REHABILITATION AND MODERNISATION OF WATER RESOURCES IN PAMBAR SUB BASIN OF PUDUKKOTTAI AND SIVAGANGAI DISTRICT UNDER IRRIGATED AGRICULTURE MODERNISATION AND WATER RESOURCES MANAGEMENT PROJECT.

(IAMWARM)

INTRODUCTION:

Water is a prime natural resource, a basic human need and a precious national asset, which is one of the most critical elements in Development Planning according to Indian National Water Policy. Planning and Development of Water Resources and their Use need to be governed by National Interest.

It has been estimated that out of the total precipitation around 4000 billion cubic metre in the country, Surface water availability is about 1780 billion cubic metres. Out of this, only about 50 % can be put to beneficial use because of topographical and other contraints. In addition, there is a Ground Water Potential of about 420 billion cubic metre. The availability of water is highly uneven in space and time. Precipitation is confined to only about 3 to 4 months with 20 – 40 significant Rainy days within a year. Hence, there is an imperative need for effective collection of Rain Water for storing in appropriate places like Reservoir, Lakes, Tanks, Ponds and Aquifers etc., in order to use the stored water efficiently for economical and social purpose.

Agriculture is the dominant section in Indian Economy. Tamil Nadu has poor ground ground water potential, depends mainly on the Surface Water Irrigation, as well as Ground Water Irrigation. The Surface Water Potential largely depends on the storage of water in Reservoirs, Dams and Tanks. The State has used the Surface water and Ground Water Potential to maximum limit and hence the future development and expansion depends only on the efficient and economical use of Water Potential and Resources.

To achieve the Water Use Efficiency, it is necessary to improve and upgrade the exiting conveyance and Storage System and also to introduce Modern Irrigation methods.

Considering all these, The World Bank during the Mission in October 2005 indicated that the irrigated Modernisation Project should be taken as Irrigated Agriculture Modernization and Water Resources Management Project **(IAMWARM).** This Project has advocated Basin wise Multidisciplinary Approach in its functioning which not only favours

Productivity in Agricultural and allied sectors but also expects to increase Benefits to the Farming Community.

Development of Farming Community results in the Prosperity of the Villages as most of the Agricultural activities are being carried out in Villages. As per the views of Father of our Nation, Mahathma Gandhi, Prosperity of the Nation depends on Prosperity of the Villages.

Based on the Geographical conditions, there are 16 River Basins in Tamil Nadu. The 16 River Basins are futher divided into 42 sub-basins and the Rough Cost Proposal for these 42 Sub-Basins has been submitted by the Tamil Nadu Government to the World Bank.

The World bank in their observations, have suggested to highlight effectively the benefits of investment by each Department and how the farmers shall stand benefited ultimately and suggested to prepare the estimates selecting one Sub-Basin in each of the 16 River Basin in the first year and to prepare the estimates simultaneously for all the sub-Basins.

Pambar sub-basin is one among the Sub-Basins selected under IAMWARM Project which covers Pudukkottai and Sivagangai Districts.

DESCRIPTION OF PAMBAR SUB-BASIN:

Pambar sub-basin is one of the Sub-basin in Pambar – Kottakkarayar Basin.

This Sub-Basin have the following Minor Basins.

1) Pambar
2) Ponpethiar
3) Koluvanar
4) Thenar
5) Kottakudiyar
6) Manimuthar
7) Virusuliar
8) Thirumanimuthar
9) Upper Palar
10) Kooraiyar

For preparation of Detailed Project Report under IAMWARM PROJECT, the Pambar Sub-Basin is divided in to Pambar sub-basin & Manimuthar Sub-Basin with the following Minor Basins.

1) Manimuthar Sub-Basin

Minor Basins

1. Manimuthar
2. Virusuliar
3. Thirumanimuthar
4. Uppar Palar
5. Kooraiyar

2) Pambar Sub-Basin

Minor Basins

1) Pambar
2) Ponpethiar
3) Koluvanar
4) Kottakudiar
5) Thenar

Based on that, **Detailed Project Report for Pambar Sub Basin** is prepared as detailed below.

LOCATION

Pambar sub-Basin is bounded on North & West by South Vellar Sub-Basin, East by Bay of Bengal and South by Manimuthar Sub-Basin. The Latitude is 09^0 53' 00" N to 10^0 17' 00" N and the Longitude is 78^0 35' 00" E. to 79^0 10' 00"E.

The Area of this Sub-Basin is **1442 Sq.Km**.

MINOR BASINS

1. Pambar Minor Basin

The area of this Minor basin starts from Rangiam Mettu in Pudukkottai District. It forms as a river from the surplus of Thamarai Kanmoi and traverse to a distance of 40 Km and divide into two arms at Irrumbanadu Dividing Dam. The right arm of this river empties into **Irumbanadu** Big Tank in Ayudayarkoil Taluk.

Again this forms as a River from right side surplus of Irumbanadu Big Tank. After traverse a distance of 35.50 Km it confluences in to Bay of Bengal near SP. Pattinam Village in Ramanad District. The Total length of River is 75.50 Km.

There are 9 Anicuts and 6 Open off-takes across this river feeding 94 Nos. of Non System irrigation Tanks having command area of 4833.705 Ha Besides 101 Nos. of rainfed Tanks having ayacut of 6067.825 Ha. The total No.of Tank are 195 and Command area is 10901.530 Ha.

II. Ponpethiar Minor Basin

Ponpethiar Minor Basin is one of the Minor Basin in Pambar Sub-Basin. It orginates from the left Arm of Irumbanadu dividing Dam. It traverse a distance of 34. Km and empties in to Ponpethi tank in Avudayarkoil Taluk.

Again it forms as a River from the surplus of Ponpethi tank and empties in to Bay of Bengal near Semankottai Village in Pudukottai District. There is only one anicut and 15 open off-takes feeding 19 Non-System Tanks and 2 Nos.of Rainfed Tanks. The area covered under this river is 1474.32 Ha.

III. Koluvanar Minor Basin

Koluvanar originates from the surplus of Kamalakkudi Tank in Audayarkoil Taluk of Pudukkottai District. It Travers to a distance of 23 Km and confluence with Bay of Bengal. There are 4 Anicuts, One Open Off-take and 27 Nos.of Tanks having command area of 2183.98 Ha.

The area of above three minor basin is **874-36 sq.Km**.

IV. Kottakudiar Minor Basin

This is yet another minor basin in Pambar Sub- Basin. The area of this Minor Basin Starts from Nangapatti & Surakkudi Village in Sivagangai District. It forms as river from the surplus of Urivayal Tank and Sakkavayal Tank in Karaikudi Taluk of Sivagangai District. It runs at 19 Km and Joins with Pambar river near Valayanvayal Village in Sivagangai District. There is only 1 anicut and 12 Nos.of rainfed tanks having command area 686.80 Ha. The area of this Minor Basin is 261.35 Sq.Km.

V. Thenar Minor Basin

The area of this minor basin starts from Keelasevalpatti & Pillamangalam Village in Thirumayam Taluk of Pudukkottai District. It forms as a river from the Surplus of Senjai Nattar Tank in Karaikudi Taluk of Sivagangai District. It Travers at a distance of 29 Km and joins with Pambar near Ruthiranpatti Village in Ramnad District. There are 3 Anicuts and 19

Open off-takes across this river having 63 Nos.of Tanks feeding 3639.85 Ha i n Sivagangai & Pudukottai District. The area of this Minor Basin is 306.35 Sq.Km.

Area covered Under Pambar Sub-Basin

Sl. No	Name of District	Name of Taluk	Name of Block	No.of Village
1.	Pudukkottai	Thirumayam	Thirumayam	17
		-do-	Arimalam	7
		Aranthangi	Aranthangi	3
		Avudayarkoil	Avudayarkoil	65
		- do-	Arimalam	6
		Manamelgudi	Manamelgudi	10
	Sivagangai	Karaikudi	Sakkottai	15
		-do-	Kallal	3
		Thiruppathur	Kallal	2
		Devakottai	Devakottai	4
		-do-	kannangudi	27
	Ramnad	Thiruvadanai	Thiruvadanai	3

No.of District Covered : 3

No.of Taluks Covered : 8

No.of Blocks Covered : 10

No.of Villages Covered : 162

LIST OF BLOCKS AND THEIR STATUS

Sl.No	Name of Block	Category
1.	Thirumayam	Safe
2.	Arimalam	Safe
3.	Aranthangi	Safe
4.	Avudayarkoil	Safe
5.	Manamelgudi	Safe
6.	Sakkottai	Safe
7.	Kallal	Safe
8.	Devakottai	Safe
9.	kannangudi	Safe
10.	Thiruvadanai	Safe

SOIL CLASSIFICATION

The Predominant soil classification – Taluk wise

Sl.No	Taluk Name	Great Order	Sub Group
1	Thirumayam	Alfisol	Udic Haplustalf
2	Aranthangi	Alfisol	Udic Haplustalf
3	Avudayarkoil	Alfisol	Udic Haplustalf
4	Manamelgudi	Alfisol	Udic Haplustalf
5	Karaikudi	Vertisols	Enti Chromusterts
6	Devakottai	Vertisols	Enti Chromusterts
7	Thiruppathur	Vertisols	Enti Chromusterts
8	Thiruvadanai	Vertisols	Enti Chromusterts

LAND HOLDINGS DETAILS

Mariginal <1 Ha Nos	Small 1-2 Ha Nos	Medium 2-5 Ha Nos	Big > 5 Ha Nos	Total
18870 60%	10140 32.20%	1470 4.67%	970 3.13%	31450

LAND USE PATTERN

The Classification of land in the Sub-Basin as per Nine Fold Classification adopted by Government of India is as follows:

Sl.No	Description	Area in Sq.Km	Percentage
1.	Geographical Area of Sub-Basin	1442.00	100 %
2	Forest	136.12	9.44 %
3	Barren & Uncultivable Land	45.57	3.16 %
4	Land Put to Non-Agri use	227.12	15.75 %
5	Cultivable Waste	62.29	4.32 %
6	Permanent Pasture	6.63	0.46 %
7	Misc. Trees in `	28.84	2.00 %
8	Current Fallows	208.08	14.43%
9	Other Fallow Lands	246.44	17.09 %
10	Net Sown area	480.91	33.35 %

HYDRO METEOROLOGICAL CHARACTERISTICS

The cultivated area under the Basin is being served with the Surface Irrigation through Aicuts, Tanks, sub surface Irrigation through wells and the remaining as Rainfed. Rain fall is the main input for the Agriculture. Rainfall is received during the two monsoons called South West and North East Monsoon. High intensity of rain fall during the monsoon periods sometimes brings heavy floods in the River and causes damages to the crops and loss to lives, affecting the economy of the area. On the other hand, failure of monsoon also causes crop loss which affects lively – hood of Cattle and Human Population.

The details of the rainfall over the Basin area, as well as Hydro Meteorological features are essential for Water Resources Analysis. The basic factors which influence Agriculture are Climatological features such as Rain fall, Temperature, Humidity Wind Speed, Sun Shine and Evaporation.

The study now made on Hydro Meteorological characteristics of the Pambar Sub Basin includes Analysis of Rain Fall, Temperature, Humidity, Wind Speed Sun Shine and Evaporation etc.

The study of the Rainfall Pattern, is distribution in Time and Space and its variability and probability of occurrence is highly useful for Water Resources Planning and Management.

RAINFALL AND DEPENDABLE RAIN FALL

There are 6 Non recording Rain Gauge Stations having long term record is the Sub Basin. The annual average rain fall is 1026 mm.

RAIN FALL DETAILS

Rain Fall Station	Total mm	SW mm	NE mm	Summer & Winter mm
Thirumayam	890	375	372	143
Aranthangi	964	334	464	166
Avudaiyarkoil	1008	321	556	131
Arimalam	1105	376.60	536.80	181.60
Karaikudi	985.22	390.16	425.03	170.03
Devakkottai	1201.43	500.33	555.22	145.88
Average	1025.61	382.85	484.84	156.25
50% Dependality	512.81	191.43	242.42	78.13
75% Dependality	769.21	287.14	363.63	117.19

CLIMATE

The Climatological features of the Basin have been studied from the data available at Kurungulam Weather Station, being maintained by Ground Water wing of P.W.D.

The Climatological features are tabulated below.

Sl.No	Average Climatological factors	S.W Monsoon	N.E Monsoon	Winter	Summer
1.	Monthly Temperature in Celsius max/min.	20/28.6	27.5/25.3	25.6/25.4	29.9/27.9
2.	Temperature in Celsius	29.3	26.5	26	28.7
3.	Relative Humidity in %	70.8	79.7	79.8	73.9
4.	Wind Speed in Kmph	11.3	10.2	12.79	13.3
5.	Sun Shine hrs/day	6.0	5.6	8.76	8.57

AGRICULTURE

Paddy is the major crop.

Other crops are

- Pulses
- Groundnut
- Sugarcane
- Vegetables
- Total Registered Ayacut - 18886.00.0 Ha

Fully Irrigated Ayacut - 10209.00.0 Ha

Partially Irrigated Ayacut - 4807.00.0 Ha

Gap - 3870.00.0 Ha

WATER BALANCE

Total Basin Area of Pambar Sub Basin

Pambar	-	874.36 Sq.km
Kottakudiar	-	261.23 Sq.km
Thenar	-	306.35 Sq.km
Total	-	**1441.94 Sq.km or**
		1442 Sq.km

TOTAL WATER POTENTIAL

Surface Water Potential	-	160.97 m.cum
Ground Water Potential	-	240.59 mcum
Total Water Potential	-	401.50 m.cum

WATER DEMAND (Without Project)

Irrigation Water Demand	-	450.09 mcum
Drinking Water	-	9.19 mcum
Livestock	-	6.16 mcum
Industries	-	14.90 mcum
Total	-	**480.340 mcum**

WATER BALANCE (Without Project)

Total Water Potential	-	401.50 m.cum
Total Water Demand	-	480.340 m.cum
Deficit	-	78.84 m.cum

WATER DEMAND (With Project)

Irrigation Water Demand	-	369.66 m.cum
Drinking	-	9.19 m.cum
Livestock	-	6.16 m.cum
Industries	-	14.9 m.cum
Total	-	**399.91 m.cum**

WATER BALANCE (with project)

Total Water Potential	-	401.50 mcum
Total Water Demand	-	399.91 mcum
Surplus	-	1.59 mcum

STACK HOLDERS MEET

To identify the System deficiencies and to asses the actual requirements to overcome the deficiencies, the following methods were done.

Farmers meeting of entire Pambar Basin was conducted at Pudukkottai and explained about IAM WARM Project and the Farmers welcomed this project.

Later, Walkthrough Survey with Farmers and Line Departments were conducted on 13 th an 14 th August 2006 .

During Walkthrough Survey, to asses the exact deficiencies in this Sub Basin, a Questionnaire has been prepared and distributed among the ryots of respective Anicuts & Tanks. The Farmers noted the prevailing conditions of Tanks & Anicuts a nd represented for the remedial measures to be done.

Further, Meetings were conducted with Stack holders . After detailed discussions, the actual requirements in this Sub Basin are assessed.

WATER USER'S ASSOCIATION

In this Sub Basin, the TNFMIS Act 2001 has not been implemented so far. About 24 Nos of Water User's Associations are functioning in this Sub Basin. They were all registered under Society Act. Action is being taken to form about 19 4 Nos of Water User's Association in the entire area of this Sub Basin.

SYSTEM DEFICIENCIES

As the Irrigation network is age old, the existing Conveyance Distribution System are functioning with less efficiency. Almost all the Tanks and Supply Channel under the Pambar

Sub Basin have been silted up. Sluices and Weirs are in dilapidated condition. Most of the Anicut constructed long back are in damaged conditions.

Due to outdated old traditional method of Irrigation practices, the water use efficiency is also minimum.

Paddy is raised in major command Area of this Sub Basin and the income from paddy crop is very small.

The income of the Farmers is mainly from Agricultural Outputs ;and thereby living standards of the Farmers and their dependants are not enriched.

Due to inadequate facilities of transporting, storing and marketing, the full benefits of the hard work are not rewarded. This, in turn reflects in the growth of the Nation.

SCOPE OF THE PROJECT

The Irrigation of this Basin is fully dependent on Non System Tanks and Rain fed Tanks. The Water Resources Organization will modernize the Irrigation specialty and expect to harness the fullest benefits from the available Water Potential.

The Water Resources Organization with the following Line Departments is proposed to take up the Irrigated Agriculture Modernization and Water Resources Management Project (IAMWARM) for Pambar River Sub Basin.

1. Agricultural Engineering Department
2. Agriculture Department
3. Agriculture Marketing and Agri Business.
4. Animal Husbandry Department
5. Tamilnadu Agricultural University (TNAU)

6. Horticulture Department

7. Fisheries Department

8. Environmental Cell

The entire project is formulated with the Multi Disciplinary Approach and meant to develop the Basin Command Area in complete sense. The overall efficiency of the System and the Socio Economic Status of the People are expected to increase on implementation of this Project.

ACTIVITIES PROPOSED UNDER WRO & THE LINE DEPARTMENTS.

Based on the Micro Level Studies conducted by the I.W.S, Chennai, it is evident that there is no scope for further harnessing Water Resources in this Basin System Improvements to increase efficiency and adopting Crop Pattern is the only way to improve the situation in this Basin. The main focus of this project is the optimal use of available Water Potential by improving and modernizing the Irrigation, Agricultural and allied activities.

In the process of Modernization the following works are likely to be taken up by Water Resources Organization with an Outlay of Rs. 5342.60 Lakhs.

1. Rehabilitation and Modernization of Irrigation tanks such as Sluice reconstruction, Weir reconstruction, strengthening the Tank bund etc.
2. Construction and Reconstruction of Anicuts.
3. Strengthening the River Banks
4. Rehabilitation of Surplus Course.
5. Construction of Open Wells, tube wells and recharging shafts.

1. AGRICULTURAL ENGINEERING DEPARTMENT will carry out the following works for extending the benefits of Irrigation facility to the Farmers with an Outlay of Rs. 589.17 Lakhs.

1. Micro Irrigation System such as drip and sprinkler Irrigation.
2. Construction of Farm Pond.
3. Modernization of Agriculture Machineries.

2.AGRICULTURE DEPARTMENT has proposed to take up the following works with an investment of Rs. 408.08 Lakhs.

1. 10 Ha. Technology Demonstration.
2. Distribution of Bio fertilizer, M.N. Mixtures, Gypsum .
3. Bund Cropping with Pulses.
4. Maize, Pulses and Groundnut Demonstration.
5. Exposés visits, Capacity Building.
6. Creation of Storage Go down etc.

3 AGRICULTURE MARKETING AND AGRI BUSINESS DEPARTMENT.

The Sub Basin is having an area of 18886 Ha as registered ayacut in which 10209 Ha is under fully irrigated and 4807Ha under partially irrigated condition. The Cropping Pattern is dominated by crops like Paddy, Sugarcane, Groundnut and Pulses. After Rehabilitation of Irrigation Structures, the fully irrigated and partially irrigated areas will increase and in the revised Cropping Pattern, Vegetable Crop will increase, Value Addition and Marketing Support for these activities will be given the following activities to promote Value Addition and Marketing with an investment of Rs. 52.00 Lakhs will be taken up under this Project.

1. Thrashing /Drying Yard
2. Storage Go down
3. Tonnage
4. Weighing Scales.

4. ANIMAL HUSBANDRY DEPARTMENT is planning to take up the following activities for enhancement of the benefits with an investment of Rs. 52.03 Lakhs under this Project.

1. Productivity enhancement by improving delivery of Veterinary services
2. Increasing availability of green Fodder in Private lands .
3. Out reach Program.
4. Enhancing the Knowledge level of Human Resource
5. Ensuring Marketing tie up by Establishing Bulk Milk coolers in the Sub Basin Area.

5. TAMILNADU AGRICULTURAL UNIVERSITY has proposed the following activities with an Outlay of Rs 125.08 Lakhs under this Project.

1. a. Technology Transformation,
   b. Seed Village
   c. soil Testing
2. Out Sourcing.
3. Training to Farmers.

6. HORTICULTURE DEPARTMENT is planning to take up the following activities under this Project with an investment of Rs. 255.26 Lakhs.

1. New area coverage for Maize and Casuarinas.
2. INM / IPM
3. Human Resources Development
4. Technical Input Provider.
5. Hiring of Computers.

7. FISHERIES DEPARTMENT has proposed the following activities with an Outlay of Rs. 29.76 Lakhs under this Project.

1. Fish seed Banks
2. Fish Seed rearing in cages.
3. Aquaculture in Form Bonds
4. Fishing Implements.
5. Vehicle Hire Charges etc.

8. ENVIRONMENTAL CELL has proposed to take up the following works with an outlay of Rs. 25.00 Lakhs under this Project.

1. Periodical water samples & Soil samples collection, Preparation, testing and analysis and other Environmental & Social parameter data collection.
2. Conducting Environmental & Social awareness meeting, Training & Workshop for conserving the natural resources and environment.

3. Implementing Environmental Projects such as Water Conservation, Prevention of Water Pollution, Solid waste Management, Eradication of Water weeds in Water spread Area by Bio – Remediation methods etc.,

IAM WARM PROJECT- P.W.D / W.R.O

PAMBAR SUB BASIN

ABSTRACT ESTIMATE

Sl No	Description of work	Quantity	Amount in Lakhs
1	Repairs to Anicuts	20 Nos	339.67
2	Improvements to Supply channel	270.76. km	277.24
3	Improvements to Tank bund	572.74 km	2361.77
4	Reconstruction of Sluices	632 Nos	730.95
5	Repairs to Sluices	211 Nos	153.35
6	Reconstruction of Weir	67 Nos	355.94
7	Repairs to Weirs	89 Nos	178.27
	Selective Lining to Field Channel	14.18 km	250.39
8	Construction of Anicut	3 Nos	99.64
9	construction of Groynes	2 Nos	13.68
10	Construction of Dividing Dams	5 Nos	135.84
11	Providing Dug wells , Bore wells and Research staffs	-	108.88
	Sub Total		**5005.62**
	Miscellaneous		
12	Labour welfare Fund @ 0.3%		
13	Documentation charges @ 1 %		
14	P.S charges and Contingencies 2.5 %		**336.98**
15	Un foreseen Items		
	Grand Total		**5342.60**

Sl No	Components Proposed	Proposed Area/Nos	Unit cost (in Lakhs)	Total cost (in Lakhs)
	Agricultural Engineering Department.			
1	**Micro Irrigation System**			
A	Drip Irrigation			
	Sugarcane	558.00.0	0.63	351.54
	Coconut	202.00.0	0.279	56.36
	Horticultural crop - Amla	100.00.0	0.382	38.20
B	**Sprinkler irrigation**			
	Ground nut	288.00.0	0.15	43.20
2	**Farm Ponds**	40 Nos	0.40	16.00
3	Farm Mechanisation			
a	Mini combined Harvestor	1 Nos	1.50	1.50
b	Rotovator	5 Nos	0.90	4.50
c	Sugarcane weeder	5 Nos	0.75	3.75
d	Groundnut Seed drill	10 Nos	0.35	3.50
e	Groundnut Harvester	20 Nos	0.25	5.00
2	Groundnut Decardicator	5 Nos	0.05	0.25
a	Maize Decardicator	20 Nos	.85	17.00
	GRAND TOTAL			**540.80**

	Description of work	Area in (Hec)	Requirement Rs / Hec	Amount in Lakhs
	Agriculture Department			
1	10 Ha. Technology Demonstration.	2500	5000	125
2	Distribution of Bio fertilizer, M.N. Mixtures, Gypsum	6000	150	9
3	Distribution of M.N Mixtures	3000	100	3
4	Bund Cropping with Pulses	7500	200	15
5	Organic forming unit	20000	50	10
6	Soil health cards	10	22500	2.25
7	Maize Demonstration	1500	6800	102
8	Pulses Demonstration	300	6700	20.10
9	Groundnut Demonstration	150	6000	9
10	Exposure Vist	20	800	8
11	Documentation and Publicity			10
12	Capacity Building			15
13	Creation of Storage Godown			50
14	Net working system and Staff on consolidated pay			16
15	Provision for conveyance			10
	TOTAL			**404.35**

AGRICULTURE MARKETTING

Sl No	Items	No		Amount (Lakhs)
1	Rural Godown	5	100 Sq.Mt	25.00
2	Drying yard	5	400 Sq.Mt	11.00
3	Plastic Tarpaulin	5	(0.50)	2.50
4	Dunnages	5	(60 x 5)	2.00
5	Weighing scales	5		0.50
				41.00

FISHERIES DEPARTMENT

Sl No	Particulars	No. of Unit	Amount (Lakhs)
1	Fish seed bank	1	14.50
2	Operational Cost		0.58
3	Fish seed rearing in cases	10	1.40
4	Operational Cost		1.60
5	Aquaculture in farm ponds	40	6.60
6	Fishing Implements	10	2.00
7	Vehicle Hire Charges		2.00
8	Documentation		0.50
	TOTAL		**29.76**

HORTICULTURE DEPARTMENT

1.Area coverage

Sl No	Description	Area (Hec)	Amount in (Lakhs)
1	Area Expansion at 30000/- And 15000/- (Amla,Vegitables and casurina)	840	252.000
2	INM/IPM	100	2.000
II	**Human Resources Development**		
1	Publicity and other contingencies		15.000
2	Tour and Training	500	12.500
III	**Technical Input Provider**	8 Persons	38.400
IV	**Hiring of Computer and Printers**		2.500
	TOTAL		**322.400**

TAMIL NADU AGRICULTURAL UNBIVERSITY

Sl No	Activities	Amount (in Lakhs)
1.	a. Technology trasformation	18.00
	b.Seed village	5.00
	c.Soil Testing	0.50
2.	Out soucing	10.80
3.	Training to formers	3.00
4.	Contingencies	3.00
	Sub Total	42.50
	15% Institional charges	6.38
	GRAND TOTAL	**48.880**

ANNIMAL HUSBANDARY DEPARTMENT

Sl No	Components	Physical	Financial(Lakhs)
1	Productivity enhancement by improving delivery of veterinary services		
	a.Establishment of sub basin Veterinary units (SBVU) AT Rs 7,75,190/- per unit	2	15.50
	b.Improving the essential infrastructures in the Government institutions at Rs 3,250/-unit	7	0.23
2	Increasing availability of green fidder in private lands (in Acres)		7.50
3	**Out reach programmes**		
	a.Infertility cum Total Veterinary Health care camps at Rs 6,000/- per camp per month for each SBVU	120	7.20
	b.Distribution of mineral mixtures at Rs 1,82,500/-per SBVU	2	3.65
	c.Printing of Pamphlets and Leaflet at Rs 5,000/- per unit per year	10	2.50
	d.Erection of hoardings and wall paintings in the project area at Rs 2000/-per unit per year	10	1.00
	e.Conducting quarterly night meetings at Rs 1000/- per meeting for 5 years	10	2.00
4	Enhancing the Knowledge level of human resource		
	a.Training of Farmers	10000	8.00
	b.Orientation Training for Sub basin Veterinary Extension officers at Rs 1350/-trainee	2	0.03
	c.In-service Training for Veterinarians at Rs 2000/- per person	8	0.16
5	Ensuring marketing tie up by establishing Bulk milk coolers in the basin area at Rs17 Lakhs per unit	1	17.00
	TOTAL		**64.77**

ENVIRONMENTAL CELL

Name of work: Environmental Monitoring on water and soil quality and Creating awareness, updating of " Environmental and Social Assessment report" for PAMBAR SUB-BASIN.

ABSTRACT ESTIMATE

Sl.No.	Qty.	Description of Work	Rate	Per	Amount
I. Environmental and social monitoring of the River Basin including periodical water and soil quality testing and documentation					
a)	51 Nos.	Testing charges for Water samples	1400	each	71,400
b)	15 Nos	Testing charges for soil samples from polluted site	7350	L.S	110,250
c)	18 Man months	Hiring Jeep driver on service contract basis for the Dept Vehicle	3500	1 Man month	63,000
d)	LS	Conveyance, including all Purchases like Cans Bottles,Chemicals Purchase of camera etc and Documentation of Water quality data	15000	Year	45,000
II.Environmental, Social Knowledge Base, Analysis and Development					
a)	18 Man months	Village level Environmental state on various aspects like Sewage disposal, Solid waste disposal, Sand mining, Weed growth & Data on Social problems by hiring Technical Assistant / Research Assistant	5000	month	90,000
b)	L.S	Expert Analysis and Development Reporting	L.S	L.S	30,000
III.Transfer of technical know how for solid waste ma nagement system including source segregation, recycle of dry waste and linkage with user agencies.					
a)	LS	Motivating the local bodies for Soild waste management project and Sewage treatment plants to prevent pollution of water sources and using for irrigation by transferring technical know how through demonstration Documentary film and Technical visit	LS		250000
b)	7 Nos	Formation of Herbal Garden in Institutions	20000	each	140000

c)	20 Nos	Promoting Entrepreneurship Policy for Eradication of weeds by setting up Bio gas Plant / Vermi compost By WUA through Awareness creation, Demonstration and consultative meeting	10000	each	200000
IV. Conducting Environmental and social Awareness meeting, pro gramme, demonstration and Exhibitions on various environ mental and social related issues including capacity building.					
a)	LS	Printing Stickers, Pamphlets, Tin sheets, Providing Banners for Propagating Environmental Awareness among public	L.S	L.S	120000
b)	9 Nos.	Conducting Awareness Programs for Public	15000	each	135000
c)	3 Nos	Conducting Meetings for WRO official/ Line Dept Official	10000	each	30000
d)	30 Nos	Conducting Meetings in School/ Institution	10000	each	300,000
e)	3 Nos	Conducting Annual Workshop at Sub basin level	50000	each	150,000
f)	1 No	Conducting Annual Workshop at Region level	100000	each	100,000
g	6 Nos	Exposure Field Visit to Eco friendly practises	20000	each	120,000
h	3 Nos	Environmental fair/ Exbition , Benchmarking, recognition of good eco - friendly practices, green awards	50000	each	150,000
i	LS	Preparing and Publishing Environmental Atlas for the Sub Basin for the use of Line departments /Institutions for better Management of Sub basin	LS		100,000
j	3Year	Environmental Related Books/Journal, Publishing Annual report for the Sub - basin	20000/Year		60,000
k	LS	Documentation of the entire activities, and Up gradation of Computer and Accessories, Viedo films and Web site development	L.S		200000
IV.Variation in rates and unforeseen items.					**35,350**
		Total			**2,500,000**
Rupees Twenty Five Lakhs only					

IAM WARM PROJECT

PAMBAR SUB BASIN - GENERAL ABSTRACT

SI.No	Departments	Amount (Lakhs)
1	Public Works Department/ Water Resources Organisation	5342.60
2	Agricultural Engineering	589.17
3	Agricultural Department	408.08
4	Agriculture Marketing & Agri Business	52.00
5	Animal Husbandry	52.03
6	Tamil Nadu Agricultural University	125.08
7	Horticulture Department	255.26
8	Fisheries Department	29.76
9	Environmental Cell Division	25.00
	Total Project Cost	**6878.98**

or

Total Cost : 68.79 Crores

Total Ayacut : 18887 Ha

Cost Per Ha Rs.36422/-

PROVISION FOR PU TANKS 20 - 40 Ha
156 Nos. - 4472 HA X Rs 18000 PER Ha 805 LAKHS

Pambar sub-basin is one of the Sub-basin in Pambar – Kottakkarayar Basin.

This Sub-Basin have the following Minor Basins.

1. Pambar
2. Ponpethiar
3. Koluvanar

4. Thenar
5. Kottakudiyar
6. Manimuthar
7. Virusuliar
8. Thirumanimuthar
9. Upper Palar
10. Kooraiyar

For implementation of IAMWARM PROJECT, the Pambar Sub-Basin is divided in to Pambar sub-basin & Manimuthar Sub-Basin with the following Minor Basins.

1) Manimuthar Sub-Basin

Minor Basins

1. Manimuthar
2. Virusuliar
3. Thirumanimuthar
4. Uppar Palar
5. Kooraiyar

2) Pambar Sub-Basin

Minor Basins

1] Pambar

2] Ponpethiar

3] Koluvanar

4] Kottakudiar

5] Thenar

The Pambar Sub Basin area is grouped into 8 Packages fpr preparing the detailed estimate to rehabilitate the irrigation Infrastructures.

In the Rehabilitation works, it is proposed to repair all the existing Anicut in the system. Such as Repair / Reconstruction of Slu ices, Strengthening of River Banks, Renewal / Repairs to Shutters etc.

All the Tanks in the Sub Basin area has been inspected by walk through survey with the Stack Holder and the nature of Repairs, Reconstructions and other needs are identified.

Accordingly the detailed estimate for the tanks has been prepared for Reconstruction / Repairs to the Sluices and Weirs, Strengthening of tank bund etc. are proposed in the detailed estimate.

In this Project it is also proposed to Construct , 3 New Anicuts, 2 New Groyne Wall and 5 New Dividing Dams in the Existing open off take points. The estimate cost of the Packages are detailed below.

Sl.No.	Name of Package	Estimate Amt.In Lakhs
1	**Rehabilitation of Irrigation Infrastructure in Pambar River from Elanjavur Anicut in Elanjavur village to Chettipatti Anicut in Chettipatti village of Pudukkottai District**	**799.00**
2	**Rehabilitation of Irrigation Infrastructure in Pambar River from Kailasapuram Anicut in Kailasapuram village to Visur open off take in Visur village of Pudukkottai District**	**1084.00**
3	**Rehabilitation of Irrigation Infrastructure in Pambar River in Kalabam Anicut and its system in Kalabam village of Pudukkottai District.**	**682.00**
4	**Rehabilitation of Irrigation Infrastructure in Pambar River from Melavasanthanur in Melavasanthanur village to Thiruppuna vasal Anicut in Thiruppunavasal village of Pudukkottai District**	**319.60**
5	**Rehabilitation of Irrigation Infrastructure in Ponpethiyar River and Koluvanar River in Pudukkottai District.**	**1028.00**
6	**Rehabilitation of irrigation infrastructure in Kottakudi river system in Sivagangai District.**	**309.00**

7	**Rehabilitation and Modernisation of Anicuts Supply channels and tanks in Thenar Minor basin of Pambar Sub basin**	**986.00**
8	**Providing Dug wells 10 No's ,Medium Tube wells 10 No's with installing pump sets and constructi on of pump rooms arrangements in Pambar Sub basin in Pudukkottai District.**	**135.00**
	PROJECT COST (WRO)	**5342.60**

AGRICULTURAL ENGINEERING DEPARTMENT

IRRIGATED AGRICULTURE MODERNISATION AND WATER RESOURCES MANAGEMENT PROJECT (IAMWARM PROJECT) IN PAMBAR SUB-BASIN

DETAILED PROJECT REPORT

PREPARED BY:

EXECUTIVE ENGINEER (AGRL.ENGG.),
PUDUKOTTAI

INDEX

Annexures:

AGRICULTURAL ENGINEERING DEPARTMENT

DETAILED PROJECT REPORT ON IAMWARM PROJECT

IN PAMBAR SUB-BASIN IN PUDUKOTTAI AND SIVAGANGAI DISTRICT

1. Profiles of Pambar Sub Basin

Agriculture sector is the dominant one in the Indian economy. Tamil Nadu, which is supposed to be the state next to Rajasthan in poor groun d water and depends largely on the surface water irrigation as well as ground water irrigation. The state has used the surface and ground water potentials to the maximum limit and hence the future development and expansion depends only on the efficient and economical use of water potential and resources.

To achieve the water use efficiency it is necessary to improve and upgrade the existing conveyance system and also to introduce modern irrigation methods. With the above objective a comprehensive programme has been proposed with Multi disciplinary approach.

1.1 Description of the Pambar Sub Basin

Pambar River originates in Pudukkottai District from the ThamaraiKanmoi catchment, Thirumayam village, 20 Km South of Pudukkottai in Thirumayam Taluk of Pudukkottai District. The origin of the river at a longitude of 78 ^{o}45' E and latitude of 10^{o}15' N. The Total length of Pambar river from its origin to its confluence with sea near Semankottai of Avudaiyarkoil Taluk in Pudukkottai District covering a len gth of nearly 69.50 Km.

The Stream starts from Surplus of the Thamarai Kanmoi at Thirumayam village and flows through the Elanjavur anicut, Vayalan Kanmoi anaicut, Chettipatti anaicut, Kailasapuram anicut, Eathanadu Kanmoi, Valaramanickam anaicut and Enda iyar anaicut.

After the Adaiyar anaicut, Pambar river passes into two main streams such as one flows through Irumbanadu big tank, the other one flows through Vellalavayal anaicut. From the Irumbanadu Big tank, the Pambar passes through Puduvakkottai anai cut, Visur Open off takes, Meyyanur Head sluice, Kalabam anaicut, Melarasanthanur open off take and Thiruppunavasal anaicut.

The second stream of Pambar river flows from the Vellalavayal anaicut passes through Okkur open off take, Arasur tank op en off take, Indanur Open off take Thatchamalli Tank open off take, Sullani tank off take, Niniyur tank open off take, Kavathukudy tank open off take, Periya Pattamangalam tank off take, Kothamangalam Open off tank Ponpethy tank, Veliveyal tank, Palankulam open off take and enters Bay of Bengal after Semankottai off take.

Districts covered : **Pudukkottai and Sivagangai**

Taluks covered : **Thirumayam, Avudaiyarkoil, Aranthangi, Manamelgudi, Karaikudi, Devakottai, Thiruvadanai**

Blocks covered : **Thirumayam, Arimalam, Avudaiyarkoil, Aranthangi, Manamelgudi, Sakkottai, Devakottai, Kannangudi, Kallal**

1.2 Ayacut Details

Sl. No	Name of River	No of Tanks	Ayacut in Hectare	Name of District	Total Area
1.	Kottakkudiyar	12	686.80	Sivagangai	686.80
2.	Thenar	41 3	3034.280 192.990	Sivagangai & Pudukkottai	3227.27
3.	Pambar	17	823.93	Sivagangai	10973.86
4.	Pambar	4	219.52	Ramnad	
5.	Pambar	173	9930.41	Pudukkottai	
6.	Ponbethiyar	21	1474.32	Pudukkottai	1474.32
7.	Koluvayar	27	2183.98	Pudukkottai	2183.98
	Total	**318**	**18886.48.0**		**18886.48.0**

1.3 LAND USE PATTERN

The Land use pattern in Pambar sub basin is as below:

Sl.No	Land use	*HECTARES*
1.	Total Geographical area	4,56,600
2.	Net area sown	1,95,425
3.	Forests	23,743
4.	Current fallows	64,381
5.	Other fallow land	27,853
6.	Land put to non Agriculture use	1,09,584
7.	Barren and uncultivable waste	9,132
8.	Lands under miscellaneous tree crops and grooves not included in net area sown	828
9.	Cultivable Waste	14,155
10.	Permanent pastures and other Grazing land	4,109
11.	Gross Area Sown	2,29,018

1.4 BASIN CHARACTERISTICS

a. Rain Fall:

Rainfall data for the period from 1994 to 2005 is available. The rainfall during the North East monsoon is the highest (i.e. 50%) while the rainfall during the South West monsoon is more than 30% of the Annual rainfall. Rainfall during the winter season is the minimum.

	SEASON	**NORMAL RAINFALL**
1.	Winter	50.60 mm
2.	Summer	119.20 mm
3.	South West	346.40 mm
4.	North East	403.20 mm
	Yearly total	919.40 mm

b. Climate

Mostly hot weather prevails in the project area. The atmospheric temperature recorded over a period of 70 years (1927-1996) was computed. The mean maximum

temperature ranging from 38-2^{o}c to 40.4 ^{o}c during March to September and cool months being December to February.

c. Physiography

Pudukkottai district is almost plain land with residual hills in the Northern and Eastern parts. The land is slightly undulating particularly in the Kunnandarkoil, Thirumayam and Ponnamaravathi area.

In the Thirumayam block area of the project laterite and inland plan land forms are noticed. In the Avudaiyarkoil and Manamelkudi Block area riverine land form is noticed except in the tail end of the basin where marine land form is noticed.

d. Geology:

In the Thirumayam, Avudaiyarkoil taluk area of the Pambar basin unclassified gneisses, Granites and syenites are found. In Alangudi, Aranthangi taluk area Cuddalore sand stone and Warkali beds are seen. Coastal alluviam along the Eastern coast and river alluviam along the sides of Vellar are found.

e. Ground water:

The ground water table is nearer to the ground level in the tail end of the Pambar river basin. The level goes down from the tail end to the head reach of the Pambar river. That is the ground water is 3 m below the ground level in the Avudaiyarkoil area and it is 12m in the head reach area of river basin.

f. Permeability

Permeability of soil is slow wherever Avudayarkoil, Kavinad and Alathur series soil are prevalent. Permeabilty of Soil is moderately rapid w here Illuppur and Visalur series of soils are noticed. Permeability of soil is rapid wherever Vayalogam series soil is noticed.

Vayalogam series soil is the leading soil type covering more area in the river basin whereas Avudaiyarkoil series soil is the second major soil series in the river basin.

g. Water holding capacity:

The water holding capacity of the soil is very low ie. 0 -20% in the tail end of the river basin where Valuthalakudi series soil is found waterholding capacity of the soil is (2 1 -50%) ie., medium range wherever Vayalogam, Illuppur, Kavinadu, Alathur and Mangalathupatti series soils are found. The waterholding capacity of the soil is high that is more than 50% in die Avudaiyarkoil series soil is present.

h. Soil Types And Details

Vayalogam Soil series (Vyg.)

This consists of moderately deep, medium textured, acidic brown soils. They are non - calcareous in nature derived from laterite parent material. They are sandy clay loams, acidic and well drained . This soil series occurs in the 50% of the Basin area.

Illuppur Soil series (Ilp)

This is extremely deep, brownish yellow, mildly alkaline and calcareous soil derived from laterite gneissic rock. They are fine sandy loams, mixed and poorly drained.

Pattukkottai Soil Series (Pkt)

It comprises extremely deep, yellowish, brown, acidic to neutral, Sandy Loams occupying the upper portion of the Catenary sequence. They are fine loamy and well drained.

Madukkur Soil Series (Mdk)

This group consists of very deep, brown neutral soils wit h conspicuously reduced mottles in the sub-soil. They are sandy loams, mixed and moderate to poorly drained.

Avudaiyarkoil series: (Avk)

It comprises very deep, medium textured yellowish brown soils developed from laterite parent material. Lime concretions are very common in this soils and the soils are mildly alkaline. This soil series occurs 30% of the basin area.

Valuthalkkudi Soil series

This series comprises very deep dark yellowish brown light texured soils formed by the tidal deposits. It is fine sandy, hyper thermic, very deep and excessively drained.

i. Problem soils:

The pH value of soil has the range from 7.2 to 9.5 and problem soils like saline, alkaline and acidity are not predominantly present in Pambar sub -basin area.

2. Existing Ayacut Scenario:

Total Registered Ayacut in Ha	:	18886.48.0
Total Irrigated Area in Ha	:	18886.48.0
Fully Irrigated in Ha	:	10209.00.0
Partially Irrigated in Ha	:	4807.00.0
Average cultivation in Ha	:	15016.00.0

3. EXISTING FARMING PRACTICES

a. Implements and equipments usage:

In the Pambar sub-basin area, there are 90 tractors, 40 Power tillers, 75 sprayers and about 1500 bullock carts available for carrying out farm operations, transport of materials and agricultural produce from villages to the towns. As per the norms for coverage area, one tractor can cover 80 Ha. approx. so as to have optimal utilization. Hence, availability of tractors is more than sufficient. The same condition holds good for power tiller also. Taking the Farm Implements presently available in the Sub Basin into consideration, suitable farm Implements are proposed as popularization measure in this project.

b. Irrigation Practices:

The farmers of Pambar sub-basin follow Flood irrigation method and adopt field to field irrigation while using tank water. During non-seasonal periods, they use well water for irrigation in furrow systems. In tank ayacut area, the adoption of micro irrigation systems and other type of specialized irrigation are not followed. The farmers do not adopt conjunctive usage of surface and ground water.

c. Land Holdings:

The details of agriculturist (farmers) based on the land holdings of Pambar Sub basin is given below :

Category	Size of holdings	Percentage
Marginal	**Below 1.00 Ha**	**32%**
Small	**1.00 – 2.00 Ha**	**30%**
Medium	**2.00 – 5.00 Ha**	**25%**
Big	**5.0 ha & above**	**13%**
Total		**100%**

d. Preparatory cultivation:

Initial Ploughing in the preparatory cultivation is done with tractors or country Melur ploughs. After the initial ploughing, puddling operation is mostly done with country ploughs. In the Aranthangi, Avudayarkoil and Manamellcudi taluk wetland area, tractor is widely used compared with other area of the basin where tractors are used only to a lesser extent.

As far as the inter cultivation operations concerned mechanization is very poor. In the sub basin area as far as the spraying of plant protection liquids is concerned, Knapsock, Sprayers, are widely used. Plant protection powders are dusted manually in the sub basin area.

In the Thirumayam,Karaikudi, Avudayarkoll, Aranthangi and Manamelkudi taluks harvesting of paddy is done by using combined harvesters while in the other area of the basin harvesting is done with harvesters only to a lesser extent. Mostly private machineries are u sed in the ploughing, plant protection and harvesting operations because of meagre availability of government machineries compared to the requirements. In the recent years purchase of tractors by farmers for use in agricultural operation has been increased considerably. Financial assistance by the Nationalised Banks have encouraged the Farmers to go for easy purchase of Tractors.

e. Labour:

Availability of agricultural labours for carrying out agricultural operations during the paddy harvest season is in adequate and not upto the requirement. The farmers 'in the Thirumayam,Aranthangi, Avudayarkoil and Manamelkudi area engage labours of neighbour villages and other villages of the districts for labours from other villages of the districts for executing harvesting and post harvesting and planting operations. Sometimes labours from neighbouring district are also engaged. The availability and utility of family labours for doing agricultural operation is minimum and family labour is sufficient only to supervis e the agricultural operations. The farmers mostly engage hired labours by giving wages either by cash or kind.

f. Fertigation & Transport

Fertigations for almost all the crops are done only manually. the transport of harvested produce is done- by using bullock carts or by using tractors. The manual transport of farm produce is minimum.

4. CONSTRAINTS IN THE EXISTING SCENARIO

The farmers in the sub basin area almost adopt flooded bed surface irrigation method for all the crops except for sugarcane for which flooded furrow irrigation method is adopted.

In the traditional surface irrigation method, the irrigation efficiency is only 30 - 50%. The reason for this low efficiency is that the irrigation water is lost much during conveyance and by way of deep percolation and seepage besides evaporation losses. More labour is required for applying water in the above method of irrigation.

In the sub basin there are so many rain fed tanks but there are no enough rainwater harvesting structures. The ground water h as been already tapped to the maximum extent. The excess irrigation water should be saved and excess run off from rain water should be harvested to supplement the tank water irrigation for crops.

5. DIVERSIFICATION:

After the implementation of the IAM WA RM project, water saving by adopting drip and sprinkler irrigation methods will be useful for irrigating more area by less water consuming crops like groundnut, pulses and vegetables. Paddy is a more water consuming crop compared to groundnut pulses and ve getables. If the farmers cultivate alternative crops in place of paddy with the same quantity of irrigation water, more area could be cultivated there by producing more quantity of produce which in turn give more remuneration to the farmers.

The excess run off from the rain water is saved and stored in the small farm ponds. The harvested water could be utilized as supplementary irrigation for the crops in the critical periods to save loss of crops due to deficiency of tank irrigation water - In the farm Ponds fishes can also be grown to improve the income of the farmers. In the porous soils the water harvested in farm ponds could recharge the ground water.

6 CHALLENGES THROWN UP BY DIVERSIFICATION AND AREA EXPANSION

In order to bridge the gap area in the tank irrigated Ayacut, Water saving technologies like drip and sprinkler systems are adopted and then the required quantity of irrigation water could be applied in the right place in right time and in right quantity to the crops. Sprinkler irrigation is suitable for closely spaced crops like groundnut and vegetables and drip irrigation is suitable for all row crops. In the cultivation of sugarcane by adopting drip

method not less than half of the irrigation water is saved there by increasin g cultivated area and bridging the gap area. The yield of sugarcane is also doubled because of the frequent application of controlled stream of water there by avoiding water stress for the crops.

To over come the labour crisis during the harvest of crops like groundnut in the post project scenario a package of implements could be issued to the water user association in the groundnut cultivated area, there by the labour crisis could be overcome with the help of labour saving implements in the agricultural operations.

7. SOLUTIONS AND RECOMMENDATIONS:

Water user association should be formed in all the irrigated area and the farmers water users should be trained and educated on alternative cropping pattern, to use water saving irrigation devices and on how to increase the income by growing fishes in the farm ponds. The user should be educated on how to get vegetable required for their own consumption by growing vegetables in their own land besides selling them for remuneration.

In order to encourage farmers to switch over to cultivation of less water consuming crops like groundnut and vegetables, package of implements consisting of seed drill, groundnut harvester maize hustler and stripper could be issued to the water user associations depending upon the area cultivated in that associations Jurisdiction. The demonstration of all the implements should be arranged to popularize their usage in the groundnut cultivated area.

8. DETAILS OF DEVELOPMENT COMPONENTS PROPOSED:

In the IAMWARM project, the following wo rk components are proposed on the basis of needs and requirements of water users/beneficiary farmers in view of achieving the project objectives and uplifting the socio economic status of the farmers of the Pambar sub-basin.

8.1 MICRO IRRIGATION:

The Micro Irrigation System components are proposed in accordance with the cropping pattern proposed by the Agriculture and Horticulture Departments in their DPR for Coconut, sugar cane,Amla,Casuarina, vegetables,and Chillies, , subject to the assurance of cropping by the concerned departments and availability of water sources. The remaining farmers would be motivated to visit the adjoining areas to witness the benefits of precision farming components so that the same may be replicated in their fields.

The benefits of MIS are increase in crop yield, productivity, savings in irrigation water, input items like fertilizer and labour, increase in crop area with available water, controlled weed growth etc., By implementation of MIS, the gap area will be brought under cultivation. The MIS will be implemented with 50% project investment from world bank and 50% assistance by GOI. The beneficiaries shall contribute 10% of the total cost of MIS and will be deposited as corpus fund for maintenance. The table showing t he crop wise proposed area for micro irrigation system is given below

CROPWISE PROPOSED AREA FOR MICRO IRRIGATION SYSTEM IN PAMBAR SUB BASIN UNDER IAMWARM PROJECT

Ayacut Area

Sl. No.	Name of Crop	With project area in Ha	Existing area under Drip/Sprinkler (Ha)	Area Proposed by TNAU (Ha)	Balance area available (Ha)	Proposed by AED for micro Irrigation (Ha)	
						Drip	Sprinkler
1	**2**	**3**	**4**	**5**	**6**	**7**	**8**
1	Amla	100	0	0	100	100	
2	Casuarina	1500	0	0	1500	120	
3	Coconut	302	0	0	302	250	
4	Sugarcane	805	0	0	805	500	

5	Paddy	13699	0	0	13699	0	
6	Vegetables	100	0	0	100	80	
7	Groundnut	420	0	0	420	0	300
8	Chillies	40	0	0	40		40
9	Pulses	420	0	0	420		0
10	Maize	1500	0	0	1500		0
	Total	**18886**	**0**	**0**	**18886**	**1050**	**340**

a. Drip Irrigation System:

Drip irrigation systems with fertigation component are proposed over an area 1000 Ha for horticultural crops like banana, Sapota, Amla, Guava, Mango, etc., and for agricultural crops like coconut, sugarcane to the extent of 861 ha and the total extent under Drip Irrigation System would be 1107 Ha.

Sugarcane is one of the commercial crop with higher water requirement of 2000 - 2500mm. Unlike surface method of irrigation, the water u se efficiency is extremely higher in drip method of irrigation, as this technology helps to supply the required quantity of irrigation water directly to root zone besides reducing conveyance evaporation and distribution losses. The Agriculture Department and TNAU has recommended latest Pit Method for sugarcane for higher yields. Pit Method is more effective only with the adoption of Drip Irrigation System. Under Pit method, the yield will be increased by two to three times of nominal yield obtained from conventional method. To minimize the usage of groundwater and to save the labor costs, the drip irrigation system shall be adopted for sustained income to the farmers.

Sugarcane is the major crop proposed at an extent of 500 hectares out of 805 hectares proposed in the project.

b. Sprinkler Irrigation System:

Sprinkler irrigation system component is proposed for vegetables, chillies, medicinal plants and flowers to the extent of 340 hectares for economic usage of irrigation water to attain the field capacity for effective growth of crops. The conveyance and application efficiency will be enhanced with the adoption of sprinkler irrigation system. The pests are also effectively controlled by the sprinkler irrigation in the case of vegetables, chillies and flowers.

8.2 PRECISION FARMING:

Precision farming is a farming practice, in which, all inputs such as water, seed, nutrients, fertilizers, plant protection chemicals, other production technologies, are supplied in optimum quantity at right time in right manner to get the highest possible yield. Fertigation is a system wherein application of plant nutrients to a crop is done through drip irrigation. By adopting Fertigation practices through drip irrigation, 25% savings of fertilizers and complete utilisation of applied nutrients by the plants are noticed by farmers as reported by TNAU.

Out of 140 Ha. proposed under Vegetables by Horticulture Department, 40 Ha. has been proposed under Sprinkler Irrigation and balance 80 Ha is proposed under Precision Farming which will be 100% funded from the project.

The tank wise/crop wise area proposed under the above components are furnished in the annexure.

8.3 FARM MECHANISATION:

To promote and demonstrate the farm mechanization among the farmers, the labour and time saving agricultural machinery and implements shall be distributed to the Water Users' Associations (WUA) (100% funding) to attain more farm productivity. These implements are proposed on popularization mode. These implements shall be hired out to the beneficiaries by the WUA and hire charges will be prescribed by the WUA. The collected hire charges will be utilized for maintenance mechanism.

Tractor drawn Rotovators are proposed for pulverizing the soil clods and crop remains especially sugarcane stables. Post Hole Diggers would be utilized for Sugarcane under pit method. Power Weeders would be useful for paddy & irrigated dry crops and hence proposed. Seed Drills, for groundnut, maize, pulses are proposed.

Due to this, the farm operations shall be effectively carried out by the farmers without excess dependence on labor force, since the urbanization and industrialization being occurred in Pambar sub-basin areas.

8.4 CONSTRUCTION OF SUMP WITH PVC BURRIED PIPE LINES

Adopting new pattern of irrigation(conjunctive use of surface and ground water) as executed in Pambar sub-basin, i.e., linking of all sluices of the tank by PVC pipe lines and construction of sump for storage of surface water, provision of bore well proposed by Ground Water Department and to store the ground water in the above said sump in non-season periods and installation of drip/sprinkler irrigation by utilizing the water stored in the sump using hydrants. As a demonstrative model, Pappankulam tank (ayacut area: 51.54.0 ha) in K. Rayavaram village has been selected for linking of sluices, construction of sump with energisation and PVC buried pipe lines to install the drip and sprinkler irrigation.

The laying of PVC pipe lines and construction of sumps will be carried out with the farmers' contribution of 10% of the cost estimate and 10% of cost estimate will be collected from the beneficiares for constructin of sump and PVC buried pipe lines deposited in corpus fund for maintenance. The recurring expenditure(electricity charges,operat ing charges and repair charges) shall be met from the water charges to be collected from the beneficiaries on hour basis and non recurring expenditure shall be met from the interest of corpus fund.

8.5 FARM PONDS:

The Farm Ponds are ideal water harvest ing structures, proposed in tail end areas of the ayacut area. The drained water and surplus irrigation water shall be stored in the Farm Ponds during monsoon seasons. Unexpected heavy run off received during summer seasons shall also be harvested in these Farm Ponds. During the critical stage of crops (before harvesting stage) when irrigation water could not be extended, the water stored in Farm Ponds shall be utilized as life saving irrigation. This will give assured yield of crops for the farmers.

The Farm Ponds are constructed in the dimension of 30M X 30M X 1.50M and the capacity of farm pond would be 1350 Cubic meters. With the help of 13.50 lakhs liters of water, an extent of 2.7 hectares under dry irrigated crops like maize, millets, pulses shall be

given life saving irrigation. The Farm Ponds will have 4 to 6 fillings of rain water during one year period due to all monsoonal rains.

For instance, if maize crop is raised in an extent of 2.7Ha. with the life saving irrigation from Farm Ponds, an yield of 9.45 Ha could be obtained @ 3.5 M.T./Ha) which could fetch Rs.56,700/- to the farmer (@ Rs.6000/- per M.T. with project. The farmer could get nominal profit of Rs.11,000/- per Ha after deduction of cultivation cost of Rs. 10,000/- which exceeds the unit cost of farm pond Rs.40,000/- over a period of four years.

Besides, the Farm Ponds shall act as Fish ponds for Fish Production giving additional income to the farmers of the tail end. The Fisheries Department has proposed Fisheries Development activities in 30 Farm Ponds and Fish Culture would yield income of Rs.10,000/- per crop to the farmer. About 50 nos. of Farm Ponds are proposed @ Rs.40,000/-. The Farmers who opted for Farm Ponds would be motivated for adopting Drip / Sprinkler irrigation for raising their crops.

The contribution @ 10% of the total cost shall be collected from the beneficiaries of the farm pond and will be deposited in corpus fund for future maintenance.

9. ABSTRACT OF WORK COMPONENTS PROPOSED:

The tankwise proposed work components in Pambar sub-basin is shown in the annexure separately. The abstract of the work components are shown in the following table:

Sl. No.	Components Proposed	Unit	Unit cost (Rs.)	Physical (Ha.)	Fin. (Rs. in Lakhs)
I	**MICRO IRRIGATION**				
a)	**Drip Irrigation with Fertigation**				
1	Amla (6m x 6m)	Ha.	33200	100	33.20
2	Sugarcane (1.5m x 1.5m)	Ha.	58000	500	290.00
3	Coconut (8m x 8m)	Ha.	22900	250	57.25
4	Casuarina (2m x 2m)	Ha.	44800	120	53.76
	Total	**Ha.**		**970**	**434.21**
b)	**Sprinkler Irrigation System**				
1	Groundnut	Ha.	15000	300	45.00
2	Chillies	Ha.	15000	40	6.00
	Total	**Ha.**		**340**	**51.00**
II	**PRECISION FARMING**				
	Vegetables	**Ha.**	**75000**	**80**	**60.00**
III	**PVC BURIED PIPE LAYING FOR WATER CONVEYANCE AND SPRINKLER IRRIGATION**				
1	Cost of Pipe laying for Pappankulam Tank as demo model	Ha.	13109	51.54	6.76
2	Construction of sump	Nos.	235000	1	2.35
	Total				**9.11**
IV	**FARM MECHANISATION WITH ADVANCED USER FRIENDLY IMPLEMENTS**				
1	Rotovators	Nos.	90000	4	3.60
2	Power Weeder	Nos.	75000	5	3.75
3	Seed drill for Maize	Nos.	35000	10	3.50
4	Groundnut Harvestor	Nos.	40000	2	0.80
5	Maize Husker cum sheller	Nos.	90000	8	7.20
	Total			**29**	**18.85**
V	**WATER HARVESTING STRUCTURES**				
	Farm Ponds	**No**	**40000**	**40**	**16.00**
	Grand Total (Rs. in Lakhs)				**589.17**

10. BENEFITS ANTICIPATED:

The following benefits will be derived from ayacut area development works under IAMWARM project:

1. Improved irrigation efficiency resulting in enhanced farm productivity per un it of irrigation water.
2. The Gap area is bridged.
3. Sustained farm income to the farming community.
4. The farm productivity per unit area is increased.
5. Increase in cropping intensity.
6. Improvement in socio-economic status of the farmers.

CONTRIBUTION BY THE BENEFICIARIES:

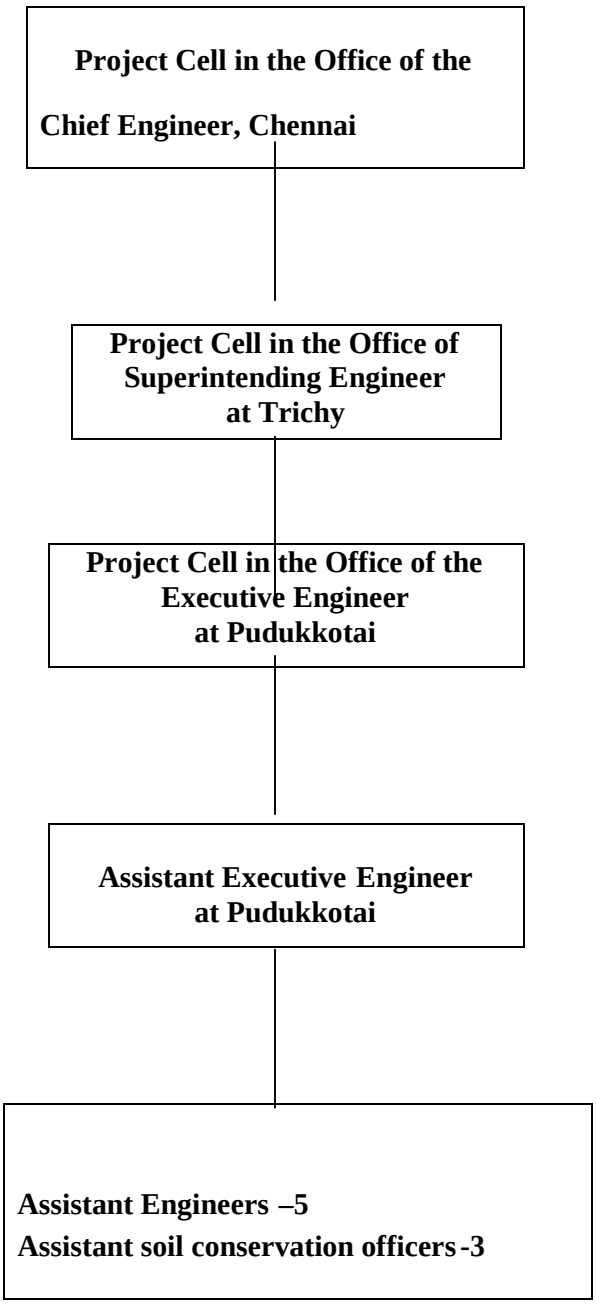
The beneficiaries are motivated to contribute for the works component proposed for their effective participation in the project. The work components like Micro Irrigation System implementation are individual oriented benefit schemes and so i t was insisted to contribute 50% contribution during WUA/Farmers' meeting. But, the farmers expressed that the Micro Irrigation Systems are to be implemented in gap areas where irrigation potential is lacking much and they could only contribute 10% of the total cost in view of their socio economic status and 5% in the case of SC/ST farmers. Hence, the beneficiary contribution may be fixed as 10% during the 1st year and raised to 20%, 25%, 30% and 35% in the subsequent years of implementation. In respect of common benefited/community oriented works such as construction of sump with energisation, 10% contributions shall be collected as beneficiaries' contribution which is appraised with the ayacut farmers during WUA meeting.

IMPLEMENTATION STRATEGY:

The Project Cell for IAMWARM project has been created in the office of Chief Engineer(AE), Chennai-35 comprising Superintending Engineer (AE), Executive Engineer(AE), Asst. Executive Engineers (AE) and Assistant Engineers (AE) to formulate project proposals, to carry out procurement plans,to co-ordinate with the line departments and to monitor the performance of the district level officers.

The District level Project Cell for IAMWARM project has been formed comprising the Executive Engineer(AE), Asst.Executive Engineers(AE) and Asst. Engineers(AE) to finalize the DPR, to co-ordinate with the district level line departments and to monitor the performance of the field personnel

The sanctioned strength of the available field personnel for implementation of IAMWARM project is furnished below:



The Work components viz. Buried PVC Pipe Lines and Farm Ponds shall be executed through the concerned Beneficiaries / WUA .

In respect of Farm Mechanization, the farm implements will be procured by the Agricultural Engineering Department from the approved suppliers and distributed to the concerned WUA.

The Work Components viz. Micro Irrigation System Installation and Precision Farming will be executed by National Shopping, procurement procedures.

The table showing the year wise split up action plan for all work components is enclosed in the annexure. In the middle reach of the basin laterite land form is noticed.

OUTCOME INDICATORS:

1. The Crop Diversification and crop intensity in post project period. (Implementation of MIS, Precision farming, Community Bore Wells)
2. Farm Productivity per unit area and unit of irrigation water.(Implementation of MIS, Precision farming, Community Bore Wells, Farm Ponds)
3. Cropping pattern in gap area. .(Implementation of MIS, Precision farming, Community Bore Wells, Farm Ponds)
4. Increase in irrigation efficiency.(Implementation of MIS, Precision farming, Community Bore Wells, Farm Ponds)
5. Technology dissemination to the farmers (Implementation of MIS, Precision farming, Distribution of farm implements)
6. Increase in awareness in farm mechanization(Distribution of farm implements)
7. Supplement income generation through diversified farm activities through fisheries(from farm ponds), cattle breeding(fodder development).
8. Per capita income to the beneficiary farmers.

IAMWARM PROJECT

PAMBAR SUB BASIN

Dept Of Agricultural Marketing & Agri Business

Detailed Project Report (DPR)
Irrigated Agriculture Modernization and
Water Resource Management
(IAMWARM)

(Agricultural Marketing & Agri. Business component)

PAMBAR SUB BASIN

NODAL OFFICER
Secretary,Ramanathapuram Market Committee,
VIRUDHUNAGAR.

AGRICULTURAL MARKETING AND AGRI BUSINESS.

Location of the Area :

PAMBAR SUB BASIN : Pudhukottai and Sivaganga i District

Blocks in Pudhukottai Portion : Thirumaiyam,Arimalam, Aranthanki, Avudaiyarkovil

Blocks in Sivagangai Portion : Sakkottai, Kannankudi, Kallal , Devakottai.

IV DIVERSIFICATION / FUTURE VISION PROPOSED

Cropping pattern pudukkottai Sivagangai

PAMBAR SUB BASIN

S. No	Name of the Crop	Season	Without project				With Project				Production Ton/Hor	
			F1	P1	RF	Total	F1	P1	RF	Total		
1	Annual Crops Sugarcane		468	0	0	468	805	0	0	805	125	
	Perennail Crops		252	0	0	252	302	0	0	302	5468	
	Ist Season											
	Paddy	Sep-Jan	9143	4556	0	13699	13699	0	0	13699	4.5	
	Pulses	June-July	0	251	0	251	420	0	0	420	3.67	
	Groundnut	Nov-Jan	250	0	0	250	420	0	0	420	2.5	
	Maize	Nov-Jan	0	0	0	0	1500	0	0	1500	2.5	
	Bhendi	June-July	30	0	0	30	40	0	0	40	9.0	
	Chillies	Sep-Jan	26	0	0	26	40	0	0	40	0.66	
	No Crops		-	-	3870	3870	-	-	-	-	-	
	Grand Total		**10669**	**4807**	**3870**	**18846**	**17226**	**-**	**-**	**17226**	**-**	
	IInd Season											
	Paddy	Jan-May	650	0	0	650	300	0	0	300	4.6	
	Pulses	Jan-May	0	0	0	0	300	0	0	300	3.67	
	Groundnut	Jan-May	0	0	0	0	220	0	0	220	2.5	
	Maize	Jan-May	0	0	0	0	50	0	0	50	9.00	
	Chillies	Jan-May	0	0	0	0	50	0	0	50	0.66	
	Great Grand Total		**10819**	**4807**	**3870**	**19496**	**18446**	**0**	**0**	**18446**	**-**	

1.Existing Cropping Scenario (infrastructure ie cold storage)

No Cold Storage available

S.No.	Name of the Crop	Season	Without Project			
			F1	**P1**	**Rf**	**Total**
1	Annual Crops Sugarcane		468	0	0	468
2	Perennail Crops		252	0	0	252
3	**Ist Season**					
	Paddy	Sep-Jan	9143	4556	0	13699
	Pulses	June-July	0	251	0	251
	Groundnut	Nov-Jan	250	0	0	250
	Maize	Nov-Jan	0	0	0	0
	Bhendi	June-July	30	0	0	30
	Chillies	Sep-Jan	26	0	0	26
	No Crops		0	0	3870	3870
	Grand Total		**10669**	**4807**	**3870**	**18846**
4	**IInd Season**					
	Paddy	Jan-May	650	0	0	650
	Pulses	Jan-May	0	0	0	0
	Groundnut	Jan-May	0	0	0	0
	Maize	Jan-May	0	0	0	0
	Chillies	Jan-May	0	0	0	0
	Great Grand Total		**10819**	**4807**	**3870**	**19496**
	Total Production					**50275**

2.Existing Marketing Scenario

S.No	Location	Capacity	Utilize for What
1	**Drying Yards** **Pudhukottai Dt.** Pulivalam Nallamalsathram Rangiyam	 400 Sq.mtr “ “ “	 All Agricultural Commodities except Vegetables
2	**Sivagangai Dt.** Koviloor Kannankudi Onjanai Karaigudi (RM) Devakotai (RM)	 “ “ “ “ “	
3	*Godowns* Karaigudi (RM) Devakottai (RM)	 1000 MT 600 MT	
4	*State Warehouse* Karaigudi *Co-operative Godowns* Thirumayam	 2000 MT 300 MT	

Markets- Specialized / General Market

S.No	Locations	Produces deals	Size
1	Puduvayal	Paddy	Commission Mandies and traders are functioning in all areas with minimum infrastructure and facilities.
2	Karur	Paddy	
3	Awdaiyarkoil	Paddy	
4	Pudukottai	Paddy,pulses,groundnut,Maize, Blockgram,Gingelly	
5	Aranthanki	Paddy,pulses,groundnut,Maize, Blockgram,Gingelly	
6	Devakottai	Paddy, Pulses	
7	Kurumbur	Sugarcane	Contract farming- Perry Sugar Mills Ltd.

5

Regulated Market

S.NO	**Location**	**Infrastructure available Godown**	**Notified Crops**	**Receipts 2004-05 to 2005-06**	**Expenditure 2004-05 to 2005-06**
1	Karaigudi	Godowns-1000 Mt	Paddy, Chillies,Can jaggery, Groundnut, Gingelly, Cotton.	7.07 7.65	2.50 2.70
2	Devakottai	600 MT	Cashewnut “	6.00 7.35	2.00 2.10

Average Market Prices prevailed

S.No	**Commodity**	**Gult Season**	**Scarcity Season**
1	Paddy I Paddy II	5000 5500	6000
2	Pulses	10000	13000
3	GroundNut I GroundNut II	11000 13000	15000
4	Maize	4000	5000
5	Sugarcane	900	900

3.Local Mandies / Commission Agents

Private mondies are function for marketing of all major agricultural produces and his prices are negotiated between traders and farmers recording to the market trend based on supply and demand.

PRACTICES (PRE HARVEST AND POST HARVEST)

a. NO scientific method is adapted at present for grading for notif ied agriculture produce grading is done at Regulated Market premises only. The farmers are selling the produces without grading, vegetables are graded by size, freshness and maturity.

b. **TRANSPORTATION**

With regard to transportation no specific difficulty is experienced. The producers are themselves to managing to transport generally by tractors, vans, minivans, and Lorries. A small percentage of farmers are using bullock carts for transport their produce from house to markets.

c. **CONTRACT FARMING**

Except sugarcane there is no contract farming arrangements M/S ED Parry Ltd at Kurumbur is marking contract forming arrangement with the sugarcane farmers.

d. **SOURCE OF MARKET INFORMATION**

The farmers are depending upon the price disseminated by the local news papers and o n the prices prevailing in the nearby local markets.

III. CONSTRAINTS

Constrains in existing scenario

The following constraints are seen in the sub basin

a. Production – Glut / Shortage, output at this sometimes
b. Lack of available markets
c. Post harvest practices, Eg No. grading / packing
d. No collective action individual farmers go to m;arkets without much bargaining power.
e. Lack of market information.

CHALLENGES THROUGH UP BY DIVERSIFICATION/ AR EA EXPANSION

1. identidy new market for new crops
2. Inpromity eeisting market utilization

   At present there is 58200 including farmers storage of produce can be stored at this exiting infrastructure including farmers storage and for improving the market utilizat ion in the interm places the following infrastructure facilities are suggest by the stake holder of WUAS.

Rural Godowns	5
Drying Yard	5
Dunnages	5
Plastic tarpaulun	5
Weighing scale	5

3. providing multiple market information (for each the crop to ge t better prices)
4. Ensuring collectiv marketing / bargains

   At present it is absent. But a sub group of FA is to be formed for this purpose to improve the access to market by collective transport, sale etc.,
5. Improving access to market by better transport col lective transport.
6. Specialised storage (cold storage Godowns) as per crops needs.
7. Processing / agro processing

   Capacity building.
8. New practices product Handey, Grading Packing on farm process and quality control.
9. Collection centers acum godowns are sugges t. Which can be formed by the

   WUAS themselves through which products will be collected, cleaned graded,

   packed and transported the wholesale point. The quality control aspects will

   be taken into consideration.
10. Information education and c ommunication (IEC)

09

SOLUTIONS AND RECOMMENDATIONS

1. Consultative process undertaken in the sub basin

walk through survey

Four groups of officials went through survey in the sub basin on 17.08.2006 to 18.08.2006 and covered all the villages and water users associations. Meetings were also conducted with farmers of the sub basin.

Need for godown

The market may be affected by the demand and supply mechanism. In the case of grains, there exists a fairly stable demand throughout they year but supply is wide ly fluctuating. The market supply is dependent on the harvest of grainswhich centers around a few months of the year and may fluctuate widely from one year to the next. So there is need for keeping the produces in godowns for a certain period. Most of t he farmers in the sub basin are not aware of modern practices of storage. The farmers are storing their produces in their houses and it leads to loss in quality and quantity.

Our farming community depends heavily on borrowed money for agriculture operations. The borrowings are at an unreasonably high rate of interest, mostly from money lenders, as a result they are forced to asell their produce immediately after the harvest although the price is very low. Thus, farmers lose heavily on their investments. This vicious cycle, recurs year after year marking the farmers poorer. Today, the country does not have appropriate infrastructure to provide relief to these farmers. Storage facilities for agricultural produce are inadequate in rural areas. The farme rs, therefore have to dispose of their produce at an unrenunerative price, immediately after the harvest.

A reasonable spread of agricultural storage godowns linked to financial organizations that provide pledge loans will to a long way towards meeting the needs of the farmers as they will not only provide the basic infrastructure for making arrangements for the pledge loan put also and quality of the produce over a longer period. This would enable farmers to sell when the rates are higher to ensure a decent return on their labour and investments. Scientifically designed storage structures reduce losses and their existence given confidence to the farmers for raising crops with quality/costly inputs.

In this way the construction of godown help the farm ers to a great extent. Utilization of godowns control and reduce the storage lossess form rodents, insects, and micro - organisms, birds, moisture and heat to a minimum.

Any market mechanism goes through seasons of surplus and scarcity resulting in wid e fluctuations inpries storage plays a vital role in fulfilling the objective of stabilizing such price fluctuations. Both from one season to the next and on year to another, the storage system's role is to take produce off the market in the surplus seaso n and release it in the lean season. The fluctuatio;ns are there by evened out. The storage system may be helpful in arresting such fluctuations in market supply.

Storage is not aimed merely as a means of achieving profitability through such and enterprise. And agricultural marketing network in a country as storage as one of the vital components to make the procurement and distribution system effective. Storage is thus a part of the farming system, a trading venture of a government policy and is under taken because of its contribution to other activities or objectives within a framework of marketing essentials.

For small farmers, the purpose is to ensure household food supplies through storage. They are also concerned about future case needs through sale, often a distress sale, or through barter, of late they have also been involved in speculative gains because of inter -seasonal price variations. In actual practice however this is rare as the traders or "middlemen" exploit the small farmer's financi al conditions and emerge as key of a market.

Gain storage therefore plays a vital role in the economy of any country, water developed or developing. Farmers get higher prices of more than 25% by was of utilization of godowns construction of godowns is t he foremost important feature in agricultural marketing and to raise the benefits of taming community.

Need for construction thrashing floor/Drying yard

At present farmers are in the habit of drying their produces on the roads and on the road sides, and due this sand, stones etc are getting mixed with the produces and the grads of the produces fall and fetch a lesser price Because of this there is a loss of produce to a significant extent and admixture are adulterated in the produce and the quality of the produce detonates.

To minimize post harvest losses of agricultural produce there is need to construct Drying utilization of drying yards will improve the quality of the farm produce and minimize the yard losses. It leads to value addition of produces.

Now the scheme of construction of drying yards are implemented by the TamilNadu Government and in the score demand is more but due to financial position it is not possible to construct more drying yards. Every produce saved is equal to production and hence the national economy will raise.

By construction the drying yards/ thrashing floors the losses are minimized and the grades are maintained and by this reason the farmer gets a higher price of more than 20%

2. Stake holders demands

Storage

The farmers like to have godowns in their nearby places. They do not ready to invers money but they want the Government to construct godowns. The first choice of the farmers is to construct more godowns in their nearby be plaves.

3. a Software components: -

- Linkages with traders manufacturer on contract farming / MOU terms to be explored along with legal coverage.
- FIG at WUA level and commodity Groups.
- Capacity Building in pre and post harvest techniques the training to be conducted among as to gain more marke t access.
  Centralised proposal by TNAV.
- Diversification of crop from paddy to maize, since paddy is more water requiro to less water requiro to order to maximize the water use efficiency.

Hard ware components

- Demand and price forecasting system to be developed at the sub basin level in liasco with TNAV DEMIC and NIC to provide necessary market information at the targeted groups to go for controlled Planting as well as the marketing of the produce.
- Collection cum storage godowns are to be construc ted at selective FA's field itself to make prevision for collection, cleaning and grading of the produce as well as packing and storage. As for as gains are concerned besides godowns, thrashing floors are constructed to minimize the during the poor harvest losscs,

2. Marketing interventions proposed with reference to identified constraints and challenges.

S.NO.	CROP	CONSTRAINT & CHALLENGES	COUNTER MEASURES
	Maize Mango	Production glut / shortage	Linkage with traders on contract farming, Food Processing methods
		Lack of available market	No such difficulty. For speeding of the marketing collection centers and formation of marketing, sub groups at WUA level for this purpose are suggested.
		Poor post harvest practices	Capacity building, IEC, Village common godowns are suggested.
		No collective action	For Divisified crops, collection centers suggested.
		Lack of Market Information	IT Methods are suggested
		Diversification / Future vision porposed.	10% area under paddy proposed to be diversified to maize. 40% area under Horticulture Crop is to be covered under Gap area and about 100 Ha under fodder crop. The remaining area will be covered by agrl crops like maize, groundnut and pulses
		Identifying new markets and new crops	For Maize contract farming arrangements to be made
		Improving existing market Utilization	Suitable suggestions are made under V(2)
		Providing Multiple Market information	It is being addressed by making separate IT proposal
		Ensuring collective bargaining / marketing	Sub group of WUA is to be formed for this purpose
		Improving access to market by better transport or collective transport	Included in collection center item and also by encouraging private transport arrangements.
		Processing and Agro processing	Suitable recommendations are made for godowns and threshing floors / drying yards. One day Interface Workshop being arranged with C11 and selected Sub Basins.
		New practices in quality control	Quality control is attended by Agmark Lab Virudhunagar and Commercial grading at Rajapalayam
		Information Education and Communication	Included under training component.

Part II

Agriculture is the back bone of Indian economy pambar basin ayyacut is dominated by paddy blackgram etc. By improving the water use eff iciency we can improve the crops pattern to an extend.

The marketing infrastructure consists of RM besides number of private mondies. Specilised storage godown market information system and agro based industry are absent in this basin area.

The Marketing strategy is based on the following 3 items.

1. Survey of existing cropping/ Marketing Scenario
2. Stake holders consultation.
3. Deciding on suitable Marketing components based on gap area.

Developmental components proposed.

S.No.	Items	No		Cortay Lakhs
1.	Rural Godowns	5	100 Sq.Mt	25.00
2.	Drying Yard	5	400 Sq.Mt	11.00
3.	Plastic tarpaulin	5	(0.50)	2.50
4.	Dunnages	5	(60x5)	2.00
5.	Weighing Scales	5		0.50
6.	Agri. Business Centre	1		11.00
		Total		**52..00**

List of Villages Selected

S.No	District	Block	Name of Villages	Ayyacut
1.	Sivagangai	Kannankudi	Madakottai	(455.710)
2.	Pudukottai	Arimalam	Irumpanadu	(351.640)
3.	Pudukottai	Manamelkudi	Seyyanam	(243.560)
4.	Pudukottai	Avudaiyarkoil	Ponpethi	(230.210)
5.	Pudukottai	Avudaiyarkoil	Alathur	(209.820)

ROUGH COST ESTIMATEE FOR CONSTRUCTION OF RURAL GODOWN / COLLECTION CENTRE

Size of the building : 15 M x 5 M

Plinth area of the building : 75 sq. M.

ESTIMATE ABSTRUCT (RATE FOR THE YEAR 2005 -06)

Sl.No.	Description	Area	Rate/Sq.m.	Amount
1.	Load bearing wall foundation	75 sq.m	Rs.1105 / Sq.m.	Rs. 82875/-
2	Super Structure cost Rs.206625/-	75 sq.m	Rs.2755 / Sq.m.	
3.	Cost of Roof (65% of Super Structure) (Steel Trusses with A.C. Sheet)	75 sq.m.	Rs.1790.75 / Sq.m	Rs.134306/-
4.	Internal Electrification	75 sq.m.	Rs.440 / Sq.m.	Rs. 33000/-
5.	Fluctuation of Current Rate 5%		L.S.	Rs. 22840/-
6.	Labour Welfare Fund 0.3%		L.S.	Rs. 1439/-
7.	Petty Supervision charges 2.5%		L.S.	Rs. 11991/-
8.	Unforseen items		L.S.	Rs. 6924/-
			Total Amount	**Rs. 500000/-**

15

NAME OF THE WORK: CONSTRUCTION OF DRYING YARD

ABSTRACT ESTIMATE

Sl. No	Qty.	Description	Rate	per	Amount
1	55.00Cu.M	Earth excavation for foundation in all soils and sub soils except in hard rock requiring blasting but including shoting, shuttering and balling out water wherever necessary, refilling the sides of the foundation with excavated sand/soil etc.,as directed by the departmental officers.	44.22	Cu.M	2432
2	134.00 Cu.M	Supplying and filling in foundation of baseme nt with filling sand in layers of not more than 15cm thick etc., complete	213.00	Cu.M	28542
3	53.00 Cu.M	Cement Concrete 1:5:10(one cement and five sand and ten aggregates)using 40MM Broken jelly for foundation and base concrete for flooring	1079.50	Cu.M	57214
4	33.00 Cu.M	Random Rubble masonry in CM 1:5(One cement and five sand) using best rough stone for foundation and basement with simultaneous pointing including curing etc.,complete	1045.20	Cu.M	34492
5	4.50 Cu.M	Reinforcement concrete 1:2:4(One cem ent, two sand four HBS jelly) using 20mm gauge HBS jelly for all RCC works.	1979.00	Cu.M	8906
6	45.50 Sq.M	Providing Form work for centering shuttering with all cross bracings including strutting to the required height for plinth beam, column footing, stair case steps etc.,	173.46	Sq.M	7892
7	2.20 Qtt	Supplying fabricating and placing in position of steel rods for reinforcement for RCC works including cost of steel, binding wire and labour charges for straightening, cutting, bending, cranking and tying grills in position etc.,	3201.00	Qtt	7042
8	29.00 Cu.M	Plain Cement concrete 1:2:4:,using 20mm gauge HBS jelly for flooring including curing etc.,complete	1760.90	Cu.M	51066
9	55.00 Sq.M	Plastering withCM 1:3,10mm thick for exposed surface of RCC item.	50.60	Sq.M	2783
10	9.00 Sq.M	Supplying and fixing of Mastic pad for expansion joint of flooring etc.	332.30	Sq.M	2991
11	75.00 Sq.M	Colour washing two coats using best shell llme and colouring pigments etc.,complete	7.95	Sq.M	596
12	LS	Provisions for Labour Benefit fund @ 0.30%			203958 600
13	LS	Provisions for Unforeseen items and variation of quantities			5444

14	LS	Provisions for petty supervision charges and contingencies @ 2.5%			5000
15	LS	Provisions for variations of Rates			5000
				Total	220000

NAME OF THE WORK : MODEL ESTIMATE FOR THE CONSTRUCTION OF DRYING YARD

DETAILED ESTIMATE

Sl.No	Description	Nos	L	B	D	Contents
1	Earth work excavation for foundation in all soils and sub soils except in hard rock requiring blasting etc., For Drying Yard Retaining Walls alround Add Sundries	1 x 1	78.48	0.80	0.80	50.23 4.77
	Total					55.00
2	Supplying and filling in foundation of basement with filling sand in layers of not more than 15 cm. thick including well rammed and consolidated etc. For Drying Yard Retaining Walls alround Add Sundries	1x1	19.54	19.54	0.35	133.63 0.37
	Total					134.00
3	Cement Concrete 1:5:10 (One Cement 5 Sand and 10 Aggregates) using 40 mm broken jelly for foundation and base concrete for flooring etc. For Drying Yard retaining wall alround For Drying Yard Basement Add Sundries	1x1 1x1	78.48 19.54	0.80 19.54	0.23 0.10	14.44 38.18 0.38
3	Cement Concrete 1:5:10 (One Cement 5 Sand and 10 Aggregates) using 40 mm broken jelly for foundation and base concrete for flooring etc. For Drying Yard retaining wall alround For Drying Yard Basement Add Sundries	1x1 1x1	78.48 19.54	0.80 19.54	0.23 0.10	14.44 38.18 0.38
	Total					53.00
4	Random rubble masonry in cm 1:5 One cement and five sand using best rough stone for foundation and basement etc. For Drying Yard retaining walls Ist footing IInd footing IIIrd footing Add sundries	1x1 1x1 1x1	78.48 78.48 78.48	0.60 0.45 0.38	0.23 0.23 0.46	10.83 8.12 13.72 0.33
	Total					33.00
5	Reinforcement concrete 1:2:4 (one cement					

	two sand four HBS jelly) using 20 mm gauge HBS jelly for all RCC works For drying Yard Parapet Add Sundries	 1x1	 79.08	 0.23	 0.23	 4.18 0.32
	Total					4.50
6	Providing Form work for centering shuttering with all cross bracing including for all RCC works etc. For drying yard parapet - inner alround For drying yard parapet - outer alround For expansion joints length wise and width wise Add Sundries	 1x1 1x1 1x3x 2	 78.16 80.00 19.54	 -- -- --	 0.23 0.23 0.075	 17.98 18.40 8.79 0.33
	Total					46.60

17

7	supplying fabricating and placing in position of steel rods upto 16mm dia including cost of binding wire and labour charges for straightening, cutting,bending and cranking etc. For Parapet wall 8mm RTS Top&Bottom Add Laps	 2x2 1x30	 79.08 0.32	 -- --	 --- ---	 316.32 9.60
					Total	325.92
	6mm stirrups	1x4x 133	0.72	--	--	383.04
	8mm RTS 6mm MS Rods Add Sundries	325.92m x 0.39 kg/m 383.04m x 0.22 kg/m				127.11 84.27 8.62
		Total			kgs.	220.00
		Total		---	Qty.	2.20
8	supplying and fixing of Mastic pad for expansion joint of flooring etc. For Expansion joints Add Sundries	 2x 3	 19.54	 ---	 0.075	 8.79 0.21
	Total				Kgs.	9.00
9	plain cement concrete 1:2:4, using 20mm gauge HBS jelly for flooring including curing etc., complete For Drying Yard Basement Add Sundries	 1x1	 19.54	 19.54	 0.075	 28.64 0.36
	Total					29.00
10	Finishing the exposed surfaces in CM 1:3 (one cement, three sand) 10mm thick etc., For Drying yard parapet – inner alround For Drying Yard parapet – Top alround For Drying Yard Parapet – Outer alround Add Sundries	 1x1 1x1 1x1	 79.08 79.08 79.08	 0.23 0.23 0.23	 -- -- --	 18.19 18.19 18.19 0.43
	Total					55.00

11	Colour wasting two coats using best shell llme, including cost of gum,kanjee,water colouring plgments etc., Qty as per plastering For DryingYard RR Masonry – Outer alround Add Sundries	 1x1	 80.00	 ---	 0.23	 55.00 18.40 1.60
	Total					75.00
12	Provisions for Labour benefit fund @ 0.30%					LS
13	Provisions for unforeseen items					LS
14	Provisions for petty supervisions charges					LS

IAM WARM PROJECT

PAMBAR SUB BASIN – AYACUT ABSTRACT

SNo	Name of Miror Basin	Name of District	No.of Anicut	No.of Off Take	Non System Tanks	Ayacut in Ha.	Rain fed Tanks	Ayacut in Ha.	Total	
									Tanks	Ayacut Ha.
1	PAMBAR	PUDUKKOTTAI	9	6	82	4254.140	91	5520.460	173	9774.600
		SIVAGANGAI	-	-	8	246.945	10	547.365	18	794.310
		RAMNAD	-	-	4	332.620			4	332.620
		SUB TOTAL	9	6	94	4833.705	101	6067.825	195	10901.530
2	PONBETHIYAR	PUDUKKOTTAI	1	16	19	1391.925	2	82.395	21	1474.320
3	KOLUVANAR	PUDHKKOTTAI	4	1	10	1097.450	17	1086.530	27	2183.980
4	KOTTAKUIDYAR	SIVAGANGAI	1				12	686.800	12	686.800
5	THENAR	SIVAGANGAI			34	1968.870	26	1477.990	60	3446.860
		PUDUKKOTTAI					3	192.990	3	192.990
		SUB TOTAL			**34**	**1968.870**	**29**	**1670.980**	**63**	**3639.850**
GRAND TOTAL			**15**	**23**	**157**	**9291.950**	**161**	**9594.530**	**318**	**18886.480**

IMWARM PROJECT

PAMBAR SUB BASIN =AYACUT DETAILS

Sl.No	Details	Name of Tank	Name of Village	Name of Block	Ayacut
1	1.ANAI KANMOI OPEN OFF TAKE	Anai Kanmoi Kanmoi	Thirumayam	Thirumayam	8.210
					8.210
2	2.ELANJAVUR ANICUT	Elanjavur Peria Kanmoi	Elanjavur	Thirumayam	97.450
3		Kottaiyur Peria Kanmoi	Kottaiyur	Thirumayam	144.400
					241.850
4	RAIN FED	Thamarai Kanmoi, Vengai,Kanakkan Kanmoi	Thirumayam	Thirumayam	160.970
5		Murungi,Veeppan,Vetti, Perunthangudi and Kanmoi Vinayagan	Thirumayam	Thirumayam	90.090
6		Meli & Pudu Kanmoi		Thirumayam	190.820
7		Kannanur pudu Kanmoi		Thirumayam	43.610
8		Kannanur Peria Kanmoi		Thirumayam	167.700
9		Durvasapuram Peria Kanmoi		Thirumayam	73.170
10		Semdar,Ooranur Kanmoi		Thirumayam	51.190
11		Rangiyam Peria Maniyaram Endal,Erani Kanmoi		Thirumayam	42.730
12		Avi,Keeraani,Vellipitchan Endal Kanmoi		Thirumayam	42.660
13		Muthan Endal,Sirivalan Endal,Pagan Endal Kanmoi		Thirumayam	66.140
14		Navini kanmoi		Thirumayam	47.010
15		Mandaga,Alan,Chithalan Kanmoi		Thirumayam	51.610
16		Perunthurai Kanmoi		Thirumayam	90.990

17		Peria,Chinna Velli Kanmoi		Thirumayam	42.650
18		Veirachilai Peria Kanmoi		Thirumayam	66.840
19		Meela,Keela,Kottiya Kanmoi		Thirumayam	54.630
20		Maruthangudi,Ekkiriendal Kanmoi		Thirumayam	43.690
21		Ena,Rajali endal Kanmoi		Thirumayam	47.330

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
22	RAIN FED	Muthu kanmoi, Parayan kanmoi	Kanmoi		Thirumayam	55.800
23		Adagu	Kanmoi		Thirumayam	47.180
24		Mangala	Kanmoi		Thirumayam	59.590
25		Andakudi,Mudugu, Kumilan	Kanmoi		Thirumayam	54.560
26		Pattanam,Sen,	Kanmoi	Thulaiyanur	Thirumayam	43.100
27		Neden Oothu	Kanmoi	Kannanur	Thirumayam	43.990
28		Puivelan Peria, Thuvanan,Amman	Kanmoi		Thirumayam	43.220
						1721.270
29	3.VALAYAN KANMOI ANICUT	Panaiya	Kanmoi		Arimalam	19.110
30		Vaiayan	Kanmoi		Arimalam	17.000
31		Kannappur	Kanmoi		Arimalam	54.580
						90.690
32	RAIN FED	Panakudi,Uppurani	Kanmoi		Arimalam	42.980
33		Kanan,Mulikundu	Kanmoi		Arimalam	67.410
34		Rayavaram	Kanmoi		Arimalam	43.930
35		Sengeerai	Kanmoi		Arimalam	42.750
36		Menon,itchi	Kanmoi		Arimalam	104.910
37		Kanadukathan	Kanmoi		Arimalam	85.040
38		Kothamangalam	Kanmoi		Arimalam	45.080
39		Thammanai	Kanmoi		Arimalam	51.285
						453.765
40	4.CHETTIPATTI	Anai Vari	Kanmoi		Arimalam	43.490

41	ANICUT	Posia	Kanmoi		Arimalam	34.500
42		Nedungudi	Kanmoi		Arimalam	24.650
43		Thoman	Kanmoi		Arimalam	9.750
44		Nava	Kanmoi		Arimalam	0.480
45		Pallan	Kanmoi		Arimalam	40.050
						122.920
46	RAIN FED	Chettipatti	Kanmoi		Arimalam	18.220
47		Pappankulam	Kanmoi		Arimalam	51.540
48		Pudu	Kanmoi		Arimalam	74.140
						143.900
49	5.KAILASAPURAM ANICUT	Pudunilai	Kanmoi	Pudunilai	Arimalam	34.620
50			Kanmoi	Pudunilai	Arimalam	20.060
51			Kanmoi	Pudunilai	Arimalam	78.240
52			Kanmoi	Nalambalsamuthiram	Arimalam	19.110
53	6.NEDUNGUDI PICKUP ANICUT		Kanmoi	Nalambalsamuthiram	Arimalam	26.840
54			Kanmoi	Nalambalsamuthiram	Arimalam	28.300
55			Kanmoi	Nalambalsamuthiram	Arimalam	20.150
56			Kanmoi	Melnilaivayal	Arimalam	38.630
57			Kanmoi	Melnilaivayal	Arimalam	6.240
58			Kanmoi	Melnilaivayal	Arimalam	27.220
59			Kanmoi	Melnilaivayal	Arimalam	26.860
60			Kanmoi	Melnilaivayal	Arimalam	60.640
61			Kanmoi	Melnilaivayal	Arimalam	20.730
62			Kanmoi	Karamangalam	Arimalam	48.640
						456.280
63	RAIN FED		Kanmoi	Nedungudi	Arimalam	62.650
64			Kanmoi	Nallambal samuthiram	Arimalam	43.250
65			Kanmoi	Melnilaivayal	Arimalam	71.500
66			Kanmoi	Melnilaivayal	Arimalam	40.640
67			Kanmoi	Keelapanaiyur	Arimalam	42.930

68			Kanmoi	Keelapanaiyur	Arimalam	56.180
						317.150
69			Kanmoi	Karamangalam	Arimalam	127.890
70	6.ETHANADU KANMOI OPEN OFF TAKE		Kanmoi	Karamangalam	Arimalam	53.950
						181.840
71			Kanmoi	Agavayal	Arimalam	34.670
72			Kanmoi	Pilayavayal	Arimalam	5.200
73	7.VALARAMANICKAM ANICUT		Kanmoi	Valramanickam	Arimalam	4.420
74			Kanmoi	Valramanickam	Arimalam	30.680
75			Kanmoi	Valramanickam	Arimalam	33.060
76			Kanmoi	Valramanickam	Arimalam	15.960
77			Kanmoi	Valramanickam	Arimalam	4.460
78			Kanmoi	Valramanickam	Arimalam	22.430
79			Kanmoi	Kurichy	Arimalam	13.950
						164.830
Sl.No	**Details**	**Name of Tank**		**Name of Village**	**Name of Block**	**Ayacut**
80		Kudimeriveera Bathairan	Kanmoi	Kummangudi	Arimalam	40.840
81		Iyyanar	Kanmoi	Kummangudi	Arimalam	46.920
82		Nallakurichi	Kanmoi	Karamangalam	Arimalam	43.380
83	RAIN FED	Thuraiya	Kanmoi	Karamangalam	Arimalam	49.660
84		Ponnan	Kanmoi	Keelapanaiyur	Arimalam	40.890
85		Othapuliya	Kanmoi	Keelapanaiyur	Arimalam	45.620
86		Ayyan	Kanmoi	Keelapanaiyur	Arimalam	45.000
87		Reguntha samuthram	Kanmoi	Valramanickam	Arimalam	42.430
						354.800

88	8. EADAYAR ANICUT	Chetti	Kanmoi	Valramanickam	Arimalam	18.220
89		Kolukkattannilai	Kanmoi	Kurichy	Arimalam	20.250
90		Andi	Kanmoi	Kurichy	Arimalam	13.240
91		Nemmeli	Kanmoi	Kurichy	Arimalam	80.960
92		Elankudy	Kanmoi	Kurichy	Arimalam	20.220
93		Eadayar	Kanmoi	Eadayar	Aranthanki	217.320
						370.210
94	RAIN FED	Amburani&Umayal	Kanmoi	Veelavayal	Arimalam	64.170
95		Kothanoudi	Kanmoi	Kurichy	Arimalam	41.260
						105.430
96	9. PUDUVAKOTTAI ANICUT	Periasengeerai	Kanmoi	Veeramangalam	Aranthanki	50.185
97		Appalai	Kanmoi	Nattucheri	Sakkottai	46.015
98		Kadukudi	Kanmoi	Nattucheri	Sakkottai	30.420
99		Manavayal	Kanmoi	Nattucheri	Sakkottai	33.950
100		Idayankudi	Kanmoi	Nattucheri	Sakkottai	28.150
101		Kadappanendal	Kanmoi	Nattucheri	Sakkottai	32.160
102		Narikudi	Kanmoi	Nattucheri	Sakkottai	29.650
103		Keelachettivayal	Kanmoi	Nattucheri	Sakkottai	19.750
104		Aranmanaivayal	Kanmoi	Nattucheri	Sakkottai	26.850
						297.130
105	RAIN FED	Kothangudi	Kanmoi	Kothangudi	Aranthanki	46.660
106		Poduvakottai	Kanmoi	Poduvakottai	Aranthanki	80.820

S.No	Details	Name of Tank	Name of Village	Name of Block	Ayacut
					127.480
107	10.IRUMBANADU	Irumbanadu Big Kanmoi	Irumbanadu	Arimalam	351.640
108		Melakarambai Kanmoi	Thannakudi	Avudaiyarkoil	37.990
					389.630
109		Kelakkarambai Kanmoi	Thannakudi	Avudaiyarkoil	55.980

110	RAIN FED	Kurungalur Kanmoi	Kurungalur	Avudaiyarkoil	44.360
111		Takkadi Kanmoi	Kurungalur	Avudaiyarkoil	50.510
112		Valayankanmoi Kanmoi	Kurungalur	Avudaiyarkoil	50.350
113		Seppakanmoi&PeriaKanmoi	Kurungalur	Avudaiyarkoil	55.140
114		Thenkudi&Kothankudi	Kurungalur	Avudaiyarkoil	50.510
115		Tnonnakudi Kanmoi	Thannakudi	Avudaiyarkoil	52.750
116		Madagam Kanmoi	Madagam	Avudaiyarkoil	55.140
117		Thanikadu Pillaiyadi & Kattu Kanmoi	Madagam	Avudaiyarkoil	63.570
118		Enagam Peria Eri & Kattu Kanmoi	Kurungalur	Avudaiyarkoil	73.92
					552.200
119	11.VISUR OPEN OFFTAKE	Visur Tank Kanmoi	Visur	Avudaiyarkoil	67.120
120					**67.120**
121	12.MEYYANUR HEAD SLUICE	Meyyanur Kanmoi	Meyyanur	Avudaiyarkoil	195.780
122		Sananendal Kanmoi	Meyyanur	Avudaiyarkoil	32.510
					228.290
123	RAIN FED	Nallikudi Kanmoi	Nallikudi	Avudaiyarkoil	43.550
124		Chithakkur Kanmoi	Chithakur	Avudaiyarkoil	71.130
125		Thunjanur Kanmoi	Thunjanur	Avudaiyarkoil	60.500
126		Chithakkur small Kanmoi	Chithakur	Avudaiyarkoil	41.740
127		Puduvakkur Kanmoi	Thunjanur	Avudaiyarkoil	41.740
128		luchikkottai Kanmoi	Thannakudi	Avudaiyarkoil	47.270
129		Alathikanmoi Kanmoi	Thannakudi	Avudaiyarkoil	66.640
130		Mavadu Kanmoi	Thannnakudi	Avudaiyarkoil	58.650
131		Satha & Embal Kanmoi	Embal	Avudaiyarkoil	124.440
132		Alavanthan Kanmoi	Sakkottai	Sakkottai	46.020

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
133	RAIN FED	Esalivelani	Kanmoi	Periakottai	Sakkottai	46.385
134		Periakottai	Kanmoi	Periakottai	Sakkottai	48.750
135		Kalathur	Kanmoi	Kalathur	Sakkottai	59.180
136		Jeyamkondan	Kanmoi	Jeyamkondan	Sakkottai	76.125
137		Enjavayal	Kanmoi	Enjavayal	Sakkottai	40.800
138		Uravayal	Kanmoi	Iruvinivayal	Sakkottai	81.520
						951.240
139	13.KALABAM	Kalabam	Kanmoi	Kalabam	Avudayar Koil	100.930
140		Kandiramanickkam	Kanmoi	Kalabam	Avudayar Koil	43.140
141		Thirukkalayanapuram	Kanmoi	Thirukkalayanapuram	Avudayar Koil	48.900
142		Adavathur	Kanmoi	Kalabam	Avudayar Koil	101.880
143		Kobinikkidangu	Kanmoi	Senganam	Avudayar Koil	36.250
144		Senganam	Kanmoi	Senganam	Avudayar Koil	72.970
145		Sundavanur	Kanmoi	Senganam	Avudayar Koil	56.680
146		Ayylkkudi	Kanmoi	Ayyikkudi	Avudayar Koil	69.230
147		Thennamary	Kanmoi	Senganam	Avudayar Koil	64.765
148		Alaganendal	Kanmoi	Senganam	Avudayar Koil	16.150
149		Karikudy	Kanmoi	Kaikudy	Avudayar Koil	76.720
150		Embakottaiyur	Kanmoi	Embakottaiyur	Avudayar Koil	41.910
151		Eduthanur	Kanmoi	Eduthanur	Avudayar Koil	51.930
152		Avanam	Kanmoi	Avanam	Avudayar Koil	43.250
153		Theeyur	Kanmoi	Theeyur	Avudayar Koil	68.460
154		Adambur	Kanmoi	Adambur	Avudayar Koil	78.620
155		Sadayamangalam	Kanmoi	Sadayamangalam	Avudayar Koil	116.980
156		Theeyathur	Kanmoi	Theeyathur	Avudayar Koil	136.085
157		Kulathur	Kanmoi	Theeyathur	Avudayar Koil	64.740
158		Achuthamangalam	Kanmoi	Theeyathur	Avudayar Koil	45.755
159		Vettivayal	Kanmoi	Theeyathur	Avudayar Koil	38.850
						1374.195

160	RAIN FED	Sirukottaiyur	Kanmoi	Karur	Avudayar Koil	42.850
161		Vilangattur	Kanmoi	Karur	Avudayar Koil	66.250
162		Niramangalam	Kanmoi	Karur	Avudayar Koil	55.580
163		Elambavayal	Kanmoi	Kumulur	Avudayar Koil	42.060
164		Velivayal	Kanmoi	Kumulur	Avudayar Koil	52.060
165		Velanur	Kanmoi	Amaradakki	Avudayar Koil	64.930
166		Kumulur	Kanmoi	Kumulur	Avudayar Koil	115.510

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
167	RAIN FED	Peravayal	Kanmoi	Okkur	Avudaiyarkoil	47.680
168		Narasingapuram	Kanmoi	Amaradakki	Avudaiyarkoil	80.6780
169		Pappakudi	Kanmoi	Karur	Avudaiyarkoil	95.030
170		Varikudi	Kanmoi	Karur	Avudaiyarkoil	65.130
171		Karur	Kanmoi	Karur	Avudaiyarkoil	167.020
172		Velimangalma	Kanmoi	Velimangalam	Avudaiyarkoil	70.820
173		Perungulam	Kanmoi	Kathiramangalam	Avudaiyarkoil	53.9000
174		Pillukkudi	Kanmoi	Pillukkudi	Avudaiyarkoil	40.500
175		Kathiramangalam	Kanmoi	Kathiramangaiam	Avudaiyarkoil	42.660
						1106.720
176	14.MELAVASANTHANUR OPEN OFF TAKE	Melavasanthanur	Kanmoi	Meiavasanthanur	Avudaiyarkoil	19.550
177		Keelavasanthanur	Kanmoi	Melavasanthanur	Avudaiyarkoil	32.255
178		Peyadikottai	Kanmoi	Peyadikottai	Avudaiyarkoil	9.395
179		Mangalam	Kanmoi	Mangalam	Avudaiyarkoil	42.520
180		Parayathur	Kanmoi	Parayathur	Avudaiyarkoil	63.035
181		Etticheri	Kanmoi	Etticheri	Avudaiyarkoil	28.245
182		Edaiyar	Kanmoi	Edaiyar	Avudaiyarkoil	36.230
183		Eluthinivayal	Kanmoi	Eluthinivayal	Avudaiyarkoil	25.085
184		Kannamangalam	Kanmoi	Kannamangalam	Avudaiyarkoil	19.205
						275.520
185	RAIN FED	Kadavakudi	Kanmoi	Kadavakudi	Avudaiyarkoil	89.250

186		1.Gudalur	Kanmoi	1.Gudalur	Avudaiyarkoil	44.930
						134.180
187	15. THIRUPPUNAVASAL ANICUT	Thiruppunavasai	Kanmoi	Thiruppunavasai	Avudaiyarkoil	162.720
188		Poovadiendal	Kanmoi	Poovadiendal	Avudaiyarkoil	32.150
189		Enathy	Kanmoi	Enathy	Avudaiyarkoil	37.500
190		Ettichery	Kanmoi	Ettichery	Kannankudi	68.790
191		Soiagampettai	Kanmoi	Soiagampettai	Kannankudi	69.56
192		Marungur	Kanmoi	Marungur	Kannankudi	98.62
193		Puduvayal	Kanmoi	Puduvayal	Kannankudi	95.65
						564.990

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
194	RAIN FED	Aluminigikkadu	Kanmoi	Aluminigikkadu	Avudaiyarkoil	42.510
195		Poyyathanallur	Kanmoi	Poyyathanallur	Avudaiyarkoil	55.150
						97.660
	PONBETHIYAR					
196	Chithrambur Tank Open Off Take	Chithrambur	Kanmoi	Thonnakudy	Avudaiyarkoil	61.310
197	Vellalavayal Anicut	Vellalavayal	Kanmoi	Vellalavayal	Avudaiyarkoil	42.180
198	Okkur Tank Open Off Take	Okkur	Kanmoi	Okkur	Avudaiyarkoil	163.240
199	Arasur Tank Open Off Take	Arasur	Kanmoi	Arasur	Avudaiyarkoil	43.570
200	Indannur Tank Open Off Take	Indanur	Kanmoi	Sathiyakudy	Avudaiyarkoil	58.460
201	Thatchamalli Tank Open Off Take	Thatchamalli	Kanmoi	Okkur	Avudaiyarkoil	79.420
202	Nalgiramam Tank Open Off Take	Nalgiramam	Kanmoi	Nalgiramam	Avudaiyarkoil	71.130
203	Sullani Tank Open Off Take	Sullani	Kanmoi	Sullani	Avudaiyarkoil	46.460

204	Niniyur Tank Open Off Take	Niniyur	Kanmoi	Niniyur	Avudaiyarkoil	49.370
205	Kavathukudy Tank Open Off Take	Kavathukudy	Kanmoi	Kavathukudy	Avudaiyarkoil	69.020
206		Kunathiranvayal	Kanmoi	Kunathiranvayal	Avudaiyarkoil	38.500
207		Thanikondan	Kanmoi	Thanikondan	Avudaiyarkoil	32.000
208	Periya Pattamangalam Tank Open Off Take	Peruta Pattamangalam	Kanmoi	Peruta Pattamangalam	Avudaiyarkoil	58.625
209	Chinna Pattamangalam Tank	Chinna Pattamangalam	Kanmoi	Chinna Pattamangalam	Avudaiyarkoil	48.610
210	Kothamangalam Tank Open Off Take	Kothamangalam	Kanmoi	Ponpethi	Avudaiyarkoil	40.930
211		Ponpethi	Kanmoi	Ponpethi	Avudaiyarkoil	230.210
212	Velivayal Tank Open Off Take	Velivayal,Naval,Velani	Kanmoi	Velivayal	Avudaiyarkoil	124.680
213	Palangulam TanK Open Off Take	Palangulam	Kanmoi	Palangulam	Avudaiyarkoil	44.360
214	Semankkottai Tank Open Off Take	Semankkottai	Kanmoi	Semankkottai	Avudaiyarkoil	89.250
			Kanmoi		Avudaiyarkoil	**1391.925**
215	RAIN FED	Sathiyakudi	Kanmoi	Sathiyakudi	Avudaiyarkoil	40.970
216		N.Purasakudi	Kanmoi	N.Purasakudi	Avudaiyarkoil	41.425
						82.395

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
	KOLUVANAR RIVER		Kanmoi	Amaradakki	Auvadiyarkoil	142.310
217	Amaradakki Anicut	Amaradakki	Kanmoi	Amaradakki	Auvadiyarkoil	142.310
218	Kanur Anicut	Kanur	Kanmoi	Kanur	Auvadiyarkoil	57.190

219	Pariveeramangalam Anicut	Pariveeramangalam	Kanmoi	Pariveeramangalam	Auvadiyarkoil	43.210
220		Thalanur	Kanmoi	Thalanur	Auvadiyarkoil	127.290
221	Seyyanam Anicut	Pilluvalasai	Kanmoi	Pilluvalasai	Auvadiyarkoil	74.370
222		Koluvanar	Kanmoi	Koluvanar	Auvadiyarkoil	65.840
223		Mimisai	Kanmoi	Mimisai	Auvadiyarkoil	73.320
224		Seyyanam	Kanmoi	Seyyanam	Auvadiyarkoil	243.560
225	Alathur Tank Open Off Take	Alathur	Kanmoi	Alathur	Auvadiyarkoil	209.820
226		Vengakudy	Kanmoi	Alathur	Auvadiyarkoil	60.540
						1097.450
227	Rainfed Tanks in Koluvanar Minor Basin	Kattukarai	Kanmoi	Kattukarai	Auvadiyarkoil	108.920
228		Vettaikaranvayal	Kanmoi	Alingiendal	Auvadiyarkoil	44.080
229		Alingiendal	Kanmoi	Alingiendal	Auvadiyarkoil	73.010
230		Chithiravidangan	Kanmoi	Chithiravidangan	Auvadiyarkoil	58.870
231		Kadangudy	Kanmoi	Kadangudy	Auvadiyarkoil	43.560

232		Kumarappanvayal	Kanmoi	Kumarappanvayal	Manamelkudi	59.380
233		Kasangudy	Kanmoi	Kasangudy	Manamelkudi	55.645
234		Sayikudy	Kanmoi	Palayavettivayal	Manamelkudi	43.990
235		Kilaravayal	Kanmoi	Kilaravayal	Manamelkudi	62.540
236		Muruganivayal	Kanmoi	Muruganivayal	Manamelkudi	51.700
237		Elambavayal	Kanmoi	Elambavayal	Manamelkudi	43.975
238		Palakkudy	Kanmoi	Palakkudy	Manamelkudi	76.270
239		Vettivayal	Kanmoi	Vettivayal	Manamelkudi	53.465
240		Palayavettivayal	Kanmoi	Palayavettivayal	Manamelkudi	89.980
241		Kanadu	Kanmoi	Kanadu	Manamelkudi	126.105
242		Kanakkur Big	Kanmoi	Kanakkur	Auvadiyarkoil	41.950
243			Kanmoi		Auvadiyarkoil	53.090
						1056.530
244	Thenar Non System Tanks	Ariyakudi	Kanmoi	Ariyakudi	Sakkottai	58.680
245	-do-	Idayan	Kanmoi	Ariyakudi	Sakkottai	48.810

246	-do-	Amaravathi	Kanmoi	Amaravathi	Sakkottai	87.640
247	-do-	Unjanai	Kanmoi	Unjanai	Kannankudi	152.880
248	-do-	Kandadevi	Kanmoi	Kandadevi	Devakottai	114.790
Sl.No	**Details**	**Name of Tank**		**Name of Village**	**Name of Block**	**Ayacut**
249	Thenar Non System Tanks	Vengaloor	Kanmoi	Vengaloor	Kannankudi	86.150
250	-do-	Thalaiyur	Kanmoi	Thalaiyur	Devakottai	48.640
251	-do-	Muthunadu	Kanmoi	Madakkottai	Kannankudi	455.710
252	-do-	Theralapur	Kanmoi	Theralapur	Kannankudi	42.150
253	-do-	Kalabam	Kanmoi	Kalapankudi	Kannankudi	41.090
254	-do-	Kappalur	Kanmoi	Kappalur	Kannankudi	178.680
255	-do-	Kannankudi	Kanmoi	Kannankudi	Kannankudi	52.320
256	-do-	Kandiyur	Kanmoi	Kandiyur	Kannankudi	69.520
257	-do-	Kattavilagam	Kanmoi	Kattavilagam	Kannankudi	65.390
258	-do-	Thaniyan	Kanmoi	Kattavilagam	Kannankudi	53.840
259	-do-	Chettivayal	Kanmoi	Chettivayal	Kannankudi	8.260
260	-do-	Siruveli	Kanmoi	Siruveli	Kannankudi	38.060
261	-do-	Illuppakudi	Kanmoi	Illuppakudi	Sakkottai	12.360
262	-do-	Pusaiakudi	Kanmoi	Pusaiakudi	Kannankudi	21.730
263	-do-	Sathanakottai	Kanmoi	Sathanakottai	Kannankudi	24.910
264	-do-	Mananvayal and pudu	Kanmoi	Mananvayal and pudu	Devakottai	23.480
265	-do-	Kovilan	Kanmoi	Kovilan	Kannankudi	11.300
266	-do-	Iruvinivayal	Kanmoi	Iruvinivayal	Kannankudi	37.150
267	-do-	Nattaveli	Kanmoi	Nattaveli	Kannankudi	12.190
268	-do-	Nambiyur	Kanmoi	Nambiyur	Kannankudi	17.090
269	-do-	Kadathi	Kanmoi	Kadathi	Kannankudi	11.860
270	-do-	Senthani	Kanmoi	Senthani	Kannankudi	27.300
271	-do-	Chinnakodakudi	Kanmoi	Chinnakodakudi	Kannankudi	29.420
272	-do-	Periakodakudi	Kanmoi	Periakodakudi	Kannankudi	36.660

273	-do-	Vakkamakottai	Kanmoi	Vakkamakottai	Kannankudi	27.390
274	-do-	Thevrenthal North & South	Kanmoi	Thevrenthal North & South	Kannankudi	28.240
275	-do-	Vettaikkaranpatti	Kanmoi	Vettaikkaranpatti	Kannankudi	17.670
276	-do-	Oyyakkondan	Kanmoi	Oyyakkondan	Kannankudi	10.680
277	-do-	Kumaramangalam	Kanmoi	Kumaramangalam	Kannankudi	16.830
						1966.870
278	Thenar Rainfed Tanks	Thiruvelangudi	Kanmoi	Thiruvelangudi	Kallal	41.020
279	-do-	Arkadu	Kanmoi	Arkadu	Kallal	61.230
280	-do-	Kunnakudi	Kanmoi	Kunnakudi	Kallal	47.600
281	-do-	Sali	Kanmoi	Kunnakudi	Kallal	42.410
282	-do-	Patharakudi Periya	Kanmoi	Manakri Sukkanendal	Kallal	42.760

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
283	Thenar Rainfed Tanks	Senjai	Kanmoi	Senjai	Sakkottai	82.650
284	-do-	Athalai	Kanmoi	Kalanivasal	Sakkottai	51.070
285	-do-	Sekarathi	Kanmoi	Koovilur	Kallal	42.740
286	-do-	Karaikudi	Kanmoi	Karaikudi	Sakkottai	55.080
287	-do-	Sankarapuram	Kanmoi	Sankarapuram	Sakkottai	64.250
288	-do-	Melasemponmari	Kanmoi	Aravayal	Devakottai	50.150
289	-do-	Perattukottai	Kanmoi	Perattukottai	Devakottai	45.000
290	-do-	Surumaruthur	Kanmoi	Surumaruthur	Devakottai	48.720
291	-do-	Chithattivayal	Kanmoi	Chithattivayal	Devakottai	46.550
292	-do-	Managalam	Kanmoi	Managalam	Kannankudi	60.890
293	-do-	Sembiyanvayal	Kanmoi	Sembiyanvayal	Kannankudi	48.320
294	-do-	Sithanur	Kanmoi	Sithanur	Kannankudi	81.770
295	-do-	HanumandakudiChinna	Kanmoi	Hanumandakudi	Kannankudi	60.870
296	-do-	T.Sirruvanur	Kanmoi	T.Sirruvanur	Kannankudi	47.430
297	-do-	Sadayamangalam	Kanmoi	Sadayamangalam	Kannankudi	51.220
298	-do-	Kallavaliendal	Kanmoi	Kallavaliendal	Kannankudi	68.800
299	-do-	Arakkottai	Kanmoi	Arakkottai	Kannankudi	58.960
300	-do-	Vadakeelkudi	Kanmoi	Vadakeelkudi	Kannankudi	42.550
301	-do-	Vilangudi	Kanmoi	Vilangudi	Kannankudi	86.120
302	Thenar Rainfed Tanks in Pudukottai district	Pillamangalam Peria cum Alan&pattachi	Kanmoi	Pillamangalam	Thrimayam	58.530
303	-do-	Seeratha cum Mananperia	Kanmoi	Seerathakudi	Thrimayam	48.400
304	-do-	Neivasal Peria cum Cheeti,narangiyan&Pudu	Kanmoi	Neivasal	Thrimayam	86.060

305	Sakkottai Block - Thenar	Illuppakudi	Kanmoi	Illuppakudi	Sakkottai	48.780
306	-do-	Koneri	Kanmoi	Kalanivasal	Sakkotai	101.050
						1670.980

Sl.No	Details	Name of Tank		Name of Village	Name of Block	Ayacut
307	Rainfed Tanks in Kottakudi Minor Basin, (Sakkotai Block), Sivagangai District.	Pallathur	Kanmoi	Pallathur	Sakkottai	52.770
308		Palayur	Kanmoi	Palayur	Sakkottai	56.610
309		Kandanur	Kanmoi	Kandanur	Sakkottai	48.410
310		Sakkavayal	Kanmoi	Melamanakkudi	Sakkottai	83.650
311		Pirambuvayal	Kanmoi	Pirambuvayal	Sakkottai	48.910
312		Nemmeni	Kanmoi	Perikottakudi	Sakkottai	66.200
313		Korappaiiam	Kanmoi	Perikottakudi	Sakkottai	43.270
314		Ochan	Kanmoi	Perikottakudi	Sakkottai	53.620
315		Vethiyankudi	Kanmoi	Pirambuvayal	Sakkottai	42.740
316		Andakudi	Kanmoi	Mithirvayal	Sakkottai	83.100
317		Thiruthangur	Kanmoi	Mithirvayal	Sakkottai	53.240

318		Sengathankudi	Kanmoi	Sengathankudi	Sakkottai	54.280
						686.800
						18886.480

Secretary
Ramanathapuram Market Committee
Virudhunagar.

ANIMAL HUSBANDRY COMPONENT

IAMWARM PROJECT

PAMBAR SUB BASIN

Commissionerrate of Animal Husbandry & Veterinary Services,
Chennai 600 006

IAMWARM PROJECT

ANIMAL HUSBANDRY

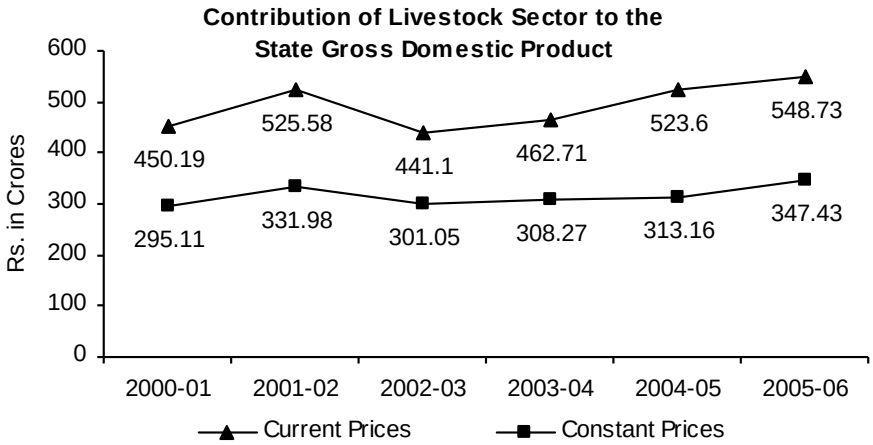
1. INTRODUCTION

1.1 Our State being an agricultural based economy with more than 60% of the people engaged in animal husbandry, agriculture and allied activ ities, it forms the backbone of the rural economy. Animal husbandry contributes significantly in supplementing the income of small, marginal farmers and landless labourers many of whom are women who play a major role in the care and management of livestoc k. Livestock is not only an important source of income to the rural poor but also helps them sustain their livelihood in times of drought and famine. Livestock provide a diverse range of output varying from draught power and organic manure for agriculture, self employment throughout the year especially for women as well as direct production of milk, meat and eggs for human food.

1.2 The contribution of livestock sector to the food basket in the form of milk, eggs and meat to the State has been impressive in fulfilling the animal protein requirement of ever growing human population. The estimated milk production which was 37.91 lakh MT during 1995-96 has increased to 54.74 lakh MT during 2005 -06. Similarly the egg production during the same period has increased from 3,048 million numbers to 6,223 million numbers. During the same period, the per capita availability of milk per day went up from 185 gms to 234 grms and eggs per annum from 54 numbers to 97 numbers respectively. The average growth rate of milk and egg during the last decade is 4.4% and 10.4% respectively. According to advance estimates (provisional), the contribution of livestock sector to the Gross State Domestic Product has increased from Rs.523.60 crores during 2004 -05 to Rs.548.73 crores during 2005-06, an increase of 4.8%.

Year	Current Prices (In crores)						Constant Prices (In crores)					
	Gross State Domestic Product	GSDP for Agriculture & Allied Activities	GSDP for Livestock Sector	Agriculture & Allied Activities to	of Livestock Sector	%age Share of Livestock Sector to Agriculture	Gross State Domestic Product	GSDP for Agriculture & Allied Activities	GSDP for Livestock Sector	Agriculture & Allied Activities to	of Livestock Sector	%age Share of Livestock Sector to Agriculture
2000-01	14109.98	2042.56	450.19	14.48	3.19	22.04	9101.07	1457.73	295.11	16.02	3.24	20.24
2001-02	14355.54	2056.09	525.58	14.32	3.66	25.56	8901.06	1457.22	331.98	16.37	3.73	22.78
2002-03	15509.93	1646.51	441.10	10.62	2.84	26.79	9170.32	1111.75	301.05	12.12	3.28	27.08
2003-04	16845.72	1700.21	462.71	10.09	2.75	27.21	9495.10	1081.96	308.27	11.39	3.25	28.49
2004-05	18892.11	2025.73	523.60	10.72	2.77	25.85	10324.84	1252.74	313.16	12.13	3.03	25.00
2005-06	20750.28	2097.25	548.73	10.11	2.64	26.16	11198.15	1305.98	347.43	11.66	3.10	26.60

2003-04 : Quick estimates 2004-05 : Advance estimates 2005-06 : Advance estimates(provisional)



1.3 Animal husbandry having a high potential for growth, its hidden potential needs to be explored as this can provide the much needed gainful employment opportunities to the weaker sections of the society and can contribute significantly in regeneration of the rural economy. Animal husbandry can ensure a better quality of life for the rural farmer by not only providing sustainable employment at their location itself but can also act as assets or rural currencies. Animal husbandry thus can act as a powerful instrument for the comprehensive socio-economic transformation of the rural people and can act as an engine for growth and trigger the economy by its multiplying effects.

2. PRESENT STATE SCENARIO

2.1 Tamil Nadu is home to 91.41 lakhs head of cattle, 16.58 lakhs buffaloes, 55.93 lakhs sheep, 81.77 lakhs goats besides 3.21 lakhs pigs and 865.91 lakhs poultry as per the 17th livestock and poultry census. The livestock ownership is more evenly distributed among landless labourers, small and marginal farmers and livestock production systems are based on low cost agro-by-products as nutritional inputs.

2.2 Veterinary assistance, health cover and breeding support to the livestock and poultry in the State is provided by 1,323 Government graduate veterinary institutions. The National Commission on Agriculture has suggested one veterinarian for every 5000 cattle units by the year 2000 A.D. whereas the present scenario is one veterinarian for every 10,000 cattle units. In addition 1,799 subcentres provide first aid and breeding support. Feed and fodder are the major limiting factors in enhancing farm animal productivity. But in the State a huge gap of around 47% exists between the requirement and availability of green fodder. Though farmers are well aware of the artificial insemination programme, their awareness level on best and latest animal husbandry practices, know-how on emerging new diseases and their control are not up to the excepted level. More over with changing global scenario, the knowledge level of the veterinarians and para-veterinarians needs to be updated frequently to take the technology instantaneously to the end users - the farmers.

2.3 Though the State is endowed with large livestock population, the breedable age females covered through artificial insemination is only 30-35%. The conception rate under field conditions ranges from 35-40%. This is due to a mixture of various factors like low nutritional status, improper time of insemination and stress due to walking the animals for long distances to the institutions for artificial insemination, shortage of feed and fodder, prevalence of endemic livestock diseases. In the State, the per day average productivity of a non-descript and crossbred cattle is 2.73 kgs.. and 6.27 kgs. respectively and that of a buffalo is 4.16 kgs. which is much below the expected yield. The productivity can be enhanced by

adopting good management practices, feeding practices, bio security measures, effective disease prevention measures, etc.

3. SCENARIO IN THE PAMBAR SUB BASIN

Livestock Population

Cattle	Buffalo	Sheep	Goat	Poultry
50608	2214	21838	21549	67726

Breedable age Female Population

Crossbred Cattle	Non Descriptive cattle	Buffalo	Total
6788	18516	1107	26411

Infrastructure and Man power in Government Veterinary Institutions

No. of Veterinary Institutions		Veterinary institutions filled up	
Graduate Institutions	Subcentres	Graduate Institutions	Subcentres
8	7	5	1

Average Per Day Milk Yield per animal

Crossbred Cattle	Non Descriptive cattle	Buffalo
6.09	2.93	4.68

Milk Procurement

Milk cooperative societies	Present milk procurement (LPD)
19	4000

4. Constraints, Challenges and Counter measures proposed:

S. No.	Constraints & Challenges	Countermeasures Proposed
1.	Remote villages and villages situated far away from the Government Veterinary Institutions are not getting sufficient veterinary services like veterinary health cover and artificial insemination facilities	The establishment of sub basin veterinary unit will ensure delivery of veterinary services at the farmer's door steps or nearest to the farmer's in remote villages and unserviced villages of the sub basin area. Provision of veterinary health cover and artificial insemination are the main works at the farmer's door steps. The unemployed veterinary graduate will be given an entrepreneurship training to establish a Sub basin veterinary unit (details enclosed vide para 6.1 of page 6) in the sub basin area and disseminate best animal husbandry practices for his earnings and to upgrade animal husbandry practices of farmers in the sub basin area.
2.	Lack of upgraded infrastructure at the Government Institutions leading to constraints in delivery of quality veterinary services.	The Government Veterinary Institutions in the sub basin will be provided with additional essential equipments (details enclosed vide para 6.2.a. & 6.2.b. of page 10) to deliver quality veterinary services in the sub basin. In addition one veterinary dispensary (details enclosed vide para 6.2.c. of page 10) will be upgraded as referral institution for quick and accurate diagnosis of diseases and help in timely treatment thereby preventing economic loss to the farmers.
3.	There is a wide gap between the requirement and availability of green fodder needed for the livestock in the sub basin.	To reduce the gap between the requirement and availability of green fodder in the sub basin, it is proposed to cultivate Kolukattai fodder in 250 hectares of private lands, (details enclosed vide para 6.3.(d). of page 11) as a part of cropping plan.
4.	Main problem affecting the fertility in cross bred cattle is infertility leading to loss of milk production days, ultimately leading to loss to the farmers.	To overcome the infertility problems, infertility cum total health cover camps (details enclosed vide para 6.4.(b) of page 13) are proposed. The animals having infertility problems will be identified and treated. In addition, mineral mixture supplement (details enclosed vide para 6.4.(c) of page 13) will be given to rectify the defects.

S. No.	Constraints & Challenges	Countermeasures Proposed
5.	Lack of adequate know-how about the livestock management practices like feeding, breeding, health care and deworming activities.	The farmers in the sub basin will be given training (details enclosed vide para 6.5.a. of page 15) on best livestock management practices in livestock breeding activities like signs of oestrum, correct time of artificial insemination, deworming, feeding schedule and other health care measures. In addition, IEC materials will be distributed to farmers in the sub basin. More over hoardings and wall paintings depicting signs of commonly affecting diseases will be erected in places where people congregate in large numbers. Apart from this, quarterly night meetings will be conducted to disseminate information to the farmers in the sub basin. (details enclosed vide para 6.4.(d) of page 14)
6.	Lack of update knowledge and skills of the veterinarians and para-veterinarians in the project area.	Veterinarians in the project area will be given trainers training (details enclosed vide para 6.5.(d) of page 16) at Veterinary Colleges to update and refresh their skills and knowledge. They will inturn train the para-veterinarians.

5. OBJECTIVES OF THE PROJECT

5.1 With this background, the main objective of the Animal Husbandry Department will be to intervene in all possible ways utilising the resources to the maximum to improve the production potentialities of the livestock in the sub basin through multi disciplinary approach.

The main interventions will be:

- Productivity enhancement by improving delivery of veterinary services in the project area at the Government and private level.
- Increasing availability of green fodder and other fodder for sustenance.
- Conducting various out reach programmes to enhance productivity.
- Enhancing the knowledge level of human resource in the project area.

5.2 With the above interventions, not only the crossbred population in the sub basin is expected to rise but also the disease outbreaks will be kept under control. Moreover systematic and periodical deworming will lead to a 10% increase in weight gain, thereby increasing the total meat yield per animal. More over the various out reach programmes and enhancing the knowledge level in the sub basin area will lead to better animal husbandry practices. Thus ultimately, the per animal milk yield is expected to increase from 6.09 lts to 9 litres in crossbred, from 2.93 lts to 3.5 litres in indigenous and from 4.68 lts to 5.5 litres in buffaloes, leading to increased total farm income.

6. Productivity enhancement by improving delivery of veterinary services in the project area at the Government and private level.

6.1 Establishment of Sub basin Veterinary Units.

6.1.(a) Though there are 8 graduate veterinary institutions and 7 subcentres operating in the project area, there is still large livestock populations uncovered which is mainly due to the geographical terrain and distance these villages are located from the institutions. In this project, the main aim will be to provide effective veterinary cover and breeding support to these villages at their door steps by establishing Sub basin Veterinary Unit. The main criteria for establishing the unit will be livestock population in the unserviced area. Hence to provide effective services in these unserved areas, it is planned to establish 2 Sub basin V eterinary Units in the Project area.

6.1.(b)The details of Sub basin Veterinary Unit to be established, their coverage villages with distance and nearest Government Veterinary institution is furnished below.

Total number units in Pambar basin :			2	
Name of the Sub basin Veterinary Unit :			1. Avudaiyurkovil	
Sl. No.	Name of Villages to be Covered	Distance from the sub basin Veterinary Unit (In Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Avudaiyurkovil	0	Embal	12
2.	Mangalam	5	Embal	10
3.	Arasur	9	Embal	8
4.	Vellavayal	11	Embal	8
5.	Errubanadu	12	Embal	6
6.	Okkur	13	Embal	8
7.	Amaradakki	8	Mimisal	10
8.	Pariveeramanagalam	12	Mimisal	8
9.	Ponbathy	15	Theeyathur	5
10.	Chinnapattamanagalam	19	Theeyathur	8
11.	Veelimanagalam	10	Karakathikottai	12
12.	Kattukarai	15	Karakathikottai	12
13.	Alingienthal	17	Karakathikottai	10
14.	Kannakkur	20	Karakathikottai	12

Villages 1 to 5	Mondays & Thursdays
Villages 6 to 9	Tuesdays & Fridays
Villages 10 to 14	Wednesdays & Saturdays
Sundays will be a reserve day in which IEC campaigns will be conducted. In addition if any villages are left out during the week, it will be covered on the reserve day.	

Avudaiyurkovil village is about 12 kms from the nearest Veterinary institution namely Veterinary Dispensary, Embal. There are about 13 villages situated in and around Avudaiyurkovil that are not covered by the Government Veterinary Institution. Further the breedable female population in and around Avudaiyurkovil that is untapped by the Government veterinary institution is around 2,112. Hence Avudaiyurkovil village is fixed as the headquarters of the Sub basin Veterinary Unit.

Name of the Sub basin Veterinary Unit :	2.Sakkottai

Sl. No.	Name of Villages to be Covered	Distance from the sub basin Veterinary Unit (In Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Sakkottai	0	Kandanoor	7
2.	Melamanakudi	3	Kandanoor	7
3.	Kulappadi	6	Kandanoor	9
4.	Sirugavail	5	Kandanoor	8
5.	Perumbavail	5	Kandanoor	10
6.	Periyakottakudi	10	Kandanoor	8
7.	Ambakudi	5	Perkalaikadu	8
8.	Pukkudi	5	Perkalaikadu	10
9.	Jayamkondan	5	Perkalaikadu	9
10.	Kallathur	7	Perkalaikadu	10
11.	Nattuchery	4	Perkalaikadu	10
12.	Vellipatti	5	Perkalaikadu	9

Villages 1 to 6	Mondays, Wednesday & Friday
Villages 7 to 12	Tuesdays, Thursday & Saturday
Sundays will be a reserve day in which IEC campaigns will be conducted. In addition if any villages are left out during the week, it will be covered on the reserve da y.	

Sakkottai village is about 7 kms from the nearest Veterinary institution namely Veterinary Dispensary, Kandanoorl. There are about 11 villages situated in and around Sakkottai that are not covered by the Government Veterinary Institution. Further the breedable female population in and around Sakkottai that is untapped by the Government veterinary institution is around 2,177. Hence Sakkottai village is fixed as the headquarters of the Sub basin Veterinary Unit.

6.1.(c) An unemployed Veterinary Graduat e who will be designated as Sub basin Veterinary Extension Officer will mann each Unit. He will be given one month entrepreneurship training at renowned national institutions like IRMA / NDDB. On completion of this training, the Animal Husbandry Department will give him 5 days orientation training in the nearest veterinary institution. The orientation training will be an over view of the departmental organisation and structure, duties and role of officers, disease endemicity and farmers know - how in the area.

6.1.(d) On completion of training, the unemployed veterinary graduate selected will be a given a two wheeler. The two wheeler vehicle will be the property of the Water Users Association. He will be located in the Water Users Association building, whic h will be his headquarters. He will prepare a weekly route map in consultation with Animal Husbandry Department, Water Users Association and local village panchayats for providing veterinary services. He will visit the villages as per the scheduled program me and provide veterinary services like vaccination, deworming, castration and treatment and breeding support like artificial insemination and pregnancy diagnosis. The route will be reviewed and assessed for intake of the veterinary services by the end use rs once in 3 months and suitable alterations if necessary will be made. Flexibility will be given to change the tour programme based on need. The unit will be under the technical control of the Animal Husbandry Department. The sub basin veterinary extensio n officer will computerize all records regarding artificial insemination like date of artificial insemination done, straw used, sire yield, date of follow up for conception, etc.

6.1.(e) To provide breeding support by artificial insemination necessary in puts like LN2 containers (a 35 lit. and 3 lit.), artificial insemination guns, thawing flasks and straw cutters (one set) will be provided. The funds for the above inputs (LN2 containers, artificial insemination guns, thawing flasks and straw cutters) wil l be sourced from Tamilnadu Livestock Development Agency (TNLDA). The unit will also be provided with other equipments like microscope, centrifuge, etc. for carrying out preliminary disease diagnosis. Other inputs for breeding like LN2 and frozen semen str aws will also be provided for carrying out services at the farmers door step. The unit will also be provided with dewormers, essential surgical items like cotton guage, catguts, intra -uterine infusions, etc., which will be procured from Tamilnadu Medical Services Corporation (TNMSC) for providing veterinary services. In addition a one time revolving fund of Rs.10,000/ - will be provided to the Water Users Association. The above fund will be utilised for stocking of medicines and injectables as per the requi rement of the Sub basin Veterinary extension officer. The fund for the above will be sourced from the project. The Animal Husbandry Department will ensure supply of vaccines like Hemorrhagic septicemia, Black quarter, Anthrax, Enterotoxaemia and Sheep pox free of cost for carrying out vaccination in the unit's service area. The Regional Joint Director of Animal Husbandry will be the facilitator for purchase of the above items from TNMSC and will also ensure prompt supply of vaccines.

6.1.(f) The veterinarian will be allowed to collect fees for the artificial insemination and he will remit Rs.25/- per insemination to the Water Users Association and keep the remaining for himself as service charges. In addition, he can collect a nominal fee of Rs.50/ - for minor treatments and Rs.100/- for major treatments as professional charges for himself. The cost of medicines utilised for treatment will be borne by the farmer. However if the farmer prefers, the sub basin veterinary extension officer can utilise the medici nes and injectables available with the Water Users Association and collect additional charges for medicines utilised which will be remitted to the Water Users Association. The above amount remitted will be used as revolving fund for purchase of medicines. To ensure a wider coverage with increased conception rate, a performance linked incentive for every calf born out of inseminations done by the Unit will be factored, wherein a sum of Rs.25/ - will be given during first year and there after a decrease of Rs. 5/- per year. The amount remitted by the unit to the Water Users Association will be kept as seed money for sourcing inputs for sustainably running the unit after withdrawal of funds by the lending agency for the project.

6.1.(g) Each unit will be established at a total cost of Rs.5.73 lakhs for 5 years in which Rs.0.99 lakhs will be non-recurring and Rs.4.74 lakhs will be recurring cost. Totally 2 units will be established in the river basin at a total cost of Rs.11.45 lakhs. The financial details and number of units to be established in each river basin is furnished below

FINANCIAL COST FOR ESTABLISHMENT OF ONE SUB BASIN VETERINARY UNIT

(In Rs.)

	NON-RECURRING EXPENDITURE/UNIT	1st yr. Rs.					
1	Cost of one 35 lts and 3 lts LN2 container Rs.18,000/- (will be sourced from TNLDA)	0					
2	Cost of A.I. Gun, thawing flask and straw cutter Rs.1000/- (will be sourced from TNLDA)	0					

3	Purchase of two wheeler and accessories	50000					
4	Cost of other equipments like centrifuge, castrator, etc.	14000					
5	Binocular Microscope	15000					
6	Purchase of furniture, etc	10000					
7	One time revolving fund for purchase of medicines	10000					
	Total	**99000**					
	RECURRING EXPENDITURE/UNIT	I Year	II Year	III Year	IV Year	V Year	Total cost (In Rs.)
1	Cost of straws @ Rs.15/straw at the rate of 2400/1st yr, 2700/2nd yr, 3000/3rd yr, 3360/4th yr & 3840/5th yr.	36000	40500	45000	50400	57600	**229500**
2	LN2 @ 250 Lit/year @ Rs.26/lit for I year and there after an increase of Rs.1/- per year	6500	6750	7000	7250	7500	**35000**
3	Cost of basic medicines, infusions and surgical items @ Rs.20,000/annum	20000	20000	20000	20000	20000	**100000**
4	Incentive for the veterinarian for each calf born @ Rs.25/- yr and there after an decrease of Rs.5/- per year	4000	19600	16500	12240	6880	**59220**
5	Miscellaneous Charges for chemicals, glasswares, etc.	10000	10000	10000	10000	10000	**50000**
	Total	**76500**	**96850**	**98500**	**99890**	**101980**	**473720**
	Recurring Expenditure for 5 years			**473720**			
	Total (Recurring + Non-recurring)			**572720**			

6.1.(g) The above endeavor will ensure that areas hitherto unserviced are covered qualitatively by increased breeding cover via artificial insemination coverage, health cover by timely vaccination, deworming and treatment. This will ensure proper disease control and livestock with better genetic potentialities which will lead to increased productivity per animal thereby ultimately leading to better profits between farmers in the project area.

6.2 Improving the essential infrastructure in the Government institutions in the project area.

6.2. (a).1 Graduate Institutions: A good and well-equipped infrastructure is the key to an all round growth and development. There are 8 graduate veterinary institutions and 7 subcentres functioning under the Government fold in the project area. The infrastructure in the graduate veterinary institutions are being strengthened at a cost of Rs.33,000/- per Graduate Institution. The infrastructure that are to be added in each Graduate Institution are Mouth

Gag, dentist autoclave, mastitis detector, etc. The 8 institutions will be strengthened at a cost of Rs.2.64Lakhs.

6.2.(a).2 Mouth gag will help in better diagnosis, dentist autoclave will be handy which can be carried to field for sterilization of equipments, instruments used in routine Veterinary practice while mastitis detector will be useful for detection of sub clinical and clinical mastitis – a disease that causes reduction in milk yield, loss of productive days and prolonged recovery time. The animal does not achieve the peak productivity after mastitis, the early detection of which will prevent economic loss to the farmers. All these measures will help in effective delivery of veterinary services and early diagnosis and facili tate quality and timely treatment of ailments for the livestock in the sub basin area.

6.2.(b) Sub-centres: The infrastructure presently available to subcentres was provided 30 years back are old and needs replacement. It is proposed to provide essential equipments like castrators (large and small), dressing tray, scissors, forceps, wash basin, etc. to each sub centre in the project area at a cost of Rs.20,000/ - per sub centre. Totally 7 subcentres in the project area will be provided with essential equip ments at a total cost of Rs.1.40 lakhs.

6.2.(c) Strengthening Diagnostic Facilities in Sub -basin Referral Institution: Strengthening the diagnostic facilities in the sub basin by providing special diagnostic tools to one sub basin veterinary institution at a cost of Rs.3.00 lakhs, is also a part of the project. The institution will be designated as Referral Institution for the sub basin. The Veterinary Dispensary at Aranthangi will be upgraded as the referral institution for the sub basin. In the identified referral institution, semi auto analyzer and accessories will be provided for ensuring complete timely blood analysis.

6.2.(d) Infrastructure improvement in the project area will enhance the quality of delivery in veterinary services and diagnostic fa cilities contributing to reduction in the incidences of animal diseases, thereby increasing the overall productivity, which can contribute significantly in increasing the farm income of the farmers.

6.3. Increasing availability of green fodder .

6.3.(a) Feed and fodder are the major limiting factors in enhancing farm animal productivity. In our country, fodder production is still deemed ancillary to agricultural production. The green fodder resources for livestock are mainly derived from grazing in grass lands and pastures, fodder crops from cropped lands, weeds, bund grasses, tree leaves and mixed forages. Crop residues mainly sorghum and paddy straws which are poor in nutritive value constitute the major fodder for livestock. The economic viability of l ivestock husbandry depends on sources of feed and fodder, as feeding cost constitutes 65 -70% of the total cost of livestock farming. The availability of green fodder is restricted to selected areas and seasons. Green fodder should be fed throughout the ye ar not only to maintain milk production but also for improving the conception rate. Moreover adequate availability of green fodder will reduce the dependence of farmers on concentrates.

6.3.(b) Generally small ruminants like sheep and goats are not stall -fed. They are allowed for grazing. Hence for calculation of green fodder, only the bovines are taken into account. In the project area a considerable gap exists between requirement and availability of green fodder.

6.3.(c) The requirement, availability and shortage of green fodder for the bovine population in the project area is furnished below.

	Sub basin	Bovine Population	Requirement (In MT)	Availability (In MT)	Shortage (In MT)	%age of Shortage
1	Pambar	52822	163398	-	163398	100

Hence to reduce the green fodder shortage, around 250 hectares of additional land will to be brought under fodder cultivation in the sub basin area.

6.3.(d) Around 250 hectares of land earmarked for fodder cultivation in the private lands in the project area will be taken up for cultivation of Kolukattai grass. The farmers will be supplied inputs like seeds. The cost of cultivation will be borne by the farmer. The Animal Husbandry Department will ensure supply of quality seeds. The yield rate and cost of inputs is furnished below.

Sl. No.	Name of fodder	Avg. Yield per year (In tonnes)	Cost of inputs Per Hectare
1.	Kolukattai	40	3,000

Village Panchayat wise fodder cultivation area proposed (In Hac.)

1.	Valaramanickam	12.5
2.	Kurungulam	12.5
3.	Pudunilaivayal	12.5
4.	Nedungudi	12.5
5.	Karamangalam	12.5
6.	Elanchavur	12.5
7.	Melur	12.5
8.	Rangiyam	12.5
9.	Virachilai	12.5
10.	Kannanur	12.5
11.	Neikkonam	12.5
12.	Nattuchery	12.5
13.	Periyakkottakulli	12.5
14.	Sirugavayal	12.5
15.	Mithravayal	12.5
16.	Velankadi	12.5
17.	Amaradakki	12.5
18.	Veelimangalam	12.5
19.	Piranthani	12.5
20.	Pariveeramangalam	12.5
	Total	250

6.3.(e) The new area to be brought under fodder cultivation and the status of green fodder in the sub basin after implementation of the project is as follows.

Fodder Availability Status after the end of project:

Year	Yield to be added (In MT)	Total fodder available during the end of the year	shortage of fodder (In MT)	Cost of inputs for the cultivation of fodder in the proposed area	
	Kolukattai grass @ yield rate of 40 tonnes/ha for 250 ha @ 25 ha for 1st yr, 80 ha for 2nd & 3rd yr, 40 ha for 4th yr and 25 ha for 5th yr.			Kolukattai grass @ Rs.3000/ha	Total Cost (In Rs.)
I Year	1000	1000	162398	75000	750000
II Year	3200	4200	159198	240000	
III Year	3200	7400	155998	240000	
IV Year	1600	9000	154398	120000	
V Year	1000	10000	153398	75000	

6.3.(f) By the above cropping pattern in the sub basin, the green fodder availability will be increased 10,000 MT. In addition 90000 MT of green fodder will be available after the harvest of maize. Totally 1,00,000 MT of green fodder will be available in the sub basin at the end of the project. Ultimately the shortage will be 63398 MT. The above shortage will be met by allowing the animals to graze in the tank bunds, Common Property Resources, etc.

6.4 Improving the knowledge level of the farmers by various out reach programmes.

6.4.(a) The success of the project depends on effective dissemination of information to the field in improving the knowledge level of the farmers on best and latest animal husbandry practices, emerging new diseases and their control and optimum utilisation of fodder resources by various out reach programmes.

The out reach programmes planned in the project area are :

1. Infertility cum Total Veterinary Health Care camps.
2. Distribution of mineral mixture
3. Information, education and communications campaigns.

6.4.(b) ***Infertility cum Total Veterinary Health Care camps.***

6.4.(b).1. Under this programme, infertility cum tota l health cover both preventive and curative will be provided to all livestock and poultry by conducting special camps in each sub-basin Veterinary Unit service area at the rate of one camp per unit per month for 5 years. In these camps, various activities like health care, disease prevention vaccination against endemic diseases, deworming, castration, artificial insemination, pregnancy verification, infertility treatment, etc. will be carried out free of cost. An exhibition depicting various livestock diseases and preventive measures, fodder development measures, calf rally along with demonstration will also be conducted for creating awareness among the farmers.

6.4.(b).2. Prior wide publicity will be given regarding the village where the camp is to be conducted in the village and near by villages. In addition, the day and place where the camp is to be conducted will be displayed in the Water Users Association building. The services of the veterinarians and para-veterinarians working in the Animal Husband ry Department in the sub basin area will be utilised for conducting the camps. A calf rally will be organised in the camp and best calf / calves will be given prizes which will act as motivation for other farmers. During the camps, pamphlets and leaflets o n best and latest animal husbandry

practices, emerging new diseases and their control and optimum utilisation of fodder will be distributed.

6.4.(b).3. Each camp will be conducted at a cost of Rs.6,000/ -.

Sl. No.	Component	Cost in Rs.
1.	Medicines	3,500
2.	Cost of 50 straws for artificial insemination	750
3.	Publicity and Propaganda	500
4.	Distribution of prizes in calf rally	500
5.	Miscellaneous charges like erection of shamina, etc., for conducting the camp	750
	Total	**6,000**

6.4.(b).4. Apart from total health cover the camp is expected to achieve, it will help in identifying animals affected by infertility due to mineral deficiency. The total financial cost for this component for 5 years is Rs.7.20/ - lakhs.

6.4.(c). ***Distribution of mineral mixture.***

6.4.(c).1. One of the major problems affecting conception is infertility. The major causative factor for infertility in the field is mineral deficiency. Hence to correct this deficiency, which is the vital factor affecting conception and calving, it is proposed to distribute mineral mixtures to needy animals in the project area.

6.4.(c).2. The sub basin veterinary extension officer visiting the villages on the scheduled programme will select the eligible animals during the visit. In addition animals will also be identified during the infertility cum total health cover camps. The eligible animals will be given mineral mixture @ 25 gms per day for 365 days. The sub basin veterinary extension officer will maintain the data of eligible an imals covered under this programme and ensure examining the animals regularly for growth parameters. The sub basin wise cost required for distribution of 25 gms. of mineral mixture for 365 days to 100 animals at a cost of Rs.40/ - kg per sub basin veterinary extension officer for 5 years is 1.825 lakhs. For 2 units, 3.65 lakhs would be required for this component.

6.4.(c).3. By this the animals will come to estrum early and lead to better conception and calving rates. Moreover this will lead to reduction in inter-calving period there by increasing the productive life of the animal.

6.4.(d). Information, education and communications campaigns

6.4.(d).1. Printing of Pamphlets and leaflets.

Pamphlets and leaflets on best practices in animal husbandry, bi osecurity measures to be taken to prevent diseases, economic diseases affecting livestock and their prevention and control measures, optimum utilisation of fodder resources with emphasis on inclusion level of non conventional feeds, etc. will be printed in Tamil for distribution to the farmers in the project area.

6.4.(d).2. Erection of hoardings and wall paintings in the project area.

Posters, hoardings and banners carrying the activities undertaken in the project area will be displayed in all Sub basin Veterinary Units. The same will also be displayed in all Government institutions functioning in the project area. In addition wall paintings depicting signs of commonly affecting diseases will be painted on walls where people congregate in large numbers

6.4.(d).3. Conducting Night meetings

6.4.(d).1.a. Night meetings will be conducted involving the Water Users Association, Animal Husbandry Department and Sub basin veterinary Extension Officer at a common place in the sub basin on a suitable day in each Sub basin Veterinary Unit and Graduate institution area at the rate of one per quarter. The meeting not only enables participation of all the farmers in the sub basin but also acts as a source of information to other farmers.

6.4.(d).1.b. During the night meetings, village people will be enlightened on benefits of rearing livestock and will be motivated to take up livestock rearing. Pamphlets and leaflets will be distributed to the farmers. A small exhibition and method demonstration will be organised for the benefit of the farmers. The services of link agencies like Tamilnadu Veterinary and Animal Sciences University and Tamilnadu Milk Producers Cooperatives Union will be utilised where ever necessary. In the night meetings successful animal husbandry entrepreneurs in the village and neighboring villages will be requested to share their views on their methodology followed for their success.

6.4.(d).4. All the above Information, education and communications campaigns will be conducted in the sub basin at a total cost of Rs.5.50 lakhs.

6.5. Enhancing the knowledge level of human resource in the project area.

Continuing education is the touchstone of success. The project envisages capacity building at all levels like farmer, veterinarian, para-veterinarian operating in the sub basin to achieve the desired results of increased sustainable productivity at the end of the project.

6.5.(a). ***Training of Farmers***

6.5.(a).1. Farmers generally have a traditional knowledge of breeding and management of livestock. The existing awareness, knowledge level and skill in profitable rearing of livestock with latest animal husbandry techniques among majority of farmers are minimum in the project area. Hence it is essential to impart training to upgrade the skills and knowledge level for profitable animal husbandry rearing.

6.5.(a).2. Under this programme, elite farmers interested in animal husbandry activities will be selected and given training on best practices in livestock rearing. They will also be enlightened on importance of feeding and cultivation of fodder crops. Emphasis will be given to enlighten the farmers on feeding of unconventional feeds and their inclusion level. Moreover they will be briefed about the diseases generally affecting the livestock in the basin and their symptoms and control measures. In addition they will be enlightened on the importance of deworming, vaccination and clean milk production. The farmers trained will be utilised for dissemination of the above information to their counterparts in the villages.

6.5.(a).3. For the above purpose, progressive farmers @ 400 per year interested in animal husbandry activities in the sub basin will be selected for 3 day training. They will be divided into batches of 25 per batch. Training will be provided in the nearest veterinary institution. They will be given a training incentive of Rs.100/day as they will have to attend the training programme foregoing their normal daily earning. During the training, each trainee will be given study material worth Rs.50/-. To motivate the trainer, a trainer honorarium of Rs.250/- per day will be provided. In addition miscellaneous charges of Rs.500/- will be provided for each batch. A total cost of Rs.10,000/- will be required for training each batch. During the project period of 5 years, a total of 2000 farmers (80 batches of 25 farmers per batch) in the sub basin will be trained at a cost of Rs.8.00 lakhs.

6.5.(b). Entrepreneurship Training to unemployed Veterinary Graduates :

3 Unemployed Veterinary Graduates are to be trained for the Pambar Sub basin. 2 River basin veterinary units are proposed in the sub basin area. One unemployed Veterinary graduate is trained additionally for the future in case there is any drop out. The entrepreneurship training is given to the unemployed veterinary graduate for sustainable animal husbandry activities.

6.5.(c). Orientation Training for Rural Veterinary Extension Officers

6.5.(c).1. Though the sub basin veterinary extension officers are basically veterinarians who may possess a sound theoretical knowledge on animal husbandry and veterinary treatment, their field experiences and exposure may be minimum. To attain the desired field results in a short term, it is essential to know the terrain and problems faced by the farmers in the basin. Hence 5 days orientation training is proposed for the sub basin veterinary extension officer selected to work in the Sub basin Veterinary Unit.

6.5.(c).2. Training will be provided to each Sub basin Veterinary Extension Officer in the nearest veterinary institution in the sub basin which will be identified by the Regional Joint Director and Assistant Director of Animal Husbandry of the concerned jurisdiction. They will be given a training incentive of Rs.150/day. During the training, each will be given study material worth Rs.100/-. To motivate the trainer, a trainer honorarium of Rs.500/- will be provided. A total cost of Rs.1,350/- will be required for training each Sub basin Veterinary Extension Officer. Thus in the project area to train 2 Sub basin Veterinary Extension Officers, Rs.2700/- would be required.

6.5.(d). In-service Training for 8 Veterinarians

6.5.(d).1. Veterinarians have an overall knowledge of breeding, management, diagnosis and treatment of livestock. With advancing science and technology, the techniques followed may have become obsolete. Moreover, new and simple techniques have evolved in animal husbandry management, breeding, diagnosis and treatment. Hence it is essential to update the knowledge and skills of the veterinarians in Government institutions in the project area.

6.5.(d).2. The 8 veterinarians working in the Government institutions in the sub-basin will be given a trainers training at Madras Veterinary College / Namakkal Veterinary College at a cost of Rs.2000/- per individual. The total cost for training the 8 veterinarians in the sub-basin would be Rs.16,000/-

7. Ensuring marketing tie up for the products.

With the rapid urbanisation, changing life styles and increasing purchasing power o f the people, the demand for livestock and livestock products is expected to rise steadily. Hence marketing the livestock and livestock products in the sub basin will not be a major problem.

PAMBAR SUB BASIN

The breedable age female population in the Pambar Sub Basin is 26411 which include 6788 crossbred, 18516 indigenous cattle and 1107 buffaloes.

ASSUMPTIONS:

1) Available breedable female population in the basin after reducing for mortality, sterility etc., at the rate of 15% in crossbred, 5 % in indigenous and 5 % in buffaloes, there will be 5770 crossbred, 17590 indigenous and 1052 buffaloes.
2) At present there are 8 Graduate Veterinary Institutions and 7 Sub centres functioning under Government fold doing artificial insemination work of which 3 subcentres and 6 graduate veterinary institutions are vacant.
3) The above Government Institutions have carried out an average artificial insemination of 1819 in crossbred, 3121 in indigenous and 106 in buffaloes.
4) Assuming 2.8 (35%) inseminations are required for consumption in cattle and 3.3 (30%) inseminations are required for conception in buffaloes, the actual animals covered is 650 crossbred, 1115 indigenous and 32 buffaloes.
5) Thus the breedable age female population unserved by the Government institutions is 5120 crossbred, 16475 indigenous and 1020 buffaloes.
6) For of the above animals unserved, two sub basin veterinary units will be established in the sub basin each covering around 12 to 14 villages.
7) During the first year 2,400, second year 2,700, third year 3,000, 4th year 3,360, 5th year 3,840 and from then on 3,840 artificial inseminations will be done by each sub basin veterinary unit.
8) It is assumed that 50% crossbred (2400), 40% indigenous (1920) and 10% (480) buffaloes will be targeted by the above two units during the first year.

Yearwise Number of animals targeted

Year	AI done by the unit (50% crossbred, 40% Indigenous, 10% buffalo)		
	Crossbred	Indigenous	Buffalo
I Year	2400	1920	480
II Year	2700	2160	540
III Year	3000	2400	600
IV Year	3360	2688	672
V Year	3840	3072	768

9) The conception rate for the Sub basin veterinary unit is as follows:

Year	Conception Rate in Cow	Conception Rate in Buffalo
1st year	35% (2.8)	30% (3.3)
2nd year	40% (2.5)	35% (2.8)
3rd year	45% (2.2)	40% (2.5)
4th year	50% (2.0)	45% (2.2)
5th year	50% (2.0)	50% (2.0)

10) Taking a conception rate of 35% for cattle and 30% for buffalo during the first year, the actual animals covered by the unit will be 857 crossbred, 686 indigenous and 145 buffaloes.

Year	Yearwise Number of animals covered		
	Crossbred	Indigenous	Buffalo
I Year	857	686	145
II Year	1080	864	193
III Year	1364	1091	240
IV Year	1680	1344	305
V Year	1920	1536	384

11) By the work done by these two units during the first year, out of the total 1,543 cattle (857 crossbred, 686 indigenous) conceived, 50% (772) heifer calves will be born. Similarly out of 145 buffaloes, 73 buffalo heifer calves will be born.

Year	Yearwise Number of heifer calves born	
	Crossbred	Buffalo
I Year	772	73
II Year	972	97
III Year	1228	120
IV Year	1512	153
V Year	1728	192

12) Now calf mortality is taken as 5% for crossbred and 10% for buffaloes. Therefore out of the 772 crossbred heifer calves, 39 will be lost. Similarly out of 73 buffalo calves, 7 will be lost during the first year.

Year	Yearwise Number of heifer calves lost	
	Crossbred	Buffalo
I Year	39	7
II Year	49	10
III Year	61	12
IV Year	76	15
V Year	86	19

13) The actual crossbred animal in milk created in the sub basin by intervention by these units during first year will be 1,543 (857 Crossbred plus 686 Indigenous cattle). Similarly 145 buffaloes will be in the milk.

Year	Yearwise Number of animals in milk

	Crossbred	Indigenous	Buffalo
I Year	857	686	145
II Year	1080	864	193
III Year	1364	1091	240
IV Year	1680	1344	305
V Year	1920	1536	384

14) The average milk yield in the project area will be increased to 7 litres in crossbred, 800 ml or maximum of 3.6 litres in indigenous and 4.5 litres for buffaloes.

15) During the first year, the total milk yield in the sub basin by intervention by these units will be 15.43 lakh litres by crossbred (assuming 6 lts. is the average yield), 5.57 lakh litres (assuming 2.9 lts. is the average yield) by indigenous and 2.04 lakh litres (assuming 4.6 lts. is the average yield) by buffalo.

Year	**Average Milk Yield/day (In Lts.)**			**Total Milk Yield/ lactation (In lakh Lts.)**		
	Crossbred	Indigenous	Buffalo	Crossbred (300 days lactation)	Indigenous (280 days lactation)	Buffalo (300 days lactation)
I Year	6.0	2.9	4.6	15.43	5.57	2.04
II Year	6.2	3.0	4.8	20.09	7.50	2.78
III Year	6.4	3.3	5.0	26.19	10.08	3.60
IV Year	6.7	3.5	5.3	33.77	13.17	4.85
V Year	7.0	3.6	5.5	40.32	15.48	6.34

16) Thus the value of milk in the sub basin will be Rs.209 lakhs during the first year (cost of cow milk is Rs.9/- and buffalo milk is Rs.10/-).

Year	**Value of Milk (In lakh Rs.)**			
	Crossbred	Indigenous	Buffalo	Total
I Year	139	50	20	209
II Year	181	67	28	276
III Year	236	91	36	363
IV Year	304	119	48	471
V Year	363	139	63	565

17) Thus economic return at the end of the proje ct by way of milk will be Rs.565lakhs, an increase of Rs.356 lakhs.

18) The cattle heifer calves born during the first year is brought into breeding stock during the 3rd year. Similarly in buffalo 1st year heifer calves is brought into 4th year breeding stock.

Year	**Yearwise Female Breeding stock created**

	Crossbred	Indigenous	Buffalo
I Year	5120	16475	1020
II Year	5120	16475	1020
III Year	5853	16475	1020
IV Year	6776	16475	1086
V Year	7943	16475	1173

19) The main advantages of the programme

- ☞ Provides service at the farmer's doorstep or nearest to the farmer's doorstep.
- ☞ Increased coverage
- ☞ Better conception rate
- ☞ Reduced stress to the animals
- ☞ Timely treatment
- ☞ Reduced recovery time from illness
- ☞ Ensuring coverage of animals with vaccination and deworming
- ☞ Saving the man hours of the farmers
- ☞ Genetic potential improvement (crossbred)
- ☞ Timely artificial insemination, thereby not only increasing conception and calving rate, but also reducing the inter-calving period.
- ☞ Timely artificial insemination and calving, leads to more production days during the productive life cycle of the animal.
- ☞ Reducing scrub bulls born out of natural service.
- ☞ Avoiding diseases like Trichomonosis, brucellosis, etc., affecting the uro-genital tract of females, leading to abortion, sterility, etc., when the animals are put into natural service.
- ☞ For natural service, the chance of the same bull serving the mother and dam is higher which may lead to inbreeding, but if frozen semen is used, the semen can be rotated nullifying the chances of inbreeding.
- ☞ Increasing the per animal milk production potential, leading to a substantial increase in milk production
- ☞ Increasing the farmers income through animal husbandry.

OUTCOMES EXPECTED

Sl. No.	Project Year	I Year	II Year	III Year	IV Year	V Year	Total
1	Artificial Insemination Done (In Nos.)	4800	5400	6000	6720	7680	30600
2	Calves Born (In Nos.)	1690	2138	2696	3330	3840	13694
3	Heifer calves born (In Nos.)	845	1069	1348	1665	1920	6847
4	Milk Yield (In lakh Lts.)	23.04	30.37	39.87	51.79	62.14	207.2
5	Value of Milk (In Lakh Rs.)	209	276	363	471	565	1884

Note: Out the total value of milk, around 70 - 75% will be cost of inputs like feed, fodder, health care, etc.

ESTIMATE FOR ANIMAL HUSBANDRY COMPONENT TO BE INCLUDED IN IAMWARM PROJECT REPORT

PAMBAR SUB BASIN

	Components	Physical	Financial (In Lakhs)
1	**Productivity enhancement by improving delivery of veterinary services**		
	a. Establishment of Sub basin Veterinary Units (SBVU) @ Rs.5,72,720/- per unit	2	11.45
	b. Improving the essential infrastructure in the Government institutions (graduate institutions) @ Rs.33,000/-unit	8	2.64
	c. Improving the essential infrastructure in the Government institutions(subcentres) @ Rs.20,000/-unit	7	1.40
	d. Strengthening the diagnostic facilities in the sub basin by providing special diagnostic tools to sub basin referral institutions @ Rs.3,00,000/- per unit	1	3.00
2	**Increasing availability of green fodder in private lands (in hac)** - Kolukattai grass 250 hac.		7.50
3	**Out reach programmes.**		
	a. Infertility cum Total Veterinary Health Care camps @ Rs.6,000 per camp per month for each SBVU	120	7.20
	b. Distribution of mineral mixture @ Rs.1,82,500 per SBVU	2	3.65
	c. Information, education and communications campaigns	10	5.50
4	**Enhancing the knowledge level of human resource**		
	a. Training of Farmers	2000	8.00
	b. Enterpruneship training to 3 unemployed veterinary graduates to be placed as Sub basin Veterinary Extension Officer @ Rs.50,000/- per person	3	1.50
	b. Orientation Training for Sub basin Veterinary Extension Officers @ Rs.1,350/- trainee	2	0.03
	c. In-service Training for Veterinarians @ Rs.2,000/- per person	8	0.16
			52.03

Tamil Nadu Agricultural University

Irrigated Agriculture
Modernization and Water Resource Management

Sub basin Plan – Pambar
TNAU component

Nodal Officer (IAMWARM)
Director
Water Technology Centre
TNAU, Coimbatore-3

1. Introduction

A. Introduction

- National Pulses Research Centre, Pudukkottai is located at Vamban 12 km from Pudukkottai to Pattukottai Road.. It comes under southern Agro climatic of Tamil Nadu.
- NPRC, Vamban is the leading pulses research centre under TNAU
- NPRC is identified as main centre for research on black gram and green gram and sub centre for Red gram by ICAR
- One Krishi Vigyan Kendra is also functioning at Vamban for the transfer technology activities in which multidisciplinary scientists are working

Varieties released from NPRC,Vamban

Blackgram - Vamban 1, (1987),Vamban 2(1996), Vamban 3(2000), VBN(Bg)4(2003),
Greengram - Vamban 1 (1989), VBN(Gg) 2 (2001),
Redgram - Vamban 1 (1992), Vamban 2 (1999), Vamban 3 (2000),
Cowpea - Vamban 1 (1997), Vamban 2 (1998),

Technologies developed

- Application of 25 kg and 12.5 kg of potash to irrigated and rainfed pulses respectively and sulphur at 20 kg/ha increased the yield of blackgram and greengram
- Among the blackgram varieties, VBN 3 and VBN (Bg) 4 are high yielding with YMV resistance and popular in Southern disricts.
- Green gram VBN (Gg)2 is very popular among farmers in view of its high yield and YMV resistance
- Application of 2% DAP as foliar spray at pre-flowering, flowering and pod filling stages significantly influenced the grain yield of Green gram and Black gram

B. Basic information about the sub basin

Total Registered Ayacut	-	18886.48.0 Ha.
Fully Irrigated Ayacut	-	9489.48.0 Ha.
Partially Irrigated Ayacut	-	4807.00.0 Ha.

Gap - 3870.00.0 Ha

(i) AREA COVERED UNDER PAMBAR SUB BASIN

S.No.	Name of District	Name of Taluk	Name of Block
1.	Pudukkottai	Thirumayam	Thirumayam, Arimalam
2.	Pudukkottai	Arantangi	Arantangi,
3.	Pudukkottai	Avudaiarkoil	Avudaiarkoil,
4.	Pudukkottai	Manamelkudi	Manamelkudi
5.	Sivaganga	Karaikudi	Sakkottai and Kallal
6.	Sivaganga	Devakottai	Devakottai and Kannangudi
7.	Ramnad	Thiruvadanai	Thiruvadanai

(ii)Climate

Sl. No.	Climatological factors	South West monsoon	North East monsoon	Winter	Summer
1.	Temperature, ^{o}C	30.8	26.7	26.5	31.20
2.	Relative humidity , %	72.5	80.3	78.2	73.3
3.	Wind speed, kmph	9.8	4.57	4.1	5.2
4.	Sunshine, hrs/day	6.0	5.6	8.8	8.6

(iii) Soil Classification

The Predominant Soil type and area

S.No	Name of Taluk	Predominant Soil Type	
		Order	Soil type
1.	Thirumayam	Entisols	Red yellow brown in colour shallow soil to loamy.
2.	Arantangi	Alfisols	Red or Brown coarse loamy to fine loamy, clay loam t o clay
3.	Avudaiarkoil	Vertisols	Heavy texture clay soil very deep Black soil
4.	Manamelkudi	Alfisols	Red or Brown coarse loamy to fine loamy, clay loam to clay
5.	Karaikudi	Alfisols	Red or Brown coarse loamy to fine loamy, clay loam to clay
6.	Devakottai	Vertisols	Heavy texture clay soil very deep Black soil
7.	Thiruvadanai	Vertisols	Heavy texture clay soil very deep Black soil

(iv)Cropping Pattern – Pambar sub basin

Sl. No	Name of the crops	Season	Area under crops in Ha							
			Without project				With project			
			Fully	Partially	Gap	Total	Fully	Partially	Gap	Total
	Annual									
1	Sugarcane		468	0	0	468	805	0	0	805
	Total		468	0	0	468	805	0	0	805
	Perennial									
1	Coconut		252	0	0	252	302	0	0	302

2	Amla		0	0	0	0	100	0	0	100
3	Casuarina		0	0	0	0	1500	0	0	1500
	Total		**252**	**0**	**0**	**252**	**1902**	**0**	**0**	**1902**
	I Season									
1	Paddy	Sep- Jan	9143	4556	0	13699	13699	0	0	13699
2	Pulses	June - July	0	251	0	251	420	0	0	420
3	Groundnut	June - July	250	0	0	250	420	0	0	420
4	Maize	Nov- Jan	0	0	0	0	1500	0	0	1500
5	Bhendi	June - July	40	0	0	40	60	0	0	60
6	Brinjal	June - July	30	0	0	30	40	0	0	40
7	Chillies	Sep- Jan	26	0	0	26	40	0	0	40
	No crops				3870	3870				
	Total		**9489**	**4807**	**3870**	**18166**	**16179**	**0**	**0**	**0**
	Grand Total		**10209**	**4807**	**3870**	**18886**	**18886**	**0**	**0**	**0**
	II Season									
1	Paddy	Jan -May	650	0	0	650	300	0	0	300
2	Pulses	Jan -May	0	0	0	0	300	0	0	300
3	Groundnut	Jan -May	0	0	0	0	220	0	0	220
4	Maize	Jan -May	0	0	0	0	300	0	0	300
5	Chillies	Jan -June	0	0	0	0	50	0	0	50
6	Bhendi	Jan -June	0	0	0	0	50	0	0	50
	Total		**650**	**0**	**0**	**650**	**1220**	**0**	**0**	**1220**
	Great Grand Total		**10859**	**4807**	**3870**	**19536**	**20106**	**0**	**0**	**20106**

(v) Objectives

- To promote water saving technologies (SRI / Drip) in agriculture and horticultural crops for large scale adoption
- To enhance the crop and water productivity
- To increase the cropped area by crop diversification

- ♦ To converge with WRO and other line departments in over all improvement in total farm income

2. Issues

- Non-availability of quality seed material in pulses(Seed village)
- Non adoption of SRI
- Low productivity of blackgram 180 kg/ha a gainst the state average of 367 kg/ha
- Lack of crop diversification (Maize,Casuarina)

3. Counter measures proposed

- Improve production technologies for pulses
- SRI
- improved production technologies for maize
- Casuarina saucer planting method

I. PROJECT MODE ACTIVITIES

1. Technologies for transformation

a. Improved crop production technologies for maize (150 ha)

Objective

To popularize improved crop production technologies with maize hybrid Co H -4

Technology

Maize is an alternate crop for the areas in which the water scarcity is a common problem. Since the farmers cultivating private hybrids with higher seed cost, there is a need to introduce TNAU hybrids in this sub basin,

Special features of CO-H (M) 4

- Minimum water requirement (650 mm)
- Shorter duration (95-100 days)
- Higher yield @ 6.25 t/ha
- Suited for both irrigated and rainfed at all seasons

Justification

Maize is introduced in Pambar under diversification in an area of 1800 ha. To popularize and familiarize the technologies TNAU introduces demon stration in 150 ha.

Linkage

Department of Agriculture, Pudukkottai will bring 2000 ha of additional area under maize under fully irrigated condition and department of Agricultural Marketing will provide storage and market facilities. Over imposing the improved agro techniques in the area will pave way for improved productivity.

Budget

S.No.	Technology	Area (Ha)	Unit cost (Rs.)	Budget (Rs. in lakhs)	Location

1	**Improved crop production technologies for maize**	**150**	**6000**	**9.00**	**Attached in activity chart**
2	**Field day for 3 yeas**		**10,000**	**0.30**	**-**

Justification for the unit cost

Sl.No	*Particulars*		Amount in (Rs.)
1	Hybrid Seed cost with seed treating chemicals (20kg/ha) @ Rs. 90 /kg	:	1800.00
2	Cost of fertilizers (150:75:75 kg NPK / ha)	:	
	Urea - 330 kg @ Rs. 5 / kg	:	1650.00
	Super Phosphate - 469kg @ Rs. 4 /kg	:	1875.00
	Muriate of Potash - 83 kg @ Rs.4.75/ kg	:	625.00
	Cost of Bio fertilizer	:	
	Azozpirillum and Phospho bacteria @ 10 pockets each	:	120.00

b. Model village concept

Crop	Area Proposed	To cover	Budget in Rs.
Quality seed production			
Rice – ADT 39	50 Ha	3000 ha	30,000
Black gram – VBN (Bg)4	20 ha	1000 ha	20,000
Technology demonstration			
Organic farming and IFS in rice	1ha		1,00,000

c. Soil Testing

Soil testing to issue soil health card for 1000 farmers - 50,000/-

.

d. On Farm demonstration and skill development

Details	Duration	No/Batch	Total Batch	Budget /Batch	Total (Lakh)
SRI techniques	1	50	3	20000	0.60
New improved cultivation techniques for Black gram	1	50	1	20000	0.20
New improved cultivation techniques for Maize	1	50	2	20000	0.40
Soil sampling techniques	1	50	2	20000	0.40
Cassurina cultivation	1	50	2	20000	0.40
Training to laborers on SRI method	1	100	5	10000	0.50
Total					2.50

Venue: NPRC, Vamban, Pudukkottai

e. Budget for Project Mode

S. No	Activities	Amount (Rs. in Lakhs)
1	a. Technology transformation	9.30
	b. Model village and seed production	1.50
	c. Soil Testing	0.50
2	Training to farmers	2.50

II. MISSION MODE ACTIVITIES

a. SRI system for rice cultivation (Mission mode: 300 ha)

Objectives

1. To minimize the usage of water
2. To improve the productivity of rice and enriching the soil
3. To obtain higher net return

Technology

Scientific management technique of allocating irrigation water based on soil and climatic condition to achieve maximum crop production per unit of water applied over a unit area in unit time is very much essential under present condition. System Rice Intensification (SRI) is one among the scientific management tool. Under conventional system of rice cultivation the rice yield will be low due to poor weed management increases competition among crop and weeds, Poor aeration affects the root activity and tiller production and Poor water management increases the water requirement. SRI does not require the purchase of new seeds or the use of new high-yielding varieties and SRI dose require skillful management of the factors of production and at least initially, additional labor input – between 25 and 50% particularly for careful transplanting and for weeding. Square planting ensures rotary weeder operation in either direction. Rotary weeder operation incorporates the weed biomass and aerates the soil for better root activity and tillering. Efficient water management reduces the irrigation water requirement.

As farmers gain skill and confidence in SRI methods, labor input decreases and can eventually become the same or even less compared with conventional rice-growing methods. The SRI technique has the following features

- Young and robust seedling (14-15 days)
- One seedling per hill
- Square planting under wider spacing (22.5 x 22.5 cm)
- Rotary weeding up to 40 days at 7-10 days interval.
- Irrigation after the disappearance of ponded water
- "N" management through Leaf Colour Chart

SRI technique has the following advantages

- Saving of seed material 50-65 kg /ha.
- Saving of 10 laborers in planting
- Saving of 300-400 mm of irrigation water
- Saving of 12-16 women laborers in weeding
- Saving of 15-45 kg N/ha. by following LCC method of N management

Use of Rotary weeder has the following advantages

- Improves soil structure
- Increases soil aeration,
- Enrichment of O_2 near the root zone,
- Increases the microbial population,
- Better nutrient availability and uptake by the plants,
- More tillering ability

Justification

Adoption of SRI in rice system reduces the water requirement with a yield increase of 15-20%. The area under rice in Pambar sub basin will be reduced by 4000 ha in first season. To offset the production loss introduction of SRI will be the best option for maintaining overall production. TNAU introduces a demonstration of 300 ha which helps in large scale adoption.

Linkage

The area under paddy at the end of project period will be 16000 ha. This is possible with the intervention of Dept. of agriculture.

Budget

S.No.	**Technology**	**Area (Ha)**	**Unit cost (Rs.)**	**Budget (Rs. in lakhs)**	**Location**
1	**Adoption and implementation of SRI system for rice cultivation**	**300**	**10000**	**30.0**	**Attached in activity chart**

Justification for the unit cost

Sl.No	***Particulares***		**Amount in (Rs.)**
1	Seed cost with seed treating chemicals (8kg/ha) @ Rs. 25 /kg	:	200.00
2	Raising nursery (wooden frame, rosecan, polythene sheet)	:	1000.00
3	Square transplanting cost @ 50 B/ha @ Rs.80/labour (Labour cost should be borne by the farmers)	:	4000.00
4	Rotary weeder 5 No. Rs.500/no for square planting	:	2500.00
5	Cost of row marker for planting (One no.)	:	1000.00
6	Cost of fertilizers (150:50:50 kg NPK / ha)	:	
	Urea - 330 kg @ Rs. 5 / kg	:	1650.00

	Super Phosphate - 312.5kg @ Rs. 4 /kg	:	1250.00
	Muriate of Potash - 83 kg @ Rs.4.75/ kg	:	415.00
	$ZnSO_4$ 25 kg @ Rs. 25 / kg	:	625.00
	Cost of Bio fertilizer	:	120.00
	Azozpirillum and Phospho bacteria @ 10 pockets each	:	
7.	Cost of Plant protection chemicals	:	
	Pseudomononas 2.5 kg / ha @ Rs. 75 /kg		200.00
	Monocrotophos 1.5 litre/ha @ Rs. 300 /litre		450.00
	Quinylphos 2 litres / ha @ Rs. 250 / litre		500.00
	Mancozeb 2 kg/ha @ 250 / kg		500.00
	Total		**14,410.00**

Out of the total cost of Rs. 14,410, the project cost includes only 10,000. The reamaining cost will be incurred by the farmer (Labour cost for planting)

b. Introducing Casuarina saucer planting method in Pa mbar sub basin (200 ha)

Objectives

- To produce higher biomass over conventional planting method.
- To get higher income per unit area over conventional planting method.

Technology

In the saucer planting method of *Casuarina*, seedlings are planted on the edges of saucer which measures 30 cm depth at centre and 3 m dia. The distance between the mid point of two adjacent saucers is 6 m thus 110 saucers can be accommodated per acre. Around the each saucer nine seedlings are planted on equi-distance. Around 990 seedlings can be planted in an acre. The main purpose of adapting this improved saucer planting method is to harvest the rain water which is becoming scarce nowadays. Each saucer can harvest around 1200 litres of rain water during each rain. This harvested rain water has been effectively used by the seedlings for the better growth and dry matter production. Hence this improved saucer planting method can be effectively deployed in the rainfed areas for maximising the biomass production.

Justification

Traditionally *Casuarina* are planted with a space of 2 x 2 m as a line planting method. The yield obtained by adapting this planting method will vary from 20 - 30 tonnes per acre after six years but the potential yield of this species is more than 50 tonnes per acre. Moreover, the main reason for reduced yield is due to the failure of evenly distributed rainfall and poor water harvesting structures. Planting of *Casuarina* with improved planting method called 'saucer planting' will double the dry matter production for the same level of input provided in the conventional planting method.

Linkage

Department of Agriculture, Pudukkottai will bring 1500 ha of area under Casuarina under fully irrigated condition. Over imposing the improved agro techniques in the area will pave way for improved productivity.

Budget

S.No.	Technology	Area (Ha)	Unit cost	Budget (Rs.	Location

			(Rs.)	**in lakhs)**	
1	**Introducing Casuarina saucer planting method in Pambar sub basin**	**200**	**14,000**	**28.00**	**Attached in activity chart**

Justification for the unit cost
Casurina Saucer plating

Preparation cost	-	Rs. 18/saucer
For 1 ha (275 saucers)	-	Rs. 4950.00
Cost of seedlings 9 seedlings /saucer	-	2500 seedlings @ Rs. 3/-
	-	Rs. 7500.00
Casualty replacement	-	Rs. 750.00
Cost of pesticides to control termites	-	Rs. 575.00
Total	-	Rs. 13775.00

d. Productivity enhancement in Pulses (300 ha)

It is proposed to bring 720 ha of pulses under Pambar sub basin in the post project period. With the inclusion of high yielding variety viz,. VBN (Bg) 4, yield could be enhanced substantially. The technologies developed by NPRC vamban will be demonstrated in large scale of 300 ha of pulses.

- Variety VBN(Bg)4
- Seed pelletting with 40g DAP and 250g of gypsum per kg of seed was found to improve the early vigour and crop stand in red lateritic soil
- Application of 2% DAP as foliar spray at pre-flowering, flowering and pod filling stages significantly influenced the grain yield of mungbean and urdbean

Cost estimate

S.No.	Technology	Area (Ha)	Unit cost (Rs.)	Budget (Rs. in lakhs)	Location
1	Productivity enhancement in Pulses	300	2500	7.50	Attached in activity chart

Justification for the unit cost

Sl.No	*Particulars*		Amount in (Rs.)
1	Seed cost with seed treating chemicals (20kg/ha) @ Rs. 50/kg	:	1000.00
2	DAP 10 kg / ha @ Rs.11/kg		110.00
	Super Phosphate - 312.5 @ Rs. 4 /kg	:	1250.00
	Muriate of Potash – 41.5 kg @ Rs.4.75/ kg	:	210.00
			2570.00

e. Budget for Mission mode

S.No	Particulars	Budget (Rs. in lakh)
Budget for Mission Mode I- SRI (300 ha)		
1	Cost of critical inputs seeds and nutrients	**30.0**
	Sub Total A	**30.00**
Budget For Mission Mode II - Casuarina (200 ha)		
1	Cost of critical inputs	**28.00**
	Sub Total B	**28.00**
Budget For Mission Mode III - Pulses (300 ha)		
1	Cost of critical inputs seeds and nutrients	**7.50**
	Sub Total C	**7.50**

Expected output

Activity	Demonstration Area (Ha)	Area spread for adoption (Ha)	Additional productivity (kg/ha)	Additional production (in tonnes)	Additional revenue (Rs. in lakhs)	Water saving million (m^3)
Improved production technologies in maize	150	600	1000	600	60.00	-
Improved production technologies in pulses	300	2500	240	576	172.80	-
System Rice Intensification in rice	300	1500	1200	1800	90.00	6.00

IV. YEAR WISE ACTIVITIES

Year	Project Mode		Mission Mode	
	Maize	SRI	Casurina	Pulses
I	59	115	83	112
II	51	110	60	15
III	40	75	57	83
Total	150	300	200	300

Finance (Rs. In Lakhs)

Sl. No	Particulars	I	II	III	IV	V	Total
I	**Activities**						
1	**a.Improved production technologies for hybrid Maize** **b. Field days**	**3.54** **0.10**	**3.06** **0.10**	**2.40** **0.10**	- -	- -	**9.00** **0.30**
2	**Seed production** **Rice** **Blackgram**	 **0.06** **0.05**	 **0.15** **0.10**	 0.09 0.05	 -	 -	 **0.30** **0.20**
3	**Organic farming and IFS in rice**	**1.00**	**-**	-	-	-	**1.00**
4	**Soil testing**	**0.50**	**-**	-	-	-	**0.50**
5	**OFD and skill development**	**2.50**	**-**	-	-	-	**2.50**
6	**SRI in rice**	**11.50**	**11.00**	7.50	-	-	**30.0**
7	**Casuarina saucer planting method**	**11.62**	**8.40**	7.98	-	-	**28.0**
8	**Productivity**						

	enhancement in pulses **i. I crop (June – July)** **ii. II crop (Jan – May)**	**1.375** **1.425**	**1.325** **1.300**	1.050 1.025	-	-	**3.75** **3.75**
	Total				**-**	**-**	
II	**Out Sourcing**	**7.20**	**7.20**	**7.20**	**2.40**	**2.40**	26.40
III	**Contingencies**	**2.00**	**1.50**	**1.00**	**1.00**	**1.00**	6.50
IV	**Equipments**	**3.00**	-	-	-	-	3.00
	Total						

TOTAL BUDGET FOR PAMBAR

Sl.No	**Particulars**	**Physical**	**Financial (in lakhs)**
I	Activities		
1	**Improved production technology for Maize + 3 field days**	**150 ha**	**9.30**
2	**Quality seed production Rice and Black gram**	**70 ha**	**0.50**
3	**Demonstration of organic farming and IFS modal in Model villages**	**1 No**	**1.00**
4	**SRI**	**300 ha**	**30.00**
5	**Casuarina drip fertigation**	**200 ha**	**28.00**
6	**Production technology for pulses**	**300 ha**	**7.50**
7	**OFD and skill development**	**-**	**2.50**
8	**Soil testing**	**-**	**0.50**
	Sub Total		*79.30*
II	Out Sourcing for technical assistance		
1	**6 nos for first 3 years,** **2 nos for 4th and 5th year**	**9000 Salary +** **1000 FTA per Month**	**26.40**
	Sub Total		*26.40*
III	Contingencies		
	a. Vehicle hire charge for Scientists @ Rs.60000/yr		**3.00**
	b. Documentation and Reporting		**1.00**
	c., stationeries and publicity etc.,		**2.50**
	Sub Total		*6.50*
IV	Equipments Computer, Printer, Scanner, LCD, Copier, Digital moisture meter		3.00
	Sub Total		*3.00*
	Total		**115.20**
	Incentive 1% of the total cost		**1.15**
	Total		116.35
	Institutional charges @ 7.5 %		**8.73**
	Grand Total		125.08

Impact

- **Crop:** Rice
- **Technology:** SRI
- **Area under demonstration:** 300 ha
- **Area under adoption :** 1500 ha

- **Crop:** Black gram
- **Technology:** Improved production technologies in pulses
- **Area under demonstration:** 300 ha
- **Area under adoption :** 2500 ha

- **Crop:** Maize
- **Technology:** Improved production technologies in maize
- **Area under demonstration:** 150 ha
- **Area under adoption :** 600 ha

- **Crop:** Cassurina
- **Technology:** Saucer planting
- **Area under demonstration:** 200 ha
- **Area under adoption :** 1500 ha

Nodal Officer – IAMWARM
And Director (WTC)
TNAU, Coimbatore

Annexure

Activity chart - Improved crop production technologies with hybrid maize (150 ha) (Nov – Jan)

Name of the Tank	Area(ha)	Year				
		I	II	III	IV	V
Thamaraikanmai	10	4	4	2	-	-
Vengai	10	3	4	3	-	-
Murungi	10	4	3	3	-	-
Kannanur peviya	10	5	2	3	-	-
Oothu	20	10	5	5	-	-
Virachilai	10	5	5	-	-	-
Pattanam	15	5	5	5	-	-
Sengeerai	10	3	4	3	-	-
Pudu	10	5	3	2	-	-
Mangudi	10	3	4	3	-	-
Nallambal samithiram	15	5	5	5	-	-
Ethanadu	10	3	4	3	-	-
Thuriya	10	4	3	3	-	-
Total	**150**	**59**	**51**	**40**	**-**	**-**

Activity chart - Adoption and implementation of SRI system for rice cultivation (Sep - Jan)

Name of the Tank	Area(ha)	Year				
		I	II	III	IV	V
Kottaiyur periya	20	10	5	5	-	-
Kanakkan	20	5	10	5	-	-
Pudu	30	10	10	10	-	-
Kannanur periya	20	10	5	5	-	-
Mangudi	15	5	5	5	-	-
Ethanadu	25	10	10	5	-	-
Eadayar	50	20	15	15	-	-
Mayyanur	30	10	10	10	-	-
Embal	20	5	10	5	-	-
Kalabam	15	5	5	5	-	-
Adavathur	15	5	5	5	-	-
Sathyamangalam	10	5	5	-	-	-
Thiruppunavasal	10	5	5	-	-	-
Seyyanam	10	5	5	-	-	-
Alathur	10	5	5	-	-	-
Total	**300**	**115**	**110**	**75**	**-**	**-**

c. Activity chart

Introducing Casuarina saucer planting method in Pambar sub basin

Name of the Tank	Area(ha)	Year				
		I	II	III	IV	V
Kottaiyur periya	15	5	5	5	-	-
Kanakkan	20	10	5	5	-	-
Meli	15	5	5	5	-	-
Eadayar	15	5	5	5	-	-
Irumbanadu big	20	10	5	5	-	-
Meyyanur	15	5	5	5	-	-
Embal	6	2	2	2	-	-

Thiruppunavasal	10	4	3	3	-	-
Okkur	10	5	3	2	-	-
Velivayal	10	5	3	2	-	-
Amaradakki	15	5	5	5	-	-
Seyyanam	20	10	5	5	-	-
Alathur	15	5	5	5	-	-
Sakkavayal	10	5	3	2	-	-
Unjanai	4	2	1	1	-	-
Total	**200**	**83**	**60**	**57**	**-**	**-**

Blackgram 300 ha (I crop 150 ha (June –July))

Name of the Tank	Area(ha)	Year				
		I	II	III	IV	V
Elanjavur periya	10	4	3	3	-	-
Kottaiyur periya	15	5	5	5	-	-
Kanakkan	20	5	10	5	-	-
Meli	20	10	5	5	-	-
Kannanur periya	10	4	3	3	-	-
Oothu	10	3	4	3	-	-
Muthu kanmoi	10	4	4	2	-	-
Adayu	10	3	4	3	-	-
Itchi	10	4	4	2	-	-
Melapilaya	10	3	3	4	-	-
Ambal samithiram	10	4	3	3	-	-
Jeyamkondan	5	3	1	1	-	-
Enjavayal	5	2	2	1	-	-
Ettichery	5	1	2	2	-	-
Total	**150**	**55**	**53**	**42**	**-**	**-**

Blackgram (II crop 150 ha (Jan –May))

Name of the Tank	Area(ha)	Year				
		I	II	III	IV	V
Kottaiyur periya	10	4	3	3	-	-
Vengai	15	5	5	5	-	-
Pudu	15	5	5	5	-	-
Kannanur periya	20	10	5	5	-	-
Oothu	15	5	5	5	-	-
Durvasapuram periya	10	4	4	2	-	-
Muthu kanmoi	10	3	4	3	-	-
Mangala	10	4	4	2	-	-
Itchi	10	3	3	4	-	-
Melapilaya	5	3	1	1	-	-
Sengeerai	5	2	2	1	-	-
Melappan	5	2	2	1	-	-
Bragathambal samuthiram	5	2	2	1	-	-
Kalathur	5	1	3	1	-	-
Ettichery	5	2	2	1	-	-
Marungur	5	2	2	1	-	-
Total	**150**	**57**	**52**	**41**	**-**	**-**

IRRIGATED AGRICULTURE MODERNIZATION AND WATER RESOURCES MANAGEMENT PROJECT

PAMBAR - SUB-BASIN
I AMWARM
PROPOSAL

PUDUKOTTAI - DISTRICT

Assistant Director of Horticulture,
PUDUKKOTTAI

HORTICULTURE
WORLD BANK MULTI DISCIPLINARY IRRIGATED AGRICULTURE MODERNIZATION AND WATER RESOURCES MANAGEMENT PROJECT

I AM – WARM

Sub basin : Pambar
District : pudukottai
WRO Region : pudukottai
Blocks Covered : Thirumayam, Arimalam, Avudayarkovil Manamelkudi, Thirupathur, Kallal, Devakkottai, Kannankudi, Sakkottai,

I. Existing Horticulture Crop Scenario

The following horticulture crops are grown in the sub basin.

S.No.	Crop	Varieties	Area(in Ha)	Production (in M.T.)/ha	Productivity (in M.T.)/ha
A	**Vegetables**				
1.	Bhendi,	Arka Anamika,	40	400	10
	Brinjal,	Local, Annamalai	30	360	12
2.	Chillies	K1,K2,	26	26	1
	Total		**96**	**786**	

II. Existing Horticulture Practices:

Existing cropping pattern and Season :

1. Vegetables - June to September - (Adipattam)
2. Chillies – September to January, January to May

Proposed Generic Croping Pattern:

1. Vegetables - September – January.
2. Vegetables - February – May.
3. Chillies - September - January

Existing Irrigation Potential:

Out of the registered Ayacut area of 18886 Ha. the present irrigation potential is

Fully Irrigated	10209 Ha
Partially Irrigated	4807 Ha
Gap	3870 HA
	18886 Ha

Proposed Irrigation Facilities:

Out of 840 Ha. under Horticulture Crops, an area of 340 Ha. is proposed to cover micro irrigation with fertigation by the Agricultural Engineering Department (vide page number -)

INM & IPM :

None of the farmers adopting INM but few farmers are adopting IPM in pre project.

It is proposed to adopt INM in 100 Ha. under fruits and 240 Ha. vegetables.

1. Inputs:

a. Seeds:

Certified seeds and seeds of traditional varieties of vegetabl es are used by farmers at present. Many farmers use their own seeds and also exchange seeds among themselves. Few innovative farmers get the required seeds from the near by TNAU research stations, KVKs and private sources also.

It is proposed to procure Planting materials from the Government farms, Horticulture Research station. The Hybrid Seeds are available from the private sources and it will be procured and supplied to the farmers and under Tender acts.

b. Soil :

In Pambar sub-basin mostly the soil is red loam, sandy loam and alkaline soils with PH- ranging from 7 to 9 Soil is tested by soil testing laboratory at Kudumiamalai. Few farmers are practicing the STL recommendation and mobile soil laboratory at Kudumiamalai. The climate is mainly tropical in nature with the temperature ranges from 28 to 40 ºc and relative humidity ranging from 60.2 to 91%.

In view of the large number of soils samples proposed to be covered in the proposed intensive cropping pattern, private sources like Agri. Clini c, KVK services etc also will be utilized for testing.

c. Prevalence of Organic farming :

Organic farming is practiced by few farmers, less than 5 Ha.

It is proposed to cover 90 Ha. under Organic farming in chilies.

d. Actual extension service available for TOT - Government / Private.

Available extension officers - 1No

Horticulture Officer, Pudukkottai - 1 No

- Horticulture Officer, Aranthangi

Assistant Agriculture Officer

1) Thirumayam block	-	2nos
2) Arimalam block	-	2nos
3) Avudayarkoil block	-	2nos
4) Manamelkudi	-	2 nos
5) Karaikudi	-	2 nos.

Available extension officers and extension service to the farmers are inadequate. Apart from this NGOs providing extension service to the farmers.

Name of the NGO's :	**Place**
1) Rose	Arimalam
2) Ozone	Aranthangi

For transfer of latest farming techniques, many extension methods are being adopted. Besides distribution of inputs, required technical advice essential for the increased productivity are also given to the farmers. As per the Training and Visit program norms, there must be one Village Extension Worker (VEW) for every 800 to 1000 farm families. But such norms are not followed in reality due to vacancies at all levels of extens ion staff.

In view of the above, it is proposed to out source Technical Input Provider for 372 man months for 5 years according to the existing policy..

2. Practices - Ground realities :

a. Irrigation :

Irrigation is by open well and borewell. Mostly farmers are using ridges and furrow irrigation system. Only 25% of the farmers are using drip irrigation.

b. Micro irrigation :

There is lot of scope for developing Orchards in this sub-basin area by introducing Micro irrigation system.

Drip and sprinkler irrigation are proposed during the current year.

Out of 840 Ha. under Horticulture Crops, an area of 340 Ha. is proposed to cover micro irrigation with fertigation by the Agricultural Engineering Department (vide page number -)

S. No.	Crop	Area Proposed to Cover Under Drip Irrigation
A.	**Fruits plants**	
1.	Amla	100
B.	**Vegetables crops**	80
C.	**Spices**	
1.	Chillies	40
D	**Tree crops (casuarina)**	120
Total		**340**

c. Fertigation :

Farmers apply fertilizers directly. Awareness on Fertigation among the farmers is inadequate.

It is proposed to adopt INM in 100 Ha. under fruits

d. Contract farming :

Contract farming is not practiced in command area. Farmers are reluctant to adopt contract farming practice due to fluctuation in produce prices and for want of legal guarantee. However steps are being taken to convince to the farmers to take up contract farming atleast for commercial crops, to start with.

e. Pre & Post harvest practices adopted :

some quantity of Chillies is stored in cold storage at Mathur Village of Pudukkottai Dist.

f. Labour issues :

Many farmers use family labours in addition to hired labours by paying over wages. Skilled labours are more scarce than the un skilled labours.

3. Agri - Processing - Factories, Capacity, etc.

There is on processing centre for fruits and vegetables and fruits. There are ten regulated markets with two storage Godown, the fruits marketed through middle men to local markets of Pudukkottai and Trichi. Vegetables are markete d to local markets in Pudukkottai, Alankudi, Gandarvakottai, Ponnaravathy, and Keeranur.

The production of Vegetables and flowers (3930 MT) would be marketed at the terminal market proposed during this project (page no 7 of Agricu lture marketing project report). Staggered planting methods are recommended to the farmers to maintain price fall in Vegetables especially during peak period of harvest.

III. Constraints :

1. Constraints in Existing Scenario :
a. Soil :

1) Soil PH is slightly alkaline in about 30% of the area.
2) Less humus content
3)Shallow soil depth, low water holding capacity,

To overcome the problem soil, addition of organic matter has to be done based on soil test reports. Green manuring composting and application of Farm Yard Manure have to be increased.

b. Adverse climatic condition :

These blocks are drought prone. Rainfall is not distributed uniformly through out the year. Maximum rainfall is received during North East monsoon. Drought resis tant crops like amla and Sapota are suggested in this sub -basin.

c. Inferior quality of seed and planting material :

Farmers are using local and poor quality seeds. Truthfull seeds are used by very few farmers.

Quality planting materials are supplied through Department of Horticulture. There are two State Horticulture farms at Kudumiyanmalai, Vallathrakottai and Nattumangalm to supply the planting materials.

SL. NO	CROP	PRODUCTION CAPACITY			TOTAL PRODUCTION	TOTAL REQUIRMENT FOR THE SUB BASIN
		SHF Kudumiyanmalai	SHF Vallathrakottai	SHF Nattumangalm		
1	Amla	20000	20000	15000	55000	27500

The Hybrid Seeds and casuarinas TC plants are available from the private sources and it will be procured and supply to the farmers and under Tender acts.

d. Limited planting material available from government sources :

Required quantity of seeds is not available with department of Horticulture.

Seeds are supplied to the farmers by department after procuring the Hybrid Seeds through tender system.

e. Improper varieties :

Traditional varieties of vegetables are adopted by majority of the farmers. In some cases varieties of fruit plants were not true to type, hence purchased from vendors of unknown sources.

f. Improper irrigation practices(Ridges and Furrows, Basin irrigation)

Ridges and Furrows system is followed for Vegetables and Basin irrigation is followed for Fruits. Drip irrigation is going to be introduced by the Agriculture Engineering Department for 340 Ha.

g. Inadequate extension service :

Available extension officers to provide extension service to the farmers are inadequate. Apart from this, NGOs provide extension service to the farmers. More extension personnel are required.

Only 2 Horticultural Officers for Pudukkottai and Aranthangi Taluks and 10 Assistant Agriculture Officers are available in five Blocks. They are not sufficient event for the ongoing schemes of the Horticulture Department.

Hence to cater the need of Technical Input Providers for Thirumayam, arimalam, Avudayarkoil, Manamelkudi and Karaikudi blocks. It is proposed to hire TIP for 216 man months for 5 years.

h. Low price for produce :

There is price fluctuation for fruits and vegetables due to un organi zed marketing and inadequate storage facilities, Middleman are taking the major portion of the profit of the farmers. Farmers are cultivating same vegetables in a particular season year after year. So produce arrival to the market is heavy during particul ar season every year leading to low price.

The staggered planting methods recommended to the farmers will maintain price fall in Vegetables especially during peak period of harvest. It is recommended to plant early and late season varieties.

i. Poor adoption of Pre & Post harvest technologies :

Farmers are not following pre and post harvest technologies, this needs more attention.

1. **Chillies**

   - To prevent fruit drop spraying of NAA
   - Conventional sun drying
   - Inadequate of storage facilities
   - Lack of processing units

2. **All fruits and vegetables**

   - Grading
   - Processing
   - Packing
   - Refrigerated vans for transport

     Awareness should be created among the farmers in pre and post harvest techniques by giving training to the farmers.

j. Limited availability of Credit facilities :

Credit facilities are available through primary Agriculture Cooperative Banks and Nationalized banks. However to avail these facilities many formalities has to be gone through. Hence simplification of procedure and single window system is essential.

k. Risk aversion

Few farmers have the knowledge of Risk aversion. However many farmers have poor knowledge on this, due to non visit to Horticulture depots and Departmental officers often. Due to lack training, lack of capacity building, etc awareness of the new technologies in cultivation of crops and price trend of the produces at various levels are low.

l. Limited processing units :

Processing units available is limited in the sub-basin. Required type of processing unit for the required crop is not available. There is no processing unit available for processing fruits.

m. Availability of labour

Labour availability is in decreasing trend for agriculture works, due to availability of non agricultural works which pays more wages to the labourers.

IV. Diversification / Future vision proposed :

S. No	Components	Physical target in Hectares						Production MT	Productivity MT	
		I Year	II Year	III Year	IV Year	V Year	Total		EXISTING	PROPOSED
I.	**AREA EXPANSION**									
A.	**Fruits plants**									
1.	Amla	25	50	25	-	-	100	800	5	8
	Total	25	50	25	-	-	100	800	5	8
B.	**Vegetables crops**									
1.	Hybrid brinjal	15	10	15	-	-	40	1000	10	25
2.	Hybrid Bhendi	25	40	45	-	-	110	2200	15	20
	Total	40	50	60	-	-	150			
C.	**Spices**									
1.	Chillies	40	30	20	-	-	90	135	1	1.5
	Total	40	30	20	-	-	90			
D.	**Tree crops**									
1.	Casurina	100	100	100	100	100	500	125000	170	250
	GRAND TOTAL	205	230	205	100	100	840			

PAMBAR sub-basin , Pudukkottai
Places of Diversification of crops are furnished as follows

Sl. No.	Crops	Area increased in ha during W.P.	Places of diversification
I	**Fruits.**		
1.	Amla (NA -7 Kanchen, Krishna)	100	Thirumayam, Arimanam,
II.	**Vegetables**		Thirumayam, Arimanam, Sakkottai,
1.	Brinjal (Ravaya)	40	Thirumayam, Arimanam, sakkottai
2.	Bhendi M10	110	Thirumayam, Arimanam, sakkottai
III.	**Spices**		
1.	Chillies(k1,k2)	90	Thirumayam, Arimanam, sakkottai, Koluvanar.
IV.	**Tree Crops**		
1.	Casurina	500	Thirumayam, Arimanam, sakkottai, Koluvanar,Avudiyar koil, Manamelkudi, & Karaikudi,
	Total	**840**	

V. Challenges thrown up by diversification /area expansion :

1. Judicious Utilization of water.

WRO should ensure quality and required quantum of irrigation water especially during the sowing season and the peak period of water requirement for each crop till harvest. Water can be judicially utilized by adopting micro irrigation and mulching techniques.

2. Identification of suitable crops/ varieties.

The crops, cropping pattern proposed in this project are suggested based on the micro climatic suitability market trend, soil type and based on the choice of the farmers(WUA) / FA.

3. Production of quality / quantity planting materials.

Timely supply of good quality and required quantity of pedigree planting materials that will be made available from the State Horticulture Farms and quality Hybrid seeds should be made available through the horticulture depots.

4. Farmers acceptability for new crops.

On farm training at the successful / progressive farmers fields, training, meetings, motivation campaigns, should be conducted. Publicity and propaganda to be taken up.

5. Lack of transfer of technology

Transfer of latest farming techniques, distribution of inputs, technical advice should be given to the farmers through the extension personnel. Now the existing extension personal is inadequate. Hence out sourcing technical input provider is the only solution.

6. Strengtherning of Horticulture information centers

Information Education and communication facilities should be strengthened. Required training should be given to the extension personal and field level workers. The infra structure facilities should be strengthened at sub basin level as well as project cell.

VI. Solutions and Recommendations

1. Soil reclamation :

i) Soil reclamation will be made as per the recommendations STL.
ii) Mulching, addition of organic manure.

2. TIP (Technical Input Provider) - Agri clinic :

i) Extension service should be provided to the farmers at 100 ha/TIP.
ii) The problem of inadequate TOT due to in sufficient in extension personnel can be overcome by employing TIP. Outsourcing of tip for 132 man months for 5 years period is proposed in this project.

	I YEAR	II YEAR	III YEAR	IV YEAR	V YEAR	TOTAL
TARGET /YEAR(HA)	205	230	205	100	100	840
Number of TIP	2	3	3	1	1	
LOCATION	Thirumayam Arimalam	Avudaiyarkoil Manalmelkudi	Sakkottai Aranthangi	Embal	Avudaiyarkoil	
MANMONTHSPER YEAR	24	36	36	24	12	132

3. Staggered Planting :

Farmers can be advised on phased planting and long and short duration varieties and off season planting.

4. Mulching, Micro - irrigation :

Efficient water usage by adoption of micro irrigation and mulching.

5. Identification of crops & Varieties suitable for drought.

The crops with low water requirement like mango, Guava etc. are identified for this sub basin.

SL.NO	NAME OF THE CROP	VARIETIES	SOURCE
1	Amla	NA -7 Kanchan, Krishna	SHF, Kudumiyanmalai, vallathirakottai, Nattumangalm

6. Consultative process undertaken in the sub basin :

The walk through survey was conducted on 12.08.2006, 14.08.2006 in the entire Pambar sub basin. Discussion was held on14.08.2006 with farmers and their requirement was heard. Then after discussion among the officers the decision taken up, accordingly the cropping pattern revised and updated .

7. Stakeholders demands (List)

i. Instead of local variety farmers demanded hybrid variety of vegetables and quality seeds.
ii. Demand for micro irrigation.
iii. Latest technology transfer - production technology and post harvest technology.
iv. Inputs for organic farming.
v. Credit facilities
vi. Processing unit for preserving vegetables and fruits.
vii. Need technical advise,
viii. Need market information centre.

8. Marketing intervention proposed with reference to identified constraints :

S.No.	Constraint & Challenges	Counter Measures
1.	Problem soil Existing capacity of the STL at Kudumiyarnmalai is 20000	To overcome the problem soil, the farmers are advised to take up soil sampling and soil testing. Existing capacity of the STL at Kudumiyarnmalai is 20000. Measures to be taken up to augment the organic content of the soil. The crops like Mango and Guava which can come up in all kinds of soil are suggested in this sub-basin.
2.	Adverse climatic condition :	Drought resistant and high yielding crops of Amla is suggested in this sub-basin.
3.	Inferior quality of seed and planting material Farmers are using local and poor quality seeds. Truthfull seeds are used by the meager farmers	Quality planting materials supplied through Department of Horticulture. There are three State Horticulture farms available at Kudumiyanmalai, vallathirakottai, Nattumangalm to supply the planting materials. The Hybrid Seeds and Casurina TC Plants available from the private sources and it will be procured and supply to the farmers and under Tender acts.
4.	Limited planting material available from government sources	Seeds are supplied to the farmers by department after procuring the Hybrid Seeds through tender system.
5.	Improper irrigation practices(Ridges and Furrows, Basin irrigation).	Drip irrigation and fertigation is going to be introduced by the Agriculture Engineering Department for 340 Ha.
6.	Inadequate extension service :	To cater the need technical input providers are proposed to be hired for 216 man months for 5 years.For every 100 Ha of area increase one TIP is proposed
7.	Low price for produce :	Staggered planting methods recommended to the farmers will maintained price fall in Vegetables especially during peak period of harvest. It is recommended to plant early and late season varieties.
8.	Poor adoption of Pre & Post harvest technologies :	Awareness should be created among the farmers in pre and post harvest techniques by giving training to the farmers.
10.	Risk aversion	Training should be given to the farmers on new techniques.
11.	Limited processing units :	Entrepreneurs should be motivated through training and seminars to start

		new processing units. Seeking new market for the produces eg for Amla and Vegetables.
12.	Availability of labour	Farm mechanization is essential. Providing farm machineries for drudgery reduction, weeding, spraying, to the WUA is needed.

PROJECT ON DEVELOPMENT OF HORTICULTURE CROPS IN PAMBAR SUB-BASIN

Fin in Rs. **Physical In Ha**

S. No	Components	Fin in Rs.			Physical target in Hectares					
		Unit cost	Assistance 75%	25% share by farmers	I Year	II Year	III Year	IV Year	V Year	Total
I.	**AREA EXPANSION**									
A.	**Fruits plants**									
1.	Amla	30000	22500	7500	25	50	25	-	-	100
	TOTAL				25	50	25	-	-	100
B.	**Vegetables crops**									
1.	Hybrid brinjal	30000	22500	7500	15	10	15			40
2.	Hybrid Bhendi	30000	22500	7500	25	40	45	-		110
	TOTAL				40	50	60	-		150
C.	**Spices**									
1.	Chillies	15000	11250	3750	40	30	20	-		90
	TOTAL				40	30	20	-		90
D.	**Tree crops**									
1.	Casurina	30000	22500	7500	100	100	100	100	100	500
	TOTAL				100	100	100	100	100	500
	GRAND Total				205	230	205	100	100	840

PROJECT ON DRIP IRRIGATION FOR HORTICULTURE CROPS

S.No.	Crop	Area Proposed to Cover Under Drip Irrigation	Implemented by
A.	**Fruits plants**		AGRICULTURAL ENGINEERING DEPARTMENT (PAGE NO)
1.	Amla	100	
B.	**Vegetables**	80	
C.	**Spices**		
1.	Chillies	40	
D	**Tree crop**	120	
Total		**340**	

PROJECT ON INM / IPM

S.No	Components	Fin in Rs.		Physical target in Hectares					
		Unit cost	Assistance 100%	I Year	II Year	III Year	IV Year	V Year	Total
A.	**Fruits plants**								
1.	Amla	1000	1000	25	50	25	-	-	100
	TOTAL			25	50	25	-	-	100
B.	**Vegetables crops**								
1.	Hybrid Brinjal	1000	1000	15	10	15	-		40
2.	Hybrid Bhendi	1000	1000	25	40	45	-		110
	TOTAL			40	50	60	-		150
	GRAND Total			**65**	**100**	**85**	**-**		**250**

PROJECT ON ORGANIC FARMING

S.No	Components	Fin in Rs.	Physical target in Hectares					
		Financial proposal already given in area expansion programme	I Year	II Year	III Year	IV Year	V Year	Total
C.	**Spices**							
1.	Chillies		40	30	20	-	-	90
	Total		40	30	20	-	-	90

PROJECT ON DEVELOPMENT OF HORTICULTURE CROPS IN Pambar SUB - BASIN

Fin in Lakhs **Physical In Ha**

S.No.	Components	Estimated cost	Financial in lakhs					Total (in lakhs)
			I Year	II Year	III Year	IV Year	V Year	
I.	**AREA EXPANSION**							
A.	**Fruits plants**							
1.	Amla	30000	7.50	15.00	7.50	-	-	**30**
B.	**Vegetables crops**							
1.	Hybrid Brinjal	30000	4.5	3.00	4.50	-	-	**12.00**
2.	Hybrid Bhendi	30000	7.5	12.00	13.50	-	-	**33.00**
C.	**Spices**							
1.	Chillies	15000	6.0	4.50	3.00	-	-	**13.50**
D.	**Tree crop**							
1.	Casurina	30000	30.00	30.00	30.00	30.00	30.00	**150.00**
	Total		**55.5**	**64.5**	**58.50**	**30.00**	**30.00**	**238.50**
II - 1	**Extension support @ Rs.**	96000	1.92	2.88	2.88	1.92	0.96	10.56

	8000/- per month. (216 man months for 5 years)							
2	Advertisement	24000	0.24	0.24	0.24	0.24	0.24	1.20
3	Hiring computers	5000	0.5	0.50	0.5	0.5	0.5	2.50
	Total		**2.66**	**3.62**	**3.62**	**2.66**	**1.70**	**14.26**
III	**Organic farming**	Amount already proposed in area expansion programme.						
IV	**INM / IPM**	1000	0.65	1.00	0.85	-	-	2.50
V	**Micro irrigation**	Implemented by Agricultural Engineering Department.						
	Overall Total		**58.81**	**69.12**	**62.97**	**32.66**	**31.70**	**255.26**

Pampar sub-basin , Pudukottai.
Places of Diversification of crops are furnished as follows

Sl. No.	Crops	Area increased in ha during W.P.	Places of diversification
I	**Fruits.**		
1.	Amla.NA-7,kanchan)	100	Thirumayam, Arimanam,
II.	**Vegetables**		Thirumayam, Arimanam, sakkottai
1.	Brinjal(Ravaya.	40	
2.	Bhendi M10	110	Thirumayam, Arimanam, sakkottai, Koluvanar.
III.	**Spices**		
1.	Chillies(k1,k2)	90	Thirumayam, Arimanam, sakkottai, Koluvanar,Avudiyar koil, Manamelkudi, & Karaikudi,
IV.	**Tree crop**		Thirumayam, Arimanam, Sakkottai,
1.	Casurina	500	Thirumayam, Arimanam, sakkottai
	Total	**840**	

Pambar sub-basin , Pudhukottai.
Technologies Proposed under Horticulture.

S. No	Technology / Practices	Existing output tons/ha	Area proposed in ha	Proposed output tons/ha	Percentage of increase	Budget out lay Rs. in lakhs.
I	**Varietal Diversification, micro irrigation, INM in fruits.**					
1.	Amla(NA-7, Krishna Kanjan)	8	100	12	60	30.00
II.	**Varietal Diversification, micro irrigation, and IPM in Vegetables**					
1.	Brinjal(Ravaya)	25	40	60	108	12.00
2.	Bhendi M10	15	110	20	33	33.00

III.	**Varietal Diversification, micro irrigation, Organic farming in Spices**					
1.	Chillies(k1,k2)	1	90	1.5	50	13.50
IV.	**Varietal Diversification, micro irrigation in Tree Crops**					
1.	Casurina(Jungniana)	170	500	250	47	150
	Total	**219**	**840**	**343.5**	**298**	**238.5**

Pambar sub-basin , Pudukkottai.

REQUIREMENTS OF INPUTS

S. No	Name of the component	Varities	Area in ha	Seeds and plants require - ment/Ha.	Total Require ment	Source of Planting material
I	**Varietal Diversification in fruits.**					
1.	Amla	NA-7, Krishna Kanjan	100	275	27500	SHF, Kudumiyanmalai, vallathirakottai, Nattumangalm
II.	**Vegetables**					
1.	Brinjal	Ravaya	40	0.200	8.00	Private source through tender
2.	Bhendi	M10	110	4kg	440	Private source through tender
III.	**Spices**					
1.	Chillies	K1,k2	90	1Kg	90	NHRDF, Dindhugal, Horticulture research station, periyakulam.
IV.	**Tree Crops**					
1.	Casurina	Jungniana	500	4400 Nos	22 lakhs	Private source through tender

OUTCOME OF THE PROJECT

SL.NO	DETAILS	WITHPUT PROJECT	WITH PROJECT	% INCREASE
1	**Area in Horticulture crops(Ha)**	**96**	**840**	**875**
2	**Introduction of micro irrigation(Ha)**	**0**	**340**	**340**
3	**Introduction of IPM/INM(Ha)**	**0**	**250**	**250**
4	**Introduction of Organic Farming(Ha)**	**0**	**90**	**90**
5	**Average Increase in Production (MT)**	**44**	**69**	**156**

FISHERIES PROPOSAL

PAMBAR SUB-BASIN

The Sub basin has 280 WRO tanks. It is estimated that about 100 tanks suitable for aquaculture which retains water for 4 to 6 month and the total water spread is 4000 ha. Potential water spread area for the purpose of aquaculture is taken at 50% of WSA. The tank receives water during North East monsoon. The present estimated fish production is about 50 kg/ha/year. The fishery of the tanks are dominated by uneconomical species like Tilapia, Cobius SP, minor carp, cat fish, and air breathing fishes. Only few tanks are utiliz ed for composite fish culture using fast growing carps.

Fisherman cooperative societies are available and the members are mostly engaged in capture fisheries. There is no private or Government fish seed farm located within the sub basin.

Considering the above existing scenario the following proposals are made for the inland fisheries development of the basin.

1. **Fish seed bank:**

Availability of advanced fish fingerlings is crucial in promoting aquaculture in the sub basin since the carp breeding season do not synchronize with receipt of water in the tanks. Hence to make available quality carp seeds in the Sub basin itself one fish seed banks is proposed which shall be owned and operated by WUA or members of Fishermen Co - operative society.

The seed bank with a total water spread area of 600m^2 shall have an output of 3 lakh fingerlings per year. The fingerling output of about 6 lakhs per year from the two seed bank will meet the fish seed requirement of 300 ha of effective WSA of the basin. Estimated table fish production the rate 300kg/ha of WSA is 900 tonnes.

The investment cost for one seed bank is 14.5 laksh (DPR proposed by Engineering wing Fisheries department). The operational cost for one year per bank is 58000/-

FISH SEED REARING IN CAGES:

Fish seed raring in net cages is an effective and simple technology. One unit of cage shall have 3 types of cages. Cages will be fixed in tanks having water depth of more than 5 feet and fish seed reared from early fry to advanced fingerlings. It is proposed to

introduce 10 cage units to be operated and managed by WUAs OR Fishermen Co -operative Societies. The investment cost is Rs.14,000/ -per unit and operational cost per year/3 cycles is Rs.16,000/- per unit. The estimated production of advanced fingerling from the 10 cage unit is 6 lakh/annum. A net revenue of Rs.32,000shall be generated by operation a single unit of cage. This shall be the stocking material for 600ha of effective water spread in this sub basin. Anticipated table fish production is 300kg/ha and the total production will be 180 tonnes/year.

3. **AQUACULTURE IN FARM PONDS:**

Farm Ponds are excavated in the farmers field as a rain water harvesting storage, and as a source of critical irrigation. The Agricultural Engineering Dep artment is identifying the geographic location and execute the excavation. As a source of additional income generating activity aquaculture will be promoted by providing aquaculture inputs like seed, feed etc. To make the pond retain water for a reasonab le period of time (>4 months) a clay layer of about 20cm will be provided on the pond bottom to avoid seepage. The total estimated cost of aquaculture input for one farm pond is Rs. 16,500/ - and 40 farm ponds will be brought under aquaculture. One of the farm pond having ground water source will be utilized/encouraged to rear stock size fish seed (about 50g) which will serve as stocking material to farm ponds. The fish production in Farm Pond will be 600Kg/crop and the anticipated net revenue is about Rs. 10,000/-.

4. **SUPPLY OF FISHING IMPLMENTS;**

The post project scenario with good quality seed materials is expected to produce about 450 tonnes of fish in the Sub basin. For harvesting this fishery effectively fishing implements (Drag net) shall be provi ded to Fisherman Co-Operative Societies in the sub basin. Ten drag net @
Rs. 20,000/- each is the cost provided

5. **TRAINING AND CAPACITY BUILDING**

IAMWARM Project's target groups are mainly the WUA who are agriculturist with little knowledge on aquaculture. Hence training and capacity building on fish seed rearing, culture etc. is highly essential. The IAMWARM project training component shall lay emphasis on planning the aquaculture training.

CONCLUSION;

- The total fish fingerlings estimated to be produced from the one seed bank and ten cage unit is about 9 lakhs.
- This will be the stocking material for 900 ha of effective water spread area of the Sub basin. In two years fish culture will be covered / demonstrated in 1800 ha. of effective WSA covering about 100 tanks.
- Private investors will be attracted to invest in fish seed rearing units.
- Agriculture farmers shall get an additional income of about Rs.10000/- from aquaculture in farm ponds.

Vision:

1. Increase in overall fish production and unit prod uction.
2. Seed requirement of the Sub basin to be met locally.
3. Additional livelihood and income to agricultural farmer from farm ponds.
4. Increase in per capita consumption of fish.
5. Reduced % of mal-nutrition especially among rural children.

ABSTRACT

Parculars	No. of Unit	1st Year	2nd Year	3rd Year	4th Year	5th Year	Total
PAMBAR							
Fish seed Bank	1		14.5		0	0	14.50
Operational cost			0.58	0.58			1.16
Fish Seed rearing in cages	10		0.7	0.7			1.40
Operational cost			0.8	0.8			1.60
Aquaculture in farm ponds	40		3.3	3.3			6.60
Fishing Implements	10		1	1			2.00
Vehicls Hire charges		0.4	0.4	0.4	0.4	0.4	2.00
Documentation		0.1	0.1	0.1	0.1	0.1	0.50
Total		0.5	18.35	5.15	3.45	1.9	**29.76**

DETAILS FOR ONE UNIT - FARM POND.

A. Fixed Cost

1. Pond (available)	-	NIL
2. Improvement to pond by providing clayey layer	-	5,000.00

B. Operational Cost (in Rs.)

1. Lime	-	250.00
2. Manure	-	750.00
3. Stock size fish seed @ Rs. 3/- per seed	-	3,000.00
4. Feed (Rs. 4/- per kg of RB 6000 kg Rs.12/- per kg of Goc 300 kg)	-	6,000.00
5. Harvesting and Miscellaneous	-	1,500.00
TOTAL		11,500.00

C. Returns

By Sale of 600 kg of fish @ Rs. 35/- per kg	-21,000.00	
(Gross Profit) – (C-B)		- 9,500.00

Fish Seed Bank (production and Selling)

Water Spread Area	Sq.m	600			
Culture Period	months	50 to 60 days per cycle. Totally 3 cycles			
Depth of Water	meter	1.0 meter			
-		**With Project**			
	Units	Quantity	Financial Unit Price (Rs)	Financial Value (Rs/Pond)	Economic Value (Rs/Pond)
INPUTS, Fixed costs					
Nursery construction (Masonry)	LS	130000	1	1300000	1170000
5 HP Motor cost	LS	20000	1	20000	18000
Pumpshed/pipeline	LS	50000	1	50000	45000
Equipments-Nets/Velon/screen	LS	50000	1	50000	45000
Electricity Service Connection	LS	30000	1	30000	27000
				1450000	**1305000**
INPUTS, Recurrent costs					
Lime	Kg	200	5	1000	900
Cowdung	Ton	1.0	1000	1000	900
Fish early fry	Lakh No			0	
Catla/Rogu/Mirgal	Lakh No	6	1000	6000	5400
Common carp	Lakh No	3	1000	3000	2700
Feed Mix	Kg	3000	10	30000	27000
Electricity	LS	6000	1	6000	5400
Rice polish	Kg	0	6	0	
Labour	LS	100	100	10000	9000
Prophylactic measures	LS	1000	1	1000	900
Sub Total	**Rs**			**58000**	**52200**
OUTPUT					
Percentage of recovery Fish fingerlings, 7.5 cm each					
Catla/Rogu/Mirgal	%	40%			
Common carp	%	20%			
Fish production					
Catla/Rogu/Mirgal	Lakh No	2.4	80000	192000	172800
Common carp	Lakh No	0.6	80000	48000	43200

Gross Income	**Rs**		**240000**	**216000**
Net Income	**Rs**		**182000**	**163800**
INCREMENTAL NET INCOME	**Rs**		**182000**	**163800**

Fish Seed Cages

Cages Required	cum	40
Culture Period	months	45 days per cycle. Totally three cycles
Depth of Water	meter	1.5 meter

-		With Project		
	Units	Quantity	Financial Unit Price (Rs)	Financial Value (Rs/Pond)
INPUTS, Fixed costs				
P40 (10*4*1 meters)	40 cum	1	4500	4500
P16 (10*4*1 meters)	40 cum	1	4000	4000
P 8 (10*4*1 meters)	40 cum	1	3500	3500
Materials (casuarina/wires/buckets)	LS	1	2000	2000
				14000
INPUTS, Recurrent costs				
Fish early fry	Lakh No			
Catla/Rogu/Mirgal	Lakh No	2.00	1000	2000
Common carp	Lakh No	1.00	1000	1000
Feed Mix	Kg	1000.00	10	10000
Labour	LS	20.00	100	2000
Other unforseen expenditure	LS	1000.00	1	1000
Sub Total	**Rs**			**16000**
Procurement/storage/selling				
OUTPUT				
Percentage of recovery				
Advance Fish fingerlings, 7.5 cm each				
Early fry to late fry	%	50%		

Late fry to Fingerlings	%	70%		
Fingerlings to advanced fingerlings	%	60%		
Advance Fish fingerlings production	Lakh No	0.63	80000	50400
Gross Income	**Rs**			**50400**
Net Income	**Rs**			**31800**
INCREMENTAL NET INCOME	**Rs**			**31800**

Government of Tamilnadu
Public Works Department

Water Resources Organisation

Proposal for Environmental activities

Name of work: ENVIRONMENTAL MONITORING ON WATER and SOIL QUALITY and CREATING AWARENESS & UPDATING OF " ENVIRONMENTAL AND SOCIAL ASSESSMENT REPORT" FOR PAMBAR RIVER SUB BASIN.

EST.RS.25.00.LAKHS.

Water Resources Organisation, PWD,
Environmental Cell Division,
Madurai.

INDEX

Name of work: Environmental Monitoring on water and soil quality and creating awareness & updating of " Environmental and Social Assessment r eport" for Pambar river sub-basin.

Estimate Cost Rs 25.00Lakhs

INTRODUCTION:

Under TNWRCP, with World Bank assistance, special emphasis was given for the first time in WRO, to assess the environmental status and degradation caused for all River basins in Tamilnadu. Accordingly, in these River basins, Environmental impact on the quality of surface and Ground water and Soil was studied by collecting water & soil samples and testing them; Micro level Environmental Status Reports for all the River ba sins were prepared and World Bank provided assistance for these works up to March 2004.

Also few Awareness programs & Workshops were conducted to create awareness on the Environmental issues & remedies among the public, farmers, Govt. officials and NGOs; Seminars were conducted to find out new techniques and methods developed recently to solve Environmental problems.

Now under IAMWARM project, focus is at each sub basin level to identify and prioritize the requirements for improvements to storage structu res, rehabilitation, new schemes for water harvest, and diversification of crops. Any new schemes or rehabilitation of existing one, consideration of the environment issues pertaining to that area and remedial action to overcome the problems is must.

DESCRIPTION OF SUB BASIN:

Pambar river originates from the surplus course of the Thamarai Kanmoi in Thirumayam taluk of Pudukottai district and traverses through the Districts of Sivaganga and Ramanathapuram and finally conflunce with Balk Strait between Eanathi and Sundarapandian pattinam of Thiruvadanai taluk.

Kottakudiyar, Thenar and Manimuthar are three major tributaries which joins with the Pambar. The total length of Pambar River from its origin to confluence is 71 kms.

Environmental problems:

INDUSTRIAL POLLUTION:

There are no major industries situated in this sub basin. The effluent discharge is minimum and meager. The details of Industries and their effluent discharge are given in Annexure-III.

CATCHMENT DEGRADATION:

Forest cover in the basin is below 10% of the basin area which is Quite inadequate . the area has to be increased substantially by taking up Afforestation..Check dams have to be proposed, at closer intervals to minimizing the bed erosion . However, Afforestation measures have to be proposed by the Forest Department

.

SOLID WASTE DISPOSAL:

There is no organised scientific method of disposal in all the Municipalities, town and Village Panchayats. The garbage is dumped in the basin area and hence the harmful chemical substances of the landfill seep through and reach the ground water reservoirs and contaminate these sources...

. The details regarding quantity of garbage, places where they are dumped are given in Annexure-II

Scheme for Solid waste Management plan is under implementation by Rural Development Department. Under this scheme, collection tank for disposable and undisposable garbage have been constructed. But in most of the panchayats, recycling the waste and converting the solid waste into manure and production of energy is yet to come up. Hence motivating the local bodies for proper implementation of solid waste management project is must.

SWAGE DISPOSAL LET INTO WATER BODIES **:**

Treatment of sewage and arrangements for safe disposal arrangements has not been provided in most of the Villages. Under ground drainage ar rangements have not been provided even in municipalities and town panchayats. Coastal villages discharge the sewage directly into sea. This sewage is washed away and got ponded in the backwaters and unhealthy conditions exit.

The locations of disposal of sewage directly let into water bodies in this sub basin are furnished in Annexure III.

So, creating awareness among the presidents of the local bodies is must and to motivate them to adapt Solid waste manage ment and Sewage management, Wherever required, workshop including field visits, exclusively for them is to be conducted under the IAMWARM project.

WATER WEEDS:

Juliflora has invaded the cultivable lands in lower reaches and water bodies' ie.tanks, channels and rivers. The area of coverage in the water bodies can be any where near 3100 Ha. and. Hence, these plants need to be eliminated totally for the conserving precious water resources. But on the contrary, in some villages local people desire to grow th is plant in the water spread area of the tanks. Once in 4 or 5 years they get cutting order from the revenue authorities, sale the Juliflora or coal produced from it and keep the money for the common expenses like court case for the litigation with the nea rby villages, temple repair and Local festivals etc. This is on account of lack of guidance and ignorance of its ill effects. Hence, this problem has to be addressed in all forms, wherever possible Bio gas plant has to be promoted.

GROUND WATER QUALITY:

From the chemical composition data for the observation wells, the ground water in the lower reaches of sedimentary formation is of moderate quality. In some areas of Aranthangi and Thiruvadanai Taluks the TDS in water exceeds 2000 ppm, which limits its use for internal consumption.

ACTIVITIES PROPOSED:

To monitor the quality of water and soil and create database regarding the Environmental Status for each sub basin, this proposal has now been proposed with the following activities at sub basin level. The provisions and necessity are explained below.

I. *Collection and Testing of Water and soil samples.*

Water samples were collected from three locations and tested in Kottakkariar river basin from December 2002. This has now proposed to continue for a period of three years at the following places to Asses the Environmental impact on the quality of surface water in this kottakkariar river sub-basin.

1. *Thamarai Kanmoi at Thirumaiyam.*
2. *D/S of bridge near Naranamangalam.*
3. *At Thirupunavasal*

It is proposed to collect water samples once in 3 months during the period of three years for assessing the quality. In addition to the above identified three locations, water samples will also be collected once in a year from tanks and near by wells in five villages where sewage is directly let into tanks, channels and tested to asses the impact on the quality of surface and ground water in this Sub basin as good and long-range data without any brake will be useful to understand the problems more precisely.

Soil samples are to be collected from selected locations to Asses the impact on the quality of soil due to various Environmental problems like use of chemical fertilizer and using the polluted water. Even from the same locations more number of samples at regular one-year interval have to be collected and tested to determine precisely the impact on the degradation of the quality of the soil. Therefore testing soil samples are essential. Soil samples will be collected and tested once in a year and will be tested in the Agricultural college. Under this item following provisions have been made

II.Environmental Social Knowledge base, Analysis and Development

Under the IAMWARM Project, Environmental cells are expected to be func tioned as Environmental Social cell. Hence village level data on Environmental and Social aspects have to be collected and analysed by an expert and reporting has to be done.

***II. Transfer of Technical Know how for solid waste management system including s ource segregation, recycles of dry waste and linkage with user agencies* :**

Scheme for Solid waste Management plan is under implementation in all Municipalities and major panchayats. Under this scheme, collection tank for disposable and non-disposable garbage have been constructed in most of the Panchayats. But, recycling process for converting the solid waste into manure and production of energy are yet to come up.

Hence, Demonstration and action programs are planned with user agencies and field visits a re programmed to transfer Technical know how for the proper implementation of Solid waste management system to avoid pollution of water resources. More over to promote Herbal Garden, it is programmed to form herbal Garden in Institution

III. Conducting Environmental and social Awareness meeting, Programme demonstration and Exhibitions on various Environmental and social related issues including capacity building:

Awareness Programs are necessary to create awareness among the public about Environmental aspects and the action to be taken by them to remove or reduce the impacts due to the Environmental problems. So far, one awareness Programs was conducted in this basin at Thirumaiyam.

Hence, to create and motivate the people, awareness programmes are to b e conducted in the villages where sewage is directly let into water bodies. This has now proposed to conduct 21 Awareness Meeting in School/ Institutions and 9 Nos. of awareness programs during the study period of three years covering the following subject s in addition to Placing Stickers, Tin sheets, Pham lets and Placing banner containing messages about Environmental Awareness.

- ***Sanitation.***
- ***Solid waste treatment.***
- ***Sewage treatment and converting the same into Gas***
- ***Organic farming.***
- ***Conversion of aquatic weeds into manure etc***

Total Cost.

The total cost works out to ***Rs: 25.00 Lakhs (Rupees Twenty Five Lakhs only)***