	All Blocks	13	13.00	13	13.00	13	13.00	13	13.00	13	13.00	65	65.00
55	Manual Sprayer-Knapsack/Foot operated Sprayer	Nos	0.12	All Blocks	125	15.00	125	15.00	125	15.00	125	15.00	125	15.00	625	75.00
56	Tractor Mounted / Operated Sprayer (Below 20HP)	Nos	0.2	B5,B6,B7	9	1.80	9	1.80	9	1.80	9	1.80	9	1.80	45	9.00
57	Tractor Mounted / Operated Sprayer (Above 20HP)	Nos	1.26	B7	5	6.30	5	6.30	5	6.30	5	6.30	5	6.30	25	31.50

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
58	Fruit Plucker, Tree pruners, Fruit Harvester, Fruit Graders, Track Trolley, Nursery Media Filling Machine, Power operated horticulture tools for pruning, budding, grating, shearing etc.	No	2.5	B9,B12,B8, B2,B10,B1, B7	7	17.50	7	17.50	7	17.50	7	17.50	7	17.50	35	87.50
59	Potato planter/Potato harvester / Onion harvester	No	0.3	B9,B8,B2, B13,B10	5	1.50	5	1.50	5	1.50	5	1.50	5	1.50	25	7.50
60	Hand operated sprayer with face mask	Nos	0.025	All Blocks Except B5,B6	77	1.93	77	1.93	82	2.05	82	2.05	82	2.05	400	10.00
61	Nets for safe harvesting of fruits, Headlights for flower picking	Nos	0.005	B12,B8,B2, B10,B13,B1 ,B7	280	1.40	290	1.45	290	1.45	290	1.45	290	1.45	1440	7.20
62	Power operated sprayer	Nos	0.05	All Blocks Except B13,B4	150	7.50	150	7.50	150	7.50	150	7.50	150	7.50	750	37.50
63	Plastic crates for vegetable & fruits handling	No of sets containing 10crates	0.075	B12,B8,B2, B11,B10,B13,B1,B4,B7, B5,B6	1380	103.50	1380	103.50	1380	103.50	1380	103.50	1380	103.50	6900	517.50
64	5 layered Polythene spread sheets for drying horticulture produce	No	0.16	All Blocks Except B6,B4,B5,B3	800	128.00	800	128.00	800	128.00	800	128.00	800	128.00	4000	640.00
65	Aluminium Ladders for Harvesting	No	0.2	All Blocks	108	21.60	108	21.60	108	21.60	108	21.60	108	21.60	540	108.00

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
66	Equipments for manure management (Motorized Shredder for cutting biomass for making Vermicomposts and organic mulching)	No	1.26	B9,B12,B8, B2,B13,B11 ,B10	6	7.56	6	7.56	6	7.56	6	7.56	6	7.56	30	37.80
G	**Water / Irrigation Management**															
67	Micro Irrigation - Drip	Ha	1.12	All Blocks	220	246.40	225	252.00	255	285.60	290	324.80	325	364.00	1315	1472.80
68	Rain gun	Ha	0.34	All Blocks	425	144.50	425	144.50	450	153.00	470	159.80	470	159.80	2240	761.60
H	**Capacity Building**															
69	Training to farmers within the State. 2 days Rs.1000/farmer/day	No	0.02	All Blocks	1060	21.20	1060	21.20	1060	21.20	1060	21.20	1060	21.20	5300	106.00
70	Training to farmers outside the state. 30 farmers/Batch	No	0.105	All Blocks	65	6.83	65	6.83	65	6.83	65	6.83	65	6.83	325	34.13
71	Exposure visit to farmers for 5 days. Rs.1000/farmer/day	No	0.05	All Blocks	509	25.45	509	25.45	509	25.45	509	25.45	509	25.45	2545	127.25
72	Training to farmers at HTC	No	0.0025	B5,B6	20	0.05	20	0.05	20	0.05	20	0.05	20	0.05	100	0.25
73	Exposure visit of farmers outside India	No	4	All Blocks	15	60.00	15	60.00	15	60.00	15	60.00	15	60.00	75	300.00
74	Training to staff outside the state / Batch of 5 members	No	0.04	All Blocks Except B5,B6	50	2.00	50	2.00	50	2.00	50	2.00	50	2.00	250	10.00
75	Training to staff outside India	No	6	All Blocks Except B4	17	102.00	17	102.00	17	102.00	17	102.00	17	102.00	85	510.00
76	District level seminar	No	2	B5,B6	2	4.00	2	4.00	2	4.00	2	4.00	2	4.00	10	20.00
77	Computerization & governance	No	1	All Blocks	13	13.00	13	13.00	13	13.00	13	13.00	13	13.00	65	65.00

Sl. No.	Interventions	Unit	Unit cost	Block Covered	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.	Phy.	Fin.
78	Publicity and Documentation	No	0.5	All Blocks Except B5,B6	12	6.00	12	6.00	12	6.00	12	6.00	12	6.00	60	30.00
I	**Crop Insurance and Risk Mitigating schemes**															
79	Crop Insurance	Ha	0.025	B4,B6,B5,B 13	140	3.50	140	3.50	140	3.50	140	3.50	140	3.50	700	17.50
	Grand Total					**4049.53**		**3059.13**		**3181.90**		**3705.65**		**3469.68**		**17465.90**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.3 Agricultural Engineering

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

4.3.1. Strategies:

- Promotion and strengthening of Agricultural Mechanization through training, Testing and Demonstration in order to ensure performance testing of agricultural machinery and equipment, capacity building of farmers and end users and promoting farm mechanization through demonstrations.
- Demonstration, 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. Financial assistance for establishing PHT units are provided.
- 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 like MB Plough, Disc plough, Cultivator, Harrow, Leveller Blade, Ridger, Laser Land Leveller, Reversible Mechanical Plough, Rotavator, Rotopuddler, Reversible Hydraulic Plough, Post hole digger, Reaper, Seed driller, Balers, Coconut thrash cutter, coconut frond chopper, Multi crop thresher, Paddy thresher, Brush cutter, Chaff cutter, Drum Seeder and Plant protection equipments .
- 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 and cotton.
- 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 and Revitalisation of wells by side boring and blasting in hard rock areas.
- Introduction of renewable energy in the villages which would replace other fuels. and 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 siccature, coconut dehusker, trolley), 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) which 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 CO_2 neutral fuel and, therefore, unlike fossil fuels such as diesel does not contribute to net CO_2 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 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

4.3.2. Expected outcome

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

4.3.3. Budget

Agriculture continues to be the most predominant sector of this district economy, as 70 percent of the population is engaged in Agriculture and allied activities for their livelihood. Agricultural Mechanization could provide the stability in agricultural production in a sustainable manner to meet the food requirement of growing population and also to meet the raw material needs of agro based industries, thereby providing employment opportunities to the rural population. The overall budget requirement for implementation of above interventions is ₹ 5623.67 lakh.

4.3.4. Implementing agency

The projects would be implemented by the Department of Agricultural Engineering

Table.4.19. Budget requirement for Agricultural Engineering

(₹. 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	Demonstration of Agricultural Machinery	No's/ Ha	0.04	All Blocks	13	0.52	13	0.52	13	0.52	13	0.52	13	0.52	65	2.60
2	Training of farmers	No's/ Ha	0.04	All Blocks Except B10,B8	23	0.92	43	1.72	44	1.76	44	1.76	63	2.52	217	8.68
3	Demonstration of Post Harvest Technologies	No's Ha	0.04	All Blocks	4	0.16	7	0.28	7	0.28	7	0.28	14	0.56	39	1.56
4	Financial assistance for Post Harvest Equipment	No's/ Ha	4	All Blocks	4	16.00	5	20.00	5	20.00	5	20.00	4	16.00	23	92.00
5	Tractor (8-15 PTO HP)	No's/ Ha	3	All Blocks	15	45.00	0	0.00	0	0.00	0	0.00	0	0.00	15	45.00
6	Tractor (15-20 PTO HP)	No's/ Ha	4	All Blocks	0	0.00	19	76.00	19	76.00	19	76.00	19	76.00	76	304.00
7	Tractor (Above 20-40 PTO HP)	No's/ Ha	6	All Blocks	15	90.00	0	0.00	0	0.00	0	0.00	0	0.00	15	90.00
8	Tractor (40-70 PTO HP)	No's/ Ha	8.5	All Blocks	0	0.00	12	102.00	12	102.00	12	102.00	17	144.50	53	450.50
9	Power Tiller (below 8 BHP)	No's/ Ha	1	All Blocks	37	37.00	10	10.00	10	10.00	10	10.00	10	10.00	77	77.00
10	Power Tiller (8 BHP & above)	No's/ Ha	1.75	All Blocks	0	0.00	34	59.50	34	59.50	34	59.50	46	80.50	148	259.00
11	Self Propelled Rice Transplanter (4 rows)	No's/ Ha	2.5	All Blocks	2	5.00	6	15.00	6	15.00	6	15.00	6	15.00	26	65.00
12	Self Propelled Rice Transplanter (Above 4-8 rows)	No's/ Ha	16	Kottam patty,B1, B2,B4	0	0.00	2	32.00	1	16.00	1	16.00	1	16.00	5	80.00
13	Rotavator	No's/ Ha	0.35	All Blocks	16	5.60	19	6.65	19	6.65	19	6.65	26	9.10	99	34.65

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
14	Power Weeder (engine operated below 2 BHP)	No's/ Ha	0.25	All Blocks Except B13, B9	33	8.25	31	7.75	26	6.50	26	6.50	33	8.25	149	37.25
15	Brush Cutter	No's /Ha	0.25	All Blocks	11	2.75	8	2.00	8	2.00	8	2.00	14	3.50	49	12.25
16	f. Chaff Cutter (Operated by engine / electric motor below 3 hp and by power tiller and tractor of below 20 BHP tractor)	No's/ Ha	0.25	All Blocks	4	1.00	3	0.75	2	0.50	2	0.50	3	0.75	14	3.50
17	Disc Plow	No's/ Ha	0.4	All Blocks	8	3.20	5	2.00	5	2.00	5	2.00	4	1.60	27	10.80
18	Cultivator	No's/ Ha	0.25	All Blocks	10	2.50	11	2.75	11	2.75	11	2.75	14	3.50	57	14.25
19	Rotavator	No's/ Ha	0.8	All Blocks	10	8.00	10	8.00	7	5.60	8	6.40	10	8.00	45	36.00
20	Post Hole digger	No's/ Ha	0.9	All Blocks	2	1.80	2	1.80	0	0.00	3	2.70	2	1.80	9	8.10
21	Power Weeder (engine operated above 2 BHP)	No's/ Ha	0.7	All Blocks	13	9.10	11	7.70	10	7.00	11	7.70	10	7.00	55	38.50
22	Multi crop Threshers	No's/ Ha	3	All Blocks	2	6.00	2	6.00	2	6.00	2	6.00	2	6.00	10	30.00
23	f.Chaff Cutter (Operated by engine / electric motor above 3-5 hp and by power tiller and tractor of below 35 BHP tractor)	No's/ Ha	0.4	All Blocks	3	1.20	3	1.20	3	1.20	3	1.20	3	1.20	15	6.00
24	Disc Plow	No's/ Ha	0.6	All Blocks	4	2.40	0	0.00	0	0.00	0	0.00	0	0.00	4	2.40
25	Cultivator	No's/ Ha	0.3	All Blocks	20	6.00	16	4.80	17	5.10	16	4.80	20	6.00	89	26.70
26	Harrow	No's/ Ha	1	All Blocks	4	4.00	4	4.00	5	5.00	4	4.00	4	4.00	21	21.00

Sl. No	Interventions	Unit	Unit cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
27	Rotavator	No's /Ha	0.95	All Blocks	21	19.95	24	22.80	29	27.55	28	26.60	32	30.40	134	127.30
28	Thresher/Multi Crop threshers	No's/ Ha	4	All Blocks	3	12.00	2	8.00	2	8.00	2	8.00	2	8.00	11	44.00
29	Paddy Thresher	No's /Ha	2.2	B5,B1,B2, B4	2	4.40	2	4.40	1	2.20	1	2.20	1	2.20	7	15.40
30	Balers (Round)	No's/ Ha	3.5	All Blocks	4	14.00	4	14.00	3	10.50	3	10.50	3	10.50	17	59.50
31	Manual sprayer: Knapsack/foot operated sprayer	No's /Ha	0.015	All Blocks	5	0.08	5	0.08	4	0.06	4	0.06	4	0.06	22	0.33
32	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity 8-12 lts)	No's/ Ha	0.06	All Blocks	3	0.18	2	0.12	2	0.12	2	0.12	2	0.12	11	0.66
33	Powered Knapsack Sprayer/Power operated Taiwan sprayer (capacity above 12-16 lts)	No's/ Ha	0.08	All Blocks	27	2.16	32	2.56	32	2.56	32	2.56	33	2.64	156	12.48
34	Establishment of Farm Machinery Banks for Custom Hiring	No's/ Ha	28	All Blocks	8	224.00	8	224.00	8	224.00	7	196.00	7	196.00	38	1064.00
35	Promotion of Farm Mechanization in Selected Villages	No's/ Ha	11.5	All Blocks	10	115.00	18	207.00	18	207.00	18	207.00	18	207.00	82	943.00
36	Financial assistance for promotion of Mechanized Farming operations	No's /Ha	0.04	All Blocks	5	0.20	5	0.20	5	0.20	5	0.20	5	0.20	25	1.00
37	Purchase of Tractors for AED	No's/ Ha	8	All Blocks	4	32.00	0	0.00	0	0.00	0	0.00	0	0.00	4	32.00

Sl. No	Interventions	Unit	Unit cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
38	Purchase of Tractor drawn implemnets for AED	No's /Ha	0.5	All Blocks	16	8.00	0	0.00	6	3.00	0	0.00	6	3.00	28	14.00
39	Purchase of Bull Dozers for AED	No's/ Ha	80	B2	1	80.00	0	0.00	0	0.00	0	0.00	0	0.00	1	80.00
40	Purchase of Balers for AED	No's/ Ha	4.5	B13,B10	3	13.50	0	0.00	0	0.00	0	0.00	0	0.00	3	13.50
41	Purchase of Multi Crop Thresher for AED	No's/ Ha	3.5	B2	1	3.50	0	0.00	0	0.00	0	0.00	0	0.00	1	3.50
42	Hammer cum Rotary Drill for AED	No's/ Ha	150	B13,B10	1	150.00	1	150.00	0	0.00	0	0.00	0	0.00	2	300.00
43	Purchase of Resitivity Metres for AED	No's/ Ha	3	B2	1	3.00	0	0.00	0	0.00	0	0.00	0	0.00	1	3.00
44	5 hp	No's /Ha	3.75	All Blocks	35	131.25	32	120.00	32	120.00	32	120.00	32	120.00	163	611.25
45	upto 400sq.ft	No's/ Ha	4.25	All Blocks	2	8.50	2	8.50	2	8.50	2	8.50	2	8.50	10	42.50
46	Computer & its accessories	No's/ Ha	0.8	B6,B10	0	0.00	0	0.00	1	0.80	2	1.60	1	0.80	4	3.20
47	Tablet (Tab)	No's /Ha	0.25	B6,B10,B1 ,B2	0	0.00	0	0.00	2	0.50	0	0.00	2	0.50	4	1.00
48	Xerox machine	No's /Ha	1.5	B6,B10,B1 ,B2	0	0.00	1	1.50	0	0.00	1	1.50	0	0.00	2	3.00
49	Mecanized row crop cultivation- Pilot mechanization Demonstration	No's/ Ha	0.04	All Blocks	0	0.00	2	0.08	4	0.16	4	0.16	2	0.08	12	0.48
50	Modernisation of Tractor workshops of AED	No's/ Ha	50	B6,B10,B1 ,B2	1	50.00	1	50.00	1	50.00	1	50.00	1	50.00	5	250.00

Sl. No	Interventions	Unit	Unit cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
51	Chain saw/ Wheel barrow/ Mango grader/ planter and other suitable self propelled machineries and equipments for horticulture Crops	No's/ Ha	1	All Blocks	0	0.00	8	8.00	15	15.00	11	11.00	8	8.00	42	42.00
52	Aluminium Ladder/ Ladder	No's /Ha	0.2	All Blocks	0	0.00	10	2.00	10	2.00	10	2.00	15	3.00	45	9.00
53	Aluminium pole	No's /Ha	0.03	All Blocks	0	0.00	5	0.15	0	0.00	4	0.12	4	0.12	13	0.39
54	Plucker	No's /Ha	0.02	All Blocks	0	0.00	0	0.00	6	0.12	6	0.12	6	0.12	18	0.36
55	Mini Rice Mill	No's /Ha	1.5	B6,B10,B1 ,B2	0	0.00	0	0.00	1	1.50	1	1.50	0	0.00	2	3.00
56	Mini Dal Mill	No's/ Ha	1.7	B6,B10,B1 ,B2	0	0.00	2	3.40	0	0.00	1	1.70	0	0.00	3	5.10
57	Millet Mill	No's/ Ha	1.5	B6,B10,B1 ,B2	0	0.00	3	4.50	0	0.00	2	3.00	2	3.00	7	10.50
58	Packing Machines (for all types of Horticulture / Food grain / Oil seeds crop)	No's /Ha	3	B2	0	0.00	0	0.00	0	0.00	1	3.00	0	0.00	1	3.00
59	All types of Power driven Dehusker/ sheller/ Threshers/ Harvesters/ De-spiking/ Deconing Machine/ Peeler/ Splitter/ Stripper (for all type of Horticulture / Food grain / Oil seeds crop)	No's/ Ha	1.2	B10,B10,B 8,B7	0	0.00	2	2.40	3	3.60	3	3.60	3	3.60	11	13.20

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
60	All types of Boiler/ Steamer/ Dryer solar (for all type of Horticulture / Food grain / Oil seeds crop)	No's /Ha	2	B1	0	0.00	0	0.00	0	0.00	1	2.00	0	0.00	1	2.00
61	All types of Grinder/ Pulveriser/ Polisher (for all type of Horticulture / Food grain / Oil seed crop)	No's /Ha	0.3	all Blocks	0	0.00	2	0.60	2	0.60	2	0.60	2	0.60	8	2.40
62	Construction of Agricultural Engineering Extension centres (AEECs)	No's /Ha	75	B1	0	0.00	1	75.00	1	75.00	0	0.00	0	0.00	2	150.00
63	Training of AED Engineers on " Agricultural Processing" and " Bio- Energy"	No's /Ha	0.04	All Blocks	0	0.00	2	0.08	7	0.28	6	0.24	7	0.28	22	0.88
	Total					**1128.12**		**1281.79**		**1114.61**		**1018.14**		**1081.02**		**5623.67**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.4. Agricultural Marketing

The Government is taking every effort to attain sustainable agricultural development by transforming agriculture into a commercial venture, by switching over to new scientific methods of cultivation so as to increase the productivity manifold. Besides, through value addition, processing and utilization of the marketing opportunities, the incremental output is 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, 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 namely farmers, traders and agricultural processors and service providers by the government and non-governmental sectors. In fact, the farmers failed 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 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 distress sales. 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 and chakki 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 and 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 is the need of the hour. Promotion of commodity groups, farmer producer agencies, marketing organization and market linkage, encouraging of private players in marketing, value addition, crop specific supply chain management, more infrastructural facilities for processing and sensitizing the farmers for market-led agriculture by rendering crop advisory and market information are focused. Agri-business also contributes to the production of higher-value products and diversification away from the staple foods. Through this diversification and the development of the value chain between producers and consumers, the rural economy benefits from innovation and the creation of non-farm employment.

Components

- Provision of Agmark lab equipments to Madurai east block
- Construction of Storage godown for commodity groups in all blocks
- Construction of drying yards in all blocks
- Upgradation of rural shandies and uzhavar shandies
- Strengthening of Regulated Markets in Madurai east block
- Formation of Farmer Producer Organizations (FPO) in Kottampatti and Chellampatti blocks
- Supply chain and post-harvest management
- Distribution of Turmeric pulveriser to Thirupparankundram block
- Promotion of cold storage facilities in Madurai east block
- Distribution of plastic crates to vegetable commodity group farmers to all blocks
- Exposure visit (within state & outside state) for commodity group farmers to acquire value addition technologies

4.4.1. Budget

The district plan proposes an outlay of **Rs.1568.90 lakh** over a period of five years for Madurai district.

4.4.2. Expected Outcome

The expected outcome of the intervention would be vibrant competitive agribusiness sector leading to diversification, higher-value added products and higher income for farmers, farm workers and entrepreneurs and reduced rural poverty. The interventions would 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 would also provide higher value for consumers which as a value that would be shared as distributed benefits to value chain stakeholders including farmers, entrepreneurs and workers.

4.4.3. Implementing Agency

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

Table 4.20. Budget for strengthening of Agricultural Marketing and Agri-Business in Madurai District

(₹. in lakhs)

Sl. No.	Intervention	Unit	Unit cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	**Promotion of Commodity Groups and Market Information**															
2	e-learning Centre	Nos.	80	B1	1	80.00	0	0.00	0	0.00	0	0.00	0	0.00	1	80.00
3	Integrated Commodity Management through Aggregation	1	250	B1	0	0.00	1	250.00	0	0.00	0	0.00	0	0.00	1	250.00
4	Provision of Agmark Lab equipments	Nos.	0.47	B1	8	3.80	11	5.20	8	3.80	2	0.90	2	0.90	31	14.60
	Strengthening of Uzhavar Sandhai and Regulated Market															
5	Cold Storage	1 Nos	200	B1	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
6	Drying Yard	1 Nos	4.5	All Blocks	7	31.50	1	4.50	4	18.00	0	0.00	6	27.00	18	81.00
7	Storage godown	1 Nos	12	All Blocks	3	36.00	0	0.00	0	0.00	0	0.00	0	0.00	3	36.00
8	Administrative Office Room (Vehicle shed ,waiting hall, washing Room, Borewell with Motor, water Tank)	156	25	B1	1	25.00	0	0.00	0	0.00	0	0.00	0	0.00	1	25.00
9	Strengthening of RM	1 Nos	10	B1	1	10.00	0	0.00	0	0.00	0	0.00	0	0.00	1	10.00
10	Upgradation of Uzhavar Shadhais	1 Nos	50.25	B1, B2, B3	3	150.80	1	50.30	0	0.00	0	0.00	0	0.00	4	201.00
	Formation of FPO / Strengthening of Existing Commodity Groups															
11	FPO	1 Nos	27	B5, B9	1	27.00	1	27.00	0	0.00	0	0.00	0	0.00	2	54.00
12	Plastic crates	Nos	0.078	All Blocks	920	71.80	470	36.70	320	25.00	420	32.80	820	64.00	2950	230.10
13	Tarpaulin	Nos	0.07	All Blocks	581	40.70	265	18.60	270	18.90	118	8.30	505	35.40	1739	121.70

Sl. No.	Intervention	Unit	Unit cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
14	Solar Dryer	Nos.	10	B3, B11	0	0.00	2	20.00	0	0.00	0	0.00	0	0.00	2	20.00
15	Turmeric pulveriser	Nos.	4	B3		0.00		0.00	1.0	4.00		0.00		0.00	1.0	4.00
	Capacity building Programme															
16	Exposure Visits - within state	Nos.	0.5	All Blocks	17	8.50	23	11.50	31	15.50	17	8.50	30	15.00	118	59.00
17	Exposure Visits - outside state - 3 days	Nos.	1.5	All Blocks	12	18.00	8	12.00	16	24.00	8	12.00	14	21.00	58	87.00
18	Training on Market led Extension, Agmark grading& Food safety, post harvest technology, Supply Chain Management, Grading-sorting-packing, Market linkages & Exports, Food processing and value addition at district level	Nos.	0.25	All Blocks	117	29.30	60	15.00	100	25.00	27	6.80	78	19.50	382	95.50
19	Conducting festivals/melas, Field days, awareness campaign, seminar, Farmers-Scientists interaction, Village meeting	40	4	0	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00	0	0.00
	Total					**532.20**		**650.60**		**134.10**		**69.20**		**182.80**		**1568.90**

B1-Madurai East, B2-Madurai West, B3-Thirupparankundram, B4-Melur, B5 -Kottampatti, B6-Vadipatti, B7-Alanganallur, B8-Usilampatti, B9-Chellampatti, B10-Sedapatti, B11-Thirumangalam, B12-T.Kallupatty, B13- Kallikudi

4.5. Seed and Organic Certification

Seed is a critical input for long-term sustained growth of agriculture. Timely availability of certified quality seeds with good yield potential continues to be a decisive factor in agricultural production. Farmers in Tamilnadu state are well aware of the benefits of using quality seeds which include foundation, certified and truthfully labelled seeds. In our State, the seed replacement rate is being adopted as per the guidelines of Government of India. In order to achieve the target of doubling the income of farmers, timely availability of quality seeds is given utmost importance. Concerted efforts are essential in ensuring timely availability of seeds as well as increasing the Seed Replacement Rate (SRR). The National Mission on Seeds has been formulated with a view to upgrade the quality of farm saved seeds and also to enhance Seed Replacement Rate. The Department of Seed Certification & Organic Certification plays the supporting role in the enhancement of Seed Replacement Rate by certifying quality seeds in an increasing rate 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, Geyser, Heater, Trolley for Carriages, Generator 30KV, Induction Stove, Fabricated Display Racks, Conductivity Meter, Dehuller/ Scarifier, Seed Grinder, Blower, Hot Air oven, Incubator and Miscellaneous are required.

- **Creation of infrastructure facilities in seed testing laboratories**

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

- **Capacity building**

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

- **Strengthening of communication and networking facilities**

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

Expected outcome

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

Budget

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

Madurai district. The overall budget requirement for implementation of above interventions is ₹ **37.42** lakhs.

Implementing agency

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

Table.4.21. Budget requirement for Seed and Organic Certification

(₹. 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 Seed Certification lab**															
1.	Blower, Conductivity meter, Dehuller/ Scarifier, Dehumidifier Air Conditioner, Digital moisture meter, Tonnage, Fabricated display Racks, Geyser, Generator, Heater, Hot air oven, Humidifier, Incubator, Induction stove, Microscope, Moisture meter, Packing machine, R. O system, Sample racks, Seed Grinder, Sieve, Thermohydro meter, Trolley for carriages, Working chair, Working table, Miscellaneous,	All Blocks	nos	13.36	1	13.36	0	0.00	1	13.36	0	0.00	0	0.00	2	26.72
II	**Strengthening of communication and networking facilities**															
2.	Computer accessories	All Blocks	No's	0.5	7	3.50	0	0.00	0	0.00	0	0.00	0	0.00	7	3.50
III	**Capacity Building**															
3.	Training to seed grower for quality seed production	All Blocks	No's	0.2	0	0.00	6	1.20	6	1.20	6	1.20	6	1.20	24	4.80
4.	Training to seed producers on seed certification procedures	All Blocks	No's	0.1	0	0.00	6	0.60	6	0.60	6	0.60	6	0.60	24	2.40
	Total					**16.86**		**1.80**		**15.16**		**1.80**		**1.80**		**37.42**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.6. Animal husbandry

Livestock have been an integral component of India's agricultural and rural economy since time immemorial, supplying energy for crop production in terms of draught power and organic manure and in turn deriving their own energy requirements from crop by products and residues. Livestock are now more valued as source of food and contribute over one-fourth of 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 56.70% of world's buffaloes, 12.50% of cattle, 20.40% of small ruminants, 2.40% of camel, 1.40% of equine, 1.50% of pigs and 3.10% of poultry. In 2010-11, livestock generated outputs worth Rs. 2075 billion which was 4% of the GDP and 26% of the agricultural GDP. The total output worth was higher than the value of food grains.

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

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

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

Increasing the availability of fodder through field level interventions

Livestock rearing is one of the major occupations in India and is making significant contribution to the country's GDP. The livestock population, over the years, has shown a steady growth on broadly two counts of (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 would be 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 and village commons fulfils 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. Meichal land development
5. Distribution of seedlings, sprinklers, grass cutter and rain gun to the farmers
6. 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 district so as to enable the livestock owners living in the remote areas can avail the opportunities to consider animal husbandry activities as livelihood option and maximize profit through livestock sector. Adequate provision of 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 would 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 would be disseminated to the farmers. The following infrastructure facilities will strengthen the fodder availability such as

1. Establishment of farm production cover
2. Construction of silo pit and overhead tanks
3. Establishment of feed mixing units
4. Installation of rain gun and sprinklers
5. Procurement of agri inputs

Livestock breeding management

Over the past few decades, imported exotic cow varieties boosted the 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 climatic 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 and 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 it is not surprising 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 would help to improve livestock breeding management, such as

1. CIDR
2. Establishment and distribution of sex-sorted semen facility
3. Establishment of IVF lab
4. Establishment of LN2 and embryo transfer lab
5. Oestrous synchronization

Livestock health

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

1. Upgradation of vaccine production facilities for bacteria and virus
2. Procurement of vaccines, medicine and diagnostic kit
3. Animal quarantine facility in government 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 when 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 interventions proposed are

1. Distribution of sheep, goat, buffalo, piggery and poultry units
2. Establishment of modern poultry, rabbit , piggery, sheep, goat and bull shed
3. Popularizing quail rearing
4. Integrated farming

Improving the service delivery at veterinary institutions

Veterinary hospitals, dispensaries, Aid Centers, diagnostic laboratories and veterinary manpower already available are much lower than what is required. These services would be improved and expanded and would 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 would consider to extend the veterinary services on full cost recovery basis. To improve the service delivery the below mentioned interventions have been proposed. The interventions that have been proposed are

1. Deep freezer facility for storage of vaccines and medicines
2. Establishment of infrastructure facilities, disease diagnostic lab, mobile veterinary units, surgical theatres and ambulance facilities.

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 the livestock shandy would also be helpful to enhancing livestock management. The interventions that have been propose are

1. Animal identification and traceability

2. Conservation of indigenous breeds
3. Improvement of livestock shandy
4. Establishment of slaughter house

Capacity building

Educating the farmers about the advanced fodder crop production technologies as well as the techniques would enrich the knowledge of farmers through conduct of trainings and demonstrations to the farmers, youths and young entrepreneurs. Field demonstrations would be conducted especially on fodder production technologies, seed production, poultry farming and sheep farming.

Capacity building programme is to strengthen the capacities of farmers, indigenous and local communities their organizations and other stakeholders, to manage sustainable biodiversity so as to increase their benefits to promote awareness and responsible action in the form of trainings, demonstrations and exposure visits. 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 is with a total budget outlay of ₹. **9532.28 lakh.**

Project implementing agency

The projects proposed would be implemented by the Department of Animal husbandry

Table.4.22. Budget requirement for Animal Husbandry

(₹. in lakhs)

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Increasing the Availability of Fodder through Field level Interventions															
1	Establishment of Vermicomposting unit (single bed)	Nos	0.05	All Blocks	3	0.15	14	0.70	3	0.15	3	0.15	3	0.15	26	1.30
2	Fodder production to the farmers by Hydrophonic methods	Nos	0.1	All Blocks	11	1.10	0	0.00	1	0.10	0	0.00	0	0.00	12	1.20
3	Distribution of Azolla trays	Nos	0.03	All Blocks	37	1.11	37	1.11	37	1.11	37	1.11	37	1.11	185	5.55
4	Distribution of Silage bags for conservation of fodder crops	Nos	0.005	All Blocks	15	0.08	15	0.08	15	0.08	15	0.08	15	0.08	75	0.38
5	Fodder plot development	acre	0.05	All blocks	400	20.00	400	20.00	400	20.00	200	10.00	200	10.00	1600	80.00
6	Development of Seed Production plots	acre	0.25	All Blocks	2	0.50	1	0.25	0	0.00	0	0.00	10	2.50	13	3.25
	Livestock Breeding Management															
7	CIDR (Controlled Internal Drug Release) for increasing Fertility in Cattle	Nos	0.01	All Blocks Except B6, B9	1200	12.00	1200	12.00	1200	12.00	1200	12.00	1200	12.00	6000	60.00
8	Distribution of sex sorted semen to veterinary institution	Nos	0.015	All Blocks	1200	18.00	1200	18.00	1200	18.00	1200	18.00	1200	18.00	6000	90.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Livestock Health															
9	Up gradation of Vaccine Production Facilities - Bacterial	Nos	50	All Blocks	24	1200.00	24	1200.00	24	1200.00	24	1200.00	0	0.00	96	4800.00
	Improving the Livestock Productivity															
10	Distribution of Sheep/Goat units -semi intensive system	Nos	0.6	All Blocks	240	144.00	240	144.00	241	144.60	240	144.00	240	144.00	1201	720.60
11	Distribution of Buffalo units(5 Buffaloes)	Nos	4.5	All Blocks	56	252.00	56	252.00	56	252.00	56	252.00	56	252.00	280	1260.00
12	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
13	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
14	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
15	Distribution of Piggery units (fattening-5 Nos)	Nos	1.25	All Blocks	0	0.00	0	0.00	8	10.00	0	0.00	2	2.50	10	12.50
16	Improvement of infrastructure facilities at PEC, Vaigai dam	Nos	50	All Blocks	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
17	Deep freezer facility for Storage of vaccines and Medicines	Nos	10	All Blocks	0	0.00	0	0.00	13	130.00	0	0.00	0	0.00	13	130.00
18	Establishment of Infrastructure facilities for Veterinary Institutions	Nos	30	B2, B4, B5, B6, B12, B13	4	120.00	4	120.00	2	60.00	0	0.00	0	0.00	10	300.00
19	Establishment of Mobile Disease Diagnostic Labs	Nos	20	B1, B4, B5, B6, B11, B12	3	60.00	2	40.00	7	140.00	1	20.00	1	20.00	14	280.00
20	Establishment of Mobile Veterinary Units	Nos	10	B2, B4, B5, B6, B7, B12, B13	5	50.00	1	10.00	0	0.00	1	10.00	2	20.00	9	90.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Establishment of surgical theatres at veterinary institution	Nos	30	All Blocks	3	90.00	3	90.00	3	90.00	3	90.00	1	30.00	13	390.00
22	Providing solar lighting panels at veterinary institution	Nos	1	All Blocks	24	24.00	24	24.00	24	24.00	13	13.00	12	12.00	97	97.00
23	Package of Modern Veterinary Diagnostic Aids to Veterinary Institutions such as Computerised X rays, Ultrasound, Diathermy etc.	Nos	30	All Blocks	3	90.00	3	90.00	3	90.00	3	90.00	1	30.00	13	390.00
24	Establishment of Ambulance facility for animals	Nos	80	B5	1	80.00	1	80.00	0	0.00	0	0.00	0	0.00	2	160.00
	Livestock Management															
25	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
26	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															
27	Establishment of Farmers training Centre	Nos	200	B5	0	0.00	1	200.00	0	0.00	0	0.00	0	0.00	1	200.00
28	Conducting Demonstrations, Camps and Campaigns	Nos	0.1	All Blocks Except B6,B9	12	1.20	12	1.20	12	1.20	12	1.20	12	1.20	60	6.00
29	Creating awareness of livestock management to the farmers through Training Programmes	Nos	0.1	All Blocks	13	1.30	13	1.30	13	1.30	13	1.30	13	1.30	65	6.50

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
30	Update of scientific advancement and technical skill of Veterinarians (Workshop, Hands-on trainings)	Nos	0.1	All Blocks	12	1.20	12	1.20	12	1.20	12	1.20	12	1.20	60	6.00
	Grand Total					**2266.64**		**2378.84**		**2318.74**		**1937.04**		**631.04**		**9532.28**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

Table.4.22.a. Budget requirement for Animal Research (TANUVAS)

(₹. in lakhs)

Sl. No	Interventions	Unit	Unit Cost	Blocks Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
I	**Infrastructure and Assets**															
1	Genetic Conservation Centres	No	168.25	All Blocks	0	0.00	1	168.25	1	168.25	1	168.25	1	168.25	4	673.00
2	Animal Ambulance and referral hospitals for addressing rural veterinary care	No	141	All Blocks	1	141.00	1	141.00	1	141.00	0	0.00	0	0.00	3	423.00
3	Socio economic empowerment of livestock farmers	Nos	51.39	All Blocks	1	51.39	1	51.39	1	51.39	1	51.39	1	51.39	5	256.95
	Total					**192.39**		**360.64**		**360.64**		**219.64**		**219.64**		**1352.95**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.7. Dairy development

The importance of dairying in a country like India hardly needs emphasis. 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 and own more than 50 per cent of the world's buffaloes and 20 per cent of world's 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 4.60 per cent as compared to the global growth rate of 2.20 per cent. During this period, per capita consumption of milk in the country was 340 g per day as against 299 g per day globally. India's milk production has touched 155.40 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, the emerging trends have to be increased in the county's milk production. To fulfill the shortage in dairy sector, the following interventions are 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. Some machinery and equipment are essentially required such as storage tanks, washer, coolers, pumps and processing equipments. 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 equipments

5. Pasteurizers
6. Heaters and chillers
7. Washer and conveyors
8. Pipes and fittings
9. Cleaning equipments
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 the 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 became 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. To get a better improvement in milk production than yesteryears, the following inputs have been suggested.

1. Provision of veterinary medicine
2. Fodder development equipment and seed material
3. Milk testing equipments
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 155.40 metric tonnes of milk and 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 proficient in dairying, trainings and camps has to be conducted. To attain this, the following interventions are 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 cost, increases returns to farmers by reducing the number of middlemen or by restricting the commission of intermediaries of marketing system. To increase the income in dairy sector, the suitable marketing structure is pivotal. To ensure that, the following structures have been suggested

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

Quality control

Quality is a vital ingredient of a good brand. One should remember the “core benefits” – the things consumers expect and must be delivered well. To ensure quality, the following interventions are suggested

1. Adulteration detection equipments
2. Milk testing equipment and laboratory

Processing and value addition

Value addition 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 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 equipments

Development for dairy sector

Though the milk production has reached an all-time high in the district, the producers are not able to market the milk produced. This is mainly due to inadequate infrastructure available for procurement, processing of milk and marketing network. Providing proper infrastructure to the veterinary health care institutions is necessary for the timely diagnosis and treatment of animal diseases. An efficient management of cattle will be incomplete without a well-planned and adequate housing of cattle. Good quality milk is essential for production of good quality dairy products, taste and flavor, free from pathogens and long keeping quality. Immediately after milking, the milk must be cooled preferably to 4° C. This requires mechanical refrigeration or

milk cooling tanks. These are expensive and can usually be afforded by large scale commercial farms. For small scale dairy farmers, setting up a milk cooling centre centrally may be the ideal solution. The following buildings have been proposed for better storage and improvement

1. 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.28448.25 lakh is proposed to fulfill the aforementioned interventions for five years.

Implementing agency

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

Table.4.23. Budget requirement for Dairy development

(₹. 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
	Strengthening of milk storages and processing units															
1	Electrical installation like Transformer, UPS, Stabilisers, Control Panel MCC etc.,	1	25	All blocks	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	1	15	All blocks	3	45.00	3	45.00	3	45.00	3	45.00	3	45.00	15	225.00
3	Tub washer, Can washers, Crate conveyor systems.	1	10	All blocks	1	10.00	1	10.00	1	10.00	1	10.00	1	10.00	5	50.00
4	Point of Sale Machines and billing systems	1	0.25	All blocks	25	6.25	25	6.25	25	6.25	25	6.25	25	6.25	125	31.25
5	SS pipes and fittings	1	5	All blocks	2	10.00	2	10.00	2	10.00	2	10.00	2	10.00	10	50.00
6	Solar system for water heating	1	2	All blocks	3	6.00	3	6.00	3	6.00	3	6.00	3	6.00	15	30.00
7	Packing Machineries for milk, Butter, Ghee, SMP and Other Milk products	1	18	All blocks	0	0.00	2	36.00	1	18.00	1	18.00	1	18.00	5	90.00
8	Plate Heat type Chillers and pasteurizers	1	10	All blocks	2	20.00	2	20.00	2	20.00	2	20.00	2	20.00	10	100.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
9	Milk Tankers of various capacities	1	25	All blocks	1	25.00	1	25.00	1	25.00	1	25.00	1	25.00	5	125.00
10	Milk Pumps of various capacities	1	0.5	All blocks	9	4.50	9	4.50	9	4.50	9	4.50	9	4.50	45	22.50
11	Generator of various capacities	1	20	All blocks	0	0.00	1	20.00	0	0.00	1	20.00	0	0.00	2	40.00
12	Curd processing equipments	1	50	All blocks	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
13	Cleaning In Place equipments with accessories	1	75	All blocks	0	0.00	0	0.00	0	0.00	1	75.00	0	0.00	1	75.00
	Enhancing milk production and milk processing unit															
14	Veterinary Medicine	1	2	All blocks	7	14.00	7	14.00	7	14.00	8	16.00	9	18.00	38	76.00
15	Two wheeler for AI technician	1	0.5	All blocks	21	10.50	21	10.50	21	10.50	21	10.50	21	10.50	105	52.50
16	Computer system with accessories	1	0.5	All blocks	21	10.50	21	10.50	21	10.50	21	10.50	21	10.50	105	52.50
17	Fodder seed materials	1	0.25	All blocks	21	5.25	21	5.25	21	5.25	21	5.25	21	5.25	105	26.25
18	Fodder development equipments like chaff cutter, Mower etc.,	1	0.2	All blocks	21	4.20	21	4.20	21	4.20	21	4.20	21	4.20	105	21.00
19	Bulk Milk coolers of Various capacities	1	15	All blocks	10	150.00	10	150.00	10	150.00	10	150.00	10	150.00	50	750.00
20	Milk cans	1	0.035	All blocks	1000	35.00	1000	35.00	1000	35.00	1000	35.00	1000	35.00	5000	175.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
21	Electronic weighing scales of various capacities.	1	0.3	All blocks	55	16.50	55	16.50	55	16.50	55	16.50	55	16.50	275	82.50
22	Electronic milk testing equipments	1	1.25	All blocks	45	56.25	45	56.25	45	56.25	45	56.25	45	56.25	225	281.25
23	Milking machine	1	0.8	All blocks	100	80.00	100	80.00	100	80.00	100	80.00	100	80.00	500	400.00
24	Cow shed	1	5	All blocks	25	125.00	25	125.00	25	125.00	25	125.00	25	125.00	125	625.00
25	Society Buildings	1	20	All blocks	25	500.00	25	500.00	25	500.00	25	500.00	25	500.00	125	2500.00
26	Cryogenic containers	1	0.35	All blocks	30	10.50	30	10.50	30	10.50	30	10.50	30	10.50	150	52.50
27	Equipments for Artificial Insemination	1	0.5	All blocks	10	5.00	10	5.00	10	5.00	10	5.00	10	5.00	50	25.00
	Capacity building															
28	Training of personnel of MPCS, Union and Federation.	1	0.05	All blocks	500	25.00	500	25.00	500	25.00	500	25.00	500	25.00	2500	125.00
29	Infertility Camps	1	0.2	All blocks	100	20.00	100	20.00	100	20.00	100	20.00	100	20.00	500	100.00
	Marketing Structure															
30	Parlour structures	1	5	All blocks	50	250.00	50	250.00	50	250.00	50	250.00	50	250.00	250	1250.00
31	Milk product storage cabinets	1	0.3	All blocks	100	30.00	100	30.00	100	30.00	100	30.00	100	30.00	500	150.00
32	Product Billing systems	1	0.3	All blocks	100	30.00	100	30.00	100	30.00	100	30.00	100	30.00	500	150.00
	Quality control															
33	Adulteration detection equipments	1	4	All blocks	2	8.00	2	8.00	2	8.00	2	8.00	2	8.00	10	40.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
34	Milk testing equipment and Laboratory.	1	5	All blocks	2	10.00	2	10.00	2	10.00	2	10.00	2	10.00	10	50.00
	Processing and value addition															
35	Skim Milk powder Plants	1	6000	All blocks	0	0.00	1	6000.00	0	0.00	0	0.00	0	0.00	1	6000.00
36	Water Treatment Plants. Reverse Osmosis plant	1	100	All blocks	0	0.00	1	100.00	1	100.00	1	100.00	1	100.00	4	400.00
37	Effluent treatment plant	1	100	All blocks	0	0.00	0	0.00	0	0.00	2	200.00	0	0.00	2	200.00
38	Steam raising plant with accessories	1	100	All blocks	0	0.00	0	0.00	1	100.00	0	0.00	0	0.00	1	100.00
39	Fat handling equipments	1	200	All blocks	1	200.00	1	200.00	0	0.00	0	0.00	0	0.00	2	400.00
40	Dairy equipments	1	50	All blocks	2	100.00	2	100.00	2	100.00	2	100.00	2	100.00	10	500.00
	Development of diary sector															
41	Construction of Dairy	1	1500	All blocks	0	0.00	0	0.00	1	1500.00	0	0.00	0	0.00	1	1500.00
42	Construction of Skim milk powder Plant	1	1500	All blocks	0	0.00	1	1500.00	0	0.00	0	0.00	0	0.00	1	1500.00
43	BMC buildings	1	15	All blocks	10	150.00	10	150.00	10	150.00	10	150.00	10	150.00	50	750.00
44	Cattle feed Plants	1	5000	All blocks	0	0.00	1	5000.00	0	0.00	0	0.00	0	0.00	1	5000.00
45	Ice cream and dairy product buildings	1	2500	All blocks	0	0.00	0	0.00	1	2500.00	0	0.00	0	0.00	1	2500.00
46	Ware house for Dairy products	1	200	All blocks	1	200.00	1	200.00	1	200.00	1	200.00	1	200.00	5	1000.00

Sl. No	Interventions	Unit	Unit cost	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
47	Ware house for Dairy consumables	1	200	All blocks	0	0.00	0	0.00	1	200.00	1	200.00	1	200.00	3	600.00
	Grand Total					**2197.45**		**14853.45**		**6465.45**		**2612.45**		**2319.45**		**28448.25**

B1-Alanganallur, B2-Chellampatti, B3-Kallikudi, B4-Kottampatti, B5-Madurai East, B6-Madurai West, B7-Melur, B8-Sedapatti, B9-T.Kallupatty, B10-Thirumangalam, B11-Thirupparankundram, B12-Usilampatti and B13-Vadipatti

4.8. Fisheries sector

Fisheries as a sector is one of the thrust areas in the overall economic development of the State playing a predominant role in its economic activity by its contribution to direct and indirect employment for more than 11 lakh fishers, contributing food security to a considerable portion of population and earning substantial revenue especially from foreign exchange. The Fisheries sector over the years has transformed from subsistence-based artisanal activities to modern livelihood activities with the application of science and modern technologies in the field of capture fishing and culture fisheries. It is developing as a major industry with diversifications of exploring deep sea resources and eco-friendly aquaculture practices for culture of finfish and shell fish, ornamental fish culture, eco-tourism, fish processing parks and mid sea fish processing units.

4.8.1.1. Enhancement of fisheries production

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

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

Aquatic plants growing in ponds and lakes are beneficial for fish and wildlife. They provide food, dissolved oxygen, spawning and nesting habitat for fish and waterfowl. Aquatic plants can trap excessive nutrients and detoxify chemicals. However, dense growth (over 25%

of the surface area) of algae and other water plants can seriously interfere with pond recreation and threaten aquatic life. Water plants can restrict swimming, boating, fishing, and other water sports. Biological controls for aquatic vegetation have received considerable publicity. Several species of fish are herbivorous in that their principal diet is aquatic vegetation. One such species, the grass carp (also known as the white amur or Chinese carp), is being tested in various parts of the country. Hence in this district, it is suggested to implement the biological control of aquatic weeds by stocking of Grass Carps in Aquatic Weed Infested water bodies.

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

The interventions are

1. Biological Control of Aquatic Weeds by Stocking of Grass Carps in Aquatic Weed Infested water bodies
2. Enhancement of Fish production in irrigation tanks and panchayat tanks by stocking fish seeds
3. Increasing Fishing Efficiency of Inland Fishermen and Fish Farmers
4. Promotion of quality fish marketing by traditional fishers by providing moped with ice box
5. Introduction of short seasonal fish species in existing farm ponds
6. Organization of Fish festival

4.8.1.2. Infrastructure and assets

Fish Farming is an age old activity and in practice from time immemorial. The successful fish culture requires ploughing of pond, addition of manure, stocking of fish seed, eradication of unwanted aquatic plants and animals, watering the pond, harvesting the crop and marketing of

the produce. The fish culture technologies and economics are simple and understandable to the fish farmers. Hence the construction of fish ponds in this district is recommended for its commercial production. Also, the fishery wealth in the inshore waters is being overexploited due to excessive fishing pressure on the resources. Artificial reefs help in augmenting the productivity of the marine ecosystem. Artificial reefs act as habitats to marine aquatic organisms and enhance the fish production through increased breeding activity and survival of young ones and act as a barrier for bottom trawling operations.

Hence it is necessary for the establishment of District Extension and Training centres, Improvement of hygienic fish marketing by establishing modern fish kiosk TNFDC, establishment of GIFT farms and provision of inputs and establishment of mini lab facilities in government fish farm of this district.

The interventions are

1. Establishment of mini lab facilities in Government fish farms
2. Establishment of fish culture ponds and provision of inputs
3. Establishment of District Extension and Training centre
4. Improvement of hygienic fish marketing by establishing modern fish kiosk TNFDC
5. Establishment of GIFT farms and provision of inputs

4.8.1.3. 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 fisheries villages, animation camps in fisheries villages, seminars, exhibitions and workshop, awareness centres for linking the fishing villages, marketing centres and the district offices.

4.8.1.4. Budget

The budget requirement is ₹220.98 lakh.

4.8.1.5. Implementing agency

Department of Fisheries would implement the project

Table 4.24. Budget requirement for Fisheries

(₹. in lakhs)

Sl. No	Interventions	Unit	Unit cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	Enhancement of fisheries															
1	Promotion of quality fish marketing by traditional fishers by providing mobbed with icebox	Nos	0.5	Thirupparankundram, Vadipatti	0	0.00	10	5.00	10	5.00	0	0.00	0	0.00	20	10.00
2	Introduction of short seasonal fish species in existing farm ponds	nos	0.79	Kallikudi, Thirumangalam	0	0.00	1	0.79	0	0.00	1	0.79	0	0.00	2	1.58
3	Increasing fishing efficiency of inland fishermen and fish farmers	1	0.15	Madurai East	0	0.00	5	0.75	0	0.00	0	0.00	0	0.00	5	0.75
4	Improvement of hygienic fish marketing by establishing modern fish kiosk TNFDC	Nos	10	Thirumangalam	0	0.00	1	10.00	0	0.00	0	0.00	0	0.00	1	10.00
5	Establishment of GIFT farms and provision of inputs	Nos	5.05	Alanganallur, Madurai East, Madurai West	0	0.00	0	0.00	1	5.05	2	10.10	0	0.00	3	15.15
6	Enhancement of Fish production in irrigation tanks and Panchayat tanks by stocking fish seeds	Ha	0.04	Alanganallur,Chellampatti, Kallikudi, , Madurai East, Madurai West, Melur,T.Kallupatty, Thirupparankundram, Vadipatti	400	16.00	400	16.00	300	12.00	400	16.00	400	16.00	1900	76.00

Sl. No	Interventions	Unit	Unit cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
7	Biological Control of Aquatic Weeds by Stocking of Grass Carps in Aquatic Weed Infested water bodies	Ha	0.02	Madurai West	50	1.00	50	1.00	0	0.00	0	0.00	0	0.00	100	2.00
	Section Total					**17.00**		**33.54**		**22.05**		**26.89**		**16.00**		**115.48**
	Creation of infrastructure facilities															
8	Establishment of fish culture ponds and provision of inputs	Ha	4.5	Alanganallur , chellampatti, Madurai East, Madurai West, Thirupparan kundram,Vadipatti	1	4.50	1	4.50	1	4.50	1	4.50	1	4.50	5	22.50
9	Establishment of District Extension and Training centres	Nos	50	Thirupparan kundram	1	50.00	0	0.00	0	0.00	0	0.00	0	0.00	1	50.00
	Section Total					**54.50**		**4.50**		**4.50**		**4.50**		**4.50**		**72.50**
	Infrastructure and Assets															
10	Establishment of mini lab facilities in Government fish farms	0	5	Alanganallur	0	0.00	1	5.00	0	0.00	0	0.00	0	0.00	1	5.00
	Section Total					**0.00**		**5.00**		**0.00**		**0.00**		**0.00**		**5.00**
	Capacity building programme															
11	Organisation of Fish festival	No	5	Madurai East, Madurai West	0	0.00	1	5.00	1	5.00	1	5.00	1	5.00	4	20.00

Sl. No	Interventions	Unit	Unit cost	Block Covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
12	Providing trainers training and exposure visit to Departmental staff	Nos	0.1	Madurai East, Madurai West	0	0.00	10	1.00	10	1.00	0	0.00	0	0.00	20	2.00
13	Training to fish farmers	Nos	0.03	Alanganallur, Madurai West, T.Kallupatty, Vadipatti	0	0.00	50	1.50	50	1.50	50	1.50	50	1.50	200	6.00
	Section Total					**0.00**		**7.50**		**7.50**		**6.50**		**6.50**		**28.00**
	Grand Total					**71.50**		**50.54**		**34.05**		**37.89**		**27.00**		**220.98**

4.8.2. FISHERIES RESEARCH

Fisheries sector occupies a very important place in the socio-economic development of the country. It has been recognized as a powerful income and employment generator as it stimulates growth of a number of subsidiary industries, source of cheap and nutritious food besides being a foreign exchange earner. Most importantly, it is the source of livelihood for a large section of economically backward population of the country. In India, fisheries have always been playing a vital role in providing gainful employment to people, besides securing their food and nutritional security especially in rural areas. India is the third largest producer of inland capture fish in the world after China and Myanmar. Inland fish production in the country registered an impressive growth of 8 fold in the last 50 years.

Tamil Nadu with its 1076 km of coastline (13 per cent of country's coastline), 1.9 lakh sq. km of Exclusive Economic Zone (EEZ) (9.4 per cent of India's EEZ) and a continental shelf of about 41,412 sq km is one of the leading producers of both marine and inland fish. Tamil Nadu has 3.7 lakh hectare of water spread area suitable for fish culture. It comprises of major reservoirs (52,000 ha.), big/small irrigation tanks (98000 ha.), small lakes and Rural Fishery Demonstration Tanks (158000 ha.), brackish water areas, swamps, estuaries (63,000 ha.) which are suitable for both capture and culture fisheries. Tamil Nadu is also endowed with rich cold water fishery resources. Apart from this, 7400 km length of rivers and canals offer good scope for fisheries development. The Inland Fisheries policy of the state focuses in maximizing the fish production utilizing available inland water resources by adopting scientific freshwater aquaculture management and quality seed production.

Tamil Nadu Fisheries University (TNFU) is the State funded, unitary professional Fisheries University in India imparting education, research and training to enhance fish production and utilization by following the State Agricultural University (SAU) pattern and syllabi. The prominent area of research in the area of aquaculture are improving the quality of progeny by developing sperm bank, development of techniques for the culture of fin fishes in cages, enhancing the water use efficiency and productivity by bio-floc technology, developing the improved methods of ornamental fish culture and breeding techniques and, inventing techniques to prevent and cure fish diseases. Stock assessment of important fishery resources, mapping the fauna and understanding the biology of commercially important and rare species,

coastal area and inland waters monitoring for the major pollutants and waste water management are the focus areas of research. Value addition to fish has been a major focus area and technologies for fish pickle, fish noodles and ready to eat products like fish curry, fish puff, fish cutlet and fish burger have been evolved. Quality control wing of fish processing has evolved several rapid techniques for detection of human pathogens. A separate laboratory for quality monitoring will be built to help the industry.

Project component

- Establishment of regional labs for disease diagnostics, water quality and animal health management in Madurai district.
- Creation of institutional fish retail outlet with the participation of stakeholders.
- Awareness campaign on health beneficial attributes of fish
- Production of short films on nutritive value of fish and screening in theatres and television channels.
- Supply of preserved ready to eat and ready to cook fish products through public distribution systems.
- Supply of fish and fish products in mid-day meal programme
- Establishment of KVK in Madurai district
- Supply chain management to promote consumption of framed fresh water fishes

Budget

The proposed intervention would be implemented with a budget outlay of. ₹ 1391. 60 lakh.

Project implementing agency

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

Expected outcome

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

Table 4.24.Budget for Fisheries Research

(₹. in lakhs)

Sl. No	Interventions	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	**Aquaculture**														
I	**Aquatic animal health and management**														
a	Establishment of regional labs for disease diagnosis, water quality and aquatic animal health management	150	Madurai	0	0.00	0	0.00	0	0.00	1	150.00	0	0.00	1	150.00
2	**Harvest and Post harvest**														
II	**Branding of fish products and institutional marketing**														
b	Creation of institutional fish retail outlets with the participation of stakeholders	100	Madurai	0	0.00	1	100.00	0	0.00	0	0.00	0	0.00	1	100.00
III	**Enhancement of per capita consumption of fish**														
c	Awareness campaign on health beneficial attributes of fish	0.005	Madurai	52	0.26	52	0.26	52	0.26	52	0.26	52	0.26	260	1.30
d	Production of short films on nutritive value of fish and screening in theatres and television channels	50	Madurai	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
IV	**Ensuring nutritional security through fish and fishery products**														
e	supply of preserved ready to eat and ready to cook fish products through public distribution systems	12.9	Madurai	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
f	Supply of fish and fish products in mid day meal programme	12.9	Madurai	0	0.00	1	12.90	0	0.00	0	0.00	0	0.00	1	12.90
g	Supply chain management to promote consumption of farmed freshwater fishes	64.5	Madurai	0	0.00	1	64.50	0	0.00	0	0.00	0	0.00	1	64.50
3	**Fisheries technology transfer**														
h	Establishment of KVK	1000	Madurai	0	0.00	1	1000.00	0	0.00	0	0.00	0	0.00	1	1000.00
	Grand total				**0.26**		**1190.56**		**50.26**		**150.26**		**0.26**		**1391.60**

4.9. Public Works Department

Groundwater as a dependable source and its proximity to various users has led to indiscriminate extraction of this precious natural resource for agricultural, domestic and industrial uses. The efficacy of the surface water bodies such as tanks, canals as a means of natural recharge to groundwater has drastically reduced simply because the water levels in those areas are too deep. Hence the need of the hour is for 'Artificial Recharge' systems that convey the fresh rainwater into the aquifer. In other words, the basic purpose of artificial recharge of ground water is to restore supplies from the aquifers depleted due to excessive ground water development. The artificial recharge to ground water aims at augmentation of ground water reservoir by modifying the natural movement of surface water utilizing suitable civil construction techniques. The artificial recharge techniques inter-relate and integrate the source water to ground water reservoir. The benefits are rise in water level and consequent increase in storage of the ground water reservoir.

Check dams are constructed across small streams having gentle slope and are feasible both in hard rock as well as in alluvial formation. The site selected for check dam should have sufficient thickness of permeable bed or weathered formation to facilitate recharge of stored water within short span of time. The water stored in these structures is mostly confined to stream course and the height is normally around 2 meters. The quality of groundwater would change as groundwater in these areas are saline. Infiltration of water into the ground would soften the hard water and improve its quality. Farmers who had dry lands would immensely benefit from the dam.

As the district is drought-prone, source of water supply to most of the tanks depended only on rains from their own catchments. Hence the supplementation of Vaigai river water through bed dam was very essential and useful for irrigation. It would also augment groundwater sources and improve the potential in drinking water wells located in the upstream side of the bed dam. The dam was constructed in Vaigai dam to stop the water and to divert a part through a channel for irrigation purposes. The purpose of the dam was to cater to hundreds of acres of land that were left without agricultural activities due to the absence of water. The dam was constructed under the supervision of the public works department with World Bank funding. Around 2,000 farmers from the region have been stressing for over five years to get a structure like that to save agriculture in the region.

4.9.1. Project components

1. Construction of check dam across Gavundanadhi in Poosalapuram village of Peraiyur Taluk in Madurai District.
2. Construction of check dam across Vaigai River in Thiruvedagam village of Vadipatti Taluk in Madurai District.
3. Construction of Bed dam across Vaigai River @ LS 57.250 Km near Nagatheertham Village to feed Madakulam Tank of Madurai West Taluk of Madurai District.
4. Construction of Bed dam across Vaigai River @ LS 58.50 Km near Kodimangalam Village to feed Thuvariman Tank of Madurai West Taluk of Madurai District.

4.9.2. Budget

It is proposed to incurred ₹.5491.00 Lakh over a period of five years

4.9.3. Expected outcome

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

4.9.4. Implementing agency

Department of Public Works would be implementing the project.

Table 4.25. Budget estimate for PWD works

(₹. in lakhs)

S.No.	Name of Scheme	Blocks	Unit	Unit cost	2017-2018		2018-2019		2019-2020		2020-2021		2021-2022		Total	
					Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of check dam across Gavundanadhi in Poosalapuram village of Peraiyur Taluk in Madurai District.	Sedapatti	Ha	0.84	83	70.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	83	70.0
2	Construction of check dam across Vaigai River in Thiruvedagam village of VadipattiTaluk in Madurai District.	Vadipatti	Ha	13.59	82	1121.0	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	82	1121.0
3	Construction of Bed dam across Vaigai River @ LS 57.250 Km near Nagatheertham Village to feed Madakulam Tank of Madurai West Taluk of Madurai District	Thirupparankundram	Ha	6.08	0.0	0.0	407	2475.00	0.00	0.00	0.00	0.00	0.00	0.00	407	2475.0
4	Construction of Bed dam across Vaigai River @ LS 58.50 Km near Kodimangalam Village to feed Thuvariman Tank of Madurai West Taluk of Madurai District	Thirupparankundram	Ha	12.14	0.0	0.0	150	1825.00	0.00	0.00	0.00	0.00	0.00	0.00	150	1825.0
	Total					**1191.00**		**4300.00**		**0.00**		**0.00**		**0.00**		**5491.00**

4.10. Cooperative Sector

The Cooperative Marketing Societies in Tamil Nadu help the farmer members by supply of quality seeds, fertilizers, pesticides and other farm requirement at competitive rates as and when required by them. The Cooperative Marketing Societies also help the farmers in processing, storing and marketing their agriculture produces to fetch reasonable price for their agricultural produces. With these objectives, the Cooperative Marketing Societies are functioning at taluk levels.

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, the 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. The 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, a phenomenal 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 and Public Distribution system. The office infrastructure has to be improved and hence the intervention is proposed for creation of infrastructure facilities.

Project components

- Office Infrastructure
- Capital Asset Creation

Budget

It is proposed to incur **Rs. 2008.05** lakh over a period of five years.

Implementing agency

Department of Cooperation would be implementing the project.

Table 4.26. Budget requirement for Cooperative Sector

(₹. in lakhs)

Sl. No.	Co-operation	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
1	Construction of Cold Storage (100 MT)	B10	0	0.00	0	0.00	1	50.00	0	0.00	0	0.00	1	50.00
2	Construction of Compound wall	B1, B2 , B3, B5, B4, B6, B7, B10, B13, B11, B9, B8 and B12	16	79.08	21	116.13	64	572.82	6	46.90	1	13.50	108	828.43
3	Construction of Godown	B1 , B7 , B5 , B8, B11, B13 , B10	4	54.00	4	72.00	1	20.00	1	50.00	1	25.00	11	221.00
4	Construction of Office Building	B2, B4, B10, B13 and B8	0	0.00	1	15.00	4	97.00	2	31.00	0	0.00	7	143.00
5	Establishment of Tractor Shed	B1	2	2.75	0	0.00	0	0.00	0	0.00	0	0.00	2	2.75
6	Processing unit-Wooden Chekku Oil unit	B6	1	5.00	0	0.00	0	0.00	0	0.00	0	0.00	1	5.00
7	Processing unit-Dhal Colour Setter	B8	1	26.97	0	0.00	0	0.00	0	0.00	0	0.00	1	26.97
8	Renovation of Godown	B1, B2, B3, B5, B6, B7, B8, B9, B10, B11, B12, B4 and B13	32	183.19	4	49.60	0	0.00	1	21.50	0	0.00	37	254.29
9	Renovation of Office Building	B1, B2, B3, B5 ,B4, B6, B7, B10, B9 and B12	23	28.15	14	72.00	8	35.40	0	0.00	0	0.00	45	135.55
10	Renovation of Processing unit - Flour mill	B10	1	3.19	0	0.00	0	0.00	0	0.00	0	0.00	1	3.19
11	Strengthening of Cooperation Centres (Furniture's, Solar panel, Modern counter, Xerox machine, Air Conditioner, CCTV Camera,	All Blocks	31	40.64	12	75.20	4	27.40	19	61.50	25	91.80	91	296.54

Sl. No.	Co-operation	Blocks covered	2017-18		2018-19		2019-20		2020-21		2021-22		Total	
			Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin	Phy	Fin
	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)													
12	Amenities for Cooperative Centres (RO Water unit, Sanitation, Vehicle Parking Shed, Construction and renovation of Marriage Hall, Construction and renovation of amenity centres)	All Blocks	11	6.95	0	0.00	8	7.18	7	7.00	3	20.20	29	41.33
	Total			**429.92**		**399.93**		**809.80**		**217.90**		**150.50**		**2008.05**

B1-Madurai East , B2-Madurai West, B3-Thirupparankundram, B4-Melur, B5 -Kottampatti, B6-Vadipatti, B7-Alanganallur, B8-Usilampatti, B9-Chellampatti, B10-Sedapatti, B11-Thirumangalam,B12-T.Kallupatty, B13- Kallikudi

Table 4.27. Budget Abstract for Madurai District

(₹. in lakhs)

Sl. No	Sectors	2017-18	2018-19	2019-20	2020-21	2021-22	Total
1	Agriculture	5457.14	4632.87	8208.70	10201.63	12559.22	41059.56
2	Agricultural Research (TNAU)	388.00	305.61	171.61	136.50	0.00	1001.70
3	Horticulture	4049.53	3059.13	3181.90	3705.65	3469.68	17465.90
4	Agricultural Engineering	1128.12	1281.79	1114.61	1018.14	1081.02	5623.67
5	Agricultural Marketing	532.20	650.60	134.10	69.20	182.80	1568.90
6	Seed Certification & Organic Certification	16.86	1.80	15.16	1.80	1.80	37.42
7	Animal Husbandry	2266.64	2378.84	2318.74	1937.04	631.04	9532.28
8	Animal Science Research (TANVAS)	192.39	360.64	360.64	219.64	219.64	1352.95
9	Dairy Development	2197.45	14853.45	6465.45	2612.45	2319.45	28448.25
10	Fisheries	71.50	50.54	34.05	37.89	27.00	220.98
11	Fisheries Research (TNFU)	0.26	1190.56	50.26	150.26	0.26	1391.60
12	Public Works Department (WRO)	1191.00	4300.00	0.00	0.00	0.00	5491.00
13	Civil Supplies & Co-Operation	429.92	399.93	809.80	217.90	150.50	2008.05
	Total	**17921.01**	**33465.76**	**22865.02**	**20308.10**	**20642.41**	**115202.26**

The total budget requirement for the implementation of various interventions by different departments in Madurai district is **₹. 115202.26 Lakh.**


KARNATAKA
KERALA
SRI LANKA