



**TN – IAMWARM PROJECT**

**KOVILAR SUB BASIN**

**DETAILED PROJECT REPORT  
WATER RESOURCE DEPARTMENT**





## 1.1 INTRODUCTION

## 1.1 INTRODUCTION

### 1.1.1 General

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

To achieve higher water use efficiency, it is necessary to improve and upgrade the existing conveyance system and also to introduce modern irrigation methods.

With the above objective, a comprehensive programme has been proposed with a Multi Disciplinary Approach.

### 1.1.2 Description of the Pennaiyar Basin

The main Pennaiyar Basin gets its name after the name of the river Pennaiyar. The Pennaiyar River has its origin in the South Eastern slopes of Chennakesava hills in Nandhidurg in Karnataka state and after traversing about 112km in Karnataka state it enters in Tamil Nadu in Hosur Taluk and flows through Hosur, Krishnagiri and Uthangarai Taluks of Krishnagiri District and Harur Taluk of Dharmapuri District for a length of 190.50km. After traversing in Dharmapuri District, the Pennaiyar river enters into Thiruvannamalai, Vilupuram, Cuddalore District and travels a distance of 139.50km. The Pennaiyar River finally empties into the Bay of Bengal near Cuddalore. The total drainage area of Pennaiyar including the area in Karnataka state is 15101 sq.km. The catchment area in Karnataka state itself is (931.06 sq.miles) 2384. sq.km. The total length of river is 432km. (i.e) 320km in Tamil Nadu and 112km in Karnataka state. The Kovilar sub basin is located between latitude of  $12^{\circ} 8' 61''$  to  $11^{\circ} 49' 40''$  and longitude of  $78^{\circ} 44' 35''$  E to  $78^{\circ} 30' 55''$ .

This basin has been divided into 18 sub basins namely as follows.

1. 1A Chinnar, 1B Chinnar
2. Markandanadhi
3. Kambainallur
4. Pambar
5. Vaniar
6. Kottapatti kallar/ Kovilar
7. Mattur River
8. Valayar Odai
9. Ramakal Odai
10. Pambanar & Varattar
11. Musukundanadhi
12. Aliyar
13. Thuringalar
14. Gadilam
15. Upto Krishnagiri Reservoir
16. Krishnagiri to Pambar
17. Pambar to Thirukovilur
18. Lower Pennaiyar

### **1.1.3 Description of the Kovilar Sub-Basin**

The Kottappatti kallar/Kovilar is one of the major tributary to the Pennaiyar.

There are 3 anicuts and one Tank involved in the Kovilar Sub basin. Kovilar starts from Kottapatti and Theerthamalai Hills, and having one tributary of Kallar which originates from Kalvarayan hills. There is a seasonal flow in the river during monsoon seasons. The maximum discharge of this river, so far measured near confluence point to Pennaiyar is 27000 C/S.

The Kovilar Sub basin area is 454 sq.km. The taluk covered in the Sub basin is Harur Taluk of Dharmapuri District.









**ANNEXURE - II**  
**CONVERGENT TABLE- ABSTRACT (FOR EACH CLUSTER)**

**Name of Sub Basin: Kovilar**

SI No.	Number & Name of the cluster	Total Ayacut (Ha)			Total Area (Ha)			WRD Activities		Agriculture		TNAU		Horticulture		Agri marketing		AED		Fisheries		Animal Husbandry	
		FI	PI	Gap	Wop	WP	Gap	Act	No./Ha	Act	No./Ha	Act	No./Ha	Act	No./Ha	Act	No./Ha	Act	No./Ha	Act	No./Ha	Act	No./Ha
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17	18	19	20	21	22	23	24
1	Cluster -I Velanoor Anicut Velanoor Village	5.90	40.84	40.30	46.74	87.04	-	AR-1 CD - 3.23 KM SCI 0.60 KM CC -2	-	DSR DM DR DP	1 3 1 5	NIL	NIL	Area expansion Mango Tomato Turmeric Tapico	1 1 2 2	Drying Yard Commodity Groups Paddy	1 1 1	Drip Sprinkler	3 3	Information, Education & Communication Training	1	FD IEC	3 1
2	Cluster -II Naripalli Anicut Venkataramapuram Village	6.85	58.49	56.12	65.34	121.46	-	CD- 4.56 SCI - 0.24 KM CC-3	-	DSR DM DR DP	1 9 2 11	NIL	NIL	Area expansion Mango Tomato Turmeric Tapica	4 2 6 4	Drying Yard Commodity Groups Maize	1 1	Drip Sprinkler	4 3	Information, Education & Communication Training	1	FD IEC	4 1
3	Cluster -III Bairanaickan patti Tank Bairanaickan patti Village	4.00	33.52	33.33	37.52	70.85	-	-	-	DSR DM DR DP	1 3 1 4	NIL	NIL	Area expansion Mango Tomato Turmeric Tapica	1 1 2 2	Drying Yard Commodity Groups Tomato	1 1	Drip Sprinkler AFP	3 4 4	FPA FI IEC	4 1 1	FD IEC	3 1
<b>Grand Total</b>		<b>16.75</b>	<b>132.85</b>	<b>129.75</b>	<b>149.60</b>	<b>279.35</b>																	

**AE**

AR	1	DSR	3	MANGO	6	DY	3	DRIP	10	IEC	3	FD	10
CD	7.79 km	DM	15	TOMATO	4	CG PADDY	1	SPRINKLER	10	FPA	4	IEC	3
SCI	0.84 km	DR	4	TURMERIC	10	CG MAIZE	1	AFP	4	FI	1		
CC	5 Nos	DP	20	TAPICO	8	CG TOMATO	1						



## 1.2 HYDROLOGY

## **GENERAL**

### **1.2.1. Kallar and Kovilar are worth mentioning tributaries of Pennaiyar River.**

During 1957 (Year) one reservoir namely Sathanur Reservoir was constructed across the Pennaiyar River.

Finally, Pennaiyar River confluences with Bay of Bengal near Cuddalore.

### **1.2.2 LOCATION**

Kovilar Sub Basin area is 454.00 Sq km. The taluk covered in this sub basin is Harur of Dharmapuri district.

### **1.2.3 CATCHMENT AREA OF KOVILAR SUB-BASIN**

The Kovilar Sub Basin has a typical climate, owing to the marginal catchments area in the Kalvarayan, Kottapatti and Theerthamalai hills. This Sub Basin enjoys the benefits of mostly North East monsoon and South West Monsoon.

### **1.2.4 HYDRO METEOROLOGY**

The Hydro Meteorology parameters include rainfall, temperature, humidity, wind velocity, evaporation and duration of sun shine which determine the climate of the basin.

### 1.2.5 RAIN FALL

Average annual rainfall of gauging stations influencing this sub basin is as follows

Sl No	Name of Rain gauge Station	North East Monsoon	Summer	Winter	South west monsoon	Annual
1.	Harur	256	118	10	306	690
2.	Kallakurichi	327	163	19	416	925
3.	Santhanur pickup Anicut	293	155	15	370	833
4	Sathanur	310	172	14	401	897

#### a. CLIMATE

The Kovilar Sub Basin lies in a medium rainfall belt having an annual average weighted rainfall of 878 mm. Southwest monsoon contribute 422 mm, while NE monsoon contributes 333 mm . This basin receives a major share of its rainfall during NE monsoon. This monsoon helps to build up storage in the anicuts and Non system tank. This sub basin originates from Kalvarayan hills on Northern sides. North East monsoon rainfall, though lesser than the South West monsoon rainfall, still contribute some runoff helping to buildup storage in the Anicuts and Tank.

#### b. SOIL CLASSIFICATION

In this sub basin, due to different stages, Weathering & parent material, the soil types are met with in combination of Inceptisol, Alfisol and Vertisol. More prominent type is Inceptisol.

Inceptisol	Red or brown or grey soil with surface horizon more developed than sub surface. They are developing soils, moderately deep, coarse loamy to loam moderately drained to well drained	Suited for commonly grown crops with exceptions
Alfisol	The red or brown soils having accumulation of alleviated clay in sub surface horizon it well drained, poor water and nutrient holding capacity.	Annual crops with shallow roots systems cum up wells
Vertisols	Black soil	Suitable for cotton, Pulses etc

#### **b.1 LAND HOLDINGS**

The details of farm holdings and size classes prevalent in Kovilar Sub basin are given below:

Category	Size of holdings	Numbers	Percentage
Marginal	Below 1.00 Ha	483	78.9%
Small	1.00 – 2.00 Ha	89	14.5%
Medium	2.00 – 5.00 Ha	26	4.2%
Big	5.0 ha & above	14	2.4%
Total		612	

Above table revealed that the marginal farmers alone accounted for 78.90 percent in the sub basin followed by small farmers. Developmental initiatives will need to take the fact into account

### 1.2.6 DEMOGRAPHY

Name of Sub Basin	Total No. of Blocks	Total No. of Villages	Population in, Million		
			2004	2010	2025
Kovilar Sub basin	1	17	0.022	0.025	0.035

## 1.2.10 CROPPING PATTERN OF KOVILOR SUB BASIN

### CROPPING PATTERN

Name of the sub Basin : KOVILOR Fully Irrigated : 16.75 Ha  
 District : Dharmapuri Partially Irrigated : 32.85 Ha  
 Registered Ayacut Area : 279.35 Ha Gap : 129.75 Ha  
 Total Ayacut Area : 279.35 Ha

S.No.	Crop	Without Project				With Project				Increase- ing
		FI	PI	RF/G	TOTAL	FI	PI	RF/G	TOTAL	
I	Perennial crop									
1	Mango	-	-	19.00	19.00	25.00	-	-	25.00	6.00
2	Palmatesa	-	5.00	-	5.00	1.00	-	-	1.00	-4.00
3	Fodder	1.00	-	-	1.00	3.00	-	-	3.00	2.00
	<b>Total</b>	<b>1.00</b>	<b>5.00</b>	<b>19.00</b>	<b>25.00</b>	<b>29.00</b>	<b>0.00</b>	<b>0.00</b>	<b>29.00</b>	
II	Annual Crop									
1	Tapioca	-	37.00	5.00	42.00	50.00	-	-	50.00	8.00
2	Turmeric	-	10.00	-	10.00	20.00	-	-	20.00	10.00
	<b>Total</b>	<b>0.00</b>	<b>47.00</b>	<b>5.00</b>	<b>52.00</b>	<b>70.00</b>	<b>0.00</b>	<b>0.00</b>	<b>70.00</b>	<b>18.00</b>
III	1 <sup>st</sup> crop (Sep-Jan)									
1 a	Paddy	15.75	-	-	15.75	-	-	-	0.00	-15.75
b	Paddy - SH	-	-	-	0.00	16.00	-	-	16.00	16.00
2	Pulses	-	50.00	-	50.00	50.00	-	-	50.00	0.00
3	Maize	-	17.85	-	17.85	99.35	-	-	99.35	81.50
4	Cumbu	-	2.00	-	2.00	-	-	-	0.00	2.00
5	Tomato	-	11.00	-	11.00	15.00	-	-	15.00	4.00
6	Fodder Chulam	-	-	4.00	4.00	0.00	-	-	0.00	-4.00
7	Fallow	-	-	101.75	101.75	-	-	-	0.00	-101.75
	<b>Total</b>	<b>15.75</b>	<b>60.00</b>	<b>105.75</b>	<b>192.50</b>	<b>180.35</b>	<b>0.00</b>	<b>0.00</b>	<b>180.35</b>	
	<b>Grand Total (I+II+III)</b>	<b>16.75</b>	<b>132.00</b>	<b>129.75</b>	<b>279.35</b>	<b>279.35</b>	<b>0.00</b>	<b>0.00</b>	<b>279.35</b>	
IV	2 <sup>nd</sup> crop									
1	Ragi	-	3.00	-	3.00	40.00	-	-	40.00	37.00
2	Groundnut	-	10.31	-	10.31	-	-	-	0.00	-10.31
3	Maize	-	-	-	0.00	50.00	-	-	50.00	50.00
4	Pulses	-	-	-	0.00	50.00	-	-	50.00	50.00
5	Fodder Chulam	-	-	-	0.00	7.00	-	-	7.00	7.00
6	Tuntake	-	4.00	-	4.00	5.00	-	-	5.00	1.00
7	Green manure	-	-	-	0.00	25.00	-	-	25.00	25.00
	<b>Total</b>	<b>0.00</b>	<b>17.31</b>	<b>0.00</b>	<b>17.31</b>	<b>177.00</b>	<b>0.00</b>	<b>0.00</b>	<b>177.00</b>	
	<b>Great Grand Total</b>	<b>16.75</b>	<b>150.16</b>	<b>129.75</b>	<b>296.66</b>	<b>456.35</b>	<b>0.00</b>	<b>0.00</b>	<b>456.35</b>	
	<b>Cropping Intensity</b>				<b>59.75%</b>				<b>163.36%</b>	

### 1.2.11 LIVE STOCK - POPULATION

Name of Sub basin	Cattle	Buffalo	Sheep	Goats	Pigs	Dogs	Others	Poultry
Kovilar Sub basin	25368	8482	24047	19175	2578	7022	25	5819
Annual requirement	5.44 Mcum							

### 1.2.12 INDUSTRIES & ANNUAL WATER DEMAND in Mcum

Name of Sub basin	Medium Industries			Small Industries			Water Requirement		
	2007	2010	2025	2007	2010	2025	2007	2010	2025
Kovilar Sub basin	-	-	-	-	-	-	-	-	-

### 1.2.13 CROP WATER REQUIREMENT (WITHOUT PROJECT )

Name of Crop		Area in Ha	Crop water requirement in mm	Total Crop water requirement in Mcum	Irrigation water requirement at source n=0.53	Total Irrigation requirement in Mcum
Perennial	Coconut	69.00	1001	0.691	1.30	1.30
	Mango	36.00	592	0.213	0.40	0.40
	<b>Total</b>	<b>105.00</b>		<b>0.90</b>	<b>1.71</b>	<b>1.71</b>
Annual	Banana	38.00	811	0.308	0.58	0.58
	Fodder	55.00	138	0.076	0.14	0.14
	<b>Total</b>	<b>93.00</b>		<b>0.38</b>	<b>0.72</b>	<b>0.72</b>
I Crop	Paddy	1590.00	612	9.731	18.36	18.36
	Ragi	370.00	231	0.855	1.61	1.61
	Tomato	50.00	382	0.191	0.36	0.36
	Bhendi	100.00	315	0.315	0.59	0.59
	Gap	2173.53	0	0.000	0.00	0.00
	<b>Total</b>	<b>4283.53</b>		<b>11.09</b>	<b>20.93</b>	<b>20.93</b>



	<b>Grand Total</b>	<b>4481.53</b>		<b>12.38</b>	<b>23.36</b>	<b>23.36</b>
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**Water Potential**

Surface Water Potential(Mcm)	=	58.88
Ground Water Potential (Mcm)	=	62.24
<b>Total Potential (Mcm)</b>	<b>=</b>	<b>121.12</b>

**Water Demand without Project**

Domestic (Mcm)	=	8.14
Livestock (Mcm)	=	7.36
Industrial (Mcm)	=	15.93
Irrigation WRO	=	23.36
PU & GW	=	68.92
<b>Total Water Demand (Mcm)</b>	<b>=</b>	<b>123.71</b>

<b>Water Balance(Mcm)</b>	<b>=</b>	<b>-2.59</b>
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### 1.2.14 CROP WATER REQUIREMENT ( WITH PROJECT )

Sl. No.	Name of Crop		Extent in Ha.	Crop Water Requirement		Irrigation Water Efficiency			Total MCM
				mm	MCM	Surface water 0.56	Drip 0.8	Sprinkler 0.7	
<b>I</b>	<b>Perennial Crops</b>								
1	Coconut	SFI	59.00	1001	0.591	1.055			1.055
		Drip	10.00	1001	0.100		0.125		0.125
2	Mango	SFI	72.00	592	0.426	0.761			0.761
		Drip	78.00	592	0.462		0.577		0.577
3	Jasmine	SFI	25.00	509	0.127	0.227			0.227
		Drip	50.00	509	0.255		0.318		0.318
4	Rose	SFI	93.00	509	0.473	0.845			0.845
	<b>Total</b>		<b>387.00</b>			<b>2.89</b>	<b>1.02</b>	<b>0.00</b>	<b>3.91</b>
<b>II</b>	<b>Annual Crops</b>								
1	Banana	SFI	108.00	811	0.876	1.564			1.564
		Drip	70.00	811	0.568		0.710		0.710
2	Fodder		330.00	138	0.455	0.813			0.813
	<b>Total</b>		<b>508.00</b>			<b>2.38</b>	<b>0.71</b>	<b>0.00</b>	<b>3.09</b>
<b>III</b>	<b>I Crop</b>								
1	Paddy		1570.00	612	9.608	17.158			17.158
2	Ragi	SFI	1075.53	231	2.484	4.437			4.437
3	Tomato	SFI	90.00	315	0.284	0.506			0.506
		Drip	80.00	464	0.371		0.464		0.464
		Sprinkler	30.00	464	0.139			0.199	0.199
4	Bhendi	SFI	81.00	462	0.374	0.668			0.668
		Drip	40.00	462	0.185		0.231		0.231
		Sprinkler	20.00	462	0.092			0.132	0.132
5	Brinjal	SFI	40.00	464	0.186	0.331			0.331
		Drip	40.00	464	0.186		0.232		0.232
		Sprinkler	20.00	464	0.093			0.133	0.133
6	Aster	SFI	100.00	438	0.438	0.782			0.782
7	Chrysanthemum	SFI	380.00	438	1.664	2.972			2.972
		Sprinkler	20.00	438	0.088			0.125	0.125
	<b>Total</b>		<b>3586.53</b>			<b>26.85</b>	<b>0.93</b>	<b>0.59</b>	<b>28.37</b>

	<b>Grand Total</b>		<b>4481.53</b>			<b>32.12</b>	<b>2.66</b>	<b>0.59</b>	<b>35.37</b>
<b>III</b>	<b>II Crops</b>								
1	Paddy		300.00	231	0.693	1.238			1.238
2	Ragi		768.00	382	2.934	5.239			5.239
3	Tomato		25.00	382	0.096	0.171			0.171
4	Cabbage		225.00	480	1.080	1.929			1.929
5	Cauliflower		150.00	480	0.720	1.286			1.286
	<b>Total</b>		<b>1468.00</b>			<b>9.86</b>	<b>0.00</b>	<b>0.00</b>	<b>9.86</b>
	<b>Grand Total</b>		<b>5949.53</b>			<b>41.98</b>	<b>2.66</b>	<b>0.59</b>	<b>45.23</b>

### Water Potential

Surface Water Potential(Mcm)	=	58.88
Ground Water Potential (Mcm)	=	62.24
<b>Total Potential (Mcm)</b>	=	<b>121.12</b>

### Water Demand with Project

Domestic (Mcm)	=	8.14
Livestock (Mcm)	=	7.36
Industrial (Mcm)	=	15.93
Irrigation WRO	=	45.23
PU & GW	=	68.92
<b>Total Water Demand (Mcm)</b>	=	<b>145.58</b>
<b>Water Balance(Mcm)</b>	=	<b>-24.46</b>



### **1.3 HYDRAULICS OF THE COMPONENTS**

### 1.3.1 Reservoirs / Anicuts / Dividing Dams / Bed Dams / Off Takes

#### Reservoir Details :

#### KELAVARAPALLY RESERVOIR PROJECT SALIENT FEATURES OF THE RESERVOIR

Reservoir Details	M.K.S.	F.P.S
a. Free Catchment area	27.71 Sq.Kms	10.70 Sq. miles
b. Combined Catchment area	2442.00 Sq. Kms	943.00 Sq. miles
c. Capacity at F.R.L.	13.6Mm <sup>3</sup>	481.00 M cft
d. Live Capacity	13.77 Mm <sup>3</sup>	465.00 M cft
e. Annual Storage	26.43 Mm <sup>3</sup>	934.00 M cft
f. Waterspread area at F.R.L. (including bound)	433.20 Ha	1069.66 Ac
g. Full Reservoir level	831.50M	2727.32 ft
h. Maximum water level	831.50M	2727.32 ft
i. T.B.L.	833.90 M	2735.20 ft
j. No. of Billing	2 Nos.	2 Nos.
Irrigation	292 Mcft	
Water Supply	183 Mcft	
Dead Storage	16 Mcft	
Total Capacity @ FRL	481 M cft	
Total Length of Dam (118.2M+546.8M = 665.00M)	665.00M	
Masonry Overflow Dam	M.K.S.	F.P.S.
a. Length of over flow Dam (Masonry Portion)	118.20M	388 Ft
b. No. of Spans	7 Nos.	7 Nos.
c. Spill way vent size	12.2mx6.10m	
d. Crest of Spillway	825.40M	2708 Ft
e. Maximum flood discharge	2490.00 Cumecs	88940.00 Cusces
<b>Earth Dam</b>		
a. Total length of earth dam (excluding masonry portion)	546.80M	1794.0 Ft
b. Top width	3.65M	12.0 ft
c. T.B.L.	833.90M	2736 ft
d. Free Board	2.40M	8.00 ft
<b>CANALS</b>	<b>LENGTH</b>	<b>AYACUT</b>
1. Right main Cannel	22.99Km	2082 Acres or 842.91 Hectares

2. Left main Cannel	25.50 Km	
3. Branch I of LMC	5.40 Km	
4. Branch – II of LMC	3.80Km	
5. Branch – III of LMC	2.78 Km	
6. Branch – IV of LMC	4.96 Km	
Distributory I of Branch IV	1.80 Km	5918 Acres (or) 2395.95 Hectares
Distributory II of Branch IV	2.00 Km	
7. Branch – V	0.71 Km	
Distributory – I Branch V	1.48 Km	
Distributory – II Branch V	1.15 Km	
<b>Total</b>	<b>72.57 Km</b>	<b>8000 Acres (or) 3238.86 Hectares</b>

Direct Ayacut through 12 Anicuts 1083 Acres (or) 438.46 Hectares

	<b>Irrigation</b>	<b>Period</b>
1. Ist Zone (Ist Year)	4106 Ac	1 <sup>st</sup> November to 31 <sup>st</sup> March
2. IInd Zone (IInd Year)	3894 Ac.	-do-

## A. KOVILAR SUB BASIN HYDRAULIC PARTICULARS OF ANICUT

Sl. No	Name of Anicut	Village	Ayacut	Length of Anicut(M)	Crest level of Anicut (M)	Front (M)	Free Sq.km	Combined Sq.km	Maximum flood discharge Cumecs/ Cusecs	Head sluice Location	Vent (M)	Sill Level sluice (M)	Discharge cumecs	Length (m)	Bed width (M)	FSD (M)	Bed slope	Sluice	Remarks
1	Velanoor Anicut	Velanoor	87.04 Ha	47m	93.20				2609 Cusec	2 Nos. L&R	0.45m 0.30m	92.600	0.15	3230	1.00	0.50	1:2100	3 Nos L/s	
2	Narippalli Anicut	Venkataramapuram	121.46 Ha	64m	96.00				21870Cusec	1No. Left	0.90m 0.45m	94.320	0.21	4560	0.90	0.60	1:2640	2 Nos.	

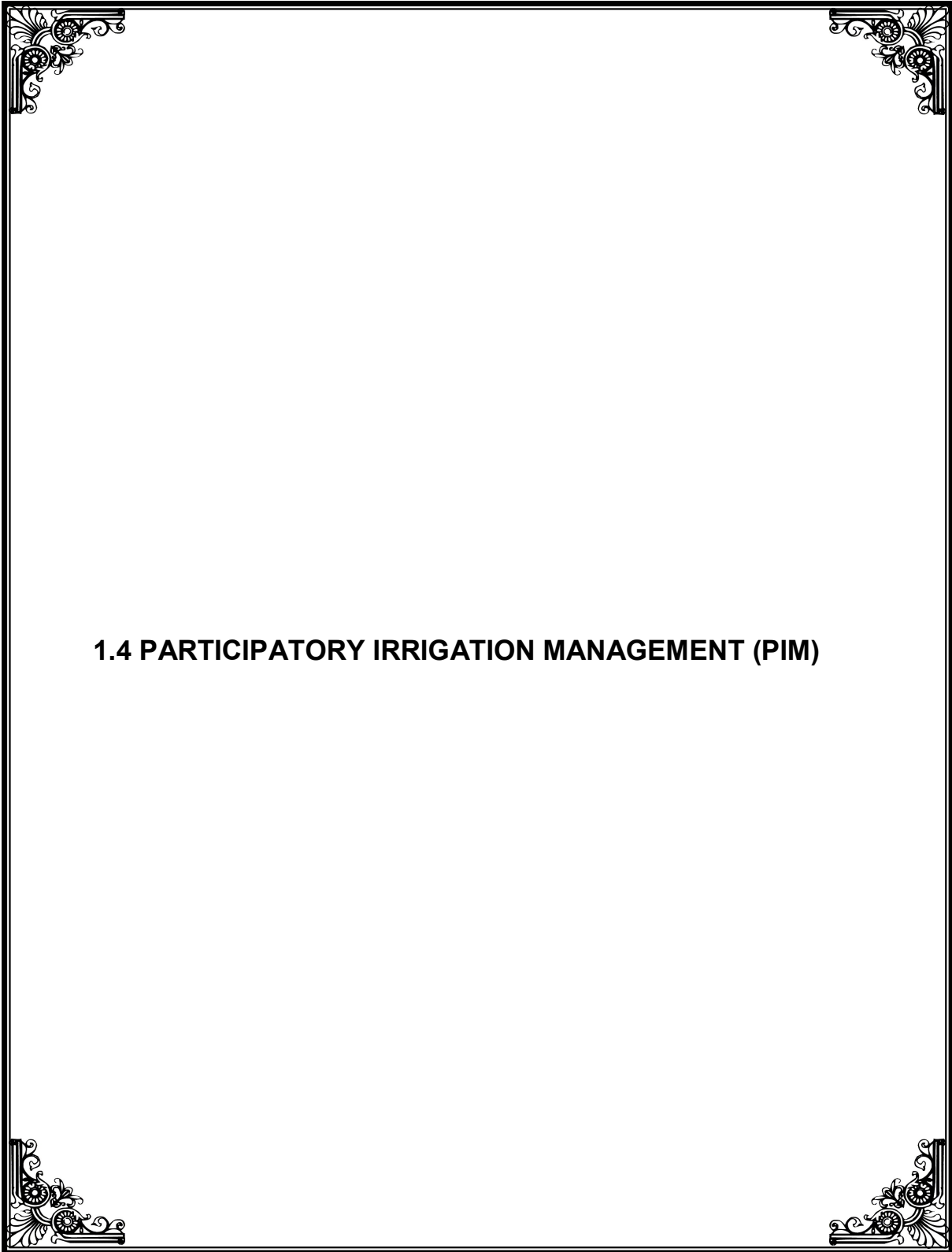
## B.HYDRAULIC PARTICULARS OF TANKS

Sl. No	District	Taluk	Name of Tank	Ayacut in Ha	Capacity in Mcft	Number of Fillings	Free catchment in SqKm	Combined Catchment in Sq.Km	Water spread area(Sq.Km)	FTL in M	MWL in M	No. of Sluices	Nos and Length of weir (m)		Discharge in Cusecs	Length of bund (M)	Upper Tank	Lower Tank
													Nos	Length in m				
1	Dharmapuri	Harur	Bairanaickanpatti Tank	70.85	17.90	2	12.90	12.90	-	100.000	100.600	1	1	36.00	1612	296	-	-

### C) SUPPLY CHANNELS HAVING DIRECT AYACUT

Sl. No.	Name of supply channel	Start Point		End Point		Length in metres	Bed width	Bed slope	Side slope	MFD	Depth of flow	Remarks
		Location	Sill level	Location	Sill level							
1	Velanoor anicut	Anicut L/S	92.60	L/S	92.00	1280	1.00	1:2100	1:1	—	0.50	
		Anicut R/S	92.60	R/S	92.00	1950	1.00	1:3250	1:1	—	0.50	
2	Narippalli anicut	Anicut L/S	94.32	L/S	92.60	4560	0.90	1:2640	1:1	—	0.60	





## **1.4 PARTICIPATORY IRRIGATION MANAGEMENT (PIM)**

### 1.4.1 SALIENT FEATURES OF IMPLEMENTATION OF PIM IN KOVILOR SUB-BASIN

1. **The Sub-Basin:** This is one of the Eighteen sub-basins of the Pennaiyar River Basin. Totally one irrigation tank, 2 Anicuts and one Reservoir are under the control of Water Resources Organization (WRO) of Public Works Department (PWD) in this sub-basin. The list of Infrastructures covered with more details are furnished in the **Annexure -1**. These Infrastructures are located within the Sub-Basin's hydraulic boundary spread over 4 villages of Harur Taluk in Dharmapuri Districts. The Total Command area under these Infrastructures works out to 279.35 Ha. (**Annexure1**).

#### 2. Command area

Non system tank-1No. : 70.85 Ha

Anicuts-2No. : 208.50 Ha

Total : 279.35 Hectare

#### 3. An Assessment of number of WUAs.

i)	WUA's are not formed already in this sub basin.	
ii)	Associates proposed to be formed under IAMWARM Project covering one tank and 2 Anicuts in 4 Villages only.	3 Nos. (279.35) Hectare.
iii)	The Total command area covered by the above (3) WUAs works out to	279.35 Hectare.
iv)	More details about formation of WUA's in the Sub-Basin are made available in the Annexure-1	

**4. An account of “Awareness creation” among the farming community:**

**Activities undertaken and “Walkthrough Survey” carried out :**

- i) There are one Tank and 2 Anicuts in the Sub-Basin spread over 4 villages as detailed out in Annexure – 01. All these Villages were visited by the WRO officials and awareness about various activities, contemplated under IAMWARM project has been created.
- ii) Details of villages covered, walkthrough surveys conducted, farmers attended, list of works suggested by the farmers, list of works analyzed and finalized by WRO officials, are all furnished in the Annexure -02 and Annexure -03:

**5. Schedule for completion of delineation and preparation for WUA documents, comprising of :**

- i) Form – I : Details to be notified by Districted Collectors (Middle of Feb - 09)
- ii) Form – II :WUA document to be notified by District Collectors (End of March – 09)
- iii) Completion of preparatory works for the conduct of Elections for WUAs (End of June -09)

**6. Schedule for conduct of Elections in the Sub-Basin for forming Management Committees (I st week of July – 2009)**

**7. Support Organization (SOs).**

- i) Initiating and completing the process of publishing EOI to hire Support Organisation at Sub-Basin level (I st week of Feb’2009)
- ii) Short listing and Providing Request for Proposals (RFPs) p all the short listed agencies, and obtaining Technical and Cost Proposals (Middle of April’2009)
- iii) Selection and deployment of Support Organization to the Sub-Basin (End of May’2009)

## 8. **Appointment and the Role of Competent Authorities:**

- i) Section 26 of the Tamil Nadu Farmer's Management of Irrigation Systems (TNFMIS) Act provides for the appointment of "Competent Authorities" to assist the respective Organization (WUA, Distributory Committee and Project Committee), in the Implementation and execution of all decisions taken by such farmers organization. Similarly, every farmer's organization shall extend such co-operation or assistance, as may be required by the competent Authority, for carrying out all the tasks related to implementation of TNFMIS Act.
- ii) Appointment of Competent Authorities for the WUAs proposed to be formed under IAMWARM project is indicated below.

Name of the WRO Sub Divisional Officer and section officer working in the Kovilor Sub-Basin:

- a. Upper Pennaiyar Basin Sub Division Harur- WUAs 1 to 3
- b. Section Officer, WRO, Irrigation Section, Harur-WUAs 1 to 3

## 9. **Involvement of farmers in the preparation "Scheme Modernization Plans".**

- i) Based on the outcome of the "Awareness Creation Programme" and walkthrough survey carried out with the involvement of farmers, a list of tasks proposed to be taken up for "Modernization" under IAMWARM Project was discussed with 135 No. of farmers from 4 Villages. The final list of tasks was also prepared and exhibited in the Notice Board of the Village Administrative Officers Office and Panchayat Office. These details were also discussed with the farmers and the tasks to be taken up under scheme modernization finalized on 22/12/2008.
- ii) During the meeting, the farmers present were also informed that soon after finalization of contract for carrying out "Modernization of Irrigation Systems" a "Notice Board" with the details about the nature of works, its cost, period of contract and Name of the contractor will all be fixed at the site of work, as well as the Executive Engineer of WRO, who has been designated as the Nodal Officer for the Sub-Basin concerned.
- iii) The field Officers of WRO are all aware of the problems in handing over the operation and maintenance responsibilities to the farmers concerned,

if the tasks as desired by the farmers in the command area are not included in the modernization of the system and also in case, some of the tasks already included and planned are not implemented due to some reasons or other.

- iv) The WRO officers were also informed that they are personally responsible for handing over the irrigation systems, under IAMWARM Project.

**10. Current status of Recovery of water charges :**

- i) An enquiry conducted with the “Village Administrative Officers” (VAOs) of randomly selected villages (4 numbers out of 4 Villages) located within the Sub-Basin the normal water charges recovery as informed by the VAO, works out to 40-50% only, about the expected percentage of 80-90%.
- ii) With the proposal to form new WUAs under IAMWARM in “Kovilori Sub-Basin” the Managing Committee will be trained to take up the responsibility of improving the water charges recovery percentage. These will be followed up, after completing the modernization tasks and handing over of the O & M responsibilities to WUAs.

**11. “Capacity Building” of the WUA farmers:**

- i) The “Support Organization Group” will prepare “Training Modules” required for building the capacity of the WUA farmers, based on a “Training Needs” Analysis. They will also organize various “Capacity Building” programs at suitable locations within the Sub-Basin command area, to benefit the farmers of the WUAs in the Sub-Basin.
- ii) The “Support Organization” will also arrange for organization the “Study Tours” both within and outside the state to enhance their knowledge and experiences which will help them to improve the crop productivity and thereby the farmer’s income.
- iii) The support Organization will also conduct necessary “Awareness programme” and impart training to educate the farmers of the WUAs in all aspects of the TNFMIS Act, TNFMS Rules and Election procedures for constituting the “Managing Committee” of the WUAs.

12. The “Component Authorities” appointed for the Sub-Basin will also be trained to effectively interact with WUA farmers and maintain good report and relationship with the farming community in the Sub-Basin.

## Annexure: 1

### AN ASSESSMENT OF COMMAND AREA AND WUAs UNDER THE CONTROL OF WRO OF PWD IN KOVILOR SUB - BASIN

WUA No	Name of Irrigation Systems and Tanks	Command Area in (Ha)	Location of the Command Area			Coverage of Command area under different projects (Ha)		Status of formation of WUAs in the Sub-Basin	
			Villages	Taluk	District	WRCP and Others	IAMWARM	Formed under WRCP	To be formed under IAMWARM
WUA - 1	Velanoor Anicut	87.04	Velanoor	Harur	Dharmapuri	-	87.04	-	Yes
WUA - 2	Narippalli Anicut	121.46	Venkataramapuram,Narippalli	Harur	Dharmapuri	-	121.46	-	Yes
WUA - 3	Bairanaickanpatti Tank	70.85	Bairanaickanpatti	Harur	Dharmapuri	-	70.85	-	Yes
	<b>TOTAL</b>	<b>279.35</b>					<b>279.35</b>		

## ABSTRACT

1.	Command Area already covered under WRCP and other Project / Schemes	Nil
2.	Command Area proposed to be covered under IAMWARM Project	279.35 Hectares
3.	Total command area controlled by WRO of PWD in the Sub Basin	279.35 Hectares
4.	Total No. of WUAs already formed under WRCP	Nil
5.	Total No. of WUAs proposed to be formed under IAMWARM	3 Nos.
6.	Total No. of WUAs that will cover the entire Sub-Basin	3 Nos.

## Annexure: 2

### Details of "Awareness Creation Activities and Walk - Through Surveys"

Sl. No	Date of Visit	Names if the Villages Visited	Awareness Programme (No.of farmers attended) (Prepare the list of farmers with acknowledgement seperately and attach)	Walk - Through Survey (No.of farmers Participated) (Prepare the list of farmers with acknowledgement seperately and attach)	Remarks
(1)	(2)	(3)	(4)	(5)	(6)
1	23.9.2008 Photo No.1	Bairanaickanpatti	48	-	
2	16.12.2008 Photo No2,3	Velanoor	-	18	
3	16.12.2008:	Bairanaickanpatti	-	27	
4	16.12.2008	Narippalli	-	32	
			<b>48</b>	<b>77</b>	



### Annexure - 3

Details of Modernisation works as suggested by the Farmers and as finalized by the officials of WRO

Sl.No	Date of Visit	Names of the villages visited	Outcome of walk through survey and discussions with farmers	
			Works Suggested by <b>Farmers</b>	Works finalized by WRO <b>Officials</b>
1	23.09.2008	Bairanaickampatti	Bairanaickampatti Tanks field channel should be de-silted and request to extend the field channel. Periodical water regulation to be done.	De-silting to field channel is to be done by the farmers only. The extension of field channel to not possible. Arrangements to be made for water regulation.
2	16.12.2008	Velanoor	Sand vent shutter in the Anicut to be renewed D/s cut of wall and damaged apron to be repaired. U/s of side retaining wall to be provided. Jungle clearance and de-silting of channel to be removed. Cut and cover, crossings culverts for public and cattle crossing to be provided. Channel lining to be done.	All the request were fulfilled except channel linings which is not necessary for the entire length of channel. The Selective retaining wall in the RMC and cut & cover in the LMC are proposed.
3	16.12.2008	Naripalli	Jungle Clearance and de-silting of Channel to be removed. Retaining wall in the damaged portion and crossing culverts to be Provides.	All the request were fulfilled. The culverts of the important locations are proposed.

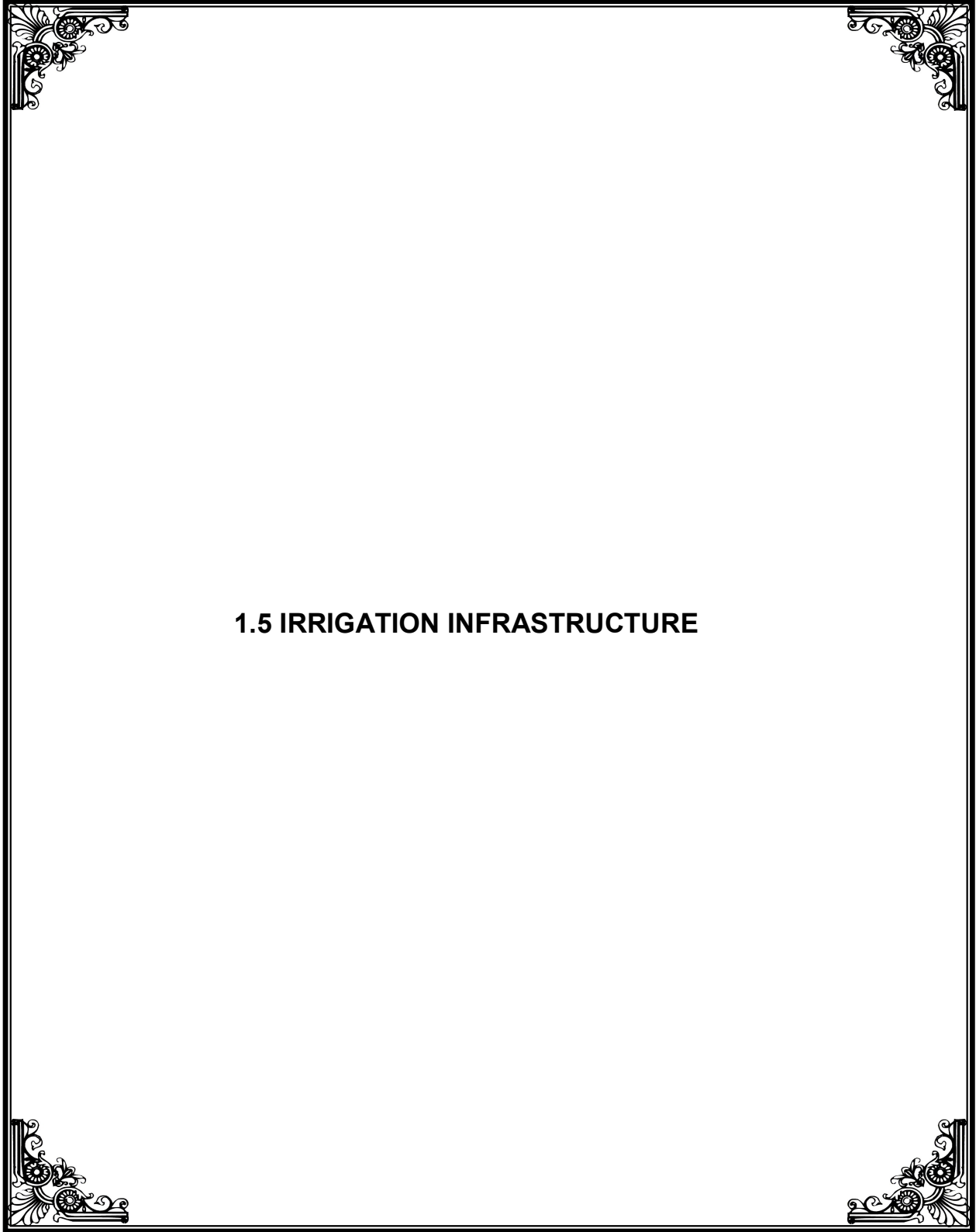
**STATEMENT WITH DETAILS OF DATE OF WALK THROUGH SURVEY, LOCATION, FARMERS REQUEST, TECHNICAL SOLUTION, PROPOSED IN THE PLAN**

Sl. No	Walk Through Survey		Farmers request	Technical Solution			
	Date	Location		WRO	Agriculture	TNAU	Horti culture
(1)	(2)	(3)	(4)	(5)	(6)	(7)	(8)
1	23.04.2008	Bairanaickampatti Village	Tank field channel should be desilted and also to be extended.	Bairanaickampatti tank field channel improvements.	-	-	-
2	16.12.2008	Velanoor Village	Velanoor Anicut repair. Canal de-silting, lining, cut and cover in the deep cutting and culvert provisions etc.,	Velanoor Anicuts and supply channel improvements.	-	-	-
3	16.12.2008	Venkataramapuram Village	De-silting Naripalli Anicut supply channel, retaining wall in the damaged portions. Culvert provisions.	Improvement to Naripalli Anicut Supply Channel	-	-	-



**DETAILS OF WATER USERS ASSOCIATION'S PROPOSED IN KOVILAR SUB BASIN**

<b>WUA No</b>	<b>Anicut / Tank and Villages it covers</b>	<b>Name of WUA's</b>	<b>Ayacut in Ha</b>
WUA- 1	Velanoor	Velanoor Anicut Water Users Association	87.04.0
WUA – 2	Naripalli	Naripalli & Sikkaloor Anicut Water Users Association	121.46.0
WUA – 3	Bairanaickampatti	Bairanaickampatti Tank Water Users Association	70.85.0
		<b>Total Ayacut in Hectare</b>	<b>279.35.0</b>



## **1.5 IRRIGATION INFRASTRUCTURE**

**1. List of Anicuts with details of Villages, Block, Taluk, District, Direct Ayacut Area, Capacity etc :**

Sl. No	Anicuts	Village	Block	Taluk	District	Direct Ayacut Area in Ha	Capacity
1	Velanoor	Velanoor	Harur	Harur	Dharmapuri	87.04	-
2	Naripalli	Venkatarama puram	Harur	Harur	Dharmapuri	121.46	-

**2. List of System tanks with details of Villages, Block, Taluk, District, Direct Ayacut Area, Capacity etc.**

- Nil

**3. List of Non System tanks with details of Villages, Block, Taluk, District, Direct Ayacut Area, Capacity etc :**

Sl. No	Tank	Village	Block	Taluk	District	Direct Ayacut Area in Ha	Capacity In Mcft.
1	Bairanaickampatti	Bairanaickampatti	Harur	Harur	Dharmapuri	70.85	17.90

**4. List of Supply Channels with details of feeding Tanks :**

Sl.No	Reservoirs/ Anicuts/ Dividing Dams/ Bed Dams/ Off Takes	Supply Channel		Feeding Tanks
		Left	Right	
1	Velanoor	Left	Right	-
2	Naripalli	Left	-	-

**5. Tanks/ Anicuts excluded in IAMWARM Project since works are carried out under various schemes since 2000 including WRCP . } 1 No.**

ABSTRACT ON THE DETAILS OF IRRIGATION INFRASTRUCTURE AVAILABLE AND WORKS TAKEUP UNDER IAMWARM PROJECT

**Name of Sub Basin: Kovilar**

SL. NO	DETAILS	ANICUT			SYSTEM TANK			NON- SYSTEM TANK			ANY OTHER SUPPLY CHANNEL		REMARKS
		NOS	SUPPLY CHANNEL IN KM	DIRECT AYACUT	NOS	SUPPLY CHANNEL IN KM	AYACUT	NOS	SUPPLY CHANNEL IN KM	AYACUT	LENGTH	DIRECT AYACUT	
1	Available Infrastructure in sub basin	2	7.79	208.50	NIL	NIL	NIL	1	1800	70.85	NIL	NIL	
2	Infrastructure excluded in iamwarm project since works carried out under various schemes from 2000	NIL	NIL	NIL	NIL	NIL	NIL	1	1800	70.85	Nil	NIL	Bairanicampatti tank was rehabilitated under Nabard scheme during 2008
3	Infrastructures that does not require any rehabilitation works	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	
4	Works taken up in iamwarm project	2	7.79	208.50	NIL	NIL	NIL	NIL	NIL	NIL	NIL	NIL	

1. Certified that the Panchayat Union Tanks are not considered in this project.
2. Certified that the component of works in tanks which were executed under various schemes (Viz, WRCP I, NABARD, PART II schemes etc.,) since 2000 were not proposed in this project.





## **1.6 REHABILITATION OF IRRIGATION INFRASTRUCTURE**

## **1.6 Rehabilitation of Irrigation Infrastructure**

### **1.6.1 Structural Status & Deficiencies in the System**

#### **1.6 Rehabilitation of Irrigation Infrastructure**

##### **1.6.1 Structural Status & Deficiencies in the System**

The following are the present structural condition of the **Kovilar** sub-basin system.

1. This system is a old system existing for more than 20 Years as such requires Rehabilitation.
2. Heavy accumulation of silt due to hilly region and contour nature of canal system.
3. Lack of adequate control of regulating structures like Anicuts, Sand/ scour vents etc.,
4. The damaged (or) dilapidated condition of the existing anicuts, diversion head works etc. and supply channels causes to poor standard of the entire conveyance system.

#### **Salient Features of Proposals :**

In order to improve the conveyance and Operational Efficiency in Irrigation, it is now proposed to improve and modernize the Irrigation Infrastructures in Kovilar Sub basin.

1. Repairs to the damaged Velanoor Anicut Apron portion.
2. Providing Scour vent shutter in Velanoor Anicut.
3. Trimming the supply channels by earthwork excavation and Bed bar provision in the supply channel.
4. Providing revetments and Retaining walls in selective area of the supply channels and also on U/s of Anicut.
5. Providing Cut & cover in the deepest cutting portion of the supply channel to avoid earth sliding into the channel.
6. Providing Culverts and Cattle crossing whenever necessary places only.

#### **1.6.2 Expected Outcome**

1. Increase in conveyance efficiency by from 53% to 60%
2. The present Gap area of 129.75ha. is to be converted as a fully irrigated area
3. The following irrigation infrastructure development works are proposed in the sub basin.

Rehabilitation works for 2 Anicuts,

Rehabilitation of supply channel for 7790 M

**A. DETAILS OF PROPOSALS IN EACH INFRASTRUCTURES OF THE SUB BASIN:**

Sl.No	Name of tank/Anicut/Reservoir	Bund		Sluice		Weir		Anicut Repairs		Supply Chennai						
		Length	Amt	No	Amt	No	Amt	No	Amt Lakhs	Desilting length	Amount lakhs	Improvement Lining Retaining wall cut and cover etc.,	Amount Lakhs	Culverts across Channel		Amount in lakhs
														No	Amount Lakhs	
1	2	3	4	5	6	7	8	9	10	11	12	13	14	15	16	17
1	Velanoor Anicut	-	-	-	-	-	-	1	1.41	3.23	0.51	0.69km	45.36	3	2.10	49.38
2.	Naripalli Anicut	-	-	-	-	-	-	-	-	4.56	1.63	0.204km	11.94	2	1.25	14.82
	Total	-	-	-	-	-	-	-	<b>1.41</b>	<b>7.79</b>	<b>2.14</b>	<b>0.894km</b>	<b>57.30</b>	<b>5</b>	<b>3.35</b>	<b>64.20</b>

## KOVILAR SUB BASIN

### NAME OF WORK:

REHABILITATION OF VELANOR ANICUT, NARIPALLI  
ANICUT & AND ITS SUPPLY CHANNEL  
IN HARUR TALUK OF DHARMAPURI DISTRICT

### GENERAL ABSTRACT

SI.NO.	Description of Work	Amount in Rs.
1	2	3
1	Velanoor Anicut and its supply channel	
	(a) Left side Irrigation Channel	4551346.00
	(b) Right side Irrigation Channel	143875.00
	(c) Construction of Culvert	161735.00
	(d) Construction of Cattle Crossing	46237.00
	(e) Measuring Device	34914.00
		<b>4938107.00</b>
2	Naripalli Anicut and its supply channel	
	(a) Supply channel	1339890.00
	(b) Road Culvert	125814.00
	(c) Measuring device	16677.00
		<b>1482381.00</b>
	Sub Total	<b>6420488.00</b>
3	Environmental cell	300000.00
	<b>TOTAL</b>	<b>6720488.00</b>

## KOVILAR SUB BASIN

### NAME OF WORK:

REHABILITATION OF VELANOUR ANICUT, NARIPALLI  
ANICUT & ITS SUPPLY CHANNEL  
IN HARUR TALUK OF DHARMAPURI DISTRICT

### B.WRO COST TABLE

Sl.No	Description of Work	Quantity	Amount in Lakhs	Remarks
I	Tank Component	-	-	
II	Non Tank Component			
1.	Improvements to Anicut	1 Nos.	0.67	
2.	Earthwork for Supply Channel	7.79km	5.93	
3.	Improvements to supply channel 5.93 (Retaining wall, Cut and cover etc.,)	-	54.15	
4.	Construction of Culvers	6 Nos	2.94	
5.	Measuring Device	3 Nos	0.51	
	<b>Total</b>		<b>64.20</b>	
6.	Environment cell		3.00	
7.	Ground water		Nil	
	<b>Total</b>		<b>67.20</b>	

1. Tank component = -----  
2. Non-Tank component = 67.20

**Total = 67.20 Lakhs**

## KOVILAR SUB BASIN

### NAME OF WORK:

REHABILITATION OF VELANOR ANICUT, NARIPALLI  
ANICUT & AND ITS SUPPLY CHANNEL  
IN HARUR TALUK OF DHARMAPURI DISTRICT

### PACKAGE DETAIL

#### PACKAGE

Sl. No.	Name of Tank / Anicut	Amount in Lakhs
1	Velanor Anicut	49.03
2	Naripalli Anicut	14.66
3	Measuring Devices – 3 no.s	0.51
	<b>Sub Total</b>	<b>64.20</b>
	Total	<b>64.20</b>

**KOVILAR SUB BASIN  
PACKAGE  
Calculation of machineries Requirement**

**Hydraulic excavator &  
4 Tippers / Lorries**

6 Hours / Day

( 4 No x 2 loads/ hour x 6 Hr x 4 m<sup>3</sup>/ trip)                      192 m<sup>3</sup> /Day

For 1 month ( 20 Working days )    20 x 192 m<sup>3</sup>                      3840 m<sup>3</sup>/ month

Total quantity of earth work                      31712

Working period for earth work                      4 months + 3 Months rainy season

**Machineries required for earth work :**

1. Hydraulic excavator        - 2 nos
2. Tippers / Lorries            - 8 nos
3. Water lorries                - 2 nos

**Mixer machine**        2 m<sup>3</sup> / hour

For 6 hours /  
day

12 m<sup>3</sup> / day

Total quantity of concrete                      2437 m<sup>3</sup>

**Mixer machine required**

**4 Nos** for 10 days / month --5 months

**Material conveyence**

**Tippers /  
Lorries**

Cement                      10 mt / Trip

1 trip / day

10 mt / day

Sand                         5.66 m<sup>3</sup> / Trip

2 trips / day

11.32m<sup>3</sup> /day

Metal / stone            5.60 m<sup>3</sup> / Trip

3 trips / day

16.80 m<sup>3</sup> /day

Total quantity of cement                      389mt

Lorry required for conveyence                      389/10

39 Lorries

Total quantity of sand                      1000 m<sup>3</sup>

Lorry required for conveyence                      1000/11.20

90 Lorries

Total quantity of metal                      572 m<sup>3</sup>

Lorry required for conveyence                      572 /16.80

34 Lorries

Total quantity of stone                      2227 m<sup>3</sup>

Lorry required for conveyence                      2227 /16.80

557 Lorries

**Tipper / Lorries for conveyance  
of materials**

**2 Nos** for 20 days for 8 months

**KOVILAR SUB BASIN - PACKAGE**

**FORM II**

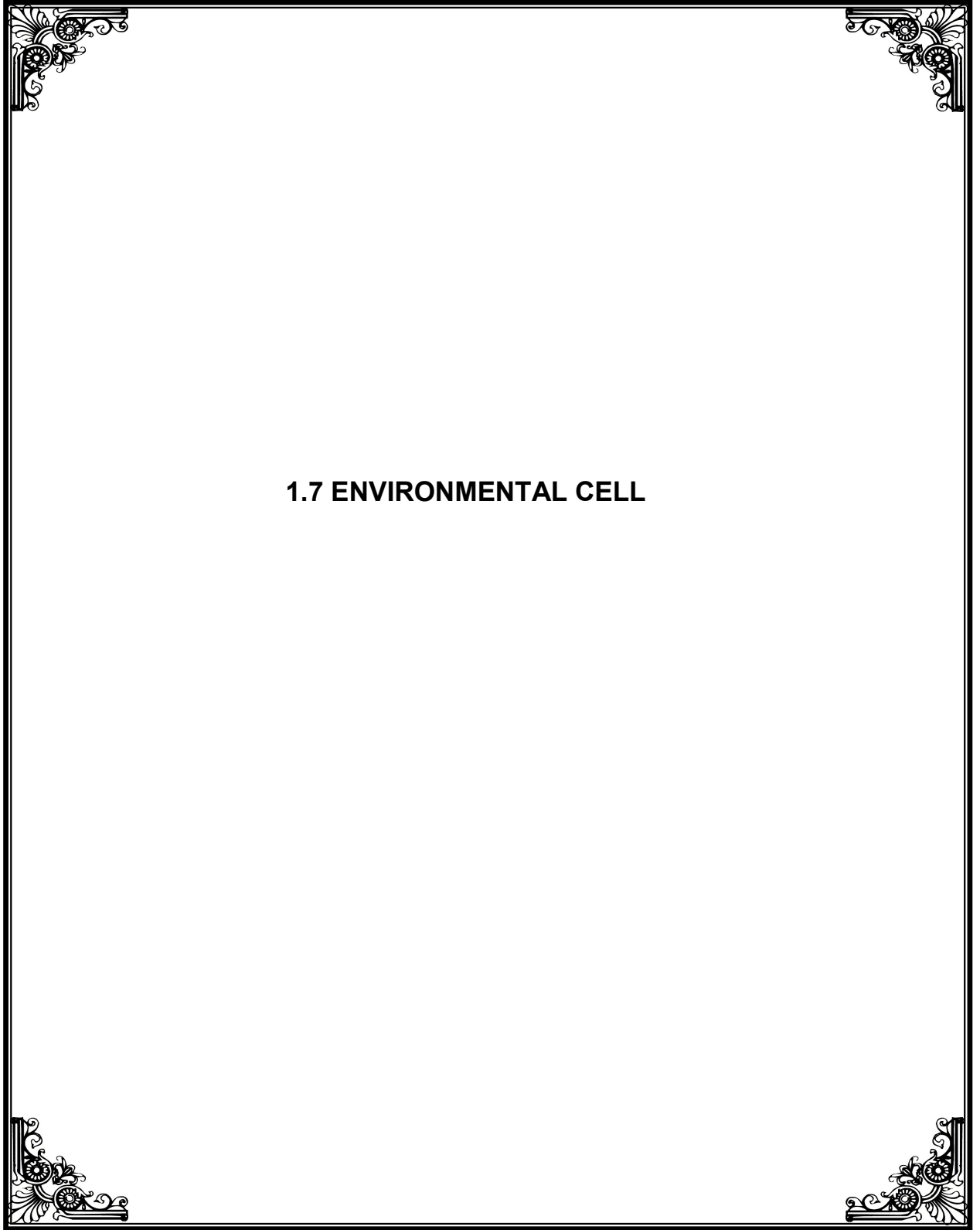
<b>REQUIREMENT OF EQUIPMENTS AND MATERIALS</b>														
PACKAGE NUMBER	EQUIPMENTS REQUIRED IN NUMBERS							MATERIAL REQUIRED						
	HYDRAULIC EXCAVATOR	POWER ROLLER	VIBRATED COMPACTOR	TIPPER / LORRY	WATER LORRY	CONCRETE MIXER MACHINE	CONCRETE VIBRATOR	CEMENT IN M.T.	SAND IN m <sup>3</sup>	STEEL IN M.T.	METAL 40MM IN m <sup>3</sup>	METAL 20MM IN m <sup>3</sup>	RR IN m <sup>3</sup>	FUEL
<b>01/IAMWARM / WRO /KVR /WORKS / III (2009 - 10 )</b>	2	-	-	10	2	4	2	389	1000	14.55	386	186	2227	



**KOVILAR SUB BASIN - PACKAGE**

**Construction Methodology**

SI.NO.	Description of Item	Working Months									Rainy Season			Total
		1	2	3	4	5	6	7	8	9	10	11	12	
1	Scrub Jungle	8500	8500	8830	-	-	-	-	-	-	-	-	-	25850m2
2	Earth work Channel	7000	7500	7500	7350	-	-	-	-	-	-	-	-	29380m3
3	<b>Foundation</b>	-	750	1000	583	-	-	-	-	-	-	-	-	2333m3
4	Concrete M7.5	-	150	200	70	-	-	-	-	-	-	-	-	420m3
5	M10 Grade	-	-	10	10	-	-	-	-	-	-	-	-	20m3
6	Centering	-	-	-	300	302	181	-	-	-	-	-	-	781m2
7	Steel fabrication	-	-	-	55	55	30.00	-	-	-	-	-	-	149.00Qtl
8	RCC M15	-	-	-	70	70	43.65	-	-	-	-	-	-	182.65m3
9	RR masonry	-	-	-	-	-	-	400	400	213	-	-	-	1013.m3
10	Plastering	-	-	-	-	-	-	-	390	390	-	-	-	780m2
11	Pointing	-	-	-	-	-	-	-	400	400	-	-	-	800m2



**1.7 ENVIRONMENTAL CELL**

Report to accompany the estimate for the work of Environmental Component in Detailed Project Report for KOVILAR SUB BASIN of Pennaiyar River Basin” under TN – IAMWARM PROJECT

**Estimate Amount: Rs 3.00 Lakhs**

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 Tamil Nadu. Soil Assessment study has been conducted by **Environment Protection Training and Research Institute (EPTRI), Hyderabad**. This institute has identified the Environmental issues, mitigatory measures and given their recommendations on the following issues.

- Environmental Issues:
- Soil Erosion, Sand Mining
  - Water Pollution due to Industries
  - Encroachment of river and tank beds
  - Poor solid waste management
- ii) Social Issues:
- Dry Land Agriculture
  - Reduction in Livestock
  - Women empowerment-SHG's
  - No storing facilities.
  - Health problems due to industrial water Pollution
- iii) Mitigatory Measures:
- Non-judicial and excessive sand mining have to be controlled and regulated.
  - Livestock services delivery and Management
  - Common storage facilities may be established
- iv) Agency:
- The above measures can be improved By the combined working of Environmental Cell wing and Animal Husbandry Department.

The Environmental Cell of WRO assessed the Environmental impact on the quality of Surface and Ground water and Soil by collecting water & soil samples

and testing them, preparation of Micro level Environmental Status Reports for all the River basins with the World Bank assistance for these works up to March 2004.

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

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 Environmental issues pertaining to that area and remedial action to overcome the problems is must. Accordingly, Environmental issues prevailing in the Kovilar Sub basin is taken up under IAMWARM Project.

### **PENNAIYAR RIVER**

Pennaiyar River originates on the South Eastern slope of Chinnakesava Hills in Karnataka State. The river is called Dakshina Pinakini in Karnataka. The river enters into Tamil Nadu at Sakkarasam palli near Bagalur village of Hosur taluk. The total length of river is 432 Km and out of which 112 Km length of river is in Karnataka State and 320 Km is in Tamil Nadu, it confluences in Bay of Bengal at Cuddalore.

### **KOVILAR SUB-BASIN**

The Kottappatti kallar/Kovilar is one of the major tributary to the Pennaiyar. There are 3 anicuts and one Tank involved in the Kovilar Sub basin. Kovilar starts from Kottapatti and Theerthamalai Hills, having one tributary of Kallar originating from Kalvarayan hills. There is a seasonal flow in the river during monsoon seasons. The maximum discharge of this river, so far measured near confluence point to Pennaiyar is 27000 C/S. The Kovilar Sub basin area is 454 sq.km. The taluk covered in the Sub basin is Harur Taluk of Dharmapuri District. Kallar and Kovilar are worth mentioning tributaries of Pennaiyar River.

During 1957 (Year) one reservoir namely Sathanur Reservoir was constructed across the Pennaiyar River. Finally, Pennaiyar River confluences with Bay of Bengal near Cuddalore.

The Kovilar Sub Basin has a typical climate, owing to the marginal catchments area in the Kalvarayan, Kottapatti and Theerthamalai hills. This Sub Basin enjoys the benefits of mostly North East monsoon and South West Monsoon.

### **ENVIRONMENTAL PROBLEMS:**

#### **SOIL EROSION:**

Soil erosion causes depletion of fertility through removal of valuable surface soil and lead to reduction in the effective arable soil depth and hence it is one of limiting factors for crop production.

#### **SAND MINING:**

One of the major problem in river basin related to Sand Mining as it poses major threat to River Bed. Sand quarrying for construction and other purposes is growing at an alarming rate which causes failure of Anicuts and Diversion structures, stagnation of water in the deep mined river bed causing consequent health hazards. This needs to be prevented by all means. Now the sand mining has come under the control of WRO. Sand is being collected only at the approved site and the Regular Territorial Division is closely monitoring.

#### **INDUTRIAL POLLUTION:**

The effluent from industries located in this sub basin are let into ditches ,lands and water drains which ultimately reach the River or supply channels of tanks or lands. Special attention is needed for treating the effluent to avoid water pollution in the sub basin.

#### **SOLID WASTE DISPOSAL:**

The problem of Garbage collection and its disposal has assumed importance, in the context of rapid growth of population, urbanization, industrial growth and development. There is no organized scientific method of disposal in all the Municipalities and Panchayats in this sub basin.

#### **AQUATIC WEEDS :**

It is observed from the field officers in this basin area that the Aquatic weeds growth Ipomoea locally known as Kadal Palai is found to be in almost 80% of the tanks. According to the officials in the sub basin, the plant growth varies from 40% to 80% in various tanks. In general weeds growth restricts the water storage and loss in capacity of the tanks.

## **SEWAGE DISPOSAL LET INTO WATER BODIES:**

Almost all the village has no safe disposal of sewage or proper treatment method is adopted. This affect the near by water source directly or affecting the ground water potential indirectly.

So, creating awareness among the Presidents of the local bodies is essential and to motivate them to adapt Solid waste management and Sewage management, wherever required, Workshop including field visits, exclusively for them is to be conducted under the IAMWARM project.

## **ACTIVITIES PROPOSED:**

### **River Basin Monitoring:-**

To monitor the quality of water and soil and create database regarding the environmental status for the sub basin, the following activities are proposed at the sub basin level.

### **Collection and testing of water and soil samples:**

Water samples will be collected and tested in the sub basin at identified sampling points regularly. 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 for a period of **Three 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 from tanks and near by wells to estimate the level of pollution in selected locations, 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 numbers of samples at regular 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.

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.

**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 disposal 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 be 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.

**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. So far, no awareness Programs were conducted in this sub basin.

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 three years covering the following subjects in addition to placing Stickers, Tin sheets and Pamphlets 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.

**Mode of Execution:**

All the works proposed are to be carried out by outsourcing through an Educational Institute.

**Total Cost.**

The total Proposal cost works out to **Rs.3.00 Lakhs.**  
**(Rupees Three Lakhs Only).**

PWD / WRO  
 PLAN FORMULATION WING  
 ENVIRONMENTAL CELL DIVISION, CHENNAI  
**IAMWARM PROJECT**  
 (ENVIRONMENTAL COMPONENT )

Name of River Basin	<b>Pennaiyar River Basin</b>	
Name of Sub Basin	<b>Kovilar Sub-Basin</b>	
Number of WUA	yet to be formed: 3 Nos.	
Name of Division	Upper Pennaiyar Basin Division, Dharmapuri	
	Upper Pennaiyar Basin Sub-Division, Harur	
District	Dharmapuri	
Taluk Block	Harur	
Name of Tanks / Anaicuts under this sub-basin	List enclosed	
Domestic Sewage (Name of River/ Tank with specific location polluted by Domestic sewage)	Sewage generated are disposed in land & tanks in Dharmapuri Distict	
Municipal Solid Waste (Name of River/ Tank with specific location where Municipal solid waste is dumped)	Solid waste generated are disposed in land & tanks in Dharmapuri Distict which may cause ground water pollution.	
<b>Water Quality Status:</b>		
i) Ground Water	Ground water is Moderate to good.	
ii) Surface Water	Water can be utilized for irrugation purpose, however it need treatment before using drinking purpose.	



### DETAILED ESTIMATE

SI No	Description of work	No	Measurement			Contents
			L	B	D	
<b>I. Environmental Social Monitoring of river basin including peroidal water and soil quality testing and documentation. (By fixing nodel agency or any educational institution)</b>						
1	Collection and testing of water samples and Soil samples					
i)	Water samples collected from river & tanks for a period of <b>Three years</b>					3 Nos
ii)	Soil samples collected from irrigation fields for a period of <b>Three years</b>					1 Nos
iii)	Hiring jeep driver for the department vehicle	1 No	1 months			1
iv)	Collection and conveyance charges including all purchases like cans, bottles,chemicals etc					LS
<b>II Environmental Social knowledge base analysis and development (By fixing nodel agency or any educational institution)</b>						
	Preparation of Impact Assessment report with expert analysis for 3 yrs @ every 6 months and documentation for					
a)	Impacts due to project investment.	LS				LS
b)	Other impacts observed in the river basin.	LS				LS
<b>III. Transfer of technical know how for solid waste management system including source segregation, recycle of dry waste and linkage with user agencies. (By fixing nodel agency or any educational institution)</b>						
a)	Motivating the local bodies for Soild waste management project and Sewage treatment plants to prevent pollution of water sources and using for irrigation by transferring technical know how through demonstration Documentary film and Technical visit including herbal garden.	LS				LS

b)	Promoting Entrepreneurship Policy for Eradication for weeds by setting up Bio gas Plant / Vermi compost By WUA through Awareness creation, Demonstration and consultative meeting and pilot study.	LS				LS
<b>IV.</b>	<b>Conducting Environmental and social Awareness meeting, programme, demonstration and Exhibitions on various environmental and social related issues including capacity building.(By fixing nodel agency or any educational institution)</b>					
a)	Printing Stickers, Pamphlets, Tin sheets, Providing Banners for Propagating Environmental Awareness among public	LS				LS
b)	Conducting meetings in school/Institutions	1 x 1				1 No
c)	Preparing and publishing Environmental Atlas for the Sub Basin for the use of Line departments / Institutions for better Management of Sub basin					LS
d)	Documentation of the entire activities, Videofilms,hire purchase of LCD,Preparation of sub-basin maps of all size & Upgradation of computer and accessories.	LS				LS
e)	Exposure to field visit and Eco-friendly practices and environmental monitoring.	LS				LS

**ABSTRACT ESTIMATE**

S.No	Qty	Description of Work	Rate	Per	Amount
<b>I. Environmental Social Monitoring of river basin including peroidal water and soil quality testing and documentation. (By fixing nodel agency or any educational institution)</b>					
a)	3 Nos	Testing charges for Water samples	6441	Each	19323
b)	1 Nos	Testing charges for soil samples from polluted site	10964	Each	10964
c)	1 months	Hiring Jeep driver on service contract basis for the Dept Vehicle@ RS 151.80 /day	152	/day	3947
d)	LS	Collection and conveyance charges including all purchases like cans, bottles,chemicals,Documentation of test results including labour charges.	LS		3446
<b>II Environmental Social knowledge base analysis and development (By fixing nodel agency or any educational institution)</b>					
a)		Preparation of Impact Assessment report with expert analysis for 3 yrs @ every 6 months and documentation for			
	LS	Impacts due to project investment.	LS		60000
	LS	Other impacts observed in the river basin.	LS		15000
<b>III. Transfer of technical know how for solid waste management system including source segregation, recycle of dry waste and linkage with user agencies. (By fixing nodel agency any educational institution)</b>					
a)	L.S.	Motivating the local bodies for Soild waste management project and Sewage treatment plants to prevent pollution of water sources and using for irrigation by transferring technical know how through demonstration Documentary film and Technical visit including herbal garden.	LS		30000

b)	L.S.	Promoting Entrepreneurship Policy for Eradication for weeds by setting up Bio gas Plant / Vermi compost By WUA through Awareness creation, Demonstration and consultative meeting and pilot study.	LS		30000
<b>IV.</b>	<b>Conducting Environmental and social Awareness meeting, programme, demonstration and Exhibitions on various environmental and social related issues including capacity building. (By fixing nodel agency)</b>				
a)	LS	Printing Stickers, Pamphlets, Tin sheets, Providing Banners for Propagating Environmental Awareness among public	LS		2500
b)	1	No	Conducting meetings in school/Institutions	20000	20000
c)	LS	Preparing and publishing Environmental Atlas for the Sub Basin for the use of Line departments / Institutions for better Management of Sub basin	LS		50000
d)	LS	Documentation of the entire activities, Videofilms, hire purchase of LCD, Preparation of sub-basin maps of all size & Upgradation of computer and accessories.	LS		4820
e)	LS	Exposure to field visit and Eco-friendly practices and environmental monitoring.	LS		50000
	<b>Total</b>				<b>300000</b>

## Working Sheet

### Water Samples

1	Testing Charges rate as per ground water division (Dept) (Partly)	650.00	/Sample
2	Testing Charges rate as per SGS Laboratory (private) (Total Coliform, Faecal Coliform, Pesticides Residual) (Partly)	5250.00	/Sample
3	Service Charges @ 10.30 %	540.75	
	<b>TOTAL</b>	6440.75	(or)
		<b>6441</b>	

### Soil Samples

1	Testing Charges rate as per SM & R Division (Dept) (Partly)	6000	/Sample
2	Testing Charges rate as per SGS Laboratory (private) ( Pesticides Residual) (Partly)	4500	/Sample
	Service Charges @ 10.3 %	463.50	
	<b>TOTAL</b>	10963.5	(or)
		<b>10964</b>	

**Water Supply, Sewage and Solid Waste Generation**

Local Body	Population 2001	Designed Capacity of Protected Water Supply ( Lakh Litre)	Total Estimated water Consumption (Lakh Litre)	Estimated Sewage generation (Lakh Litre)	Solid Waste Management (Tonnes)	
					Generation	Collection
<b>A..Municipalities</b>						
Dharmapuri	66696	19.00	31.68	22.18	45	38.0
<b>B.Town Panchayat</b>						
Harur	21523	7.0	7.5	5.4	3.5	3.4
<b>Grand Total</b>	<b>88219</b>	<b>26</b>	<b>39.2</b>	<b>27.6</b>	<b>48.5</b>	<b>41.4</b>

**Status of Sewerage condition**

Town	Population 2001	Estimated Sewerage generation in Lakh litre	Existance of Sewerage under ground	No Treatment	Nature of Disposal & Quantity in Lakh litre		
					Water Body		
					River	Reservoir	Land
<b>A.Municipalities</b>							
Dharmapuri	66696	22.18		yes	22		
<b>B.Town Panchayat</b>							
Harur	21523	5.4		yes	5.4		



**1.8 GROUND WATER**

## **1.8 Ground Water**

### **1.8.1 Ground Water Scenario**

In present scenario of water crises, artificial recharge of Ground Water becomes an essential phenomenon to meet out the water scarcity due to ever increasing demand on water.

Artificial recharge is a method to augment the natural infiltration of precipitation or surface water into under ground formation by some method of construction, spreading of water and injecting surface water into ground formation through dug well / bore well.

When the amount of average annual ground water extraction is more than the annual ground water recharges artificial recharge is required to balance the overdraft. Krishnagiri is one of the drought prone districts in Tamil Nadu. In Pennaiyar upto Krishnagiri Reservoir Basin area in Krishnagiri district annual rainfall is 810 mm. Due to frequent failure of monsoon or delay in monsoon setting agricultural activity has to depend on ground water to major extent. Hence we have to recharge the replenishable ground water resources whenever and wherever possible.

### **1.8.2 Geology:**

Area is covered by Granitoid Gneiss Hornblende Biotite Gneiss Magmatite and Granite. In this, major area is covered by Granitoid Gneiss rocks of Achaean age. Top soil is followed by kankar, weathered rock, fractured rock and fresh rock of variegated gneissic rocks and Charnockite. Middle portion of the project area is covered by black cotton soil, red soil and kankar soil.

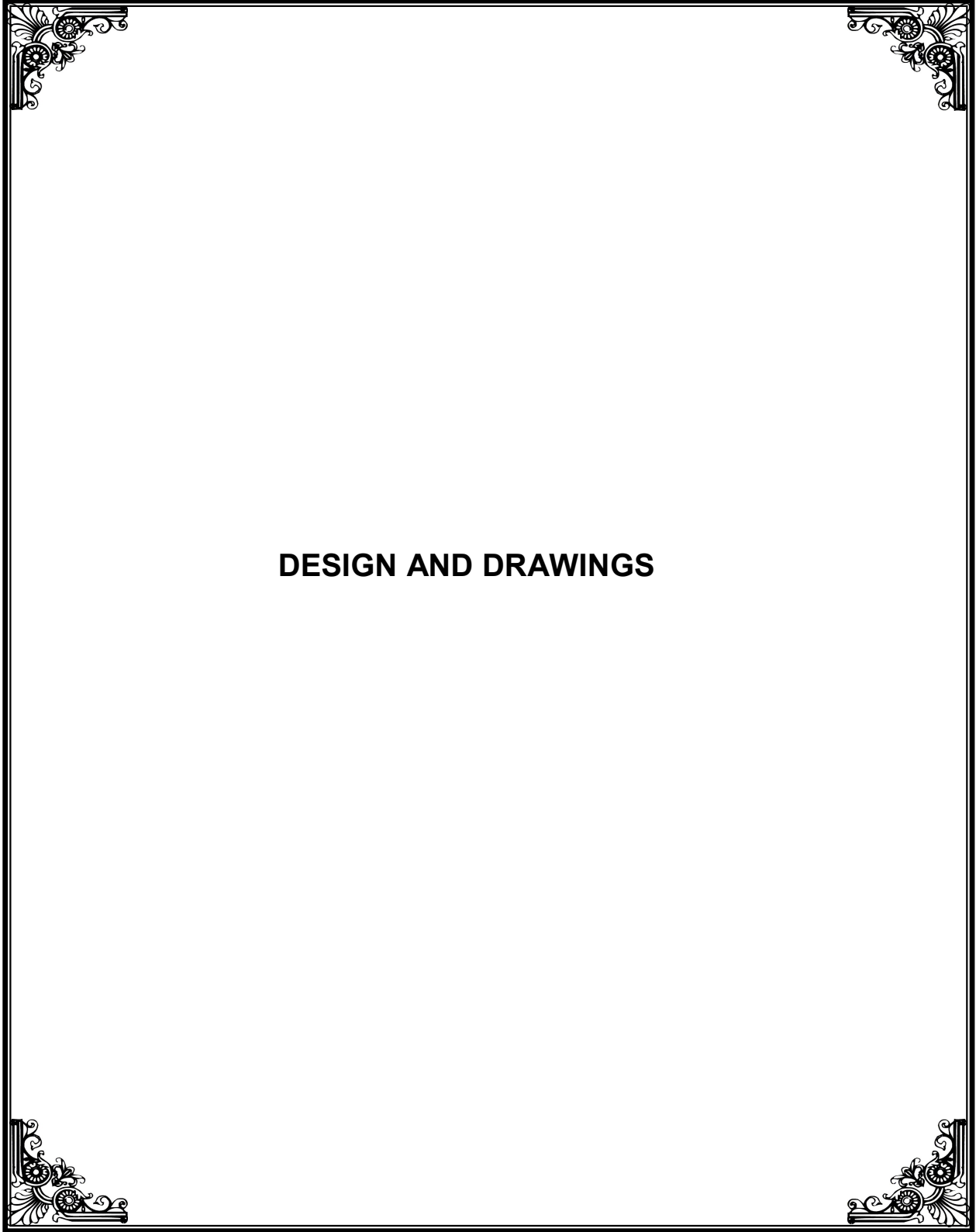
### **1.8.3 Quality:**

In the upper and middle part of the Pennaiyar Basin upto Krishnagiri sub basin quality of ground water is moderate to good. In lower Pennaiyar basin upto Krishnagiri Sub basin area it is moderate to poor.

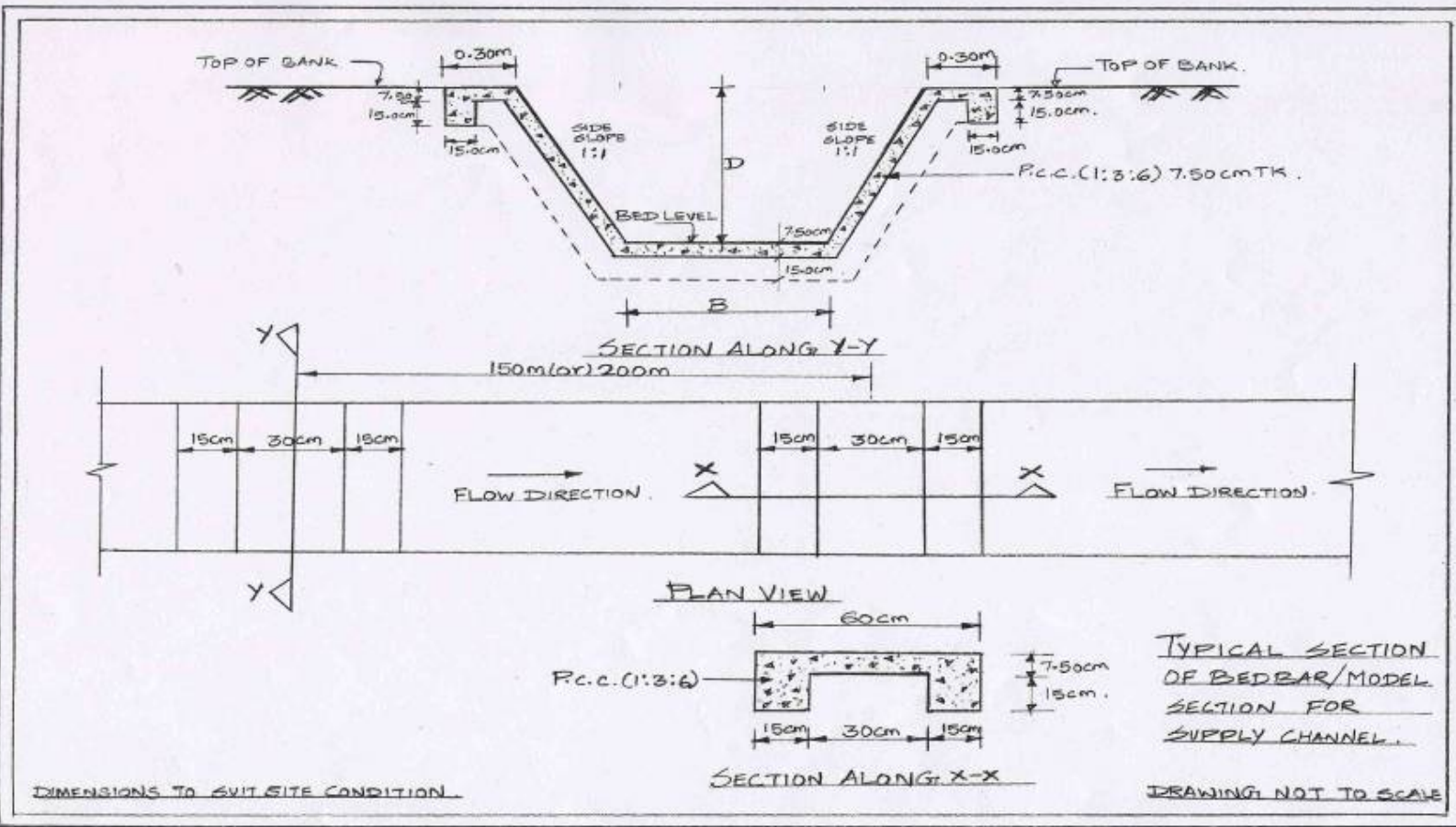
### **1.8.4 Conclusion**

This Pennaiyar upto Krishnagiri Reservoir sub basin comes under semi critical region. This sub basin is located in hilly terrain and also having two reservoirs. Hence no proposal is made under "IAMWARM" Project.



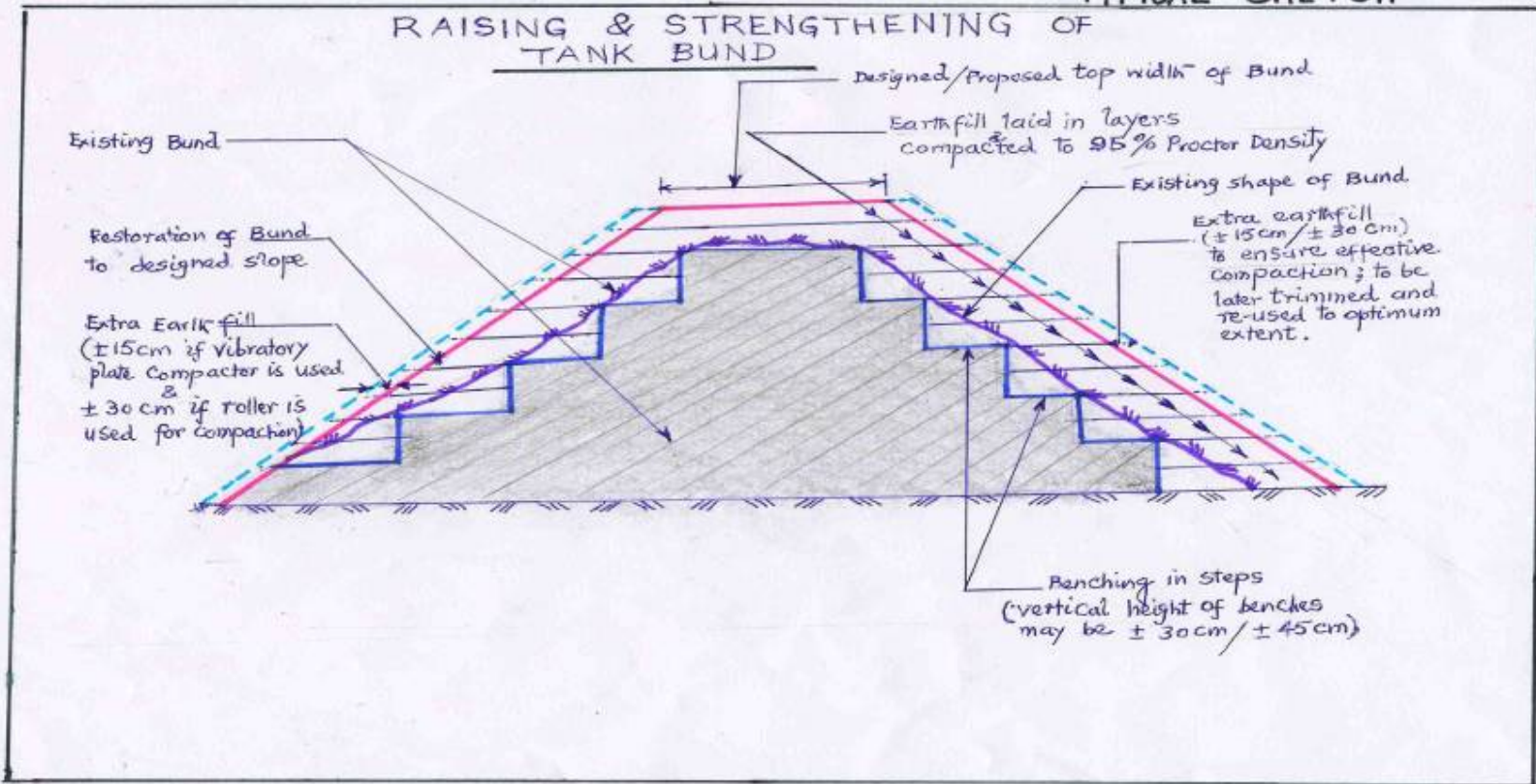


**DESIGN AND DRAWINGS**



# TYPICAL SKETCH

## RAISING & STRENGTHENING OF TANK BUND



Designed/Proposed top width of Bund

Earthfill laid in layers compacted to 95% Proctor Density

Existing shape of Bund

Extra earthfill (± 15cm / ± 30cm) to ensure effective compaction; to be later trimmed and re-used to optimum extent.

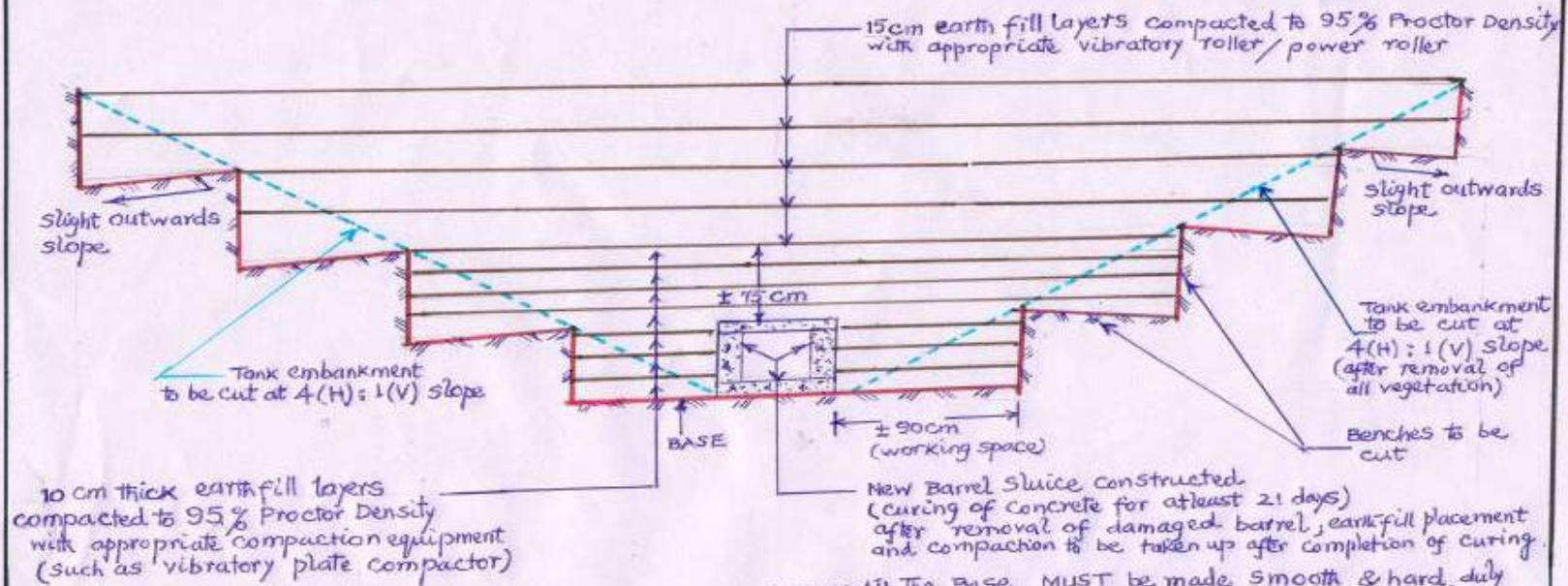
Existing Bund

Restoration of Bund to designed slope

Extra Earth fill (± 15cm if Vibratory plate Compactor is used & ± 30 cm if roller is used for compaction)

Benching in steps (vertical height of benches may be ± 30cm / ± 45cm)

## TYPICAL SKETCH



### RECONSTRUCTION OF SLUICES

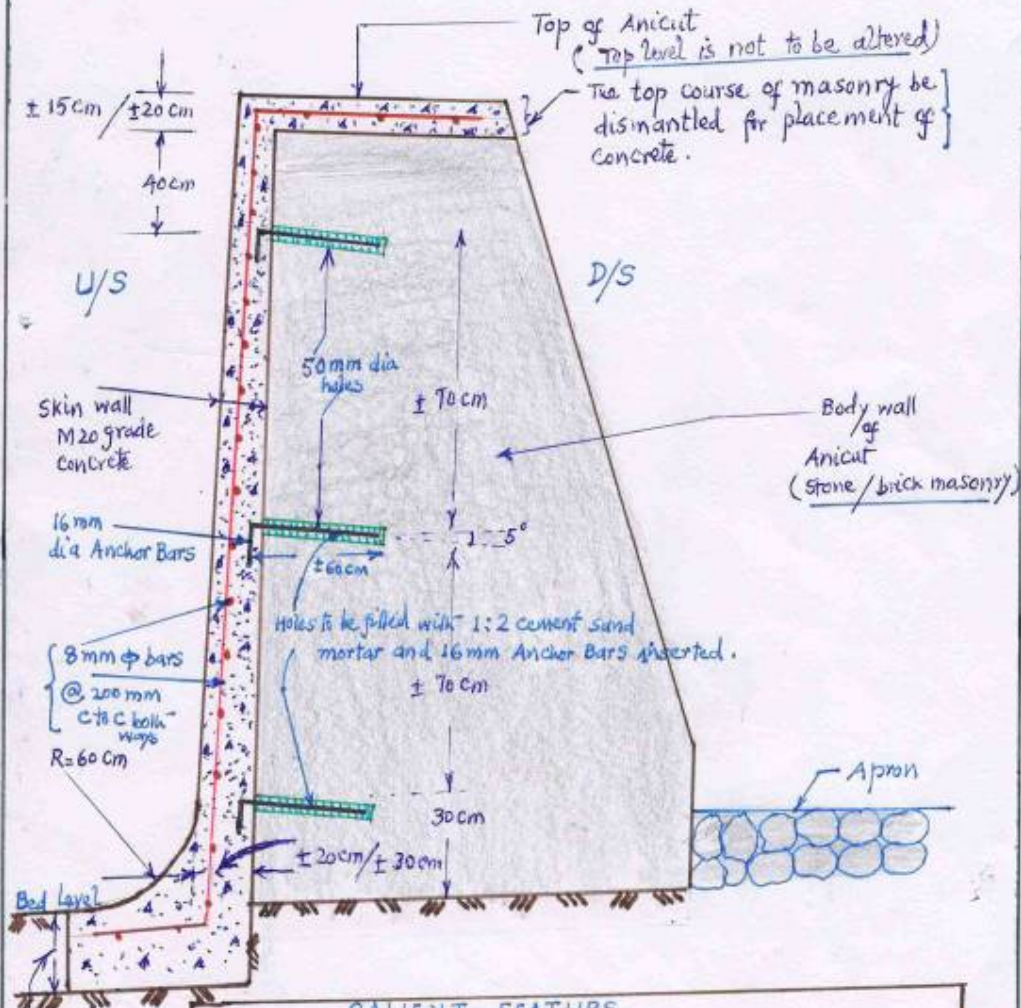
#### NOTES

- (i) The Base MUST be made smooth & hard, duly compacted with compactors/pneumatic tampers.
- (ii) Earth fill compaction adjoining the Barrel and Benches should be compacted by mechanical/pneumatic tampers to ensure effective compaction.
- (iii) Earth obtained from "benching" be reused (after removal of clods (bigger than 7.5 cm), vegetation etc) in earth fill layers.



## TYPICAL SKETCH

### Rehabilitation of Anicut through SKIN WALL Concrete



#### SALIENT FEATURES

- Joints on U/S surface to be taken to 25 mm depth & surface roughened by chipping;
- Drill holes of 50 mm to be filled with 1:2 mortar and 16 mm Anchor Bars to be pushed in. The roughened surface to be kept wet for 72 hours and cement slurry (1:2.5) of 0.70 water-cement ratio be applied over the surface prior to placement of skin concrete.
- Concrete of M20 Grade is to be used with 20 mm maximum aggregate size.
- Curing is to be done for 21 days.
  - Thickness of skin concrete: 15 cm at top & 20 cm at bottom for Anicuts of height upto ± 1.50 m and 20 cm at top & 30 cm at bottom for Anicuts of height more than ± 1.50 m.