GOVERNMENT OF TAMIL NADU

WATER RESOURCES ORGANISATION

PUBLIC WORKS DEPARTMENT

REHABILITATION AND MODERNISATION OF ANICUTS , FLOOD BANKS, SUPPLY CHANNELS AND ALL TANKS COVERD BY VARAHANADHI S UB BASIN

UNDER

IRRIGATED AGRICULTURAL MODERNISATION AND WATER RESOURCES MANAGEMENT (IAMWARM) PROJECT

DETAILED PROJECT REPORT

PROJECT COST :- 5200.81Lakhs

DPR VARAHANADHI
(Executive Summary)

INTRODUCTION

The World Bank during the mission in October 2005 indicated that the irrigation modernisation project should be taken as Irrigated Agricultura l Modernisation and Water Resources Management Project (IAMWARM). This multi faceted approach will not only increase the agricultural productivity, it will also expect to yield holistic benefits to the farming community.

SCOPE OF THE PROJECT

Varahanadhi Basin is having only one reservoir to the capacity of 605 Mcft and it is highly dependent on non-system rainfed and chain of tanks. The irrigation tanks of this basin have served excellently for the past century. The efficacy of the tank irrigation is det eriorating day by day due to the sedimentation, lack of maintenance of the tank. The Water Resources Organisation will modernise the irrigation facility and expected to harness the fullest benefit from the available water potential.

In this project, the irrigation facilities like System tanks, Non-system tanks and Anicuts of the basin under the control of Water Resources Organisation P.W.D., are proposed to be modernised. The registered ayacut under WRO is 22215 Ha..

The Water Resources Organisation wit h the integration of the following Line departments is proposes to take up the Irrigated Agricultural Modernisation and Water Resources Management Project (IAMWARM) for Varahanadhi Basin,

1. Agriculture Department
2. Agricultural Engineering Department
3. Tamil Nadu Agricultural University
4. Horticulture Department
5. Agricultural Marketing and Agribusiness Department
6. Animal Husbandry Department
7. Fisheries Department
8. Ground Water
9. Forest Department
10. Environmental Department

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 is expected to increase on implementation of the project.

DESCRIPTION OF THE BASIN

The Varahanadhi basin is one of the major river basins and is located in Villupuram, Thiruvannamalai, Kancheepuram and Cuddalore districts of Tamil Nadu and Pondicherry. Varahanadhi Basin consists of Varahanadhi , Ongur and Nallavur Sub Basins.

Varahanadhi Sub Basin is the largest sub basin among the above three sub basins which is now taken up for the modernization and rehabilitation under IAMWARM project.

The total geographical area of the basin is 2250.00 sq.km. The Varahanadhi sub basin is surrounded by Bay of Bengal in the east, Palar basin and Nallavur sub basin in the north and Ponnaiyar basin in the south and west. The basin is situated between north latitude 11° 55' 00" to 12° 33' 00" and east longitude 79° 18' 00" to 79° 52' 00" . There are 18 blocks in this sub basin of which 4 blocks are covered in full and the remaining blocks are partly covered.

Varahanadhi sub basin

The main river Varahanadhi sub basin originates in the western slopes/part of Gingee Taluk. It has two arms, i.e. left arm and right arm. The right arm originates from Pakkammalai hills and left arm originates from Melmalayanur. They join together near Thenpalai village and forms the main river Varahanadhi and flows in an easterly direction. The first tributary called Annamangalam surplus course joins the main river near Melacheri. Then the river takes a turn towards south in the eastern past of Singaram village near Gingee and then flows again towards east. The second tributary called "Nariyar odai" joins Varahanadhi river near Uranithangal Village.

Near Vallam village, the main Varahanadhi river takes a turn towards the south. The third tributary called Thondiar joins near Vidur. The Vidur reservoir across Varahanadhi is situated just below the confluence of this tributary in Tindivanam taluk.

After Vidur reservoir, the river turns towards southeast and enters Villupuram Taluk. In this reach the fourth tributary called Pambaiyar joins the main river near Radhapuram village in Villupuram taluk. From there, the river runs east upto Kodukkur and southeast in TamilNadu and Pondichery states alternately. In this reach, the fifth tributary called Pambai channel joins Varahanadhi river near Sankarakkudi in Villupuram Taluk just 3 kms. above its confluence with Bay of Bengal a little south of Pondichery state. The total length of Varahanadhi river is about 78.50 kms.

Ayacut Detail:

(a) Direct Ayacut :

Vidur Reservoir	:	1 No	-	890.33 ha
Anicut system	:	42 Nos	-	3232.61 ha

(b) Indirect Ayacut:

i. System Tank	:	13 Nos	-	994.26 ha
ii. Non system Tank	:	243 Nos	-	20157.77 ha
iii. Panchayat Tank (20 – 40 Ha)	:	182 Nos	-	5326.36 ha

The total Ayacut area under the sub-basin: 30601.33 ha

The total Ayacut area under the maintenance of PWD: 25274.97 ha say 25275 ha.

Though the total registered ayacut under PWD control is 25275 the average cultivation is only 15690 leaving a gap of 6525 ha. which is approx 25% of designed irrigation extent.

Soil type and Crops grown.

The soil types met with are combination of Entisol and Vertisol

Crops grown in this sub basin area are Coconut, Sugarcane, Banana, Mango, Watermelon, Fodder besides annual crops, (i.e) Paddy, Cotton, Vegetables, Pulses, Fodder Cholam, Cumbu, Maize as I crop, and Paddy, Groundnut , Pulses as II crop.

SURFACE WATER POTENTIAL

Surface runoff is the response of a catchment to precipitation reflecting the integrated effects of a wide range of parameters like catchment, climate and precipitation, intensity, duration, size and shape of the catchment, the direction of storm, orientation of the catchment, slope, soil, land use, climate etc.

Sl.No	Name of sub basin	75 % Dependable Surface Water Potential in Mcum			
		SW	**NE**	**NM**	**Annual**
1.	**Varahanadhi**	**55.31**	**125.15**	**41.39**	**221.75**

South West Monsoon Potential	55.31 Mcum
North East Monsoon Potential	125.15 Mcum
Non Monsoon Potential	41.39 Mcum
Annual Potential	**221.75 Mcum**

Surface Water Potential of Varahanadhi Sub Basin is 221.75 Mcum.

Water potential

Surface water potential: 221.75 Mcum
Ground water potential: 781.99 Mcum
Total : 1003.74 Mcum

Present water Demand

Domestic	:	30.58 Mcum
Live stock	:	40.56 Mcum
Industrial	:	17.34 Mcum
Irrigation. (PWD/ WRO)	:	242.64
Irrigation (other PU)	:	278.50
Total	:	609.06 Mcum

There is thus surplus scenario with 394.68 Mcum (1003.74 -609.06)

In spite of the surplus scenario, the reasons for substantial gap are.

1. No technical attention is paid to the application of water to the fields.
2. Most of the lands are in fragmented condition, consequently, lot of loss of water in field to field irrigation.
3. Farmers are not aware of modern techniques, and hybrid – varieties.
4. Lack of efficient farm management.
5. Encroachment on canal banks, and consequently, water is allowed to spread through man made damages to prevent inu ndation to in the upper reaches, (i.e.) the canal sections need redesigning.
6. The cross masonry works need repairs.

Stake holders Meeting

In order to improve the system efficiency and productivity of irrigated agriculture, a multi disciplinary appr oach involving the following departments is attempted.

(i) Agriculture
(ii) Agriculture Engineering
(iii) Horticulture
(iv) Agricultural Marketing
(v) Tamil Nadu Agricultural University
(vi) Fisheries
(vii) Animal Husbandry.

WRO officials with the officials of the above Line departmen ts, held meetings with the stakeholders in the sub basin and also had joint walk through survey and the following table shows the constraints as observed by them and countermeasures suggested by the departments.

Overall picture

Components	Constraints	Counter Measures
WRO	(i) Insufficient water ways damaged bunds requiring revetment and lining etc.	i. Redesigning to be done and where ever necessary protection work river / canal drainage works are proposed.

	i.Problems like leakage through shutter and sluice regulating arrangements	i.Damaged shutters are proposed to be replaced. ii.WUA are newly proposed to be formed wherever there is no informal WUA and awareness training are proposed to maintain the system by themselves so that wasteful irrigation is minimised.
	The Tank feeder desilting canal , tank bunds is required and distribution system to be rehabilitated	(i) Improvements to tank bund., (ii) WUA's are to be formed and further maintenance should be their responsibility (iii)Surplus weirs, tank sluice, are to be improved etc. (iv) The rehabilitation of distribution system network is also proposed.
	Post irrigation management, over drawl by upper reaches, no water to lower reaches.	Proposed WUA's shall take care of this with members from lower reaches in the WUA and regulatory systems shall be developed as bye laws of WUA.

Details of Activities of each Department.

WRO

Approach: To rehabilitate the irrigation system may be as below:

1. Thematic Maps on land use, soils, crops, water bodies, and other agricultural, and demographic attributes are prepared by IWS.
2. The crop water requirements for the crops without project and for the crops with the project are prepared by IWS, with the crops proposed by Agriculture and Horticulture Departments.
3. The adequacy of the canal system, feeder channels to tanks , distribution system etc, have been checked by the WRO(both Regional and Plan Formulation wing) and the following packages are proposed accordingly.

Sl.No	Package Name	Estimate Amount in Lakhs
1	Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub Basin in Kilpennathur and Thurinjapuram Block in Thiruvannamalai Taluk of Thiruvannamalai District	88.77
2	Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub Basin in Thellar and Pernamallur Block in Vandavasi Taluk of Thiruvannamalai District	78.50
3	Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub Basin in Thellar Block in Vandavasi Taluk of Thiruvannamalai District	91.00
4	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Mel-malayanur Block, Gingee Taluk of Villupuram District	410.00
5	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Gingee Block, Gingee Taluk of Villupuram District	229.00
6	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Vallam Block, Gingee Taluk of Villupuram District	237.00
7	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Gingee and Vallam Block, Gingee Taluk of Villupuram District	142.00
8	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Mailam Block, Tindivanam Taluk of Villupuram District	244.00
9	Rehabilitation and Modernization of Vidur Main canal, Supply channels and all tanks covered under Varahanadhi Sub Basin in Mailam and Vanur Block in Tindivanam and Vanur Taluk of Villupuram District	223.00
10	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Mugaiyur, Kanai, Koliyanur and Vikkaravandi Block, Thirukoilur and Villupuram Taluk of Villupuram District	303.00
11	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Vikkaravandi, Koliyanur and Kanai Block in Villupuram Taluk and District	283.00
12	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Koliyanur and Kandamangalam Block in Villupuram Taluk and District	143.00
	WRO Total	**2472.27**

Selective lining is proposed where ever necessary with extension of micro-irrigation in the command. There will be substantial improvement in storage facilitating raising of value added and less water intensive crops as second crop in a vast area.

Outcome:

The irrigation efficiency is expected to be improved from the present 40% to 60% thereby the gap area can be bridged and cultivation of crops in more area can be take up.

Besides, the WRO is actively engaged in formation of WUAs as per TNFMIS Act 2000 and Rules by preparing the relevant documents such as maps showing the hydraulic boundary of WUA, land owners voters list etc. To help in the above collection of data involving social and field activities, it is proposed to enlist the services of NGOs, Agricultural Extension Offices, and SHGs etc.

Tank and Anicut Components:

The practice of tank irrigation has been prevalent for centuries to store water for lean season and has played a significant role in the irrigation sector. They not only provide a source for irrigation but also help recharging of ground water under suitable conditions. There are 42 Anicuts commanding an ayacut of 3232.61, 13 system tanks commanding on ayacut of 994.26 Ha, 243 Non-system tanks with an ayacut of 20157.77 ha, and 182 P.U. Tanks with a command area of 5326.36 ha (each PU tank having Ayacut between 20 to 40 ha). They are quite old and are in urgent need of repairs. The irrigation potential of these tanks have declined with siltation, sluice damages, tank bund are below standards and distributi on system.

Under the IAMWARM project, the following investments are proposed to rehabilitate these tanks.

For improving the water bodies by desilting the supply channel, standardizing the tank bund, repairs to weirs and sluices in 236 PWD tanks to a sum of Rs. 18.50 Crores. To improving the anicuts, formation of flood bank, repairs to head sluice and providing shutters in 38 anicuts to a vaule of 5.66 crores and for 182 P.U. tanks a sum of Rs. _____crores have been proposed. Thus a total sum of Rs 24.15 crores is proposed for Tank and Anicut improvements in this basin. As per National project for Repairs, Renovation and Restoration of Water Bodies (viz) tanks, there is an element of grant of 25% from Government of India. This Repairs, Renovation, Restoration of the tanks project is also dovetailed in the IAMWARM Project, and about component 25% of the investment on the tank components ie. Rs._____crores will become eligible for grant from Government of India.

Agriculture Department

Approach to enhance Agriculture production are be as below.

Approaches

- Diversification of low profit high water requiring crops to high profit, low water requiring crops, especially to commercial crops.
- Gap area coverage with irrigated crops.
- Transfer of latest production technologies to increase the productivity through
  - Demonstrations and crop coverage.
  - Distribution of critical inputs in time.
  - More area coverage with SRI in paddy.
  - Strengthening of field visits.
  - Distribution of farm implements and sprayers.
  - Training to farmers and field staff.
  - Strengthening information and publicity activities.
  - Exposure visits.
  - Using Agri clinic services.
  - Frequent review and documentation of reports and achievements.

Cropping Pattern

The existing cropping pattern and the proposed cropping pattern for the project is given in the below.

The registered Ayacut area of this sub-basin is 22215 ha of which only 15690 ha also covered in the existing cropping pattern (cropping intensity 71). Under the proposed cropping pattern for the project, the gross cropped area proposed is 28640 ha (dropping intensity 129)

Varahanadhi sub basin crop pattern

Sl. No	Name of the crops cultivated	Area under crops in Ha						
		Without project				With project		
		Fully	Partially	(Gap) Rainfed	Total	Fully	Partially 2nd crop	Total
1	Paddy (Dec-Mar)	6800			6800	6000		6000
2	Ragi(Dec-Mar)	100			100	200		200
3	Cumbu (Dec-Mar)	30		100	130	130		130
4	Maize (Dec-Mar)				-	1000		1000
5	Pulses Blackgram) (Aug-Nov)			1425	1425		1425	1425
6	Pulses Blackgram) (Dec-Mar)		1460		1460	1960		1960
7	Ground nut (Aug-Nov)			5000	5000		5000	5000
8	Ground nut (Dec-Mar)	2164	1784		3948	6705		6705
9	Gingelly (Dec-Mar)		974		974	2000		2000
10	Coconut (Perennial)	20			20	20		20
11	Cotton (Dec-Mar)	100			100	225		225
12	Sugarcane (Dec)	1083			1083	2000		2000
13	Watermelon (Dec-Mar)	150			150	300		300
14	Bhendi (Dec-Mar)	150			150	300		300
15	Flowers (Dec-Mar)	200			200	375		375
16	Mango (Perennial)		650		650	650		650
17	Banana (Dec-Mar)	25			25	50		50
18	Fodder (Aug-Nov)				-	300		300
	Total	**10822**	**4868**	**6525**	**22215**	**22215**	**6425**	**28640**
	Cropping intensity				**100**			**129**

Constraints	**Counter measures**
a. Problem Soil In few pockets there is problem soil in the sub-basin area	Soil testing could be done. The problem soil is to be reclaimed with suitable soil amendment.
b. Adverse climatic condition – drought	Suitable drought resistant varieties in addition to drought proof/cultural practices will be recommended.
c. Inferior Quality of seeds	Low yielding traditional varieties are there in the villages under minor millets. Steps will be taken to replace the same with improved hybrid varieties.
d. Limited availability and distribution of certified seeds from Government sources/ Private.	Required Quality of certified seeds will be stored in all AECS as per the norms for distribution fixed by Department. To overcome the high cost of hybrid seeds, suitable private sources, which could supply at cheaper cost will be identified and recommended to the farmers in future.
e. Improved varieties	Steps will be taken up to replace varieties by timely supply of improved variety to the farmer. Farmers will be suitably educated through training and demonstratations.
f. Improved irrigation practice (Flood irrigation)	Farmers will be trained/educated for economic and judicious use of irrigation water through demonstrations and trainings Micro irrigation will be introduced for the needly crop through AED
g. Inadequate extension services	If necessary agri clinic will be set up with the help of unemployed agri graduates will be utilized. Services of NGOs who are already in agricultural sector will be utilized as and when needed on contract bases. The services TNAU/KVK will also be utilized.
h. Low price of produce	The cost of produce goes low during harvest periods. Hence the farmers will be suitably educated and to store the produce for 2 to 3 months to get high price. Storage godowns may be setup by AMD.
i. Poor adoption of pre&post harvest technologies for (eg) excessive use of plant protection chemicals	Farmers will be educated suitably through trainings pre-seasons campaign and demonstration, Introduction of IPM & INM practices, Micro irrigation practices etc.,

j. Limited availability of credit facilities	Necessary steps will be taken to arrange credit facilities (crop loan) through co-operative societies and nationalized banks loan on produce stock will be arranged through regulated market
k. Risk aversion	To overcome the risk aversion farmers will be educated suitably on market demand, yield potential, technology available, price situation before choosing a crop. Farmers will be educated for capacity building through trainings and campaigns IEC facilities will be given to the farmers through various media and also through internet facilities available in block development offices.
L. Limited processing units	As far as this sub-basin is concerned in the case of maize crop, agro-processing units are limited. Poultry feed in which maize is the major ingredient, Poultry feed manufacturing units may be set up to meet the demand of Maize farmers.
m. Availability of labour	Labour availabilities is a problem in the sub-basin. To overcome labor problem. Labor saving farm equipments, hand and power operated sprayers, Micro irrigations systems will be introduced.

The Agriculture Department components are below

DEVELOPMENTAL COMPONENETS PROPOSED - FOR 5 YEARS (ABSTRACT)

Sl. No	Name of the Item	Cost Perdemonstration							
		Govt Share (Rs)	Former Share (Rs)	Total (Rs)	No	Govt. Share (L. Rs)	Farmers Share (L. Rs)	Total (L. Rs)	Area to be covered (in Ha)
1	Issue of Soil Health Cards 100% Subsidy	16	..	16	22000	3.52	_	3.52	8800
2	Paddy Micro nutrient mixture 10Ha demonstration 25 % subsidy	438	1312	1750	140	0.613	1.837	2.45	1400
3	Paddy Bio-fertilizer 10 Ha. Demonstration 25 % subsidy	375	1125	1500	140	0.525	1.575	2.10	1400
4	10 Ha. Paddy - Green manure seeds demonstration 25 % subsidy	1750	5250	7000	140	2.450	7.350	9.80	1400
5	5 Ha Hybrid maize demonstration 100% Subsidy	7500	..	7500	50	3.750	_	3.75	250
6	5 Ha. Bio-fertilizer demonstration for Groundnut crop subsidy Rs.50/HA	250	350	600	135	0.3375	0.4725	0.81	675
7	5Ha .Groundnut Micro nutrient mixture demonstration 50% subsidy	980	980	1960	135	1.323	1.323	2.65	675
8	5Ha IPM demonstration for groundnut crop 100% subsidy	6250	..	6250	135	8.4375	_	8.44	675
	TOTAL PROJECT COST					**20.956**	**12.557**	**33.51**	

The estimated cost is Rs. 33.51 Lakhs

The final outcome can be summaries as below

Out come

10 % of the farmers turn as commercial farmers.

10% to 20 % shift from paddy to other commercial crops.

60% to 70 % adoption with INM and IPM Practices.

5% to 20% increase in productivity.

10% to 20% increase in farm income.

Horticulture department

The Horticulture department serves with an objective of increasing the area under horticulture crops substantially with varietal up gradation such as tissue culture and hybrid, crops. It also proposed co ntrolled cultivation in shade net and poly green houses. It also proposes to promote inter-cropping. The above are proposed carefully with reference to market linkages especially perishables.

The Approach to achieve these objectives are as followed.

(i) Improving the knowledge of the farmer in least cultivation techniques through demos, training etc.

(ii) Encouraging micro irrigation with irrigation and ten water intensive.

(iii) Introduction of maintainable, agro-chimotic enterprise, Hi-brid verities of Horticulture crops.

(iv) Promoting inter-cropping and controlled cultivation etc.

The following table shows the horticulture activities proposed in the sub basins with cost details

Crop	***Unit cost***	***Assistance 75%***	***Target (Financial in L.Rs., Physical in Ha.)***								
			I		***II***		***III***		***IV***		
			Fin	***Phy***	***Fin***	***Phy***	***Fin***	***Phy***	***Fin***	***Phy***	***Total***
Banana TC	50000	37500	2.50	5	5.0	10	2.50	5	2.50	5	12.50
Veg. Hybrid											
Bhendi	30000	22500	7.50	25	15.0	50	15.0	50	7.50	25	45.0
Watermelon	30000	22500	15.0	50	15.0	50	15.0	50			45.0
Flowers	24000	18000	6.0	25	12.0	50	12.0	50	12.0	50	42.0
TOTAL			**31.0**	**105**	**47.0**	**160**	**44.50**	**160**	**22.0**	**80**	**144.5**

The total estimated cost of investment is Rs. 144.50 Lakhs and following increased production shall be achieved with the project as outcome.

Sl. No.	***Constraint & Challenges***	***Counter measures***
1	Problem soil: Existing capacity of the STL at Villupuram is 2000	To overcome the problem soil, the farmers are advised to take up soil sampling and soil testing. 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 Mango and Amla are suggested in this sub-basin.
3	Inferior quality of seed and planting material: Farmers are using local and poor quality seeds. Truthful seeds are used by the meager farmers.	Quality planting materials supplied through Department of Horticulture. There are sufficient State Horticulture Farms available to supply the planting materials. The hybrid seeds are available from private sources and it will be procured and supplied to the farmers under tender acts.
4	Limited planting materials are 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.
6	Inadequate extension services	To cater the need technical input providers are proposed. For every 100 Ha. of area increase one TIP is proposed.
7	Low price for produce	Staggered planting methods recommended to the farmers to prevent price fall, especially during peak period of harvest. It is recommended to plant early and late season varieties.
8	Poor adoption of pre and post harvest technologies	Awareness should be created among the farmers in pre and post harvest techniques by giving training to the farmers.
9	Risk aversion	Training should be given to the farmers on new technologies.
10	Limited processing units	Entrepreneurs should be motivated through training and seminars to start new processing units. Seeking new market for the produces.
11	Availability of labour	Farm mechanisation is essential providing farm machineries for drudgery reduction, weeding, spraying to the WUA is needed.

Increase of production in the Project period

Sl. No.	Component	Project period		
		Area in Ha.	Production (MT)	Yield (Tonnes)
1	Banana TC	50	2000	40 – 50
2	Veg. Hybrid	600	1500	25 – 30
3	Flower	375	1500	4 – 5
4	Mango	560	13000	10 – 20

The other outcomes shall be saving of water to expend the area of cultivation and to increase productivity and farm income. There will be also an increased non-from employment opportunities through including private sector participation in Agro-processing units to be developments in this sub basin.

Agriculture Engineering Department

The IAMWARM project aims at improving the irrigation efficiency thereby saving Water and Power besides Increasing Agricultural Production per unit usage of water.

Approach:

Promoting latest water saving technologies like Drip & sprinkler systems and precision Farming to Improve Water Application efficiency.

- Improving the Conveyance efficiency through buried pipe laying with conjunctive use of surface and ground water.
- Promoting labour saving improved implements and machineries for farm operation.
- Harnessing the excess runoff in the Ayacut areas through Farm Ponds and utilising the same as life saving irrigation.
- Encouraging fish culture in Farm Ponds as Additional Income.

The project component shall be as below.

VARAHANADHI SUB BASIN					
Sl. No.	**Components Proposed**	**Unit**	**Unit Cost (Rs.)**	**Physical**	**Amount in Lakhs**
1	**Micro Irrigation System**				
a	**Drip Irrigation**				
	Sugarcane	Ha.	58000	950	551.00
	Banana	Ha.	52800	50	26.40
	Coconut	Ha.	22900	20	4.58
	Mango	Ha.	21000	200	42.00
Total		**Ha.**		**1220**	**623.98**
b	**Sprinkler Irrigation**				
	Groundnut	Ha.	15000	3500	525.00
	Watermelon	Ha.	15000	200	30.00
	Flowers	Ha.	15000	200	30.00
	Vegetables	Ha.	15000	120	18.00
Total		**Ha.**		**4020**	**603.00**
2	**Precision Farming**	**Ha.**	**75000**	**50**	**37.50**
3	**Buried Pipeline System**				
	Seyyaduvinnan	Ha.		41.80	5.00
	Kuppam	Ha.		90.00	8.81
	Viswareddipalayam	Ha.		43.36	4.87
Total		**Ha.**		**175.16**	**18.68**
4	**Farm Mechanisation**				
a	Seed Drill for Groundnut and Maize	No.	35000	46	16.10
b	Groundnut Harvester	No.	40000	46	18.40
c	Rotavator	No.	90000	10	9.00
d	Posthole Digger	No.	90000	10	9.00
e	Power Weeder attachment for Tractor	No.	75000	10	7.50
f	Maize Husker cum Sheller	No.	90000	5	4.50
Total		**No.**		**127**	**64.50**
5	**Farm Ponds**	**No.**	**40000**	**34**	**13.60**
Grand Total					**1361.26**

Thus a sum of Rs 1361.26 Lakhs is proposed to be invested by this Department in this sub-basin, to help farmers association to effect substantial saving in water by using Drip and Sprinkle irrigation and to help them go in for mechanisation in their farms, 34 numbers of farm ponds are proposed.

The final outcome will be.

Out Come Indicators:

- The crop diversification and crop intensity in post project period (due to Implementation of MIS, Precision Farming, Buried Pipeline)
- Farm Productivity per unit area and unit irrigation water (due to Implementation of MIS, Precision Farming, Buried Pipeline , Farm Pond)
- Cropping Pattern (due to Implementation of MIS, Precision Farming, Buried Pipeline,Farm Pond)
- Increase in Irrigation Efficiency (due to Implementation of MIS, Precision Farming, Buried Pipeline , Farm Pond)
- Transfer of Technology (due to Implementation of MIS, Precision Farming, Buried Pipeline , Farm Pond)
- Increased Farm Mechanisation (due to distribution of Farm Implements)
- Increased supplemental income (due to integrated agriculture including farming, fisheries, cattle development, marketing)
- Increased per capita income.

The Tamil Nadu Agriculture University (TNAU)

TNAU proposed large scale demonstration of improved technologies under Project and Mission mode.

The approach to enhance usefulness of document under be as below.

Approaches:

- System of rice intensification in an area of 1000 ha.
- Improved production technology for groundnut in area of 500 ha.
- Introduction and improved production technology for maize in an area of 150 ha.
- Model village for quality seed production in groundnut, organic forming, integrate forming system.
- Onfarm demonstration and skill development for farmers.

The outcome of new constructs made be.

Outcome:

- At the end of 5th year, atleast 1000 ha will be under improved production technology. The expected productivity increase will be 140 Kg / ha.
- Maize crop will be introduced and at the end of project period as area of 100 ha and it will improve the livelihood of farmers.
- Groundnut productivity could be enhanced by 346 Kg / ha. The expected area adoption will be 4000 ha at the end of project period.
- An area of 5000 ha under SRI in the post project period. The expected increase in productivity will be 1200 Kg / ha and 20 % water saving could be achieved by this technology adoption.

PROJECT DETAILS

Sl.No	Particulars	Physical	Financial (in lakhs)
I	**Activities**		
1	Improved production technology for Gingelly + 3 field days	100 ha	2.30
2	Improved production technology for Maize + 3 field days	150 ha	9.30
	Maize dehuller	2 Nos.	1.00
3	Quality seed production Groundnut	100 ha	5.00
4	Demonstration of organic farming and IFS modal in Model villages	1 No	1.00
5	SRI	1000 ha	100.00
6	Production technology for groundnut	500 ha	30.00
7	On farm demonstration and farmers training	-	6.40
	Sub Total		155.00
II	**Out sourcing for technical assistants**		
1	15 numbers for 2 years, 10 numbers for 3rd year, 5 numbers for 4th and 5th year	9000 Salary + 1000 FTA per Month	60.00
	Sub Total		60.00
III	**Contingencies**		
	a. Vehicle hire charge for Scientists @ Rs.60000/yr		3.00
	b. Stationeries, Publicity, Documentation, Reporting,		3.00
	c. Field boards and exhibits		1.00
	Sub Total		7.00
IV	**Equipments** **Computer, Printer, Scanner, LCD, Copier, Digital moisture meter**		3.00
	Sub Total		3.00
	Total		**225.00**
	Incentive 1% of the total cost		**2.25**
	Total		**227.25**
	Institutional charges @ 7.5 %		17.04
	Grand Total		**244.29**

Under project mode, transfer of technologies in major crops, and demonstration of labour saving implements high yielding varieties, scientific irrigation management and high harvesting technologies are proposed.

Under mission mode, large scale implementation of specific technologies of SRI in 500 ha, Hybrid cotton in 400 ha will be attempted.

These will enhance productivity by 15% and water saving of 20% besides improved soil health and farm income.

Agriculture Marketing

In the background of stakeholders demand for identifying markets for new and diversified crops, improving existing markets utilization, improving access to market by better collective transport, specialised storages as per crop needs, the following components are the approach.

Approaches:

- Strengthening infrastructural facilities - Storage sheds, Drying yards, Plastic tarpulins and weighing scale etc.
- Linkages with traders / manufacturers on contract farming / MOU terms to be explored along with legal coverage.
- Collective bargaining through FIG, Farmers Commodity Groups.

  Diversification of crop from paddy to less water required and market driven crops.
- Providing transport facilities – goods auto

VARAHANADHI SUB BASIN - Agriculture Marketing						
Sl. No.	**Item**	**Nos.**	**Description**	**Place**	**Unit Cost (in Lakhs)**	**Total Cost (in lakhs)**
1.	Storage godown	4	20m x 5m	Nattarmangalam Koliyanur Melmalaiyanur Kutteripattu	5.0	20.0
2.	Drying yard	5	20m x 20m	Koliyanur – 1 Vikravandi –1 Kanai – 1 Melmalaiyanur –1 Gingee – 1	2.2.	11.0
3.	Plastic Tarpaulins	40		Nattarmangalam-10 Koliyanur – 10 Melmalayanur – 10 Kutteripattu-10	0.05	2.0
4.	Dunnages	120		Nattarmangalam-30 Koliyanur-30 Melmaliyanur-30 Kutheripattu – 30	0.0075	0.09
5	Weighing scales	4		Nattarmangalam –1 Koliyanur – 1 Melmalayanur – 1 Kutheripattu – 1	0.125 2.0	0.5 4.0
6	Collection Centre	1		Tindivanam	7.0	9.0
7	Goods Auto	2				
8	Cost of one ABC	1		Vallam	11.30	11.30
					Total	**58.70**

Thus the investment of Rs. 58.70 Lakhs, will propel agricultural growth from production front to the marketing front thus making the Agricu lture sector more profitable and vibrant to face competition both at national and international scene.

Outcome:-

Upto 10 % increase in farm gate income due to improved marketing facilities, more than 2006 – 07 level.

Marketing support for new crops (or) diversified crops – i.e upto 33 %

30 % -40% vegetables/fruits growers will be benefited through collection centre to Sell their produce in nearest wholesale market.

15 % of stakeholders use the marketing kiosk per year.

5 % of output taken for agro processing more than 2006 – 07 level.

Fisheries

The sub basin has 236 WRO tanks and one reservoir. It is estimated that about 200 tanks are suitable for agriculture with a total water spread area of about 10,000 ha. Potential WSA for the purpose of agriculture of taken at 50% of WSA which is 5000 ha. There is acare for increasing the fish production in these tanks from the current 25 Kg/ha. Components proposed.

(1) Renovation of Govt. fish seed farm:

The fish seed farm at Vidur Dam at all the renov ated and a total rearing space of 108% Sq.m. (Six Tanks) will be made available by the project. This shall produce 5 Lakhs advanced fingerlings per year. This shall later to the need 500 ha of effective WSA producing 150 tones of fish per year.

(2) Fish seed bank:

Two seed banks are proposed which shall produce 6 Lakhs of advanced fingerlings per year and shall later to the need of 600 ha of WSA. The investment cost per unit in 14.5 kgs. The units shall be owned and operated by WUA.

(3) Fish bed rearing in cages:

Twelve units of cases are to be provided which shall be operated by WUA or fisher man Co – Op Society. The investment cost and one year operational cost per unit in Rs. 30,000/- about 750 ha of WSA shall benefit from these units. An ticipated fish production of fish per ha of WSA I 300 Kg.

(4) Fish Kiosks:

Tow kiosks are proposed which shall facilities take hygienic marketing and thereby better price for fresh water fish.

(5) Fishing Implements:

Fishing implements such as corrodes, Gill nets and drag nets are proposed facilities efficient harvest of fish.

Approaches:

1. Timely availability of quality carp seeds when the tank receives water by providing rearing and storing space for fish seeds.
2. Additional income to agriculture farmers through aquaculture in farm ponds.
3. Increase in over all fish production and water spread area under aquaculture.
4. Facilitate Hygienic fish marketing.
5. Increased fishing efficiency,

ABSTRACT

Total project cost for the fisheries development proposal under world bank assistance.

1.	Renovation repair work of existing pond	Rs.	15.10
	Operational Cost per year 1.10 x 5	Rs.	5.00
2.	Fish seed bank 2 nos.	Rs.	29.00
	Operational Cost	Rs.	2.32
3.	Seed rearing in velan cages 12 units	Rs.	1.68
	Operational cost	Rs.	1.92
4.	Setting up of Fish kiosks 2 Nos.	Rs.	3.00
5.	Supply of fishing implements	Rs.	1.40
6.	Vehicle hire Charges	Rs.	2.00
7.	Documentation	Rs.	0.50
	TOTAL	**Rs.**	**61.92**

Outcome:-

- Total fish fingerlings estimated to be produced from govt. fish seed farm, two seed banks and twelve lakhs unit is about 17.5 lakhs.
- This will be the stocking material for 1750 ha of effective WSA of the sub – basin producing about 500 tones/year.
- In two year of won culture will be demonstrated in 3500 ha of effective WSA. Covering about 100 Tones.
- Private inventor will be attracted to invert in fish seed rearing unit and aquatinter.

Animal Husbandry

Improved delivery of Veterinary services, increasing Fodder availability, capacity building of farmers on Veterinary health care camps, Artificial insemination techniques, and Human resources developments by way of training to farmers and in -service officials etc, are the main areas of concentration of A.H. Development in the sub basin. The following table shows the components and their cost.

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 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. Five sub basin retry units to the established in this sub – basin namely (1) Avvaiyarkuppam 92) Alampoondi (3) Ayyur Agram (4) Melkaranai (5) Veedur.

S. No.	Constraints & Challenges	Countermeasures Proposed
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 to deliver quality veterinary services in the sub basin. In addition one veterinary 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 CO3 fodder in 300 hectares of private lands, 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 16) are proposed. The animals having infertility problems will be identified and treated. In addition, mineral mixture supplement will be given to rectify the defects.
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 18) 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.
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 (at Veterinary Colleges to update and refresh their skills and knowledge. They will inturn train the para-veterinarians.

The Approach to achieve these area

(i) Productivity enhancement by improving delivery of Veterinary services in the project area of the Government and private level (WUA.)

(ii) Increasing the availability of green fodder for sustainable growth of livestock.

(iii) Improving the infrastructure and diagnostic facilities in the project area.

(iv) Improving the knowledge level of the farmers about the livestock activities through various outreaches programmes, training etc.

Project Cost - Animal Husbandry
VARAHANADHI SUB BASIN

	Components	Physical	Financial (Rs. 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	5	28.64
	b. Improving the essential infrastructure in the Government institutions (graduate institutions) @ Rs.33,000/-unit	29	9.57
	c. Improving the essential infrastructure in the Government institutions (subcentres) @ Rs.20,000/-unit	28	5.60
	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	3	9.00
2	**Increasing availability of green fodder in private lands (in hac) - C03 300 hac.**		18.00
3	**Out reach programmes.**		
	a. Infertility cum Total Veterinary Health Care camps @ Rs.6,000 per camp per month for each SBVU	300	18.00
	b. Distribution of mineral mixture @ Rs.1,82,500 per SBVU	5	9.13
	c. Information, education and communications campaigns	34	18.70
4	**Enhancing the knowledge level of human resource**		
	a. Training of Farmers	2000	8.00
	b. Entrepreneurship training to 31 unemployed veterinary graduates to be placed as Sub basin Veterinary Extension Officer @ Rs.50,000/ - per person	6	3.00
	b. Orientation Training for Sub basin Veterinary Extension Officers @ Rs.1,350/ - trainee	5	0.07
	c. In-service Training for Veterinarians @ Rs.2,000/ - per person	29	0.58
	TOTAL		**128.29**

OUTCOMES EXPECTED

Sl. No.	Project Year	I Year	II Year	III Year	IV Year	V Year	Total
1	Artificial Insemination Done (In Nos.)	12000	13500	15000	16800	19200	76500
2	Calves Born (In Nos.)	4222	5342	6736	8324	9600	34224
3	Heifer calves born (In Nos.)	2111	2671	3368	4162	4800	17112
4	Milk Yield (In lakh Lts.)	51	69	93	122	152	487
5	Value of Milk (In Lakh Rs.)	466	623	844	1113	1376	4422

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

- 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 concepti on 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 whi ch 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.

Ground Water

This proposal covers the technological interventions made to improve the ground water resources through Artificial Recharge Schemes to sustain the Well irrigation in the Ayacut under 18 Irrigation tanks.

1. Intervention through Artificial Recharge Schemes
2. Justification for Injection Well
3. Injection wells over other ARS
4. Field Tested Technology

Concepts:

The very idea Artificial Recharge Structures are saving the surplus water in the underlying aquifers capable of storing water. The social impact / resistance to these projects come out during the lean periods of scanty rainfall, for fear of their due share be arrested by the people in the upstream side. This obstacle is overcome by providing the Injection Wells at about 0.30m below the full tank level, ensuring that the near surplus flow only in diverted for recharging the groundwater.

Construction:

The proposed construction for the Injection Bore well is to provide a 6" bore from the tank bed to the bottom of the fissured rocky strata. A casing will be provided in the topsoil portion to stabilize the bore. A self-cleaning graded filter provided at the top of the bore, filters and let the water into the bore. This water in the bore, under the static water pressure gets injected in to the fissures of the rocky strata across its entire depth. The Injection Well is working on the same principles except that instead of a bore, a circular dug well is proposed. The location of the Recharge Bore wells in the Tanks near foreshore area will be determined through geo-physical field survey.

Post Project Scenario:

The additional groundwater stored in the aquifers will sustain the well Irrigation follows,

At 5% of the total ayacut of the selected 18 tanks = 136 Ha.

Additional Food production, Paddy, @ 4500Kg / Ha = 612 ton.

Value of additional food production @ Rs 5600 / ton = Rs.34.27lakh.

Project Economy:

The project cost is just Rs.21 lakhs only for the current schedule of rate for 2006 -07.

It is a project with very high returns, at a minimum of Rs 34.27 lakhs, breaking even in the first year itself.

Conclusion:

The project is a very viable one and sustains the well irrigation in the ayacut area of the selected 18 tanks. The agricultural lands and drinking water su pply wells falling outside the ayacut area also will be benefited by these schemes.

ABSTRACT

Name of Work: Provision of Artificial Recharge Schemes in 18 tanks in the Varahanadhi Sub-basin, under IAMWARM Project.

Estimate: Rs 21 Lakh

SI No	Description	Amount (Rs Lakh)
	Construction of injection Bore Wells in	
1.	Elusempon Tank	1.25
2.	Meenampur Tank	1.25
3.	Kalaiyur Tank	1.25
4.	Thalavanur Tank	1.25
5.	Perumpugai Tank	1.25
6.	Anathur Tank	1.25
7.	Arugaivur Tank	1.25
8.	Mukkunam Tank	1.25
9.	Nallan Pillai Petral Tank	1.25
10.	Thiruvathigunam Tank	1.25
11.	Kammanthur Tank	1.25
12.	Pallipudupattu Tank	1.25
13.	Kilaiyur Tank	2.00
	Construction of Injection Wells in	
14.	Anniyur Tank	0.85
15.	Karuvachi Tank	0.85
16.	Kadagampundi Tank	0.85
17.	Perumgappur Tank	0.85
18.	Panamalaipettai Tank	0.60
	Total	21.00

(RUPEES TWENTY ONE LAKH ONLY)

Forest Department

For sustained development, our national Forest Policy suggest that forest should cover atleast 33% of the geographical area of our country. In India and in the state of Tamil Nadu, statistics shows that 21% and 17.59% of total geographical area covers forest respectively. It is estimated that about 1.5 m ha. of Forest land being degraded every year.

The consequences of reduced and depleted forest cover are obvious. Rivers, reservoirs and tanks, are being silted due to excessive erosion in the catchment areas. This has affected the carrying capacity of rivers and the storage capacity of water bodies, which in turn results in flooding during heavy run-off and a reduced subsurface flow during drought due to reduced water storage in the catchments.

In the above and based on broad principles and objectives of TamilNadu water policy, this proposal aims to –

(a) Ensure preservation & stabilization of the existing water resources in the forest areas & outside forest areas.

(b) Rehabilitation of existing water harvesting structures.

(c) Restoration of surface water & groundwater potential.

(d) Judicious use of water resources through existing Village level institution of Village Forest Committees in Joint Forest Management villages & creating new institutions wherever required.

(e) Amelioration of environment.

Proposals:

In view of above, to contain the trend of degradation of catchment area and to arrest soil erosion, following activities have been proposed which will be carried through two administrative units of Forest Department -

i. Viluppuram Forest Division (Territorial)

ii. Social Forestry Division, Viluppuram

Division wise detailed proposals are given below:-

1. Improvement of Bio-diversity

a) Afforestation inside R.F.

b) Afforestation outside R..F.

(i) Agro Forestry- Free supply of seedlings to farmers

(ii) Avenue and sacred grove planting

(iii) Riverine, Canal and Tank Bund Plantation

2 Soil and Moisture Conservation works

(a) Construction of Check dams, Percolation Pond and miniature dams

(b) Improvement of Old dilapidated Water Conservation Structures.

3. Awareness generation

4. Seminar / Workshops / Training

5. Monitoring and evaluation

6. Documentation

7. Treatment in TAP area.

8. Treatment in Community Wasteland.

9. Treatment in Greening Community Land Area.

Forest Department

IAMWARM Project Proposals

VARAHANADHI SUB – BASIN

(A) Viluppuram Forest Division (Territo rial)

Total Cost - 323.30 lakhs

Sl.No.	Details of works proposed	Quantity	Rate per unit	Amount
1	Improvement of Bio – diversity			
	(a) Afforestation inside R.F	100 Ha.	Rs.10000	10,00,000
	(b) Afforestation outside R.F			
	(i) Agro Forestry- Free supply of seedlings to farmers	1,00,000 Seedlings	Rs.7.00	7,00,000
	(ii) Avenue and sacred grove planting	10,000 Seedlings	Rs.200.00	20,00,000
	(iii) Reverine , Canal and Tank bund plantation	200 kms.	Rs. 24000	48,00,000
2	Soil and Moisture Conservation Works			
	(a) (i) Construction of check dams	86 Nos	75,000	64,50,000
	(ii) Construction of Percolation Pond with surplus weir	25 Nos	4,00,000	1,00,00,000
	(iii) Construction of miniature dams	10 Nos	6,00,000	60,00,000
	(b) Improvement of Old dilapidated Water Conservation structures	20 Nos	35,000	7,00,000
3	Awareness generation	30 villages	15,000	4,50,000
4	**Seminars / Workshops / Training**	-	-	1,00,000
5	Monitoring & evaluation	-	-	30,000
6	**Documentation**	-	-	1,00,000
				3,23,30,000

(B) Social Forestry Division, Viluppuram.

The total Abstract Cost comes to Rs.341.68 lakhs phased over 5 years from 2007-2008 to 2011 – 2012 as below.

Year Wise

Sl. No.	Name of Schemes	2007-08	2008-2009	2009-2010	2010-2011	2011-2012
		Total (in lakhs)	Total (in lakhs)	Total (in lakhs)	Total (in lakhs)	Total (in lakhs)
1	2	3	4	5	6	7
1	Soil and Moisture conservation works in TAP Areas	40	30	25	25	20
2	Soil and Moisture conservation works in GCL Areas	6	6	6	0	0
3	Afforestation in Tank foreshores	**41.6**	**43.5**	**43.87**	**47.91**	**6.8**
	Total	**87.6**	**79.5**	**74.87**	**72.91**	**26.8**

2007 – 2008	87.60 lakhs
2008 – 2009	79.50 lakhs
2009 – 2010	74.87 lakhs
2010 – 2011	72.91 lakhs
2011 – 2012	26.80 lakhs
Total	341.68 lakhs

V. PROJECT COST ABSTRACT

Forest Department

IAMWARM Project Proposals - Varahanadhi Sub- Basin

Sl.No.	Name of the Division	Amount
1.	**Viluppuram Forest Division (Territorial), Viluppuram.**	**323.30 lakhs**
2.	**Social Forestry Division, Viluppuram.**	**341.68 lakhs**
	Total	**664.98 lakhs**

(Rupees Six Crores, Sixty four lakhs and ninety eight thousand only)

Environmental Department

Now under IAMWARM project, focus is at each sub basin level to identify and prioritize the requirements for improvements to storage structures, 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.

Activities

Soil samples are to be collected from selected locations to assess the impact on the quality of soil due to various Environmental problems like use of chemical fertilizer and using the polluted water. From these locations 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. The S.M&R Division of WRO will test soil samples thus collected.

Under this item, following provisions have been made.

1. Testing charges for the water& soil samples.
2. Provision of Labour charges, purchase of materials, conveyance, driver salary and computer operator.

9.2. Transfer of Technical Know how for solid waste management system including source Segregation, recycle of dry waste and linkage with user agencies.

Now, a new scheme for Solid waste Management plan is under implementation in all Municipalities and Panchayats. Under this scheme, collection tank for disposable and non-disposable garbage have been constructed in most of the Local bodies. But, recycling the waste and converting the solid waste into manure and production of energy from them are yet to come up.

Hence Demonstration and action programs are planned with user agencies and necessary field visits are programmed to transfer of Technical Know how for Solid Waste management system.

9.3. Conducting Awareness Programs

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.

Hence, to create and motivate the people, awareness programmes are to be conducted in the villages where sewage is directly let into water bodies. It is also proposed to conduct awareness meetings in School/ Institutions during the study period of five years covering the following subjects in addition to placing Stickers, Tin sheets and Pham lets containing messages about Environmental Awareness.

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

Environmental Activities in Varahanadhi Sub Basin from 2006-07 to 2010-11.

Sl. No	Description of Component	Amount in Rupees
1	Collection and testing of Water samples in rivers , anicuts reservoirs , major tanks,wells etc., including testing charges, packing, conveyance and labour charges in river basin and Collection and testing of Soil samples , including testing charges, packing, conveyance and labour charges in river basin	
	a. Water Samples: Water samples from rivers: 15 nos x4 times = 60 nos Water samples from wells, major tanks, etc twice in a year =5nos x 2 times = 10 Nos Total = 70 Nos Testing charges =70 nos x 5 yearsx Rs 1000 /ea = 350000 Labour charges = Rs1000 /year x 5 years = 5000 Conveyance charges = = 5000 Purchase of chemicals, sampling equipments = 1000 Sub total for water samples = Rs 361000 -	393,000
	b. Soil Samples Testing Charges = 5 Nos x Rs 6200 / ea = 31000 - Labour charges =5 x 1 x 100 / ea = 500 - Conveyance Charges = 5 x 100 / ea = 500 - Sub total for soil samples = Rs 32000 -	

2	Collection of data and updating Environmental and Social Assessment including Documentation and binding charges of environmental reports, engaging technical assistant, mazdoor, Computer operators, jeep drivers etc., Computer Operator = 1 No x 2month x 5 years x Rs 3500 = Rs 35000 - Jeep Driver = 1 No x 2 x5 x Rs 3500 = Rs 35000 - Technical Assistant- 1 No x2x5 x Rs 4000 = Rs 40000 - Mazdoor Grade I - 1 No x 2x5 x Rs 2000 = Rs 20000 - Documentation and Binding charges, maps, Publishing Annual report for the sub basin visual display, books purchase, upgradation of computer and accessories etc., = Rs 60000- **Total** **= Rs 190000**	190,000
3	Conducting Awareness Programmes in villages, schools, colleges etc., and workshop including printing stickers, booklets,banners, honorarium, refreshment, stationary, prizes etc.,	400,000
4	Impact Assesment of Environmental Degration due to Sugar Industries in and around Mundiambakkam village in varahanadhi River Basin	400,000
5	Provision for unforeseen items and escalation charges	27,000
	Total	**1410000**

(Rupees Fourteen lakhs and Ten Thousand only)

VARAHANADHI SUB BASIN

PROJECT COST

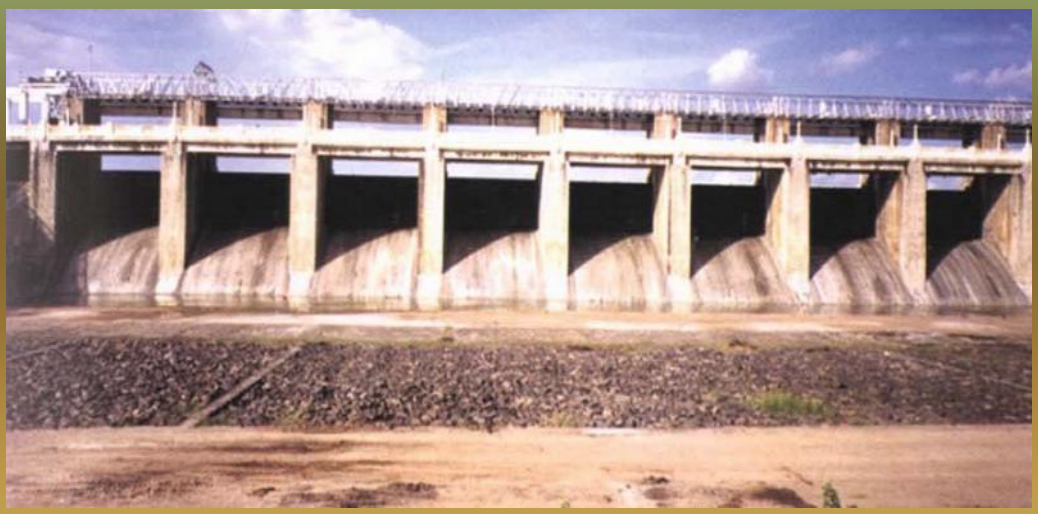
Sl.No	Departments	Amount in Lakhs
1	Water Resources Organisation	2472.27
2	Agriculture Department	33.51
3	Agricultural Engineering Department	1361.26
4	Tamil Nadu Agricultural University	244.29
5	Horticulture Department	144.50
6	Agricultural Marketing Department	58.70
7	Animal Husbandry Department	128.29
8	Fisheries Department	57.91
9	Ground Water	21.00
10	Forest Department	664.98
11	Environmental Department	14.10
		5200.81

5200.81

(Rupees Five Thousand Two Hundred Lakhs and Eighty One Only)

WATER RESOURCES ORGANISATION PROPOSALS

GOVERNMENT OF TAMIL NADU
PUBLIC WORKS DEPARMENT
WATER RESOURCES ORGANISATION



REHABILITATION AND MODERNISATION OF WATER RESOURCES IN VARAHANADHI SUB BASIN IN VILLUPURAM DISTRICT OF TAMIL NADU

UNDER

IRRIGATED AGRICULTURAL MODERNISATION AND WATER RESOURCES MANAGEMENT PROJECT (IAMWARM)

WRO PROJECT COST – 2472.27 LAKHS

CHENNAI REGION, CHENNAI.

IRRIGATED AGRICULTURAL MODERNISATION AND WATER RESOURCES MANAGEMENT PROJECT 'IAMWARM'

INTRODUCTION:-

The Government of Tamilnadu have taken a number of progressive actions on water resources and irrigation management, particularly through the Bank-assisted Tamil Nadu Water Resources Consolidation Project (WRCP) which was closed in September 2004 with a satisfactory rating. Now the Tamilnadu Government have decided to implement a project for the modernisation of the Traditional Irrigation systems in Tamil N adu with a loan assistance from World Bank. The World Bank has also come forward to assist the Tamilnadu Government's proposal. Under the World Bank funded project of "Irrigated Agriculture Modernisation and Water Resources Management" (WRCP - II), about 16 River sub basins have been selected and proposed to be taken up under the control of Water Resources Organisation Wing of Public Works Department of Tamilnadu. The Varahanadhi sub basin is one among the sixteen.

Accordingly this 'IAMWARM' Project report for the modernisation of the irrigation systems of Varahanadhi Sub Basin has been prepared. The very objective of this project is to attain maximum productivity from farm lands, for which serious attention is required to modernise the existing irrigation structures, anicuts, canal systems and tanks in order to make them functionally more effective, conserve and utilise the available water from catchment area for optimum use.

The history of the Varahanadhi sub basin, problems in the irrigational sy stem and the proposals to overcome the problems have been dealt in depth in the following chapters. The highlighted benefits of the project are

(i) 6525 Ha. of registered gap ayacut will be bridged.

(ii) There will be an additional food production of 95,430 MT. (Annexure-7)

(iii) About 60000 mandays for agriculture labours will be created in the successive every years.

(iv) Depletion of ground water table will be improved and drinking water problem in the command area will be solved appreciably.

(v) This project will promote water users participation in all aspects of water planning and management and also improve their socio economic status.

The project cost for water resources organisation is worked out to a tune of Rs.2472.27 Lakhs

I. HISTORY OF VARAHANADHI SUB BASIN

1.1. MAIN BASIN:-

The Varahanadhi basin is one of the 17 major river and is located in the Villupuram, Thiruvannamalai, Kancheepuram and Cuddalore districts of Tamil Nadu and Pondicherry Union Territory. The total area of the basin is 4498.5 Sq.Km. The Varahanadhi basin is surrounded by Bay of Bengal in the east, Palar basin in the north and Ponnaiyar basin in the south and west. The basin is situated between north Latitude 11 °50'00" and 12°28'00" and east Longitude 79°08'00" to 80°10'00". There are 24 blocks in this basin of which 7 blocks are covered in full and the remaining blocks are partly covered. The details of blocks, taluks and districts are furnished in the following statements.

List of Blocks, Taluks and Districts covered in the Varahanadhi basin

Sl. No.	District	Taluk	Blocks	
1	Kancheepuram	2. Madhuranthagam	1. Maduranthagam	Part
			2. Acharapakkam	Part
		3. Cheyyar	3. Chitamur	Part
			4. Lathur	Part
2	Villupuram	4. Villupuram	5. Kandamangalam	Part
			6. Vikravandi	Full
			7. Kanai	Part
			8. Koliyanur	Part
		5. Vanur	9. Vanur	Full
		6. Tinidivanam	10. Olakkur	Full
			11. Mylam	Full
			12. Marakkanam	Full
		7. Gingee	13. Gingee	Part
			14. Melmalayanur	Full
			15. Vallam	Full
		8. Thirukoilur	16. Mugaliyur	Part
3	Thiruvannamalai	9. Polur	17. Kalasapakkam	Part
			18. Chetpet	Part
		10. Thiruvannamalai	19. Thurinjapuram	Part
			20. Kilpennathur	Part
		11. Vandavasi	21. Pernamallur	Part
			22. Tellar	Part
			23. Vandavasi	Part
4	Cuddalore	12. Cuddalore	24. Cuddalore	Part

The three individual rivers such as Varahanadhi, Ongur and Nallavur had separate catchment areas and flow separately and confluence separately ie . the Varahanadhi river confluence with Bay of Bengal, the Ongur river flows into Yedayantittu Kaluveli tank and the Nallavur river joins the Kaluveli swamp. For Water Resources Assessment, water balance and water planning are done by integrating all the three rivers under Varahanadhi river basin.

1.2. VARAHANADHI SUB BASIN: -

The main river Varahanadhi originates in the western slopes part of Gingee Taluk. It has two arms, ie., left arm and right arm. The right arm originates from Pakkam hills and left arm originates from Melmalayanur. They join together near Thenpalai village, form the main river Varahanadhi, and flow in an easterly direction.

The Varahanadhi originates at an Altitutde of 566 m. above M.S.L. and runs in plains with altitudes from 100 m. to 10 m. above M.S.L. This Varahanadhi sub basin covers 7 Taluks viz. Villupuram, Tindivanam, Gingee, Vanur, Thirukoilur, Vandavasi, Thiruvannamalai and the Pondicherry Union Territory. The first tributory called Annamangalam surplus course joins the main river near Melacheri. Then the river takes a turn towards south in the eastern part of Singavaram village near Gingee and then flows again towards east. The second tributory called 'Nariyar Odai' joins Varahanadhi river near Uranithangal village.

Near Vallam village the main Varahanadhi river takes a turn towards the south. The third tributory called Tondiar joins near Vidur. The Vidur reservoir across Varahanadhi is situated just below the confluence of this tributory in Tindivanam Taluk.

After Vidur reservoir, the river turns towards southeast and enters into Villupuram Taluk. In this reach the fourth tributory called Pambaiyar joins the main river near Radhapuram village in Villupuram Taluk. From there, the river runs east upto Kodukkur and southeast in Tamil Nadu and Pondicherry states alternately. In this reach, the fifth tributory called Pambai channel joins Varahanadhi river near Sankarakkudi in

Villupuram Taluk just 3 Kms. above its confluence Bay of Bengal a little south of Pondi cherry state. The total length of Varahanadhi river is about 78.50 Kms.

1.2.1. DRAINAGE AREA AND POTENTIAL AVAILABLE: -

This sub basin cover a drainage area of 2647.00 Sq.Km. The surface runoff depends upon the irrigated effects of a wide range paramete rs like catchment, climate and precipitation, intensity, duration, size and shape of the catchment the direction of storm, orientation of catchments, slope, soil, land use, climate etc.

The river comprises all land drainages from both sides of river. Th e total surface water potential available at 75% dependability is 221.75 M.Cum. as detailed below.

Sl. No.	Name of sub basin	75% Dependable surface water potential in M.Cum.			
		S.W.	N.E.	N.M.	Annual
1.	Varahanadhi Sub Basin	55.319	125.15	41.39	221.75

Surface water potential of the sub basin includes the surface water drawn for usage from tanks.

1.2.1.1. WATER BUDGET: -

(i) The total water potential of Varahanadhi sub basin at 75% dependability.

Surface Water Potential : 221.75 M.Cum.

Ground Water Potential : 781.99 M.Cum.

TOTAL : 1003.74 M.Cum.

(ii) Total potential Demand of Varahanadhi sub basin is as detailed below:

Demestic : 30.577 M.Cum.

Live stock : 40.089 M.Cum.

Industries : 17.340 M.Cum.

Irrigation by WRO tanks : 242.55 M.Cum

Irrigation by PU tanks : 278.50 M.Cum

TOTAL : 609.06 M.Cum.

(iii) Water Budget = Total available – Total requirement

= 1003.740 – 609.06

= 394.68 M.Cum.

(iv) Surplus available = 394.68 M. Cum.

1.2.2. IRRIGATION SYSTEMS: -

There are about 994 tanks in this basin. Out of this, 256 tanks are maintained by WRO with a registered ayacut of 25274.96 Ha. The tanks are classified as system tanks and non system tanks. The non-system tanks use surface water of the direct runoff from their own catchment, where as the system tanks are supplemented from the river through supply channels and anicuts. The list of 42 anicuts are furnished in Annexure 1. The list of 256 tanks are furnished in Annexure 2.

In addition to the tanks and anicuts there is One reservoir namely Vidur Reservoir. In the total command area of Varahanadhi sub basin, an important roll is played by the Vidur Reservoir. The command area in Tamil Nadu is about 890.33 ha and about 404.69 ha in Pondicherry. Total ayacut of 1295 ha. is benefited by this reservoir. The Reservoir and its hydraulic particulars with salient feature are furnished in Annexure - 3.

Ayacut Detail:

(c) Direct Ayacut :

Vidur Reservoir	:	1 No	-	890.33 ha
Anicut system	:	42 Nos	-	3232.61 ha

(d) Indirect Ayacut:

i. System Tank	:	13 Nos	-	994.26 ha
ii. Non system Tank	:	243 Nos	-	20157.77 ha

ABSTRACT OF EXISTING IRRIGATION WORKS UNDER IAMWARM : -

(i) System & non system Tanks	:	236
(ii) Anicuts	:	38
(iii) Reservoirs	:	1

1.2.3. AYACUT:-

Total registered ayacut of the sub basin is 25274.96 Ha. In which 22215.87 Ha is taken up for modernization and rehabilitation under IAMWARM project and the remaining 3059 ayacut were modernized by other schemes.

Sl. No.	Irrigation Works	Ayacut
	Under IAMWARM Project	
(i)	Ayacut under 236 Tanks.	18092.93 Ha.
(ii)	Ayacut under the direct irrigation of 38 anicuts	3098.67 Ha.
(iii)	The ayacut under Vidur Reservoir	890.33 Ha.
	Total Ayacut	22081.93 Ha.

1.2.4. RAINFALL:-

INFLUENCING RAINFALL STATIONS AND THEIR ANNUAL DEPENDABLE RAINFALL:-

Sl. No.	Rain gauge Station	25%	50%	75%	90%	Average
1.	Cuddalore	1539	1246	986	751	1264
2.	Gingee	1199	942	804	581	994
3.	Kilnatchipattu	1112	978	734	501	934
4.	Panruti	1357	1080	883	725	1118
5.	Pondicherry	1345	1157	904	778	1214
6.	Tindivanam	1186	1015	772	537	1007
7.	Thirukovilur	2000	898	728	602	974
8.	Vanamadevi Anicut.	1459	1142	846	760	1163
9.	Vandavasi	1392	1103	864	702	1124
10.	Vanur	1346	1015	751	595	1063
11.	Vidur Dam	1265	1031	824	679	1061
12.	Villupuram	1202	975	861	626	1025

Annual Average weighted rainfall: -

Sl. No.	Sub Basin	Rain Gauge Station	Rain gauge station area	Sub basin area	Weight in %	Annual average rainfall in mm.	Annual average weighted rainfall for the sub basin in mm.
1.	Varaha-nadhi Sub Basin	Gingee	1016.00	2550.08	0.40	994	397.60
		Kilnatchipattu	240.00		0.09	934	84.06
2.		Villupuram	294.78		0.116	1025	118.90
3.		Thirukovilur	148.72		0.058	974	56.49
		Vidur Dam	380.03		0.15	1061	159.15
		Tindivanam	75.15		0.03	1007	30.21
		Vandavasi	59.14		0.02	1124	22.48
		Panruti	13.95		0.01	1118	11.18
		Vanamadevi Anicut.	5.15		0.002	1163	2.33
		Pondicherry	150.15		0.06	1214	72.84
		Cuddalore	7.90		0.003	1264	3.79
		Vanur	159.11		0.06	1063	63.78

1.2.5. SURFACE WATER RESOURCES AND IRRIGATION SYSTEM: -

1.2.5.1. OUT FLOW TO SEA: -

The analysis of flow particulars of Vidur reservoir for 41 years (1962 – 2003) revealed that there was no surplus flow in 12 years. In n ine years, the quantity is in between 100 to 500 M.Cum. During seven years, the surplus quantity is in between 50 to 100 M.Cum. In thirteen years, the quantity is less than 50 M.Cum. The analysis further reveals that the 50% dependable surplus is 10.94 M.Cum., whereas for 75% and 90% dependability it is found to be Nil.

1.2.5.2. THE EXISTING SURFACE WATER SUPPLY SYSTEMS: -

In the Varahanadhi basin, the surface water is drawn for usage from tanks. The tanks are classified as system tanks and Non -system tanks.

The non-system tanks use surface water of the direct runoff from their own catchments. Whereas the system tanks are filled from the canal flow diverted by the anicuts across the river apart from the direct runoff from their own catchments.

1.2.5.3. RESERVOIR: -

Vidur reservoir is the only reservoir in the Varahanadhi sub basin. It is situated near Vidur village in Tindivanam taluk of Villupuram District lies in Latitude 12 °5'N and Longitude 79°35'E and 800 m. below the confluence Point of San akarabarain river and Thondiar. The reservoir was constructed during the year 1958 -59. Below the reservoir, the river is called Varahanadhi. The command area under this reservoir, nearly 60% of them fall within the boundary of Tamil Nadu state and remai ning 31% lies in the Union Territory of Pondicherry. The command area in Tamil Nadu is about 890.33 Ha. and about 404.69 Ha. in Pondicherry. The total catchment area is 1298 Sq.Km. The waterspread area at FRL is 7.98 Sq.Km. and capacity at FRL is 17.13 M.Cum. There are two numbers of river sluices of size 1.52 x 1.83 m. each. An ayacut of 1295.02 Ha. is benefited by this reservoir.

1.2.5.4. RESERVOIR SEDIMENTATION: -

Gauging Division of P.W.D. conducted sedimentation surveys in Vidur reservoir during 1981, 1986 and 1991. As per the latest survey conducted in 1991, the average rate of silting per year is 0.046 M.Cum. and percentage annual storage loss is 0.27%. The loss in capacity of the reservoir over 32 years is 8.75%.

1.2.5.5. ANICUTS & TANKS : -

There are 39 anicuts and 256 Tanks in different locations in the Varahanadhi sub basin .Out of 39 anicuts about 38 anicuts are proposed to be taken up under this

IAMWARM Project. The Packagewise list of anicuts and tanks are furnished in Annexure 2A. Total ayacut cover under this anicuts is 3098.67 Ha of direct ayacut. The ayacut benefited by the tanks of the basin comes out to 18092.95 Ha. There are large numbers of tanks used to irrigate paddy. Due to problems of tank siltation, poor water schedulin g and water availability at field level is very low. Conjunctive use of tank and well water can improve the overall performance of irrigation systems.

Package wise details of Tanks & Anicuts

Package No	Block	Tanks		Anicuts		Total Ayacut Ha
		Nos	Ayacut Ha	Nos	Ayacut	
01	Kilpannathur , Thurijipuram	9	773.45	--	--	773.45
02	Pernamallur , Thellur	13	756.32	--	--	756.32
03	Thellur	8	389.84	--	--	389.84
04	Melmalayanur	24	1774.57	14	572.10	2346.67
05	Gingee	27	2060.43	5	35.64	2096.07
06	Vallam	24	1736.43	5	84.09	1820.52
07	Gingee	20	1559.29	3	83.52	1642.81
08	Mailam	17	1388.66	7	1508.00	2896.66
09	Mailam , Vanur	8	570.95	--	--	570.95
10	Mugayur,Kanai,Koliyanur& Vikkiravandi	29	2635.73	--	--	2635.73
11	Kanai,Koliyanur,Vikkiravandi	45	3264.90	3	736.00	4000.90
12	Koliyanur, Kandamangalam	12	1182.38	1	79.32	1261.70
Total		236	18092.95	38	3098.67	21191.62

and one reservoir 890.33

1.2.5.6. SUGGESTIONS FOR THE MEETING FUTURE NEEDS (I.W.S.): -

The Surface Water Potential of this basin has been almost utilized in full. The maximum quantity of Surface Water, ie. 85 to 90% is consumed by agriculture. But the overall efficiency of this sector is 30 to 40%. If about 10% of this consumption could be

reduced, it would result in considerable savings and the quantum of water could be spared for other purposes. The following short-term measures are suggested for reducing the consumption of water for irrigation.

1. Equitable distribution of irrigation water by better water management.

2. Improving the performance of the existing irrigation system by suitable structural measures.

3. Introducing micro irrigation like, drip and sprinkler irrigation.

4. Conjunctive use of surface and ground water wherever possible.

5. Renovating old tanks and ponds, desilting of supply channels and constructing water harvest structures to improve irrigation potential.

6. Planning for effective rainwater harvesting and saving surface water, which is let into sea during the flood.

7. Adopting better agricultural practices such as crop rotation, raising garden crops and other less water consuming crops.

Availability of water can be improved by extending the period of tank storage, it is possible to increase the recharge to ground water. Also due to increased irrigation, recharge to ground water from the conveyance system and irrigated fields would increase. Irrigation intensity can be increased substantially.

1.2.6. PRESENT AND FUTURE WATER DEMANDS (For Entire Basin):-

1.2.6.1. ECONOMIC BENEFITS DERIVED FROM WATER SUPPLY FOR IRRIGATION: -

The economic analysis carried out for the development and action plan is focused mainly on prioritization of developmental projects based on estimating some economic indicators such as Net Present Value (NPV), Internal Rate of Return (IRR), Benefit Cost Ratio (BCR) and the Net Present Value to Investment Ratio (NPV/I) for each one of the proposed projects. The benefits in this analysis reflect the economic value of using the water for irrigation.

The benefits assigned to new irrigation projects are assessed by estimating the net income per irrigated hectare. This is multiplied by the additional irrigated area enabled by the project to derive the total irrigation benefit of the project.

Crop budgets were prepared for the main irrigation crops in the Varahanadhi basin. They were first given in physical terms and then (with proper economic prices) in

monetary terms. The result is the net income per crop per hectare is given in the following table.

1.2.6.2. Net Income Per Hectare Estimates forIrrigated Crops in Varahanadhi Basin (I.W.S.)

Irrigated Crops	Net Income (Rs./Ha.)
Paddy Ist Crop	13304.54
Paddy IInd and Single Crop	10480.25
Ragi	8678.50
Cumbu	5968.35
Groundnut	14795.15
Cotton	9787.70
Pulses	3085.75
Gingelly	5634.58
Sugarcane	36373.20
Banana	55466.80
Coconut	27871.28

1.2.6.3. TABLE NET ECONOMIC BENEFITS UNDER EXISTING IRRIGATED CROP AREA UNDER OPTIMAL YIELD CONDITIONS IN VARAHANADHI BASIN: -

Sl. No.	Irrigated Crops	Gross Irrigated Area (Ha.)	Annual Benefits (Rs. Lakhs)
1.	Rice (First Crop)	49,525	6,589.07
2.	Rice (Second & Single Crop)	55,259	5,791.28
3.	Ragi	1,115	96.78
4.	Cumbu	632	37.71
5.	Groundnut	23,676	3,502.90
6.	Cotton	863	84.42
7.	Pulses	694	21.42
8.	Gingelly / Sesamum	909	51.21
9.	Sugarcane	14,663	5,333.40
10.	Banana	430	238.51
11.	Coconut	2,099	585.09
12.	Others	2,658	385.41
	TOTAL	**152,523**	**22,771.20**

It could be seen that the annual economic benefits to farmers under irrigated crops in an area of 1,52,523 Ha. would be in the order of Rs.22,717 / - Lakhs under optimal yield situation. However, the average yields in the basin is less than half of the optimal yield and would at least yield a benefit of Rs.11,350 Lakhs annually.

1.2.6.4. CROP WATER REQUIREMENT:-

COMPARISION BETWEEN SCENARIOS

Net Irrigation Demand at Field Level in Varahanadhi Basin

for 75% Dependability Rainfall.

Sl. No.	Sub Basin	Present Net irrigation demand (M.Cum)	Lower limit Net irrigation demand (M.Cum.)
1.	Varahanadhi	712.19	651.62

NOTE:- The above tabulation shows the net irrigation water demand at field level only. Gross irrigation demand after considering all losses and field efficiency is considered.

1.2.7. SOIL:-

Based on the soil properties and their classification the Basin soils were grouped for irrigation planning purposes, into 5 major groups denoted Type -I to Type-V. The intention is to determine uniform cropping patterns which would be associated to the soil Types, mainly for the assessment of future scenarios. The soil Types are described as follows:

Type 1 : Irrigable, fruits, Vegetables and field crop soils.

Type 2 : Irrigable crop soils.

Type 3 : Irrigable rice soils.

Type 4 : Non-Irrigable soils.

Type 5 : This soil includes Non-irrigable soils such as rock out crops

The command areas of the sub basin is mostly found as Type 2 & Type 3 which are suitable for all crops and particularly paddy.

The Description of Type-2 and Type-3 Soils are as follows:

Type-2 Soil:- They are of fine texture, imperfectly drained, moderately deep to deep, with 1 - 3% slope, with none to moderate erosion problems. Those soils are classified for irrigation as 2d and 3d, for land capability as 2, and for crop suitability: rice – NR, groundnuts – S3 and cotton – mainly S1 and some S3. The soils are irrigable and suitable for field crops relatively tolerant to imperfect drainage such as cotton, sorghum and some fodder crops. In spite of the above mentioned NR classification for sugarcane it can be con cluded that in the future with improved irrigation methods and systems, Type -2 soils with lower slopes, could also be cultivated by sugarcane.

Type-3 Soil:- They are mostly of fine texture, mostly imperfectly drained, moderately deep to deep, mostly with 1-3% slope, with none to moderate erosion problems. Those soils are classified for irrigation mainly as 2d and 2s, for land capability as 2, and for crop suitability: rice – mainly S2, sugarcane – mainly S2, groundnuts – mainly S3 and cotton – mainly S2. Type-3 soils are irrigable and suitable to rice and sugarcane and also to relatively tolerant to imperfect drainage other crops such as cotton, sorghum and some fodder crops.

1.2.7.1. PHYSICAL PROPERTIES: -

Regarding the physical properties of the soils , particularly the recharging capacity of the soils in the Varahanadhi sub basin area, it is reported that as per the study conducted by Anna University, Chennai – the sub basin has been classified as four zones viz.

(i) Highly favourable zone (53.15%)

(ii) Moderately favourble zone (20.42%)

(iii) Less favourable zone (8.18%)

(iv) Poor favourable zone (18.25%)

1.2.8. GEOLOGY:-

The Varahanadhi sub basin consists of hard crystalline rock masses of Archaen age for the most part of the area (84%) on the western portion and sedimentary rocks of Upper Gondwana, Cretaceous, Teritary and Quatenary age on the eastern portion (16%).

The Varahanadhi Sub basin exposes hare crystalline rocks of Archaen to proterozoic age and sedimentary rocks of

(i) Gondwana super group of Lower Gondwana age.

(ii) The Archaen group belonging to upper cretaceous age.

(iii) Transitional rocks between cretaceous and teritary group belonging to Mio - Pliocene age and

(iv) The laterite and alluvium relating to quaternary age.

1.2.9. CROPPING PATTERN:-

Total registered ayacut as on date is 19443.90 Ha. Paddy is the main wet crop of the basin. But due to in adequate distribution system and monsoon failures make the farmers to raise dry crops such as cholam etc. The garden crops such as Banana etc. are being raised in pockets depending on the wells, that too in the river margin. It is reported that the change of existing cropping pattern, introducing Drip Irrigation etc. and educating the farmers for economic cultivation, savings of water etc. are dealt in the detailed reports submitted by the line Departments of Agriculture Department, Agriculture Engineering Department, Horticulture Department, Forest Department, Agriculture Marketting Department, Animal Husbandry Department, Fi sheries Department and Agriculture University.

Sl. No.	Name of Crop	Cropping Period
1.	Paddy	September – January and January – May
2.	Groundnut	September – January, January – May and July – October
3.	Cholam	September – January and January – May
4.	Ragi	September – January, January – May and July – October
5.	Tapioca	July – March
6.	Sugarcan	January – Decembe
7.	Cotton	September – February
8.	Cumbu	January – May
9.	Vegitable	June – September and January – June
10.	Pulses	October – December.

(ii) CROP YIELD OF MOSTLY IRRIGATED CROPS IN THIS SUB BASIN: -

Sl. No.	Name of crop	Yield in Kg./Ha.	Remarks
1.	Paddy	5300	
2.	Groundnut	1634	
3.	Cholam	1100	
4.	Cumbu	1197	
5.	Tapioca	30000	
6.	Sugarcane	1,03,509	
7.	Cotton	1000	
8.	Coconut	14960 Nuts	

The major portion of irrigation activities in this basin start almost the middle of June and extend upto October. If the monsoons do not fail, the II Crop cultivation – mostly dry crops, will take place from December to February.

1.2.10 LAND USE:-

In the command area both wet and dry crops are being raised according to the water availability.

Total land use benefit under the IAMWARM Project excluding the works taken up under W.R.C.P., NABARD Loan Assistance works and maintenance works will be as belo w:

Sl. No.	Irrigation Works	Registered ayacut in Ha.	Average cultivated area in Ha	Gap ayacut in Ha.	% of Gap	Remarks
1.	Tank	18092.75				
2.	Anicut	3232.61				
3.	Reservoir	890.33				
	GRAND TOTAL	**22215.69**				

1.2.11. CLIMATE:-

1.2.11.1. TEMPRATURE:-

The average temperature is ranging from 19.20 °C. to 41.63°C. (maximum) and from 17.19°C. to 32.39°C. (minimum). December and January are the coolest months and May is the hottest month. This climatic data is almost hold good for the en tire sub Basin.

1.2.11.2. RELATIVE HUMIDITY:-

The nearest weather station of Varahanadhi Sub Basin is Kilnatchipattu - maintained by Public Works Department (SG & SWRDC) which is located at Latitude of 12°14'10" and Longitude 78°05'50". The monthly aver age percentage of relative humidity varies from 47.28% (June 1990) to 93.83% (November 1988).

1.2.11.3. WIND SPEED:-

Wind velocity has considerable influences on evoporation and evopotransipiration phenomena. Wind also has direct impact on claimate and vegitation. The average wind velocity varies from 0.89 to 16.55 Km/hour.

1.2.11.4. SUNSHINE: -

The average sunshine hrs/day varies from 2.16 to 10.63 hrs./day.

1.2.11.5. POTENTIAL EVAPORATION: -

The loss of water is caused due to evaporation particularly in arid and semi arid region. Hence while calculating the crop water requirement this evaporation loss has been considered for all crops. The average monthly evaporation varies from 55.90 mm. to 454.40 mm.

1.2.12. TOPOGRAPHY: -

Physiographically out of 2647.08 Sq.Km. of the sub basin area which are Peneplain with moderate and lesser undulations about 382.57 Sq.Km. of the basin area are covered by rock out crops hills and hillocks. The general slope of the terrain is towards South East. The plain area lies between the altitudes about 100 m. and 10 m. and confined to the South East valley portion. The North end has been occupied by Pakkammalai hills with altitudes ranging from 566 m. to 100 m.

1.2.13. GROUND WATER STATUS: -

Geologically this sub basin is a formation of granitic gneiss, charsockite and all soils with moderate permeability.

(i). Ground Water Suitability: -

The North parts of the Varahanadhi sub basin are covered by Pakkammalai hills. There is no chance for influencing the ground water quality for that side by neighboring sub basin. But the South and western part have some influence from the neighboring sub basin. The eastern part is alone having the sea water influences that too for 8.03%. Most of the wells in this sub basin have good and moderate ground water quality. The major constituents are found to be within the permissible limit. But in pockets of some parts like Gingee the total hardness value is found to above the permissible limit which did not create any irrigation problem in these sub basin.

(ii). Depth of Ground Water: -

There are sufficient wells in the sub basin to meet out the water scarcity to the maximum possible. The assessment of ground water potential is done by the State Ground Water and Surface Water Resources Data Centre, Chennai a wing of Public Works Department. The winter ground water level varies from 5.2 to 5.6 m/ depth and summer water level varies from 6.30 to 7.60 m. depth.

(iii). Ground Water Potential Based on 2003 Projected Assessment: -

Sl. No.	Name of Block	% of block area falls in sub basin	100% block net potential in M.Cum.	Block net potential in sub basin M.Cum.	Total sub basin net potential M.Cum.	Level of exploitation
1.	Chetpet	0.045	82.7421	3.687		Semi Critical
2.	Cuddalore	0.053	181.0729	9.626		Semi Critical
3.	Gingee	0.920	70.2987	64.671		Over Exploited
4.	Kalasapakkam	0.006	100.6154	0.771		Over Exploited.
5.	Konai	0.837	71.8683	60.132		Semi Critical
6.	Kandamangalam	0.473	104.4706	49.427		Over Exploited.
7.	Kilpennatur	0.326	74.9952	24.582		Over Exploited.
8.	Koliyanur	0.467	83.8833	39.142		Over Exploited.
9.	Mailam	0.645	65.8855	42.521		Over Exploited.
10.	Melmalayanur	1.000	82.1207	82.121		Over Exploited.
11.	Mugaiyur	0.174	83.0660	14.413		Over Exploited.
12.	Olakkur	0.031	59.1340	1.808		Over Exploited.
13.	Pernamalur	0.147	105.1326	15.412		Safe
14.	Thellar	0.286	124.7345	35.685		Safe
15.	Turinjapuram	0.274	89.4926	24.562		Over Exploited.
16.	Vallam	0.992	76.8781	76.299		Over Exploited.
17.	Vanur	0.221	93.8783	20.708		Critical
18.	Pondicherry	0.756	161.0729	136.819		Semi-Critical
19.	Vikravandi	1.000	79.6003	79.600	**781.99**	Over Exploited.

In this connection it is reported that in G.O. Ms. No.51, Dated 11.02.2004 the Government have instructed to provide rechargeable structures in the over exploited and critical zones. Accordingly in this IAMWARM Project Rechargeable structures have been included and estimate have been prepared by the Ground Water wing of P.W.D.

(iv). WELLS:-

In this sub basin about an average area of 60% of the command area are being irrigated with the supplementation of wells. The total number of observation wells of 89 Numbers have been maintained by P.W.D. Ground Water Wing.

1.2.14. WATER LOGGING AND SALINITY: -

The country is sloping fairly to the Bay of Bengal and hence natural drainage is existing. Even in the command area of the newly formed Vidur Reservoir several cross drainage works have been constructed across canals to pass the natural drains. In the basin there is water logging only in the two Kaluveli swamps. For irrigation purposes in the sub basin water logging is not at all a major problem due to the free drainage available in the command area.

Generally the soils in this basin are not harmful. But the alkalinity and salinity is identified in the mouth in Pondicherry Union Territory and the eastern part peripheral water spread area in the connected with the two Kaluveli swamps. Also minor area is demarcated in the western part around Gingee (about an area of 2.83%) which will not affect the main agriculture production in the other areas.

1.2.15. FARM OWNERSHIP STRUCTURE: -

Owner cultivation account is for 90% of the cultivable area with the balance cultivated by tenants. Holding are split into three segments such as:

(i) Marginal Farmers - holding less than 1 Ha.
(ii) Small Farmers - holding between 1 Ha. to 2 Ha.
(iii) Big Farmers - holding more than 2 Ha.

For Agriculture purpose, loan assistance of the Government, priority is given for marginal and small farmers through Co-operative Credit Societies. In addition to the Co-operative Societies, the nationalised banks and Land Development Banks also extend their Loan Assistance to the farmers. The farm operation is done either by tractor or bullocks according to availability.

1.3. VARAHANADHI SUB BASIN – POLITICAL:-

1.3.1. ADMINISTRATION:-

District : Villupuram, Thiruvannamalai

Taluks : Villupuram, Vanur, Tindivanam, Gingee Thirukovilur,Vandavasi, Thiruvannamalai

Municipalities : 12

Panchayat Unions Blocks : 19

Villages : 482

1.3.2. CONSTITUENCIES:-

Assembly constituencies : 8

Parliament Constituency : 2

1.3.3. DEMOGRAPHY:-

(i) The Urban and Rural Population as per Census 2001

Sl. No.	Sub Basin	Urban Population in million	Rural Population in million	Total Population in million.
1.	VARAHANADHI SUB BASIN	0.127	0.950	1.077

(ii) Population Density

Sl. No.	Sub Basin	Area in Sq.Km.	Total Population in millions	Density Person/ Sq.Km.
1.	VARAHANADHI SUB BASIN	2357.88 (excluding Pondicherry)	1.077	457

(iii) Literacy Population:-

Sl. No.	Male (in Million)	Female (in Million)	Total (in Million)
1.	0.046	0.30	0.76

(iv) Male and Female Ratio:-

For 1000 Male/985 Female (ie) 1:0.99

(v) The Annual Domestic Water Demand = 30.577 M.Cum.

1.3.4. LIVESTOCK POPULATION:-

(i) Cattle	307397
(ii) Buffaloes	8039
(iii) Sheep	108217
(iv) Goat	149803
(v) Horses	113
(vi) Pigs	28649
(vii) Rabbits	2032
(viii) Bovines	355959
(ix) Dogs	30059
(x) Fowls	291477

The annual water demand for animals is 40.089 M.Cum.

1.3.5. INDUSTRIES:-

(i) The basic objectives of the industrial policy pursued by the State Government are massive increase in employment opportunities, utilisation of local resources, explorations of new sectors hitherto untapped and development of backward area. In accordance with this policy, promotion of large and medium scale industries as well as small-scale industries have been aimed at the districts of the Tamil Nadu, in

collaboration with Tamil Nadu Industrial Investment Corporation (TIIC), Tamil Nadu Industrial Development Corporation (TIDCO) and Tamil Nadu Corporation for Industrial Infrastructure Development (TNCID).

The State's new industrial policy accords the highest priority to infrastructure development through TACID. Besides identifying and rectifying the existing gap in the infrastructure, TACID will also have a window for building up soft infrastructure such as hospitals, schools, etc. in areas newly industrialized.

There are about 41 large and medium industries in this basin at present. There are about 2729 small scale industries available in the basin.

(ii) AGRO-BASED INDUSTRIES: -

These industries provide employment opportunities to the agricultural labourers during the off-season and thereby enhance their income to a certain extent.

(iii) The total water requirement for industries = 17.34 M.Cum.

1.3.6. SOCIO ECONOMIC STATUS: -

Agriculture is the main occupation of the rural pop oulation of Varahanadhi sub basin. The farmers mostly depend on tank irrigation and well irrigation, besides area under project like Vidur Reservoir. Most of them are marginal and small farmers and there is inequality in the distribution of lands. This aspect has seriously eroded the economic viability of farm, leading the reduced efficiency and profit margin.

There is an exodus of rural agriculture labours to urban areas for their better livelihood. Hence ample employment facilities have to be provi ded to them in the sub basin.

2. OBJECTIVES

2.1. The broad and principal objectives of the Tamilnadu Water Policy are:-

(a) Ensure preservation and stabilization of the existing water resources.

(b) Plan for augmentation to utilizable water resources.

(c) Promote research and training facilities for water resources management.

(d) Establish allocation priorities for water use by different sectors with provisions of drinking water being of highest priority.

(e) Maximize multipurpose benefit from surface and ground wa ter, land and other resources.

(f) Maximize hydropower generation within the constraints imposed by other water users.

(g) Evolving a cropping pattern for devising the optimal benefit per unit of water.

(h) Provide adequate water for industry.

(i) Preserve and enhance the economic standards.

(j) Maintain water quality to establish standards.

(k) Plan for economic and financial sustainability based upon the principle that those benefit from projects and programs should also pay for them.

(l) Promote water users participation in all asp ects of water planning and management.

(m) Provide mechanisms for resolutions of conflicts between users and between intra-river basins.

To establish and ensure the above principal objectives of water policies it is become necessary to over come the followi ng existing and experienced problems and bottlenecks in the irrigation system of Varahanadhi Sub Basin.

2.2. REHABILITATION OF IRRIGATION INFRASTRUCTURES: -

(i) Most of the anicuts are in damaged conditions and without proper scourvents.

(ii) There are no regulating arrangements for supply canals in the off-take point from anicut resulting free entry of heavy silt in the feeder canals.

(iii) The tanks and its components works such as surplus weir, bund, sluices are in disturbed condition which are to be strengthened and standardised.

2.3. IMPROVING THE CONVEYANCE EFFICIENCY OF WATER: -

(i) Most of the filed channels and canals are in silted up and damaged condition with improper section. The channel courses have been encroached by the adjacent landowners. Because of these conditions sufficient flow does not reach up to the tail end ayacut areas.

(ii) Erosion of soil in the sides of canal and illicit quarrying of sand and earth are noticed in many places. Because of these defects the bed levels are in changed condition, which affect the free flow of water in the channel.

(iii) Water ways are devasted principally by the aquatic weed growth especially Juliflora, Neyveli Kattamanakku, Hyhomica etc. which spoils the water flow and quantity. These are to be uprooted.

(iv) Cross masonries are in damaged condition due to ageing and floods and public use.

2.4. RESTORATION OF SURFACE WATER AND GROUND WATER: -

(i) The ground water depletion is due to exploitation of ground water for agriculture purpose because of non-assured supply of water through the existing irrigation system. This necessitates to construct rechargeable

structures across the streams and rivers to harvest the rain water and to bring up the ground water table.

(ii) The seepage and perculation wastages in surface flow ie. in canals and channels have to be arrested by way of lining the canals where ever necessary.

2.5. PARTICIPATION OF WATER USERS: -

(i) To fulfill the objectives regarding water policies the involvement of farmers in this project are found necessary. The requirements of ayacutdars have been assessed by way of conducting meetings. Their suggestions and needs related to this IAMWARM Project are proposed to be carried out.

(ii) The main scope of this project is not only to increase the overall agriculture production by way of conserving water and introducing new techniques in cultivation but also to improve the living standards of farmers, especially the marginal and small farmers for which the strengthening and modernising the irrigation system of Varahanadhi sub Basin are to be implemented immediately.

2.6. COLLECTION OF DATA: -

(i) Collection of Hydraulic particulars of the Reservoirs, Anicuts, Sluice, System Tanks, non-system Tanks Panchayat Union Tanks, Canals are to be done to maintain Pacca records for the basin to carryout proper maintenance works in future.

(ii) Collection of data on land use and present practice of irrigation practiced by the farmers, so that modern methods of irrigation practices are explored for increasing the productivity of crops per unit cubic meter of water used for irrigation.

3.PROPOSALS UNDER THIS 'IAMWARM' PROJECT

This IAMWARM Project estimate envisages the following modernisation works in the Varahanadhi Sub Basin to attain the objectives already explained which will also be the remedial measures for the existing problems in the irrigation system.

3.1. ANICUTS:-

The main components of improvement works of anicuts are as below.

(i) Checking the adequacy of the anicut such as length, bodywall, Upstream and Downstream floors etc. and providing necessary improvements.

(ii) Providing sand vents at canal off take side for easy operation and to prevent the silt deposition on Upstream of anicut.

(iii) Necessary head sluices are proposed for the open off-take supply channels. Removing the silts on the Upstream side and providing necessary banks connections either by rough stone dry packing or R.R. Masonry according to the site condition.

3.2. TANKS:-

The following are the proposed main components of the modernisation of tanks.

(i) Improvements to tank bund as per standards.

(ii) Improvements to sluices after checking the adequacy of vents.

(iii) Improvements to surplus weir arrangements after checking the adequacy of the weir.

(iv) Regrading the field channels below the sluices including providing selective lining wherever essential.

3.3. CANALS AND CHANNELS: -

The following modernisation works are proposed to be carried out especially in the Varahanadhi Reservoir command area, to increase the efficiency of canals to carry water upto Tail end.

(i) Standardising the earthen canals and the leading canals by way of removing silts, uprooting weeds, and providing revetment at required places.

(ii) Lining the canals in the command area of Vidur Reservoir, and the supply channels from anicuts to make the flow easy with out dwindling of flow up to tail end.

(iii) At salient points necessary outlets are proposed including the improvements to the existing dividing dams in the supply channels.

(iv) Providing culverts and foot paths across canals wherever necessary to safeguard the canal sections as well as to full-fill the requirement and representation of the farmers.

3.5. O & M:-

This scheme is proposed to be completed within a period of 5 years after finalising the agencies. The operation of execution will be carried out by the existing staff strength available in Water Resources Organisation Wing. After completion of Project works the maintenance of the system will be looked after by the concerned territorial basin authorities of the Water Resources Organisation Wing.

4. ANALYSIS OF BENEFIT

By way of implementing this IAMWARM Project for modernising the Varahanadhi Sub Basin, the following benefits will be achieved.

4.1. AGRICULTURE BENEFIT: -

(i) The traditional tanks and anicut irrigation systems and the new Reservoir irrigation system of the basin will be modernised and assured and equitable water supply will be distributed all over the command area resulting 100% yield against the present yield of 60%.

(ii) About 6525.44 Ha. of Gap ayacut will be brought into cultivation.

(iii) In addition to the bridging of gap ayacut about 3888.80 Ha. of II Seasonal crops such as vegetables and pulses may be raised in the command areas with the supplementation of ground water through wells.

4.2. EMPLOYMENT BENEFITS: -

(i) During execution of this IAMWARM Project skilled and unskilled labours will get employment, every year, until the completion of Project.

(ii) By way of bridging the Gap ayacut and creating new wet crop ayacut about 60000 man days for agriculture labours vide Annexure 5 will be created during the successive years. The annual turn over towards the payment to the agriculture labours will be to a tune of Rs.5.23 Crores vide Annexure 5.

Besides, this project will facilitate additional employment opportunity to the agriculture labours of 982 villages in and around the command areas of the sub Basin for more than 100 days per year. Thus the IAMWARM Project will play a roll in the Indian Governments' aim of "Creating 100 Days employment opportunity per year".

4.3. SOCIAL ASPECTS:-

(i) Agriculture is the main occupation of rural population of the sub Basin. More than 80% of the farmers are marginal and small farmers. This project will increase the overall agriculture activities and production and also improve the living stands of marginal and small farmers.

(ii) There is exodus of rural agriculture labour to urban areas or other states such as Karnataka and Andra Pradesh for their better livelihood, only because of non-employment situations. After completion of IAMWARM Project ample employment opportunities will be created and kept them in their own villages with better life.

(iii) The raise of ground water potential due to formulation of new rechargeable check dams, Supply channels and bridging the registered gap ayacut, will solve the drinking water problems in the villages and hamlets located in and around the command areas of the basin.

5. CONCLUSION

In the Districts, where the Varahanadhi Sub Basin located, most of the people are very poor. They have to earn their livelihood as coolies engaged in agriculture works during crop season. Also most of the land holders are backward in all respects. By implementing this IAMWARM Project, there will be additional food production, more employment opportunities and improvement in socio-economic status of the people. Eventually after completion of the project, the sub soil water table in the command area will raise and due to raise of ground water table, there is scope for digging more wells to feed the additional crops during non irrigation seasons. This will also facilitate for fast development of processing industries for agriculture produces.

VARAHANADHI SUB BASIN
PACKAGE ABSTRACT - WRO PROPOSALS

Sl.No	Package No.	Package Name	Estimate Amount in Lakhs
1	01 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub Basin in Kilpennathur and Thurinjapuram Block in Thiruvannamalai Taluk of Thiruvannamalai District	88.77
2	02 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub Basin in Thellar and Pernamallur Block in Vandavasi Taluk of Thiruvannamalai District	78.50
3	03 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub Basin in Thellar Block in Vandavasi Taluk of Thiruvannamalai District	91.00
4	04 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Mel - malayanur Block, Gingee Taluk of Villupuram District	410.00
5	05 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Sup ply channels and all tanks covered under Varahanadhi Sub Basin in Gingee Block, Gingee Taluk of Villupuram District	229.00
6	06 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Vallam Block, Gingee Taluk of Villupuram District	237.00
7	07 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covere d under Varahanadhi Sub Basin in Gingee and Vallam Block, Gingee Taluk of Villupuram District	142.00
8	08 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered unde r Varahanadhi Sub Basin in Mailam Block, Tindivanam Taluk of Villupuram District	244.00
9	09 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Vidur Main canal, Supply channels and all tanks covered under Varahanadhi Su b Basin in Mailam and Vanur Block in Tindivanam and Vanur Taluk of Villupuram District	223.00
10	10 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varah anadhi Sub Basin in Mugaiyur, Kanai, Koliyanur and Vikkaravandi Block, Thirukoilur and Villupuram Taluk of Villupuram District	303.00
11	11 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub Basin in Vikkaravandi, Koliyanur and Kanai Block in Villupuram Taluk and District	283.00
12	12 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07	Rehabilitation and Modernization of Anicuts, Flood Banks, S upply channels and all tanks covered under Varahanadhi Sub Basin in Koliyanur and Kandamangalam Block in Villupuram Taluk and District	143.00
		WRO Total	**2472.27**

VARAHANADHI SUB BASIN

Package No:- 01 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07

Package Name:Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub basin in Kilpenathur, Thurinjapuram Block Thiruvannamalai Taluk of Thiruvannamalai District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl. No	Name of Tank / Anicut	Total Cost
1	1	Kilpenathur Tank	1397873
2	2	Kekkalur Tank	833171
3	3	Mekkalur Tank	527436
4	4	Kilpenathur Kooton Eri	302072
5	5	Mangalam Big Tank	909906
6	6	Mangalam Putheri	495891
7	7	Kothemthavadi Tank	815998
8	8	Erumpoondi Tank	1393981
9	9	Vedanthavadi Tank	961663
			7637991
10		**Lump Sum Provision**	
a)		Provision for Eviction and Demarcation	281905
b)		Provision for Documentation Charges	39000
c)		Provision for Name Board & Details etc	74000
d)		Provision for Special Tool & plants @ 1 %	77000
e)		Provision for Departmental Lab test (sand, concrete etc)	33000
f)		Provision for Advertisement charges	70000
g)		Provision for Labour welfare Fund @ 0.30%	26000
h)		Provision for Audit & Accounts @ 1 %	77000
i)		Provision for Photographic & Video charges	47000
j)		Provision for PS charges @ 2.5%	195000
k)		Provision for Contingencies @ 2.5%	195000
		WUA Building	
l)		Provision for Electrification	72000
m)		Provision for clearing the site and leveling site after completion	22104
n)		Provision for approach Road	30000
		Total Package Cost	**8877000**

88.77 Lakhs

(Rupees eighty eight lakhs and seventy seven thousand only)

VARAHANADHI SUB BASIN

Package No:- 02 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name:Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub basin in Pernamallur , Thellar Block Vandavasi Taluk of Thiruvannamalai District .

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
1	10	Reghunathasamudram Tank	1118438
2	11	Melathangal Tank	512733
3	12	Nedungunam Tank	699456
4	13	Kalayanapuram Tank	907492
5	14	Madam Hissa Kolathur Tank	24408
6	15	Thennathur Tank	1354050
7	16	Seeyamangalam Tank	24699
8	17	Desur Tank	24467
9	18	Chithrugavoor Tank	323056
10	19	Kunnagampoondi Tank	24395
11	20	Vedal Tank	24679
12	21	Kilangunam Tank	942765
13	22	Gengampoondi Tank	764615
			6745253
14		**Lump Sum Provision**	
a)		Provision for Eviction and Demarcation	200000
b)		Provision for Documentation Charges	60000
c)		Provision for Name Board & Details etc	160000
d)		Provision for Special Tool & plants @ 1 %	67500
e)		Provision for Departmental Lab test (sand, concrete etc)	60000
f)		Provision for Advertisement charges	50000
g)		Provision for Labour welfare Fund @ 0.30%	21000
h)		Provision for Audit & Accounts @ 1 %	67500
i)		Provision for Photographic & Video charges	20000
j)		Provision for PS charges @ 2.5%	166000
k)		Provision for Contingencies @ 2.5%	166000
l)		Unforeseen item of work	66747
		Total Package Cost	**7850000**

78.50 Lakhs

(Rupees seventy eight lakhs and fifty thousand)

VARAHANADHI SUB BASIN

Package No:- 03 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name:Rehabilitation and Modernization of Supply channels and all tanks covered under Varahanadhi Sub basin in Thellar Block Vandava si Taluk of Thiruvannamlai District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
1	23	Kilputhur Tank	1233160
2	24	Desur Sitheri Tank	703143
3	25	Achamangalam Tank	99821
4	26	Korakottai Tank	1014726
5	27	Nerkunnam Tank	2042187
6	28	Kilnamandy Tank	823983
7	29	Pennattagaram Tank	1036165
8	30	Gudalure Tank	1008657
			7961842
24		**Lump Sum Provision**	
a)		Provision for Eviction and Demarcation	210000
b)		Provision for Documentation Charges	60000
c)		Provision for Name Board & Details etc	140000
d)		Provision for Special Tool & plants @ 1 %	79600
e)		Provision for Departmental Lab test (sand, concrete etc)	60000
f)		Provision for Advertisement charges	50000
g)		Provision for Labour welfare Fund @ 0.30%	23885
h)		Provision for Audit & Accounts @ 1 %	79600
i)		Provision for Photographic & Video charges	20000
j)		Provision for PS charges @ 2.5%	199000
k)		Provision for Contingencies @ 2.5%	190000
l)		Unforeseen item of work	26073
		Total Package Cost	**9100000**

Say

91.00 Lakhs

(Rupees ninety one lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 04 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name:Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub basin in Mel -malayanur Block Gingee Taluk of Villupuram District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
		Tanks	
1	31	Thalangunam Tank	771215
2	32	Koilpuraiyur Tank	623522
3	33	Kunthalampattu Tank	622773
4	34	Kapplambadi Tank	731235
5	35	Kottapoondi Tank	726663
6	36	Unnamandal Tank	647340
7	37	Naranamangalam Tank	825371
8	38	Mel - Sevalambadi Tank	1565559
9	39	Parthipuram Tank	879441
10	40	Annamangalam Tank	752179
11	41	Devanur Pee Eri	265066
12	42	Devanur Agraharathu Tank	933979
13	43	Samathakuppam Tank	455189
14	44	Peruvalur Tank	672961
15	45	Thurinjipoondi Tank	462945
16	46	Melmannur Tank	524992
17	47	Eyyakunam Tank	489720
18	48	Sevalapurai Tank	1283245
19	49	Vadapalai Tank	557474
20	50	Thenpalai citheri Tank	301249
21	51	Thenpalai Periya Eri	686509

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
22	52	Thenpalai Hanuman Tank	1063036
23	53	Kalathampattu Tank	694881
24	54	Maanandal Tank	900813
		Anicut	
25	A-1	Melpudupattu Anicut	380274
26	A-2	Kundalampattu Anicut	396069
27	A-3	Thenpalai Anicut	467058
28	A-4	Sekadikuppam Anicut	341503
29	A-5	Sangilikuppam Anicut	408558
30	A-6	Unnamandal Anicut	438187
31	A-7	Gudapattu Anicut	3525921
32	A-8	Siyampoondi Anicut	2083789
33	A-9	Kannalam Anicut	957830
34	A-10	Kadali Anicut	898827
35	A-11	Avalurpetai Anicut	353997
36	A-12	Chokkapallam Anicut	258122
37	A-13	Kovilpuraiyur Anicut	133358
38	A-14	Sevalpurai Anicut	8722140
			36802990
39		**Lump Sum Provision**	
a)		Provision for Documentation Charges	250000
b)		Provision for Name Board & Details etc	350000
c)		Provision for Special Tool & plants @ 1 %	368030
d)		Provision for Departmental Lab test (sand, concrete etc)	200000
e)		Provision for Advertisement charges	200000
f)		Provision for Labour welfare Fund @ 0.30%	110400
g)		Provision for Audit & Accounts @ 1 %	368030
h)		Provision for Photographic & Video charges	280000
i)		Provision for PS charges @ 2.5%	920000
j)		Provision for Contingencies @ 2.5%	920000
k)		Unforeseen item of work	230550
		Total Package Cost	**41000000**

or

410.00 Lakhs

(Rupees four hundred and ten lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 05 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name: Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub b asin in Gingee Block Gingee Taluk of Villupuram District .

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
		Tanks	
1	55	Odiyathur Tank	334689
2	56	Thandavasamuthiram Kadaperi.	375039
3	57	Anai eri Tank	495073
4	58	Thuthiupattu Amman eri	263371
5	59	Pazhavalam Tank	511864
6	60	Sirunampoondi Tank	575775
7	61	Madapoondi Tank	352172
8	62	Karai jammbodi Tank	474488
9	63	Nallampillaipetral perieri	1141172
10	64	Kavarai Tank	501423
11	65	Mathur thirukai Tank	808117
12	66	Paddipallam Tank	635693
13	67	Perungapur Tank	590007
14	68	Se-pattai Tank	756233
15	69	Nallampillaipetral Salaputhur Tank	1016639
16	70	Konalur Tank	679670
17	71	Sennalur Tank	344827
18	72	Oddambattu Tank	773315
19	73	Gangavaram Tank	819874

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
20	74	Allampoondi Tank	754976
21	75	Devathanampettai Tank	1032060
22	76	Semmadu Tank	799580
23	77	Pakkam Tank	997809
24	78	So-Kuppam Tank	738976
25	79	Sathiyamangalam Tank	1636385
26	80	Thandavasamutharam Kommetueri	660698
27	81	Mel -Pamppambadi Tank	108453
		Anicut	
28	A -15	Konai Anicut	163186
29	A -16	Sathiyamangalam Anicut	477623
30	A -17	Nallanpillaipetral Anicut	215985
31	A -18	Ponpathy Anicut	669862
32	A -19	Jayakondan Anicut	631159
			20336193
33		**Lump Sum Provision**	
a)		Provision for Documentation Charges	150000
b)		Provision for Name Board & Details etc	280000
c)		Provision for Special Tool & plants @ 1 %	200000
d)		Provision for Departmental Lab test (sand, concrete etc)	80000
e)		Provision for Advertisement charges	125000
f)		Provision for Labour welfare Fund @ 0.30%	61000
g)		Provision for Audit & Accounts @ 1 %	200000
h)		Provision for Photographic & Video charg es	250000
i)		Provision for PS charges @ 2.5%	550000
j)		Provision for Contingencies @ 2.5%	550000
k)		Unforeseen item of work	117807
			22900000
			(Say)
			229.00 Lakhks
		(Rupees Two Hundred and Twenty Nine Lakhs)	

VARAHANADHI SUB BASIN

Package No:- 06 / IAMWARM / VNSB / WRO / LPBD /NCB06 -07

Package Name:Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub basin in Vallam Block Gingee Taluk of Villupuram District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
		Tanks	
1	82	Kallapuliyur Tank	1028833
2	83	Irumbuli Tank	554324
3	84	Perumpoondi Tank	672908
4	85	Kariyamangalam Tank	615287
5	86	Mel Kalavai Tank	613450
6	87	Eachur Tank	457521
7	88	Perumpugai Tank	822040
8	89	Kadambur Tank	780671
9	90	Agalur Tank	676577
10	91	Mel - Olakkuur Citheri	907640
11	92	Thondur Tank	487784
12	93	Koravanandal Tank	573405
13	94	Illodu Tank	657943
14	95	Mahadevimangalam Tank	542842
15	96	Chellapirati Tank	512770
16	97	Veeranamur Tank	557880
17	98	Ethanemili Tank	751964
18	99	Panapakkan Tank	870837
19	100	Vallam Tank	464177
20	101	Mel - Sithamur Tank	1039517
21	102	Arugavoor - Hissa Tank	900606
22	103	Arugavoor Sivanandal Tank	723400
23	104	Bonthairantham Tank	752041
24	105	Anathur Tank	544504
		Anicut	
25	A-20	Melathur Anicut	1510617
26	A-21	Thondur Anicut	653485
27	A-22	MelOlakkur Anciut	629028
28	A-23	Nangiyandal Anicut	608638
29	A-24	Aviyur Anicut	1327295
			21237984

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
30		**Lump Sum Provision**	
a)		Provision for Documentation Charges	210000
b)		Provision for Name Board & Details etc	260000
c)		Provision for Special Tool & plants @ 1 %	200000
d)		Provision for Departmental Lab test (sand, concrete etc)	100000
e)		Provision for Advertisement charges	160000
f)		Provision for Labour welfare Fund @ 0.30%	63060
g)		Provision for Audit & Accounts @ 1 %	210188
h)		Provision for Photographic & Video charges	150000
i)		Provision for PS charges @ 2.5%	525470
j)		Provision for Contingencies @ 2.5%	525470
k)		Unforeseen item of work	57828
		Total Package Cost	**23700000**

or

237.00 Lakhs

(Rupees Two Hundred and Thirty Seven lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 07 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name: Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub basin in Gingee & Vallam Block Gingee Taluk of Villupuram District .

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
1	106	Mattaparai Tank	547930
2	107	Kappai Tank	457998
3	108	Kadagumpoondai Tank	682017
4	109	Kongarapattu Tank	715207
5	110	Kurinjipai Tank	414228
6	111	Singavaram Tank	427468
7	112	Meleddyalam Tank	201647
8	113	Pallapattu Tank	247338
9	114	Thudupakkam Tank	605098
10	115	Jambothy Tank	1187591
11	116	Mel -Seevour Tank	916092
12	117	Thaiyur Tank	562659
13	118	Thiruvampattu Tank	738994
14	119	Thiruvathikunnam Tank	618463
15	120	Marur Tank	360032
16	121	Ponpathy Tank	634213
17	122	Kalladikuppam Tank	599770
18	123	Kallalippattu Tank	681707
19	124	Sorathur Tank	282559
20	125	Kammandur Tank	780631
21	A-25	Vilvamadevi Anicut	213246
22	A-26	Aniladi Anicut	369407
23	A-27	Jambothy Anicut	401157
			12645452
24		**Lump Sum Provision**	
a)		Provision for Documentation Charges	130000
b)		Provision for Name Board & Details etc	180000

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
c)		Provision for Special Tool & plants @ 1 %	125000
d)		Provision for Departmental Lab test (sand, concrete etc)	65000
e)		Provision for Advertisement charges	65000
f)		Provision for Labour welfare Fund @ 0.30%	40000
g)		Provision for Audit & Accounts @ 1 %	126000
h)		Provision for Photographic & Video charges	160000
i)		Provision for PS charges @ 2.5%	320000
j)		Provision for Contingencies @ 2.5%	320000
k)		Unforeseen item of work	23548
		Total Package Cost	**14200000**

Say

142.00 Lakhs

(Rupees One Hundred and forty two lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 08 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name: Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub basin in Mailam Block Tindivanm Taluk of Villupura m District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
		Tanks	
1	126	Rettanai Thangal Tank	829521
2	127	Naradikuppam Tank	978161
3	128	Chendur Tank	108011
4	129	Vengandur Tank	1209693
5	130	V. Nallalam Tank	850849
6	131	V.Panchalam Tank	767960
7	132	Sithani Tank	663754
8	133	Vilangambadi Tank	751330
9	134	Kothamangalam Tank	724195
10	135	Sendiyampakkam Tank	851986
11	136	Chinnanerkunnam Tank	1277805
12	137	Pathirapuliyaur Tank	870436
13	138	Thenalapakkam Tank	709687
14	139	Vizhukkam Tank	894770
15	140	Elamangalam Tank	849323
16	141	Deevanur Tank	704200
17	142	Puliyanur Tank	699085
		Anicut	
18	A-28	Perani Anciut	715471
19	A-29	Sengamedu Anicut	1827169
20	A-31	Pathirapuliyur Anicut	1273973
21	A-32	Nedimozhiyanur Anicut-I	2914763

Sl.No.	Tank / Anicut.Sl.No	Name of Tank / Anicut	Total Cost
22	A-33	Nedimozhiyanur Anicut-II	798914
23	A-34	Chendur	587387
			21858443
24		**Lump Sum Provision**	
a)		Provision for Documentation Charges	150000
b)		Provision for Name Board & Details etc	320000
c)		Provision for Special Tool & plants @ 1 %	218585
d)		Provision for Departmental Lab test (sand, concrete etc)	80000
e)		Provision for Advertisement charges	110000
f)		Provision for Labour welfare Fund @ 0.30%	66000
g)		Provision for Audit & Accounts @ 1 %	218585
h)		Provision for Photographic & Video charges	180000
i)		Provision for PS charges @ 2.5%	546461
j)		Provision for Contingencies @ 2.5%	546461
k)		Unforeseen item of work	105465
		Total Package Cost	**24400000**

or

244.00 Lakhs

(Rupees Two Hundred and Forty Four Five lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 9 / IAMWARM / VNSB / WRO / LPBD /NCB 06-07

Name of Work:- Rehabilitation and Modernization of Vidur Main canal, Supply Channels and all tanks covered under Varahanadhi Sub basin in Mailam and Vanur Block in Tindivanam and Vanur Taluk of Villupuram District

GENERAL ABSTRACT

Sl.No.	Tank / Reservoir.Sl.No	Name of Tank / Anicut	Total Cost
		Tank	
1	143	Vidur Tank	1673808
2	144	Ponnampoondi Tank	506399
3	145	Korakkari Tank	493034
4	146	Eraiyur Tank	812245
5	147	Nemili Tank	444561
6	148	Thollamur Tank	519282
7	149	Thiruvakkarai Tank	318576
8	150	Sengamedu Tank	277899
9	R-1	Vidur Main canal	14984555
			20030359
10		**Lump Sum Provision**	
a)		Provision for Documentation Charges	150000
b)		Provision for Name Board & Details etc	180000
c)		Provision for Special Tool & plants @ 1 %	200300
d)		Provision for Departmental Lab test (sand, concrete etc)	100000
e)		Provision for Advertisement charges	75000
f)		Provision for Labour welfare Fund @ 0.30%	60100
g)		Provision for Audit & Accounts @ 1 %	200300
h)		Provision for Photographic & Video charges	200000
i)		Provision for PS charges @ 2.5%	500750
j)		Provision for Contingencies @ 2.5%	500750
k)		Unforeseen item of work	102441
		Total Package Cost	**22300000**

Say

223.00 Lakhs

(Rupees Two Hundred and Twenty three lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 10 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name: Rehabilitation and Modernization of Supply channels a nd all tanks covered under Varahanadhi Sub basin in Mugaiyur,Kanai, Koliyanur and Vikaravandi Block in Villupuram Taluk & District

GENERAL ABSTRACT

Sl. No.	Tank / Anicut.Sl.No	Name of Tank	Total Cost
I		**Tanks**	
1	151	Veeringipuram Tank	497761
2	152	Sennakunnam	409098
3	153	Velliyampattu tank	1202650
4	154	Porur Hissa Tank	645145
5	155	Hanumanthanpuram Iayaynar Eri	41557
6	156	Velleripattu Tank	799010
7	157	Athiyur Tirukkai Tank	1229367
8	158	Thirukunnam Tank	654416
9	159	AnniyurTank	707833
10	160	Semmedu tank	397341
11	161	Veeramur Hissa Tank	1258705
12	162	Kakanur Periya Eri	224896
13	163	Ariyalur Tirukkai tank	1194119
14	164	Malligapattu	1052459
15	165	Palliyandur Tank	777985
16	166	Kangeyanur Peria eri	743180
17	167	Kangaiyanur Ayyan Eri	1068345
18	168	Kuppam Eri	1441780
19	169	Karungalipattu Tank	721224
20	170	Maragathapuram tank	1738110
21	171	Pidagam Large Tank	1198799
22	172	Pidagam Sitheri	121429
23	173	Kandamanadi Tank	1085566

Sl. No.	Tank / Anicut.Sl.No	Name of Tank	Total Cost
24	174	Valuthareddy Large Tank	2507395
25	175	Alathur Tank	671637
26	176	Virattikuppam tank	751677
27	177	Muthuampalayan Tank	786410
28	178	Ayyur Agaram Tank	1897552
29	179	Orathur Tank	1166569
			26992015
30		**Lump Sum Provision**	
a)		Provision for Documentation Charges	200000
b)		Provision for Name Board & Details etc	569890
c)		Provision for Special Tool & plants @ 1 %	270000
d)		Provision for Departmental Lab test (sand, concrete etc)	100000
e)		Provision for Advertisement charges	100000
f)		Provision for Labour welfare Fund @ 0.30%	80735
g)		Provision for Audit & Accounts @ 1 %	270000
h)		Provision for Photographic & Video charges	200000
i)		Provision for PS charges @ 2.5%	675000
j)		Provision for Contingencies @ 2.5%	675000
k)		Unforeseen item of work	167360
		Total Package Cost	**30300000**

Say

303.00 Lakhs

(Rupees Three Hundred and three lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 11 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name: Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadhi Sub basin in Vikkaravandi,Koliyanur and Kanai Block in Vi llupuram Taluk & District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl. No	Name of Tank / Anicut	Total Cost
		Tanks	
1	180	Nangathur Tank	292309
2	181	Muttathur Tank	946281
3	182	S.Pudur Tank	349051
4	183	S.Kunnadhur Tank	332468
5	184	S.Kolapakkam Tank	1029316
6	185	Mandagapattu Tank	303640
7	186	Brammadesam Tank	688570
8	187	Esalam Tank	547173
9	188	Eachankuppam Tank	240789
10	189	Nemur Tank	471520
11	190	Melakaranai Tank	493237
12	191	Nanthivadi Tank	364297
13	192	Elusempon Tank	140980
14	193	Kanjanur Tank	567762
15	194	Adanur Tank	815127
16	195	Kaspakaranai Tank	155320
17	196	Asur Tank	546660
18	197	Ulagalampoondi	308693
19	198	Kottiyampoondi Tank	644624
20	199	Kongarampoondi Tank	427655
21	200	Sathanur Papanampattu Tank	2437186
22	201	V.Salai Tank	1067047

Sl.No.	Tank / Anicut.Sl. No	Name of Tank / Anicut	Total Cost
23	202	Vikkiravandi Tank	742817
24	203	Panayampuram Tank	550398
25	204	Radhapuram Iyyanar Eri	276866
26	205	Radhapuram Large Tank	221875
27	206	Radha Puram Small Tank	564997
28	207	Radha Puram Otteri	472708
29	208	Seyyaduvannan Tank	32828
30	209	Vishwareddy Palayam Tank	465547
31	210	Mungilpattu Tank	489887
32	211	Madurapakkam Arsanthangal	67060
33	212	Poyyapakkam Tank	664121
34	213	Kakuppam	381753
35	214	Senganthangal Tank	487886
36	215	Kappiyampuliyur Small Tank	139060
37	216	Pagandai Tank	517985
38	217	Korakkamthangal Tank	448428
39	218	V.Maruthur Tank	835179
40	219	Salamedu Ponneri	157719
41	220	Salamedu Iyyanar Eri	260681
42	221	Panamapattu Tank	1021542
43	222	Anangur Tank	679942
44	223	Kavanikuppam Tank	86148
45	224	V.Agaram Periya Eri	690684
		Anicut	
1	A-35	Pedaripattu Anicut	291482
2	A-36	Melakondai Anicut	667203
3	A-37	Vikkaravandi Anicut	229630
			24614131
46		**Lump Sum Provision**	
a)		Provision for Documentation Charges	300000
b)		Provision for Name Board & Details etc	1000000

Sl.No.	Tank / Anicut.Sl. No	Name of Tank / Anicut	Total Cost
c)		Provision for Special Tool & plants @ 1 %	246000
d)		Provision for Departmental Lab test (sand, concrete etc)	100000
e)		Provision for Advertisement charges	100000
f)		Provision for Labour welfare Fund @ 0.30%	74000
g)		Provision for Audit & Accounts @ 1 %	246000
h)		Provision for Photographic & Video charges	250000
i)		Provision for PS charges @ 2.5%	615000
j)		Provision for Contingencies @ 2.5%	615000
k)		Unforeseen item of work	139869
		Total Package Cost	**28300000**

Say

283.00 Lakhs

(Rupees Two Hundred and Eighty three lakhs Only)

VARAHANADHI SUB BASIN

Package No:- 12 / IAMWARM / VNSB / WRO / LPBD /NCB 06 -07

Package Name: Rehabilitation and Modernization of Anicuts, Flood Banks, Supply channels and all tanks covered under Varahanadh i Sub basin in Koliyanur, Kandamangalam Block in Villupuram Taluk & District

GENERAL ABSTRACT

Sl.No.	Tank / Anicut.Sl.No.	Name of Tank / Anicut	Total Cost
		Tanks	
1	225	Naraiyur Tank	774478
2	226	Siruvanthadu Tank	1326339
3	227	Kothampakkam Tank	995902
4	228	Pallineliyanur Tank	1375954
5	229	Pallipudupattu Tank	1326107
6	230	Madagapattu Tank	1096932
7	231	Azhiyur Tank	782728
8	232	Chinnababusamuthiram Tank	258297
9	233	Navamal Kapper Tank	771157
10	234	Chithalampattu Tank	860889
11	235	Kodukur Tank	830102
12	236	Vahuthavur Tank	1047895
		Anicut	
13	A-38	Kothambakkam Anicut	1119956
			12566736
14		**Lump Sum Provision**	
a)		Provision for Documentation Charges	130000
b)		Provision for Name Board & Details etc	280000
c)		Provision for Special Tool & plants @ 1 %	125000
d)		Provision for Departmental Lab test (sand, concrete etc)	65000
e)		Provision for Advertisement charges	65000
f)		Provision for Labour welfare Fund @ 0.30%	40000
g)		Provision for Audit & Accounts @ 1 %	126000
h)		Provision for Photographic & Video charges	190000
i)		Provision for PS charges @ 2.5%	320000
j)		Provision for Contingencies @ 2.5%	320000
k)		Unforeseen item of work	72264
		Total Package Cost	**14300000**

Say

143.00 Lakhs

(Rupees One Hundred and forty three lakhs Only)

LINE DEPARTMENT
PROPOSALS

AGRICULTURE DEPARTMENT PROPOSALS

IAMWARM PROJECT

AGRICULTURE

INTRODUCTION:

SUBBASIN : VARAGANATHY
BASIN : VILLUPURAM
DISTRICT : VILLUPURAM
WRO REGION : MADRAS

BLOCKS COVERED:

1. GINGEE	**2. MELMALAIYANUR**	**3. VALLEM**
4. MAILAM	**5. VANUR**	**6. VIKRAVANDY**
7. KOLIYANUR	**8. KANDAMANGALAM**	**9. KANAI**
10. MUGAIUR	**11. THIRUJIYAPURAM**	**12. KILPENATHUR**
13. PERANAMULAR	**14. THELLAR**	

Varaganathy Sub-basin is one of the 9 Sub-basins selected for the implementation of IAMWARM project in TAMILNADU under WORLD BANK assistance. This sub-basin has the registered ayacut area of 22215 Ha-10 years average rainfall at the basin is 1060mm. The important Crops grown in the sub-basin are paddy, groundnut, sugarcane, blackgram, gingelly, vegetables, coconut, mango etc.,

OBJECTIVE :

To increase the income of the farmers per unit of land / per unit of irrigation water.

PLAN

- **Diversification of low profit high water requirement crops to high profit, low water requirement crops, especially to commercial crops.**
- **Gap area coverage with irrigated crops**
- **Transfer of Latest production technologies to increase the productivity through.**
- **Demmonstrations and area coverage**
- **Distribution of crtical inputs in time**
- **More area coverage with SRI in paddy**
- **Strengthening of field visit**
- **Trainings to farmers and field staff**
- **Strengthening information and publicty a ctivities.**

- **Exposire visits.**
- **Using Agri. Clinic Services**
- **Frequent review and documentation of reports and achievements**
- **Encouraging contract farming.**

The Details of Land Utilization pattern of the Viluppuram District given in the table below.

LAND UTILISATION

District : Viluppuram

Sl. No.	Details	2000-01	2001-02	2002-03	2003-04	2004-05
1.	Total Geographical area of the District	722203	722203	722203	7222203	722203
2.	Forest	71697	71697	71697	71697	71697
3.	Uncultivable Waste	56651	56655	56651	56651	56651
4.	Land put to non-agricultural use	119973	120328	121198	135028	135634
5.	Cultivable waste	11830	11602	11951	11108	11192
6.	Pasture	4195	4195	4195	4195	4195
7.	Thopes and Groves	+7435	7652	7494	6565	6396
8.	Current fallows	94088	89796	169971	124950	92151
9.	Other fallow	18324	17278	30033	24732	23892
10.	Net area sown	338026	343000	249013	287367	320395
11.	Area sown more than once	34090	37611	20523	68591	53299
12.	Gross Area sown	372116	380611	269536	355958	373694
13.	Cropping intensity	110%	111%	108% (Drought)	124%	116.6%

The General Particulars Pertaining to Viluppuram District is furnished below.

AGRO CLIMATIC ZONE - NORTH EASTERN ZONE

1. Population:

	Male	:	16,20,852
	Female	:	14,58,120

2. Classification of workers:

	Cultivators	:	4,78,543
	Small/Marginal farmers	:	4,50,946
	Agricultural Labourers	:	5,29,671

3. Animal Husbandry:

1.	Plough Animal	:	3,14,787
2.	Dairy Animal	:	6,19,431
3.	Sheep	:	3,39,507
4.	Goat	:	4,86,395
5.	Poultry	:	7,47,304

The details monthwise, season wise, and yearwise rainfall of the Viluppuram District is given in the table below for the last 5 years from 2000 -2005

RAINFALL DETAILS IN VILUPPURAM DISTRICT

District: Viluppuram

Name of the Month	Normal Rainfall (mm)	Rainfall (mm.)					
		2000	2001	2002	2003	2004	2005
January	9.72	10.50	1.18	6.50	-	2.50	-
February	8.63	94.00	-	9.88	-	-	8.00
March	8.68	7.00	-	-	6.00	-	17.00
April	11.25	10.00	50.00	13.00	6.60	-	51.30
May	27.25	20.50	22.00	-	15.10	398.60	59.20
June	54.70	63.06	7.50	106.99	29.50	39.50	13.50
July	72.30	12.50	121.95	95.59	125.60	54.50	48.20
August	108.36	115.21	190.02	38.00	239.23	24.00	120.00
September	121.30	47.27	15.00	39.00	72.87	353.50	185.50
October	252.11	371.46	169.13	154.41	187.06	328.50	231.62
November	317.80	132.75	144.00	152.25	239.65	192.07	489.46
December	68.20	47.75	55.35	75.44	19.70	-	334.00
TOTAL	**1060.30**	**932.00**	**776.13**	**691.06**	**941.31**	**1393.17**	**1557.78**

Rainfall Details – Season wise (Unit : in mm)

Sl No	Season	Normal rainfall	Actual Rainfall					
			2000	2001	2002	2003	2004	2005
1.	Winter (Jan-Feb)	18.35	104.50	1.18	16.38	-	2.50	8.00
2.	Summer (Mar-May)	47.18	37.50	79.5	13.00	27.70	398.60	127.67
3.	S.W.M (Jun-Sep)	356.66	238.04	326.97	279.58	467.20	471.50	367.20
4.	N.E.M (Oct-Dec)	638.11	551.94	368.48	382.1	446.41	520.57	1055.08
	TOTAL	**1060.30**	**932.00**	**776.13**	**691.06**	**941.31**	**1393.17**	**1557.78**

Existing Cropping pattern

Groundnut - Paddy
Agu-Nov Dec-Mar

Groundnut - Groundnut/Gingelly
Agu-Nov Dec-Mar

Pulses - Groundnut
Agu-Nov Dec-Mar

Groundnut - Ragi/Cumbu/Cotton
Agu-Nov Dec-Mar

Groundnut - Sugarcane
Agu-Nov Dec-Nov

Proposed cropping pattern

Groundnut - Paddy
Agu-Nov Dec-Mar

Groundnut - Groundnut/Gingelly
Agu-Nov Dec-Mar

Pulses - Groundnut
Agu-Nov Dec-Mar

Groundnut - Ragi/Cumbu/Cotton
Agu-Nov Dec-Mar

Groundnut - Sugarcane
Agu-Nov Dec-Nov

Groundnut - Maize
Agu-Nov Dec-March

Varahanadhi sub basin crop pattern

Sl. No	Name of the crops cultivated	Area under crops in Ha						
		Without project				With project		
		Fully	Partially	(Gap) Rainfed	Total	Fully	Partially 2nd crop	Total
1	Paddy (Dec-Mar)	6800			6800	6000		6000
2	Ragi(Dec-Mar)	100			100	200		200
3	Cumbu (Dec-Mar)	30		100	130	130		130
4	Maize (Dec-Mar)				-	1000		1000
5	Pulses Blackgram) (Aug-Nov)			1425	1425		1425	1425
6	Pulses Blackgram) (Dec-Mar)		1460		1460	1960		1960
7	Ground nut (Aug-Nov)			5000	5000		5000	5000
8	Ground nut (Dec-Mar)	2164	1784		3948	6705		6705
9	Gingelly (Dec-Mar)		974		974	2000		2000
10	Coconut (Perennial)	20			20	20		20
11	Cotton (Dec-Mar)	100			100	225		225
12	Sugarcane (Dec)	1083			1083	2000		2000
13	Watermelon (Dec-Mar)	150			150	300		300
14	Bhendi (Dec-Mar)	150			150	300		300
15	Flowers (Dec-Mar)	200			200	375		375
16	Mango (Perennial)		650		650	650		650
17	Banana (Dec-Mar)	25			25	50		50
18	Fodder (Aug-Nov)				-	300		300
	Total	10822	4868	6525	22215	22215	6425	28640
	Crapping intersity				100			129

Details of increasing decreasing new Crop in the Project

Sl. No	Name of the crop	Increasing Crop (Ha)	Decreasing area (Ha)	NewCrop (Ha)
1	Paddy	-	800	-
2	Ragi	100	-	-
3	Maize	-	-	1000
4	Pulses. Black Gram	500	-	-
5	Groundnut	2757	-	-
6	Gingelly	1026	-	-
7	Cotton	125	-	-
8	Sugarcane	917	-	-
9	Watermelon	150	-	-
10	Bhendi	150	-	-
11	Flowers	175	-	-
12	Banana	25	-	-
13	Mango	-	-	-
14	Fodder	-	-	300
	Total	5925	800	1300

Existing irrigation potential

Out of the registered ayacut area of 22215 Ha. the present irrigation potential is as given below.

Fully irrigated	**10822**	**Ha**
Partially irrigated	**4868**	**Ha**
Gap	**6525**	**Ha**
Total	**22215**	**Ha**

1. Agricultural infrastructure available:

The details of agriculture infrastructure like AEC, FTC, STL, Sub depots, SSF, SPU, TNAU Regional research station, Regulated Markets, Sugar factories, Modern Rice mills etc., are indicated in the sub-basin map. In addition to above details. Details of the gap area, area in which diversified crops are proposed etc., are also indicated in the sub-basin map enclosed with this (Map 1).

Existing Agriculture Crop Scenario

Cropwise area, production and productivity for the existing and the proposed cropping pattern are given in the following tables.

Area productivity and production in Vara hanadhi sub Basin (Without Project)

Sl. No	Name of the Crop	Fully			Partially			Rainfed			Total	
		Area in ha	Productivity in MT/ha	Production in MT/ha	Area in ha	Productivity MT	Production in MT	Area in ha.	Productivity MT	Production in MT	Area in ha.	Production in MT
1.	Paddy -Dec –Mar	6800	4.72	32096			0			0	6800	32096
2.	Ragi- Dec-March	100	2.61	261			0				100	261
3.	Cumbu-Aug-Nov	30	3.1	93			0	100	0.8	80	130	173
4.	Maize Dec-Mar			0			0				0	0
5.	Pulses-B.G.-Aug-Nov			0			0	1425	0.58	826.5	1425	826.5
6.	Pulses-B.G.-Dec-Mar			0	1460	0.74	1080.4				1460	1080.4
7.	Ground nut-Aug-Nov			0			0	5000	1.57	7850	5000	7850
8.	Groundnut-Dec-Mar	2164	2.43	5258.52	1784	1.93	3443.12				3948	8701.64
9.	Gingilly Dec-Mar			0	974	0.4	389.6				974	389.6
10	Coconut - Pemnial	20	11200	224000			0				20	224000
11	Cotton-Dec-Mar	100	1	100			0				100	100
12	Sugarcane - Dec	1083	114	123462			0				1083	123462
13	Watermelon-Dec	150	20	3000			0				150	3000
14	Bhendi-Dec-Mar	150	3.97	595.5			0				150	595.5
15	Flowers-Dec-Mar	200	5	1000			0				200	1000
16	Mango-Pemnial			0	650	4.77	3100.5				650	3100.5
17	Banana-Dec-Mar	25	42.47	1061.75			0				25	1061.75
18	Fodder (perennial)			0			0				0	0
	Total	**10822**		**166927.77**	**4868**		**8013.62**	**6525**				**183697.89**

Footnote

Total production excludes coconut because which is in number

Area productivity and production in Varahanadhi sub Basin (With Project)

Sl. No	Name of the Crop	Fully			Partialy			Total	
		Area in ha	Productivity in MT/ha	Production in MT/ha	Area in ha	Productivity in MT/ha	Production in MT/ha	Area in ha	Production in MT
1	Paddy-Dec-Mar	6000	4.95	29700			0	6000	29700
2	Ragi-Dec-Mar	200	2.74	548			0	200	548
3	Cumbu-Aug.Nov.De	130	3.25	422.5			0	130	422.5
4	Maize Dec-March	1000	3.80	3800			0	1000	1800
5	Pulses-B.G Aug-Nov			0	1425	0.78	1111.5	1425	1111.5
6	Pulses-B.G Dec-Mar	1960	1.02	1999.2			0	1960	1999.2
7	Groundnut-Aug-Nov			0	5000	2.02	10100	5000	10100
8	Groundnut-Dec-Mar	6705	2.55	17097.75			0	6698	17079.9
9	Gingilly-Dec-Mar	2000	0.75	1500			0	2007	842.94
10	Coconut(N)-Perennial	20	11760.00	235200			0	20	235200
11	Cotton-Dec-March	225	1.50	338.00			0	225	338.00
12	Sugarcane-Dec	2000	120.00	240000			0	2000	240000
13	Watermelon-Dec-Ma	300	21.00	6300			0	300	6300
14	Bhendi-Dec-Mar	300	4.20	1260			0	300	1260
15	Flowers-Dec-March	375	5.25	1968.75			0	375	1968.75
16	Mango-Perennial	650	5.00	3250			0	650	3250
17	Banana-Dec-Mar	50	44.29	2214.5			0	50	2214.5
18	Fodder (perennial)	300	200.00	60000			0	300	60000
	Total	**22215**		**370399**	**6425**		**11211.5**	**28640**	**378935**

Footnote

Total production excludes coconut because which is in number

Cropwise increased income expected in the proposed cropping pattern under the project over the existing cropping pattern is given in the Table.

Comparative Study of Crop wise product ion and Total Income For Varaganadhi Sub-basin without project and with project

		Without Project			With Project		
Sl.No	**Crop**	**Totalk Production M.T**	**Average Price/M.T**	**Total Income**	**Total Production**	**Average Price/M.T**	**Total Income (L.Rs.)**
			(Rs,)	**(L.Rs)**	**(M.T)**	**(Rs.)**	
1	Paddy	32096	5600	1797.376	29700	5600	1663.20
2	Ragi	261	6220	16.234	548	6220	34.09
3	Cumbu	173	7400	12.802	423	7400	31.30
4	Maize	0	7000	0.000	3800	7000	266.00
5	Pulses (B.G)	1907	34000	648.380	3110	34000	1057.40
6	Groundnut	16551	22000	3641.220	27179	22000	5979.38
7	Gingelly	390	25000	97.500	1500	25000	375.00
8	Cotton	100	21000	21.000	338	21000	70.98
9	Sugarcane	123462	1000	1234.620	240000	1000	2400.00
10	Watermelon	3000	2500	75.000	6300	2500	157.50
11	Bhendhi	595	3000	17.850	1260	3000	37.80
12	Flowers	1000	5000	50.000	1968	5000	98.40
13	Mango	3100	8000	248.000	3250	8000	260.00
14	Banana	1061	4000	42.440	2214	4000	88.56
15	Coconut (NO)	224000	4	8.960	253200	4	10.13
16	Fodder	0	450	0.000	60000	450	270.00
	Total			**7911.38**			**12799.74**

II. Existing agriculture practices in the Sub-basin are:

Inputs (a) Seeds:

The farmers to a limited extent use Certified/Hybrid/Improved Quality seeds and planting materials only. Only in millets the farmer uses traditional low yielding local varieties. In certain pockets, however the area under such millets is limited in the sub-basin. The main source of seeds to the farmers is through the Agricultural extension centres. Many farmers use their own seeds and also exchange quality seeds among themselves. Some farmers get the required quality seeds from private agencies. Rarely some innovative farmers get the required seeds from the near by TNAU research stations and KVKS.

(b) Soil:

The soil types are follows:

S.No.	Soil types
1.	Clay Soils
2.	Sandy loamy soils
3.	Sandy soils
4.	Red Loamy soils

Farmers testing their soils mostly once in a year through the assistance of the agricultural extension staff of the area. The soils are mainly tested through the departmental MSTL available in the district. In view of large number of soil samples proposed to be covered, as a result of intensive cropping, agri clinics may be set-up by using unemployed agricultural graduates for testing the soil.

c) Organic Farming

Organic farming practices are not in practice so for in the sub-basin. Necessary steps are being taken to educate the farmers through demonstrations, trainings, pre-seasons campaign and other mass-media channels 30% of the farmers. Raise green manure Crop and plough in situ. 50% of the farmers apply FARM YARD MANURE. However 100% use of only organic manures in not prevalent in the sub-basin. Slowly farmers aware of the benefits of the use of organic manures and it may take few more years to adapt significantly.

d) INM & IPM

Nearly 30 to 40% of the farmers adapt INM & IPM practices, In Paddy, pulses, and oil seed crops.

The percentage of adaption of this practices may increase significantly in future due to extension efforts like demonstration, trainings and campaign being taken by the agricultural department.

e) Actual Extension services available for TOT:

For transfer of latest farming techniques many extension techniques are being adapted. One of the main extension service is existence of AECS in all the block Headquarters and sub-depots in the needly locations. Through AECS required critical farm inputs, especially seeds, bio-fertilizer, Micronutrients & bio pesticides and implements are distributed to the farmers mostly under subsidized cost. Besides distribution of inputs required technical advices essential for increased productivity are given to farmers in person. In addition required publicity and propaganda are being made through various media to educate the formers in time to adapt the latest production technologies to increase the productivity of crops. There is a TNAU regional research station for oil seeds crops, KVK at Tindivanam, which caters the technical needs of the farmers of the district. As per the T&V norms, there must be one village level extension worker for every 800 to 1200-form families but such norms is not in reality due to lot of vacancies.

Practices – Ground Realities.

a) Irrigation

The details of water availability, season, sources etc. are given below.

S.No	Sources	Season	Period
1.	Reservoirs	Navari	Dec-Mar
2.	Tanks	Navari	Dec-Mar
3.	Wells	Kharif	Apr-Sep

b) Micro irrigation:

Micro irrigation practices are increasing year-by-year and popular among the farmers. The details of area under Micro irrigation Crop wise give below.

S.No	Crop	Type of Irrigation		
		Sprinkles	Drip	Pipeline
1.	Paddy	-	-	525
2.	Ground nut	15	-	300
3.	Sugarcane	-	50	-
4.	Pulses	-	-	275
	Total	15	50	1100

c) Fertigation:

Few farmers are following Fertigation practices in the sub-basin. Fertigation is practiced in sugarcane crop.

d) Contract farming:

Contract farming is popular only in sugarcane crop. This year contract farming is proposed far groundnut crop in 400Ha tieing up with NAFED.

e) Pre & Post harvest practices adopted:

As for as paddy is concerned, farmers' use only certified seeds. IPM and INM practices are also followed considerably. As a post harvest practice few farmers harvest the produce and store for 2 to 3 months before selling to get good price.

As for as groundnut is concerned the seed material is treated with bacterial culture to induce root nodules, which helps to fix atmosphere nitrogen in the plants. Band application of gypsum also practiced followed by hoeing and weeding which also induces peg formation and bold pod formation. Many farmers stock the produce for 2 to 3 months to get more prices.

As per blackgram is concerned the seed materials treated with bacterial culture to induce root nodules, which helps to fix atmosphere nitrogen in the plants for robust growth. DAP foliar spray is practiced which induces more pod formation. Many farmers stock the produce for 2 to 3 months to get more prices.

f) Labour issues

Labour availability is a problem due to migration from rural area to urban areas to get more wages by doing non-agricultural work. Many farmers use family labours in addition to hired labors by paying overwages. Skilled labours are scare in the sub basin.

AGRO PROCESSING FACTORIES, CAPACITY ETC.

The Details of various agro-processing units, factories, available in the sub-basin is given below.

Sl. No.	Details	Numbers	Capacity
1.	Modern Rice Mills	40	200MT/Day
2.	Oil Mills GIANT	1	5MT/Day
3.	Oil Mills Small	42	21MT/Day
4.	Sugar Factory	1	5,000MT/Day

CONSTRAINTS:

1. Constraints in existing scenario

a) Problem Soil:

In few Pockets, there is Problem soil in the sub-basin, which needs reclamation.

b) Adverse climatic condition – drought / Flood

The temperature is generally high and drought occurred for 2 years followed by heavy rain in 2005- 2006.

c) Inferior / Improper Seeds & Varieties

Low yielding local varieties are exsisting in few pockets especially in millets. About 5% millet area under traditional low yielding varieties Poor yielding varieties still exist in minor millets.

d) Limited availability of seeds from Government Sources.

Certified seeds are stocked in the AEC as per the seed Replacement Ratio norms prescribed by the Department. Hybrid seeds cost more, which is not distributed through department.

e) Inferior Irrigation practices (Flood Irrigation)

Flood irrigation system still exists, for paddy and sugarcane crop.

f) Inadequate extension Services.

Full pledged extension service is not available due to limited extension workers in the department.

g) Low Price for Produces during Heavy harvest season and lack of intra suppor t services.

Poor adoption of pre & post harvest technologies. The details are as follows.

S.No.	Crop	
1.	Paddy	1. More Nitrogen fertilizer used. 2. Flood Irrigation still followed. 3. Closer Plant is not followed 4. Line planting is not followed
2.	Sugarcane	1. Pit method plant is not followed 2. Flood irrigation still exsist. 3. Drip not adopted 4. Late cutting order given by the mill.
3.	Millets	Local varieties still used in minor millets.
4.	Groundnut	Most farmers sell their produce immediately after harvest. Rainfed grou ndnut yields less.
5.	Black Gram	Most farmers sell their produce immediately after harvest Rainfed Black Gram yields less.

h) Getting form credit through nationalized banks, are tough compared to through co-operative.

i) Risk Aversion

Knowledge of risk aversion is poor with farmers due to non contact of AECS and departmental officers, due to lack of training, capacity building, IEC facilities to aware the new technology in cultivation of crops.

j) AGRO Processing Units are limited in the case of maize.

k) Labour availability is problem in their sub basin. Formers have to spend more on labour wages.

Diversification/ Future Vision Proposed

The total Ayacut area of the Sub-basin is 22215 ha, of which only 15690 ha is under cultiviation. Hence there is a gap of 6525 ha which is going for rainfet crop. In this gap area it is proposed cover 1000 ha maize and 2750 ha with groundnut tin the project of start with and full gap will be covered with in the project period of 5 years.

Strategy :

The farmers will be encouraged to go in for well irrigated maize and groundnut crops till WRO works are completed and gap area is irrigated by Surface Water.

Reasons for Diversification of the Crop and introduction of new crop in the proposed cropping pattern for the project.

1. PADDY

As it consumes considerable quantity of water farmers are unwilling to grow up paddy and seek a alternative crop. Thus there is reduction of around 800 hectare during next 3 years.

2. MAIZE

Maize crop is catching in the sub basing as a other area of the state, the poultry industry is registering considerable growth and the poultry feed requirement for maize is estimated to 18 lakhs MT. While, the supply from the state is around three lakh MT only. Thus there is considerab le gap to be met from the farmers of the state. Thus an increasing area of 1000 hectare under maize is in envisaged. Incidentally stover portion of the maize is utilized as fodder. Farmers meet their demands like seeds, fertilizers, plant protection chemic als etc, through private sources.

3. PULSES

In view of cultivation economics favourable to pulses crop by selling of pulses @ Rs.25-30 per kg more farmers are opting of cultivation of pulses crop.

In the short duration nature and the less irrigation requirement are additional advantageous. Thus an increase in area of 500 hectares is anticipated. Farmers meet their seeds demand through seed village programme and also through private sources and farmers exchange. Plant protection chemicals, fertilizers etc. through private sources .

4. GROUND NUT

The agro climatic situation of this district favourable for groundnut crop which is a major crop of this area for long time. The presence of regulated markets ensures profitable price for the produce. Taking advantages of the farmers are expressed the desire for more area under this crop to anextend of 2750 hectare. Farmers meet their seeds demand through seed village programme and also through private sources and farmers exchange. Plant protection chemicals, fertilizers etc. through private sources

5. GINGEELY

Gingeely is a traditional crop of this area and increasing customer preference for this oil is motivated by many oil manufactures like VVD, Idyam etc., who have positioned permanent procurement arra ngement in this area. The crop requires less irrigation which is an added advantageous.

Pest and disease problem is less in the case of this crop. Thus an additional area 1000 hectares is anticipated over the next period of 3 years. Farmers meet their seeds demand through Agricultural depo and private sources and formers Exchange. Plant protection chemicals, fertilizers etc. through private sources

6. SUGARCANE

Sugarcane crop is expanding in this district due to presence of M/s. Rajshree Sugars Mill Ltd situated at Mundiyampakkam, Co-operative Sugarmills at Mugilthuraipattu, and also EID Parry at Nellikuppam and discussion with M/s Rajshree Sugars indicated that they are prepared to procure around 10.2 lakhs MT for this year. While the supply was around 9 Lakh MT only. Thus the additional area proposed for 900 hectares.

7. FODDER

There is no fodder crop in the existing cropping pattern. An area of 300 ha has been suggested in the proposed cropping pattern for the project. The fodder production would be utilized by the fermers to feed their own farm anmails.

Locations of diversified and new crops are indicated in MAP-2.

CHALLENGES THROWN UP BY DIVERSIFICATION /AREA EXPANSION

1. **WRO should ensure quality water availability throughout the croppin g pattern. They should release water in time and equal distribution of water from Head to tail end throughout the cropping season.**

2. **Proposed cropping pattern for the project is given in the table. The crops suggested based on agro climatic suitability, mar ket demand and farmers choice.**

3. **Required quality seeds/planting material will be made available in all AECS, private sources and exchanging among the farmers.**

4. **Regarding diversion and introduction of new crops/varieties lengthy discussion had with the FA/W UA during joint walk through, joint meetings. Farmers accepted the new approach. For the mind set of farmers, training will be given, pre-season campaigns may be arranged, demonstrations will be conducted, publicity and propaganda through various media.**

5. **In addition to the available extension services in the sub -basin, the service of the Agri-clinics to be set-up with unemployed agri, graduates will be utilized if necessary. The services of NGOs who are already in agricultural sector will be utilized as an d when needed on contract basis. The services of TNAU/KVK will be utilized.**

6. **Information, Education and communication facilities will be strengthened at AEC level, Market information at different places may be gathered and informed to farmers through rural Development Department etc...**

Solutions and Recommendations:

To overcome the constraints and challenges detailed above, the issue was discussed during the joint walk through in the sub basin and also during joint meeting with WRO line department officials and WUA/FA

Joint Walk through survey	**27.07.06**
Held on	**11.08.06**
	12.08.06
Joint meeting held on	**27.07.06**
	11.08.06
	12.08.06
	31.08.06

During the above meetings and walk through, the farmers were consulted frequently and the demands were chalked out.

The details of WUA /F A demand & Agriculture components of activities which was finalized during the joint meeting are given below along with the cost estimate for five years.

Developmental components proposed

1. Issue of Soil Health cards

Soil testing to be done to find out the PH, EC Macro Nutrients and Micro Nutrients present in the soil. Based on which farmers can correct the soil through the application of soil amendments and required quantity of fertilizers to be ap ply to the crop. Due to which excess inorganic fertilizers usage by the farmers is avoided.

Here financial assistance is provided @ 100% subsidy cost.

2. Paddy Micro nutrient mixture 10 Ha demonstration

Availability of micro nutrient to Paddy crop is less which leads to yellowing and stunting of crop growth. In turn which decreases the yield. For this purpose paddy micro nutrient mixture is distributed to layout demonstration at the rate of 12.5kg/Ha which increases the yield. For which necess ary financial assistance is provided @ 25% subsidy.

3. Paddy bio-fertilizer 10 HA Demonstration

Microbial activity is less in the soil due to excess application of inorganic fertilizers. To promote organic fertilizers application and to avoid environment al pollution, Bio-fertilizers may be distributed to layout demonstrate to increase the yield.

Here azospyrilum is distributed at the rate at 25 pockets for Ha which fixes atmosphere nitrogen in the soil thereby reducing the application of inorganic fertilizers. For which necessary finance assistance is provided.

4. Paddy 10Ha Green manure seeds demonstration

To avoid excess application of inorganic fertilizers, to promote organic manures green manure seeds like Daincha Crotolaria and Indigo may be distributed to layout demonstrations. The crops are sown and before the flowering, they are ploughed in situ. It increases the soil fertility of the soil. Green manure seeds 25 Kg/Ha is recommended for which necessary financial assistance is provided.

5. Hybrid Maize 5 hectare demonstration

To focus the attention of the farmers maize is the new crop going to be and introduce around 1000 hectres in the sub-basin. Hybrid maize gives varieties. Therefore Hybrid maize seed is distributed @ 15 kg per ha. The seeds will be distributed @ 100 percent subsidy.

6. 5 Ha Bio fertilizer Demonstration for Groundnut crop

To promote organic fertilizers application and to avoid environmental pollution Bio-fertilizers may be distributed to layout demonstrations.

Here for groundnut crop

Rhizobium (Ground nut) 10 pockets/Ha and Phosphor/Bacteria 10 pockets/Ha distributed.

Rhizobium induces to form root nodules which fixes atmosphere nitrogen. Phosptobacteria dissolves the unavailable form of phosphorus into available form

7. 5 Ha Groundnut Mixture Demonstration

Availability of Micro nutrient to groundnut crop is less which stunts crop growth in turn decreases the yield. For this purpose groundnut Micro nutrient mixture at the rate 12.5kg/ha is distributed to layou t demonstration which increases the yield. For which necessary financial assistance is provided @ 50% subsidy.

8. 5 Ha IPM Demonstration in Ground Nut Crop

Here farmers are taught to identify beneficial insects and harmful insects. To avoid chemical plant production measures farmers are supply with biocides which avoids environmental pollution.

The biocides are distributed to the farmers @ 100% subsidy.

VII) The Details of Constraints in exsisting is scenario and the counter measures proposed are given below.

Constraints	**Counter measures**
a. Problem Soil **In few pockets there is problem soil in the sub-basin area**	**Soil testing could be done. The problem soil is to be reclaimed with suitable soil amendment.**
b. Adverse climatic condition –drought	**Suitable drought resistant varieties in addition to drought proof/cultural practices will be recommended.**
c. Inferior Quality of seeds	**Low yielding traditional varieties are there in the villages under minor millets. Steps will be taken to replace the same with improved hybrid varieties.**
d. Limited availability and distribution of certified seeds from Government sources/ Private.	**Required Quality of certified seeds will be stored in all AECS as per the norms for distribution fixed by Department. To overcome the high cost of hybrid seeds, suitable private sources, which could supply at cheaper cost will be identified and recommended to the farmers in future.**
e. Improved varieties	**Steps will be taken up to replace varieties by timely supply of improved variety to the farmer. Farmers will be suitably educated through training and demonstratations.**
f. Improved irrigation practice (Flood irrigation)	**Farmers will be trained/educated for economic and judicious use of irrigation water through demonstrations and trainings Micro irrigation will be introduced for the needly crop through AED**
g. Inadequate extension services	**If necessary agri clinic will be set up with the help of unemployed agri graduates will be utilized. Services of NGOs who are already in agricultural sector will be utilized as and when needed on contract bases. The services TNAU/KVK will be utilized.**
h. Low price of produce	**The cost of produce goes low during harvest periods. Hence the farmers will be suitably educated and to store the produce for 2 to 3 months to get high price. Storage godowns may be setup.**
i. Poor adoption of pre&post harvest technologies for (eg) excessive use of plant protection chemicals	**Farmers will be educated suitably through trainings pre-seasons campaign and demonstration, Introduction of IPM & INM practices, Micro irrigation practices etc.,**

Constraints	**Counter measures**
j. Limited availability of credit facilities	**Necessary steps will be taken to arrange credit facilities (crop loan) through co-operative societies and nationalized banks loan on produce stock will be arranged through regulated market**
k. Risk aversion	**To overcome the risk aversion farmers will be educated suitably on market demand, yield potential, technology available, price situation before choosing a crop. Farmers will be educated for capacity building through trainings and campaigns IEC facilities will be given to the farmers through various media and also through internet facilities available in block development offices.**
L. Limited processing units	**As far as this sub-basin is concerned in the case of maize crop, agro-processing units limited. Poultry feed in which maize is the major ingredient, Poultry feed manufacturing units may be set up to meet the demand of Maize farmers.**
m. Availability of labour	**Labour availabilities is a problem in the sub-basin. To overcome labor problem. Labor saving farm equipments, hand and power operated sprayers, Micro irrigations systems will be taken up.**

DEVELOPMENTAL COMPONENETS PROPOSED - FOR 5 YEARS

(ABSTRACT)

Sl. No	Name of the Item	Cost Perdemonstration							
		Govt Share (Rs)	Former Share (Rs)	Total (Rs)	No	Govt. Share (L. Rs)	Farmers Share (L. Rs)	Total (L. Rs)	Area to be covered (in Ha)
1	Issue of Soil Health Cards 100% Subsidy	16	..	16	22000	3.52	_	3.52	8800
2	Paddy Micro nutrient mixture 10Ha demonstration 25 % subsidy	438	1312	1750	140	0.613	1.837	2.45	1400
3	Paddy Bio-fertilizer 10 Ha. Demonstration 25 % subsidy	375	1125	1500	140	0.525	1.575	2.10	1400
4	10 Ha. Paddy - Green manure seeds demonstration 25 % subsidy	1750	5250	7000	140	2.450	7.350	9.80	1400
5	5 Ha Hybrid maize demonstration 100% Subsidy	7500	..	7500	50	3.750	_	3.75	250
6	5 Ha. Bio-fertilizer demonstration for Groundnut crop subsidy Rs.50/HA	250	350	600	135	0.3375	0.4725	0.81	675
7	5Ha .Groundnut Micro nutrient mixture demonstration 50% subsidy	980	980	1960	135	1.323	1.323	2.65	675
8	5Ha IPM demonstration for groundnut crop 100% subsidy	6250	..	6250	135	8.4375	_	8.44	675
	TOTAL PROJECT COST					**20.956**	**12.557**	**33.51**	

DEVELOPMENTAL COMPONENETS PROPOSED - FOR 5 YEARS

Sl. No	Name of the Item	Cost Perdemonstration			I st Year		II nd Year		IIIrd Year		IVth Year		V th Year		Total	
		Govt Share (Rs)	Former Share (Rs)	Total (Rs)	No	Finance L..Rs	No	Finance L..Rs	No	Finance L..Rs	No	Finance L..Rs	No	Finance L..Rs	No	Finance L..Rs
1	Issue of Soil Health Cards 100% Subsidy	16	..	16	4300	0.688	4100	0.656	4400	0.704	4500	0.72	4700	0.752	22000	3.52
2	Paddy Micro nutrient mixture 10Ha demonstration 25 % subsidy	438	1312	1750	30	0.525	29	0.5075	29	0.5075	27	0.4725	25	0.4325	140	2.45
3	Paddy Bio-fertilizer 10 Ha. Demonstration 25 % subsidy	375	1125	1500	30	0.45	29	0.435	29	0.435	27	0.405	25	0.375	140	2.10
4	10 Ha. Paddy - Green manure seeds demonstration 25 % subsidy	1750	5250	7000	30	2.1	29	2.03	29	2.03	27	1.89	25	1.75	140	9.80
5	5 Ha Hybrid maize demonstration 100% Subsidy	7500	..	7500	18	1.35	5	0.375	14	1.05	8	0.6	5	0.375	50	3.75
6	5 Ha. Bio-fertilizer demonstration for Groundnut crop subsidy Rs.50/HA	250	350	600	27	0.162	27	0.162	27	0.162	27	0.162	27	0.162	135	0.81
7	5Ha .Groundnut Micro nutrient mixture demonstration 50% subsidy	980	980	1960	27	0.529	27	0.529	27	0.529	27	0.529	27	0.529	135	2.65
8	5Ha IPM demonstration for groundnut crop 100% subsidy	6250	..	6250	27	1.688	27	1.688	27	1.688	27	1.688	27	1.688	135	8.44
	TOTAL PROJECT COST					**7.492**		**6.38**		**7.11**		**6.467**		**6.064**		**33.51**

Block wise Component wise Year wise Project Cost
1) Issue of Soil Health Cards 100% Subsidy (L. Rs.)

Sl.No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	660	0.106	635	0.102	660	0.106	585	0.094	685	0.110	3225	0.516
2	Vallam	455	0.073	300	0.048	465	0.074	625	0.100	500	0.080	2345	0.375
3	Melmalayanur	530	0.085	470	0.075	570	0.091	510	0.082	510	0.082	2590	0.414
4	Koliyanur	410	0.066	410	0.066	410	0.066	440	0.070	410	0.066	2080	0.333
5	Kanai	230	0.037	230	0.037	230	0.037	260	0.042	260	0.042	1210	0.194
6	Kandamangalam	260	0.042	200	0.032	200	0.032	200	0.032	200	0.032	1060	0.170
7	Vikravandi	680	0.109	680	0.109	680	0.109	650	0.104	670	0.107	3360	0.538
8	Mailam	500	0.080	400	0.064	390	0.062	450	0.072	540	0.086	2280	0.365
9	Vanur	315	0.050	415	0.066	375	0.060	450	0.072	355	0.057	1910	0.306
10	Mugaiyur	0	0.000	50	0.008	0	0.000	50	0.008	50	0.008	150	0.024
11	Perenamallur	50	0.008	50	0.008	50	0.008	0	0.000	50	0.008	200	0.032
12	Theller	180	0.029	180	0.029	160	0.026	190	0.030	200	0.032	910	0.146
13	Keelpennathure	50	0.008	50	0.008	100	0.016	50	0.008	100	0.016	350	0.056
14	Thurinjiapuram	70	0.011	70	0.011	70	0.011	50	0.008	70	0.011	330	0.053
	Total	4390	0.702	4140	0.662	4360	0.698	4510	0.722	4600	0.736	22000	3.520

Block wise Component wise Year wise Project Cost

2) Paddy M N Mixture 10 ha Demonstration 25% Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	7	0.123	6	0.105	5	0.088	4	0.070	7	0.123	29	0.508
2	Vallam	5	0.088	6	0.105	6	0.105	7	0.123	5	0.088	29	0.508
3	Melmalayanur	6	0.105	4	0.070	4	0.070	2	0.035	2	0.035	18	0.315
4	Koliyanur	1	0.018	2	0.035	2	0.035	2	0.035	1	0.018	8	0.140
5	Kanai	1	0.018	0	0.000	2	0.035	1	0.018	1	0.018	5	0.088
6	Kandamangalam	2	0.035	1	0.018	2	0.035	1	0.018	1	0.018	7	0.123
7	Vikravandi	3	0.053	3	0.053	2	0.035	2	0.035	3	0.053	13	0.228
8	Mailam	2	0.035	3	0.053	2	0.035	4	0.070	2	0.035	13	0.228
9	Vanur	1	0.018	1	0.018	1	0.018	1	0.018	1	0.018	5	0.088
10	Mugaiyur	0	0.000	1	0.018	0	0.000	0	0.000	0	0.000	1	0.018
11	Perenamallur	0	0.000	0	0.000	1	0.018	1	0.018	0	0.000	2	0.035
12	Theller	1	0.018	2	0.035	1	0.018	1	0.018	1	0.018	6	0.105
13	Keelpennathure	0	0.000	0	0.000	1	0.018	1	0.018	0	0.000	2	0.035
14	Thurinjiapuram	1	0.018	0	0.000	0	0.000	0	0.000	1	0.018	2	0.035
	Total	30	0.525	29	0.508	29	0.508	27	0.473	25	0.438	140	2.450

Block wise Component wise Year wise Project Cost

3) Paddy Bio-Fertilizer 10 ha Demonstration 25% Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	7	0.105	6	0.090	5	0.075	4	0.060	7	0.105	29	0.435
2	Vallam	5	0.075	6	0.090	6	0.090	7	0.105	5	0.075	29	0.435
3	Melmalayanur	6	0.090	4	0.060	4	0.060	2	0.030	2	0.030	18	0.270
4	Koliyanur	1	0.015	2	0.030	2	0.030	2	0.030	1	0.015	8	0.120
5	Kanai	1	0.015	0	0.000	2	0.030	1	0.015	1	0.015	5	0.075
6	Kandamangalam	2	0.030	1	0.015	2	0.030	1	0.015	1	0.015	7	0.105
7	Vikravandi	3	0.045	3	0.045	2	0.030	2	0.030	3	0.045	13	0.195
8	Mailam	2	0.030	3	0.045	2	0.030	4	0.060	2	0.030	13	0.195
9	Vanur	1	0.015	1	0.015	1	0.015	1	0.015	1	0.015	5	0.075
10	Mugaiyur	0	0.000	1	0.015	0	0.000	0	0.000	0	0.000	1	0.015
11	Perenamallur	0	0.000	0	0.000	1	0.015	1	0.015	0	0.000	2	0.030
12	Theller	1	0.015	2	0.030	1	0.015	1	0.015	1	0.015	6	0.090
13	Keelpennathure	0	0.000	0	0.000	1	0.015	1	0.015	0	0.000	2	0.030
14	Thurinjiapuram	1	0.015	0	0.000	0	0.000	0	0.000	1	0.015	2	0.030
	Total	30	0.450	29	0.435	29	0.435	27	0.405	25	0.375	140	2.100

Block wise Component wise Year wise Project Cost
4) Paddy Green -Manure Seeds 10 ha Demonstration 25% Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	7	0.490	6	0.420	5	0.350	4	0.280	7	0.490	29	2.030
2	Vallam	5	0.350	6	0.420	6	0.420	7	0.490	5	0.350	29	2.030
3	Melmalayanur	6	0.420	4	0.280	4	0.280	2	0.140	2	0.140	18	1.260
4	Koliyanur	1	0.070	2	0.140	2	0.140	2	0.140	1	0.070	8	0.560
5	Kanai	1	0.070	0	0.000	2	0.140	1	0.070	1	0.070	5	0.350
6	Kandamangalam	2	0.140	1	0.070	2	0.140	1	0.070	1	0.070	7	0.490
7	Vikravandi	3	0.210	3	0.210	2	0.140	2	0.140	3	0.210	13	0.910
8	Mailam	2	0.140	3	0.210	2	0.140	4	0.280	2	0.140	13	0.910
9	Vanur	1	0.070	1	0.070	1	0.070	1	0.070	1	0.070	5	0.350
10	Mugaiyur	0	0.000	1	0.070	0	0.000	0	0.000	0	0.000	1	0.070
11	Perenamallur	0	0.000	0	0.000	1	0.070	1	0.070	0	0.000	2	0.140
12	Theller	1	0.070	2	0.140	1	0.070	1	0.070	1	0.070	6	0.420
13	Keelpennathure	0	0.000	0	0.000	1	0.070	1	0.070	0	0.000	2	0.140
14	Thurinjiapuram	1	0.070	0	0.000	0	0.000	0	0.000	1	0.070	2	0.140
	Total	30	2.100	29	2.030	29	2.030	27	1.890	25	1.750	140	9.800

Block wise Component wise Year wise Project Cost
5) Hybrid Maize 5 ha Demonstration 100% Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	4	0.300	1	0.075	1	0.075	1	0.075	0	0.000	7	0.525
2	Vallam	4	0.300	3	0.225	0	0.000	0	0.000	0	0.000	7	0.525
3	Melmalayanur	3	0.225	0	0.000	4	0.300	0	0.000	0	0.000	7	0.525
4	Koliyanur	0	0.000	0	0.000	2	0.150	2	0.150	0	0.000	4	0.300
5	Kanai	0	0.000	0	0.000	1	0.075	0	0.000	1	0.075	2	0.150
6	Kandamangalam	2	0.150	0	0.000	2	0.150	1	0.075	0	0.000	5	0.375
7	Vikravandi	0	0.000	1	0.075	2	0.150	2	0.150	1	0.075	6	0.450
8	Mailam	4	0.300	0	0.000	1	0.075	2	0.150	1	0.075	8	0.600
9	Vanur	1	0.075	0	0.000	1	0.075	0	0.000	0	0.000	2	0.150
10	Mugaiyur	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
11	Perenamallur	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
12	Theller	0	0.000	0	0.000	0	0.000	0	0.000	1	0.075	1	0.075
13	Keelpennathure	0	0.000	0	0.000	0	0.000	0	0.000	1	0.075	1	0.075
14	Thurinjiapuram	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000	0	0.000
	Total	18	1.350	5	0.375	14	1.050	8	0.600	5	0.375	50	3.750

Block wise Component wise Year wise Project Cost
6) Groundnut Bio-Fertilizer 5 ha Demonstration Rs.50 per Ha Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	7	0.042	6	0.036	5	0.030	4	0.024	7	0.042	29	0.174
2	Vallam	5	0.030	6	0.036	5	0.030	9	0.054	5	0.030	30	0.180
3	Melmalayanur	5	0.030	4	0.024	4	0.024	1	0.006	2	0.012	16	0.096
4	Koliyanur	1	0.006	2	0.012	1	0.006	2	0.012	1	0.006	7	0.042
5	Kanai	1	0.006	0	0.000	1	0.006	0	0.000	1	0.006	3	0.018
6	Kandamangalam	2	0.012	1	0.006	1	0.006	1	0.006	2	0.012	7	0.042
7	Vikravandi	2	0.012	3	0.018	3	0.018	3	0.018	3	0.018	14	0.084
8	Mailam	2	0.012	2	0.012	2	0.012	4	0.024	3	0.018	13	0.078
9	Vanur	1	0.006	1	0.006	2	0.012	0	0.000	1	0.006	5	0.030
10	Mugaiyur	0	0.000	1	0.006	0	0.000	0	0.000	0	0.000	1	0.006
11	Perenamallur	0	0.000	0	0.000	1	0.006	1	0.006	0	0.000	2	0.012
12	Theller	1	0.006	1	0.006	1	0.006	1	0.006	1	0.006	5	0.030
13	Keelpennathure	0	0.000	0	0.000	1	0.006	1	0.006	0	0.000	2	0.012
14	Thurinjiapuram	0	0.000	0	0.000	0	0.000	0	0.000	1	0.006	1	0.006
	Total	27	0.162	27	0.162	27	0.162	27	0.162	27	0.162	135	0.810

Block wise Component wise Year wise Project Cost
7) Groundnut M.N Mixter 5 ha Demonstration Rs.50 per Ha Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	7	0.137	6	0.118	5	0.098	4	0.078	7	0.137	29	0.568
2	Vallam	5	0.098	6	0.118	5	0.098	8	0.157	5	0.098	29	0.568
3	Melmalayanur	5	0.098	4	0.078	5	0.098	1	0.020	2	0.039	17	0.333
4	Koliyanur	1	0.020	2	0.039	1	0.020	2	0.039	1	0.020	7	0.137
5	Kanai	1	0.020	0	0.000	1	0.020	0	0.000	1	0.020	3	0.059
6	Kandamangalam	2	0.039	1	0.020	1	0.020	1	0.020	2	0.039	7	0.137
7	Vikravandi	2	0.039	3	0.059	3	0.059	3	0.059	3	0.059	14	0.274
8	Mailam	2	0.039	2	0.039	2	0.039	4	0.078	3	0.059	13	0.255
9	Vanur	1	0.020	1	0.020	2	0.039	0	0.000	1	0.020	5	0.098
10	Mugaiyur	0	0.000	1	0.020	0	0.000	0	0.000	0	0.000	1	0.020
11	Perenamallur	0	0.000	0	0.000	1	0.020	1	0.020	0	0.000	2	0.039
12	Theller	1	0.020	1	0.020	1	0.020	1	0.020	1	0.020	5	0.098
13	Keelpennathure	0	0.000	0	0.000	1	0.020	1	0.020	0	0.000	2	0.039
14	Thurinjiapuram	0	0.000	0	0.000	0	0.000	0	0.000	1	0.020	1	0.020
	Total	27	0.529	27	0.529	28	0.549	26	0.510	27	0.529	135	2.646

Block wise Component wise Year wise Project Cost
8) Groundnut I.P.M 5 ha Demonstration Rs.100 per Ha Subsidy (L. Rs)

Sl. No	Name of the Block	I'st Year		II'nd Year		III'rd Year		IV'th Year		V'th Year		Total	
		No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.	No	Fin.
1	Ginge	7	0.438	6	0.375	5	0.313	4	0.250	7	0.438	29	1.813
2	Vallam	5	0.313	6	0.375	5	0.313	8	0.500	5	0.313	29	1.813
3	Melmalayanur	5	0.313	4	0.250	5	0.313	1	0.063	2	0.125	17	1.063
4	Koliyanur	1	0.063	2	0.125	1	0.063	2	0.125	1	0.063	7	0.438
5	Kanai	1	0.063	0	0.000	1	0.063	0	0.000	1	0.063	3	0.188
6	Kandamangalam	2	0.125	1	0.063	1	0.063	1	0.063	2	0.125	7	0.438
7	Vikravandi	2	0.125	3	0.188	3	0.188	3	0.188	3	0.188	14	0.875
8	Mailam	2	0.125	2	0.125	2	0.125	4	0.250	3	0.188	13	0.813
9	Vanur	1	0.063	1	0.063	2	0.125	0	0.000	1	0.063	5	0.313
10	Mugaiyur	0	0.000	1	0.063	0	0.000	0	0.000	0	0.000	1	0.063
11	Perenamallur	0	0.000	0	0.000	1	0.063	1	0.063	0	0.000	2	0.125
12	Theller	1	0.063	1	0.063	1	0.063	1	0.063	1	0.063	5	0.313
13	Keelpennathure	0	0.000	0	0.000	1	0.063	1	0.063	0	0.000	2	0.125
14	Thurinjiapuram	0	0.000	0	0.000	0	0.000	0	0.000	1	0.063	1	0.063
	Total	27	1.688	27	1.688	28	1.750	26	1.625	27	1.688	135	8.438

COMPONENTWISE WORKSHEET

SL. NO	Details	Full cost (Rs.)	Subsidy (Rs.)	Farmers Contribution (Rs.)	Remarks
1	Issue of Soil Health Card For testing one no of soil including micro nutrients Rs.10/- Issue of Soil Health Card Cost Rs. 6/- Total Cost Rs.16/-	16	16	-	Soil testing is done to find out nutrients status of the soil. As it is heavily required by the farmers, it may be included as special one.
2	Paddy M N Mixture 10 ha Demonstration 25% Subsidy 12.5 Kg MN Mixture /ha cost Rs.175/- For 10/ha, 125 kg M.N Mixture cost Rs.1750/-	1750	438	1312	Guidelines followd as per Commissioner of Agriculture, Chennai – Lr. No.P & M. 1/ 2296 / dt.18.04.06 (ICDP Rice)
3	Paddy Bio-Fertilizer 10 ha Demonstration 25% Subsidy 25 Pockets of Azospirillum per ha cost Rs.150/- For 10/ha, 250 Pockets cost Rs.1500	1500	375	1125	Guidelines followd as per Commissioner of Agriculture, Chennai – Lr. No.P & M.1/ 2296 / dt.18.04.06 (ICDP Rice)
4	Paddy Green -Manure Seeds 10 ha Demonstration 25% Subsidy 25 Kg Green- Manure Seeds per ha cost Rs.700/- For 10/ha, 250 Kg of Seeds cost Rs.7000/-	7000	1750	5250	Guidelines followd as per Commissioner of Agriculture, Chennai – Lr. No.SM1 / 43304 / 2006 / dt.31.03.06
5	Hybrid Maize 5 ha Demonstration 100% Subsidy 15 Kg Hybrid Maize seeds per ha cost Rs.1500/- For 5 Ha, 75 Kg Hybrid Maize seeds cost Rs.7500/-	. 7500	7500	_	**Maize is catching focus of the farmers now a days. As the farmers heavily require, it may be included as special one.**
6	Groundnut Bio-Fertilizer 5 ha Demonstration Rs.50 per Ha Subsidy For Groundnut Crop Rhizobium 10 Pockets + Phospho Bacteria 10 Pockets. Total No Bio-Fertilizer 20 Nos per /ha cost Rs.120/- For 5 Ha 100 Nos cost Rs.600/-	600	250	350	Guidelines followd as per Commissioner of Agriculture, Chennai – Lr. No.OSD1 / 96401 / 2006 / dt.06.07.06 (ISOPOM – Oil Seeds)

SL. NO	Details	Full cost (Rs.)	Subsidy (Rs.)	Farmers Contribution (Rs.)	Remarks
7	Groundnut M.N Mixture 5 ha Demonstration Rs.50 per Ha Subsidy 12.5 Kg M. N Mixture per /ha For 5Ha 62.5 Kg cost Rs.1960/-	1960	980	980	Micro Nutrients deficecncy sysmtomes noticed prevellant in this Sub Pasin. Beacuse the farmers heavily require, it may be included as special one.
8	Groundnut I.P.M 5 ha Demonstration Rs.100 per Ha Subsidy Here the following Biocides per/ha is recommended for5ha 1. Azardaraction 0.03 . 2.5 Ltr 12.5 2. N P V 250 ml 1.25 3. Phremone Trap 12 Nos 60 4. Lures 24 Nos 120 5. Basillus Thruingiensis 0.5 Kg 2.5 Kg 6. Tricoderma Viridae 0.5 Kg 2.5 Kg Total Biocides for one ha cost Rs.1250/- For 5 Ha Biocides cost Rs.6250/-	6250	6250	-	To avoid chemical plant protection measures farmers are supplied with Biocides, which avoids environmental pollution. Because it is heavily required by the farmers, it may be included as special one.

Varaganathi Sub Basin Inputs Requirement year wise : for the Project Proposed : District : Viluppuram.

Sl. NO	Name of the Project Items	I'st Year	II'nd Year	III'rd Year	IV'th Year	V'th Year	Total	Time of requirement
1	2	3	4	5	6	7	8	9
1	Soil Health Cards (Nos)	4300	4100	4400	4500	4700	22000	Sep. - Oct.
2	Paddy Micro Nuttrient Mixture (M.T)	3.75	3.625	3.625	3.375	3.125	17.500	Sep. - Oct.
3	Paddy Bio-Fertilizer (Nos)	7500	7250	7250	6750	6250	35000	Sep. - Oct.
4	Paddy- Green Manure Seeds (M.T)	7.50	7.25	7.25	6.75	6.25	35.00	Sep. - Oct.
5	Hybrid Maize Seeds (M.T)	1.350	0.375	1.05	0.60	0.375	3.75	Sep. - Oct.
6	Groundnut Bio-Fertilizer (Nos)	2700	2700	2700	2700	2700	13500	Sep. - Oct.
7	Groundnut M.N Mixture (M.T)	1.688	1.688	1.688	1.688	1.688	8.44	Sep. - Oct.
8	Groundnut I.P.M Inputs							
a	Azardiractine (Lit.)	337.50	337.50	337.50	337.50	337.50	1687.50	Sep. - Oct.
b	N P V (Lit.)	33.75	33.75	33.75	33.75	33.75	168.75	Sep. - Oct.
c	Phremone Traps (Nos)	1620	1620	1620	1620	1620	8100	Sep. - Oct.
d	Lures (Nos)	3240	3240	3240	3240	3240	16200	Sep. - Oct.
e	Bacillus Thuruingiensis (Kg)	67.50	67.50	67.50	67.50	67.50	337.50	Sep. - Oct.
f	Trichoderma Viridi (Kg)	67.50	67.50	67.50	67.50	67.50	337.50	Sep. - Oct.

Out come of the Project

10 % of the farmers turn as commercial farmers.

10% to 20 % shift from paddy to other commercial crops.

60% to 70 % adoption with INM and IPM Practices.

5% to 20% increase in productivity.

10% to 20% increase in farm income.

DEVELOPMENTAL COMPONENETS PROPOSED - FOR 5 YEARS

(ABSTRACT)

Sl. No	Name of the Item	Cost Perdemonstration							
		Govt Share (Rs)	Former Share (Rs)	Total (Rs)	No	Govt. Share (L. Rs)	Farmers Share (L. Rs)	Total (L. Rs)	Area to be covered (in Ha)
1	Issue of Soil Health Cards 100% Subsidy	16	..	16	22000	3.52	_	3.52	8800
2	Paddy Micro nutrient mixture 10Ha demonstration 25 % subsidy	438	1312	1750	140	0.613	1.837	2.45	1400
3	Paddy Bio-fertilizer 10 Ha. Demonstration 25 % subsidy	375	1125	1500	140	0.525	1.575	2.10	1400
4	10 Ha. Paddy - Green manure seeds demonstration 25 % subsidy	1750	5250	7000	140	2.450	7.350	9.80	1400
5	5 Ha Hybrid maize demonstration 100% Subsidy	7500	..	7500	50	3.750	_	3.75	250
6	5 Ha. Bio-fertilizer demonstration for Groundnut crop subsidy Rs.50/HA	250	350	600	135	0.3375	0.4725	0.81	675
7	5Ha .Groundnut Micro nutrient mixture demonstration 50% subsidy	980	980	1960	135	1.323	1.323	2.65	675
8	5Ha IPM demonstration for groundnut crop 100% subsidy	6250	..	6250	135	8.4375	_	8.44	675
	TOTAL PROJECT COST					**20.956**	**12.557**	**33.51**	

AGRICULTURAL ENGINEERING DEPARTMENT PROPOSALS

GOVERNMENT OF TAMILNADU
AGRICULTURAL ENGINEERING DEPARTMENT

IRRIGATED AGRICULTURE MODERNISATION AND WATER RESOURCES MANAGEMENT PROJECT (IAMWA RM)

VARAHA NADHI SUB BASIN

Executive Engineer (Agrl. Engg)
Viluppuram

AGRICULTURAL ENGINEERING DEPARTMENT

IAMWARM PROJECT PROPOSALS

VARAHA NADHI SUB BASIN

INTRODUCTION

The Irrigated Agriculture Modernization and Water Resources Management **(IAMWARM)** project aims at improving the irrigation efficiency thereby saving **Water** and **Power** besides **Increasing Agricultural Production per unit usage of water.**

PROJECT AREA

In Varaha Nadhi River Basin major portion of the irrigated area gets their irrigation from irrigation tanks (both from PWD & Panchayat Union tanks). It is proposed to modernise 236 Nos. of Non - System Tanks and their ayacut areas & Direct ayacut areas and Vidur Reservoir ayacut areas (which are not covered under other schemes). The project area lies in 219 villages situated in Viluppuram and Thiruvannamalai districts. The total command area to be modernised is **22215.87.0 Ha.**The Districtwise area distribution is as follows.

Sl. No.	District	Tank Ayacut (Ha.)		Anicut Ayacut (Ha.)		Reservoir Area (Ha.)
		No.	Area	No.	Area	
1	Viluppuram	206	16173.32.0	33	3232.61.0	890.33.0
2	Thiruvannamalai	30	1919.61.0	-	-	-
	Total	**236**	**18092.93.0**	**33**	**3232.61.0**	**890.33.0**

The selected area lies in Thurinjapuram, Kilpennathur, Peranamallur, and Thellar Blocks of Thiruvannamalai District, and in Melmalayanur, Gingee, Vallam, Mailam , Vikkiravandi, Kandamangalam, Kanai, Koliyanur and Mugaiyur Blocks of Viluppuram District.

EXISTING AGRICULTURE CROP SCENARIO

The major crop cultivated in the command area is Paddy , Sugarcane and Groundnut. Ragi, Cholam, Blackgram and Greengram are also cultivated depending upon the availability of water at that time.The existing crop pattern prevailing in the project as furnished by Agriculture and Horticulture Departments are as follows.

Annual crops

Coconut	200.00.0 Ha.
Sugarcane	83.57.0 Ha.
Mango	650.05.0 Ha.
Banana	25.00.0 Ha.
Total	**1813.62.0 Ha.**

Dec - March

Paddy	6800.00.0	Ha.
Millets	130.21.0	Ha.
Groundnut	3947.98.0	Ha.
Gingelly	974.51.0	Ha.
Cotton	100.00.0	Ha.
Pulses	1460.18.0	Ha.
Vegetables	299.68.0	Ha.
Flowers	200.03.0	Ha.
Total	**13962.69.0**	**Ha.**

There existing gap area in the project area is **6525 Ha.**

RAINFALL PATTERN

The average annual rainfall of this tract is 989.56 mm which is far below the state average. The distribution of rainfall is as follows

Jan - March	April- May	June- Sept S.W. Monsoon	Oct - Dec N.E. Monsoon	Average Annual Rainfall
16.08 mm	64.14 mm	407.21 mm	502.13 mm	989.56 mm

The major share of rainfall is being received during the S. W. and N.E. Monsoons. During this periods only half and less than half capacity of tank gets filled. The monsoonal rainfall also fails frequently. This results in adequate storages. Crop failures occur due to inadequate supply of irrigation water for the entire cropping seasons. Also rapid run off, poor vegetative cover and lack of sufficient wat er harvesting facilities has resulted on poor ground water recharge.

WATER

WALK THROUGH SURVEY has been conduced along with allied department officials. Personal contact with the farmers has been done. Discussions with the farmers had been conducted at Meetings conducted at Gingee, Tindivanam and Viluppuram. The outcome of the interactions with the farmers shows the following the constraints

The rainfall is scanty, which is erratic in frequency and distribution

The major portion of rainfall is received during S.W. Monsoon and N.E. Monsoon. The Irrigation tanks fill only to half of the capacity during this period.

The No. of wells available is 7048, with a command of 7605.14.5 Ha.

The scanty surface storages has prompted the farmers to dig wells t o substantiate their irrigations to about 40 % of the total command area.

All the wells have been energized.

Anticipating sufficient rainfall all farmers go in for Paddy as first crop. If rainfall is not adequate, irrigation becomes difficult in the last lapses, and so crop failures occur.

Those farmers having wells go in for Sugarcane, which is a 11 month crop. Most of this tract is open well area, having lesser yields. Installation of Micro irrigation systems like Drip and Sprinkler also exist s in far below the recommended extent. Hence the available water from the wells also not able to support the moisture regime to extended periods.

About 60 % of the command mainly depends solely on tank irrigation. But there is nil infrastructures to provide the water at the right place, at right time, and at right quantity. Mostly all the sluices are in dilapidated conditions, having no shutters to be opened when required or to be closed when not required. All supply channels are unlined. No Distribution b oxes available to divert or regulate water.

As field to field irrigation is being followed resulting in wastage of water.

About one third of command area is to be treated as tail end command. This tail end command area does not receive water. Even if it receives, it receives 30 to 45 days late, resulting either in loosing the Agro - Climatic seasons, ultimately resulting in crop failures or in no cultivation taken up

ON FARM

a) Condition of Distributory canals

From the sluice point water is let out only in earthen channels. In no Tank area Lining is done, leading to seepage losses. There is no diversion box to divert water to places of necessity. Only field to field irrigation is practiced. Tail end farmers oddly receive water for irrigat ion

b) Condition of field channels

The field channels are unlined. Bushes and unnecessary vegetational growth abstracts the flow of water. The channels are widened year by year.

d) Lined channels maintenance

No lining of channels have been taken up by any Government schemes. The Water User Association has to be formed in all Tank ayacut areas. Since there is no association exists no maintenances work has been taken up till date. Individual farmer alone desilts the channels lying in ad jacent to his holdings.

LAND

Size of Holdings

The total No. of beneficiaries is 30912 No. The distribution of category of farmers is as follows.

1) Marginal farmer _ 16569

2) Small farmer _ 8670

3) Big farmer _ 518

4) SC / ST Farmer _ 5155

The size of holding works ranges from 0.25 Acres to 10 Acres.

Level of Mechanization

241 Tractors and 68 Power tillers available in this command area. 5 Tractors are available in Agricultural Engineering Department in Tindivanam, Viluppuram, Thirukoilur, Thiruvannamalai, and Arni sub divisions. Improved agricultural implements are not available in sufficient n umbers. These less number of machineries put heavy pressure on the farmers to complete their cultural operations in time.

Post harvest

No sufficient storage facilities available. Only Government Regulated Markets are available in Tindivanam, Gingee and Viluppuram, which is not in proportion to the harvests.

Infrastructures like Thrashing / Drying Floors are to be constructed in more numbers in tune with the harvests.

CONSTRAINTS AND CHALLENGES

1. Since Water User Associations not formed , the farmers are n ot able to get themselves organized to share available water equally among themselves. Collective farming which reduces the per utility of water is absent.

2. Since no lining of channels and diversion boxes constructed, regulation of water to the needy farm holdings is not done.

3. The head reach farmers have the advantage of getting water in excess of their requirement.

4. The tail reaches not receiving water and so not going in for cultivation for years together

5. Cultivation is taken up in areas, more than that can be taken up using available water storages, resulting in crop failures or reduced yields.

6. Since Irrigation water management works have not taken up in these commands, irrigation efficiency is very low.

7. Absence of control structures like sluice shutters, diversion structures leads to loss of precious water.

8. Not following Rotational water system, excess water is being applied more than requirement during all stages of cultural practices.

9. Low level of farm mechanization exists.

10. More area is being cultivated with high water consuming crops.

11. No infrastructure for Conjunctive use of water even though more no of wells exist.

MEASURES PROPOSED

To increase the productivity in the project area the Agriculture and Horticulture Departments have chalked out a revised cropping pattern to be adopted.

Annual Crop

1)	Coconut	20.00.0 Ha.
2)	Sugarcane	2000.00.0 Ha.
3)	Mango	660.00.0 Ha.
4)	Banana	50. 00.0 Ha

Dec - March Season

1)	Paddy	6000.00.0 Ha.
2)	Sugarcane	2000.00.0 Ha.
3)	Millets	330.00.0 Ha.
4)	Maize	1000.00.0 Ha.
5)	Groundnut	6705.00.0 Ha.
6)	Gingelly	2000.00.0 Ha
7)	Cotton	225.00.0 Ha.
8)	Pulses	1960.00.0 Ha.
9)	Watermelon	300.00.0 Ha.
10)	Vegetables	300.00.0 Ha.
11)	Flowers	375.00.0 Ha.
12)	Fodder	300.00.0 Ha.

By conducting Demonstrations and training the Agriculture Department has proposed to bring about 2000 Ha. from 1083 Ha. presently under Sugarcane. Also it has been planned to bring down the area under Paddy from 6800 Ha. to 6000 Ha. Groundnut which is a less waterconsuming crop is proposed to be covered for 6705 Ha. In this project area Poultry farming is in i ncreasing trend. To meet the feed for Poultry, Agriculture Department has proposed to cover 1000 Ha. under Maize crop as a new crop.

Drip Irrigation to Sugarcane and Horticulture crops

Sugarcane is one of the major commercial crop with higher water requ irement of 2000 - 2500 mm. Unlike surface method of irrigation, the water use 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. Farmers with wells alone mo stly go in for Sugarcane cultivation. As surface water availability is less more dependability lies on groundwater potential. To minimize the usage of Groundwater,about 50 Ha.is planned to be brought under Drip irrigation system which save nearly 30 - 40 percent of water requirement. Same is the case with with Horticultural crops like Mango (200 Ha.)Banana (50 Ha.), Coconut (20 Ha.) etc.,. The benefits of the micro irrigation systems will be exposed to the other farmers. The farmers will be taken to the demonstrations to be conducted by Agriculture and Hoticulture departments, by conducting live models at Village level Mass Contact programmes, by giving vide publicity by issuing suitable handouts etc,.

The unit costs adopted are as per Govt. of India gui delines in addition to installation charges for the respective crop spacings. The subsidy pattern will be decided by the Government.

Sprinkler to Groundnut, Watermelon and Flowers

Groundnut, Vegetables (Watermelon, Brinjal) and Flowers are cult ivated extensively. Groundnut an important edible oilseed crop is usually raised with check basin method of irrigation consuming about 550 mm of water. The Pulses, cotton and other vegetables and Flowers consume 350 - 800 mm. Possibility of water saving a nd yield enhancement is assured by Micro Irrigation System for these crops. Besides saving 35 - 40 % of water requirement this Micro Irrigation System enables higher soil profile moisture content and greater leaf water potential and resulted in better expr ession of growth and yield parameters. It has been planned to cover Groundnut (3500 Ha.),Watermelon (200 Ha.),Vegetables(120 Ha.), Flowers (200 Ha.) under Sprinkler System. The unit cost adopted as per Govt. of India guidelines is Rs. 15000 / Ha. ., T he benefits of the micro irrigation systems will be exposed to the other farmers in such a way they feel the benefits, so that they will switch over to the micro irrigation systems in subsequent years. The unit costs adopted are as per Govt. of India guide lines . The subsidy pattern will be decided by the Government.

Precision Farming

Precision Farming is a farm practice in which all inputs such as water, seeds, nutrients, fertilizers, pesticides and other plant production technologies are applied in optimu m levels at right time, in right manner to attain the highest possible yield levels. Fertigation is a system wherein application of plant nutrients to the crop is done through drip irrigation, which saves 25 % of fertilizers and complete utilization of applied nutrient by the plants are noticed by farmers as reported by TNAU.

The Hoticulture Department has programmed to cover 300 Ha. under vegetables in project area, of which 100 Ha. under Precision Farming. The AED will install drip irrigation systems i n those areas . The unit cost adopted is Rs. 75000 / Ha. as per the existing guidelines.Precision Farming has been proposed in Kothamvadi, Erumpoondi, Rettanai , Sithanai, Kilpennathur, Siyamangalam, Kilputhur, Anathur, Vizhukkam, Vidur, and Naradikuppam villages.The subsidy pattern will be decided by the Government.

Buried Pipeline System

To avoid losses and save water thereby to supply water for increased periods, Buried Pipeline Systems are proposed in Tank Commands. As a pilot project three tanks, viz. , Seyyaduvinnan Tank (41.80 Ha.), Kuppam Tank(90.00 Ha.) and Vishvareddy Palayam Tank (43.36 Ha.) have been proposed. When water is available in the Tank , water will be let into a subsurface Sump under gravity flow. From the sump water will be supplied using a motor through buried PVC pile line system. Hydrant points will be fixed at selected points covering the entire command area. From these Hydrants farmers can get supply and irrigate using micro irrigation systems.During midterm appraisal the Burie d Pipeline system will be evaluated and based on the results the same will be replicated in other tank commands.The subsidy pattern will be decided by the Government.

Farm Mechanisation

As intensified agriculture cannot become a reality without adequate fa rm power support, and also for the completion of crop sequences within a short duration, certain critical farm operations like ploughing, transplanting weeding and harvesting needs more farm machineries. In this project area for every 500 Ha. (Blockwise or Tankwise) Water User Associations are planned to be grouped as a cluster. Based on the major crops cultivated by them each cluster will be provided with Implements like Seed Drill and Groundnut Harvester for Groundnut crop. For Sugarcane area Rotavator and Posthole Digger which are used extensively for land preparation works will be supplied. For Maize area Maize Husker cum Sheller will be supplied. These machineries will lower the stress on labour availability. The implements will be procured by AED an d the same will be supplied to the respective WUA clusters after entering into a Memorandum of Understanding. The cost of all such implements are adopted as per TNAU recommendations. At present no WUA has been formed. WRO has proposed to form WUAs in first two years of the project period. As and when WUA formed machineries will be supplied to WUA clusters. The hire charges can be fixed by WUA. Since the machineries are supplied to WUA clusters,the Government will finalise the subsidy pattern for this item of work.

Farm Pond

Farm Pond is an ideal water harvesting structure. The drained water and surplus Irrigation water shall be stored in the Farm Ponds during monsoon seasons. Unexpected heavy runoff received during summer seasons shall also be ha rvested in these Farm Ponds. During critical stages of crops when irrigation water could not be extended, water stored in these Farm Ponds shall be utilized as life saving irrigation. This will give assured yield of crops to the farmers. Besides these Farm Ponds can utilized for Fisheries development activities. The unit cost is Rs. 40000 / No.

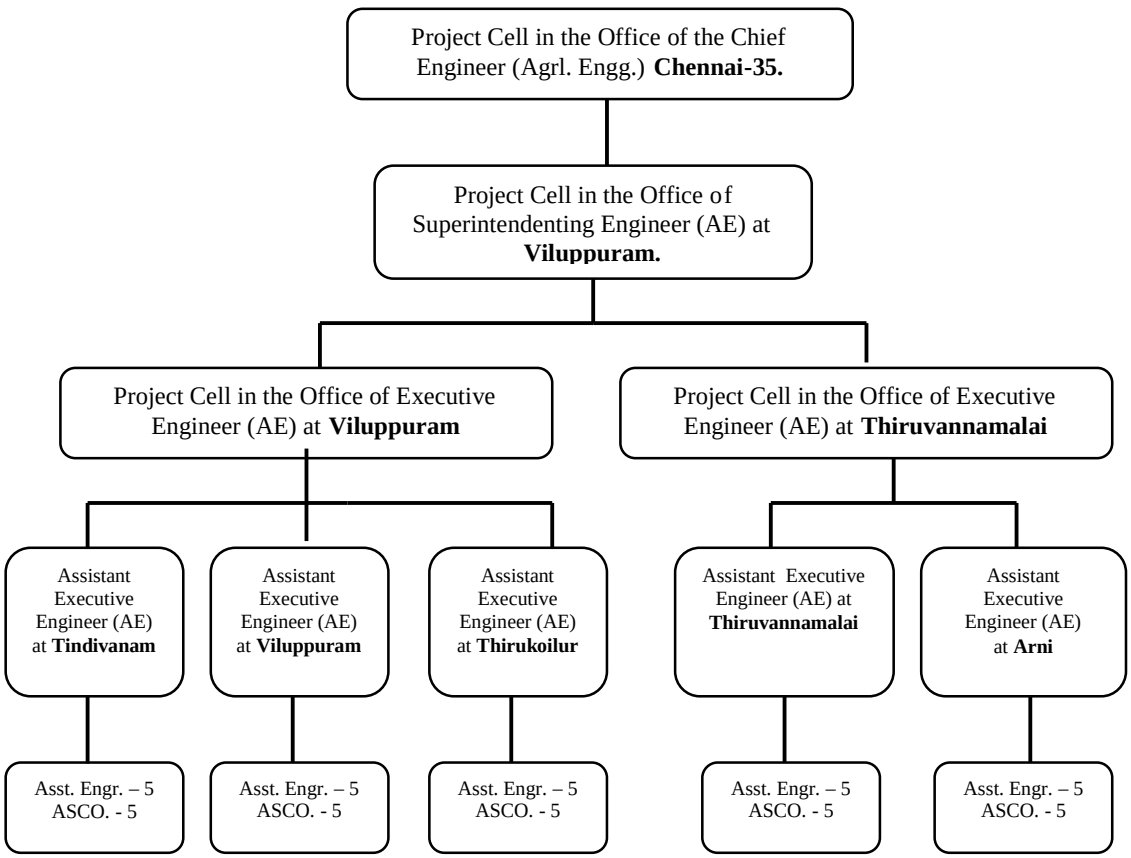
IMPLEMENTATION STRATEGY

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 Engineer (AE) and Assistant Engineer (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. Engineer (AE) to finalize the DPR, to co-ordinate with the district level line departments and to monitor the performance of the field staff.

The Flow Chart showing the HR Pattern and the sanctioned strength of the available field personnel for implementation of IAMWARM project is furnished below:

HR Pattern



With the above staff pattern the project can be implemented within five years.

OUTCOME INDICATORS

1) The crop diversification and crop intensity in post project period (due to Implementation of MIS, Precision Farming, Buried Pipeline)

2) Farm Productivity per unit area and unit irrigation water (due to Implementation of MIS, Precision Farming, Buried Pipeline , Farm Pond)

3) Cropping Pattern (due to Implementation of MIS, Precision Farming, Buried Pipeline,Farm Pond)

4) Increase in Irrigation Efficiency (due to Implementation of MIS, Precision Farming, Buried Pipeline , Farm Pond)

5) Transfer of Technology (due to Implementation of MIS, Precision Farming, Buried Pipeline , Farm Pond)

6) Increased Farm Mechanisation (due to distribution of Farm Imp lements)

7) Increased supplemental income (due to integrated agriculture including farming, fisheries, cattle development, marketing)

8) Increased per capita income.

AGRICULTURAL ENGINEERING DEPARTMENT
TAMILNADU IAMWARM PROJECT ESTIMATE ABSTRACT
VARAHANADHI SUB BASIN
PROJECT COST

(Rs. in Lakhs)

Sl. No.	Components Proposed	Unit	Unit Cost (Rs.)	Physical	Amount	Project Investment	GOI Investment	Farmer's Contribution		
								Rate %	For Corpus Fund	For Works
						50 %	50 %			
1	**Micro Irrigation System**									
a	**Drip Irrigation**									
	Sugarcane	Ha.	58000	950	551.00	275.50	275.50	10	55.1	`
	Banana	Ha.	52800	50	26.40	13.20	13.20	10	2.64	
	Coconut	Ha.	22900	20	4.58	2.29	2.29	10	0.458	
	Mango	Ha.	21000	200	42.00	21.00	21.00	10	4.2	
Total		**Ha.**		**1220**	**623.98**	**311.99**	**311.99**	10	**62.398**	
	Groundnut	Ha.	15000	3500	525.00	262.50	262.50	10	52.5	
	Watermelon	Ha.	15000	200	30.00	15.00	15.00	10	3	
	Flowers	Ha.	15000	200	30.00	15.00	15.00	10	3	
	Vegetables	Ha.	15000	120	18.00	9.00	9.00	10	1.8	
Total		**Ha.**		**4020**	**603.00**	**301.50**	**301.50**	10	**60.3**	
						90 %				
2	**Precision Farming**	**Ha.**	**75000**	**50**	**37.50**	**37.50**		**10**	**3.75**	
						90 %				
3	**Buried Pipeline System**									
	Seyyaduvinnan	Ha.		41.80	5.00	4.50		10		0.5
	Kuppam	Ha.		90.00	8.81	7.93		10		0.881
	Viswareddipalayam	Ha.		43.36	4.87	4.38		10		0.487
Total		**Ha.**		**175.16**	**18.68**	**16.81**				**1.868**
						100 %				
4	**Farm Mechanisation**									
a	Seed Drill for Groundnut and Maize	No.	35000	46	16.10	16.10				
b	Groundnut Harvester	No.	40000	46	18.40	18.40				
c	Rotavator	No.	90000	10	9.00	9.00				
d	Posthole Digger	No.	90000	10	9.00	9.00				
e	Power Weeder	No.	75000	10	7.50	7.50				

	attachment for Tractor									
f	Maize Husker cum Sheller	No.	90000	5	4.50	4.50				
Total		**No.**		**127**	**64.50**	**64.50**				
						90 %				
5	**Farm Ponds**	**No.**	**40000**	**34**	**13.60**	**12.24**		10		**1.36**
Grand Total					**1361.26**	**744.54**	**613.49**		**126.448**	**3.228**

1374.86Project cost	1361.26	744.54
Area	22215	22215
Cost per Ha.	6128	3352

AGRICULTURAL ENGINEERING DEPARTMENT
TAMILNADU IAMWARM PROJECT ESTIMATE ABSTRACT
VARAHANADHI SUB BASIN

(Rs. in Lakhs)

Sl. No.	Components Proposed	Unit	Unit Cost (Rs.)	Physical	Amount
1	**Micro Irrigation System**				
a	**Drip Irrigation**				
	Sugarcane	Ha.	58000	950	551.00
	Banana	Ha.	52800	50	26.40
	Coconut	Ha.	22900	20	4.58
	Mango	Ha.	21000	200	42.00
Total		**Ha.**		**1220**	**623.98**
b	**Sprinkler Irrigation**				
	Groundnut	Ha.	15000	3500	525.00
	Watermelon	Ha.	15000	200	30.00
	Flowers	Ha.	15000	200	30.00
	Vegetables	Ha.	15000	120	18.00
Total		**Ha.**		**4020**	**603.00**
2	**Precision Farming**	**Ha.**	**75000**	**50**	**37.50**
3	**Buried Pipeline System**				
	Seyyaduvinnan	Ha.		41.80	5.00
	Kuppam	Ha.		90.00	8.81
	Viswareddipalayam	Ha.		43.36	4.87
Total		**Ha.**		**175.16**	**18.68**
4	**Farm Mechanisation**				
a	Seed Drill for Groundnut and Maize	No.	35000	46	16.10
b	Groundnut Harvester	No.	40000	46	18.40
c	Rotavator	No.	90000	10	9.00
d	Posthole Digger	No.	90000	10	9.00
e	Power Weeder attachment for Tractor	No.	75000	10	7.50
f	Maize Husker cum Sheller	No.	90000	5	4.50
Total		**No.**		**127**	**64.50**
5	**Farm Ponds**	**No.**	**40000**	**34**	**13.60**
Grand Total					**1361.26**

TAMIL NADU AGRICULTURAL UNIVERSITY PROPOSALS

Tamil Nadu Agricultural University

Irrigated Agriculture Modernization and Water Resource Management

Sub basin Plan – Varahanadhi
TNAU component

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

Irrigated Agriculture Modernization and Water Resource Managem ent (IAMWARM)
Varahanadhi Sub Basin
TNAU component

1. Introduction

A. About the station

- Oilseeds Research Station, Tindivanam located in the Varahanadhi sub basin is one among the lead centres for Oilseeds research in India to undertake basic and strategic research.
- It caters the needs of the farmers in the North Eastern agroclimatic zone of Tamil Nadu
- One Krishi Vigyan Kendra is also functioning at Tindivanam for the transfer technology activities in which multidisciplinary scientists are working
- Among the varieties released from this centre, TMV 7 groundnut is popular among farmers.
- **The recently released variety TMV (Gn 13) a red kernel variety gaining momentum among the farmers and having very good market value.**
- **With respect to gingelly, TMV 3 is a cosmopolitan variety and TMV 6 is mostly suitable for irrigated condition.**
- **ORS and KVK Tindivanam, identified as a TNAU centre for IAMWARM project for Varahanadhi basin.**

B. Basic information about the sub basin:

(i). Ayacut details

Particulars	Area
Total Ayacut area	22215.87 Ha
Fully irrigated	10822.41 Ha
Partially irrigated	4868.02 Ha
Gap area	6525.43 Ha
Total	**22215.87**

(ii). Cropping pattern – Varahanadhi sub basin

Sl.No	Name of the crops cultivated	Area under crops in Ha				
		Without project			With project	
		Fully	Partially	Gap	Fully	Partially
1	Paddy (Dec- Mar)	6800			6000	
2	Groundnut (Aug-Nov)			5000		5000
	Groundnut (Dec-Mar)	2164	1784		6705	
	Groundnut (Apr-Jul)					3000
3	Gingelly (Dec- Mar)		974		2000	
4	Sugarcane (Dec-Mar)	1083			2000	
5	Pulses (Black gram) (Aug-Nov)			1425		1425
	Pulses (Blackgram) Dec-Mar)		1460		1960	
6	Ragi(Dec-Mar)	100			200	
7	Cumbu (Dec-Mar)	30		100	130	
8	Cotton (Dec- Mar)	100			225	
9	Coconut (Perennial)	20			20	
10	Watermelon (Dec-Mar)	150			300	
11	Bhendi (Dec-Mar)	150			300	
12	Flowers (Dec-Mar)	200			375	
13	Mango (Perennial)		650		650	
14	Banana (Dec- Mar)	25			50	
15	Maize (Dec- Mar)				1000	
16	Fodder (Aug – Nov)				300	
	Total	**10822**	**4868**	**6525**	**22215**	**9425**

(iii).. Climate:

Winter (Jan-Feb)		Summer (Mar-May)		S.W.Monsoon (June-Sep.)		N.E. Monsoon (Oct-Dec)		Annual Im Climate	
Moisture Index	Climate	Moisture Index	Climate	Moisture Index	Climate	Moisture Index	Climate	Moisture Index	Climate
(-) 89.6	Arid	(-) 78.7	Arid	(-) 41.9	Arid	**(+) 46.5**	**Humid**	**(-) 42.2**	**Semi Arid**

(AVERAGE RAINFALL in mm)

Taluk	2001	2002	2003	2004	2005
Viluppuram	714.00	486.00	1134.00	1155.20	1273.00
Vanur	389.20	285.00	698.90	1203.00	1187.00
Gingee	1034.00	194.50	1093.70	1098.00	1556.00
Tindivanam	1038.80	567.00	666.50	1359.50	1088.00

(iv). Soil Type:

The sub basin is dominated by alfisols, vertisols. The other soil groups include inceptisol, loamy soils.

(v). Objectives

- To promote water saving technologies (SRI / Drip) in agriculture and horticultural crops for large scale adoption
- To enhance crop and water productivity
- To increase the cropped area by diversification
- To converge with WRO and other line departments in over all improvement in total farm income

2. Issues

- Non adoption of water saving technologies
  - SRI in Rice
  - Micro irrigation and fertigation in sugarcane and groundnut
- Lack of crop diversification (Maize)
- Lack of awareness on labour saving implements in groundnut
- Lack of pre and post harvest technologies in gingelly and groundnut

3. Counter measures proposed

- SRI
- Introduction and improved production technologies for maize
- Improved production technologies for groundnut
- Improve production technologies for gingelly

I. PROJECT MODE ACTIVITIES

1. Technologies for transformation

a. Improved production Technologies for Gingelly

Sustainable productivity of gingelly calls for adequate supply of plant nutrients as gingelly response to nutrients. Proper population maintenance is one of the important techniques to have more yield attributes per plant. The basic concept of Integrated Nutrient Management (INM) is the maintenance or adjustment of soil fertility and plant nutrient supply at an optimum level for sustaining the desired crop productivity through optimization of benefits from all possible sources of plant nutrients in an integrated way.

The appropriate combination of fertilizer, organic manures, bio-fertilizers and micro nutrients will be implemented according to the system of land use of possible sources of plant nutrients. In addition with technologies, improved varieties (TMV 3 and TMV 6), balanced nutrition and scientific water management will be imposed. Under this the cost of critical inputs like seeds, and nutrients are included. The cost on field days and publications showing the success of the technology are included.

Justification

Gingelly crop need minimum irrigation for its growth and fetches higher revenue also. With available water, maximum productivity will be obtained.

Linkage:

Department of Agriculture proposed to bring additional area (917 ha) of gingelly under fully irrigated condition and department of Agricultural Marketing will provide storage and market facilities. Over imposing the improved agro techniques through demonstrations in the area will pave way for improved productivity.

Outcome:

- **Area spread:** 1000 Ha
- **Increased productivity:** +140 kg/ha
- **Additional revenue:** Rs. 3.10 million

Technology	Total area (ha)	Unit cost (Rs.)	Total cost In Lakhs	Location
Improved Production technologies in gingelly Field days for 3 years @ Rs. 10,000/ yr	100	2000/ha	2.00 0.30	Devathanampettai (3), Thiruvathikunnam (3) Mel – Sevalambadi (3), Sathiyamangalam (4) Sevalapurai (5), Rettanai (4)Naradikuppam (4), V.Nallalam (4)V.Panchalam (4), Thenalapakkam (5) Pathirapuliyaur (4), Poonampodni (4)Vizukkam (4), Siruvanthadu (4)Naraiyur (4),Vidur (5), Pallineliyanur (4) Chinnababusamuthiram(4), Vikkiravandi (5)Adanur (3), Annuiyur (4), Panayampuram (2) Maragathpuram (4), Ananagur (2), Kanthmanadi (4), Ayyur Agaram (4)

Justification for the unit cost

Sl.No	Particulares		Amount in (Rs.)
1	Seed cost with seed treating chemicals (5kg/ha) @ Rs. 50 /kg	:	250.00
2	Cost of fertilizers (35:23:23 kg NPK / ha)	:	
	Urea - 80 kg @ Rs. 5 / kg	:	400.00
	Super Phosphate - 144 kg @ Rs. 4 /kg	:	576.00
	Muriate of Potash - 38 kg @ Rs.4.75/ kg	:	180.00
	$MnSO_4$ 12.5 kg @ Rs. 50 / kg		625.00
	Cost of Bio fertilizer	:	
	Azozpirillum and Phospho bacteria @ 10 pockets each	:	120.00
	Total cost		**2151.00**

b. Improved production technologies in maize

Under Varahanadhi sub basin maize crop will be introduced nearly 1000 ha by the agricultural department. TNAU included its transfer of technology in maize, which helps in the large scale adoption. The technologies are improved varieties (CO 1) /hybrids (COH M 5), balanced nutrition and scientific water management. Under this the cost of critical inputs like seeds, and nutrients are included. The cost on field days and publications showing the success of the technology are included

Justification:

Recent market demand for maize in poultry feed industry and dairy farm makes way to increase the area. By educating the new agro techniques will pave way for yield enhancement. Starting from sowi ng to harvest all the need based improved techniques will be demonstrated.

Linkages:

Water resource Organization will provide water facility through tank modernization so that the gap area could be covering with maize with full irrigation.

Outcome:

- **Area spread:** 1000 Ha
- **Increased productivity:** +481 kg/ha
- **Additional revenue:** Rs. 32.17 million

Technology	Total area (ha)	Unit cost (Rs.)	Total cost In Lakhs	Location
Improved Production technologies in Maize Field days for 3 years @ Rs. 10,000/ yr	150	6000/ha	9.00 0.30	Pakkam (4) So-Kuppam (4) Devathanampettai (4), Thiruvathikunnam (4) Mel – Sevalambadi (2), Thiruvampattu (5), Sathyamangalam (5), Kottapoondi (5) Sevalapurai (7), Ethnemelli (5), Arugavoor Hisa (4), Rettanai (4), V.Nallalam (8), Pathirapuliyaur (4), Vizukkam (4), Siruvanthadu (5), Naraiyur (4), Kothampakkam (4), Madagapattu (4), Pallineliyanur (2), Vazhathaur (4), Chinnababusamuthiram(4), Seeyamangalam (2), Kilpenathur (4) Sathanur papanampattu (3), Azur (4), Vikkiravandi (5)Poyyapakkam (4), Annuiyur (4), Panayampuram (4) Maragathpuram (2), Ayyur Agaram (4), Orathur (4), Sengamedu anicut (4), Nedumozhiyanur anicut (4), Chendur ananicut(4) and Perani anicut (2)
Maize dehuller	Two	50,000/-	1.00	Sevelapuri and Vikaravandi water user Association

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
	Total cost		**6070.00**

f. Model village concept

(i) Seed Village:

Village for seed production: Mailam (100 ha for three years)

(Ist year- 30 ha, IInd year- 50 ha and III yr – 20 ha)

Cost for seed production: 5.00 lakhs (Seed cost alone)

Area coverage through seed village: 1000 ha (To meet 15 % of the groundnut area)

(ii) Village for technology demonstration: Rettanai

Organic farming & IFS model in rice and other improved technologies (Two ha) = 50,000/ ha (1, 00,000)

- Cost for organic farming- 20,000/ha
- IFS – 15,000/-
- Other improved technologies- 15,000/-

g. On farm demonstration and skill development

Skill development programme will be conducted during first and second year

Title	No.of persons/ batch	Cost per batch (in Lakhs)	Total no. of batches	Total cost (in lakhs)
1. Improved production technologies in gingelly	50	0.20	1	0.20
2. Improved production technologies in maize	50	0.20	2	0.40
3. System Rice Intensification	50	0.20	20	4.00
4. Production technology for groundnut	50	0.20	5	1.00
6. Training to labours (SRI only)	50	0.05	16	0.80
Total				6.40

h. BUDGET for Project mode

S.No	Particulars	Budget (Rs. in lakhs)
1	Cost for Transfer of technologies (2.3 +9.3+1.0)	12.60
3	Model village (Including seed cost for seed village (5.00) and Organic farming and IFS model in rice (1.00)	6.00
4	On farm demonstration and skill development (28 batches for farmers @ Rs. 20,000 /batch (5,60,000) and 16 batches for labourers for SRI technology@Rs.5,000/batch (80,000)	6.40

II. MISSION MODE ACTIVITIES

a. System of Rice Intensification

Scientific management techniques 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 a t 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 c onventional 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 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

Rotor weeding has the following advantages

- Improves soil structure
- Increases soil aeration,
- Enrichment of O_2 near the root zone,
- Increases the microbes population,

Objectives

To increase crop and water productivity

Why this Project

To increase the yield of rice in first crop season and to off set the production loss due to reduced rice area in post project

Total area under rice **: 6000 ha**

Area of Implementation : 1000 ha

Period : 3 years

Area Expansion : IV and Vth year

Outcome:

- **Area spread:** 5000 Ha
- **Increased productivity:** +1200 kg/ha
- **Additional revenue:** Rs. 30.00 million

Technology	Total area (ha)	Unit cost (Rs.)	Total cost In lakhs	Location
SRI in rice	1000	10000/ha	100.00	Kappai (5), Sorathur (5), Kammandur (15), Semmadu (15),Pakkam(20),SoKuppam (15), Devathanampettai(15), Thiruvathikunam (15), Mel – Sevalambadi (20) Thiruvampattu (20), Sathiyamangalam (30), Kottapoondi (15) , Sevalapurai (25), Thenpalai periya eri (10) Ethanemili(20), Rettanai (20), Naradikuppam (20), Pathirapuliyaur (20), Vizhukkam (15), Siruvanthadu (20), Naraiyur ((15), Pallineliyanur (15), Vahuthavur (20) Chinnababusamuthiram (20), Seeyamangalam (25), Vedalm (15), Kilpenathur (25), Vikkiravandi (20), Adanur (10), Papanampattu (25), Mungil pattu (20), Poyya pakkam (20), Annuiyur (20), Panayampuram (20), Maragathpuram (30), Ananagur (40), Kanthmanadi (20), Ayyur Agaram (15), Orathur (15), Sengamedu anicut (40), Nedumozhiyanur anicut (40) Chendur anicut (20), Pathirapuliyur anicut (15) , Melkondai anicut (15), Vikiravandi (50) and Vidur dam (75)

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. Improved production Technologies for groundnut

The productivity of water is the inter-dependent relationship between the amount of water used and the economic yield realised, which is also termed as Wa ter Use Efficiency (WUE) at different levels. The productivity of water could be increased in field level either by reducing the water requirement without detrimental effect on yield or by increasing the production per unit water by controlling loss of wa ter through conveyance, distribution, application, seepage, percolation *etc.*, Micro irrigation techniques like micro sprinkler in groundnut improves the Water Use Efficiency.

Justification:

The department of Agricultural Engineering providing micro sprinkler to the groundnut cropped farmers. The technology of on the use of quality seeds, application of micro nutrients providing nutrients and Integrated Disease management are to be demonstrated in a large scale. Based on that TNAU included 500 ha area for demonstration in Varahanadhi sub basin demonstrating the production technologies

Convergence

- The technologies resulted in the complementary effect of the water augmentation and micro irrigation methods
- Adoption of technologies resulted in over all standard of living of basin farmers

Outcome:

- **Area spread:** 4000 Ha
- **Increased productivity:** +346 kg/ha
- **Additional revenue:** Rs. 32.17 million

Technology	Total area (ha)	Unit cost (Rs.)	Total cost In lakhs	Location
Production Technology for Groundnut	500	6000/ha	30.00	Madapoondi (3), Kappai (2), Sorathur (10), Kammandur (10), Semmadu (12), Pakkam(10), SoKuppam(10), Devathanampettai(12),Thiruvathi kunam (9), Mel Sevalambadi (9) Thiruvampattu (10), Sathiyamangalam (15), Kottapoondi (5) , Sevalapurai (15), Thenpalai periya eri (5) Ethanemili(9), Rettanai (10), Naradikuppam (9), V.Nallalam (5), V. Panchalam (5), Pathirapuliyaur (8), Vizhukkam (8), Siruvanthadu (50), Naraiyur (5), Vidur (10), Pallineliyanur

				(8), Vahuthavur (8) Chinnababusamuthiram (8), Seeyamangalam (10), Vedalm (7), Kilpenathur (10), Vedeanthavadi (5), Azur (6), Vikkiravandi (5), Adanur (5), Papanampattu (8), Mungil pattu (7), Poyya pakkam (7), Annuiyur (10),Panayampuram (10), Maragathpuram (12), Ananagur (20), Kanthmanadi (11), Ayyur Agaram (15), Orathur (7), Sengamedu anicut (20), Gudapattu anicut (5), Nedumozhiyanur anicut (15) Chendur anicut (10), Pathirapuliyur anicut (5), Melkondai (5), Vikiravandi (20), Perain (5) and Vidur dam (75)
Seed drill	Five	25,000	1.25	Sathiyamangalam, Rettanai, Vikkiravandi, Annuiyur and Chendur water user associations
Rotavator	Two	1,00,0,00	2.00	Nallam and Thenlapakkam WUA

Justification for the unit cost

Sl.No	Particulares		**Amount in (Rs.)**
1	Seed cost with seed treating chemicals (125kg/ha) @ Rs. 4 0 /kg	:	5000.00
2	Soil application of *Trichoderma viride* 2.50 kg @ Rs. 150 /kg	:	375.00
	Gypsum application @ 400 kg/ha @ Rs. 1.50 /kg		600.0
3	Micronutrient spray		
	(DAP - 2.5 kg, Ammonium sulphate – 1 kg, Borax – 500g and Planofix – 375 ml) @ Rs. 200/ spray for 3 sprays		600.00
	Cost of Bio fertilizer	:	
	Total cost		**6575.00**

e. BUDGET for Mission mode

S.No	Particulars	Budget (Rs. in lakh)
dget For Mission Mode I - SRI (1000 ha)		
1	Cost of seed, nursery raising materials, marker, conow eeder, transplanting and critical inputs @ Rs. 10000/ha	100.00
Budget For Mission Mode II Groundnut production technologies (500 ha)		
1.	Cost of seeds, gypsum and nutrient spray @ 6000/ha	30.00
	Purchase of seed drill 5 nos @ 25,000	1.25
	Purchase of Rotavator 2 Nos@ Rs. 1,00,000	2.00
	Sub Total A	**133.25**

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 gingelly	100	900	140	126	25.20	-
Improved production technologies in maize	150	1000	1000	1000	50.00	-
System Rice Intensification in rice	1000	5000	1200	6000	300.00	14.64
Production technology for groundnut	500	4000	346	1460	321.70	06.10

IV. YEAR WISE ACITVITIES

a. Project mode

Year	Improved Production technologies in gingelly (ha)	Improved production technologies in maize (ha)	Seed village (Ha)	On Farm demonstration and farmers training (No.of batches)
I year	46	41	30	22
II year	54	61	50	22
III YEAR	-	48	20	-
TOTAL	**100**	**150**	**100**	**44**

b. Mission mode

Year	SRI technology in rice	Production technology in groundnut
I year	259	112
II year	477	207
III YEAR	112	181
TOTAL	**1000**	**500**

Finance (Rs. In Lakhs)

Sl. No	Particulars	I	II	III	IV	V	Total
I	**Activities**						
1	a.Improved production technologies for gingelly b. Field day	0.92 0.10	1.08 0.10	- 0.10	- -	- -	**2.00** **0.30**
2	a. Improved prodution technologies in Maize b. Field day	2.46 0.10	3.66 0.10	2.88 0.10	- -	- -	**9.00** **0.30**
3	Maize dehuller	1.00	-	-	-	-	**1.00**
4	Organic farming and IFS in rice	1.00	-	-	-	-	**1.00**
5	Seed Production	1.50	2.50	1.00	-	-	**5.00**
6	SRI in rice	25.90	47.70	26.40	-	-	**100.00**
7	Production technology for Groundnut	6.72	12.42	10.86	-	-	**30.00**
8	Seed drill (5 Nos.)	1.25	-	-	-	-	**1.25**
9	Rotavator (2 Nos)	2.00	-	-	-	-	2.00
	Total	**59.89**	**68.18**	**41.59**	**-**	**-**	
II	Out Sourcing	18.00	18.00	12.00	6.00	6.00	60.00
III	Contingencies	2.00	2.00	1.00	1.00	1.00	7.00
IV	Equipments	3.00	-	-	-	-	3.00
	Total	83.89	88.18	54.59	7.00	7.00	

TOTAL BUDGET FOR VARAHANADHI

Sl.No	Particulars	Physical	Financial (in lakhs)
I	**Activities**		
1	Improved production technology for Gingelly + 3 field days	100 ha	2.30
2	Improved production technology for Maize + 3 field days	150 ha	9.30
	Maize dehuller	2 Nos.	1.00
3	Quality seed production Groundnut	100 ha	5.00
4	Demonstration of organic farming and IFS modal in Model villages	1 No	1.00
5	SRI	1000 ha	100.00
6	Production technology for groundnut	500 ha	30.00
7	On farm demonstration and farmers training	-	6.40
	Sub Total		*155.00*
II	**Out sourcing for technical assistants**		
1	15 numbers for 2 years, 10 numbers for 3rd year, 5 numbers for 4th and 5th year	9000 Salary + 1000 FTA per Month	60.00
	Sub Total		*60.00*
III	**Contingencies**		
	a. Vehicle hire charge for Scientists @ Rs.60000/yr		3.00
	b. Stationeries, Publicity, Documentation, Reporting,		3.00
	c. Field boards and exhibits		1.00
	Sub Total		*7.00*
IV	**Equipments** **Computer, Printer, Scanner, LCD, Copier, Digital moisture meter**		3.00
	Sub Total		*3.00*
	Total		**225.00**
	Incentive 1% of the total cost		**2.25**
	Total		**227.25**
	Institutional charges @ 7.5 %		17.04
	Grand Total		**244.29**

Impact

- **Crop:** Rice
- **Technology:** SRI
- **Area under demonstration:** 1000 ha
- **Area under adoption :** 5000 ha

- **Crop:** Groundnut
- **Technology:** Improved production technologies in groundnut
- **Area under demonstration:** 500 ha
- **Area under adoption :** 4000 ha
- **Crop:** Gingelly
- **Technology:** Improved production technologies in gin gelly
- **Area under demonstration:** 100 ha
- **Area under adoption :** 900 ha

- **Crop:** Maize
- **Technology:** Improved production technologies in maize
- **Area under demonstration:** 150 ha
- **Area under adoption :** 1000 ha

HORTICULTURE DEPARTMENT PROPOSALS

IRRIGATED AGRICULTURE MODERNIZATION AND WATER RESOURCES MANAGEMENT PROJECT

VARAGA NADHI - SUBBASIN

IAMWARM

PROPOSAL

VILLUPURAM DISTRICT

Assistant Director of Horticulture,
Villupuram.

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

IAMWARM

Sub basin : VARAGA NADHI
District : VILLUPURAM
WRO Region : CHENNAI
Blocks Covered : GINGEE, VALLAM, MELMALAYANUR, MAILAM, VIKRAVANDI, KOLIYANUR,TIRUKOILUR, KANDAMANGALAM,VANUR, THURUINJAPURAM, VANDAVASI.

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.	**Fruits**				
1.	Mango	Neelam, Bangalora	650	6500	10.0
2.	Banana	Local, Mondhan	25	110	5.0
B.	**Vegetables**				
1.	Bhendi	MH – 10, Us Agri	150	1500	10.0
2.	Watermelon	NS - 295, NS - 450	150	3000	20.0
	Total		**975**	**11110**	

II. Existing Horticulture Practices:

<u>Existing cropping pattern and Season :</u>

1. Banana - January - Febuary, November - December
2. Vegetables
   - Bhendi - December – February, June – August
   - Watermelon - December – January

Proposed Generic Croping Pattern:

1. Banana - December - January.
2. Vegetables
   - Bhendi - December – February, June – August
   - Watermelon - December – January
3. Flowers - January – February

Existing Irrigation Potential:

Out of the registered Ayacut area of 22429.47 Ha. the present irrigation potential is

Fully Irrigated	10722.41 Ha
Partially Irrigated	5181.62 Ha
Gap	6525.44 HA

	22429.47Ha

Proposed Irrigation Facilities:

Out of 500 Ha. under Horticulture Crops, an area of 300 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 675 Ha. under fruits.

1. Inputs:

a. Seeds:

Certified seeds and seeds of traditional varieties of vegetables 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 :

Soil Testing is done in many farmers field once in two years. Farmers should be educated in this aspect of acquiring the soil health card in respect to their land. A Soil Testing Lab is available at Villupuram.

c. Prevalence of Organic farming :

Organic farming is practiced in many of the farmers field in Villupuram district where fruit crops are grown. More awareness should be created among the farmers in this regard. Panchakavya is used instead of pesticide to control pests. Vermicompost is used as fertilizers. Only 5% of the farmers are practicing organic farming. It is proposed to cover 70 Ha. in organic farming.

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

Training, trials, and demonstrations are conducted in the farmer's field bringing them latest technologies in horticulture practices. The present condition in Horticulture Department is one Assistant Agricultural Officer is available in every block. An Horticultural Officer for 7 Blocks. Availability of Extension Officers is very inadequate. Krishi Vigyan Kendras are also conduct trainings for local farmer's even NGO are al so educating farmers.

2. Practices - Ground realities :

a. ***Irrigation – Water availability***: The Horticulture crops depend totally on the seasonal rains for irrigation. If water available in the wells get charged giving way to another crop under Vegetable s, the farmers does not go to dryland farming. Only 5% of the farmers are raising crops under drip irrigation conditions.

b. ***Micro Irrigation*** – About 2 to 5% of the farmers enjoy the benefits of Micro Irrigation, no fertigation is carried out in this sub -basin. More farmers should be educated in making use of Micro Irrigation along with Fertigation.

c. ***Contract Farming*** – Under Horticulture Crops no contract farming exists. Contract farming will bring a lot of benefits to the local farmers. Steps are being taken to promote contract farming.

d. ***Pre and Post Harvest practices adopted*** – Pre and Post harvest technologies are practiced by very progressive farmers that covers only one per cent of the total number of farmers. Due to high cost, they defer from utilising these technologies.

e. ***Labour Issue*** – Due to high labour cost, family labour is more in vogue. As non agricultural works get more wages the farm labours move towards more remuneration. Hence high labour cost.

3. Horti-processing factories

There is not Horti Processing Factories in this sub -basin.

4. Constraints

a. **Problem soils –** There are pockets of saline and alkaline patches in this basin. Reclamation may be done by applying gypsum or lime to this patches. Moreover saline tolerant fruit crops can b gro wn in the patches.

b. **Adverse climatic condition –** Long periods of drought followed by heavy rains causing floods have prevented the farmers from the natural Agriculture practices.

c. **Inferior quality of seeds and planting material –** Small farmers due to non-availability of seeds and plants from Government sources going for inferior quality from private sources, unaware of its priority.

d. **Inadequate quantity of seed and planting materials -** Inadequate quantity of seed and planting materials are supplied from Govern ment due to limited fund.

e. **Inadequate extension service -** Due to limited field functionaries.

f. **Low price for produce –** The facilities to get good price for the produce is practically non existent. Middlemen get good gains from these transactions. Farmers should be educated to make use of farm cooperative societies for selling their produce.

g. **Pre or post harvest management -**There is not pre or post harvest management in this basin Fruit and Vegetables) - The farmers are forced to sell their produce at rock bottom prices to avoid produce from getting perished.

h. **Limited availability of credit facilities -** The credit facilities offered by the banks are very limited. Hence the farmers are forced to go to money lenders.

i. **Risk aversion –** The farmers in the basin ar e not prepared to go for alternate crops due to risk in marketing them and also facing natural disasters. The farmers may go for crop insurance.

j. **Floriculture processing units -** Non-existent in this basin.

Increase of production in the Project period

Sl. No.	Component	Project period		
		Area in Ha.	Production (MT)	Yield (Tonnes)
1	Banana TC	50	2000	40 – 50
2	Veg. Hybrid	600	1500	25 – 30
3	Flower	375	1500	4 – 5
4	Mango	560	13000	10 – 20

5. Challenges thrown up by diversification /area expansion :

- **a.** Water is the main requirement where ever the diversified crops is suggested timely release or water is essential for production.
- **b.** Suitable varieties – since water is provided to the gap areas annual crops like vegetables and floriculture (annual) has been ta ken into consideration.
- **c.** Farmers mind set for new crops – since growing any horticulture crops was distant dream to this farmers growing vegetables and flowers through out the year at low cost technology is much appreciated.
- **d.** Research and extension services for addressing needs for newly diversified areas – need based materials to be provided to the farmers in time. Training to be imparted to the farmers, communication and information made easy.

Identification of crops and varieties – Horticulture fruit crops, where water is scarce, fruit crop prone to drought is A

6. Solutions and Recommendations

i). Soil reclamation :

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

ii). 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 216 man mont hs for 5 years period is proposed in this project.

iii). Staggered Planting :

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

iv). Mulching, Micro - irrigation :

Efficient water usage by adoption of micro irrigation and mulching.

v). 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
1	MANGO	ALPHONSO, NEELAM, BANGALORA
2	AMLA	KRISHNA, BSR

vi). 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.

vii). Marketing intervention proposed with reference to identified constra ints :

Sl. No.	*Constraint & Challenges*	*Counter measures*
1	Problem soil: Existing capacity of the STL at Villupuram is 2000	To overcome the problem soil, the farmers are advised to take up soil sampling and soil testing. 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 Mango and Amla are suggested in this sub - basin.
3	Inferior quality of seed and planting material: Farmers are using local and poor quality seeds. Truthful seeds are used by the meager farmers.	Quality planting materials supplied through Department of Horticulture. There are sufficient State Horticulture Farms available to supply the planting materials. The hybrid seeds are available from private sources and it will be procured and supplied to the farmers under tender acts.
4	Limited planting materials are 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.
6	Inadequate extension services	To cater the need technical input providers are proposed. For every 100 Ha. of area increase one TIP is proposed.
7	Low price for produce	Staggered planting methods recommended to the farmers to prevent price fall, especially during peak period of harvest. It is recommended to plant early and late season varieties.
8	Poor adoption of pre and post harvest technologies	Awareness should be created among the farmers in pre and post harvest techniques by giving training to the farmers.
9	Risk aversion	Training should be given to the farmers on new technologies.
10	Limited processing units	Entrepreneurs should be motivated through training and seminars to start new processing units. Seeking new market for the produces.
11	Availability of labour	Farm mechanisation is essential providing farm machineries for drudgery reduction, weeding, spraying to the WUA is needed.

Project on the Development of Horticulture Crops – Area Expansion

Crop	*Unit cost*	*Assistance 75%*	*Target (Financial in L.Rs., Physical in Ha.)*								
			I		*II*		*III*		*IV*		
			Fin	*Phy*	*Fin*	*Phy*	*Fin*	*Phy*	*Fin*	*Phy*	*Total*
Banana TC	50000	37500	2.50	5	5.0	10	2.50	5	2.50	5	12.50
Veg. Hybrid											
Bhendi	30000	22500	7.50	25	15.0	50	15.0	50	7.50	25	45.0
Watermelon	30000	22500	15.0	50	15.0	50	15.0	50			45.0
Flowers	24000	18000	6.0	25	12.0	50	12.0	50	12.0	50	42.0
TOTAL			**31.0**		**47.0**		**44.50**		**22.0**		**144.5**

Project on the Drip Irrigation for vegetable crops

Sl. No.	*Crop*	*Area*	*Implemented by*
1	Vegetables	300 Ha.	Agricultural engineering

Project on INM / IPM for existing fruit

Crop	*Unit cost*	*Assistance 75%*	*Target (Financial in L.Rs., Physical in Ha.)*					
			I		*II*		*III*	
			Fin	*Phy*	*Fin*	*Phy*	*Fin*	*Phy*
Mango	1000	1000	1.00	100	1.00	100	0.75	75
Banana TC	1000	1000	0.05	5	0.10	10	0.10	10
TOTAL			**1.05**		**1.10**		**0.85**	

Project on the Organic Farming on Vegetables

Sl. No.	***Component***	***Physical target in Ha.***			
		I	II	III	IV
1	Vegetables	50	100	100	50

Requirement of Inputs

Sl. No.	***Component***	***I YEAR***		***II YEAR***		***III YEAR***		***IV YEAR***	
		Area in Ha.	**Nos / Kgs**	**Area in Ha.**	**Nos / Kgs**	**Area in Ha.**	**Nos / Kgs**	**Area in Ha.**	**Nos / Kgs**
1	Banana TC	5	12500	10	25000	5	12500	5	12500
2	Vegetable – Bhendi	25	100	50	200	50	200	25	100
3	Watermelon	50	75	50	75	50	75		
4	Crossandra	25	3.125 lakhs	50	6.250 lakhs	50	6.25 lakhs	50	6.250 lakhs

AGRICULTURAL MARKETING PROPOSALS

Irrigated Agriculture Modernization and Water Resource Management in Varahanadhi Sub Basin

Project Sub Title :

Providing Agriculture Marketing Facilities in Varahanadhi Sub-Basin

2006-2007

Submitted by

Department of Agricultural Marketing &
Agri. Business

Department of Agrl. Marketing and Agrl. Business

IAMWARM PROJECT

in Varahanadhi Sub-basin

INTRODUCTION :

Varahanadhi originates in the western slopes / part of Gingee Taluk. It has two arms Left and Right Arms. The right arm originates from PAKKAMALAI HILLS and the Left arm originates from Melmalayanur. They join together near Thenpalai Village and forms as main river VARAHANADHI and flows in an easily direction and confluence at Bay of Bengal. The basin is situated between north latitude 11^0 50" 00^0 to 12^0 28" 00^0 and east longitude 790 08" 00^0 to 80^0 10" 00^0

The length of river is 78.50 KM and the basin area is 4498.53 Sq. km Varahanad hi Basin Consists of

1. Varahanadhi Sub Basin
2. Ongur Sub Basin
3. Nallur Sub Basin in which Varahanadhi Sub Basin is the larger sub basin in the Basin.

The Varahanadhi Sub Basin alone has an area 2550.08 Sq.Km having 236 Tank and 41 Anicuts Served.

Now Administratively Varahanadhi Sub Basin Spread out in 1. Thiruvannamalai District 2. Villupuram District for about 2647 (2250) Square Kilo metres.

Total Ayacut of 22215_{Ha} For Varahanadhi Sub Basin.

At the Sub-Basin covers the following district / Taluks / Blo cks

Sl. No.	District	Taluk	Block
1.	Villupuram	Villupuram	Koliyanur
			Kandamangalam
			Kanai
			Vikravandi
			Mugaiyur
		Gingee	Gingee
			Melmalaiyanur
			Vallam
		Tindivanam	Mailam
		Vanur	Vanur
		Thirukoilur	Mugaiyur
2.	Thiruvannamalai	Thiruvannamalai	Thurinjapuram
			Keelpennathur
		Vandavasi	Perunamallur
			Thellar

Tank, River & Tributaries

There are 236 Nos. of Tanks at Villupuram District area and 30 Nos. of Tanks at T.V. Malai District area of the Sub-Basin.

There is only one reservoir at Veedur of Villupuram Dist.

The River and tributaries of Varahanadhi Sub-basin is listed below :

1. Annamangalam Odai
2. Nari Odai
3. Ginjee Odai
4. Pembai Channel
5. Thondi river

Varahanadhi Sub-basin crop pattern

Sl. No.	Name of the crops cultivated	Area under crops in Ha					
		Without Project			With Project		
		Fully	Partially	Rainfed	Fully	Partially	Rainfed
1.	Paddy (Dec. Mar.)	6800			6000		
2.	Ragi (Dec. Mar.)	100			200		
3.	Cumbu (Dec. Mar.)	30		100	130		
4.	Maize (Dec. Mar.)				1000		
5.	Pulses (Blackgram) (Aug. Nov.)			1425		1425	
6.	Pulses (Blackgram) (Dec. Mar.)		1460		1960		
7.	Pulses (Blackgram) (Apr. Jul.)						
8.	Ground Nut (Aug. Nov.)			5000		5000	
9.	Ground Nut (Dec. Mar.)	2164	1784		6705		
10.	Ground Nut (Apr. Jul.)						
11.	Gingelly (Dec. Mar.)		974		2000		
12.	Coconut (Perennial)	20			20		
13.	Cotton (Dec. Mar.)	100			225		
14.	Sugarcane (Dec.)	1083			2000		
15.	Water nucleon (Dec. Mar.)	150			800		
16.	Bhendi (Dec. Mar.)	150			800		
17.	Flowers (Dec. Mar.)	200			875		
18.	Mango (Perenninal)		650		650		
19.	Banana (Dec. Mar.)	25			50		
20.	Fodder (Aug. Nov.)				300		
	Total	10822	4868	6526	22215	6425	

Ayacut : 22215 Ha
Full Irrigate : 10822 Ha
Gap : 6526 Ha
Partial Irrigate : 4868 Ha

I. Existing Marketing Scenario

1.Cold storage is not available in the Sub-Basin area

2. No. specialized or general markets are identified in the Sub-Basin area except two village weekly Shandis (Sandai) one at Kuttarapattu and other at Theevanur & Mailam block.

	TYPE	LOCATION
1.	Regulated Market	1. Villupuram 2. Tindivanam 3. Gingee 4. Vikravandi 5. Marakkanam.
2.	Rural Godown	1. Villupuram 2. Tindivanam 3. Gingee (Each Godown with 1000 MT. Capacity)
3.	Rural Godown at CMF	1. Villupuram – 2 Nos. – 240MT Capacity each 2. Tindivanam – 2 Nos. – with capacity of 500MT and 120 MT 3. Gingee – 2 Nos. – with capacity of 800 MT and 120 MT
4.	Threshing Floor/ Drying Yard:	1. Villupuram 2. Tindivanam 3. Gingee 4. Vikravandi 5. Marakkanam

Drying Yard at Village level.

In Villupuram Regulated Market area

1. Kandamanadi	2. Pidagam	3. Valavanur
4. Thodaruthanur	5. V.Villiyanur.	6. Kozhippattu
7. Mittamandagapattu		

In Tindivanam Regulated Market area.

8. Siruvai 9. Puliyanur.

In Gingee Regulated Market area.

10. Anathoor 11. Annangur 12. Vadaputhur
13. Kalaiyur 14. Kadambur

Total Production : 62479
(Excluding Sugarcane, Cotton, Vegetables,
Fruits, Coconut, Fodder)

Marketable Surplus : 54536 MT

Existing Capacity

- Regulated Markets : 14000 MT
- State ware housing corporation : -
- Co-operative : 2000 MT
- Private : 9500 MT

Total : 25500 MT
(2 fillings) : 51000 MT

Gap in Capacity : 3536 MT

Godowns proposed in the Sub-Basin : 4 (x 200 MT)

(5 Fillings) : 4000 MT

MARKETS: A). CROPWISE MARKET DETIALS IN REGULATED MARKETS 2004-05

CROP	Villupuram		Tindivanam		Gingee		Vikkiravandi		Markkanam	
	Qty. Transacted in MT	Average rate / Qtls in Rs.	Qty. Transacted in MT	Average rate / Qtls in Rs.	Qty. Transacted in MT	Average rate / Qtls in Rs.	Qty. Transacted in MT	Average rate / Qtls in Rs.	Qty. Transacted in MT	Average rate / Qtls in Rs.
PADDY	26428	555	1252	575	85115	660	5031	560	36	545
GROUNDNUT	1130	2125	6933	2200	4233	2100	267	2050	726	1950
GINGELLY	708	1900	643	1850	187	1950	72	1900	20	1850
CUMBU	1209	585	217	520	768	525	382	569	186	600
RAGI	379	542	164	520	299	535	119	510	12	522
BLACK GRAM	253	1671	142	1650	25	1719	83	1660	5	1680
GREEN GRAM	30	1557	16	1550	4	1448	9	1500	4	1500
OTHER CROPS	8716	-	744	-	1779	-	1032	-	-	-
TOTAL	**38853**	**-**	**10111**	**-**	**92410**	**-**	**6995**	**-**	**989**	**-**

MARKETS: A). CROPWISE MARKET DETIALS IN REGULATED MARKETS

CROP	Villupuram		Tindivanam		Gingee		Vikkiravandi		Markkanam		Grand total in MT
	Qty. Transacted in 2005-06 in MT	Average rate / Qtls in Rs.	Qty. Transacted in 2005-06 in MT	Average rate / Qtls in Rs.	Qty. Transacted in 2005-06 in MT	Average rate / Qtls in Rs.	Qty. Transacted in 2005-06 in MT	Average rate / Qtls in Rs.	Qty. Transacted in 2005-06 in MT	Average rate / Qtls in Rs.	
PADDY	31947	560	7760	600	69374	710	17966	561	1223	540	128270
GROUNDNUT	722	2200	5975	2100	3989	2050	171	1945	686	1843	11543
GINGELLY	533	2500	528	2350	183	2100	77	2251	11	2080	1332
SUGARCANE	7589	2100	816	1969	1169	1980	818	2011	-	-	10392
RAGI	328	622	145	550	207	610	152	535	9	448	841
CUMBU	613	740	394	650	228	630	508	637	180	660	1923
PLSES BLACK GRAM	365	3410	221	3000	29	2960	147	3116	3	3075	765
GREEN GRAM	32	3000	41	2900	2	2780	9	2819	-	-	84
OTHER CROPS	980	-	108	-	55		302	-	-	-	1445
TOTAL	**43109**	**-**	**15988**	**-**	**75236**	**-**	**20150**	**-**	**2112**	**-**	**156595**

B). Uzhavar Sandhai

Crops	Villupuram		Tindivanam		Grand Total	
	Qty. Transacted in 2005-06	Total value of the product Rs.	Qty. Transacted in 2005-06	Total value of the product Rs.	Total Qty. in MT's	Total value in lakh Rs.
Vegetables and Fruits	73,93,287 Kgs.	5,48,88,565.00	23,56,878 Kgs.	2,09,62,438.00	9750.00	572.45

- **Specialised Market : Nil**
- **General Market : Villupuram , Tindivanam, Gingee, Vikkiravandi, Marakkanam.**

Crops	Villupuram		Tindivanam		Grand Total	
	Qty. Transacted in 2004-05	Total value of the product Rs.	Qty. Transacted in 2004-05	Total value of the product Rs.	Total Qty. in MT's	Total Value in lakh Rs.
Vegetables and Fruits	5,67,053 Kgs.	53,04,878.00	3,83,074 Kgs.	27,06,872.00	950.127	80.22

Month wise maximum minimum price 2005-06

Sl. No	Commodity	April		May		June		July		August		Sep.		Oct.		Nov.		Dec.		Jan.		Feb.		Mar.	
		Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini	Max	Mini
1	Paddy	589	5330	797	380	598	390	751	390	739	320	725	400	782	375	809	450	733	430	635	375	696	370	440	360
2	Ground Nut	1709	1490	2078	1850	1756	1550	2016	1650	2033	1600	2025	1750	2108	1750	2050	1500	2009	1433	1783	1550	1740	1396	1846	1675
3	Gingelly	2131	1750	2300	1850	1769	1400	2002	1650	1659	1300	1710	1450	1750	1500	2026	1400	1918	1450	1950	1575	1986	1550	2211	1800
4	Black gram	2167	1800	2162	1669	2280	1900	2220	1850	2169	1750	2310	1990	2680	2200	3029	1890	3006	2100	3169	2750	3152	2990	3450	3120
5	Green gram	2113	1750	2081	1571	2080	1850	2206	1750	2253	1700	2217	1900	2127	1900	1850	1350	2150	2029	1776	1615	2732	2390	3231	2750
6	Cumbu	795	500	758	474	758	550	796	520	770	480	753	520	792	575	780	550	753	550	727	675	778	700	826	630

3. Local Mandies / Commission agent system

Commission mandies and middle men trading are the existing transaction system prevailing other than the regulated market com mittees.

For Paddy, the produce is purchased at farmer's place itself by the middle men operate for specific rice mill owners. The commission amount paid to then is Rs. 5 / - per bag of Paddy Purchased.

Regarding purses the produce is taken to the Comm ission mandies directly by the farmers. The day to day prices are quoted by the wanted mill owners and the mandy agents purchase the quantity relatively. The commissioner paid to the Mandi agent is Rs. 5 /- per bag of pulses.

The other major millet and oil seeds produces are mostly transacted through Regulated market committees only.

4. Practice (Pre and Post Harvest)

a.	Grading	-	Facility available at Regulated Markets
b.	Transportation	-	Farmers own arrangements
c.	Contract Farming	-	Only for Sugarcane by South India Sugars, factory at Mundiyampakkam.
d.	Source of Market Information	-	Through Regulated Markets, Audio visual means and News paper

Constraints

1. Constraints In Existing Scenario: -

a.	Production	-	Post Harvest glut in production during March - April
b.	Lack of Available markets	-	Markets for perishables like water melon, not available.
c.	Poor Post Harvest Practices	-	Lack of awareness on post harvest Technology at village levels
d.	No Collective action	-	Farmers market their produce individually. No organised collection, or Transport or marketing.
e.	Lack of Market Information	-	---

Area productivity and production in Varahanadhi Sub-Basin (With Project) 5% increase in yield due to project

Sl. No.	Name of the Crop	Fully			Partially			Reinfed			Total	
1.	**Cereals, Oil Seeds, Pulses & Sugar cane and Cotton**	**Area in Ha.**	**Productivity in MT/Ha**	**Production in MT/Ha.**	**Area in Ha.**	**Productivity in MT/Ha**	**Production in MT/Ha.**	**Area in Ha.**	**Productivity in MT/Ha**	**Production in MT/Ha.**	**Area in Ha.**	**Production in MT/Ha.**
1	Paddy-Dec.-March	6800	4.72	32096			0				6800	32096
2	Groundnut-August – Nov.			0			0			0	5000	7850
3	Groundnut-Dec. – March	2164	2.43	5258.52	1784	1.93	3443.12	5000	1.57	7850	3948	8701.64
4	Groundnut-Apr. – July			0			0			0	0	0
5	Gingelly – Dec. March			0	974	0.4	389.5			0	974	389.6
6	Sugarcane – Dec.	1083	114	123462			0			0	1083	123462
7	Pulses – B.G. Aug. - Nov.			0				1425	0.58	826.5	1425	826.5
8	Pulses – B.G. Dec. – March			0	1460	0.74	1080.4			0	1460	1080.4
9	Pulses – B.G. Apr. – July			0			0			0	0	0
10	Regi-Dec. – March	100	2.61	261			0			0	100	261
11	Cumbu – Aug. Nov. Dec.	30	3.1	93			0	100	0.8	80	130	173
12	Cotton – Dec. - March	100	1	100			0			0	100	100
13	Maize Dec. – March			0			0			0	0	0
	Total	**10277**		**161270.52**	**4218**		**4913.13**	**6525**	**0**	**8756.5**	**21020**	**174940.14**
II	Vegetables and Fruits											
14	Water Melon – Dec. – March	150	20	3000			0			0	150	3000
15	Bhendi – Dec. – March	150	3.97	595.5			0			0	150	595.5
16	Flowers – Dec. – March	200	5	1000			0			0	200	1000
17	Mango – Pernnial			0	650	4.77	3100.5			0	650	3100.5
18	Banana – Dec. – March	25	42.47	1061.75			0			0	25	1061.75
	Total	**525**		**5657.25**	**650**		**3100.5**	**0**	**0**	**0**	**1175**	**8757.75**
III	Coconut											
19	Coconut – Pernnial (in Nos.)	20	11200	224000			0				20	224000
	Total	20		224000	0		0	0	0	0	20	224000
IV	Fodder											
20	Fodder (Pemnial)			0			0		0		0	0
	Total	**0**		**0**	**0**		**0**	**0**	**0**	**0**	**0**	**0**
	Grand Total	**10822**		**166927.77**	**4868**		**8013.62**	**6525**		**8756.5**	**22215**	**183697.89**

Area productivity and production in Varahanadhi Sub-Basin (With Project) 5% increase in yield due to project

Sl. No.	Name of the Crop	Fully			Partially			Reinfed			Total		Marketable Surplus in %	Marketable Surplus in MT	Abstract M.S.
1.	**Cereals, Oil Seeds, Pulses & Sugar cane and Cotton**	**Area in Ha.**	**Productivity in MT/Ha**	**Production in MT/Ha.**	**Area in Ha.**	**Productivity in MT/Ha**	**Production in MT/Ha.**	**Area in Ha.**	**Productivity in MT/Ha**	**Production in MT/Ha.**	**Area in Ha.**	**Production in MT/Ha.**			
1	Paddy-Dec.-March	6000	4.95	29700			0				6000	29700	80.65	23953.05	23953.00
2	Groundnut-August – Nov.			0	5000	2.02	10100				5000	10100	96	9696	26109.8
3	Groundnut-Dec. – March	6705	2.55	17097.7			0				6705	97.7	96	16413.8	
4	Groundnut-Apr. – July			0											
5	Gingelly – Dec. March	2000	0.75	1500							2000	1500	100	1500	1500
6	Sugarcane – Dec.	2000	120.0	240000			0				2000	240000	100	240000	
7	Pulses – B.G. Aug. - Nov.			0											2488.56
8	Pulses – B.G. Dec. – March	1960	1.02	1999.2			0				1960	1999.2	80	1599.36	
9	Pulses – B.G. Apr. – July			0		0.78	1170				1500	1170	80	936	
10	Regi-Dec. – March	200	2.74	548			0				200	548	50	274	485
11	Cumbu – Aug. Nov. Dec.	130	3.25	422.5			0				130	422.5	50	211.25	
12	Cotton – Dec. - March	225	1.5	337.5			0				225	337.5	100	337.5	338
13	Maize Dec. – March	1000	3.8	3800			0				1000	3800	95	3610	1710
	Total	**20220**		**295404.9**	**6425**	**11211.5**	**18441.5**	**0**	**0**	**0**	**31145**	**306616.4**		**298483.91**	**56584.36**
II	Vegetables and Fruits														
14	Water Melon – Dec. – March	300	21.00	6300			0				300	6300	100	6300	
15	Bhendi – Dec. – March	300	4.20	1260			0				300	1260	100	1260	
16	Flowers – Dec. – March	375	5.25	1968.75			0				375	1968.75	100	1968.75	
17	Mango – Pernnial	650	5.00	3250			0				650	3250	100	3250	
18	Banana – Dec. – March	50	44.29	2214.5			0				50	2214.5	100	2214.5	
	Total	**1675**		**14993.25**	**0**		**0**	**0**	**0**	**0**	**1675**	**14993.25**		**14993.25**	
III	Coconut														
19	Coconut – Pernnial (in Nos.)	20	11760	235200			0				20	235200	100	235200	
	Total	20		235200	0		0	0	0	0	20	235200			
IV	Fodder														
20	Fodder (Pemnial)	300	200	60000			0				300	60000	100	60000	
	Total	**300**		**60000**	**0**		**0**	**0**	**0**	**0**	**300**	**60000**		**60000**	
	Grand Total	**22215**		**367983**	**10925**		**18441.5**	**0**		**0**	**33140**	**386424.8**		**377916.864**	

Approximate location of the Diversifie d crops :

Annangur, Kalaiyur, Kadambur, Vadaputhur,
Retanai, Kanai, Melmalayanir, Kooteripattu, Nattarmangalam,
Koliyanur, Vikkiravandi, Ginjee

Paddy Area is decreased due to following reasons

1 Due to urbanization or utilized for real estate business .

2 Farmers are also not willing to cultivate paddy because Market price is not stable and rice from neighboring states like Andra , Karnataka comes to our state for competition so farmers like to Diversify from paddy other crops.

Challenges thrown up by Diversification / Area expansion

1.	Identifying new market for new crop	-	Farmers have to be encouraged to utilise Uzhaver shandhais, For horticultural crops provide facilities for marketing at wholesale markets like Koyambedu at Channai.
2.	Improving existing market utilisation	-	Capacity utilisation can be improved at Regulated Markets and Uzhavar Sandhai.
3.	Providing multiple market information to get best prices for each type of crops to get best prices	-	Regulated Market, Audio visual means and News papers.
4.	Ensuring collective marketing / bargain (WUAs - Sub groups) ;	-	For vegetables and fruits it can be achieved through collection centre.

5.	Improving access to market by better transport or collective transport	- Ensuring regular transport facility to nearest market s.
6.	Specialised storage as per crop needs (cold storage, rural godowns) ;	- Rural godowns at village level
7.	Processing and Agro processing ;	- Regarding paddy and oil seed crops enough processing units like Modern Rice mills, oil mills are available.
8.	New practices-Product handling, Grading, Packing, on farm process and quality control	- Collection centres cum godowns are suggested through which products like vegetables will be collected, cleaned, graded, packed and transported to wholesale point with plastic crates without causing any physical injury to the produce. The quality control aspects will be taken in to consideration through capacity building exercises to be conducted.
9.	Information Education and Communication (IEC) ;	- Through extension officers by conducting training and demonstrations.

Solutions and Recommendations ;

1. Consultative process under taken in the sub-basin ;

Farmer's Association meetings and walk through survey were conducted on 27.07.06 and 12.08.06.

During the walk through, the cross section of sub-basin has been contacted through walking and the farmers demands were studied. Along with this the topography of the area, cropping pattern, water availability, transport also observed. This background facilitated in understanding the stake holders problems and the solutions suggested.

2. Stake holders demands :

The stake holders in different parts of the sub basin requested the following infrastructure.

a. Storage godown : Farmers are of the opinion that storage godowns and threshing floors are necessary for the following reasons.

1. At many places the regulated Marketing's & other markets are situated 20-30 km from the place of production.

2. If the produces are transported and sale has not been effected due to price difference, the produce could not be returned.

3. Pledge loan facility is not available in the villages where godowns are not available.

4. Without storage, the produces are likely to reduce in quality.

Due to the above reasons, the stake holders demanded storage godowns and threshing floor at interior villages.

b. Threshing floor / drying yard
c. Dunnages
d. Plastic tarpaulins
e. Weighting scale

C. Marketing intervention proposed

Software components

- Linkages with traders / manufacturers on con tract farming / MOU terms to be explored along with legal coverage.
- FIG's at WUA level and commodity Groups.
- Capacity building in pre and post harvest techniques – the training to be conducted among FA's to gain more market access. – Centralized proposal by TNAU.
- Diversification of crop from paddy to Groundnut, pulses, Sugarcane since paddy is more water required to less water required in order to maximize the water use efficiency.

Hard Ware Component

- Demand and price forecasting system to be deve loped at the Sub-Basin level in liason with TNAU 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 Godown are to be constructed at Sel ective FA's field itself to make provision for collection, cleaning and Grading of the Produce as well as Packing and storage. As for as grains are concerned besides Godowns, Tharshing floors are constructed to minimise the losses during the post harve st processes.

Marketing Intervention Required

To maximise water use efficiency, diversification of crop from Paddy to lesser water consuming crops like groundnut, pulses, fodder etc., is adopted. As such, existing marketing capacity for Paddy and for other major millets is enough. But as there is glut in production, and to provide flexibility in marketing by short term storing and also for proper drying the produce we are providing rural storage godowns 4 Nos. and drying yards 5 Nos. Other than Paddy, the market intervention required for Other crops are furnished below.

1. Ragi :

For the year 2005-06 a total quantity of 841MT has been transacted through the five Regulated market committees within the Sub-Basin Area. 85% of the arrivals were from outside sub-basin area. So the excess production 137MT will be absorbed through the regulated markets.

2. Maize :

Maize has been newly introduced in the cropping pattern of this project. As per the enquiries made, the poultry feed manufacturers like M/s. Suguna, Poineer etc. are ready to purchase the entire quantity of 3800 MT at prevailing market rates at the time of purchase.

3. Oil Seeds :

A total quantity of 11543 MT of groundnut kernels has been transacted during 2005-06 through regulated market committees in the sub-basin area. More over, there are 1 jaint oilmill and 42 small oilmill units in and around Villupuram region. When enquired the jaint oil mill is capable of crushing 5 MT of ground nut kernals daily, The smaller oil mill are capacble of crushing 20 MT per day. More over the traders from other adjacent state like Karnataka are procuring groundnut Pods through Regulated Markets seasonally. So, the excess production of 3711 MT produce can easily the absorbed through the regulated market committees.

In Gingelly during 2005-06 around 1332 MT produce was transected, out of which 70% of the produce were from outside the Sub-Basin area.

other than regulated market committees, like groundnut, ginjelly also procured by the local oil mills and by traders. So, the excesses quantity produced with project can easily be absorbed through the regulated markets.

4. Pulses (Black gram)

In Black gram, for 2005-06, around 765 MT produce was transacted through the regulated market committees. More over, in and around Villupuram, Tindivanam, Panruti private mandis are also purchasing directly from the growers. So, the excess production of 408 MT is marketable.

5. Sugarcane :

M/s. Rajasree Sugar factory at Mudiyampakkam of the only sugar mill situated in the sub-Basin area. The existing crushing capacity of this mill is 5000MT / day. Last year they have crushed about 9.1 lakh MT. So the increased production of 1.10 lakh MT from 917 Ha will be absorbed by the factory.

6. Cotton :

Arrivals during 2005-06 was 10392 MT. Villupuram Regulated Market committee is a major centre for cotton transaction. When enquired, the excess production of 131.25 MT can easily be absorbed through regulated market committee.

7. Horticultural crops :

During 2005-06 a quantity of about 9,750 MT of vegetables and fruits were transacted through the two Uzhavar Sandhai's viz. Villupuram and Tindivanam. The excess production of vegetables, fruits, and flowers around 5806 MT should be collected through c ollection centre and then has to be transported to Koimbedu market at Chennai to fetch better price and renumaration to the growers.

8. Fodder :

As per the information got from the Animal Husbandry department the cattle population is around 68000 Nos. The entire Fodder production of 60,000 MT will be consumed locally.

Marketing interventions proposed with reference to identified constraints ;

Sl. No.	Crop	Constraint & Challenges	Counter Measures
1.	Paddy	**Constraints** Production - Post harvest glut in production during January & February Post harvest Practices - Lack of threshing floors / Drying yards **Challenges** - Providing storage facilities at village level and thrashing floor / drying yards.	**1. Two Rural Storage godown :** At village level will help the farmers in the interior areas of the sub-basin for better storage and marketing. **2. Five Thrashing floors / Drying yards :** Even though these facilities are available in the regulated markets, and in certain villagest, other rural and interior area formers experience much difficulties in availing these facilities because of distance and the cost of transport. Hence, the thrashing floors / drying yards, shall be constructed in the rural areas.

2.	Vegetables & Fruits	**Constraints** Poor Harvest Practices Not collective action, Transport **Challenges**	- - - -	Lack of awareness in post harvest technology, packing, cleaning. No regular assured transport and collective action Providing access to market by better transport and collective transport / collective marketing.	**3. Two mini Autos at Tindivanam :** Because of the increase in volume of Horticulture crops, approximately 20 tones per day) and to move them from rural areas to the collection centre, two number of Mini Autos are felt essential for transportation. For the time being private transport vehicles shall be engaged for moving the produces to Chennai, and in near future own transport vehicles can be purchased. **4. One Collection centre at Tindivanam :** Due to modernization of irrigation, the area under cultivation particularly horticultural crops is expected to increase. Horticultural crops like fruits and vegetables are perishable in nature. Farmers need project support for marketing their produce in addition to Uzhavar Sandhais. Hence it is proposed to have a collection centre for perishable produces and move them to wholesale market at Koyembedu, Chennai.
3.	For all crops	Information education & Communication	- 	Providing Kiosks at selection Villages	5 Kiosks may be formed at 5 representative villages across the Sub-Basin at a cost of Rs. 2 lakh each. However, this item of work is entrusted with TNAU it does not figure in this estimate cost.

VARAHANADHI SUB- BASIN

AGRICULTRURE BUSINESS CENTRE

Location - vallam

Crop - Groundnut - pulses

Groundnut is the existing major crop swon followed by pulses. Maize crop is being introduced newly in cropping pattern of this sub -basin with project, suitable infrastructure has to be provided for proper drying and short storing of the produce. For that an Agri Business Centre proposed at vallam village of Block in Villupuram District.

Presently, is no Regulated Market at vallam. The existing Regulated Markets situated around Vallam village are, on the east Thindivanam, on the west Gingee, on the North Thelir and on the South Vikkiravandi at a distance of 14 km, 12km, 35km and 28 km respectively from Vallam.

The existing groundnut area is 1000 Ha in two seasons and pulses 500 Ha. So, Vallam being the centre point, the proposed Agri Busness Centre can be utilized throughout the year without gap, with either of the crops. A nominal amount could be collected from the farmers who uses the Agri Business Centre and this amount can be utilized for maintenance of the centre.

CROP	AREA Ha	YIELD (Kg-Ha)	PRODN ((Mt)	UNIT COST Rs Kg	COST (Rs in lakhs)
Groundnut	1000	2500	2500	17	425.0
Pulses	500	580	290	22	63.8
					488.8

ESTIMATE FOR AGRI . BUSINESS CENTRE

Sl.No	Particulars	Cost in Lakhs
1	Lab cum Admin	1.00
2	Grading cum Storage Shed	5.00
3	Electricity, Water Supply	1.50
4	Drying Yard	2.20
	Equipments	
5	Moister Meter and weighing scale	0.30
6	Dunnage (Rs.2000 each) 30 Nos.	0.60
7	Tarpaulins (Rs.5000/- each) 2 Nos.	0.10
8	Recurring expenditure	0.60
	Total Cost	11.30

Department of Agri. Marketing and Agri. Bussiness

IAMWARM PROJECT

In Varahanadhi Sub- basin

Phasing of Expenditure

The Expenditure will be phased out as follows

S.No	Particulars	I	II	III	IV	V	Total	Amount in Lakhs
1.	Storage Godown	-	4	-	-	-	4	20.0
2.	Drying Yard	-	5	-	-	-	5	11.0
3.	Plastic Tarpaulin	-	20	20	-	-	40	2.0
4.	Dunnages	-	60	60	-	-	120	0.09
5.	Weighing Scales	-	4	-	-	-	4	4.5
6.	Collection Centre	-	1	-	-	-	1	5.0
7.	Mini Auto	-	2	-	-	-	2	4.0
8.	Cost of One ABC	-	1	-	-	-	1	11.30
TOTAL								**58.7**

Department of Agrl. Marketing and Agri. Business

IAMWARM PROJECT
In Varahanadhi Sub-basin

Sl. No.	Item	Nos.	Description	Place	Unit Cost (in Lakhs)	Total Cost (in lakhs)
1.	Storage godown	4	20m x 5m	Nattarmangalam Koliyanur Melmalaiyanur Kutteripattu	5.0	20.0
2.	Drying yard	5	20m x 20m	Koliyanur – 1 Vikravandi –1 Kanai – 1 Melmalaiyanur –1 Gingee – 1	2.2.	11.0
3.	Plastic Tarpaulins	40		Nattarmangalam-10 Koliyanur – 10 Melmalayanur – 10 Kutteripattu-10	0.05	2.0
4.	Dunnages	120		Nattarmangalam-30 Koliyanur-30 Melmaliyanur-30 Kutheripattu – 30	0.0075	0.09
5	Weighing scales	4		Nattarmangalam –1 Koliyanur – 1 Melmalayanur – 1 Kutheripattu – 1	0.125 2.0	0.5 4.0
6	Collection Centre	1		Tindivanam	5.0	5.0
7	Mini Auto	2		Tindivanam	2.0	4.0
8	Cost of one ABC	1		Vallam	11.30	11.30
					Total	**58.70**

ANIMAL HUSBANDRY PROPOSALS

ANIMAL HUSBANDRY COMPONENT

IAMWARM PROJECT

VARAHANADHI SUB BASIN

Commissionerrate of Animal Husbandry & Veterinary Services, Chennai 600 006

IAMWARM PROJECT

ANIMAL HUSBANDRY

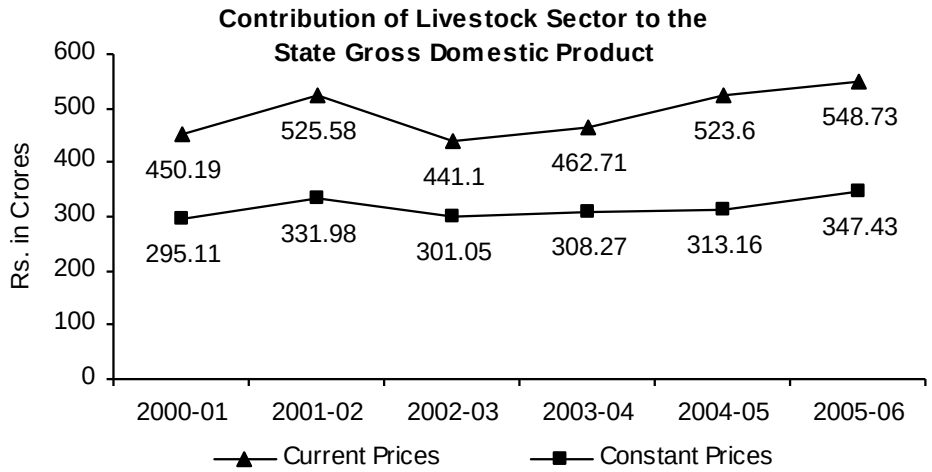
1. INTRODUCTION

1.1 Our State being an agricultural based economy with more than 60% of the people engaged in animal husbandry, agriculture and allied activities, 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 livestock. 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	%age Share of Agriculture & Allied Activities to GSDP	%age Share of Livestock Sector to GSDP	%age Share of Livestock Sector to Agriculture	Gross State Domestic Product	GSDP for Agriculture & Allied Activities	GSDP for Livestock Sector	%age Share of Agriculture & Allied Activities to GSDP	%age Share of Livestock Sector to GSDP	%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 VARAHA NADHI SUB BASIN

Livestock Population

Cattle	Buffalo	Sheep	Goat	Poultry
234276	13280	48290	62243	83110

Breedable age Female Population

Crossbred Cattle	Non Descriptive cattle	Buffalo	Total
88083	72068	8860	169011

Infrastructure and Man power in Government Veterinary Institutions

No. of Veterinary Institutions		Veterinary institutions filled up	
Graduate Institutions	Subcentres	Graduate Institutions	Subcentres
29	28	22	11

Average Per Day Milk Yield per animal

Average Per Day Milk Yield per animal (In Kgs.)		
Crossbred Cattle	Non Descriptive cattle	Buffalo
5.665	2.556	2.909

Milk Procurement

Milk cooperative societies	Present milk procurement (LPD)	Milk sent to Aavin (LPD)
199	65,000	30,000

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. of page 12 & 6.2.b. of page 13) to deliver quality veterinary services in the sub basin. In addition one veterinary dispensary (details enclosed vide para 6.2.c. of page 13) 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 vide 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 CO3 fodder in 250 hectares of private lands, (details enclosed vide para 6.3.(d). of page 14) 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 16) 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 17) 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 18) 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 18)
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 19) 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 5.66 lts to 10 litres in crossbred, from 2.5 lts to 3.3 litres in indigenous and from 2.9 lts to 6 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 29 graduate veterinary institutions and 28 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 5 Sub basin Veterinary 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.

Name of the Sub basin :			Varahanadhi	
Total number units in Varahanadhi basin :			Five	
Name of the Sub basin Veterinary Unit :			1. Avvaiyarkuppam	
Sl. No.	Name of Villages to be Covered	Distance from the Head Quarters (in Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Avvaiyarkuppam	0	Rettanai	10
2.	Peramandur	10	Rettanai	8
3.	Chinnanerkunam	6	Pathirapuliyur	8
4.	Kothamangalam	13	Rettanai	20
5.	Nedimoziyanur	12	Pathirapuliyur	10
6.	Palappattu	9	Pathirapuliyur	8
7.	V.Panjalam	13	Rettanai	14
8.	V.Nallalam	12	Rettanai	10
9.	Sithani	12	Pathirapuliyur	6
10.	Peranni	16	Pathirapuliyur	15
11.	Periyathachur	20	Ennayiram	6
12.	Marur	12	Rettanai	15
13.	Nagandoor	9	Rettanai	11
14.	Kalladikuppam	14	Rettanai	10
15.	Keelmampattu	12	Rettanai	8
16.	Dhalavalapattu	15	Rettanai	10

Villages 1 to 6	Mondays & Thursdays
Villages 7 to 11	Tuesdays & Fridays
Villages 12 to 16	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.	

Avvaiyarkuppam village is about 10 kms from the nearest Veterinary institution namely Veterinary Dispensary, Rettanai. There are about 15 villages situated in and around Avvaiyarkuppam that are not covered by the Government Veterinary Institution. Further

the breedable female population in and around Avvaiyarkuppam that is untapped by the Government veterinary institution is around 2,342. Hence Avvaiyarkuppam village is fixed as the headquarters of the Sub basin Veterinary Unit.

Name of the Sub basin Veterinary Unit :			2. Alampoondi	
Sl. No.	Name of Villages to be Covered	Distance from the Head Quarters (in Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Alampoondi	0	Sathiyamangalam	5
2.	Thenpallai	7	Sathiyamangalam	9
3.	Vadapallai	9	Sathiyamangalam	11
4.	Seayapundi	4	Sathiyamangalam	7
5.	Manandhal	16	Sathiyamangalam	18
6.	Kalathanpattu	9	Sathiyamangalam	5
7.	Sokkanandhal	7	Sathiyamangalam	4
8.	Virpattu	20	Vallam	15
9.	Servelagam	15	Gingee	7
10.	Melkalavai	12	Gingee	3
11.	Perumpugai	12	Gingee	5
12.	Anathur	13	Gingee	4
13.	Neganoor	16	Gingee	7
14.	Nangilikondon	7	Gingee	8
15.	Melyadayalam	16	Gingee	6
16.	Eachur	18	Gingee	11

Villages 1 to 6	Mondays & Thursdays
Villages 7 to 11	Tuesdays & Fridays
Villages 12 to 16	Wednesdays & Saturdays
Sundays will be a reserve day in which IEC campaigns wil l be conducted. In addition if any villages are left out during the week, it will be covered on the reserve day.	

Alampoondi village is about 5 kms from the nearest Veterinary institution namely Veterinary Dispensary, Sathiyamangalam. There are about 15 villages situated in and around Alampoondi that are not covered by the Government Veterinary Institution. Further the breedable female population in and around Alampoondi that is untapped by the Government veterinary institution is around 2,112. Hence Alampoondi village is fixed as the headquarters of the Sub basin Veterinary Unit.

Name of the Sub basin Veterinary Unit :			3. Ayyuragaram	
Sl. No.	Name of Villages to be Covered	Distance from the Head Quarters (in Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Ayyuragaram	0	Mundiyampakkam	4
2.	Panayapuram	7	Mundiyampakkam	3
3.	Duravi	9	Mundiyampakkam	5
4.	Madurapakkam	13	Radhapuram	4
5.	Chittalampattu	16	Radhapuram	8
6.	Kodukkur	18	Radhapuram	10

7.	Vadakuchipalayam	4	Mundiyampakkam	4
8.	Kappiyampuliyur	8	Koliyanur	5
9.	Siruvallikuppam	12	Radhapuram	4
10.	Vakkur	14	Radhapuram	5
11.	V.Pagandai	15	Radhapuram	6
12.	Kaspakaranai	6	Asokapuri	4
13.	Kundalapuliyur	10	Asokapuri	6
14.	Veliyandal	13	Narasinganur	5
15.	Asoor	14	V.Sathanur	5
16.	Melakondai	16	Vikravandi	4

Villages 1 to 6	Mondays & Thursdays
Villages 7 to 11	Tuesdays & Fridays
Villages 12 to 16	Wednesdays & Saturdays
Sundays will be a reserve day in which IEC campaigns will be conducted. In addition i f any villages are left out during the week, it will be covered on the reserve day.	

Ayyuragaram village is about 4 kms from the nearest Veterinary institution namely Veterinary sub centre, Mundiyampakkam. There are about 15 villages situated in and around Ayyuragaram that are not covered by the Government Veterinary Institution. Further the breedable female population in and around Ayyuragaram that is untapped by the Government veterinary institution is around 2,207. Hence Ayyuragaram village is fixed as the headquarters of the Sub basin Veterinary Unit.

Name of the Sub basin Veterinary Unit :			4. Melkaranai	
Sl. No.	Name of Villages to be Covered	Distance from the Head Quarters (in Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Melkaranai	0	Anniyur	5
2.	Siruvalai	5	Anniyur	4
3.	Viramur	8	Kedar	5
4.	Ariyalurthirukai	10	Atthiyurthirukai	6
5.	Kakkanur	12	Atthiyurthirukai	4
6.	Othiyathur	15	Atthiyurthirukai	8
7.	Salavanur	4	Anniyur	5
8.	Panamalai	5	Sangeethamangalam	4
9.	Ponnankuppam	8	Anniyur	6
10.	Karuvachi	13	Kadayam	5
11.	Valaiampattu	13	Kadayam	7
12.	Thirukunam	8	Anniyur	4
13.	Hanumanthapuram	10	Anniyur	6
14.	Vengamoor	13	Kadyam	8
15.	Udanattham	15	Atthiyurthirukai	6
16.	Melvalai	16	Atthiyurthirukai	8

Villages 1 to 6	Mondays & Thursdays
Villages 7 to 11	Tuesdays & Fridays
Villages 12 to 16	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.	

Melkaranai village is about 5 kms from the nearest Veterinary institution namely Veterinary Dispensary, Anniyur. There are about 15 villages situated in and around Melkaranai that are not covered by the Government Veterinary Institution. Further the breedable female population in and around Melkaranai that is untapped by the Government veterinary institution is around 2,262. Hence Melkaranai village is fixed as the headquarters of the Sub basin Veterinary Unit.

Name of the Sub basin Veterinary Unit :			5. Veedur	
Sl. No.	Name of Villages to be Covered	Distance from the Head Quarters (in Kms.)	Nearest Govt. Institution	Distance from the village to Govt. inst. (In Kms)
1.	Veedur	0	Pathirapuliyur	5
2.	Siruvai	2	Pathirapuliyur	7
3.	Edaiyapattu	6	Pomboor	6
4.	Ganapathipattu	4	Pathirapuliyur	6
5.	Ankanikuppam	3	Pathirapuliyur	7
6.	Athikuppam	2	Pathirapuliyur	5
7.	Ezla	4	Vikravandi	5
8.	Reddikuppam	6	Vikravandi	8
9.	Kayathur	10	Vikravandi	5
10.	Ponnampoondy	5	Pomboor	6
11.	Vilangampady	10	Mailam	9
12.	Sendur	7	Pathirapuliyur	5
13.	Sendiampalkam	12	Ennayiram	6

Villages 1 to 5	Mondays & Thursdays
Villages 6 to 9	Tuesdays & Fridays
Villages 10 to 13	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.	

Veedur village is about 5 kms from the nearest Veterinary institution namely Veterinary Dispensary, Pathirapuliyur. There are about 12 villages situated in and around Veedur that are not covered by the Government Veterinary Institution. Further the breedable female population in and around Veedur that is untapped by the Government veterinary institution is around 2,120. Hence Veedur village is fixed as the headquarters of the Sub basin Veterinary Unit.

6.1.(c) An unemployed Veterinary Graduate 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, which 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 programme 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 users 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 extension 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 inputs 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) will 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 straws 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 requirement 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 medicines 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 5 units will be established in the river basin at a total cost of Rs.28.65 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, stc	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 29 graduate veterinary institutions and 28 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 and mastitis detector. The 29 institutions will be strengthened at a cost of Rs.9.57 Lakhs.

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 huge economic losses to the farmers. All these measures will help in effective delivery of Veterinary services and early diagnosis and facilitate 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 and wash basin to each sub centre in the project area at a cost of Rs.20,000/- per sub centre. Totally 28 subcentres in the project area will be provided with essential equipments at a total cost of Rs.5.6 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 three sub basin veterinary institutions at cost of Rs.3.00 lakhs each, is also a part of the project. The institution will be designated as Referral Institution for the sub basin. The Veterinary Hospital at Gingee, Veterinary Dispensaries at Pathirapuliyur and Vikravandi will be upgraded as the referral institutions for the sub basin. In the identified referral institution, semi auto analyzer and accessories will be provided for ensuring complete timely blood analysis. Totally Rs.9.00 lakhs will be required for this component if work.

6.2.(d) Infrastructure improvement in the project area will enhance the quality of delivery in veterinary services and diagnostic facilities 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

grasslands 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 livestock 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 year 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	Varahanadhi	247556	765780	3250	762530	99%

Hence to nullify the green fodder shortage, around 462 hectares of additional land has to be brought under CO3 cultivation in the sub basin area.

6.3.(d) Around 300 hectares of land earmarked for fodder cultivation in the private lands in the project area will be taken up for cultivation of Co3. The farmers will be supplied inputs like seeds and slips. The cost of cultivation will be borne by the farmer. The Animal Husbandry Department will ensure supply of quality slips. The yield rate and cost of inputs is furnished below.

Sl. No.	Name of fodder	Avg. Yield per year (In tonnes)	Cost of Cultivation Per Hectare
1.	Maize	50	1,000
2.	Ragi	25	200
3.	Co3	300	6,000
4.	Cumbu	25	130

Villagewise CO-3 fodder cultivation area proposed (In Hac.)

1. Avvaiyarkuppam	10 ha
2. Kothamangalam	10 ha
3. Nedimoliyanur	10ha
4. Palapattu	10ha
5. Sithani	5ha
6. Perani	5ha
7. Periyathachur	10ha

8. Alampoondi	20ha
9. Thenpalai	10ha
10. Vadapalai	5ha
11.Chokanthangal	5ha
12.Melkavalai	10ha
13.Virpattu	10 ha
14.Ayyuragaram	20 ha
15.Pagandai	5 ha
16.Thoravai	5 ha
17.Melakonthai	10 ha
18.Madurapakkam	10 ha
19.Assur	10 ha
20.Thirukunam	10 ha
21.Melvalai	10 ha
22.Udayathur	10 ha
23.Panayapuram	5 ha
24.Veeramur	10 ha
25.Ariyalurthirukai	10 ha
26.Vilangampadi	10 ha
27.Sendur	10 ha
28.Reddikuppam	10 ha
29.Ganapathipattu	10 ha
30.Veedur	10 ha
31.Vakkur	10 ha
32.Karuvachi	5 ha

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.

Present Fodder Status :

Year	Bovine Population	Green fodder requirement @ 15kg/animal/day (in MT)	Availability at present (in MT)		
			Ragi @ yield rate of 25 tonnes/ ha for 100 ha	Cumbu @ yield rate of 25 tonnes/ha for 30 ha	Total yield
I Year	227556	765780	2500	750	3250
II Year	227556	765780	2500	750	3250
III Year	227556	765780	2500	750	3250
IV Year	227556	765780	2500	750	3250
V Year	227556	765780	2500	750	3250

Fodder Availability Status after the end of project:

Year	Yield to be added (In MT)						Cost of inputs for the cultivation of fodder in the proposed area	
	Ragi @ yield rate of 25 tonnes/ ha for 200 ha	Co3 fodder @ yield rate of 250 tonnes/ha for 300 ha @ 90 ha for 2/3rd yr, 70 4th yr and 50ha 5thnyr	Cumbu @ yield rate of 25 tonnes/ha for 130 ha	Total Proposed Yield to be added	Total fodder available during the end of the year	shortage of fodder (In MT)	Co3 fodder @ Rs.6000/ha	Total Cost of inputs (In Rs.)
I Year	5000	0	3250	8250	11500	754280	0	
II Year	5000	22500	3250	30750	42250	723530	540000	
III Year	5000	22500	3250	30750	73000	692780	540000	1800000
IV Year	5000	17500	3250	25750	98750	667030	420000	
V Year	5000	12500	3250	20750	119500	646280	300000	

6.3.(f) By the above cropping pattern in the sub basin, the green fodd er availability will be increased from 3250 MT to 119500 MT. In addition 50,000 MT of green fodder will be available after the harvest of maize. Totally 169500 MT of green fodder will be available in the sub basin at the end of the project. Ultimately the shortage will be 646280 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 total 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 Husbandry 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 whic h will act as motivation for other farmers. During the camps, pamphlets and leaflets on 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 fina ncial cost for this component for 5 years is Rs.18.00/- 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 defici ency. 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 vill ages 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 animals 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 miner al 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 5 units, 9.13 lakhs would be required for this component.

6.4.(c).3. By this the animals will come to estrum early an d 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 Pamp hlets and leaflets.

Pamphlets and leaflets on best practices in animal husbandry, biosecurity 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.18.70 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 :

6 Unemployed Veterinary Graduates are to be trained for the Varahanadhi Sub basin. 5 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 5 Sub basin Veterinary Extension Officers, Rs.6,750/- would be required.

6.5.(d). In-service Training for 29Veterinarians

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 29 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 29 veterinarians in the sub-basin would be Rs.58000/-

7. Ensuring marketing tie up for the products.

With the rapid urbanisation, changing life styles and increasing purchasing power of 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.

VARAHANADHI SUB BASIN

The breedable age female population in the varahanathi Sub Basin is 169011 which include 88083 crossbred, 72068 indigenous cattle and 8860 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 74871 crossbred, 68465 indigenous and 8417 buffaloes.
2) At present there are 29 Graduate Veterinary Institutions and 28 Sub centres functioning under Government fold doing artificial insemination work of which 7 Veterinary dispensaries and 17 subcentres are vacant.
3) The above Government Institutions have carried out an average artificial insemination of 18564 in crossbred, 6992 in indigenous and 1644 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 6630 crossbred, 2497 indigenous and 498 buffaloes.
5) Thus the breedable age female population unserved by the Government institutions is 74871 crossbred, 68465 indigenous and 8417 buffaloes.
6) For of the above animals unserved, 5 sub basin veterinary units will be established in the sub basin each covering around 15 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 (6000), 40% indigenous (4800) and 10% (1200) 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	6000	4800	1200
II Year	6750	5400	1350
III Year	7500	6000	1500
IV Year	8400	6720	1680
V Year	9600	7680	1920

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 2143 crossbred, 1714 indigenous and 364 buffaloes.

Year	**Yearwise Number of animals covered**		
	Crossbred	Indigenous	Buffalo
I Year	2143	1714	364
II Year	2700	2160	482
III Year	3409	2727	600
IV Year	4200	3360	764
V Year	4800	3840	960

11) By the work done by these 5 units during the first year, out of the total 3857 cattle (2143 crossbred, 1714 indigenous) conceived, 50% (1929) heifer calves will be born. Similarly out of 364 buffaloes, 182 buffalo heifer calves will be born.

Year	**Yearwise Number of heifer calves born**	
	Crossbred	Buffalo
I Year	1929	182
II Year	2430	241
III Year	3068	300
IV Year	3780	382
V Year	4320	480

12) Now calf mortality is taken as 5% for crossbred and 10% for buffaloes. Therefore out of the 1929 crossbred heifer calves, 96 will be lost. Similarly out of 182 buffalo calves, 18 will be lost during the first year.

Year	**Yearwise Number of heifer calves lost**	
	Crossbred	Buffalo
I Year	96	18
II Year	122	24
III Year	153	30
IV Year	189	38
V Year	216	48

13) The actual crossbred animal in milk created in the sub basin by intervention by these units during first year will be 3857 (2143 Crossbred plus 1714 Indigenous cattle). Similarly 364 buffaloes will be in the milk.

Year	Yearwise Number of animals in milk		
	Crossbred	Indigenous	Buffalo
I Year	2143	1714	364
II Year	2700	2160	482
III Year	3409	2727	600
IV Year	4200	3360	764
V Year	4800	3840	960

14) The average milk yield in the project area will be increased to 7 litres in crossbred, 800 ml or maximum of 3.5 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 21.99 lakh litres by crossbred (assuming 6.11 lts. is the average yield), 2.69 lakh litres (assuming 2.8 lts. is the average yield) by indigenous and 1.40 lakh litres (assuming 3.2 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	5.6	2.56	2.9	36	12	3
II Year	5.8	2.8	3.3	47	17	5
III Year	6.2	3.0	3.7	63	23	7
IV Year	6.6	3.2	4.1	83	30	9
V Year	7.0	3.5	4.5	101	38	13

16) Thus the value of milk in the sub basin during first year will be Rs.466 lakhs (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	324	110	32	466
II Year	423	152	48	623
III Year	571	206	67	844
IV Year	748	271	94	1113
V Year	907	339	130	1376

17) Thus economic return at the end of the project by way of milk will be Rs.1376 lakhs, an increase of Rs. 910 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	74871	68465	8417
II Year	74871	68465	8417
III Year	75560	68465	8417
IV Year	76532	68465	8472
V Year	77927	68465	8558

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	12000	13500	15000	16800	19200	76500
2	Calves Born (In Nos.)	4222	5342	6736	8324	9600	34224
3	Heifer calves born (In Nos.)	2111	2671	3368	4162	4800	17112
4	Milk Yield (In lakh Lts.)	51	69	93	122	152	487
5	Income by milk (In Lakh Rs.)	466	623	844	1113	1376	4422
6	Fodder Production (in Tonnes)	0	22500	45000	62500	75000	205000
7	Income (In Lakh Rs.)	0.00	15.75	31.50	43.75	52.50	143.5
8	**Total income generated (In lakh Rs.)**	466.00	638.75	875.50	1156.75	1428.50	4565.5

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

VARAHANADHI SUB BASIN

	Components	Physical	Financial (Rs. 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	5	28.65
	b. Improving the essential infrastructure in the Government institutions (graduate institutions) @ Rs.33,000/-unit	29	9.57
	c. Improving the essential infrastructure in the Government institutions(subcentres) @ Rs.20,000/-unit	28	5.60
	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	3	9.00
2	**Increasing availability of green fodder in private lands (in acres)**		18.00
3	**Out reach programmes.**		
	a. Infertility cum Total Veterinary Health Care camps @ Rs.6,000 per camp per month for each SBVU	300	18.00
	b. Distribution of mineral mixture @ Rs.1,82,500 per SBVU	5	9.13
	c.Information, education and communications campaigns	34	18.70
4	**Enhancing the knowledge level of human resource**		
	a. Training of Farmers	2000	8.00
	b. Enterpruneship training to 31 unemployed veterinary graduates to be placed as Sub basin Veterinary Extension Officer @ Rs.50,000/- per person	6	3.00
	b. Orientation Training for Sub basin Veterinary Extension Officers @ Rs.1,350/- trainee	5	0.07
	c. In-service Training for Veterinarians @ Rs.2,000/- per person	29	0.58
	TOTAL		**128.30**

FISHERIES DEPARTMENT PROPOSALS

DEPARTMENT OF FISHERIES

WORLD BANK ASSISTED IAMWARM – PROJECT VARAHAHNATHI SUB BASIN IN VILLUPUR AM DISTRICT

The river Varahanathi originates in Villupuram district and flow through Gingee taluk, Villupuram taluk and confluences in the sea Bay of Bengal near Pondicherry. One Dam has been constructed across the river at vidur called vidur dam. The river Varahanathi dry almost throughout the year. During the monsoon the South West & North East Monsoon period due to the rain in the basin area, the water flows through the river. Therefore the tanks which are connected in this basin system gets water and retention of water for 4 to 8 months which offers good scope for fisheries development in the basin area. There are 236 tanks are available with a water spread of about 10,000 ha ranging from 50 to 150 ha with high production potential. Though fish culture has been carried out in these area for many years, the fish production has not reached its optional due to lack of scientific culture method, inadequate infrastructure facilities for qualities fish seed and poor fish marketing network. The present fish production is 15 to 25 kg/ha. If this basin area is developed under the world bank assistance, the fish production can be increased ten folds.

Proposed fisheries activities into Varahanathi Sub basin

Under the MDPP the Dept of fisheries proposed the following components for implementation.

6. Aquaculture in irrigation tank
7. Renovation and repairing existing rearing ponds in Vidur dam.
8. Fish seed rearing in cages
9. Setting up of kiosk for fish marketing
10. Supply of coracles & fishing implements

1. Aquaculture in Irrigation tank (openwater bodies)

It is proposed to demonstrate fish culture in the irrigation tank in the Varahanathi sea basin there are 236 irrigation tank are available. These tanks are connected with the river system in which 75 tanks with area 3750 ha are proposed for Aquaculture.

1. Number of tanks proposed for Aquaculture	-	75
2. Water spread area (average proposed Irrigation tanks (50 ha/tank)	-	3750 ha
3. Require fish seeds for stocking in all the tanks @ 1000 no/ha 50% of the total wate r area is taken for stocking purpose i.e., average water area is 18750 ha so 18750x1000	-	18.75 lakhs
4. Cost of fish seeds @ Rs. 300/1000 nos.	-	5.5 lakhs
5. Expected fish production in a year @ 10% recovery of stocked seeds and a average growth is 0.5 kg/seed	-	91.25 tonnes
6. Value of fish production	-	273.75 lakhs

The tanks with average area of 50 to 150/ha will be selected for fish culture. The stock size fish seeds will be stocked @ 500 ha. The fish culture will be arranged by the respecti ve water users association.

After 5 to 6 months culture period the waters users association can auction the fishery wealth of the tank and fishermen in the basin area will arrange for fishing in the water bodies.

Seed rearing in cages : -

The success of fish culture mainly depends on the availability of quality fish seeds for timely stocking. The required quantity of fish seeds are not available at present both from public sector and private sector in Villupuram district. Fish seeds in cages had been pract ice successfully in many district. Fish seeds in cages had been practice successfully in many districts. The technology of rearing fish seed in the cages is very simple and cost effective. This can be easily taken up by water users Association member by training them under this culture practice. Cages will be erected in irrigation tanks & farm ponds. The early fry & late fry of carps varieties will be reared for 1 to 1½ months period in Velanscreen net cages of different men size till they attain stock size in the tank waters. It is proposed to operate 12 units of cages in the basin and produced 6.30 lakhs of fish seed through cage culture at a total fixed cost of Rs. 1.68 lakhs.

The farmers can sell the surplus seeds reared in the cages after meeting for his own requirement. The farmers can undertakes cage culture operation 3 to 4 times in a year. Under this programme it is proposed to purchase 12 for selected farms at seeds produce will be stocked in aquaculture tank for culture.

Operational cost of early fry

Cost of manuring Rs. 2.23 lakhs

Cost of groundnut oil cake & Rice baran

Setting up of kiosk :

It is proposed to setup two kiosks with icebox facility one at Tindivanam & one at Villupuram to strength the marketing network. The Kiosk will be given to water users association for maintenance. The marketing work will be look after by the WUA members. Cost of two no of kiosks is Rs. 3.00 lakhs.

Supply of Coracles and Fishing implements to the fishermen :

It is proposed to supply coracles & fishing nets for effectives conservation and fishing in the Aquaculture irrigation tanks. This should be supplied to the fishermen on free of cost.

Non-recurring Expenditure :

1.	Cost of FRP Coracles @ Rs. 90,000/- for 10 units	Rs.	90,000
2.	Cost of fishing nets to each unit Rs. 500x10x10	Rs.	50,000
		Rs.	**1,40,000**

Fish seed rearing in nursery ponds at Vidur Dam : -

Among the total available 220 tanks in the sub basin, 75 numbers of tanks with water area of 18750 ha an average water spread area of 50 to 100 ha can be selected for stocking of carp seeds.

1) Proposed water spread area for fish seed stocking 75 nos of tanks x 50 ha - 3750 ha
2) Average water spread area by each tanks (considering 50% of water receipt) - 18750 ha
3) Number of seeds needed to stock the proposed water spread area 18750 ha x 1000 nos of seeds/ha - 18.75 ha

The fish seed rearing farm at vidur dam by Govt. having water area of 1000 Sq.m. This rearing area is required renovation & repairs. It is proposed to renovate these rearing ponds at a total cost of Rs. 15.10 lakhs. It is proposed to reared 5 lakhs of fish seeds from this rearing area departmentally per year. This seeds will be supplied to Aquaculture tank for stocking and culture.

I.	Renovation and repair to the existing ponds to avoid leakage of water Rearing ponds 30m x 12m = 2 Nursery pond 12m x 6m = 4	7,00,000
II.	Construction of one no. of 10,000 litres capacity OHT	1,30,000
III.	Construction of one pump room of size (1.5m x 1.2m)	25,000
IV.	Providing electrification for serviceline and charges paid for TNEB	20,000
V.	Providing G.I. banded wire fencing with posts for the complex	1,50,000
VI.	Providing A.C. Sheet package shed	1,75,000
VII.	Providing pipeline PVC Pipeline from OHT to ponds	1,60,000
VIII.	Petty supervision charges	1,50,000
	Total	**Rs. 15,10,000**

Operational cost for one year – Rs. 1,10,000

Fish seed tank :-

It is proposed to establish 2 no of fish seed bank into sub-basin area. These two seed bank will produce 6.00 la khs of fish seeds which will be supplied to Aquaculture tanks for stocking & culture. Cost of two nos of seed bank is proposed for Rs. 29.00 lakhs

ABSTRACT

Total project cost for the fisheries development proposal under world bank assistance.

1.	Renovation repair work of existing pond	Rs.	15.10
	Operational Cost per year 1.10 x 5	Rs.	5.50
2.	Fish seed bank 2 nos.	Rs.	29.00
3.	Seed rearing in velan cages in farm ponds 12 units	Rs.	1.68
	Operational cost	Rs.	2.23
4.	Setting up of kiosks 2 nos with Ice boxes	Rs.	3.00
5.	Supply of coracles of fishing implements	Rs.	1.40
	TOTAL	**Rs.**	**57.91**

GROUND WATER
PROPOSALS

IAMWARM Project
Detailed project Report (Groundwater Component)
Varahanadhi Sub-basin

Estimate: Rs21 lakh

Introduction

The Varahanadi Sub- Basin is one of the sub-basins selected under the IAMWARM
Project for implementation during 2006-2007. This proposal covers the technological
interventions made to improve the ground water resources through Artificial Recharge Schemes to sustain the Well irrigation in the Ayacut under 18 Irrigation tanks.

Existing Groundwater Scenario:

Groundwater is being very extensively exploited for Well Irrigation for crops like Paddy, Sugarcane. The Aquifers of the sub-basin are generally

0 - 2 m	- Topsoil
2 -12 m	- Weathered granitic gneiss
12 – 20 m	- Jointed / fissured granitic gneiss
Below 20m	- Fresh Rock

In normal monsoons, the ground water level varies from 3-5m. During summer, the water level goes up to 14 – 19m, ie almost depleting to the groundwater available depth. Net result is that, 6out of the 7 blocks in this sub-basin are Over Exploited.

Intervention through Artificial Recharge Schemes:

Site specific Artificial Recharge Scheme is the apt solution to replenish the sub- surface aquifers and to augment the groundwater resources.

Justification for Injection Well:

There are many types of Artificial Recharge Structures (ARS) like Check Dams,

Sub-Surface Dykes, percolation Ponds, Injection Wells (or Recharge Shafts) etc
each one having its own exclusive utility.

The lithology of Varahanadhi sub-basin as given above, is predominantly hard rock area, except the small sandy coastal belt. Since the rainfall in the coastal belt is higher, this proposal concentrates more on the rocky part of the sub-basin. Hence Injection wells are proposed for the reasons below.

Injection wells over other ARS

In the heterogeneous fissured rocky substrata, conventional recharge structures like the Check Dam and Percolation pond are not effective because they recharge from the top. Hence, the injection wells are selected as the effective means of taking the water right to the bottom of the heterogeneous fissured rocky substrata and recharge the entire thickness of the strata simultaneously, during the short period of high water levels the tank.

Field Tested Technology:

The efficacy of the injection Wells has been very successfully demonstrated in the Chennai city during 2004. As recommended in the WRCP, the Government of Tamilnadu made the provision of artificial Recharge Structures in all the buildings mandatory. After the monsoon of 2005, the groundwater level and the quality rose substantially in areas where this technology is adopted and the water taken to deeper strata. Hence this technology can be replicated in this sub-basin too.

Impact of ARS:

The Ayacut area under the 18 tanks is 2720Ha. The weathered and fissured rocky strata of 18m thickness at 2.5% of Specific Yield can hold 12.24 MCM of water, which is made available for well irrigation in the post monsoon period.

Concepts:

The very idea Artificial Recharge Structures are saving the surplus water in the underlying aquifers capable of storing water. The social impact / resistance to these projects come out during the lean periods of scanty rainfall, for fear of their due share be arrested by the people in the upstream side. This obstacle is overcome by providing the Injection Wells at about 0.30m below the full tank level, ensuring that the near surplus flow only in diverted for recharging the groundwater.

Site Selection Methodology:

The project sites are selected in the following steps.

a. The needy locations are identified through the distribution of disused wells as per the Well Census data.

b. The feasible sites recommended by the Zonation Maps of the Institute of Remote Sensing, Anna University are consulted.

c. Local representations are analysed.

d. The sites are inspected to confirm their field suitability.

e. One sanction of the project, exact location will be fixed using Geo - physical surveys.

Construction:

The proposed construction for the Injection Bore well is to provide a 6" bore from the tank bed to the bottom of the fissured rocky strata. A casing will be provided in the topsoil portion to stabilize the bore. A self -cleaning graded filter provided at the top of the bore, filters and let the water into the bore. This water in the bore, under the static water pressure gets injected in to the fissures of the rocky strata across its entire depth. The Injection Well is working on the same principles except that instead of a bore, a circular dug well is proposed. The location of the Recharge Bore wells in the Tanks near foreshore area will be determined through geo -physical field survey.

Post Project Scenario:

The additional groundwater stored in the aquifers will sustain the well Irrigation follows,

At 5% of the total ayacut of the selected 18 tanks = 136 Ha.

Additional Food production, Paddy, @ 4500Kg / Ha = 612 ton.

Value of additional food production @ Rs 5600 / ton = Rs.34.27lakh.

Project Economy:

The project cost is just Rs.21 lakhs only for the current sched ule of rate for 2006-07.
It is a project with very high returns, at a minimum of Rs 34.27 lakhs, breaking even in the first year itself.

Conclusion:

The project is a very viable one and sustains the well irrigation in the ayacut area of the selected 18 tanks. The agricultural lands and drinking water supply wells falling outside the ayacut area also will be benefited by these schemes.

IAMWARM PROJECT

Detailed Project Report Groundwater Component-Varahanadi Sub basin

Well Census Data for Artificial Recharge Schemes in 18 Tanks

						Irrigation Wells							
S.No	District	Taluk	Village	Total Wells	Domestic	Total	Disuse	Open	Open Disuse	Bore	Bore Disuse	Tube	Tube Disuse
1	Villupuram	Gingee	Kilaiyur	75	0	75	0	75	0	0	0	0	0
2	Villupuram	Gingee	Aanathur	261	31	230	0	226	0	0	0	4	0
3	Villupuram	Gingee	Arukavoor	211	5	183	2	156	2	0	0	27	0
4	Villupuram	Gingee	Kadakampoondi	66	23	40	0	40	0	0	0	0	0
5	Villupuram	Gingee	Kalaiyur	117	0	116	3	91	0	0	0	25	3
6	Villupuram	Gingee	Kammanthur	88	0	77	3	4	0	0	0	73	3
7	Villupuram	Gingee	Meenamur	92	10	82	5	82	5	0	0	0	0
8	Villupuram	Gingee	Mukkunam	119	0	119	0	119	0	0	0	0	0
9	Villupuram	Gingee	Nallapillaipetral	340	23	305	13	304	13	1	0	0	0
10	Villupuram	Gingee	Perumpugai	200	0	196	13	120	5	0	0	76	8
11	Villupuram	Gingee	Perunkappur	272	25	247	0	247	0	0	0	0	0
12	Villupuram	Gingee	Thirubathikundram	190	10	173	17	173	17	0	0	0	0
13	Villupuram	Villupuram	Anniyur	336	0	297	28	296	28	1	0	0	0
14	Villupuram	Villupuram	Ezhusempon	247	0	228	36	227	36	1	0	0	0
15	Villupuram	Villupuram	Karuvatchi	515	42	412	3	409	2	3	1	0	0
16	Villupuram	Villupuram	Palliputhupattu	200	0	197	0	4	0	1	0	192	0
17	Villupuram	Villupuram	Panaimalaipattu (Noth)	200	0	159	2	156	2	3	0	0	0
	Villupuram	Villupuram	Panamalai (South)	166	0	148	4	148	4	0	0	0	0
18	Villupuram	Villupuram	Thalavanur	236	0	234	12	63	5	171	7	0	0
			Total	**3931**	**169**	**3518**	**141**	**2940**	**119**	**181**	**8**	**397**	**14**
			Percentage	**0**	**4.3**	**89.6**	**4**	**83.6**	**4**	**5.1**	**4.4**	**11.3**	**3.5**

ABSTRACT

Name of Work: Provision of Artificial Recharge Schemes in 18 tanks in the
Varahanadhi Sub-basin, under IAMWARM Project.

Estimate: Rs 21 Lakh

SI No	Description	Amount (Rs Lakh)
	Construction of injection Bore Wells in	
1.	Elusempon Tank	1.25
2.	Meenampur Tank	1.25
3.	Kalaiyur Tank	1.25
4.	Thalavanur Tank	1.25
5.	Perumpugai Tank	1.25
6.	Anathur Tank	1.25
7.	Arugaivur Tank	1.25
8.	Mukkunam Tank	1.25
9.	Nallan Pillai Petral Tank	1.25
10.	Thiruvathigunam Tank	1.25
11.	Kammanthur Tank	1.25
12.	Pallipudupattu Tank	1.25
13.	Kilaiyur Tank	2.00
	Construction of Injection Wells in	
14.	Anniyur Tank	0.85
15.	Karuvachi Tank	0.85
16.	Kadagampundi Tank	0.85
17.	Perumgappur Tank	0.85
18.	Panamalaipettai Tank	0.60
	Total	**21.00**

(RUPEES TWENTY ONE LAKH ONLY)

FOREST DEPARTMENT PROPOSALS

FOREST DEPARTMENT
IAMWARM PROJECT PROPOSALS

VARAHANADHI SUB-BASIN

I. Introduction

For sustained development, our national Forest Policy suggest that forest should cover atleast 33% of the geographical area of our country. In India and in the state of Tamil Nadu, statistics shows that 21% and 17.59% of total geographical area covers forest respectively. It is estimated that about 1.5 m ha. of Forest land being degraded every year.

The consequences of reduced and depleted forest cover are obvious. Rivers, reservoirs and tanks, are being silted due to excessive erosion in the catchment areas. This has affected the carrying capacity of rivers and the storage capacity of water bodies, which in turn results in flooding during heavy run-off and a reduced subsurface flow during drought due to reduced water storage in the catchments.

In the above and based on broad principles and objectives of TamilNadu water policy, this proposal aims to –

(f) Ensure preservation & stabilization of the existing water resources in the forest areas & outside forest areas.

(g) Rehabilitation of existing water harvesting structures.

(h) Restoration of surface water & groundwater potential.

(i) Judicious use of water resources through existing Village level institution of Village Forest Committees in Joint Forest Management villages & creating new institutions wherever required.

(j) Amelioration of environment.

II. Varahanadhi Sub-Basin and Forest catchment areas

Varahanadhi sub-basin has a total command area of 47278 Ha. The sub-basin falls in following Taluks of Viluppuram District

1. Viluppuram (95 Villages)
2. Tindivanam (134 Villages)
3. Tirukoilur (4 Villages)
4. Vanur (35 Villages)

The sub-basin falls in administrative jurisdiction of Viluppuram Forest Division of Viluppuram Circle.

The following Reserved Forests falls within the catchment of Varahanadhi sub-Basin.

1.	Pakkam malai R.F.	-	4473.84 Ha.
2.	Adukkam R.F.	-	809.37 Ha.
3.	Thurinjikadu R.F.	-	401.24 Ha.
4.	Odayanatham R.F.	-	648.71 Ha.
5.	Gangavaram R.F.	-	2681.87 Ha.
6.	Thandavasamudram R.F.	-	318.49 Ha.
7.	Poolanjimalai R.F.	-	236.34 Ha.
8.	Siruvadi R.F.	-	1360.16 Ha.
9.	Muttakadu R.F.	-	1239.72 Ha.
10.	Padipallam R.F.	-	1457.28 Ha.
11.	Karai R.F.	-	686.75 Ha.
	Total area	-	14,313.77 Ha.

About 5.4% of Varahanadhi Sub-basin falls under Reserved Forest of Viluppuram Range and Gingee Range of Viluppuam Forest Division. It is notable that Varahanadhi originates from Pakkam malai Reserved Forests.

List of Blocks and Taluks covered in the Varahanadhi basin

Sl. No.	District	Taluk	Blocks	
1	Villupuram	13. Villupuram	25. Kandamangalam	Part
			26. Vikravandi	Full
			27. Kanai	Part
			28. Koliyanur	Part
		14. Vanur	29. Vanur	Full
		15. Tinidivanam	30. Olakkur	Full
			31. Mylam	Full
			32. Marakkanam	Full
		16. Gingee	33. Gingee	Part
			34. Melmalayanur	Full
			35. Vallam	Full
		17. Thirukoilur	36. Mugaliyur	Part

III. Necessity of improvement of Forest Catchment Area

(A) Forest areas under Villupuram and Gingee Range facing tremendous biotic pressure due to urban development and numerous hamlets around the Reserved Forests. Local needs of Fuelwood, Fodder, Small Timber, Cattle grazing etc., are few causes for degradation. Loss of vegetative cover induces soil erosion. Soil erosion leads loss of soil and fertility and loss of water as run-off, resulting in unproductive fields, silted water bodies, flood, drought etc.

Hence it is absolutely necessary to improve vegetative covers and Soil and Moisture Conservation measures in Forest areas. Moreover every forested and mountains region is the over head tank of any riverine system. Hence it is necessary to conserve and upgrade the upper forest catchment areas of Varahanadhi sub-basin to augment ground water table and to ensure prolonged inflow in riverine system. Moreover, infrastructure development within reserve Forests will also contain crop raiding by Wild animals in farmers land. Several measures need to be undertaken in order to contain this degraded process and all such measures need to be integrated in a holistic manner to obtain the desired result with sustainability.

(B) The sub-basin also contains a large number of ponds & tanks which are a source of water for irrigation and drinking purpose. In most of these tanks, Forest Department has earlier taken up plantation of Babul under tank foreshore plantation scheme in the past. These plantations are under administrative management of Social Forestry Division Viluppuam. These plantations provide small timber and fuel wood at local level when harvested through a well laid procedure. However, many of these plantations already harvested, have failed to coppice and also in many tanks plantation were never raised. To stabilize the tank bunds & to meet local timber & fuel wood requirement , it is proposed to carry out tank foreshore plantations.

In addition, under Tamilnadu Afforestation Project, various villages in the sub-basin have been tackled through Joint Forest Management. This included miscellaneous need based plantation (250-300 Ha.) in forest area watershed adjoining to the programme village, Bufferzone activities and Soil moisture Conservation Works. Due to small allocation of funds, whole of the watershed could not be treated by providing

sufficient water harvesting structures. Hence, it is now proposed to treat the watershed of various old and new TAP villages under IAMWARM.

IV. Proposals:

In view of above, to contain the trend of degradation of catchment area and to arrest soil erosion, following activities have been proposed which will be carried through two administrative units of Forest Department in Viluppuram District namely -

i. Viluppuram Forest Division (Territorial)
ii. Social Forestry Division, Viluppuram

Division wise detailed proposals are given below: -

IV (A) PROPOSALS TO BE IMPLEMENTED THROUGH VILUPPURAM FOREST DIVISION (TERRITORIAL)

1. Improvement of Bio-diversity

By considering edaphic and climatic factors of the region, endemic species will be planted so as to cover open and degraded forest areas. These works will be taken up in two sub-components :-

a) Afforestation inside R.F.

Under this, gap planting is open and degraded Reserved forests area will be taken up. It is proposed to plant seedlings in 100 Ha. @ Rs.10000/ Ha. with total cost of Rs.10.00 Lakhs.

b) Afforestation outside R..F.

(i) Agro Forestry- Free supply of seedlings to farmers

Seedlings of economically valuable & of usufructry value species like Teak, Nelli, Neem, Pungan, Glyricidia, Vagai etc., will be raised and distributed to farmers free of cost so as to motivate them to plant in bunds of field, waste lands etc.

Hence it is proposed to raise 1,00,000 seedlings @ Rs.7/seedling with total cost of Rs.7.00 Lakhs for free distribution & to be planted by pattadars at their own cost.

(ii) Avenue and sacred grove planting

Planting will be taken up along appropriate avenue connecting villages, Temple, School & College premises to enrich bio-diversity and to improve aesthetic value. For this purpose 10,000 seedlings will be planted @ Rs.200/ seedling with total cost Rs.20.00 Lakhs, which includes cost of raising, planting, tree guard and maintenance for 2 years.

(iii) Riverine, Canal and Tank Bund Plantation

Riverine Banks, Canal and Tank Bunds will be taken up for planting with non-browsible species like Pungan, Jatropha, Cassia Siamia, Glyricidia, etc., since these species are source of bio-diesel and green leaf manure for farmers.

Hence it is proposed to plant upto 200 kms. @ Rs.24 000/km. with total cost Rs.48.00 Lakhs.

2 Soil and Moisture Conservation works

(a) Construction of Check dams, Percolation Pond and miniature dams

Series of Check dams will be constructed at Upper hilly catchment area. At the end of these series of check dams wherein the run off from a adjacent area and excess flow out of check dams can be accumulated in percolation ponds, miniature dam etc., near vicinity of villages.

The proposal for soil and moisture conservation works are as follows: -

(i) 86 masonary check dams @ Rs.75,000/each, with total cost of Rs.64.50 lakhs

(ii) 25 Percolation ponds with surplus weir @ Rs.4.00 Lakhs/each, with total cost of Rs.100.00 lakhs.

(iii)10 Miniature dams @ Rs.6.00lakh/each with total cost of Rs.60.00 lakhs.

(b) Improvement of Old dilapidated Water Conservation Structures.

Under various schemes Soil and Moisture Conservation works like check dams, percolation ponds etc., were constructed in the past decades, inside the reserved forest areas. During unprecedented monsoon during earlier year, many structures have

suffered and fractural damages. To make them useful again with little cost 20 Nos of structures are proposed to be repaired and maintained @ Rs.35,000/ - each with total cost Rs.7.00 lakhs.

3. Awareness generation

Lack of information flow among field staff, Public, School and College students etc., is resulting problems in management of natural resources, environment and wildlife. To sensitize the public, it is necessary to ensure the information flow through conducting public awareness programmes like eco -camp, eco-Tour, street play, publicity etc., These activities are proposed at a total cost of 4.50 lakhs.

4. Seminar / Workshops / Training

Training to the farmers on capacity building and other income generati on activities and to field staff on capacity building are proposed at a total cost of Rs.1.00 lakh.

5. Monitoring and evaluation

Works carried out under IAMWARM Scheme will be monitored and evaluated through internal and external agencies. For this ac tivities Rs.0.30 Lakhs is proposed.

6. Documentation

For these activities Rs.1.00 Lakh is proposed.

For details of cost please refer to Annexure -I

IV (B) PROPOSALS TO BE IMPLEMENTED THROUGH SOCIAL FORESTRY DIVISION, VILUPPURAM

Varaganadhi Watershed comprises many streams and nullahs, Irrigation tanks, and lands of various landuse patterns, within it. All water sources drain into Varaganadhi river and flows towards East, covering four taluks of Gingee, Tindivanam, Vanur and Villupuram. Veedur Dam has been constructed across Varaganadhi river at Veedur. Thus, to check soil erosion and to avoid siltation in Veedur

reservoir and to increase the longevity of Veedur Dam, holistic treatment of Varaganadhi Watershed is essential.

In Varaganadhi Watershed existing Plantation areas raised under the following schemes have been proposed for treatment.

1. Tamilnadu Afforestation Project.
2. Community Wasteland Development Programme.
3. Greening Community land.

I. Treatment in TAP area.

As noted earlier, in Varaganadhi Watershed, several Forest Micro-Watershed of about 250 to 350 Ha. were identified and treated from 1997 to 2006 under Tamilnadu. Afforestation Project by Social Forestry Division, Villupuram. Degraded Forest areas of <0.4 crown density had been identified and treated. Afforestation in gaps with misc. species like Pungan, Naval, Nelli, Vembu, Iluppai, Ficus spp. etc. have been done with in-situ soil and moisture conservation like catchwater drain and semi-circular bund for each plant. In order to harvest rainwater, cement checkdams, percolation Ponds have also been formed to some extent within the limit of funds allocated under TAP. Due to dearth of funds many streams and Odais have not been treated in these TAP areas. In order to treat the TAP areas holistically, the following soil and moisture conservation works are proposed under this plan.

1. Gully plugging with Rough Dry Stones.
2. Minor Cement Checkdams.
3. Major Cement Checkdams.
4. Disilting existing Percolation Ponds.

An amount of Rs.140.00lakhs has been proposed for the above works **(*for details refer Annexure II)***

II. Treatment in Community Wasteland.

Social Forestry Division, Villupuram has also undertaken Community Wasteland Development Programme. The Panchayat Tanks under the control of Social Forestry Division have been planted with Babul (Accacia nilotica) and harvested on 10 years rotation basis. This is an ongoing scheme. However, due to limitation of funds, many of the tanks could not be planted. Now, in Varaganadhi Watershed development Project, Panchayat tanks are being proposed for raising Babul Plantations. These plantation activities will provide employment generation for local

villagers, avoid soil erosion, bring about ecological restoration, and help to improve micro-climate of the Villages. It will also meet fuel, fodder, small timber requirement of the Villagers, apart from fetching revenue by way of sale, of which 60% share will be given to the local Panchayats. Under this component an area of 1320Ha has been proposed for raising Babul Plantations over 5 years, with I year maintenance by way of 10 % casualty replacement and soil working to the survival plants.

An amount of Rs.183.68 lakhs has been proposed for these works

works **(*for details refer Annexure III)***

III. **Treatment in Greening Community Land Area.**

In Varaganadhi Watershed, under Greening Community land (G.C.L) 11 plantations have been raised in (in the past) Revenue porombokes and hillocks over an area of 490 **Ha**. In these plantations Percolation Ponds were formed to harvest rainwater, to recharge ground water and also to help increase Vegetation. The existing Percolation Ponds are silted up and the water holding capacity has been reduced. Hence, under this component, desilting of existing Percolation Ponds inside the GCL plantation has been proposed.

Apart from this, to harvest rainwater and to check velocity of water and to arrest soil erosion construction of 22 Nos. of minor Checkdams have been proposed.

An amount of Rs.18.00 lakhs has been proposed for these works.

works **(*for details refer Annexure IV)***

Forest Department

IAMWARM Project Proposals

VARAHANADHI SUB – BASIN

(A) Viluppuram Forest Division (Territorial)

Total Cost - 323.30 lakhs

Sl.No.	Details of works proposed	Quantity	Rate per unit	Amount	Remarks
1	Improvement of Bio – diversity				
	(a) Afforestation inside R.F	100 Ha.	Rs.10000	10,00,000	
	(b) Afforestation outside R.F				
	(i) Agro Forestry- Free supply of seedlings to farmers	1,00,000 Seedlings	Rs.7.00	7,00,000	
	(ii) Avenue and sacred grove planting	10,000 Seedlings	Rs.200.00	20,00,000	
	(iii) Reverine , Canal and Tank bund plantation	200 kms.	Rs. 24000	48,00,000	
2	Soil and Moisture Conservation Works				
	(a) (i) Construction of check dams	86 Nos	75,000	64,50,000	
	(ii) Construction of Percolation Pond with surplus weir	25 Nos	4,00,000	1,00,00,000	
	(iii) Construction of miniature dams	10 Nos	6,00,000	60,00,000	
	(b) Improvement of Old dilapidated Water Conservation structures	20 Nos	35,000	7,00,000	
3	Awareness generation	30 villages	15,000	4,50,000	
4	**Seminars / Workshops / Training**	-	-	1,00,000	
5	Monitoring & evaluation	-	-	30,000	
6	**Documentation**	-	-	1,00,000	
				3,23,30,000	

The total Abstract Cost comes to Rs.341.68 lakhs pha sed over 5 years from 2007-2008 to 2011 – 2012 as below.

Year Wise

Sl. No.	Name of Schemes	2007-08	2008-2009	2009-2010	2010-2011	2011-2012
		Total (in lakhs)	Total (in lakhs)	Total (in lakhs)	Total (in lakhs)	Total (in lakhs)
1	2	3	4	5	6	7
1	Soil and Moisture conservation works in TAP Areas	40	30	25	25	20
2	Soil and Moisture conservation works in GCL Areas	6	6	6	0	0
3	Afforestation in Tank foreshores	**41.6**	**43.5**	**43.87**	**47.91**	**6.8**
	Total	**87.6**	**79.5**	**74.87**	**72.91**	**26.8**

2007 – 2008	87.60 lakhs
2008 – 2009	79.50 lakhs
2009 – 2010	74.87 lakhs
2010 – 2011	72.91 lakhs
2011 – 2012	26.80 lakhs
Total	341.68 lakhs

The Comprehensive Treatment Map is also enclosed.

V. PROJECT COST ABSTRACT

Forest Department

IAMWARM Project Proposals - Varahanadhi Sub- Basin

Sl.No.	Name of the Division	Amount
1.	**Viluppuram Forest Division (Territorial), Viluppuram.**	**323.30 lakhs**
2.	**Social Forestry Division, Viluppuram.**	**341.68 lakhs**
	Total	**664.98 lakhs**

(Rupees Six Crores, Sixty four lakhs and ninety eight thousand only)

ENVIRONMENTAL DEPARTMENT PROPOSALS

INTRODUCTION:

The main activities of the Environmental Cell Division, functioning at Chennai from 1.1.2001 as per the direction of Staff Appraisal R eport (SAR) and Mid-Term Review of World Bank are generally classified as below:

1.River Basin Monitaring

2.Preparation of Environmental Status Report

3. Preparation of Environmental Impact Assessment

4.Conducting Pilot Studies on Environmental Issues

5. Preparation of Environmental Action Plan

6.Implementing the Eco-restoration works in River Basins

7. Conducting Environmental Workshop / Seminars / Meetings and Public Awareness programmes.

The following River Basins are allotted for EAP works for Envi ronmental Cell Division, Chennai which covers 10 Districts.

Name of Basin	**District Covered**
Palar	--- Kancheepuram, Vellore &Tiruvannamalai
Chennai	--- Chennai, Tiruvallur & Kancheepuram
Pennaiyar	--- Dharmapuri, Tiruvannamalai, Villupuram& Cuddalore
Varahanadhi	--- Kancheepuram, Tiruvannamalai &Villupuram
Vellar	--- Dharmapuri, Salem, Perambalur, Villupuram and Cuddalore

Under TNWRCP, with World Bank assistance, special emphasis was given for the first time 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 basins 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 and workshop were conducted to find out new techniques and methods developed recently to solve Environmental problems.

Now under IAMWARM project, focus is at each sub bas in level to identify and prioritize the requirements for improvements to storage structures, 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 THE VARAHANADHI RIVER BASIN

1.GENERAL

The Varahanadhi basin is one of the 17 major river basins and is located in the Villupuram, Thiruvannamalai, Kancheepuram and Cuddalore districts of Tamil Nadu and Pondicherry state of union teritory. The total area of the basin is 4498.5 Sq.km. The Varahanadhi basin is surrounded by and Bay of Bengal in the east. Palar basin in the n orth and Ponnaiyar basin in the south and west. The basin is situated between North latitude 11° 50' 00" to 12° 28' 00" and east longitude 79° 08' 00" to 80° 10' 00". There are 24 blocks in this basin of which 7 blocks are covered in full and the rema ining blocks are partly covered.

1.1 VARAHANADHI SUB BASIN

The main river Varahanadhi originates in the western slopes/past of Gingee Taluk. It has two arms, i.e. left arm and right are. The right arm originates from Pakkammalai hills and left arm orig inates from Melmalayanur. They join together near Thenpalai village and form the main river Varahanadhi and flows in an easterly direction. The first tributary called Annamangalam surplus course joins the main river near Melcheri. Then the river takes a t urn towards south in the eastern past of Singaram village near Gingee and then flows again towards east. The second tributary called "Nariyar odai" joins Varahanadhi river near Uranithangal Village.

Near Vallam village the main Varahanadhi river takes a turn towards the south. The third tributary called Tondiar joins near Vidur. The Vidur reservoir across Varahanadhi is situated just below the confluence of this tributary in Tindivanam taluk.

After Vidur Reservoir, the river turns towards southeast and enters into Villupuram Taluk. In this reach the fourth tributary called Pambaiyar joins the main river near Radhapuram village in Villupuram taluk. From there, the river runs east upto Kodukkur and South East in Tamilnadu and Pondichery states alternately. In this reach, the fifth Tributary called Pambai Channel joins Varahanadhi river near Sankarakkudi in Villupuram Taluk just 3 kms. above it's confluence Bay of Bengal a little south of Pondichery State.

The total length of Varahanadhi River is about 78.50 kms. The Sub Basin has an area extent of 2550 Sq km. There are nineteen observation wells in this sub basin. The winter water level varies from 5.20 to 5.60 m and the summer water level ranges from 6.30 to 7.60 m. The details of Taluk, Blocks in the Sub Basin are enclosed in the statement.

2. Tanks Polluted by Aquatic Weeds:

An ayacut of 22721.14 Hectare is irrigated in this Sub Basin through 237 tanks. Prosopis Juliflora is found in the tank bunds through out the Sub Basin. Out of 237 tanks, about 30% of tanks are severely affected by Aquatic Weeds.

3. Domestic Sewage and Municipal Solid Waste:

The Municipality or Blocks in this sub basin are not treating sewage. Two Municipalities available in this sub basin are 1) Villuppuram 2) Tindivanam and its population is 163256(as per 2001 Census).

Solid waste generated is 12.55 MT / day and disposed in the land. The blocks falling in this sub basin are Kandamangalam, Vikravandi,,Kanai, Koliyanur, Vanur,Olakkur, Mylam, Marakkanam, Gingee, Melmalayanur , Vallam and Mugaliyur. The sewage is being leached into the ground or directly into the nearby drains and streams. Practically there is no sewage treatment system in the case of villages create non-point pollution. It is therefore essential to conduct awareness programmes to avoid domestic pollution in the Sub Basin. **It is also essential to give training to make use of the waste as worth manure by Vermicomposting techniques.**

Overall, the Tanks / River in the Sub Basin are not severely affected by domestic pollution.

4. Industries:

The major industry found in this sub basin are 1) Sugar industry.2) Argifurane Industry 3) Bakery Industry and 4) Fasteners Industry.Out of 192 industies, there are 159 orange small industries are available in this sub basin .

The effluent generated is let out directly into the nearby drains, which ultimately reach the River or supply channels of tanks in this sub basin. Even though major industries with their own treatment plants, the fields in and around the area are still affected by the treated effluent disposed by the industries. Special attention is needed to avoid water pollution in the sub basin.

List of Industries category wise in Varahanadhi Sub Basin: -

Category	Large	Medium	Small
Red	4	2	17
Orange	1	9	159

To know the exact impact of Sugar industries on water resources, A **"Study on Impact Assessment of Environmental degradation due to Sugar Industry in and around Mundiambakkam Village by Research in the Sub Basin is found essential".**

5. Sand mining:

Sand mining problem is seen in several locations along the river Varahanadhi sub basin. Action has been taken by WRO to minimise the problem by selecting the mining locations judiciously. The result of this action is expected to minimize the issue in due course.

6. **Mining of Rocks:**

No appreciable mining of rocks are taking place in this sub basin affecting water resources

7. Water Quality Status:

7.1 Ground Water:

Overall the ground water quality is not affected by any external pollution except near the Sugar industry in Mundiambakkam in Villupuram Taluk. The Ground water quality of the sub basin is moderate Overall the water is fit for drinking and irrigation.

7.2 Surface Water:

Only during North East monsoon, flow occurs in the river. During the flow period the surface water is found to be good and fit for irrigation. The water is also fit for drinking with minimum treatment.

8. Social Issues:

The social problems identified in the sub basin are Seasonal migration, reduction in Livestock and lack of awarene ss on the environmental issues.

9.ACTIVITIES PROPOSED

To monitor the quality of water and soil and create database regarding the Environmental Status for each Sub Basin, this proposal is proposed now with the following activities at sub basin level.

9.1. Collection and Testing of Water and soil samples.

Water samples were collected and tested in this Sub Basin at located points and tested regularly from 2002.

The details of water sample & soil samples collected and given for testing during 2005-06 are shown below:

WATER SAMPLES:

S.No	No.of Samples	Place of sample	No.of Samples tested	Inference /quality of inference	Remarks
1	1	D/s of bridge Km 140/2,Chennai-Villupuram NH			Test result awaited from the Ground Water wing
2	1	D/S side of Cause way near Vidur Dam			-Do-
3	1	200m U/S side of road bridge across Varahanadhi on Gingee-Tindivanam Road			-Do-
4	1	300m D/S side of road bridge across Varahanadhi on Gingee-Tindivanam Road			-Do-
5	1	300m U /S side of Nainar Koil near Uruni thangal village confluence point of Nainar Odai			- Do-
6	1	200m D/S side of Nainar Koil near Uruni thangal village confluence point of Nainar Odai			-Do

SOIL SAMPLES:

S.No	No.of Samples	Place of sample	No.of Samples tested	Inference /quality of inference	Remarks
1	2	M/ S Southern AgroFurnace IndustriesLtd, near Mundiampakkam Village 1)Papanapatti 2) Papanapatti			Test result awaited from S.M&R Division, Chennai

The Executive Engineers of Ground Waterwing and Soil Mechnaics &Research Division Chennai have informed that only on receipt of payment towards testing charges, the samples will be taken up for testing.

The chief Engineer, PWD, WRO, Plan Formulation has addressed the Government for the Waiver of testing charges.

Continuance of collection and testing of water samples is essential, as good and long-range data will enable to understand the problems more precisely. Hence, now it is proposed to collect and test water samples at located points in addition for a period of five years to assess the environmental impact on the quality of surface water of this sub basin more accurately.

In addition to the above identified locations, water samples will also be collected at regular intervals from tanks and near by wells to estimate the level of pollution where sewage is directly let into tanks and Channels. These samples will be tested, to assess the impact on the quality of surface and ground water.

Soil samples are to be collected from selected locations to assess the impact on the quality of soil due to various Environmental problems like use of chemical fertilizer and using the polluted water. From these locations 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. The S.M&R Division of WRO will test soil samples thus collected.

Under this item, following provisions have been made.

3. Testing charges for the water& soil samples.
4. Provision of Labour charges, purchase of materials, conveyance, driver salary and computer operator.

9.2. Transfer of Technical Know how for solid waste management system including source Segregation, recycle of dry waste and linkage with user agencies.

Now, a new scheme for Solid waste Management plan is under implementation in all Municipalities and Panchayats. Under this scheme, collection tank for disposable and non-disposable garbage have been constructed in most of the Local bodies. But, recycling the waste and converting the solid waste into manure and production of energy from them are yet to come up.

Hence Demonstration and action programs are planned with user agencies and necessary field visits are programmed to transfer of Technical Know how for Solid Waste management system.

9.3. Conducting Awareness Programs

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.

Hence, to create and motivate the people, awareness programmes are to be conducted in the villages where sewage is directly let into water bodies. It is also proposed to conduct awareness meetings in School/ Institutions during the study period of five years covering the following subjects in addition to placing Stickers, Tin sheets and Pham lets containing messages about Environmental Awareness.

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

The major problem in the Sub Basin that requires immediate attention is to avoid industrial pollution mainly due to major industries mentioned above in and around Mundiambakkam, Mittamandagapattu and in Vanur Taluk

9.4.Total Cost.

River basin monitoring and Environmental Awareness should be given throughout the sub basin for conserving the quantity and quality of water. In order to achieve this objective, an estimate has b een prepared. The estimate cost works out to Rs. **14.10 Lakhs**. (Rupees Fourteen Lakhs and Ten Thousand Only).

Environmental Activities in Varahanadhi Sub Basin from 2006-07 to 2010-11.

Sl. No	Description of Component	Amount in Rupees
1	Collection and testing of Water samples in rivers , anicuts reservoirs , major tanks,wells etc., including testing charges, packing, conveyance and labour charges in river basin and Collection and testing of Soil samples , including testing charges, packing, conveyance and labour charges in river basin	
	a. Water Samples: Water samples from rivers: 15 nos x4 times = 60 nos Water samples from wells, major tanks, etc twice in a year =5nos x 2 times = 10 Nos Total = 70 Nos Testing charges =70 nos x 5 yearsx Rs 1000 /ea = 350000 Labour charges = Rs 1000 /year x 5 years = 5000 Conveyance charges = = 5000 Purchase of chemicals, sampling equipments = 1000 Sub total for water samples = Rs 361000-	393,000
	b. Soil Samples Testing Charges = 5 Nos x Rs 6200 / ea = 31000 - Labour charges =5 x 1 x 100 / ea = 500 - Conveyance Charges = 5 x 100 / ea = 500 - Sub total for soil samples = Rs 32000 -	
2	Collection of data and updating Environmental and Social Assessment including Documentation and binding charges of environmental reports, engaging technical assistant, mazdoor, Computer operators, jeep drivers etc., Computer Operator = 1 No x 2month x 5 years x Rs 3500 = Rs 35000 - Jeep Driver = 1 No x 2 x5 x Rs 3500 = Rs 35000 - Technical Assistant- 1 No x2x5 x Rs 4000 = Rs 40000 - Mazdoor Grade I - 1 No x 2x5 x Rs 2000 = Rs 20000- Documentation and Binding charges, maps, Publishing Annual report for the sub basin visual display, books purchase, upgradation of computer and accessories etc., = Rs 60000 - **Total = Rs 190000**	190,000

Sl. No	Description of Component	Amount in Rupees
3	Conducting Awareness Programmes in villages, schools, colleges etc., and workshop including printing stickers, booklets,banners, honorarium, refreshment, stationary, prizes etc.,	400,000
4	Impact Assesment of Environmental Degration due to Sugar Industries in and around Mundiambakkam villa ge in varahanadhi River Basin	400,000
5	Provision for unforeseen items and escalation charges	27,000
	Total	**1410000**

(Rupees Fourteen lakhs and Ten Thousand only)