FINAL WRITING ASSIGNMENT.

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PARAMBIKULAM

Distance Learning Course in Hydrology: Basic Hydrologic Sciences for the Asian Region (2017)

OPTION:A

WATER MANAGEMENT IN PARAMBIKULAM ALIYAR PROJECT.

CONTENT

INTRODUCTION:

Highly imaginative in concept, bold in its approach, ingenious in planning and beneficial on its completion. This interstate multipurpose, multi valley PAP is truly unique one. It successfully accomplishes the **diversion and integration of 8 west flowing rivers,** 6 in Anamalai Hills and 2 in the plains for the benefit of the drought prone areas in Coimbatore and Erode district of Tami l Nadu state and stabilizing the existing irrigation system in Chitoorpuzha of Kerala state.

ADDRESSING PAP

The PAP project is an outcome of hard and sustained work done by band of enthusiastic engineers of Tamil Nadu. This is situated in Anamalai range, among its flora and fauna and on the arid and semi -arid plains of the southern taluks of Coimbatore district. All the river has its source in the Anamalais range,is served by the SW monsoon. The major portion of Dams and tunnels are located in the scenic and scene surrounding of the Anamalais range and the reservoirs are located amongst picturesque and natural surroundings in the reserved forest areas and tea estates.

WHAT IS PAP?

The Parambikulam Aliyar takes its name after the two important river 1) Parambikulam representing the series of river on the west.2) Aliyar representing the east of western ghats. The reservoirs lie at various elevations ranging between +3800 feet and 1050feet and this difference of elevation has made it possible to utilize the drop between them for development of hydroelectric power.

UNIQUENESS OF PAP:

1.Upper Nirar weir is the first work done in the highest elevation in Tamil Nadu

2 .Parambikulam, Thunacadavu and Peruvaripallam are the dams located in Kerala state, which are constructed, maintained and operated by Tamil Nadu.

3. Thunacadavu and Peruvaripallam are the first balancing reservoirs in Tamil Nadu.

4. This contour canal is unique of its in the whole of south India. It passes through four major tunnels.

5.**It is a symbol of Inter-state cooperation-Pundit Jawaharlal Nehru.**

RESPONSIBILITIES OF OUR OFFICE:

1.LOVE.

L Listening to the demand of farmers of Tamil Nadu and demand of Kerala.

O Observing Hydrological data, such as Rainfall, yield of dams, inflows and outflows of dams, storage of dams.

V Verifyimg the Supply versus Demand by calculating Hydrology, observed data with past data, 75% and 100% dependability yield will be verified with Present scenario, verifying the conditions of all Power houses, Agreement…

E Educating the farmers to use water effectively.

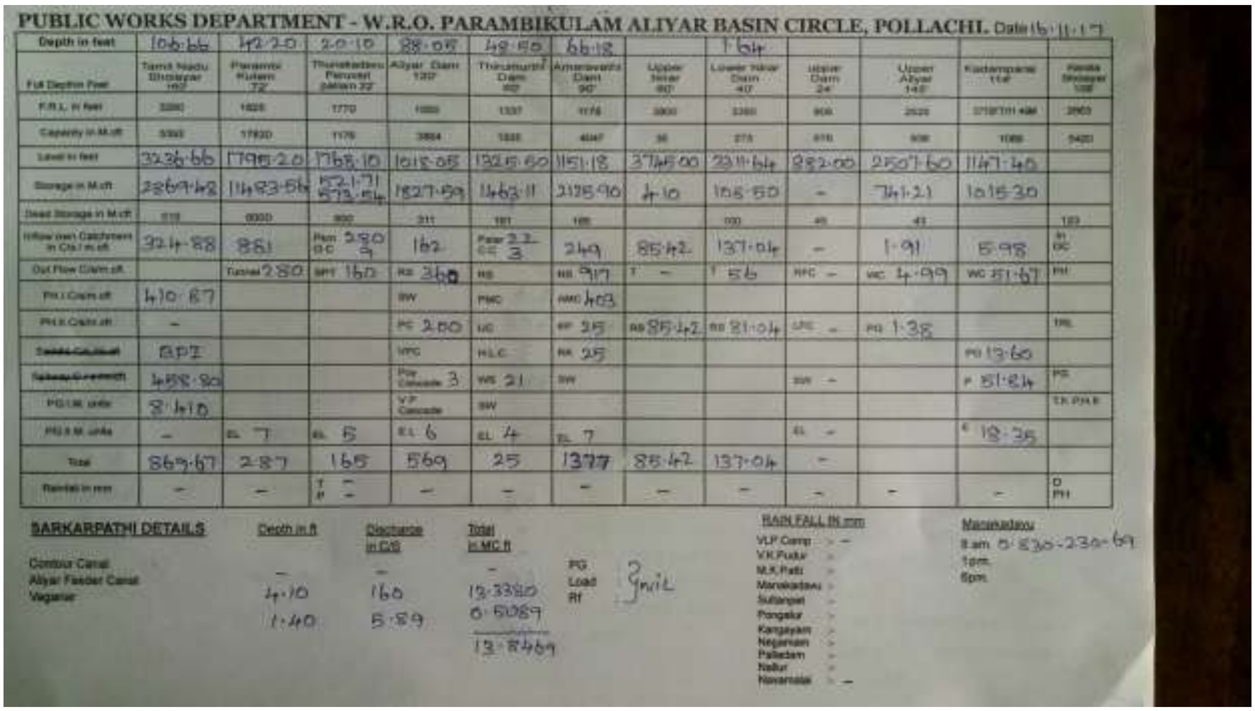
Listening the Demand of Farmers and Demand of Kerala.

One month prior to the commencement of each irrigation season demands of farmers and Kerala state will be discussed with farmers. JWRB (Joint Water Regulation Board) conducted in which Kerala's demand will be discussed.

Observing the Hydrological data.

Daily rainfall in 'mm' is collected in 11 stations by PAP, whenever necessary rainfall data's of required places will be collected from Agriculture Department, Meteorological Department, as well as from Taluk offices.

Yield of PAP reservoirs are observed daily by rise and fall method in all the eight dams. Storage, Inflows and outflows are also collected from the persons appointed to observe. The observed data will be tabulated and communicated as follows.



PUBLIC WORKS DEPARTMENT - W.R.O. PARAMBIKULAM ALIYAR BASIN CIRCLE, POLLACHI. Date 16·11·17

Depth in feet	106·66	42·20	20·10	88·05	49·50	66·18		1·64				
Full Depth Feet	Tamil Nadu Sholayar 160'	Parambikulam 72'	Thunakadavu Peruvaripallam 22'	Aliyar Dam 120'	Thirumurthi Dam 60'	Amaravathi Dam 90'	Upper Nirar 80'	Lower Nirar Dam 40'	Upper Dam 24'	Upper Aliyar 140'	Kadamparai 114'	Kerala Sholayar 108'
F.R.L. in feet	[illegible]	[illegible]	1770	[illegible]	1337	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Capacity in M.cft	[illegible]	17820	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]	[illegible]
Level in feet	3236·66	1798·20	1768·10	1018·05	1326·60	1151·18	3745·00	2311·64	882·00	2507·60	1147·40	
Storage in M.cft	2269·42	11493·56	521·71 573·54	1827·59	1463·11	2125·90	4·10	105·50	–	741·21	1015·30	
Dead Storage in M.cft	[illegible]	[illegible]	[illegible]	311	[illegible]	[illegible]		[illegible]	[illegible]	[illegible]		[illegible]
Inflow own Catchment in Cfs / m.cft	324·88	881	Pam 280 OC 9	162	Pasr 22 CC 3	249	85·42	137·04	–	1·91	5·98	
Out Flow Cfs/m.cft		Tunnel 280	SPT 160	RS 360	RS	RS 917	T –	T 56	NFC –	WC 4·99	WC 151·67	PH
PH I Cfs/m.cft	410·87			SW	PMC	AMC 403						
PH II Cfs/m.cft	–			PC 200	UC	RP 25	RS 85·42	RS 21·04	UPC –	PH 1·38		
[illegible]	BPT			VPC	HLC	RR 25					PH 13·60	
[illegible]	458·80			Pvr Cascade 3	WS 21	SW			SW –		P 51·84	PS
PG I M. units	8·410			VP Cascade	SW							T.K.P.H.E
PG II M. units	–	EL 7	EL 5	EL 6	EL 4	EL 7			EL –		E 18·35	
Total	869·67	287	165	569	25	1377	85·42	137·04	–			
Rainfall in mm	–	–	T – P –	–	–	–	–	–	–	–	–	D PH

SARKARPATHI DETAILS

	Depth in ft	Discharge in C/S	Total in MC ft
Contour Canal	–	–	–
Aliyar Feeder Canal	4·10	160	13·3380
Vaganar	1·40	5·89	0·5089
			13·8469

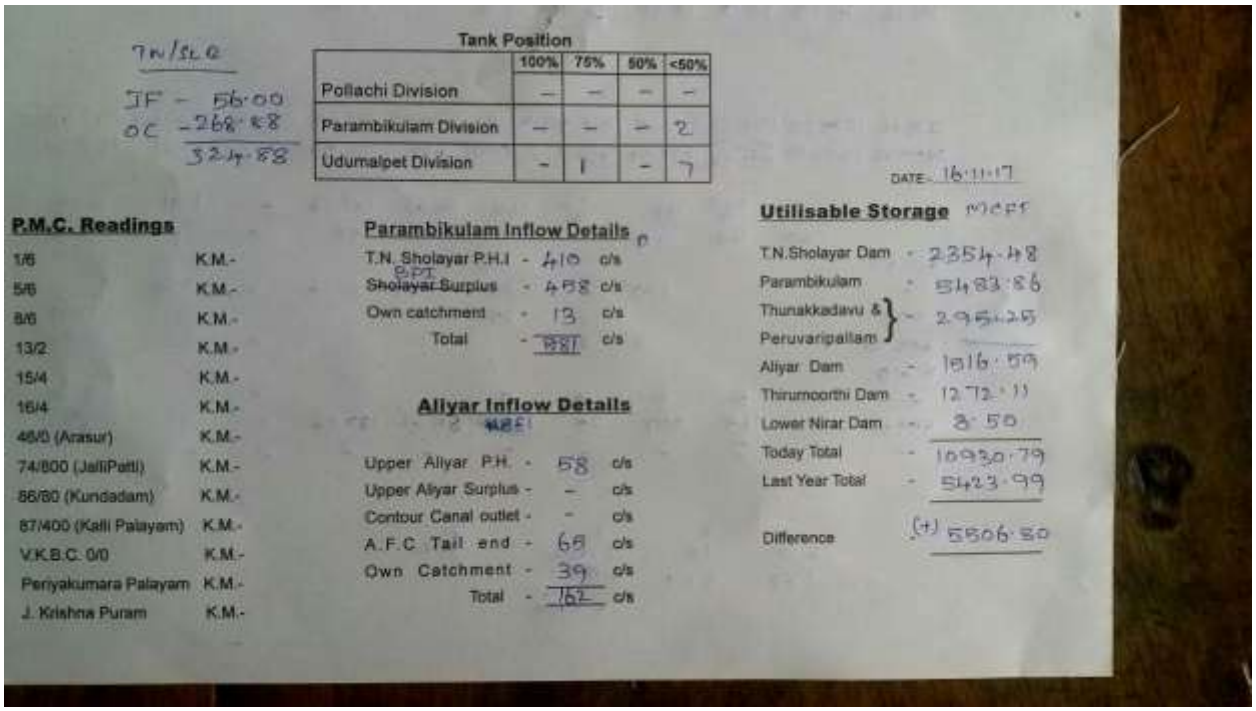
PG Load Rf – Nil

RAIN FALL IN mm

VLP Camp – –
V.K.Pudur –
M.K.Patti –
Manakadavu –
Sultanpet –
Pongalur –
Kangayam –
Negamam –
Palladam –
Nallur –
Navamalai – –

Manakadavu

8 am 5·830-230-69
1pm
6pm



TN/SLO

JF - 56.00
OC - 268.88
324.88

Tank Position

	100%	75%	50%	<50%
Pollachi Division	–	–	–	–
Parambikulam Division	–	–	–	2
Udumalpet Division	–	1	–	7

DATE 16.11.17

P.M.C. Readings

1/6	K.M.-
5/6	K.M.-
8/6	K.M.-
13/2	K.M.-
15/4	K.M.-
16/4	K.M.-
46/0 (Arasur)	K.M.-
74/800 (JalliPatti)	K.M.-
86/80 (Kundadam)	K.M.-
87/400 (Kalli Palayam)	K.M.-
V.K.B.C. 0/0	K.M.-
Periyakumara Palayam	K.M.-
J. Krishna Puram	K.M.-

Parambikulam Inflow Details

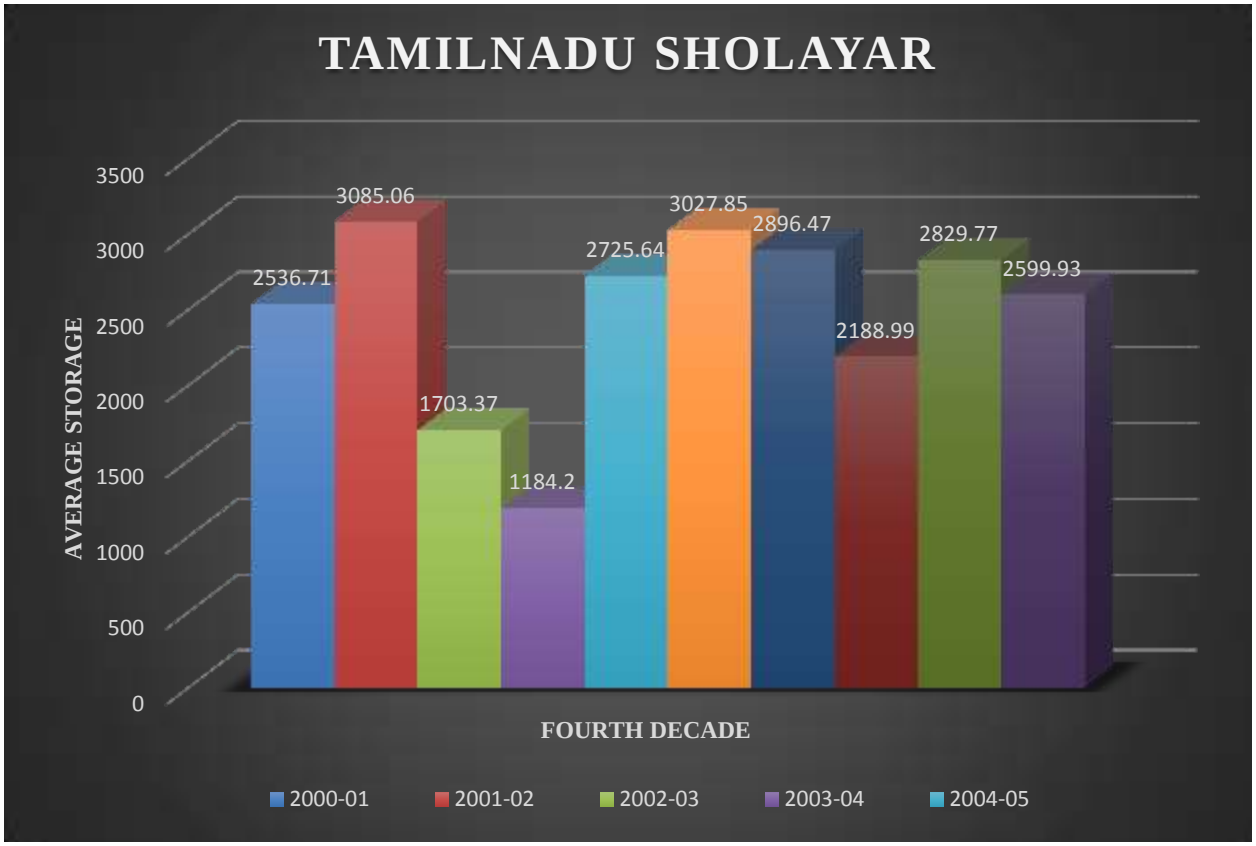
T.N. Sholayar P.H.I	410	c/s
Sholayar Surplus	458	c/s
Own catchment	13	c/s
Total	881	c/s

Aliyar Inflow Details

Upper Aliyar P.H.	58	c/s
Upper Aliyar Surplus	–	c/s
Contour Canal outlet	–	c/s
A.F.C. Tail end	66	c/s
Own Catchment	39	c/s
Total	162	c/s

Utilisable Storage MCFT

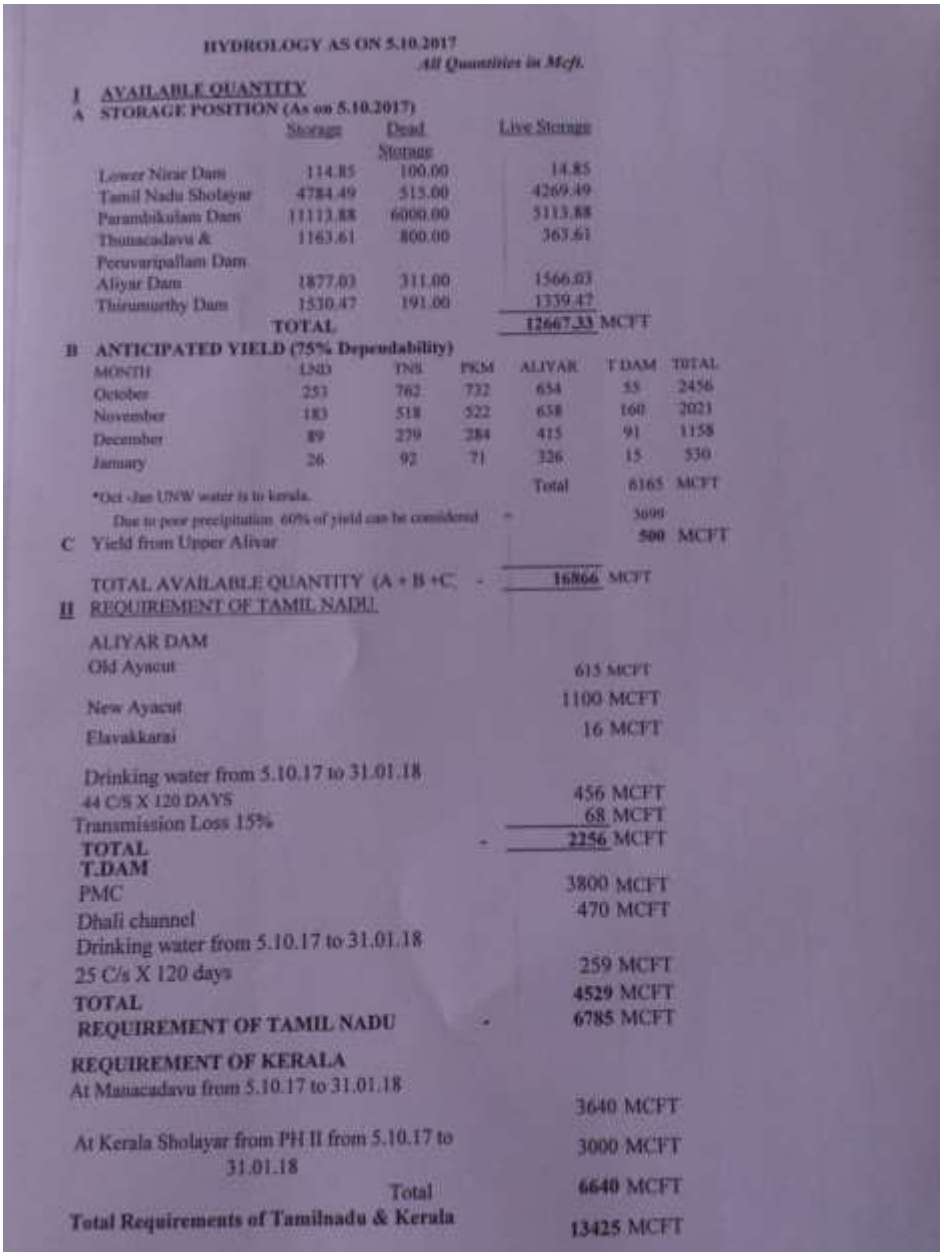
T.N.Sholayar Dam	2354.48
Parambikulam	5483.86
Thunakkadavu & Peruvaripallam	295.25
Aliyar Dam	1816.59
Thirumoorthi Dam	1272.11
Lower Nirar Dam	8.50
Today Total	10930.79
Last Year Total	5423.99
Difference	(+) 5506.80



Likewise storage of all dams are compared with past data to arrive decision.
Reference: https://www.meted.ucar.edu/hydro/basic_int/runoff/navmenu.php

Verifying Supply Vs Demand

In order to meet out the demand, the storage position of PAP reservoirs, anticipated yield (75% dependable yield) are calculated and the demand will be worked out for every sub basin and decision will be taken how much of water can be regulated for irrigation. Hydrology calculation is as follows.



HYDROLOGY AS ON 5.10.2017

All Quantities in Mcft.

I AVAILABLE QUANTITY

A STORAGE POSITION (As on 5.10.2017)

	Storage	Dead Storage	Live Storage
Lower Nirar Dam	114.85	100.00	14.85
Tamil Nadu Sholayar	4784.49	515.00	4269.49
Parambikulam Dam	11113.88	6000.00	5113.88
Thunacadavu & Peruvaripallam Dam	1163.61	800.00	363.61
Aliyar Dam	1877.03	311.00	1566.03
Thirumurthy Dam	1530.47	191.00	1339.47
TOTAL			12667.33 MCFT

B ANTICIPATED YIELD (75% Dependability)

MONTH	UNB	TNS	PKM	ALIYAR	T DAM	TOTAL
October	253	762	732	654	55	2456
November	183	518	522	658	160	2021
December	89	279	284	415	91	1158
January	26	92	71	326	15	530
				Total	6165	MCFT

*Oct -Jan UNW water is to kerala.

Due to poor precipitation 60% of yield can be considered - 3699

500 MCFT

C Yield from Upper Aliyar

TOTAL AVAILABLE QUANTITY (A + B +C - **16866** MCFT

II REQUIREMENT OF TAMIL NADU

ALIYAR DAM

Old Ayacut 615 MCFT

New Ayacut 1100 MCFT

Elavakkarai 16 MCFT

Drinking water from 5.10.17 to 31.01.18

44 C/S X 120 DAYS 456 MCFT

Transmission Loss 15% 68 MCFT

TOTAL - **2256** MCFT

T.DAM

PMC 3800 MCFT

Dhali channel 470 MCFT

Drinking water from 5.10.17 to 31.01.18

25 C/s X 120 days 259 MCFT

TOTAL **4529** MCFT

REQUIREMENT OF TAMIL NADU - **6785** MCFT

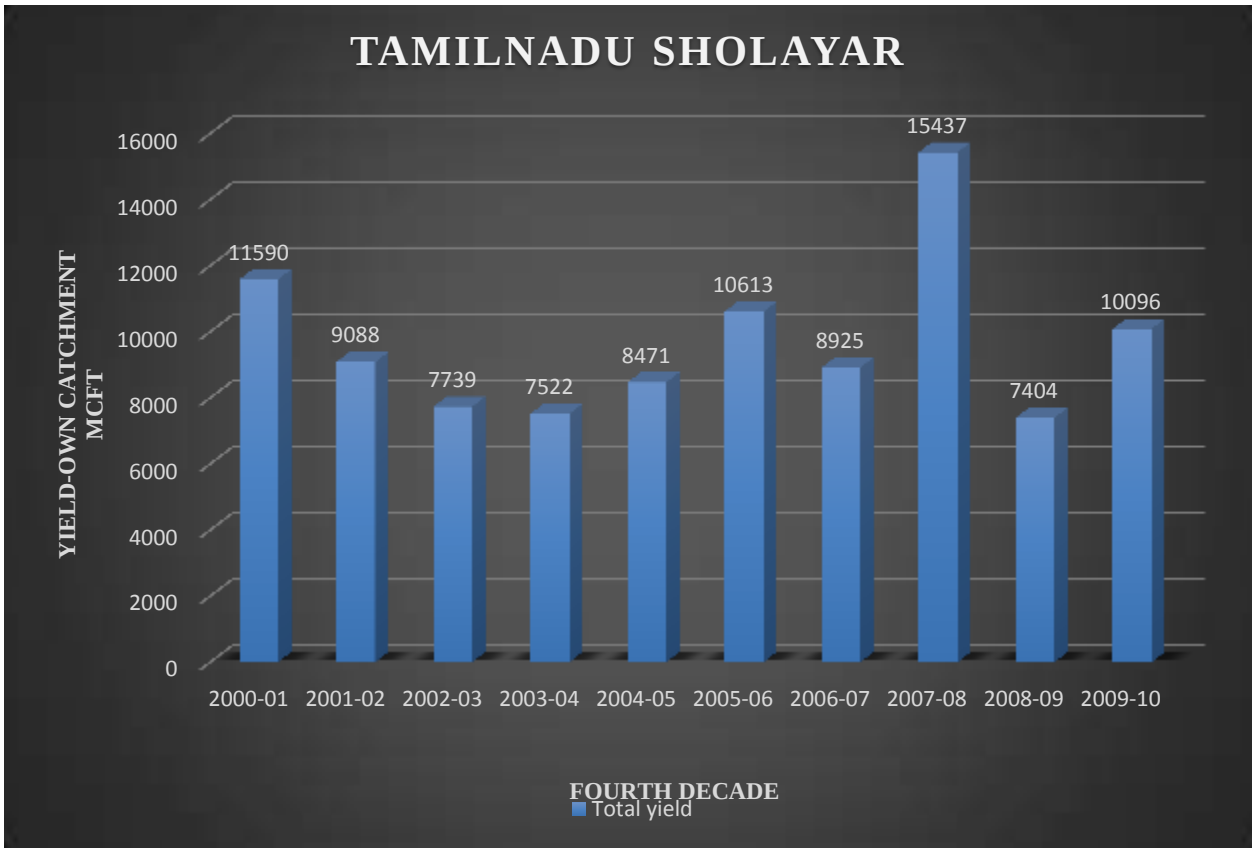
REQUIREMENT OF KERALA

At Manacadavu from 5.10.17 to 31.01.18 3640 MCFT

At Kerala Sholayar from PH II from 5.10.17 to 31.01.18 3000 MCFT

Total **6640** MCFT

Total Requirements of Tamilnadu & Kerala **13425** MCFT



Educating the farmers to use water effectively.

PAP officers educated the farmers of PAP about Zonation and Alternate sluice method, following system is in practice with the cooperation of farmers. Farmers are highly disciplined. Management of water in PAP is successful by the following methods.

1.Zonation

2.Alternate sluice method.

1.Zonation:

ALIYAR SUBBASIN COMMAND AREA NEW AYACUT					
Sl.No.	Name of Canal	Length in Km.	Ayacut in Ha		
			A' Zone	B' Zone	Total
1	Aliyar Feeder Canal	13.40	957	932	1889
2	Sethumadai Canal	8.40	1018	1024	2042
3	Vettaikkaranpudur Canal	17.40	2250	2277	4527
4	Pollachi Canal	48.00	4703	4806	9509
	TOTAL		**8927**	**9039**	**17967**

ALIYAR SUBBASIN COMMAND AREA OLD AYACUT				
Sl.no	Name of Anicut	Distance from Reservoir in Km	Length in Km	Ayacut in Ha
1	Pallivilangal	0.901	10.20	265.62
2	Ariyapuram	1.481	13.65	504.34
3.	Karaipatty	4.281	11.22	316.45
4.	Perianai	5.794	17.90	770.36
5.	Vadakkalur	14.838	10.75	734.23
	Total			**2591.00**

IRRIGATION SEASON

ALIYAR SUB BASIN

- **OLD – 16TH MAY TO 15TH APRIL**
- **NEW – 1ST SEPT. TO 15TH JANUARY**

IRRIGATION PATTERN – ALIYAR SUB BASIN

YEAR	SEASON (JAN – MAY)
FIRST YEAR	ZONE A (50% AREA)
SECOND YEAR	ZONE B (50% AREA)

PALAR SUBBASIN COMMAND AREA - NEW

Sl. No	Name of the Canal	Total in Ha.	ZONES			
			I	II	III	IV
1	Parambikulam Main Canal	128090	32040	31970	32166	31914
2	Udumalpet Canal	23600	5981	5920	5783	5916
3	High Level Canal	1003	246	249	254	254

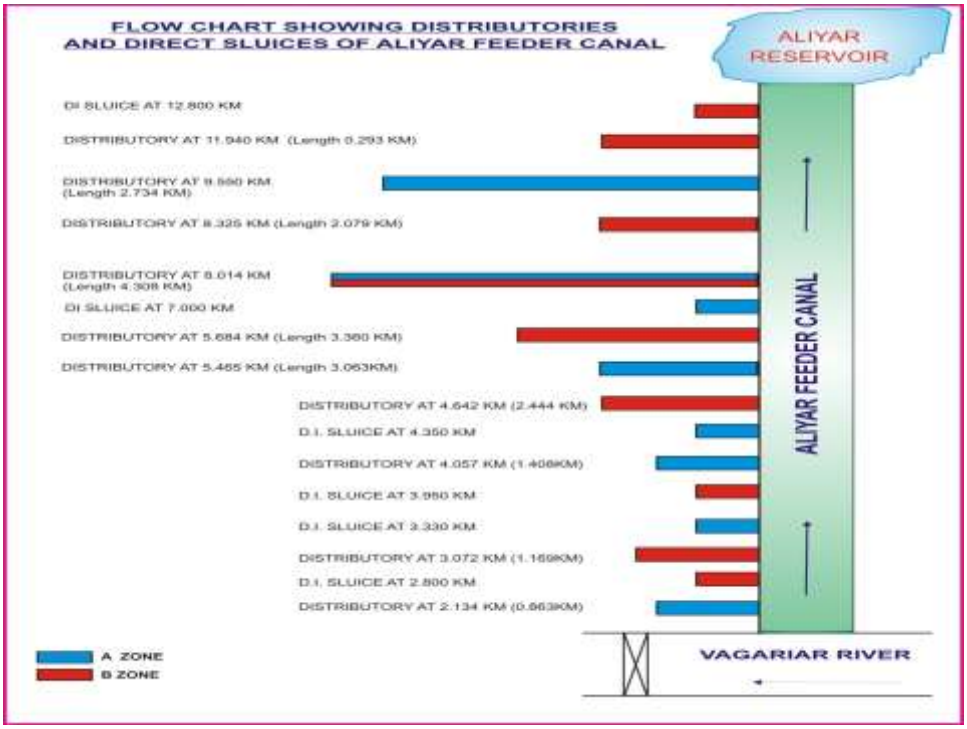
IRRIGATION PATTERN – PALAR SUB BASIN

YEAR	I SEASON (AUG – DEC)	II SEASON (JAN – MAY)
FIRST YEAR	ZONE I (25% AREA)	ZONE II (25% AREA)
SECOND YEAR	ZONE III (25% AREA)	ZONE IV (25% AREA)

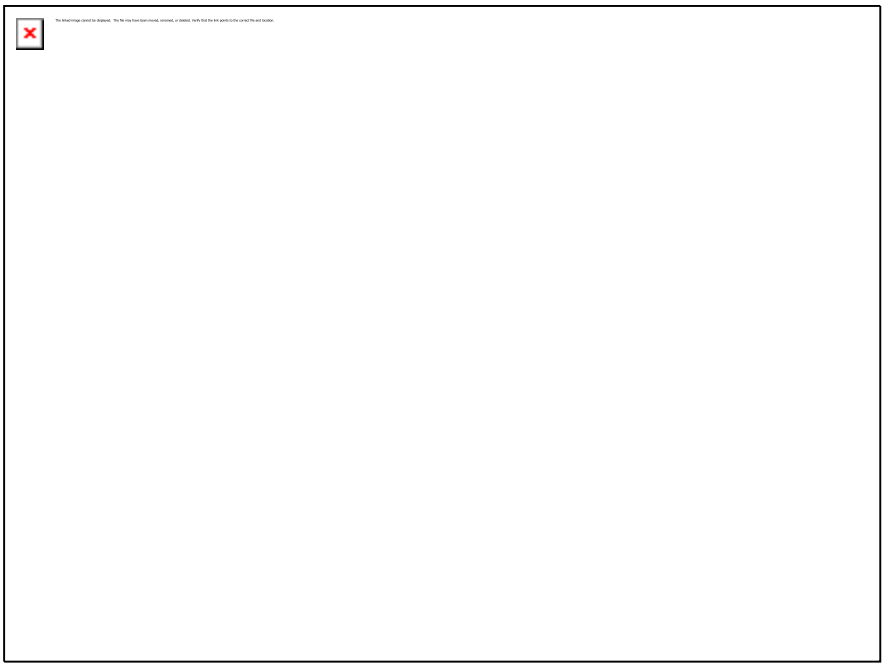
In this method the entire PAP ayacut is getting water for irrigation.

2.Alternate sluice method:

The following sample picture will explain about Alternate sluice method.



Along with this Zonation and Alternate sluice method,Farmers are encouraged to adopt Modern irrigation practices.



Participatory irrigation Management is enhanced by regular WUA meetings.

PARTICIPATORY IRRIGATION MANAGEMENT

TNFMIS ACT 2000

TAMIL NADU FARMERS' MANAGEMENT OF IRRIGATION SYSTEMS

- **WATER USERS' ASSOCIATION**
- **DISTRIBUTORY COMMITTEE**
- **PROJECT COMMITTEE**

PARAMBIKULAM ALIYAR PROJECT

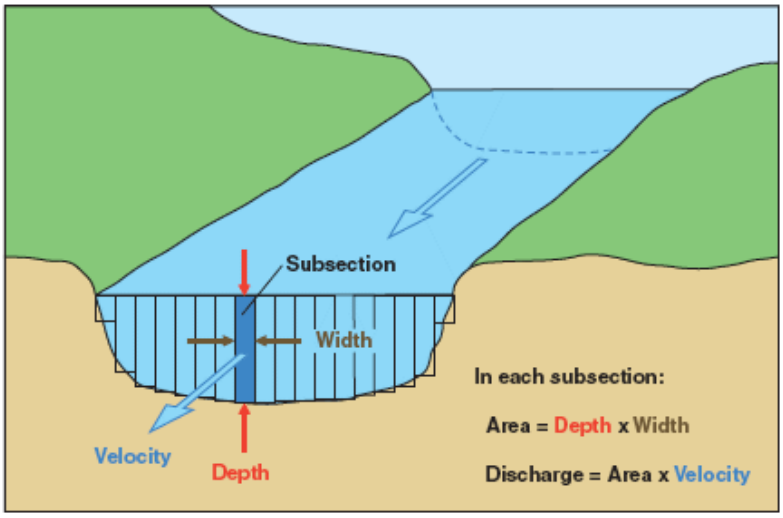
PROJECT COMMITTEE FOR ALIYAR SUB BASIN	PROJECT COMMITTEE FOR PALAR SUB BASIN
DISTRIBUTORY COMMITTEE : 4 NOS	DISTRIBUTORY COMMITTEE : 9 NOS
WUA : 21 NOS	WUA : 135 NOS

2. GAUGING &CALIBRATING CHART&FLOOD WARNING.

PAP system is having 35 interstate gauging point. whenever necessary, at required place gauging will be done and the discharge will be calculated and communicated to all Engineers and farmers, which help to regulate optimum water and prevent over usage of water.

Apart from this, joint gauging will be carried out regularly by Tamil Nadu and Kerala officials.

After Gauging the point, the calculation will be done as follows. Calibration of chart is carried out whenever any changes made in the section of the canal..



Current-meter discharge measurements are made by determining the discharge in each subsection of a channel cross section and summing the subsection discharges to obtain a total discharge.

Reference: http://nwa.mah.nic.in/DL_modules/MRD/mrd.htm

During flood ,flood warning will be given to d/s dam and nearby villages and Kerala officials, the surplus from dam is calculated from spill way shutter open, and the discharge at the upstream of the river (which is 10km above the gauge point) is collected from CWC section office. In the year 2009,at Manacadavu weir interstate gauge point, due to flood, water gushing above the weir to height of 10m -15m,which carried away the way bridging the DWLR room. that flood without attenuation travel to a distance of 5km and carried away a portion of the d/s dam. flood frequency and failure of dam had been studied.

Reference: https://www.meted.ucar.edu/hydro/basic_int/flood_frequency/

https://www.meted.ucar.edu/hydro/basic_int/flash_flood/

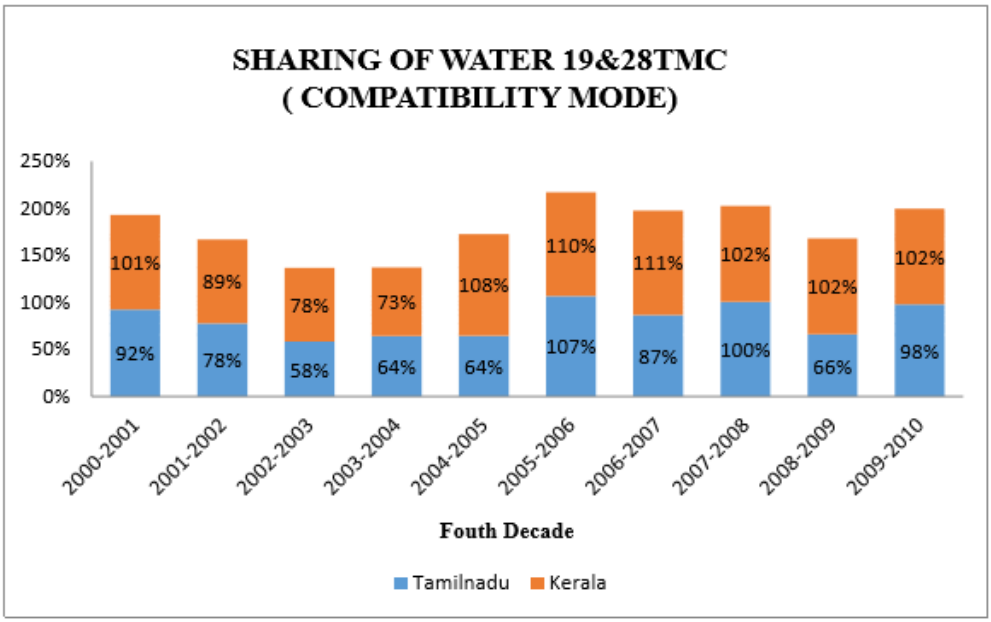
http://www.meted.ucar.edu/hydro/damfailure/applications_int/

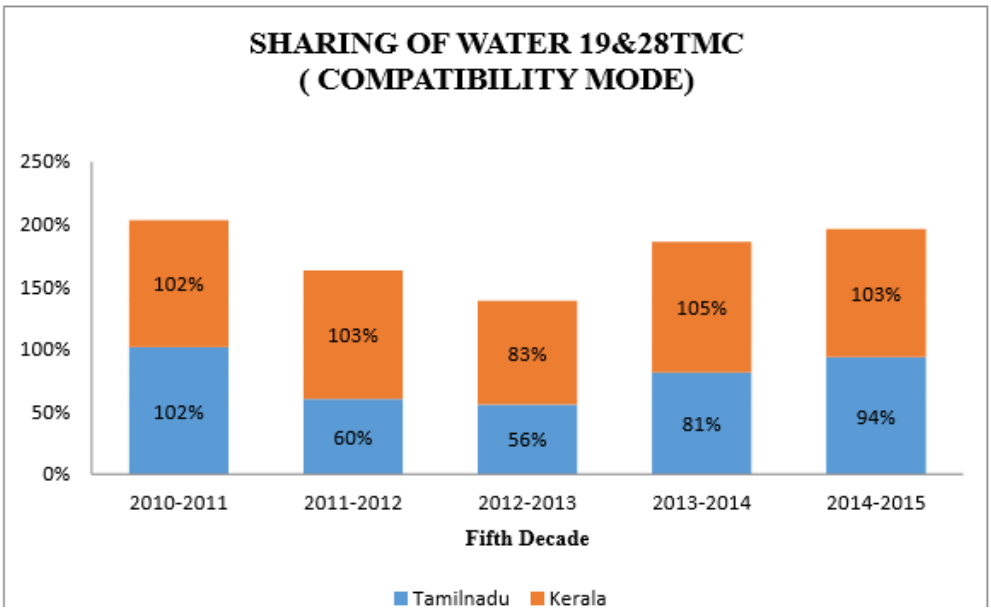
3.MAINTAINING WATER ACCOUNTS.

Water year, water accounts for entire PAP system is maintained by our office. Accounts will be reconciled with Kerala fortnightly. water sharing between Kerala and Tamil Nadu will be checked out then and there.

TAMIL NADU SHARES AVAILABLE

The following chart compares the sharing of water between Tamil Nadu and Kerala during the year 2000-2015





LIMITATIONS

1.Major portion of the catchment area is in core zone of reserved forest, Hence it is too difficult to assess the yield correctly.

2.Digitization of instruments are too difficult due to animal intrusion and non -availability of signals.

3.Computation is done through Excel sheet.so need extra manpower to enter the data.

4.Staffing is yet another big issue, since it is a tropical rainforest availability of observer is too less.

USE OF OUR OFFICE

1. Gauging sub division provide necessary data and inputs to top level officials to prepare water supply proposal to irrigation.

2. Provide past and present scenario of PAP to top level officials and supplement, to prepare the reply to Government to Government communication.

3. Discharges of all dams and canals are gauged and informed to Basin authority to guide the farmers to irrigate, it indirectly increases the GDP of the Nation.

4. Data and reminder will be sent to the basin authority to monitor the supply of water to Kerala.

5. Our office will place its view ,present water scenario and arguments in JWRB behalf of Government of Tamilnadu.

SUMMARY:

Our office deals with Interstate water sharing (Kerala and Tamil Nadu).provides hydrological data, Utilization by Tamil Nadu and Kerala out of total yield received, to Government of Tamil Nadu to justify the water utilization by Tamil Nadu and how TN is respecting the spirit of PAP agreement.

Management of available water is effectively monitor by our office.

By providing past and present utilization, our office is guiding to optimize the irrigation with available water. Our office is privileged to deal with Anamalayar project.

PAP System is successfully catering the irrigation need of both Tamil Nadu and Kerala **since 1964**

REFERENCES

1. https://www.meted.ucar.edu/hydro/basic_int/runoff/navmenu.php
2. http://nwa.mah.nic.in/DL_modules/MRD/mrd.htm
3. https://www.meted.ucar.edu/hydro/basic_int/flood_frequency/
4. https://www.meted.ucar.edu/hydro/basic_int/flash_flood/
5. http://www.meted.ucar.edu/hydro/damfailure/applications_int/