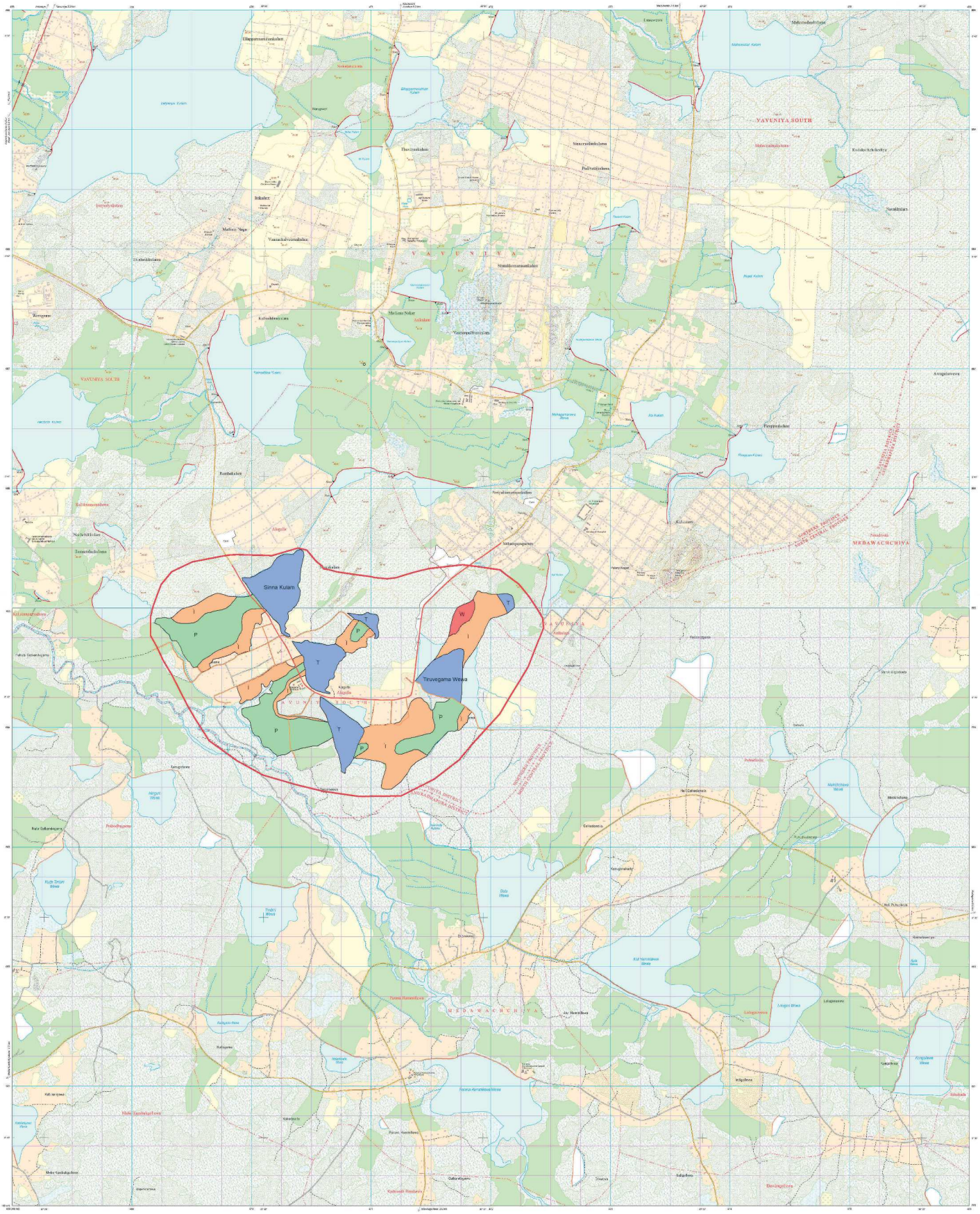
ANNEX-3

SOIL MAPS OF THE MODEL CASCADES

ALAGALLA CASCADE 7MAL 8
DRAINAGE CLASS MAP



LEGEND

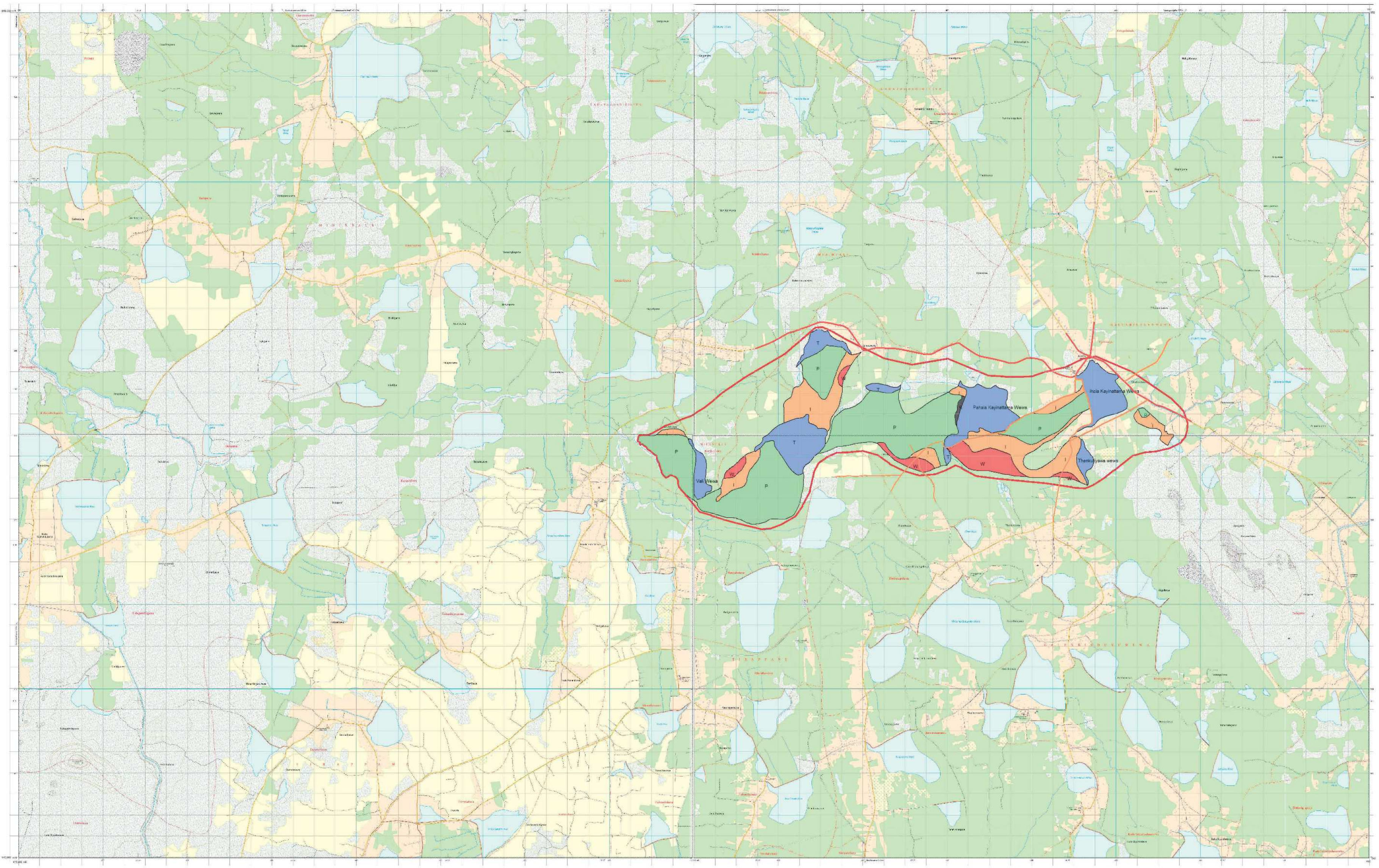
- W — Well drained soils
- I — Imperfectly drained soils
- P — Poorly drained soils
- T — Tank
- Area boundary

SCALE 1 : 11,000

0 0.5 km

Source: Survey Department of Sri Lanka 1:10,000 Topogarphic Sheet

ICHCHANKULAMA CASCADE 13MAL 4
DRAINAGE CLASS MAP



LEGEND

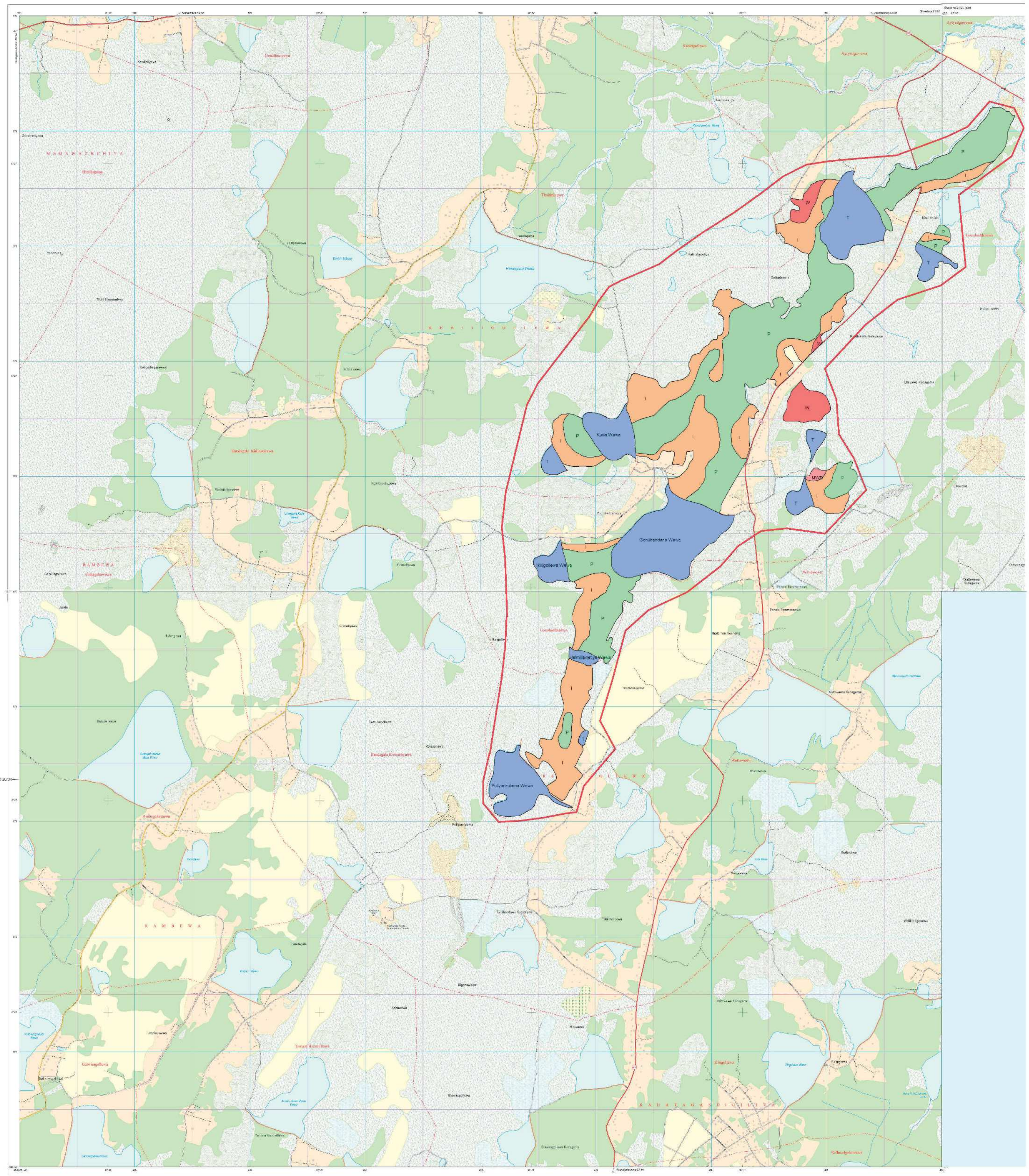
- W — Well drained soils
- I — Imperfectly drained soils
- P — Poorly drained soils
- R — Rocky area
- T — Tank
- Area boundary

SCALE 1 : 17000

0 — 1 km

Source: Survey Department of Sri Lanka 1:10,000 Topogarphic Sheet

KIWULEKADA CASCADE 7MAL 1
DRAINAGE CLASS MAP



LEGEND

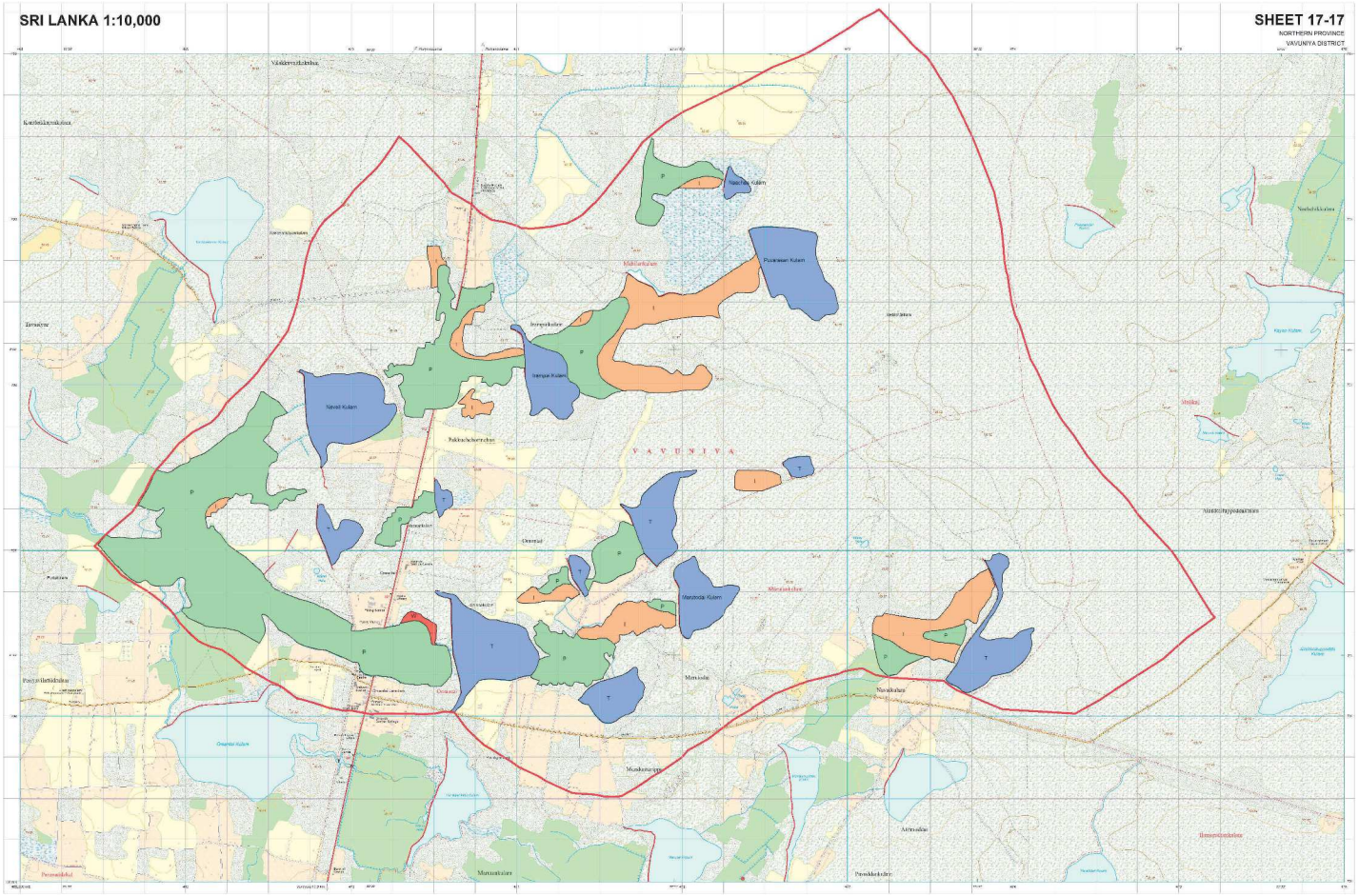
- W — Well drained soils
- MWD — Moderatley well drained soils
- I — Imperfectly drained soils
- P — Poorly drained soils
- T — Tank

1 : 12000

0 — 0.5 km

Source: Survey Department of Sri Lanka 1:10,000 Topogarphic Sheet

NEVELI KULAM CASCADE 4PAR 2
DRAINAGE CLASS MAP

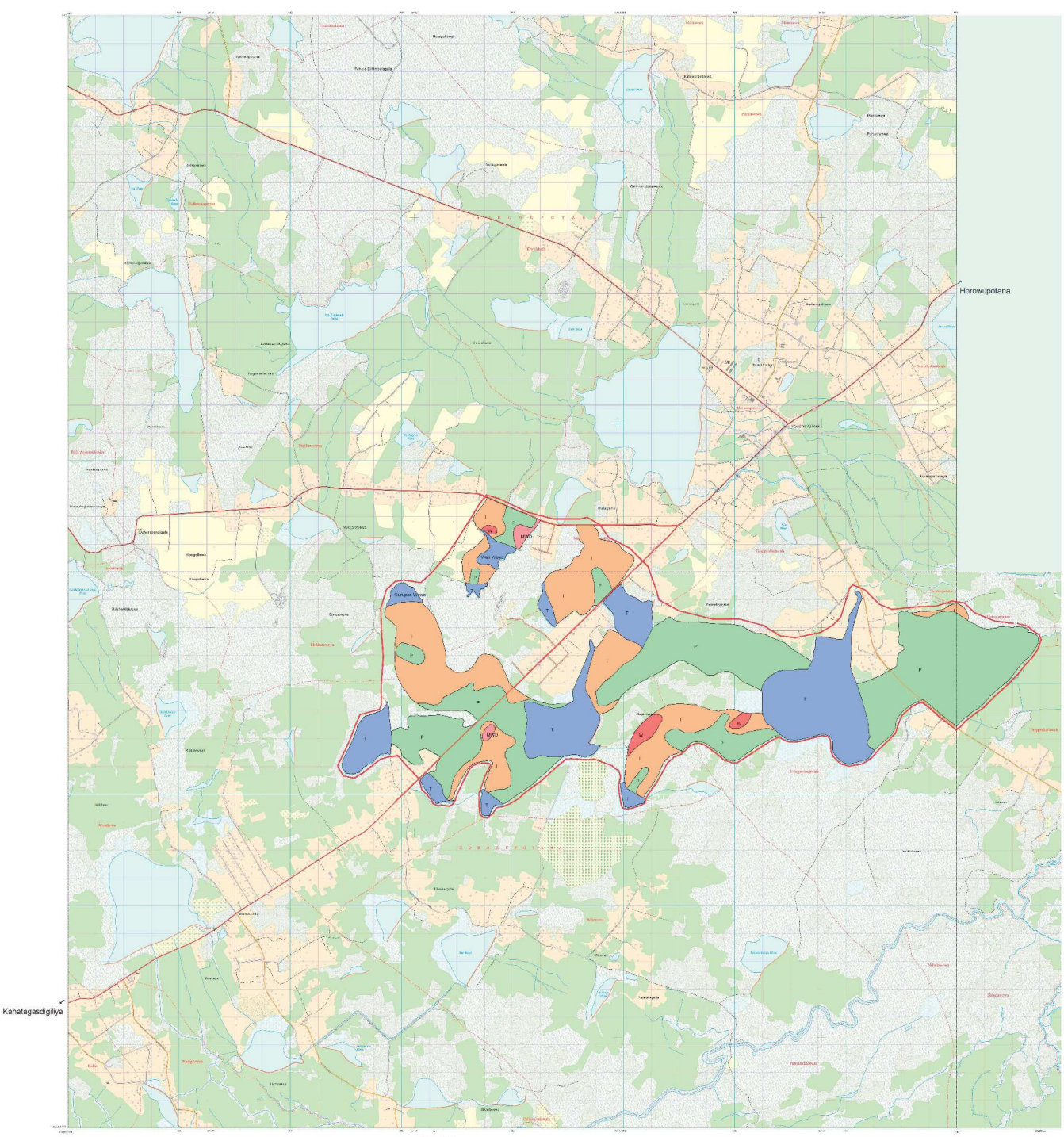


LEGEND

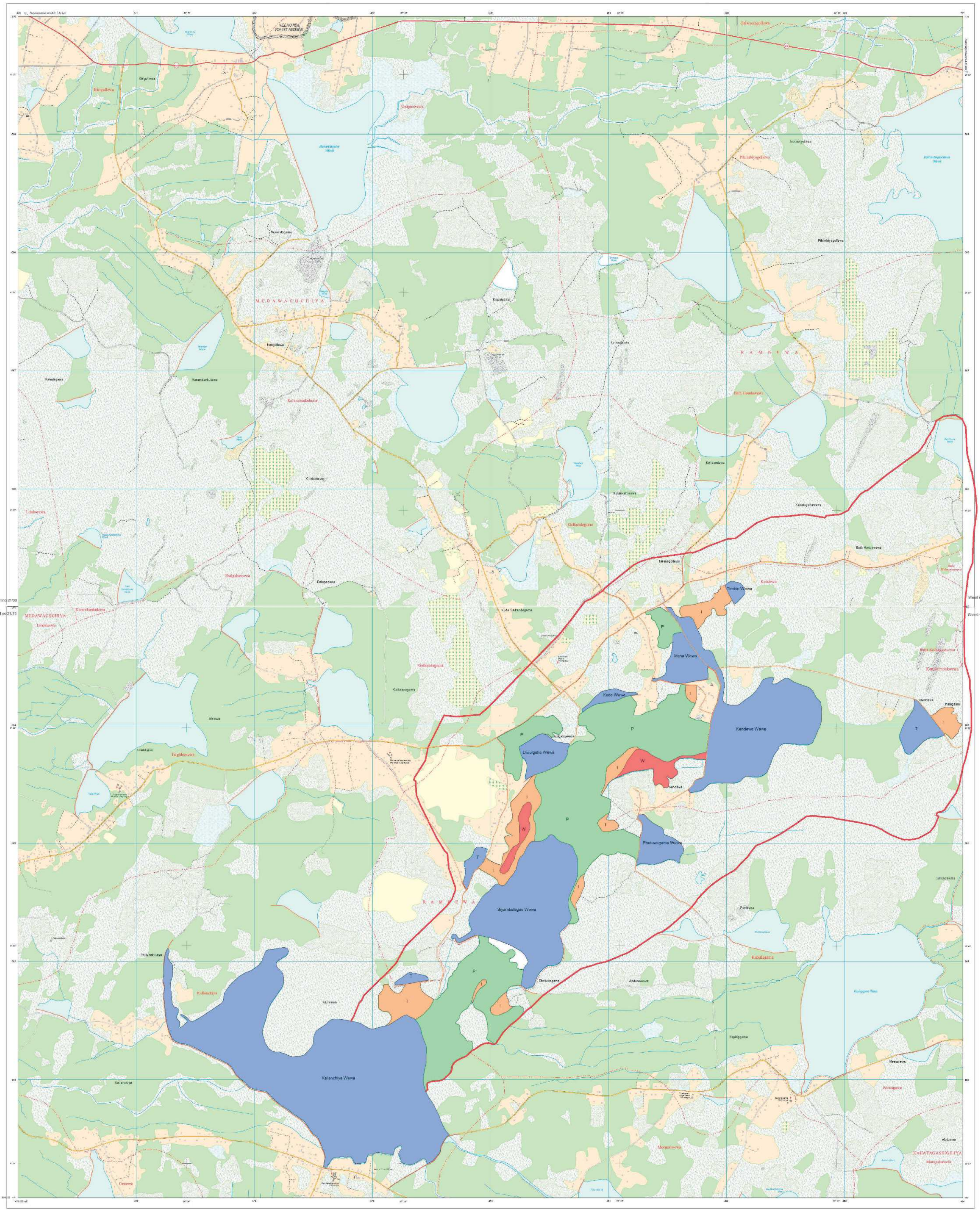
- Well drained soils
- Imperfectly drained soils
- Poorly drained soils
- Tank
- Area Boundary

Source: Survey Department of Sri Lanka 1:10,000 Topogarphic Sheet

RATHMALAWEWA CASCADE 4Y 5
DRAINAGE CLASS MAP



SIYAMBALAGASWEWA CASCADE 5 MAL 6
DRAINAGE CLASS MAP



LEGEND

- W — Well drained
- I — Imperfectly drained soils
- P — Poorly drained soils
- T — Tank
- Area boundary

SCALE 1:11,000

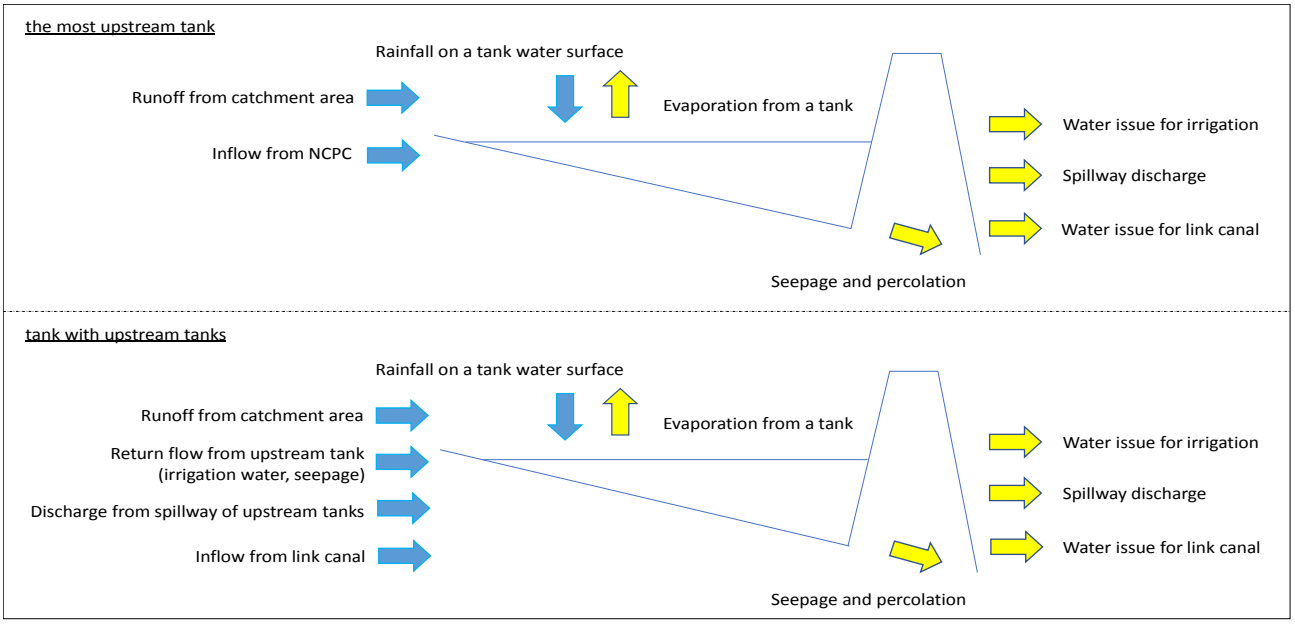
0 — 0.5 km

Source: Survey Department of Sri Lanka 1:10,000 Topogarphic Sheet

ANNEX-4

RESULT OF WATER BALANCE STUDY FOR 6 MODEL CASCADE SYSTEMS

The water balance study for six model cascade system was carried out by using the simulation model developed by Japan International Research Centre for Agriculture Sciences (JIRCAS) as described in Section 6.6 in Chapter 6. Tank operation study was carried out for one year starting from 1st October with tank volume at FSL till 30th September. The water balance was evaluation monthly basis for each tank. The basic concept of the simulation model, proposed cropping calendar for each cascade system and result of operation study on each tank are shown hereinafter.



The basic data and parameter used for water balance study are summarized hereinafter.

ROF＋RAINTK＋RETFLW＋SPLIN＝EVLOSS＋WTQ＋SPLOUT＋SPLOSS＋⊿Q

Components of Water Balance of a Tank Cascade System

Components	**Index**	**No.**
Runoff from catchment area	RUNOF	(1)
Rainfall on a tank water surface	ROT	(2)
Return flow from upstream tanks	RETFLW	(3)
Discharge from spillway of upstream tanks	SPLIN	(4)
Inflow from NCPC or Link Canal	TLNIN	(5)
Total of Inflow	IFT	(6)
Evaporation from a tank	EVLOS	(7)
Water issue for irrigation	WI	(8)
Seepage and percolation	SPLOS	(9)
Water issue to link canal	LNOUT	(10)
Total of outflow	OFT	(11)
Spillway discharge	SPD	(12)

Source: JICA Project Team based on JIRCAS

The details of the components are shown below.

(1) RUNOF=rcf × (RAIN÷1000) × CAREA ÷ API

rcf：runoff coefficient (0.18 was employed)

RAIN：daily precipitation (mm) (2002 year at Kebithigollewa)

CAREA：catchment area (m^2)

API：antecedent precipitation index

When n is the number of successive non-precipitation days before precipitation starts:

n=0, then API＝1

$1 \leq n \leq 11$, then $API = 1 + {}^{1}/_{2} + {}^{1}/_{3} + \cdots + {}^{1}/_{(n+1)}$

$n \geq 12$, then $API = 1 + {}^{1}/_{2} + {}^{1}/_{3} + \cdots + {}^{1}/_{(11+1)}$

To calculate a delay in runoff generation that follows an extended dry spell, after "50 days or more of non-precipitation and tanks are dry," ROF was set to 0 until cumulative precipitation reached a certain level. This cumulative precipitation was named *delay*.

(2) ROT＝TKAREA×RAIN／1000

TKAREA：tank submerged area (m^2)

(3) RETFLW＝$\sum_{k=m}^{n} fret \times (\mathrm{WTQ}_k + \mathrm{SPLOSS}_k)$

fret: return flow coefficient related to water issue and tank seepage (0.2 was employed)

k: number of upstream tanks

m: tank number of the first upstream tank

n: tank number of the last upstream tank

Return flow is generated only in the wet cropping period when water management is extensive.

(4) SPLIN＝$\sum_{k=m}^{n} fretspil \times \mathrm{SPLOUT}_k$

fretspill: return flow coefficient related to spillway discharge (0.5 was employed)

k: number of upstream tanks

m: tank number of the first upstream tank

n: tank number of the last upstream tank

(5) TLNIN

Link canal discharge The discharge for NCPC for upper most tank was decided based on irrigation block based allocated water by pre feasibility study. The average for 40 years data was proportionally

divided based on the command area within the irrigation block. The other tank discharge will be equal to LNOUT.

(7) EVLOS＝TKAREA×EVAPO×*fevap*

fevap: coefficient for pan evaporation (0.8 was employed)

EVAPO: pan evaporation (3.47 mm/day was employed)

(8) WI

The volume of irrigation water issue was calculated based on the cropping calendar decided each tank according to the "Technical Guideline of Irrigation Works A. J. P. Prnrajha, 1988". The effective rainfall was calculated with 2002 year at Kebithigollewa

(9) SPLOS＝[a ln (h) + b]×TKVOL／100

a, b: coefficients for individual tanks determined based on water balance during the non-precipitation time

TKVOL: tank water volume

(10) LNOUT

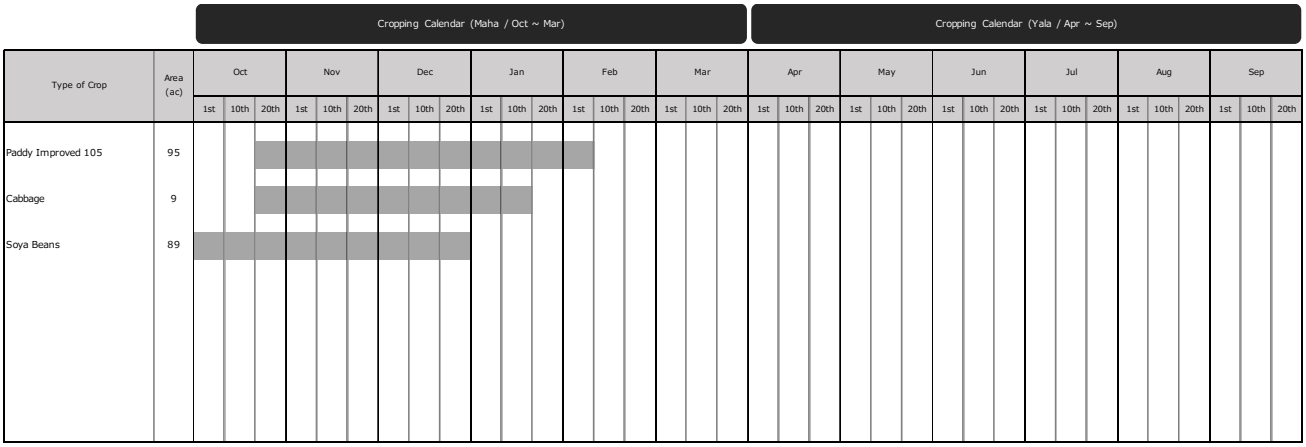
Link canal discharge going out to the lower tank was decided considering the optimum usage of NCPC water. 5% of conveyance loss was considered.

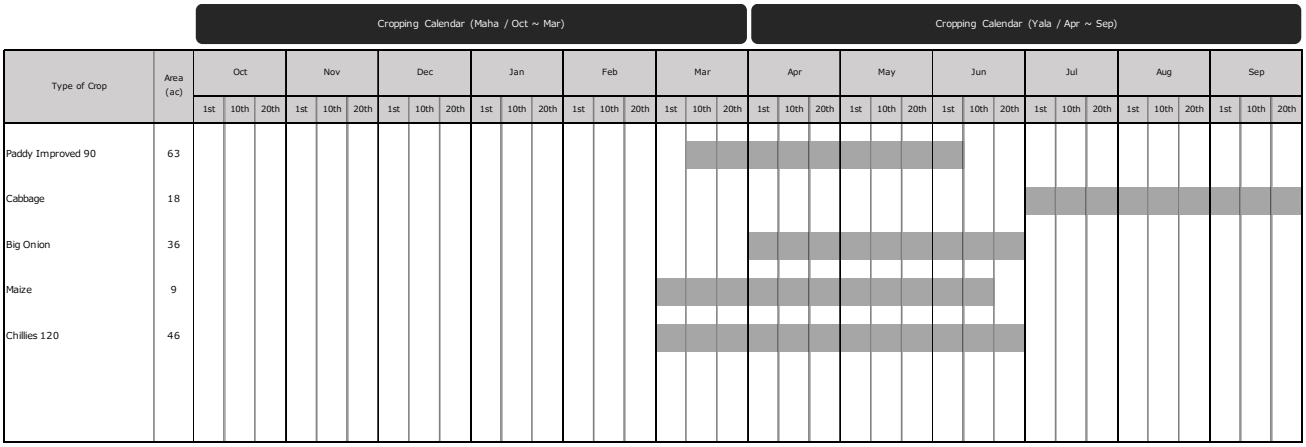
(11) OFT = EVLOS+ WI+ SPLOS+ LNOUT

(12) SPD =(⊿Q + IFT- OFT)- Q total

Q total : water volume at FSL

Proposed Cropping Calendar Alagalla Cascade System



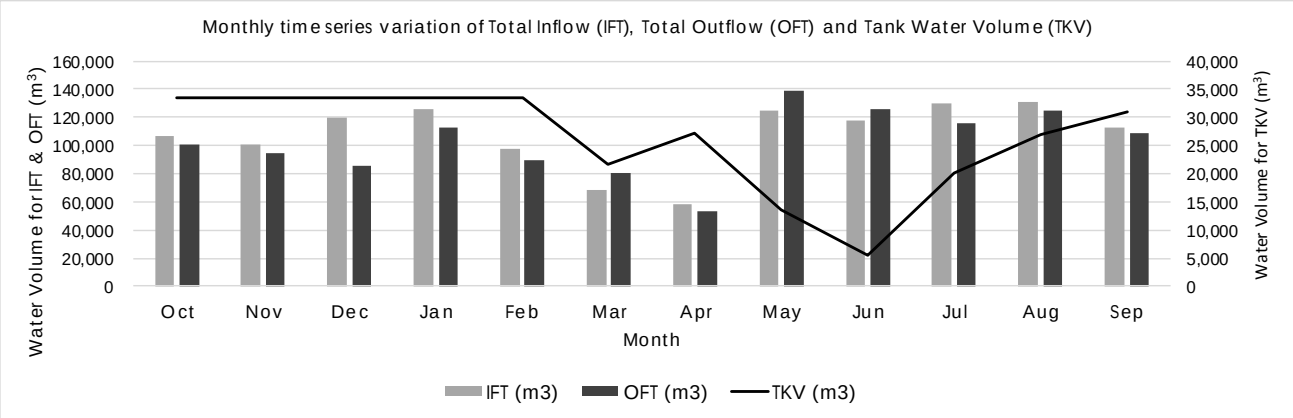


Result of Operation Study for Each Tank in Algalla Cascade System

Tank Name: Kalkulam **Tank Water Volume at FSL : 50,000 (m3)**

Cultivation Extend (Maha) : 13.3 ha **Cultivation Extend (Yala) : 12 ha**

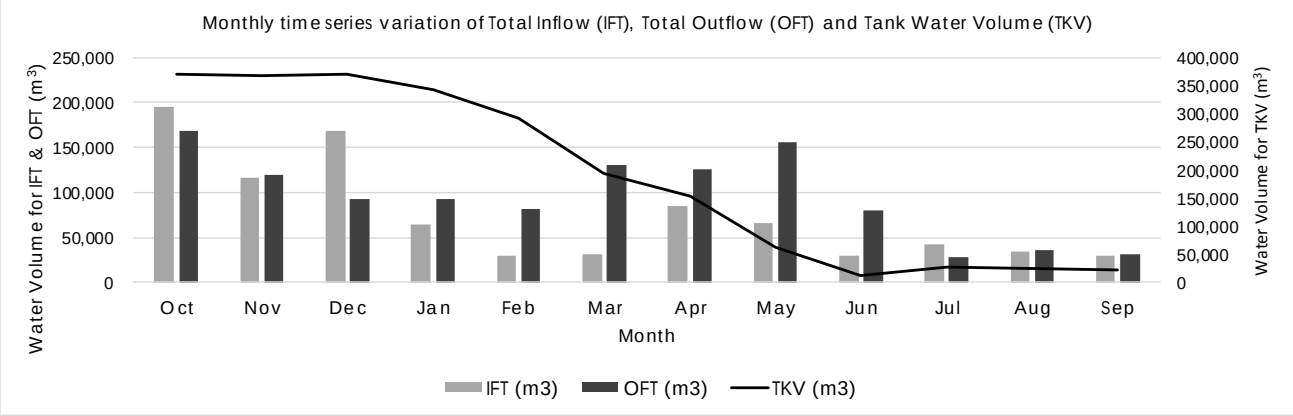
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	55,877	37,030	14,194	0	0	107,101	5,728	5,032	43,871	46,098	100,729	33,421	6,372
Nov	162	72,099	20,481	7,878	0	0	100,458	4,240	3,880	27,231	59,482	94,833	33,421	5,625
Dec	241	79,159	28,693	11,925	0	0	119,777	4,540	3,813	11,947	65,306	85,606	33,421	34,171
Jan	51	116,410	6,350	2,551	0	0	125,311	4,675	3,748	8,068	96,038	112,529	33,421	12,782
Feb	3	96,733	355	135	0	0	97,223	5,040	3,213	1,415	79,805	89,473	33,421	7,750
Mar	32	65,190	2,083	1,449	0	0	68,722	5,876	4,781	16,095	53,781	80,533	21,609	0
Apr	180	31,543	20,519	6,779	0	0	58,841	4,655	6,027	16,676	26,023	53,382	27,069	0
May	107	111,754	8,357	5,063	0	0	125,174	5,210	5,609	35,628	92,197	138,644	13,599	0
Jun	2	117,161	174	18	0	0	117,353	1,166	1,979	25,637	96,658	125,440	5,512	0
Jul	30	125,723	3,638	577	0	0	129,938	3,308	5,247	3,059	103,721	115,336	20,114	0
Aug	9	130,379	398	330	0	0	131,107	5,411	6,590	4,728	107,563	124,292	26,929	0
Sep	3	112,655	139	126	0	0	112,920	6,109	5,656	4,172	92,940	108,878	30,971	0



Tank Name: Turuvegama **Tank Water Volume at FSL : 290,000 (m3)**

Cultivation Extend (Maha) : 26.6 ha **Cultivation Extend (Yala) : 24 ha**

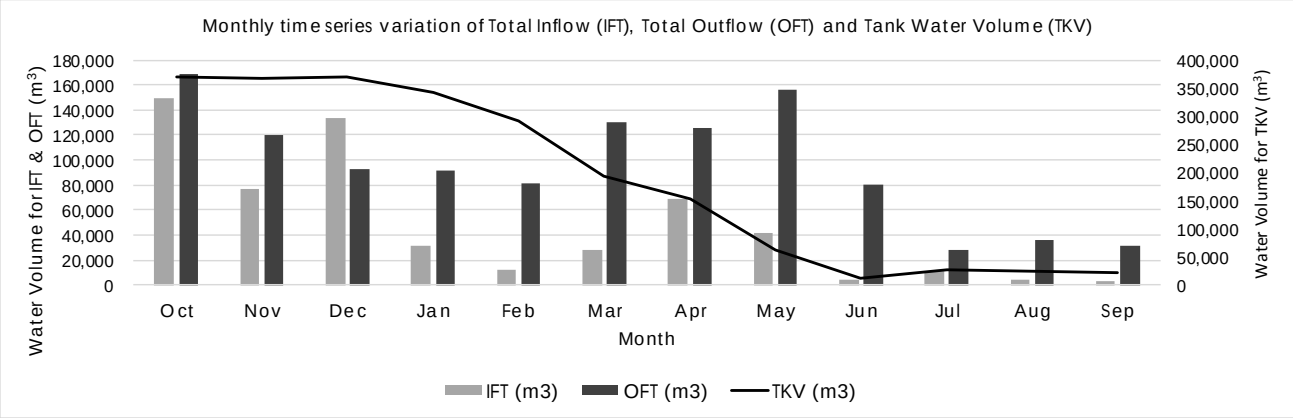
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	13,934	76,848	91,085	9,781	3,186	194,834	35,897	45,110	87,741	0	168,747	370,266	26,087
Nov	162	17,980	42,661	46,321	6,222	2,813	115,997	24,823	40,567	54,462	0	119,852	366,411	0
Dec	241	19,740	59,820	69,035	3,152	17,085	168,833	26,266	42,931	23,895	0	93,092	370,266	71,886
Jan	51	29,030	13,346	14,085	2,363	6,391	65,215	26,254	49,831	16,136	0	92,221	343,260	0
Feb	3	24,123	745	745	926	3,875	30,414	26,947	52,123	2,830	0	81,899	291,775	0
Mar	32	16,257	4,514	6,930	4,175	0	31,876	28,006	70,148	32,191	0	130,345	193,305	0
Apr	180	7,866	45,219	31,336	1,205	0	85,626	21,136	71,020	33,352	0	125,508	153,423	0
May	107	27,869	18,740	17,908	1,122	0	65,638	18,470	66,505	71,257	0	156,231	62,830	0
Jun	2	29,217	395	100	396	0	30,108	6,397	22,229	51,274	0	79,899	13,039	0
Jul	30	31,352	8,495	1,023	1,049	0	41,920	5,598	16,622	6,118	0	28,338	26,621	0
Aug	9	32,513	945	375	1,318	0	35,151	6,508	20,614	9,457	0	36,578	25,194	0
Sep	3	28,093	333	131	1,131	0	29,688	5,796	17,009	8,344	0	31,149	23,733	0



Tank Name: alagalla **Tank Water Volume at FSL : 170,000 (m3)**

Cultivation Extend (Maha) : 19 ha **Cultivation Extend (Yala) : 17 ha**

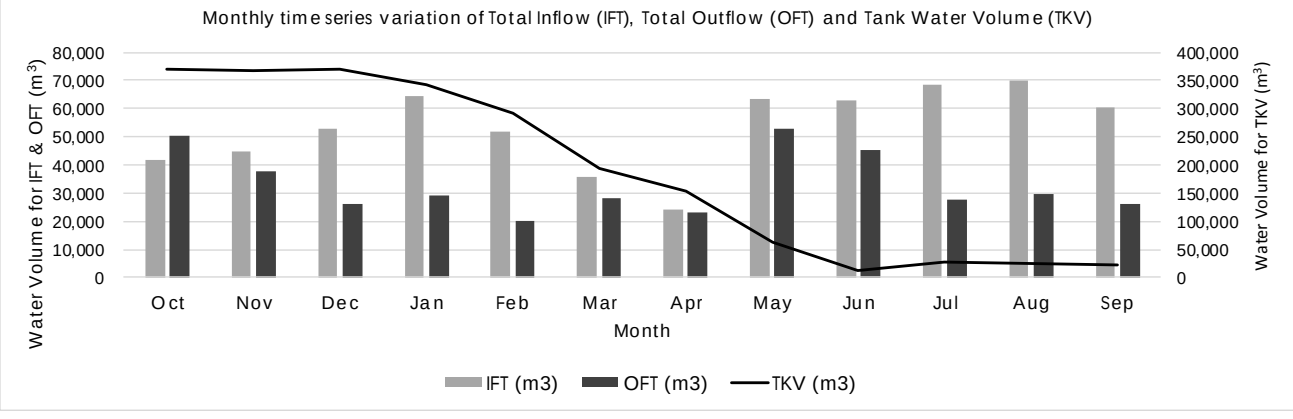
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	0	55,328	54,681	26,570	13,043	149,622	21,375	19,742	18,802	0	59,919	178,268	89,703
Nov	162	0	30,817	27,400	19,006	0	77,223	14,664	18,572	11,670	0	44,906	178,268	32,317
Dec	241	0	43,229	40,777	13,365	35,943	133,314	15,538	19,483	5,120	0	40,142	178,268	93,172
Jan	51	0	9,609	8,451	13,193	0	31,253	15,703	21,568	3,458	0	40,728	168,793	0
Feb	3	0	537	448	10,991	0	11,976	16,203	23,112	606	0	39,921	140,848	0
Mar	32	0	3,206	4,410	20,468	0	28,084	17,892	31,856	6,898	0	56,647	112,285	0
Apr	180	0	31,494	23,504	14,204	0	69,202	15,935	32,235	7,147	0	55,317	126,170	0
May	107	0	12,828	15,552	13,301	0	41,681	18,701	31,440	15,269	0	65,411	102,440	0
Jun	2	0	260	183	4,446	0	4,889	14,278	33,743	10,987	0	59,008	48,321	0
Jul	30	0	5,797	1,782	3,324	0	10,903	9,346	27,260	1,311	0	37,917	21,308	0
Aug	9	0	664	242	4,123	0	5,029	5,009	14,259	2,026	0	21,294	5,043	0
Sep	3	0	235	61	3,402	0	3,698	2,041	3,746	1,788	0	7,575	1,166	0



Tank Name: wirandagollewa **Tank Water Volume at FSL : 20,000 (m3)**

Cultivation Extend (Maha) : 5.7 ha **Cultivation Extend (Yala) : 5 ha**

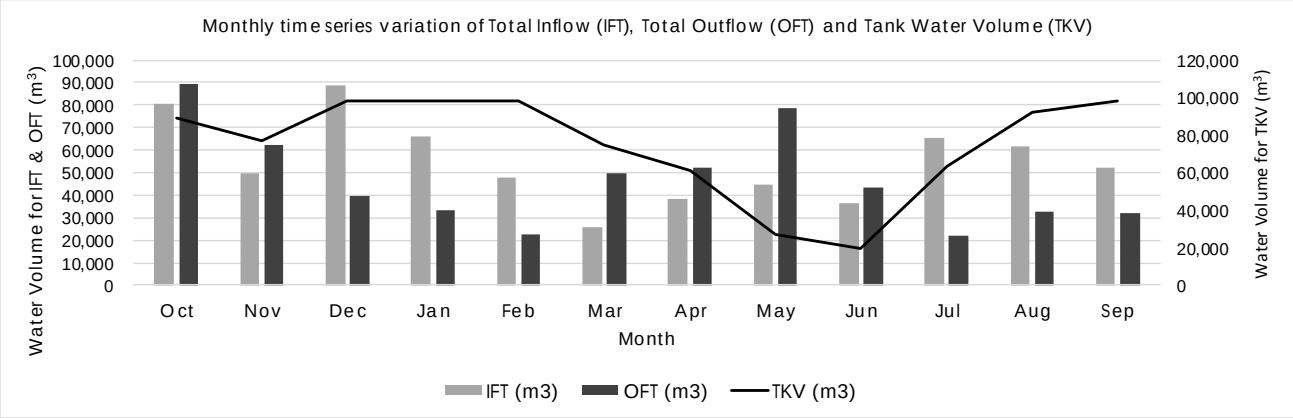
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	29,859	7,991	3,832	0	0	41,682	1,660	1,676	37,603	9,290	50,228	980	0
Nov	162	38,528	4,447	1,801	0	0	44,776	1,065	1,514	23,341	11,986	37,906	7,850	0
Dec	241	42,300	5,895	4,807	0	0	53,002	1,823	1,053	10,241	13,160	26,277	9,526	25,049
Jan	51	62,207	1,305	1,022	0	0	64,534	1,885	1,014	6,915	19,353	29,167	9,526	35,366
Feb	3	51,692	73	54	0	0	51,819	2,016	916	1,213	16,082	20,226	9,526	31,592
Mar	32	34,836	426	630	0	0	35,892	2,530	1,014	13,796	10,838	28,177	9,526	7,714
Apr	180	16,856	4,198	3,261	0	0	24,315	2,149	1,418	14,294	5,244	23,105	9,526	1,210
May	107	59,718	1,711	2,146	0	0	63,575	2,629	1,014	30,539	18,579	52,760	9,526	10,815
Jun	2	62,608	34	32	0	0	62,674	2,784	981	21,975	19,478	45,218	9,526	17,456
Jul	30	67,183	718	598	0	0	68,499	3,075	1,014	2,622	20,901	27,612	9,526	40,887
Aug	9	69,671	80	184	0	0	69,935	3,075	1,014	4,053	21,676	29,818	9,526	40,118
Sep	3	60,200	28	64	0	0	60,292	2,970	949	3,576	18,729	26,223	9,526	34,069



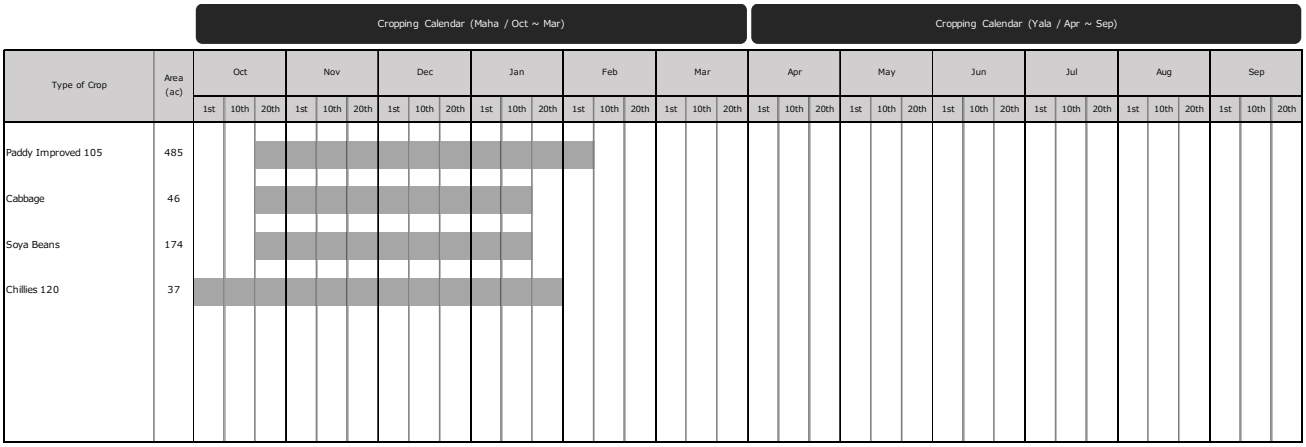
Tank Name: puliyankulama **Tank Water Volume at FSL : 110,000 (m3)**

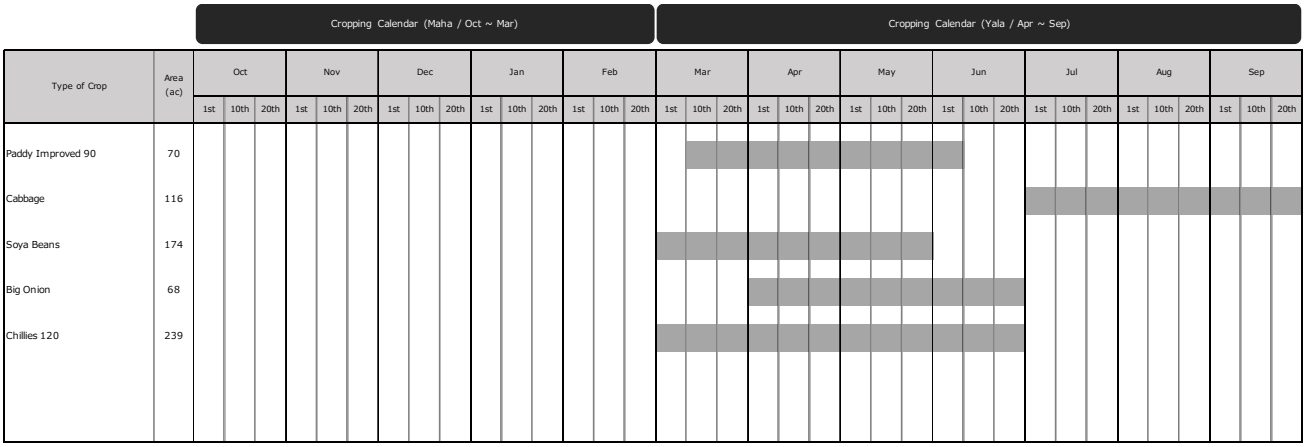
Cultivation Extend (Maha) : 11.4 ha **Cultivation Extend (Yala) : 10 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	8,825	30,563	33,191	7,856	0	80,435	13,235	13,578	62,672	0	89,485	89,129	0
Nov	162	11,387	17,032	16,450	4,971	0	49,840	8,792	14,674	38,901	0	62,367	76,602	0
Dec	241	12,502	23,818	24,955	2,259	25,049	88,583	9,553	13,211	17,068	0	39,831	98,180	27,174
Jan	51	18,385	5,225	5,587	1,586	35,366	66,150	10,253	11,240	11,525	0	33,019	98,180	33,131
Feb	3	15,278	292	297	426	31,592	47,885	11,088	9,439	2,021	0	22,548	98,180	25,336
Mar	32	10,296	1,720	3,276	2,962	7,714	25,968	13,188	13,597	22,994	0	49,779	74,369	0
Apr	180	4,982	17,357	14,782	284	1,210	38,615	9,893	18,205	23,823	0	51,920	61,064	0
May	107	17,650	7,182	8,613	203	10,815	44,463	9,082	18,496	50,898	0	78,475	27,052	0
Jun	2	18,504	156	34	196	17,456	36,346	2,212	4,858	36,624	0	43,694	19,704	0
Jul	30	19,856	3,248	923	203	40,887	65,117	5,051	12,378	4,370	0	21,799	63,022	0
Aug	9	20,592	351	493	203	40,118	61,756	8,020	17,899	6,755	0	32,674	92,105	0
Sep	3	17,792	123	186	190	34,069	52,360	8,690	17,585	5,960	0	32,236	98,180	14,049



Proposed Cropping Calendar Kiulekada Cascade System

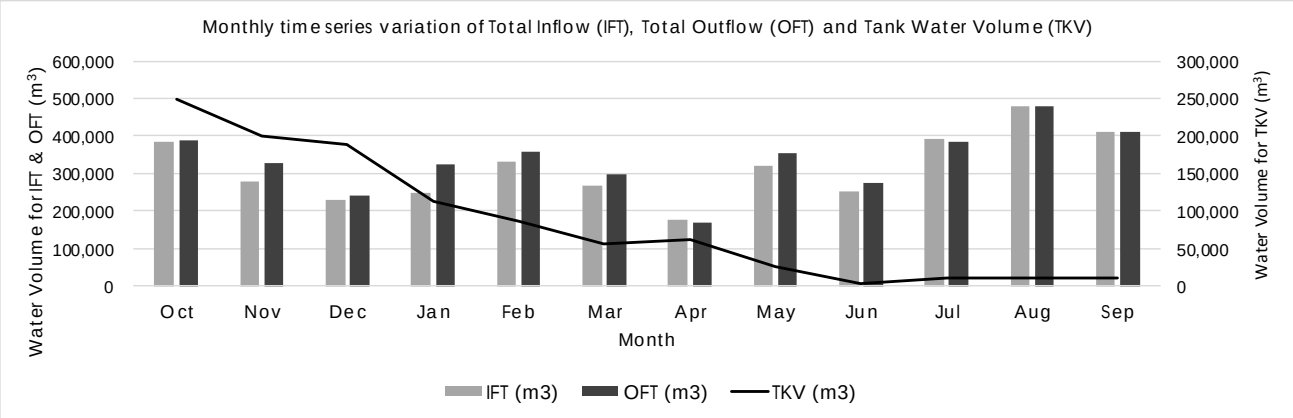




Result of Operation Study for Each Tank in Kiulekada Cascade System

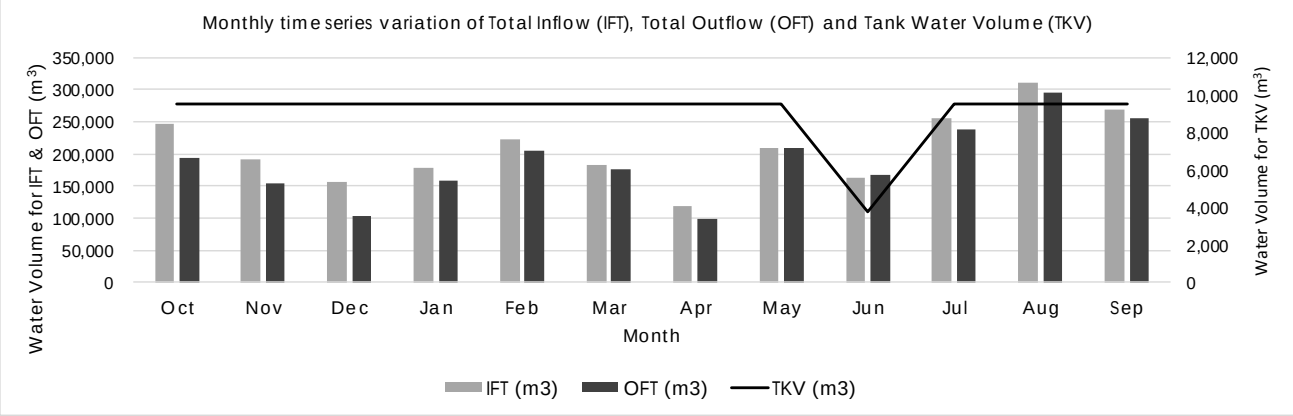
Tank Name: puliyankulama **Tank Water Volume at FSL : 220,000 (m3)**
Cultivation Extend (Maha) : 36.1 ha **Cultivation Extend (Yala) : 32 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	257,501	56,546	69,523	0	0	383,570	27,166	38,883	84,564	237,757	388,369	248,797	0
Nov	162	216,691	32,553	28,725	0	0	277,969	15,232	56,382	54,890	200,076	326,579	200,187	0
Dec	241	145,544	46,510	37,518	0	0	229,572	14,572	62,014	31,034	134,384	242,004	187,755	0
Jan	51	232,871	10,796	5,020	0	0	248,687	10,787	59,023	38,965	215,015	323,789	112,652	0
Feb	3	331,682	611	225	0	0	332,518	6,672	38,122	8,000	306,250	359,044	86,127	0
Mar	32	261,980	3,746	666	0	0	266,392	2,936	13,357	38,698	241,892	296,883	55,636	0
Apr	180	136,515	36,559	2,997	0	0	176,071	2,211	8,242	32,650	126,048	169,150	62,557	0
May	107	300,045	14,816	4,385	0	0	319,246	2,518	11,210	64,536	277,038	355,303	26,500	0
Jun	2	251,362	303	0	0	0	251,665	-	-	43,100	232,088	275,188	2,976	0
Jul	30	385,132	6,289	758	0	0	392,179	4,031	13,335	10,792	355,602	383,760	11,396	0
Aug	9	476,937	700	266	0	0	477,903	4,640	15,986	16,693	440,367	477,686	11,614	0
Sep	3	411,713	246	95	0	0	412,054	4,140	13,252	14,730	380,144	412,267	11,401	0



Tank Name: halmillawatiya **Tank Water Volume at FSL : 20,000 (m3)**
Cultivation Extend (Maha) : 15.2 ha **Cultivation Extend (Yala) : 14 ha**

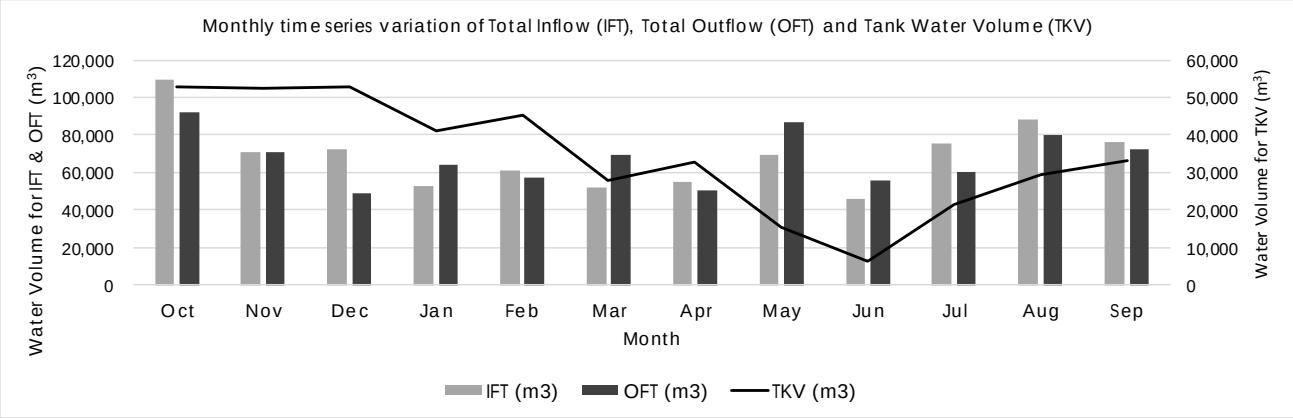
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	165,689	48,761	6,399	24,689	0	245,539	2,509	1,332	35,590	153,185	192,616	9,526	52,922
Nov	162	139,430	27,175	3,189	22,254	0	192,048	1,723	1,249	23,100	128,907	154,978	9,526	37,070
Dec	241	93,651	38,108	4,810	18,610	0	155,178	1,835	1,270	13,067	86,583	102,754	9,526	52,424
Jan	51	149,841	8,436	1,022	19,598	0	178,896	1,885	1,267	16,400	138,532	158,084	9,526	20,812
Feb	3	213,421	471	54	9,224	0	223,170	2,016	1,145	3,370	197,314	203,844	9,526	19,326
Mar	32	168,571	2,753	630	10,411	0	182,365	2,529	1,268	16,290	155,849	175,936	9,526	6,429
Apr	180	87,841	26,843	3,451	1,648	0	119,783	2,272	1,494	13,740	81,211	98,717	9,526	21,066
May	107	193,064	11,067	2,131	2,242	0	208,504	1,535	1,356	27,159	178,493	208,543	9,487	0
Jun	2	161,739	224	0	0	0	161,963	-	-	18,130	149,532	167,662	3,788	0
Jul	30	247,814	4,661	470	2,667	0	255,612	2,324	1,576	4,542	229,111	237,553	9,526	12,321
Aug	9	306,886	518	184	3,197	0	310,785	3,075	1,267	7,023	283,724	295,090	9,526	15,695
Sep	3	264,917	182	64	2,650	0	267,814	2,970	1,186	6,190	244,923	255,269	9,526	12,545



Tank Name: ikirigollewa **Tank Water Volume at FSL : 70,000 (m3)**

Cultivation Extend (Maha) : 19.95 ha **Cultivation Extend (Yala) : 18 ha**

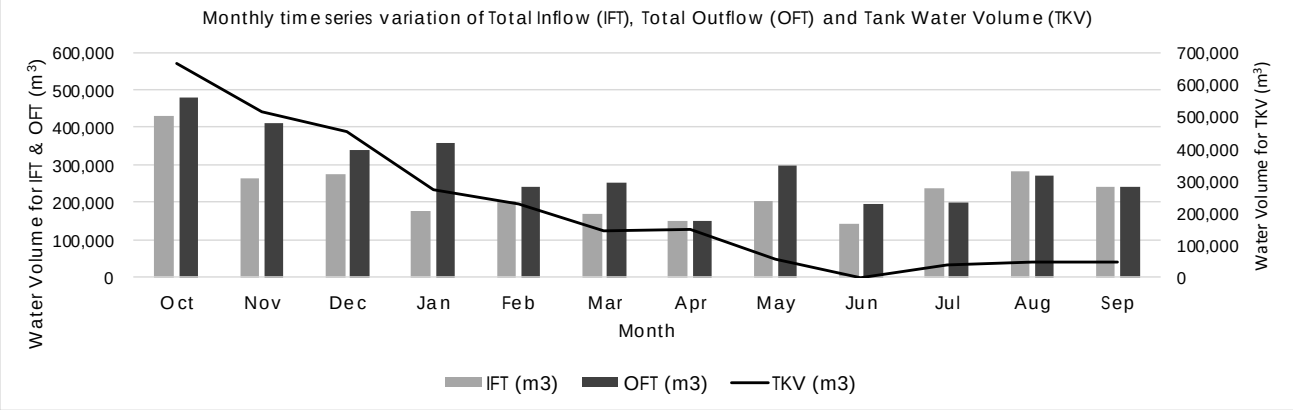
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	47,259	40,366	21,636	0	0	109,261	8,450	8,388	46,724	28,214	91,777	52,951	17,484
Nov	162	39,769	22,992	7,932	0	0	70,693	4,278	12,687	30,330	23,743	71,038	52,606	0
Dec	241	26,711	31,896	14,051	0	0	72,658	5,561	10,117	17,140	15,947	48,765	52,951	23,548
Jan	51	42,738	7,113	2,678	0	0	52,529	5,428	11,790	21,517	25,515	64,251	41,229	0
Feb	3	60,873	397	145	0	0	61,415	5,498	11,188	4,420	36,342	57,449	45,195	0
Mar	32	48,080	2,329	1,542	0	0	51,951	6,311	12,847	21,376	28,705	69,239	27,908	0
Apr	180	25,054	22,976	6,965	0	0	54,995	4,793	12,460	18,040	14,958	50,250	32,653	0
May	107	55,067	9,373	5,166	0	0	69,606	5,646	12,436	35,660	32,876	86,617	15,641	0
Jun	2	46,132	193	23	0	0	46,348	1,158	3,066	23,810	27,541	55,575	6,414	0
Jul	30	70,682	4,061	625	0	0	75,368	3,501	8,797	5,958	42,198	60,454	21,328	0
Aug	9	87,531	443	366	0	0	88,340	5,886	12,756	9,217	52,257	80,117	29,552	0
Sep	3	75,561	155	141	0	0	75,857	6,676	12,420	8,130	45,111	72,337	33,071	0



Tank Name: gonuhaddanawewa **Tank Water Volume at FSL : 470,000 (m3)**

Cultivation Extend (Maha) : 100.7 ha **Cultivation Extend (Yala) : 90 ha**

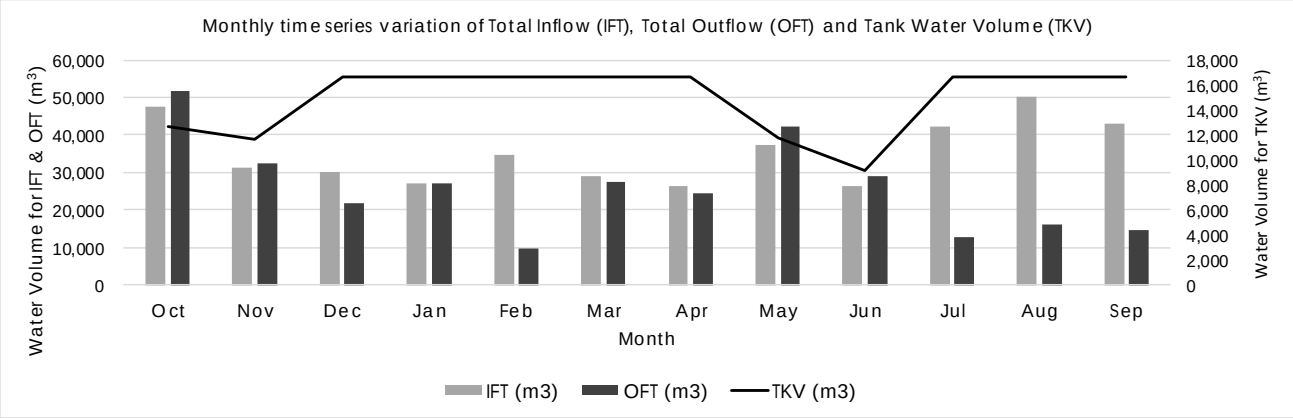
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	145,525	81,417	148,802	18,407	35,203	429,354	58,142	108,595	235,901	77,960	480,598	665,473	0
Nov	162	122,462	47,793	60,370	13,473	18,535	262,633	31,925	161,383	153,130	65,604	412,043	516,063	0
Dec	241	82,253	69,082	77,235	8,319	37,986	274,875	29,730	178,427	86,600	44,064	338,822	452,117	0
Jan	51	131,605	16,455	9,575	10,195	10,406	178,236	20,668	159,422	108,695	70,503	359,288	271,066	0
Feb	3	187,448	933	434	4,025	9,663	202,503	13,969	106,481	22,330	100,419	243,198	230,370	0
Mar	32	148,056	5,699	2,316	10,356	3,214	169,642	9,567	56,793	108,005	79,316	253,681	146,331	0
Apr	180	77,151	56,816	4,100	2,791	10,533	151,391	2,940	13,873	91,090	41,331	149,234	148,488	0
May	107	169,569	22,924	7,518	2,758	0	202,769	3,907	21,479	180,060	90,840	296,287	54,969	0
Jun	2	142,056	471	0	613	0	143,140	-	-	120,230	76,101	196,331	1,778	0
Jul	30	217,655	9,654	1,843	2,074	6,161	237,387	9,602	44,525	30,136	116,601	200,864	38,301	0
Aug	9	269,538	1,065	789	2,805	7,847	282,044	13,141	67,294	46,598	144,395	271,428	48,917	0
Sep	3	232,677	375	286	2,721	6,272	242,332	12,773	63,465	41,110	124,648	241,997	49,252	0



Tank Name: nawaghawewa **Tank Water Volume at FSL : 30,000 (m3)**

Cultivation Extend (Maha) : 19.95 ha **Cultivation Extend (Yala) : 18 ha**

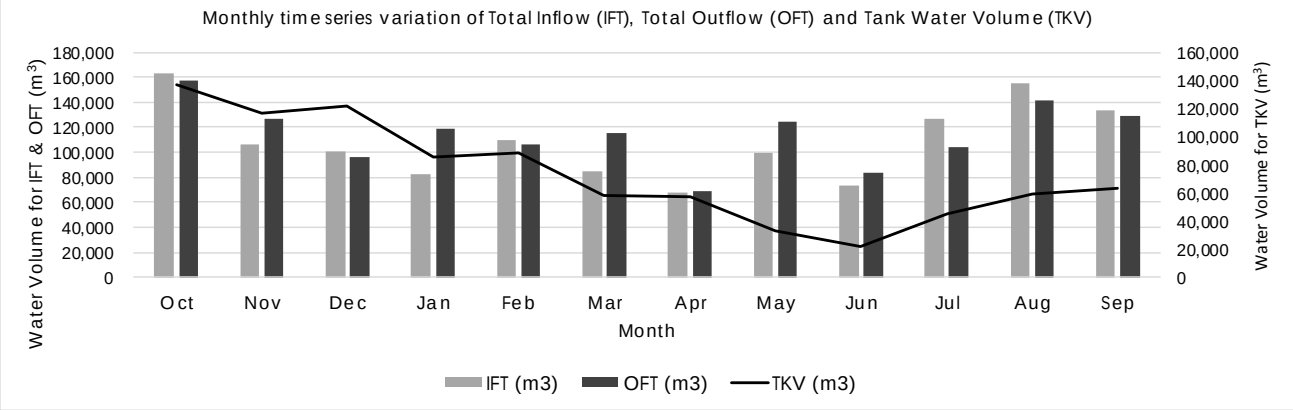
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	26,803	13,438	7,445	0	0	47,686	2,925	2,060	46,724	0	51,709	12,667	0
Nov	162	22,555	7,988	765	0	0	31,308	465	1,499	30,330	0	32,295	11,681	0
Dec	241	15,150	10,663	4,496	0	0	30,309	1,795	2,887	17,140	0	21,823	16,689	3,477
Jan	51	24,240	2,405	700	0	0	27,345	1,613	4,022	21,517	0	27,151	16,689	193
Feb	3	34,525	131	55	0	0	34,711	2,789	2,576	4,420	0	9,785	16,689	24,926
Mar	32	27,270	739	934	0	0	28,943	3,750	2,400	21,376	0	27,526	16,689	1,417
Apr	180	14,210	7,245	5,019	0	0	26,474	3,338	2,967	18,040	0	24,345	16,689	2,129
May	107	31,232	2,967	3,209	0	0	37,408	3,334	3,318	35,660	0	42,312	11,785	0
Jun	2	26,164	63	20	0	0	26,247	1,714	3,388	23,810	0	28,913	9,120	0
Jul	30	40,089	1,247	858	0	0	42,194	4,017	2,889	5,958	0	12,864	16,689	21,760
Aug	9	49,645	139	276	0	0	50,060	4,613	2,221	9,217	0	16,050	16,689	34,009
Sep	3	42,855	49	96	0	0	43,000	4,454	2,077	8,130	0	14,662	16,689	28,339



Tank Name: kudagama **Tank Water Volume at FSL : 140,000 (m3)**

Cultivation Extend (Maha) : 29.45 ha **Cultivation Extend (Yala) : 26 ha**

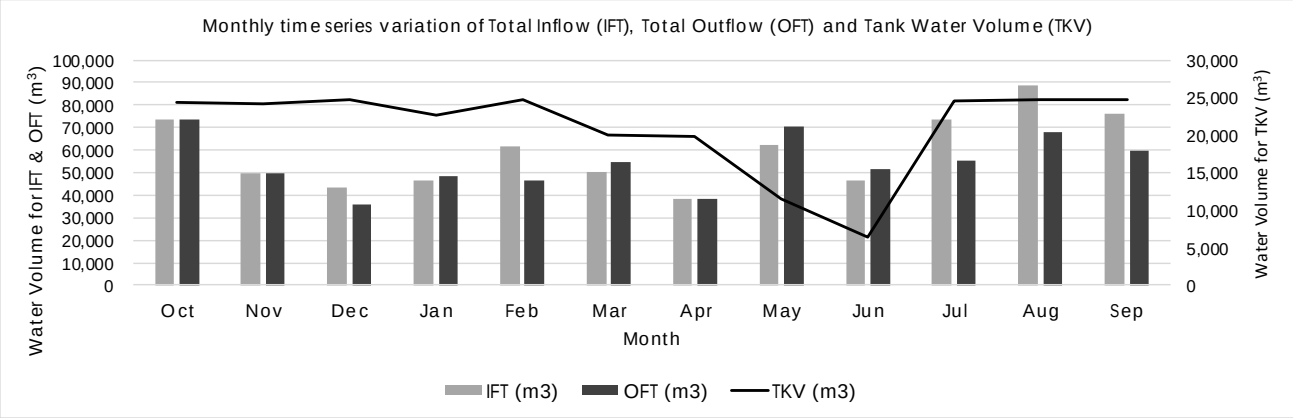
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	74,062	34,823	44,340	9,757	0	162,982	17,333	20,522	68,982	50,080	156,917	136,724	6,065
Nov	162	62,324	20,134	17,949	6,366	0	106,773	9,558	30,722	44,780	42,143	127,202	116,295	0
Dec	241	41,861	28,520	25,024	4,005	1,739	101,149	9,846	32,328	25,317	28,306	95,797	121,647	0
Jan	51	66,978	6,540	3,985	5,108	97	82,707	8,123	33,625	31,772	45,290	118,810	85,545	0
Feb	3	95,398	368	194	1,399	12,463	109,822	6,832	28,507	6,530	64,507	106,377	88,990	0
Mar	32	75,350	2,214	1,597	4,755	708	84,625	6,563	26,335	31,569	50,951	115,418	58,197	0
Apr	180	39,264	22,260	4,405	593	1,065	67,587	3,037	12,289	26,630	26,550	68,506	57,278	0
May	107	86,298	9,071	3,703	664	0	99,736	2,623	10,432	52,653	58,354	124,062	32,951	0
Jun	2	72,296	188	0	678	0	73,162	-	-	35,140	48,886	84,026	22,087	0
Jul	30	110,771	3,838	814	578	10,880	126,881	4,558	15,446	8,802	74,902	103,708	45,260	0
Aug	9	137,176	414	502	444	17,005	155,540	8,001	27,004	13,614	92,757	141,375	59,425	0
Sep	3	118,416	145	194	415	14,169	133,340	9,061	27,867	12,010	80,072	129,010	63,755	0



Tank Name: galkadawala **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 16.15 ha **Cultivation Extend (Yala) : 14 ha**

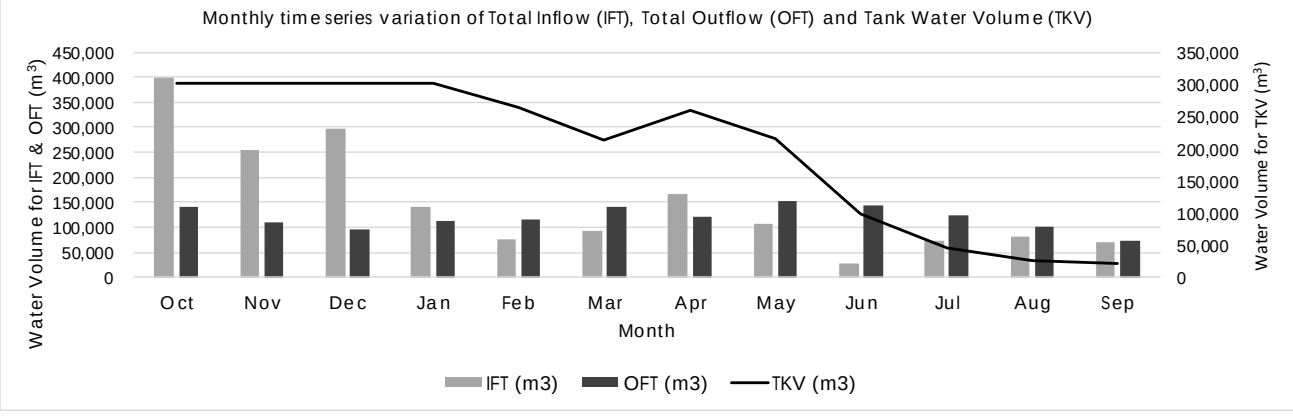
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	47,576	14,301	11,526	0	0	73,403	4,453	3,930	37,829	27,473	73,685	24,373	0
Nov	162	40,036	8,813	840	0	0	49,689	518	1,786	24,540	23,119	49,963	24,099	0
Dec	241	26,891	11,858	4,381	0	0	43,130	1,768	4,697	13,873	15,528	35,866	24,655	6,707
Jan	51	43,025	2,692	540	0	0	46,257	1,336	4,609	17,417	24,846	48,208	22,704	0
Feb	3	61,282	148	42	0	0	61,472	2,549	5,195	3,580	35,388	46,712	24,655	12,809
Mar	32	48,403	813	1,056	0	0	50,272	4,282	5,397	17,311	27,951	54,941	19,986	0
Apr	180	25,223	8,086	4,947	0	0	38,256	3,327	5,878	14,600	14,565	38,370	19,871	0
May	107	55,436	3,291	3,358	0	0	62,085	3,887	5,684	28,865	32,013	70,448	11,508	0
Jun	2	46,442	69	22	0	0	46,533	1,660	3,846	19,260	26,818	51,585	6,456	0
Jul	30	71,157	1,414	715	0	0	73,286	3,798	5,417	4,823	41,091	55,128	24,614	0
Aug	9	88,119	150	368	0	0	88,637	6,083	3,513	7,466	50,886	67,947	24,655	20,648
Sep	3	76,068	53	128	0	0	76,249	5,939	3,069	6,570	43,927	59,505	24,655	16,745



Tank Name: kiulekada **Tank Water Volume at FSL : 250,000 (m3)**

Cultivation Extend (Maha) : 14.25 ha **Cultivation Extend (Yala) : 13 ha**

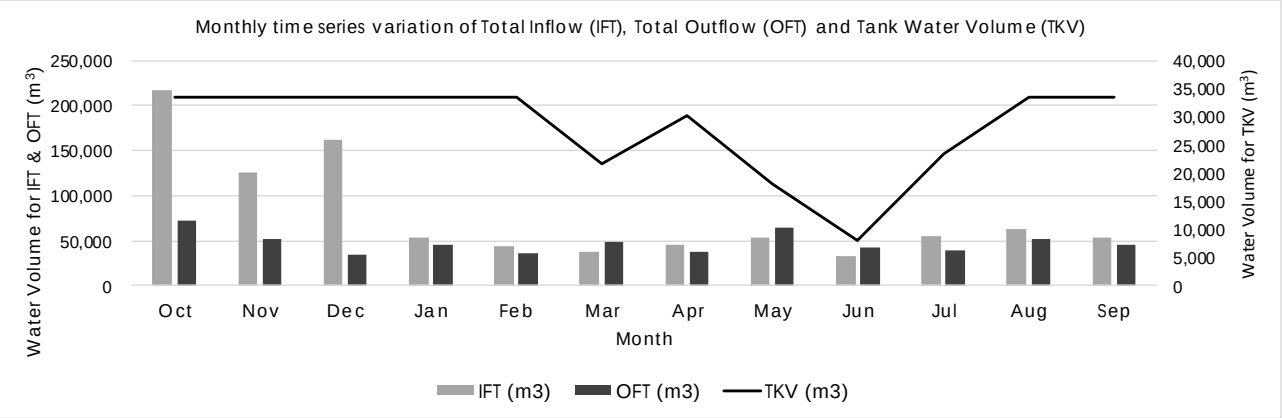
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	26,100	194,558	80,498	95,152	3,032	399,340	31,475	41,472	33,371	35,012	141,330	302,186	258,009
Nov	162	21,963	108,392	40,370	83,268	0	253,993	21,597	38,952	21,650	29,463	111,661	302,186	142,332
Dec	241	14,752	152,036	60,138	68,248	3,354	298,528	22,920	40,447	12,240	19,789	95,396	302,186	203,132
Jan	51	23,603	33,665	12,747	71,108	0	141,123	23,467	41,286	15,372	31,663	111,788	302,186	29,336
Feb	3	33,619	1,881	672	34,525	6,405	77,101	24,451	43,514	3,160	45,098	116,223	263,064	0
Mar	32	26,554	11,065	6,919	49,082	0	93,620	28,010	63,186	15,279	35,621	142,095	214,588	0
Apr	180	13,837	108,089	37,821	6,408	0	166,155	25,826	63,175	12,890	18,562	120,453	260,290	0
May	107	30,412	44,305	25,289	7,519	0	107,525	30,385	55,810	25,463	40,796	152,454	215,361	0
Jun	2	25,477	892	284	769	0	27,423	22,028	71,206	16,990	34,177	144,401	98,383	0
Jul	30	39,036	19,336	2,419	13,078	0	73,869	13,095	55,533	4,250	52,366	125,243	47,008	0
Aug	9	48,341	2,185	279	19,562	10,324	80,692	6,144	23,714	6,580	64,848	101,287	26,413	0
Sep	3	41,730	770	84	18,880	8,372	69,837	3,318	8,138	5,800	55,980	73,236	23,014	0



Tank Name: kiulekada ihalawewa **Tank Water Volume at FSL : 50,000 (m3)**

Cultivation Extend (Maha) : 19 ha **Cultivation Extend (Yala) : 17 ha**

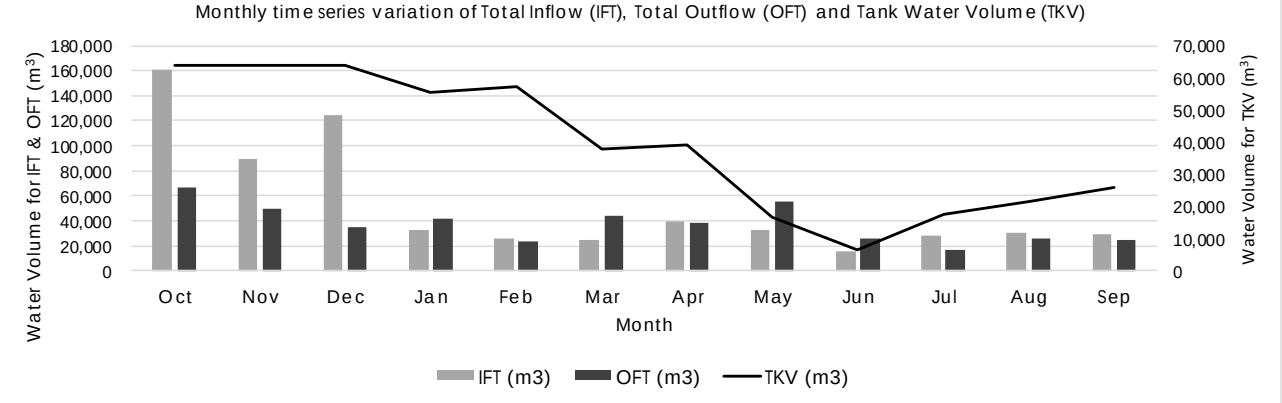
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	33,261	39,906	14,909	0	129,005	217,081	5,836	5,488	44,505	15,724	71,553	33,421	145,528
Nov	162	27,990	22,767	4,367	0	71,166	126,290	2,431	7,849	28,880	13,232	52,392	33,421	73,898
Dec	241	18,800	31,433	9,633	0	101,566	161,432	3,779	6,340	16,323	8,887	35,328	33,421	126,103
Jan	51	30,080	7,004	1,780	0	14,668	53,532	3,638	7,812	20,500	14,220	46,169	33,421	7,362
Feb	3	42,843	390	99	0	0	43,332	4,054	6,857	4,210	20,253	35,374	33,421	7,958
Mar	32	33,840	2,271	1,252	0	0	37,363	5,090	7,583	20,365	15,997	49,035	21,749	0
Apr	180	17,634	22,282	6,093	0	0	46,009	4,196	7,914	17,170	8,336	37,616	30,141	0
May	107	38,757	9,063	4,862	0	0	52,682	5,274	7,057	33,954	18,321	64,607	18,216	0
Jun	2	32,468	186	25	0	0	32,679	1,410	3,364	22,670	15,349	42,794	8,102	0
Jul	30	49,747	3,925	583	0	0	54,255	3,313	6,507	5,677	23,517	39,014	23,344	0
Aug	9	61,606	428	356	0	0	62,390	5,766	7,966	8,774	29,123	51,629	33,421	684
Sep	3	53,181	149	146	0	0	53,476	6,986	5,695	7,750	25,140	45,571	33,421	7,905



Tank Name: kiulekada kudawewa **Tank Water Volume at FSL : 80,000 (m3)**

Cultivation Extend (Maha) : 19.95 ha **Cultivation Extend (Yala) : 18 ha**

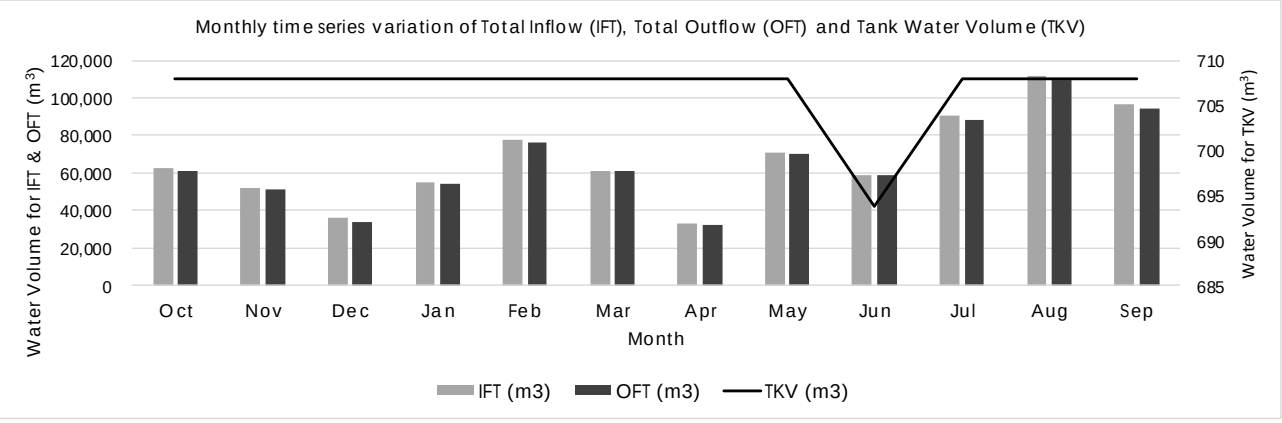
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	14,937	38,285	25,305	9,999	72,764	161,290	9,904	9,581	46,724	0	66,209	63,719	95,081
Nov	162	12,570	21,546	11,427	7,346	36,949	89,838	6,192	12,781	30,330	0	49,303	63,719	40,535
Dec	241	8,443	30,009	18,304	4,533	63,052	124,340	6,990	10,796	17,140	0	34,926	63,719	89,414
Jan	51	13,509	6,725	3,424	5,662	3,681	33,001	6,694	13,124	21,517	0	41,335	55,385	0
Feb	3	19,240	375	183	2,213	3,979	25,991	6,583	13,110	4,420	0	24,113	57,263	0
Mar	32	15,197	2,228	1,729	5,590	0	24,744	7,071	15,583	21,376	0	44,030	37,976	0
Apr	180	7,919	22,053	7,564	1,583	0	39,119	5,195	14,789	18,040	0	38,024	39,071	0
May	107	17,405	9,013	5,333	1,411	0	33,163	5,521	14,222	35,660	0	55,403	16,831	0
Jun	2	14,581	189	7	673	0	15,450	467	1,240	23,810	0	25,517	6,764	0
Jul	30	22,341	3,931	551	1,301	0	28,125	3,017	8,394	5,958	0	17,369	17,519	0
Aug	9	27,667	433	274	1,593	342	30,309	4,511	12,518	9,217	0	26,246	21,582	0
Sep	3	23,883	152	101	1,139	3,953	29,228	4,628	12,232	8,130	0	24,990	25,820	0



Tank Name: Kudawewa **Tank Water Volume at FSL : 3,000 (m3)**

Cultivation Extend (Maha) : 0.95 ha **Cultivation Extend (Yala) : 1 ha**

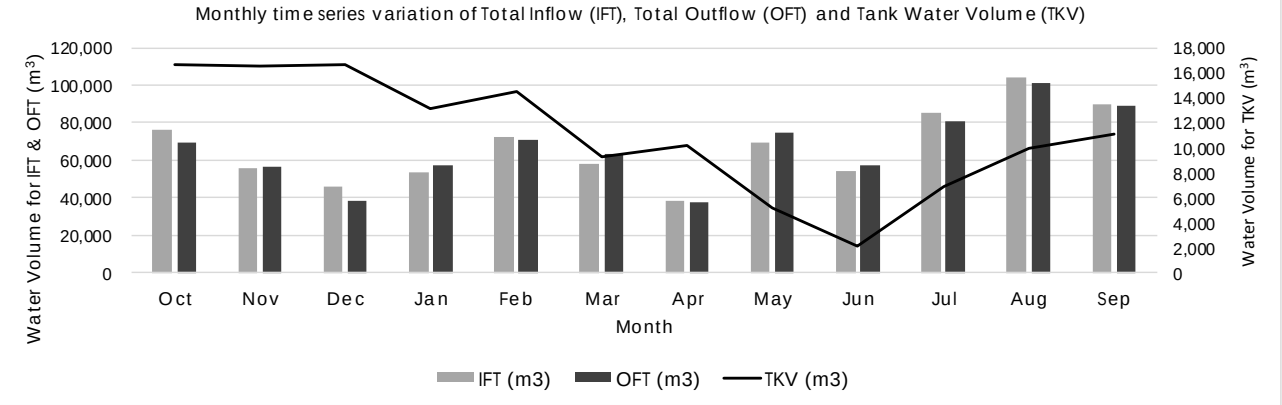
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	60,180	1,887	798	0	0	62,865	312	104	2,208	58,617	61,241	708	1,624
Nov	162	50,642	1,064	322	0	0	52,028	199	125	1,440	49,327	51,091	708	937
Dec	241	34,015	1,458	705	0	0	36,178	270	105	806	33,131	34,312	708	1,865
Jan	51	54,423	324	142	0	0	54,889	265	126	1,007	53,010	54,408	708	481
Feb	3	77,516	18	8	0	0	77,542	302	85	210	75,503	76,100	708	1,442
Mar	32	61,226	105	94	0	0	61,425	378	96	1,011	59,636	61,121	708	304
Apr	180	31,904	1,026	527	0	0	33,457	347	107	850	31,076	32,380	708	1,078
May	107	70,122	422	321	0	0	70,865	352	133	1,686	68,301	70,472	708	394
Jun	2	58,745	8	3	0	0	58,756	269	172	1,110	57,219	58,770	694	0
Jul	30	90,008	177	88	0	0	90,273	444	107	271	87,670	88,492	708	1,767
Aug	9	111,463	20	28	0	0	111,511	461	94	422	108,568	109,545	708	1,966
Sep	3	96,220	7	10	0	0	96,237	445	88	380	93,721	94,634	708	1,603



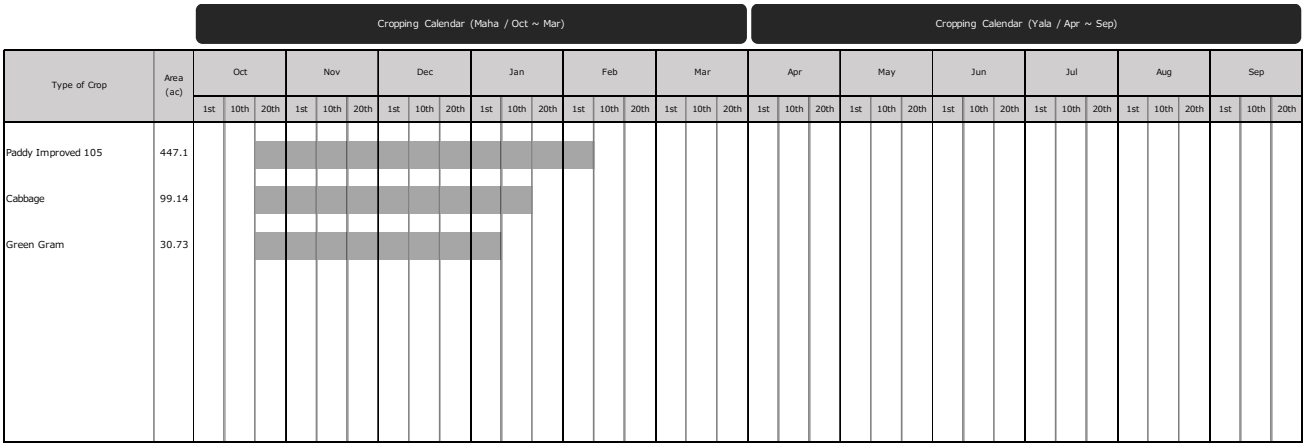
Tank Name: Puliyankulam Kudawewa **Tank Water Volume at FSL : 30,000 (m3)**

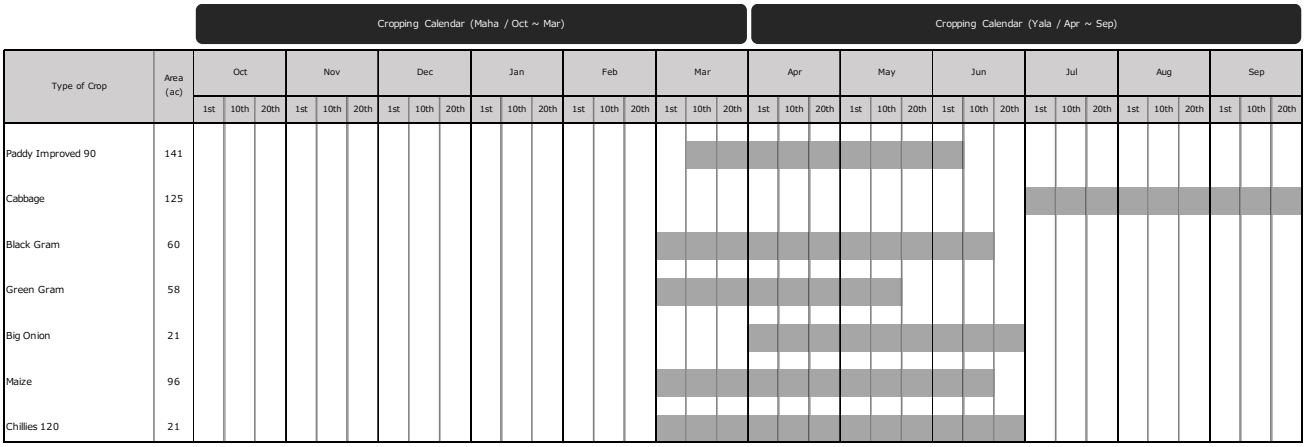
Cultivation Extend (Maha) : 5.7 ha **Cultivation Extend (Yala) : 5 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	55,686	9,102	9,365	462	1,288	75,903	3,657	2,603	13,332	49,746	69,338	16,689	6,565
Nov	162	46,860	5,266	3,550	313	123	56,112	1,916	3,892	8,650	41,862	56,320	16,482	0
Dec	241	31,475	7,239	6,210	182	978	46,083	2,422	3,137	4,890	28,117	38,567	16,689	7,309
Jan	51	50,359	1,627	1,173	227	187	53,572	2,365	3,663	6,145	44,988	57,160	13,101	0
Feb	3	71,728	91	63	59	720	72,661	2,430	3,465	1,260	64,077	71,231	14,531	0
Mar	32	56,654	534	688	221	152	58,250	2,808	4,003	6,097	50,611	63,518	9,262	0
Apr	180	29,522	5,324	3,122	21	532	38,521	2,139	3,969	5,150	26,373	37,632	10,151	0
May	107	64,886	2,158	2,226	27	367	69,664	2,490	3,954	10,177	57,965	74,586	5,228	0
Jun	2	54,358	45	12	34	0	54,449	744	1,450	6,790	48,560	57,544	2,134	0
Jul	30	83,286	960	275	21	705	85,248	1,528	2,812	1,688	74,403	80,430	6,951	0
Aug	9	103,140	103	164	19	991	104,416	2,622	4,062	2,626	92,138	101,448	9,920	0
Sep	3	89,035	36	63	18	765	89,916	2,989	3,911	2,310	79,538	88,748	11,088	0



Proposed Cropping Calendar Navelikulam Cascade System

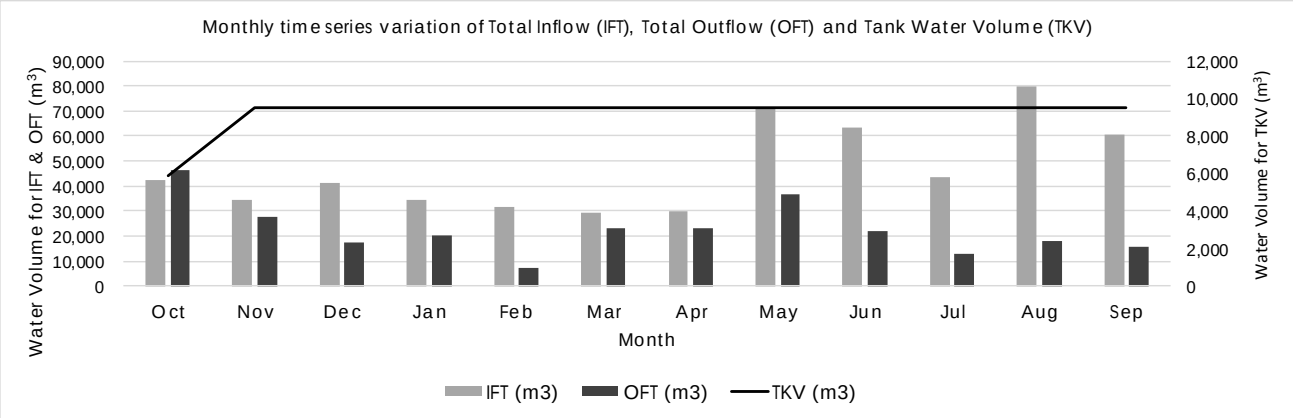




Result of Operation Study for Each Tank in Navelikulam Cascade System

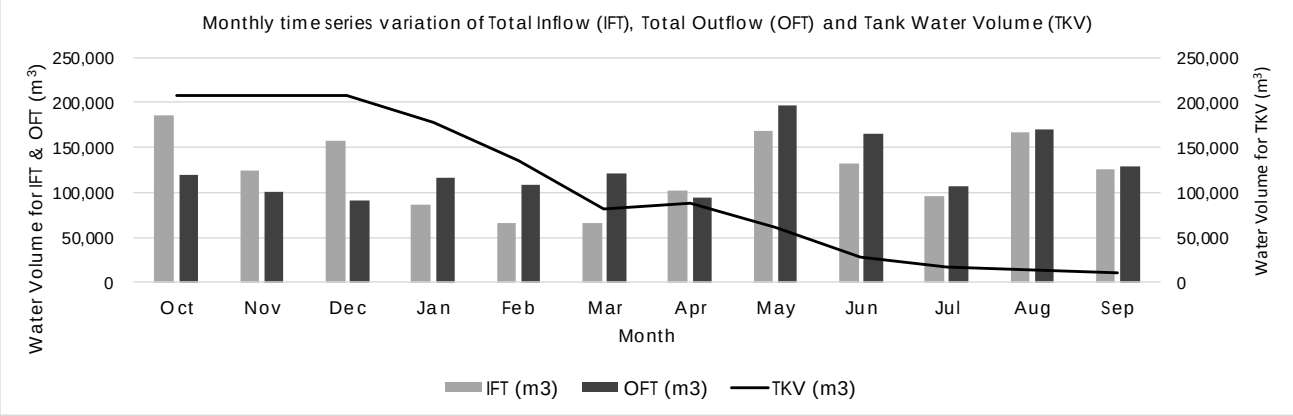
Tank Name: Puthiya puarasan kulam **Tank Water Volume at FSL : 20,000 (m3)**
Cultivation Extend (Maha) : 15 ha **Cultivation Extend (Yala) : 17 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	17,550	20,402	4,589	0	0	42,541	1,828	815	43,574	0	46,217	5,850	0
Nov	162	21,101	11,467	1,690	0	0	34,258	1,048	1,533	25,391	0	27,972	9,526	2,611
Dec	241	20,741	15,734	4,656	0	0	41,131	1,755	1,242	14,325	0	17,322	9,526	23,809
Jan	51	29,782	3,478	1,022	0	0	34,282	1,850	1,123	17,540	0	20,512	9,526	13,770
Feb	3	31,229	194	54	0	0	31,477	2,016	916	4,300	0	7,232	9,526	24,245
Mar	32	27,655	1,135	625	0	0	29,415	2,507	1,076	19,865	0	23,449	9,526	5,966
Apr	180	15,446	11,100	3,338	0	0	29,884	2,185	1,359	19,480	0	23,024	9,526	6,860
May	107	64,889	4,563	2,146	0	0	71,598	2,629	1,014	33,197	0	36,840	9,526	34,758
Jun	2	63,310	91	32	0	0	63,433	2,784	981	18,099	0	21,864	9,526	41,569
Jul	30	40,957	1,914	598	0	0	43,469	3,075	1,014	8,925	0	13,014	9,526	30,454
Aug	9	79,248	214	184	0	0	79,646	3,075	1,014	13,797	0	17,886	9,526	61,760
Sep	3	60,222	76	64	0	0	60,362	2,970	949	12,174	0	16,092	9,526	44,270



Tank Name: Mahilan kulam **Tank Water Volume at FSL : 190,000 (m3)**
Cultivation Extend (Maha) : 14.25 ha **Cultivation Extend (Yala) : 13 ha**

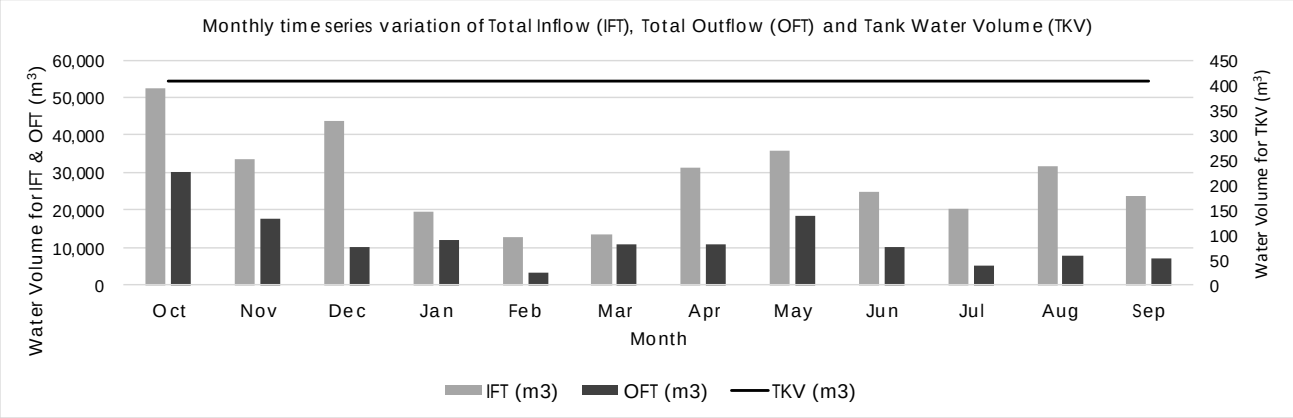
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	36,546	88,059	60,738	0	0	185,343	23,773	23,729	40,851	31,325	119,679	207,607	65,664
Nov	162	43,941	49,056	30,453	0	0	123,450	16,327	22,180	23,804	37,664	99,975	207,607	23,475
Dec	241	43,191	68,790	45,411	0	0	157,392	17,299	23,272	13,430	37,021	91,021	207,607	66,371
Jan	51	62,018	15,330	9,063	0	0	86,411	17,011	29,252	16,444	53,158	115,865	178,153	0
Feb	3	65,030	857	476	0	0	66,363	16,310	32,648	4,032	55,740	108,730	135,787	0
Mar	32	57,588	5,148	3,968	0	0	66,704	16,112	41,096	14,899	49,361	121,469	81,022	0
Apr	180	32,164	50,745	18,757	0	0	101,666	12,840	39,158	14,610	27,570	94,177	88,511	0
May	107	135,123	20,793	12,528	0	0	168,444	14,788	40,606	24,898	115,820	196,112	60,843	0
Jun	2	131,836	422	115	0	0	132,373	8,924	29,261	13,574	113,002	164,762	28,455	0
Jul	30	85,287	9,088	1,230	0	0	95,605	6,683	20,692	6,694	73,103	107,172	16,888	0
Aug	9	165,025	1,021	257	0	0	166,303	4,695	13,313	10,347	141,450	169,806	13,385	0
Sep	3	125,406	360	86	0	0	125,852	3,544	8,532	9,130	107,491	128,697	10,540	0



Tank Name: Alan kulam **Tank Water Volume at FSL : 2,000 (m3)**

Cultivation Extend (Maha) : 10.45 ha **Cultivation Extend (Yala) : 9 ha**

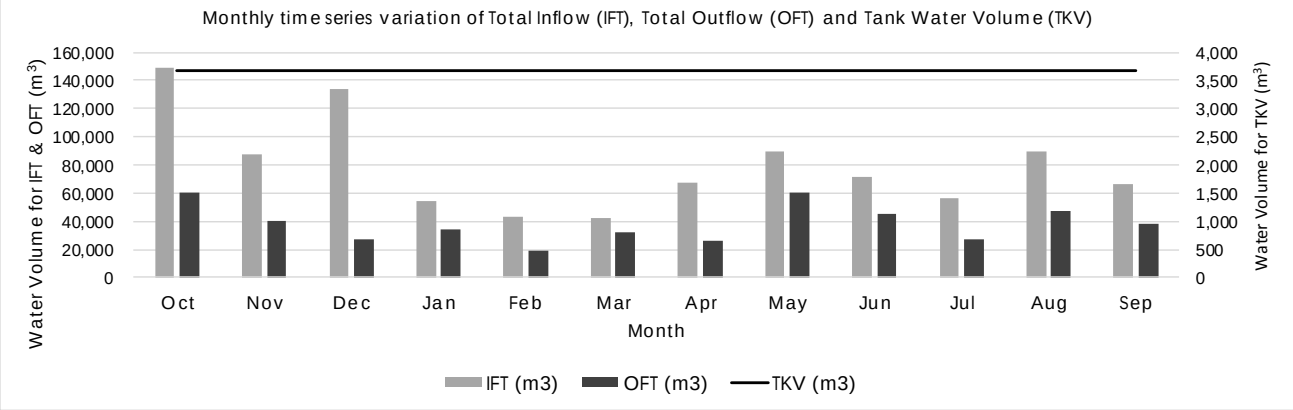
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	6,867	45,157	498	0	0	52,522	196	34	29,957	0	30,187	407	22,336
Nov	162	8,257	25,172	207	0	0	33,636	123	42	17,457	0	17,622	407	16,014
Dec	241	8,116	35,294	363	0	0	43,773	133	34	9,848	0	10,016	407	33,757
Jan	51	11,654	7,813	86	0	0	19,553	133	43	12,059	0	12,234	407	7,319
Feb	3	12,220	436	5	0	0	12,661	202	39	2,956	0	3,197	407	9,464
Mar	32	10,821	2,548	45	0	0	13,414	149	37	10,926	0	11,111	407	2,303
Apr	180	6,044	24,837	289	0	0	31,170	169	43	10,714	0	10,925	407	20,245
May	107	25,391	10,244	214	0	0	35,849	263	43	18,259	0	18,565	407	17,285
Jun	2	24,774	203	4	0	0	24,981	278	42	9,954	0	10,275	407	14,706
Jul	30	16,027	4,298	60	0	0	20,385	308	43	4,909	0	5,260	407	15,125
Aug	9	31,010	480	18	0	0	31,508	308	43	7,588	0	7,939	407	23,569
Sep	3	23,565	168	6	0	0	23,739	297	41	6,696	0	7,033	407	16,706



Tank Name: Sinnmara irampai kulam **Tank Water Volume at FSL : 10,000 (m3)**

Cultivation Extend (Maha) : 18.05 ha **Cultivation Extend (Yala) : 16 ha**

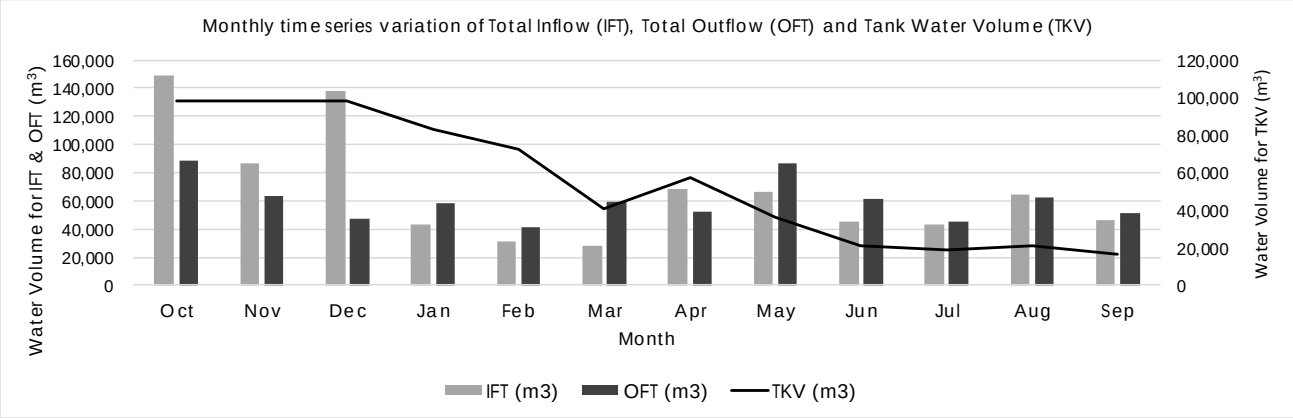
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	12,209	78,968	2,798	21,794	32,832	148,601	1,105	386	51,744	7,249	60,485	3,682	88,116
Nov	162	14,679	44,021	1,369	14,582	13,043	87,694	820	408	30,152	8,716	40,096	3,682	47,598
Dec	241	14,429	61,696	2,273	10,454	45,090	133,941	877	458	17,011	8,567	26,913	3,682	107,028
Jan	51	20,718	13,660	489	12,872	6,885	54,624	889	488	20,829	12,301	34,507	3,682	20,117
Feb	3	21,724	763	27	8,379	12,122	43,016	1,008	354	5,107	12,899	19,368	3,682	23,648
Mar	32	19,238	4,454	313	15,387	2,983	42,376	1,251	421	18,872	11,423	31,967	3,682	10,409
Apr	180	10,745	43,431	1,637	8,104	3,430	67,347	1,015	418	18,506	6,380	26,319	3,682	41,028
May	107	45,140	17,909	1,073	8,324	17,379	89,825	1,314	392	31,538	26,802	60,046	3,682	29,779
Jun	2	44,042	355	16	6,049	20,784	71,246	1,392	379	17,194	26,150	45,115	3,682	26,131
Jul	30	28,492	7,514	299	4,341	15,227	55,873	1,538	392	8,479	16,917	27,325	3,682	28,548
Aug	9	55,129	839	92	2,865	30,880	89,806	1,538	392	13,107	32,733	47,769	3,682	42,037
Sep	3	41,894	295	32	1,896	22,135	66,252	1,485	367	11,565	24,874	38,291	3,682	27,961



Tank Name: Pakkusorinchan **Tank Water Volume at FSL : 110,000 (m3)**

Cultivation Extend (Maha) : 19.95 ha **Cultivation Extend (Yala) : 18 ha**

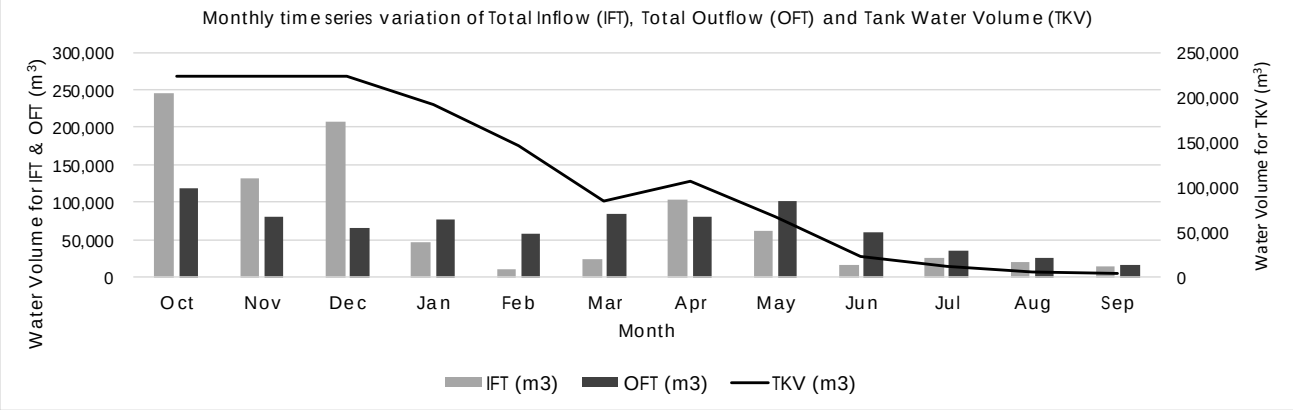
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	6,887	35,309	34,763	16,424	55,226	148,609	13,599	11,957	57,191	6,162	88,910	98,180	59,699
Nov	162	8,280	19,815	16,556	9,612	31,806	86,069	8,995	13,450	33,326	7,408	63,180	98,180	22,889
Dec	241	8,139	27,536	26,211	5,470	70,393	137,749	9,971	11,325	18,802	7,282	47,380	98,180	90,369
Jan	51	11,686	6,211	4,911	6,684	13,718	43,209	9,495	15,315	23,021	10,456	58,288	83,102	0
Feb	3	12,254	345	271	1,691	16,556	31,117	9,381	15,659	5,644	10,964	41,649	72,570	0
Mar	32	10,852	2,082	2,398	6,051	6,356	27,739	9,818	19,098	20,859	9,709	59,484	40,825	0
Apr	180	6,061	20,651	11,269	92	30,636	68,709	7,841	18,627	20,454	5,423	52,345	57,190	0
May	107	25,462	8,307	8,724	87	23,532	66,112	10,895	18,252	34,857	22,782	86,785	36,516	0
Jun	2	24,842	174	66	84	20,418	45,585	5,408	14,288	19,004	22,227	60,928	21,173	0
Jul	30	16,071	3,705	1,081	87	21,836	42,780	6,069	15,125	9,371	14,379	44,945	19,008	0
Aug	9	31,096	414	326	87	32,803	64,726	5,627	14,364	14,486	27,823	62,300	21,434	0
Sep	3	23,631	146	118	81	22,334	46,310	4,840	12,102	12,783	21,143	50,867	16,876	0



Tank Name: Navelikulam **Tank Water Volume at FSL : 200,000 (m3)**

Cultivation Extend (Maha) : 23.75 ha **Cultivation Extend (Yala) : 21 ha**

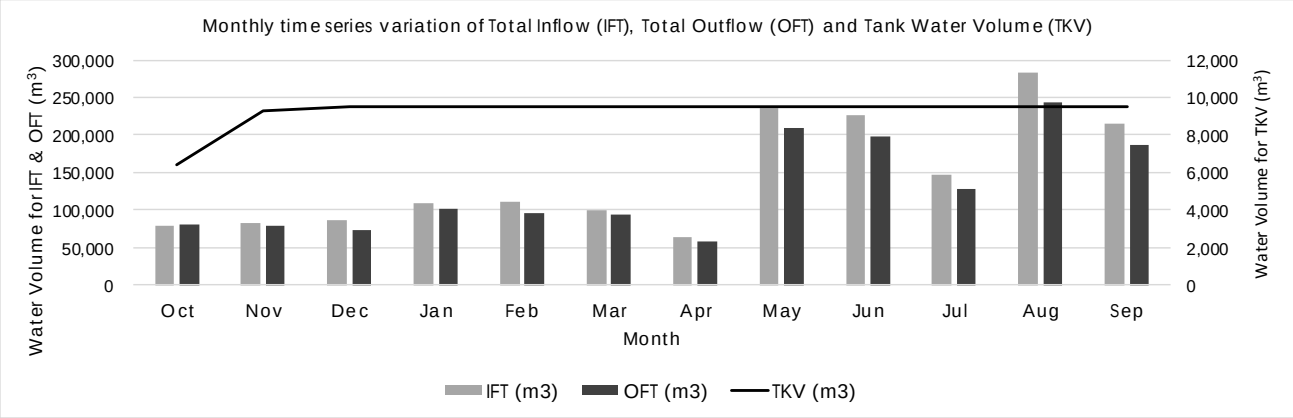
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	3,443	133,802	63,920	13,830	29,850	244,845	25,025	25,432	68,085	0	118,541	222,536	126,303
Nov	162	4,140	74,545	32,060	9,355	11,445	131,545	17,192	23,718	39,674	0	80,584	222,536	50,961
Dec	241	4,069	104,536	47,825	6,025	45,184	207,640	18,227	24,794	22,383	0	65,404	222,536	142,236
Jan	51	5,843	23,257	9,522	7,667	0	46,289	17,895	31,424	27,406	0	76,725	192,100	0
Feb	3	6,127	1,299	503	4,261	0	12,190	17,232	34,832	6,719	0	58,783	145,506	0
Mar	32	5,426	7,740	4,164	7,991	0	25,321	16,935	44,012	24,832	0	85,779	85,049	0
Apr	180	3,030	75,938	20,317	3,725	0	103,011	13,988	42,286	24,350	0	80,624	107,436	0
May	107	12,731	31,092	14,367	3,650	0	61,840	16,721	43,658	41,497	0	101,875	67,401	0
Jun	2	12,421	630	118	2,858	0	16,027	8,757	29,185	22,624	0	60,566	22,861	0
Jul	30	8,036	13,525	1,025	3,025	0	25,611	5,964	18,087	11,156	0	35,207	13,265	0
Aug	9	15,548	1,523	89	2,873	0	20,033	3,010	6,374	17,246	0	26,629	6,668	0
Sep	3	11,815	537	18	2,420	0	14,791	511	942	15,217	0	16,670	4,789	0



Tank Name: Mathavuvaiththa kulam **Tank Water Volume at FSL : 20,000 (m3)**

Cultivation Extend (Maha) : 9.5 ha **Cultivation Extend (Yala) : 9 ha**

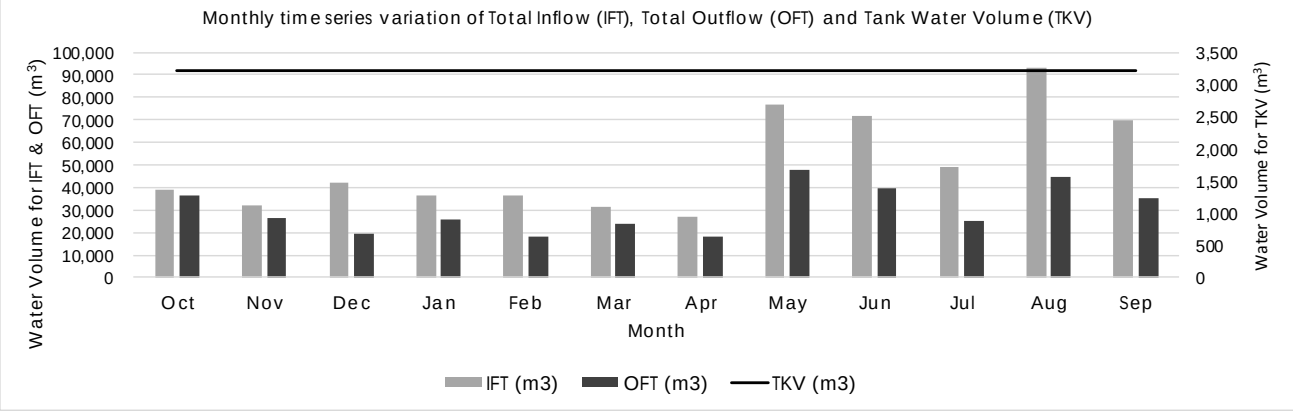
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	62,651	10,815	4,864	0	0	78,330	1,927	913	27,234	51,406	81,479	6,377	0
Nov	162	75,328	6,245	1,136	0	0	82,709	705	1,417	15,870	61,807	79,799	9,287	0
Dec	241	74,042	8,320	4,364	0	0	86,726	1,586	1,413	8,953	60,752	72,705	9,526	13,781
Jan	51	106,316	1,827	1,022	0	0	109,165	1,857	1,112	10,962	87,234	101,165	9,526	8,000
Feb	3	111,480	102	54	0	0	111,636	2,016	916	2,688	91,471	97,091	9,526	14,546
Mar	32	98,722	595	630	0	0	99,947	2,530	1,014	9,933	81,003	94,479	9,526	5,468
Apr	180	55,139	5,816	3,538	0	0	64,493	2,345	1,120	9,740	45,242	58,447	9,526	6,046
May	107	231,640	2,395	2,146	0	0	236,181	2,629	1,014	16,599	190,063	210,305	9,526	25,876
Jun	2	226,005	48	32	0	0	226,085	2,784	981	9,050	185,440	198,254	9,526	27,830
Jul	30	146,207	1,004	598	0	0	147,809	3,075	1,014	4,463	119,965	128,516	9,526	19,293
Aug	9	282,899	112	184	0	0	283,195	3,075	1,014	6,898	232,122	243,110	9,526	40,085
Sep	3	214,981	40	64	0	0	215,085	2,970	949	6,087	176,395	186,400	9,526	28,685



Tank Name: Umaiyar puliyan kulam **Tank Water Volume at FSL : 9,000 (m3)**

Cultivation Extend (Maha) : 9.5 ha **Cultivation Extend (Yala) : 9 ha**

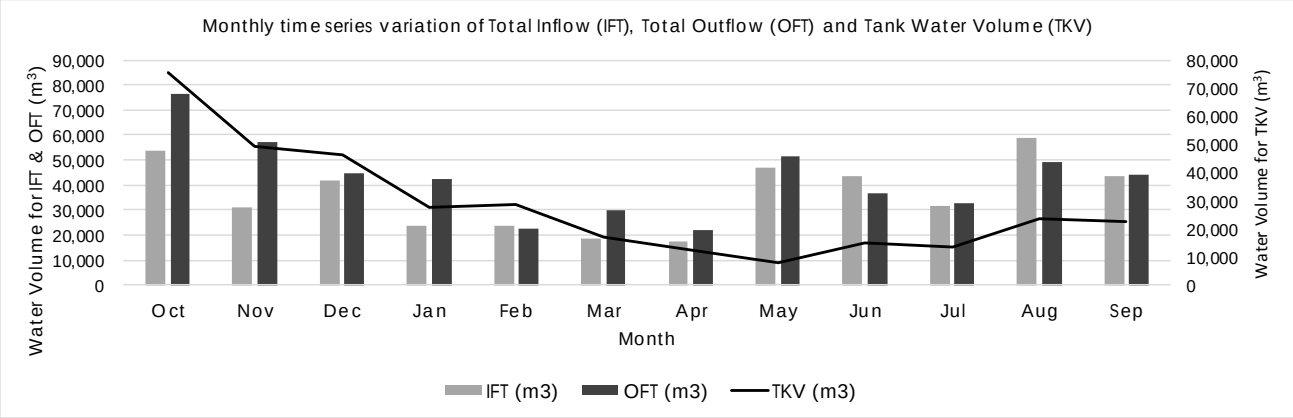
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	16,024	15,271	2,018	5,629	0	38,942	796	252	27,234	8,012	36,294	3,208	2,648
Nov	162	19,267	8,497	1,056	3,457	0	32,277	645	448	15,870	9,633	26,596	3,208	5,681
Dec	241	18,938	11,835	2,084	2,073	6,891	41,821	802	394	8,953	9,469	19,618	3,208	22,203
Jan	51	27,192	2,618	460	2,415	4,000	36,685	839	364	10,962	13,596	25,762	3,208	10,924
Feb	3	28,513	146	24	721	7,273	36,677	907	308	2,688	14,257	18,160	3,208	18,517
Mar	32	25,250	854	283	2,189	2,734	31,311	1,138	341	9,933	12,625	24,038	3,208	7,273
Apr	180	14,103	8,348	1,474	224	3,023	27,172	964	429	9,740	7,051	18,184	3,208	8,988
May	107	59,246	3,434	966	203	12,938	76,787	1,183	341	16,599	29,623	47,746	3,208	29,041
Jun	2	57,805	68	14	196	13,915	71,998	1,253	330	9,050	28,903	39,535	3,208	32,463
Jul	30	37,395	1,442	269	203	9,646	48,955	1,384	341	4,463	18,698	24,885	3,208	24,070
Aug	9	72,357	161	83	203	20,043	92,846	1,384	341	6,898	36,178	44,802	3,208	48,044
Sep	3	54,986	56	29	190	14,343	69,603	1,336	319	6,087	27,493	35,235	3,208	34,367



Tank Name: Vala sinna kulam **Tank Water Volume at FSL : 110,000 (m3)**

Cultivation Extend (Maha) : 16.15 ha **Cultivation Extend (Yala) : 14 ha**

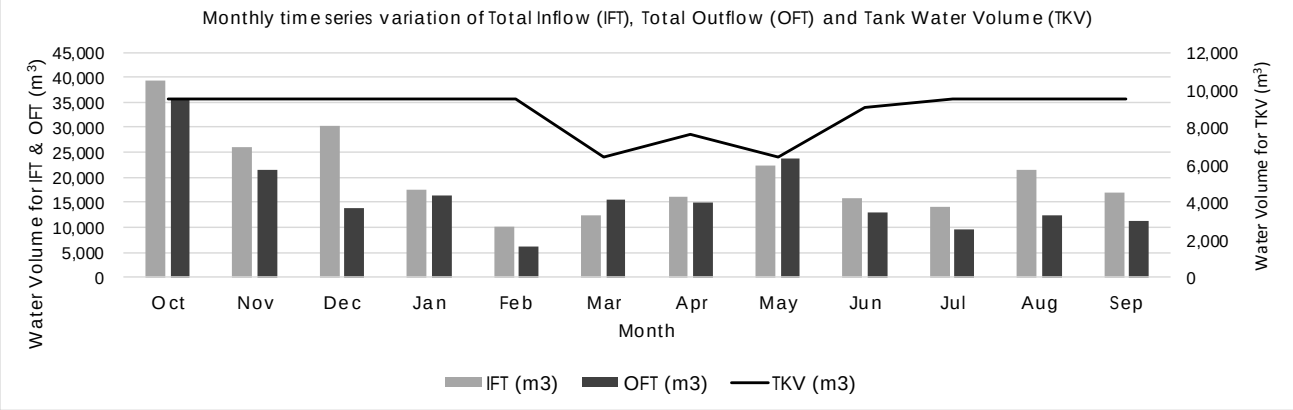
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	7,611	5,217	34,385	5,497	1,324	54,035	13,383	12,464	46,298	4,349	76,494	75,721	0
Nov	162	9,152	3,819	11,889	3,264	2,840	30,964	6,264	18,810	26,978	5,229	57,282	49,403	0
Dec	241	8,995	5,959	14,009	1,869	11,101	41,934	5,546	18,897	15,220	5,140	44,803	46,533	0
Jan	51	12,916	1,592	1,374	2,265	5,462	23,609	3,247	13,187	18,636	7,381	42,450	27,692	0
Feb	3	13,544	90	68	599	9,258	23,559	2,337	7,982	4,569	7,739	22,628	28,624	0
Mar	32	11,994	563	392	2,055	3,636	18,640	1,677	4,841	16,886	6,854	30,258	17,006	0
Apr	180	6,699	5,691	635	86	4,494	17,605	398	1,044	16,558	3,828	21,828	12,783	0
May	107	28,142	2,172	2,058	68	14,520	46,961	1,988	5,420	28,218	16,081	51,706	8,038	0
Jun	2	27,457	48	0	66	16,232	43,803	1,586	3,901	15,384	15,690	36,562	15,279	0
Jul	30	17,763	875	814	68	12,035	31,555	4,273	11,049	7,586	10,150	33,058	13,776	0
Aug	9	34,370	94	316	68	24,022	58,870	5,002	12,889	11,727	19,640	49,257	23,389	0
Sep	3	26,118	32	121	64	17,184	43,519	5,407	13,386	10,348	14,925	44,066	22,842	0



Tank Name: Panichchan kulam **Tank Water Volume at FSL : 20,000 (m3)**

Cultivation Extend (Maha) : 11.4 ha **Cultivation Extend (Yala) : 10 ha**

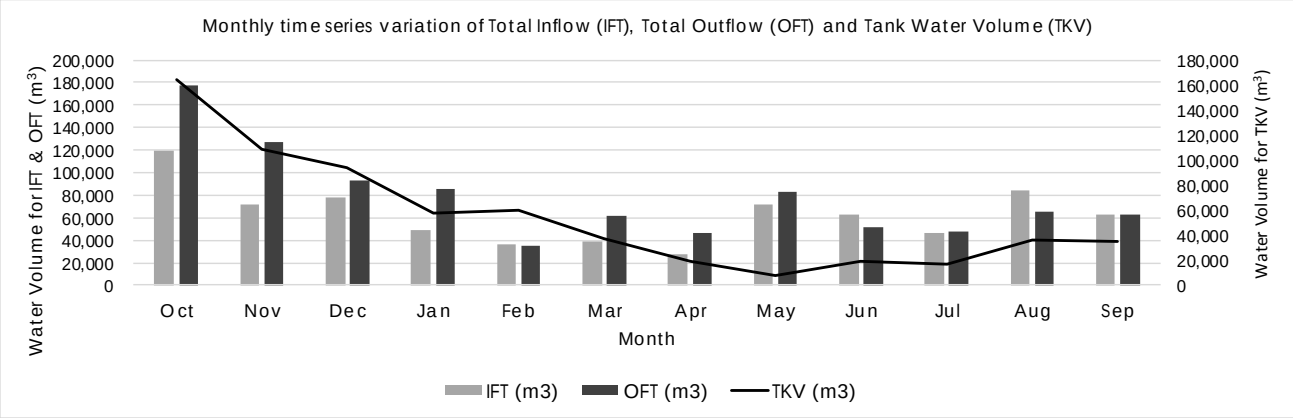
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	4,132	18,308	5,150	11,752	0	39,342	2,011	1,021	32,681	0	35,712	9,526	3,630
Nov	162	4,968	10,401	1,390	9,158	0	25,917	871	1,581	19,044	0	21,496	9,526	4,421
Dec	241	4,883	14,185	4,519	6,823	0	30,411	1,660	1,367	10,744	0	13,771	9,526	16,640
Jan	51	7,012	3,156	883	6,365	0	17,415	1,723	1,441	13,155	0	16,319	9,526	1,096
Feb	3	7,352	175	54	2,510	0	10,092	2,014	924	3,225	0	6,162	9,526	3,929
Mar	32	6,511	1,027	570	4,345	0	12,453	2,310	1,374	11,919	0	15,603	6,377	0
Apr	180	3,637	10,180	2,103	209	0	16,128	1,477	1,739	11,688	0	14,903	7,602	0
May	107	15,277	4,127	1,932	1,084	0	22,420	2,143	1,571	19,918	0	23,632	6,390	0
Jun	2	14,905	85	6	780	0	15,777	982	1,236	10,859	0	13,077	9,089	0
Jul	30	9,643	1,734	529	2,210	0	14,115	2,770	1,379	5,355	0	9,505	9,526	4,174
Aug	9	18,658	192	184	2,578	0	21,611	3,075	1,014	8,278	0	12,367	9,526	9,244
Sep	3	14,178	68	64	2,677	0	16,988	2,970	949	7,304	0	11,222	9,526	5,765



Tank Name: Omanthai kulam **Tank Water Volume at FSL : 200,000 (m3)**

Cultivation Extend (Maha) : 43.7 ha **Cultivation Extend (Yala) : 39 ha**

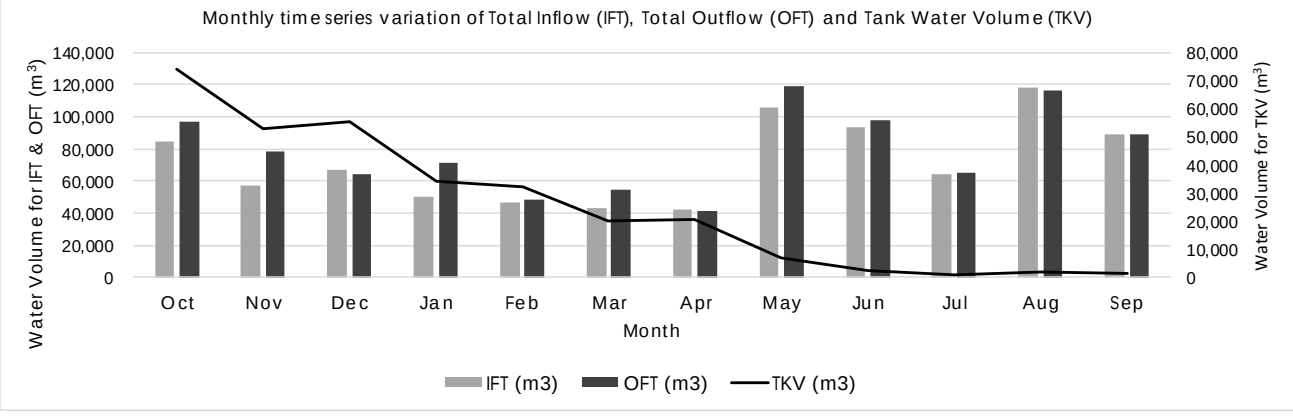
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	17,216	9,416	62,405	28,650	1,815	119,503	24,272	28,214	125,276	0	177,762	164,277	0
Nov	162	20,700	6,955	21,263	20,355	2,210	71,484	11,199	42,736	73,000	0	126,935	108,826	0
Dec	241	20,347	10,938	24,343	14,069	8,320	78,017	9,520	42,121	41,185	0	92,826	94,016	0
Jan	51	29,216	2,871	2,535	14,348	548	49,517	5,708	29,291	50,427	0	85,425	58,108	0
Feb	3	30,635	163	121	3,966	1,965	36,849	4,244	18,030	12,364	0	34,638	60,320	0
Mar	32	27,129	1,007	835	9,488	0	38,459	3,438	12,077	45,691	0	61,206	37,573	0
Apr	180	15,152	10,413	522	1,303	0	27,390	416	1,043	44,804	0	46,263	18,700	0
May	107	63,654	4,094	2,240	1,894	0	71,883	1,665	4,785	76,354	0	82,804	7,778	0
Jun	2	62,106	86	0	447	0	62,639	2,509	7,289	41,628	0	51,426	18,990	0
Jul	30	40,178	1,611	1,299	1,221	2,087	46,396	6,709	20,892	20,528	0	48,129	17,257	0
Aug	9	77,741	174	502	647	4,622	83,686	7,916	25,382	31,732	0	65,030	35,913	0
Sep	3	59,077	60	192	430	2,883	62,641	8,549	26,866	28,000	0	63,415	35,139	0



Tank Name: Maruthodai kulam **Tank Water Volume at FSL : 100,000 (m3)**

Cultivation Extend (Maha) : 18.05 ha **Cultivation Extend (Yala) : 16 ha**

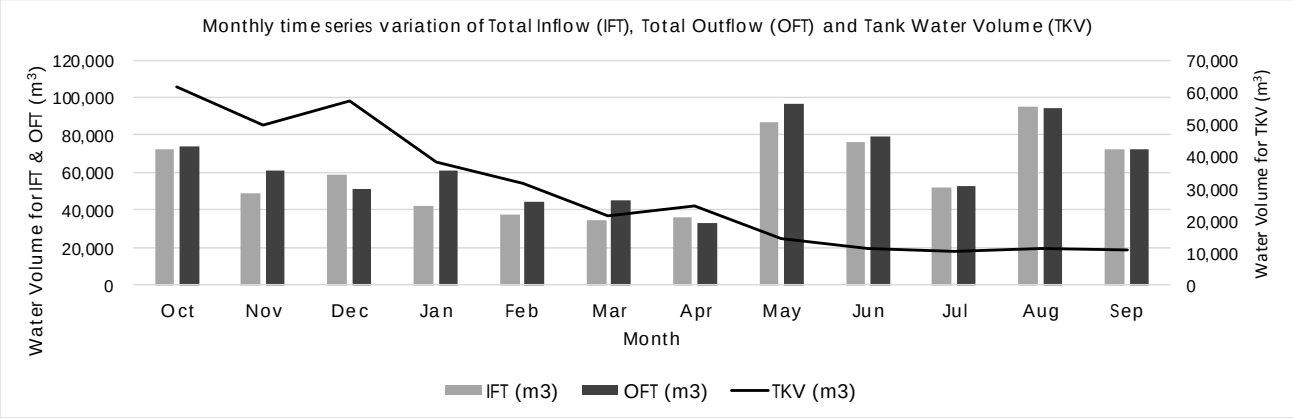
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	25,944	27,893	30,808	0	0	84,645	11,985	11,329	51,744	22,129	97,187	73,910	0
Nov	162	31,193	16,478	9,953	0	0	57,624	5,250	16,498	30,152	26,606	78,506	53,028	0
Dec	241	30,661	23,533	12,273	0	0	66,467	4,924	16,292	17,011	26,152	64,379	55,115	0
Jan	51	44,026	5,474	1,054	0	0	50,554	2,727	10,541	20,829	37,551	71,647	34,022	0
Feb	3	46,164	308	46	0	0	46,518	1,087	2,728	5,107	39,375	48,297	32,244	0
Mar	32	40,881	1,837	75	0	0	42,793	420	816	18,872	34,869	54,977	20,059	0
Apr	180	22,833	17,752	1,290	0	0	41,875	999	2,411	18,506	19,475	41,391	20,543	0
May	107	95,923	7,170	2,285	0	0	105,378	1,519	4,224	31,538	81,816	119,096	6,825	0
Jun	2	93,589	147	0	0	0	93,736	409	726	17,194	79,826	98,155	2,405	0
Jul	30	60,545	3,059	325	0	0	63,929	1,851	3,493	8,479	51,641	65,464	870	0
Aug	9	117,149	342	84	0	0	117,575	1,471	2,125	13,107	99,921	116,624	1,821	0
Sep	3	89,024	121	30	0	0	89,175	773	1,088	11,565	75,932	89,359	1,638	0



Tank Name: Kakkayar puliyan kulam **Tank Water Volume at FSL : 80,000 (m3)**

Cultivation Extend (Maha) : 13.3 ha **Cultivation Extend (Yala) : 12 ha**

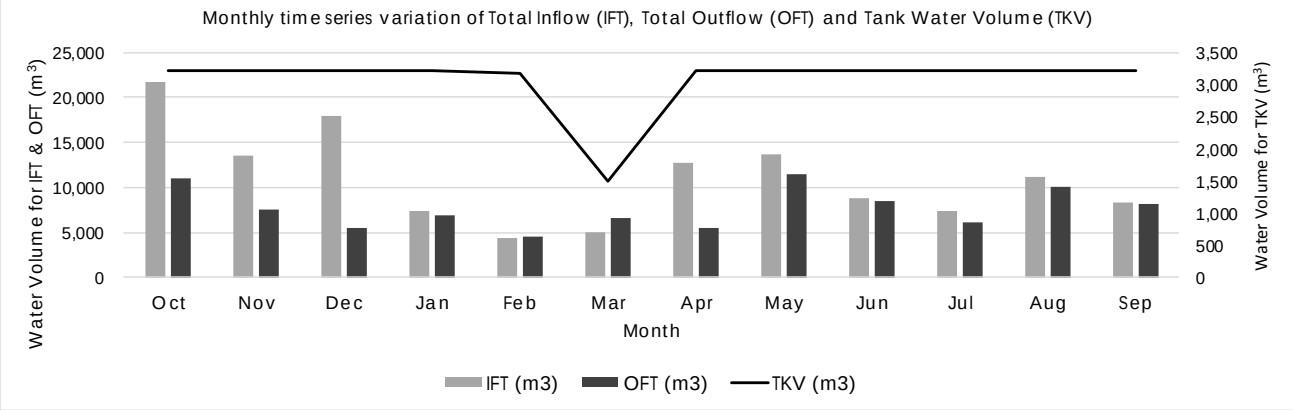
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	21,022	26,316	24,754	0	0	72,092	9,635	8,307	38,128	18,123	74,192	61,619	0
Nov	162	25,276	15,300	8,678	0	0	49,254	4,617	12,301	22,217	21,790	60,925	49,948	0
Dec	241	24,844	21,596	12,142	0	0	58,582	4,812	12,382	12,534	21,418	51,146	57,384	0
Jan	51	35,674	4,941	1,624	0	0	42,239	3,633	11,450	15,347	30,753	61,183	38,440	0
Feb	3	37,407	278	76	0	0	37,761	2,084	6,556	3,763	32,247	44,650	31,551	0
Mar	32	33,126	1,685	203	0	0	35,014	779	1,922	13,906	28,557	45,164	21,401	0
Apr	180	18,502	16,360	1,420	0	0	36,282	1,062	2,537	13,636	15,950	33,185	24,497	0
May	107	77,725	6,606	2,210	0	0	86,541	1,736	4,510	23,238	67,005	96,489	14,549	0
Jun	2	75,835	135	0	0	0	75,970	360	595	12,669	65,375	78,999	11,520	0
Jul	30	49,059	2,829	272	0	0	52,160	1,595	2,931	6,248	42,292	53,066	10,613	0
Aug	9	94,925	316	71	0	0	95,312	1,281	1,930	9,658	81,832	94,701	11,225	0
Sep	3	72,136	111	26	0	0	72,273	770	1,035	8,522	62,186	72,513	10,985	0



Tank Name: Arasan kulam **Tank Water Volume at FSL : 9,000 (m3)**

Cultivation Extend (Maha) : 2.85 ha **Cultivation Extend (Yala) : 3 ha**

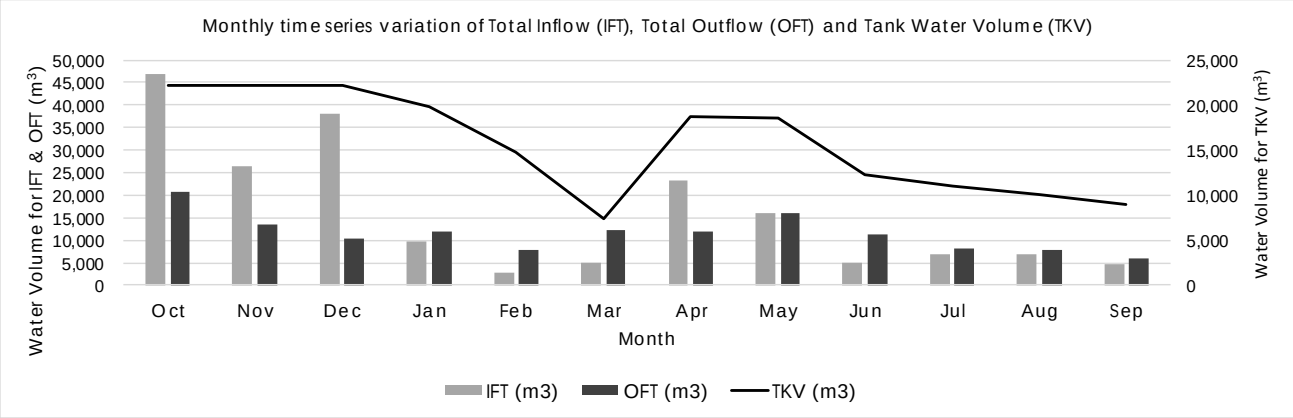
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	2,410	16,680	2,623	0	0	21,713	1,046	431	8,170	1,377	11,025	3,208	10,689
Nov	162	2,898	9,297	1,309	0	0	13,504	741	398	4,761	1,656	7,556	3,208	5,948
Dec	241	2,849	13,009	2,132	0	0	17,990	813	375	2,686	1,628	5,502	3,208	12,487
Jan	51	4,090	2,899	353	0	0	7,342	708	518	3,289	2,337	6,852	3,208	490
Feb	3	4,289	161	24	0	0	4,474	868	395	806	2,451	4,521	3,161	0
Mar	32	3,798	944	231	0	0	4,973	960	532	2,980	2,170	6,642	1,492	0
Apr	180	2,121	9,179	1,436	0	0	12,736	989	438	2,922	1,212	5,561	3,208	5,460
May	107	8,912	3,778	950	0	0	13,640	931	532	4,980	5,092	11,535	3,208	2,104
Jun	2	8,695	76	3	0	0	8,774	375	387	2,715	4,968	8,445	3,208	329
Jul	30	5,625	1,600	167	0	0	7,392	1,029	565	1,339	3,214	6,147	3,208	1,245
Aug	9	10,884	177	79	0	0	11,140	1,300	460	2,069	6,219	10,049	3,208	1,091
Sep	3	8,271	63	29	0	0	8,363	1,320	346	1,826	4,726	8,218	3,208	144



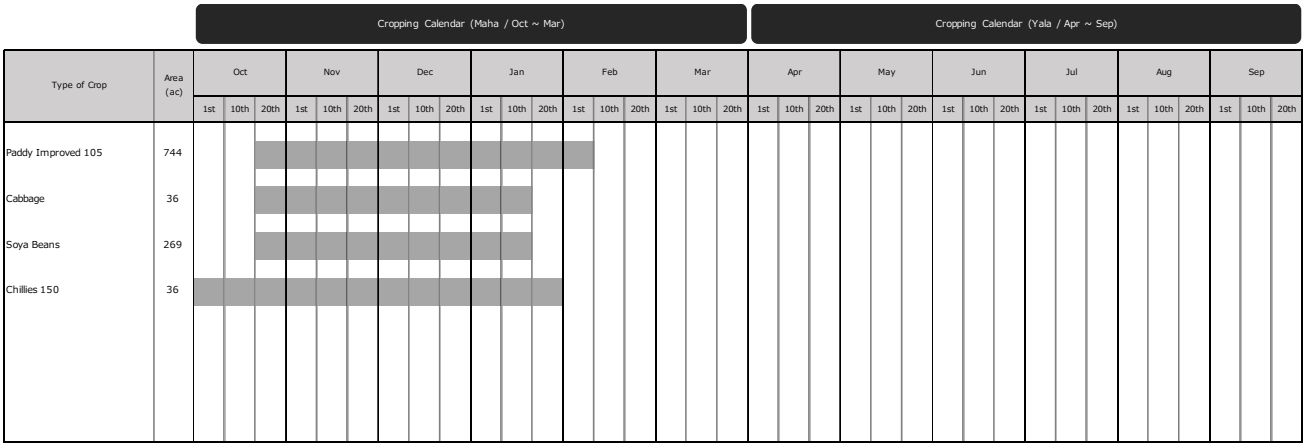
Tank Name: Puthar kulam **Tank Water Volume at FSL : 37,000 (m3)**

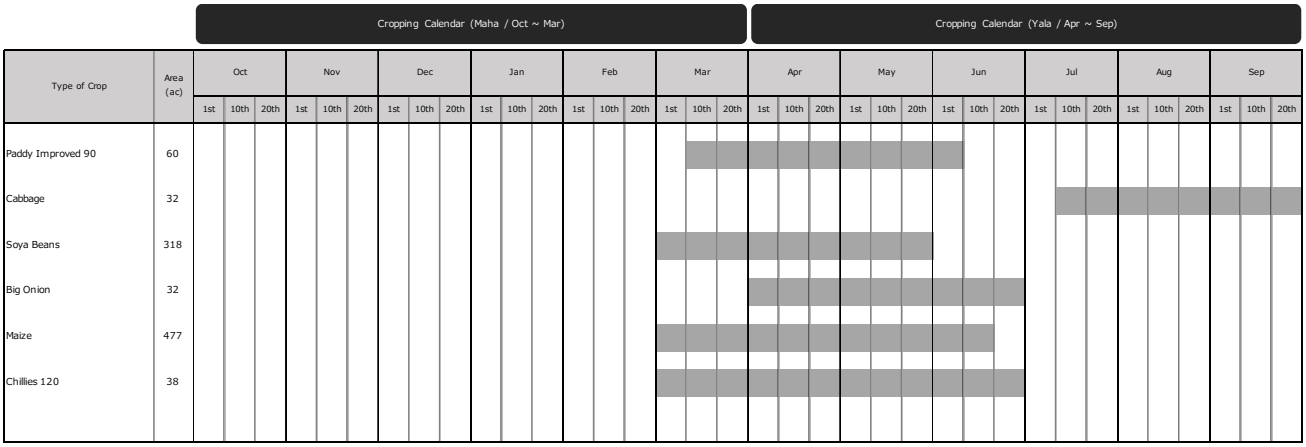
Cultivation Extend (Maha) : 4.75 ha **Cultivation Extend (Yala) : 4 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	1,308	26,817	11,763	1,720	5,344	46,953	4,608	2,610	13,617	0	20,835	22,212	26,118
Nov	162	1,573	14,944	5,902	1,032	2,974	26,425	3,173	2,404	7,935	0	13,512	22,212	12,913
Dec	241	1,546	20,950	8,838	612	6,244	38,190	3,368	2,495	4,477	0	10,339	22,212	27,851
Jan	51	2,220	4,669	1,704	761	245	9,600	3,251	3,298	5,481	0	12,030	19,782	0
Feb	3	2,328	260	94	240	0	2,923	3,177	3,477	1,344	0	7,998	14,707	0
Mar	32	2,062	1,552	734	702	0	5,050	3,009	4,361	4,966	0	12,336	7,421	0
Apr	180	1,152	15,119	4,122	88	2,730	23,210	2,930	4,131	4,870	0	11,932	18,699	0
May	107	4,838	6,095	3,804	106	1,052	15,895	4,302	3,485	8,299	0	16,086	18,509	0
Jun	2	4,720	124	36	77	165	5,122	2,785	4,074	4,525	0	11,383	12,247	0
Jul	30	3,053	2,665	400	113	623	6,854	2,251	3,655	2,231	0	8,137	10,964	0
Aug	9	5,908	300	85	92	546	6,931	1,596	2,780	3,449	0	7,825	10,069	0
Sep	3	4,490	106	28	69	72	4,765	1,079	1,722	3,043	0	5,845	8,989	0



Proposed Cropping Calendar Ratmalawewa Cascade System

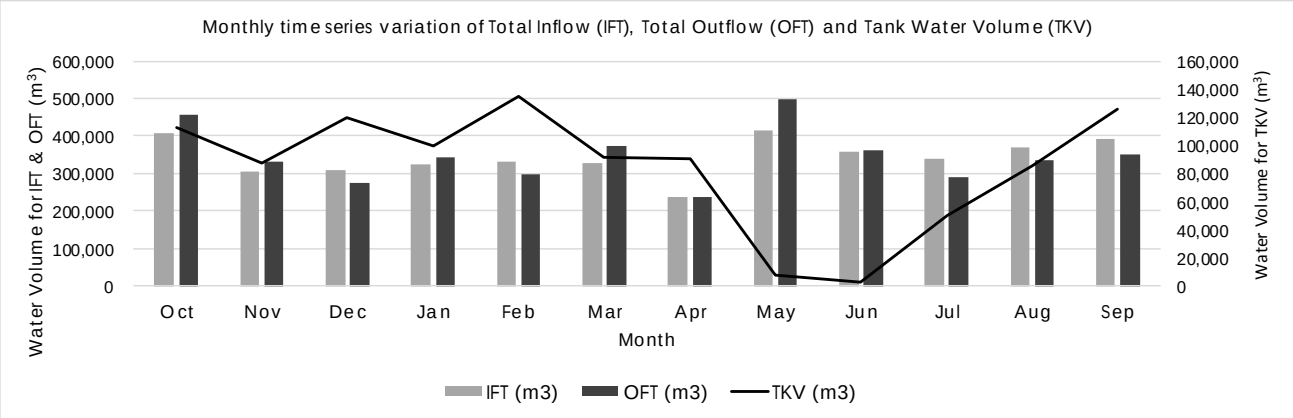




Result of Operation Study for Each Tank in Ratmalawewa Cascade System

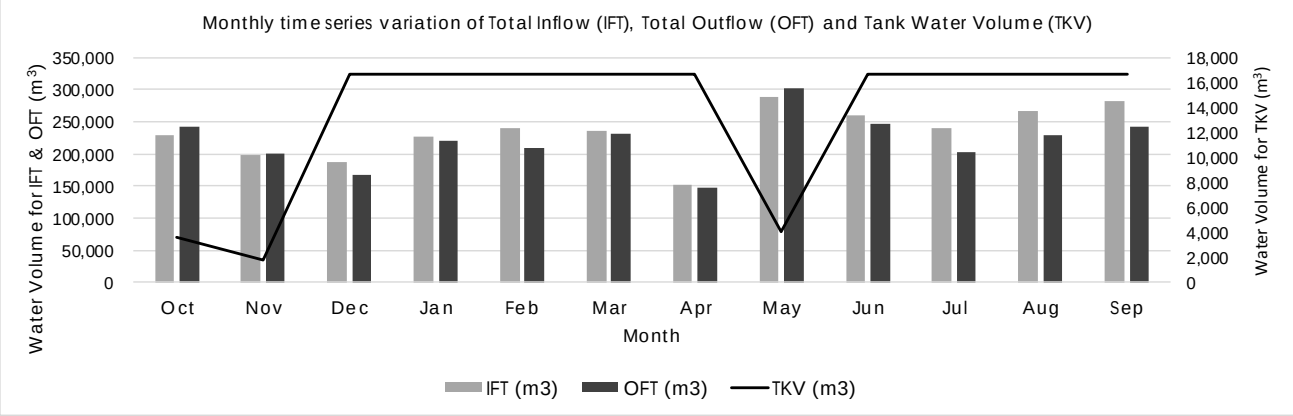
Tank Name: Nanumillewa Mahawewa **Tank Water Volume at FSL : 160,000 (m3)**
Cultivation Extend (Maha) : 66.5 ha **Cultivation Extend (Yala) : 60 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	281,665	78,224	46,665	0	0	406,554	18,080	21,194	204,850	213,857	457,980	112,513	0
Nov	162	257,223	47,133	2,787	0	0	307,143	1,386	6,076	129,357	195,299	332,117	87,539	0
Dec	241	230,068	64,430	14,503	0	0	309,001	5,916	23,570	72,924	174,681	277,091	119,449	0
Jan	51	309,434	14,688	641	0	0	324,763	3,142	14,492	92,135	234,941	344,710	99,503	0
Feb	3	331,445	809	97	0	0	332,351	5,196	20,290	19,615	251,653	296,753	135,100	0
Mar	32	323,320	4,683	1,587	0	0	329,590	6,576	22,237	99,278	245,483	373,575	91,115	0
Apr	180	188,120	46,426	3,674	0	0	238,220	2,448	8,040	85,836	142,832	239,156	90,179	0
May	107	390,763	18,841	5,163	0	0	414,767	2,646	8,885	188,707	296,690	496,928	8,018	0
Jun	2	358,965	384	0	0	0	359,349	1,261	3,714	86,524	272,548	364,046	3,321	0
Jul	30	329,276	7,808	2,031	0	0	339,115	11,094	28,291	2,870	250,006	292,260	50,176	0
Aug	9	368,939	848	1,030	0	0	370,817	16,601	32,606	6,618	280,120	335,945	85,047	0
Sep	3	391,594	297	391	0	0	392,282	20,064	26,859	6,919	297,322	351,163	126,167	0



Tank Name: Nanumillewa Kudawewa **Tank Water Volume at FSL : 30,000 (m3)**
Cultivation Extend (Maha) : 22.8 ha **Cultivation Extend (Yala) : 20 ha**

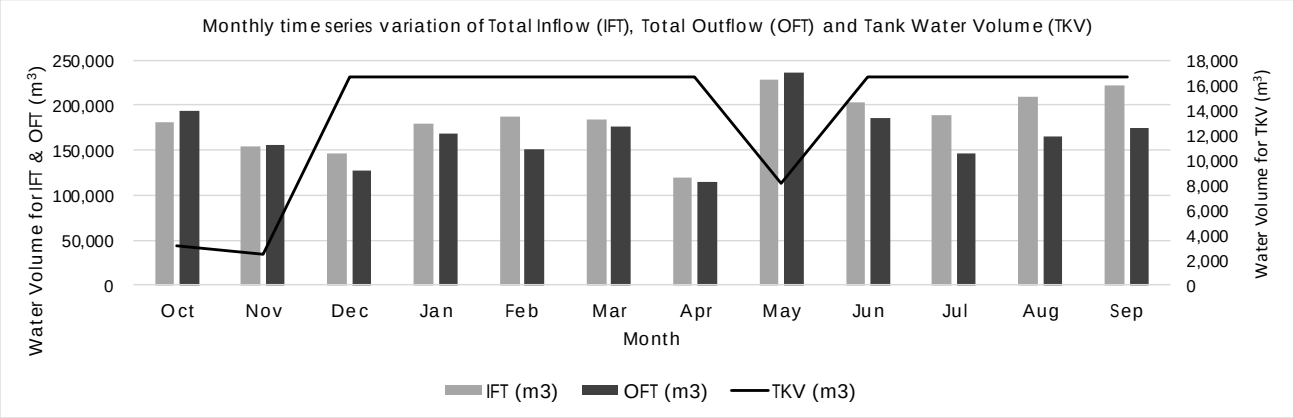
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	203,164	19,041	6,910	0	0	229,115	2,774	1,471	70,234	167,651	242,130	3,674	0
Nov	162	185,534	11,048	893	0	0	197,475	546	1,386	44,351	153,103	199,386	1,762	0
Dec	241	165,947	14,796	5,549	0	0	186,292	1,979	2,417	25,003	136,940	166,339	16,689	5,027
Jan	51	223,194	3,338	851	0	0	227,383	1,801	3,235	31,589	184,180	220,806	16,689	6,577
Feb	3	239,070	181	74	0	0	239,325	3,000	1,685	6,725	197,281	208,692	16,689	30,633
Mar	32	233,209	1,050	942	0	0	235,201	3,781	1,818	34,038	192,445	232,082	16,689	3,119
Apr	180	135,690	10,300	4,946	0	0	150,936	3,255	2,447	29,429	111,972	147,104	16,689	3,832
May	107	281,856	4,223	3,196	0	0	289,275	2,467	2,164	64,700	232,588	301,919	4,044	0
Jun	2	258,920	91	0	0	0	259,011	1,301	1,546	29,665	213,662	246,174	16,689	192
Jul	30	237,506	1,771	897	0	0	240,174	4,607	1,793	984	195,990	203,374	16,689	36,800
Aug	9	266,114	198	276	0	0	266,588	4,613	1,776	2,269	219,598	228,257	16,689	38,332
Sep	3	282,455	69	96	0	0	282,620	4,454	1,662	2,372	233,083	241,572	16,689	41,049



Tank Name: Etaweerawewa **Tank Water Volume at FSL : 30,000 (m3)**

Cultivation Extend (Maha) : 22.8 ha **Cultivation Extend (Yala) : 20 ha**

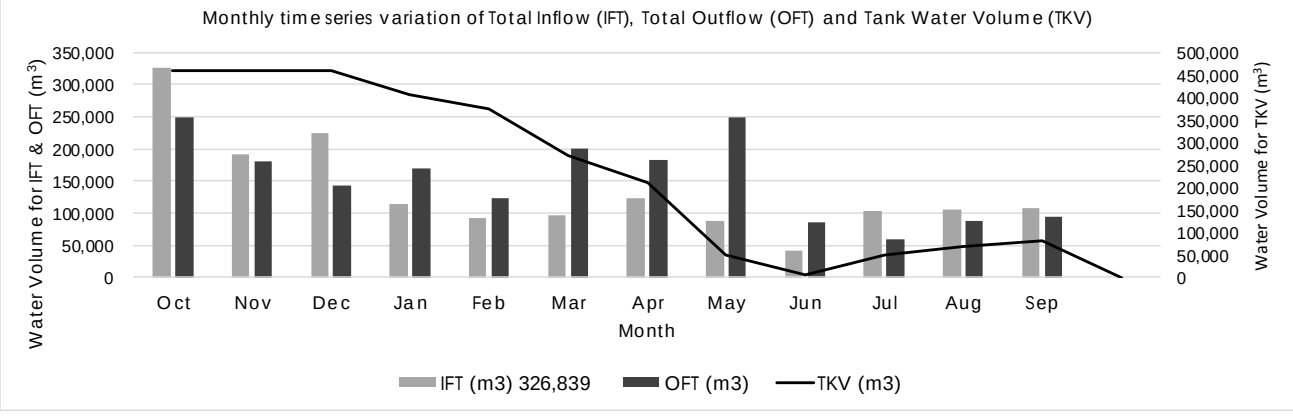
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	159,269	14,014	6,914	0	0	180,197	2,778	1,475	70,234	119,255	193,742	3,144	0
Nov	162	145,448	8,230	991	0	0	154,669	600	1,513	44,351	108,907	155,372	2,442	0
Dec	241	130,093	10,848	5,673	0	0	146,614	2,020	2,433	25,003	97,410	126,865	16,689	5,502
Jan	51	174,971	2,422	1,119	0	0	178,512	2,145	3,067	31,589	131,013	167,815	16,689	10,698
Feb	3	187,417	131	81	0	0	187,629	3,024	1,604	6,725	140,332	151,686	16,689	35,944
Mar	32	182,823	767	945	0	0	184,535	3,794	1,776	34,038	136,892	176,501	16,689	8,034
Apr	180	106,373	7,531	4,999	0	0	118,903	3,274	2,420	29,429	79,649	114,772	16,689	4,131
May	107	220,959	3,082	3,208	0	0	227,249	3,044	2,625	64,700	165,447	235,816	8,122	0
Jun	2	202,979	66	10	0	0	203,055	2,002	2,260	29,665	151,984	185,912	16,689	8,575
Jul	30	186,191	1,292	897	0	0	188,380	4,613	1,776	984	139,414	146,787	16,689	41,593
Aug	9	208,619	144	276	0	0	209,039	4,613	1,776	2,269	156,207	164,865	16,689	44,173
Sep	3	221,429	51	96	0	0	221,576	4,454	1,662	2,372	165,799	174,288	16,689	47,288



Tank Name: Olugaskadawewa Mahawewa **Tank Water Volume at FSL : 340,000 (m3)**

Cultivation Extend (Maha) : 47.5 ha **Cultivation Extend (Yala) : 43 ha**

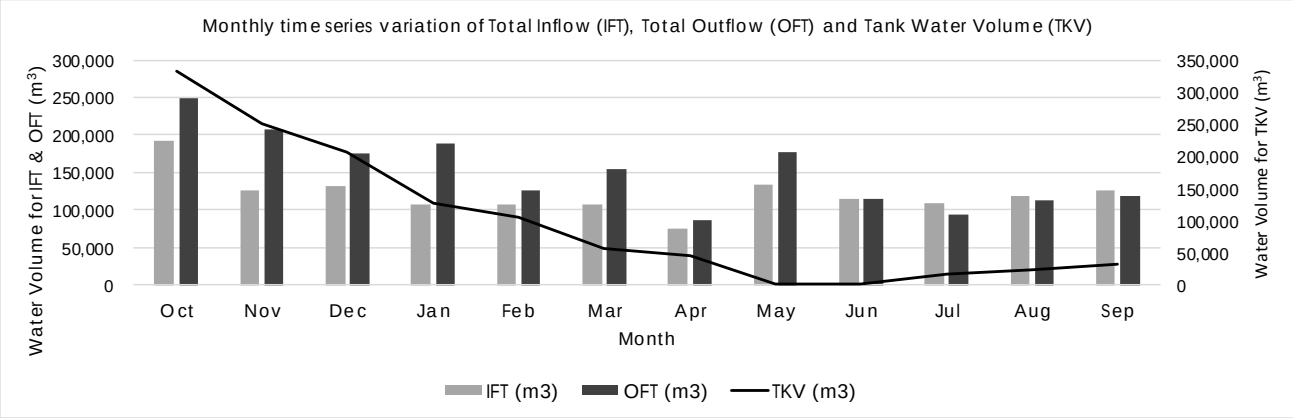
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	27,460	101,599	109,372	88,407	0	326,839	42,833	50,286	146,321	9,415	248,855	459,960	77,984
Nov	162	25,077	56,663	54,407	54,507	0	190,654	29,178	49,555	92,398	8,598	179,729	459,960	10,925
Dec	241	22,430	79,438	81,229	35,971	5,264	224,332	30,955	51,566	52,089	7,690	142,300	459,960	82,032
Jan	51	30,167	17,741	16,359	42,515	8,637	115,420	30,640	63,050	65,811	10,343	169,843	405,537	0
Feb	3	32,313	993	856	13,247	44,646	92,056	31,153	67,428	14,011	11,079	123,670	373,922	0
Mar	32	31,521	5,943	8,394	46,017	5,593	97,468	34,016	85,219	70,913	10,807	200,955	270,435	0
Apr	180	18,340	59,281	38,792	3,391	3,982	123,786	26,194	88,898	61,311	6,288	182,691	211,530	0
May	107	38,096	24,535	22,406	3,516	0	88,554	21,500	80,282	134,791	13,062	249,634	50,449	0
Jun	2	34,996	525	57	1,969	4,384	41,932	2,914	9,764	61,803	11,999	86,480	5,901	0
Jul	30	32,102	11,003	1,784	6,992	52,509	104,390	9,894	36,118	2,050	11,006	59,067	51,223	0
Aug	9	35,969	1,210	880	7,757	58,761	104,576	14,402	56,692	4,727	12,332	88,153	67,646	0
Sep	3	38,177	424	327	6,527	63,047	108,503	15,774	59,927	4,942	13,089	93,733	82,417	0



Tank Name: Oligaskadawewa Kudawewa **Tank Water Volume at FSL : 300,000 (m3)**

Cultivation Extend (Maha) : 38 ha **Cultivation Extend (Yala) : 34 ha**

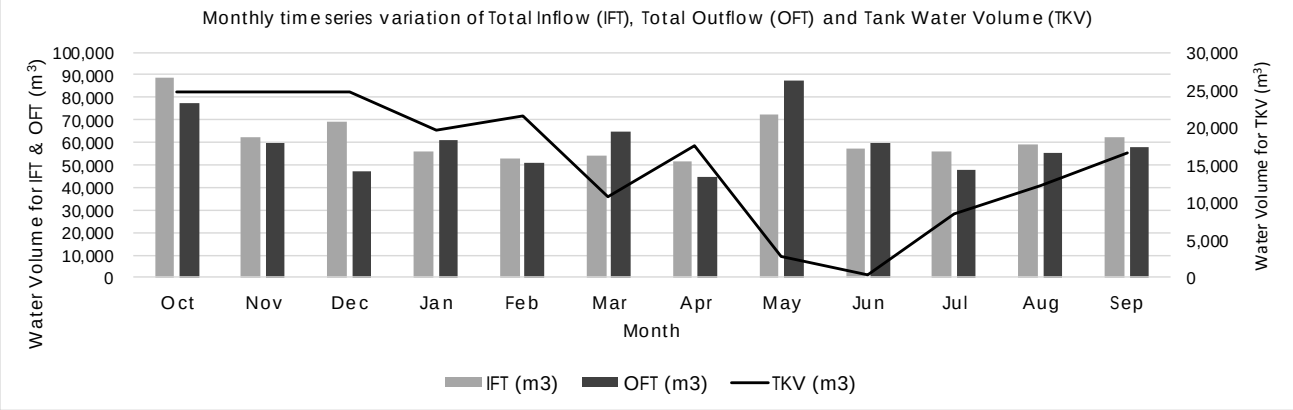
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	90,350	7,355	94,989	0	0	192,694	37,102	46,978	117,057	47,106	248,242	332,288	0
Nov	162	82,510	5,741	37,971	0	0	126,222	20,063	70,549	73,918	43,018	207,549	250,961	0
Dec	241	73,799	9,339	48,511	0	0	131,649	18,585	77,640	41,671	38,477	176,373	206,238	0
Jan	51	99,258	2,727	6,442	0	0	108,427	13,433	70,045	52,648	51,750	187,876	126,789	0
Feb	3	106,318	160	302	0	0	106,780	9,935	50,737	11,208	55,431	127,311	106,258	0
Mar	32	103,712	1,072	2,003	0	0	106,787	8,234	36,049	56,730	54,072	155,084	57,960	0
Apr	180	60,343	11,655	3,218	0	0	75,216	1,753	5,064	49,049	31,461	87,327	45,849	0
May	107	125,346	4,682	3,179	0	0	133,207	1,044	2,895	107,833	65,351	177,123	1,933	0
Jun	2	115,146	99	0	0	0	115,245	1,388	3,788	49,442	60,033	114,651	2,527	0
Jul	30	105,622	1,852	1,575	0	0	109,049	8,295	28,417	1,640	55,068	93,420	18,156	0
Aug	9	118,345	199	617	0	0	119,161	10,156	36,872	3,782	61,701	112,512	24,806	0
Sep	3	125,612	69	223	0	0	125,904	10,674	38,517	3,954	65,490	118,635	32,075	0



Tank Name: Dumbuluwewa **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 11.4 ha **Cultivation Extend (Yala) : 10 ha**

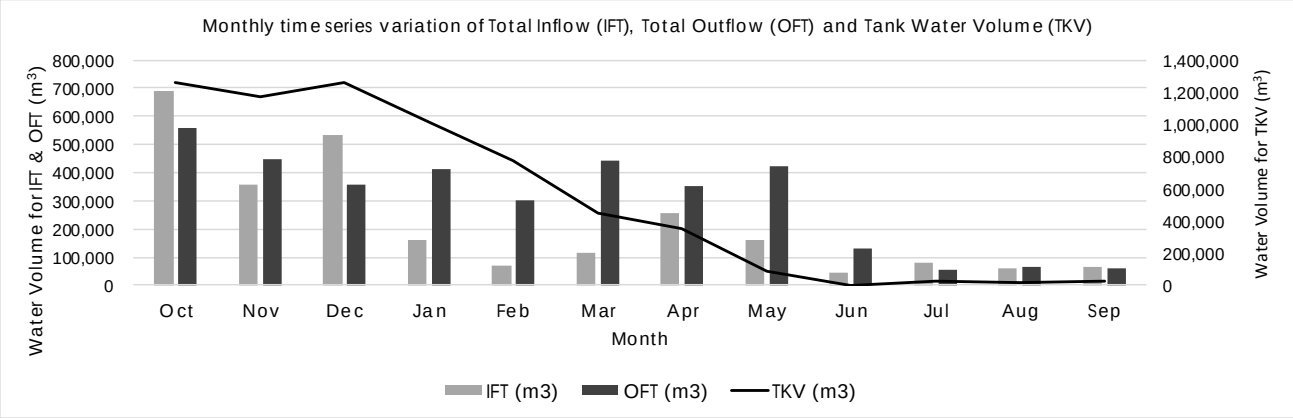
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	44,750	31,845	11,802	0	0	88,397	4,610	3,254	35,117	34,480	77,462	24,655	10,936
Nov	162	40,867	18,257	2,937	0	0	62,061	1,662	4,344	22,175	31,488	59,669	24,655	2,392
Dec	241	36,553	25,090	7,583	0	0	69,226	2,957	3,648	12,501	28,164	47,269	24,655	21,957
Jan	51	49,162	5,578	1,465	0	0	56,205	3,006	4,506	15,795	37,879	61,186	19,674	0
Feb	3	52,659	311	83	0	0	53,053	3,116	4,186	3,363	40,574	51,238	21,490	0
Mar	32	51,368	1,826	825	0	0	54,019	3,419	4,758	17,019	39,579	64,775	10,734	0
Apr	180	29,888	17,980	3,514	0	0	51,382	2,457	4,390	14,715	23,029	44,591	17,526	0
May	107	62,084	7,299	3,214	0	0	72,597	3,162	3,903	32,350	47,835	87,250	2,872	0
Jun	2	57,032	151	0	0	0	57,183	308	541	14,833	43,942	59,624	431	0
Jul	30	52,315	3,125	504	0	0	55,944	2,898	4,282	492	40,308	47,980	8,394	0
Aug	9	58,616	343	254	0	0	59,213	4,172	4,921	1,134	45,163	55,390	12,217	0
Sep	3	62,216	121	94	0	0	62,431	4,693	4,279	1,186	47,937	58,096	16,552	0



Tank Name: Thrippankudawewa Mahawew Tank Water Volume at FSL : 710,000 (m3)

Cultivation Extend (Maha) : 104.5 ha Cultivation Extend (Yala) : 90 ha

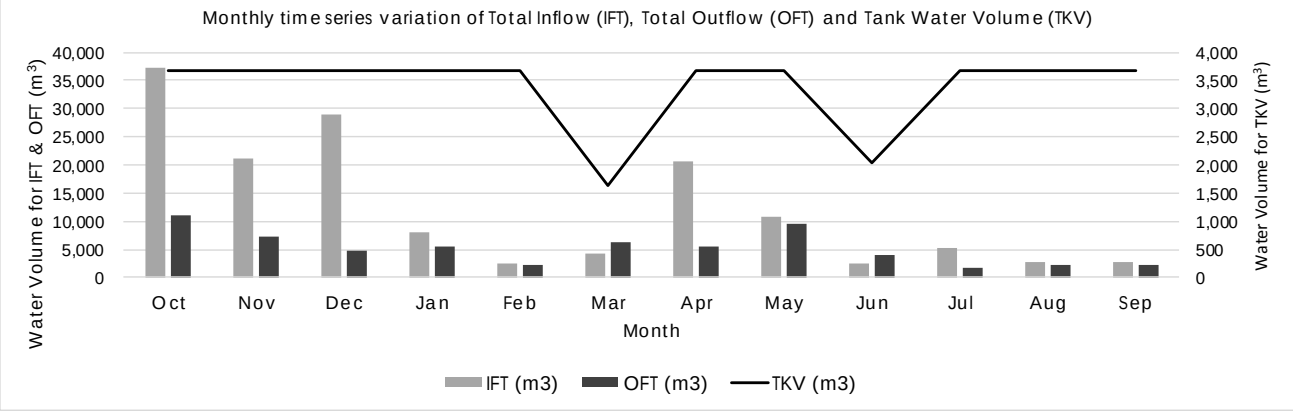
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	32,756	272,437	226,149	70,683	85,560	687,584	88,437	148,157	321,907	0	558,500	######	129,084
Nov	162	29,913	152,982	106,236	50,435	16,823	356,389	56,797	189,157	203,275	0	449,228	######	0
Dec	241	26,755	214,885	156,787	34,989	99,680	533,096	60,805	182,620	114,595	0	358,019	######	82,237
Jan	51	35,985	47,907	31,237	43,717	0	158,847	59,771	206,716	144,783	0	411,271	######	0
Feb	3	38,545	2,692	1,569	24,982	0	67,788	52,928	220,144	30,823	0	303,895	773,197	0
Mar	32	37,600	16,241	12,558	51,044	0	117,443	51,033	243,887	149,768	0	444,688	445,952	0
Apr	180	21,877	162,153	45,731	24,409	1,454	255,624	31,002	189,759	129,489	0	350,250	351,327	0
May	107	45,443	67,039	26,047	21,743	0	160,272	20,330	116,922	284,678	0	421,930	89,669	0
Jun	2	41,745	1,383	0	2,482	0	45,611	566	1,957	130,527	0	133,050	2,229	0
Jul	30	38,293	28,961	2,006	10,598	0	79,858	10,970	39,888	4,329	0	55,187	26,900	0
Aug	9	42,905	3,229	700	15,187	0	62,021	12,209	45,001	9,983	0	67,193	21,727	0
Sep	3	45,540	1,137	247	15,305	1,641	63,870	11,454	39,625	10,438	0	61,517	24,080	0



Tank Name: Pupulagala Tank Water Volume at FSL : 10,000 (m3)

Cultivation Extend (Maha) : 3 ha Cultivation Extend (Yala) : 3 ha

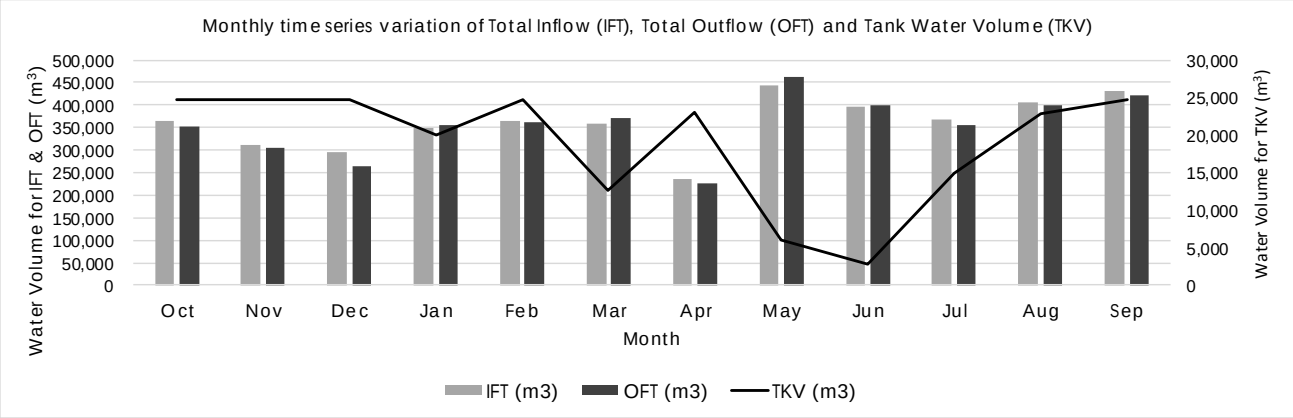
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	1,830	32,182	3,124	0	0	37,136	1,236	429	9,365	0	11,030	3,682	26,106
Nov	162	1,671	17,939	1,536	0	0	21,146	847	415	5,913	0	7,176	3,682	13,970
Dec	241	1,495	25,150	2,368	0	0	29,013	905	427	3,334	0	4,666	3,682	24,347
Jan	51	2,011	5,581	427	0	0	8,019	820	559	4,212	0	5,591	3,682	2,428
Feb	3	2,154	311	27	0	0	2,492	972	437	897	0	2,306	3,682	185
Mar	32	2,101	1,822	242	0	0	4,165	1,040	631	4,538	0	6,210	1,637	0
Apr	180	1,222	17,717	1,637	0	0	20,576	1,107	483	3,924	0	5,514	3,682	13,018
May	107	2,539	7,304	1,044	0	0	10,887	569	335	8,627	0	9,531	3,682	1,356
Jun	2	2,332	147	0	0	0	2,479	78	82	3,955	0	4,115	2,047	0
Jul	30	2,140	3,084	166	0	0	5,390	1,074	480	131	0	1,685	3,682	2,069
Aug	9	2,397	342	92	0	0	2,831	1,538	392	303	0	2,232	3,682	599
Sep	3	2,544	120	32	0	0	2,696	1,485	367	316	0	2,168	3,682	529



Tank Name: Kudagurupaswewa **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 15.2 ha **Cultivation Extend (Yala) : 14 ha**

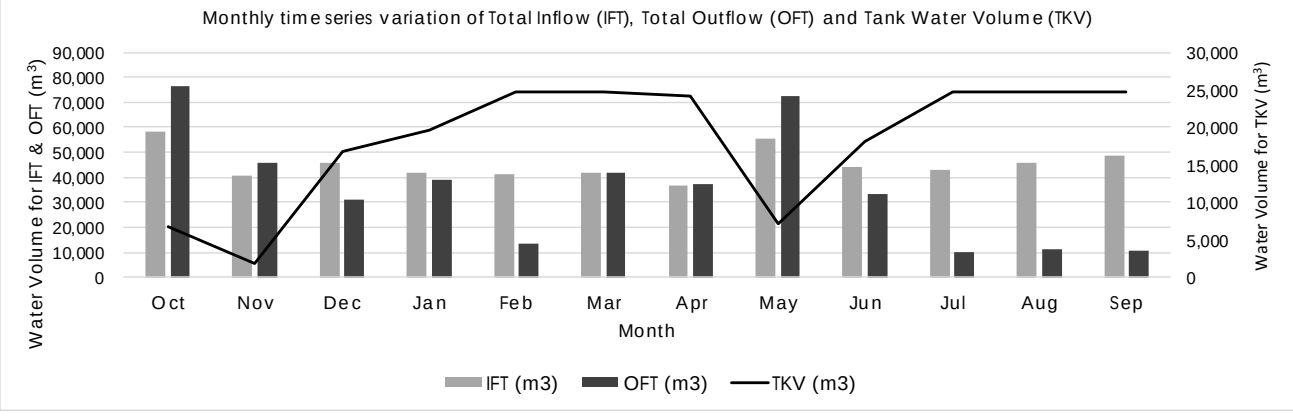
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	310,216	42,980	11,334	0	0	364,530	4,390	3,142	46,823	296,489	350,844	24,655	13,685
Nov	162	283,296	24,590	1,944	0	0	309,830	1,228	3,472	29,567	270,761	305,029	24,655	4,802
Dec	241	253,389	33,739	7,533	0	0	294,661	2,880	3,604	16,668	242,177	265,329	24,655	29,331
Jan	51	340,800	7,511	1,349	0	0	349,660	2,822	4,667	21,059	325,720	354,270	20,045	0
Feb	3	365,042	418	80	0	0	365,540	3,184	4,112	4,483	348,889	360,669	24,655	261
Mar	32	356,093	2,444	908	0	0	359,445	3,745	4,627	22,692	340,336	371,400	12,699	0
Apr	180	207,188	23,980	4,034	0	0	235,202	2,840	4,496	19,620	198,021	224,977	22,925	0
May	107	430,372	9,733	3,913	0	0	444,018	3,150	3,352	43,133	411,329	460,964	5,979	0
Jun	2	395,352	201	0	0	0	395,553	361	660	19,777	377,858	398,656	2,876	0
Jul	30	362,653	4,156	635	0	0	367,444	3,547	4,523	656	346,606	355,332	14,988	0
Aug	9	406,336	456	342	0	0	407,134	5,459	3,987	1,513	388,357	399,316	22,806	0
Sep	3	431,288	160	128	0	0	431,576	5,931	2,479	1,582	412,204	422,196	24,655	7,531



Tank Name: Gurupaswewa **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 22.8 ha **Cultivation Extend (Yala) : 20 ha**

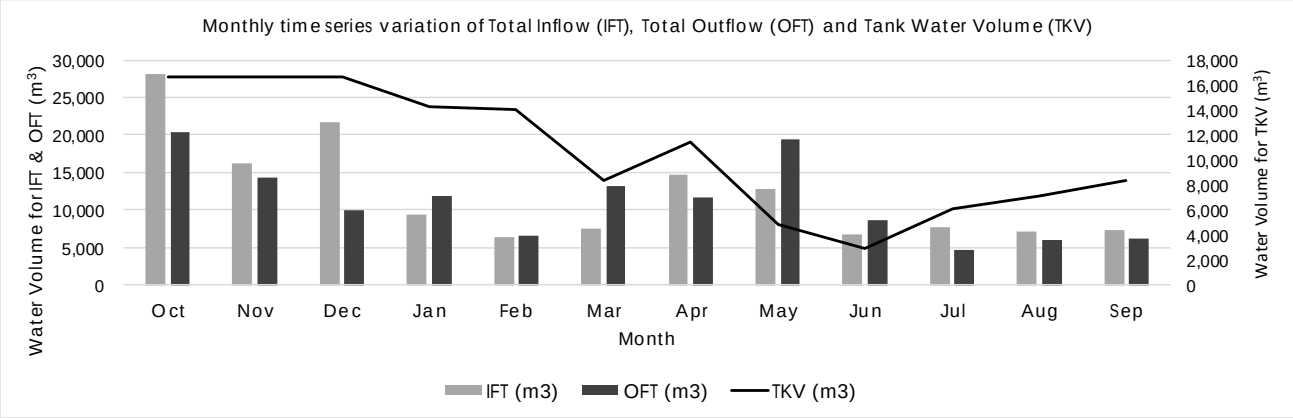
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	34,773	14,096	9,711	0	0	58,580	3,849	2,346	70,234	0	76,429	6,807	0
Nov	162	31,756	8,564	668	0	0	40,988	401	1,148	44,351	0	45,900	1,894	0
Dec	241	28,403	11,153	6,315	0	0	45,871	2,478	3,503	25,003	0	30,984	16,782	0
Jan	51	38,202	2,483	1,268	0	0	41,953	2,580	4,879	31,589	0	39,048	19,686	0
Feb	3	40,919	135	87	0	0	41,141	3,866	2,866	6,725	0	13,457	24,655	22,716
Mar	32	39,916	768	1,242	0	0	41,926	4,993	2,862	34,038	0	41,893	24,655	33
Apr	180	23,225	7,622	6,163	0	0	37,010	4,070	4,049	29,429	0	37,548	24,117	0
May	107	48,242	3,090	4,191	0	0	55,523	3,848	3,907	64,700	0	72,455	7,185	0
Jun	2	44,317	71	0	0	0	44,388	1,462	2,327	29,665	0	33,454	18,118	0
Jul	30	40,651	1,293	1,178	0	0	43,122	5,878	3,099	984	0	9,961	24,655	26,625
Aug	9	45,548	144	368	0	0	46,060	6,150	2,624	2,269	0	11,044	24,655	35,016
Sep	3	48,345	51	128	0	0	48,524	5,939	2,455	2,372	0	10,766	24,655	37,758



Tank Name: Paluketiya **Tank Water Volume at FSL : 30,000 (m3)**

Cultivation Extend (Maha) : 4.75 ha **Cultivation Extend (Yala) : 4 ha**

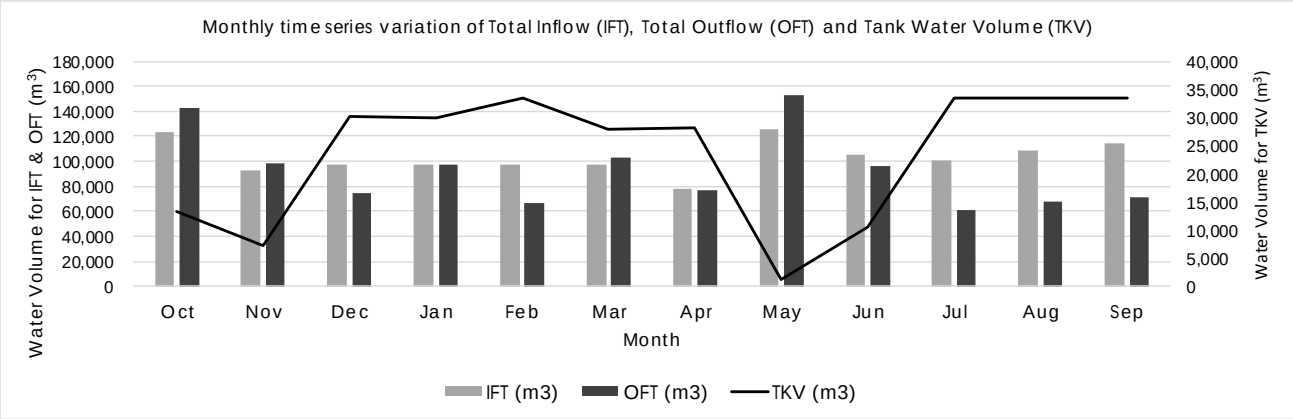
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	5,216	13,628	9,316	0	0	28,160	3,640	2,107	14,632	0	20,379	16,689	7,781
Nov	162	4,763	7,756	3,725	0	0	16,244	2,035	3,008	9,240	0	14,283	16,689	1,962
Dec	241	4,261	10,683	6,741	0	0	21,685	2,554	2,326	5,209	0	10,089	16,689	11,596
Jan	51	5,730	2,388	1,313	0	0	9,431	2,564	2,657	6,581	0	11,802	14,318	0
Feb	3	6,138	133	74	0	0	6,345	2,670	2,555	1,401	0	6,626	14,037	0
Mar	32	5,987	788	702	0	0	7,477	2,870	3,165	7,091	0	13,126	8,388	0
Apr	180	3,484	7,771	3,396	0	0	14,651	2,322	3,204	6,131	0	11,656	11,382	0
May	107	7,236	3,152	2,524	0	0	12,912	2,871	3,030	13,479	0	19,380	4,915	0
Jun	2	6,648	66	13	0	0	6,727	965	1,591	6,180	0	8,737	2,905	0
Jul	30	6,098	1,384	317	0	0	7,799	1,791	2,651	205	0	4,647	6,057	0
Aug	9	6,832	152	144	0	0	7,128	2,376	3,157	473	0	6,006	7,179	0
Sep	3	7,252	53	53	0	0	7,358	2,593	3,080	494	0	6,167	8,370	0



Tank Name: Weliwewa **Tank Water Volume at FSL : 50,000 (m3)**

Cultivation Extend (Maha) : 30.4 ha **Cultivation Extend (Yala) : 27 ha**

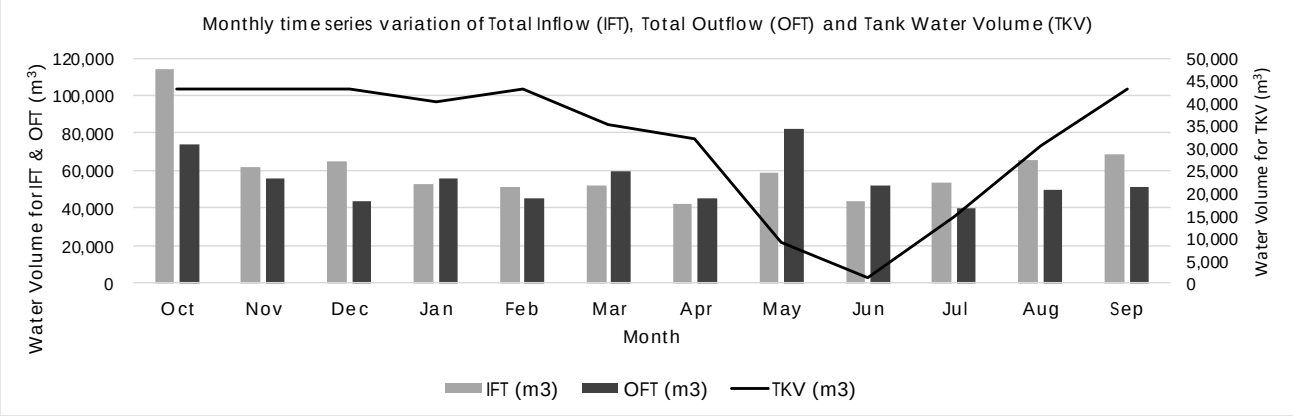
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	82,358	28,287	12,226	0	0	122,871	4,832	3,223	93,646	41,179	142,880	13,412	0
Nov	162	75,211	16,645	900	0	0	92,756	547	1,679	59,135	37,606	98,966	7,203	0
Dec	241	67,271	22,271	7,997	0	0	97,539	3,116	4,570	33,337	33,636	74,658	30,084	0
Jan	51	90,478	4,987	1,378	0	0	96,843	3,004	6,604	42,119	45,239	96,965	29,962	0
Feb	3	96,914	274	96	0	0	97,284	4,520	4,437	8,967	48,457	66,381	33,421	27,444
Mar	32	94,538	1,565	1,524	0	0	97,627	6,134	4,254	45,384	47,269	103,041	28,007	0
Apr	180	55,006	15,500	7,076	0	0	77,582	4,699	5,965	39,239	27,503	77,405	28,183	0
May	107	114,258	6,307	5,039	0	0	125,604	4,267	4,810	86,266	57,129	152,472	1,315	0
Jun	2	104,961	135	0	0	0	105,096	1,332	2,378	39,554	52,480	95,744	10,667	0
Jul	30	96,280	2,640	1,430	0	0	100,350	7,030	4,634	1,312	48,140	61,116	33,421	16,479
Aug	9	107,877	294	460	0	0	108,631	7,688	3,557	3,025	53,938	68,209	33,421	40,422
Sep	3	114,501	104	160	0	0	114,765	7,424	3,328	3,163	57,251	71,166	33,421	43,600



Tank Name: Ihalagama **Tank Water Volume at FSL : 60,000 (m3)**

Cultivation Extend (Maha) : 11.4 ha **Cultivation Extend (Yala) : 10 ha**

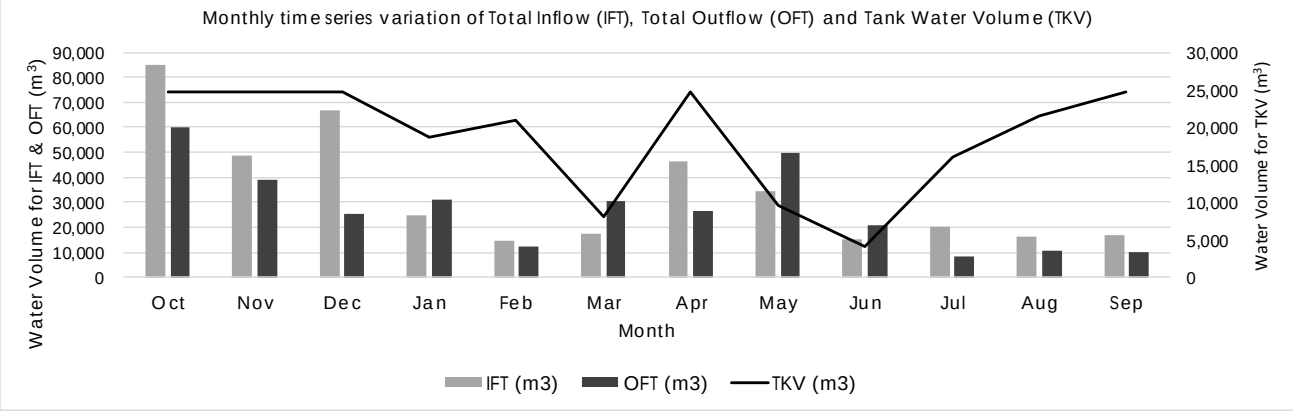
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	33,904	17,124	19,166	19,374	24,339	113,907	7,510	4,901	35,117	26,080	73,607	42,986	40,299
Nov	162	30,962	9,570	9,407	12,163	0	62,102	5,068	5,098	22,175	23,817	56,159	42,986	5,943
Dec	241	27,693	13,365	14,367	7,581	2,034	65,040	5,479	4,727	12,501	21,303	44,009	42,986	21,031
Jan	51	37,247	2,987	2,899	9,745	0	52,877	5,431	5,782	15,795	28,651	55,659	40,205	0
Feb	3	39,896	166	156	2,681	8,083	50,981	5,807	5,225	3,363	30,689	45,084	42,986	3,116
Mar	32	38,918	972	1,812	9,928	400	52,030	7,318	5,648	17,019	29,937	59,922	35,094	0
Apr	180	22,644	9,656	9,108	1,193	0	42,601	6,153	7,222	14,715	17,418	45,507	32,187	0
May	107	47,036	3,949	5,751	962	1,317	59,015	5,918	7,578	32,350	36,182	82,027	9,175	0
Jun	2	43,209	87	21	476	0	43,792	1,221	2,418	14,833	33,238	51,709	1,259	0
Jul	30	39,635	1,841	454	927	10,544	53,400	3,102	5,819	492	30,489	39,902	14,758	0
Aug	9	44,409	190	404	711	20,207	65,921	6,444	8,361	1,134	34,161	50,100	30,578	0
Sep	3	47,136	65	171	666	20,880	68,917	8,505	5,396	1,186	36,259	51,346	42,986	5,164



Tank Name: Nidikulambawewa **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 17 ha **Cultivation Extend (Yala) : 14 ha**

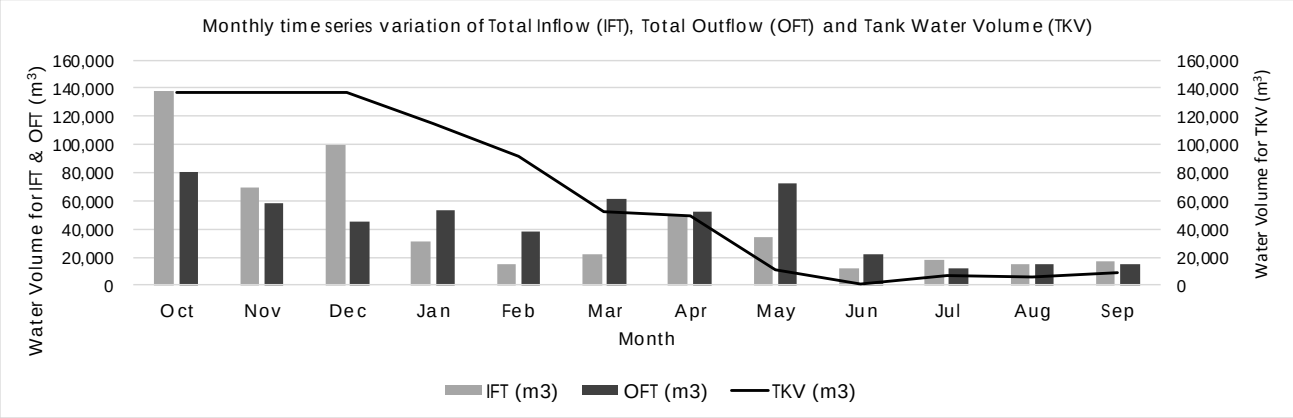
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	11,812	62,090	11,242	0	0	85,144	4,380	3,168	52,676	0	60,224	24,655	24,920
Nov	162	10,783	35,109	2,661	0	0	48,553	1,682	4,113	33,263	0	39,058	24,655	9,495
Dec	241	9,642	48,486	8,579	0	0	66,707	3,157	3,721	18,752	0	25,630	24,655	41,078
Jan	51	12,990	10,840	1,227	0	0	25,057	2,704	4,681	23,692	0	31,076	18,636	0
Feb	3	13,910	603	78	0	0	14,591	2,892	4,372	5,044	0	12,308	20,919	0
Mar	32	13,553	3,539	708	0	0	17,800	2,972	4,612	22,976	0	30,559	8,160	0
Apr	180	7,880	34,530	3,742	0	0	46,152	2,743	4,140	19,865	0	26,748	24,655	2,909
May	107	16,392	14,041	4,200	0	0	34,633	2,961	3,015	43,672	0	49,648	9,640	0
Jun	2	15,060	287	0	0	0	15,347	325	581	20,024	0	20,930	4,056	0
Jul	30	13,821	5,985	578	0	0	20,384	3,384	4,394	664	0	8,442	15,998	0
Aug	9	15,481	660	314	0	0	16,455	5,095	4,392	1,532	0	11,018	21,434	0
Sep	3	16,433	232	120	0	0	16,785	5,772	2,910	1,601	0	10,283	24,655	3,282



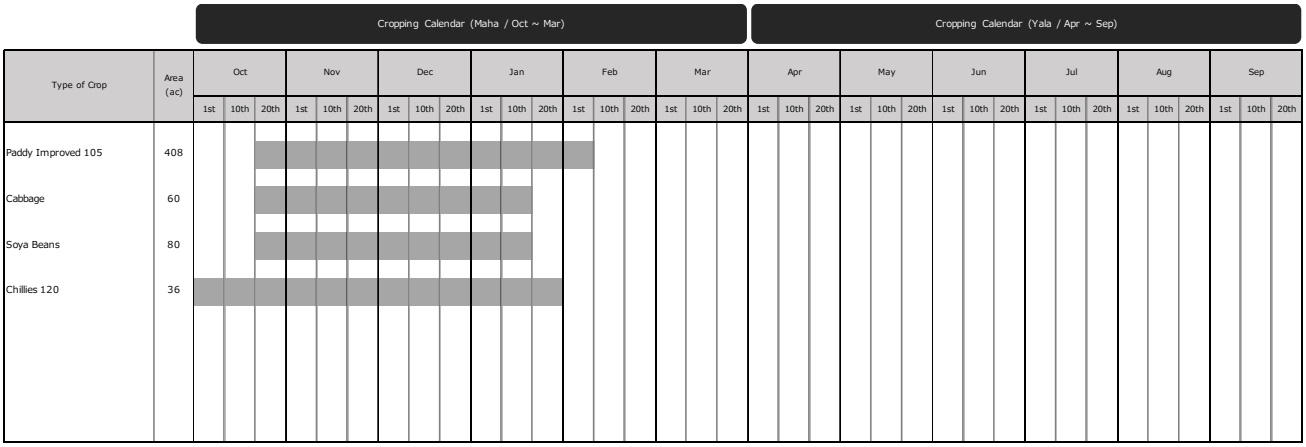
Tank Name: Paradehiyakada **Tank Water Volume at FSL : 140,000 (m3)**

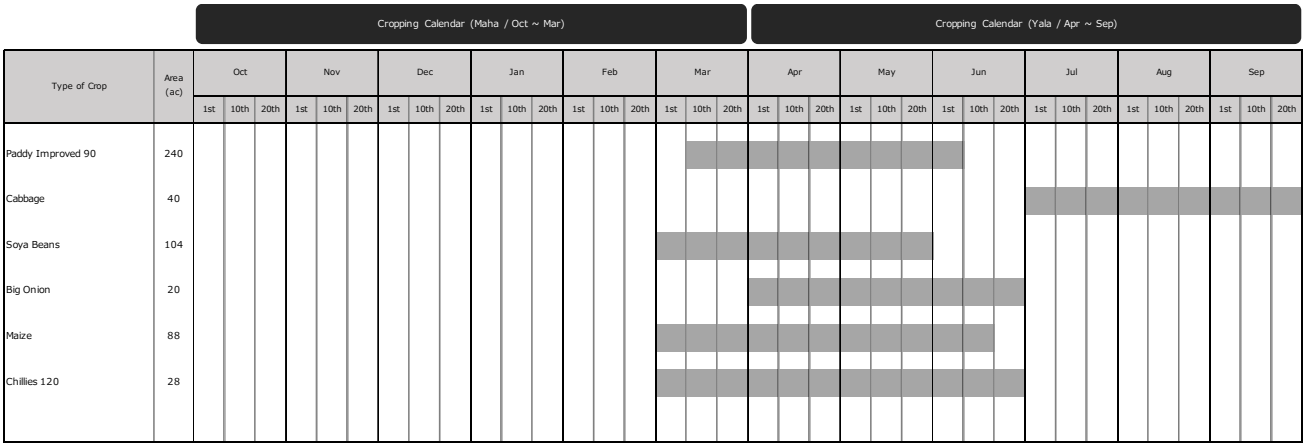
Cultivation Extend (Maha) : 15.2 ha **Cultivation Extend (Yala) : 14 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	8,944	48,335	44,693	11,351	24,040	137,364	17,492	15,767	46,823	0	80,082	136,724	57,281
Nov	162	8,168	27,013	21,885	7,904	3,952	68,923	11,761	16,761	29,567	0	58,089	136,724	10,834
Dec	241	7,306	37,772	33,279	4,953	16,313	99,623	12,661	16,000	16,668	0	45,330	136,724	54,293
Jan	51	9,826	8,444	6,590	6,163	0	31,023	12,411	19,994	21,059	0	53,464	114,283	0
Feb	3	10,525	472	346	2,509	1,558	15,410	11,744	22,025	4,483	0	38,253	91,440	0
Mar	32	10,267	2,863	2,877	6,585	0	22,592	11,695	27,034	22,692	0	61,421	52,611	0
Apr	180	5,974	28,523	12,246	2,085	0	48,828	8,357	24,615	19,620	0	52,592	48,847	0
May	107	12,409	11,713	7,824	2,121	0	34,067	7,489	21,514	43,133	0	72,136	10,777	0
Jun	2	11,399	248	1	802	0	12,449	788	1,526	19,777	0	22,090	1,137	0
Jul	30	10,456	5,171	579	1,694	0	17,900	3,356	8,198	656	0	12,210	6,826	0
Aug	9	11,716	575	220	2,304	0	14,814	3,800	9,930	1,513	0	15,243	6,397	0
Sep	3	12,435	202	78	1,695	2,582	16,992	3,713	9,408	1,582	0	14,703	8,686	0



Proposed Cropping Calendar Siyabalagaswewa Cascade System



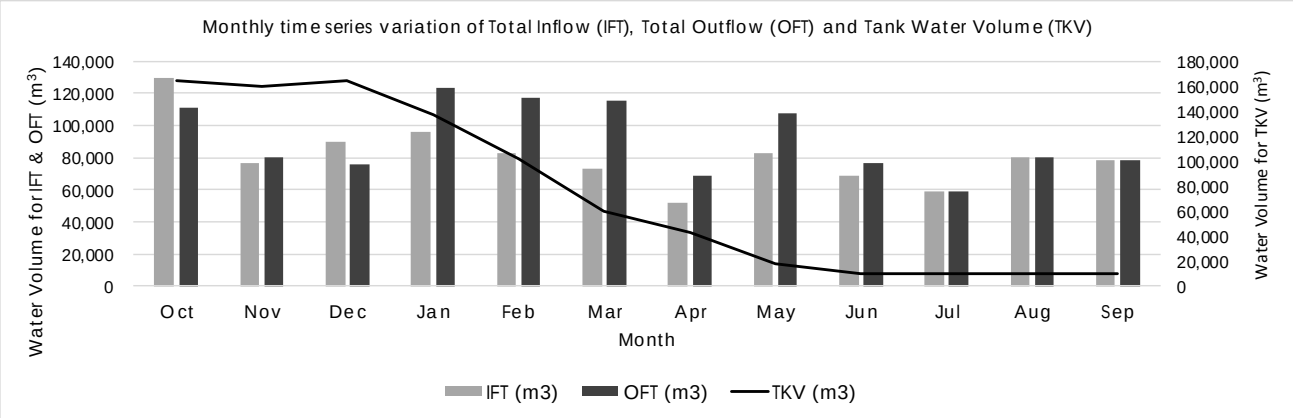


Result of Operation Study for Each Tank in Siyabalagaswewa Cascade System

Tank Name: Timbiriwewa **Tank Water Volume at FSL : 160,000 (m3)**

Cultivation Extend (Maha) : 4.75 ha **Cultivation Extend (Yala) : 4 ha**

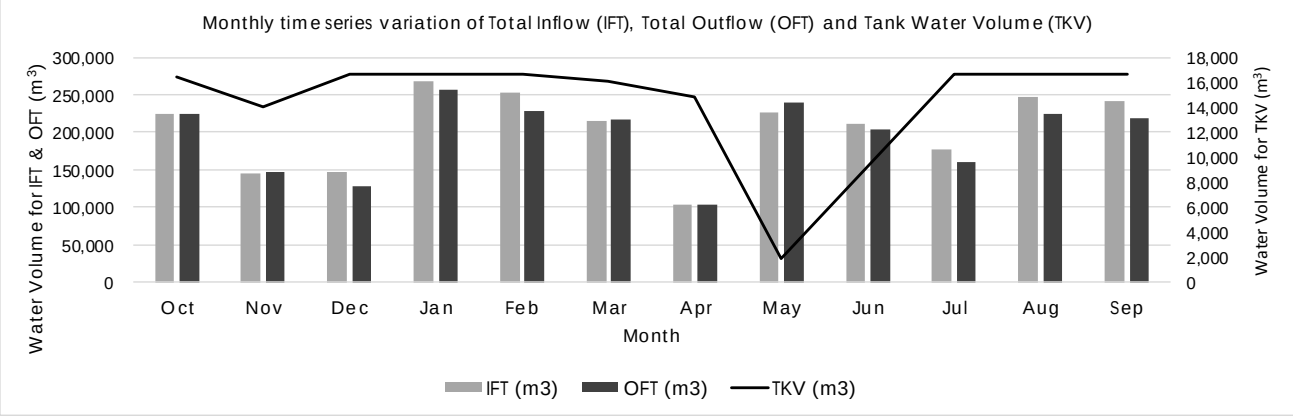
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	62,538	16,186	51,074	0	0	129,798	20,002	18,840	15,045	57,327	111,214	163,940	18,585
Nov	162	41,899	9,055	25,307	0	0	76,261	13,551	19,187	9,260	38,407	80,406	159,795	0
Dec	241	39,688	12,728	37,528	0	0	89,944	14,358	20,079	5,229	36,380	76,045	163,940	9,753
Jan	51	85,389	2,890	7,540	0	0	95,819	14,148	24,217	6,664	78,273	123,302	136,457	0
Feb	3	82,013	163	390	0	0	82,566	12,977	27,080	1,432	75,179	116,668	102,355	0
Mar	32	69,153	1,080	3,145	0	0	73,378	12,720	32,419	7,158	63,390	115,687	60,046	0
Apr	180	27,933	11,360	12,393	0	0	51,686	8,388	27,663	6,899	25,605	68,555	43,176	0
May	107	70,957	4,761	6,710	0	0	82,428	6,726	22,494	12,882	65,044	107,146	18,458	0
Jun	2	68,668	103	35	0	0	68,806	2,665	6,223	5,126	62,945	76,960	10,303	0
Jul	30	56,525	2,229	427	0	0	59,181	2,341	4,092	793	51,814	59,040	10,444	0
Aug	9	79,977	249	133	0	0	80,359	2,271	3,542	1,225	73,312	80,350	10,452	0
Sep	3	77,979	87	47	0	0	78,113	2,182	3,256	1,081	71,480	78,000	10,565	0



Tank Name: Weddewa **Tank Water Volume at FSL : 30,000 (m3)**

Cultivation Extend (Maha) : 17.1 ha **Cultivation Extend (Yala) : 15 ha**

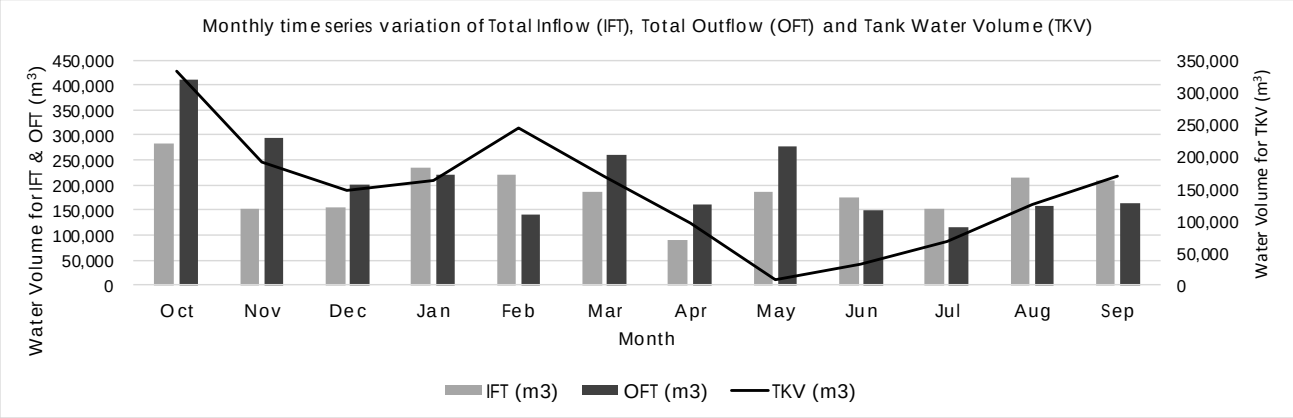
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	192,826	25,038	7,176	0	0	225,040	2,861	1,563	54,161	166,768	225,353	16,376	0
Nov	162	129,189	14,440	707	0	0	144,336	446	1,170	33,337	111,731	146,684	14,027	0
Dec	241	122,370	19,582	5,156	0	0	147,108	1,915	2,249	18,825	105,834	128,823	16,689	15,624
Jan	51	263,281	4,307	1,283	0	0	268,871	2,334	2,790	23,992	227,703	256,819	16,689	12,052
Feb	3	252,875	238	81	0	0	253,194	3,024	1,604	5,156	218,702	228,487	16,689	24,707
Mar	32	213,221	1,398	871	0	0	215,490	3,513	2,382	25,769	184,407	216,071	16,108	0
Apr	180	86,126	13,902	3,055	0	0	103,083	2,082	2,990	24,836	74,487	104,395	14,796	0
May	107	218,783	5,663	2,511	0	0	226,957	2,117	2,120	46,376	189,218	239,831	1,923	0
Jun	2	211,726	117	0	0	0	211,843	1,257	1,681	18,455	183,114	204,507	9,258	0
Jul	30	174,285	2,345	886	0	0	177,516	4,436	2,099	2,854	150,733	160,122	16,689	9,964
Aug	9	246,595	262	276	0	0	247,133	4,613	1,776	4,411	213,271	224,072	16,689	23,061
Sep	3	240,434	92	96	0	0	240,622	4,454	1,662	3,892	207,943	217,952	16,689	22,670



Tank Name: Kendewa Mahawewa **Tank Water Volume at FSL : 340,000 (m3)**

Cultivation Extend (Maha) : 89.3 ha **Cultivation Extend (Yala) : 80 ha**

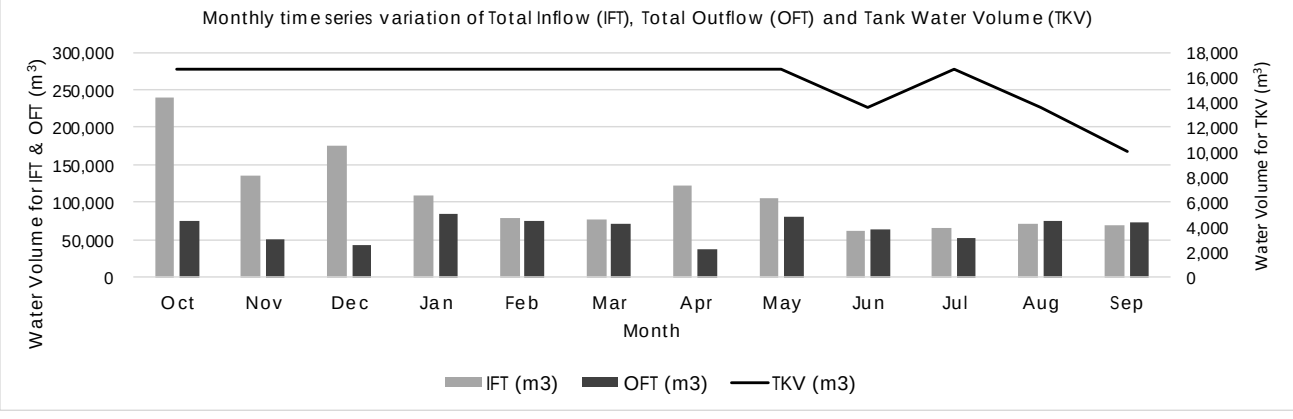
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	158,430	8,249	105,605	11,145	0	283,429	41,064	57,864	282,840	28,715	410,483	332,905	0
Nov	162	106,144	8,242	31,616	6,902	0	152,904	16,402	85,253	174,096	19,239	294,989	190,820	0
Dec	241	100,542	14,278	30,173	4,215	7,812	157,020	11,727	72,835	98,307	18,223	201,092	146,748	0
Jan	51	216,318	3,632	3,741	5,356	6,026	235,073	7,529	47,440	125,292	39,208	219,469	162,352	0
Feb	3	207,767	193	253	1,352	12,353	221,919	12,438	63,735	26,927	37,658	140,757	243,514	0
Mar	32	175,187	995	4,444	5,630	0	186,256	17,813	77,220	134,572	31,753	261,358	168,412	0
Apr	180	70,763	12,630	5,800	598	0	89,791	3,427	14,687	129,699	12,826	160,639	97,564	0
May	107	179,757	5,348	2,387	424	0	187,916	525	1,256	242,184	32,581	276,546	8,934	0
Jun	2	173,958	111	0	336	0	174,406	4,905	18,288	96,376	31,530	151,099	32,241	0
Jul	30	143,196	1,872	2,949	420	4,982	153,419	15,581	60,874	14,903	25,954	117,312	68,348	0
Aug	9	202,607	181	1,387	355	11,531	216,061	21,797	78,082	23,037	36,723	159,638	124,771	0
Sep	3	197,546	60	540	332	11,335	209,814	26,731	82,218	20,327	35,805	165,082	169,502	0



Tank Name: Kendewa Kudawewa **Tank Water Volume at FSL : 30,000 (m3)**

Cultivation Extend (Maha) : 5.7 ha **Cultivation Extend (Yala) : 5 ha**

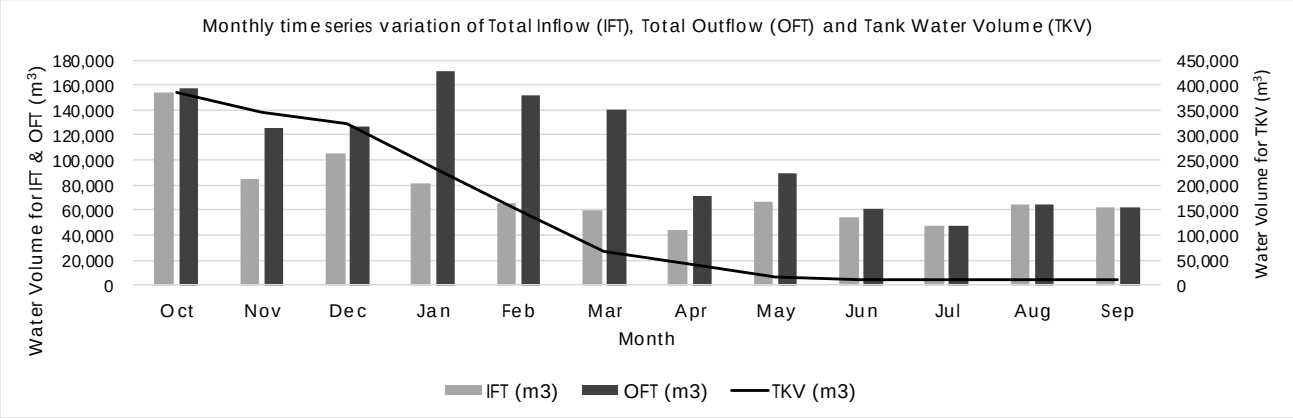
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	54,460	158,828	9,653	6,777	9,292	239,011	3,782	1,817	18,054	52,480	76,132	16,689	162,878
Nov	162	36,487	88,517	4,795	5,689	0	135,489	2,582	1,765	11,112	35,160	50,619	16,689	84,870
Dec	241	34,561	124,145	7,188	5,062	4,876	175,832	2,743	1,820	6,275	33,305	44,143	16,689	131,690
Jan	51	74,359	27,489	1,516	6,176	0	109,540	2,771	2,010	7,997	71,655	84,433	16,689	25,107
Feb	3	71,420	1,536	81	5,702	0	78,739	3,019	1,624	1,719	68,823	75,184	16,689	3,555
Mar	32	60,221	8,967	922	7,915	0	78,025	3,717	2,015	8,590	58,031	72,353	16,689	5,672
Apr	180	24,325	87,375	5,365	5,533	0	122,597	3,557	1,858	8,279	23,440	37,134	16,689	85,464
May	107	61,791	36,050	3,188	4,499	0	105,528	3,056	2,752	15,459	59,545	80,811	16,689	24,718
Jun	2	59,798	720	7	1,245	0	61,770	464	668	6,152	57,624	64,908	13,551	0
Jul	30	49,224	15,219	295	818	0	65,556	2,604	1,801	951	47,434	52,790	16,689	9,628
Aug	9	69,646	1,693	198	708	0	72,246	3,655	3,084	1,470	67,114	75,324	13,611	0
Sep	3	67,906	596	68	651	0	69,222	2,972	3,102	1,297	65,437	72,809	10,024	0



Tank Name: Diwugaha wewa **Tank Water Volume at FSL : 300,000 (m3)**

Cultivation Extend (Maha) : 8.55 ha **Cultivation Extend (Yala) : 8 ha**

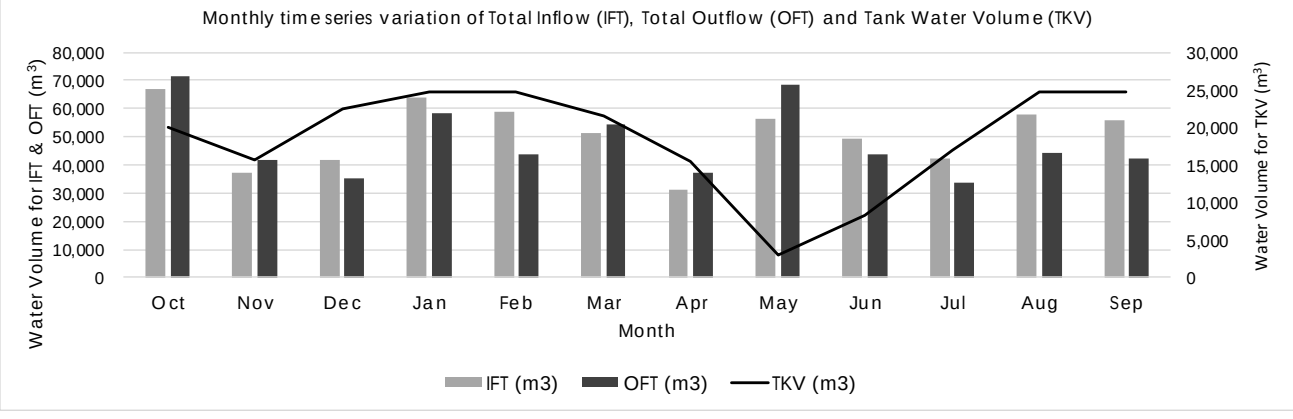
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	49,856	9,349	95,159	0	0	154,364	37,374	45,566	27,080	47,034	157,055	385,145	0
Nov	162	33,402	5,436	46,184	0	0	85,022	24,662	52,671	16,669	31,512	125,514	344,654	0
Dec	241	31,639	8,107	65,806	0	0	105,552	25,236	61,776	9,412	29,848	126,273	323,933	0
Jan	51	68,072	2,256	11,253	0	0	81,581	22,033	72,495	11,996	64,219	170,743	234,772	0
Feb	3	65,382	131	566	0	0	66,079	18,562	69,244	2,578	61,681	152,065	148,786	0
Mar	32	55,129	1,047	3,549	0	0	59,725	14,450	61,263	12,885	52,009	140,606	67,905	0
Apr	180	22,268	11,675	10,323	0	0	44,266	6,995	30,615	12,418	21,008	71,035	41,136	0
May	107	56,567	4,959	4,860	0	0	66,386	2,833	9,972	23,188	53,365	89,359	18,164	0
Jun	2	54,743	109	0	0	0	54,852	24	96	9,228	51,644	60,992	12,024	0
Jul	30	45,062	2,276	129	0	0	47,467	928	2,117	1,427	42,511	46,983	12,508	0
Aug	9	63,758	255	22	0	0	64,035	514	1,291	2,206	60,149	64,159	12,383	0
Sep	3	62,165	90	10	0	0	62,265	436	1,076	1,946	58,646	62,104	12,545	0



Tank Name: Poradutuwewa **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 12.35 ha **Cultivation Extend (Yala) : 11 ha**

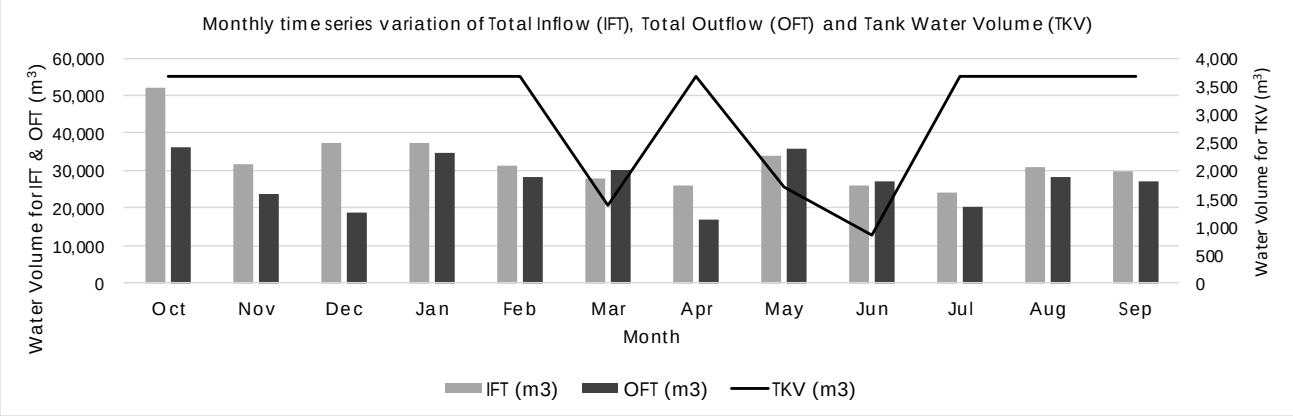
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	44,682	10,809	11,380	0	0	66,871	4,360	3,022	39,116	25,022	71,520	20,007	0
Nov	162	29,936	6,942	344	0	0	37,222	219	562	24,077	16,764	41,622	15,606	0
Dec	241	28,356	9,134	4,244	0	0	41,734	1,713	3,790	13,596	15,879	34,977	22,363	0
Jan	51	61,008	2,000	1,046	0	0	64,054	1,974	4,650	17,328	34,165	58,117	24,655	3,645
Feb	3	58,597	108	74	0	0	58,779	3,427	3,627	3,724	32,814	43,592	24,655	15,187
Mar	32	49,408	600	1,210	0	0	51,218	4,854	3,273	18,611	27,669	54,406	21,467	0
Apr	180	19,957	6,131	5,053	0	0	31,141	3,369	4,640	17,937	11,176	37,122	15,486	0
May	107	50,697	2,532	3,001	0	0	56,230	2,702	4,058	33,494	28,390	68,644	3,072	0
Jun	2	49,062	57	0	0	0	49,119	1,095	1,945	13,329	27,475	43,843	8,348	0
Jul	30	40,386	1,072	771	0	0	42,229	4,031	4,807	2,061	22,616	33,515	17,062	0
Aug	9	57,142	112	368	0	0	57,622	5,774	3,415	3,186	31,999	44,374	24,655	5,654
Sep	3	55,714	40	128	0	0	55,882	5,939	2,455	2,811	31,200	42,405	24,655	13,477



Tank Name: Siyambalagaswewa Kudawew Tank Water Volume at FSL : 10,000 (m3)

Cultivation Extend (Maha) : 4.75 ha Cultivation Extend (Yala) : 4 ha

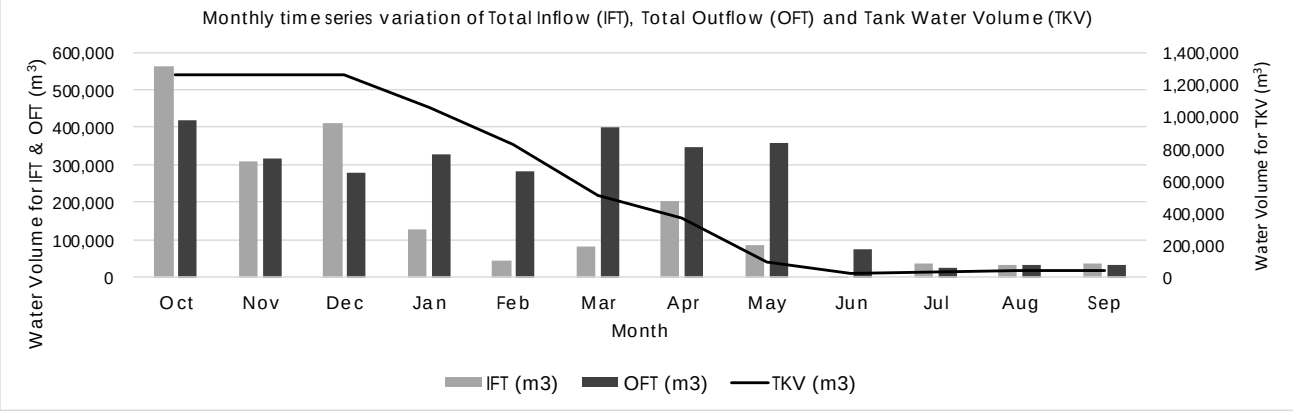
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	23,771	25,730	2,589	0	0	52,090	1,047	451	15,045	19,526	36,069	3,682	16,021
Nov	162	15,926	14,344	1,258	0	0	31,528	772	478	9,260	13,082	23,593	3,682	7,935
Dec	241	15,085	20,042	2,331	0	0	37,458	893	450	5,229	12,392	18,963	3,682	18,495
Jan	51	32,456	4,455	402	0	0	37,313	778	588	6,664	26,661	34,691	3,682	2,623
Feb	3	31,174	248	27	0	0	31,449	1,008	354	1,432	25,607	28,401	3,682	3,047
Mar	32	26,285	1,455	233	0	0	27,973	957	563	7,158	21,591	30,270	1,385	0
Apr	180	10,617	14,169	1,348	0	0	26,134	987	529	6,899	8,721	17,137	3,682	6,701
May	107	26,971	5,822	1,038	0	0	33,831	481	275	12,882	22,155	35,794	1,719	0
Jun	2	26,101	117	0	0	0	26,218	245	259	5,126	21,440	27,071	866	0
Jul	30	21,485	2,453	221	0	0	24,159	1,255	553	793	17,649	20,249	3,682	1,095
Aug	9	30,399	272	92	0	0	30,763	1,538	392	1,225	24,971	28,126	3,682	2,638
Sep	3	29,640	96	32	0	0	29,768	1,485	367	1,081	24,347	27,280	3,682	2,488



Tank Name: Siyambalagaswewa Mahawew Tank Water Volume at FSL : 710,000 (m3)

Cultivation Extend (Maha) : 58.9 ha Cultivation Extend (Yala) : 53 ha

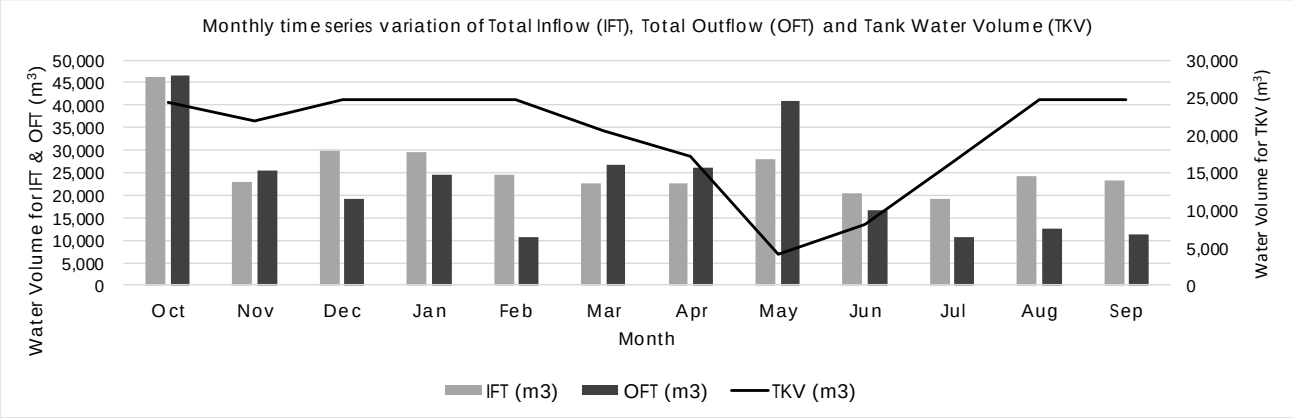
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	0	157,596	227,666	93,099	82,130	560,490	89,081	141,677	186,554	0	417,312	1,261,728	143,179
Nov	162	0	87,941	113,077	67,094	42,435	310,547	60,582	141,015	114,829	0	316,426	1,255,849	0
Dec	241	0	123,384	168,153	44,141	75,357	411,035	64,163	148,337	64,840	0	277,341	1,261,728	127,815
Jan	51	0	27,670	33,649	47,105	19,494	127,919	63,099	182,952	82,639	0	328,691	1,060,956	0
Feb	3	0	1,552	1,746	21,891	21,393	46,582	58,828	205,088	17,760	0	281,677	825,861	0
Mar	32	0	9,588	14,593	55,281	2,836	82,298	59,081	250,514	88,760	0	398,356	509,803	0
Apr	180	0	97,007	59,458	5,157	42,732	204,353	40,256	221,217	85,546	0	347,020	367,137	0
May	107	0	40,369	32,271	2,319	12,359	87,318	29,690	168,544	159,739	0	357,973	96,482	0
Jun	2	0	867	12	4,619	0	5,498	2,113	8,051	63,567	0	73,731	28,249	0
Jul	30	0	18,288	540	14,280	4,892	38,000	4,625	13,341	9,829	0	27,796	38,453	0
Aug	9	0	2,041	182	17,441	13,777	33,441	4,220	12,602	15,194	0	32,017	39,877	0
Sep	3	0	716	111	18,046	17,507	36,380	5,465	15,145	13,407	0	34,017	42,240	0



Tank Name: Aluthwewa **Tank Water Volume at FSL : 40,000 (m3)**

Cultivation Extend (Maha) : 12.35 ha **Cultivation Extend (Yala) : 11 ha**

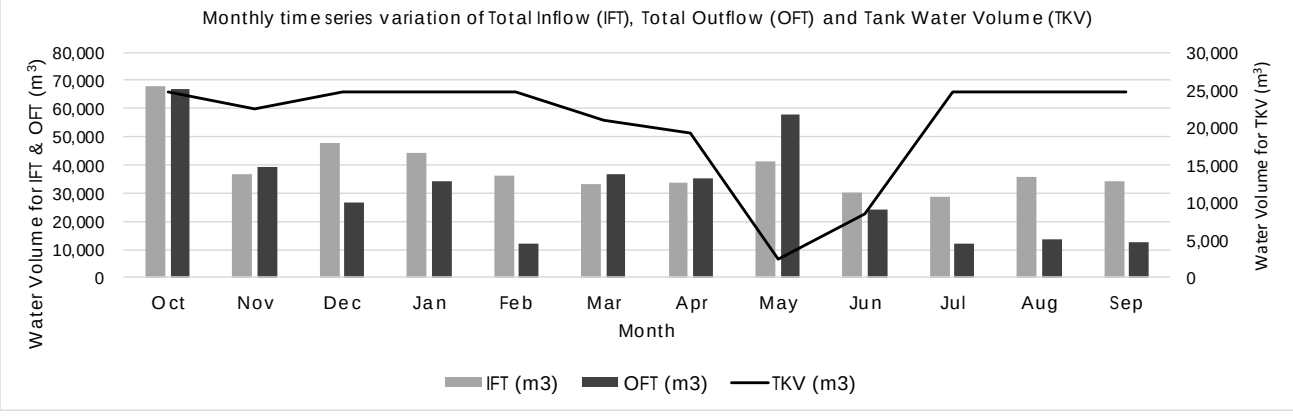
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	18,550	16,321	11,472	0	0	46,343	4,428	3,122	39,116	0	46,666	24,332	0
Nov	162	12,428	9,985	562	0	0	22,975	351	936	24,077	0	25,365	21,942	0
Dec	241	11,772	13,366	4,821	0	0	29,959	1,955	3,753	13,596	0	19,304	24,655	7,942
Jan	51	25,328	2,917	1,272	0	0	29,517	2,419	4,905	17,328	0	24,652	24,655	4,865
Feb	3	24,326	160	81	0	0	24,567	3,647	3,332	3,724	0	10,703	24,655	13,864
Mar	32	20,512	914	1,204	0	0	22,630	4,823	3,329	18,611	0	26,763	20,522	0
Apr	180	8,285	9,164	5,125	0	0	22,574	3,433	4,632	17,937	0	26,002	17,095	0
May	107	21,047	3,762	3,227	0	0	28,036	3,198	4,294	33,494	0	40,986	4,145	0
Jun	2	20,368	82	0	0	0	20,450	1,146	2,043	13,329	0	16,519	8,076	0
Jul	30	16,766	1,604	729	0	0	19,099	3,873	4,803	2,061	0	10,737	16,438	0
Aug	9	23,722	172	355	0	0	24,249	5,600	3,678	3,186	0	12,465	24,655	3,568
Sep	3	23,130	60	128	0	0	23,318	5,939	2,455	2,811	0	11,205	24,655	12,112



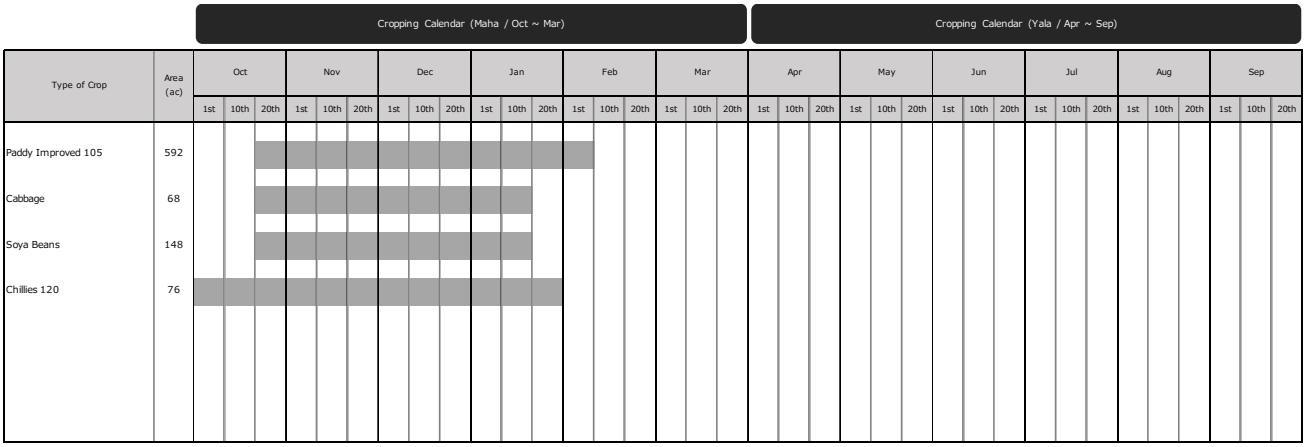
Tank Name: Ehetuwewa **Tank Water Volume at FSL : 40,000 (m3)**

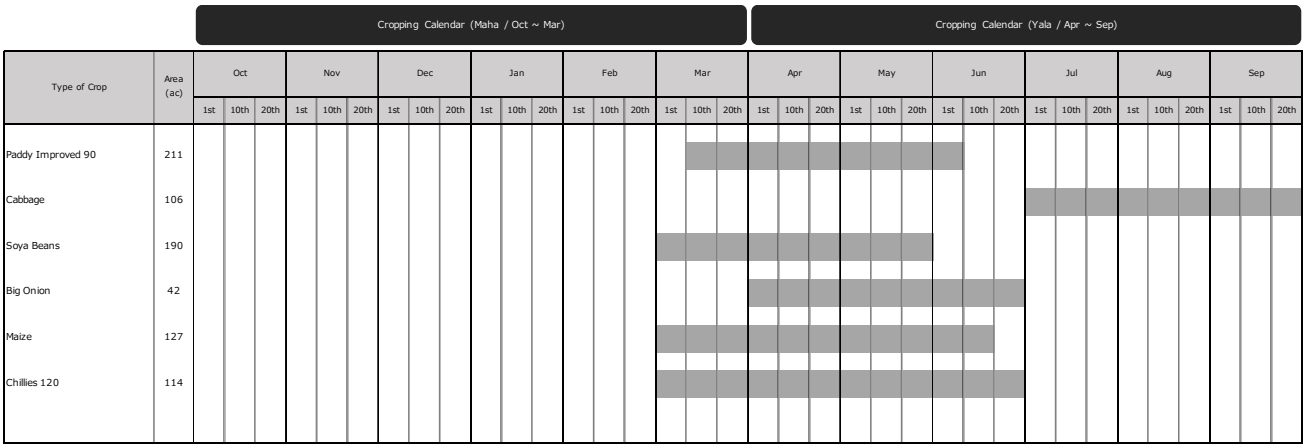
Cultivation Extend (Maha) : 19 ha **Cultivation Extend (Yala) : 17 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	27,280	30,589	10,306	0	0	68,175	4,013	2,602	60,179	0	66,794	24,655	1,381
Nov	162	18,277	17,775	842	0	0	36,894	538	1,563	37,042	0	39,143	22,406	0
Dec	241	17,312	24,097	6,458	0	0	47,867	2,512	3,165	20,916	0	26,593	24,655	19,025
Jan	51	37,247	5,281	1,698	0	0	44,226	3,181	4,151	26,658	0	33,989	24,655	10,237
Feb	3	35,775	292	108	0	0	36,175	4,032	2,370	5,729	0	12,132	24,655	24,043
Mar	32	30,165	1,711	1,167	0	0	33,043	4,700	3,493	28,632	0	36,826	20,872	0
Apr	180	12,184	17,005	4,449	0	0	33,638	3,033	4,598	27,596	0	35,227	19,284	0
May	107	30,952	6,946	3,319	0	0	41,217	2,958	3,528	51,529	0	58,016	2,485	0
Jun	2	29,953	144	0	0	0	30,097	1,304	2,195	20,506	0	24,004	8,578	0
Jul	30	24,657	2,906	965	0	0	28,528	5,208	3,916	3,171	0	12,295	24,655	156
Aug	9	34,886	321	368	0	0	35,575	6,150	2,624	4,901	0	13,676	24,655	21,899
Sep	3	34,015	113	128	0	0	34,256	5,939	2,455	4,325	0	12,719	24,655	21,537



Proposed Cropping Calendar Ichchankulama Cascade System



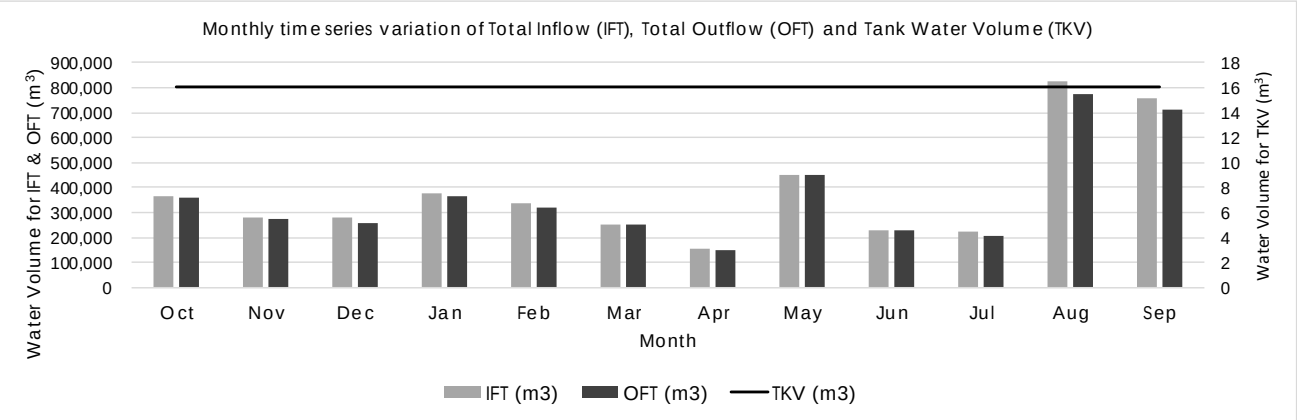


Result of Operation Study for Each Tank in Ichchankulama Cascade System

Tank Name: Agale wewa **Tank Water Volume at FSL : 200 (m3)**

Cultivation Extend (Maha) : 12 ha **Cultivation Extend (Yala) : 15 ha**

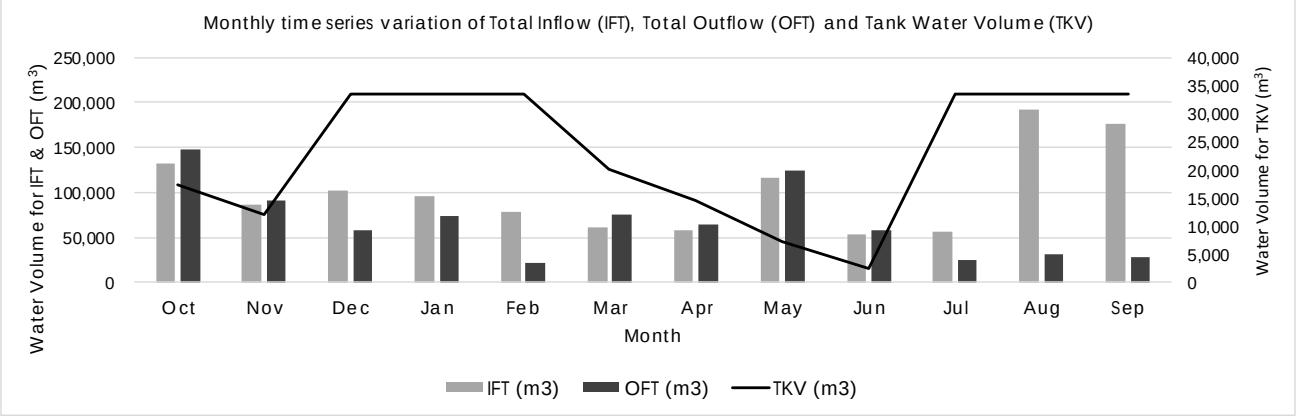
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	344,607	21,604	45	0	0	366,256	17	1	36,801	321,786	358,604	16	7,652
Nov	162	266,783	12,038	17	0	0	278,838	10	1	23,215	249,115	272,341	16	6,497
Dec	241	262,765	16,887	35	0	0	279,687	13	1	13,061	245,364	258,438	16	21,249
Jan	51	374,757	3,738	9	0	0	378,504	15	1	16,739	349,939	366,693	16	11,810
Feb	3	338,490	209	1	0	0	338,700	20	2	3,449	316,073	319,544	16	19,156
Mar	32	249,830	1,219	5	0	0	251,054	11	1	16,855	233,285	250,150	16	903
Apr	180	141,721	11,886	25	0	0	153,632	14	1	15,296	132,335	147,646	16	5,986
May	107	447,992	4,902	22	0	0	452,916	17	1	29,737	418,324	448,079	16	4,837
Jun	2	229,276	97	0	0	0	229,373	19	1	14,264	214,093	228,376	16	997
Jul	30	219,680	2,057	5	0	0	221,742	31	2	3,486	205,132	208,650	16	13,091
Aug	9	822,749	230	2	0	0	822,981	31	2	5,389	768,262	773,684	16	49,297
Sep	3	758,678	81	1	0	0	758,760	30	2	4,755	708,434	713,221	16	45,539



Tank Name: Theankuttiya **Tank Water Volume at FSL : 50,000 (m3)**

Cultivation Extend (Maha) : 45.6 ha **Cultivation Extend (Yala) : 41 ha**

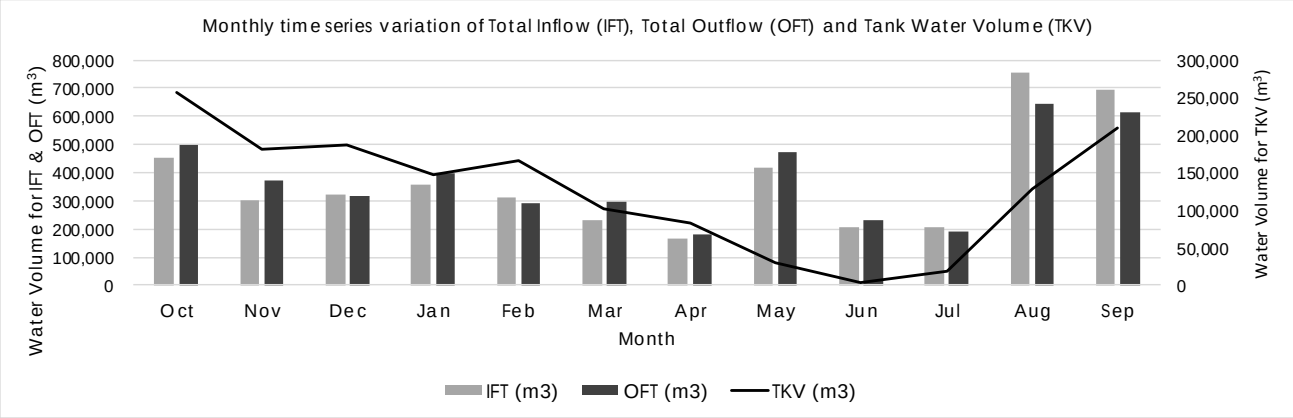
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	79,876	40,443	11,535	0	0	131,854	4,647	2,975	140,193	0	147,815	17,460	0
Nov	162	61,837	23,285	1,374	0	0	86,496	828	2,542	88,436	0	91,807	12,150	0
Dec	241	60,906	31,422	9,500	0	0	101,828	3,356	4,839	49,755	0	57,951	33,421	22,606
Jan	51	86,864	6,990	1,894	0	0	95,748	3,616	6,058	63,766	0	73,440	33,421	22,308
Feb	3	78,458	384	135	0	0	78,977	5,040	3,213	13,140	0	21,393	33,421	57,584
Mar	32	57,908	2,260	1,379	0	0	61,547	5,565	5,044	64,208	0	74,816	20,151	0
Apr	180	32,849	22,731	3,135	0	0	58,715	2,000	4,015	58,271	0	64,287	14,580	0
May	107	103,839	9,215	3,414	0	0	116,468	4,202	6,162	113,285	0	123,649	7,399	0
Jun	2	53,144	190	0	0	0	53,334	1,295	2,507	54,339	0	58,141	2,591	0
Jul	30	50,919	3,828	1,178	0	0	55,925	6,296	5,184	13,281	0	24,761	33,421	334
Aug	9	190,703	422	460	0	0	191,585	7,688	3,557	20,531	0	31,776	33,421	159,809
Sep	3	175,852	149	160	0	0	176,161	7,424	3,328	18,116	0	28,868	33,421	147,294



Tank Name: Ihala Kainathama **Tank Water Volume at FSL : 250,000 (m3)**

Cultivation Extend (Maha) : 64.6 ha **Cultivation Extend (Yala) : 58 ha**

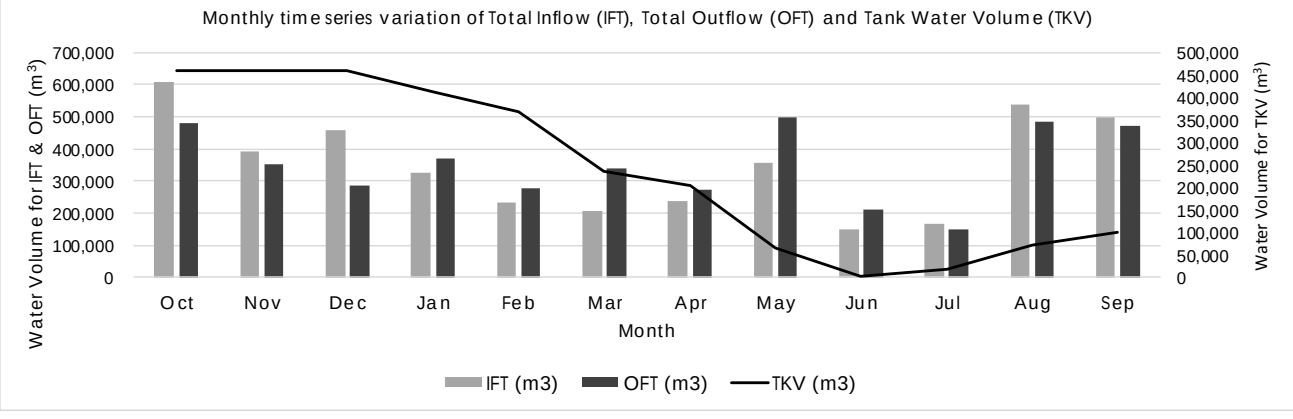
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	305,696	47,764	77,643	7,360	14,064	452,528	30,206	38,044	198,607	230,898	497,755	256,958	0
Nov	162	236,659	29,043	24,692	4,643	4,494	299,532	12,977	57,557	125,285	178,753	374,572	181,918	0
Dec	241	233,095	41,686	31,000	2,612	12,516	320,910	12,228	57,213	70,486	176,061	315,988	186,839	0
Jan	51	332,442	9,721	3,712	3,348	5,950	355,173	8,284	45,417	90,335	251,099	395,136	146,876	0
Feb	3	300,270	541	207	690	9,580	311,288	8,127	38,844	18,615	226,800	292,385	165,779	0
Mar	32	221,620	3,220	1,794	3,371	1,401	231,406	7,431	30,033	90,961	167,394	295,819	101,365	0
Apr	180	125,719	32,600	1,719	0	5,232	165,270	1,268	4,185	82,551	94,958	182,961	83,674	0
May	107	397,407	13,104	4,388	0	3,076	417,976	2,328	8,536	160,487	300,169	471,520	30,129	0
Jun	2	203,388	268	0	0	2,003	205,659	636	1,263	76,980	153,623	232,502	3,286	0
Jul	30	194,875	5,502	1,187	0	6,541	208,105	6,445	19,966	18,815	147,193	192,419	18,971	0
Aug	9	729,849	568	1,164	0	24,636	756,217	16,363	49,669	29,085	551,269	646,386	128,802	0
Sep	3	673,012	193	515	0	21,968	695,688	25,986	55,685	25,664	508,339	615,674	208,816	0



Tank Name: Pahala Kainathama **Tank Water Volume at FSL : 340,000 (m3)**

Cultivation Extend (Maha) : 71.25 ha **Cultivation Extend (Yala) : 64 ha**

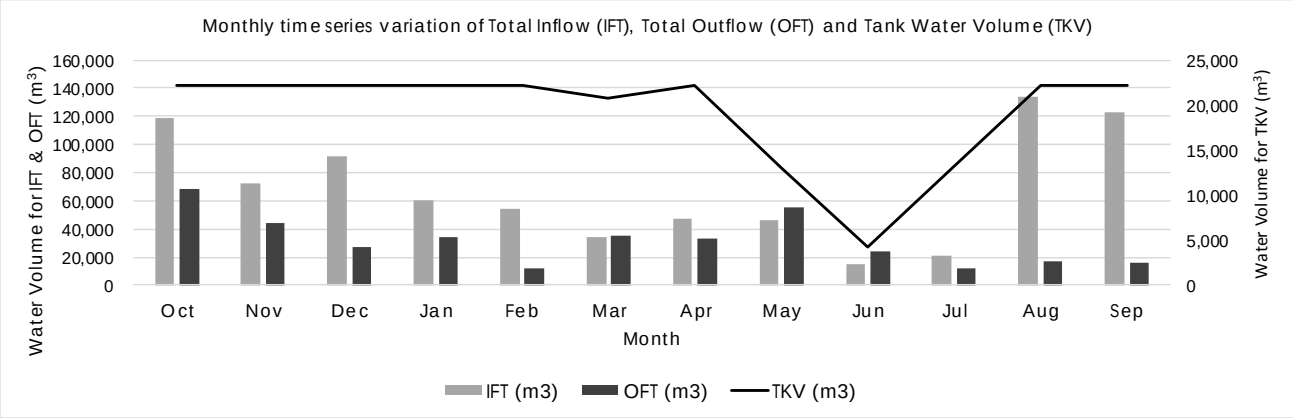
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	219,353	192,222	108,405	58,624	30,983	609,587	42,442	53,278	219,052	163,728	478,500	459,960	131,088
Nov	162	169,816	107,406	52,521	44,152	18,200	392,095	28,257	59,498	138,182	126,752	352,689	459,960	39,405
Dec	241	167,258	150,193	80,941	30,427	28,107	456,927	30,787	53,398	77,742	124,844	286,772	459,960	170,155
Jan	51	238,545	33,411	16,295	33,082	3,712	325,044	30,585	63,588	99,634	178,052	371,860	413,144	0
Feb	3	215,460	1,866	866	13,764	0	231,956	31,483	65,727	20,531	160,821	278,562	366,537	0
Mar	32	159,024	11,062	8,244	30,512	0	208,842	33,353	86,253	100,325	118,698	338,627	236,752	0
Apr	180	90,210	109,355	36,734	2,850	0	239,149	24,900	88,280	91,049	67,334	271,562	204,339	0
May	107	285,161	45,045	22,602	3,836	0	356,644	23,107	83,601	177,007	212,847	496,563	64,420	0
Jun	2	145,942	930	79	854	0	147,804	3,396	12,770	84,904	108,933	210,003	2,221	0
Jul	30	139,833	19,735	1,043	4,607	0	165,218	6,020	18,773	20,752	104,373	149,918	17,521	0
Aug	9	523,705	2,174	837	11,091	0	537,807	12,461	47,868	32,079	390,900	483,308	72,020	0
Sep	3	482,922	762	346	12,701	0	496,731	17,124	63,855	28,306	360,459	469,743	99,008	0



Tank Name: Kudawewa **Tank Water Volume at FSL : 37,000 (m3)**

Cultivation Extend (Maha) : 19.95 ha **Cultivation Extend (Yala) : 18 ha**

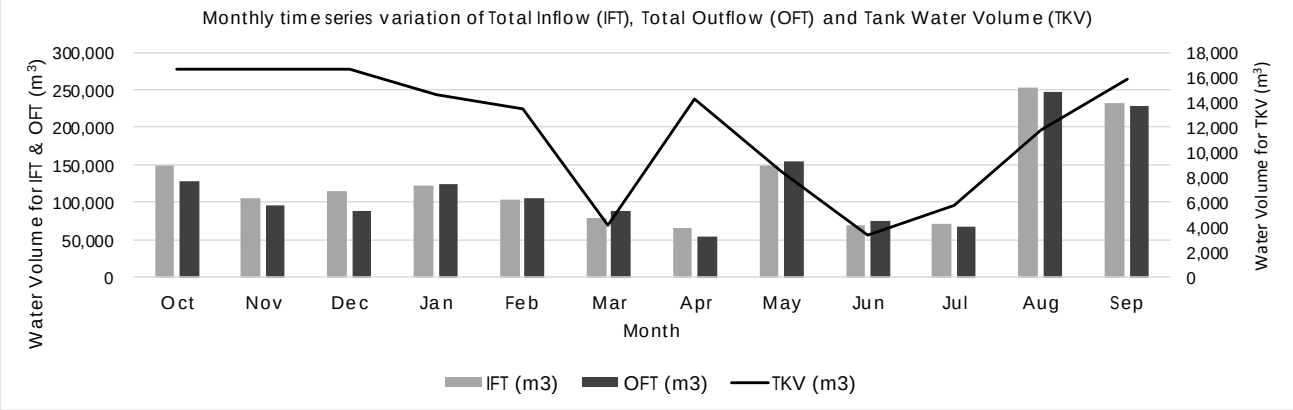
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	21,935	56,487	11,633	28,634	0	118,689	4,590	2,630	61,334	0	68,554	22,212	50,135
Nov	162	16,982	31,468	5,881	18,196	0	72,526	3,179	2,368	38,691	0	44,238	22,212	28,289
Dec	241	16,726	44,125	8,851	10,919	11,303	91,923	3,378	2,446	21,768	0	27,592	22,212	64,332
Jan	51	23,854	9,769	1,887	13,965	11,154	60,629	3,479	2,400	27,898	0	33,777	22,212	26,852
Feb	3	21,546	546	100	3,271	28,792	54,255	3,730	2,135	5,749	0	11,614	22,212	42,641
Mar	32	15,902	3,189	1,129	13,850	0	34,071	4,535	2,840	28,091	0	35,466	20,817	0
Apr	180	9,021	31,138	6,058	803	0	47,020	4,055	3,240	25,494	0	32,788	22,212	12,837
May	107	28,516	12,817	3,910	1,232	0	46,475	3,059	3,053	49,562	0	55,674	13,013	0
Jun	2	14,594	263	0	501	0	15,359	174	240	23,773	0	24,187	4,185	0
Jul	30	13,983	5,483	425	1,037	167	21,095	2,695	3,579	5,811	0	12,085	13,196	0
Aug	9	52,371	600	340	711	79,905	133,927	5,612	2,489	8,982	0	17,083	22,212	107,827
Sep	3	48,292	212	118	666	73,647	122,935	5,494	2,212	7,926	0	15,631	22,212	107,303



Tank Name: Palugaswewa **Tank Water Volume at FSL : 30,000 (m3)**

Cultivation Extend (Maha) : 7.6 ha **Cultivation Extend (Yala) : 7 ha**

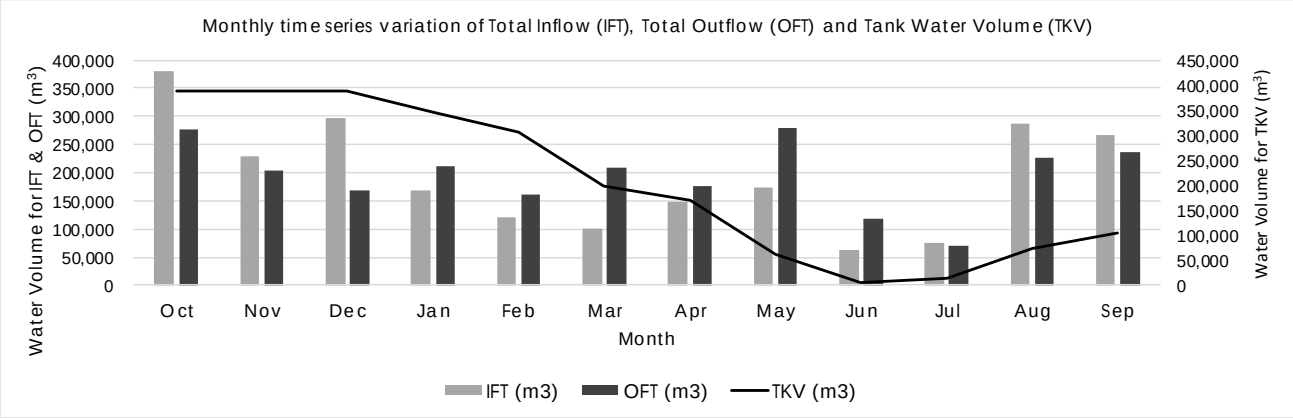
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	105,688	34,766	9,139	0	0	149,593	3,599	2,149	23,365	99,706	128,819	16,689	20,774
Nov	162	81,820	19,446	4,152	0	0	105,418	2,318	2,460	14,739	77,189	96,706	16,689	8,712
Dec	241	80,588	27,119	7,127	0	0	114,834	2,719	1,925	8,293	76,026	88,963	16,689	25,871
Jan	51	114,935	6,060	1,201	0	0	122,196	2,434	2,830	10,628	108,429	124,321	14,565	0
Feb	3	103,812	337	74	0	0	104,223	2,563	2,660	2,190	97,936	105,349	13,439	0
Mar	32	76,621	1,992	564	0	0	79,177	2,362	3,111	10,701	72,284	88,459	4,157	0
Apr	180	43,465	19,495	2,648	0	0	65,608	1,950	2,882	9,712	41,004	55,549	14,216	0
May	107	137,396	7,890	3,024	0	0	148,310	2,816	2,729	18,881	129,619	154,044	8,482	0
Jun	2	70,317	163	0	0	0	70,480	86	132	9,056	66,337	75,612	3,350	0
Jul	30	67,374	3,418	168	0	0	70,960	1,103	1,642	2,214	63,561	68,520	5,791	0
Aug	9	252,331	375	157	0	0	252,863	2,344	3,044	3,422	238,048	246,858	11,796	0
Sep	3	232,681	132	66	0	0	232,879	3,304	3,009	3,019	219,510	228,843	15,832	0



Tank Name: Ichchankulama **Tank Water Volume at FSL : 300,000 (m3)**

Cultivation Extend (Maha) : 41.8 ha **Cultivation Extend (Yala) : 37 ha**

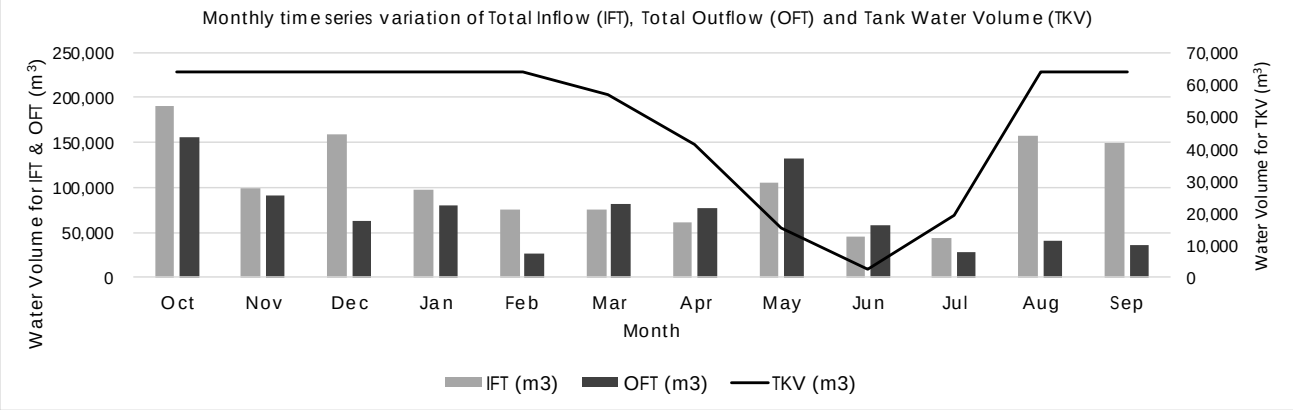
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	94,721	119,774	95,962	34,449	35,454	380,360	37,566	44,110	128,510	65,357	275,543	387,836	104,817
Nov	162	73,330	66,941	46,814	23,023	18,500	228,608	25,145	48,131	81,067	50,597	204,940	387,836	23,668
Dec	241	72,225	93,617	71,370	14,247	45,101	296,561	27,150	45,188	45,609	49,835	167,782	387,836	128,779
Jan	51	103,008	20,874	14,319	16,685	13,426	168,312	26,879	54,518	58,452	71,075	210,925	345,223	0
Feb	3	93,039	1,166	757	5,547	21,320	121,830	27,361	57,111	12,045	64,197	160,714	306,339	0
Mar	32	68,670	6,965	7,109	16,864	0	99,608	28,789	73,714	58,857	47,382	208,742	197,205	0
Apr	180	38,954	69,183	31,883	1,523	6,418	147,962	21,622	74,231	53,415	26,878	176,146	169,021	0
May	107	123,138	28,508	19,347	1,769	0	172,762	20,410	71,259	103,844	84,965	280,478	61,305	0
Jun	2	63,020	593	99	144	0	63,857	5,708	20,043	49,811	43,484	119,046	6,116	0
Jul	30	60,382	12,699	758	2,232	0	76,071	4,100	11,322	12,175	41,664	69,261	12,926	0
Aug	9	226,146	1,387	775	3,767	53,914	285,988	10,970	39,812	18,820	156,040	225,642	73,273	0
Sep	3	208,535	485	334	3,451	53,652	266,456	16,831	58,181	16,606	143,889	235,508	104,222	0



Tank Name: Weliwewa **Tank Water Volume at FSL : 80,000 (m3)**

Cultivation Extend (Maha) : 45.6 ha **Cultivation Extend (Yala) : 41 ha**

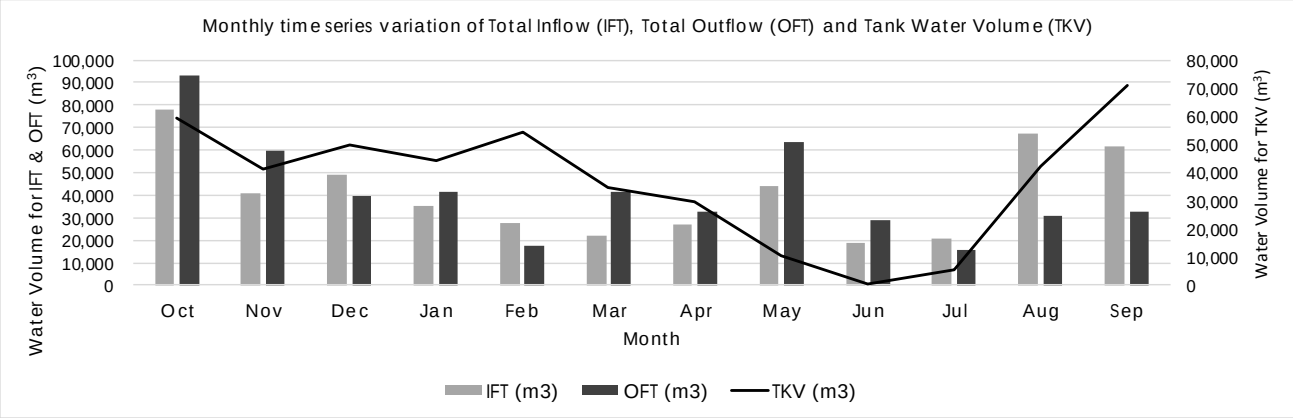
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	62,089	19,191	22,273	34,524	52,408	190,486	8,485	7,398	140,193	0	156,076	63,719	34,410
Nov	162	48,067	12,378	1,277	25,840	11,834	99,396	772	2,746	88,436	0	91,953	63,719	7,443
Dec	241	47,344	15,556	13,165	18,159	64,389	158,613	5,154	7,723	49,755	0	62,632	63,719	95,981
Jan	51	67,522	3,287	3,712	22,594	0	97,115	6,942	9,843	63,766	0	80,551	63,719	16,563
Feb	3	60,987	180	216	13,831	0	75,214	8,064	6,126	13,140	0	27,330	63,719	47,885
Mar	32	45,013	1,057	2,446	26,514	0	75,030	9,810	8,123	64,208	0	82,141	56,608	0
Apr	180	25,534	10,793	10,725	14,846	0	61,899	7,022	11,850	58,271	0	77,143	41,364	0
May	107	80,717	4,460	6,313	14,252	0	105,742	6,699	11,921	113,285	0	131,904	15,201	0
Jun	2	41,310	102	3	4,009	0	45,423	1,160	2,488	54,339	0	57,987	2,638	0
Jul	30	39,581	2,015	860	2,264	0	44,720	4,711	9,888	13,281	0	27,880	19,477	0
Aug	9	148,238	198	736	7,962	0	157,135	11,202	8,523	20,531	0	40,256	63,719	72,637
Sep	3	136,694	69	256	11,636	0	148,656	11,878	6,345	18,116	0	36,339	63,719	112,317



Tank Name: Karkolawewa **Tank Water Volume at FSL : 90,000 (m3)**

Cultivation Extend (Maha) : 23.75 ha **Cultivation Extend (Yala) : 21 ha**

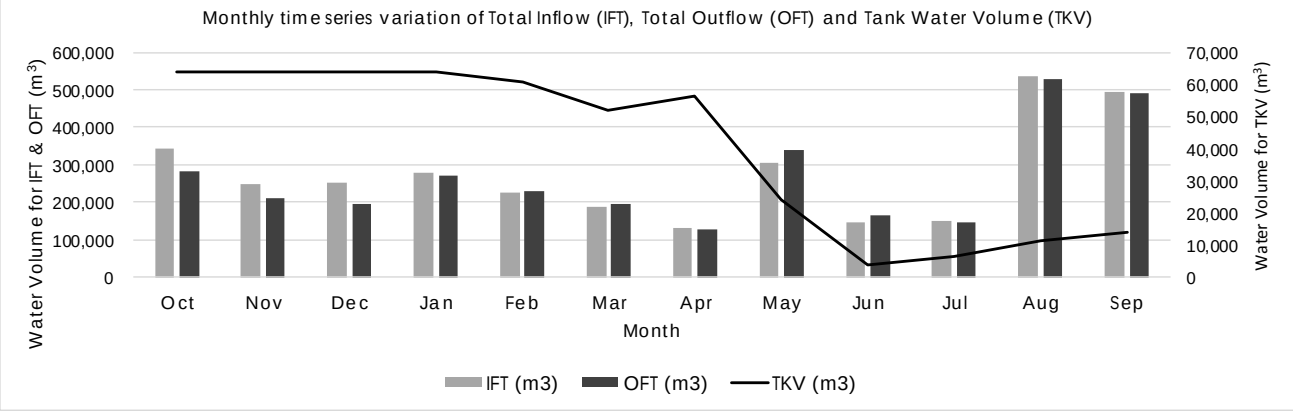
	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	27,918	22,942	27,105	0	0	77,965	10,555	9,748	73,017	0	93,321	59,569	0
Nov	162	21,613	14,193	5,355	0	0	41,161	2,758	10,795	46,061	0	59,614	41,116	0
Dec	241	21,287	19,983	7,559	0	0	48,829	3,090	10,889	25,914	0	39,893	50,052	0
Jan	51	30,360	4,605	558	0	0	35,523	1,743	6,456	33,211	0	41,411	44,165	0
Feb	3	27,422	253	53	0	0	27,728	2,499	8,159	6,844	0	17,502	54,391	0
Mar	32	20,239	1,490	486	0	0	22,215	2,177	6,135	33,442	0	41,753	34,854	0
Apr	180	11,481	14,797	775	0	0	27,053	614	1,495	30,350	0	32,459	29,448	0
May	107	36,293	5,940	2,046	0	0	44,279	1,138	3,066	59,002	0	63,207	10,521	0
Jun	2	18,574	122	0	0	0	18,696	253	350	28,301	0	28,904	313	0
Jul	30	17,797	2,504	486	0	0	20,787	2,630	5,938	6,917	0	15,486	5,614	0
Aug	9	66,653	259	505	0	0	67,417	7,022	13,303	10,693	0	31,018	42,014	0
Sep	3	61,463	89	213	0	0	61,765	11,323	12,034	9,435	0	32,793	70,986	0



Tank Name: Mawathawewa **Tank Water Volume at FSL : 80,000 (m3)**

Cultivation Extend (Maha) : 16.15 ha **Cultivation Extend (Yala) : 14 ha**

	RFL	TLNIN	RUNOF	ROT	RETFLW	SPLIN	IFT	EVLOS	SPLOS	WI	LNOUT	OFT	TKV	SPD
	(mm)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)	(m^3)
Oct	323	219,353	51,271	25,825	47,330	0	343,779	10,111	6,816	49,652	215,234	281,813	63,719	61,967
Nov	162	169,816	28,571	12,896	36,568	0	247,851	6,907	6,596	31,321	166,627	211,451	63,719	36,400
Dec	241	167,258	40,072	19,234	25,540	0	252,104	7,336	6,815	17,622	164,117	195,889	63,719	56,215
Jan	51	238,545	8,877	4,064	27,151	0	278,636	7,492	7,072	22,584	234,065	271,212	63,719	7,424
Feb	3	215,460	496	216	11,492	0	227,663	7,953	6,708	4,654	211,413	230,728	60,655	0
Mar	32	159,024	2,904	2,391	24,199	0	188,518	9,654	8,826	22,740	156,038	197,257	51,915	0
Apr	180	90,210	28,468	12,632	837	0	132,147	8,578	10,065	20,638	88,516	127,796	56,266	0
May	107	285,161	11,667	8,267	1,707	0	306,802	8,334	10,643	40,122	279,806	338,905	24,163	0
Jun	2	145,942	245	30	253	0	146,469	1,309	3,005	19,245	143,201	166,760	3,872	0
Jul	30	139,833	5,225	231	3,993	0	149,282	1,502	3,068	4,704	137,207	146,481	6,673	0
Aug	9	523,705	578	167	9,934	0	534,384	2,609	5,784	7,271	513,871	529,535	11,523	0
Sep	3	482,922	203	71	11,137	0	494,333	3,479	7,820	6,416	473,853	491,569	14,287	0



ANNEX-5

OUTLINE OF CASCADE SYSTEM REHABILITATION PROCEDURE

1. Introduction

This Manual is prepared under the "Project for Formulating Cascade System Development Plan under North Central Province Canal" to give the technical guidance to the government officers for planning, design, construction supervision, and maintenance for cascade system development. This manual consists of (1)Introduction, (2)Social Mobilisation and Investigation, (3)Irrigation Planning, (4)Design and Cost Estimate, (5)Construction Supervision and (6)Maintenance Activities.

North Central Province Canal project targets 128 cascade irrigation systems in Anuradhapura in the North Central Province and Vavuniya districts in Northern Province. The 128cascade systems are spread into five sub-river basins, namely: Malwathu Oya, Yan Oya, Ma Oya, Parangi Aru, and Kanakarayan Aru and covering 12 divisional secretary divisions, namely: Galenbidunuwawe, Horowpothana, Kahatagasdigiliya, Kebithigollewa, Medawachchiya, Mihintale, Rambewa, Thirappane in Anurapdapura District and Vavuniya, Vavuniya North, Vavuniya South, and Vengalacheddiculam in Vauniya District. The summary of the target cascade systems is as follows:

River basin	Benefited Cascade System			Benefited Tank		
	Total	**Anuradhapura**	**Vavuniya**	**Total**	**Anuradhapura**	**Vavuniya**
	(Nos.)	(Nos.)	(Nos.)	(Nos.)	(Nos.)	(Nos.)
Malwathu Oya	62	58	9	521	469	52
Yan Oya	24	24	0	215	215	0
Ma Oya	24	24	1	198	197	0
Parangi Aru	16	2	16	125	0	125
Kanakarayan Aru	2	1	2	25	0	25
Total	128	109	28	1,084	881	202

Source: The information from the Feasibility Study carried out by the Ministry of Mahaweli Development and Environment

This manual consists of (1)Introduction, (2)Social Mobilisation and Investigation, (3)Irrigation Planning, (4)Design and Cost Estimate, (5)Construction Supervision and (6)Maintenance Activities.

2. Social Mobilisation and Field Investigation

In order to formulate irrigation development plan, field investigation will be conducted after social mobilisation, such as an awareness meeting, and workshop.

STEP 2-1 Awareness Meeting for Farmers

The awareness Programme will be one-day and it included 06 sessions namely 1).Opening Session, 2).Introduction to the Project, 3).Components of the Project, 4).Field Level Implementation, 5).Irrigation Scheme Rehabilitation and 6).Closing Session.

STEP 2-2 Workshop for Rehabilitation Works

After the initial awareness sessions, workshops will be conducted. The workshop as a planning tool has been instrumental to identify basic needs of farmers for rehabilitation of irrigation facilities

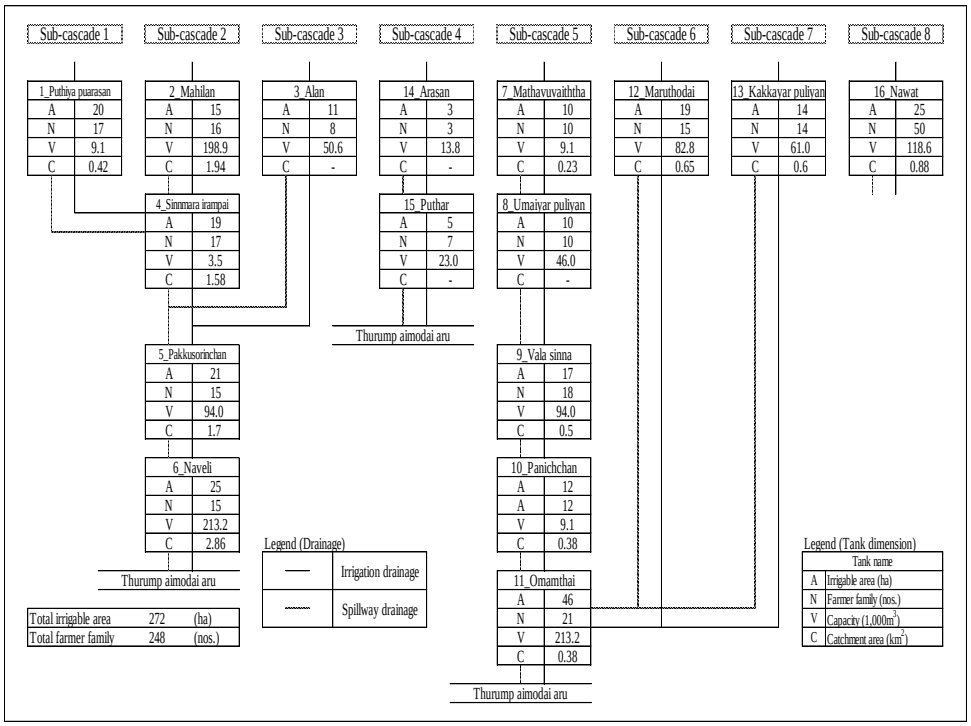
One-day workshop will be conducted with the aim of identifying basic needs in line with project objectives. The needs contained Irrigation Rehabilitation, Strengthening of FOs, Water Management, and Irrigation Maintenance. A Map indicating location of facilities with their condition will be prepared under a group work by the participants. It is also important to identify location of each tank within the particular cascade so as to obtain information for irrigation and drainage network in the cascade system.

STEP 2-3 Inventory Survey

An inventory survey will be conducted to overview the current situation of each cascade system. Samples of the survey results is given in Appendix 2.A.

STEP 2-4 Preparation of Irrigation and Drinage Diagram in Cascade System

Based on the Map prepared under the workshop and the Inventory Survey, a map on irrigation and drainage network in cascade system will be prepared by the Project Team. The diagram should include flow of return flow from upstream tank to downstream tank, natural stream as drainage canal, catchment area and storage capacity of tanks with their commanding area, the number of households. A sample of the diagram, which was prepared under CSDPP, is illustrated below.



Irrigation and Spillway Drainage Diagram of Navelikulam Cascade

STEP 2-5 Walk-through Survey for Existing Irrigation Facilities

Walk through Surveys will be carried out the technical staff of the departments with the participation of farmers to identify their needs. Sometimes, representatives of the technical officer and DO from DAD or Divisional Engineer of PID will also participate in the survey.

Current condition of irrigation facilities, such as tanks and canals, will be identified and discussed with the farmers. Need of the rehabilitation works would be prioritised taking into consideration the budget allocation to each scheme.

The result of the survey will be compiled with the Appendix 2.B and an issue tree of existing irrigation canal network with location of structures will be prepared as shown in Appendix 2.C.

STEP 2-6 Engineering Survey

As per regulation of GOSL, Engineering Surveys of the irrigation schemes will be carried out by the Engineering Assistants of the Project Team with the help of the farmer representatives

STEP 2-7 Soil Investigation for Filling Material

The Departments will conduct field investigation to confirm filling material for tank/canal construction can be obtained bear the scheme. Usually, soil at the tank bed may be considered as a filling material. Sampled materials will be tested at laboratories to determine suitability for the filling materials

STEP 2-8 Investigation for Trees

As per the Government's Regulation, since an approval by GA is required to cut trees along the tanks and irrigation canals, field investigation is required to identify the condition.

3. Irrigation Planning

Based on the results of field investigation in irrigation schemes, focusing on water distribution plan within cascade, estimation of flood discharge for determining scale of spillway of tanks, irrigation planning will be carried out.

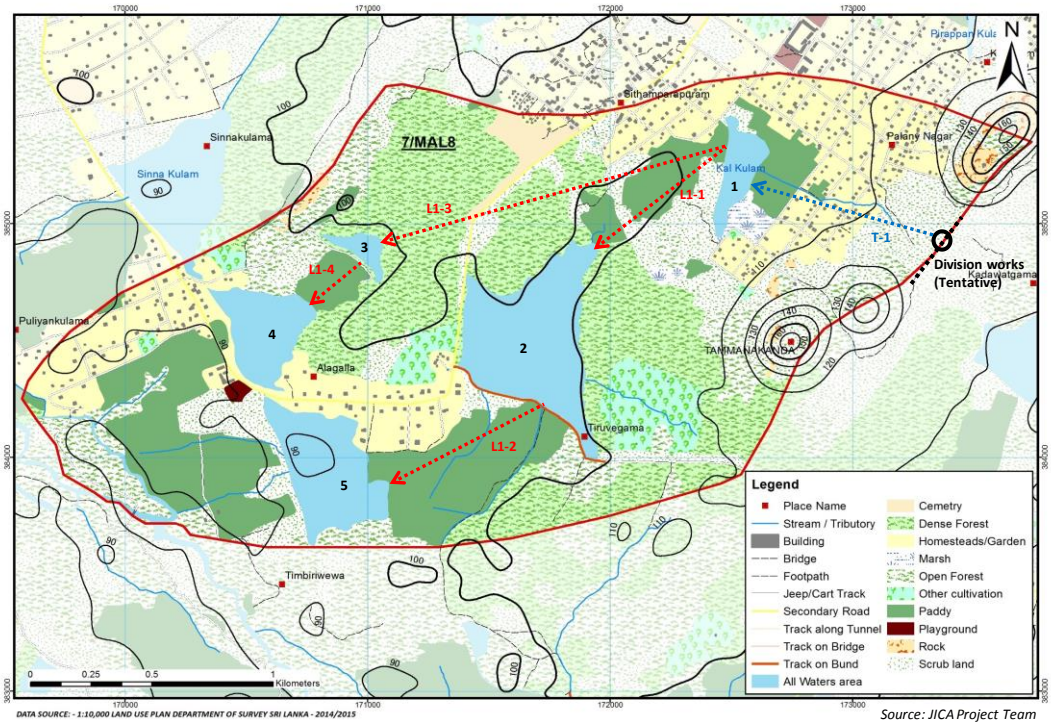
STEP 3-1 Water Distribution Plan for each Cascade System

Water distribution plan will be prepared for each tank in the Cascade System. The maximum monthly water flow as per the Feasibility Study Report will be applied to determine water allocation for each cascade.

STEP 3-2 Water Distribution Plan within Cascade System

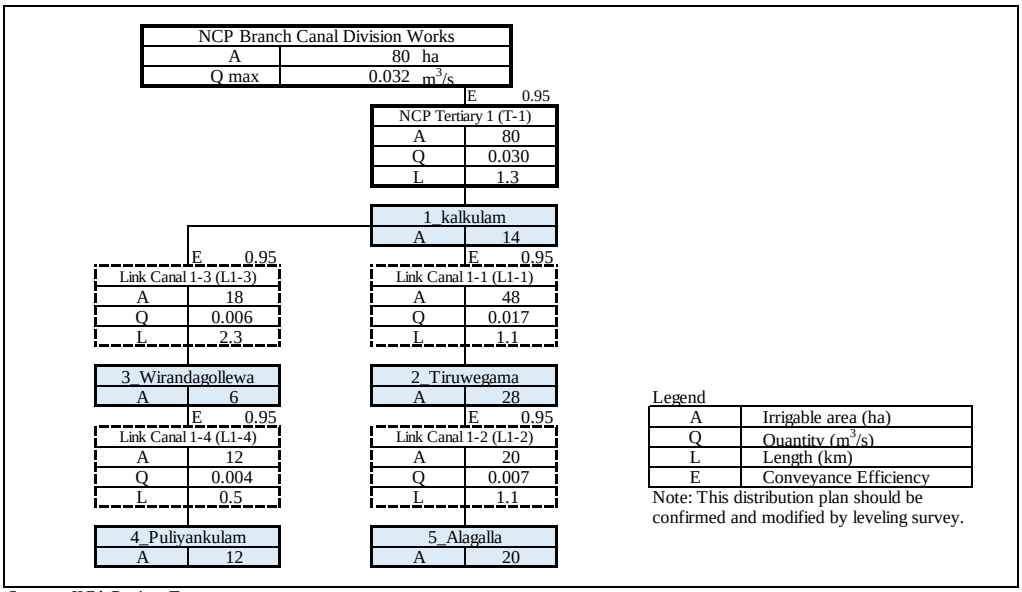
Link Canals will be constructed to convey water from upstream tank to downstream tank in the Cascade System. Then, the allocated water will be distributed to each tank proportionally according to command area of the particular tank by Link Canals.

As a sample, water distribution plan in Alagalla Cascade system, including layout of the Tertiary Canal and the Link Canals with their alignment, length and design discharge is indicated in the following figures.



Source: JICA Project Team (Map data: 1: 10,000 Land Use Plan Development of Survey Sri Lanka 2014/2015

Distribution Plan of Alagalla Cascade



Source: JICA Project Team

Distribution Diagram of Alagalla Cascade

STEP 3-3 Rehabilitation Plan for Tank

To achieve proper water distribution and consequent sustainable irrigation scheme management and market-oriented farming, based on the field investigation, the rehabilitation plan for the tanks will be prepared. Rehabilitation work of the tanks covers tank bund forming, repair or reconstruction of sluices, improvement of spill way and provision of washing steps. Capacities of the spillways to release flood water are enhanced based on the flood analysis conducted under the project.

Basic concept for the rehabilitation or construction of the tanks is described hereinafter.

The rehabilitation of the tank is to be conducted. To avoid adverse environmental and social effects, special attention should be made so that an elevation of the tank bund top and crest of the spillway are to be maintained.

Length of the spillway is to be reviewed and extended, if needed, based on estimated probable flood discharge.

STEP 3-4 Rehabilitation Plan for Irrigation Canal

(1) Irrigation Requirement

The unit irrigation requirement is calculated based on "Technical Notes for the Guideline of the Technical Officers of the Department of Agrarian Services on Minor Irrigation Works" (p.11) as indicated below.

Quantity	0.0308	(m3/s)	(considering 10% loss)
Irrigable area	16.188	(ha)	
Unit quantity	0.00190	(m3/s/ha)	

Say, 0.002 (m3/s/ha) (adoption)

As presented above, the unit water requirement of 2.00 litres/sec/ha is estimated to determine capacities of irrigation facilities. Furthermore, taking into consideration field level application, 20% of irrigation is added to the above. Thus, unit irrigation requirement for the design of the canal will be determined at 2.40 litres/sec/ha. Based on the unit water requirement and commanding area indicated in the Irrigation Diagram, design discharge of the irrigation canals will be decided.

(2) Rehabilitation/Improvement Plan for Irrigation Canals

Basic concept for the rehabilitation or construction of the irrigation canals is set as described below.

As for the rehabilitation works of the canals, taking into consideration easiness of future maintenance works by the farmers, earth lined canals is to be adopted. Further, water management aiming at efficient water use from the NPC Canal, farm turnouts are provided.

Link canals will be constructed to convey water from upstream tank to downstream tank in the cascade system.

Irrigation canals will be rehabilitated with trapezoidal earth canals and related structures, such as farm turnouts and drops. Those facilities will enable farmers to conduct proper and efficient water distribution at the field level. Improvement of the farm road is partially proposed so that agricultural inputs and products can be transported effectively from fields to main road. Basically, while the alignment of the irrigation canals will follow current route of the existing irrigation canals, the alignment of the canals might be reviewed and deviated with series of discussion with the farmers.

Taking into consideration of the topography in the area, pipeline system is adopted for the tertiary canals. The canals are to connect off-takes on the main or the branch canals of the NCPC to the most upstream tanks in the cascade.

Likewise, the link canals with pipeline system are introduced to convey irrigation water from upstream tank to downstream tank, aiming at utilizing the augmented irrigation water efficiently.

4. Design and Cost Estimate

This chapter presents procedure of design for tanks, irrigation canals, and link canals (Open canal, and Pipeline)

STEP 4-1 Design of Tank

Design for Rehabilitation work of the tanks, consisting of tank bund forming, repair or reconstruction of sluices, improvement of spill way and provision of bathing steps, will be carried out taking into consideration matters indicated in the following table.

Rehabilitation Planning and Design for the Tanks

Item	Description of Planning and Design
Tank Bund	・ Designed bund top elevation is to be determined based on the currently highest one obtained from the levelling works. ・ The bund top width is to be maintained between 2.4 to 3.0 m with gravel to reduce wear and tear and for easy access for proper maintenance of the tank bund and also smooth transport. ・ Bund slope is 1 on 2 for the stability of the tank bund. ・ According to site condition, clay wall should be introduced for certain critical section of the bund for arresting of seepage or piping through. ・ Turfing to fill earth will be provided to protect the bund slope.
Sluice	・ Repairs and modification to sluice gates are proposed with easy operation and access for the gates on the basis of the current condition of the structures
Spillway	・ To escape surplus water without damaging the bund, capacities of the spillways to release flood water wll be enhanced with modifications and extension of the spill length based on the flood analysis conducted under the Project. ・ Generally, determining length of spillway, a 2-feet afflux is set with 2 feet free board. ・ There might be several cases to apply a 3-feet afflux in the structures, taking into consideration results of field investigation on previous flood damage in their areas.
Related Structures	・ As per the farmers' request, a Bathing Step is to be provided in Puliyankulam and Valasinnakulam Tanks to improve their livelihood condition, preventing damages to the tank bund slope

Source: JICA Project Team

The design of spillway is conducted under the following conditions:

- Design flood discharge with 25-year probability is used for the design of Spillway.
- based on "DESIGN of IRRIGATION WORKS for Small Catchment (Chapter 5.8)", spillway length is determined by using the following formula.

$$Q=CLH2/3.$$

Where,

Q: Discharge (cusec)

C: Coefficient (drop wall type: 3.33, natural type: 2.8)

L: Length of spillway (feet)

H: Afflux (feet)

STEP 4-2 Design of Irrigation Canals

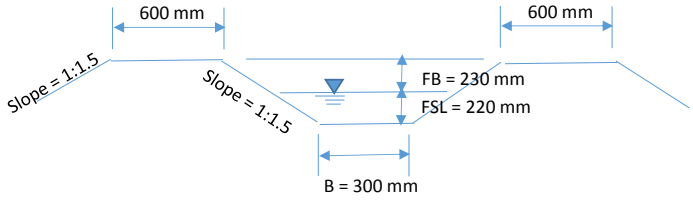
For designing irrigation canals, the Technical Guidelines for Irrigation Works, by A.J.P. Ponrajah is applied. Longitudinal hydraulic design will be carried out so that necessary water abstraction level can be secured at each farm turnout. Based on the design discharge of the canals, dimension of the irrigation canals are determined as shown below.

Applied Dimension for Rehabilitated Irrigation Canals

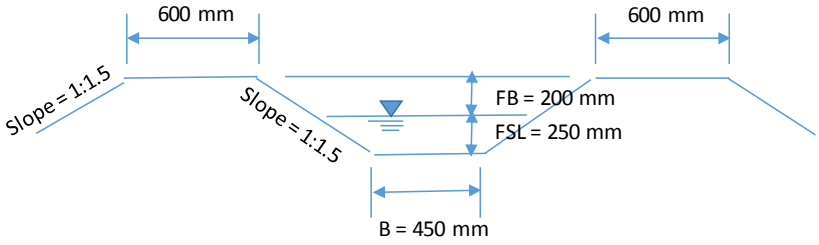
Type	Commanding Area A	Design Discharge Q	Canal Slope	Trapezoidal-Earth Canal with Side slop 1:1.5					
	(ha)	(m3/sec)	S	Bed Width (m)	FSD (m)	FB (m)	FSD+FB (m)	Velocity (m/s)	CVR
Type 1	upto 12	0.0279	0.0004	0.30	0.22	0.23	0.45	0.20	0.97
Type 2	from 12 to 20	0.0471	0.0004	0.45	0.25	0.20	0.45	0.23	1.01
Type 3	from 20 to 24.5	0.0580	0.0004	0.60	0.25	0.20	0.45	0.24	1.06

Source: JICA Project Team

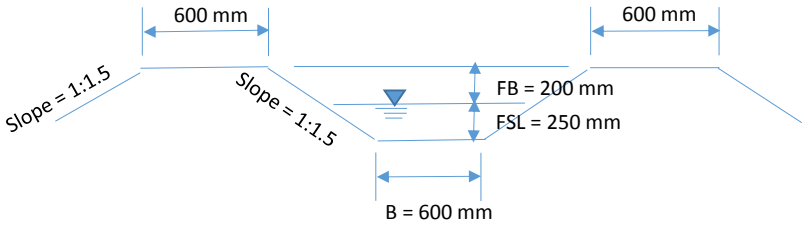
Typical cross section for each canal type is illustrated below.



Typical Cross Section of Canal (Type 1)



Typical Cross Section of Canal (Type 2)



Typical Cross Section of Canal (Type 3)

Figure 5.1 Typical Cross Section of Irrigation Canals

Source: Page 145, the Technical Guidelines for Irrigation Works, by A.J.P. Ponrajah
Design Note and Canal Regulation & Control Analysis under Emergency Natural Disaster Rehabilitation Project

Field Turnouts (FTO) are provided to divert water from a canal to each farm plot. As per location of the farm plot fed by the irrigation canals, two types of FTO will be proposed.

Due to steep topographic condition in the command area, drop structures are provided to

protect canals against erosion, keeping required longitudinal gradient and subsequent velocity. Stilling basins will be used to ensure that both the canal and the structure are adequately protected. According to longitudinal profile of the canals, two types of the structures, with 300mm and 450mm height are proposed as per the topographic condition.

STEP 4-3 Design of Link Canal

Sample of the design of the link canals, comprising an open canal and pipeline, is described in Appendix 4.A. Those were prepared for the pilot sites for the Verification Study under the CSDPP.

STEP 4-4 Preparation of Conceptual Design

Based on the Engineering Surveys carried out in the Field, plans will be prepared to show the existing conditions of the Canals, structures and the ruling levels. By making use of these plans, Conceptual Designs will be prepared by the Project Team taking into consideration the existing parameters of the Canals, Field Levels, Command Area etc. Subsequently, these Conceptual Designs will be submitted to the respective the Assistant Commissioner through DO, DAD or the Director of PID through Divisional Engineer of PID for approval.

STEP 4-5 Cost Estimate

After taking into consideration any observations made by the Assistant Commissioner or the Director of Provincial Irrigation Department while approving the Conceptual Designs, the Project Team prepared Bill of Quantities for the work involved in rehabilitating Canals in the Conceptual Design and a Draft Estimate will be prepared based on rates approved by the Irrigation Department or DAD making special attention to the transport distance involved in transporting materials to the site and the current market prices of certain construction materials.

STEP 4-6 Ratification Meeting

After finalizing the Draft Estimates, Ratification Meetings will be held with the participation of farmers to explain the proposals and the estimates prepared by the Project Team in order to obtain their approval for those proposals. After obtaining the consent of the farmers for the proposals and also taking into consideration any observations made by them on the original proposals prepared by the Project Team, the Draft Estimates will be amended and submitted to the ACAD or the Director of PID. Once the Draft Estimates will be approved by them, Fair Copies will be prepared by the Project Team and submitted to the ACAD or the Director of PID for sanction.

STEP 4-7 Preparation of Draft Agreements /Bid Documents

The Agreements and the Bid Documents will be prepared by the Project Team based on the sanctioned estimates.

5. Construction Supervision

STEP 5-1 Mobilisation of Contractors

When awarded contractors commence the works, they should be introduced by the FO members, and location of the contractors' camp and earth borrowed area should be confirmed. Further, importance of safety management should be shared and understood among the people.

STEP 5-2 Time Control

In accordance with the Condition of Contract of the Contract Agreement, the Contractors are required to submit an overall work programme with relevant information, such as list of equipment, manpower.

Further, for smooth construction management, the Project Team requested the Contractors to submit a weekly work programme for each work category.

Monthly Progress Reports should be obtained from the Field Staff of the Engineer and they will be compiled into a Composite Report and submitted to the Employer, Namely, PDOI or DAD. Those Progress Reports will be updated monthly and where necessary remedial actions should be taken to step up progress if the progress of work is lagging due to some reason or other.

Regular progress review meetings should be held by the Employer to review the progress of each contract package and to discuss how to solve shortcomings of the rehabilitation works.

STEP 5-3 Quality Control

In order to maintain the quality of the Contractor's works, activities of quality control have been carried out by the Project Team in collaboration with the counterpart agencies. Daily performance by the Contractors should be monitored by field staff of the Project Team, who instructed the Contractors to improve the quality of the works, keeping the records in log books, or issuing official letters to the Contractors.

Quality control tests, such as soil compaction tests for filling materials, and concrete compression tests, will be carried out at laboratories of the counterpart agencies, namely, PID, NCP and DAD, Vavuniya. Based on the test results, the Contractors are instructed to rectify the condition if the test result failed to meet requirement indicated in the Technical Specification.

STEP 5-4 Financial Management

In the case of out sourced Contracts, the Progress Claims shall be prepared by the Contractors and submitted to the Engineer supervising the work for checking. Once it is checked by the Engineer, the Progress Claim will be submitted to the Employer for settlement of the payment with any recoveries.

STEP 5-5 Reporting and Information Management

Reporting and information management focuses on record keeping of the progress as well as material and labour input for the overall management of the construction and reporting to the Engineer.

STEP 5-6 Safety Management and Environmental/Social Consideration

The Contractors are required to submit a safety management plan in accordance with the requirement specified in the Technical Specification. A "safety control management guidance, including environmental protection" has also been prepared and distributed to the Contractors. Daily monitoring of the safety control management is to be conducted by use of a check list

Environmental management focuses on the health-related matter as well as reducing the environmental impact through activities such as soil and water conservation, soil run-off prevention, avoids excess run-off/ infiltration of chemical substances.

STEP 5-7 Final Inspection

Final inspection will be conducted at the presence of the Employer's Representative, the SCIO, the Project Manager (PMT), and representative of the IWUA, together with the Contractor, so as to confirm if the work is done properly according to the design and the technical specification. The list of outstanding works to be rectified will be prepared to conclude the work successfully.

STEP 5-8 Issuance of Completion Certificate

The Engineer will issue a Certificate of Completion to the Contractors and send its copy to the Employer.

STEP 5-9 Preparation of Taking-over Documents

The Engineer will to prepare Handing over Documents including rule and regulation during maintenance period with an inventory for the completed works in irrigation schemes.

6. Maintenance Activities

STEP 6-1 Type of maintenance

Maintenance may be divided into three categories, (1) Routine, (2) Major (Annual or Seasonal) and (3) Emergency.

(1) Routine Maintenance

This type of maintenance is the most important which covers small-scale work that needs to be done as required throughout the year. Typically, it includes a) minor earthwork repairs and glass cutting along canals, b) filling holes in canal banks, c) removal of trash and silt from in front of structures, and d) greasing of gate operating mechanisms.

(2) Major (Annual or Seasonal) Maintenance

This type of maintenance covers repairs that are too large to be undertaken routinely, so they must be planned for a time when the irrigation water is stopped. It includes a) reshaping of canals, b) desilting; c) removal of weeds from channels; d) bush-cutting and vegetation removal from banks; e) gate repair and painting; f) repair of failed parts of structures; g) channel protection works; h) earthworks; i) cleaning out cross-drainage culverts.

(3) Emergency

This type of activities covers urgent or temporary repairs that are required to maintain water delivery following breaching or sudden failures in the system. It includes a) construction of temporary canal sections, b) strengthening of structures, c) repair of landslides and canal breaches.

STEP 6-2 Roles and responsibilities in maintenance

FOs are responsible for the maintenance and operation of their tanks, canals, access roads and structures, as well as any associated drainage works. FO may have an O&M committee and one or more persons (water heads) responsible for day-to-day operation and maintenance. There need to be clear agreements so that people can work effectively together.

STEP 6-3 Planning of Maintenance Activities

Annual maintenance programme will be prepared such steps as indicated in the following table

Maintenance Program: Annual Maintenance Activities

Activity	When	**Activities**	**Responsible**
Problem Identification	Before canal closure	• Meeting of FO committee before canal closure to identify problems of all canals • Motivate members to participate and contribute labour, funds and tractors etc.	PID FO committee members
Walk-Through Survey	Before Canal closure	• FO committee members identify sections where de-silting, repairs of bank and other structures are required	FO/PID/DAD
Engineering Survey	As soon as canal is closed	• Identify necessary canals for measuring according to FO's report • Measure cross-section every 100 m (or any) • Measure longitudinal-section from head to tail • Compare to design drawing of canal	PID PID PID
Discussion (Prioritization of Needs)	Before harvesting	• FO general meeting to discuss priority of maintenance • Consensus obtained on what to do as a priority • Estimation of costs, financial resources and contribution etc are finalized • Set date for maintenance	FO/DAD FO/PID FO/PID FO/PID/DAD
Resource Mobilization	After harvesting	• Collection of necessary funds if necessary • Agreement for labour commitment of members • Arrangement of machinery if necessary	FO committee FO committee FO committee
Implementation	After harvesting	• Communal de-silting, bank restoration and other work until design conditions are restored	FO/PID
Monitoring and Feedback	After harvesting and after water issuing	• Assessment of labour and machinery inputs and overall schedule and arrangement • Estimation of earthwork and bank work undertaken • Measurement of hydraulic performance to re-fix the performance indicator	FO/PID/DAD

Sample of annual maintenance calendar for FO is illustrated below.

Example: Annual Maintenance Calendar for FO

No.	Annual Maintenance Calendar / Description	Yala: Apr	May	Jun	Jul	Aug	Maha: Sep	Oct	Nov	Dec	Jan	Feb	Mar
1.	Crop seasons												
2.	Irrigation												
3.	General Meeting												
4.	Committee Meeting												
5.	Maintenance Activities												
6.	Routine Inspection and Maintenance												
	1) Weeding / Mowing												
	2) Desilting / Plug up holes												
	3) Painting / Grease												
7.	Emergency Maintenance (as required)												
8.	Annual Major Maintenance												
	1) Planning												
	- Preliminary meeting for problem identification												
	- Walk-through survey and prioritising												
	- Engineering survey: Assessment of works required												
	- Discussion: Prioritising of needs												
	- Estimating												
	- Ratification meeting with FO Committee & relevant FO members												
	- Final Estimating & budgeting												
	- Approval by members & Preparation of Implementation Schedule												
	2) Implementation by FO												
A	Monitoring and feedback / Field day												
B	Technical Check Up and Evaluation												

FO members are required to understand the above-mentioned process of maintenance activities. They can carry out many of the activities without extensive records or calculations, but where they need help, they should ask for assistance from PDOI technical staff.

Points to remember are,

- FOs should develop an annual maintenance calendar showing the planning and implementation of the maintenance works. The calendar will depend on water issue schedule and rainy season.
- FOs should designate a person or committee skilled and responsible for maintenance activities, to control all the relevant activities
- As planning for the maintenance activities is important, FOs should allocate enough time to prepare the maintenance plan before carrying out maintenance works.

STEP 6-4 Inspection

Record keeping is indispensable to maintain accountability among FO members. The FO committee should review periodically how record-keeping is conducted, or whether any other required documents will serve the purpose. It is important to record what maintenance is required, and to identify potential future problems and priorities. Records should be available to members for inspection, if desired.

STEP 6-5 Survey and design

Most of the maintenance works will be concerned with the channel (desilting, bank repairs, vegetation removal etc.) and should need little survey and design. The FO may be able to make an estimate of the resources required, principally labour through much experience on FO Contract. For minor repair of structures, the FO should be able to estimate the labour, materials and other costs based on the experience. Local masons or other skilled labours may be able to assist in the estimate.

As for planning of maintenance for the tanks, FOs are required to consult the agencies concerned.

STEP 6-6 Cost estimate and budgeting

The budget and proposed fee rate should be presented to all the members at a General meeting of FO, prior to conduct the annual / seasonal maintenance works. The members of the FO will need to know:

- The overall financial obligation of the FO, including any reserves for future maintenance
- What maintenance works are included, how they are prioritized and how members will be benefitted from them. Improvement works should be listed separately.

When fees are to be collected and whether alternative methods of payment, such as by labour contributions, can be made.

STEP 6-7 Conduct of maintenance work

After the scope of works has been approved at the General meeting, it should be discussed and approved how the work will be implemented. The committee could prepare in advance a simple program, from experience showing for each type of work:

- When it will be carried out and how long it will take
- Who will carry it out and how many people are required

Any needs for skilled labour – who, how many, for how long

Appendices

Appendix 2.A	Samples of Results of Inventory Survey
Appendix 2.B	Results of Detailed Survey
Appendix 2.C	Irrigation Diagram
Appendix 4.A	Design of Link Canal

Appendix 2A Samples of Results of Inventory Survey

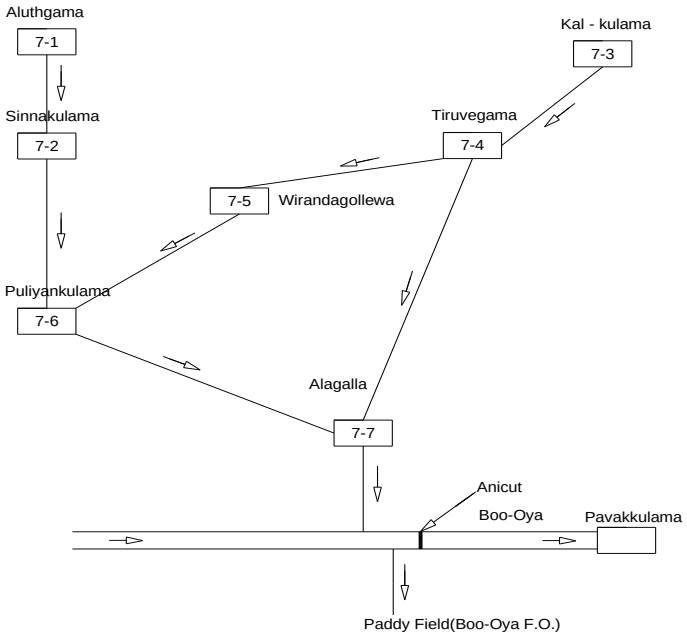
Inventory Survey Sheet

Sheet No.	7/MAL8-1

Basic Information

Cascade Symbol	7/Mal-8	Cascade Name	Alagalla		District	Vavunia
ASC	Madukanda	Irrigable area	221	(ha)	Nos. of Tanks	7

Layout Map



List of Tanks

Tank No.	Name of Tank	Irrigable area (ha)	Farmer family (nos.)	Spillway (nos.)	Sluice (nos.)	Canal (nos.)	Name of FO	Contact No.	Remarks
7-1	Aluthgama*	12	55	1	2	2	Alagalla	715766767	Gamini
7-2	Sinnakulama*	28	40	1	2	2	Alagalla	715766767	Gamini
7-3	Kalkulama	14	25	1	2	2	a Gomarassank	777654574	ppunatha
7-4	Tiruwegama	28	42	1	2	2	Tiruwegama	711553588	Jothi
7-5	Wirandagollewa	6	9	1	2	2	Alagalla	715766767	Gamini
7-6	Puliyankulama	12	15	1	2	2	Alagalla	715766767	Gamini
7-7	Alagalla	20	30	1	2	2	Alagalla	715766767	Gamini
7-8	Boo-Oya(Anicut)**	24	30	1	1	1	Isuru	774438587	Senaratna
Total		144	246	8	15	15			

*: Not in Alagalla Cascade

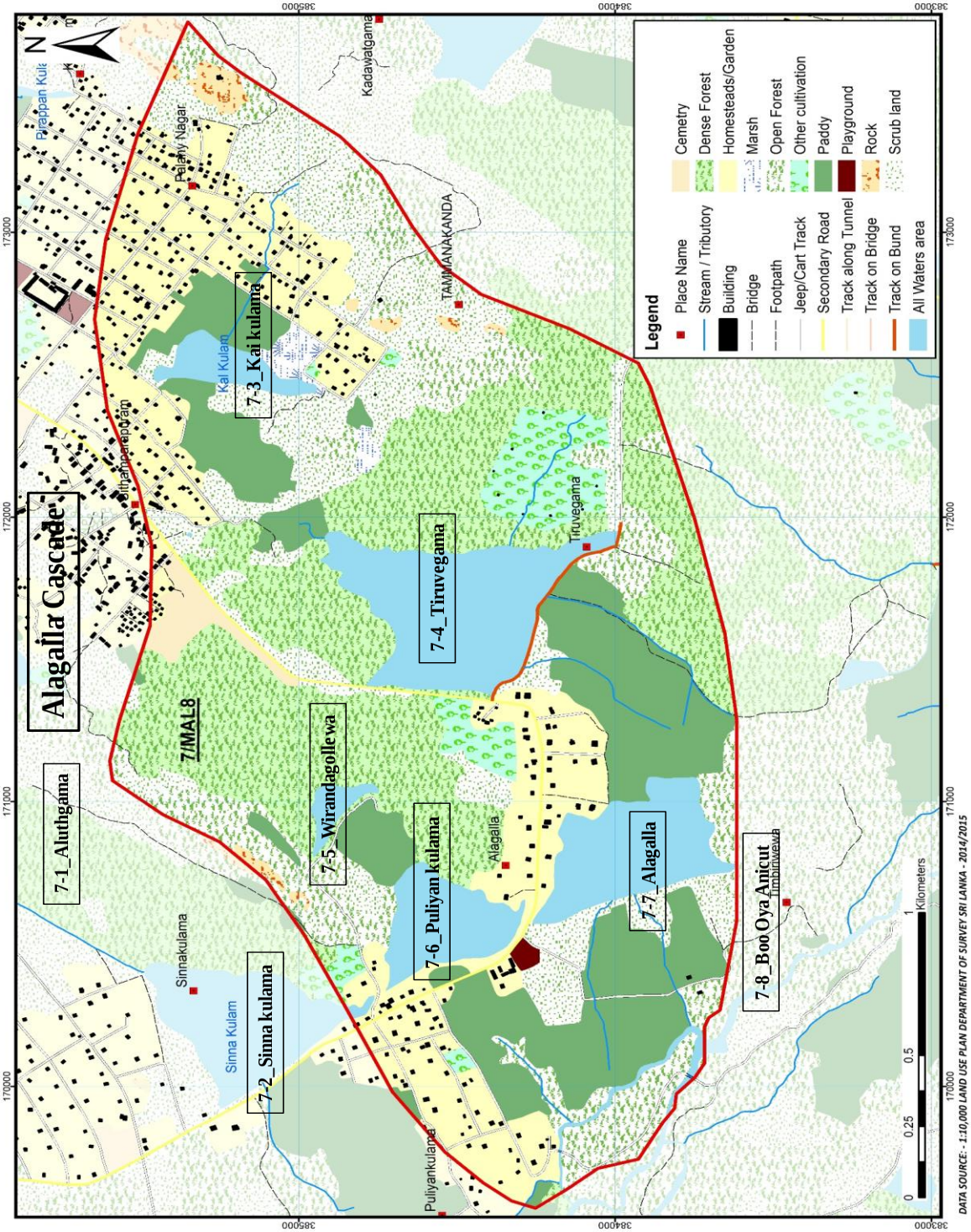
**: Not targets

Inventory Survey Sheet (Structure Photograph)

(Bund, Spillway, Sluice, Canal, Causeway etc.)

Sheet No.	7/MAL8-2

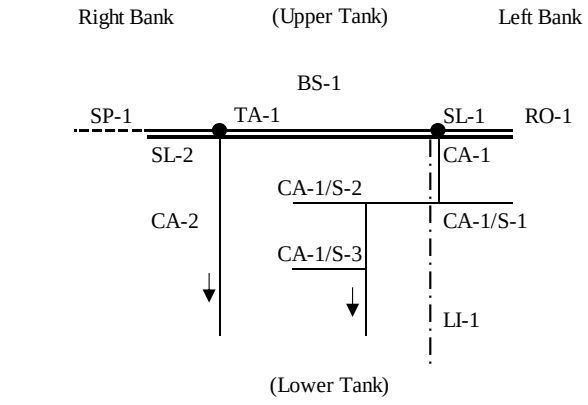
								
Tank No.	1	LB-Sluie	Tank No.	1	RB-Sluice	Tank No.	1	Spill
								
Tank No.	2	RB-Sluice	Tank No.	2	LB-Sluice	Tank No.	2	LB - Sluice-D/S
								
Tank No.	2	Spill	Tank No.	5	RB-Sluice	Tank No.	5	RB-Sluice
								
Tank No.	5	Spill	Tank No.	6	RB-Sluice	Tank No.	6	LB-Sluice
								
Tank No.	7	RB-Sluice	Tank No.	7	LB-Sluice	Tank No.	7	Spill
								
Tank No.	7	Spill	Tank No.	4	RB-Sluice	Tank No	4	LB-Sluice


Alagalla Cascade
7/MA18
7-1_Aluthgama
7-2_Sinna kulama
7-3_Kai kulama
7-4_Tiruvegama
7-5_Wirandagollewa
7-6_Puliyan kulama
7-7_Alagalla
7-8_Boo Oya Anicut
Kadawatgama
TAMMANAKANDA
Pallavy Nagar
Kai Kulam
Tiruvegama
Alagalla
Timbiruwewa
Sinnakulama
Sinna Kulam
Puliyankulama
Legend
Place Name
Stream / Tributory
Building
Bridge
Footpath
Jeep/Cart Track
Secondary Road
Track along Tunnel
Track on Bridge
Track on Bund
All Waters area
Cemetry
Dense Forest
Homesteads/Garden
Marsh
Open Forest
Other cultivation
Paddy
Playground
Rock
Scrub land
Kilometers
DATA SOURCE: - 1:10,000 LAND USE PLAN DEPARTMENT OF SURVEY SRI LANKA - 2014/2015

Appendix 2.B Results of Detailed Survey

Cascade: Neveli kulam **Tank: 9_Vala sinna kulam**

Location Map (Image)



Legend

	Tank Bund
	Spillway
	Sluice
	Canal
	Link Canal
	Road

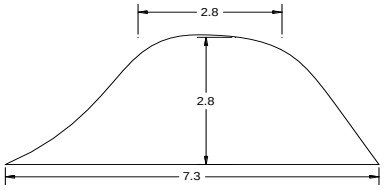
Quantity

Summary Table

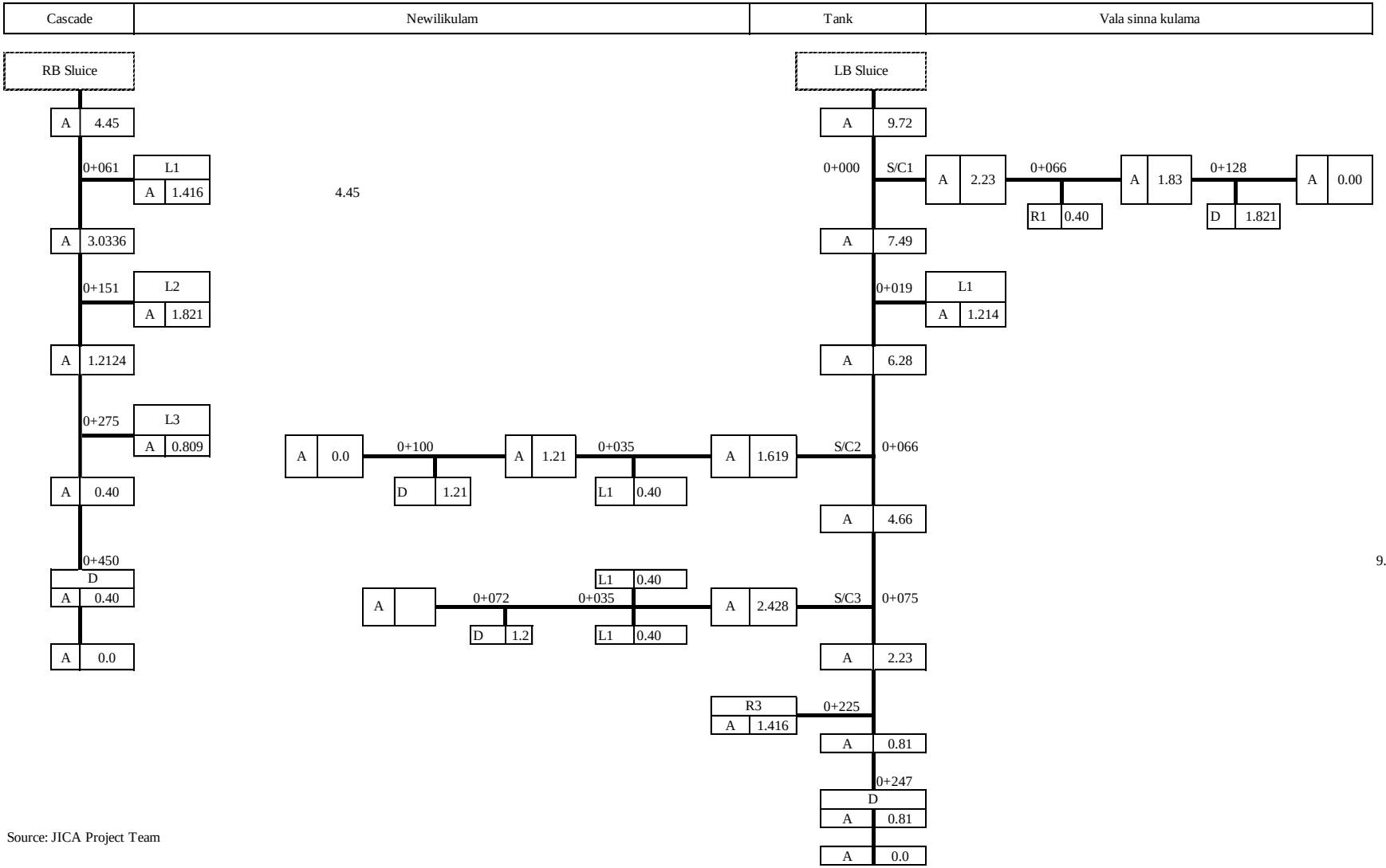
Facility	Quantity	Unit
Tank Bund	500	m
Bathing Step	1	nos.
Right Bank Spillway	19	m
Slice	2	nos.
Canal	525	m
- Subsidiary	300	m
- Division Box	3	nos.
- Farm Turnout (one side)	7	nos.
- Farm Turnout (both side)	1	nos.
Link Canal	400	m
Road (Gravel, topn of bund)	500	m

List of Facilities

SI	Facility	Quantity	Unit	Plan
TA-1	Tank Bund	500	m	Repair
BS-1	Bathing Step	1	nos.	New construction
SP-1	Right Bank Spillway	19	m	Reconstruction
SL-1	Left Bank Sluice	1	nos.	Gate: new, concrete: repair
SL-2	Right Bank Sluice	1	nos.	Gate: new, concrete: repair
CA-1	Left Bank Canal	250	m	Reconstruction
	Division Box	3	nos.	New construction
	Farm Turnout (one side)	2	nos.	New construction
CA-1/S-1	Subsidiary	125	m	Reconstruction
	Farm Turnout (one side)	2	nos.	New construction
CA-1/S-2	Subsidiary	100	m	Reconstruction
	Farm Turnout (one side)	2	nos.	New construction
CA-1/S-3	Subsidiary	75	m	Reconstruction
	Farm Turnout (one side)	1	nos.	New construction
	Farm Turnout (both side)	1	nos.	New construction
CA-2	RB Canal	275	m	Reconstruction
	Farm Turnout (one side)	3	nos.	New construction
LI-1	Link Canal	400	m	New construction
RO-1	Road-1 (Gravel, top of bund)	500	m	Reconstruction

<table>
<tr><td colspan="3">Cascade: Naveli kulam Tank: 9_Vala sinna kulam</td></tr>
<tr><td>Facility</td><td colspan="2">Existing and Plan</td></tr>
<tr><td rowspan="2">Tank Bund (TA-1)
and
Bathing Step (BS-1)
and
Road (RO-1)</td><td>(Existing Photograph)
  </td><td>(Existing Cross Section)
 
</td></tr>
<tr><td>(Problem)
-Srubs jungle
- Shotage of top width
- Erosion of sloop
- No washing step
- Water leakage in 0+75-0+100m chain after 1.5m in water level
* Remarks: Last renovation Year; 2005</td><td>(Plan) <u>Repair</u>
- Jungle clearing
- Total reshaping based on the criteria
- Installation of washing step</td></tr>
<tr><td rowspan="2">Left Bank Sluice (SL-1)</td><td>(Existing Photograph)
  </td><td>(Existing Cross Section)</td></tr>
<tr><td>(Problem)
- No Access to operating the gate
- Need for minor repairs
- Erosion of sloop
* Remarks: Last renovation Year; 2005</td><td>(Plan) <u>Repair</u>
- Gate: Installation of new gate
- Concrete structure: Minor repair
- Providing Pascrell for sluice
- Painting and lubricating all sluice component
- Providing rubble packing either side of sluice</td></tr>
<tr><td rowspan="2">Right Bank Sluice (SL-2)</td><td>(Existing Photograph)
  </td><td>(Existing Cross Section)</td></tr>
<tr><td>(Problem)
- No Access to operating the gate
- Need for minor repairs
- Erosion of sloop
* Remarks: Last renovation Year; 2005</td><td>(Plan) <u>Repair</u>
- Gate: Installation of new gate
- Concrete structure: Minor repair
- Providing Pascrell for sluice
- Painting and lubricating all sluice component
- Providing rubble packing either side of sluice</td></tr>
</table>

Appendix 2.C Irrigation Diagram



Source: JICA Project Team

Appendix 4.A Design of Link Canal

1.1 Design of Open Canal Type Link Canal

(1) Basic Condition

In the Link Canal, open channel system is applied. The canal is a concrete type by considering water conveyance efficiency.

(2) Hydraulic Calculation

Longitudinal Profile of the Link Canal is shown below.

Table 5.11 Longitudinal Profile of the Link Canal

	Elevation MSL (m)	Distance (m)
Beginning point	114.610	0
End point	109.148	1,085

Source: JICA Project Team

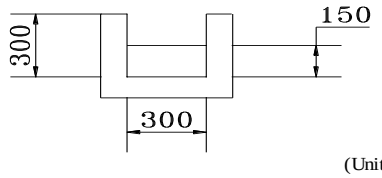
Conclusion
- Material: Concrete
- Bed width: 0.30 m (minimum size)
- Side wall height: 0.30 m (minimum size)

Calculation sheet

m	s	n	b	h	A	p	R	Q
0	0.005025	0.025	0.3	0.15	0.045	0.600	0.075	0.02269

Q > Q' → OK

Where
m: Side Slope of the canal
s: Slope of the canal (Longitudinal)
n: Manning coeficient of the material
b: Width of the canal (m) Note: minimum 0.30 m
h: Design water Depth (m) Note: minimum 0.15 m (minimum side wall height 30 cm (free board 0.15m))
Using Maning Eqvation For Rectangulor Cannal
Q=A/n x s^0.5 x R^2/3 (m3/s) (Page 105- Technical Guide Line A.L.P. Ponrajah Eng.)
X: Section Area=(m*h+b)*h
Weted pirameter p= 2*h(m^2+1)^0.5+b
Hydraulic mean depth R=A/P *(It is not more than 1.25)*
Design flow (Q') = 0.00925 (m3/s)



(Unit: mm)

Minimum cross section

In conclusion, an equiangular concrete-lined canal with 300 mm bottom width and 300 mm height was adopted.

1.2 Design of Pipeline Type Link Canal

(1) Basic Condition

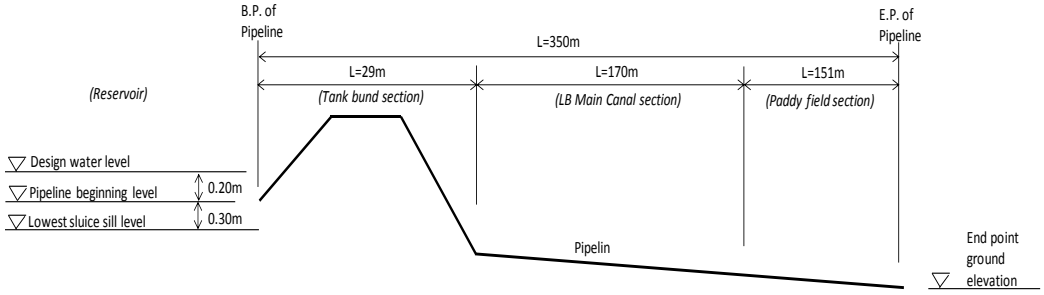
In the Link Canal, pipeline system is applied. The sluice of Left Bank Main Canal is the lowest between sluices.

(2) Hydraulic Calculation

Longitudinal Profile of the Link Canal is shown below.

a) Elevation and length

	Elevation MSL (m)	Dintance (m)	Remarks
Beginning point	90.795	0	Lowest sluice sill level
Minimum water depth	0.500		Beginning point
Design water level	91.295		Beginning point
End point	89.713	350	Ground level (Panichchn kulam spill level)
Topographic longitudinal	1/ 323		
Hydraulic longitudinal	1/ 221		
Head different (m)	1.582		



b) Minimum cover based on the criteria

Minimum cover to pipe line: 1.0 m

Source: Tender Drawings; Standard Drawings, Bridge Crossing,
Causeway Crossing & Pipe on Support (28 August 2015)

c) Minimum cover for uplift pressure

Minimum cover to top line is 0.20 m as below.

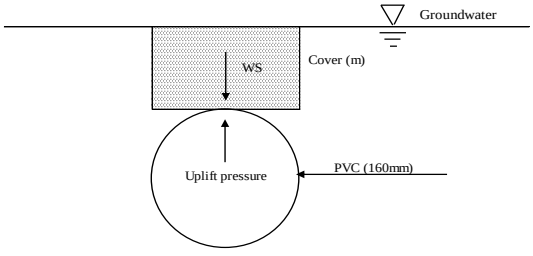
H	:	Minimum cover for uplift pressure	
D	:	Inside diameter (m)	0.154
D_c	:	Outside diameter (m)	0.160
S	:	Safety rate	1.2
γ_p	:	Unit weight of pipe material (kN/m^3)	14.0
w_0	:	Unit weight of water (kN/m^3)	9.8
γ_1	:	Unit weight of soil (kN/m^3)	18.0

Uplift pressure (UP)	$=S\times(D_c^2\times\pi/4)\times w_0$	0.236
Weight of pipe (WP)	$=(D_c^2-D^2)\times\pi/4\times\gamma_p$	0.021
WS	$=D_c\times$ (Cover) $\times(\gamma_1-w_0)$	

Minimum cover calculation sheet

Cover	UP (a.)	WP (b.)	WS(c.)	(b.)+(c.)	Evaluation	Remarks
0.10	0.236	0.021	0.131	0.152	OUT	
0.20	0.236	0.021	0.262	0.283	OK	Minimum
0.30	0.236	0.021	0.394	0.414	OK	
0.40	0.236	0.021	0.525	0.546	OK	
0.50	0.236	0.021	0.656	0.677	OK	

(b.)+(c.) > (a.) : OK



Source: JICA Project Team

(3) Hydraulic Calculation

1) Formula

Friction head loss is caluculated by using Hazen William Formula based on NWSDB (National Water Supply and Drainage Broard) Criteria (IV. Preparatory Survey on Anuradhapura North Integrated Water Supply Project in The Democratic Socialist Republic of Sri (JICA, 2013)).

$$A = \pi \div 4 \times D^2$$
$$V = Q \div A$$
$$I = 10.67 \times C^{-1.85} \times D^{-4.87} \times Q^{1.85}$$
$$hf = I \times L \times 1.10$$

Where,

A : Cross-sectional area of flow (m^3)
I : Hydraulic gradient (m/m)
Q : Flow (m^3/s)
L : Length of pipeline (m)
D : Diameter of pipeline (m)
C : Coefficient of discharge (PVC: 130 based on NWSDB Criteria)
V : Average velocity (m/s)

2) Pipe material

PVC is selected based on NWSDB Criteria (p.5-39) and coefficient of discharge (130) is decided by the Criteria.

3) Diameter

Diameter is selected by considering the market in Sri Lanka.
Stabdard diameter (mm) is 20, 25, 32, 40, 50, 63, 75, 90, 110, 140, 160, 225, 280, 315.

Dimensions of uPVC pipes Conformity to SLS 147 / 1993 unit: millimetre (mm)

Outside diameter					Type 250 kPa			Type 400 kPa			Type 600 kPa			Type 1000 kPa		
(1) Nominal diameter	(2) Mean diameter Dm.		(3) Any Measured diameter D*		(4) Nominal Internal diameter	(5) Thickness		(6) Nominal Internal diameter	(7) Thickness		(8) Nominal Internal diameter	(9) Thickness		(10) Nominal Internal diameter	(11) Thickness	
	Min.	Max.	Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.		Min.	Max.
20	20.0	20.3	19.5	20.5	-	-	-	-	-	-	-	-	-	18	1.2	1.6
25	25.0	25.3	24.5	25.5	-	-	-	-	-	-	-	-	-	22	1.5	1.9
32	32.0	32.3	31.5	32.5	-	-	-	-	-	-	30	1.2	1.6	28	1.9	2.3
40	40.0	40.3	39.5	40.5	-	-	-	-	-	-	37	1.5	1.9	35	2.3	2.8
50	50.0	50.3	49.4	50.6	-	-	-	47	1.2	1.6	46	1.8	2.2	44	2.9	3.4
63	63.0	63.3	62.2	63.8	-	-	-	60	1.5	1.9	58	2.3	2.8	55	3.7	4.3
75	75.0	75.3	74.1	75.9	72	1.2	1.6	71	1.8	2.2	69	2.7	3.2	65	4.4	5.1
90	90.0	90.3	88.9	91.1	87	1.4	1.8	85	2.2	2.7	83	3.2	3.8	79	5.2	6.0
110	110.0	110.4	108.6	111.4	106	1.7	2.1	104	2.7	3.2	102	3.9	4.5	97	6.4	7.3
140	140.0	140.5	138.3	141.7	135	2.2	2.7	133	3.4	4.0	128	5.0	5.7	123	8.1	9.2
160	160.0	160.5	158.0	162.0	155	2.5	3.0	152	3.9	4.5	148	5.7	6.5	140	9.2	10.4
225	225.0	225.7	222.3	227.7	218	3.4	4.0	214	5.4	6.2	208	8.0	9.0	198	13.0	14.5
280	280.0	280.9	276.6	283.4	271	4.3	5.0	266	6.7	7.6	259	9.9	11.1	246	16.1	18.0
315	315.0	316.0	311.2	318.8	305	4.8	5.5	299	7.5	8.5	292	11.2	12.6	277	18.2	20.3

Notes:
1. These requirements apply only to Types 600 KPa and 1000 KPa.
2. Dm = Mean outside diameter (determined in accordance with clause 7.1.1)
3. D = Any measured diameter on a given cross-section of the pipe
4. The above Thicknesses have been calculated using an induced stress of 8.2 MPa at 29° C.
(This is equivalent to an Induced stress of 10 MPa at 20° C)

Type 250 - 250 kPa (2.5 Kgf/cm², 36 lbf/in², 83. ft. head)
Type 400 - 400 kPa (4.1 Kgf/cm², 58 lbf/in², 133. ft. head)
Type 600 - 600 kPa (6.1 Kgf/cm², 87 lbf/in², 200. ft. head)
Type 1000 - 1000 kPa (10.2 Kgf/cm², 145 lbf/in², 328. ft. head)

Standard Pipe Length :
Nominal Diameter 20mm to 75mm in *4 Metres (13 Feet)*
Nominal Diameter 90mm to 315mm in *6 Metres (20 Feet).*

Source: ARPICO HP

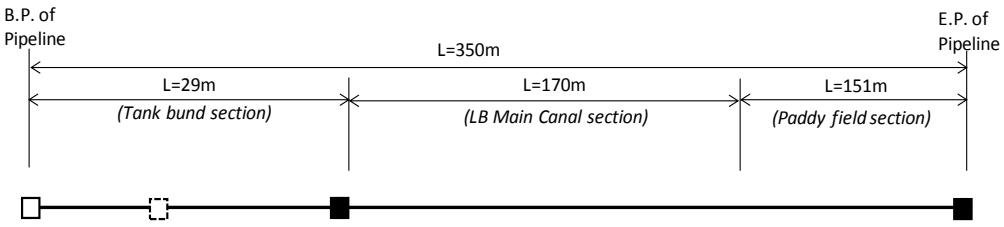
4) Calculation

Point	Distance (m)	Accumulated Distance (m)	Design flow (m^3/s)	Material	Diameter (mm)	Water level (m)	Pipe Centre Level (m)	Flow Area (m2)	Velocity (m/s)	Haed loss (m)
B.P.	0	0	0.00914	PVC	160	91.295	91.30	0.0201	0.45	0.00
E.P	350	350	0.00914	PVC	160	89.713	88.63	0.0201	0.45	0.58

Hydrostatic pressure (Maximum point : EP)	0.026	(MPa)	
Water hammer pressure (=hydrostatic pressure)	0.026	(MPa)	
Design pressure	0.052	(MPa)	52 (kPa)
Necessary head at E.P. :0.50 m (Head loss: less than	1.08	m)	

Source: JICA Project Team

(4) Related structures



Legend

Symbol	Related structure	No.
□	Foot valve	1
■	Sluice valve	2
⬚	Inlet tee, sluice valve	1

(5) Summary

1) Pipeline

Material	PVC (5.7mm thickness (600 kPa type) based on the structure calculation)	
Diameter	160 (mm)	
Length	350	(m)

2) Related structures

Foot valve	1 (nos.)
Sluice valve	2 (nos.)
Inlet tee and sluice valve	1 (nos.)

ANNEX-6

COUNTERPART TRAINING REPORT

Democratic Socialist Republic of Sri Lanka

Ministry of Mahaweli Development and Environment

THE PROJECT
FOR
FORMULATING CASCADE SYSTEM DEVELOPMENT PLAN
UNDER NORTH CENTRAL PROVINCE CANAL
IN
DEMOCRATIC SOCIALIST REPUBLIC OF SRI LANKA

THE REPORT ON THE TRAINING ON CAPACITY DEVELOPMENT OF DEVELOPMENT AND MANAGEMENT ON TANK BASED IRRIGATION SYSTEM IN JAPAN

15th June 2017

JAPAN INTERNATIONAL COOPERATION AGENCY (JICA)

NIPPON KOEI CO., LTD.

NTC INTERNATIONAL CO., LTD.

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1. Outline of the Training

1.1 Trainee Title, Periods, and Participants

'Training on improvement of development and management on tank based irrigation system' was conducted from 14th to 27th May 2017 as the first counterpart training in Japan.

Fifteen officers from Ministry of Mahaweli Development and Environment (MMDE), Ministry of Irrigation and Water Resource Management (MIWRM), Ministry of Finance, Department of Agrarian Development (DAD) in Department of Agriculture, North Central Provincial Council, and Northern Provincial Council participated in the training. The participants were selected from the officers who are expected to take critical roles in the planning and implementation of the cascade system development in the 128 target cascades under North Central Provincial Canal Project (NCPCP). The criteria of the selection are as stated in the section 2.2.1. Basic profiles of the participants are attached as the Attachment 2.

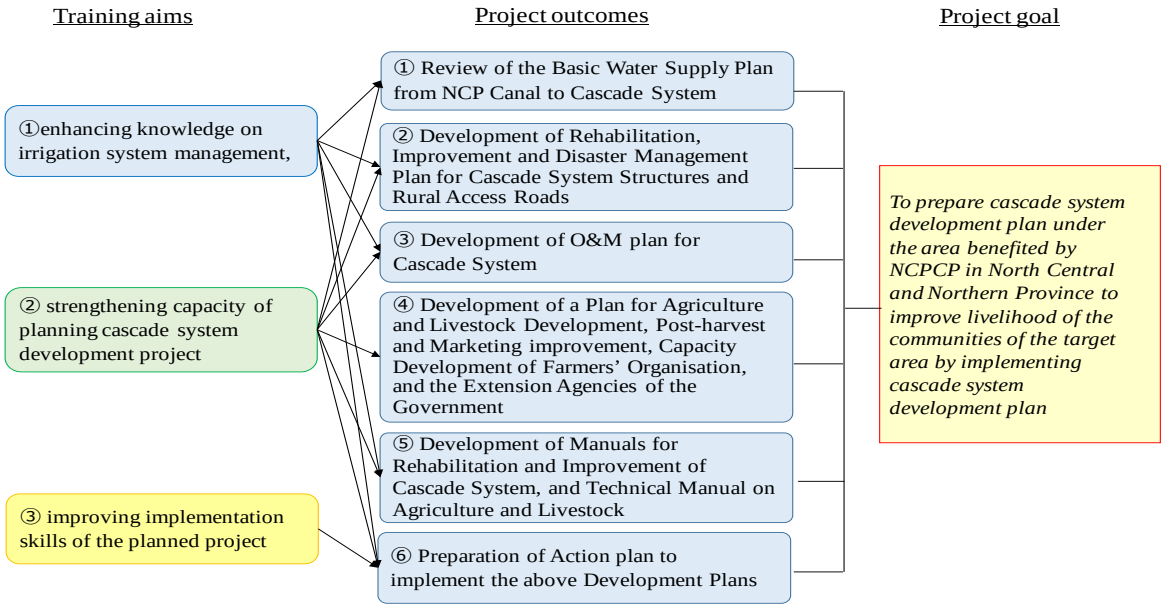
2. Contents of the Training

2.1 Structure of the Training

The participants of the training have been building up their basic skill on cascade system development through implementation of the pilot activities of the project. However, further comprehensive capacity with intense knowledge is indispensable for detail action planning of the NCPCP.

The training was organised with the aims of enhancing knowledge on irrigation system management, strengthening the capacity of planning cascade system development projects, and improving implementation skills of the planned project.

The following figure describes correlation between the project activities and the training themes.



Source: The Project Team

Figure 2.1.1 Relation between the Training and Project

2.2 Training Schedule

The detail training schedule is indicated in the Attachment 1.

2.3 Training Programme

The training programmes and training sites are summarised in the table below.

Table 2.3.1 Training Programme

Training Sites	Methodology	Contents
Nippon Koei, Co., Ltd	Lecture	- Agriculture and rural development projects and tank irrigation system in Japan
JICA Sikoku Branch	Lecture	- History and prospective of the irrigation development in Kagawa prefecture
Kagawa Yosui Commemorative Park	Field visit	- Learning from the exhibit and demonstration on tank irrigation systems and Kagawa Yosui project
Kagawa Prefecture Agriculture and Land Improvement Department Agricultural infrastructure improvement group	Lecture	- Tank rehabilitation management system
Shikaike Land Improvement District (LID)	Lecture, Site visit	- Management system of the LID (amount and sorts of fees, fee collection methods, roles of meetings and selection of participants, etc) - Structure of tank irrigation and management system (inclined sluice, driving channel, water distribution)
Kagawa Prefecture Rural Infrastructure Development Section	Lecture	- Irrigation facilities and engineering technologies (1) Design criteria for tank rehabilitation
Kagawa Prefecture Agriculture and Land Improvement Department Agricultural infrastructure improvement group	Lecture	- Irrigation facilities and engineering technologies (2) Construction technology
Farmers' Market 'Sansan market', JA Kagawa	Site visit	- Direct marketing system, pricing of agriculture produce, and quality control
Kondo Farm Co., Ltd.	Site visit	- Farm management system and marketing routes of progressive farmers
Kyouei Collecting Centre, JA Kagawa	Site visit	- Functions and management of the collection centre
Mokkokuike Water Users Association	Lecture	- Progressive case of efficient water use - Organizational management system of water users association
Kagawa Prefecture Agriculture and Land Improvement Department Agricultural infrastructure improvement group	Lecture	- Agriculture and rural development plan of Kagawa prefecture - - Water balance in Kagawa prefecture
Japan Water Agency Kagawa Yosui Management Office	Lecture, Site visit	- Reality of irrigation facilities and irrigation management in Kagawa irrigation system
Japan Water Agency Ikeda Management Office	Lecture, Site visit	- Flood management system of different dam systems and innovative water resource management
JICA Rural Development Department	Practical session	- Evaluation of the training

Source: JICA Project team

3. Observation

3.1 Lectures

Lectures

The lectures were organised in the conference rooms of JICA Shikoku branch and the institutions visited. All the lectures were interpreted from Japanese to English except the session of 'Agriculture and rural infrastructure development and tank irrigation' conducted in English by Nippon Koei.

The lectures were remarkably comprehensive and easily understood. Sufficient time for questions and answers enabled the participants to clarify and deepen the knowledge of their interests through interactions with the lecturers. Even though some participants face difficulties in broaden their perception, many have tried to explore how to apply the learnt knowledge in their own duty by clarifying differences in environmental conditions between Japan and Sri Lanka.

Participants showed strong interests as government officers in the lecture of irrigation tank management in Kagawa prefecture especially in the issues of cost sharing between national and prefectural government, and current individual and integrated type project with the prefecture's own financial source and the project subsidised by the central government.

Facts that irrigation projects are mainly formed on request basis from the beneficiaries and there is a clear portion of farmers' contribution, impressed most of the participants, and motivated them to apply it to the irrigation management of Sri Lanka in future. Construction technologies employed in Kagawa such as front care wall method and water shielding sheet methods, as well as advantages of intake through inclined flume were fairly understood and can be adopted in Sri Lanka, as expressed by a participant.

Moreover, the decreasing agriculture population and aging population in the agriculture sector are challenges faced both in Japan and Sri Lanka, thus the agriculture and rural development plan of Kagawa that takes these challenges into consideration was remarkably helpful in their future planning of agriculture strategy. It was also stated that profound discussions with stakeholders through opportunities of public consultation from planning to the final stage of the decision making shall be adopted, which have been insufficient in Sri Lanka.

The opportunities of learning the water balance in Kagawa, which covered the rainfall trends of Sanuki plain, estimation of agricultural water requirement, procedure of irrigation planning in Kagawa Yosui area, and calculation of irrigation water, was exceptionally helpful for the engineering officers who have never encountered principles other than what is applied in Sri Lanka.

3.2 Discussion, Practice, and Presentation

Discussion

Focuses of the training was presented at the beginning of the training by Mr.Takao, the course leader of the tank irrigation training periodically conducted till the year 2015. The introduction, which

clarified the training contents referring to the situation of both Japan and Sri Lanka, was notably effective to facilitate understanding of the participants in the following programmes. Lessons learnt through the training and evaluation of the programme were compiled and presented by the participants on the final day of the training, with which discussion was developed with the resource persons participated from Agriculture and fishery department of Kagawa prefectural government, Midori Net Kagawa, and Mr.Takao.

Demonstration and practices

There was no demonstration and practice session.

Presentation

Training report was presented in JICA Shikoku branch on 25th May and in JICA Ichigaya Office on 26th May. Participates were grouped into four with particular themes of tank irrigation technologies, operation and management of irrigation system, agriculture development, and institutional development at the beginning of the training in consideration of the specialities of the participants. The participants worked as a group to compile the reports and presentation materials making use of their free-time. Presentations were successfully prepared with active participation of the group members.

3.3 Field Visits

Field visits

The field visit programmes were organised in the sites of Kagawa Yosui Commemorative Park, tank and irrigation facilities of Shikaike Land Improvement District (LID), Sansan Farmers' Market of JA Kagawa, demonstration field in Kondo Farm Co., Ltd., produce collection and shipping facilities of Kyouei Collecting Centre, tanks and water distribution structures of Mokkokuike Water Users Association, Kagawa Yosui system and Ikeda dam at Kagawa Yosui Management Office and Ikeda Management Office of Japan Water Agency. Knowledge acquired through the lectures was strengthened through actual observation of the facilities and operation of the systems.

The participants showed considerable interests on the finely demonstrated self explanatory exhibits of the tank irrigation system and Kagawa Yosui project in the Kagawa Yosui Commemorative Park. It was stated that experiences and knowledge of tanks and water resources can be succeeded by the next generation through such facilities in Sri Lanka as well.

Shikaike Land Improvement District (LID) offered an opportunity for the participants to learn about effective operation and management of irrigation system, which is one of the critical constraints in Sri Lanka. The management of LID including the sorts and amount of fees, fee collection methods, functions of the different forms of meetings, and selection of the participants of the meetings, were shared through the discussion. The participants, moreover, acquired the technical knowledge on the structure and maintenance of inclined flume, the function of driving channel, and sophisticated water distribution roles from the Shikaike LID.

Innovative practices in the Sansan Farmers' market of JA Kagawa triggered their interests and the

practices such as price setting by farmers with their own responsibility, quality management of the produce, and sampling and tasting of the commodities for consumers, were noted for execution in Sri Lanka.

Farm management system in Kondo Farm establishing their marketing routes after shipping not depending on the marketing system of Agriculture Cooperatives, have several attempts, from which Sri Lankan farmers can learn to improve their practice.

The experience in the Kyouei Collecting Centre, where the participants discovered grading methods of asparagus, as well as functions and management of collection centre, was significant for the participants. Adequate post-harvesting technologies and value addition will be particularly important for agriculture in Sri Lanka in near future, for which the practice of Kyoei Collection Centre shall be highly applicable. Moreover, learning on operation of the collection centres was essential as more collection centres are expected to be established through co-funding by government and private entities in Sri Lanka.

At the site of the Mokkokuike water users association, the participants encountered the established link-canals between tanks, which improved agriculture productivity and water management practice of the water users association for efficient water use.

Lastly the learning from Kagawa Yosui irrigation system that has similar feature as NCPCP enabled them to envisage the features of NCPCP after completion. Discussion at the Kagawa Yosui management office and Ikeda Management office on the management of Kagawa Yosui irrigation system shall be referred in the operation of NCPCP. Furthermore, the case of the flood management system of different dams in Yoshino liver watershed gave an insight on comprehensive water management of Mahaweli systems that has several similarities.

3.4 Training period, Flow, and Contents

Training period

The training was organised as a 14-day training. The length of the training period was adequate for the high level officers of Sri Lanka who cannot be absent from their duty for a longer period.

Programme flow

The programme started with the outline of the Japanese experience of irrigation projects and explanation of intense tank irrigation area. Field-visit programmes in Kagawa prefecture was initiated through the remarkably helpful orientation by Mr.Takao as mentioned above and Mr.Hatano of JICA Shikoku Branch. Lecture sessions and field visits were well organised to maintain interests and concentration of the participants.

Training contents

The programme comprehensively covered the field of irrigation technologies, operation and management of the facilities, agriculture strategies, marketing, and progressive and innovative

practices of the agriculture entities. Lectures were well structured for the participants to grasp the important issues.

3.5 Handouts, Materials and Facilities

Handouts

Handouts prepared by the institutions visited included all the necessary aspects in a way it is easily understood. The handouts were prepared well in advance for translation into English, and all the handouts were distributed in the orientation session at the beginning.

Materials and facilities

Necessary facilities for the lecture sessions were provided by JICA Shikoku branch. Accommodations for the participants were moderately arranged.

4. Participants

4.1 Criteria

The total of 15 participants were selected from Ministry of Mahaweli Development and Environment (MMDE), Ministry of Irrigation and Water Resource Management (MIWRM), Ministry of Finance, Department of Agrarian Development (DAD) in Department of Agriculture, North Central Provincial Council, and Northern Provincial Council, who are expected to take critical roles in planning and implementation of the cascade system development in the 128 target cascades under NCPCP. Those who have engaged in planning and implementation of irrigation development programme at central, provincial and district having a certain level of knowledge and experience on the irrigation development planning were prioritised. The participants were finalised with the project coordinator and project manager in consideration of the relative balance among central, province and district, as well as the field of specialities such as irrigation engineer, agriculture and institutional development.

Table 4.1.1 Summary of the Participants

	Irrigation Engineer	Agriculture / Institutional Development	Total
Central level	3	1	4
Provincial level	3	2	5
District level	2	4	6
Total	8	7	15

Source: JICA Project Team

4.2 Participation and Attitude of the Participants

The participants were enthusiastic towards the programme and actively participated in the discussions with high respects on the trainers. Some trainers evaluated the trainees as serious and hardworking.

5. Application of the Training Output

5.1 Output of the Training

The training programme mainly consisted of the lectures and field visits. The lectures widely covered

the entire process from the project planning, implementation to operation and maintenance, including national and district agriculture policies (especially on irrigation related projects), design criteria of tank rehabilitation, construction management skills, and operation and maintenance of tank irrigation facilities. Therefore, planning capacity of tank rehabilitation and irrigation development, as well as knowledge on the management of tank irrigation facilities were enhanced through the lecture sessions. Field visits enforced the knowledge acquired through the lectures through observations of constructed tank irrigation facilities, and experiences on water management and control system. Interactions with the agriculture cooperative, the collection centre, and the progressive farmers expanded their knowledge on agriculture extension service for the tank beneficiaries, agriculture planning, and marketing strategies. The outputs from each training theme is summarised in the following table.

Table 5.1.1 Outputs of the Training

Training Theme	Major Outputs
Enhancing knowledge on irrigation system management,	- National and district agriculture policies and outline of the tank irrigation projects were understood - History and prospect of the tank irrigation development in Kagawa prefecture is acknowledged - Japanese design criteria and construction technologies on tank rehabilitation was learned - Management system of LID for operation and maintenance of irrigation facilities as well as their activities was understood - Knowledge on different aspects of tank irrigation facility management was developed through field observations.
Strengthening capacity of planning cascade system development project	- Understanding on policy shift of Japanese agriculture and current strategies (especially on irrigation project) was enhanced - Implementation process and operation and maintenance system of the Japanese national project was understood through the case study of Kagawa Yosui system - Knowledge on Japanese design criteria and construction technologies for tank irrigation system was acquired. - Know-how of the planning and operation of tank irrigation facilities was adopted through the experience in the field visits. - Innovative practices of progressive farmers on farm management, marketing and sales for profitable agriculture were recognised. - Methods on post-harvesting technologies, marketing style, value addition was comprehended
Improving implementation skills of the planned project	- Experience on the practical examples of construction and management of the facilities such as dams and sluices in the Kagawa Yosui is expected to enhance implementation capacity. - Learning from interactions with construction managers and beneficiaries (LID, farmers) who are key stakeholders in the planning shall enable them to improve planning and implementation by reflecting the voice of the key stakeholders.

Source: JICA Project Team

5.2 Dissemination of the Training Outputs

The outputs of the training are to be shared with the relevant officers in Sri Lanka in late June. Issues particularly noted by the participants that can be adopted in the cascade system development and management in Sri Lanka are as follows;

- Effective management of water users body learnt from LID (rules, fee collection, etc)
- Introduction of beneficiaries' contribution in irrigation development projects
- Concept of demand oriented project formation in irrigation project
- Field level water management during irrigation period

- Improvement of agriculture and irrigation planning through public consultation
- Tank rehabilitation technologies of front care wall method and water shielding sheet methods,
- Water intake through inclined pipe
- Transfer of tank irrigation technologies to next generation through exhibit and demonstration
- Establishment of direct produce stands / farmers' markets and their management
- Operation of produce collection centres
- Efficient water use through establishment of link-canals between tanks

6. Training Environment

Environment in the month of May was suitable for the training and no health problem was reported. The travelling arrangement hiring a bus was also adequate, which was convenient and minimised fatigue of participants. It is recommended to arrange a hired bus for future trainings as well.

7. Other Remarks

Per diem for the participants was enough to cover their daily basic expenses during the training.

The project would here express sincere appreciation to the government of Kagawa prefecture, Midori Net Kagawa, JA Kagawa, Japan Water Agency, Mr. Takao, staffs of the JICA Shikoku branch for their supports and hospitalities.

Attachment 1

Detail Training Programme

Detail Training Programme（Actual）

Day	Date			Type of Program	Contents / Activities	Lecturer / Implementing Orgenization
1	May	14	Sun	-	Arriving at Kansai Airport	-
2	May	15	Mon	Meetng	Orientation meeting	JICA Kansai
				Lecture	Land Improvement Project and Pond (Tank) Irrigation in Japan	Mr. Usuki, Nippon Koei
3	May	16	Tue	-	Move (Tokyo to Kagawa)	-
				Meetng	Orientation in JICA Shikoku	JICA Shikoku
4	May	17	Wed	Lecture	The History of Irrigation in Kagawa and Future Issues	Mr. Hirai, Fomer Senior Officer in Midori Net Kagawa
				Field Visit	Field visit for Kagawa Yosui Commemorative Park	Mr. Yamamoto, Manager
5	May	18	Thu	Lecture	Reservoir Improvement/Maintenance Program and Project	Mr. Inoike, Kagawa Pref. Gov.
				Field Visit	Operational system for Land Improvement District (Shikaike LID)	Shikaike LID
5	May	19	Fri	Lecture	Outline of Design Standard of Irrigation Pond Facilities	Kagawa Pref. Gov.
				Lecture	Civil Engineering Technology for Renovation of Tank	Kagawa Pref. Gov.
6	May	20	Sat	Field Visit	Kuribayashi Park	-
7	May	21	Sun	-	Documentation	-
9	May	22	Mon	Field Visit	Sun Sun Hiroba	JA Kagawa
				Field Visit	Kondo Farm	Kondo Farm Co., Ltd.
				Field Visit	JA Kagawa Collecting Center	JA Kagawa
				Field Visit	Mokkokuike WUA	Midori Net
10	May	23	Tue	Courtesy call	Courtesy call to Governor of Kagawa Prefecture	Kagawa Pref. Gov.
				Lecture	Agriculture and Rural Development of Kagawa	Kagawa Pref. Gov.
				Lecture	Water Demand and Supply in Kagawa	Kagawa Pref. Gov.
11	May	24	Wed	Field Visit	Kagawa Yosui Management Office (Headworks)	Japan Water Agency
				Field Visit	Ikeda Management Office (Ikeda Dam)	Japan Water Agency
12	May	25	Thu	Meetng	Discussion for information and knowledge obtained and utilization of those	Midori Net
				-	Move (Kagawa → Tokyo)	-
13	May	26	Fri	Meeting	Wrap up meeting	JICA Head Office
				Courtesy call	Courtesy call to JICA Head Office	JICA Head Office
14	May	27	Sat	-	Leaving for Sri Lanka	-

Source: JICA Project Team

Attachment 2

List of Participants

Participants' list

Name	Present post	Post in the project
Mr.NISSANKA ARACHCHIGE Sisira Kumara [1]	Additional Secretary Ministry of Mahaweli Development & Environment/Water Resources Planning	Project Coordinator
Mr.DE ALWIS Samaraweera Mudalige Don L. K.	Director (Water Resources Management) Ministry of Irrigation & Water Resources Management/Water Resources Management Division	Project Manager
Mr.WITHARANA Daya Deepthi Prabath	Head of Water Management Division Department of Agrarian Development/Water Management Division	Counterpart
Mr.PUNCHIBANDAGE Dayarathne	Deputy Chief Secretary (Planning) Office of the Chief Secretary/Dept. of Planning & Monitoring, North Central Provincial Council	Counterpart
Mr.HERATH MUDIYANSELAGE Jayantha Herath [2]	Director Provincial Department of Irrigation North Central Provincial Council"	Counterpart
Mr.THILAKARATHNE Kalubandage Prasanna U. K.	Divisional Irrigation Engineer Dept. of Irrigation/Divisional Irrigation Engineer's Office, Anuradhapura	Counterpart
Mr.SOMASUNTHARAM Shanmugananthan	Deputy Chief Secretary (Engineering Service) Northern Provincial Council/Office of the Deputy Chief Secretary Engineering Service	Counterpart
Mr.PREMAKUMAR Velauthapillai	Director Provincial Department of Irrigation Northern Provincial Council	Counterpart
Mr.SENARATH YAPAGE DON Asanga Somawansa	Assistant Commissioner Department of Agrarian Development/ Asst. Commissioner Office, Anuradhapura	Counterpart
Mr.RAJARATNAM Vijayakumar	Assistant Commissioner Department of Agrarian Development/ Asst. Commissioner Office, Vavuniya	Counterpart
Mr.KANAGARATNAM Dineshkumaran	Regional Engineer Department of Agrarian Development/ Asst. Commissioner Office, Jaffna"	Counterpart
Mr.POOLOGASINGAM Thanigashalam	Senior Engineering Assistant Department of Agrarian Development/ Asst. Commissioner Office, Vavuniya	Counterpart
Mr.HERATH MUDIYANSELAGE Kulathunga	Divisional Officer Dept. of Agrarian Development/Agrarian Dev. District Office, Anuradhapura"	Counterpart
Mr.KANAGARATNAM Thileepan	Divisional Officer Department of Agrarian Development/Agrarian Service Centre	Counterpart
Mr.PODDIWALA MARAGE Sunil Jayathilaka	Assistant Director Dept. of National Planning/Agriculture and Irrigation Section	Counterpart

Source: JICA Project Team

[1] Partial participation（Period: from 21 May 2017 to 27 May 2017）

[2] Partial participation（period: from 14 May 2017 to 20 May 2017）

Attachment 3

Presentation Material of the Training Output

AYUBOWAN – LONG LIVE

Training Background

- Ministry of Mahaweli Development and Environment is being implemented a Project on Tank Cascade System Development Plan.
- This proposal was submitted by the Ministry of Irrigation and Water Resources Management in Year 2014.
- The aim of this project proposal was to improve the overall productivity of Tank cascade systems under the NCP canal project.
- NCP Canal project is the final phase of Mahaweli Development Programme , the largest special project in the irrigation sector.
- Feasibility study is done as a result of the Policy Dialogue with JICA in 2014 GOSL under JICA Technical Assistance Programme
- The Study was started in Year - 2016 March and will be ended up in 2018 March.

Training Background

- Consultant for the study is from Nippon Koei Co. Ltd. , Japan and it is coordinated by JICA Sri Lanka Office
- Counterpart organizations are under the
  1. Ministry of Mahaweli Development and Environment
  2. Ministry of Irrigation and Water Resources Management
  3. Ministry of Agriculture
  4. Ministry of Cooperatives and Social Welfare
  5. Northern Provincial Council
  6. North Central Provincial Council

NCP Canal Project Area

- No of Cascades – 128
- No of tanks per cascade – 5 to 23
- Total number of Tanks to be benefitted - 958

Role of Counterpart Staff

- Active participation to the study with consultants.
- Providing Data and Information , previous study reports, maps, plans and any related literature to the study.
- Facilitation for field works and public consultations.
- Organizing consultative meetings at divisional level , district level and national level.
- Helping for conducting baseline surveys in study area
- Attending to Provincial level and National level PCC meetings and Progress review meetings.
- Aware subordinate officers and facilitate to minimize any problems occur in study area for the consultants.
- Learning through involving project activities.

Counterpart Trainees

There are 15 participants attended to this programme from key counterpart organizations involving in Irrigation System Management for enhancing the productivity of Irrigated Agriculture Sector in Sri Lanka and the project works of CSDP project under different disciplines.

- Planning Sector
- Engineering Sector
- Agrarian Sector

They are from,

- National Level
- Provincial Level
- District and divisional Level

Objectives of the Training

- Specific Objective of the Counterpart Training is to Study and Learn about the Success of Development Works of Tank (Pond) Irrigation Systems in Kagawa (Udon) Prefecture in Japan including methodology and approach for physical infrastructure development, agricultural development and institutional arrangement for management .
- The secondary objectives of the training is to build up the capacities of trainees for
  1. Introduce possible adaptations in Cascade Systems in NCP and NP focusing on risk reduction for drought and flood related consequences.
  2. Improve the management capabilities of Organizations in Irrigated Agriculture Sector.
  3. Enhance the Water, Land and Crop productivity to improve the living standard of farming families .

Lessons Learnt and Outcome of the KCCP

What we learnt ?
How we can apply?
Discuss ;

- Engineering and Technical Aspects
- System operation, Maintenance and Management aspects
- Agriculturel Development aspects
- Institutional Development aspects

Conclude;

- Effort for recommended adaptations to ongoing CSDPP through water resources development, system operation and management, improving agriculture practices including marketing
- Improve the capacities of officers and water users for participatory irrigation management
- How we can improve water, land and crop productivity in our irrigation systems with high involvement of social capital as they did.
- Minimize the hazzard risk in tank irrigation systems mainly due to floods and droughts and thereby improve the living standard of farming communities under NCP canal project.

Why Kagawa Prefecture is more relevant ?

- **Land Area – 1,876km²**
- **Rainfall – 1,100mm (Dry -50% within 4m)**

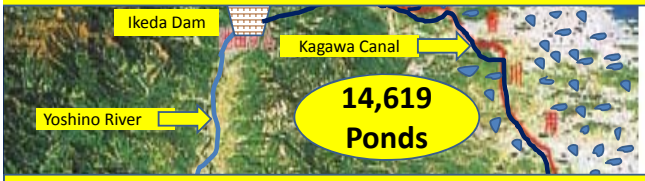
- **Highest Tank Density – 7.79 ponds / km²**
- **Total Storage – 146MCM**
- **Area of Paddy Fields – 28,600ha (70% by Ponds)**
- **3rd highest Number of Ponda – 14,619**

Ikeda Dam (1968-1974)

Height – 24m, Length 247m
Capacity – 12.65 MCM
Diversion – 247 MCM

- Length of Kagawa Canal – 106km
- Max capacity of Kagawa Canal – 15.8m^3/sec

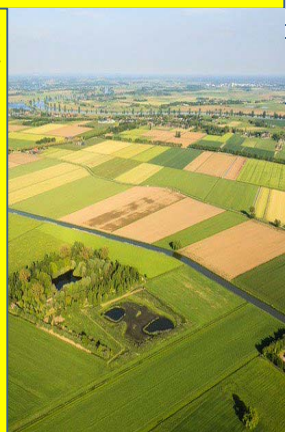
Total annual diversion volume – 247 MCM



- Annual Domestic water – 98.4 MCM (3.87m^3/sec)
- Annual Industrial water – 43.6 MCM (0.63m^3/sec)
- Annual Agri water – 105 MCM (Max 11.3m^3/sec)
- Area of Paddy Fields – 25,100ha
- Area of Dry Fields – 5,600ha

Design Approach in Land Improvement

1. Agricultural productivity is good due to high efficiency of irrigation and drainage.
2. Upland crops could be planned during rice cultivation period.
3. Manpower could be saved through mechanization due to large plot size and even lots.



Best practices in designing Head-works

Mode of failures

- Failures of intake barrel
- Overflowing Dam section
- Seepage & Piping
- Bank erosion

Method of Dam re-sectioning

- U/S impervious slops
- Centre core
- Homogeneous fill
- Concrete facing with core wall
- Concrete facing- with synthetic sheet cover

Best practices in designing Canals

(1) Closed systems(Pipe –70-80% Partial flowing)

(2) Open systems-Rectangular & Trapezoidal concrete canal ,Free board -50% in concrete & 50% in earth section

(3) Siphon system
Parallel pipe for Emergency Maintenance.

Strength Observed

- Both high rainfall and temperature occur simultaneously.
- Average temp 17-28 ·c is optimum for Paddy.
- Rainfall during June, July and September >500mm
- More sandy soil –High aeration and workability
- Land cover vegetation >80%.- Favorable watersheds.
- Low rate of evaporation – Av 1.2mm/day
- Water balance is positive.(Precipi (e) > Evapo)

Weaknesses Identified

Weaknesses.(Drawbacks)	Measures adopted
1) Low rainfall.	1) Trans- basin feeder canal.
2) More sandy soils-high rate of infiltration and low water holding capacity.	2) Re utilization of water .
	3) High water use efficiency(75%)
3) Steep terrain – High runoff % and low soil retention.	4) Reservoir storage system. a) Damming natural water ways. b) Supply by Feeder canal
4) Water distribution is Supply Oriented.	5) Land Improvements.

Opportunities Taken

Type-1 - Trans basin

- Kagawa canal project.- Facilitation from 1975
- a)Head works in Tokushima prefecture.
- b)Across Yosino River(3750 Sq km)
- Semeure -(289MCM)& Ikeda –(12.65MCM)
- Regulatory Res-3 MCM (2008)

Type-2 –Historical Dams

- Manno pond (6th Century- 15.4MCM)
- Pond located in 1st paneplane -dry zone
- Water shed area in 2nd & 3rd peneplane in the wet zone.

Type-3 – Three in One

- Mokku pond –(0.33MCM)
- Fed by large Pond in Up
- Act as a Regulatory Reservoir
- Distribution water for 30 chield ponds

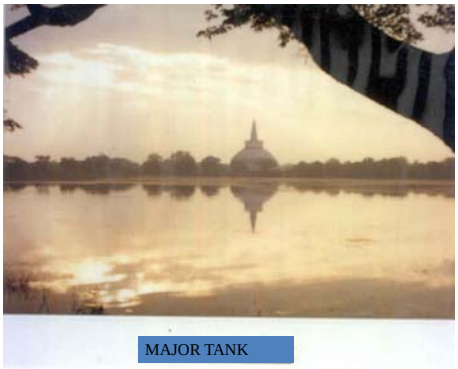
Threats

1. Climate change phase from 1970
2. High dam with low capacity
3. Alkali –silica (aggregate) reaction in concrete within 40 years
4. Water quality deterioration due to reuse and trans-basin.

Lesson learned

- Pond (sluice) intake water from the top surface
- Bottom release sluice for sediment Ejection.
- LID &WUA are two different entities.
- LID fees-initial , Current (continuous , Rotational), Settlement

- Autonomous F.O
- Emergency Pond (regulatory)
- Prefecture boundaries and watershed boundaries are same in Japan.
- Water demand & supply forecast for Prefecture(Pe - measure daily)
- Central monitoring and WSN for efficient decision making and disaster prevention.



MAJOR TANK

Glance at Kagawa and Project Area in Sri Lanka

	Kagawa Prefecture	NCP
Average Annual RF (mm)	1,100	900 -1,400
Temperature (^{0}C)	20	32
Crops	One time Paddy and year round field crops	Paddy, vegetables, field crops
Cultivation seasons	One Wet Rice & Winter crop	Two but 2nd season face water shortage
Farm land size (ha)	0.4-1.0	0.5-1.0
Farmer engagement	Part time farmers	Majority full time farmers
Average Farm income (Yen/ha)	Over 900,000	135,000
Age of farmers (Years)	Over 68 yrs	Majority over 55 yrs, younger moves away
Water duty (mm)	1,700 – 2,400	750-1200

Good Practices for Agriculture

Land Improvement for Profitable Agriculture

•Improved Farm plot size and leveling and 65% of paddy land has improved under land improvement projects

•Increased land, crop and labour productivity and water use efficiency (SL 45 (JP-18) labour days/ha and rice yield JP 6 mt/ha but SL 4.3 mt/ha)

•Increased land utilization due to renting the lands of retired farmers

•Reduced abandoned land extent via assured irrigation facilities

•Increased commercial scale farming then profitability

•Increase farm machinery usage

Good Practices for Agriculture Contd..

Agriculture production and technology improvements

•Cropping calendar based on annual RF and water availability in ponds

•Agro-tech practices at fields widely vary from mulching, drip and sprinkler irrigation, poly tunnel and green house

•Increased crop diversification with the water sharing among ponds

•Observed appropriate cultivation practices and increased average income per ha

Good Practices for Agriculture Contd..

Agro product storage and marketing

- Japanese Agricultural Cooperative (JA) is linked with the Market Chain
- JA provides direct market for small and large scale farmers
- Farmers decide the price of his products based on information of prices of adjacent market and super markets
- Farm products are cleaned, graded and packaged at shipment center using machineries before sending to super markets in major cities.
- Product processing mechanism helps to minimize postharvest losses, branding and reduce crop waste at market premises (JA keeps 15% commission for their services)

Good Practices for Agriculture Contd..

Agro product storage and marketing

•JA also provides fertilizers, seedling and planting materials, pesticides/agro-chemicals and equipment etc. at low cost than normal market prices and extension and technical advice also

•After selling the agro-product, cash is directly transfered to farmers account twice a month (very transparency manner)

•Small farmers harvest their product daily and provide fresh product to consumers and reduce crop waste

•Value addition opportunities are more prominent

•Consumer satisfaction is at higher level at direct market

Observed Short falls

- Majority of core farming community is over 68 years
- Retiring farmers percentage seems to be high
- Younger generation move away from the farming
- Surplus production of commercial farmers is at a risk

Appropriate adaptation for Cascade systems in Sri Lanka

- Application of land consolidation to increase the plot size and addressing the land over fragmentation.
- Assuring water for year round crop production with crop diversification
- Enhancement of agricultural mechanization at field and in packaging house
- Improve bulk storage facilities for agri products and introduce proper value chain
- Strengthen of value addition and market chain to gain higher farm gate price while minimizing intermediate collector who gets substantial commission (JA's Practices)
- Reduction of postharvest losses in field to markets (Japan <10% but SL Fruits and vegetables 25-30%)

Key Players Observed

Institutional Set up	Roles and responsibility
LID	Empowered by Land Improvement Act Support farmers for irrigation system Management Fee collection and fund raising Land improvement and irrigation rehabilitation Project formulation
WUA	Seasonal planning and water distribution under LID Annual fee collection for LID Operation and maintenance of irrigation system at field level
JA	Facilitate for procuring farm inputs Agriculture extension services Handling supply chain management for agri products. Introduce value addition and branding Consumer satisfaction services

Good Practice under Institutional Arrangement

- Some tanks managed directly and indirectly by the LID
- Governed by the farmers at all levels for decision making.
- LID have own different regulations which are imposed by the Land Improvement Act. It causes transparency , auditing and accountability.
- The committee members of the LID and WUA are selected by the farmers
- LID and WUA are farmer centered organizations
- LID has its own staff and hired staff to deliver its services and support farmers.
- Sustainable strategies continued for rural livelihood development .
- Keep the high degree of equity among community groups.

Good Practice under Institutional Arrangement – contd..

- The LID and WUA submit plans for relevant agencies .
- The characteristics of Institutions
  - Closely work with National govt prefecture Govt and Municipalities and other subsidiary agencies
  - Japan Water Agency (JWA) is an independent body with skill professionals and deals with multipurpose irrigation projects.
  - Empowered by strong laws (Ex: Fee collection etc.)
  - Successfully contribute for the formulation and Implementation of 9th, master plan (1974…2020) while providing high priority for rural development
  - Master plan can be reviewed by academics, CBO's, private sector CEO's and farmers

Good Practice under Institutional Arrangement – contd..

- Strong leadership help smooth functioning of activities and farmer empowerment
- Traditional knowledge and experiences of farmers is well occupied.
- The agricultural data base of LID is update frequently.

- Utilize farm resources properly and efficiently by the farmers.
- Provide market facilities for the farmers products.
- Farmers are informed before implementing the government agricultural policies and master plans.
- Maintain and assure the supply chain management by JA to farming committee
- Keep the satisfaction of consumers by JA

Appropriate adaptation for Cascade systems in Sri Lanka

- Young generation should be allowed for the leadership in FOO.
- Active involvement by Local politicians in farmer organizations is significant.

Conclusion and Recommendation

Conclusion and Recommendations

- It is important to improve cascade systems for equitable water distribution to keep the assured water supply for crop cultivation in time : it needs connectivity of tanks to keep safe water storages in each tank.
- There should be a flexibility to address for flood operations and drought mitigation.
- It is necessary to have a proper mechanism for sustainable operation, maintenance and management mechanism to cascade systems in cost effective manner.
- Need of design criteria for water distribution among the tanks to be taken in to account in future cascade development projects

Conclusion and Recommendations

- It is understood that the land consolidation would be a more practicable solution to improve water use efficiency and land productivity and thereby improve crop productivity
- In order to increase the famer income introducing high value crops and marketing facility are necessary with Govt. policy intervention.
- Cooperation among farming societies under each tank and amongst the tanks are very important to safeguard the farmers from threats happening due to disasters like floods and droughts and keep food security and thereby secure farming family income.
- Proposed development plan for cascade development activities can be used as a development tool to include above recommendations.

MAJOR TANK

Attachment 4

Photos of the Training

Photos (1)

History and prospect of Irrigation Development in Kagawa Prefecture

Lecture on the history of tank development In Kagawa and prospective challenges due to diversified water requirement

Kagawa Irrigation System Commemorative Park

Museum of the commemorative park exhibiting the history of Kagawa irrigation system and equipments used for construction

Tank Improvement Project

Lecture on the tank improvement projects in Kagawa

Management System of LID

Lecture and discussion on management system of Shikaike LID

Irrigation facilities managed by LID

Field visit of the tank irrigation facilities managed by Shikaike LID

Sansan Farmers' Market of JA Kagawa

Learning about operation of farmers' market through field visit

Photos (2)

Kyouei Collecting Centre of JA Kagawa

Visit to the collection centre that perform value addition by improving post-harvesting processing

Water Management by Water Users Association

Lecture and discussion with Mokkokuike Water Users Association on their water management

Overview of Kagawa Irrigation Project

Lecture on the overview of Kagawa Irrigation Project

Intake management office of Kagawa irrigation

Learning water intake at the management office of Japan Water Agency

Visit to Ikeda dam

Listening explanation about flood management at the Ikeda dam managed by Japan water agency

Training Evaluation session in Tokyo

Output and experiences of the training was shared and presented and evaluated